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Indianapolis Power & Light Company

2014 Integrated Resource Plan

Public Version

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Section 1. EXECUTIVE SUMMARY

As part of IPL's integrated resource planning, the Company participates in an Integrated Resource Planning ("IRP") process as required by the Indiana Administrative Code ("IAC") on a biennial basis to identify a resource plan to reliably serve IPL customers for a forward looking twenty (20) year period. For the first time, the Company also participated in a Public Advisory Process as required by the proposed IAC that yielded meaningful stakeholder feedback in the development of the 2014 IRP. The IRP analyzes a combination of projected customer load, existing resources, projected operating costs, anticipated environmental and other regulatory requirements, and potential supply and demand side resources within the context of risks of uncertain future landscapes to plan to provide electricity service in the most cost-effective way possible.

IPL's mission is "Improving lives by providing safe, reliable, affordable energy solution to the communities we serve." As a result of numerous current and future expected environmental requirements, IPL has developed and is executing plans to significantly change its generation portfolio. The Company's strategy includes a combination of activities in order to continue to reliably and affordably meet the future needs of our customers:

1. Offer cost-effective energy efficiency programs to help customers reduce their energy usage and help the Company reduce its peak system demand.
2. Upgrade its existing generation fleet to reduce air emissions and reduce or treat waste water.
3. Convert some existing coal-fired units to natural gas generation.
4. Retire several units where it is not economic to comply with future environmental requirements.
5. Construct a modern, efficient combined cycle natural gas plant.
6. Enhance the Company's transmission and distribution system.
7. Explore and implement new technologies, such as solar generation through our renewable feed-in tariff, energy storage, electric transportation and smart grid.

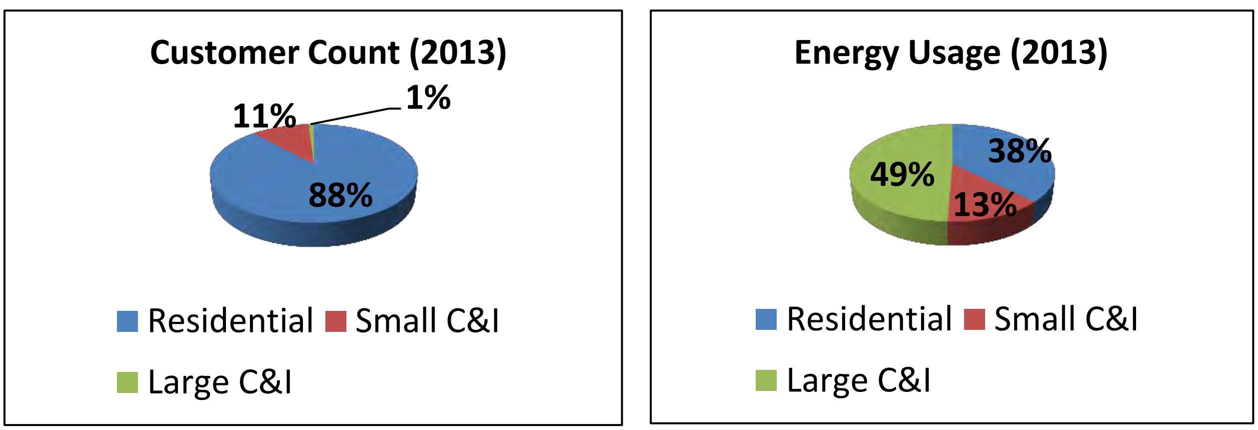
If all components of the strategy are approved, IPL will have a cleaner and more diversified generation portfolio while continuing to provide safe, reliable and affordable energy solutions to the Indianapolis community.

IPL's 2014 IRP modeling results indicate that in the majority of the future scenarios the base case expansion plan yields the lowest present value revenue requirement ("PVRR"). This plan does not add any new generation resources - other than the projects[1] listed above in IPL's strategy - until 2031 to meet the Company's energy and capacity requirements. Because the base case expansion plan serves customers reliably and cost effectively under multiple future scenarios, IPL considers this plan its Preferred Resource Portfolio.

Background

IPL serves approximately 470,000 households and businesses in ten counties in Central Indiana, mainly in Marion County and adjoining counties[2]. The service area is compact measuring approximately 528 square miles. The Company, which is headquartered in Indianapolis, is subject to the regulatory authority of the Indiana Utility Regulatory Commission ("IURC") and the Federal Energy Regulatory Commission ("FERC"). IPL fully participates in the electricity markets managed by the Midcontinent Independent System Operating ("MISO"). IPL owns and efficiently operates approximately 3,089 MW[3] of generation at four plants, over 800 miles of transmission lines, and over 11,600 miles of distribution lines as a vertically integrated investor owned utility. IPL also has purchase power agreements for approximately 98 MW of solar generation and approximately 300 MW of wind generation. IPL's customer mix and their respective energy usage split between residential and small and large Commercial and Industrial ("C&I") is shown in Figure 1.1. The Large C&I customers class, which is only 1% of the Company's customer count, consumed the largest amount of IPL's 2013 total jurisdictional retail energy.

Figure 1.1 – IPL Customer Mix and Energy Use



Source: IPL

[1] The projects in IPL's strategy represent projects currently approved and pending before the Indiana Utility Regulatory Commission ("IURC").

[2] Although IPL is not the sole service provider in the adjoining counties, IPL does provide service to some customers in Boone, Hamilton, Hancock, Shelby, Johnson, Morgan, Owen, Putnam, and Hendricks counties.

[3] This is based on summer ratings for planning purposes at the time of this filing.

Existing Resources

Thermal Generation

Subsequent to the 2011 IRP, decisions have been made to significantly transform IPL's generating fleet as described below. In 2013, IPL discontinued operation at the following five oil-fired units: HSS Units 3 and 4, HSS Gas Turbine Unit 3, and Eagle Valley Units 1 and 2.

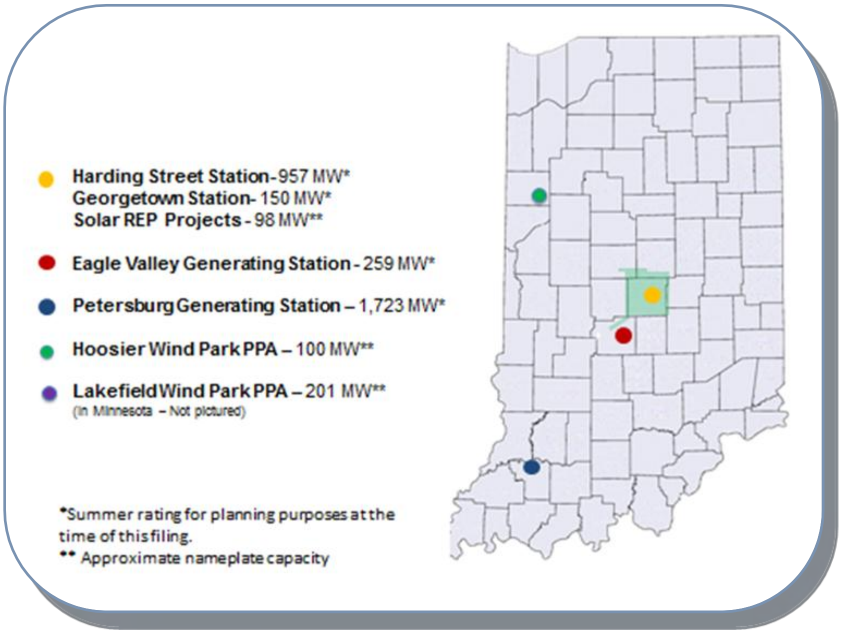
IPL currently owns and operates the following generation:

> (1) the four unit, coal-fired Petersburg Generating Station in Petersburg, Indiana. The Petersburg station, located in close proximity to its Indiana fuel supply, provides low cost generation to IPL's customers. This plant is being retrofitted with environmental compliance equipment in accordance with the Commission's order in Cause No. 44242.
>
> (2) the seven unit, Harding Street Generating Station ("HSS") in Indianapolis, IN, including three coal units and four natural gas fired combustion turbines. Because HSS is directly connected to the IPL load zone, it provides an important capacity resource at the center of IPL's service territory, thus reducing transmission costs and interruption risk. In accordance with the Commission's order in Cause No. 44339, IPL is refueling HSS Units 5 and 6 from coal to natural gas in 2016. Pending Commission approval of Cause No. 44540, IPL will also refuel HSS Unit 7 from coal to natural gas, which will eliminate all coal fired units at this plant in 2016.
>
> (3) the four unit, coal-fired Eagle Valley Generating Station in Mooresville, IN. Eagle Valley Units 3 through 6 will be retired in 2016 as part of IPL's plan to comply with the EPA's environmental mandates, including the Mercury and Air Toxics Standard ("MATS"). Pursuant to the Order in Cause No. 44339, IPL is adding a 644 to 685 MW[4] natural gas fired combined cycle gas turbine at the Eagle Valley Generating Station in 2017.
>
> (4) the two unit, natural gas fired Georgetown Generating Station in Indianapolis, IN.

Figure 1.2 shows the relative location and nameplate capacity of IPL's generating stations.

[4] IPL is constructing a 671 MW CCGT.

Figure 1.2 – IPL Facilities



Source: IPL

Wind and Solar Generation

While no mandatory federal or state renewable energy standard ("RES") currently exists, IPL's resources include approximately 300 MW of wind generation secured under long term Power Purchase Agreements ("PPAs"), which diversifies IPL's generating portfolio. Under the terms of the PPAs, IPL receives all of the energy and Renewable Energy Credits ("RECs") from the two wind farms[5]. Additionally, as of September 1, 2014, IPL purchases the energy and renewable attributes from approximately 66 MW of solar projects through IPL's Rate REP program. IPL's Rate REP is a three-year pilot renewable energy feed-in tariff offering approved by the IURC that went into effect on March 30, 2010 and concluded in 2013. In total, there are currently 98 MWs of solar PV nameplate capacity under long-term contracts through this program; approximately 66 MWs are in-service and the remaining 32 MWs are expected to be in-service in the first half of 2015. IPL has the 5th largest per capita concentration of solar among U.S. cities to date.[6] See Section 7, Attachment 8.1 and 8.2 for a listing and map of the

5 The null energy of the Wind PPAs is used to supply the load for IPL customers and, in the absence of any RES mandates, IPL is currently selling the associated RECS, but reserves the right to use RECs from the Wind PPAs to meet any future RES requirement. The Wind PPAs were approved by the IURC and if IPL chooses to monetize the RECs that result from the agreements, IPL shall use the revenues to first offset the cost of the Wind PPAs and next to credit IPL customers through its fuel adjustment clause proceedings. The Green-e Dictionary (http://green-e.org/learn_dictionary.shtml) defines null power as, "Electricity that is stripped of its attributes and undifferentiated. No specific rights to claim fuel source or environmental impacts are allowed for null electricity. Also referred to as commodity or system electricity."

6 http://www.environmentcaliforniacenter.org/reports/cae/shining-cities

Rate REP projects. IPL is currently selling the RECs associated with the Wind PPAs to offset the cost of this energy to customers and anticipates doing the same for the RECs from the solar projects. However, IPL reserves the right to use RECs to meet any future environmental requirement such as RES or the EPA' Clean Power Plan ("CPP").

Impact of Environmental Regulations on Generation Resources

As summarized in the Thermal Generation section above, EPA regulations have led to significant generating plant upgrades and generation portfolio changes over the past several years to improve air emissions and water quality as described below.

In response to the Mercury and Air Toxics Standard ("MATS") Rule issued in February 2012, IPL developed a Compliance Plan, which included activated carbon injection and sorbent injection for mercury control and upgraded Flue Gas Desulfurization ("FGD") systems for acid gas control on coal-fired units. The Plan also included upgraded electrostatic precipitators on Petersburg Units 1 and 4 and Harding Street Unit 7, in addition to baghouses on Petersburg Units 2 and 3 for particulate and mercury control. Finally, the Compliance Plan includes continuous emissions monitoring systems ("CEMS") for mercury ("Hg"), hydrochloric acid ("HCl"), and particulate matter ("PM"). The IURC approved IPL's MATS Compliance Plans in August 2013 (Cause No. 44242) and construction of Petersburg controls is currently underway.

IPL's MATS Compliance Plan determined that installation of the compliance controls was not economical for the smaller, less controlled units, Eagle Valley Units 3 through 6 and Harding Street Units 5 and 6. In May 2014, the IURC granted a Certificate of Public Convenience and Necessity ("CPCN") for IPL to construct a new combined cycle natural gas turbine ("CCGT") unit and approved converting Harding Street Units 5 and 6 to natural gas fired units. IPL plans to retire Eagle Valley Units 3 through 6 by the April 2016 MATS compliance deadline. In addition to the MATS Rule, the Indiana Department of Environmental Management ("IDEM") issued National Pollutant Discharge Elimination System ("NPDES") permit renewals to Petersburg and Harding Street in August 2012. The reasonable least cost plan to comply with the estimated costs of NPDES and future environmental regulations is to convert Harding Street Unit 7 to natural gas-fired and to install measures to address wastewater and Stormwater at both Petersburg and Harding Street generation stations. As a result, the MATS controls proposed in Cause No. 44242 were no longer necessary for that unit. IPL is currently proposing to the IURC in Cause No. 44540 to refuel Harding Street Unit 7 to operate on natural gas which reduces cost of compliance with NPDES and the impact on the environment.

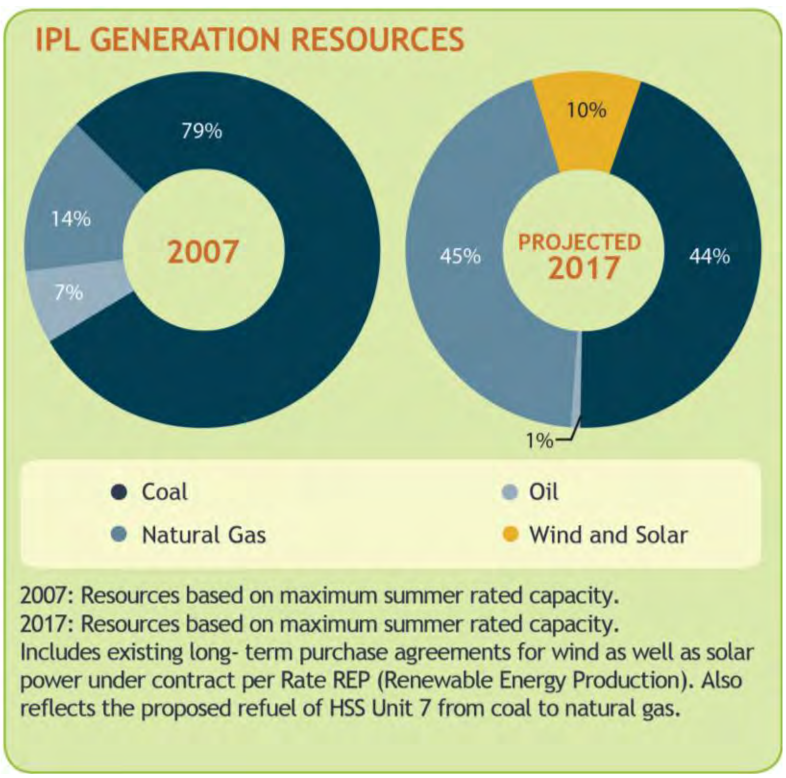
The future impacts on IPL's generation resources continue to be uncertain amidst potential legislation and U.S. Environmental Protection Agency ("EPA") regulations.

New Generation

IPL received approval on May 14, 2014 from the IURC (See IURC Cause No. 44339) to construct a 644 MW to 685 MW[7] natural gas-fired combined-cycle plant. This new CCGT is necessary to replace the generation from the retired Eagle Valley Generating Station, as discussed above, and IPL's previously existing capacity shortage. The approved new construction will furnish IPL with the resources necessary to serve retail load economically and reliably. Additional need for new generation in the short-term has been eliminated due to this recent approval.

IPL has made great strides to diversify its portfolio by changing the fuel mix from 79% coal and 14% natural gas and no renewables in 2007 to the projected mix of 44% coal and 45% natural gas in 2017, subject to IURC approval. The Company has also added 10% wind and solar resources to its portfolio since 2007. The Company's projected resource portfolio in 2017 is expressed in Figure 1.3.

Figure 1.3 – Projected Generation Resources



Source: IPL

[7] IPL is constructing a 671 MW CCGT.

As a result of HSS refueling to NG, Petersburg MATS Controls, and Eagle Valley CCGT replacement generation, IPL expects to achieve considerable reductions in fleet-wide emission rates by 2017 from current (2013):

- 67% reduction in SO_2 emission rate
- 23% reduction in NO_x emission rate
- 23% reduction in PM emission rate
- 76% reduction in Hg emission rate
- 7% reduction in CO_2 emission rate

Transmission and Distribution Enhancements

IPL's has studied the need for transmission and substation projects for retirement of generation connected to the IPL 138 kV system and designed projects to ensure deliverability of power into the IPL load zone. These projects include the installation of new 345 kV breakers, autotransformers, and 138 kV capacitor banks to improve power import capability from the 345 kV system to load centers on the 138 kV system. Several projects associated with the new CCGT will be completed in 2015 and 2016. In addition, IPL plans to install a Static Volt Ampere Reactive ("VAR") System to provide dynamic voltage and reactive power support.

IPL has enhanced its distribution system to incorporate the Rate REP projects. People in multiple areas of IPL worked closely to develop efficient procedures and successfully interconnect the DG sites. Based on the proposed location and feeder interconnection, specific engineering site studies were performed to determine if the distribution system could reliably support the DG resource without impacting the service reliability of existing customers. Line extension projects were engineered and constructed as needed. To date ten (10) projects with capacity of 500 kW to 10 MW have been connected to IPL's smart grid network to enable remote switching for IPL to safely work on distribution lines without any chance of DG backfeed. See Section 4C for more information on IPL's transmission and distribution system.

IRP Modeling Scenarios

IPL identified three key drivers most likely to impact its preferred resource portfolio: (a) CO_2 prices as a proxy for pending environmental legislation related to greenhouse gas ("GHG") emissions, (b) gas/market prices, and (c) load forecast differences due to economic and DSM impacts. Eight (8) scenarios were identified based on combinations of these drivers as shown in Figure 1.4 below. Instead of assuming the four (4) coal-fired units at Petersburg will remain in service through the projected planning life, the modeling software chose unit retirement dates based upon when they would no longer be economic to run in various scenarios. See Section 4 - Integration for a detailed description of these scenarios.

Figure 1.4 – IPL's 2014 IRP Modeling Scenarios

Scenario No	Scenario Name	Gas/Market Price	CO_2 Price	Load Forecast
1	Base	Ventyx Base	IPL-EPA Shadow price starting 2020	Base
2	High Load	Ventyx Base	IPL-EPA Shadow price starting 2020	High
3	Low Load	Ventyx Base	IPL-EPA Shadow price starting 2020	Low
4	High Gas	Ventyx High	IPL-EPA Shadow price starting 2020	Base
5	Low Gas	Ventyx Low	IPL-EPA Shadow price starting 2020	Base
6	High Environmental	Ventyx Environmental	Waxman-Markey proxy Ventyx Fall 2013 prices starting 2025	Base
7	Environmental	Ventyx Mass Cap	Mass Cap ICF Prices beginning in 2020	Base
8	Low Environmental	Ventyx Base	None	Base

Source: IPL

Key Driver #1 - Future Environmental Regulation

The environmental challenges facing utilities is unprecedented in terms of the number of rules coming due simultaneously, the compressed timeframe for compliance and the wide array of rules covering all environmental media (air, water, and waste). There are a number of environmental initiatives that the EPA is considering at the federal level that will likely impact coal-fired generation. These include, but are not limited to:

- Cross State Air Pollution Rule ("CSAPR")
- National Ambient Air Quality Standards ("NAAQS")
- Greenhouse Gas ("GHG") Regulation
- Cooling Water Intake Structures, Clean Water Act Section 316(b)
- Coal Combustion Residuals ("CCR")

This IRP addresses GHG Regulation through a CO_2 price. See Section 3 of this IRP for more information on Environmental Rules and Regulations.

Key Driver #2 – Natural Gas Prices

As mentioned above in New Generation, IPL expects to increasingly utilize natural gas within its generation fleet. Natural gas ("NG") alternatives are important in the analysis of new supply options for two reasons: First, is the significant pressures felt by U.S. utilities to retire existing coal assets and the difficulty in permitting new coal-fired generation. As important, however, is the emergence of shale gas and the significant increase in available U.S. natural gas resources. Breakthroughs and commercial developments in hydraulic fracturing technologies have economically tapped previously inaccessible reserves and brought huge supplies of shale gas from domestic sources. The advent of shale gas along with increasing levels of storage capacity continues to create an abundant supply of domestic NG, suppressing NG prices.

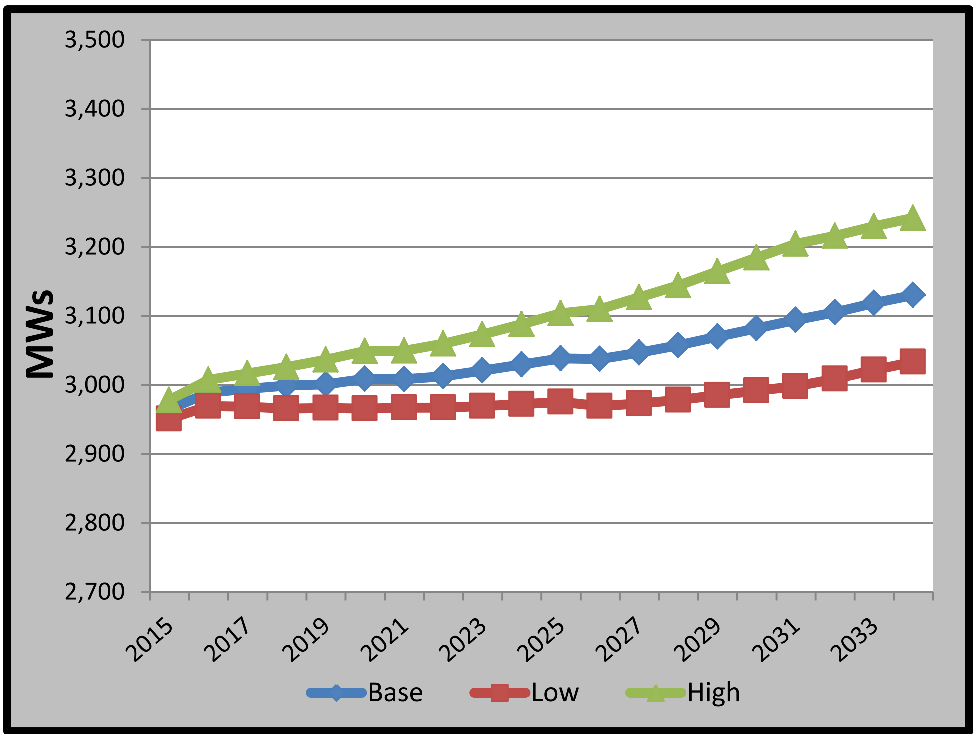
The increase in shale gas offers long-term NG price stability and substantial growth in use of NG for power production. Because market prices correlate with NG prices, the high and low NG scenarios reflect high and low market prices as well. As experienced during the Polar Vortex in the winter of 2013/2014, pipeline transportation constraints can result in a sudden rise in NG prices within the market zones and therefore electricity prices, unlike the historically relatively stable prices of coal. Instability in NG gas prices represents a key area of concern in the IRP planning period. IPL plans to hold firm transportation to liquid market centers and/or production zones to mitigate the price spikes seen during the Polar Vortex. IPL's gas-fired generation facilities are situated in favorable locations near several gas pipelines which provide the opportunity for multiple sources of NG and competitive procurement. See Section 4A for more discussion on natural gas resource options.

Key Driver #3 – Load Variation

To capture forecast uncertainty in Ventyx's IRP modeling, IPL selected three peak forecast scenarios: 1) Base load, 2) Low load, and 3) High load, with the Base load being the most probable. The base load forecast is established through econometric modeling using proprietary Moody's forecast economic parameters, such as Marion County household information and Indianapolis Manufacturing and Non-Manufacturing Employment. This forecast is adjusted by incorporating all forecasted energy efficiency DSM and other direct load impacts, such as appliance efficiencies. IPL then adds cost effective load management resources including demand response DSM, such as Air Conditioning Load Management ("ACLM") and interruptible programs plus any other load modifications, such as distribution automation enabled voltage reductions. This adjusted net load forecast, adjusted for MISO resource adequacy requirements, determines the supply resources needed to reliably serve IPL load and meet MISO resource adequacy requirements.

The High and Low load forecasts were derived by applying the low and high ranges of the State Utility Forecasting Group's (SUFG) 2013 IPL-forecast to IPL's internal forecast. Although this range, as modeled by the SUFG, is primarily driven by economics, we interpret the range to represent uncertainties resulting from: economic activity, DSM program impacts and technological and behavioral changes. For reference, IPL's base case with net DSM impacts represents a peak load forecast growth at 0.3% CAGR with 3131 MW of net internal demand ("NID") by 2034. IPL's forecast range, as modeled by Ventyx in the Capacity Expansion module, ranged from 0.2% CAGR (3,033 MW) for the Low Load forecast to 0.5% CAGR (3,242 MW) for the High Load forecast by 2034. Figure 1.5 below is IPL's Base, High, and Low peak forecast net of DSM.

Figure 1.5 – Peak Forecast (Net of DSM)



Source: IPL

Demand Side Management: Load Variation Impact

IPL's DSM programs are comprised of energy efficiency and load management. Since IPL's 2011 IRP, Senate Enrolled Act 340 ("SEA 340") has been passed resulting in the elimination of IURC established DSM targets and providing the availability for large customers to opt-out of DSM program participation. Hence, the DSM evaluation for this IRP is driven by a traditional analysis that identifies the market potential for cost effective DSM.

Despite the elimination of IURC set DSM targets, IPL filed Cause No. 44497 with the IURC to continue energy efficiency programs that were identified as cost-effective in 2015 and 2016.

Also, to reflect the Company's projected energy efficiency programs and savings, IPL contracted with Applied Energy Group ("AEG") to develop a DSM market potential forecast through 2034 to include in this IRP.

As part of its DSM strategy, IPL offers a number of Demand Response programs. At the end of 2013, IPL accounted for approximately 27 MW of Air Conditioning Load Management, 20 MW of Conservation Voltage Reduction ("CVR") described below, and 36 MW of contracted demand response capability with its C&I customers. In total, that is 83 MW of Demand Response programs. Section 4B fully describes DSM history, current programs and future plans.

Smart Grid: Load Variation Impact

IPL has enhanced service reliability and field asset operations by deploying Smart Grid assets through its Smart Energy Project. From 2009 to 2013, Distribution Automation ("DA") and Advanced Metering Infrastructure ("AMI") initiatives were completed to produce reliability benefits, reduce peak demand and improve operational efficiency.

Reliability improvements driven by adding distribution Supervisory Control and Data Acquisition ("SCADA") software tools and protective distribution devices throughout the system have resulted in 12.1 % SAIFI improvements to treated circuits by reducing the number of customers who experience a service interruption when a fault occurs on the system and restoring power more quickly through remote switching[8].

IPL has implemented a conservation voltage reduction ("CVR") program to reduce system peak demand as mentioned above with other demand response programs. IPL worked with MISO and stakeholder forums to allow this to be considered a Load Modifying Resource ("LMR") and count for capacity. In 2014, IPL registered a conservative target of 20 MW in MISO and has included this capacity in the IRP model. See Section 4C for more details about this and other Smart Grid benefits.

Resource Modeling Results

IPL worked with Ventyx to model and evaluate IPL's portfolio of existing generation and new resource options against forecast load requirements to derive its integrated resource plan. The modeling takes a structured multi-step process from load forecast to resource needs to a resource plan.

IPL uses its forecast of existing generation resources, including the planned unit retirements, to identify the resource gap to be met by additional supply resources. The Ventyx Capacity Expansion and Scenario Evaluation modules were used to identify low cost and low risk resources for IPL's resource portfolio. In addition to IPL's base case, which includes base market and gas prices, a base load forecast, and moderate CO_2 costs, the scenarios include

[8] Based on 2014 experience.

sensitivities related to the three key drivers: potential environmental regulations reflected in CO_2 costs, natural gas price and market price variation, and load variation. In all scenarios, IPL is not expected to build any additional generation until 2031 at the earliest to meet capacity and energy requirements. Additional need for new generation in the short-term has been eliminated due to the recent approval of the new Eagle Valley CCGT and the conversion of HSS Units 5 through 7[9] from coal to natural gas. (See IURC Cause No. 44339.) However, there is still much uncertainty surrounding the EPA Proposed Clean Power Plan. Depending on the construct of the final rule and how Indiana chooses to administer this regulation, additional adjustments to IPL's generation portfolio could be needed to comply with regulations. More information on IPL's load forecast and supply resource planning is available in Section 4D and 4 respectively.

Capacity Purchases

IPL customers have benefited in recent years from IPL's ability to purchase capacity at prices well below the levelized cost of building new generation. However, due to EPA MATS regulation based retirements, the supply-demand balance of capacity and load continues to come more into equilibrium in the MISO footprint, driving an increase in capacity prices. IPL will be retiring Eagle Valley Units 3 through 6 on April 16, 2016, six weeks before the end of the MISO Planning Year ("PY") 2015-2016. MISO's current resource adequacy requirement states a capacity resource that clears a planning reserve auction must be available during the entire commitment period, otherwise replacement capacity from the same zone must be secured to avoid compliance penalties. On June 20, 2014, IPL submitted a request to FERC to waive the replacement requirement needed during the stated 6 week span. This request was granted by FERC on October 15, 2014, eliminating the need to replace capacity during that time span and avoiding unnecessary costs for IPL customers.

To mitigate the MISO Planning Resource Auction price volatility risk, IPL has bilaterally purchased 100 MWs of Zone 6 Zonal Resource Credits at a fixed and known price for the PY 2015-2016 resulting in a minimal net capacity requirement. For PY 2016-2017, IPL has purchased 100 MWs of Zone 6 Zonal Resource Credits at a fixed and known price and nears completion of an agreement for an additional 200 MW. This results in a net capacity requirement ranging from 50 to 100 MW.

IPL will continue to evaluate the purchase of additional capacity to meet the difference between its actual Planning Reserve Margin Requirement and secured resources with bilateral purchases or sales, auction purchases or sales, additional demand response, or other resources. Starting in Planning Year 2017-2018, with the addition of the Eagle Valley CCGT, IPL projects that its resources will exceed its MISO Planning Reserve Margin Requirement for 2017-2018 by 240 MWs which it plans to optimize in the capacity market.

[9] The refuel of HSS Unit 7 from coal to natural gas is pending approval by the IURC in Cause No. 44540.

Preferred Portfolio

Once the new generation construction and unit refuels, as discussed in the New Generation section above, are complete, IPL will meet its peak demand until future unit retirements are necessary. Therefore, IPL's preferred portfolio is the base case expansion plan. This plan includes no additional generation extending out until 2031, at which point the Company anticipates the retirement of Petersburg 1 along with Harding Street Units 5 through 7. The determination and additional details surrounding IPL's preferred portfolio can be found in Section 4 - Integration.

Research & Development/Technology Applications

IPL continually evaluates emerging technologies, new applications of technologies and contemporary methods to improve operational excellence, identify future business opportunities and enhance long-term planning. Specifically, (1) energy storage, (2) enhanced combustion turbine output options, (3) the expansion of electric transportation, and (4) utilizing smart grid assets are included as part of these efforts. Accordingly, IPL is investigating the possibility of installing a Battery Energy Storage System ("BESS") within its grid to provide ancillary services. This could be up to a 20 MW facility located within IPLs 138 kV grid, which will also facilitate local stakeholder education. See Section 2, Changing Business Landscapes, for more information about the potential BESS installation. Turbine enhancements in the form of cooling inlet air to increase output through a process known as "fogging" is under investigation. IPL led transportation electrification efforts through its Electric Vehicle ("EV") program over the past three (3) years. Approximately 160 Electric Vehicle Supply Equipment ("EVSE") units were installed in homes, businesses and public locations to foster support of EV usage. In addition, IPL implemented a time-of-use rate ("EVX") and public EV ("EVP") tariff. This environmentally friendly transportation mode has been well received by its approximate 100 participants[10]; however, EV sales and public EVSE usage is lower than originally forecasted in Indianapolis. Additionally, IPL is working with the City of Indianapolis to implement an electric vehicle supply equipment system throughout its service territory. This would create the first total electric vehicle car sharing system in the United States. The program includes up to 1,000 EVSE at 200 locations to support 500 EVs, as outlined in IPL's proceeding filed with the IURC in Cause No. 44478. If approved, the facilities will be installed by June 2016, to modernize IPL's electric distribution infrastructure and decrease the community's dependence on foreign oil. See Section 4B and 4C for more information on IPL's involvement with EVs. Finally, IPL will continue to optimize smart grid assets. Please see Section 5 for more information about these efforts.

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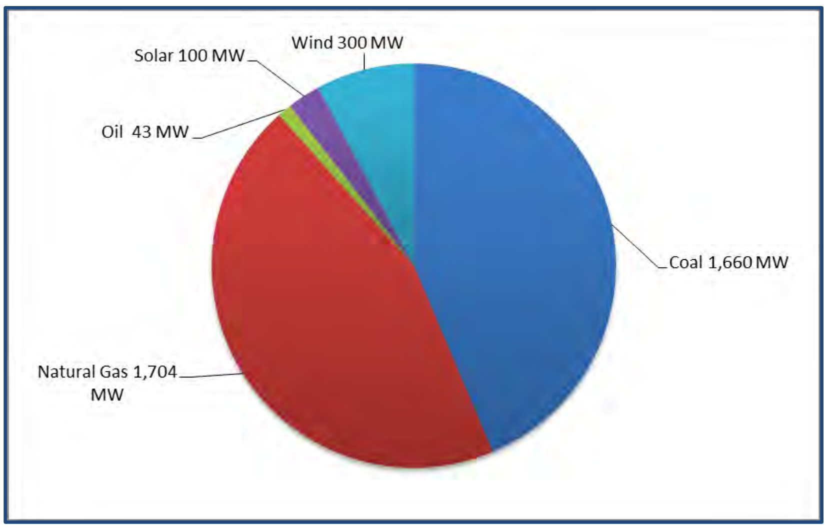
[10] IPL's 2013 Electric Vehicle Program Report can be found under a link located at: https://www.iplpower.com/Business/Programs_and_Services/Electric_Vehicle_Charging_and_Rates/

Portfolio 2024 and 2034

Much of the IRP reporting is appropriately focused on where IPL is, what uncertainties IPL is facing, and how IPL is going to navigate those challenges. The process ultimately results in a preferred resource plan, as identified above, that best serves IPL customers. In addition to defining the preferred resource plan, it is also helpful to focus on what IPL's generation mix consists of after the preferred plan is executed. IPL's selection is based upon a 50 year view to incorporate full plant life and end effects as shown in Section 4. "Portfolio 2024" and "Portfolio 2034" are snapshots of IPL's 10 and 20 year resource mix broken out by base, intermediate, and peaking resources. Of note, the energy efficiency DSM identified is the incremental DSM forecast from 2014 forward, as previous DSM programs are continually incorporated into the net internal demand ("NID") load forecast.

The 10 year look-forward projects about 3,830 MW of base load and intermediate resources, including 1,660 MW of coal-fired generation, 1,704 MW of gas-fired generation, and 43 MW of oil-fired generation. Additionally, IPL's portfolio will include 300 MW of wind generation and 100 MW of solar generation.

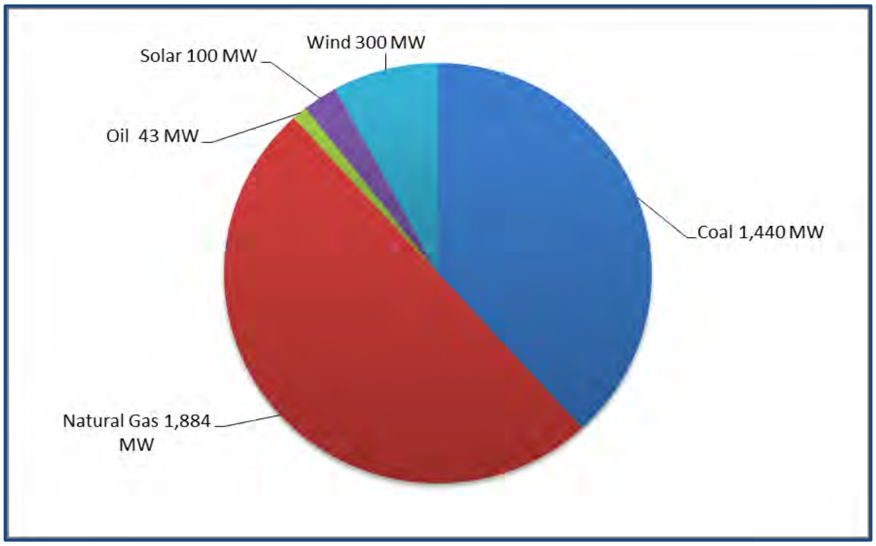
Figure 1.6 – IPL Resources – 2024 (by Operating Capacity)



Source: IPL

The 20 year outlook projects a slightly different outlook, as existing unit retirement dates become a factor. Prior to 2034, it is anticipated that Petersburg Unit 1 along with Harding Street Units 5 through 7 will retire. With CCGT being the least cost option for replacement generation, the shift from a portfolio primarily made up of coal resources to a natural gas intensive mix is expected to continue. The 2034 resource mix includes a total 3,767 MW of base load and intermediate resources, including 1,440 MW of coal-fired generation, 1,884 MW of gas-fired generation, and 43 MW of oil-fired generation. Likewise, the renewable resources are expected to remain at the 2024 levels of 400 MW.

Figure 1.7 – IPL Resources – 2034 (by Operating Capacity)



Source: IPL

Although the model selects new CCGT units in the preferred resource plan based upon current market conditions and what IPL knows today, other cost effective resources may exist in the future. IPL will evaluate these resource options in subsequent IRPs to develop the best Preferred Portfolio based on updates to market and fuel price outlooks, future environmental regulations, relative costs of technologies, and load forecasts.

Section 2. THE CHANGING BUSINESS LANDSCAPE

Since the submission of the IPL 2011 IRP, the business landscape for IPL and the electric utility industry has shifted in a number of key areas. Also, this 2014 IRP is being filed under a proposed rule 170 IAC 4-7, which includes different requirements including more transparent descriptions of risk analysis and mitigation, regional transmission organization membership impacts in the IRP, and reasoning for decision making to identify the preferred resource portfolio. The landscape areas described below are key drivers in the development of this IRP and IPL's future resource strategy.

Changing Regulatory Landscape

[170-IAC 4-7-4(b)(14)]

The most current revision of the proposed rule 170 IAC 4-7, which describes the Indiana IRP process and requirements, was issued on October 4, 2012. While this rule has not yet been finalized, IPL and other Indiana electric utilities are voluntarily working to comply with the new requirements as much as possible. In addition to the amended documentation requirements and methodology and risk descriptions, there are two new items within the proposed rule: (1) a public advisory process, and (2) a non-technical summary to be posted on the utility's website. Both of these new requirements aid in stakeholder education and input.

IPL hosted three public advisory meetings to inform its stakeholders and gather feedback. Stakeholders were notified by email and a newspaper public notice at least 30 days in advance of the meetings. Meeting materials in the form of Microsoft PowerPoint slides were posted on the Company's webpage two weeks prior to each meeting. Stakeholders were invited to attend in person or via the Webex option. A summary of the topics discussed are listed below. In addition, the meeting materials are provided as Section 7, Attachment 9.1 of this IRP.

<u>1st Public Advisory Meeting - May 16, 2014</u>

- Introduction to IPL and Integrated Resource Planning Process
- Energy and Peak Forecasts
- Demand Side Management: Energy Efficiency and Demand Response
- Planning Reserve Margin
- Generation Overview
- Environmental Overview
- Distributed Energy Resources
- Proposed Modeling Assumptions

<u>2nd Public Advisory Meeting - July 18, 2014</u>

- Demand Side Management Update

- Environmental Update
- Incorporating Stakeholder Input
- Presentation of Initial Ventyx Scenario Results

3rd Public Advisory Meeting - October 10, 2014

- Waste Water Analysis Results
- Updated Modeling Inputs and Assumptions
- Presentation of Ventyx Scenario Results
- Short Term Action Plan

Approximately 30 stakeholders were present at each of the three meetings including IPL residential, commercial and industrial customers, the Indiana Utility Regulatory Commission ("IURC"), the Office of Utility Consumer Councilor ("OUCC"), the Citizens Action Coalition ("CAC"), the Sierra Club, and other environmental and interest groups. After the first workshop, the Company responded to 112 comments and questions while an additional 29 comments and questions followed the second meeting. Modifications made as a result of stakeholder participation include: reduced the estimated cost of new wind resources, assigned a cost of carbon to every scenario evaluated, and created eight (8) scenarios versus four (4) scenarios to reflect multiple combinations of possible risks. The public advisory process increased transparency in IRP planning and was a conducive environment for discussion.

On October 31, 2014, IPL posted a non-technical summary on its IRP webpage including an overview of the Company and its existing resources, the public advisory process, the Company's current capacity position, and the Company's IRP scenarios, assumptions, and resulting preferred resource portfolio. A short term action plan and accompanying schedule is also described. The non-technical summary provides a simplified explanation of the Company's IRP.

The public advisory process was a productive way to include a variety of points of view and produce a more robust IRP. Stakeholder input drove changes to expand the number of scenarios IPL analyzed from four to eight, spurred the inclusion of additional wind sensitivity analysis, and helped IPL understand how to more effectively explain decision making processes. IPL welcomed suggested improvements for the 2016 process from participants which will be thoughtfully considered.

Meeting materials, stakeholder comments and questions, and meeting summaries are included in Volume II of this IRP and are available at https://www.iplpower.com/irp/.

Contemporary IRP Inputs and Methodology

[170-IAC 4-7-4(b)(11)]

IPL fully supports and employs a continuous improvement process for service reliability and efficient business management. As part of this process, IPL seeks to implement IRP best practices to improve the accuracy of our data, forecasts, risk mitigation and modeling. Since the 2011 IRP, the Company has completed the following activities:

- Included dynamic forecasted market prices in the model as well as market operations simulation whereby market resources or IPL units may be selected to meet IPL's load requirements
- Included a range of possible greenhouse gas regulatory impacts
- Updated data for weather normalization more frequently than was done in the past
- Described its experience with Distributed Generation ("DG") including impacts to transmission and distribution elements
- Implemented a public advisory process in the development of the IRP as described below
- Reviewed 2013 IRP documents filed by Indiana utilities and participated in 2014 IRP public advisory meetings conducted by NIPSCO and Vectren and applied lessons learned

As part of the Company's efforts to stay abreast of new and efficient methods, IPL employees have attended the Commission's annual IRP contemporary issues technical conferences in 2013 and 2014 as well as various industry conferences. IPL employees have also attended resource planning focus area conferences and trainings, such as:

- Association of Edison Illuminating Companies - Load Research Conference
- Itron, Inc - Forecasting 101Workshop: An Introduction to Forecasting
- Itron, Inc - Fundamentals of Sales and Demand Forecasting Workshop
- Itron, Inc - 11th Annual Energy Forecasting Meeting
- Itron, Inc - 12th Annual Energy Forecasting Meeting
- Edison Electric Institute - Load Forecasting Group Meeting

Risk Mitigation

[170-IAC 4-7-8(b)(7)(A)] [170-IAC 4-7-8(b)(7)(B)]

IPL regularly evaluates risks to its business and identifies means to mitigate these risks. As part of our normal business practices and for the IRP process, the risks and mitigation methods in Figure 2.1 are reviewed. The key risks that affect resource planning, as shown in the left-most column, drove the development of IPL's scenarios to analyze potential future impacts: environmental regulation, load variation, and fuel costs. Section 4 (Integration) describes how IPL's preferred resource plan mitigates these risks as best as possible, specifically the three key risks identified above.

Figure 2.1 – IPL Risks and Mitigation Methods

Risk	Description	Mitigating Measure
Environmental Regulation	As described fully in Section 3 of this IRP, a wide variety of regulations related to water, air, and waste continue to impact the electric utility industry and will do so in the near future.	To mitigate these risks, IPL carefully evaluates potential impacts and actively participates in the rulemaking processes including work with various industry trade groups and government agencies.
Load Variation	Loads may vary based on consumer usage behavior, demand response program participation, weather as described below, public policy and many economic drivers.	Planning reserve margins determined by MISO, above annual load forecasts, serve as mitigating measures to address increased load. IPL proactively manages costs regularly to mitigate the impacts of variable costs and revenues.
Fuel Costs	Commodity pricing varies based on supply, demand, and source.	IPL's contracts include fixed costs and market based commodity prices with variable index-based escalation factors. In addition, increasing generation portfolio fuel diversification will mitigate price increases. (See IHS report. "The Value of US Power Supply Diversity" dated July 2014 for more information.)
Fuel Supply	Commodity availability directly influences IPL's ability to run its generating units efficiently. Shortages may occur during high volume periods including seasonal peaks.	IPL maintains inventory of 35 to 50 days for coal resources. In addition, long-term coal supply contracts that rotate on a three (3) year cycle are negotiated. IPL's existing natural gas units have run intermittently which did not justify the need for contracts with fixed demand charges. For units to be refueled and the new CCGT, IPL contracts for firm delivery and no-notice services for natural gas to mitigate fuel availability risks. IPL maintains firm transportation for the new Eagle Valley CCGT unit which can also serve the Harding Street units. As generating units are refueled to NG, IPL will contract for additional firm transportation as necessary.
MISO Market Changes	As a member of MISO, IPL is subject to changes in FERC approved MISO tariffs and business practices which may impact operations and long-term planning. These may be in the area of capacity credits, transmission expansion policy and costs, or demand response design.	IPL actively participates in MISO stakeholders processes including the Transmission Owners Committee to mitigate risks of changes. If needed, IPL intervenes at FERC to protect the best interests of its customers.
Weather	Variances in weather directly affect IPL's retail load requirements, costs and revenues.	IPL evaluates 30 year weather patterns as part of the IRP process to forecast loads. In addition, high, low and base load forecasts were evaluated within scenarios to determine possible resource requirement outcomes.
Workforce Availability	Labor intensive operations require consistent highly trained staff	IPL regularly negotiates contracts with bargaining unit employees and contractors to ensure qualified staff are available to perform necessary work. In addition, IPL's total rewards compensation is competitive within

		the utility industry to retain employees.
Reliability	Outages to distribution and occasionally transmission equipment due to public vehicular accidents, storms or mechanical failures can impact service reliability. In addition, transmission system design limitations affect the amount of power that can be imported to the IPL 138 kV system.	IPL's plans to site generation close to its load center and connect it to its 138 kV system. This intentionally mitigates risks of limited import capabilities and fluctuations in voltage and reactive power.
Technology Advancements	Over the past several years, resource technologies continue to evolve to decrease costs and improve efficiencies. These may include gas turbines, distributed generation, solar PV, wind turbines, battery storage, electric vehicles, fuel cells, demand response, energy management systems and other applications.	IPL stays abreast of technology cost trends and uses up to date information in the IRP. For example, the CCGT and wind turbine capital costs in this IRP are lower than the 2011 IRP. IPL continues to connect solar DG facilities from 2 kW to 10 MW through net metering and Rate REP programs and learn from its operational experience in this area. For the first time, IPL has included DG capacity in its IRP. IPL continues to research best practices in this area and monitor developments in terms of innovation and adoption rates to plan for future impacts.
Construction Costs	Construction expenses vary based on commodity costs, scope creep, labor and material expenses.	IPL works diligently to schedule and manage its internal and contracted resources. It competitively bids contracts, negotiates fixed fees whenever commercially practical, coordinates changes in scope closely to minimize cost increases, requires transparent regular reporting of progress and costs and open audit rights to verify vendor expenses when negotiating vendor contracts. Cost savings are captured through project management efforts and reflected in fair rates and charges.
Production Cost Risk	Variances in production costs are dependent upon electricity demand, fuel supply, market pricing and other factors.	IPL's diverse portfolio helps to mitigate production cost risks through varying fuels, that is, coal, natural gas, oil, wind and solar, as well as technologies including simple and combined cycle turbines, distributed generation, demand response, etc.
Generation Availability	Generation equipment is subject to electro-mechanical failures which directly impact the availability of the units to produce electricity.	In accordance with asset management best practices, IPL performs planned maintenance on a regular basis and performs root causes analyses when failures occur as means to mitigate these risks.
Access to Capital	Adequate funding to finance large capital projects is essential to long-term business success. Varying interest rates and capital access may affect this.	IPL manages a balanced financial portfolio through a blend of equity, short term and long term debt to mitigate these risks.

Regulatory Risk	There is jurisdictional overlap in several areas where FERC has jurisdiction relative to markets, but the primary responsibility resides with the States. Jurisdiction over Resource Adequacy and Demand Response are two of those overlap areas.	IPL actively engages with MISO, IURC, FERC, and the Organization of MISO States (OMS) to clarify the jurisdiction and maintain appropriate outcomes for its customers. Educating stakeholders and listening to other points of view helps to create collaborative results whenever possible.
Misc. Catastrophic Events	Major events such as weather catastrophes can occur as part of normal business	IPL has concrete plans for business continuity/disaster recovery for each area and the Company as a whole. Annual drills in critical areas such as T&D operations are conducted. Debrief sessions are held to identify lessons learned and identify improvements.

Financing

[170-IAC 4-7-8(b)(6)(D)]

As identified above, access to capital is a critical component of managing the electric utility business. IPL must secure funding to complete capital projects. IPL expects that existing cash balances, cash generated from operating activities and borrowing capacity on our committed credit facility will be adequate for the foreseeable future to meet anticipated operating expenses, interest expense on outstanding indebtedness and recurring capital expenditures, and to pay dividends to the owners of the business. Sources for principal payments on outstanding indebtedness and nonrecurring capital expenditures are expected to be obtained from: (i) existing cash balances; (ii) cash generated from operating activities; (iii) borrowing capacity on our committed credit facility; and (iv) additional debt financing. In addition, due to current and expected future environmental regulations, it is expected that equity capital will continue to be used as a significant funding source. AES has approved significant equity investments in IPL for its proposed nonrecurring capital expenditures from 2013 through 2017; for example, on June 27, 2014, IPALCO received an equity capital contribution of $106.4 million from AES for funding needs related to IPL's environmental and replacement generation projects, which IPALCO then made the same investment in IPL.

All of IPL's long-term borrowings must first be approved by the IURC and the aggregate amount of IPL's short-term indebtedness must be approved by the Federal Energy Regulatory Commission (FERC). IPL has received FERC approval to borrow up to $500 million of short-term indebtedness outstanding at any time through July 28, 2016. In December 2013, IPL received an order from the IURC granting the authority through December 31, 2016 to, among other things, issue up to $425 million in aggregate principal amount of long-term debt (inclusive of $130 million of IPL first mortgage bonds issued in June 2014).

Demand Side Management

IPL has continually offered DSM since 1993. But since the last IPL IRP was completed in 2011, the landscape for DSM in Indiana has changed significantly. Prior DSM efforts were influenced by the significant energy efficiency targets established in the IURC Phase II Generic Order. These targets provided the direction for the amount of DSM efforts in the State of Indiana through the end of 2014. The Generic Order also established five Core DSM Programs and identified the mechanism for these Core programs to be delivered by a state-wide third party administrator.

The 2013-2014 Indiana General Assembly passed Senate Enrolled Act 340 ("SEA 340"), which, among other things, (1) effectively terminated the Generic DSM Order's savings goals and (2) provided the industrial customers with demand at a single site greater than one MW the opportunity to opt-out of participation in utility sponsored energy efficiency programs.

(1) While the IURC's Generic Order was the dominant factor in shaping DSM developments in Indiana, IPL is committed to continue to offer cost effective DSM programs to its customers. A confluence of internal and external influences has prompted IPL, and the electric industry as a whole, to make a concerted effort to increase the levels of DSM offerings to its customers. Increasing fuel costs and volatility, a looming build cycle for new generation and environmental concerns have caused renewed interest in DSM.

(2) While it is still uncertain to what extent customer opt-outs will reduce the DSM market potential in IPL's service territory, there will be some reduction in potential. However, the reduction in DSM opportunities may be mitigated to the extent that large customers create energy efficiency projects on their own. IPL plans to submit comments to the EPA as part of the CPP rule making process and will suggest that opt-out customers report their energy efficiency savings to the appropriate agency. This information will aid in IPL's ability to comply with the CPP.

Forecast

[170-IAC 4-7-5(a)(4)]

Economic conditions have improved at a slower than anticipated recovery rate from the financial crisis in 2008-2009. Although Indiana's Gross State Product ("GSP") and other key economic indicators are back to pre-recession levels, future conditions are viewed to not achieve pre-recession growth rates. According to Moody's Analytics, Indiana's economy is expected to experience an uptick in 2014 and 2015 with GSP growth rates of 3.6% and 3.4% respectively. After this improvement, growth in Indiana's economy is expected to slow down to 1.3% in the following two years. The reduced growth expectations results from negative demographic trends such as an aging workforce, lowering the growth of the labor force, accompanied by political uncertainty surrounding the current Federal Budget Crisis and future inflation rates. Indiana's GSP is forecast to level off at a modest 1.6% for the following 6 years. This growth in economic activity is mainly driven by growth in manufacturing and household income. Sales before any DSM adjustments are expected to grow at a compound annual growth rate of 1.2% over the next three years, and 0.7% over the next 20 years. The growth-rate drops to 0.7% over the next three years after DSM savings are netted out. In other words, DSM is forecasted to address 42% of the estimated load growth.

Fuel Landscape

[170-IAC 4-7-4(b)(7)]

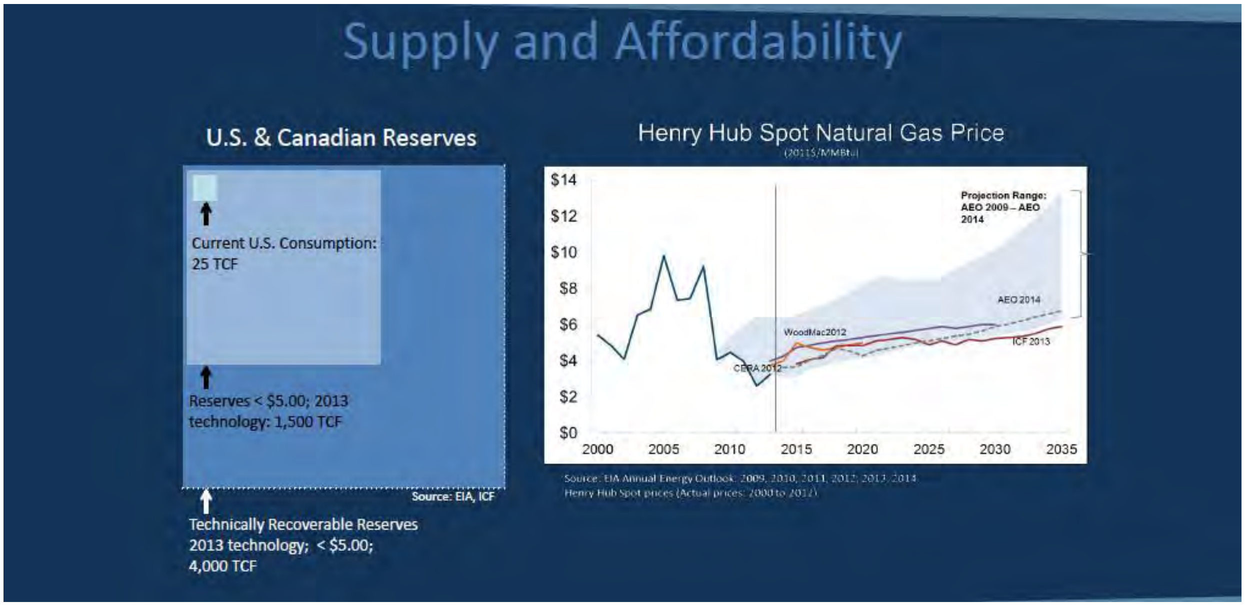
After 2017, IPL expects to increasingly use natural gas within its generation fleet. The emergence of shale gas into the United States ("U.S.") natural gas ("NG") supply has sparked a renaissance in domestic NG markets. As little as a decade ago, the outlook for U.S. NG production was rather bleak. Reserves in conventional wells had peaked and begun to decline in 2001 with little expectation for a reversal. Tight supplies and expensive and unreliable liquefied natural gas imports were the expected new normal of the U.S. natural gas market. However, developments in hydraulic fracturing technologies and directional drilling brought the massive quantities of shale gas from what was one of the most expensive sources in the market to one of the cheapest. In fact, the United States is now the largest producer of natural gas in the world, having surpassed Russia and Iran (Canada is now in fourth place).

Furthermore, shorter drilling times and front-loaded well yields make shale supplies more flexible to swings in demand and less expensive. This is particularly true of "wet gas plays" where the associated oil and natural-gas liquids drive the drilling and natural-gas is a "by-product" of the effort.

Figure 2.2 below, prepared by the America's Natural Gas Alliance, and based upon EIA and ICF consulting data, puts this information into graphic format. On the left are three interweaved boxes. The smallest, in the left-hand corner, shows current U.S. natural gas consumption. The other two boxes show current U.S. reserves of natural-gas and additional reserves which are technically recoverable. Although current consumption of natural gas is huge in the U.S. (25 TCF), reserves and technically-recoverable reserves are much, much higher.

Likewise, on the right side of Figure 2.2, the price forecast for natural gas is flatter and more stable – as opposed to the area in light blue shading which shows the earlier forecasts of much higher natural-gas prices. The historic numbers for pricing shows high volatility with natural-gas prices swinging from low to high. This volatility was caused both by declining supplies of natural gas, and reliance on one primary natural-gas basin (the gulf coast). Storms in the Gulf of Mexico would cause production to be halted which in turn drove up prices. One of the additional benefits of the shale revolution is to open up many different natural-gas basins in the U.S. For example, Indiana will increasing receive natural gas from Pennsylvania and Ohio.

Figure 2.2 – EIA and ICF Natural Gas Supply and Affordability



Source: EIA, ICF

In addition to plentiful supply in the United States, the Indianapolis region is bisected by five major natural-gas pipelines. These allow natural-gas power plants in Central Indiana to source fuel from the Gulf of Mexico, the Rocky Mountain region and the new shale playes in Pennsylvania and Ohio.

It is now widely expected that the electricity generation sector will significantly grow its natural gas generation fleet to be significant consumers of this plentiful resource. In response to these factors, the price, according to Ventyx, stabilizes over the next 20 years as shown in Section 7, Confidential Attachment 5.1, Ventyx IPL IRP Modeling Summary. More discussion and industry commentary on NG markets can be found in Section 4D, Market Trends and Forecasts, Fuel Forecasts.

Although IPL expects to increasingly use natural gas within its generation fleet, the Company values coal as a stable, low cost and reliable fuel source. Coal is a regional strength, especially for IPL's Petersburg units which are located close to coal mines reducing transportation cost and risk. Coal plays an important role in portfolio diversification as described in the July 2014 IHS report "The Value of US Power Supply Diversity."

Environmental Landscape

[170-IAC 4-7-6(a)(4)] [170-IAC 4-7-7(a)(1)] [170-IAC 4-7-7(a)(2)]

The Environmental Protection Agency ("EPA") is in the process of developing and implementing various regulations that will especially impact coal-fired fleet generation. The environmental challenges facing utilities is unprecedented in terms of the number of rules coming due simultaneously, the compressed time frame for compliance and the wide array of rules covering all environmental media. There are a number of environmental initiatives that are being considered at the federal level that may impact the cost of electricity derived from the burning of coal. This includes, but is not limited to:

- Cross State Air Pollution Rule ("CSAPR") - While IPL cannot predict the outcome of the final Rule, we expect to comply through the successful operation of our existing pollution control equipment. In addition, IPL may purchase NO_x and/or SO_2 allowances on the open market to supplement our compliance plan.
- National Ambient Air Quality Standards ("NAAQS") - The areas in which IPL operates are all currently designated as nonattainment for SO_2. As a result, IDEM must develop a State Implementation Plan ("SIP") establishing new requirements to ensure that the areas return to attainment. The impact of the SO_2 NAAQS will be dependent upon the final SIP developed by IDEM.
- Greenhouse Gas ("GHG") Regulation - At this time, IPL cannot predict the final outcome of the Clean Power Plan as it is currently a proposed rule and the State will have discretion in its implementation. However, based on the proposed rule, the impacts may include decreased dispatch of coal-fired generation, increased dispatch of natural gas and renewable generation, and increased demand side energy efficiency measures.
- Cooling Water Intake Structures, Clean Water Act Section 316(b) - The rule could require closed cycle cooling systems. Alternatively, utilities could be faced with installing less costly controls, like modified travelling screens and fish handling and return systems. Three of the five IPL coal-fired units are currently equipped with closed cycle cooling systems. Another is equipped with a cooling tower which dissipates approximately one-half of the waste heat generated by that unit. The impact of this rule will be dependent upon Indiana Department of Environmental Management's ("IDEM") determination for Best Technology Available for the IPL generating stations.
- Coal Combustion Residuals ("CCR") - It is currently expected that EPA will issue a final rule in December 2014. The outcome could potentially require closure and capping of existing ponds, additional CCR disposal costs, and the installation of groundwater monitoring.

These Rules may require additional investment for compliance. Planning for compliance is complicated by the significant level of uncertainty surrounding the final outcome of the regulations, including impacts and timing and potential legislative activity. See Section 3 for a more detailed discussion of anticipated environmental impacts.

Transmission Expansion Cost Sharing

[170-IAC 4-7-6(d)(4)]

Since the last IRP, both at the state level and in the MISO tariff, the right of first refusal for transmission projects needed for reliability to be built by the incumbent utility has been preserved. Effective with the 2015 planning cycle, due to the implementation of FERC Order 1000, the right to develop Market Efficiency and Multi-Value transmission projects ("MEPs" and "MVPs") has opened up to third party transmission developers. This event necessitates a process to qualify transmission developers and to select a developer to build the project. This will add up to three years to the process of placing transmission enhancements in service. FERC demands that incumbent utilities who wish to bid on projects not directly connected to their own transmission systems compete with third parties for the right to build and therefore must submit a developer application to MISO for evaluation. If the project is directly connected to the incumbent's transmission system, no application is required; however, the incumbent still must compete for the right to build MEPs or MVPs. To preserve its right to develop transmission projects of all types and locations, IPL has completed the application process dictated by the MISO tariff. As one result of implementation of FERC Order 1000, MISO has proposed numerous changes to the project types that will be vetted through the stakeholder process in the coming months. Additionally, due to the integration of Entergy into the MISO system at the end of 2013, changes to the kV bright lines of MEPs and MVPs are proposed. If those bright lines are lowered as proposed, IPL will be required to pay a greater portion of the shared costs of transmission in the now much larger footprint.

Battery Energy Storage Systems

Ongoing cost reductions and technology improvements driven by consumer electronics (cell phones, laptops) and electric vehicle applications continue to improve opportunities for battery-based energy storage systems ("BESS") as resources on the electricity grid. BESS systems are being installed on power grids around the world in ever larger sizes. Lithium-ion batteries are used in much of recent BESS development, though significant research and development ("R&D") is underway on a wide range of chemistries with the promise of quantum reductions in battery energy density.

Major BESS components are interconnection facilities, power conditioning systems, and batteries. Battery arrays typically operate up to 1000 Volts DC and are connected to Power Conditioning Systems ("PCS") for transformation to AC power. PCSs are most typically bi-directional Insulated-gate bipolar transistor "(IGBT') based inverter systems converting AC power to DC to charge batteries and converting DC to AC power when discharging. PCSs operate typically at 480V on the AC side to 1000V on the DC side. Inverters are bi-directional versions of inverter systems typically used in solar and wind electricity generating applications, and have also been used for many years in motor drives and industrial processes. Interconnection facilities connect PCSs to electricity grid distribution and transmission voltages by way of step-up/step-down transformers – the same common electrical equipment used in all power system generation and load applications. The permitting profile of a BESS is more benign that traditional power resources. There are no air emissions, no water consumption for cooling, and no fuel supply is needed except for a connection to the power grid. A BESS consists of simple structures containing energy storage equipment and electric transformers with switchgear, similar to a data center.

AES (IPL's parent company) is a worldwide leader in energy storage applications. In fact, the first test units ever deployed by AES were at the IPL Glens Valley Substation.

IPL Battery Storage Project- IPL is in the late-stages of analyzing several options, including up to a 20 MW BESS within Indianapolis and MISO regional transmission area which would likely be located within the IPL 138 kV grid. The immediate benefit that the BESS would provide to customers is fast-response frequency regulation for the grid. To maintain grid stability, load (demand for electricity) and generation (supply of electricity) must be in balance on a real time basis. The grid currently sends AGC (automatic generation control) signals to traditional power plants to either increase or decrease their output to keep the system in balance. Although this is an adequate way to provide frequency regulation, it is inferior to fast-response batteries which can instantaneously add or remove power to the grid. This has been proven within the nearby PJM regional transmission system.

Although frequency regulation of a BESS project is the immediate commercial benefit to IPL customers, IPL will also explore and pilot studies on other applications such as renewables integration focusing on solar, ramping, peak shaving, as a capacity resource in lieu of traditional combustion turbines, black start capability, and VAR support ("Volt Ampere Reactive"). IPL has begun the initial process with MISO for the required studies for a BESS system, as well as continuing in-house engineering and regulatory analysis. IPL is also modeling the current ancillary services pricing within the MISO market which will have a significant impact on whether to deploy a system sooner or later. IPL plans to provide additional information on this project to stakeholders as appropriate. While IPL is investigating the feasibility of installing a Battery Energy Storage System ("BESS") to provide ancillary services, capacity and pilot testing for renewable integration, it was not included as a separate new resource in the Ventyx model for this IRP due to MISO tariff conditions, which are not favorable to energy storage.[11]

[11] IPL is working with MISO to adapt its tariff and Business Practice Manuals to treat BESS appropriately.

Section 3. ENVIRONMENTAL RULES and REGULATIONS

[170-IAC 4-7-7(a)(1)] [170-IAC 4-7-7(a)(2)] [170-IAC 4-7-8(b)(7)(A)]

EPA is in the process of developing and implementing a new suite of rules that will impact coal-fired fleet generation. The environmental challenges facing utilities is unprecedented in terms of (1) the number of rules coming due simultaneously; (2) the compressed time frame for compliance; and (3) the wide array of rules covering all environmental media. As it relates to air, EPA is regulating for the first time greenhouse gas ("GHG") emissions. As it relates to water, EPA is regulating cooling water intake structures. Finally, as it relates to solid waste, EPA is proposing further restrictions for ash management. The most recent impending EPA rules include, but are not limited to the following:

- In June 2010, EPA proposed revised regulations for Coal Combustion Residuals ("CCRs") with consideration of two primary options: (a) regulate CCRs as a solid waste under Subtitle D of the Resource Conservation and Recovery Act ("RCRA"); or (b) regulate ash as a hazardous waste under Subtitle C of RCRA.
- In January 2013, EPA lowered the National Ambient Air Quality Standard ("NAAQS") for particulate matter.
- In June 2013, EPA proposed revisions to the Clean Water Act's effluent limitation guidelines regulations for the steam electric power generating industry.
- In January 2014, EPA re-proposed the New Source Performance Standard ("NSPS") for GHGs for new sources.
- On April 29, 2014, the Supreme Court upheld EPA's July 2011 Cross State Air Pollution Rule ("CSAPR"), which regulates SO_2 and NO_x emissions, remanding the Rule to the D.C. Circuit, which lifted the stay on October 23, 2014.
- In June 2014, EPA proposed the Clean Power Plan which would regulate GHGs from existing sources.
- In August 2014, EPA finalized a revised regulation requiring utilities to reduce the adverse impacts to fish and other aquatic life caused by cooling water intake structures.

These rules may require additional investment for compliance. Planning for compliance with these regulations is complicated by the significant level of uncertainty surrounding the final outcome of the regulations, including impacts, timing and potential legislative activity.

In light of these uncertainties, each of the EPA rules will be discussed in detail later in this section following a review of the existing environmental rules and regulations.

Existing Regulations – Significant Environmental Effects

[170-IAC 4-7-6(a)(4)]

Air Emissions

IPL is subject to regulation on the following air emissions: Sulfur Dioxide, Nitrogen Oxide, Regional Haze, Mercury and Air Toxics Standard ("MATS"), National Ambient Air Quality Standard, and Greenhouse Gas.

Sulfur Dioxide

Title IV of the Clean Air Act Amendments of 1990 ("CAAA") established a two-phase statutory program to reduce SO_2 emissions. The EPA allocated SO_2 emissions allowances based on a formula that uses historical operating data for specified years multiplied by the allowable limit and then converted to tons of emissions allowed. These tons of emissions are called "allowances" that can then be bought, sold or transferred between units for compliance purposes. Phase I of the program became effective on January 1, 1995, for larger, higher emitting units. In Phase I, the EPA allocated SO_2 emissions allowances based on an emission rate of 2.5 lbs. per MMBtu. Phase II of the program became effective on January 1, 2000, and the EPA lowered the emissions rate used to allocate SO_2 allowances from 2.5 to 1.2 lbs. per MMBtu.

In response to this regulatory program, IPL developed an Acid Rain Compliance Plan that was submitted to the IURC on July 1, 1992, (IURC Cause No. 39437) and subsequently approved on August 18, 1993. This plan called for the installation of two SO_2 retrofit Flue Gas Desulfurization ("FGD") units on Pete Unit 1 and Pete Unit 2. These FGD units were placed in-service in 1996. FGD is the technology used for removing SO_2 from the exhaust flue gases in power plants that burn coal or oil to produce steam for the steam turbines that drive their electricity generators.

The SO_2 regulations remained relatively unchanged as did the IPL compliance plan until March 10, 2005, when the EPA issued Clean Air Interstate Rule ("CAIR") which covered the 28 eastern states and the District of Columbia ("D.C."). The federal CAIR established a two-phase regional cap-and-trade program for SO_2 and NO_x. Phase I of CAIR for SO_2 had an effective date of January 1, 2010, and reduced SO_2 emissions by 4.3 million tons; 45% lower than 2003 levels. Phase II of CAIR, was scheduled to become effective on January 1, 2015.

In anticipation of this CAIR regulatory program and to help meet the existing CAAA regulatory requirements, IPL developed a Multi-Pollutant Plan ("MPP") that was submitted to the IURC on July 29, 2004, (IURC Cause No. 42700) requesting approval of certain core elements of the plan which were approved on November 30, 2004. In order to reduce SO_2 emissions, IPL completed the Petersburg Generating Station ("Pete") Unit 3 FGD enhancement (May 2006) and the new Harding Street Generating Station ("HSS") Unit 7 FGD (September 2007). IPL also identified the enhancement of the Pete Unit 4 FGD as a core element of its MPP. IPL also completed a

Pete Unit 4 FGD upgrade project (IURC Cause No. 43403 approved April 2, 2008) in 2011 to help meet the additional SO_2 emission reduction requirements. IPL materially meets the Phase I CAIR requirements for SO_2 upon completion of all of these projects. However, IPL supplements its compliance plan with the purchase of emission allowances on the open market as needed.

As IPL was developing and implementing its MPP, the United States ("U.S.") Court of Appeals for the D.C. Circuit vacated the federal CAIR in July 2008 and remanded it to the EPA. Subsequently, in September 2008, the EPA moved for rehearing to the full bench (en banc). In December 2008, the U.S. Court of Appeals for the D.C. Circuit issued an order requiring the EPA to revise the federal CAIR and reinstate the effectiveness of the existing rule until the EPA revises CAIR. Thus, CAIR has remained in effect and will do so until a replacement rule is in place.

In August 2010, the EPA issued a proposed replacement rule, known as CSAPR, which was subsequently finalized in July 2011. The CSAPR mandated additional cuts in SO_2 and NO_x emissions in two phases: 2012 and 2014. Further, it was a modified cap and trade rule with unlimited trading of allowances within individual states but limited interstate trading. However, prior to CSAPR becoming effective in 2012, several appeals were filed challenging its implementation. On December 31, 2011, the Court granted a request for stay and instructed EPA to implement CAIR during the stay. On August 21, 2012, the Court vacated and remanded back to EPA the CSAPR. As a result, CAIR remains in effect.

On April 29, 2014, the Supreme Court upheld CSAPR, remanding the Rule to the D.C. Circuit Court which lifted the stay on October 23, 2014. Many uncertainties remain related to the potential implementation of CSAPR, including timing, allocation of allowances, and market pricing. As it relates to timing, the D.C. Circuit Court did not specifically address the timeline suggested by EPA, which includes implementation of Phase I in 2015 and implementation of Phase II in 2017. As it relates to allowances, they may be allocated as originally included in the final Rule or EPA may re-evaluate and re-allocate allowances prior to re-instating the Rule. EPA may address new lower standards in the Rule prior to implementation, making the Rule more stringent. As a result of the uncertainty around the timing and allocation of allowances, there is also significant uncertainty around market pricing associated with this final Rule.

While we cannot predict the outcome of the Court decision or the final Rule which will be implemented, we expect that such a Rule would have a similar impact as that of CAIR or the original CSAPR. As such, IPL expects to comply through the successful operation of our existing pollution control equipment. In addition, IPL may be required to purchase NO_x and/or SO_2 allowances on the open market to supplement its compliance plan.

Nitrogen Oxide

On September 24, 1998, the EPA issued a final rule, referred to as the NO_x State Implementation Plan ("SIP") Call. The rule imposed more stringent limits on NO_x emissions from fossil fuel-fired steam electric generators in 21 states in the eastern third of the U.S., including Indiana. In June 2001, the Indiana Air Pollution Control Board adopted the Federal NO_x SIP Call rule requiring IPL and other Indiana utilities to meet a system wide NO_x emissions rate of 0.15 lb. MMBtu during the annual ozone season from May 1 – September 30 each year. In a similar fashion with the CAAA, compliance was demonstrated via an emission allowance trading program. In order to meet these more stringent NO_x emission reduction requirements which became effective in 2004, IPL installed Selective Catalytic Reduction ("SCR") equipment on Pete Unit 2, Pete Unit 3 and HSS Unit 7 along with several low NO_x clean coal technology ("CCT") projects on other units. The Pete SCR units commenced operations in May 2004 whereas the HSS Unit 7 SCR came online in May 2005.

As previously discussed, the EPA issued CAIR in May 2005. The federal CAIR not only required additional SO_2 emission reductions but it also required further NO_x emission reductions. Phase I of CAIR became effective for NO_x on January 1, 2009, and required NO_x emission reductions by 1.7 million tons, 53% from 2003 levels. In addition, for the first time, NO_x compliance was required on a year-round basis in addition to the annual summer ozone requirements. Phase II of CAIR was scheduled to become effective on January 1, 2015.

IPL has already substantially met the Phase I CAIR emission reduction requirements for NO_x as a result of the installation of the SCR equipment on Pete Unit 2, Pete Unit 3 and HSS Unit 7. The only major impact from CAIR Phase I is IPL must now operate its NO_x emission reduction equipment on a year-round basis.

As mentioned earlier, EPA issued replacement rule, known as CSAPR, which has faced legal challenges for which the details of the outcome remain unknown.

Regional Haze

A Regional Haze rule established planning and emissions reduction timelines for states to use to improve visibility in national parks throughout the U.S. The rule sets guidelines for states in setting Best Available Retrofit Technology ("BART") at older power plants. The EPA determined that states, such as Indiana, which adopt the federal CAIR cap-and-trade program for SO_2 and NO_x will be allowed to apply federal CAIR controls to satisfy BART requirements. The Indiana Air Pollution Control Board also approved a final rule implementing BART which provides that sources in compliance with federal CAIR controls are also in compliance with BART requirements for SO_2 and NO_x. It is anticipated the CSAPR will also meet the BART requirements.

Mercury and Air Toxics Standard ("MATS")

In February 2012, EPA issued the final MATS Rule. MATS places strict emission standards equivalent to the top twelve percent in the industry for each of the four groups of Hazardous Air Pollutants ("HAPs"), as defined in Section 112 of the Clean Air Act ("CAA"): (1) mercury ("Hg"); (2) non-mercury metal HAPs (e.g., barium, beryllium, cadmium, and chromium, among others); (3) acid gas HAPs (e.g., hydrochloric acid ("HCl"); and (4) organic HAPs (e.g., dioxins and furans).

First, the MATS rule establishes a mercury limit of 1.2 lbs/TBtu on a 30-day rolling average on a single unit basis. The rule also allows for emissions averaging on multiple units. In the case of averaging multiple units, the rule establishes a mercury limit of 1.0 lb/TBtu on a 90-day rolling average. EPA allows emissions to be monitored using either Hg continuous emissions monitoring system ("CEMS") or sorbent trap monitoring. Second, the MATS rule limits acid gas emissions by establishing an emissions limit on HCl of 0.0020 1b/MMBtu with compliance demonstrated by frequent stack testing or HCl CEMS. Third, the MATS rule limits non-mercury metal HAPs. The rule allows compliance to be demonstrated with a filterable particulate matter limit of 0.030 lb/MMBtu, based on PM continuous parametric monitoring system ("CPMS"), PM CEMS, or frequent stack testing.

IPL developed a Compliance Plan, which included activated carbon injection and sorbent injection for mercury control and upgraded FGDs for acid gas control on all coal-fired units. The Plan also included upgraded electrostatic precipitators on Petersburg Units 1 and 2 and Harding Street Unit 7, in addition to baghouses on Petersburg Units 2 and 3 for particulate and mercury control. Finally, the Compliance Plan includes CEMS for Hg, HCl, and PM. In development of IPL's MATS Compliance Plan, it was also determined that installation of the necessary controls was not economical for the smaller, less controlled units, Eagle Valley Units 3-6 and Harding Street Units 5 and 6.

IPL received IURC approval in Cause No. 44242 to proceed with its MATS Compliance Plans and construction of Petersburg controls is currently underway. However, it was later determined that when considering the cost of complying with National Pollutant Discharge Elimination System ("NPDES") requirements and other potential future environmental regulations for HSS Unit 7 that the MATS controls were no longer economical and are no longer being installed for HSS Unit 7. IPL has proposed in Cause No. 44540 to refuel HSS Unit 7 from coal to natural gas. The costs, if approved, are listed in Section 5, Short Term Action Plan, Figure 5.5. See the Water section below for more detail on NPDES requirements.

National Ambient Air Quality Standards

EPA is required under the CAA to set NAAQS for air pollutants that endanger public health or welfare. There are several NAAQS but only three directly impacting coal-fired power plants: SO_2, ozone, and particulate. NAAQS do not directly limit emissions from utilities, but states must develop State Implementation Plans ("SIPs") to achieve emissions reductions to address each NAAQS when an area is designated as nonattainment.

Currently, the counties in which IPL operates (Marion, Morgan, and Pike) are designated as attainment or unclassifiable for all pollutants, except SO_2. The areas in which IPL operates are all currently designated as nonattainment for SO_2. As a result, IDEM must develop a SIP establishing new requirements to ensure that the areas return to attainment. This is discussed in greater detail in the next section.

Greenhouse Gas

The only current national regulation for GHG is for existing sources with significant increases in emissions and for new sources. Congress has been unable to implement a national GHG program due to the potential impacts on a struggling economy. Potential future regulation in this area is discussed in the Impending and Future Regulations later in this section.

Existing Controls to Reduce Air Emissions

As shown in Figure 3.1 below, IPL has already installed a myriad of environmental pollution control equipment. IPL has invested over $600 million in the last ten years which has significantly reduced IPL's NO_x, SO_2, and particulate matter emissions as outlined below.

- Pete Unit 2 and Pete Unit 3 SCR in 2004
- HSS Unit 7 SCR in 2005
- Pete Unit 3 FGD upgrade in 2006
- HSS Unit 7 FGD in 2007
- Pete Unit 4 FGD upgrade 2011

Figure 3.1 – IPL Generating Units: Environmental Controls

Unit	Fuel	ICAP Rating (MW)	Environmental Controls
Pete Unit 1	Coal	230	FGD, NN, LNB/OFA
Pete Unit 2	Coal	415	FGD, SCR, LNB/OFA
Pete Unit 3	Coal	540	FGD, SCR
Pete Unit 4	Coal	530	FGD, NN, LNB
Pete DG	Diesel	8	
	Subtotal	1,723	
HSS Unit 5	Coal	100	SNCR, NN, LNB/OFA
HSS Unit 6	Coal	100	SNCR, NN, LNB/OFA
HSS Unit 7	Coal	410	SCR, FGD, NN, LNB/OFA
HSS CTs 1-2	Oil	32	
HSS CT 4	Oil/Gas	79	Water Injection
HSS CT 5	Oil/Gas	79	Water Injection
HSS CT 6	Gas	154	LNB
HSS DG	Diesel	3	
	Subtotal	957	
Eagle Valley Unit 3	Coal	40	
Eagle Valley Unit 4	Coal	55	LNB/OFA
Eagle Valley Unit 5	Coal	61	LNB/OFA
Eagle Valley Unit 6	Coal	100	NN, LNB/OFA
Eagle Valley DG	Diesel	3	
	Subtotal	259	
Georgetown GT 1	Gas	75	LNB
Georgetown GT 4	Gas	75	LNB
	Subtotal	150	
	Total	3,089	

Source: IPL

Note: Acronyms used in Figure 3.1 – CCOFA (Closed-Coupled Overfire Air), FGD (Flue Gas Desulfurization), LNB (Low NOx Burner), NN (Neural Net), SCR (Selective Catalytic Reduction), SNCR (Selective Non-Catalytic Reduction), SOFA (Separated Overfire Air)

As a result of HSS refueling to NG, Petersburg MATS Controls, and Eagle Valley CCGT replacement generation, IPL expects to achieve considerable reductions in fleet-wide emission rates by 2017 from current (2013):

- 67% reduction in SO_2 emission rate
- 23% reduction in NO_x emission rate
- 23% reduction in PM emission rate
- 76% reduction in Hg emission rate
- 7% reduction in CO_2 emission rate

Water

The National Pollution Discharge Elimination System ("NPDES") permit system obtains its authority from Clean Water Act ("CWA"). Section 402 requires permits for the direct discharge of pollutants to the waters of the U.S. These permits, which IPL maintains for each of its power plants, have three main components: technology based and water quality based effluent limitations; monitoring requirements; and reporting requirements.

Effluent limitations identify the nature and amount of specific pollutants that facilities may discharge from regulated outfalls which are identified by unique numbers and internal wastewater streams as defined by 40 CFR Part 423. Currently, the NPDES permits require that the outfalls be monitored regularly for specified parameters.

On August 28, 2012, the IDEM issued NPDES permit renewals to Petersburg and Harding Street. These permits contain new Water Quality Based Effluent Limits ("WQBELs") and Technology-Based Effluent Limits ("TBELs") for the regulated facility NPDES discharges with a compliance date of October 1, 2015 for the new WQBELs. IPL sought and received approval to extend this compliant date to September 29, 2017, through Agreed Orders from IDEM. The NPDES permits limit several pollutants, but the new mercury and selenium limits drive the need for additional wastewater treatment technologies at Petersburg and Harding Street. IPL determined that installation of the necessary wastewater treatment technologies and other potential future environmental requirements in addition to the necessary Mercury and Air Toxic Standard (MATS) controls described in IPL's case-in-chief Cause No. 44242 were no longer the reasonable least cost plan for HSS. Instead, IPL is currently proposing to refuel HSS Unit 7 to operate on natural gas which reduces the cost to comply with environmental regulations and reduces the impact on the environment.

In addition to establishing effluent limits, the NPDES permit also includes compliance requirements with Section 316(a) and Section 316(b) of CWA. Section 316(a) provides thermal effluent limitations for certain facility outfall discharges which IPL must meet. These limits ensure the facility does not harm the fish, shellfish, and wildlife of the receiving waterbody. Section 316(b) provides regulations requiring that facility cooling water intake structures demonstrate the best technology available to minimize adverse environmental impact. In addition, EPA has recently modified its cooling water intake regulations under Section 316(b) of CWA.

Solid Waste (Solid Waste, Hazardous Waste and Disposal)

The solid waste generated at IPL's power plants is classified as either non-hazardous or hazardous. IPL generates hazardous and non-hazardous waste with the handling of both waste streams regulated under the Resource Conservation and Recovery Act ("RCRA").

Hazardous Waste

Hazardous waste is regulated under RCRA Subtitle C. There are three categories of hazardous waste generators for industry with each category having its own scope of regulations that must be met. The more hazardous waste that is generated, the higher the risk to the environment, hence the more regulation and oversight is imposed.

The three categories of hazardous waste are: 1) large quantity generator ("LQG"); 2) small quantity generator ("SQG"); and 3) conditionally exempt small quantity generator ("CESQG"). IPL plants are historically categorized as SQG and CESQG. As such, IPL faces minimal regulations and risk in this area.

Non-Hazardous Waste

Solid waste is regulated under Subtitle D of RCRA. IPL generates a large amount of solid waste every year that must be handled in accordance with this regulation. The primary sources of non-hazardous waste in the steam electric industry are fly ash, bottom ash, and scrubber sludge resulting from the FGD process. The fly ash and bottom ash are generated from the combustion of coal. Generally, IPL generates about 10% ash from the burning of coal or approximately 800,000 tons of ash per year, based on a typical coal burn of about 8,000,000 tons of Indiana coal per year. All ash is managed in accordance with federal, state and local laws and permits.

Ash is normally placed in ponds for treatment via sedimentation, to which the effluent is regulated pursuant to NPDES, shipped back to mines, and/or reused in an environmentally sound manner. In addition, fly ash is mixed with dewatered scrubber sludge and lime to make a stabilized product which is disposed of in a permitted, on-site landfill. Further, the Pete Units 1, 2, and 4 and HSS Unit 7 FGD, produce commercial grade gypsum from FGD operations that can be beneficially used for wallboard manufacturing, cement manufacturing, and agricultural use. In general, ash management activities have not changed for several years. However, more stringent ash management rules are anticipated, as discussed in the next section.

Pending and Future Regulations – Significant Environmental Effects

[170-IAC 4-7-6(a)(4)]

There are a number of environmental initiatives that are being considered at the federal level that may impact the cost of electricity derived from the burning of coal. This includes, but is not limited to more stringent regulations requiring:

- Additional SO_2 emission reductions
- Additional NO_x emissions reductions
- More stringent water management including 316(a) and 316(b)
- Metal and other various pollutant reductions associated with wastewater effluents
- More stringent ash management handling requirements for both wet and dry ash

Cross State Air Pollution Rule

The CAIR was promulgated in 2005, but was vacated by the D.C. Circuit Court. On appeal, the Court ruled that CAIR would remain in effect until such time as EPA promulgated a replacement rule. In August 2010, the EPA issued a proposed replacement rule, known as CSAPR, which was subsequently finalized in July 2011. The CSAPR mandated additional cuts in SO_2 and NO_x emissions in two phases: 2012 and 2014. Further, it was a modified cap and trade rule with unlimited trading of allowances within individual states but limited interstate trading. However, prior to CSAPR becoming effective in 2012, several appeals were filed challenging its implementation. On December 31, 2011, the Court granted a request for stay and instructed EPA to implement CAIR during the stay. On August 21, 2012, the Court vacated and remanded back to EPA the CSAPR. As a result, CAIR remains in effect.

On April 29, 2014, the Supreme Court upheld CSAPR, remanding the Rule to the D.C. Circuit Court which lifted the stay on October 23, 2014. Many uncertainties remain related to the potential implementation of CSAPR, including timing, allocation of allowances, and market pricing. As it relates to timing, the D.C. Circuit Court did not specifically address the timeline suggested by EPA, which includes implementation of Phase I in 2015 nd implementation of Phase II in 2017. As it relates to allowances, they may be allocated as originally included in the final Rule or EPA may re-evaluate and re-allocate allowances prior to re-instating the Rule. EPA may address new lower standards in the Rule prior to implementation, making the Rule more stringent. As a result of the uncertainty around the timing and allocation of allowances, there is also significant uncertainty around market pricing associated with this final Rule.

While we cannot predict the outcome of the Court decision or the final Rule which will be implemented, we expect that such a Rule would have a similar impact as that of CAIR or the original CSAPR. As such, IPL expects to comply through the successful operation of our existing pollution control equipment. In addition, IPL may be required to purchase NO_x and/or SO_2 allowances on the open market to supplement our compliance plan.

National Ambient Air Quality Standards

EPA is required under the CAA to set NAAQS for air pollutants that endanger public health or welfare. There are several NAAQS but only three directly impacting coal-fired power plants: SO_2, ozone, and particulate. NAAQS do not directly limit emissions from utilities, but states must develop State Implementation Plans ("SIPs") to achieve emissions reductions to address each NAAQS.

First, as it relates to SO_2, EPA added a new one hour standard for SO_2 of 75 ppb in June 2010. This short-term standard is more stringent than in prior standards and may require additional SO_2 reductions in any area that is designated as not meeting the standard (known as a non-attainment area). On July 25, 2013, the areas in which IPL's Harding Street, Eagle Valley, and Petersburg Generating Stations operate were designated as non-attainment for this standard. SO_2 reductions for coal-fired units may be required by a SIP developed to meet new SO_2 NAAQS as early as 2017. On September 10, 2014, IDEM published proposed SO_2 SIP limits for IPL facilities. IPL Petersburg will likely require enhanced operation of the existing FGDs to further reduce SO_2 emissions. IPL is currently evaluating the impact of the proposed limits on the Petersburg facility. IPL's Harding Street and Eagle Valley generating stations are expected to comply with the proposed limits because coal-fired operation will cease (pending IURC approval of conversion of HSS 7 to natural gas) prior to the compliance date of the SO_2 SIP, January 2017.

Second, in January 2010, EPA proposed a revision to the NAAQS for ozone. EPA subsequently indicated that it would not propose revisions to the ozone standard until 2013 or later. It is expected that EPA may propose a revision to the NAAQS for ozone in 2014. Although ozone is not directly emitted by power plants, it forms in the atmosphere as a result of chemical reactions involving NO_x and volatile organic compounds in the presence of sunlight. As such, utilities may be required to reduce emissions of NO_x as a result of the revised ozone NAAQS and associated SIP. It is expected that NAAQS attainment under a revised standard and compliance with associated SIP would be required by around 2020.

Third, on January 15, 2013, EPA issued a final rule, which lowered the NAAQS for fine particulate matter ("$PM_{2.5}$"). While designations are not yet final and IDEM has not developed a SIP, EPA has indicated that they expect 99% of counties (including all of Indiana) to meet the standard by 2020, when attainment is required, without any additional controls. In addition, the baghouses currently planned for installation on Petersburg Units 2 and 3 will further reduce $PM_{2.5}$ emissions.

Greenhouse Gas Regulation

On June 18, 2014, EPA published its proposed Clean Power Plan, which establishes the proposed Best System of Emissions Reductions available for existing sources in accordance with Section 111(d) of the Clean Air Act. The President has set a target date of June 1, 2015 for a final rule. States will then be expected to submit their implementation plans to EPA by June 30, 2016, with potential for a one to two year extension.

The proposed Clean Power Plan establishes state-specific rate-based (lbs CO_2/MWh) goals for carbon intensity for which States must develop plans in order to achieve by 2030. States may adopt the rate-based form of the goal of an equivalent mass-based form. EPA based these reductions on "building blocks," or measures of reduction, which include heat rate improvements for existing coal-fired EGUs, substituting generation from carbon-intensive affected EGUs with generation from existing (construction began prior to January 8, 2014) natural gas combined cycle units and renewables, and demand side energy efficiency. States may include some or all of these measures to varying degrees in their State regulations or they may use other measures.

For Indiana, the EPA proposal establishes an interim goal of 1,607 lbs CO_2/MWh, which must be achieved by the State of Indiana on average over the years 2020-2029, in addition to a final goal of 1,531 lbs CO_2/MWh which must be achieved by the State of Indiana in 2030. EPA based these standards on the "building blocks" previously mentioned. Specifically, EPA first used a basis of a six percent heat rate improvement of the coal-fired units in Indiana, which would result in a reduction from 2,158 to 2,029 lbs CO_2/MWh. Second, EPA based the standards on an increase in dispatch of existing natural gas combined cycle units from 53% capacity factor in 2012 to 70% capacity factor in 2020. Third, EPA based the standards on re-dispatch to renewables from a 2012 value of 3% of Indiana's total generation to a value of 6.6% by 2029. Lastly, EPA based the standards on Indiana achieving a 1.5% annual incremental savings as a percentage of retail sales by 2025 and cumulative savings as a percentage of retail sales of 11.66% by 2029.

At this time, we cannot predict the final outcome of the Clean Power Plan as it is currently a proposed rule and the State will have discretion in its implementation. However, based on the proposed rule, the impacts may include decreased dispatch of coal-fired generation, increased dispatch of natural gas and renewable generation, and increase demand side energy efficiency measures.

Cooling Water Intake Structures – Clean Water Act Section 316(b)

Section 316(b) of the Clean Water Act requires that the location, design, construction and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact. Specifically, the 316(b) Rule is intended to reduce the impacts to aquatic organisms through impingement and entrainment due to the withdrawal of cooling water by facilities. In April 2011, EPA published a proposed rule which would set requirements that establish the "Best Technology Available" to minimize such impact. EPA released a final rule on May 19, 2014.

The rule could require closed cycle cooling systems. Alternatively, utilities could be faced with installing less costly controls, like modified travelling screens and fish handling and return systems. Three of the five IPL coal-fired units are currently equipped with closed cycle cooling systems. Another is equipped with a cooling tower which dissipates approximately one-half of the waste heat generated by that unit. The impact of this rule will be dependent upon IDEM's determination for Best Technology Available for the IPL generating stations.

Coal Combustion Residuals (CCR)

Utilities generate ash and other CCRs from the burning of coal and associated activities. Some of the CCRs are beneficially used in products such as concrete and wallboard while some are generally treated in on-site ash ponds or disposed in on-site landfills.

On three separate occasions over the last 20 years, EPA has conducted extensive research on what impacts CCRs have on land and water. Each time, EPA has ruled that CCRs were not hazardous waste. Now, EPA is once again determining how and at what level to regulate CCRs. On June 21, 2010, EPA published regulations for CCRs. EPA indicated that it is considering two primary options: (a) regulate CCRs as a solid waste under Subtitle D of the Resource Conservation and Recovery Act ("RCRA"); or (b) regulate ash as a hazardous waste under Subtitle C of RCRA. It is currently expected that EPA will issue a final rule in December 2014. The outcome could potentially require closure and capping of existing ponds, additional CCR disposal costs, and the installation of groundwater monitoring.

Summary of Potential Impacts

These regulations would potentially require IPL to incur additional expenses for compliance in the future. Figure 3.2 below provides a summary of these potential regulations including potential timing and preliminary cost estimates.

Figure 3.2 – Estimated Cost of Potential Environmental Regulations

Rule	Earliest Expected Compliance Date	Preliminary Estimated Capital	Preliminary Estimated Annual O&M
CSAPR	January 2015	$0	$0
CCR*	Late 2019	$21M-$30M	$3M-$35M
CWA 316(b)	2020	$6M-$154M	$0M-$6M
ELG	2018	$0M-$43M	$0M-$1M
GHG	2020	TBD	TBD
NAAQS	2017	$27M-$174M	$13M-$15M

*Includes estimated pond closure costs for the Petersburg Generating Station. It does not include the Eagle Valley Generating Station and HSS pond closure costs because IPL will incur those costs at the time they cease burning coal regardless of CCR outcome.

Source: IPL

Section 4. INTEGRATION

Resource Evaluation Process

[170-IAC 4-7-4(b) (1)] [170-IAC 4-7-8(a)]

The goal of IPL's integrated resource planning effort is to identify a resource plan that reliably serves IPL customers while meeting all federal, state, and IURC requirements, maintains rates at the reasonable least cost, and remains robust against the risks of uncertain future landscapes. This section describes the process to utilize modeling data inputs, define scenarios, assess capacity expansion plans, identify potential resource plans, analyze modeling results and select IPL's preferred resource portfolio. Subsections 4A through 4D contain detailed information to support the narrative as shown below.

Subsection	Topic
4A	Resource Options
4B	Demand Side Management
4C	Transmission and Distribution
4D	Markets Trends and Forecasts

To achieve this, IPL selects and tests resource plans against future landscapes that target the key drivers that may significantly impact the electric industry and IPL customers. IPL combines the outcome of the future landscape analyses with other resource selection requirements and targets to select a robust plan which meets IPL's resource goals and represents IPL's preferred resource portfolio strategy.

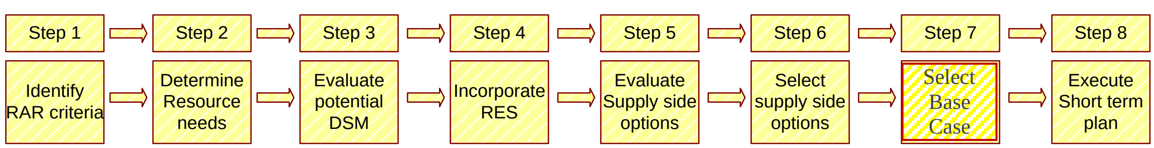
As discussed in detail in the Changing Business Landscape and Environmental Rules and Regulations (Sections 2 and 3), the electric industry faces a multitude of environmental challenges and landscape uncertainties, but also some opportunities for change. EPA's existing, pending, and future regulations governing air, water, and solid waste targeting coal-fired generation clearly challenges existing and future generation resources. Significant among the challenges are the recent and pending EPA rules governing mercury ("Hg") and hazardous air pollutants, and new rules and requirements pending around water and solid waste management. Additionally, Greenhouse gas ("GHG") regulation has recently been proposed by EPA through the Clean Power Plan increasing the challenges faced by existing and new generating units' owners and operators.

In addition, the Indiana General Assembly passed legislation eliminating the previously established IURC target levels of energy efficiency DSM. Regardless, future cost-effective DSM will continue to be a resource used by IPL, which will reduce IPL's future load growth and future supply needs. IPL has included significant DSM savings in this IRP as described in Section 4B.

The outlook for natural gas ("NG") supply and prices remains a positive note for utilities. The continued commercial use of hydraulic fracturing ("fracking") technology has opened up abundant reserves of shale gas supplies, driving NG supplies higher and prices lower. Forecasts reflect prolonged low NG prices throughout the 20 year forecasted period. NG supplies have historically been more risky relative to coal, but access to abundant gas created by fracking technology has reduced the volatility in gas markets, pricing, and sourcing reliability. Gas-fired generation remains a more viable resource consideration, especially in light of the proposed EPA Clean Power Plan since gas-fired generation emits significantly less GHG emissions than coal-fired generation.

To assist in modeling these drivers and conducting IPL's resource planning evaluation, IPL engaged Ventyx in a consulting and modeling role for its integrated resource planning. Ventyx's extensive modeling capability with the scenario analyses of future landscapes provides valuable insights into how specific resource plans perform against a range of possible outcomes. This cost-based evaluation is supplemented by additional decision criteria important to the planning process and ultimate resource selection. Inclusion of criteria, such as fuel source reliability and diversity, new technology reliability, demand side resources, and the timing of likely Greenhouse gas ("GHG") regulation, present planning challenges. IPL employs additional consultants with specific expertise in demand side management ("DSM") with multiple test criteria for DSM selection as described in Section 4B. The resource evaluation and planning at IPL follows a robust multi-step process, as shown below in Figure 4.1, which incorporates refining long-term plans based on dynamic challenges in business and regulatory environments. The goal of this process is to propose a preferred resource portfolio to provide IPL customers with long-term low cost, low risk and reliable electricity service.

Figure 4.1 – IPL's Resource Evaluation Process



Step 1. Identify resource planning criteria including the target reserve margin consistent with MISO resource adequacy requirements ("RAR").

Step 2. Determine resource needs to meet that criteria based on a gross internal demand ("GID") load forecast.

Step 3. Evaluate and model potential DSM programs and incorporate cost-effective DSM into the plan and also into a netted load forecast, to determine net internal demand ("NID"). Add demand response resources including Air

Conditioning Load Management ("ACLM"), interruptible rider programs, and smart grid enabled Conservation Voltage Reduction ("CVR") as resources. [12]

Step 4. Incorporate required supply resources, such as renewable generation, as appropriate and prudent as projected to be required by state or federal law. Currently, Indiana does not have a mandatory Renewable Energy Standard ("RES").

Step 5. Determine remaining resource requirements and evaluate needs against an array of viable supply-side generation options based on minimum revenue requirements criteria and the future volatility/risk around those generation options in future scenarios.

Step 6. Assess supply options against all resource selection objectives, including minimum revenue requirements, risk planning, fuel source reliability, possible future legislation and other pertinent planning criteria.

Step 7. Select a base case expansion plan that incorporates all the DSM, renewable and supply resources that best meet IPL's long term planning objectives.

Step 8. Identify and execute the short-term resource plan as appropriate, while continuing to refine, challenge, and update its longer-term resource plan as new information becomes available.

Source: IPL

Resource Planning Criteria

[170-IAC 4-7-4(b)(9)] [170-IAC 4-7-6(c)(2)] [170-IAC 4-7-6(d)(4)]

As a member of the Midcontinent Independent System Operator ("MISO"), IPL is subject to the planning reserve margin requirement calculated by MISO. MISO determines the level of Planning Reserve Margin Requirement ("PRMR") necessary for the footprint and each Local Resource Zone to meet the 1 day in 10 years Loss of Load Expectation ("LOLE") standard. LOLE calculations take into account factors that determine the required level of Planning Reserve Margin necessary to meet the 1 day in 10 years standard required by FERC jurisdictional Reliability Entities. These factors include but are not limited to load shapes, load forecast uncertainty, regional load diversity, existing and planned capacity resources, and planned transmission facilities. IPL participates in MISO's regional, sub-regional and technical planning processes. The MISO methodology for determining the PRMR and specific results are identified below.

In order to determine generator capability, all units are required to annually demonstrate their maximum available capacity, by performing tests conducted in conformance with tariff terms and conditions. These tests establish the unit's MISO Installed Capacity ("ICAP") rating. The ICAP rating for each unit is then adjusted by its specific three (3) year average Equivalent Forced Outage Rate Demand excluding outside management control events ('XEFORd").

[12] ACLM is described in Section 4B and CVR is described in Section 4C.

XEFORd is a forced outage rate that includes derate and outage information and is measured only during periods when the resource is in demand. This adjusted value establishes the Unforced Capacity ('UCAP") for the unit. Resources with higher availability contribute more toward resource adequacy. The Unforced Capacity ("UCAP") methodology recognizes the relative contribution toward the MISO-wide resource adequacy goal of each generating unit.

The Zonal Resource Credit ("ZRC") requirements based upon one MW unit of Planning Resource converted from one MW of UCAP, can vary by zone. Figure 4.2 below illustrates the FERC approved zonal boundaries IPL is in Zone 6.

Figure 4.2 – MISO Zones

Source: MISO

Resource Adequacy Requirements

MISO requires market participants to identify capacity resources to meet the PRMR based upon specific load requirements on a planning year basis. Planning years are defined as June 1 of the current year through May 31 of the subsequent year.   For the 2014-2015 planning year, LOLE results yielded a Planning Reserve Margin ICAP ("PRMICAP") of 14.8 % and a Planning Reserve Margin UCAP ("PRMUCAP) reserve margin of 7.3 %. The PRMUCAP for the 2015-2016 planning year will be published in November of 2014 and preliminary results show a decrease in the PRMUCAP of 0.2%.

Since MISO began calculating the PRMR for its LSEs, it has made annual adjustments to that calculation as well as to the Resource Adequacy construct. The current annual MISO resource adequacy construct may be modified by the next planning year to either replace the annual construct with a seasonal construct or to add seasonal capacity products. A Seasonal Construct is favored by utilities with an obligation to serve as aligns better with its obligations to customers, allows utilities to better adapt changing market, business, and regulatory landscapes, and addresses the winter peaking issues of natural gas. IPL is a leader in the resource adequacy related stakeholder process and actively provides substantive comments to MISO to influence change in the best interests of our customers.

Planning Reserve Margin Modeling

IPL's minimum PRMR established by MISO for 2014 equates to an effective 14.8% reserve margin, representing an increase from 2012 (13.1%) and 2013 (14.2%). As identified above, many factors are used by MISO to establish an LSE's resource adequacy requirement. The LSE's planning reserve margin changes annually as MISO modifies its LOLE analysis and as a result of changes in its EFORd and diversity. IPL's ICAP ratings can also change annually due to the results of unit testing. For Ventyx's long term modeling purposes in this IRP, IPL identified a 14% planning reserve margin to be used consistent with IPL's summer-rated capacity. This long-term modeling number provides for targeted reserves in the range of future expected MISO-determined resource needs and is consistent with the MISO specific calculations shown in Figure 4.3.

Planning Year beginning June 1, 2015 and ending May 31, 2016

IPL is retiring its Eagle Valley units 3 through 6 by April 16, 2016 to comply with its MATS deadline. However, this retirement date is 6.5 weeks before the end of the 2015-2016 MISO Planning Year. MISO's current resource adequacy requirement states a capacity resource that clears a planning reserve auction must be available during the entire commitment period otherwise replacement capacity from the same zone must be secured to avoid tariff compliance penalties levied by FERC. During this 6.5 week low load period IPL has capacity in excess of its requirement to reliably serve its load. The requirement to buy additional capacity is unjust and unreasonable and would be merely a transfer of wealth with no impact on resource adequacy for IPL or Zone 6. In order to avoid the excess costs associated with this provision, on June 20, 2014, IPL submitted a request to FERC to waive the replacement requirement needed during the stated 6.5 week timeframe. With the support of the IURC comments filed with FERC, this request was granted by FERC on October 15, 2014. As a result of FERC granting the Waiver Request, IPL and its customers will not be forced to bear the costs of unneeded capacity.

Determine Resource Needs

[170-IAC 4-7-4(b)(6)] [170-IAC 4-7-5(b)] [170-IAC 4-7-6(b)(8)] [170-IAC 4-7-8(b)(3)]

Load Forecast, Incorporation of Demand Side Management, and Application of Planning Criteria

IPL's load history and forecast of economic drivers are used to derive a base econometric forecast. IPL then overlays any non-economic drivers that are in the landscape, but not in the economic drivers, such as appliance efficiencies, to derive the gross internal demand ("GID"). The GID load forecast includes historical conservation or energy efficiency DSM, but excludes any new energy efficiency DSM initiatives or load management programs.

IPL determines the cost-effective energy efficiency DSM levels to be included in the resource planning throughout the 20 year planning period based on its forecast described in Section 4B. The cost-effectiveness tests of the DSM programs incorporate the avoided supply capacity and energy costs used in the IRP model. The same capacity and energy costs are used to determine the cost-effectiveness of a new generating unit for production cost modeling to evaluate demand-side resources on a consistent and comparable basis with supply side resources. DSM resources include energy efficiency and demand response programs dependent upon customer participation. The demand response programs, including ACLM and loads associated with IPL interruptible tariffs, are included as a "first resource" option in the capacity expansion plan. Since energy efficiency programs do not have significant capacity attributes and are not dispatchable, they are built in next as reductions to load requirements followed by solar DG energy secured through Rate REP.

IPL recognizes the challenge of DSM program benefit cost test evaluation results not directly aligning with PVRR analysis of the production cost model. Using the same cost inputs for both models aligns outcomes. IPL's short term needs to mitigate environmental regulatory risks through generation additions and retrofits results in excess energy production capability in the IRP planning period. Theoretically, a model including DSM as an optional choice would likely not choose DSM in this situation. IPL recognizes the importance of consistency in DSM programs to focus on changing customer behavior though a multi-year approach; therefore, DSM continues to be included as described above.

As further described in Section 4B, IPL's DSM evaluation process includes estimates of future DSM profiles, program measure duration, program free riders, and coincident peak impacts to identify the expected load impacts. Since these long-term DSM programs will be more clearly defined in future filings with the IURC, estimates of their load impacts are used. The GID forecast is then adjusted to incorporate all cost effective energy efficiency and demand response to derive the net internal demand ("NID"). These load forecasts are shown in the supply-demand balance report in Figure 4.3.

IPL's resource planning reserve margin is applied to the NID forecast to determine the additional IPL resource needs, and used by Ventyx in resource scenario modeling. Note, the current MISO resource adequacy methodology is based on short-term targeted IPL resource requirements rather than a long-term targeted IPL reserve margin, which is influenced by both IPL and regional MISO conditions and correlations as discussed previously.

Figure 4.3 - IPL's Load and Resource Balance Report

PEAK	**15-16**	**16-17**	**17-18**	**18-19**	**19-20**	**20-21**	**21-22**	**22-23**	**23-24**	**24-25**
IPL's Non-Coincident Peak Forecast	2,965	2,989	2,995	2,999	3,001	3,009	3,008	3,013	3,021	3,030
Demand Reduction Programs (MW)	**15-16**	**16-17**	**17-18**	**18-19**	**19-20**	**20-21**	**21-22**	**22-23**	**23-24**	**24-25**
Demand Response	63	63	63	63	63	63	63	63	63	63
Conservation Voltage Reduction (CVR)	20	20	20	20	20	20	20	20	20	20
Total	83	83	83	83	83	83	83	83	83	83
Effective Capacity Reserve Margin										
Net Internal Demand	2,882	2,906	2,912	2,916	2,918	2,926	2,925	2,930	2,938	2,947
PRM_{ICAP}	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%
IPL ICAP Requirement	3,285	3,313	3,319	3,324	3,327	3,336	3,335	3,340	3,349	3,359
MISO Installed Capacity (ICAP)	3,119	2,861	3,532	3,532	3,532	3,532	3,532	3,532	3,532	3,532
Effective Reserve Margin using MISO ICAP	8%	-2%	21%	21%	21%	21%	21%	21%	20%	20%

Source: IPL

Supply Resource Modeling

After inclusion of all DSM, IPL plans to satisfy the balance of its resource needs through existing and new supply-side generation and/or capacity purchases. Existing IPL generation resources are undergoing changes as described above. In addition, recent changes in wastewater permit requirements dictated extensive analysis of remaining coal-fired units as described below.

National Pollutant Discharge Elimination System ("NPDES") Analysis

Concurrent with the 2014 IRP process, IPL conducted an extensive evaluation of IPL's two coal-fired generating plants, surrounding the upcoming costs of NPDES compliance along with other potential environmental regulations. As discussed in Section 3, Environmental, NPDES permit requirements regulate and authorize specific industrial wastewater and Stormwater. On August 28, 2012, the IDEM issued NPDES permit renewals to Petersburg and Harding Street, which contain new Water Quality Based Effluent Limits and Technology-Based Effluent Limits, with a compliance date of September 29, 2017, resulting from an IDEM approved extension as described in Section 3 Environmental Rules and Regulations.

The NPDES wastewater compliance projects are centrally designed systems to treat the wastewater and Stormwater from each generating plant, not unit-specific controls, and are primarily driven by the presence of coal-fired generation. Harding Street Unit 7 will be the sole coal-fired unit at Harding Street following the pending refuel of units 5 and 6, and contribute the majority of the costs associated with NPDES compliance. Contrarily, at Petersburg, all generating units are coal-fired, minimizing the incremental impact that any one unit has on NPDES compliance costs.

Using the unit-specific NPDES compliance costs, IPL estimated the full life cycle cost profile of the Big Five coal units (Petersburg Units 1 through 4 and Harding Street Unit 7) and compared those costs to replacement of the coal units with alternative resource options over the estimated remaining life of the units. In order to assess various risks and uncertainties, this analysis included stress testing resource options by considering future unknown environmental regulations including Greenhouse Gas Regulation, National Ambient Air Quality Standards, Coal Combustion Residuals, and cooling tower water impacts called 316(b), but plausible risks by way of discrete scenario analysis and probabilistic decision tree scenario analysis.

The analysis identified the Petersburg NPDES retrofit, inclusive of all four Petersburg units, as the reasonable least cost plan. Furthermore, the NPDES costs at Petersburg are relatively low on a per-unit basis. A simple payback analysis supported the scenario analysis showing all the Petersburg units as having the low cost PVRR under all future scenarios (except for a low gas price scenario where Pete 1 was near breakeven) through 2019. Conversely, high incremental NPDES capital costs associated with Harding Street 7 along with avoidable MATS costs and potential future environmental regulations do not justify continuing Harding Street 7 on coal. The results identified the conversion of Harding Street Station ("HSS") Unit 7 to gas-fired generation as the reasonable least cost plan. Therefore, in the IRP, HSS Unit 7 is modeled under the assumption that the unit will be refueled in 2016.

The NPDES analysis was a detailed analysis specific to NPDES compliance costs and other pending and future regulations costs on IPL's existing generation. Its primary focus was on the economics of the NPDES retrofit decision. The IRP analysis, discussed below, is a much broader resource planning evaluation focused on future resources needs. Using both scenario analysis and a probabilistic decision tree analysis, the NPDES analysis considered a wide range of scenarios surrounding Greenhouse Gas Regulation, National Ambient Air Quality Standards, Coal Combustion Residuals, and 316(b). Whereas, in the IRP modeling, the more known/probabilistic cost estimates of these regulations discerned from the NPDES analysis were used, with the exception of Greenhouse Gas Regulation where three scenarios were used. Both sets of modeling included high, low, and base natural gas forecasts.

On October 16, 2014, IPL filed its NPDES compliance strategy with the IURC, comprising of retrofitting Petersburg and refueling HSS Unit 7. Additional details on IPL's compliance plan as well as the analysis performed can be found under IURC Cause No. 44540.

Existing Generation

[170-IAC 4-7-6(a)(1)] [170-IAC 4-7-6(a)(2)]

In addition to current wind and solar Power Purchase Agreements ("PPAs") described later in this section, Figure 4.4 shows IPL's current generation resources with projected summer installed capacity ratings used in the model for the next 20 years. These numbers reflect all known and/or planned unit derates, life extensions and retirements. This table includes the identified planned retirements of Eagle Valley Units 3 through 6 by April 16, 2016. Likewise, the replacement generation for the mentioned retirements, the Eagle Valley CCGT, has been integrated with an expected in-service date of spring 2017. Fuel changes have also been identified and incorporated into this table showing the approved refueling of Harding Street Steam Turbine Units 5 and 6 and the anticipated refueling of Harding Street Steam Turbine Unit 7.

Figure 4.4 – IPL's Current Generation Resources with Summer Capacity Ratings (MW)

Generating Resource Report																				
MISO Installed Capacity (MW)	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
HS ST5	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HS ST6	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HS ST7	410	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EV ST3	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EV ST4	55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EV ST5	61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EV ST6	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PETE ST1	230	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	0	0
PETE ST2	415	410	410	410	410	410	410	410	410	410	410	410	410	410	410	410	410	410	410	410
PETE ST3	540	534	534	534	534	534	534	534	534	534	534	534	534	534	534	534	534	534	534	534
PETE ST4	530	526	526	526	526	526	526	526	526	526	526	526	526	526	526	526	526	526	526	526
HS GT4	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79
HS GT5	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79
HS GT6	154	154	154	154	154	154	154	154	154	154	154	154	154	154	154	154	154	154	154	154
GTOWN GT1	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
GTOWN GT4	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
HSS GT1 & GT2	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
PETE IC 1-3	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
EV IC1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HSS IC1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
HS ST5 Gas	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	0	0	0
HS ST6 Gas	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	0	0	0
HS ST7 Gas	0	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	0
EV CCGT*	0	0	671	671	671	671	671	671	671	671	671	671	671	671	671	671	671	671	671	671
Solar	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Total Resources	3119	2861	3532	3532	3532	3532	3532	3532	3532	3532	3532	3532	3532	3532	3532	3532	3532	3332	3105	2675

*Updated Ratings reflect 671 MW of ICAP Capacity resulting from Duct Firing Technology, however 644 MW was used in modeling.

Source: IPL Installed Capacity (Equivalent of MISO ICAP)

New Generation Resource Modeling

Currently, Indiana's voluntary 10% renewable energy standards ("RES") is included in the resource modeling. IPL is well positioned for the future with about 300 MW of associated energy secured under long-term Wind PPAs and an additional 98 MW of solar energy acquired through our Rate REP program. Therefore, absent any pending RES bills, and a solid renewable energy foundation, no specific renewables requirements were used to constrain the generation resource modeling. The supply resource selection process includes consideration of a range of generation resource options, including H-Class CCGT, CT, Nuclear, Wind and Solar. In the IPL 2011 IRP, the Company determined hydroelectric power was not a viable resource. Inputs from this analysis have maintained constant over the last three years; hence, hydroelectric power has not been included in this IRP. While IPL is investigating the feasibility of installing a Battery Energy Storage System ("BESS") to provide ancillary services, capacity and pilot testing for renewable integration, it was not included as a separate new resource in the Ventyx model for this IRP due to MISO tariff conditions, which are not favorable to energy storage.[13] These technologies are identified in detail in Section 4A. IPL would need to incorporate renewable resources to satisfy any RES during this step.

Once the existing resources were profiled and potential new resources were identified, IPL worked with Ventyx to define and model these new generation resources including IPL's cost definitions and operating profiles. The generation profiles are described in Section 4A and include heat rates, Operation and Maintenance ("O&M") costs, capital costs, and emission rates for each technology.

Capacity Purchase Modeling

IPL customers have benefited in recent years from IPL's ability to purchase capacity at prices below the levelized cost of building new capacity. Although bilateral market capacity prices have remained depressed historically, they are not expected to remain at the current level as the supply-demand balance of capacity comes more into equilibrium in the MISO footprint over the next few years. In 2014, MISO Zone 6 Capacity Auction Clearing Price rose sharply to $16.75 /MW-Day compared to the previously established clearing price in the 2013-14 Planning Year of $1.05/MW-Day. Excess capacity supply will likely continue to diminish in the near term as generators are retired in response to EPA rules set to take effect over the next few years, resulting in a continued rise in MISO capacity auction prices. Stemming from the retirements of Eagle Valley Units 3 through 6 in spring 2016, IPL will need to purchase capacity to bridge the gap between the mentioned forced small unit retirements and in-service date of the CCGT. IPL used forecasted rising capacity market prices for IRP modeling Resources are compared to these market prices which influence the timing and/or need of new generation additions.

IRP Modeling Scenarios

[170-IAC 4-7-8(b)(2)] [170-IAC 4-7-8(b)(7)(A)] [170-IAC 4-7-8(b)(7)(B)] [170-IAC 4-7-8(b)(7)(E)] [170-IAC 4-7-4(b)(6)]

With the resource options identified and profiled, IPL worked with Ventyx to help define possible future power industry landscapes. With the assistance from stakeholders in the public meeting process, IPL identified the three drivers that were viewed to have the largest impact on future plans, along with having a great deal of uncertainty linked to them: environmental regulation, natural gas prices, and load variation.

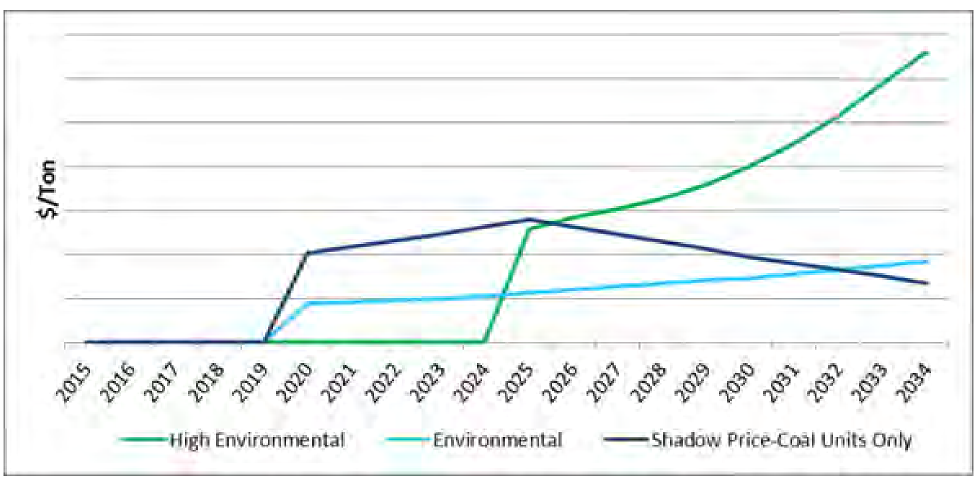
[13] IPL is working with MISO to adapt its tariff and Business Practice Manuals to treat BESS appropriately.

Key Driver #1 – Future Environmental Regulation

IPL considered four environmental landscapes around costs and timing of effective dates for proposed CO_2 regulation. The description associated with each landscape is described below.

- EPA Shadow Price (Base) - The prices are representative of marginal compliance with the EPA's proposed CPP. The modeling for this case applied EPA's shadow prices to IPL's coal unit emissions above the Indiana target emission rate commencing in 2020 using a fixed ($/kW) cost based on the CO_2 building block shadow prices.
- ICF Mass Cap (Environmental) - IPL engaged the consulting firm ICF to provide its CO_2 projections.[14] The prices are representative of ICF's view of the EPA's proposed CPP with the application of aggregate treatment of a cap on CO_2 emissions ("Mass Cap"). This case assumed a market clearing price and was applied in the modeling as an equivalent CO_2 tax to existing fossil generation. The modeling assumes the EPA rules start in 2020 as proposed in the rule making, although ICF's probabilities suggest a reasonable chance of deferred, post 2020, implementation.
- Waxman-Markey (High Environmental) - These prices, developed by Ventyx as part of their 2013 Fall Reference case, are representative of previously proposed federal legislation known as the Waxman-Markey Bill. These prices represent the high range of our CO_2 sensitivities.
- No CO_2 (Low Environmental) - A no CO_2 case that could either reflect no near term regulation or no or very low additional costs needed beyond IPL's current projected resource plan. This shows incremental effects of CO_2 compared to the base case.

Figure 4.5- CO2 Sensitivities



Source: Ventyx

See Section 7, Confidential Attachment 5.1, Ventyx IPL IRP Modeling Summary for pricing.

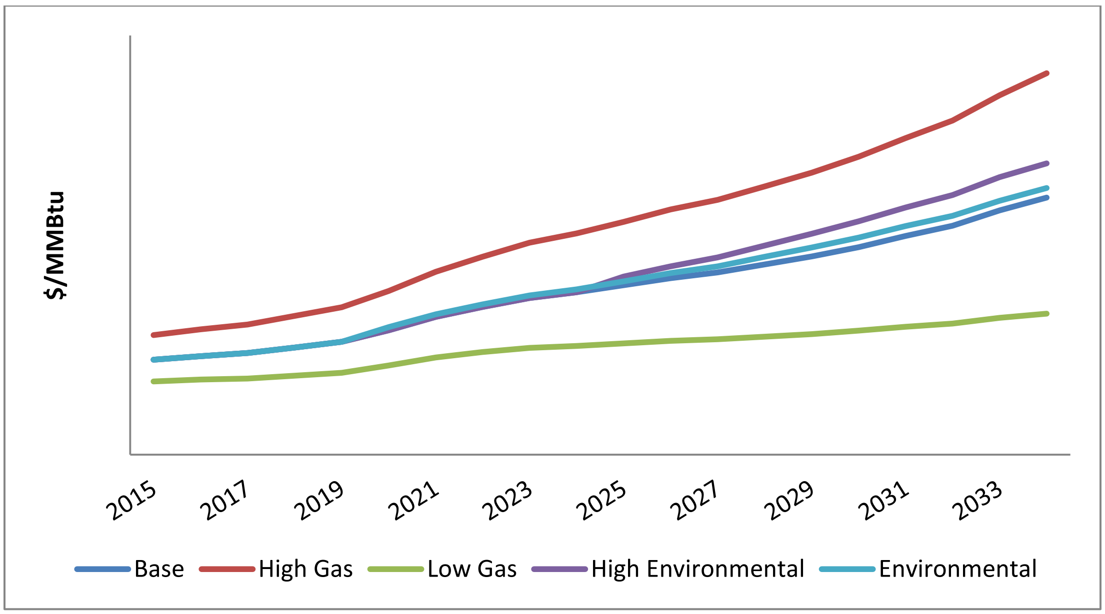
[14] Additional information can be found in IURC Cause No. 44540

Key Driver #2 – Natural Gas Prices

IPL considered five fuel forecasts of NG prices as shown in Figure 4.6. NG pricing has historically been the most volatile, but promising assumptions on shale gas supply and pricing make this fuel source a key resource driver; although, the surge in natural gas plant construction could diminish fuel diversity in the market. See Section 7, Confidential Attachment 5.1, Ventyx IPL IRP Modeling Summary for pricing.

- Base Gas Prices
- High Gas Prices Landscape
- Low Gas Prices Landscape
- Environmental Prices Landscape
- Mass Cap Prices Landscape

Figure 4.6- Natural Gas Sensitivities



Source: Ventyx

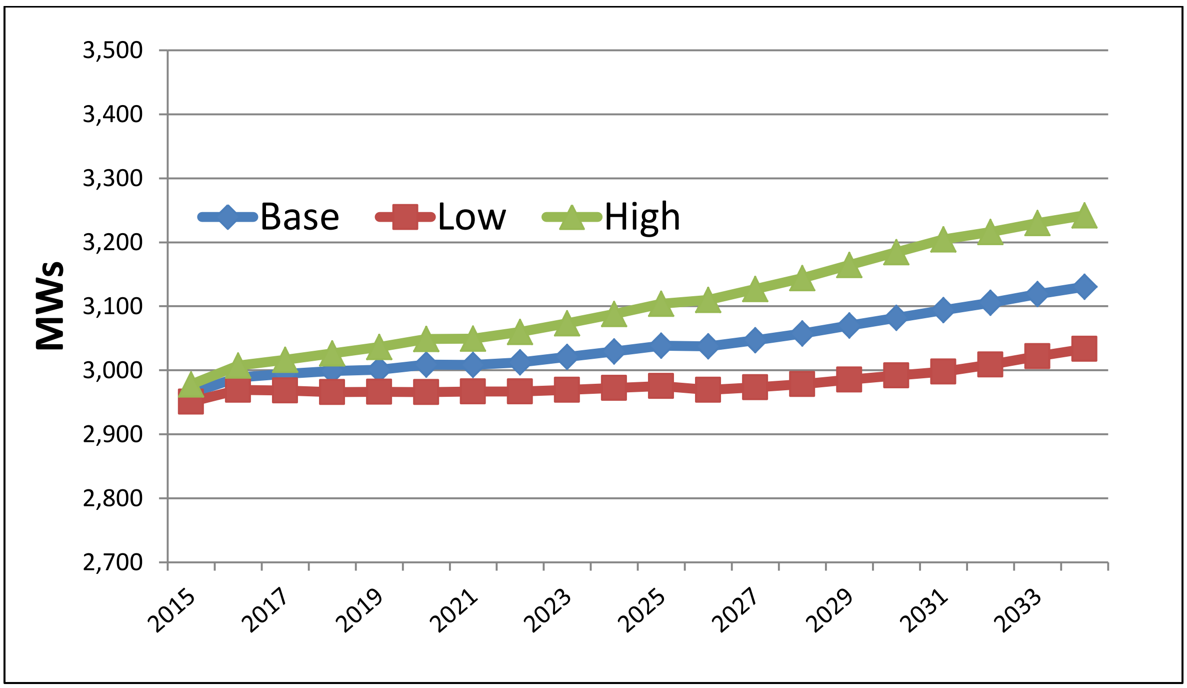
See Section 7, Confidential Attachment 5.1, Ventyx IPL IRP Modeling Summary for pricing.

Key Driver #3 - Load Variation

IPL considered three demand and energy forecasts for load sensitivity. The High and Low Load range was derived from the 2013 IPL-specific State Utility Forecasting Group ("SUFG") forecast. This range was developed primarily based upon economic uncertainty. The forecast scenarios, while based on economic uncertainty, could also be driven by changes in technology, consumer behavioral changes, and State and Federal energy policies. The forecast scenarios should be viewed broadly as demand driven sensitivity scenarios from all load impact sources. For example, the low load forecast could be driven by high DSM levels, a weak economy, or higher distributed generation adoption. See Section 4D for additional details along with the High and Low energy forecast.

- Base Load Forecast (3,131 MW NID in 2034)
- High Load Forecast(3,242 MW NID in 2034)
- Low Load Forecast (3,033 MW NID in 2034)

Figure 4.7- Load Sensitivities (Demand Net of DSM)



Source: IPL

Derived from the three key drivers discussed above, IPL created eight scenarios as shown in Figure 4.8 as a way to screen the capacity expansion resources. In addition to the sensitivities themselves, Ventyx created correlated market prices based on the sensitivities supplied. These scenarios help determine the robustness of possible expansion plans. The use of multiple scenarios allows IPL to identify a Preferred Portfolio that will be competitive in a wide range of future landscapes.

Figure 4.8- IPL's 2014 IRP Modeling Scenarios

Scenario No	Scenario Name	Gas/Market Price	CO_2 Price	Load Forecast
1	Base	Ventyx Base	IPL-EPA Shadow price starting 2020	Base
2	High Load	Ventyx Base	IPL-EPA Shadow price starting 2020	High
3	Low Load	Ventyx Base	IPL-EPA Shadow price starting 2020	Low
4	High Gas	Ventyx High	IPL-EPA Shadow price starting 2020	Base
5	Low Gas	Ventyx Low	IPL-EPA Shadow price starting 2020	Base
6	High Environmental	Ventyx Environmental	Waxman-Markey proxy Ventyx Fall 2013 price starting 2025	Base
7	Environmental	Ventyx Mass Cap	Mass Cap ICF price starting 2020	Base
8	Low Environmental	Ventyx Base	None	Base

Source: IPL

Supply Resource Evaluation

Overall Methodology Description

With the generation resource technologies profiled, the future landscapes identified, and supply resource needs established, the next step was to evaluate the generation technologies against the future landscapes. IPL worked with Ventyx to perform a multi-step evaluation process. First, Ventyx performed a capacity expansion evaluation for the profiled supply resources allowing the model's least-cost planning algorithm to select resources based on resource needs and targeting a minimum revenue requirement objective. Modeling using Ventyx's "Capacity Expansion" module was performed for all future landscapes. Next, based on these results, IPL then derived select resource plans for future landscape analysis. This involved identifying the resource and timing and running the resource portfolio against all future landscapes.

Capacity Expansion Simulation Methodology

[170-IAC 4-7-4(b)(9)] [170-IAC 4-7-7(a)]

The Capacity Expansion simulation uses minimum revenue requirements planning criteria to evaluate generation technologies based on a given set of future landscape assumptions. In this simulation, IPL's retail load, current generating fleet, and future additions are dispatched competitively against MISO-IN market prices, replicating the current MISO market. This is performed by calculating the incremental present value of revenue requirements ("PVRR") for multiple resource expansion plans and selecting the resources and timing that result in the lowest present value. The model is a useful tool in generating informative cost-focused planning insights, based on a given set of future assumptions. Different future landscapes will produce a different set of future drivers and could produce different capacity expansion results.

For the modeling, Ventyx and IPL selected a group of generation options that represent proven and commercially available technologies, as shown in Figure 4.9. Ventyx's Capacity Expansion model was then run for the selected generation technologies against the future landscapes. Additionally, Ventyx's Capacity Expansion model was used to determine if and/or the early retirement of the four units at Petersburg was economic in each scenario.

Confidential Figure 4.9- Supply Resource Options (2013$)

	CT	Combined Cycle – H Class	Nuclear	Photovoltaic	Wind Turbine
Summer (MW)	160	200**	200**	10	50
Winter (MW)	180	212.5**	200**	10	50
Average Heat Rate	[redacted]				
VOM* ($/MWh)					
FOM* ($/kW)					
Capital Cost ($/kW)					

*VOM – Variable Operating and Maintenance Costs, FOM – Fixed Operating and Maintenance Costs
**Partial Units

Source: Ventyx

The expansion simulation modeling is deterministic – looking at one set of future conditions, and does not consider the variance risk of the inputs or other relevant decision criteria. So in that respect, the model does not necessarily generate the preferred solution, but rather information to screen resources and support the overall resource decision making process. Descriptions of the capacity expansion analysis modeling and inputs are discussed below.

Capacity Expansion Results

[170-IAC 4-7-8(b)(7)(C)]

The results of the capacity expansion modeling are presented below. In all scenarios, Eagle Valley ("EV") units 3 through 6 were set to retire in 2016 and Harding Street units 5 through 7[15] were set to be refueled in 2016. Also, all scenarios include the addition of the Eagle Valley CCGT in 2017.

[15] The Harding Street unit 7 refuel from coal to natural gas is currently pending before the IURC in Cause No. 44540.

Figure 4.10 – Capacity Expansion Results

YEAR	Base	High Gas	Low Gas	High Load	Low Load	High Environ-mental	Environ-mental	Low Environ-mental
2015	Market 200 MW	Market 200 MW	Market 200 MW	Market 200 MW	Market 200 MW	Market 200 MW	Market 200 MW	Market 200 MW
2016	Market 450 MW	Market 450 MW	Market 450 MW	Market 500 MW	Market 450 MW	Market 450 MW	Market 450 MW	Market 450 MW
2017	671 MW EV CCGT	671 MW EV CCGT	671 MW EV CCGT	671 MW EV CCGT	671 MW EV CCGT	671 MW EV CCGT	671 MW EV CCGT	671 MW EV CCGT
2018-2019								
2020			Retire Pete 1,2, and 4 CC 200 MW					
2021			CC 800 MW Market 100 MW					
2022			CC 200 MW					
2023								
2024				Market 50 MW		Retire Pete 1		
2025				Market 50 MW		CC 200 MW		
2026				Market 50 MW				
2027				CC 200 MW				
2028						Wind 100 MW		
2029						Wind 150 MW		
2030	Market 50 MW	Wind 100 MW				Wind 100 MW	Market 50 MW	Market 50 MW
2031	Retire HSS 5 and 6 CC 200 MW Market 50 MW	Retire HSS 5 and 6 CC 200 MW Wind 150 MW	Retire HSS 5 and 6 CC 200 MW	Retire HSS 5 and 6 CC 200 MW	Retire HSS 5 and 6 CC 200 MW	Retire HSS 5 and 6 CC 200 MW Market 50 MW Wind 50 MW	Retire HSS 5 and 6 CC 200 MW Market 50 MW	Retire HSS 5 and 6 CC 200 MW Market 50 MW
2032	Market 50 MW	Wind 100 MW				Market 50 MW	Market 50 MW	Market 50 MW
2033	Retire Pete 1 CC 200 MW Market 100 MW	Retire Pete 1 CC 200 MW Wind 50 MW Market 50 MW	Market 50 MW	Retire Pete 1 CC 200 MW Market 50 MW	Retire Pete 1 CC 200 MW	Market 50 MW	Retire Pete 1 CC 200 MW Market 100 MW	Retire Pete 1 CC 200 MW Market 100 MW
2034	Retire HSS 7 CC 400 MW Market 150 MW	Retire HSS 7 CC 400 MW Market 100 MW	Retire HSS 7 CC 400 MW Market 100 MW	Retire HSS 7 CC 400 MW Market 50 MW	Retire HSS 7 CT 180 MW CC 200 MW Market 50 MW	Retire HSS 7 CC 400 MW Market 100 MW	Retire HSS 7 CC 400 MW Market 150 MW	Retire HSS 7 CC 400 MW Market 150 MW

Source: Ventyx

The Capacity Expansion results demonstrate IPL's existing fleet is economic in a wide-range of scenarios. As shown in Figure 4.10, Petersburg Unit 3 was favored in all eight scenarios, Units 3 and 4 were favored in seven of the eight, and Unit 1 was favored in six of the eight. Due to the economic value of IPL's existing fleet and with the addition of the Eagle Valley CCGT, IPL's resource needs are met for the majority of the planning period in most scenarios. Resource additions are only selected in the modeling in connection with retirements, or in the high load scenario.

Evaluation of Scenario Resource Plans

The next step incorporated the results of the capacity expansion modeling, along with IPL's view of future drivers and pending legislation, to derive a targeted selection of resource options for landscape scenario evaluation. With no additional build out over the next 15 years in five of the eight scenarios, IPL identified five different resource plans to determine the impact of Petersburg 1 and 2 retiring early, symbolic of the Low Gas and High Environmental results. The five plans were created to represent the results of the capacity expansion model. The build out plans utilize resources that were selected in the capacity expansion results as a way of creating plans that would be competitive across multiple future landscapes, while also considering the impact of diversification. IPL limited the potential of earlier retirements to the two Petersburg units because that is what the capacity expansion results indicated as most economic and in order to maintain a balance in fuel mix and portfolio diversity. The five different resource plans were then tested across the future landscapes in order to evaluate a range of resource options and combinations of resources.

Figure 4.11 shows the five resource plans that were subjected to additional scenario analyses in this IRP. These scenarios were created based on similar resource sizing and consistent resource timing so as to not bias any one technology. Also, in order to isolate the impact of replacing Petersburg 1 and 2, the planning life or age-based retirements of HSS 5 through 7 were replaced with an equivalent capacity CCGT unit, the predominately favored resource in the Capacity Expansion Plan simulation. Plan 1 and 2 also require additional build in 2033, the end of expected life for Petersburg 1, since these plans exclude the early retirement of the unit in 2024.

Figure 4.11 – Scenario Resource Plans (by Operating Capacity)

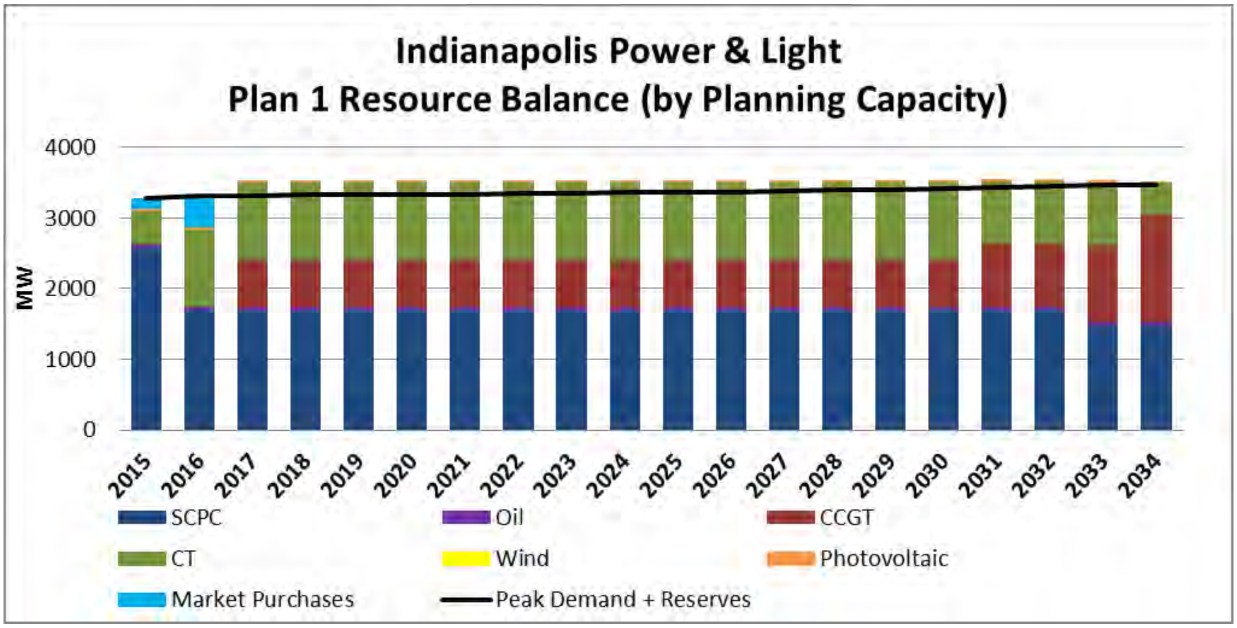
YEAR	Plan 1	Plan 2	Plan 3	Plan 4	Plan 5
2024			Retire Pete 1 & 2	Retire Pete 1 & 2	Retire Pete 1 & 2
2025		Wind 200 MW	CC 600 MW	CT 550 MW & Wind 500 MW	CC 600 MW & Wind 200 MW
2026					
2027					
2028					
2029					
2030					
2031	CC 200 MW	CC 200 MW	CC 200 MW	CC 200 MW	CC 200 MW
2032					
2033	CC 200 MW	CC 200 MW			
2034	CC 400 MW	CC 400 MW	CC 400 MW	CC 400 MW	CC 400 MW

Source: IPL

Plan 1 Expansion

The Plan 1 expansion results, including IPL's existing and proposed generation, are shown in Figure 4.12. For this future landscape, no additional generation is built until the age based retirements of HSS Units 5 and 6 (2031), Petersburg 1 (2033) and HSS Unit 7 (2034). The preferred resource to replace the retired capacity is new CCGT for each retirement.

Figure 4.12 – Capacity Expansion Results for Plan 1



Source: IPL

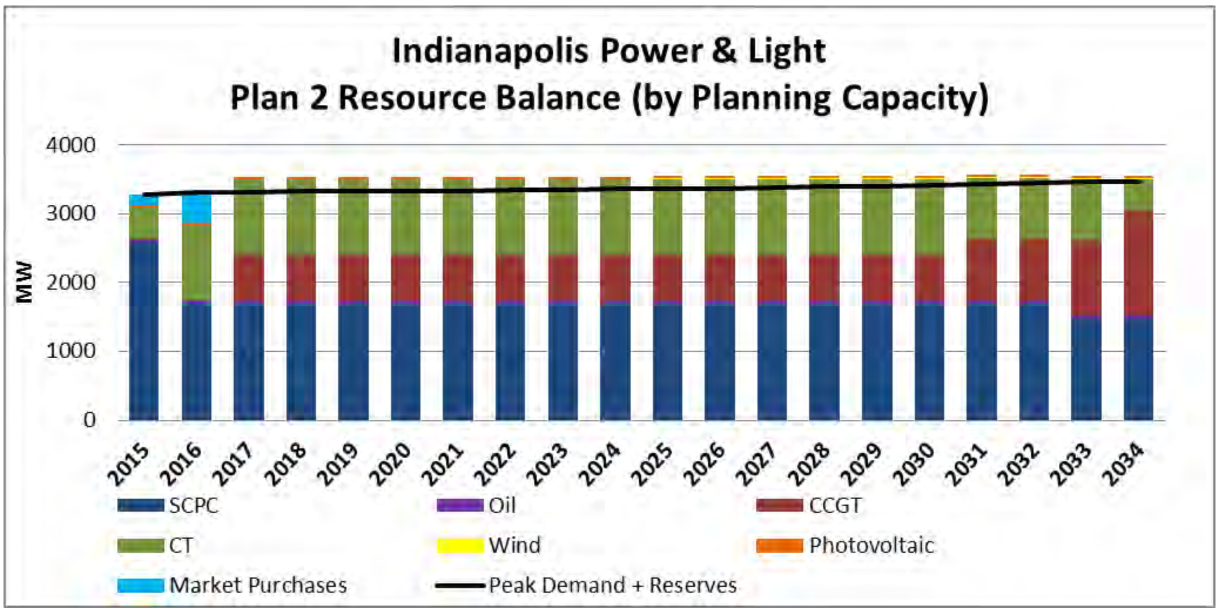
Plan 1 Expansion by Operating Capacity											
	2015	2016	2017	2018-2024	2025	2026-2029	2030	2031	2032	2033	2034
Nuclear	-	-	-	-	-	-	-	-	-	-	-
CT	-	-	-	-	-	-	-	-	-	-	-
CCGT	-	-	644	-	-	-	-	200	-	200	400
PV	-	-	-	-	-	-	-	-	-	-	-
Wind	-	-	-	-	-	-	-	-	-	-	-

Source: IPL

Plan 2 Expansion

The Plan 2 expansion results, including IPL's existing and proposed generation, are shown in Figure 4.13. For this future landscape, 200 MW of wind generation was built in 2025. Wind was the second most frequent selected resource in the Capacity Expansion simulation. While there is still much uncertainty surrounding Greenhouse Gas Regulation, additional wind resources could be needed for compliance, while also diversifying IPL's generation mix. CCGT has been identified as the preferred resource for the age based retirements of HSS Units 5 and 6 (2031), Petersburg 1 (2032) and HSS Unit 7 (2034).

Figure 4.13 – Capacity Expansion Results for Plan 2



Source: IPL

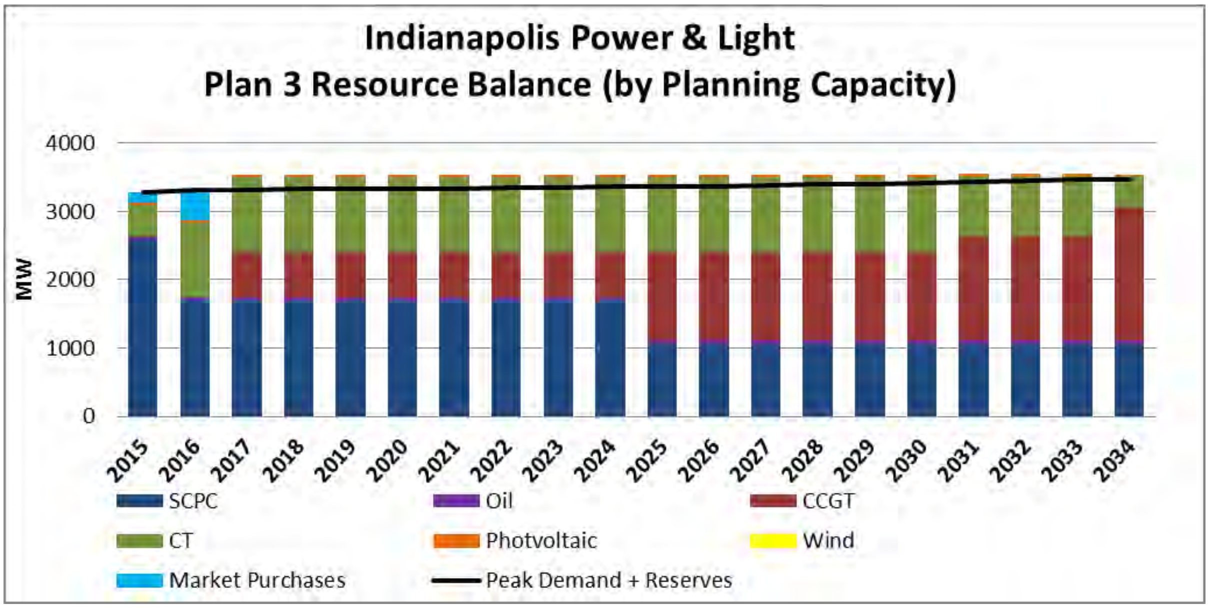
Plan 2 Expansion by Operating Capacity											
	2015	2016	2017	2018-2024	2025	2026-2029	2030	2031	2032	2033	2034
Nuclear	-	-	-	-	-	-	-	-	-	-	-
CT	-	-	-	-	-	-	-	-	-	-	-
CCGT	-	-	644	-	-	-	-	200	-	200	400
PV	-	-	-	-	-	-	-	-	-	-	-
Wind	-	-	-	-	200	-	-	-	-	-	-

Source: IPL

Plan 3 Expansion

The Plan 3 expansion results, including IPL's existing and proposed generation, are shown in Figure 4.14. For this future landscape, Petersburg units 1 and 2 are retired 10 years prematurely and replaced with an equivalent amount of CCGT. CCGT was the preferred replacement resource in the Capacity Expansion simulation. By replacing Petersburg 1 and 2 with CCGT, IPL's resource mix continues the shift from a predominately coal-fired fleet to the majority being natural gas-fired generation. CCGT has been also identified as the preferred resource for the age based retirements of HSS Units 5 and 6 (2031) and HSS Unit 7 (2034).

Figure 4.14 – Capacity Expansion Results for Plan 3



Source: IPL

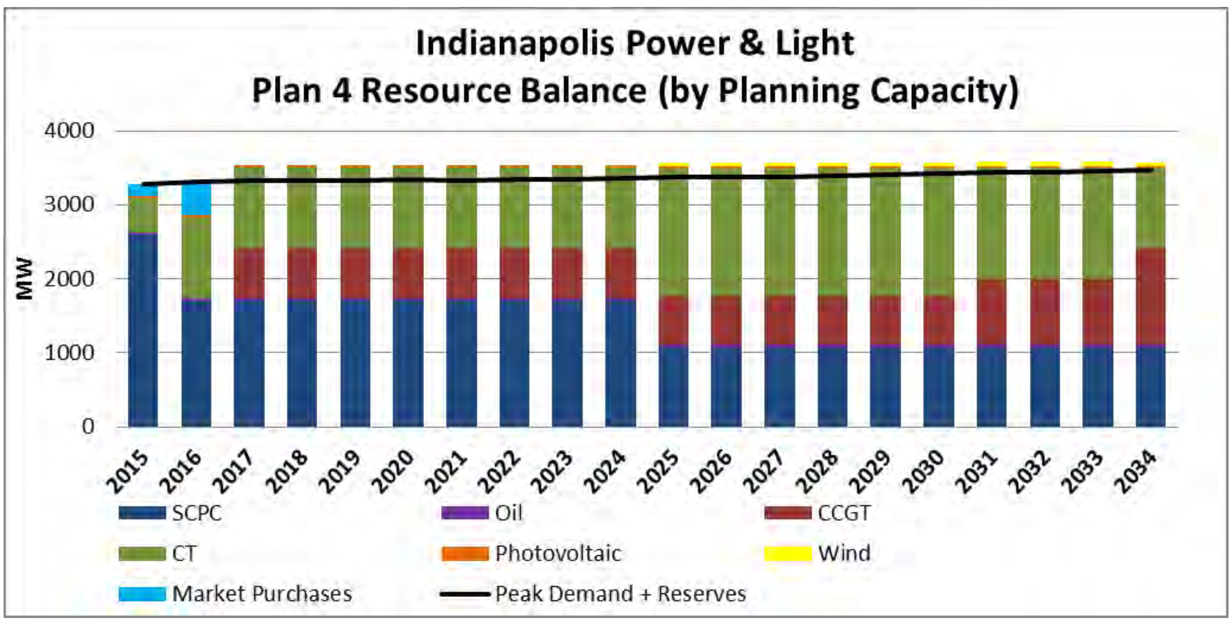
Plan 3 Expansion by Operating Capacity											
	2015	2016	2017	2018-2024	2025	2026-2029	2030	2031	2032	2033	2034
Nuclear	-	-	-	-	-	-	-	-	-	-	-
CT	-	-	-	-	-	-	-	-	-	-	-
CCGT	-	-	644	-	600	-	-	200	-	200	400
PV	-	-	-	-	-	-	-	-	-	-	-
Wind	-	-	-	-	-	-	-	-	-	-	-

Source: IPL

Plan 4 Expansion

The Plan 4 expansion results, including IPL's existing and proposed generation, are shown in Figure 4.15. For this future landscape, Petersburg units 1 and 2 are retired 10 years prematurely and replaced with an equivalent amount of capacity by a CT and Wind. While the CT was only selected in the Low Load scenario, the CT has the lowest $/KW cost. The CT provides the necessary capacity; however, the expected energy volume is less than a CCGT. By pairing a CT with wind resources, a balance between meeting capacity requirements and providing energy during non-peak conditions can be achieved. By replacing Petersburg 1 and 2 with a CT and Wind, IPL's resource mix continues the shift from a predominately coal-fired fleet to a fleet comprised of primarily natural gas-fired generation and renewable resources. A CCGT has been also identified as the preferred resource for the age based retirements of HSS Units 5 and 6 (2031) and HSS Unit 7 (2034).

Figure 4.15 – Capacity Expansion Results for Plan 4



Source: IPL

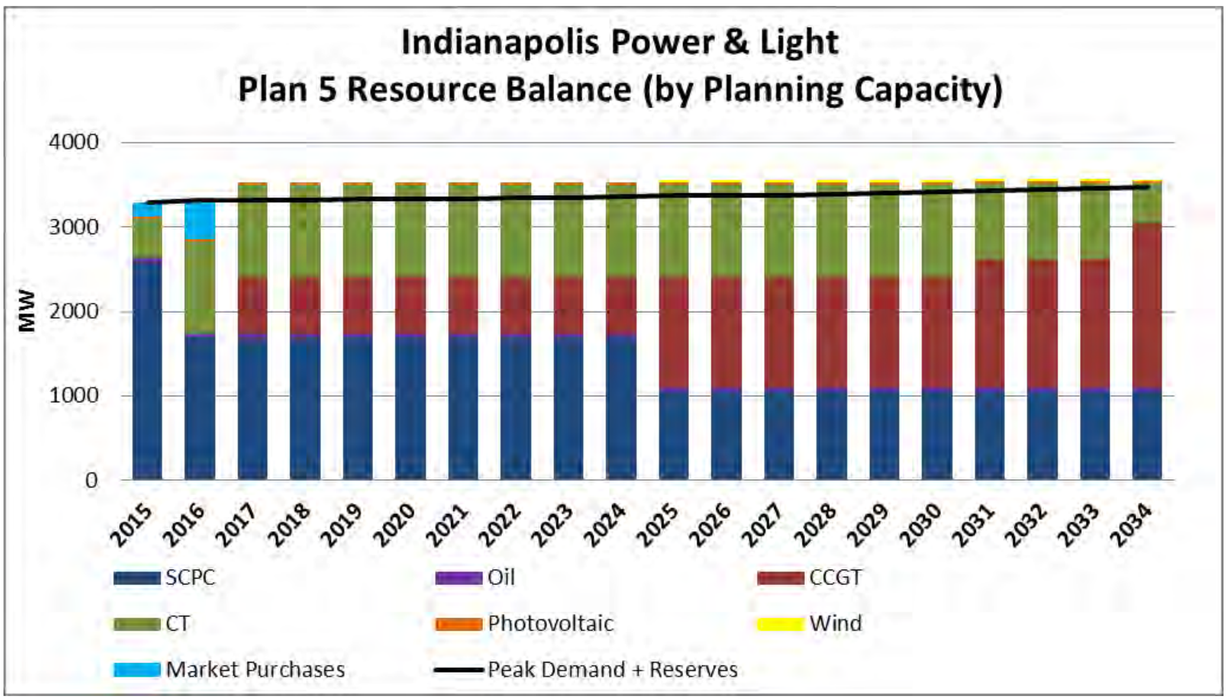
Plan 4 Expansion by Operating Capacity											
	2015	2016	2017	2018-2024	2025	2026-2029	2030	2031	2032	2033	2034
Nuclear	-	-	-	-	-	-	-	-	-	-	-
CT	-	-	-	-	550	-	-	-	-	-	-
CCGT	-	-	644	-	-	-	-	200	-	200	400
PV	-	-	-	-	-	-	-	-	-	-	-
Wind	-	-	-	-	500	-	-	-	-	-	-

Source: IPL

Plan 5 Expansion

The Plan 5 expansion results, including IPL's existing and proposed generation, are shown in Figure 4.16. For this future landscape, Petersburg units 1 and 2 are retired 10 years prematurely and replaced with an equivalent amount of CCGT while also adding 200 MW of wind resources. This plan combines the top two preferred resources from the Capacity Expansion simulation. A CCGT was the preferred replacement resource in the Capacity Expansion simulation. By replacing Petersburg 1 and 2 with CCGT, IPL's resource mix continues the shift from a predominately coal-fired fleet to a fleet comprised of primarily natural gas-fired generation and renewable resources. A CCGT has been also identified as the preferred resource for the age based retirements of HSS Units 5 and 6 (2031) and HSS Unit 7 (2034).

Figure 4.16 – Capacity Expansion Results for Plan 5



Source: IPL

Plan 5 Expansion by Operating Capacity											
	2015	2016	2017	2018-2024	2025	2026-2029	2030	2031	2032	2033	2034
Nuclear	-	-	-	-	-	-	-	-	-	-	-
CT	-	-	-	-	600	-	-	-	-	-	-
CCGT	-	-	644	-	-	-	-	200	-	200	400
PV	-	-	-	-	-	-	-	-	-	-	-
Wind	-	-	-	-	200	-	-	-	-	-	-

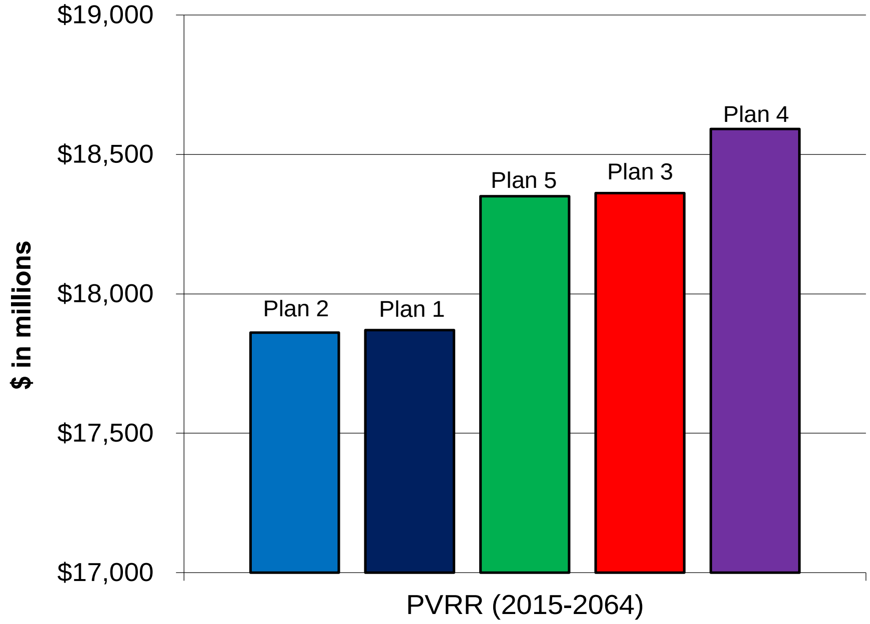
Source: IPL

PVRR Scenario Results for the Resource Plans

[170-IAC 4-7-8(b)(7)(D)]

IPL ran each of the resource plans against six of the eight future landscapes to better understand the potential ramifications of significantly divergent futures around natural gas and CO_2 prices. High and Low Load scenarios were not considered in this phase of the evaluation because load variance does not impact the dispatch or costs of resources. The following section describes the results of these runs. Figures 4.17 through 4.22 show the expected PVRR for the resource plans against Ventyx's future landscapes. Note these prices are for resource plan comparative purposes and do not reflect the total revenue requirements of the IPL business, since current rate base, transmission and distribution, along with other factors are not encompassed.

Figure 4.17 – Base Case PVRR Plan Ranking (2015-2064)

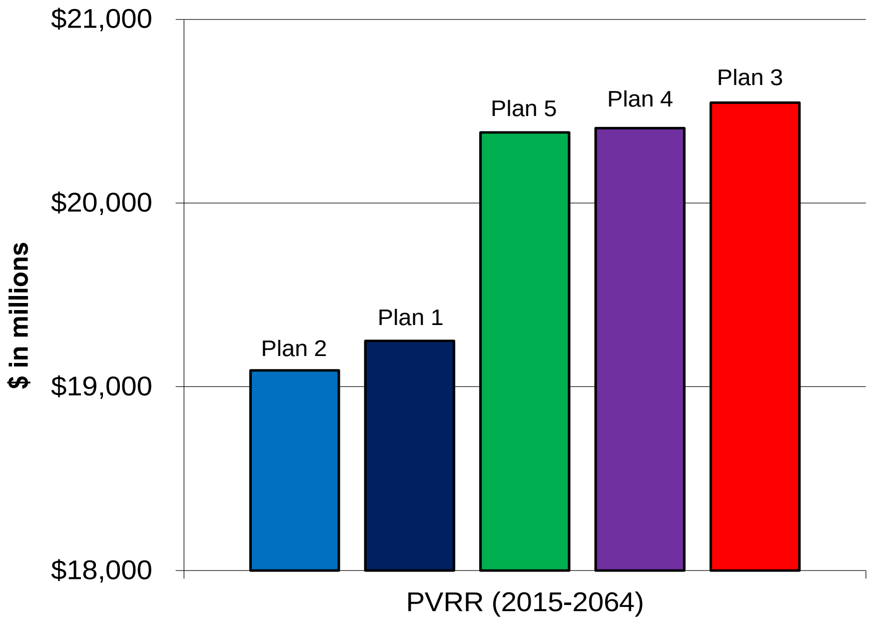


Source: Ventyx

The Base Case results are shown in Figure 4.17. This landscape includes the base gas and market prices, the base load forecast, and the IPL-EPA Shadow price starting in 2020 for coal units. Plans representing IPL's current resource portfolio (Plans 1 and 2) were the lowest-cost resource plans for this landscape.

In all landscapes, Eagle Valley units 3 through 6 were set to retire in 2016 and Harding Street units 5 through 7 were set to be refueled in 2016. Also, all plans include the addition of the Eagle Valley CCGT in 2017.

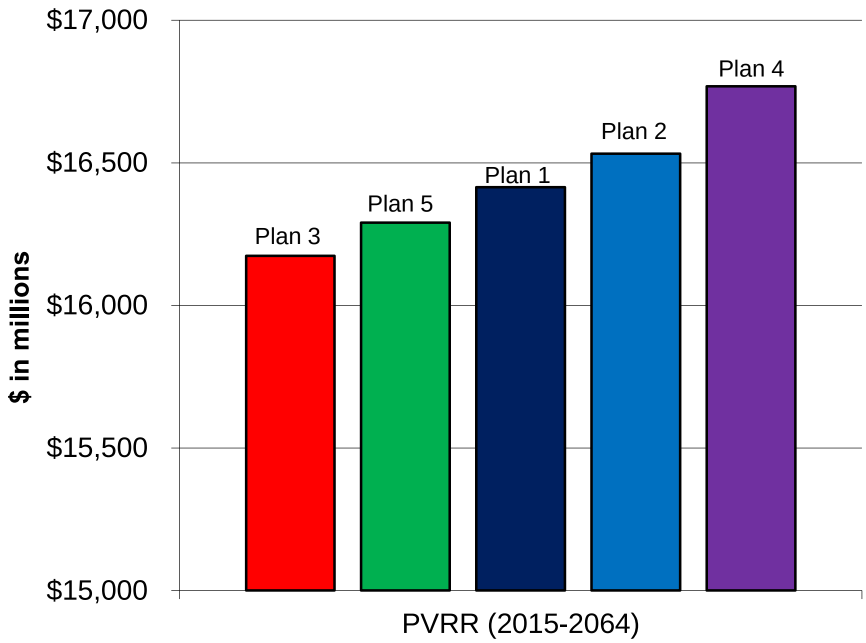
Figure 4.18 – High Gas Case PVRR Plan Ranking (2015-2064)



Source: Ventyx

The High Gas Case results are shown in Figure 4.18. This landscape includes the high gas correlated gas and market prices, the base load forecast, and the IPL-EPA Shadow price starting in 2020 for coal units. Plans representing IPL's current resource portfolio (Plans 1 and 2) were the lowest-cost resource plans for this landscape.

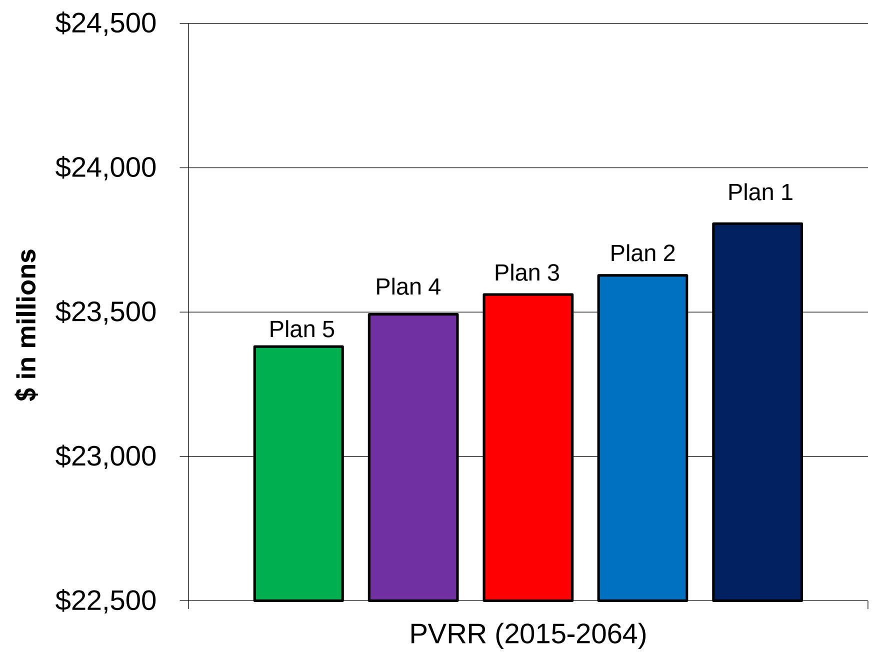
Figure 4.19 – Low Gas Case PVRR Plan Ranking (2015-2064)



Source: Ventyx

The Low Gas Case results are shown in Figure 4.19. This landscape includes the low gas correlated gas and market prices, the base load forecast, and the IPL-EPA Shadow price starting in 2020 for coal units. Plans with a new 600 MW combined cycle in 2025 (Plan 3 and 5) were the lowest-cost resource plan for this landscape. Note that the PVRR for all plans are lowest in this case.

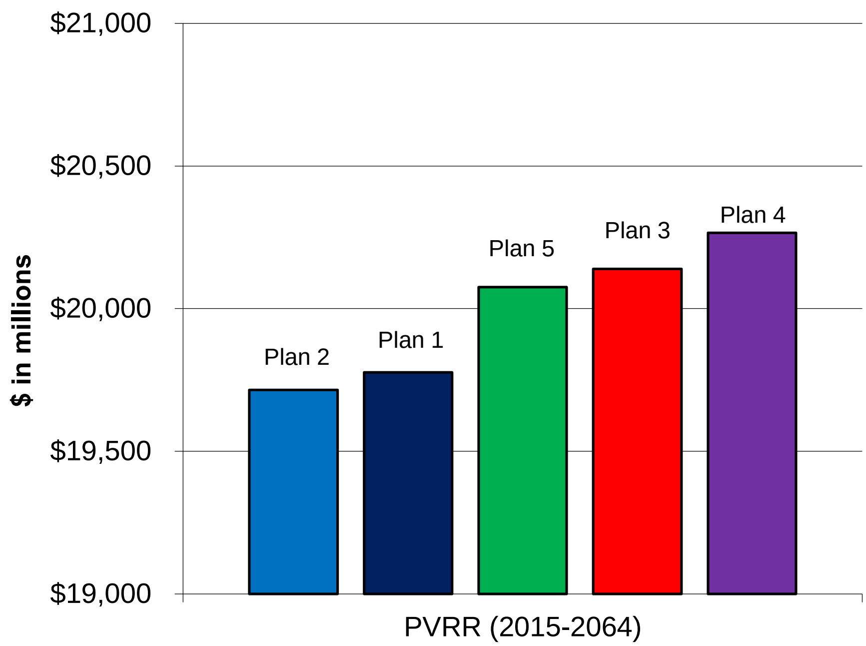
Figure 4.20 – High Environmental Case PVRR Plan Ranking (2015-2064)



Source: Ventyx

The High Environmental Case results are shown in Figure 4.20. This landscape includes Ventyx Environmental gas and market prices, the base load forecast, and the Waxman-Markey proxy Ventyx Fall 2013 CO_2 price starting in 2025 for all CO_2 emitting generation. Plans with new wind generation in 2025 (Plans 4 and 5) were the lowest-cost resource plans for this landscape. Note that the PVRR for all plans are highest in this case.

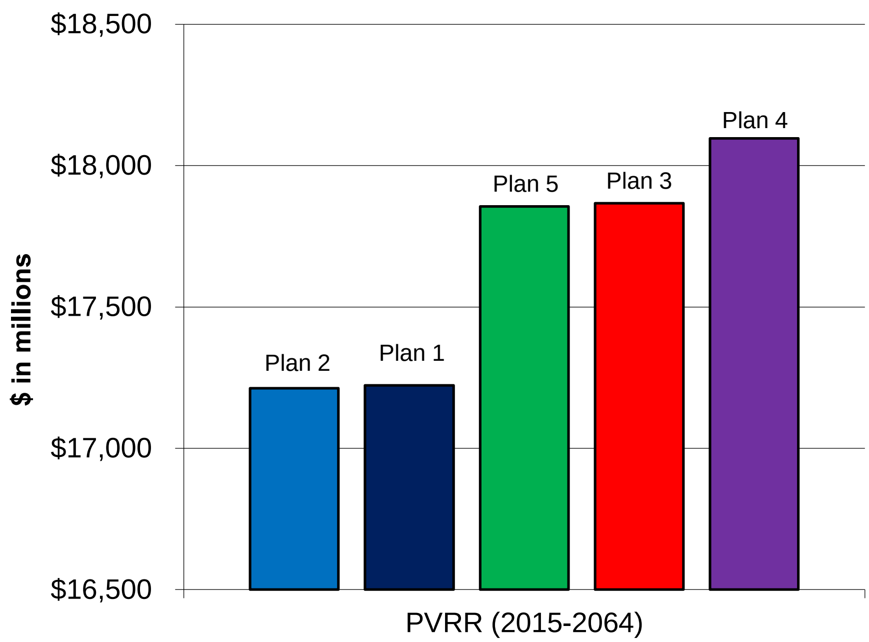
Figure 4.21 –Environmental Case PVRR Plan Ranking (2015-2064)



Source: Ventyx

The Environmental Case results are shown in Figure 4.21. This landscape includes the ICF Mass Cap correlated gas and market prices, the base load forecast, and the ICF Mass Cap CO_2 price starting in 2020 for all CO_2 emitting generation units. Plans representing IPL's current resource portfolio (Plans 1 and 2) were the lowest-cost resource plans for this landscape.

Figure 4.22 –Low Environmental Case PVRR Plan Ranking (2015-2064)



Source: Ventyx

The Low Environmental Case results are shown in Figure 4.22. This landscape includes the base gas and market prices, the base load forecast, and no CO_2 price. Plans representing IPL's current resource portfolio (Plans 1 and 2) were the lowest-cost resource plans for this landscape.

Wind Sensitivities

Under base assumptions, new wind resources are modeled using a 35% capacity factor and their Locational Marginal Price ("LMP") is equivalent to the MISO-IN forecasted market price. However, these modeling assumptions are not consistent with the current actual performance of the wind generation IPL secured under long-term PPAs with Hoosier Wind Farm in Benton County, Indiana and Lakefield Wind Farm in Jackson County, Minnesota. In actuality, these wind generators have yielded capacity factors between 20-25% on an annual basis and receive an LMP significantly lower than the MISO-IN average. The cause of these characteristics is a lack of transmission infrastructure, which causes transmission congestion in the wind corridors and manifests itself by lowering capacity factors as well as LMPs. Sensitivities were then created to reflect and determine the impact of these current characteristics. For Case 1, the historic LMP or market price difference between Lakefield and IPL load was applied, therefore lowering the market price for wind. The LMP differential applied to all planning years in the IRP model is shown below in Figure 4.23.

Figure 4.23 LMP Differential ($/MWh)

Month	On-Peak	Off-Peak
Jan	21.9	19.1
Feb	18.2	16.2
Mar	19.3	17.4
Apr	15.6	14.3
May	12.1	8.7
June	11.6	8.2
July	8.7	6.2
Aug	9.9	7.3
Sept	12.3	9.0
Oct	13.6	10.9
Nov	16.1	13.1
Dec	12.2	10.4

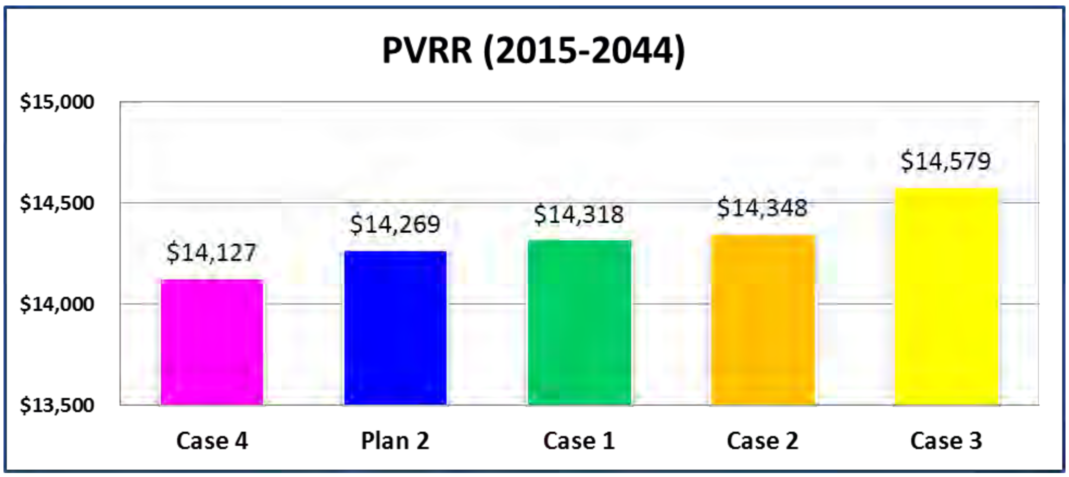
Source: IPL

Case 2 reduces the expected capacity factor for new wind resources to 25%, which was based upon Lakefield's historic capacity factor. Furthermore, IPL modeled potential improvements to wind. In response to stakeholder feedback from a representative from Clean Line Energy, IPL was informed about a project that would build DC transmission lines from Kansas to Indiana thus transferring high capacity factor wind. If completed, the project would provide Indiana access to 50% capacity factor wind. The Clean Line Energy representative discussed utilities could purchase this energy via a PPA for $45/MWH.

The attributes of this project embody Case 3. In attempt to relieve congestion, IPL also considered the impact utility scale batteries could have on wind resources for Case 4. Along with relieving congestion, batteries can minimize intermittency, increase capacity credit, and take advantage of price arbitrage. For this analysis, a 4-hour duration battery equal to 12% of the operating capacity of wind was used. Additional fixed costs of $197/kw/year (2025$)[16] were incorporated in this sensitivity to quantify the cost of the battery. The battery charges during lower market prices hours, corresponding with higher wind speeds, and discharges during peak hours; therefore, shifting the generation from off-peak to on-peak hours.

Wind Sensitivities Results

Figure 4.24 Wind Sensitivity PVRR (2015-2044)



Source: Ventyx

The wind sensitivity results are shown above in Figure 4.24. The sensitivities were than imposed on Plan 2, which includes an additional 200 MW of wind in 2025, of the Base results. Case 1 and 2, as anticipated, escalate the revenue requirement, making wind resources less-cost effective. These sensitivities isolate the two characteristics, but as discussed above, suppressed LMPs and reduced capacity factors are typically interrelated. Despite the multitude of benefits batteries offer, the high capital costs of batteries cause this case to be disadvantageous. The case with the lowest PVRR signifies the Clean Line Energy PPA. Despite significant progress, there is still uncertainty surrounding the DC transmission line construction. IPL will continue to analyze and monitor the progression of transmission capability and technology improvements in the wind industry.

[16] From the State Utility Forecasting Group report "Utility Scale Energy Storage Systems" published in June 2013

Scenario Evaluation Results Summary

[170-IAC 4-7-8(b)(6)(A)] [170-IAC 4-7-8(b)(7)(D)] [170-IAC 4-7-8(b)(7)(E)]

A summary of the results of the future landscapes are presented in Figures 4.25 and 4.26 which show a summary of the PVRR results and the two lowest-cost (PVRR) plans for each landscape respectively. The scenario evaluation focuses on comparing the results of the build out plans in each of the developed scenarios. Particularly, this evaluation measures the robustness of the performance of each plan in all scenarios.

Figure 4.25 – Incremental PVRRs in Each Scenario

PVRR (MM$)	Scenarios						
	Base	High Gas	Low Gas	High Environmental	Environmental	Low Environmental	Average
Plan 1	$17,870	$19,249	$16,415	$23,807	$19,776	$17,223	**$19,057**
Plan 2	$17,861	$19,090	$16,532	$23,628	$19,715	$17,213	**$19,006**
Plan 3	$18,362	$20,546	$16,174	$23,561	$20,139	$17,867	**$19,441**
Plan 4	$18,591	$20,408	$16,768	$23,493	$20,266	$18,096	**$19,604**
Plan 5	$18,351	$20,385	$16,290	$23,381	$20,076	$17,856	**$19,390**

Figure 4.26 – Resource Plan Selection Top Two Summary

PVRR Rank	Base Case	High Gas Case	Low Gas Case	High Environmental Case	Environmental Case	Low Environmental Case
1	Plan 2	Plan 2	Plan 3	Plan 5	Plan 2	Plan 2
2	Plan 1	Plan 1	Plan 5	Plan 4	Plan 1	Plan 1

Source: IPL

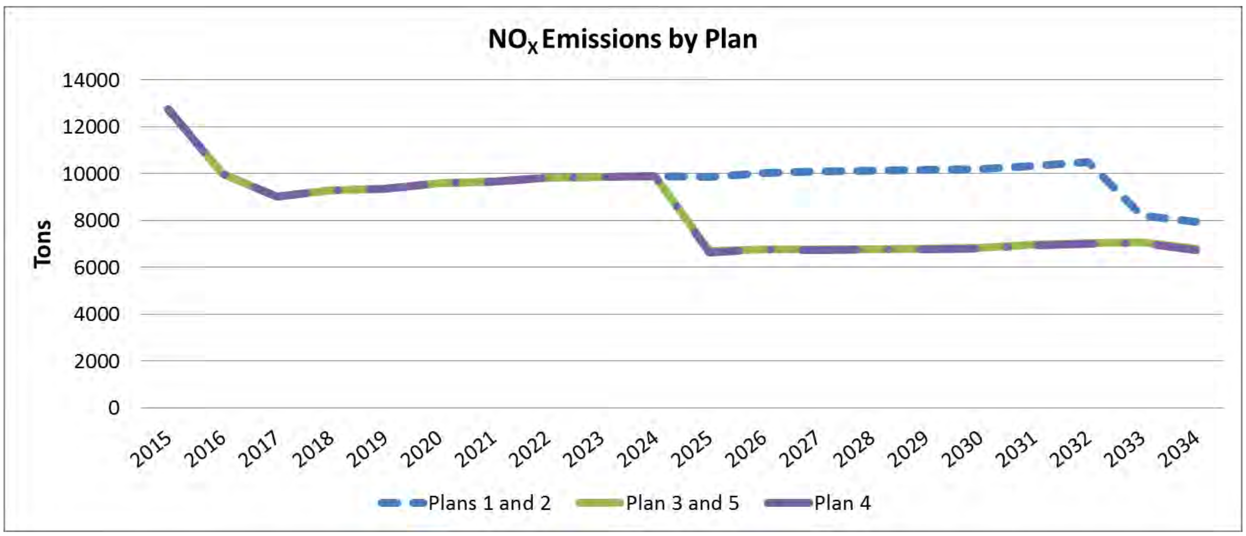
Plans 1 and 2, which both include IPL's existing fleet with proposed refuel and new construction projects, appeared in the top two resources for the majority of the landscapes. The plans with CCGT, CCGT with wind, or CT with wind replacement performed well in the low gas and high environmental scenarios. Nuclear generation did not appear in any of the top spots in all the scenario evaluations.

Comparative Air Emissions by Resource Plan

[170-IAC 4-7-4(b)(8)] [170-IAC 4-7-7(a)(1)]

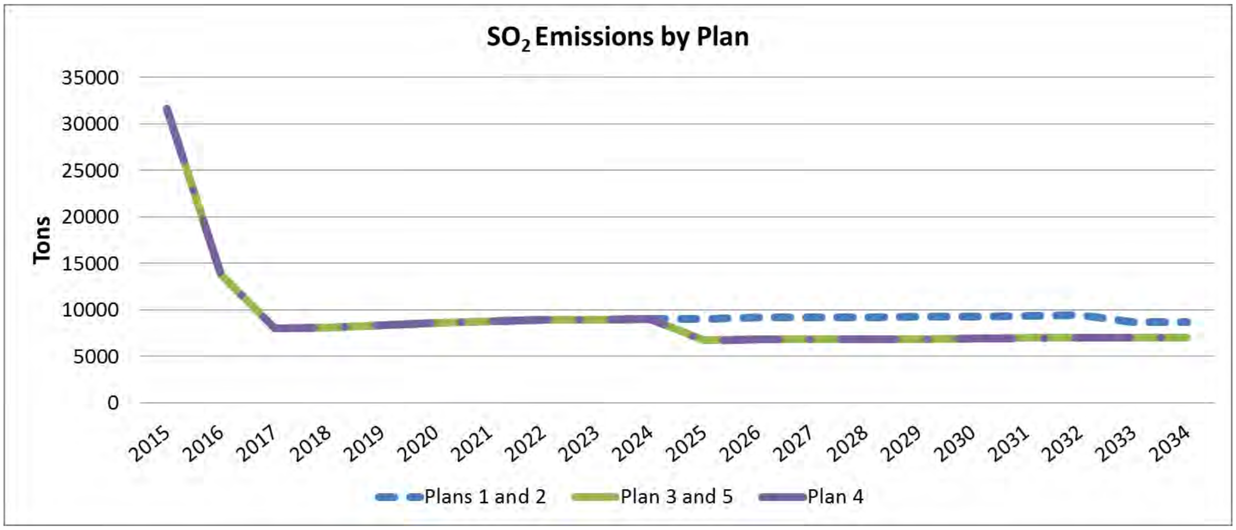
Figures 4.27 through 4.29 provide the air emissions for the five resource plans as modeled by Ventyx. As mentioned above, all plans are identical until 2025 were the plans differ by the retirement of Petersburg units 1 and 2 and the replacement generation selected. All plans demonstrate IPL is making significant advancements in reducing the air emissions of its portfolio over the next three years. In the Ventyx modeling, the costs of NO_X, SO_2 and in most scenarios CO_2 emissions are considered, impacting the dispatch of the emitting units.

Figure 4.27 – NOX Emissions



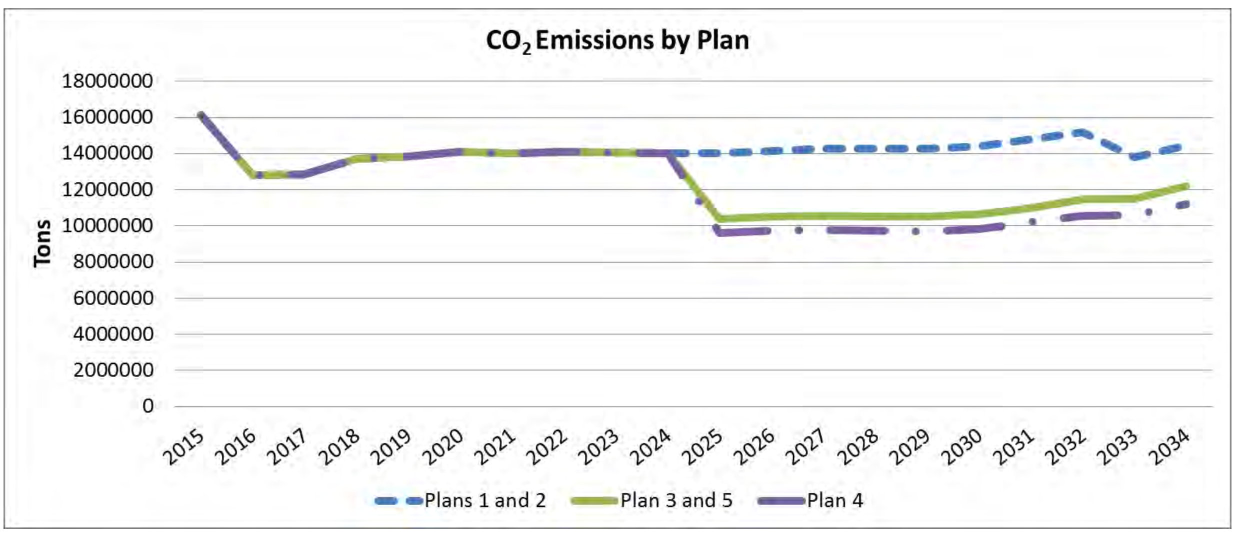
Source: IPL

Figure 4.28 – SO2 Emissions



Source: IPL

Figure 4.29 – CO2 Emissions



Source: IPL

Comparative Annual Costs by Resource Plan

[170-IAC 4-7-8(b)(6)(B)]

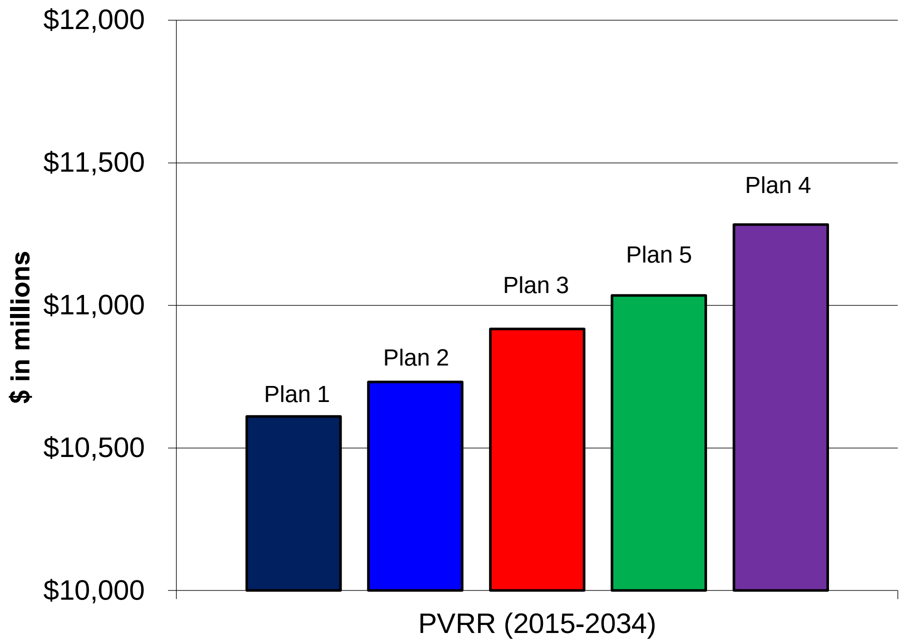
Figure 4.30 provides representative annual revenue requirements for the Base Case for the five resource plans as modeled by Ventyx. The 20 year PVRR of these plans are shown in Figure 4.31 with Plan 1 showing the lowest 20 year PVRR. These costs include existing generation production costs, system capacity and power purchase expense, and incremental new resource costs. The annual costs are best used for comparison purposes to access the relative impacts of new resource plans, and are not intended to represent IPL's full revenue requirements.

Figure 4.30 – Comparative Annual Revenue Requirements by Plan (Base Case), Incremental Average Annual Revenue Requirements (cents/kWh)

Year	Plan 1	Plan 2	Plan 3	Plan 4	Plan 5
2015	0.32	0.32	0.32	0.32	0.32
2016	1.31	1.31	1.36	1.36	1.36
2017	1.46	1.46	1.49	1.49	1.49
2018	1.71	1.71	1.73	1.73	1.73
2019	1.92	1.92	1.94	1.94	1.94
2020	2.30	2.30	2.32	2.31	2.32
2021	2.68	2.68	2.70	2.70	2.70
2022	3.07	3.07	3.09	3.08	3.09
2023	3.57	3.57	3.59	3.58	3.59
2024	3.86	3.86	3.93	3.91	3.93
2025	4.17	4.45	4.36	5.26	4.63
2026	4.35	4.72	4.91	5.89	5.27
2027	4.58	4.89	5.13	5.99	5.43
2028	4.79	5.05	5.36	6.10	5.61
2029	5.04	5.26	5.62	6.24	5.82
2030	5.30	5.48	5.91	6.46	6.08
2031	5.66	5.80	6.28	6.77	6.42
2032	6.10	6.21	6.76	7.17	6.87
2033	6.67	6.76	7.15	7.51	7.23
2034	7.33	7.39	7.71	8.05	7.77

Source: Ventyx

Figure 4.31 – Base Case PVRR Plan Ranking (2015-2034)



Source: Ventyx

Results Summary and Resource Selection Overview

[170-IAC 4-7-8(b)(1)]

The supply resource selection at IPL combines information from both the quantitative part of the evaluation, that is the capacity expansion results and future landscape scenario results, and risks associated with resource planning especially environmental, fuel pricing, and load variation, creating a robust evaluation process.

The capacity expansion results which are presented in Figure 4.10 establish IPL's current resource projects (Eagle Valley CCGT and refuel of HSS Units 5 through 7) will be sufficient to satisfy IPL's capacity requirement until 2031. However, in two scenarios, the capacity expansion modeling results determine it would be economic to retire one or multiple units at Petersburg. Over the last five years of the IRP planning period, IPL's fleet is expected to undergo significant changes as Petersburg 1 along with HSS 5 through 7 approach their anticipated retirement dates. To replace these retired units, CCGT, CT, and wind were the selected resources with CCGT appearing in the majority of the capacity expansion scenarios. Nuclear and solar resources did not appear in any of the landscapes. IPL has experienced a large influx of early adoption of DG solar due in large part to its feed-in-tariff, Rate REP as described in Section 4A. Additional DG is not included in the short-term forecast absent further financial incentives. IPL recognizes the installed costs for solar are decreasing, however, modeling limitations do not allow dynamic costs to be included. Therefore, the 2016 IRP will include updated cost which may find solar to be a cost-effective option.

Since the capacity expansion modeling did not identify an additional need for generation without the early retirement of IPL's coal units, IPL derived build out plans to highlight the potential impact of retiring Petersburg units 1 and 2 early. The build out plans, as shown in Figure 4.11, utilize resources that were selected in the capacity expansion results as a way of creating plans that would be competitive across multiple future landscapes. The plans representing IPL's existing thermal generation, Plans 1 and 2, had the lowest PVRR in the Base, High Gas, Environmental, and Low Environmental that is the plans with moderate or low CO_2 costs. Replacing Petersburg 1 and 2 with CCGT had the lowest PVRR in the Low Gas Scenario while CCGT and wind as the replacement had the lowest PVRR in the High Environmental scenario. The scenario analysis results are shown in Figure 4.17. Wind, firmed by a CT, also performed well the High Environmental case due to the high and imminent CO_2 cost benefits, but generally finished behind the CCGT. The scenario analysis results are shown in Figures 4.17 through 4.22.

The plans representing IPL's existing thermal generation were in the top two selected resources in four (4) of the six (6) future landscapes. These results demonstrate the ability of our current fleet to perform well with and without CO_2 costs, and with low and moderate natural gas prices. From a risk perspective, with the addition of the Eagle Valley CCGT, IPL's generation portfolio will have a balanced fuel mix, limiting its fuel risk exposure.

While the difference in PVRR was unsubstantial in most instances, Plan 2, representing an additional 200 MW of wind resources, typically outperformed Plan 1. However, as further discussed in the wind sensitivity section above, IPL models new wind resources at a capacity factor of 35% and an LMP equal to the MISO-IN price, both of which are improvements from the actual current characteristics of Hoosier and Lakefield Wind Farms. These assumptions are based upon the belief that transmission capabilities will be improved to resolve the current conditions. Also, a great deal of uncertainty surrounds requirements of the proposed EPA Clean Power Plan.

In the upcoming years, IPL will better understand the congestion improvements created from transmission expansion to potentially improve wind capacity factors. Since compliance for the proposed Clean Power Plan could start as early as 2020, IPL will continue to analyze the benefits of adding additional renewables to its portfolio between now and then. Nevertheless, IPL's capacity requirement will be met by the addition of the Eagle Valley CCGT along with existing generation improvements, therefore, IPL's existing resources, or Plan 1, is IPL's Preferred Portfolio. From both a minimum revenue requirements perspective and a risk mitigation perspective, IPL's existing portfolio eliminates the need for new generation in the IRP planning period. This strategic direction is supported by quantitative results and is the basis for IPL's Preferred Resource Portfolio.

IPL's Preferred Portfolio

[170-IAC 4-7-8(b)(1)] [170-IAC 4-7-8(b)(4)] [170-IAC 4-7-8(b)(8)]

IPL's Preferred Portfolio is focused on deriving a low cost, low risk, reliable plan to serve customer load, while complying with all federal, state, and IURC mandates.

As outlined in Figure 4.1, IPL's resource selection strategy takes a systematic approach including an assessment of existing resources, determination of resource needs, inclusion of all cost-effective and/or required DSM and renewables, and then uses Ventyx Capacity Expansion and scenario analysis modeling of supply options to identify the balance of IPL's resource plan.

The selected IPL Preferred Portfolio includes its four large scrubbed coal-fired units at Petersburg, including all required environmental compliance enhancements, its gas-fired peaking units, including the approved refuel of HSS 5 and 6 along with the proposed refuel of HS7, 300 MW of wind from PPAs, 98 MW of solar Rate REP, forecasted DSM resources, and the addition of the Eagle Valley CCGT. When replacement is needed for the units nearing their anticipated retirement dates (HSS 5 and 6 and Petersburg Unit 1), CCGT has been identified as the preferred resource. The details of the selected Reference Plan are described below.

Existing Core Base Load Resources

IPL and other coal-fired utilities will continue to face new environmental requirements. A number of additional environmental rules – either proposed or final – affect these units. These rules include but are not limited to the Cross State Air Pollution Rule ("CSAPR"), National Ambient Air Quality Standards ("NAAQS"), Cooling Water Intake Structures Rule, Coal Combustion Residuals ("CCR") Rule, and federal Effluent Limitations Guidelines ("ELG") for Steam Electric Generating Stations. Additional requirements could also result from settlement or litigated outcome of the Notice of Violation ("NOV") and Finding of Violation from EPA received in October 2009 related to alleged violations of the New Source Review ("NSR"). These regulations and requirements would potentially require IPL to incur additional expenses for compliance in the future.

Demand Side Management

The IPL short-term action plan (2015-2017 Action Plan) for demand side management ("DSM") was filed and approval is currently pending approval before the IURC in Cause No. 44497. The three year plan in Cause No. 44497 covers the years 2015-2017. Although cost and savings information was developed and presented for 3 years, IPL is only seeking spending approval to deliver the programs for the first 2 years (2015-2016), to facilitate flexibility with expected future DSM legislation. This proceeding specifically seeks approval of DSM programs and budgets for 2015 and 2016. In response to stakeholder input, IPL engaged AEG to update its forecast from 2017 to create a full 20 year projection for this IRP. It accounts for the elimination of IURC annual savings targets and the opt-out provision of large customers, due to Senate

Enrolled Act 340. IPL include the forecasted twenty (20) years of DSM savings in the load forecast. However, Future programs will be developed for the balance of the IRP period and presented in subsequent IURC proceedings. The twenty year forecast is provided in Section 7, Attachment 4.7, DSM Supporting Documents. For more information, please see Section 4B.

Renewables Generation/Climate Change

Renewables technologies represent a resource that primarily targets potential future requirements for GHG regulation, and specifically any federal or state RES legislation. EPA's Clean Power Plan, which establishes the proposed Best System of Emissions Reductions available for existing sources in accordance with Section 111(d) of the Clean Air Act, includes renewables as a "building blocks," or measures of reduction, for compliance. Specifically, EPA based the standards on re-dispatch to renewables from a 2012 value of 3% of Indiana's total generation to a value of 6.6% by 2029.

IPL's preferred portfolio includes a renewables generation component of about 300 MW of wind secured under two long-term PPAs and 98 MW of solar under Rate REP to meet any future RES requirement. Under the terms of the existing PPAs, IPL receives all of the energy and Renewable Energy Credits ("RECs") from the two wind farms. The null[17] energy is used to supply the load for IPL customers and, in the absence of any mandatory federal or state RES, IPL is currently selling the associated wind RECs and plans to sell solar RECs, but reserves the right to use RECs from the PPAs to meet any future RES requirement. The PPAs were approved by the IURC and if IPL chooses to monetize the RECs that result from the agreements, IPL shall use the revenues to first offset the cost of the PPAs and next to credit IPL customers through its fuel adjustment clause proceedings. When the RECs associated with the production of null energy from the Wind PPAs are sold to a third party, IPL shall not claim that energy as renewable energy on behalf of its retail customers. Absent a clear renewables requirement, no additional renewables resources are planned.

Power/Capacity Purchases

Historically, IPL has relied on short-term capacity markets for up to 300 MW of its capacity requirements. However, for the period 2015 to 2016, IPL will be facing additional challenges as MISO capacity prices continue to rise and retirements increase to comply with new EPA regulations. As discussed above, IPL will be retiring Eagle Valley coal-fired units 3-6 by April 16, 2016, six weeks before the end of the MISO Planning Year ("PY") 2015-2016. With a favorable FERC waiver decision, IPL will not need to purchase replacement capacity for this

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17 The Green-e Dictionary (http://www.green-e.org/learn_dictionary.shtml) defines null power as, "Electricity that is stripped of its attributes and undifferentiated. No specific rights to claim fuel source or environmental impacts are allowed for null electricity. Also referred to as commodity or system electricity."

timeframe. Along with a bilateral purchase of 100 MW, IPL has effectively minimalized its exposure to the price volatility of the MISO Capacity auction for PY 15-16.

PY 2016-2017 represents a dissimilar story as IPL's capacity position will be short up to 350-400 MW, due to the retirement of the Eagle Valley coal units mentioned above. IPL has mitigated its exposure through a bilateral agreement of 100 MW and is nearing the completion of another 200 MW purchase.

IPL will continue to evaluate the purchase of some or all of its remaining projected volume difference between its actual Planning Reserve Margin Requirement and its own resources plus bilaterally purchased Zone 6 Zonal Resource Credits, with either bilateral purchases or sales, or auction purchases or sales.

With the addition of the Eagle Valley CCGT just prior to the MISO Planning Year 2017-2018, IPL projects that its resources will exceed its MISO Planning Reserve Margin Requirement for 2017-2018 by 250 MWs. IPL will evaluate whether to sell the extra Zonal Resource Credits bilaterally before the auction or to sell the extra Zonal Resource Credits in the 2017-2018 MISO Resource Planning Auction.

Transmission and Distribution

IPL's electric transmission and distribution (T&D) facilities are designed to provide safe, reliable, and low cost service to its customers as described in section 4C. IPL's has studied the need for transmission, substation and distribution enhancements and designed projects to support the preferred resource portfolio. Specifically, accommodating generation additions and retirements while improving operational flexibility is paramount to ensure deliverability of power into the IPL load zone. These projects include the installation of new 345 kV breakers, autotransformers, and 138 kV capacitor banks to improve power import capability from the 345 kV system to load centers on the 138 kV system as well as distribution system improvements to accommodate DG at Rate REP project locations. Several projects associated with the new CCGT will be completed in 2015 and 2016. In addition, IPL plans to install a Static Volt Ampere Reactive ("VAR") System to provide dynamic voltage and reactive power support.

IPL has enhanced its distribution system through smart grid investments that enable demand response through CVR and interconnect its Rate REP projects. People in multiple areas of IPL worked closely to develop efficient procedures and successfully interconnect the DG sites. Based on the proposed location and feeder interconnection, specific engineering site studies were performed to determine if the distribution system could reliably support the DG resource without impacting the service reliability of existing customers. Line extension projects were engineered and constructed as needed. To date, ten (10) projects with capacity of 500 kW to 10 MW have been connected to IPL's smart grid network to enable remote switching for IPL to safely work on distribution lines without any chance of DG backfeed. See Section 4C for more information on these projects and IPL's transmission and distribution planning criteria.

IPL's business practices include regular reviews of transmission and distribution system needs occurs with operations, construction and engineering personnel. If needed, adjustments are made to current or proposed projects to accommodate field or directional changes such as changes in IPL's preferred resource portfolio. Monthly large project coordination meetings facilitate this nimble process and include budget and schedule reviews. T&D will likely continue to play a larger role in resource planning in the future as DR, smart grid and DG become more prevalent. T&D projects typically are deployed more quickly than generation projects as evolution occurs to improve system capabilities incrementally.

Summary

The IRP presented herein and the selected Preferred Portfolio represents IPL's current view on the future electricity landscape and sensitivities around that landscape, and the resources that will reliably and cost-effectively meet customers' future electricity needs within expected legislative, EPA, and IURC requirements. Resource planning is a continuous process with the IRP representing a key snapshot of the planning horizon. In addition to IRP studies, IPL also monitors for special situational opportunities. IPL will pursue improvements to existing programs and assets as well as new, prudent, and advantageous resources as the need and deemed benefits of such resource options are clearly identified.

Section 4A. RESOURCE OPTIONS

World events and trends play a big role in forecasting future resource possibilities. This is particularly true this year with many new regulations being promulgated by EPA. With this changing landscape, IPL has worked diligently to identify, characterize and evaluate a broad selection of demand side, renewable and supply options.

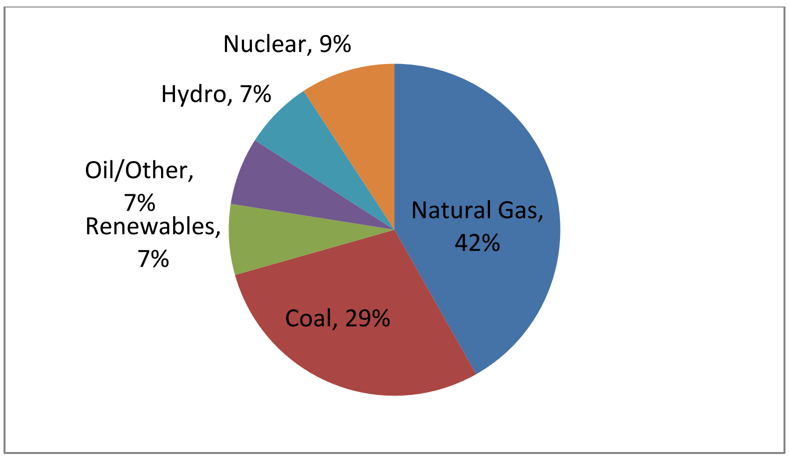
Generation Technology

National Resource Mix[18]

The U.S. currently maintains a domestic generation mix dominated by coal and natural-gas as Figures 4A.1 and 4A.2 illustrate.

The use of natural gas as a source of capacity and energy is starting to catch up with coal. Between the last IPL IRP in 2011 and the statistics for 2012, natural gas has increased its share of capacity and energy by 3 and 7 percentage points respectively – an increase for natural gas of 18% for capacity and 30% for energy. Most of these gains have come at the expense of coal.

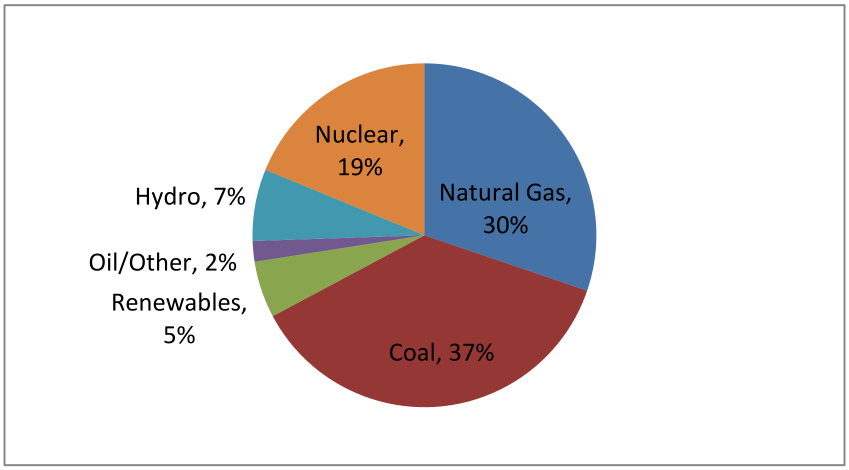
Figure 4A.1 – U.S. Generating Capacity by Fuel Type (2012)



Source: EIA

[18] The source for all resource mix comments in this section is *Electricity & Fuel Price Outlook, Midwest Spring 2014*, Ventyx, unless otherwise noted.

Figure 4A.2 – U.S. Electric Power – Electricity Production (2012)

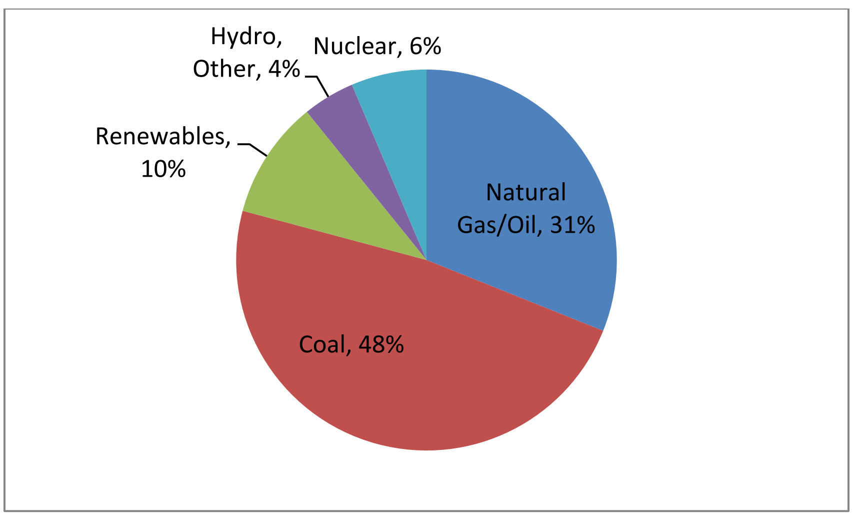


Source: EIA

MISO Resource Mix

As a member of MISO, and a participant in the energy market for this Regional Transmission Organization ("RTO"), IPL has access to the diverse resources of the 13 states and part of the Province of Manitoba in the MISO North/Central Regions (parts of an additional four states make up the MISO South Region). As shown in Figure 4A.3, the MISO North/Central Region relies heavily on coal-fired generating resources for capacity.

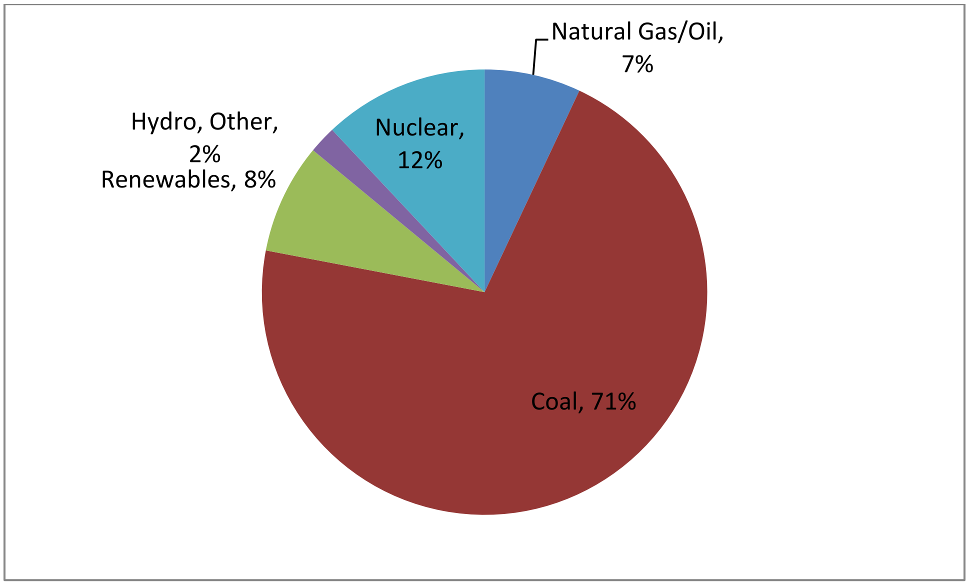
Figure 4A.3 – MISO Generating Capacity by Fuel Type (2013)



Source: MISO, "The Changing Power Generation Fleet," February 6, 2014

As an energy source, coal plays an even larger role in the production of electrical energy, where it dominates with a 71% share. Here too, however, there has been a decline of 5% since 2011 when coal was responsible for 75% of the energy production in MISO.

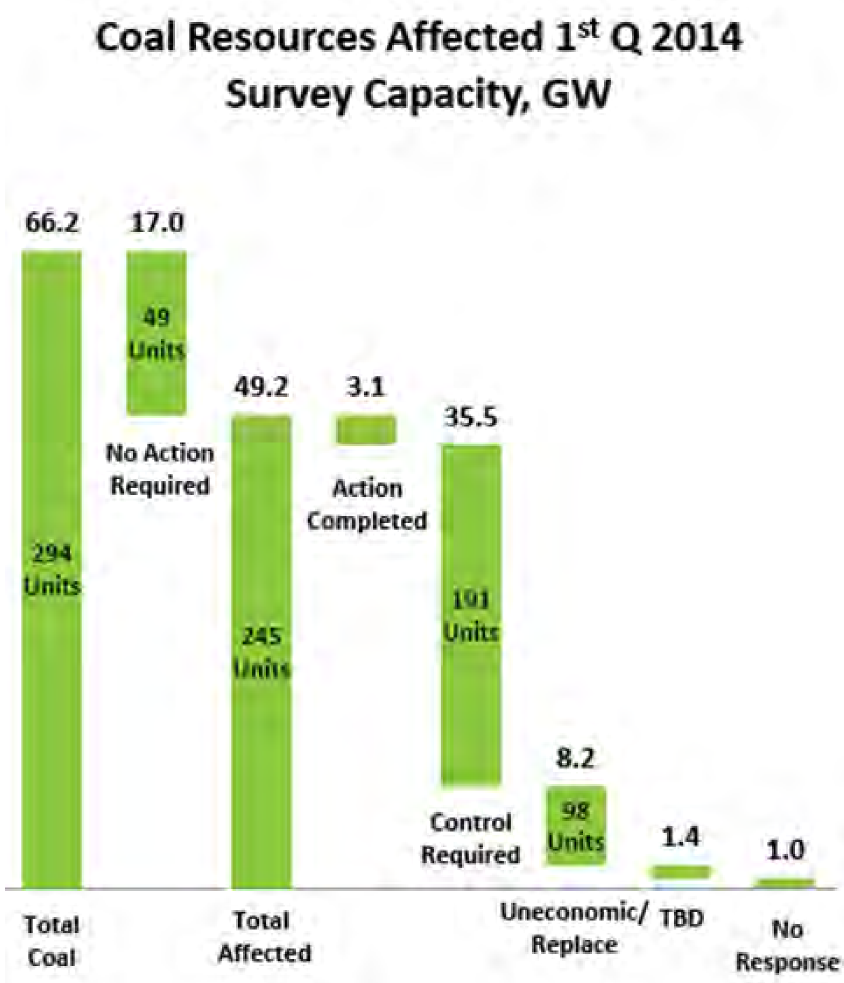
Figure 4A.4 – MISO Generating – Electricity Production (2013)



Source: MISO, "The Changing Power Generation Fleet," February 6, 2014

The next largest fuel-type is natural-gas fired generation, which accounts for almost 31% of the generating resources in the MISO North/Central Regions. Because these resources are higher-cost than most of the other resources in MISO, they produce less than 7% of the energy in the region (which is up from 5% in 2009). Natural gas capacity frequently sets the price in MISO. Energy production from natural gas is expected to increase within the MISO North/Central Regions. Due to EPA regulations, a significant portion of the coal fleet is forced into retirement. MISO surveys of member generators indicate that at least 8.2 GW of coal resources will retire due to the MATS regulation as noted in Figure 4A.5 below:

Figure 4A.5 – MISO Coal Units Affected by MATS



Source: MISO, "2014 Q1 EPA Survey Update"

The mix of generation is relatively homogeneous across the sub-regions within the MISO North/Central Regions; however, the north and west sub-region hosts most of the wind resources, while the east has the largest quantity of nuclear resources.

Supply Side Options

[170-IAC 4-7-6(c)(1)] [170-IAC 4-7-7(a)]

For planning purposes, IPL selected a group of reference units that represent proven and commercially available technologies, as well as emerging technologies considered viable in the next five to 10 years. In addition to traditional generating units, transmission projects, efficiency improvements and smart grid resources are considered as part of IPL's portfolio. IPL submits transmission expansion and improvement projects to MISO as part of its transmission planning process. MISO determines the benefits of such projects and includes those that are cost effective in its MISO Transmission Expansion Plan ("MTEP") on an annual basis. IPL will build out two (2) market efficiency projects including the Petersburg to Breed 345 kV line upgrade and a Petersburg 345 to 138 kV autotransformer upgrade as described in the short-term action plan. IPL determines ways to improve system stability and flexibility to improve import capability. IPL does not currently have any Multi Value Projects ("MVP") however, MISO continues to study MVP projects. In addition, IPL considers and implements transmission improvements to support additional or upgraded generating resources. These are both described in Section 4D

IPL considers efficiency improvements that may provide additional generating capacity such as a technique known as "fogging" whereby inlet air is cooled to increase gas turbine outputs. This is described in the short-term action plan (Section 5) as part of technology applications. Analysis is underway, therefore, no specific incremental capacity in terms of MWs are included in the preferred resource portfolio.

Smart grid assets have been included in this IRP and the preferred resource portfolio in the form of 20 MWs through IPL's Conservation Voltage Reduction ("CVR") program. Two-way communicating devices at distribution substations and capacitor bank locations allow IPL to remotely lower the system voltage incrementally to reduce peak demand. The voltage levels on the feeders and at Advanced Metering Infrastructure ("AMI") meters are monitored to ensure service voltage limits are maintained.

For the first time, a significant amount of distributed generation ("DG") resources are also included in this IRP. This DG is comprised of approximately 66 MW of solar facilities located at customer premises as described below and in Section 4C.

The reference units represent two natural gas-fired options, and three nuclear/renewables choices. A Battery Energy Storage System ("BESS") was not included as a separate new resource in the Ventyx model due to the current economics precluding it from being selected by the model as a resource[19]. Unlike previous years, coal options were not considered since Supercritical Pulverized Coal ("SCPC") no longer appears to be a viable option due to EPA 111(b) regulations on greenhouse gas emissions for new sources. Likewise, IPL has not considered Integrated Gasification Combined Cycle ("IGCC") since this technology has yet to become widely adopted.

Natural Gas

- Simple Cycle Combustion Turbine ("CT")
- Combined Cycle Gas Turbine – H-Class ("CCGT")

[19] See Section 2 for more information about IPL's plans to research BESS options on its 138 kV grid.

Nuclear and Renewables

- Nuclear
- Wind
- Solar
- Hydroelectric[20]

The technology and size of units selected for capacity additions will depend on a number of factors including, among others, load and energy demand growth and best available technologies at time of construction. In the write-up on technology below, IPL indicates the size in megawatts of each unit under consideration. So as to not skew the results, IPL is using a "common size" of 200 MW for the CCGT and Nuclear options. This would represent a portion of those plants and not the full output so that IPL can analyze the underlying need and not be overly concerned about minimum unit size. In reality, however, IPL would build or buy the appropriate sized unit, perhaps with partners if the size does not correspond to minimum unit size.

A brief description of each of the technology alternatives currently or potentially available to IPL to meet future capacity needs follows.

Please note that all capital costs provided below are derived from Ventyx assumptions for "overnight costs". As the name implies, overnight costs represent pricing the costs of a unit as if it could be built in one day. Separate assumptions on commodity and labor-price inflation are included in the Ventyx modeling to adjust these costs to the year a unit is brought online. In addition, Allowance for Funds Used During Construction ("AFUDC") costs is also included in the model runs. Note that Figure 4A.7 below does not include either commodity-price and labor-price inflation or AFUDC.

Natural Gas

[170-IAC 4-7-6(c)(1)] [170-IAC 4-7-7(a)]

IPL has evaluated two types of natural gas-fired generation in the IRP analysis. Natural gas-fired units have historically had low dispatch rates in the Midwest due to a competitive installed coal-fired fleet. However, increasing regulation of coal generation coupled with increased discoveries of natural gas supply may lead to a significant increase in natural-gas fired generation in the Midwest. Please note that all capacity numbers represented below are approximate winter outputs.

[20] In the IPL 2011 IRP, the Company determined hydroelectric power was not a viable resource. There have been no significant changes since the analysis performed for the 2011 IRP; hence, hydroelectric power has not been included in this IRP.

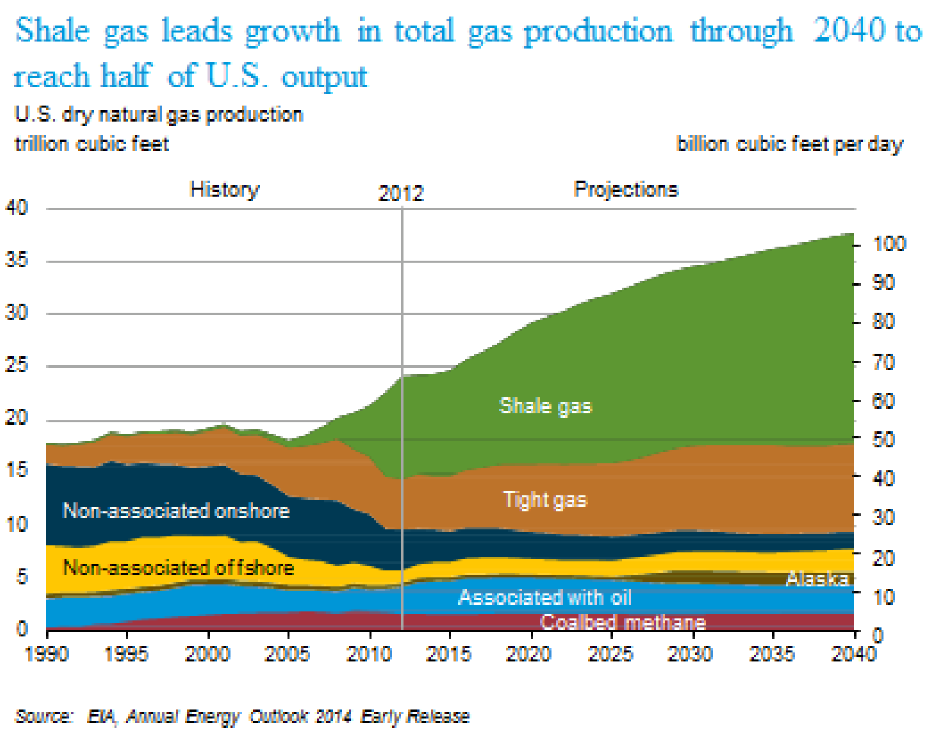
Shale and the New Gas Supply Paradigm

Natural gas alternatives are increasingly important in the analysis of new supply options for two reasons: first is the significant pressures felt by U.S. utilities to retire existing coal assets and the difficulty in permitting new coal-fired generation. As important, however, is the emergence of shale gas and the significant increase in available U.S. natural gas resources.

Geologists have long known that shale formations contained significant amount of natural gas, the formations are not porous and the gas cannot flow freely when wells are drilled. The breakthrough in commercial drilling in shale formations was combining the practice of horizontal drilling coupled with hydraulic fracturing (the process of using high pressure liquids to create cracks in the shale which allow the gas to flow)[21].

Between 2005 and today, the rate and range of shale gas development expanded in many parts of the county. "In addition to the Barnett, producers began intensively developing plays in the Woodford, north of the Barnett in Texas and Oklahoma; the Fayetteville in Arkansas; and the Haynesville in Louisiana/East Texas. During this time development also began in the Marcellus Shale of the eastern United States." [22] In 2014 the Annual Energy Outlook, the domestic supply picture has changed as noted below in Figure 4A.6:

Figure 4A.6 – Projected Domestic Gas Supply



21 *Task Force on Ensuring Stable Natural Gas Markets*, 2011 Report, Bipartisan Policy Center and American Clean Skies Foundation, pp. 35-36.

22 Ibid.

With traditional domestic U.S. gas drilling, most operations are in relatively unpopulated areas. Shale gas operations include more populated areas, leading to more chance of public opposition and possible water pollution. The natural gas industry and environmental officials have begun paying more attention to these issues and must take the steps necessary to avoid any significant environmental degradation.

Simple-Cycle Combustion Turbine

For purposes of the IRP analysis, IPL assumed the incremental addition of a 160 MW CT in its expansion planning. Conventional frame CTs are a mature technology, widely used for peaking applications. The units are characterized by low capital costs, low non-fuel variable Operation and Maintenance Costs ("O&M"), modular designs and short construction lead times. However, one disadvantage of CTs is the relatively high average heat rate, cost of fuel and resulting high operation costs at higher capacity factors.

IPL has substantial experience in both the construction and operation of CTs. IPL unit additions include Georgetown Generating Station ("Georgetown") Unit 1 (100 MW) added in 2000 and Harding Street Generating Station ("HSS") CT 6 (183 MW) added in 2002. IPL also purchased Georgetown Unit 4 in 2007 (100 MW). IPL will continue to consider CTs as a generation option due to their flexibility in adding small increments of capacity within a relatively short time frame. IPL also continues to monitor developments in CT technology and will consider CT alternatives in any decision for future capacity additions.

See environmental characteristics and capital costs assumed for IRP modeling in Figure 4A.7.

Combined Cycle Gas Turbine

For purposes of the IRP analysis, IPL assumed the incremental addition of a 200 MW CCGT. The typical combined cycle installation consists of gas turbines discharging waste heat into a heat recovery steam generator ("HRSG"). The HRSG supplies steam that is expanded through a steam turbine cycle driving an electric generator. Combined cycle units have the distinct advantage of being the most efficient fossil-fueled process available. IPL has recently begun construction on a 671MW F-class CCGT at Eagle Valley. It is anticipated that by the commercial operation date of any new CCGT, that either G- or H-class machines will be widely in-service with other North American utilities and will represent a good choice for IPL. IPL has modeled an H-Class machine in its analysis. In addition, the units have low pollutant emissions, low water consumption levels, reduced space considerations and modular construction. IPL continues to monitor developments in CCGT technology and will consider CCGT alternatives in any decision for future capacity additions.

See environmental characteristics and capital costs assumed for IRP modeling in Figure 4A.7.

Nuclear and Renewables

[170-IAC 4-7-6(c)(1)] [170-IAC 4-7-7(a)]

Nuclear

With increasing concern about GHG, there has been a renewed interest in additional investment in nuclear generation. While the debate over nuclear plant siting is controversial and the plants are extremely capital intensive, additional electricity production by nuclear power is promoted on the basis of mitigating increases in GHG emissions. Countervailing views on the "nuclear renaissance" are that the technology is too expensive and the accident at the Fukushima Daiichi plant in Japan should make regulators hesitant to approve new reactors.

A total of 23 new reactors are before the Nuclear Regulatory Commission (NRC) for a combined construction and operating license (COL). These new reactors are all located in the Midwest, Southeast and Texas. Despite this rather large figure, Ventyx notes that the "high uncertainty around construction cost estimates and the ability to obtain financing, Ventyx is assuming that only Vogtle 3&4 and VC Summer 2&3 in the Carolinas will be constructed plus the completion of the TVA's partially constructed Watts Bar 2 reactor, scheduled to be completed in December 2015."

Summary details of the two projects are noted below:

	Vogtle 3&4	VC Summer 2&3
Primary Utility	Southern Company	South Carolina Electric & Gas
Reactor	Westinghouse AP1000	Westinghouse AP1000
Completion	2017 (Unit 3) 2018 (Unit 4)	2017 (Unit 2) 2018 (Unit 3)

Ventyx also notes that in "August 2012, the NRC denied a license for the Calvert Cliffs nuclear power plant in Maryland. The judges said the applicants cannot receive a combined license to build and construct an Areva nuclear plant at Calvert Cliffs since the applicants are owned by a US Corporation that is 100% owned by a foreign corporation."

IPL has chosen to include a nuclear option within this analysis. It is not anticipated that IPL will build a greenfield nuclear plant. Rather, it is assumed that IPL could participate as a minority participant in the development of a new nuclear plant at an existing site if such development could overcome permitting issues. IPL continues to monitor developments in nuclear technology and will consider nuclear alternatives in any decision for future capacity additions.

See environmental characteristics and capital costs assumed for IRP modeling in Figure 4A.7.

Wind

Recent introduction of large-scale, utility-grade wind turbine generators ("WTG") has made wind energy a commercially viable technology in Indiana and the U.S. Indiana in particular has benefited from the widespread adoption of increasing wind tower heights. The 80 meter turbine height which is common in Benton County can more readily utilize the increased wind speeds found at higher elevations. Likewise, the Midwest is favored with several very good wind basins, allowing generation to be diversified and take advantage of metrological variances.

Wind speeds are important in determining WTG performance. The power available to drive WTG is proportional to the cube of the speed of the wind. In other words, a doubling in wind speed leads to an eight-fold increase in power output.

Higher wind speeds are not only important for generation; they also tend to lower the cost per kWh of the electricity produced. This is because wind parks generally have very high fixed costs (i.e., most of the cost of operating a wind park is the initial capital and financing costs). Spreading this cost over more hours per year reduces the hourly cost of electricity.

Currently, IPL's resource plan has an available renewables generation component of approximately 300 MW of energy secured under two long-term Wind Power Purchase Agreements ("PPAs"). Under the terms of the Wind PPAs, IPL receives all of the energy and Renewable Energy Credits ("RECs") from the two wind farms. The null[23] energy is used to supply the load for IPL customers and, in the absence of any mandatory federal or state renewable energy standard ("RES"), IPL is currently selling the associated RECs, but reserves the right to use RECs from the Wind PPAs to meet any future RES requirement. The Wind PPAs were approved by the IURC and if IPL chooses to monetize the RECs that result from the agreements, IPL shall use the revenues to first offset the cost of the Wind PPAs and next to credit IPL customers through its fuel adjustment clause proceedings. When the RECs associated with the production of null energy from the Wind PPAs are sold to a third party, IPL shall not claim that energy as renewable energy on behalf of its retail customers.

Good wind sites are usually located far from the main load centers, and therefore transmission system expansion may be required to connect the load centers with the wind-rich sites. IPL continues to monitor developments in wind technology and will consider wind alternatives in any decision for future capacity additions.

[23] The Green-e Dictionary (http://www.green-e.org/learn_dictionary.shtml) defines null power as, "Electricity that is stripped of its attributes and undifferentiated. No specific rights to claim fuel source or environmental impacts are allowed for null electricity. Also referred to as commodity or system electricity."

See environmental characteristics and capital costs assumed for IRP modeling in Figure 4A.7. The cost is the same for in state or out of state wind, but the capacity factor will vary depending on the location of the resource.

Solar

The total U.S. solar market grew more than 120% in 2010 – from 349 MW to 782 MW – and included approximately 48,000 photovoltaic ("PV") systems. These were mostly rooftop systems, but there were also a significant number of utility-scale projects, with eight projects greater than 10 MW.[24] As noted in the Rate REP Feed-In Tariff section below, IPL is on pace to have approximately 98 MW of PV systems commissioned by June 2015. IPL continues to monitor developments in PV technology and will consider PV alternatives in any decision for future capacity additions.

IPL's model allowed additional solar to be selected in 10 MW blocks. See environmental characteristics and capital costs assumed for IRP modeling in Figure 4A.7.

Hydroelectric Resources

The use of water-power to generate electricity is one of the oldest generation resources still in use today. In addition, hydroelectric power remains by far the largest source of renewable energy in the world, including North America.[25] In the IPL 2011 IRP, the Company determined hydroelectric power was not a viable resource. There have been no significant changes since the analysis performed for the 2011 IRP; hence, hydroelectric power has not been included in this IRP.

MW Capacity, Performance Attributes, and Installed Costs

[170-IAC 4-7-7(a)] [170-IAC 4-7-7(a)(1)]

The Supply Side Resources considered in IPL's IRP modeling are listed below in Figure 4A.7 along with their assumed MW capacity, performance attributes, and installed costs.

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24 http://www.solarelectricpower.org/

25 *Power Engineering*, June 2009 "Hydroelectricity: The Versatile Renewable," page 32.

Confidential Figure 4A.7 – IRP Supply Side Resource Options

				Emission Rates		
	MW Capacity	Base/Peaker/ Intermittent	Cost per Installed KW	SO_2 (lb/MWh)	No_x (lb/MWh)	CO_2 (lb/MWh)
Simple Cycle Gas Turbine	160	Peaker	[redacted]	[redacted]	[redacted]	[redacted]
Combined Cycle Gas Turbine - H-Class	200	Base	[redacted]	[redacted]	[redacted]	[redacted]
Nuclear	200	Base	[redacted]	[redacted]	[redacted]	[redacted]
Wind	50	Intermittent	[redacted]	[redacted]	[redacted]	[redacted]
Solar	10	Intermittent	[redacted]	[redacted]	[redacted]	[redacted]

Source: Ventyx

Distributed Generation, Net Metering and Feed-In Tariff

[170-IAC 4-7-4(b)(5)] [170-IAC 4-7-6(c)(1)] [170-IAC 4-7-7(a)]

Distributed Generation

IPL continues to identify and inventory customers who own distributed generation ("DG") (in addition to those already identified and contacted for possible participation in IPL's Standard Contract Rider No. 15, Load Displacement) for inclusion in future distribution planning studies. Transmission and Distribution impacts are discussed in Section 4C. As a Company, we stay connected to our customers in order to gage their interest in DG through public outreach events. IPL recognizes factors in addition to costs may motivate customers to install DG, such as environmental attributes, customer empowerment, energy independence, increased reliability, and social activism. Due to a large occurrence of early adoption from Rate REP and the Indiana climate, IPL believes its service territory will see little growth in DG.

Rate REP (Renewable Energy Production)

IPL's Rate REP is a three-year pilot renewable energy feed-in tariff approved by the IURC that went into effect on March 30, 2010 and concluded in 2013. Under Rate REP, IPL was authorized to purchase all of the energy produced by customer-sited solar photovoltaic, wind, or biomass systems and receives all of the Renewable Energy Credits ("RECs"). The null[26] energy from the customer-sited systems is used to supply the load for IPL customers and, in the absence of any mandatory federal or state renewable energy standard ("RES"), IPL plans to sell the associated RECs, but reserves the right to use RECs from Rate REP agreements to meet any future RES requirement.[27] When the RECs associated with the production of null energy produced by customer-sited solar photovoltaic, wind, or biomass systems are sold to a third party, IPL shall not claim that energy as renewable energy on behalf of its retail customers.

IPL has executed and the IURC has approved forty (40) agreements for a total nameplate capacity of approximately 98 MW (alternating current ["AC"]). As of September 1, 2014, there were 26 operating projects totaling 66 MW of nameplate capacity; 11 MW are under construction and an additional 21 MW have not started construction. All projects are expected to be completed by June, 2015. See Section 7, Attachment 8.1 and Attachment 8.2, Rate REP for the solar projects and their location in the IPL service territory.

IPL is currently working with MISO to receive capacity credit for these Rate REP projects in future Planning Years. As more historical data is gathered, IPL will have a better understanding of the capacity value, but due to the intermittent nature of these resources, only 30 MW are included in IPL's generation planning reserves.

Net Metering

In 2011, the IURC expanded the Net Metering rules to include all customers and increased the maximum nameplate rating to 1 MW. As of September1, 2014, IPL has 51 net metered customers that include 8 commercial customers and 43 residential customers. Total nameplate capacity of these installations is approximately 240 kW. This increase in residential participation has been influenced by the decline in PV panel costs and IPL's DSM incentives that will expire at the end of 2014. Commercial customers continue to have limited participation. Due to low retail rates and expiring tax credits, it is expected that few, if any, commercial customers will participate in Rider 9 in a tangible manner. Additional residential customers may participate in Rider 9 as a result of lower PV system costs but overall volume will continue to be low and will not impact the IRP.

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[26] The Green-e Dictionary (http://www.green-e.org/learn_dictionary.shtml) defines null power as, "Electricity that is stripped of its attributes and undifferentiated. No specific rights to claim fuel source or environmental impacts are allowed for null electricity. Also referred to as commodity or system electricity."

[27] Rate REP was approved by the IURC and if IPL chooses to monetize the RECs that result from the agreements, the ratemaking treatment of those transactions will be the same as the Wind PPAs to benefit customers (Hoosier Wind Farm - IURC Cause No. 43485, Lakefield Wind Farm – IURC Cause No. 43740, Rate REP – IURC Cause No. 44018).

Section 4B. DEMAND SIDE MANAGEMENT

Demand Side Management

[170-IAC 4-7-6(a)(6)]

IPL's demand side management ("DSM") program is comprised of load management DSM and energy efficiency. With the passage of Senate Enrolled Act 340 ("SEA 340") and the resulting pause in the efforts to meet the IURC targets for DSM, the DSM evaluation for this IRP is driven by a more traditional analysis that identifies the market potential for cost effective DSM.

In April 2014, IPL engaged the consulting firm Applied Energy Group (formerly EnerNOC) to assist in the development of a short term (2015-2017) DSM action plan and a longer term (2018-2034) DSM forecast. The DSM short term action plan was intended to provide evidence in support of IPL's May 30, 2014 filing to the IURC for approval of DSM programs, while the longer term DSM forecast was intended to support the future of DSM for purposes of IPL's resource planning and in particular this IRP.

While the primary driver in developing the amount of energy efficiency DSM resources in the prior IRP was the IURC's Generic Order (Cause No. 42693-S1)[28], these targets were suspended with the passage of SEA 340 in March 2014. As IPL has indicated before, other factors such as increasing customer interest, higher supply-side resource costs and federal environmental rules, already had IPL moving in the direction of DSM playing a significantly greater role in IPL's resource strategy. Despite the absence of state DSM targets, IPL believes DSM is a valuable resource and expects to continue offering a broad range of cost-efficient programs to its customers.

The forecast of future DSM (2018-2034) that was completed by Applied Energy Group is discussed and incorporated in IPL's Load Forecast (Section 4D) and modeled by Ventyx in the Integration section (Section 4). The Integration section addresses historical and current DSM initiatives as well as local and national developments that influence IPL's DSM strategy for the future. The development of IPL's proposed 3-Year Demand Side Management Plan ("3-Year DSM Plan")[29], dated May 30, 2014, including the screening methodologies, cost-benefit analysis and proposed programs, is described in this Section and a copy of the Plan is included in Section 7, Attachment 4.1, DSM Supporting Documents.

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[28] The IURC Order in Cause No. 42963-S1 (dated December 9, 2009) – the Generic Phase II Order – established targets for Energy Efficiency achievement that are significantly greater than historical energy efficiency efforts in Indiana.

[29] In Cause No. 44497, IPL has proposed a 3-Year Demand Side Management Plan. While IPL filed a 3 year Action Plan for the years 2015-2017, IPL is only seeking spending authority from the Commission for a 2 year period (2015-2016).

IPL Historical DSM Programs

[170-IAC 4-7-6(a)(6)]

IPL was among the first utilities in Indiana to implement a comprehensive DSM program. IPL has offered DSM on essentially a continuous basis since 1993 with average annual DSM expenditures over the past five (5) years exceeding $16 million per year.[30]

The IPL DSM efforts from 2003 to 2009 focused on low income weatherization, energy efficiency education, and demand response programs including the Air Conditioning Load Management Program, which provides demand savings but limited energy savings. Subsequent to the issuance of the Phase II Generic Order, IPL efforts became primarily focused on the energy efficiency savings to achieve compliance with the Order. IPL forecasts achievement of approximately 456 GWh savings by year end 2014, which is approximately 92% of the cumulative Commission targets through the end of 2014.[31]

A summary of IPL's historical DSM program offerings since 2010 is detailed in Figure 4B.1.

[30] As stated in the 2014 IPL annual DSM status report filed under IURC Cause No. 42693.

[31] *Ibid*

Figure 4B.1 – DSM Program History (2010-2014)

Cause No.	Date Approved	Expiration Date	Programs	Authorized Program Expenditures
43623	2/10/2010	2/9/2013	• Residential On-site Audit with Direct Install (Core) • Residential Prescriptive Lighting (Core) • Energy Efficiency Schools – Kits Program (Core) – extension • Income-Qualified Weatherization (Core) - extension • Residential ACLM Program (Core Plus) – extension • Residential Energy Assessment Program (Core Plus) • Residential New Construction ES Plus (Core Plus) • Residential 2nd Refrigerator Pick-Up (Core Plus) • Res & C&I Renewable Energy Incentives (Core Plus) • Commercial and Industrial ("C&I") Prescriptive (Core) • C&I ACLM (Core Plus) • C&I Custom (Core Plus) • C&I Retro-Commissioning (Core Plus) • C&I New Construction (Core Plus)	Total budget: $26.0M
43911	11/4/2010	11/4/2013	• Energy Efficiency Schools Program – Audits (Core)	Total budget: $560,000

Cause No.	Date Approved	Expiration Date	Programs	Authorized Program Expenditures
43960	Initial Approval Date 11/22/2011 Amended in 43623-DSM-5 on 6/20/12	12/31/2013 While this was initially approved as a 3 year plan, it was compressed to a 2 year plan	**CORE PROGRAMS** • Residential Home Energy Assessment • Residential Lighting • Energy Efficiency Schools - Education Component - Audit Component • Income-Qualified Weatherization • Commercial and Industrial ("C&I") Prescriptive **CORE PLUS PROGRAMS** • Resident New Construction • Residential On-Line Energy Assessment with Kit • Residential 2nd Refrigerator Pick-Up • Residential Peer Comparison Report • Residential ACLM Program • Residential High Efficiency HVAC • Residential Renewable • Residential ACLM Program (Core Plus) • Residential High Efficiency HVAC • Residential Renewable Energy Incentives • C&I Business Energy Incentives - Customer - Prescriptive • C&I ACLM • C&I Renewable Energy Incentives	$63.1 M Initial Authority $54.5 M – First Amendment to the Settlement Agreement
44328	11/25/13	12/31/2014	• One Year Extension of Cause No. 43960. Programs offerings remained the same except for IPL ceased to offer High Efficiency HVAC	Total budget: $23.7 M
44497	Pending	Proposed 2 Year Plan – Requesting that Term Begins on January 1, 2015	• IPL has requested the extension of the current Program offerings with the exception of the Residential New Construction; Renewable Energy Incentives for Residential and Business Customers and the Residential New Construction Programs. IPL has proposed the continuation of all of the other programs. IPL has also proposed one new Program – Small Business Direct Install.	Total budget: $63.6M

Source: IPL

Online Energy Feedback (PowerView)

IPL's online energy feedback has been available for all IPL customers that create a sign-on since its July 2010 inception. For Residential customers, daily energy consumption along with a historical view is displayed on a one-day delayed basis through a web-portal. Industrial and Commercial customers can also access similar information at the iplpower.com website.

IPL Current DSM Programs

[170-IAC 4-7-6(a)(6)]

IPL's current portfolio of DSM programs was approved in November 2013 in Cause No. 44328. IPL is currently offering all five of the programs that were designated as Core Programs by the IURC in its Generic Order. This comprehensive set of programs provides energy efficiency opportunities for all IPL customers. Delivery of most of the Core Programs will transition from delivery by the statewide third party administrator ("TPA") to IPL in January, 2015.

The programs approved in Cause No. 44328 are listed in the table above. The residential programs are generally a continuation of the prior program offerings that were initially approved in Cause No. 43623[32]. In some cases, these programs have been successfully offered by IPL for several years (i.e., Air Conditioning Load Management ["ACLM"]).

Note that the Core and Core Plus designations are from the Generic Order and these labels will cease to be relevant as the TPA program delivery concludes at the end of 2014 and IPL moves into the role of having primary responsibility for the delivery of all of these DSM programs.

As is detailed in IPL's Annual Compliance Filings made with the IURC on July 1st of each year, IPL DSM programs in total have generated significant demand and energy savings. The most recent IPL DSM Compliance Filing, as filed on July 1, 2014, is provided in Section 7, Attachment 4.2, DSM Supporting Documents. This compliance filing demonstrates that although the IURC targets were suspended by the passage of SEA 340, IPL expects to be at or near achievement of the prior Commission targets on a cumulative basis at the end of 2014.

IPL's ACLM ("CoolCents®") and Income Qualified Weatherization Programs are IPL's longest continually offered DSM programs. The Residential ACLM program has been offered since 2003 and represents the largest DSM program in terms of customer participation and peak demand reduction. At the end of 2013, IPL had deployed approximately 39,650[33] switches, which is equivalent to about 27 MW of summer peak reduction capability. When the demand savings from IPL's other demand response tariff riders are considered there is approximately 83 MW[34] of total peak demand reduction available to IPL.

Nuclear and solar resources did not appear in any of the landscapes. IPL has experienced a large influx of early adoption of DG solar due in large part to its feed-in-tariff, Rate REP as described

[32] The IURC issued an Order approving Cause No. 43623 on February 10, 2010.
[33] Residential Air Conditioner Load Management Program EM&V Final Report, August 7, 2014, Table 8, p. 10.
[34] Includes 27 MW of ACLM, 20 MW of Conservation Voltage Reduction, and 36 MW of load curtailment/interruptible programs.

in Section 4A. Additional DG is not included in the short-term forecast absent further financial incentives. IPL recognizes the installed costs for solar are decreasing, however, modeling limitations do not allow dynamic costs to be included. Therefore, the 2016 IRP will include updated cost which may find solar to be a cost-effective option.

Of current offerings, the most significant DSM programs in terms of energy efficiency savings in 2014 are forecast to be the Core C&I Prescriptive Program (approximately 55,000 MWh) and the Residential Core Plus Peer Comparison Report (approximately 29,000 MWh).

Current Load Curtailment/Interruptible Programs

In addition to the energy efficiency DSM programs and the ACLM demand response program described above, IPL also has a number of Load Curtailment/Interruptible programs that are offered under its tariff and targeted to C&I customers. At the end of 2013, IPL had 36 MW of demand response programs under contract with C&I customers. This is a decrease from the amount available in 2011, in part as a result of the recent economic downturn and of the shutdown of facilities that previously participated but no longer can due to EPA restrictions on emissions from diesel generators. In most cases, the incentives offered are adjusted annually to reflect changes in power market conditions. The currently approved programs are described below.

- Standard Contract Rider No. 14 (Interruptible Power). Rider 14, IPL's first interruptible/curtailable rider has been available since the early 1990s. IPL has one customer participating on Rider 14. This customer represented 9.3 MW of interruptible load.
- Standard Contract Rider No. 15 (Load Displacement). The IURC approved this Rider in April 2001. This Rider is available to customers who contract with IPL and agree to operate their generators at IPL's request to displace their own load. Rider 15 contributed approximately 25.4 MW to IPL's 2014 summer load reductions.
- Standard Contract Rider No. 17 (Curtailment Energy). Rider 17 has been available since 1999 for customers who contract with IPL and agree to curtail their load to a Firm Power Level at IPL's request. Rider 17 contributed approximately 1.7 MW to IPL's 2014 summer load reductions.
- Standard Contract Rider No. 18 (Curtailment Energy II). Rider 18 has been available since 2000 for C&I customers who contract with IPL and agree to curtail their load to a Firm Power Level at IPL's request. Each Rider 18 participant selects their own Firm Power Level and the energy price at which they agree to curtail load. No customers participated on this Rider in 2014.
- Standard Contract Rider No. 23 (Market Based Demand Response). Rider 23 has been available since 2011 for C&I customers on rates HL, PL, PH and SL and aggregators of customers ("ARCs") who wish to participate through IPL in the MISO energy market. No customers have elected to participate in this Rider due to low rates in the market.

- Special Rate SS Agreements. Several Rate SS (Small Secondary Service) customers with loads that exceed the 75 kW demand typically allowed by that rate, are allowed by the tariff to be served on Rate SS under special agreements. These customers typically have sporadic loads and very low load factors. The total diversified Rate SS Special interruptible load for 2014 was approximately 9.6 MW. Due to notification requirements and other non-conforming issues, these resources are not counted towards IPL's Module E resource requirements at the MISO but are nevertheless valuable to IPL as a measure to prevent load from coming onto the system at critical times.

Indiana Developments – The Changing Landscape

The landscape for DSM in Indiana has changed significantly since the last IPL IRP was completed in 2011. Prior DSM efforts were influenced by the significant energy efficiency targets established in the IURC Phase II Generic Order. These targets provided the direction for the amount of DSM efforts in the State of Indiana through 2014. The Generic Order also established five Core DSM Programs and identified the mechanism for these Core programs to be delivered.

The IURC's Generic Order established the Demand Side Management Coordination Committee ("DSMCC") that solicited bids and selected a statewide TPA to deliver the Core Programs on behalf of the jurisdictional electric utilities. After a rigorous process, GoodCents® was selected as TPA by the DSMCC. In July 2011, the IURC approved the contract with GoodCents® and since, the DSMCC and GoodCents® worked diligently to deliver the Core Programs on behalf of the jurisdictional utilities beginning in January, 2012. The delivery of DSM programs by GoodCents will conclude on December 31, 2014. The DSMCC has remained in place to manage the wind-down of the Core Program delivery by GoodCents and to manage other transition related issues.

<u>Senate Enrolled Act 340</u>

The 2013-2014 Indiana General Assembly passed SEA 340, which, among other things, (1) provided the industrial customers with demand at a single site greater than one MW the opportunity to opt-out of participation in utility sponsored energy efficiency programs, and (2) eliminated the Generic DSM Order's savings goals.

SEA 340 provides that an industrial customer that meets the definition of a "Qualifying Customer" may opt-out by providing notice to its electricity supplier. Once a Qualifying Customer has opted out, the utility may not charge the customer rates that include energy efficiency program costs. The statute defines "energy efficiency program costs" as including: "(1) program costs; (2) lost revenues; and (3) incentives approved by the commission."

SEA 340 also allows customers to opt back in to participation and payment for utility-sponsored energy efficiency programs. A customer who opts back in must participate in the energy efficiency program for at least 3 years (and must pay energy efficiency program rates for such 3-year period).

Cause No. 44441 – Qualifying Customer Opt-Outs

The procedures for customer opt out were proposed and approved by the Commission in Cause No. 44441. In accordance with these procedures, IPL has made a good faith effort to notify Qualifying Customers of their ability to opt-out of participating in DSM programs, and defined the date ranges by which the customer must provide notice to opt-out. The Qualifying Customer's intention to opt-out of DSM participation in the second half of 2014, had to be received by IPL on or before June 1, 2014. The opt-out elections were applied to bills beginning with than July 1, 2014. Any Qualifying Customer providing notice after June 1, 2014, but before November 15, 2014, is eligible for opt-out effective January 1, 2015. After January 1, 2015, Qualifying Customers will only be able to opt-out on a calendar year basis with an effective date of January 1st of each year.

Figure 4B.2 below provides the Qualifying Customer opt-out schedule as proposed by the utilities.

Figure 4B.2 – Qualifying Customer Opt-out Schedule

Notice Must be Received On or Before:	Effective Date of Opt Out:
June 1, 2014	July 1, 2014
November 15, 2014	January 1, 2015
November 15, 2015	January 1, 2016
November 15, 2016	January 1, 2017
November 15, 2017	January 1, 2018
November 15, 2018	January 1, 2019

Source: IPL

While it is still uncertain to what extent customer opt-out will reduce the market potential for DSM in IPL's service territory, there will be some reduction in DSM potential. However, the reduction in DSM opportunities may be mitigated to the extent that large customers create energy efficiency projects on their own.

As of the July 1, 2014 initial opt-out opportunity, a total of 42 IPL large customers with approximately 3,640 GWh of sales, have provided notice to opt-out of DSM program participation. This represents about 12.5% of total IPL retail sales. In total, IPL has approximately 150 customers that are served at over 200 sites eligible to opt-out of participation in its DSM programs. In aggregate, eligible customers including those who could opt-out but haven't necessarily done so, represent about 25% of IPL's total retail sales.

National Developments – The Changing Landscape

Without question, the most significant national development regarding energy efficiency is the rule that was recently proposed by the EPA to regulate CO2 as discussed in Section 3 of this IRP. Labeled the Clean Power Plan ("CPP"), the proposed rule was issued pursuant to Section 111(d) of the Clean Air Act. The EPA has identified four specific building blocks on which compliance with the target state CO2 emission rates can be achieved. Energy efficiency is one of these four building blocks along with heat rate improvements at existing power plants; additional generation by renewable energy resources and nuclear energy. The State of Indiana and IPL are still early in evaluating and commenting on the proposal and trying to understand the role that energy efficiency ("EE") and these other building block will play in compliance.

Due to the evolving nature of the rulemaking and legal challenges, it is unknown whether the CPP will ultimately go into effect. However, while the ultimate disposition of the rulemaking is unknown, it is prudent for IPL to actively plan for the eventuality that this rule, or other carbon constraints, will result in an increasing role for energy efficiency.

Although the specific level of energy efficiency that might be necessary for Indiana to achieve compliance with the Clean Power Plan is not known at this time, the EPA assumes that at some point Indiana is capable of achieving an incremental annual energy efficiency amount of 1.5% per year[35]. The cumulative amount of energy efficiency that EPA has assumed for Indiana under Option 1 (compliance by 2029) is 11.11%. This amount of energy efficiency is expected to be difficult to achieve, but if Indiana is eventually required to comply with the Clean Power Plan, EE will have a significant role in the compliance plan.

Beyond the implications of the CPP for EE in the future, there has continued to be an uptick in the scale and scope of energy efficiency nationally as well as locally. Data shows that the significant increase in DSM efforts in Indiana has continued to be in synch with national developments. According to the 2013 State Energy Efficiency Scorecard report from the American Council for an Energy Efficient Economy ("ACEEE")[36], total spending on customer-funded energy efficiency programs has increased from approximately $2.5 billion in 2007 to approximately $6.0 billion in 2012.

There has not been significant recent Federal legislation regarding energy efficiency since the passage of the American Recovery and Reinvestment Act of 2009 ("ARRA").[37] This legislation injected more than $11 billion ARRA funds directly into state energy efficiency programs. ARRA includes several additional provisions modifying and expanding the scope of the energy

[35] http://www2.epa.gov/sites/production/files/2014-06/documents/20140602tsd-ghg-abatement-measures.pdf

[36] "The 2013 State Energy Efficiency Scorecard", American Council for an Energy-Efficient Economy by Annie Downs, Sara Hayes, , Max Neubauer, , Seth Nowak, Shruti Vaidyanathan, Kate Farley, Celia Cui and Anna Chittum, November 2013, Table 2, page 9.

[37] The inclusion of EE/DSM in the EPA proposed CPP may significantly impact future EE efforts nationally.

efficiency effort. For example, on-site renewables, including solar photovoltaic ("PV"), hot water systems, small wind systems, and geothermal heat pumps are also eligible for a tax incentive worth 30% of the total cost, without a cap.

Many of the Federal tax provisions designed to encourage energy efficiency expired at the end of 2013. Tax credits for combined heat and power systems, fuel cell and microturbines, and accelerated depreciation for smart meters and smart systems remain in place.

Perhaps the most significant long-term consequence of ARRA is the impact on building codes. In order for states to receive the appropriate funds from the ARRA, they must adopt more stringent building codes (2009 IECC and ASHRAE 90.1-2007 for commercial). The ARRA also calls for 90% compliance with these higher codes by 2017. Indiana stakeholders are discussing a utility funded program that would encourage builders and others to achieve compliance with the updated building codes, but a methodology to assure attribution of savings has yet to be determined and agreed upon. This has possible relevance in planning for CPP compliance.

There have been limited demand response developments since the completion of the prior IPL IRP in 2011. In its Order 719, FERC instructed MISO to remove barriers to participation in demand response as part of their Ancillary Services Market ("ASM"). Through its Demand Response Working Group ("DRWG"), in which IPL participates, MISO is working through the attendant issues including, baseline determinations; technical performance requirements, such as communications, measurement, and verification; compensation and the potential conflict with state regulatory authority. The IURC completed an investigation into demand response in Indiana in IURC Cause No. 43566. In response to the IURC's order, IPL filed Standard Contract Rider No. 23 -- Market Based Demand Response Rider, which was approved by the IURC on March 7, 2011. Rider 23 provides customers the opportunity to submit bids through IPL to MISO for Emergency Demand Response and Demand Response Resource Type 1 economic energy. To date, no IPL customers have participated on Rider 23.

IPL's DSM Strategy

IPL has continuously offered DSM programs to benefit customers and optimize demand side resources since 1993. Following the IURC's Generic DSM Order through the passage of Senate Enrolled Act 340, IPL's DSM Strategy had been to comply with the energy efficiency targets established by the IURC in the Phase II Generic Order. Recent IPL DSM Plan filings up to and including the DSM Plan for 2014 (Cause No. 43960) were filed with the intention to have adequate energy efficiency offerings and sufficient funding to allow IPL to achieve the IURC's energy efficiency targets.

Following the passage of SEA 340, IPL voluntarily developed and filed for approval of the 2015-2016 DSM plan with the Commission to continue to offer customer programs. This plan provides for the delivery of a significant amount of DSM savings to our customers (approximately 1.1% of sales per year). The company expects to continue to propose and deliver additional cost-effective programs consistent with the IURC IRP and CPCN rules for demand side management options. The specific programs to be delivered beyond the current three-year planning horizon will be identified and proposed in subsequent IPL DSM plans to be filed with the Commission.

IPL's DSM initiatives will only be successful with broad customer participation. Therefore, customer adoption remains the most important element of successful DSM implementation. IPL must continue to ensure that the customer has positive interactions with IPL's many program partners and IPL will continue to carefully choose these partners and monitor their efforts.

The elements of the IPL 2015-2017 DSM Action Plans will:

- Continue to grow IPL's successful demand response program "CoolCents®"
- Continue to provide premise based Home Energy Audits that includes the installation of low cost energy efficiency measures
- Continue to provide weatherization services for income-qualified customers
- Continue to promote and encourage our customers to take advantage of IPL's web-based energy manage tools
- Continue to provide energy efficiency kits as a fulfillment for participation in the web based on-line audits
- Continue to provide the opportunities for customers to have their second refrigerators and freezers picked up and recycled
- Continue to periodically provide customers with a Peer Comparison Energy Report
- Continue to provide energy efficiency programs to C&I customers by providing prescriptive rebates for lighting, pumps, and motors
- Continue to provide a Custom energy efficiency program to C&I customers that provides funding for projects that do not fit into the Prescriptive program
- Introduce a small business customer audit and direct install program
- Continue to evaluate future DSM expansion capabilities including leveraging the two-way metering capabilities and advanced grid functionality

IPL's Screening Process and Evaluation

Screening of demand side measures is a multi-step process. Measures are first qualitatively screened and then logically grouped into prospective programs. These programs are then systematically evaluated with the aforementioned cost effectiveness tests. IPL calculates future avoided costs and compares them to projected savings.

DSM Cost Effectiveness

[170-IAC 4-7-7(b)]

The cost effectiveness of the DSM programs is built upon avoided supply costs which include capacity and marginal production costs, as well as program design and delivery features. The program success attributes are discussed below:

(a) *Conservation and load management programs that are correlated to or can be applied coincident to the peak demands of the utility*. A strong correlation of DSM to peak load drives proportionately enhanced capacity reductions, along with some level of energy reductions, depending on the specific program. The "peak correlation" attribute is significant to the success of the program because avoided costs are maximized. The type of customer loads targeted will include, for example, ACLM that helps control IPL's system peak.

(b) *Conservation and load management programs with efficient delivery channels*. IPL looks to wisely employ incentives targeted to encourage specific measures through traditional low-cost and effective delivery channels. These channels include the new appliance and the new construction markets, where more efficient appliance or insulation specifications could most cost-effectively be substituted for less efficient ones with minimal incremental material costs. The primary benefit to using these channels is the avoidance of labor-intensive removal and upgrade costs of replacement programs.

(c) *Conservation and select load management programs with long-life measures*. This will include new construction projects such as insulation, low-e glass, efficient heat pumps, and air conditioners that can last the life of the home in some cases, or nearly 15 years in others. Load management programs that require upfront capital (such as ACLM) also need to be designed for long-life to justify initial costs and balance the DSM portfolio demand and energy savings.

(d) *Conservation programs where government efficiency regulations have yet to happen, and where large efficiency improvements can still be realized*. Starting in 1987 with the National Appliance Energy Conservation Act that established minimum efficiency requirements for 12 types of residential appliances sold in the United States ("U.S.")., the law has been amended several times to include mandates for additional minimum efficiency standards for additional appliances and other electric products. An example of this standards improvement is the setting of new efficiency standards for light bulbs which begins in 2012.

(e) *Conservation and load management programs that have been successfully identified elsewhere*. Simply put, if DSM programs are not cost-effective in high-cost energy states, such as California, New York, or even Illinois, they will not be cost effective in Indiana. Indiana electric customers generally, and IPL customers specifically, benefit from some of the lowest electric prices in the nation. So it can be difficult to develop cost-effective DSM products to offer. IPL studies Midwestern DSM programs, reviews trade magazines, seeks stakeholder input at industry conferences and solicits advice from conservation advocates for potential conservation and load management programs.

(f) *Conservation programs that benefit electric customers who are financially least-likely to be able to participate on their own because of the higher initial costs of such measures.* Income can be a barrier to customers' decisions to participate in energy efficiency and therefore it is appropriate to consider DSM investments targeted to the economically disadvantaged. Over the prior 10 years, IPL has provided weatherization services through its DSM program to several hundred income qualified residential customers, reducing their energy consumption, while improving their comfort and ability to pay their electric bills. Without the IPL program, the majority of these customers would not have been in a position to make these investments in energy efficiency measures.

(g) *Load management programs that take advantage of advances in information technology -- specifically those that allow customers to respond to price signals either manually or via automated systems to economically shift load to off-peak periods, and/or conserve the load entirely.* Information technology capabilities are increasing, while some costs have decreased. IPL monitors this area for cost-effective applications including DSM and demand response measures as time based rate offerings.

IPL delivers some programs jointly with Citizens Gas. Using the same contractor and delivering both gas and electric measures in the same visit reduces overhead costs and improves cost-effectiveness by delivering more measures than if the companies delivered the measures separately.

Avoided Costs

[170-IAC 4-7-4(b)(12)] [170-IAC 4-7-6(a)(5)] [170-IAC 4-7-6(a)(6)] [170-IAC 4-7-6(b)(2)] [170-IAC 4-7-8(b)(5)] [170-IAC 4-7-8(b)(6)(C)]

The marginal cost of capacity including generation, transmission, distribution, capacity, and the marginal cost of production, including fuel, quantifiable emission costs, and variable operating and maintenance costs are the primary value drivers of the avoided cost benefits associated with a given load reduction.

IPL capacity costs and marginal production costs were fairly flat over the last decade. These costs have risen in recent years and are expected to trend higher as more environmental restrictions on coal-fired production are implemented. Representative values from the tariff rate Cogeneration Service ("CGS") over the prior years are shown in Figure 4B.3 below:

Figure 4B.3 – Historical Avoided Capacity and Production Costs

Year	Avoided capacity costs ($/kW/Month)	Avoided production costs (Cents/kWh, Off Peak)
1998	2.87	1.53
1999	2.84	1.55
2000	2.91	1.54
2001	2.85	1.82
2002	3.00	1.55
2003	2.94	1.33
2004	2.85	1.42
2005	3.13	1.39
2006	3.08	1.41
2007	3.17	1.62
2008	4.76	2.14
2009	6.18	2.66
2010	6.05	1.93
2011	7.19	2.20
2012	7.30	2.46
2013	7.42	2.57
2014	7.39	2.65

Source: IPL

The avoided capacity costs for 2014 were used in the DSM modeling for the updated DSM Action Plan filed in Cause No. 44497. IPL included the marginal cost of capacity (inclusive of savings in generation capacity, and transmission and distribution capacity). The avoided energy costs are from the Ventyx Midwest Fall 2013 Reference Case. The marginal cost of production includes fuel, emission costs and variable operating and maintenance costs.

For this IRP modeling, the marginal generation capacity cost was calculated to be [redacted]/kW/year which included avoided fixed O&M and the avoided transmission and distribution ("T&D") capacity costs that were assumed at 10% of the avoided generation value[38]. The DSM programs were also credited with avoided T&D line losses of 4.95%, which is a calculation that IPL performs annually. The 4.95% credit was also applied to the avoided energy cost values for the line losses that are avoided by the DSM measure being implemented at the point of use. Future avoided capacity and production costs are shown in Section 7, Confidential Attachment 4.3, DSM Supporting Documents.

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[38] The marginal generation capacity cost is based on the deferral of a simple cycle combustion turbine with an installed cost of [redacted]/kW.

Evaluation Process

[170-IAC 4-7-7(b)] [170-IAC 4-7-7(d)(1)] [170-IAC 4-7-7(d)(2)]

Programs are evaluated using the four traditional California Standard Practice Methodology cost effective tests: These include the Participant Cost Test ("PCT"), Utility Cost Test ("UCT"), Rate Impact Measure ("RIM") Test and the Total Resource Cost Test ("TRC"). A general description of the major tests – including the tests' components and objectives is presented in Section 7, Attachment 4.4, DSM Supporting Documents. The equations for the four traditional California Standard Practice Methodology cost effective tests are expressed in Section 7, Attachment 4.9, DSM Supporting Documents.

IPL systematically uses these tests to derive its prospective DSM programs. First, IPL will look for all programs that pass the RIM test which is the most difficult test to pass. This is both a measure of program efficiency and fairness. Any program passing this test represents both an efficient program and one that benefits all other non-participating customers as well.

Next, IPL looks for programs that pass both the TRC and UCT tests. The TRC test addresses whether the delivered DSM measure is truly efficient – although it does not speak to fairness. So while society as a whole may be served, it is the participant that generally derives much of the benefit, while other customers absorb much of the costs. The UCT addresses whether the delivered DSM measure lowers utility costs. While a positive benefit/cost result of the UCT value lowers revenue requirements (measured in dollars), it may not lower customer rates (measured in dollars per kWh, as included in the RIM test).

The TRC and UCT values are considered for any program that does not pass the RIM test. Since programs that do not pass the RIM test tend to raise rates, IPL must balance the desire to promote efficiency with the need to maintain economical rates. Programs that fail the TRC test may still be considered for implementation for reasons of market continuity, market transformation, public education, synergy with other programs, or other reasons that make interruption or termination of a program a problem for future implementation or creates an adverse perception in the marketplace.

Finally, IPL ensures that the screened DSM measures and programs pass the PCT test which examines the net benefits to the participants of the program. This process has been consistently used by IPL since the development of the 2008 MPS. This and subsequent refinements made to the programs included in the DSM program pending in Cause Nos. 43623, 43960 and 44497.

In Cause No. 44497, IPL also introduced the concept of a hybrid test which was identified as the Customer Balance Test ("CBT"). The CBT can be used to assess the degree of subsidization between participants and non-participants. The calculations for this test are discussed below. The programs that are found to be cost-effective from the UCT and TRC test perspective can be further ranked by the CBT ratio. The CBT is not used as a pass/fail test but serves as an indicator that programs that did pass the TRC or UCT tests but also had a low CBT ratio should be further examined to determine whether other factors warranted their inclusion in the DSM Plan. IPL presented information on the CBT at the IRP Contemporary Issues Workshop on October 23.

Including programs that passed the TRC or UCT is consistent with the Commission's DSM rules, which require that at least one of the tests listed above be used to evaluate the cost-effectiveness of a DSM program. However, simply passing the TRC or UCT only means the program is cost-effective from a particular viewpoint and may not necessarily mean the program is equitable and in the interest of all customers. While certain programs do not pass the traditional benefit-cost tests these programs do have other societal benefits or the benefits are difficult to quantify and have been generally accepted subject to budget restrictions. Specifically, low-income weatherization programs typically do not pass these cost-effectiveness tests, but IPL believes it is important to offer low-income customers DSM program offerings in order to give such customers the opportunity to participate in programs that will help them control their energy usage and their energy bills.

The CBT tests attempts recognize that not everyone in the customer population receives a net benefit for programs that pass the TRC test. There will be some cross-subsidization between participants and nonparticipants within a customer group but this needs to be minimized to a reasonable extent. For example, the TRC ratio can be greater than 1.0 if a small group of participants benefit a great deal at the expense of a large number of non-participants so long as the benefit averaged over all customers is sufficient. This can raise equity issues among customers. To provide an indication of some balance between these different perspectives, the CBT compares the adverse rate impacts with the aggregate cost savings such that the net benefits of the TRC test must equal or be greater than the net costs of the RIM test. Expressed as a formula:

$$\text{CBT} = \frac{\text{NPV Net Benefits of TRC (Avoided Costs – Utility Costs – Participant Costs)}}{\text{NPV Net Costs of RIM (Utility Costs + Lost revenue – Avoided Costs)}}$$

This ratio, while not eliminating all subsidization between participants and non-participants, does balance the benefits with the total costs which now include rate impacts.

DSM – Benefit/Cost Test Results

[170-IAC 4-7-7(b)] [170-IAC 4-7-7(c)]

The benefit/cost test results and the Net Present Values ("NPV") of the programs' impact are found in Section 7, Attachment 4.5, DSM Supporting Documents. The DSM programs were evaluated using a discount rate of 8.55%, which is IPL's most recent weighted average cost of capital.

IPL's informational programs form just a part of the customer's knowledge base and when combined with other knowledge-based initiatives (Energy Star®, government information, etc.), and with easy availability of efficiency measures (efficient lighting and appliances in hardware and mass-merchandise stores) ultimately influence the decision process. These program benefits are difficult to quantify, but undoubtedly influence the market and have a place in a comprehensive and cost-effective DSM portfolio such as IPL's.

Market Potential Study - Future DSM Market Analysis

[170-IAC 4-7-8(b)(4)]

In 2012, IPL in collaboration with Citizens Energy and each respective DSM Oversight Board retained the consulting firm Applied Energy Group ("AEG") (formerly EnerNOC)[39] to complete a Market Potential Study ("MPS") and Action Plan for the period 2014-2017. Since the completion of the 2012 MPS and Action Plan, Senate Enrolled Act 340 ("SEA 340") was passed into law, significantly changing the structure of DSM in Indiana. In response to SEA 340, IPL re-engaged AEG to update the last three years of its DSM Action Plan.

The most significant change to the original Action Plan as developed by AEG related to measure level details. In the updated Action Plan, AEG adjusted measure level participation forecasts, per unit costs, per unit savings, and measure life assumptions. These measure level assumptions have changed primarily as a result of: (1) Evaluation, Measurement & Verification ("EM&V") of IPL's DSM programs; and (2) Adoption of the Indiana Technical Resource Manual ("IN TRM"). In addition to adjusting the measure level assumptions, AEG refreshed the programs' cost-effective results to account for the revised costs and savings to be reflected in the updated Action Plan. As part of refreshing the economics, IPL provided more recent avoided cost information to AEG.

The updated Action Plan reflects decreased savings projections for the Business Energy Incentive Prescriptive and Business Energy Incentive Custom programs, in relation to the prior Action Plan to account for the reduction in savings potential due to opt-out. In other words, as customers begin to opt out of participating in IPL's DSM programs, the pool of potential participants decreases.

[39] The EnerNOC resource planning group, including all the principals who had worked on the 2012 MPS, was acquired by Applied Energy Group in the 2nd Quarter of 2014. Therefore all references to EnerNOC have been changed to Applied Energy Group.

DSM Plan Forecasted Savings (2015-2017)

[170-IAC 4-7-6(a)(6)] [170-IAC 4-7-6(b)(4)] [170-IAC 4-7-6(b)(5)] [170-IAC 4-7-6(b)(6)] [170-IAC 4-7-6(b)(7)] [170-IAC 4-7-6(b)(8)]

The following table, Figure 4B.4, summarizes the program forecasts (energy and demand impacts) for the IPL 2015-2017 DSM Action Plan proposed in and approval pending in Cause No. 44497. Year 1 program delivery is coincident with 2015 and so on.

Figure 4B.4 – Total Demand and Energy Impacts of Proposed DSM

Program Year	Energy Savings MWh-Annual Incremental	Demand Savings kW-Annual Incremental
2015	122,860	59,196
2016	126,441	60,904
2017	129,903	62,603
Total	379,204	182,703

Source: IPL

Target demand and energy savings, by program by year, are found in Section 7, Attachment 4.6, DSM Supporting Documents. These savings are expressed on a Net basis.

The estimated bill reduction, participation incentive, program cost, and energy (kWh) and demand (kW) savings per participant for each program are provided in Section 7, Attachment 4.10, DSM Supporting Documents. This attachment also includes the estimated program penetration rate.

DSM Plan Proposed Programs (2015-2017)

[170-IAC 4-7-6(a)(6)]

The proposed DSM programs for both Residential and C&I customers are described below. See Section 7, Attachment 4.1, DSM Supporting Documents for the entire 3-Year DSM Plan that was filed in Cause No. 44497. The majority of these programs are currently being offered to IPL customers. IPL proposed to eliminate 3 programs in this filing (largely on the basis of cost-effectiveness):

- Residential New Construction

- Residential Renewable Energy Incentives[40]
- Commercial and Industrial Renewable Energy Incentives

Residential Programs

[170-IAC 4-7-6(b)(1)] [170-IAC 4-7-6(b)(3)]

Residential Lighting Program

The Residential Lighting Program is an existing IPL program that has been available to IPL customers since 2003. The goal of the Residential Lighting Program is to increase the penetration of high efficiency Energy Star® ("ES") qualified lighting in the homes of IPL residential customers. This program will provide IPL residential customers with the opportunity to purchase energy efficient light bulbs, while traditionally these lights have been primarily Compact Fluorescent Lights ("CFLs"), LEDs are becoming available in significantly more types at a much lower prices.

Therefore, LED technologies will be increasingly emphasized as their market readiness increases. The program will provide upstream "buy-downs" for certain products such as compact fluorescent lamps so that customers pay a lower price at the point of purchase without needing to apply for a rebate. The upstream buy-down activity is a component of the program's focus on market transformation that will increase the demand for high efficiency products.

Residential Home Energy Assessment Program

The goals of the existing Residential Home Energy Assessment Program are to produce long-term, cost-effective electric savings in the Residential market sector by helping customers analyze and understand their energy use, recommending appropriate weatherization measures, and facilitating the direct installation of specific low-cost energy saving measures.

This program is designed to generate energy savings for IPL residential customers by providing low-cost energy efficiency measures and improvement recommendations tailored to customer homes.

Residential Income Qualified Weatherization Program

The Residential Income Qualified Weatherization Program is the continuation of an IPL program that has been available to IPL customers since 1993. Goals of the Residential Income Qualified Weatherization Program are to produce long-term energy and demand savings for qualifying low-income residential customers by providing professionally-installed energy efficiency

[40] In Cause No. 44623, the Commission required IPL to meet certain conditions to continue to offer the Renewable Energy Incentive Programs. IPL's experience has been that there is no evidence of market transformation with these programs.

measures and improvements tailored to customers' homes as well as providing education on ways to reduce energy consumption. This program has generally been jointly delivered with Citizens Energy.

Participating households receive the following types of assistance:

- In-Home Audits and Education—On-site inspections and tests used to identify the applicability of energy-savings measures the program offers and to educate residents about ways to reduce their energy usage.
- Direct Installation of Measures—Install measures to reduce energy use in the home at no charge to residents.

Residential School Kits Program

The Residential School Kits Program is an existing program that achieves cost-effective energy savings by educating students and their families about energy efficiency in their homes. This program incorporates an educational module provided to grade school students, along with a take-home kit of energy efficiency measures. Measures include CFLs and low-flow fixtures. It targets students to help them learn about energy efficiency and how they can apply it at school and at home.

Residential Online Energy Assessment Program

The Residential Online Energy Assessment Program is an existing IPL program, launched in July 2010, which educates consumers on their home energy use and identifies potential areas where they can take action to reduce their energy consumption. This program continues to be promoted with a combination of marketing materials directing customers to IPL's website to complete an online audit of their home. The web-based energy audit tool (branded as *Home Energy Inspector*) provides customers with information on: (1) no-or low-cost ways to reduce energy consumption, (2) identifies possible investment opportunities in energy efficiency improvements, and (3) describes how a customer's energy bill is calculated. Armed with this information, customers are better equipped to make informed decisions in managing their consumption and energy costs. Customers that complete the brief energy assessment will be provided an energy efficiency kit at no charge that includes low-cost, easy-to-install energy-saving water fixtures and CFLs for self-installation.

Residential Appliance Recycling Program

This existing program was introduced to IPL residential customers in May 2010. The Residential Appliance Recycling Program is a program that provides for the removal and disposal of operable but inefficient secondary refrigerator and freezer units. Many households retain these older refrigerator or freezer units in a garage or basement and often do not realize how inefficient they are. This program provides education on the cost of keeping an older, often underutilized unit along with the opportunity to have the unit removed at no cost and recycled in an environmentally-sound manner.

Residential customers with eligible units can schedule a date to have the unit(s) picked-up at no charge and will also receive an incentive payment for each unit. The current incentive the customer receives for allowing the removal of the appliance is $30 per unit. IPL is proposing to increase this incentive to $40 beginning in 2015. IPL's contractor removes the units and hauls the appliance to a facility where the components, including cooling systems and insulation which are potentially harmful to the environment, can be completely recycled. The process used captures hazardous materials and recycles over 95% of the metal, glass and plastic components.

The Room Air Conditioner Pick-Up and Recycling Program is bundled with the Refrigerator Recycling program described above and provides for the removal and disposal of operable but inefficient window/room air conditioner units. This program is intended as an add-on to the Second Refrigerator Pick-Up and Recycling Program, in that a customer who schedules a pick-up of a refrigerator or freezer unit may also relinquish an older, inefficient room air conditioner unit and receive an incentive for both appliances. The incentive for a room air conditioner unit is $20. Air conditioner unit pick-ups will only be scheduled for customers who are also having a refrigerator and/or freezer picked-up on the same visit.

The units will be taken to the recycling facility and decommissioned and dismantled in an environmentally-responsible way. This program will ensure that these older, inefficient units are permanently taken off the electric grid.

Residential Air Conditioning Load Management Program

The Residential ACLM Program is a continuation of a program that IPL has offered since 2003. IPL currently has approximately 35,000 customers participating in this program. The program consists of the remote dispatch and control of an ACLM switch installed on participating customers' central cooling units (central air conditioners and heat pumps). The goal of the program is to reduce summer system peak loads. The central cooling units are generally expected to be cycled at a 40% duty cycle strategy using the True Cycle[41] adaptive approach. Key provisions of the program are as follows:

- Enrolled residential customers receive a $5 credit on their bill for each of the months of June, July, August and September that they participate equaling up to $20 per year.
- IPL's contractor, GoodCents®, installs the switch on the outside of the customer's home near the central cooling equipment; and
- IPL can control the customer's central cooling unit during peak demand periods for the five months of May through September.

[41] True Cycle is the proprietary term for the logic that the switch vendor Cooper (Cooper acquired Cannon) uses to operate the ACLM during control events that considers uncontrolled air conditioner operation.

IPL utilizes its Automated Meter Reading ("AMR") system to assist in conducting a "metered maintenance" program on its switches as a cost-effective means to identify switches needing to be repaired or replaced.

Residential Multi-Family Direct Install Program

This program is designed to affect the energy efficiency of rental apartment units through the installation of energy-efficient, high-performance water fixtures (i.e., showerheads and faucet aerators) and CFLs. The program educates tenants about the energy benefits of these installed measures and behavior changes that will have a lasting impact on their energy and water consumption.

The program targets multi-family complexes with units that are either all-electric or have natural gas-fueled storage water heaters. In the latter situation, IPL partners with Citizens Gas to jointly deliver and share costs for this program.

This program is available at no charge, which is an important consideration since property owners will not typically have an incentive to make investments that provide energy efficiency benefits to the tenants who pay the utility bills.

The program first targets property-management companies as well as property owners in an effort to secure agreements to treat multiple properties through a single point of contact before targeting owners and managers of single properties.

Residential Peer Comparison Reports Program

The Peer Comparison Energy Reports Program utilizes behavioral science-based marketing to provide customized energy consumption information to IPL residential households, engage those households in their energy consumption as compared to their peers, and thus drive changes in behavior that result in measurable energy savings.

Selected households receive a printed and mailed quarterly energy report that combines their energy usage data with demographic and housing data to provide a picture of their energy consumption trends and how those trends compare with similar households. The report contains customized suggestions for reducing energy consumption, including information about key IPL energy efficiency programs.

By comparing a household's energy use to others, including their "most efficient" neighbors, and showing specific actions that those other households took to save energy, the reports provide both goals and a sense of competition that have shown to produce sustained energy-conservation behaviors.

Commercial and Industrial Programs

[170-IAC 4-7-6(b)(1)]   [170-IAC 4-7-6(b)(3)]

Business Energy Incentives Program

Business Custom and Prescriptive Incentives Program is an existing IPL program that has been available to IPL customers since September 2010. The C&I Prescriptive Program goal is to produce long-term cost-effective electric savings in the C&I market sector. Savings are achieved by offering incentives structured to cover a portion of the customer's incremental cost of installing prescriptive efficiency measures.

Small Business Direct Install Program

IPL has proposed a new program for delivery in 2015, the Small Business Direct Install Program. The Small Business Direct Install program provides a suite of targeted, highly cost-effective measures to small businesses in a quickly deployable program delivery mechanism, along with education and program support to help business customers reduce their energy bills.

The program will provide several direct-install measures at no additional cost to participants, such as lighting replacements, programmable thermostats, occupancy sensors, vending machine controls, and low-flow water fixtures. The program also connects customers with other programs in the portfolio and a network of qualified trade allies/contractors that can install follow-on measures to provide deeper energy savings.

Business Air Conditioning Load Management Program

The Business ACLM Program is a companion program to the Residential ACLM Program. This program (also branded as CoolCents®) was launched in June 2010 to Rate SS and Rate SL customers. This program provides significant demand savings along with some energy savings to participating customers. Customers who enroll in the program have an ACLM switch installed on their facility cooling equipment. This allows IPL the opportunity to cycle the equipment during times of system peak usage. The switches will be controlled at the same time as the Residential ACLM customer switches. In return for participating, a customer must agree to allow IPL to control 50% of its cooling load and receives an incentive on the basis of net tons of controlled air conditioning load. Customers will receive a $5/ton credit on their utility bill during the billing months of June, July, August and September for each net ton enrolled.[42]

Other Proposed DSM Programs through Cause No. 44478

[170-IAC 4-7-6(b)(1)]

The City of Indianapolis asked IPL to support its plan to implement an all-electric car sharing program with its partner, Bolloré Group/BlueIndy. Up to 1,000 car charging stations are

[42] See IPL Rider 13 Tariff sheet at iplpower.com.

proposed at approximately 200 locations. IPL understands this would be the largest deployment of such an EV car-sharing program in the United States. IPL entered into a settlement agreement with the OUCC in the BlueIndy case (IURC Cause No. 44478) which includes the evaluation of three additional DSM programs: LED Street lighting, an energy management pilot based on the ISO 50001 standard, and demand response using electric vehicle batteries to provide power to the grid as described below in the electric vehicle section. If the settlement agreement is approved by the Commission, IPL will move forward to plan the implementation of these programs.

Evaluation, Measurement and Verification ("EM&V")

The key to assessing demand and energy savings is the evaluation of IPL's DSM programs by an independent third-party as a utility industry best practice. Evaluations of the Core and Core Plus programs have been performed by TECMarket Works. IPL's EM&V reports have been provided to the Commission pursuant to the General Administrative Order ("GAO") related to the Commission's August 2014 report to the Indiana General Assembly.

DSM Forecast (2018-2034)

[170-IAC 4-7-6(b)(4)] [170-IAC 4-7-6(b)(5)] [170-IAC 4-7-6(b)(6)] [170-IAC 4-7-6(b)(7)]

The DSM estimates through 2017 contained in this IRP reflect the estimated demand and energy savings for DSM programs for the three years for which approval is being sought in IURC Cause No. 44497. IPL engaged Applied Energy Group ("AEG") to complete a DSM potential forecast for the period 2018-2034. The full report is included in Section 7, Attachment 4.7, DSM Supporting Documents. The following information is excerpted from the AEG Report (Indianapolis Power & Light Demand Side Management Potential for 2015-2034).

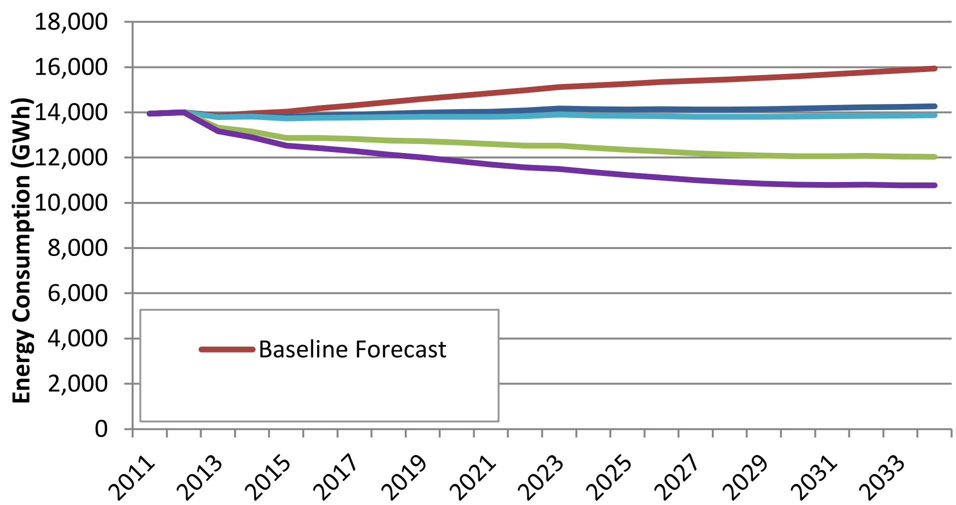
To develop the DSM potential forecasts, AEG used a bottom-up analysis approach following the major steps listed below. A more detailed description of the analysis approach is included in the 2012 MPS in Section 7, Attachment 4.8, DSM Supporting Documents.

- Performed a market characterization to describe sector-level electricity use for the residential, commercial, and industrial sectors for the base year, 2011 within IPL's service territory. This included existing information contained in prior Indiana studies, specific updates to the IPL customer database since the 2012 MPS, AEG's own databases and tools, and other secondary data sources such as the American Community Survey (ACS) and the Energy Information Administration (EIA).
- Developed a baseline projection of energy consumption and peak demand by sector, segment, and end use for 2011 through 2034. This 20-year timeframe was a requirement for the IPL integrated resource plan, and had not been developed in the 2012 MPS or previous Action Plans, which only focused on years through 2017.

- Defined and characterized several hundred DSM measures to be applied to all sectors, segments, and end uses.
- Estimated the Technical, Economic, Maximum Achievable, and Realistic Achievable potential from the efficiency measures. This involved a step to calibrate the participation, savings, and spending levels of Realistic Achievable potential to align with those filed in IPL's 2015-2017 DSM Action Plan.

The following Figure 4B.5 illustrates the forecasted amount of DSM savings potential relative to the baseline projection over the IRP period.

Figure 4B.5 – Forecasts of Potential (GWh)



Source: AEG

The information in Figure 4B.5 is summarized in the following Figure 4B.6:

Figure 4B.6 – Summary of Overall DSM Potential

	2015	2016	2017	2020	2025	2029	2034
Baseline Forecast (GWh)	14,033	14,186	14,319	14,722	15,260	15,526	15,940
Cumulative Savings (GWh)							
Realistic Achievable	234	320	412	706	1,125	1,378	1,665
Maximum Achievable	305	419	540	915	1,417	1,718	2,067
Economic Potential	1,163	1,323	1,495	2,057	2,914	3,438	3,911
Technical Potential	1,509	1,770	2,034	2,877	4,030	4,681	5,172
Energy Savings (% of Baseline)							
Realistic Achievable	1.7%	2.3%	2.9%	4.8%	7.4%	8.9%	10.4%
Maximum Achievable	2.2%	3.0%	3.8%	6.2%	9.3%	11.1%	13.0%
Economic Potential	8.3%	9.3%	10.4%	14.0%	19.1%	22.1%	24.5%
Technical Potential	10.8%	12.5%	14.2%	19.5%	26.4%	30.2%	32.4%

Source: AEG

This DSM outlook is based upon information known today. The impacts of DSM beyond 2017 will depend on the attributes of future programs selected including the load profiles of the measures, program measure duration, program participation and free riders. These factors will change over time along with continued technology advances and large industrial customer participation rates to shape future DSM programs and outcomes. In addition, assumptions around how these programs impact IPL's peak demand and reduce capacity needs, as well as whether DSM will remain cost-effective at the levels identified, remain uncertain. As stated on the cover page to the AEG 20 year forecast, programs were included in the forecast based on a Total Resource Cost (TRC) threshold result of one (1) or greater, while IPL's DSM portfolios of offerings typically have an aggregate TRC value greater than 1. While the TRC test has recently served as a significant threshold for program selection, future cost-effectiveness tests may include other criteria and significantly affect offerings. Future public policy, including the Clean Power Plan and Indiana's legislative direction, will influence IPL's determination of the appropriate level of DSM beyond 2017.

Electric Vehicles

IPL is implemented an Electric Vehicle ("EV") program, which developed integrated charging infrastructure in homes, businesses and public parking facilities, with partial Smart Grid Investment Grant ("SGIG") funding support from the U.S. Department of Energy ("DOE") and the State of Indiana Office of Energy Development. IPL received authority to defer the non-grant funded portion of this project in Cause No. 43960 for future rate recovery. Approximately 162 of the 200 planned charging stations have been installed in homes and businesses. IPL received approval for both a time of use ("TOU") EVX rate for customer premises and a public EVP rate. To date, approximately 100 customers participate in rate EVX.

Figure 4B.7 – Electric Vehicle Time of Use Rate

		Non-Holiday Weekdays	Holidays & Weekends	Price / kWh
Summer (Jun- Sept)	Peak	2pm-7pm		12.150 ¢
	Mid-Peak	10am-2pm; 7pm-10pm	10am-10pm	5.507 ¢
	Off-Peak	12am-10am; 10pm-12am	12am-10am; 10pm-12am	2.331 ¢
Winter (Jan - May; Oct - Dec)	Peak	8am-8pm	8am-8pm	6.910 ¢
	Off-Peak	12am-8am; 8pm-12am	12am-8am; 8pm-12am	2.764 ¢

Source: IPL Rate EVX tariff sheet

IPL found that approximately 76% of the electricity used for EVX charging occurred during off-peak periods, an additional 4% occurred during mid-peak, and the remaining 20% occurred during peak periods in 2013. While the impacts of the total 2013 EVX usage of nearly 400 MWh representing a very small fraction of the total IPL residential and small commercial retail sales are modest[43], IPL customers have responded favorably to manage this new load during off-peak periods.

The public EV rate, EVP, is based upon a flat fee of $2.50 regardless of the duration of the charging session and applied for twenty two (22) chargers at eight (8) area public locations. The public systems may be used by any customer or visitor to Indianapolis using a keyfob and credit card based system. While public charging is less robust than expected, it mitigates range anxiety for EV drivers and includes higher usage in 2013 than in 2012. In 2013, 292 subscribers utilized the public units with total usage of 10,600 kWh between January 1, 2013, and December 31, 2013, with an average of 883 kWh consumed per month. This is a 204% increase in kWh per month over the previous year.

Please see IPL's 2013 Electric Vehicle Program Report for more information at: https://www.iplpower.com/Business/Programs_and_Services/Electric_Vehicle_Charging_and_Rates/.

As described above, the City of Indianapolis asked IPL to support its plan to implement an all-electric car sharing program with its partner, Bolloré Group/BlueIndy for up to 500 EVs and 1,000 car charging stations. The practice of utilizing EV batteries to feed a distribution system as proposed in settlement agreement for this project is often referred to as Vehicle to Grid ("V2G"). If approved, IPL will work with BlueIndy to determine the technical feasibility of piloting this technology and closely monitor and report grid impacts of the BlueIndy project. IPL included EV impact projections in this IRP as described in Section 4D Energy Sales Forecast.

[43] IPL's 2013 aggregate residential and small commercial customer sales totaled over 7,000,000,000 MWh as shown in Section 7, Attachment 6.1 - 10 Yr. Energy and Peak Forecast.

Section 4C. TRANSMISSION AND DISTRIBUTION

Transmission

[170-IAC 4-7-4(b)(10)(C)] [170-IAC 4-7-6(a)(5)]

IPL provides electric power principally to the city of Indianapolis and portions of the surrounding counties. The IPL transmission system includes 345 kV and 138 kV voltage levels. The 345 kV system consists of a 345 kV loop around the city of Indianapolis and 345 kV transmission lines connecting the IPL service territory to the Petersburg power plant in southwest Indiana. At Petersburg, IPL has 345 kV interconnections with American Electric Power ("AEP") and Duke Energy Midwest ("DEM"), and 138 kV interconnections with DEM, Hoosier Energy, and Vectren ("SIGE"). In the Indianapolis area, IPL has 345 kV interconnections with AEP and DEM and 138kV interconnections with DEM and Hoosier Energy. Autotransformers connect the 345 kV network to the underlying IPL 138 kV transmission system which is also networked and principally serves load. See Section 7, Confidential Attachment 1.1, Transmission and Distribution Supporting Documents for the 2014 FERC Form 715 for a geographic outline of the IPL service territory and the one-line connection diagram showing the IPL facilities.

IPL's electric transmission facilities are designed to provide safe, reliable, and low cost service to IPL customers. As part of this transmission system assessment process, IPL participates in and reviews the findings of assessments of transmission system performance by regional entities as it applies to the IPL transmission system. In addition to the summer peak demand period which is the most critical for IPL, assessments are performed for a range of demand levels including winter seasonal and other off-peak periods. For each of these conditions, sensitivity cases may be included in the assessment.

IPL transmission plans are based on transmission planning criteria and other considerations. Other considerations include load growth, equipment retirement, decrease in the likelihood of major system events and disturbances, equipment failure or expectation of imminent failure.

Changes to transmission facilities are considered when the transmission planning criteria are exceeded and cannot feasibly be alleviated by sound operating practices. Any recommendations to either modify transmission facilities or adopt certain operating practices must adhere to good engineering practice.

A summary of IPL transmission planning criteria follows. IPL transmission planning criteria are periodically reviewed and revised.

- Limit transmission facility voltages under normal operating conditions to within 5% of nominal voltage, under single contingency outages to 5% below nominal voltage, and under multiple contingency outages to 10% below nominal voltage. In addition to the above limits, generator plant voltages may also be limited by associated auxiliary system limitations that result in narrower voltage limits.

- Limit thermal loading of transmission facilities under normal operating conditions to within normal limits and under contingency conditions to within emergency limits. New and upgraded transmission facilities can be proposed at 95% of the facility normal rating.
- Maintain stability limits including critical switching times to within acceptable limits for generators, conductors, terminal equipment, loads, and protection equipment for all credible contingencies including three-phase faults, phase-to-ground faults, and the effect of slow fault clearing associated with undesired relay operation or failure of a circuit breaker to open.
- Install and maintain facilities such that three-phase, phase-to-phase, and phase-to-ground fault currents are within equipment withstand and interruption rating limits established by the equipment manufacturer.
- Install and maintain protective relay, control, metering, insulation, and lightning protection equipment to provide for safe, coordinated, reliable, and efficient operation of transmission facilities.
- Install and maintain transmission facilities as per all applicable Indiana Utility Regulatory Commission rules and regulations, ANSI/IEEE standards, National Electrical Safety Code, IPL electric service and meter guidelines, and all other applicable local, state, and federal laws and codes. Guidelines of the National Electric Code may also be incorporated.
- The analysis of any project or transaction involving transmission facilities consists of an analysis of alternatives and may include but is not limited to the following:
    - Initial facility costs and other lifetime costs such as maintenance costs, replacement cost, aesthetics, and reliability.
    - Consideration of transmission losses.
    - Assessment of transmission right-of-way requirements, safety issues, and other potential liabilities.
    - Engineering economic analysis, cost benefit and risk analysis.
- Plan transmission facilities such that generating capacity is not unduly limited or restricted.
- Plan, build, and operate transmission facilities to permit the import of power during generation and transmission outage and contingency conditions. Provide adequate import capability to the IPL 138 kV system in central Indiana assuming the outage of the largest base load unit connected to the 138 kV system.
- Maintain adequate power transfer limits within the criteria specified herein.
- Provide adequate dynamic reactive capacity to support transmission voltages under contingency outage or other abnormal operating conditions.
- Provide adequate dynamic reactive capacity to support transmission voltages under contingency outage or other abnormal operating conditions.

- Minimize and/or coordinate MVAR exchange between IPL and interconnected systems.
- Generator reactive power output shall be capable of, but not limited to, 95% lag (injecting MVAR) and 95% lead (absorbing MVAR) at the point of interconnection to the transmission system.
- Design transmission substation switching and protection facilities such that the operation of substation switching facilities involved with the outage or restoration of a transmission line emanating from the substation does not also require the switched outage of a second transmission line terminated at the substation. This design criterion does not include breaker failure contingencies.
- Design 345 kV transmission substation facilities connecting to generating stations such that maintenance and outage of facilities associated with the generation do not cause an outage of any other transmission facilities connected to the substation. Substation configurations needed to accomplish this objective and meet safety procedures are a breaker and a half scheme, ring bus or equivalent.
- Avoid excessive loss of distribution transformer capacity resulting from a double contingency transmission facility outage.
- Coordinate planning studies and analysis with customers to provide reliable service as well as adequate voltage and delivery service capacity for known load additions.
- Consider long-term future system benefits and risks in transmission facility planning studies.

IPL transmission facilities are also planned and coordinated with the flowing reliability criteria.

- The reliability standards of the North American Electric Reliability Council ("NERC") including the Transmission System Planning Performance Requirements ("TPL") standards, Modeling Data Analysis ("MOD") standards, and Facility Ratings ("FAC") standards. The NERC reliability standards may be found on the NERC website at http://www.nerc.com.
- The regional reliability standards of the reliability entity Reliability First -("RF"). The RF reliability standards may be found on the RF website at http://www.rfirst.org.
- The IPL Transmission Planning Criteria can be found on the MISO website at https://www.misoenergy.org/Library/Repository/Study/TO%20Planning%20Criteria/IPL%20TO%20Planning%20Criteria.pdf.

There is no measure of system wide reliability that covers the reliability of the entire system that includes transmission and generation.

Assessment Summary

[170-IAC 4-7-4(b)(10)(A)] [170-IAC 4-7-4(b)(10)(B)] [170-IAC 4-7-6(a)(5)] [170-IAC 4-7-6(d)(1)] [170-IAC 4-7-6(d)(3)] [170-IAC 4-7-6(d)(4)]

As a member of MISO, IPL actively participates in the MISO annual coordinated seasonal assessments ("CSA") of the transmission system performance for the upcoming spring, summer, fall, and winter peaks. The CSAs are performed to provide guidance to system operators as to possible acute system conditions that would warrant close observation to ensure system reliability. Planned and unplanned outages are modeled to determine system impacts.

As a member of MISO, IPL actively participates in the Midwest Transmission Expansion Plan ("MTEP") process. MISO annually performs these rigorous studies to facilitate a reliable and economic transmission planning process. The MTEP study process identifies economic values including congestion and fuel saving and reductions in operating reserves, system planning reserve margins, and transmission line losses of a proposed transmission project or portfolio.

System congestion is analyzed through the MISO MTEP. Top Congested Flowgate Analysis is performed by MISO in this process to identify near-term system congestion and a Congestion Relief Analysis is performed to explore longer-term economic opportunities. The Market Efficiency Planning Study process, also performed as part of the MTEP, builds on the study methodologies of both analyses and further improves them by appropriately linking the two processes to identify both transmission issues and economic opportunities. The study results are discussed among MISO members throughout the process as well as reported in the MTEP study report provided by MISO.

The seasonal assessments and MTEP analysis may be found on the MISO website at URL:

https://www.misoenergy.org/Planning/SeasonalAssessments/Pages/SeasonalAssessments.aspx
https://www.misoenergy.org/Planning/TransmissionExpansionPlanning/Pages/MTEPStudies.aspx

RF also performs annual assessments of transmission system performance for the upcoming summer and winter peak seasons, for near-term and long-term shoulder peak load conditions, and from time to time will perform near long-term transmission assessments for off-peak load conditions based on information from each transmission planner including IPL. The transmission system seasonal assessment summarizes the projected performance of the bulk transmission system within ReliabilityFirst's footprint for the upcoming summer peak season and is based upon the studies conducted by Reliability First staff, MISO, PJM, and the Eastern Interconnection Reliability Assessment Group (ERAG). As an entity within the reliability region of Reliability First, IPL actively participates and reviews the studies and study processes of the assessments.

RF develops a series of power flow cases and performance assessments with expected power transfers and long term power purchases and sales. RF also performs First Contingency Incremental Transfer Capability (FCITC) analysis. This analysis shows adequate power transfer capability to support load growth and long term power purchases and sales. FCITC cannot be used as an absolute indicator of the capability of a power system; FCITC is only determined for specific system conditions represented in the study case. Any changes to study case specific conditions, such as: variations in generation dispatch, system configuration, load, or other transfers not modeled in the study case, can significantly affect level of determined transfer capability

These assessments may be found on the RF website at URL: https://www.rfirst.org/reliability/Pages/default.aspx

The IPL assessment of transmission system performance is also performed annually in conjunction with the RF and MISO assessments. The IPL assessment follows the NERC TPL standards to assess transmission performance in peak near-term and long-term conditions and other sensitivity conditions.

- IPL transmission performance analysis using dynamic simulations for stability as evaluated under the NERC Transmission System Planning Performance Requirements ("TPL") reliability standards shows no evidence of system or generator instability.
- IPL transmission performance analysis as evaluated under the NERC TPL reliability standards shows a few localized thermal violations appearing on IPL lines and transformers resulting primarily from multiple element outages of internal IPL transmission facilities.
- IPL transmission performance analysis as evaluated under the NERC TPL reliability standards shows transmission voltages in the expected range on IPL facilities.
- IPL transmission performance analysis as evaluated under the NERC TPL reliability standards shows expected loss of demand that is planned, controlled, small, and localized.
- IPL transmission performance analysis as evaluated under the NERC TPL reliability standards shows no evidence of curtailed firm transfers.
- IPL transmission performance analysis as evaluated under the NERC TPL reliability standards shows no evidence of area-wide cascading or voltage collapse.
- Applicable operating and mitigation procedures, in conjunction with planned major transmission facility additions and modifications, result in transmission system performance which meets the requirements of the NERC TPL reliability standards.

Key Results

[170-IAC 4-7-4(b)(10)(D)]

- IPL operates its transmission system efficiently with strong ties to interconnecting companies.
- IPL does not jointly own or operate any transmission facilities.
- The transmission facility outages with the greatest impact on IPL facility loadings are those internal to IPL. Of greatest impact are double-contingency outages on the west side of the service area in an arc stretching from Guion to Rockville to Thompson substations and around the Harding Street Generating Station ("HSS").
- The transmission facility outages with the greatest impact on IPL area voltages are those in neighboring utilities. In particular, these are the AEP Rockport-Jefferson 765kV line and the Duke Cayuga-Nucor 345kV line. IPL will continue to review the impact on voltage resulting from these facility outages, and will monitor available reactive resources to help mitigate this impact and for general voltage support.
- The most critical generating unit affecting the IPL area is HSS Unit 7. This is due to its size, its immediate proximity to the local IPL area load, and that IPL generating units at Petersburg are over 100 miles from the IPL service area making it difficult for them to have a large impact on local area voltages.

Individually and combined, these transmission performance assessments demonstrate that IPL meets the system performance requirements of NERC TPL-001, TPL-002, TPL-003, and TPL-004. From these transmission performance assessments, the IPL transmission system is expected to perform reliably and with continuity over the long term to meet the needs of its customers and the demands placed upon it.

- NERC TPL-001: System performance under normal (no contingency) conditions (Category A)
- NERC TPL-002: System performance following loss of a single bulk electric system element (Category B)
- NERC TPL-003: System performance following loss of two or more bulk electric system elements (Category C)
- NERC TPL-004: System performance following extreme events resulting in the loss of two or more bulk electric system elements (Category D)

IPL continuously seeks to upgrade its ability to model the transmission system and to more accurately forecast its performance. This includes review of available computer software, data collection techniques, equipment capabilities and parameters, and developments in industry and academia. IPL upgraded its current-day and next-day planning software in 2013. It also includes information sharing with neighboring transmission owners and regional transmission organizations.

Based on its own individual efforts, as well as in concert with others, IPL constantly works to ensure that its transmission system will continue to reliably, safely, efficiently, and economically meet the needs of its customers.

IPL's FERC Form 715 was submitted by MISO and is in Section 7, Confidential Attachment 1.1, Transmission and Distribution Supporting Documents to provide additional documentation of the IPL's planning and reliability criteria.

The FERC 715 was based on MTEP 13 studies which contain the most recent power flow study available to IPL including interconnections. In MTEP 13, MISO conducted regional studies using models for 2015 Summer Peak, 2018 Summer Peak, 2018 Shoulder Load, 2018 Light Load, 2018 Winter Peak, 2023 Summer Peak, and 2023 Shoulder Load. The MTEP 13 dynamic simulations identified no system stability needs and meet the NERC standards.

Transmission Short Term Action Plan

[170-IAC 4-7-6(d)(2)]

For the forecast period, IPL currently plans to add or modify the following transmission facilities. The estimated cost for all facilities is in Section 7, Confidential Attachment 1.3, Transmission and Distribution Supporting Documents.

Transmission Plans for the New Eagle Valley CCGT in 2015

- Transmission line upgrades are needed to deliver the capacity and energy of the New Eagle Valley CCGT into the MISO market.
    - Pritchard – Centerton rating increase to 305 MV
    - Centerton – Honey Creek rating increase to 305 MVA
    - Honey Creek – Southport rating increase to 305 MVA
    - Pritchard – Mullinix rating increase to 272 MVA
    - Mullinix – Glens Valley rating increase to 272 MVA
- The 1200A line disconnect switches at Honey Creek, and Centerton substations are scheduled for replacement to increase the rating on the above lines
- All three existing 138 kV circuit breakers rated 800 ampere at Mooresville substation are scheduled to increase the rating of line 132-24
- The terminal equipment for the 132-21 line is scheduled for replacement to be compatible with the protection scheme at the new 138 kV Eagle Valley substation. The terminal equipment includes a wave trap, disconnect switches, and relays, etc.

Transmission Plans for the New Eagle Valley CCGT in 2016

- A new Eagle Valley to Franklin Township line rated 322 MVA minimum is scheduled for installation from the new Eagle Valley substation. This line will utilize the spare tower position on the Petersburg to Francis Creek to Hanna 345 kV line. The line will include fiber optic conductors in the static wire for communication.

- Two new line terminals are scheduled for installation at the Franklin Township substation to accommodate the routing of the 138 kV line transmission line from the new Eagle Valley 138 kV substation. The terminal equipment includes breakers, disconnect switches, relays, etc.
- A breaker and a half bus design 138 kV Eagle Valley substation is scheduled to be installed for the new CCGT power plant located on the existing Eagle Valley site by April 16, 2016.
- Transfer all four existing 138 kV transmission lines at the existing Eagle Valley plant Pritchard substation.

Misc. Transmission Line Jobs – 2015

- Various transmission line surveys and upgrades are needed to increase the line during contingency loading conditions to meet NERC reliability standards.

Petersburg to Duke Wheatland to AEP Breed Line- 2015

- The upgrade of the IPL Petersburg to Duke Wheatland to AEP Breed 345 kV line from 956 to at least 1386 MVA has been approved by MISO as a market efficiency project. The project is eligible for cost sharing and is included in the MISO MTEP.

Hanna Substation Upgrade - 2016

- The upgrade of the Hanna Substation include two new 345 kV breakers, the replacement of a 275 MVA autotransformer with a 500 MVA autotransformer, and a breaker and a new 138 kV breaker and a half bus design. Will increase import capability into the IPL 138 kV transmission system improves reliability, and allows for better operational flexibility.

Thompson Substation Upgrade - 2016

- The upgrade of the Thompson Substation include a new 345 kV breakers, the relocation of the 275 MVA Hanna autotransformer and two 138 kV breakers. The project increase imports capability into the IPL 138 kV transmission system, improves reliability, and allows for better operational flexibility.

Static VAR System (SVS) - 2016

- The project includes a new Static VAR System (SVS) like a Static VAR Compensator (SVC) or Static Synchronous Compensator (STATCOM) at the Southwest 138 kV substation. The SVC would have a nominal continuous rating of –100 Mvar inductive to +300 Mvar capacitive at 138kV. The STATCOM would have a nominal continuous rating of –100 Mvar inductive to +250 Mvar capacitive at 138kV. The primary application and need for the SVS is for the transient voltage response for transmission events. The SVS would also be used for continuous voltage regulation. The project increase imports capability into the IPL 138 kV transmission system, improves reliability, and allows for better operational flexibility.

Transmission Expansion Cost Sharing

The methodology for the socialization of transmission expansion costs has been one of the significant drivers of uncertainty in the past several years. MISO and the transmission owners began development of a methodology for the sharing of costs for reliability projects in 1994, and shortly thereafter launched into development of a methodology for the sharing of costs of projects deemed to be “economic.” Economic projects are those projects that are not needed to meet NERC criteria for reliability but for which there may be an economic benefit. In 2010, MISO filed and FERC accepted a cost sharing methodology for transmission projects built to meet the renewable mandates of states within the footprint. These projects are called Multi-Value Projects (“MVP”). The costs of these projects are socialized across the footprint regardless of the need of load. Included in the MVP filing was a renaming of “Economic” projects; they are now called Market Efficiency Projects (“MEP”).

FERC Order 1000

Since the last IRP, both at the state level and in the MISO tariff, the right of first refusal for transmission projects needed for reliability has been preserved. Effective with the 2015 planning cycle, due to the implementation of FERC Order 1000, the right to develop Market Efficiency and Multi-Value transmission projects has opened up to third party transmission developers. This event necessitates a process to qualify transmission developers and to select a developer to build the project. This will add up to three years to the process of placing transmission enhancements in service. FERC demands that incumbent utilities who wish to bid on projects not directly connected to their own transmission systems compete with third parties for the right to build and therefore must submit a developer application to MISO for evaluation. If the project is directly connected to the incumbent’s transmission system, no application is required; however the incumbent still must compete for the right to build MEPs or MVPs. To preserve its right to develop transmission projects of all types and locations, IPL will complete the application process dictated by the MISO tariff. As one result of implementation of FERC Order 1000, MISO has proposed numerous changes to the project types that will be vetted through the stakeholder process in the coming months. Additionally, due to the integration of Entergy into the MISO system at the end of 2013, changes to the kV blight lines of MEPs and MVPs are proposed. If those bright lines are lowered as proposed, IPL will be required to pay a greater portion of the shared costs of transmission in the now much larger footprint.

To preserve its option to bid to build transmission projects other than reliability projects, IPL is required to submit an application to MISO to qualify as a transmission developer under the Order 1000 rules. FERC requires incumbent transmission developers to qualify on the same terms and conditions as new transmission developers. IPL submitted its application on August 4, 2014.

Distribution

[170-IAC 4-7-8(b)(8)]

IPL's Electric Distribution System Plans are based on various criteria and parameters that are used to determine expansion and replacement requirements. The criteria and parameters include: consideration of load growth, equipment load relief, timely equipment replacement to optimize performance, effects of major system events, reliability improvements, national Electric Safety Code (NESC) requirements, and industry guides and design standards.

Distribution construction projects are based on the results of IPL's small area load studies. Grid area data, such as historical data, land use statistics, and demographic customer data, provide the basis for long-range demand projections. These projections are modified for the short-term on the basis of known customer additions and recent historical substation load growth, since the grid area data cannot predict short-term deviations from long-term statistical trends. Distribution substations additions or improvements are scheduled when projected area loads cannot be served from existing substations, or if existing substation facilities reach their design limits. Circuit construction is scheduled to utilize newly installed substation capacity, to provide relief to circuits projected to exceed design capacity or to improve reliability or operational performance. Short-term operating remedies are used to delay construction only with the agreement of the Distribution Operations Department.

A 4.16 kV to 13.2 kV conversion plan consists of the replacement of critical transformers and the conversion of radial circuits where 13.2 kV sources are available to avoid overloads on critical substations. This plan is formulated to avoid the failure of adjacent substations that may lead to a cascading outage event. Any equipment with remaining life that is removed due to conversion is used to provide adequate capacity to the remaining 4.16 kV loads, to provide spare units to cover unforeseen transformer or switchgear failures, and to permit the retirement of equipment which has outlived its useful life and cannot provide reliable service. The conversion schedule is developed to complete the proposed plan with minimum capital expenditures and to maintain system continuity.

Industrial substation expansion is scheduled to provide capacity for known industrial load additions and to relieve existing or anticipated overloaded facilities. Several customers, either by internal policy or government regulations, may be required to maintain 100% emergency capacity, and the company's additional investment is recovered through excess facility agreements. IPL's policy is to provide such service to certain public service customers, such as hospitals and communications facilities provided the customer meets specific engineering design criteria.

IPL maintains a capacitor program to provide sufficient reactive power (known as volt amperes reactive or "VARs") to maintain adequate distribution voltage under all probable operating conditions and to economically reduce facility loading. Through its Smart Grid Initiative, funded in part through an U.S. Department of Energy ("DOE") Smart Grid Investment Grant ("SGIG"), IPL recently upgraded its capacitor control system to improve operators' the remote monitoring and control capability with two-way verifications from each location. Please see the following section for more details about smart grid efforts.

Smart Grid Initiative

IPL deployed advanced technologies as part of its DOE-funded Smart Energy Project to accomplish the following functions:

- Strategically automate distribution equipment to improve reliability
- Build upon equipment and systems which are in place to minimize undepreciated assets and minimize costs
- Utilize Advanced Metering Infrastructure ("AMI") for approximately 10,000 customers to accomplish 100% automated meter reading, and integrate interactive system outage and voltage information
- Upgrade communications infrastructure to support long-term requirements

IPL's distribution system includes the following features:

- Supervisory Control and Data Acquisition ("SCADA") functionality enables remote device monitoring and control for 90% of its distribution customers.
- Automated controls are used in 100% of its 1,300 switched capacitor banks.
- Nearly 225 automated reclosers with microprocessor-based programmable remote controls and 50 automatic distribution line switches are in use to reduce customer exposure to outages.
- SCADA functionality was extended to the Central Business District ("CBD") network in downtown Indianapolis through network protector relays and communicating fault indicators on the network.
- A Distribution SCADA (dSCADA) software system has been implemented on the radial distribution network throughout the service territory to link new devices.
- Upgraded microprocessor-based distribution feeder relays have been installed for approximately 300 circuits to enable remote configuration and estimated fault location data to operators.
- An automated Conservation Voltage Reduction ("CVR") program has been implemented through the deployment of smart microprocessor-based Transformer Load-Tap Changer ("LTC") controllers and upgrading capacitor controls from one-way to two-way functionality as described below.

IPL is using common communication systems for the AMI and DA systems to form a robust foundation for additional deployment of "advanced technology" components. For more details about IPL's smart grid efforts, please see Section 7 Attachment 1.2, Transmission and

Distribution Supporting Documents which contains information from the DOE website: smartgrid.gov.

Advanced Metering Systems

IPL has been using an Automatic Meter Reading ("AMR") system for its energy-only metered customers since 2001 to automatically read meters and provide one-day delayed energy information to customers through a web-portal known as PowerView®. Since the AMR system operates well as designed, IPL initiated AMI to capture its demand meters which are still manually read. The DA devices shared common communication networks with AMI. IPL recently renegotiated a long-term metering technology contract to operate both systems through 2016. After 2016, all advanced metering will be transitioned to a single system.

Smart Grid Benefits

[170-IAC 4-7-6(a)(5)]

Smart Grid, or Distribution Automation ("DA"), will enhance outage restoration with the additional reclosers and advanced relays allowing sections of circuits to be isolated if there is a fault on the system which allows fewer customers to experience a service interruption. In addition, quicker service restoration results when operators may back-feed sections of circuits. Circuits may also be operated more efficiently with interactive information received from devices with two-way communication equipment.

A CVR program allows IPL to reduce system peak demand during peak hours of the year. This voltage reduction through interactive operations monitoring on the 13.2 kV distribution system is planned through multiple circuit devices, two-way communications, and a distribution SCADA control software system. Essentially, IPL will operate the system at slightly lower voltages at the substation bus but still within industry standard limits. Real time voltage readings from two-way communicating capacitor controls and meters are collected to verify compliance with service requirements. Partial system tests in 2012 through 2014 continue to indicate positive results with the largest test reducing demand by 7 MW per hour based on an average voltage reduction at each substation bus of 1%. IPL may also avoid purchasing power from the market during those times when demand and prices are highest. IPL successfully achieved the ability to modify the MISO business practices to "count" this capacity as a Load Modifying Resource (LMR) within the context of the MISO market. IPL estimates achieving up to 40 MW of peak load reductions through CVR if voltage is reduced by 2.5% at each substation bus, however, IPL conservatively registered 20MWs for CVR in MISO and included it in this IRP. See Section 7, Attachment 1.4, Transmission and Distribution Supporting Documents for the IPL CVR Baseline Report dated February 2014.

In 2010, engineering estimates of DA reliability impacts related to the smart grid project projected a reduction in the System Average Interruption Frequency Index ("SAIFI") of 11%.

Representative results measured from January 2014 to July 2014 indicate actual improvements of 12.1% for SAIFI when major event days are excluded.

Distributed Generation Connections

[170-IAC 4-7-4(b)(5)] [170-IAC 4-7-6(a)(5)]

IPL has successfully connected 66 MW of solar distributed generation (DG) since 2012 through its Rate Renewable Energy Production (REP) program. This includes eight (8) utility scale sites ranging in size from 500 kW to 10 MW in nameplate alternating current capacity. IPL's experience with solar facilities indicates no significant impact to its transmission system. This is due to many factors including the decision to limit the total capacity per site to 10 MW, connect the facilities at 13 kV, and establish the engineering criteria for a maximum of 10 MW connected per substation transformer. IPL is not aware of any occurrence of backfeed on its transmission system including during non-peak hours.

Distribution circuit impacts have been monitored and mitigated through its DG interconnection working group. Specifically, remote control capabilities are enabled through reclosers connected to IPLs DA network. Protection settings for the inverter control systems, reclosers and IPL feeder relays are reviewed by IPL engineers and adapted as needed to avoid "nuisance" tripping which isolates the DG from the IPL grid. IPL monitors the output of the sites over 500 kW in real-time through its dSCADA system. IPL will continue to evaluate the business practices as more DG comes on-line. Section 4A contains more information about existing and "new" solar resources.

Electric Vehicle Projects

As described in section 4B, IPL initiated an electric vehicle (EV) pilot program which included the deployment of one hundred sixty two (162) chargers. Minimal impacts to the distribution grid have been monitored through separate meters for each charger location. Transformer loading analysis has been completed for each site with no replacements necessary

IPL's 2013 Electric Vehicle Program Report can be found under a link located at: https://www.iplpower.com/Business/Programs_and_Services/Electric_Vehicle_Charging_and_Rates/

IPL is using lessons learned from the pilot to plan an all-electric car sharing project with the City of Indianapolis and BlueIndy to include approximately 1,000 chargers to support up to 500 new EVs throughout the greater Indianapolis area as described in testimony in the IURC Cause No. 44478. IPL plans to optimize engineering, construction and back-office practices from its small pilot to efficiently implement this program to improve the distribution infrastructure in preparation for the mobile EV loads.

IPL continues to support the growth of EVs in its service area through these programs. Awareness of EV charging locations allows engineers to verify existing facility capacity and upgrade requirements. To date these have been limited to customers' service and panel upgrades but any future transformer replacements will be managed closely by IPL. Understanding grid impacts will help IPL to create and implement future demand response programs to release battery energy to the grid during peak periods.

IPL's area EV penetration has been slower than anticipated in the 2011 IRP. Should EV load growth increase significantly, the high load growth scenario in this IRP reflects related impacts as described in Section 4D.

Cyber Security and Interoperability Standards

IPL recognizes interoperability and strong cyber security practices are essential to advanced technology deployment. IPL employs specific cyber security business practices and procedures and is working closely with vendors to assure that current and proposed Smart Grid standards and procedures are employed. IPL has a dedicated staff including a Certified Information Systems Security Professional ("CISSP") to ensure that cyber security is maintained at each stage of system deployment. IPL tests and updates its security plan to mitigate any foreseen threats to key infrastructure components. IPL monitors and protects its network on a 24/7 basis with intrusion prevention systems to identify any malicious activity targeting or originating from corporate assets, including outside attempts to gain access to the system.

IPL vendors who may affect cyber security risk undergo a screening process which includes a thorough questionnaire and interview process to identify risks and mitigation plans.

IPL also seeks vendors who could commit to physical equipment security and utilize open protocols and standards to support interoperable system components wherever possible. While some customization is required to interface to legacy systems, IPL prefers vendors that utilize standards-based security features of application servers versus proprietary methods to quickly adapt through configuration to new requirements as they unfold and become adopted standards.

The smart grid system is being designed with security best practices incorporated from an architectural standpoint to facilitate security from the beginning of a project. Implementation of security best practices at each system junction point ensures authenticity and reliability of data transport.

Future Smart Grid Expectations

IPL will continue to leverage smart grid investments to provide resource planning benefits, realize operational efficiencies, increase the understanding of equipment performance and to develop asset lifecycle plans. Detailed analysis of field device data being collected through the two-way communications systems will enhance these capabilities. In addition, IPL operations staff plans to use the data to complete the following:

- Leverage fault locations from relays to dispatch trouble crews more effectively and reduce service restoration times.

- Use relay event data to indicate the need for breaker maintenance
- Optimize CVR on distribution circuits to maximize peak load reductions and minimize substation transformers load tap changer operations
- Use CBD SCADA operations as a catalyst for network protector maintenance frequency
- Use CBD fault indicators for cable loading and fault analysis
- Refer to capacitor control and AMI meter voltage information to assess power quality
- Consider time based rates and prepaid metering service offerings

There are plans to upgrade some legacy DA and telecommunication equipment to use the new platforms over the next few years as well.

Transmission and distribution assets will likely play a larger role in future resource planning as distributed resources including DG, DR, and smart grid initiatives increase to provide capacity and energy benefits. IPL plans to optimize operations of these interrelated efforts.

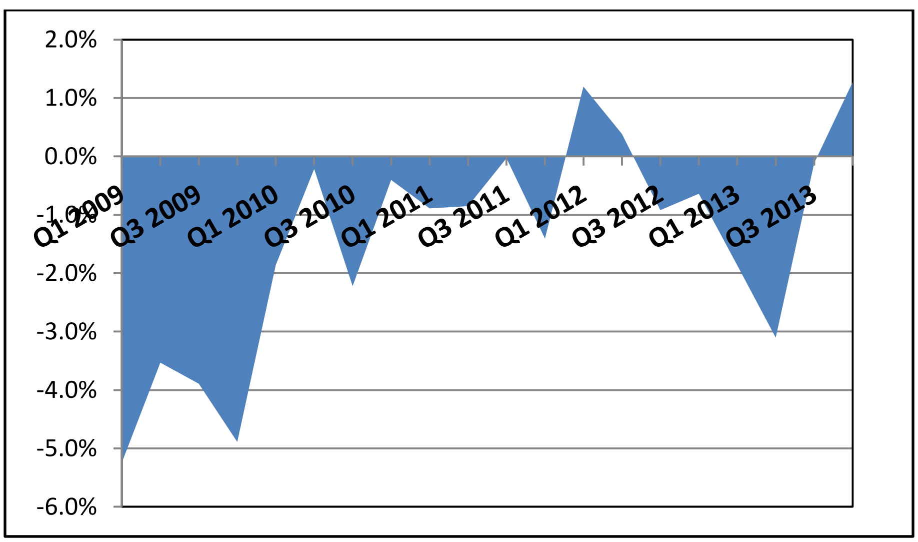
Section 4D. MARKET TRENDS AND FORECASTS

This section addresses IPL short-term and long-term energy and demand forecasts, model performance, and forecast error, as well as fuel planning, procurement practices and pricing forecasts. Specific data to support the narratives may be found in Section 7.

Load Forecast Overview Short Term

Economic conditions have fairly stabilized in IPL's service territory since the conclusion of the recession that began in 2008. Household-growth in the Marion-county area has been increasing since 2011, and is set to grow at 1.4% over the next three years. Employment rates have been improving steadily since 2010; personal-income is projected to grow albeit at a modest rate compared to 2011 levels because much of the employment-gains are believed to have been in the low-wage sectors. The short-term projected growth rates for these are 1.8% and 1.2% respectively. Energy sales have consequently recovered since the recession, but have not mirrored the overall growth in economic parameters. This is in part due to the structural shift in energy-consumption induced as a result of increasing appliance-efficiencies. Even if better than recession-levels, quarter over quarter growth in 2013 has been negative as depicted in Figure 4D.1 below. IPL's forecasting models, which will be discussed later, depict impending energy sales growth after accounting for the impacts of forecasted demand side management ("DSM") with a compound annual growth rate ("CAGR") over the next three years of 0.7%. This growth rate is then forecasted to decrease after the initial recovery phase because of an economic slow-down.

Figure 4D.1 – Year-Over-Year Change in Historical Weather Normalized kWH Sales



Source: IPL

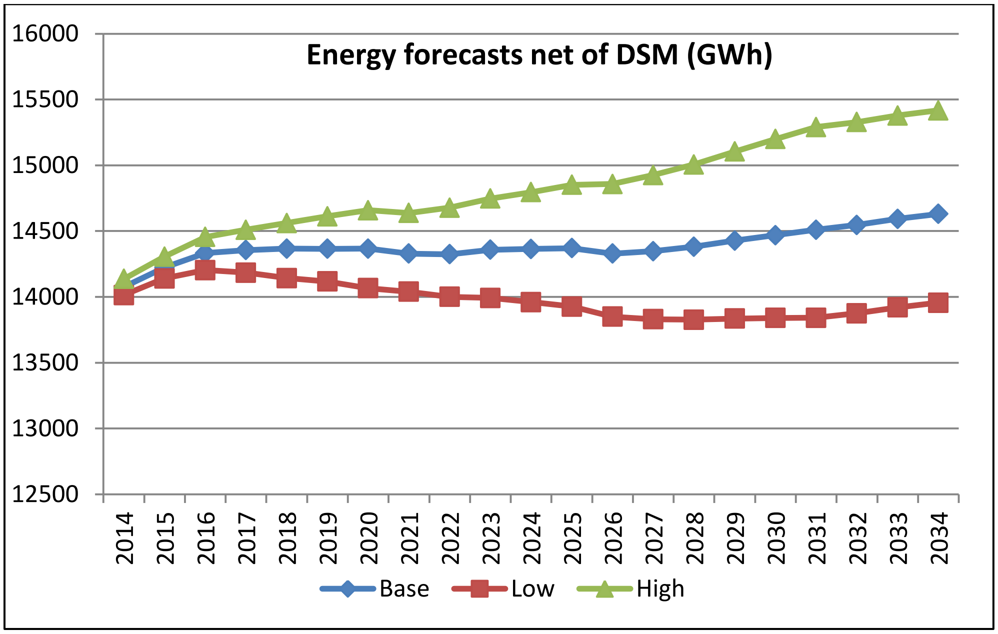
Load Forecast Overview Long Term

[170-IAC 4-7-4(b)(6)] [170-IAC 4-7-5(a)(6)] [170-IAC 4-7-5(b)]

IPL's long-term load forecast shows that growth will be impacted by organic energy-efficiency trends and DSM load impacts almost as much as the econometric variables. This forecast is based on econometric and end-use based modeling of IPL's gross internal demand ("GID") load and energy forecast plus incorporation of IPL's DSM expectations. Assumptions around DSM program free riders, program duration/degradation, and coincident peak load reductions were used to calculate a total internal demand ("NID") forecast. Sales before any DSM adjustments are expected to grow at a compound annual growth rate of 1.2% over the next three years, and 0.7% over the next 20 years. The growth-rate drops to 0.7% over the next three years after DSM savings are netted out. In other words, DSM is forecasted to address 42% of the estimated load growth.The estimated net energy efficiency DSM impact on the load and energy forecast is 1,575 GWH (337 MW) by 2034. IPL assumes an average 23% free-ridership/spill-over impact. These assumptions and corresponding forecast impacts could vary considerably as specifics of the DSM programs are continually evaluated and updated.

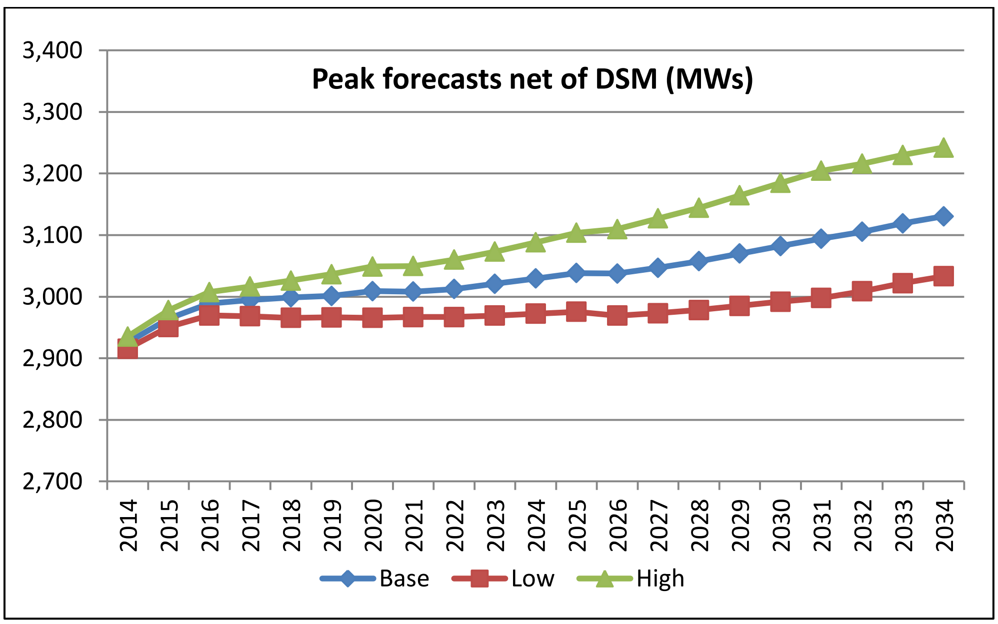
To capture forecast uncertainty in Ventyx's IRP modeling, IPL selected three energy and peak forecast scenarios: 1) Base load, 2) Low load, and 3) High load, with the Base load being the most probable. These energy and peak forecasts are shown in Figure 4D.2 and Figure 4D.3. These forecasts were derived by applying the low and high ranges of the State Utility Forecasting Group's (SUFG) 2013 IPL-forecast to IPL's internal forecast. Although this range, as modeled by the SUFG, is primarily driven by economics, we interpret the range to represent uncertainties resulting from: economic activity, DSM program impacts and technological and behavioral changes. For reference, IPL's base case with net DSM impacts represents a peak load forecast growth at 0.3% CAGR with 3131 MW of net internal demand ("NID") by 2034. IPL's forecast range, as modeled by Ventyx in the Capacity Expansion module, ranged from 0.2% CAGR (3,033 MW) for the Low Load forecast to 0.5% CAGR (3,242 MW) for the High Load forecast by 2034. The impact of this forecast uncertainty on the expansion plan modeling is discussed in Section 4, Integration. Sales forecasts by rate and IPL peak forecast, for the first 10 years, may be found in Section 7, Attachment 6.1, Forecasting Data Sets. The low and high range forecast data for all twenty years are provided in Section 7, Attachment 6.2, Forecasting Data Sets.

Figure 4D.2 Energy Forecast Range



Source: IPL

Figure 4D.3 Peak Forecast Range



Source: IPL

IPL creates the internal load and energy forecast spanning ten years due to constraints in economic data availability. For this IRP, the average growth rate of the tail-end years (final three years) is used to extrapolate the forecast over twenty years. Figure 4D.4 below shows the data behind the base line forecast in Figures 4D.2 and 4D.3.

Figure 4D.4 – Energy Sales and Peak Forecasts Net of Energy Efficiency DSM

Year	Energy Forecast (MWh)	YOY % Change	Peak TID (MW)	YOY % Change
2014	14,075,327		2926	
2015	14,223,236	1.1%	2965	1.3%
2016	14,332,600	0.8%	2989	0.8%
2017	14,355,903	0.2%	2995	0.2%
2018	14,366,218	0.1%	2999	0.1%
2019	14,365,853	0.0%	3001	0.1%
2020	14,366,838	0.0%	3009	0.3%
2021	14,329,494	-0.3%	3008	0.0%
2022	14,324,115	0.0%	3013	0.1%
2023	14,358,194	0.2%	3021	0.3%
2024	14,364,022	0.0%	3030	0.3%
2025	14,370,741	0.0%	3038	0.3%
2026	14,329,665	-0.3%	3038	0.0%
2027	14,347,078	0.1%	3047	0.3%
2028	14,381,659	0.2%	3058	0.3%
2029	14,427,629	0.3%	3070	0.4%
2030	14,469,065	0.3%	3082	0.4%
2031	14,510,624	0.3%	3094	0.4%
2032	14,546,314	0.2%	3105	0.4%
2033	14,592,712	0.3%	3119	0.4%
2034	14,630,095	0.3%	3131	0.4%

Source: IPL

Energy Sales Forecast

[170-IAC 4-7-4(b) (1)] [170-IAC 4-7-4(b)(2)] [170-IAC 4-7-4(b)(4)] [170-IAC 4-7-4(b)(6)] [170-IAC 4-7-5(a)(8)] [170-IAC 4-7-5(a)(9)]

IPL's forecasting effort is based on statistically adjusted end-use econometric modeling and takes into account factors including:

- Economic variables
- Energy efficiency standards
- New technology penetration

- Weather
- DSM

IPL employs an econometric model that also makes use of some end-use impacts in order to accommodate efficiency measures, appliance saturation and new technology penetration, such as electric vehicles. This methodology was developed for IPL by Itron, Inc. ("Itron"), a consulting firm that assisted IPL with past retail energy forecasts. Additional detail with respect to this end-use technique may be found in Section 7, Confidential Attachment 6.3, Forecasting Data Sets. Estimates of appliance saturation and efficiency are obtained from the U.S. Energy Information Administration ("EIA"), a statistical information agency of the U.S. Department of Energy ("DOE"). EIA information is modified by Itron to better reflect appliance saturation and end-use efficiency impacts within IPL's jurisdictional territory. This data can be found in Section 7, Confidential Attachment 6.4, Forecasting Data Sets.

IPL's forecast also includes an estimate to reflect customer adoption of plug-in hybrid electric vehicles ("PHEV") and electric vehicles. It is estimated that up to 10% of IPL's customers may purchase a new car in any given year. An annual adoption rate of hybrid electric vehicles, based on a report published by the Electric Power Research Institute (EPRI)[44], is applied to this number. The usage per car is assumed to be 2,477 kWh per year, and cars are assumed to have a 7-year use-span. This usage compares to approximately 3,900 kWh per year per IPL residential EVX customer in 2013.[45] The cumulative estimated energy-impact, as listed below in Figure 4D.5, is added to the forecast.

[44] IPL modified the rate set forth in 'Environmental Assessment of Plug-In Hybrid Electric Vehicles' by the Electric Power Research Institute (EPRI), July 2007 to a less aggressive adoption rate, which is reflective of IPL's service territory.

[45] As shown in IPL's 2013 report available at this link: https://www.iplpower.com/Business/Programs_and_Services/Electric_Vehicle_Charging_and_Rates/

Figure 4D.5 Electric-Vehicle Assumptions Applied to Load Forecast

Year	Assumed Annual EVs Sold	Cumulative EVs Sold	Annual Electricity Consumption per Car (kwh)	Cumulative Load (MWH)
2014	165	313	2477	776
2015	221	534	2477	1,324
2016	306	841	2477	2,083
2017	421	1,261	2477	3,124
2018	564	1,825	2477	4,520
2019	792	2,617	2477	6,483
2020	909	3,526	2477	8,734
2021	1,022	4,548	2477	11,266
2022	1,136	5,684	2477	14,080
2023	1,250	6,934	2477	17,175

Source: IPL

As of 2013, the actual total number of registered electric vehicles in the Indianapolis area is 211[46]. The BlueIndy program is expected to add 500 electric vehicles. IPL recognizes the variance between forecasted and actual EVs deployed and anticipates the availability of BlueIndy public chargers may foster adoption of additional EVs in the area. The forecast of electric-vehicles and estimation of their impact on the load will be refined in subsequent IRP analysis as and when more information specific to IPL's service area becomes available.

IPL gathers information about residential and commercial customer adoption of end-use appliances, penetration and consumption patterns through means that vary from scheduled surveys that are described in the IRP rule. These methods include DSM program data collection such as home energy audits, refrigerator recycling, air conditioning load management program participation, the evaluation measurement and verification process for DSM programs. Requests for new commercial and residential service extensions are managed through engineering and connections groups where load information such as square footage and HVAC specifications are used to estimate projected customer consumption. Similarly, existing and new IPL industrial customers remain in close contact with individual Strategic Account Representatives to address the addition of new loads. This information is shared with appropriate engineering and resource planning staff to prepare for significant forecasted demand changes.

In addition, virtually all of IPL's meters are read daily since the completion of the smart grid project in 2013.[47] IPL is able to understand system loading and evaluate any concerns in real-

[46] Source: Indiana Bureau of Motor Vehicles

[47] Less than 1% of the meters read may be unreachable due to obstructions such as vehicles or trees or communication issues.

time as well as utilize information for forecasting from its meter data management system if needed.

IPL's NID is net of incremental DSM as projected by AEG. AEG's DSM forecast was adjusted to account for prorated implementation of programs and the fact that the base forecast has historical DSM (up till 2014) embedded in it owing to the use of actual historical consumption data. Figure 4D.6 shows the cumulative DSM impact applied to the forecast.

Figure 4D.6 DSM Assumptions Applied to Load Forecast

Year	Cumulative Energy Forecast (MWh)	Cumulative Energy Efficiency Peaks (MW)
2014	60,942	11
2015	119,587	19
2016	207,416	37
2017	295,970	57
2018	386,788	73
2019	484,327	93
2020	567,922	110
2021	674,654	131
2022	769,184	151
2023	830,724	168
2024	910,577	183
2025	995,088	199
2026	1,128,097	225
2027	1,201,352	240
2028	1,259,135	255
2029	1,305,910	268
2030	1,357,487	281
2031	1,409,738	295
2032	1,468,342	310
2033	1,516,762	322
2034	1,574,806	337

Source: IPL

IPL's retail sales forecast is the summation of individual rate class forecasts. The bulk of IPL's econometric models is multi-regression in nature and is generated for each major rate class of IPL's retail customers. The models require monthly inputs and provide monthly outputs, thereby allowing for a true monthly sales forecast rather than one which parses quarterly or annual data. The sales forecasting effort is accomplished using models that are based on billing cycle sales. Simulation models are then created to convert billing cycle information into a calendar month format. This allows for modeling actual information without exposure to unbilled estimation that is integral with a calendar month approach. An overview of IPL's current forecast, both sales and peaks, are expressed in Figure 4D.4 above. The "YOY % Change" column is an indication of year-over-year growth.

The models that support the base level forecast are developed as either average-use models by rate or aggregated-sales models by rate. The homogeneity of the residential rate class allows for the use of average-use techniques. A forecast of the number of customers and the average-use of an individual customer is generated for each residential rate. IPL's Commercial and Industrial ("C&I") customers are more heterogeneous and an aggregated-sales by rate methodology has been found to be superior. Average-use models have been tested for these larger customers; however, the load variation of these customers makes an average-use approach statistically untenable.

Economic drivers, one of the independent variables, are re-specified for each iteration of the forecast. Econometric forecasts modeling software is typically limited to two or three economic drivers per modeling run. The inclusion of more drivers generally causes a collinearity problem which degrades the predictive power of the model. The main economic drivers used in IPL's most current forecast are as follows:

Residential Economic Drivers

- Total Households Marion County – to estimate number of customers
- Real Household Income Indianapolis - to estimate average KWh use
- Household Size Indianapolis – to estimate average KWh use

Small C&I Economic Drivers

- Indianapolis Non-Manufacturing Employment – to estimate rate SS and SH KWh requirement

Large C&I Economic Drivers

- Indianapolis Non-Manufacturing Employment – to estimate rate SL and PL KWh requirement
- Indianapolis Manufacturing Employment – to estimate rate PH & HL KWh requirement

Moody's Economy.com supplies the economic drivers used by IPL. These are provided on a local, Metropolitan Statistical Area ("MSA"), statewide, and national basis. IPL's models are generally better using local specified drivers than ones that are broader in scope. A compilation of the drivers used, as well as others provided by Moody's Economy.com can be found in Section 7, Confidential Attachment 6.5, Forecasting Data Sets. As previously mentioned, the driver sets used are unique to the current forecast effort. Past or future forecasts may be specified using a different set of drivers that are statistically superior at different points in time. IPL's models are created with a 10-year horizon for internal purposes and then inflated at an average rate of 0.6% for the subsequent 10 years on a before-DSM basis. Summer and winter peaks are inflated at an average rate of 0.7% on a before-DSM basis.

Historic weather and customer information are also important drivers of IPL's retail forecast models. The actual weather information is obtained from the National Oceanic and Atmospheric Administration ("NOAA") and includes heating degree days ("HDD") and cooling degree days ("CDD"). The most recent 30-year averages of monthly HDDs and CDDs are used as 'normals' for the forecast period. The customer information applied in IPL's retail forecasts (customer counts by rate, KWh sales by rate, and billing day information) are all acquired from confidential IPL customer records. Input data sets used in the modeling effort may be found in Section 7, Attachments 6.6, 6.7 and 6.8, Forecasting Data Sets. These attachments are segmented down to the three classes of customers: residential, small C&I, and large C&I. Data found in these attachments includes customer counts by rate, sales history by rate, weather information, and model outputs, as well as statistical specifications of each model.

Peak Forecast

[170-IAC 4-7-4(b) (1)] [170-IAC 4-7-4(b)(2)] [170-IAC 4-7-4(b)(6)] [170-IAC 4-7-5(a)(8)]

As a member of MISO, IPL supplies monthly forecasts in response to MISO's emphasis on balancing monthly peak supply and demand. To meet this requirement, IPL develops a monthly peak forecast by means of a "hybrid" model that utilizes both econometric drivers and energy-efficiency impacts, similar to the energy models described above. From the monthly values, a summer-peak (allotted to July) and a winter-peak (allotted to January) are identified. IPL's peak models reflect the GID. Adjustments are then made for incremental projections of energy efficiency DSM initiatives to create the TID. IPL created high and low ranges for the peak forecast, similar to the energy forecast, for the IRP modeling. The forecast data can be found in Section 7, Attachment 6.2, Forecasting Data Sets.

The peak model is linked to the energy forecast model in such a way that the same economic variables drive the peak forecast. Average temperatures/degree-days associated with historical peak-days form the weather bases. Specification of the models, including all history, incorporated driver variables, and output may be found in Section 7, Attachment 6.9, Forecasting Data Sets. Summer peak projections are highlighted in Figure 4D.4 above and the monthly forecast of peaks is available in Section 7, Attachment 6.1, Forecasting Data Sets.

Model Performance and Analysis

[170-IAC 4-7-5(a)(5)] [170-IAC 4-7-5(a)(7)] [170-IAC 4-7-5(a)(4)]

IPL periodically evaluates forecast model performance (1) when the model is created, (2) on a monthly basis as a variance analysis and (3) after-the-fact as a year-end comparison.

During forecast development a number of models are analyzed at the rate level. The adjusted R-squared statistic, Mean Absolute Percent Error ("MAPE"), the Durbin-Watson statistic, and reasonableness of each model to IPL are statistically evaluated. The IPL Forecasting group targets adjusted R-squared values better than 90%; this is accomplished in nearly all cases. Further, MAPE needs to be less than 2% and the Durbin-Watson statistic is targeted around 2.0. IPL considers independent variables with T-statistics of at least 2.0 acceptable. This judgment is somewhat subjective and dependent upon the implied importance of the variable. The other statistical measures considered are discussed in Section 7, Confidential Attachment 6.10, Forecasting Data Sets.

"Out of Sample Testing" is another methodology that IPL uses to gauge model performance. This methodology involves withholding a year of history from the model and then assessing how well the model is able to predict previous historic results.

Occasionally, a model that performs well from a statistical standpoint may not seem reasonable when further inspected. Excessive specification of independent variables is one cause of this situation. The investigation of rates of change between recent history and model-generated predictions can identify models that are statistically valid yet unreasonable. When disagreement between a model and common sense inspection arises, additional investigation and/or specification are required. (Recent history must be weather-corrected to allow for meaningful comparisons.) Models of individual rates, after undergoing comprehensive review, are summed to create a proposed forecast. The proposed forecast is then evaluated against aggregated weather-adjusted history as a final test before the forecast is recommended.

IPL uses different methodologies to obtain weather-normalized energy sales and demand. Energy sales are normalized to the most recent 30-year averages of HDDs and CDDs. Demand is normalized to the historical average of the peak producing weather conditions. One method of obtaining weather-corrected energy sales or demand is to re-run the models as simulations with normal weather substituted for actual weather. The difference between predicted energy sales or demand (actual weather) and simulated energy sales or demand (normal weather) is the amount the actual energy sales or demand should be adjusted to give normalized energy sales or demand. Another method is to take the difference between actual weather and normal weather and multiply it by an appropriate weather coefficient for the given conditions. This adjustment is the amount the actual energy sales or demand should be adjusted by to give normalized energy sales or demand. The weather coefficient is obtained by analyzing the current daily response to weather. In effect, this allows behavior changes that may exist compared to more historical approaches in long-term models.

Evaluation of the variance of energy sales and peak demand is looked at each month after weather adjustments have been completed. IPL's forecasting staff uses this information to consider model performance. As long as monthly variance moves reasonably with current "knowns" like economic factors and/or weather, a conditional approval supports the forecast.

However, should variance move contrary to "knowns," investigation of possible bias and other elements are undertaken. A similar determination, but with greater detail is made at year-end. Actual and weather-adjusted results are compared to the forecasted values generated each of the previous five years. This is done with respect to energy sales at the class level, namely residential, small C&I, and large C&I. Summer peak and winter peak, both actual and weather-adjusted, are reviewed in similar fashion.

The Mean Percent Error (MPE) is used to evaluate overall forecast performance after the fact. Two interesting comparisons that gauge IPL's forecasting ability are those that compare weather-adjusted annual GWH sales and weather-adjusted summer peak to their respective forecasts. IPL's one-year-out energy forecast, as measured by MPE, is on average, within 1.7% of weather-adjusted sales. The summer MPE peak forecast averages 2.4%. IPL targets a one-year forecast error of less than 2%. Occasionally, rapidly changing external conditions, such as the extreme winter of 2013-14, can cause fluctuations that exceed this bandwidth. However, reviewing forecast updates on a quarterly basis will allow IPL to make both tactical adjustments in the short-term and initiate additional scenario analyses in the long term. Figures 4D.7 and 4D.8 highlight IPL's overall retail energy sales and summer peak demands forecast performance, respectively, for the last 10 years. The remainder of the forecast error analyses, at the class level, may be found in the previously mentioned Section 7, Attachment 6.11, Forecasting Data Sets.

Figure 4D.7 – Forecast Error Analysis: Weather-Adjusted Energy Sales vs. Forecasts

ANNUAL "INDIANAPOLIS ONLY" GWH SALES

Adjusted & Forecasted

		Forecast Made:				
For	Adjusted Sales *	One Year Ago	Two Years Ago	Three Years Ago	Four Years Ago	Five Years Ago
2003	14,543 920	14,561.734	15,077.845	15,143.833	15,385.066	15,346.251
		0.1%	3.7%	4.1%	5.8%	5.5%
2004	14,759.085	14,588.136	14,767.804	15,327.185	15,446.414	15,756.329
		-1.2%	0.1%	3.8%	4.7%	6.8%
2005	14,928 377	14,917.100	14,809.058	14,966.217	15,620.768	15,752.324
		-0.1%	-0.8%	0.3%	4.6%	5.5%
2006	14,959 551	15,221.281	15,164.506	14,996.604	15,153.834	15,938.745
		1.7%	1.4%	0.2%	1.3%	6.5%
2007	14,971.610	15,255.687	15,452.281	15,408.373	15,157.356	15,364.855
		1.9%	3.2%	2.9%	1.2%	2.6%
2008	14,956 362	15,264.979	15,427.470	15,702.410	15,620.741	15,334.846
		2.1%	3.1%	5.0%	4.4%	2.5%
2009	14,296 266	15,208.790	15,472.539	15,612.025	15,932.337	15,838.873
		6.4%	8.2%	9.2%	11.4%	10.8%
2010	14,120.637	14,287.148	15,356.932	15,702.517	15,817.438	16,173.497
		1.2%	8.8%	11.2%	12.0%	14.5%
2011	14,010.057	14,172.293	14,420.894	15,463.008	15,832.780	16,020.434
		1.1%	2.8%	9.4%	11.5%	12.5%
2012	14,011 544	14,268.134	14,391.694	14,717.444	15,591.706	16,066.858
		1.8%	2.6%	4.8%	10.1%	12.8%
2013	13,878.196	14,118.020	14,263.240	14,491.940	14,783.227	15,721.475
		1.7%	2.7%	4.2%	6.1%	11.7%
Mean % Error		1.7%	3.7%	5.5%	6.9%	8.6%

Source: IPL

Figure 4D.8 – Forecast Error Analysis: Weather-Adjusted Summer Peak Demands vs. Forecasts

SUMMER PEAK DEMANDS Adjusted & Forecasted											
		Forecast Made:									
For	Adjusted Peak Demand	One Year Ago	Two Years Ago	Three Years Ago	Four Years Ago	Five Years Ago	Six Years Ago	Seven Years Ago	Eight Years Ago	Nine Years Ago	Ten Years Ago
2003	3023	3061	3202	3144	3129	3102	3091	3101	3035	3038	3081
		1.3%	5.9%	4.0%	3.5%	2.6%	2.2%	2.6%	0.4%	0.5%	1.9%
2004	3085	3042	3106	3260	3195	3179	3156	3146	3160	3078	3079
		-1.4%	0.7%	5.7%	3.6%	3.0%	2.3%	2.0%	2.4%	-0.2%	-0.2%
2005	3108	3167	3088	3149	3318	3245	3227	3211	3202	3223	3120
		1.9%	-0.6%	1.3%	6.8%	4.4%	3.8%	3.3%	3.0%	3.7%	0.4%
2006	3165	3110	3203	3132	3191	3376	3297	3275	3267	3259	3288
		-1.7%	1.2%	-1.0%	0.8%	6.7%	4.2%	3.5%	3.2%	3.0%	3.9%
2007	3177	3195	3156	3243	3173	3233	3430	3348	3322	3322	3319
		0.6%	-0.7%	2.1%	-0.1%	1.8%	8.0%	5.4%	4.6%	4.6%	4.5%
2008	3153	3197	3231	3190	3264	3215	3277	3483	3402	3370	3379
		1.4%	2.5%	1.2%	3.5%	2.0%	3.9%	10.5%	7.9%	6.9%	7.2%
2009	2902	3218	3236	3293	3236	3313	3257	3321	3536	3457	3419
		10.9%	11.5%	13.5%	11.5%	14.2%	12.2%	14.4%	21.8%	19.1%	17.8%
2010	2886	3117	3253	3274	3343	3281	3354	3300	3364	3590	3514
		8.0%	12.7%	13.4%	15.8%	13.7%	16.2%	14.3%	16.6%	24.4%	21.8%
2011	2905	2943	3173	3287	3312	3391	3327	3395	3344	3408	3644
		1.3%	8.4%	11.6%	12.3%	14.3%	12.7%	14.4%	13.1%	14.7%	20.3%
2012	2822	2938	3001	3253	3320	3350	3445	3372	3429	3388	3453
		4.0%	6.0%	13.3%	15.0%	15.8%	18.1%	16.3%	17.7%	16.7%	18.3%
2013	2839	2928	2975	3047	3311	3352	3388	3489	3418	3484	3432
		3.0%	4.5%	6.8%	14.2%	15.3%	16.2%	18.6%	16.9%	18.5%	17.3%
Mean % Error		2.7%	4.7%	6.5%	7.9%	8.5%	9.1%	9.6%	9.8%	10.2%	10.3%

Source: IPL

IPL Fuel Planning

[170-IAC 4-7-4(b)(7)]

IPL procures and manages a reliable supply of fuel for its generating units at the lowest long-term cost reasonably possible, consistent with maintaining low long-term busbar cost and compliance with all environmental requirements and/or guidelines. Busbar costs reflect those needed to produce a kilowatt of energy to the transmission grid.

IPL seeks competitive prices for coal through the use of the solicitation and negotiation process. IPL considers all material factors, including, but not limited to, (a) availability of supply from qualified suppliers, (b) current inventory levels, (c) forecast of fuel usage, (d) market conditions and other factors affecting price and availability, and (e) existing and anticipated environmental standards. IPL prepares long-term projections of fuel purchased, annual inventory levels, quality and delivered cost for each plant.

For the coal-fired units, IPL maintains coal inventory at levels sufficient to ensure service reliability, to provide flexibility in responding to known and anticipated changes in conditions, and to avoid risks due to unforeseen circumstances. Inventory targets are established based upon forecasted usage, deliverability and quality of the required fuel to each unit, the position of the unit in the dispatch order, risk of market supply-demand imbalance, and the ability to conduct quick market transactions. The general level of inventory throughout the year is adjusted to meet anticipated conditions (i.e., summer/winter peak load, transportation outages, unit outages, fuel unloading system outages, etc.).

Natural gas ("NG") is currently purchased on a daily basis as required based on availability and pricing from several suppliers for its NG fired units. IPL's existing natural gas units have run intermittently which did not justify the need for contracts with fixed demand charges. As a larger portion of its generation will move to NG, IPL recently negotiated NG contracts. NG procurement includes commodity pricing, transportation and delivery components for the new Eagle Valley CCGT and planned refueled HSS units IPL will negotiate commodity pricing prior to plant start-ups expected in late 2015 and 2016. IPL has secured firm delivery as well as no-notice and park/loan services which are used for unexpected unit starts & stops to mitigate fuel availability risks. IPL maintains firm transportation to liquid supply zones for the new Eagle Valley CCGT unit which can also serve the Harding Street units. As generating units are refueled to NG, IPL will contract for additional firm transportation as necessary. Since the Georgetown units are used for peaking needs only, firm NG contracts are not cost-effective. IPL contracts with Citizens Gas for firm redelivery and balancing services to the generating units located at the Harding Street and Georgetown plants.

Fuel Price Forecasting and Methodology

[170-IAC 4-7-4(b)(2)] [170-IAC 4-7-6(a)(3)]

The fuel forecasts used in the IPL 2014 IRP modeling are based on Ventyx's "Midwest Fall 2013 Power Reference Case, Electricity and Fuel Price Outlook". These fuel forecasts and their related explanations also appear in Ventyx's "2014 Integrated Resource Plan Modeling Summary", dated October 13, 2014. See Section 7, Confidential Attachment 5.1, Ventyx IPL IRP Modeling Summary for additional details.

A forecast of average annual fuel costs by IPL generating unit is found in Figure 4D.9.

Confidential Figure 4D.9 – IPL Average Annual Fuel Forecast per Generating Unit (Nominal $/MMBtu)

	Petersburg 1-4	Eagle Valley 3-6	Harding Street 5&6	Harding Street 7	Eagle Valley CCGT	Harding Street Natural Gas Units
2015	[redacted]					
2016	[redacted]					
2017	[redacted]					
2018	[redacted]					
2019	[redacted]					
2020	[redacted]					
2021	[redacted]					
2022	[redacted]					
2023	[redacted]					
2024	[redacted]					
2025	[redacted]					
2026	[redacted]					
2027	[redacted]					
2028	[redacted]					
2029	[redacted]					
2030	[redacted]					
2031	[redacted]					
2032	[redacted]					
2033	[redacted]					
2034	[redacted]					

**Individual Unit Natural Gas prices will vary slightly due to differing delivery charges.*

Source: IPL

Market Transactions

IPL offers all of its generating resources into the MISO energy market and IPL's load is bid into the MISO energy market. Therefore, IPL has no scheduled power import and export transactions, neither firm nor non-firm.

Section 5. SHORT-TERM ACTION PLAN

[170-IAC 4-7-9(1)(A)]

As suggested in the revised 170 IAC 4-7-9, IPL has included a comparison of the last IRP short-term action plan to what actions actually transpired, a summary of actions planned for the next three years (3) including a schedule and budgetary costs as well as a description of its Preferred Resource Portfolio.

Comparison to Last IRP

[170-IAC 4-7-9(4)]

IPL measures its progress and success in relation to the IRP objective by comparison of the previous IRP goals and what actually transgressed. The 2011 IRP short-term action plan was centered on developing cost-effective DSM programs to meet aggressive IURC energy efficiency requirements, complying with strict new EPA rules that had the potential to force early retirements of small coal-fired units, and the need to begin the process of replacing that capacity with new generation, most likely a CCGT.

The majority of the items identified are in the process of being implemented. The IURC DSM targets identified in the 2011 IRP were abolished in May 2014 as a result of legislation, yet IPL expects to be at or near the former IURC DSM targets by the end of 2014. The IURC issued a report of the DSM to the legislature in August 2014 detailing historical accomplishments for all Indiana utilities.

Many actions were taken over the past three years as a result of EPA rules including significant changes to existing generation as described below. In addition, several autotransformers, transmission lines and substation breakers identified in the 2011 short-term action plans were upgraded. See Figure 5.1 below for details on the Company's 2011 IRP objectives and implementation status.

Figure 5.1 – IPL 2011 IRP Objectives and Implementation

2011 Objectives	Implementation as of October 2014	IURC Cause No.
Retire the six (6) small unscrubbed coal-fired units by 2016 (EV Units 3-6 and HSS 5 and 6)	• Eagle Valley Units 3 through 6 will be retired by April 16, 2016 • Harding Street Station Units 5 and 6 will be refueled to natural gas	• N/A • 44339
Retire four (4) oil-fired units by 2015 (HSS Units 3 and 4 and EV Units 1 and 2)	• In 2013, IPL retired the four oil-fired units (HSS Units 3 and 4 and EV 1 and 2) mentioned along with HSS GT 3	• N/A
Retrofit "Big 5" to comply with EPA MATS regulation (Pete 1 through 4 and HSS 7)	• IPL received IURC approval to proceed to retrofit Petersburg units and construction is underway • IPL has sought approval to refuel HSS Unit 7 to natural gas	• 44242 • 44540
Meet IURC established DSM targets (Cause No. 42693)	• IPL expects to be at or near cumulative targets at the end of 2014. IURC targets have been suspended with the passage of SEA 340. IPL will continue to offer cost-effective DSM, including its proposed 2015/16 Plan proposed to the IURC.	• 44497
Select and implement preferred resource to replace retirements	• IPL received approval to construct 644 to 685 MW[48] EV CCGT (Cause No. 44339)	• 44339
Reduce capacity exposure resulting from IPL shortage in Planning Years 2015-2016 and 2016-2017	• IPL has purchased 100 MWs of Capacity for the two stated planning periods and nears completion of an agreement for an additional 200 MW for PY 2016-2017 • IPL achieved a successful FERC wavier to mitigate exposure from the "6 week" gap • Implemented operational enhancements to increase the Unforced Capacity on existing units • Achieved capacity credit for the Conservation Voltage Reduction program	• N/A
Complete Distributed Automation and Advanced Metering Infrastructure Projects	• Projects have been completed and are fully operational	• N/A

Source: IPL

[48] IPL is constructing a 671 MW CCGT.

2014 Short Term Action Plan

Environmental

IPL's short-term action plan focuses on compliance with the changing environmental landscape and maintaining the viability of IPL's base load generating units. IPL is currently in the process of installing MATS controls on the Petersburg coal-fired units as shown above.

Additionally, IPL is preparing for compliance with new National Pollution Discharge Elimination System ("NPDES") permit limitations. On August 28, 2012, the IDEM issued NPDES permit renewals to Petersburg and Harding Street. These permits contain new Water Quality Based Effluent Limits ("WQBELs") and Technology-Based Effluent Limits ("TBELs") for the regulated facility NPDES discharges with a compliance date of October 1, 2015 for the new WQBELs. IPL sought and received approval to extend the compliance deadline to September 29, 2017 through Agreed Orders from IDEM. The NPDES permits limit several pollutants, but the new mercury and selenium limits drive the need for additional wastewater treatment technologies at Petersburg and Harding Street. IPL determined that installation of the necessary wastewater treatment technologies and other potential future environmental requirements in addition to the necessary Mercury and Air Toxic Standard (MATS) controls described in IPL's case-in-chief Cause No. 44242 was not the reasonable least cost plan for HSS. Instead, IPL is currently proposing to refuel HSS Unit 7 to operate on natural gas which reduces the cost to comply with environmental regulations and reduces the impact on the environment.

Review of the impact of new air, water, and waste regulations is ongoing as these regulations are still being developed. IPL will continue to evaluate its compliance options as the requirements become more defined. Aside from MATS and NPDES implications, this IRP represents no additional technology investments or Operation and Maintenance ("O&M") costs associated with potential new air, water, and waste regulations.

Demand Side Management

The IPL short-term action plan (2015-2017 Action Plan) for demand side management ("DSM") was filed and approval is currently pending before the IURC in Cause No. 44497. This proceeding specifically seeks approval of DSM programs and budgets for 2015 and 2016. The 2015-2017 Action Plan was based on an update of the Market Potential Study that was completed in 2012. In 2012 IPL, in collaboration with Citizens Energy and each respective Oversight Board retained the consulting firm EnerNOC (now Applied Energy Group or "AEG")[49] to complete a Market Potential Study ("MPS") and Action Plan for the period 2014-2017. Since the completion of the 2012 MPS and resulting Action Plan, Senate Enrolled Act 340 ("SEA 340") was passed into law, significantly changing the structure of DSM in Indiana. IPL

[49] The EnerNOC resource planning group, including all the principals who had worked on the 2012 MPS, was acquired by Applied Energy Group in the 2nd Quarter of 2014. Therefore references to EnerNOC have generally been changed to AEG.

re-engaged AEG to update its 2015-2017 Action Plan to account for the elimination of IURC annual savings targets and the opt-out provision of large customers and to identify cost-effective achievable DSM potential in the 2015-2017 timeframe.

The Action Plan was adjusted to reflect decreased savings projections by approximately 20% compared to savings projections in IPL's 2014 DSM Plan.

Figure 5.2 – DSM Annual Savings Projections

Program	2014 Annual Savings Projection (MWh)	Average 2015-2017 Annual Savings Projection (MWh)	% Reduction
Business Prescriptive	98,636	78,813	(20%)

Source: IPL

The three year plan in Cause No. 44497 covers the years 2015-2017. Although cost and savings information was developed and presented for 3 years, IPL is only seeking spending approval to deliver the programs for the first 2 years (2015-2016) as listed below. If approved, IPL will continue to offer a broad range of cost effective programs to our customers as shown in Figure 5.3. For more information, please see Section 4B.

Figure 5.3 – DSM Programs Proposed in Cause No. 44497

Programs
Residential Lighting
Residential Income Qualified Weatherization
Residential Air Conditioning Load Management
Residential Multi Family Direct Install
Residential Home Energy Assessment
Residential School Kit
Residential Online Energy Assessment
Residential Appliance Recycling
Residential Peer Comparison Reports
Business Energy Incentives - Prescriptive
Business Energy Incentives – Custom
Small Business Direct Install
Business Air Conditioning Load Management

Source: IPL

IPL forecasted twenty (20) years of DSM savings that are included in the load forecast. Future programs will be developed for the balance of the IRP period and presented in subsequent IURC proceedings. The twenty year forecast is provided in Section 7, Attachment 4.7, DSM Supporting Documents.

In addition, IPL entered into a settlement agreement with the OUCC in the BlueIndy case (IURC Cause No. 44478) which includes three potential new DSM programs: LED Energy Efficient Streetlighting Program, assessing customer strategic energy management (ISO 50001 or similar program), and determining the potential feasibility of using the BlueIndy electric vehicle batteries to provide electricity back to the IPL grid as a demand response resource If approved by the Commission, IPL will move forward to plan specific details in the near future.

Transmission

IPL's has studied and is evaluating the need for transmission and substation projects for retirement of generation connected to the IPL 138 kV system to ensure deliverability of power into the IPL load zone. These projects include the installation of new 345 kV breakers, autotransformers, and 138 kV capacitor banks to improve power import capability from the 345 kV system to load centers on the 138 kV system. Several projects associated with the new CCGT will be completed in 2015 and 2016. In addition, IPL plans to install a Static VAR System (SVS) to provide dynamic voltage and VAR support. See Section 4C and Section 7 – Confidential Attachment 1.3 for detailed project information.

Distribution

IPL has completed its distribution automation ("DA") and Advanced Metering Infrastructure ("AMI") plans funded in part by a Smart Grid Investment Grant ("SGIG") awarded by the U.S. Department of Energy ("DOE") as described in section 4. These assets will be optimized for continued service restoration improvements, to connect additional solar distributed generation facilities of approximately 30 MW, and to utilize the conservation voltage reduction ("CVR") program to reduce demand by between 20 and 40 MW during peak conditions. In addition, data collected will be mined for asset management improvements to complete condition based maintenance and replacements. Estimated expenses are allocated in the capital budget process and do not exceed average annual expenditures; therefore they are not specifically highlighted in the IRP.

Research & Development/Technology Applications

IPL continually evaluates emerging technologies, new applications of technologies and contemporary methods to improve operational excellence, identify future business opportunities and enhance long-term planning. Specifically, (1) energy storage, (2) enhanced combustion turbine output options, (3) the expansion of electric transportation, and (4) utilizing smart grid assets are included as part of these efforts.

(1) IPL is investigating the possibility of installing a Battery Energy Storage System ("BESS") within its grid to provide ancillary services. This could be up to a 20 MW facility located on the IPL 138 kV transmission system, which will also facilitate local

stakeholder education. See Section 2, Changing Business Landscapes, for more information about the potential BESS installation.

(2) IPL considers efficiency improvements that may provide additional generating capacity such as a technique known as "fogging" whereby inlet air is cooled to increase gas turbine outputs. Analysis is underway, therefore, no specific incremental capacity in terms of MWs are included in the preferred resource portfolio.

(3) IPL proposed expanding local electric transportation infrastructure in its proceeding before the IURC in 2014. If approved, this project will support the first all-electric car-sharing program in the U.S. through the installation of up to 1,000 Electric Vehicle Supply Equipment ("EVSE") units at approximately 200 locations throughout the IPL service territory. The project is expected to begin later this year and be completed in mid-2016.

(4) IPL will continue to utilize smart grid system assets to support its Conservation Voltage Reduction ("CVR") program. Two-way communicating devices at distribution substations and capacitor bank locations allow IPL to remotely lower the system voltage incrementally to reduce peak demand. The voltage levels on the feeders and at Advanced Metering Infrastructure ("AMI") meters are monitored to ensure service voltage limits are maintained. In addition, IPL plans to leverage the AMI assets for power quality monitoring overall and future energy management possibilities for inclusion in DSM programs.

Preferred Portfolio

Subsequent to the 2011 IRP, as mentioned above, IPL received approval to construct a 644 to 685 MW[50] Eagle Valley CCGT (IURC Cause No. 44339). Once in-service, this approval along with IPL's other current generation will allow IPL to meet its peak demand until other unit retirements are necessary. Therefore, IPL's preferred portfolio includes no additional generation in the time horizon of the short-term action plan, extending out until the anticipated retirement of Petersburg 1 along with Harding Street Units 5 through 7 in the early 2030's. The determination and additional details surrounding IPL's preferred portfolio can be found in Section 4 - Integration. Significant changes, comprising the reasonable least cost plan, will be made to IPL's current coal-fired fleet to meet recent environmental requirements as described below.

Existing Generation

Environmental requirements, specifically the Mercury and Air Toxics rule ("MATS") and the National Pollutant Discharge Elimination System ("NPDES") along with potential future environmental regulations, significantly impacted the evaluation process of the six unscrubbed coal-fired units and continue to have a large impact on IPL's larger coal fleet. Eagle Valley coal Units 3 through 6 are nearing the end of their useful lives, making future investments for EPA

[50] IPL is constructing a 671 MW CCGT.

compliance uneconomical. These units will be retired to coincide with the MATS compliance date in April 2016. To maintain generation to serve load, IPL requested and received approval (Cause No. 44339) to construct a 644 to 685 MW[3] CCGT, which is projected to be in-service by April 2017 as mentioned above.

Harding Street Station Units 5 and 6 represent the other two unscrubbed units in IPL's fleet. Due to the close vicinity to load, these units provide a large reliability benefit to IPL's system. Based on reliability and economic factors in the evaluation, IPL determined refueling HSS Units 5 and 6 - along with HSS Unit 7 – to natural gas in 2016 is the reasonable least cost plan.

Refueling HSS Units 5 through 7 and the addition of the 671 MW Eagle Valley CCGT allows IPL to diversify its portfolio in addition to providing economic energy solutions to its customers. Additionally, IPL's resource plan recognizes the value and reliability offered by its four coal-fired units located in Petersburg. Additional environmental compliance investments controls on these units continue to be cost-effective and necessary over the next two to three years.

Capacity Needs (2015-2017)

Historically, IPL has relied on short-term capacity markets for up to 300 MW of its capacity requirements. However, for the period 2015 to 2016, IPL will be facing additional challenges as MISO capacity prices continue to rise and retirements increase to comply with new EPA regulations. As discussed above, IPL will be retiring Eagle Valley coal-fired units 3-6 by April 16, 2016, six weeks before the end of the MISO Planning Year ("PY") 2015-2016. Under MISO's current resource adequacy requirements, a capacity resource that clears a planning reserve auction must be available during the entire commitment period, otherwise replacement capacity from the same Load Resource Zone ("LRZ") must be secured to avoid compliance penalties. On June 20, 2014, IPL submitted a request to FERC to waive the replacement requirement needed during the stated 6 week span. This request was granted by FERC on October 15, 2014, eliminating the need to replace capacity during that time span and avoiding unnecessary costs for IPL customers.

To mitigate the MISO Planning Resource Auction price volatility risk, IPL has bilaterally purchased 100 MWs of Zone 6 Zonal Resource Credits at a fixed and known price for the PY 2015-2016 resulting in a minimal net capacity requirement. For PY 2016-2017, IPL has purchased 100 MWs of Zone 6 Zonal Resource Credits at a fixed and known price and nears completion of an agreement for an additional 200 MW. This results in a net capacity requirement ranging from 50 to 100 MW.

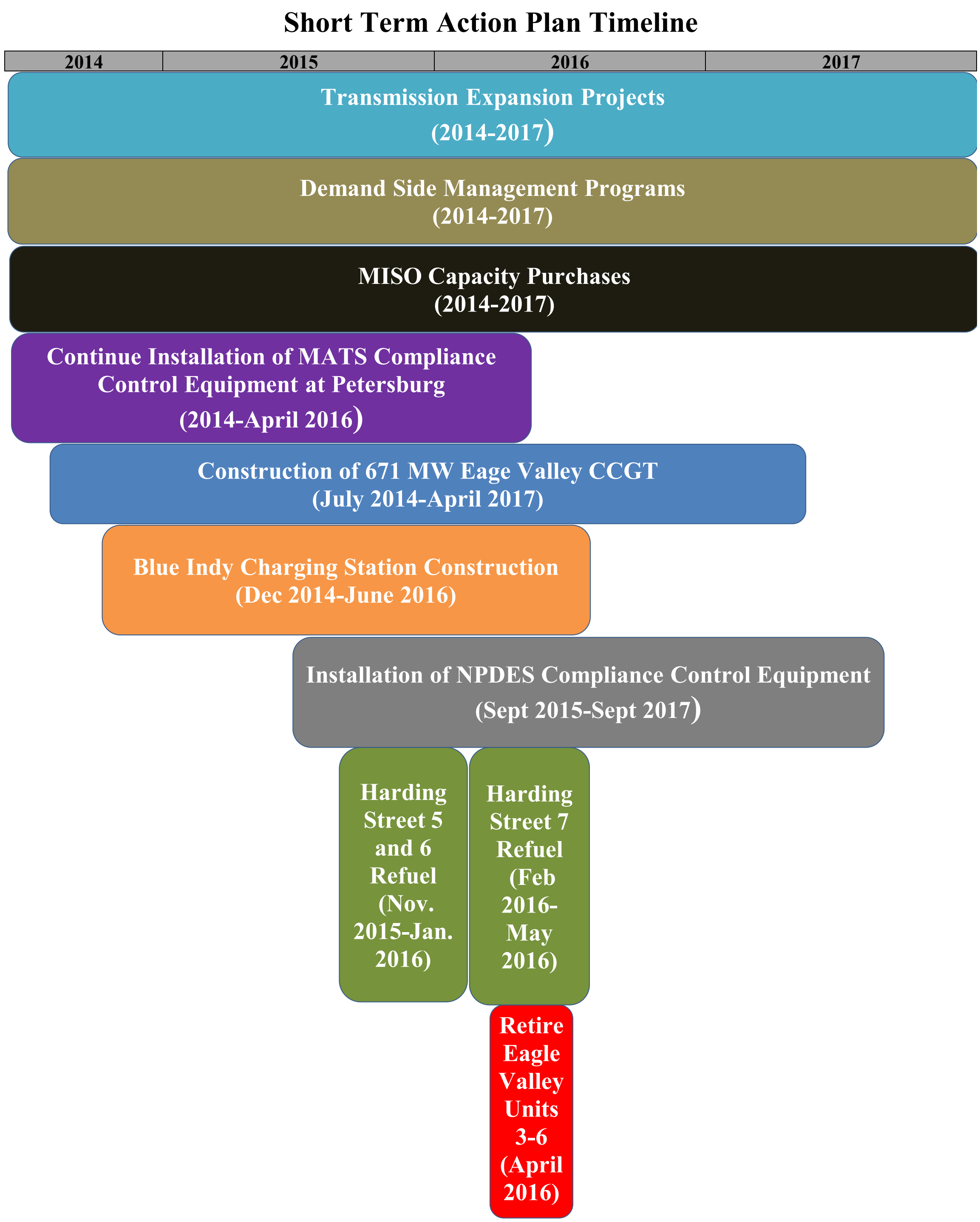
IPL will continue to evaluate the purchase of additional capacity to meet the difference between its actual Planning Reserve Margin Requirement and secured resources with bilateral purchases or sales, auction purchases or sales, additional demand response, or other resources. Starting in Planning Year 2017-2018, with the addition of the Eagle Valley CCGT, IPL projects that its resources will exceed its MISO Planning Reserve Margin Requirement for 2017-2018 by 240 MWs which it plans to optimize in the capacity market.

2014 Short Term Action Plan Summary

[170-IAC 4-7-9(1)(B)] [170-IAC 4-7-9(2)] [170-IAC 4-7-9(3)]

This short-term planning period focuses on managing the impacts of implementing the recommendations that resulted from the 2011 IRP, including meeting reliability needs in 2015 and beyond through transmission system upgrades during the "gap year" of June 2016 through May 2017 when new and refueled generation resources will not be available. The following recommendations are in the process of being implemented. The short-term action plan covering 2015 through 2017 identifies the initial steps toward IPL's longer-term resource strategy as shown below in Figures 5.4 and 5.5, which include a timeline of the projects mentioned above and their projected costs.

Figure 5.4 – Short Term Action Plan Timeline



Source: IPL

Figure 5.5 – Short Term Action Plan Current Capital and DSM Cost Estimates

Project	Timing	Current Estimated Cost[51]
MATS[52]	2014-2016	$460M
Eagle Valley 671 MW CCGT	2014-2017	$590M
Harding Street Units 5&6 Refuel	2015-2016	$36M
Harding Street Unit 7 Refuel[53]	2015-2016	$134M
Waste Water Compliance (NPDES)	2015-2017	$258M
Transmission Expansion	2014-2017	$100M-$120M
MISO Capacity Purchases	2015-2017	$10M-$15M
Demand Side Management Programs	2015-2016	$67M
Blue Indy-Electric Vehicle Project	2014-2016	$16M
Total Costs		$1,671M-$1,696M

Source: IPL

IPL will monitor the progression of the above action items to ensure they are completed within the budgeted costs and in a timely manner. Consistent with business operations related to major projects, IPL will regularly review progress and success in relation to these IRP objectives. In addition, subsequent IRPs will include a comparison of these short term IRP goals to what actually transpires in the future.

[51] These costs do not include O&M, carrying charges, or AFUDC.
[52] These reflect current projections based on the refuel of HSS Unit 7.
[53] These include estimated coal pond and ash pond closure costs.

Section 6. ACRONYMS

Acronym	Reference
3-Year DSM Plan	IPL's 2015-2017 Demand Side Management Plan proposed in Cause No. 44497
AC	Alternating current
ACEEE	American Council for an Energy Efficient Economy
ACESA	American Clean Energy and Security Act of 2009
ACI	Activated carbon injection
ACLM	Air-Conditioning Load Management
AEG	Applied Energy Group
AEP	American Electric Power
AFUDC	Allowance for Funds Used During Construction
AG	Indiana Office of the Attorney General
AHRI	Air Conditioning, Heating & Refrigeration Institute
AMI	Advanced Metering Infrastructure
AMR	Automatic Meter Reading
ARRA	American Recovery and Reinvestment Act of 2009
ASM	Ancillary Services Market
ATC	Available Transmission Capability
BA	Balancing Authority
BACT	Best Available Control Technology
BART	Best Available Retrofit Technology
BESS	Battery Energy Storage System
C&I	Commercial and industrial
CAA	Clean Air Act
CAAA	Clean Air Act Amendments of 1990
CAGR	Compound annual growth rate
CAIR	Clean Air Interstate Rule
CBD	Central Business District
CCGT	Combined cycle gas turbine
CCOFA	Closed-Coupled Overfire Air
CCR	Coal Combustion Residuals
CCS	Carbon capture and sequestration
CCT	Clean coal technology
CDD	Cooling degree days
CEM	Customer Energy Management System Program

Acronym	**Reference**
CESQG	Conditionally exempt small quantity generator
CFL	Compact Fluorescent Light
CGS	Cogeneration Service
CIP	Critical Infrastructure Protection
CISSP	Certified Information Systems Security Protocol
CO_2	Carbon dioxide
CONE	Cost of New Entry
CoolCents®	IPL's Air Conditioning Load Management Program
CPCN	Certificate of Public Convenience and Necessity
CSAPR	Cross State Air Pollution Rule
CT	Combustion turbine
CVR	Conservation Voltage Reduction
CWA	Clean Water Act
DA	Distribution Automation
DOE	U.S. Department of Energy
DRWG	Demand Response Working Group
dSCADA	Distribution SCADA
DSI	Dry sorbent injection
DSM	Demand Side Management
DSMCC	Demand Side Management Coordination Committee
ECM	Electronic Commutated Fan
ECS	Energy Control System
EFORd	Equivalent Forced Outage Rate demand
EIA	U.S. Energy Information Administration
EIS	Enterprise Information Services
ELG	National effluent limitation guidelines
EM&V	Evaluation, Measurement and Verification
EPA	U.S. Environmental Protection Agency
ER	Energy Resource
ES	ENERGY STAR®
ESP	Electrostatic precipitator
EV	Electric Vehicles or Eagle Valley Generating Station
FAC	Fuel Adjustment Clause
FEED	Front End Engineering Design
FERC	Federal Energy Regulatory Commission
FGD	Flue Gas Desulfurization
FOB	Free On-Board
Fracking	Hydraulic fracturing

Acronym	Reference
GDP	Gross Domestic Product
Georgetown	Georgetown Generating Station
GHG	Greenhouse gas
GID	Gross internal demand
HAPs	Hazardous air pollutants
HDD	Heating degree days
HERS	ENERGY STAR® Home Energy Rater Index
Hg	Mercury
HRSG	Heat recovery steam generator
HSS	Harding Street Generating Station
HVAC	Heating, ventilation and air-conditioning
IDEM	Indiana Department of Environmental Management
IEA	Indiana Energy Association
IEEE	Institute of Electrical and Electronics Engineers
ICAP	Installed Capacity
IGCC	Integrated Gasification Combined Cycle
IMM	Independent Market Monitor
IPL	Indianapolis Power & Light Company
IRP	Integrated Resource Plan
Itron	Itron, Inc.
IURC	Indiana Utility Regulatory Commission
JCSP	Joint Coordinated System Plan
LAER	Lowest Achievable Emission Rate
LMR	Load Modifying Resource
LNB	Low NO_x Burner
LNG	Liquid natural gas
LOLE	Loss of Load Expectation
LQG	Large quantity generator
LSE	Load Serving Entity
LTC	Transformer Load-Tap Changer
MACT	Maximum Achievable Control Technology
MAIFI	Mandatory Average Interruption Frequency Index
MAPE	Mean Absolute Percent Error
MATS	Mercury and Air Toxics Standard
MECT	Module E Capacity Tracking
MGD	Million gallons per day
MISO	Midcontinent Independent Transmission System Operator, Inc.
MOD	Transmission Planning Standards, part of NERC Reliability Standards
MOPR	Minimum Offer Price Requirements

Acronym	Reference
MPE	Mean Percent Error
MPP	Multi-Pollutant Plan
MPS	Market Potential Study
MSA	Metropolitan Statistical Area
MTEP	MISO Transmission Expansion Plan
MVA	Mega Volt Amplifier
MVP	Multi-Value Projects
NAAQS	National Ambient Air Quality Standard
NERC	North American Electric Reliability Corporation
NG	Natural Gas
NID	Net internal demand
NIST	National Institute of Standards and Technology
NN	Neutral Net
NOAA	National Oceanic and Atmospheric Administration
NO_x	Nitrogen oxide
NPDES	National Pollution Discharge Elimination System
NPV	Net Present Value
NYMEX	New York Mercantile Exchange
O&M	Operation and Maintenance costs
OUCC	Office of Utility Consumer Counselor
PC	Pulverized coal
Pete	Petersburg Generating Station
PHEV	Plug-In hybrid electric vehicle
PJM	PJM RTO; "PJM Interconnection"
$PM_{2.5}$	Particulate matter less than 2.5 microns
PPA	Power Purchase Agreement
PRMR	Planning Resource Margin Requirements
PRM_{UCAP}	Planning Reserve Margin on UCAP
PT	Participant cost test
PV	Photovoltaic
PVRR	Present value of revenue requirements
Rate EVP	IPL Tariff: Experimental Service for Electric Vehicles Charging on Public Premises
Rate EVX	IPL Tariff: Experimental Time of Use Service for Electric Vehicles Charging on Customer Premises
Rate REP	IPL Tariff: Renewable Energy Production
Rate SS	IPL Tariff: Small Secondary Service
RCRA	Resource Conservation and Recovery Act
REC	Renewable Energy Credit
RES	Renewable Energy Standards
RFC	Reliability *First* Corporation
RFP	Request For Proposal

Acronym	Reference
RIM	Ratepayer impact measurement
RTO	Regional Transmission Organization
SAIFI	System Average Interruption Frequency Index
SCADA	Supervisory Control and Data Acquisition
SCPC	Supercritical Pulverized Coal
SCR	Selective Catalytic Reduction
SFT	Simultaneous Feasibility Study
SGIG	Smart Grid Investment Grant
SIGE	Vectren
SIP	State Implementation Plan
SNCR	Selective Non-Catalytic Reduction
SO_2	Sulfur dioxide
SOFA	Separated Overfire Air
SQG	Small quantity generator
TBEL	Technology based effluent limits
TID	Total internal demand
TOU	Time of use
TPA	Third Party Administrator
TPL	Transmission Planning Standards, part of NERC Reliability Standards
TRC	Total resource cost
TVA	Tennessee Valley Authority
U.S.	United States
UCAP	Unforced Capacity
UCT	Utility cost test
Ultra SCPC	Ultra Supercritical Pulverized Coal
VAR	Reactive Power
Utility MACT	Utility Maximum Achievable Control Technology
WQBEL	Water quality based effluent limits
WTG	Wind turbine generators

Section 7. ATTACHMENTS

Confidential Attachment 1.1 (FERC Form 715 Cover Letter) [170-IAC 4-7-4(b)(10)(A)] [170-IAC 4-7-4(b)(10)(B)]

Attachment 1.2 (US DOE IPL Smart Energy Project)

Confidential Attachment 1.3 (Cost of Transmission Expansion Projects) [170-IAC 4-7-6(d)(2)]

Attachment 1.4 (CVR Demand Response Verification)

Attachment 2.1 (2013 IPL System Load) [170-IAC 4-7-4(b)(13)]

Attachment 3.1 (Load Research Narrative) [170-IAC 4-7-4(b)(3)][170-IAC 4-7-5(a)(1)][170-IAC 4-7-5(a)(2)]

Attachment 3.2 (2013 Hourly Load Shape Summary) [170-IAC 4-7-4(b)(3)][170-IAC 4-7-5(a)(1)][170-IAC 4-7-5(a)(2)]

Attachment 4.1 (DSM Case - Cause No. 44497)

Attachment 4.2 (July 1, 2014 DSM Status Report)

Confidential Attachment 4.3 (DSM Future Avoided Costs) [170-IAC 4-7-6(b)(2)]

Attachment 4.4 (Standard DSM Benefit Cost Tests) [170-IAC 4-7-4(b)(12)][170-IAC 4-7-7(b)] [170-IAC 4-7-7(d)(1)]

Attachment 4.5 (DSM Benefit Cost Results) [170-IAC 4-7-4(b)(12)] [170-IAC 4-7-7(b)] [170-IAC 4-7-7(c)]

Attachment 4.6 (DSM 15-17 Costs and Energy and Demand Savings)

Attachment 4.7 (AEG's DSM Forecast) [170-IAC 4-7-6(b)(4)] [170-IAC 4-7-6(b)(5)] [170-IAC 4-7-6(b)(6)] [170-IAC 4-7-6(b)(7)]

Attachment 4.8 (2012 MPS)

Attachment 4.9 (Benefit Cost Test Equations) [170-IAC 4-7-7(d)(2)]

Attachment 4.10 (DSM Per Participant Data) [170-IAC 4-7-6(b)(4)][170-IAC 4-7-6(b)(5)][170-IAC 4-7-6(b)(6)][170-IAC 4-7-6(b)(7)]

Confidential Attachment 5.1 (Ventyx IPL-IRP 2014 Report)

Attachment 6.1 (10 Yr Energy and Peak Forecast) [170-IAC 4-7-4(b)(2)]

Attachment 6.2 (20 Yr High and Low Range Forecast) [170-IAC 4-7-4(b)(2)]

Confidential Attachment 6.3 (End Use Modeling Technique)

Confidential Attachment 6.4 (EIA End Use Data) [170-IAC 4-7-4(b)(2)]

Confidential Attachment 6.5 (Energy - Forecast Drivers) [170-IAC 4-7-4(b)(2)]

Attachment 6.6 (Energy - Input Data Set 1) [170-IAC 4-7-4(b)(2)] [170-IAC 4-7-5(a)(3)]

Attachment 6.7 (Energy - Input Data Set 2) [170-IAC 4-7-4(b)(2)] [170-IAC 4-7-5(a)(3)]

Attachment 6.8 (Energy - Input Data Set 3) [170-IAC 4-7-4(b)(2)] [170-IAC 4-7-5(a)(3)]

Attachment 6.9 (Peak - Forecast Drivers and Input Data) [170-IAC 4-7-4(b)(2)]

Confidential Attachment 6.10 (Model Performance - Statistical Measures)

Attachment 6.11 (Forecast Error Analysis)

Attachment 7.1 (Non-Technical Summary) [170-IAC 4-7-4(a)]

Attachment 8.1 (Rate REP Projects)

Attachment 8.2 (Rate REP Map)

Attachment 9.1 (IRP Public Advisory Meeting Presentations)

PUBLIC

MISO

FILED
SECRETARY OF THE
COMMISSION

2014 APR -1 P 4:00

FEDERAL ENERGY
REGULATORY COMMISSION

March 31, 2014

Federal Energy Regulatory Commission
Secretary of the Commission
Form No. 715
888 First Street, NE
Washington, D.C. 20426

RE: FERC Form 715 - Annual Transmission Planning and Evaluation Report

Dear Secretary Bose:

Pursuant to Sections 213(b), 307(a) and 311 of the Federal Power Act and 18 CFR § 141.300 of the Federal Energy Regulatory Commission's ("FERC" or "Commission") regulations, enclosed for filing is the FERC Form 715 Response for certain Transmission Owners of the Midcontinent Independent System Operator, Inc. ("MISO") that elected to have a regional filing of their FERC Form 715 response. A listing of those Transmission Owners for which this data is supplied (the "Respondents") is included as Attachment 1.[1] A summary of the information submitted in compliance with Part 1 through Part 6, Appendix A of Form 715 is included as Attachment 2.

This filing, submitted to FERC via CD, contains Critical Energy Infrastructure Information ("CEII"). Thus, this filing is made pursuant to the Commission's regulations 18 CFR § 388.112(b)(2)(ii) (A) and contains the following:

1) The electronic media of all six parts of Form 715 with all pages marked "Critical Energy Infrastructure Information - Do Not Release;" and

2) A cover letter with two Attachments identifying the Respondents and a summary of the filing content with all pages marked "Critical Infrastructure Information - Do Not Release."

Please note the following points concerning the filing:

The response for Part 1 has a dual purpose. MISO is providing detailed information that will identify the source of data for each of the six parts of the report with exceptions as noted in Attachment 2. Also, this information is intended to satisfy Part 1 and includes the certifying signature.

PUBLIC

[1] The responding Transmitting Utilities are now Transmission Owners of the MISO, and therefore, the MISO will now be filing FERC Form 715 on their behalf.

The response for all Parts is being made to FERC on a CD.

There will be no charge for providing the public with copies of the FERC 715 filing on a CD. The MISO reserves the right to levy a charge in future filing years if this cost becomes a significant burden.

This letter constitutes MISO's written statement requesting, on behalf of the Respondents, privileged treatment of the information contained in this filing as CEII pursuant to the Commission's Regulations at 18 CFR § 388.112(a).

If you have any questions about this filing, including the above request for CEII treatment, please do not hesitate to contact me. The required contact information is below my signature to this letter.

Ben Stearney
MISO, Engineer II Expansion Planning
2985 Ames Crossing Drive
Eagan, MN 55121
bstearney@misoenergy.org
Phone: 651-632-8414
Fax: 651-632-8417

cc: MISO Transmission Owning Member Respondents

ATTACHMENT 1

MISO
Regional FILING RESPONDENTS
FOR WHICH FERC FORM 715 DATA IS BEING SUPPLIED

BREC	Big Rivers Electric Corporation
CFU	Municipal Electric Utility of the City of Cedar Falls Iowa (Cedar Falls Utilities)
CMMPA	Central Minnesota Municipal Power Agency
CWLD	Columbia Water & Light
CWLP	City Water Power & Light
DPC	Dairyland Power Cooperative
DUKE	Duke Energy Indiana
GRE	Great River Energy
HE	Hoosier Energy
IPL	Indianapolis Power & Light Company
ITCM	ITC Midwest
ITCT	ITCTransmission
MISO	Midcontinent Independent Transmission System Operator
MDU	Montana-Dakota Utilities Co.
MEC	MidAmerican Energy Company
METC	Michigan Electric Transmission Company
MP	Minnesota Power
MPW	Muscatine Power and Water
MRES	Missouri River Energy Services
OTP	Otter Tail Power Company
PPI	Prairie Power Inc.
SIPC	Southern Illinois Power Cooperative
SMMPA	Southern Minnesota Municipal Power Agency
Vectren	Vectren Energy Delivery
XEL	Xcel Energy

March 31, 2014

Midcontinent Independent System Operator, Inc. P.O. Box 4202 Carmel, IN 46082-4202 2985 Ames Crossing Road Eagan, MN 55121 317-249-5400 www.misoenergy.org

ATTACHMENT 2

MISO
FERC FORM 715 RESPONSE

ITEMS SUBMITTED AND FEE SCHEDULE

PART 1

- Information regarding identification and certification of contact people required for Part 1 of the order is supplied. Part 1 also included detailed information identifying the source of the data for each of the six parts.

PART 2

- Six power flow cases corresponding to the two, five and ten year time frame are provided in Saved Case format. A detailed description of each case is found in the title [redacted]

- A bus name Data Dictionary complete with EIA generator codes is supplied.

PART 3

- A geographic MISO Transmission Planning Map showing approved future transmission plans in the MISO region is included. Respondents' maps showing breaker placement are also provided.

PART 4

Respondents' Planning Criteria is included and also posted on the MISO's Planning page as required. The MISO utilizes the Respondents' Planning Criteria in the MISO Transmission Expansion Plan ("MTEP") study report filed to meet requirements of Part 4.

PART 5

- Respondents' reporting requirements for Part 5 are satisfied by the MISO's Transmission Planning Business Practices Manual. A copy of the manual is included in this filing.

Midcontinent Independent System Operator, Inc. | P.O. Box 4202 Carmel, IN 46082-4202 | 2985 Ames Crossing Road Eagan, MN 55121 | 317-249-5400 www.misoenergy.org

PART 6

- Respondents' reporting requirements for Part 6 are satisfied by the MTEP report and applicable Appendices. A copy is included in this filing.

Any questions regarding the material should be directed to Mr. Ben Stearney, Engineer II, MISO, 2985 Ames Crossing Drive, Eagan, MN 55121, phone 651-632-8414, bstearney@misoenergy.org, fax 651-632-8417.

There is no charge for a CD of this FERC filing. Requests for a copy should be directed to the FERC. Respondent's contact information is located in Part 1 of the filing.

March 31, 2014

Midcontinent Independent System Operator, Inc.
P.O. Box 4202 Carmel, IN 46082-4202
2985 Ames Crossing Road Eagan, MN 55121
317-249-5400 www.misoenergy.org

Parts 2, 3, and 6 May Contain Critical Energy Infrastructure Information - Do Not Release
FERC Form 715
MISO Region - April 1, 2014

Part 1: Identification and Certification	
Transmitting Utility Name	**Indianapolis Power & Light Company**
Transmitting Utility Mailing Address	**1230 W. Morris St.** **Indianapolis, IN 46221-1710**
Contact Person Name	**Mark J. Kempker**
Title	**Mgr. Transmission Planning**
Telephone Number	**(317) 261-8615**
FAX Number	**(317) 630-5787**

*The Certifying signature below (row 22) is that of the authorized Respondant official who certifies the accuracy of the information submitted, and also authorizes the MISO to consent to release of this filing to third parties pursuant to FERC CEII disclosure policy and subject to any exceptions noted in row 21 of this form.**

Objections or other conditions related to the MISO's release of information contained in this filing to third parties.	NONE
Certifying Official Signature	Mark J. Kempker
Name (please print)	**Mark J. Kempker**
Title	**Mgr. Transmission Planning**

Part 2:	
the Respondent authorizes the MISO to submit powerflow information in the Respondent's behalf. Regional contact information is as follows:	[redacted]
Regional Organization	
Mailing Address	
Contact Person	
Contact Person Title	
Contact Person Telephone Number	
Contact Person email	

Power Flow Cases Available are 2013 MISO MISO Transmission Expansion Plan (MTEP) Models

[redacted]

Respondent authorizes the MISO to submit the Resondant's system representation that exists in the curent MISO MTEP models	[redacted]
Respondent will submit additional powerflow information other than the above MISO MTEP models	

Respondent does not authorize the MISO to submit its system representation that exists in the MISO MTEP models and will submit its own powerflow information	[redacted]			
Respondent authorizes the MISO to submit a data dictionary referencing power flow bus names with long English names and EIA plant codes				
Part 3: Transmitting Utility Map and Diagrams				
Respondent authorizes the MISO to submit a regional bulk transmission Planning map that includes the respondent's bulk transmission system	[redacted]			
Respondent authorizes the MISO to submit the respondent's transmission Planning maps that have been provided to the MISO				
Respondent will submit additional maps				
Part 4: Transmission Planning Reliability Criteria**				
Respondent employs NERC Transmission Planning Standards TPL-001-0.1 , TPL-002-0 , TPL-003-0, and TPL-004-0. FAC-010-2, and NUC-001-2 are also applicable to an RC or TP. RTO and RRO, State, and MISO Member (Local) planning criteria are also used. MISO will submit the applicable criteria following FERC instructions.	Yes	X	No	
Respondent will submit criteria in addition to that submitted by MISO.	Yes		No	X
Respondent will submit its own criteria	Yes		No	X
Part 5: Transmission Planning Assessment Practices**				
Respondent endorsess the MISO Transmission Planning Assessment Practices used in the MTEP, and authorizes the MISO to submit the MISO Planning Business practices document (Assessment Practices) in respondent's behalf.	Yes	X	No	
Respondent will submit Assessment Practices in addition those of the MISO	Yes		No	X
Respondent will submit its own Assessment Practices	Yes		No	X
Part 6: Evaluation of Transmission System Performance				
Respondent cities the Annual MISO MTEP report, including Appendices A, B, C, D1, D2, D3, D4, D5 and D8 as a satisfactory evaluation of the performance of its portion of the transmission system, and authorizes the MISO to submit this report in respondent's behalf.	[redacted]			
Respondent will submit its own evaluation				

*Tranmission planning data is submitted to the MISO for the MISO's further submission as part of the Regional FERC Form 715 filing being made on behalf of Transmission Owning members of the MISO. Parts of this filing contain CEII as marked. Data provided by Transmission Owners marked as CEII will not be used for any other purpose by the MISO unless specifically authorized. FERC Form 715 data as submitted may contain data regarding the electric system of partys other than the responding Transmission Owner. There are no representations made regarding the accuracy of any other party's data included in this filing. In addition, the MISO's policy on disclosure of FERC Form 715 data to FERC is: Upon notification of a third party request to FERC for disclosure of this filing and subject to satisfaction of all other appropriate FERC CEII disclosure requirements, the MISO is authorized to and will consent to such disclosure.

Part 3

[redacted]

Part 3 IPL GENERAL TRANSMISSION MAP

[redacted]

Transmission Planning Criteria

Part 4

Document Change Control

Rev. No.	Changes	Date
1.1	Updated criteria 15-18 & general formatting	8/20/2009
1.2	Updated criteria 9	5/17/2010
1.3	General wording and formatting	2/15/2011
1.4	Updated criteria 1, 2, 9, & 15 added paragraph on upgrades to existing transmission facilities	12/13/2012

Transmission Planning Criteria

Indianapolis Power & Light Company's electric transmission facilities are designed to provide safe, reliable, and low cost service to IPL customers. IPL transmission facilities are planned using the IPL transmission planning reliability criteria in conjunction with the reliability standards of the North American Electric Reliability Council (NERC) including the Transmission Planning (TPL) standards and Modeling Data Analysis (MOD) standards. The NERC reliability standards may be found on the NERC website at http://www.nerc.com. IPL transmission facilities are also planned using the regional reliability standards of the reliability entity Reliability First Corporation (RFC). The RFC reliability standards may be found on the RFC website at http://www.rfirst.org. IPL transmission facilities are also planned as part of an effort to coordinate the development of the greater regional transmission system with neighboring systems and other member companies of the Midwest Independent System Operator (MISO). The MISO regional planning efforts may be found on the MISO website at http://www.midwestiso.org.

IPL transmission plans are based on transmission planning criteria and other considerations. Other considerations include load growth, equipment retirement, decrease in the likelihood of major system events and disturbances, equipment failure or expectation of imminent failure.

Changes to transmission facilities are considered when the transmission planning criteria are exceeded and cannot feasibly be alleviated by sound operating practices. Any recommendations to either modify transmission facilities or adopt certain operating practices must adhere to good engineering practice and sensible business judgment.

Upgrades to existing IPL transmission facilities or new transmission facilities connected to the IPL transmission system proposed by MISO Market Participants and other interested parties will be considered as time permits. The schedule for consideration of Market Participant proposed projects is at the sole discretion of IPL. This type of proposal whether or not fully funded by a Market Participant or other interested parties may not disrupt the on-going IPL planning process, disrupt or otherwise delay the planning process for reliability needs of the IPL system or replace an IPL project scheduled to resolve the same or similar transmission issue.

A summary of IPL transmission planning criteria follows. IPL transmission planning criteria are periodically reviewed and revised, and are subject to change with applicable notice.

Transmission Planning Criteria

1) Limit transmission facility voltages under normal operating conditions to within 5% of nominal voltage, under single contingency outages to 5% below nominal voltage, and under multiple contingency outages to 10% below nominal voltage. In addition to the above limits, generator plant voltages may also be limited by associated auxiliary system limitations that result in narrower voltage limits.

2) Limit thermal loading of transmission facilities under normal operating conditions to within normal limits and under contingency conditions to within emergency limits. New and upgraded transmission facilities can be proposed at 95% of the facility normal rating.

3) Maintain stability limits including critical switching times to within acceptable limits for generators, conductors, terminal equipment, loads, and protection equipment for all credible contingencies including three-phase faults, phase- to-ground faults, and the effect of slow fault clearing associated with undesired relay operation or failure of a circuit breaker to open.

4) Install and maintain facilities such that three-phase, phase- to-phase, and phase-to-ground fault currents are within equipment withstand and interruption rating limits established by the equipment manufacturer.

5) Install and maintain protective relay, control, metering, insulation, and lightning protection equipment to provide for safe, coordinated, reliable, and efficient operation of transmission facilities.

6) Install and maintain transmission facilities as per all applicable Indiana Utility Regulatory Commission rules and regulations, ANSI/IEEE standards, National Electrical Safety Code, IPL electric service and meter guidelines, and all other applicable local, state, and federal laws and codes. Guidelines of the National Electric Code may also be incorporated.

Transmission Planning Criteria

7) The analysis of any project or transaction involving transmission facilities consists of an analysis of alternatives and may include but is not limited to the following:

   a) Initial facility costs and other lifetime costs such as maintenance costs, replacement cost, aesthetics, and reliability.

   b) Consideration of transmission losses.

   c) Assessment of transmission right-of-way requirements, safety issues, and other potential liabilities.

   d) Engineering economic analysis, cost benefit and risk analysis.

8) Plan transmission facilities such that generating capacity is not unduly limited or restricted.

9) Plan, build, and operate transmission facilities to permit the import of power during generation and transmission outage and contingency conditions. Provide adequate import capability to the IPL 138 kV system in central Indiana assuming the outage of the largest base load unit connected to the 138 kV system.

10) Maintain adequate power transfer limits within the criteria specified herein.

11) Provide adequate dynamic reactive capacity to support transmission voltages under contingency outage or other abnormal operating conditions.

12) Minimize and/or coordinate MVAR exchange between IPL and interconnected systems.

13) Generator reactive power output shall be capable of, but not limited to, 95% lag (injecting MVAR) and 95% lead (absorbing MVAR) at the point of interconnection to the transmission system.

Transmission Planning Criteria

14) Design transmission substation switching and protection facilities such that the operation of substation switching facilities involved with the outage or restoration of a transmission line emanating from the substation does not also require the switched outage of a second transmission line terminated at the substation. This design criterion does not include breaker failure contingencies.

15) Design 345 kV transmission substation facilities connecting to generating stations such that maintenance and outage of facilities associated with the generation do not cause an outage of any other transmission facilities connected to the substation. Substation configurations needed to accomplish this objective and meet safety procedures are a breaker and a half scheme, ring bus or equivalent.

16) Avoid excessive loss of distribution transformer capacity resulting from a double contingency transmission facility outage.

17) Coordinate planning studies and analysis with customers to provide reliable service as well as adequate voltage and delivery service capacity for known load additions.

18) Consider long term future system benefits and risks in transmission facility planning studies.

FERC FORM 715 Part 5

Transmission Planning Assessment Practices
April 10, 2014

Indianapolis Power & Light Company employs the Midwest ISO Transmission Planning Assessment Practices, which may be found at the following link:

MISO Transmission Planning Assessment Practices

Indianapolis Power & Light Company

Smart Energy Project

Scope of Work

Indianapolis Power & Light Company's (IPL's) Smart Energy Project involved implementation of distribution automation (DA) assets, an advanced metering infrastructure (AMI) system, a meter data management system (MDMS), and various customer systems. The project deployed 10,349 smart meters and DA equipment including automated switches, relays, reclosers, capacitors, voltage regulators, and condition monitors. Customer systems included enhanced website features, allowing customers to enroll in energy programs and personalized energy dashboard access. IPL also deployed 162 electric vehicle (EV) charging stations to better understand EV impacts on the grid.

Objectives

The Smart Energy Project aimed to improve the operational efficiency of its distribution system, reducing operations and maintenance costs. New DA assets are also used to shorten outage and restoration times, improving service reliability for IPL's customer base.

Deployed Smart Grid Technologies

- **Smart meters:** IPL deployed 3,846 meters to residential locations and 6,503 meters to commercial and industrial locations. The smart meters measure interval consumption data and communicate wirelessly to the utility. They also support outage detection functions that have been integrated into the outage management system.
- **Communications infrastructure:** Radio frequency mesh network technology was used to build the meter communication network. Receivers located at key substations transfer meter data to a fiber optic network, which backhauls the data to the AMI head end system. An additional 90 miles of fiber optic circuits provides the necessary infrastructure for AMI and DA.
- **Advanced electricity service options**: IPL now offers a web portal for customers with either AMI meters or existing automated meter reading (AMR) devices. The web portal facilitates two-way information exchange, allowing customers to view their electricity consumption information and better manage their use and monthly bills. The web portal also provides tips to conserve electricity.

At-A-Glance

Recipient: **Indianapolis Power & Light**

State: **Indiana**

NERC Region: **ReliabilityFirst Corporation**

Total Project Cost: $52,700,000

Total Federal Share: $20,000,000

Project Type: **Advanced Metering Infrastructure**
Customer Systems
Electric Distribution Systems

Equipment

- **10,349 Smart Meters**
- **AMI Communications System**
  - **Meter Communications Network**
  - **Backhaul Communications Network**
- **Meter Data Management System**
- **Customer Web Portal (for customers with both new and pre-project meters)**
- **DA Equipment for all 400 Circuits**
  - **Distribution SCADA System**
  - **DA Communications Network**
  - **Automated Distribution Circuit Switches**
  - **Automated Capacitors**
  - **Automated Voltage Regulators**
  - **Equipment Condition Monitors**
- **162 Electric Vehicle Charging Stations**

Key Benefits

- **Improved Electric Service Reliability and Power Quality**
- **Reduced Operating and Maintenance Costs**
- **Deferred Investment in Distribution Capacity Expansion**
- **Reduced Costs from Equipment Failures**
- **Reduced Truck Fleet Fuel Usage**
- **Reduced Greenhouse Gas and Criteria Pollutant Emissions**

- **Distribution automation systems**: The project deployed automated network relays, switches, reclosers, and substation and transformer monitoring systems across all 400 distribution circuits.
- **Automated capacitor controls**: Automated capacitor controls, combined with a new distribution supervisory control and data acquisition (dSCADA) equipment, provides enhanced service restoration and enables more efficient distribution of power across the system.
- **Electric vehicle charging stations**: 162 EV charging stations were deployed in residential, utility fleet, and public locations. IPL is collecting the usage data from the charging stations to help determine the potential impacts of EVs on the grid.

Benefits Realized

- **Improved electric service reliability and power quality:** DA equipment improves system reliability and operational efficiency through reduced outage and restoration times.
- **Reduced operating and maintenance costs:** Operators have the ability to remotely configure field devices to enable live line restrictions on circuits prior to crews completing work and return the settings to normal while avoiding extra trips
- **Deferred investment in distribution capacity expansion:** The verification process for equipment status allows IPL to avoid additional investments in capacitors.
- **Reduced costs from equipment failures:** The combination of automated relays and reclosers helps isolate faults or resume operations in the event of a transient fault. Substation and transformer monitoring informs IPL of irregularities with assets before problems occur, thus reducing equipment failures.
- **Reduced truck fleet fuel usage:** Fully automating meter reading as well as remotely operating devices supports fewer miles driven.
- **Reduced greenhouse gas and criteria pollutant emissions:** Reduced fleet driving results in reduced emissions.

Lessons Learned

Overall, the holistic project was quite successful. Cross functional teams who installed and operate equipment work well together. While the initial DA communications network was not robust enough for all field devices, the expanded system improves reliability. Integration efforts were more extensive than anticipated but ultimately effective. Customer acceptance of website enhancements resulted in improved J.D. Powers customer satisfaction ratings.

Future Plans

IPL plans to continue to leverage its smart grid assets to improve reliability and reduce operating expenses as well as deploy additional distribution protection equipment, interface with distributed generation in its service territory, continue to use conservation voltage reduction program to reduce peak demand, and use the information about grid impacts of electric vehicles through a larger scale project. In addition, plans are in the implementation stage to expand and more effectively monitor telecommunications systems.

Contact Information

Joan Soller
Director, Resource Planning
Indianapolis Power & Light Company (IPL)

Joan.soller@aes.com

Recipient team website: IPLpower.com

Short Term Action Plan Transmission Expansion Projects

	Project	Description	Construction Period	Estimated Cost
1	Transmission Plans for the New Eagle Valley CCGT Phase I	Upgrade conductor for 5 circuits, replace 2 sets of line disconnect switches, three 138 kV breakers, and terminal equipment at EV	2014-2015	[redacted]
2	Transmission Plans for the New Eagle Valley CCGT Phase II	New 138 kV line in spare tower position, new EV substation, 2 sets of terminal equipment, transfer four existing 138 kV circuits.	2015-2016	[redacted]
3	Petersburg to Duke Wheatland to AEP Breed Line	Upgrading this 345 kV line from Pete to Wheatland to Breed from 956 MVA to at least 1386 MVA has been approved by MISO as a market efficiency project and is eligible for MTEP cost sharing.	2015	[redacted]
4	Hanna Substation Upgrade	This includes the replacement of a 275 MVA autotransformer with a 500 MVA autotransformer, adding 2 new 345 kV breakers, upgrading the 138 kV breaker and bus design to improve operational flexibility.	2016	[redacted]
5	Thompson Substation Upgrade	Include a new 345 kV breakers, 2 new 138 kV breakers, and relocating the 275 MVA Hanna autotransformer to increase imports capability into the IPL 138 kV transmission system, improve reliability, and operational flexibility.	2016	[redacted]
6	Static VAR System (SVS)	A new Static VAR System (SVS) is planned at the Southwest 138 kV substation. The design will be finalized in 2014 to provide reactive power in the range of –100 Mvar inductive to +300 Mvar capacitive to provide voltage regulation and mitigate transient voltage response for transmission events. This will also increase import capability into the IPL 138 kV transmission system, improves reliability, and improve operational flexibility.	2016	[redacted]
			total	[redacted]

Note: This does not inlcude any costs for projects completed by other MISO members that will be allocated to IPL

INDIANAPOLIS POWER & LIGHT CO.

CUSTOM BASELINE PROFILE FOR

CONSERVATION VOLTAGE REDUCTION

DEMAND RESPONSE VERIFICATION PLAN

February 12, 2014

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1. Executive summary

This document describes Indianapolis Power & Light Company's plan to measure demand savings per MISO requirements using a custom baseline. None of the other baseline options in Attachment TT are accurate or applicable to demand reduction through Conservation Voltage Reduction (CVR). CVR requires a different technique using industry accepted methods.

This custom baseline is unique because the most accurate baseline is a voltage profile rather than a load profile. A combination of carefully verified load response to voltage and measured amount of change from a voltage baseline accurately portrays the load reduction. Also, a rapid initiation of the voltage reduction shows a marked change profile at the beginning and end of an event. All of this provides accurate verification of actual results from a reduction event.

The approach for the baseline and demand reduction verification is:

- Adopt a verified CVR factor for load response through controlled tests at IPL.
- Establish a baseline operating voltage of how IPL has operated and would continue to operate without the CVR event (V_{Base}).
- Measure actual voltage (V_{CVR}) during the event and compare to baseline voltage profile.
- Measure actual demand (D_{CVR}) delivered to customers during the CVR event.
- Calibrate the voltage at the beginning of the event the baseline voltage profile.
- Calculate demand reduction using equation (5-11).

This document describes IPLs Custom Baseline and verification protocol in compliance with MISO attachment TT item 3(d).

2. Voltage baseline is more accurate

Many demand reduction baselines use a variety of recent history load profiles for comparison with load profiles on the event day. This can work well if the unmodified profile would have been the same as the event day. IPL tried the standard baselines and found they do not work well for CVR. Consider the following example using the highest ten days method.

Figure 1shows actual highest ten weekday load profiles. It also shows the average baseline as a heavy black line. A dashed line shows the same average baseline with a 40 MW, four hour reduction. Now imagine that a reduction event occurred any one day of the ten days that created the baseline. It is clear that the daily variation completely overwhelms and masks the savings.

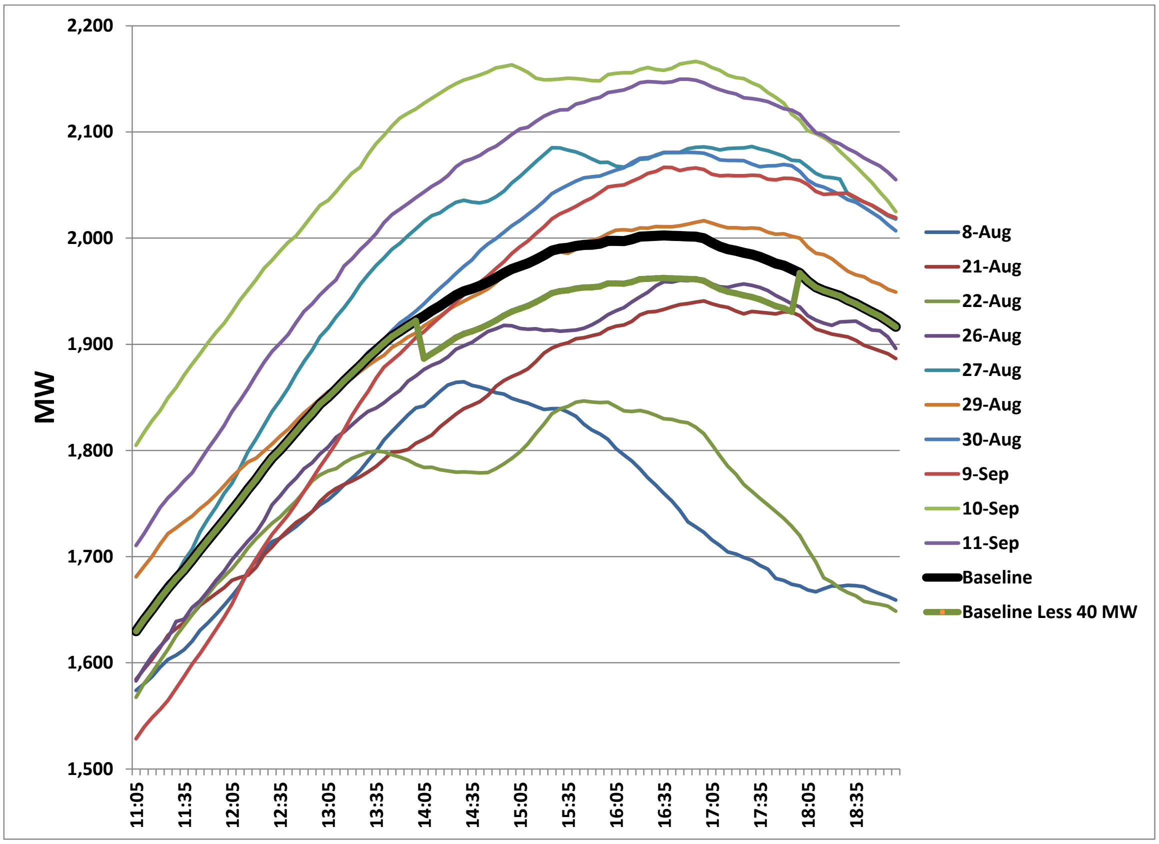

Figure 1 - Top ten in 45 day MW profiles

A second effort to use the top ten also did not produce satisfactory results. Figure 2 shows a normalized version of the same profiles in Figure 1. Demands for each interval are divided by the average for that day. The vertical axis is percent of average for the day. This compresses the profiles closer to the average. It might be possible to observe the leading and trailing edges if the CVR initiates quickly. However load shapes for any individual day still overwhelm and mask the expected savings.

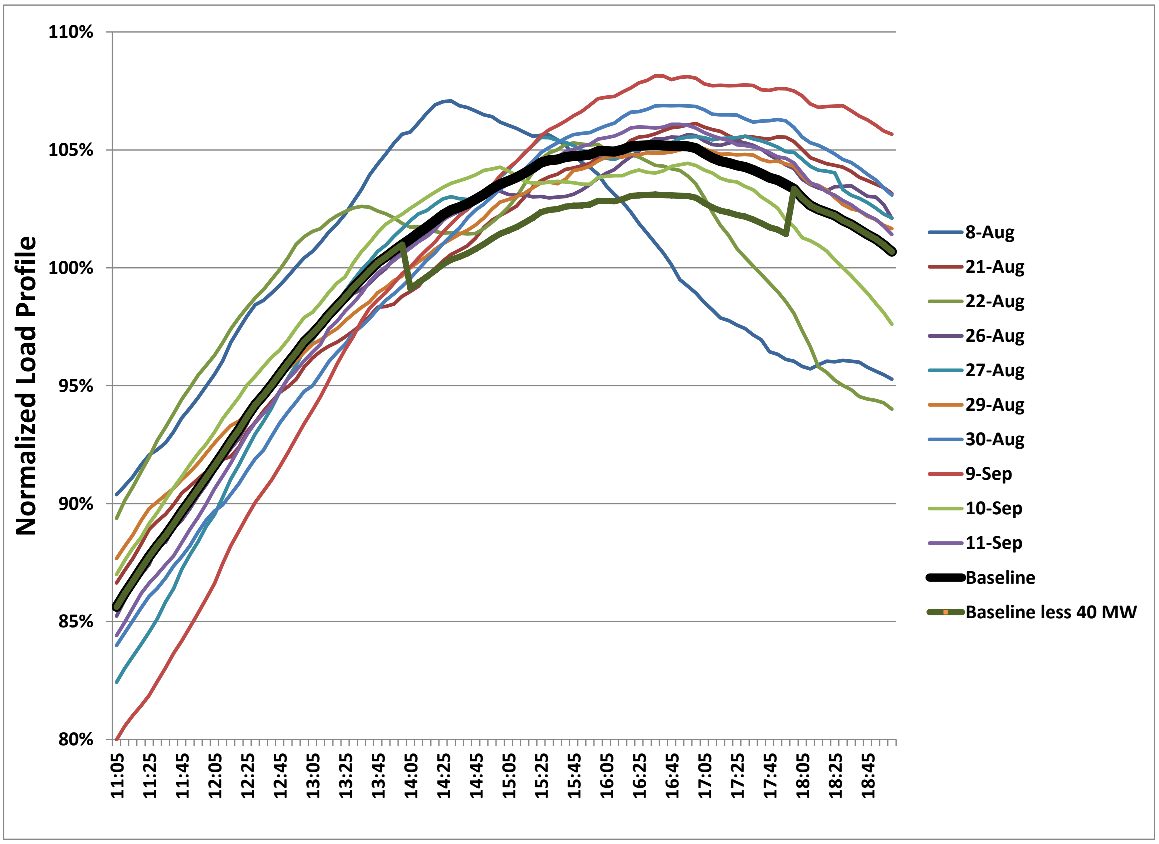

Figure 2 - Top ten in 45 days normalized profiles

The only solution to this problem is to use industry accepted practice of comparing voltage during an CVR event to a voltage baseline. Careful testing before the CVR event reveals a consistent load response to voltage. Combining the measured voltage change and the known voltage response delivers the demand reduction.

Figure 3 shows the daily voltage profiles for the same top ten days. It also shows the average profile with a heavy black line. The highlighted, dashed line is the voltage reduction required to generate the demand savings depicted on Figure 1and Figure 2. Without question, the profile is much more consistent from day to day. Also, it is far more obvious that the CVR action did happen. This is why the voltage baseline profile is so much better.

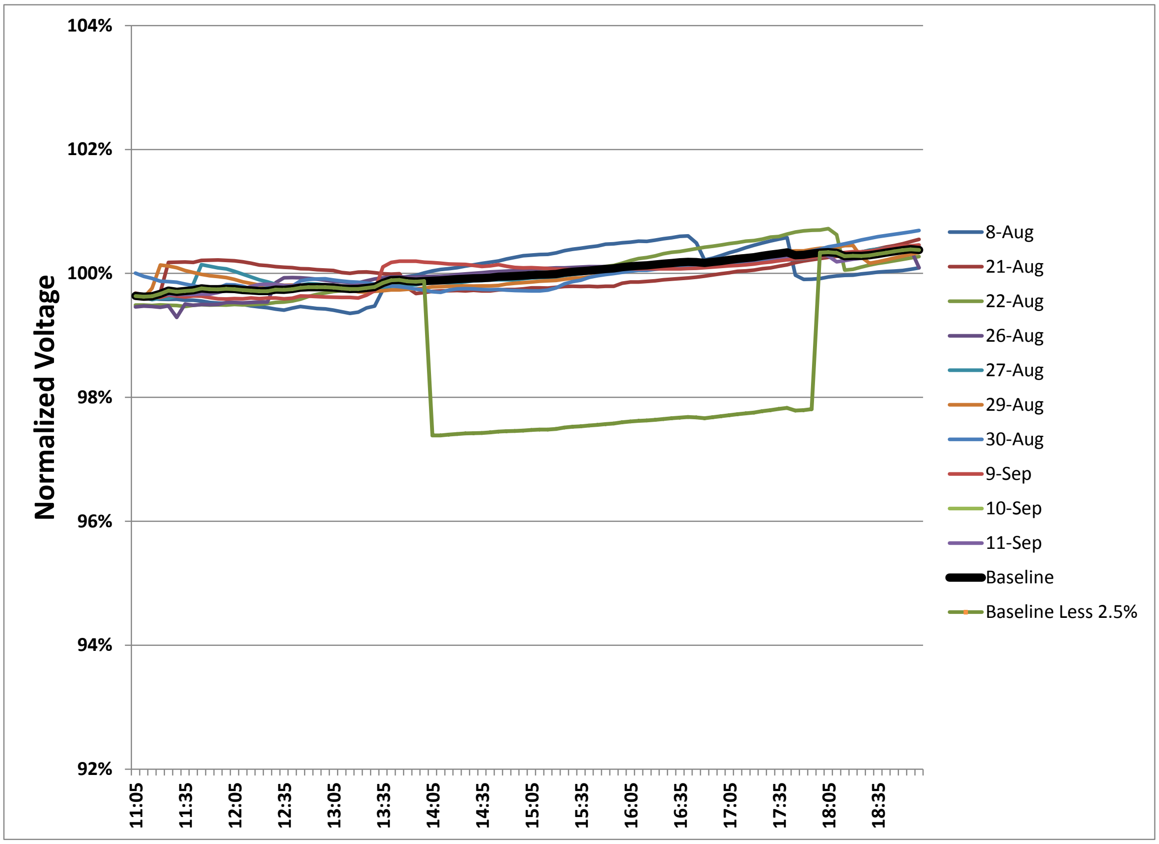

Figure 3 – Top ten in 45 days normalized voltage profile

3. Verify CVR factor through controlled tests

Calculating the load response to CVR requires treating a portion of load and simultaneously comparing the treated load profile to a reference. Simultaneous comparison improves the accuracy and eliminates uncertainty of weather corrections. Repeating the tests on several days and treating different representative groups further improves confidence in the load response. Finally, careful monitoring of individual circuits during a CVR test assures the results do not inadvertently include emergency load transfers, power outages, etc.

IPL conducted tests for near peak summer conditions in 2012 and in 2013. The next two sections describe IPL testing to determine the CVR factor.

3.1. Three days of tests in 2012

IPL conducted tests on three consecutive days in 2012. A selection process identified eleven (out of 99) substation transformers whose aggregate load profile closely matched the profile of the system and of the remaining 88 transformers. The eleven transformers had about 163 MW peak for the test. Voltage was lowered for a four hour strip between 14:00 and 18:00 each day.

Care was taken to be sure no load transfers or other unusual patterns occurred. One industrial customer switched on about 2 MW on one of the three days in the middle of the test. That customer was removed from the analysis because the expected reduction was also about 2 MW.

Figure 4 graphically shows the final results. The blue line shows the treated voltage in per unit of the untreated voltage. The red line shows the treated load profile in per unit of the untreated profile. There is an obvious voltage change and an obvious load response to the voltage. The shorter purple line is a best guess of what the profile would have looked like without the CVR treatment. This test yielded 1.7 MW average demand reduction and CVR_f = 0.85.

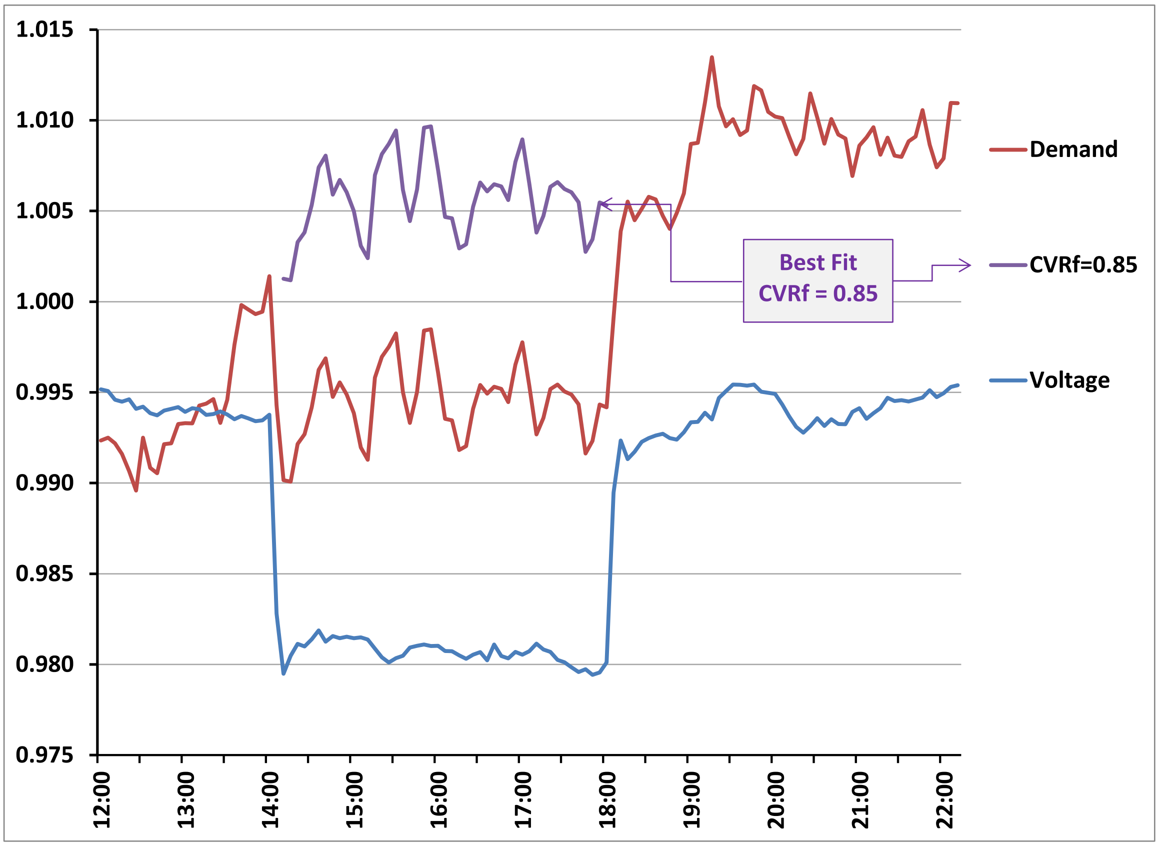

Figure 4 - Three day test results in 2012

3.2. Two days of tests 2013

IPL conducted tests on two more days in 2013. This test provided a much bigger sample, and a different sample from the 2012 test. Thirty-two transformers (about one third) received treatment. Careful analysis revealed load transfers between treated and untreated transformers during the September 11 analysis window. They were removed from the sample leaving twenty-nine treated transformers with about 466 MW. The reaming transformers that did not experience load transfers served as the baseline.

Figure 5 shows the raw data averages for the two days of the test. The green line is voltage on a 120 Volt base while the blue line is the actual MW demand. There is absolutely no doubt that the voltage changed and that the load responded to the voltage. Two light blue diagonal lines provide a visual image of the approximate load profiles for treated load. Those lines projected to the right-hand, MW axis show the reduction was between 5 and 6 MW.

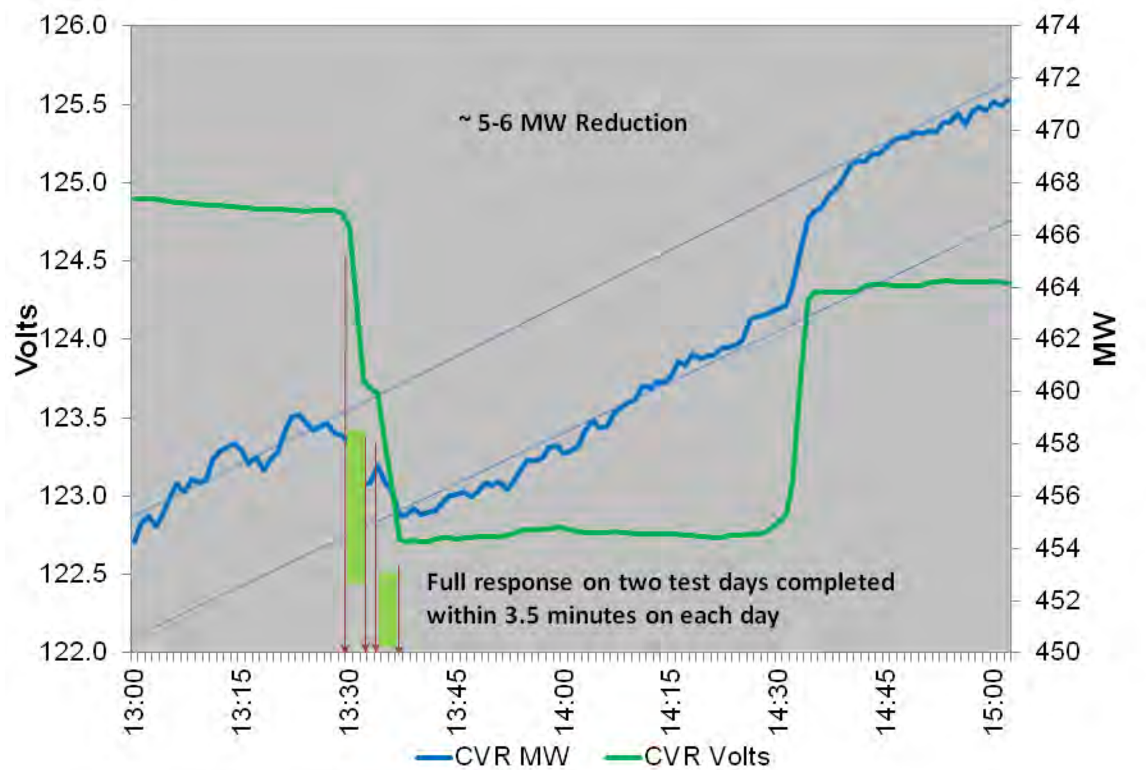

Figure 5 - Raw data from test in 2013

Figure 6 graphically shows a CVR factor calculation comparing the pre-event load, pre-event voltage to their changes during the CVR event. Figure 6 displays the average voltage and average demand over the two days test. The blue line is the treated load profile compared to the baseline load profile in per unit of the baseline. The green line is treated voltage profile compared to the baseline voltage profile in per unit of the baseline voltage profile.

Two yellow lines show the average voltage reduced 0.0163 when CVR was applied. Two red lines through the load profile show the average demand reduced 0.0128 per unit in response to the voltage. The calculated CVR factor is 0.079 using only the before treatment baseline.

Table 1 shows a complete calculation that also includes the post event response. It includes the voltage (yellow) and load (red) averages from Figure 6. Note that the voltage and load averages do not include a short amount of data during the transitions at the beginning and the end of the event. The final CVR factor from this test is 0.75.

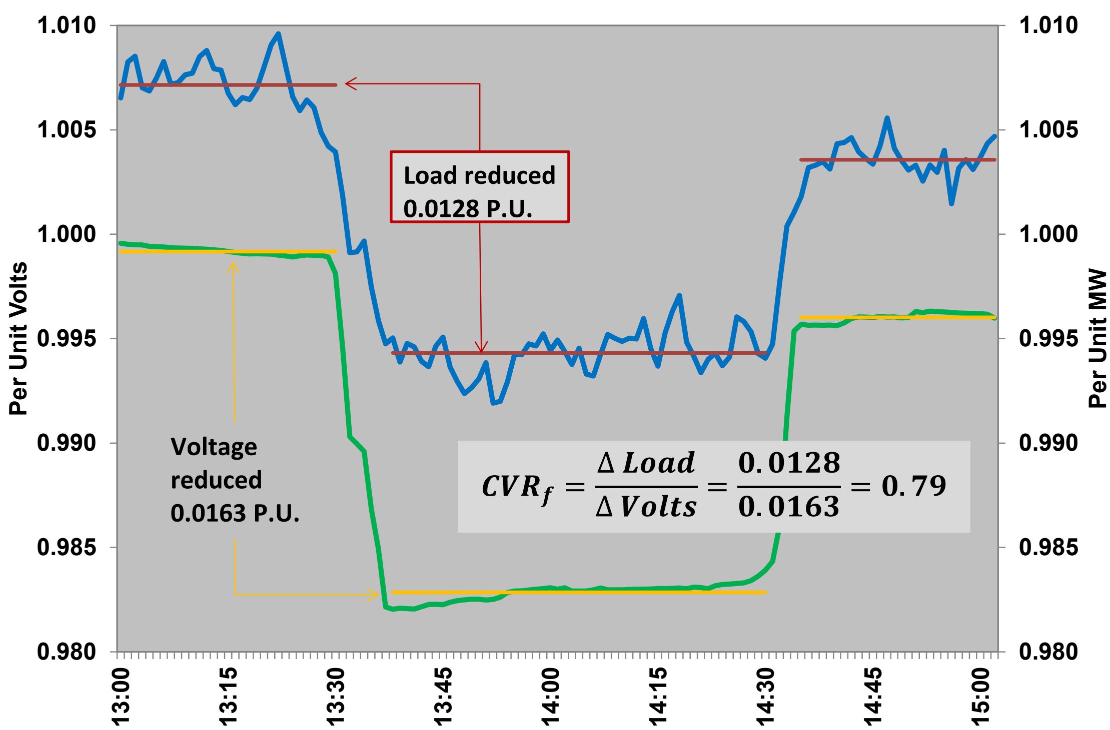

Figure 6 - Leading edge CVR factor calculation

Table 1

Full CVR factor calculation example

	Volt Ratio CVR to Reference	MW Ratio CVR to Reference
1) Before Reduction time window	0.9992	1.0071
2) During Reduction time window	0.9829	0.9943
3) After Reduction time window	0.9960	1.0036
4) Before and After time window (average of Row 1 and Row 3)	0.9977	1.0054
5) Reduction amount (Row 4 - Row 2)	0.0148	0.0111
CVR Factor – Δ Demand / Δ Volts Values from Row 5 0.011 / 0.0148	**0.75**	

IPL conducted two detailed tests over five near peak days using in two years. The aggregate CVR factor for 2012 is 0.85 and is 0.75 for 2013. IPL will use 0.8 CVR factor until additional tests justify changes. This is reasonably conservative to not overestimate savings. The Indiana Utilities Regulatory Commission recently approved a CVR factor of 1.0 for AEP in Indiana. Using a CVR factor of 1.0 would increase IPL savings estimates by 25%

3.3. Ongoing CVR factor measurement

IPL is confident the CVR factor of 0.8 is accurate and does not over estimate savings. However, IPL will continue to conduct verification tests to be sure the CVR factor is correct. IPL will initiate CVR on approximately half of the system on one near peak day, and then the other half on another near peak day. The CVR factor will be calculated as described in section 0, Table 1. The before event window will be one hour will before initiation. The “during event” window will be no less than two and not more than four hours and include all data except the transitions. The after event window will be one full hour after the return to normal is complete.

4. Event savings verification

Demand savings during an event consists of the following steps

- Calculate an average voltage baseline using measured voltages for ten previous non-event days during the same time window as the event. This data is permanently stored in and always available from IPL's PI data historian.
- Compare the hour before event voltage average to the voltage baseline. Calibrate the event hour before voltage to the baseline profile. This step further improves accuracy of results. A calibration example is shown in Figure 7.
- Calculate the voltage reduction from the baseline
- Calculate the demand savings using equation (5-11).

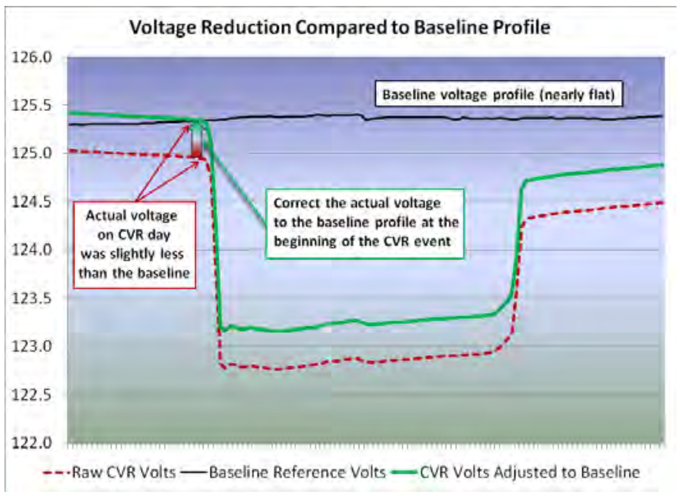

Figure 7- Calibrating event voltage to baseline

IPL has developed and will continue to improve an excel workbook that will perform all savings calculations. It will draw all data from the PI historian to make the savings calculation. Figure 8 shows a sample output from the tool. It simulates the results from testing and a request for 7.5 MW.

CVR Demand Reduction Response Verification Tool

Input Data		
Date	8/28/2013	
Requested Start Time	13:00	Hours
Voltage Reference Start Time	12:25	Hours
Amount Requested	7.5	MW
CVR Factor	0.8	%MW/%V

Hourly Savings		
14:00	7.43	MW
15:00	7.57	MW
16:00	7.79	MW
17:00	8.71	MW
Four hour Average	**7.88**	**MW**

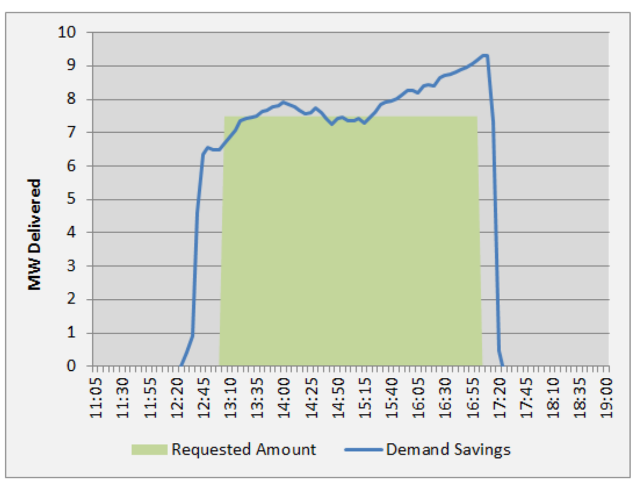

Figure 8 - CVR demand reduction verification

5. Detailed equations to calculate savings

Calculating CVR savings is similar to calculating the original price from a discounted price. It is slightly more complicated because the exact savings rate must be calculated from voltage and load. However the concept is to calculate what the demand would have been and subtract what was actually measured. The demand savings is the calculated non-CVR demand less the measured demand during the CVR event.

The following definitions will be very helpful to understand the calculations:

$D_{Savings} = Demand\ saved\ (measured\ in\ MW)$

$D_{Base} = total\ MW\ demand\ without\ IVVC\ (this\ is\ the\ untreated\ baseline)$

$D_{CVR} = total\ MW\ demand\ with\ IVVC\ in\ service$

$V_{Base} = Baseline\ voltage\ established\ before\ IVVC\ implementation\ (per\ unit)$

$V_{CVR} = Voltage\ measured\ with\ IVVC\ in\ service\ (per\ unit)$

$CVR_f = Agreed\ Conservation\ Voltage\ Reduction\ Factor$

$\Delta V = Difference\ between\ voltage\ with\ IVVC\ and\ established\ baseline\ (per\ unit)$

The most important value in the calculation is the Conservation Voltage Reduction factor, CVR_f. CVR_f describes how energy savings vary with respect to voltage. Industry experts calculate CVR_f by conducting extensive tests on utility circuits and sometimes on individual loads. Sometimes, experts simultaneously enable IVVC on a group of test circuits and compare performance to a second, untreated, group of circuits. In other cases, experts use a single group of circuits to by alternating times with IVVC off and on. Regardless of the method, voltage and energy consumption with IVVC off becomes the baseline. Voltage and energy with IVVC in service are compared to the baseline to determine savings and CVR_f.

The measured voltage difference is:

$$\Delta V = V_{Base} - V_{CVR} \tag{5-1}$$

The energy savings are:

$$E_{Savings} = E_{Base} - E_{CVR} \tag{5-2}$$

The voltage is normally expressed in per unit because the utility maintains a very close tolerance. Nominal voltage is 1.0 per unit. Energy has a large variation over time and normally is not measured in per unit. Energy is most commonly measured in MWh, although kWh, GWh and even Wh can be used.

Experts calculate CVR_f by comparing energy during IVVC treatment times to untreated baselines with the following equation:

$$CVR_f = \frac{\frac{E_{Savings}}{E_{Base}}}{\frac{\Delta V}{V_{Base}}} \tag{5-3}$$

CVR_f is a simple ratio of energy savings to voltage difference. For example, when $CVR_f = 1.0$, we can expect a 1% reduction in energy for every 1% reduction in voltage. A $CVR_f =$

1.5 indicates a 1.5% energy reduction for every 1% reduction in voltage. IPL measured $CVR_f = 0.8$

IPL's plan calls for treating all eligible circuits when needed. This generates maximum reduction. However, no coincident baseline circuits will be available once reduction is fully operational. Therefore, it is important to develop a method to calculate savings when no simultaneous baseline is available. Fortunately, there is a way for IPL to provide assurance that the energy savings are real and the commitments have been met.

V_{Base} is readily available because IPL has extensive historical information in the PI Historian database. Analysis described in Section _(TBA)_ shows IPL maintained a consistent voltage management practices for several years. This past practice of consistent and well managed voltage control allows provides a very good value for V_{Base}.

IPL PI historian also has extensive energy information, but the historical information does not provide the accurate baseline as it did for voltage. Energy is highly dependent on weather and the economy. Adjusting historical energy data for weather, the economy and other factors will never provide a future baseline with the necessary accuracy for IVVC benefits. Using the CVR factor, a well justified voltage baseline, and actual energy use will produce the most accurate savings estimates. This is especially true when IPL uses a conservative $CVR_f = 0.5$ in order to assure savings targets are met or exceeded.

Referring back to the basic energy savings equation (5-2) and rearranging for D_{Base},

(5-4)

The savings portion of (5-4) may also be expressed in terms of E_{Base} and the voltage difference:

(5-5)

Substituting the right side of (5-5) into (5-4) gives the following:

(5-6)

Now solve for E_{Base} in terms of E_{CVR} and CVR_f: in three steps. First rearrange (5-6) to:

(5-7)

Then factoring (5-7) for E_{Base} on the right side of the equation,

(5-8)

And finally we have E_{Base} in terms of measured energy and voltage with IVVC in service.

$$\frac{\quad}{(CV\quad)} \qquad (5\text{-}9)$$

Now substitute (5-9) for E_{Base} in (5-2). This gives the savings based on energy measured, CVR_f, and voltage difference while IVVC is in service.

$$\left(\frac{CVR}{(CV\quad)}\right) \qquad (5\text{-}10)$$

Finally, (5-10) can be simplified by factoring E_{CVR} on the right hand side. This gives the savings based on measurements with IVVC fully in service.

$$\left(\frac{\quad}{(CV\quad)}\quad 1\right) \tag{5-11}$$

All savings calculations use equation (5-11).

To summarize, IPL will enable IVVC on all eligible circuits to maximize savings for customers. Perfect knowledge of savings will never be available. However IPL can reliably confirm that it met or exceeded the savings commitments as

- Adopt a conservative CVR factor (see other sections describing the use of 0.5)
- Establish a baseline operating voltage of how IPL has operated and would continue to operate without the sophistication of Smart Grid IVVC (V_{Base})
- *Measure actual energy delivered to customers while IVVC is in service (*E_{CVR}*)*
- Measure actual voltage delivered to customers while IVVC is in service (V_{CVR})
- Calculate savings using equation (5-11)

Indianapolis Power & Light Company
2014 Integrated Resource Plan

IPL System Loads For Calendar Year 2013, MW																								
Date	**HE1**	**HE2**	**HE3**	**HE4**	**HE5**	**HE6**	**HE7**	**HE8**	**HE9**	**HE10**	**HE11**	**HE12**	**HE13**	**HE14**	**HE15**	**HE16**	**HE17**	**HE18**	**HE19**	**HE20**	**HE21**	**HE22**	**HE23**	**HE24**
1/1/2013	1586	1554	1526	1525	1532	1568	1597	1630	1631	1676	1713	1721	1719	1713	1712	1696	1728	1856	1951	1955	1946	1911	1856	1803
1/2/2013	1764	1758	1761	1792	1856	1970	2123	2251	2264	2222	2168	2133	2074	2011	1985	1998	2039	2129	2207	2199	2173	2113	2052	1976
1/3/2013	1925	1898	1888	1901	1932	2033	2163	2274	2257	2206	2154	2117	2092	2034	2032	2018	2019	2085	2147	2111	2070	1989	1901	1802
1/4/2013	1739	1716	1701	1721	1762	1854	2008	2122	2124	2099	2076	2036	2011	1957	1929	1888	1877	1970	2075	2062	2035	1988	1911	1830
1/5/2013	1772	1743	1724	1733	1756	1800	1865	1937	1942	1920	1882	1843	1760	1695	1707	1723	1759	1846	1913	1894	1872	1808	1740	1655
1/6/2013	1592	1543	1511	1499	1500	1520	1559	1605	1638	1684	1763	1809	1847	1848	1849	1851	1884	1955	2039	2023	1987	1921	1848	1761
1/7/2013	1702	1683	1697	1722	1787	1946	2115	2235	2219	2174	2099	2032	1976	1920	1875	1824	1818	1908	2050	2050	2017	1950	1853	1760
1/8/2013	1703	1673	1681	1684	1729	1827	2012	2136	2113	2040	1974	1932	1880	1800	1768	1716	1720	1805	1939	1940	1913	1843	1745	1646
1/9/2013	1562	1514	1482	1469	1484	1581	1758	1867	1848	1828	1809	1757	1720	1687	1655	1638	1636	1731	1838	1843	1829	1787	1701	1617
1/10/2013	1570	1549	1546	1560	1609	1714	1883	2010	1973	1945	1932	1922	1916	1901	1882	1867	1896	1947	1976	1935	1881	1791	1675	1554
1/11/2013	1470	1426	1394	1378	1408	1478	1631	1736	1715	1698	1697	1688	1678	1638	1600	1575	1551	1581	1667	1637	1610	1557	1491	1402
1/12/2013	1328	1284	1263	1256	1267	1305	1356	1430	1467	1493	1489	1476	1453	1424	1396	1379	1398	1485	1537	1508	1477	1443	1379	1304
1/13/2013	1249	1208	1176	1173	1195	1230	1281	1361	1425	1495	1547	1581	1625	1654	1704	1746	1770	1832	1911	1922	1918	1881	1822	1765
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1/16/2013	1708	1686	1680	1688	1719	1820	1997	2108	2086	2060	2046	2004	1951	1919	1909	1907	1930	1977	2080	2066	2035	1966	1856	1738
1/17/2013	1666	1629	1613	1621	1650	1748	1922	2020	2007	1980	1943	1868	1832	1803	1766	1759	1755	1851	1994	2012	2009	1963	1879	1788
1/18/2013	1740	1722	1729	1756	1797	1919	2102	2224	2193	2095	2036	1974	1926	1867	1824	1781	1774	1827	1946	1929	1908	1844	1765	1677
1/19/2013	1602	1546	1522	1517	1523	1555	1618	1680	1697	1685	1667	1631	1585	1533	1485	1464	1458	1518	1632	1643	1618	1584	1535	1465
1/20/2013	1409	1382	1377	1419	1471	1543	1617	1718	1772	1801	1802	1765	1747	1706	1673	1682	1739	1846	1960	1963	1944	1896	1848	1768
1/21/2013	1728	1700	1694	1713	1765	1867	1995	2111	2157	2214	2269	2260	2269	2252	2217	2206	2237	2319	2467	2482	2460	2392	2306	2225
1/22/2013	2169	2152	2153	2166	2207	2312	2468	2600	2588	2538	2459	2387	2330	2276	2215	2182	2192	2309	2433	2430	2402	2326	2216	2119
1/23/2013	2040	2016	2005	2018	2062	2161	2326	2423	2388	2369	2378	2357	2317	2290	2250	2229	2232	2258	2312	2285	2242	2158	2055	1956
1/24/2013	1926	1913	1915	1940	1980	2091	2275	2398	2367	2311	2278	2226	2174	2135	2076	2042	2067	2144	2269	2275	2259	2189	2075	1973
1/25/2013	1914	1873	1854	1856	1879	1982	2146	2263	2243	2224	2240	2183	2123	2098	2067	2053	2062	2084	2151	2127	2096	2046	1975	1896
1/26/2013	1833	1802	1799	1807	1842	1890	1952	2032	2056	2059	2012	1920	1859	1792	1742	1699	1694	1765	1917	1957	1955	1936	1886	1841
1/27/2013	1793	1761	1754	1750	1761	1797	1842	1888	1913	1930	1928	1899	1868	1857	1839	1837	1864	1924	1978	1959	1930	1857	1765	1654
1/28/2013	1572	1520	1488	1479	1502	1600	1752	1860	1827	1815	1819	1817	1814	1799	1767	1745	1740	1770	1804	1779	1733	1656	1543	1426
1/29/2013	1354	1307	1276	1277	1309	1406	1584	1701	1680	1661	1671	1669	1658	1658	1642	1612	1613	1643	1714	1686	1650	1575	1472	1353
1/30/2013	1268	1206	1185	1182	1219	1328	1505	1647	1655	1654	1680	1700	1674	1663	1643	1672	1728	1797	1922	1957	1961	1923	1858	1780
1/31/2013	1738	1730	1728	1748	1805	1922	2117	2237	2194	2194	2191	2160	2152	2123	2083	2053	2080	2124	2239	2280	2291	2284	2233	2183

Indianapolis Power & Light Company
2014 Integrated Resource Plan

IPL System Loads For Calendar Year 2013, MW																								
Date	**HE1**	**HE2**	**HE3**	**HE4**	**HE5**	**HE6**	**HE7**	**HE8**	**HE9**	**HE10**	**HE11**	**HE12**	**HE13**	**HE14**	**HE15**	**HE16**	**HE17**	**HE18**	**HE19**	**HE20**	**HE21**	**HE22**	**HE23**	**HE24**
2/1/2013	2150	2133	2133	2158	2207	2294	2447	2564	2541	2487	2443	2375	2309	2261	2228	2202	2177	2212	2338	2351	2324	2277	2198	2085
2/2/2013	2008	1953	1922	1904	1911	1946	2004	2060	2065	2082	2078	2014	2012	1992	1971	1967	1957	1993	2049	2043	2019	1999	1962	1920
2/3/2013	1882	1867	1866	1884	1898	1922	1959	2005	2029	2068	2069	2045	2046	2052	2048	2038	2034	2051	2123	2120	2100	2077	2000	1929
2/4/2013	1857	1815	1798	1797	1827	1935	2114	2231	2208	2187	2177	2115	2090	2080	2042	1987	1904	1904	2024	2058	2025	1957	1866	1762
2/5/2013	1702	1667	1669	1675	1723	1829	2018	2147	2120	2085	2096	2056	2023	2025	1991	1940	1930	1953	2048	2038	1988	1915	1816	1725
2/6/2013	1657	1624	1621	1630	1667	1762	1950	2058	2027	2012	1987	1938	1882	1851	1820	1789	1790	1836	1979	2033	2019	1953	1853	1755
2/7/2013	1682	1631	1616	1617	1667	1782	1939	2055	2015	1951	1879	1822	1771	1729	1675	1635	1604	1625	1735	1772	1753	1689	1588	1484
2/8/2013	1434	1416	1434	1458	1512	1637	1829	1964	1962	1974	2009	1994	1974	1958	1936	1913	1906	1917	1973	1972	1946	1897	1825	1721
2/9/2013	1663	1610	1596	1613	1639	1710	1801	1879	1893	1851	1806	1751	1693	1638	1584	1546	1541	1583	1726	1785	1785	1759	1707	1645
2/10/2013	1589	1548	1521	1503	1494	1519	1563	1609	1649	1686	1698	1656	1636	1641	1635	1636	1653	1662	1734	1733	1693	1607	1520	1424
2/11/2013	1352	1305	1293	1301	1365	1492	1700	1854	1859	1880	1932	1928	1934	1916	1898	1867	1865	1867	1945	1967	1937	1873	1778	1679
2/12/2013	1617	1591	1592	1607	1649	1783	1977	2073	2027	1962	1907	1855	1813	1763	1725	1671	1651	1689	1803	1864	1865	1823	1746	1658
2/13/2013	1608	1579	1572	1585	1624	1733	1925	2028	2000	1988	1993	1963	1915	1862	1782	1706	1671	1680	1799	1863	1857	1815	1735	1632
2/14/2013	1565	1536	1524	1537	1565	1669	1854	1946	1925	1891	1847	1790	1769	1723	1705	1703	1657	1667	1778	1834	1830	1775	1697	1619
2/15/2013	1557	1530	1520	1540	1580	1693	1862	1973	1959	1955	1978	1949	1931	1905	1906	1901	1877	1881	1951	1990	1967	1932	1875	1807
2/16/2013	1752	1736	1707	1700	1725	1778	1853	1913	1946	1967	1967	1978	1954	1907	1889	1904	1926	1975	2058	2079	2051	2004	1941	1871
2/17/2013	1822	1795	1792	1811	1836	1889	1955	2008	2006	1954	1894	1835	1793	1738	1687	1640	1632	1671	1826	1922	1923	1887	1837	1759
2/18/2013	1711	1676	1671	1677	1714	1799	1931	2008	1970	1930	1895	1823	1762	1720	1659	1628	1636	1687	1791	1799	1774	1712	1615	1519
2/19/2013	1444	1414	1441	1497	1574	1735	1937	2080	2081	2108	2145	2149	2168	2158	2146	2138	2168	2204	2281	2288	2249	2175	2063	1969
2/20/2013	1905	1878	1870	1881	1940	2068	2266	2358	2322	2272	2200	2139	2087	2038	1982	1952	1928	1988	2098	2155	2130	2074	1972	1880
2/21/2013	1821	1816	1822	1828	1856	1956	2116	2206	2171	2167	2157	2059	2025	1977	1949	1962	1994	2033	2105	2126	2117	2061	1953	1835
2/22/2013	1773	1735	1699	1669	1697	1772	1881	1968	1972	2001	2015	2016	2017	2010	1989	1957	1923	1917	1952	1950	1913	1860	1797	1707
2/23/2013	1641	1614	1592	1594	1619	1678	1753	1820	1826	1810	1789	1754	1711	1652	1597	1556	1541	1581	1708	1792	1804	1793	1754	1698
2/24/2013	1652	1625	1610	1615	1632	1677	1744	1784	1782	1756	1705	1657	1620	1585	1537	1509	1496	1540	1650	1773	1787	1762	1709	1646
2/25/2013	1607	1583	1594	1610	1670	1788	1993	2078	2010	1928	1901	1841	1803	1768	1709	1670	1663	1705	1804	1882	1875	1817	1727	1629
2/26/2013	1553	1522	1513	1519	1556	1665	1854	1992	2009	1996	2020	2002	1984	1952	1912	1895	1874	1870	1908	1903	1866	1791	1688	1584
2/27/2013	1507	1464	1447	1454	1500	1635	1826	1948	1955	1972	1985	1973	1975	1984	1988	1980	1974	1986	2044	2067	2035	1966	1853	1756
2/28/2013	1689	1647	1627	1625	1662	1768	1924	2023	2012	2008	2015	2011	1990	1970	1933	1912	1924	1932	1980	2003	1980	1920	1822	1714

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Date	HE1	HE2	HE3	HE4	HE5	HE6	HE7	HE8	HE9	HE10	HE11	HE12	HE13	HE14	HE15	HE16	HE17	HE18	HE19	HE20	HE21	HE22	HE23	HE24
3/1/2013	1644	1607	1593	1590	1632	1727	1917	2002	1988	1986	1987	1981	1965	1953	1943	1924	1927	1935	1966	1973	1929	1870	1801	1717
3/2/2013	1655	1614	1595	1597	1617	1665	1732	1796	1856	1897	1924	1909	1892	1867	1846	1826	1826	1828	1874	1927	1912	1875	1812	1746
3/3/2013	1700	1668	1640	1643	1641	1672	1718	1743	1785	1807	1769	1726	1721	1719	1706	1683	1680	1707	1785	1913	1913	1891	1828	1770
3/4/2013	1723	1712	1718	1745	1808	1940	2131	2199	2118	2016	2002	1940	1887	1850	1858	1863	1888	1896	1949	1996	1951	1870	1769	1661
3/5/2013	1589	1560	1542	1541	1582	1685	1861	1945	1910	1921	1938	1943	1945	1951	1934	1934	1932	1960	2000	2044	2009	1944	1842	1734
3/6/2013	1685	1653	1650	1664	1709	1805	1983	2069	2082	2073	2061	2035	2007	2001	1981	1983	1978	1995	2038	2081	2048	1974	1867	1754
3/7/2013	1684	1650	1632	1640	1669	1790	1959	2021	1997	1990	1965	1922	1885	1860	1835	1839	1847	1861	1910	1979	1952	1895	1795	1698
3/8/2013	1643	1619	1628	1645	1696	1821	2014	2076	1991	1911	1861	1814	1778	1738	1683	1636	1621	1597	1650	1765	1775	1756	1691	1619
3/9/2013	1569	1518	1502	1502	1520	1555	1608	1631	1664	1649	1620	1583	1541	1500	1474	1467	1468	1485	1524	1595	1576	1537	1478	1402
3/10/2013	1333	1296	1260	1257	1264	1299	1336	1367	1400	1419	1428	1420	1382	1359	1339	1341	1360	1396	1454	1523	1489	1415	1317	1243
3/11/2013	1196	1174	1179	1216	1309	1486	1640	1650	1639	1680	1696	1720	1735	1712	1721	1737	1787	1808	1851	1897	1852	1761	1655	1590
3/12/2013	1544	1526	1526	1553	1662	1850	1986	1979	1953	1970	1976	1902	1834	1759	1718	1685	1699	1731	1771	1872	1848	1755	1648	1594
3/13/2013	1561	1565	1585	1636	1756	1949	2093	2079	2060	2073	2059	2032	2037	2011	1985	1975	1969	1957	1978	2037	2003	1902	1796	1735
3/14/2013	1700	1692	1719	1754	1873	2058	2197	2142	2073	2004	1937	1881	1830	1783	1711	1679	1712	1715	1758	1851	1821	1741	1645	1592
3/15/2013	1554	1546	1556	1593	1702	1885	2013	1980	1941	1922	1857	1800	1740	1686	1634	1624	1610	1594	1617	1659	1623	1556	1469	1395
3/16/2013	1352	1327	1320	1329	1361	1424	1499	1534	1540	1546	1560	1576	1558	1547	1551	1569	1589	1592	1632	1687	1661	1610	1519	1476
3/17/2013	1451	1441	1454	1474	1499	1538	1619	1659	1720	1759	1761	1746	1727	1706	1681	1643	1639	1670	1736	1805	1774	1698	1617	1567
3/18/2013	1554	1550	1553	1569	1689	1867	1996	1982	1972	1975	1963	1937	1889	1859	1869	1861	1873	1875	1902	1920	1861	1751	1637	1571
3/19/2013	1564	1584	1628	1676	1808	2018	2140	2131	2093	2076	2077	2034	1963	1916	1851	1798	1753	1747	1800	1907	1884	1791	1695	1626
3/20/2013	1596	1580	1590	1635	1757	1958	2081	2068	2054	2047	2004	1976	1950	1917	1885	1920	1942	1960	1997	2084	2057	1969	1876	1813
3/21/2013	1784	1779	1784	1823	1937	2126	2247	2207	2142	2066	2039	1984	1938	1874	1812	1771	1755	1753	1799	1920	1909	1839	1750	1696
3/22/2013	1670	1675	1694	1737	1862	2051	2177	2131	2026	1955	1888	1834	1778	1725	1656	1610	1565	1545	1577	1692	1711	1671	1592	1515
3/23/2013	1480	1455	1447	1460	1489	1554	1633	1691	1717	1711	1666	1593	1536	1461	1417	1389	1380	1390	1419	1542	1566	1540	1492	1451
3/24/2013	1426	1403	1402	1418	1446	1493	1570	1634	1691	1719	1723	1733	1738	1729	1738	1784	1830	1832	1853	1898	1862	1791	1716	1651
3/25/2013	1621	1608	1611	1654	1748	1885	1976	1992	2014	2027	2000	1976	1947	1912	1894	1897	1894	1886	1900	1963	1915	1818	1722	1652
3/26/2013	1618	1602	1615	1645	1740	1891	1996	1979	1987	1958	1899	1840	1808	1796	1757	1734	1722	1762	1809	1898	1865	1777	1681	1614
3/27/2013	1585	1578	1589	1629	1746	1909	2003	1976	1919	1871	1817	1792	1797	1790	1767	1728	1702	1691	1710	1822	1819	1758	1667	1617
3/28/2013	1597	1589	1605	1639	1743	1914	2007	1975	1910	1860	1809	1764	1725	1678	1629	1576	1532	1520	1533	1644	1659	1608	1530	1483
3/29/2013	1453	1463	1469	1515	1606	1742	1846	1832	1807	1778	1715	1625	1573	1526	1482	1450	1432	1423	1433	1511	1500	1462	1388	1339
3/30/2013	1320	1315	1333	1359	1411	1487	1561	1576	1559	1518	1467	1419	1374	1337	1316	1289	1302	1324	1339	1424	1418	1374	1312	1254
3/31/2013	1208	1183	1171	1181	1195	1241	1297	1330	1388	1415	1421	1368	1315	1272	1240	1222	1215	1230	1281	1386	1373	1333	1268	1223

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Date	HE1	HE2	HE3	HE4	HE5	HE6	HE7	HE8	HE9	HE10	HE11	HE12	HE13	HE14	HE15	HE16	HE17	HE18	HE19	HE20	HE21	HE22	HE23	HE24
4/1/2013	1208	1220	1251	1305	1423	1585	1700	1712	1714	1716	1708	1692	1683	1645	1609	1581	1557	1559	1592	1704	1720	1660	1579	1528
4/2/2013	1494	1492	1511	1546	1659	1829	1930	1893	1844	1821	1775	1745	1722	1669	1616	1569	1542	1540	1557	1666	1687	1635	1559	1506
4/3/2013	1483	1481	1503	1543	1658	1823	1933	1900	1841	1809	1765	1723	1694	1649	1597	1556	1531	1523	1558	1664	1659	1601	1516	1459
4/4/2013	1426	1410	1413	1447	1546	1713	1815	1809	1790	1750	1710	1671	1630	1596	1530	1505	1467	1460	1452	1538	1560	1490	1407	1356
4/5/2013	1337	1334	1342	1378	1476	1634	1728	1723	1698	1658	1631	1598	1574	1544	1511	1459	1435	1400	1390	1472	1479	1426	1353	1294
4/6/2013	1264	1248	1249	1265	1291	1358	1401	1446	1407	1467	1456	1425	1369	1336	1309	1299	1302	1294	1302	1368	1379	1325	1245	1180
4/7/2013	1125	1103	1081	1078	1090	1129	1144	1181	1235	1276	1284	1292	1299	1287	1290	1292	1311	1309	1326	1414	1411	1331	1224	1148
4/8/2013	1093	1076	1067	1096	1189	1377	1490	1505	1529	1564	1573	1586	1591	1568	1551	1534	1519	1503	1491	1553	1538	1430	1306	1221
4/9/2013	1159	1122	1111	1133	1227	1404	1510	1514	1548	1580	1624	1678	1696	1695	1674	1657	1638	1613	1589	1644	1643	1543	1412	1308
4/10/2013	1244	1196	1180	1193	1276	1453	1563	1586	1639	1708	1746	1777	1778	1786	1798	1766	1711	1678	1622	1676	1610	1474	1352	1254
4/11/2013	1196	1164	1156	1167	1262	1423	1540	1551	1590	1629	1642	1655	1654	1620	1603	1578	1578	1568	1575	1593	1533	1410	1296	1209
4/12/2013	1174	1137	1144	1179	1291	1481	1631	1654	1674	1672	1675	1671	1682	1682	1665	1632	1634	1618	1627	1668	1649	1571	1477	1398
4/13/2013	1352	1313	1302	1310	1339	1406	1441	1496	1539	1560	1554	1523	1485	1430	1392	1367	1349	1334	1341	1422	1464	1420	1359	1298
4/14/2013	1266	1252	1239	1233	1255	1297	1305	1343	1374	1364	1346	1329	1315	1303	1301	1303	1310	1303	1315	1388	1426	1345	1248	1164
4/15/2013	1116	1094	1091	1124	1220	1417	1509	1546	1559	1597	1596	1594	1599	1579	1566	1538	1517	1508	1498	1536	1550	1441	1316	1220
4/16/2013	1176	1140	1128	1155	1243	1417	1519	1549	1555	1590	1603	1587	1581	1585	1583	1592	1585	1578	1563	1585	1560	1458	1342	1256
4/17/2013	1208	1181	1176	1212	1314	1544	1599	1612	1628	1640	1639	1643	1632	1622	1608	1606	1582	1568	1553	1632	1601	1526	1376	1255
4/18/2013	1204	1163	1153	1175	1273	1460	1542	1592	1645	1694	1722	1742	1733	1691	1652	1610	1602	1616	1612	1615	1564	1460	1357	1252
4/19/2013	1182	1161	1154	1188	1293	1433	1640	1678	1724	1771	1777	1782	1716	1753	1749	1749	1736	1734	1715	1731	1713	1630	1554	1474
4/20/2013	1433	1410	1396	1416	1464	1527	1546	1563	1577	1568	1550	1519	1472	1438	1401	1380	1366	1360	1365	1445	1513	1481	1439	1396
4/21/2013	1366	1358	1360	1374	1404	1458	1472	1514	1516	1495	1458	1432	1390	1362	1332	1330	1327	1337	1348	1431	1478	1417	1333	1272
4/22/2013	1248	1243	1256	1314	1432	1633	1713	1682	1656	1649	1629	1618	1616	1588	1563	1534	1511	1494	1478	1520	1539	1438	1308	1219
4/23/2013	1171	1146	1150	1175	1276	1458	1538	1549	1575	1610	1607	1611	1623	1549	1561	1549	1539	1549	1539	1573	1538	1440	1331	1240
4/24/2013	1189	1159	1168	1204	1317	1513	1634	1676	1704	1793	1773	1771	1749	1718	1683	1654	1636	1627	1612	1658	1681	1581	1479	1406
4/25/2013	1380	1375	1374	1425	1531	1721	1768	1734	1704	1679	1657	1642	1624	1598	1563	1535	1492	1472	1474	1526	1587	1514	1418	1355
4/26/2013	1325	1320	1333	1370	1479	1651	1719	1686	1660	1640	1612	1590	1565	1541	1509	1483	1444	1412	1387	1429	1453	1393	1303	1224
4/27/2013	1183	1158	1158	1173	1209	1275	1304	1351	1373	1382	1370	1351	1332	1321	1305	1303	1304	1306	1315	1352	1365	1316	1244	1173
4/28/2013	1129	1102	1089	1082	1102	1135	1153	1230	1284	1323	1348	1356	1350	1339	1337	1341	1365	1370	1379	1413	1415	1346	1245	1172
4/29/2013	1131	1105	1117	1133	1240	1416	1529	1540	1564	1581	1585	1587	1573	1568	1555	1525	1512	1493	1484	1504	1536	1436	1302	1205
4/30/2013	1148	1115	1119	1141	1235	1406	1490	1518	1552	1591	1618	1639	1670	1697	1700	1710	1696	1670	1640	1649	1672	1554	1400	1280

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Date	**HE1**	**HE2**	**HE3**	**HE4**	**HE5**	**HE6**	**HE7**	**HE8**	**HE9**	**HE10**	**HE11**	**HE12**	**HE13**	**HE14**	**HE15**	**HE16**	**HE17**	**HE18**	**HE19**	**HE20**	**HE21**	**HE22**	**HE23**	**HE24**
5/1/2013	1206	1158	1139	1144	1233	1386	1475	1533	1597	1676	1732	1776	1822	1853	1869	1865	1860	1835	1805	1774	1770	1654	1493	1369
5/2/2013	1280	1230	1200	1208	1283	1437	1522	1587	1652	1724	1768	1796	1828	1839	1846	1817	1780	1732	1699	1682	1696	1578	1430	1314
5/3/2013	1246	1194	1173	1193	1269	1429	1518	1565	1600	1638	1669	1693	1719	1738	1712	1679	1618	1572	1534	1533	1551	1473	1346	1241
5/4/2013	1167	1129	1096	1092	1118	1145	1166	1234	1294	1340	1359	1365	1366	1357	1338	1330	1316	1314	1306	1323	1356	1304	1228	1155
5/5/2013	1105	1074	1051	1049	1043	1067	1088	1165	1233	1275	1298	1319	1323	1321	1312	1317	1331	1328	1346	1373	1403	1335	1231	1163
5/6/2013	1112	1089	1093	1118	1221	1390	1481	1529	1550	1580	1612	1632	1630	1598	1568	1543	1515	1505	1488	1509	1532	1424	1306	1214
5/7/2013	1155	1124	1112	1132	1226	1394	1476	1533	1557	1617	1648	1670	1680	1676	1649	1600	1584	1562	1549	1553	1587	1489	1354	1249
5/8/2013	1185	1152	1137	1156	1246	1399	1479	1556	1606	1683	1712	1749	1761	1755	1740	1722	1691	1676	1647	1627	1641	1532	1390	1276
5/9/2013	1199	1157	1136	1160	1239	1393	1486	1516	1597	1673	1735	1790	1803	1762	1709	1675	1665	1623	1572	1593	1585	1480	1346	1260
5/10/2013	1197	1163	1152	1165	1250	1415	1504	1572	1616	1664	1684	1684	1673	1657	1623	1594	1570	1534	1496	1466	1458	1372	1269	1179
5/11/2013	1129	1094	1076	1084	1106	1151	1194	1285	1344	1391	1404	1377	1353	1312	1304	1300	1296	1288	1274	1286	1355	1312	1246	1181
5/12/2013	1137	1110	1108	1112	1142	1165	1199	1264	1304	1319	1317	1290	1278	1253	1253	1236	1247	1246	1268	1319	1391	1348	1265	1203
5/13/2013	1166	1144	1154	1194	1315	1486	1581	1590	1604	1622	1618	1614	1585	1572	1541	1519	1497	1483	1457	1470	1514	1424	1305	1208
5/14/2013	1165	1126	1123	1149	1244	1408	1510	1470	1553	1596	1621	1643	1669	1698	1725	1745	1749	1750	1741	1730	1751	1648	1497	1371
5/15/2013	1299	1247	1221	1230	1317	1469	1576	1659	1737	1814	1876	1932	1991	2038	2066	2073	2032	2006	1972	1958	1964	1833	1664	1519
5/16/2013	1424	1357	1328	1326	1405	1556	1644	1728	1782	1869	1918	1964	1977	1994	2017	2019	2031	2016	1968	1920	1917	1788	1608	1472
5/17/2013	1371	1304	1274	1280	1363	1529	1606	1693	1785	1879	1944	1994	2031	2054	1983	1857	1783	1741	1688	1670	1672	1594	1468	1355
5/18/2013	1278	1232	1199	1184	1209	1239	1287	1369	1439	1490	1513	1531	1543	1576	1609	1657	1684	1686	1665	1636	1647	1583	1489	1370
5/19/2013	1286	1217	1183	1160	1166	1158	1192	1309	1432	1532	1622	1704	1774	1835	1896	1950	1987	1989	1973	1930	1939	1836	1679	1542
5/20/2013	1456	1407	1378	1386	1486	1637	1756	1829	1893	1970	2045	2141	2221	2257	2269	2257	2230	2195	2154	2092	2076	1933	1757	1620
5/21/2013	1516	1457	1385	1327	1400	1521	1631	1673	1722	1826	1913	1999	2073	2132	2167	2193	2181	2129	2038	1975	1965	1832	1638	1485
5/22/2013	1396	1345	1304	1309	1393	1554	1656	1699	1737	1829	1871	1863	1836	1825	1830	1862	1836	1783	1743	1740	1731	1617	1465	1345
5/23/2013	1265	1209	1186	1208	1291	1420	1517	1560	1602	1637	1666	1679	1675	1664	1626	1590	1534	1479	1460	1480	1483	1408	1297	1210
5/24/2013	1157	1132	1119	1134	1223	1351	1448	1483	1499	1531	1531	1530	1539	1524	1510	1484	1462	1440	1414	1389	1409	1361	1264	1171
5/25/2013	1109	1072	1048	1051	1079	1087	1118	1191	1252	1296	1307	1306	1291	1267	1264	1251	1256	1244	1248	1267	1307	1259	1195	1126
5/26/2013	1076	1042	1033	1022	1046	1056	1080	1138	1187	1211	1235	1223	1235	1228	1233	1239	1243	1245	1240	1262	1310	1269	1199	1133
5/27/2013	1083	1053	1038	1031	1061	1071	1071	1132	1230	1297	1342	1368	1385	1427	1479	1529	1540	1550	1553	1566	1564	1469	1361	1270
5/28/2013	1194	1157	1141	1157	1256	1406	1520	1620	1686	1755	1816	1872	1924	1953	1959	1969	1956	1929	1928	1897	1900	1810	1645	1516
5/29/2013	1411	1343	1303	1303	1380	1514	1620	1725	1833	1937	2017	2098	2163	2200	2229	2250	2230	2174	2112	2043	2034	1906	1731	1581
5/30/2013	1475	1403	1365	1373	1444	1566	1685	1794	1896	2020	2134	2229	2290	2318	2315	2300	2285	2247	2154	2100	2072	1968	1805	1653
5/31/2013	1547	1479	1432	1426	1489	1601	1686	1731	1750	1783	1804	1793	1827	1840	1841	1851	1840	1792	1753	1718	1735	1689	1584	1477

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Date	HE1	HE2	HE3	HE4	HE5	HE6	HE7	HE8	HE9	HE10	HE11	HE12	HE13	HE14	HE15	HE16	HE17	HE18	HE19	HE20	HE21	HE22	HE23	HE24
6/1/2013	1399	1338	1287	1244	1244	1271	1290	1356	1418	1489	1565	1582	1576	1582	1589	1616	1644	1641	1623	1580	1591	1544	1454	1358
6/2/2013	1274	1217	1170	1145	1131	1113	1143	1241	1334	1388	1407	1428	1444	1451	1460	1480	1492	1477	1457	1444	1453	1404	1292	1194
6/3/2013	1125	1091	1074	1091	1164	1269	1369	1438	1486	1537	1570	1583	1602	1612	1606	1609	1596	1590	1567	1534	1525	1457	1323	1220
6/4/2013	1156	1115	1103	1120	1188	1288	1399	1470	1535	1607	1627	1661	1693	1712	1717	1723	1712	1696	1652	1607	1612	1526	1374	1264
6/5/2013	1188	1152	1138	1143	1220	1320	1419	1499	1568	1636	1697	1765	1821	1845	1904	1931	1925	1913	1883	1817	1821	1718	1545	1407
6/6/2013	1281	1243	1204	1211	1259	1372	1506	1546	1577	1620	1651	1671	1695	1755	1814	1862	1867	1859	1807	1757	1747	1678	1525	1394
6/7/2013	1311	1258	1225	1221	1282	1378	1453	1546	1603	1686	1752	1809	1855	1856	1823	1784	1718	1645	1594	1565	1582	1517	1420	1304
6/8/2013	1236	1174	1139	1119	1132	1144	1183	1272	1346	1408	1475	1533	1580	1616	1648	1669	1677	1668	1637	1591	1603	1558	1452	1353
6/9/2013	1265	1210	1170	1148	1149	1134	1159	1246	1349	1471	1571	1639	1685	1736	1758	1740	1712	1683	1657	1632	1648	1594	1491	1392
6/10/2013	1315	1262	1231	1242	1322	1450	1544	1619	1720	1815	1883	1927	1956	1942	1904	1842	1804	1815	1796	1751	1744	1680	1527	1403
6/11/2013	1313	1266	1233	1238	1313	1410	1528	1636	1754	1867	1951	2028	2117	2179	2222	2253	2199	2172	2103	2050	2025	1932	1766	1611
6/12/2013	1503	1436	1402	1395	1483	1596	1731	1851	1963	2053	2180	2313	2434	2477	2473	2473	2443	2416	2399	2321	2305	2205	2044	1911
6/13/2013	1817	1738	1689	1612	1634	1721	1790	1815	1856	1874	1876	1903	1959	1999	2034	2033	2013	1960	1890	1795	1734	1662	1500	1362
6/14/2013	1278	1216	1192	1190	1247	1335	1438	1533	1626	1722	1778	1857	1907	1938	1962	1991	1982	1946	1867	1799	1762	1685	1532	1401
6/15/2013	1297	1235	1194	1174	1190	1182	1231	1324	1449	1555	1648	1733	1786	1825	1878	1907	1872	1865	1849	1789	1770	1705	1582	1477
6/16/2013	1385	1335	1283	1254	1241	1239	1246	1317	1382	1450	1485	1545	1607	1676	1720	1755	1804	1816	1803	1765	1765	1728	1604	1468
6/17/2013	1376	1316	1285	1290	1376	1481	1603	1708	1841	1992	2102	2207	2276	2330	2352	2370	2337	2260	2183	2128	2086	1973	1783	1616
6/18/2013	1484	1411	1360	1354	1418	1503	1626	1741	1846	1974	2078	2173	2265	2314	2334	2333	2303	2244	2165	2077	2001	1902	1720	1568
6/19/2013	1443	1359	1309	1302	1353	1434	1536	1624	1723	1827	1910	1986	2056	2106	2152	2173	2168	2140	2076	1997	1964	1867	1688	1523
6/20/2013	1412	1337	1295	1288	1354	1441	1561	1670	1784	1911	2010	2111	2208	2264	2309	2321	2304	2273	2216	2123	2047	1923	1731	1574
6/21/2013	1462	1388	1345	1338	1389	1460	1592	1701	1839	1987	2109	2204	2287	2350	2392	2404	2391	2330	2236	2144	2086	1999	1868	1722
6/22/2013	1601	1517	1451	1436	1431	1433	1481	1604	1757	1938	2079	2182	2245	2279	2262	2122	1984	1890	1822	1777	1771	1718	1612	1498
6/23/2013	1404	1337	1297	1272	1266	1249	1291	1407	1555	1709	1868	1979	2064	2113	2070	1899	1827	1789	1758	1747	1763	1729	1612	1498
6/24/2013	1412	1359	1335	1346	1432	1546	1647	1773	1864	1987	2102	2206	2297	2375	2423	2453	2460	2433	2355	2254	2197	2074	1891	1739
6/25/2013	1614	1530	1476	1454	1515	1623	1734	1855	1976	2154	2241	2327	2436	2524	2563	2592	2578	2515	2424	2359	2324	2132	1878	1691
6/26/2013	1583	1500	1449	1440	1490	1586	1676	1764	1838	1925	2034	2176	2285	2337	2305	2215	2138	2106	2047	1981	1955	1872	1725	1590
6/27/2013	1489	1423	1392	1398	1477	1591	1703	1803	1931	2142	2189	2279	2374	2435	2463	2504	2498	2488	2446	2358	2290	2183	1990	1813
6/28/2013	1694	1602	1536	1510	1549	1616	1714	1843	1966	2078	2175	2235	2283	2310	2233	2062	2079	2066	2010	1929	1851	1741	1601	1465
6/29/2013	1364	1298	1251	1228	1239	1231	1268	1377	1470	1532	1582	1610	1635	1629	1589	1565	1576	1558	1542	1510	1533	1505	1408	1328
6/30/2013	1248	1198	1172	1156	1164	1167	1184	1248	1330	1415	1486	1556	1607	1637	1637	1634	1620	1608	1595	1568	1596	1547	1440	1341

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Date	HE1	HE2	HE3	HE4	HE5	HE6	HE7	HE8	HE9	HE10	HE11	HE12	HE13	HE14	HE15	HE16	HE17	HE18	HE19	HE20	HE21	HE22	HE23	HE24
7/1/2013	1257	1220	1201	1252	1336	1393	1469	1558	1639	1680	1727	1779	1776	1787	1765	1755	1713	1653	1619	1591	1613	1540	1433	1351
7/2/2013	1280	1242	1216	1222	1294	1389	1472	1541	1610	1668	1671	1695	1752	1803	1814	1823	1827	1795	1760	1693	1665	1595	1469	1352
7/3/2013	1273	1218	1201	1200	1270	1363	1444	1557	1623	1693	1754	1819	1868	1917	1935	1968	1970	1934	1831	1760	1728	1677	1546	1421
7/4/2013	1322	1250	1214	1185	1190	1192	1188	1257	1349	1446	1551	1632	1665	1667	1645	1633	1612	1572	1515	1476	1473	1437	1413	1344
7/5/2013	1268	1217	1194	1196	1238	1291	1362	1462	1585	1691	1759	1822	1870	1922	1947	1981	1989	1973	1907	1829	1812	1758	1627	1505
7/6/2013	1414	1351	1312	1295	1303	1317	1327	1389	1458	1528	1571	1595	1591	1580	1581	1576	1584	1569	1534	1520	1547	1538	1448	1346
7/7/2013	1271	1204	1174	1152	1152	1152	1164	1229	1308	1389	1479	1598	1722	1819	1879	1948	2012	2030	1990	1942	1918	1848	1705	1564
7/8/2013	1465	1395	1361	1372	1438	1536	1660	1784	1907	2029	2150	2233	2255	2297	2289	2332	2373	2373	2323	2247	2219	2125	1963	1823
7/9/2013	1698	1611	1571	1571	1636	1749	1859	1967	2083	2148	2200	2281	2329	2414	2499	2556	2568	2512	2443	2344	2294	2190	2037	1889
7/10/2013	1784	1694	1652	1634	1701	1816	1918	2057	2187	2345	2427	2403	2296	2127	2098	2163	2231	2256	2216	2162	2124	2017	1852	1680
7/11/2013	1527	1438	1371	1351	1404	1487	1571	1677	1780	1886	1965	2022	2058	2089	2104	2116	2106	2069	2003	1918	1863	1777	1612	1471
7/12/2013	1360	1293	1255	1246	1299	1384	1465	1582	1689	1801	1895	1956	2015	2069	2109	2133	2117	2075	2005	1903	1846	1772	1609	1472
7/13/2013	1365	1296	1250	1230	1233	1236	1270	1376	1503	1641	1739	1808	1866	1930	1991	2047	2067	2032	1988	1928	1886	1815	1689	1573
7/14/2013	1473	1394	1338	1313	1301	1281	1316	1450	1610	1770	1922	2063	2159	2225	2272	2307	2341	2343	2319	2273	2233	2159	2016	1869
7/15/2013	1756	1665	1606	1595	1649	1745	1858	2001	2154	2301	2410	2495	2564	2613	2646	2654	2631	2609	2551	2462	2396	2266	2060	1887
7/16/2013	1755	1648	1594	1575	1634	1730	1838	1981	2143	2318	2439	2525	2602	2631	2637	2649	2612	2589	2539	2467	2419	2318	2138	1962
7/17/2013	1831	1729	1671	1652	1709	1810	1913	2055	2205	2368	2503	2608	2672	2722	2747	2757	2746	2734	2686	2588	2516	2396	2202	2029
7/18/2013	1890	1788	1711	1685	1729	1831	1933	2093	2260	2424	2530	2628	2713	2768	2789	2793	2769	2736	2674	2590	2532	2419	2221	2050
7/19/2013	1921	1830	1759	1744	1792	1902	1989	2133	2274	2432	2550	2634	2699	2738	2761	2749	2721	2666	2586	2495	2459	2348	2180	2023
7/20/2013	1900	1797	1727	1678	1664	1675	1689	1811	1959	2026	2079	2052	1934	1840	1785	1768	1749	1713	1678	1666	1679	1626	1536	1453
7/21/2013	1386	1321	1290	1310	1229	1272	1279	1372	1513	1681	1811	1877	1926	1975	2048	2110	2108	2100	2071	2038	2051	1958	1815	1693
7/22/2013	1591	1508	1452	1449	1513	1639	1718	1779	1836	1918	1966	2022	2079	2151	2206	2245	2229	2229	2187	2133	2092	1982	1794	1649
7/23/2013	1538	1457	1422	1422	1493	1621	1715	1857	2003	2191	2331	2435	2519	2557	2591	2579	2537	2458	2345	2194	2091	1927	1709	1541
7/24/2013	1416	1315	1268	1260	1311	1394	1456	1528	1593	1671	1734	1792	1859	1898	1929	1945	1950	1919	1866	1784	1748	1649	1495	1372
7/25/2013	1278	1224	1196	1197	1256	1341	1428	1530	1613	1697	1758	1818	1871	1923	1980	1998	2006	1990	1929	1851	1823	1720	1550	1419
7/26/2013	1322	1263	1236	1234	1297	1388	1460	1576	1669	1789	1852	1911	1989	2036	2059	2052	2017	1936	1854	1810	1800	1716	1585	1475
7/27/2013	1384	1318	1288	1271	1286	1323	1345	1391	1466	1561	1628	1676	1689	1703	1715	1731	1722	1696	1628	1545	1534	1458	1351	1249
7/28/2013	1169	1118	1084	1067	1067	1065	1070	1147	1222	1298	1340	1385	1410	1418	1432	1452	1459	1455	1439	1437	1475	1429	1326	1225
7/29/2013	1160	1130	1116	1130	1214	1318	1405	1492	1582	1668	1731	1794	1833	1881	1907	1932	1945	1917	1852	1780	1765	1648	1490	1366
7/30/2013	1275	1224	1199	1206	1271	1390	1462	1548	1644	1734	1765	1793	1805	1817	1794	1773	1735	1705	1681	1681	1698	1613	1482	1382
7/31/2013	1307	1259	1246	1255	1332	1483	1564	1613	1661	1722	1764	1793	1825	1852	1862	1858	1848	1838	1820	1793	1816	1742	1599	1480

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8/1/2013	1386	1331	1293	1297	1366	1505	1564	1646	1740	1855	1928	2000	2070	2113	2125	2121	2098	2064	1992	1908	1885	1766	1589	1446
8/2/2013	1336	1270	1235	1229	1290	1405	1474	1560	1637	1729	1811	1903	1997	2060	2090	2030	1949	1872	1818	1780	1799	1718	1596	1491
8/3/2013	1402	1339	1298	1282	1295	1330	1341	1414	1500	1591	1643	1689	1752	1827	1892	1941	1957	1935	1879	1795	1751	1647	1504	1372
8/4/2013	1270	1196	1152	1129	1124	1122	1119	1203	1314	1408	1492	1556	1613	1672	1724	1757	1787	1785	1760	1708	1703	1602	1447	1319
8/5/2013	1244	1194	1177	1191	1287	1414	1493	1573	1685	1782	1880	1949	2018	2062	2102	2079	2017	1964	1918	1872	1864	1739	1581	1457
8/6/2013	1383	1323	1301	1307	1400	1558	1639	1707	1784	1861	1897	1947	2001	2041	2038	2034	2070	2068	2049	2014	2020	1905	1740	1621
8/7/2013	1526	1463	1432	1433	1509	1673	1752	1828	1895	1963	2039	2108	2217	2292	2327	2364	2345	2313	2250	2199	2165	2031	1856	1716
8/8/2013	1601	1534	1500	1505	1589	1748	1816	1903	2004	2103	2198	2306	2402	2456	2416	2317	2232	2191	2147	2125	2100	1948	1783	1642
8/9/2013	1548	1487	1451	1454	1527	1686	1761	1807	1856	1926	2004	2102	2191	2240	2289	2308	2274	2189	2082	2006	1982	1860	1708	1562
8/10/2013	1464	1392	1347	1328	1344	1365	1388	1470	1578	1707	1829	1935	2015	2070	2123	2154	2156	2127	2065	1999	1978	1871	1725	1593
8/11/2013	1489	1409	1345	1307	1300	1308	1304	1416	1565	1722	1834	1920	1996	2057	2101	2138	2164	2152	2116	2044	2027	1881	1701	1553
8/12/2013	1449	1378	1348	1356	1445	1619	1691	1790	1912	2032	2138	2242	2313	2378	2399	2391	2321	2251	2166	2135	2096	1954	1769	1621
8/13/2013	1534	1448	1420	1414	1502	1642	1699	1764	1828	1926	1987	2041	2085	2092	2075	2045	1974	1895	1796	1703	1680	1548	1399	1284
8/14/2013	1212	1168	1155	1159	1241	1380	1449	1506	1572	1633	1659	1696	1724	1730	1739	1752	1734	1715	1669	1639	1634	1514	1363	1257
8/15/2013	1190	1150	1133	1143	1218	1366	1435	1489	1548	1634	1680	1710	1742	1764	1760	1761	1767	1728	1676	1657	1659	1546	1399	1294
8/16/2013	1219	1180	1162	1173	1255	1404	1479	1532	1579	1627	1653	1688	1729	1753	1773	1771	1751	1720	1655	1618	1619	1530	1414	1310
8/17/2013	1233	1188	1153	1146	1161	1191	1212	1289	1407	1509	1585	1642	1693	1718	1728	1745	1757	1756	1715	1678	1669	1577	1460	1353
8/18/2013	1268	1213	1174	1150	1148	1163	1157	1240	1349	1470	1591	1683	1758	1821	1861	1900	1938	1940	1900	1876	1855	1724	1549	1418
8/19/2013	1323	1266	1240	1253	1338	1511	1582	1654	1758	1878	1978	2074	2153	2208	2248	2283	2266	2229	2172	2113	2071	1897	1708	1544
8/20/2013	1443	1368	1331	1333	1408	1565	1646	1719	1850	1986	2104	2201	2278	2334	2378	2409	2394	2358	2282	2251	2199	2029	1840	1680
8/21/2013	1560	1485	1441	1431	1504	1673	1754	1825	1941	2082	2208	2297	2372	2430	2466	2502	2484	2438	2360	2316	2253	2052	1853	1684
8/22/2013	1584	1498	1457	1453	1525	1692	1769	1822	1933	2060	2196	2317	2390	2373	2410	2388	2282	2174	2097	2074	2037	1884	1714	1588
8/23/2013	1497	1433	1394	1395	1466	1622	1710	1764	1878	1981	2074	2169	2238	2297	2339	2365	2346	2282	2191	2106	2030	1881	1700	1547
8/24/2013	1421	1348	1291	1264	1255	1289	1288	1384	1505	1645	1763	1847	1940	2034	2101	2149	2173	2147	2068	1985	1910	1778	1618	1483
8/25/2013	1373	1303	1255	1223	1216	1226	1211	1304	1438	1590	1722	1848	1962	2063	2150	2213	2249	2236	2175	2115	2051	1876	1679	1526
8/26/2013	1415	1349	1310	1321	1412	1588	1679	1756	1897	2062	2217	2342	2448	2497	2500	2527	2508	2460	2395	2365	2297	2108	1915	1756
8/27/2013	1634	1575	1532	1538	1617	1796	1903	1946	2027	2141	2290	2456	2601	2660	2696	2678	2663	2619	2543	2502	2432	2250	2044	1888
8/28/2013	1773	1691	1653	1653	1742	1911	1990	2043	2171	2321	2448	2555	2677	2754	2807	2801	2768	2705	2627	2577	2490	2300	2079	1910
8/29/2013	1771	1674	1618	1611	1674	1841	1919	1963	2078	2210	2335	2426	2502	2556	2601	2601	2585	2518	2444	2410	2340	2147	1930	1765
8/30/2013	1639	1555	1502	1489	1559	1710	1776	1864	1974	2136	2274	2385	2489	2565	2643	2657	2648	2594	2558	2577	2407	2274	2095	1939
8/31/2013	1792	1683	1600	1545	1530	1534	1525	1616	1787	1942	2091	2214	2328	2430	2478	2418	2181	2069	1997	1968	1892	1767	1653	1549

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Date	HE1	HE2	HE3	HE4	HE5	HE6	HE7	HE8	HE9	HE10	HE11	HE12	HE13	HE14	HE15	HE16	HE17	HE18	HE19	HE20	HE21	HE22	HE23	HE24
9/1/2013	1454	1390	1344	1312	1300	1316	1329	1380	1470	1568	1683	1808	1900	1954	2016	2062	2070	2061	1972	1946	1910	1805	1666	1549
9/2/2013	1455	1391	1350	1337	1355	1386	1387	1432	1519	1608	1665	1744	1849	1953	2017	2065	2083	2048	1979	1946	1880	1710	1544	1413
9/3/2013	1317	1258	1227	1221	1281	1431	1490	1542	1612	1686	1748	1813	1869	1897	1930	1954	1951	1928	1855	1834	1777	1617	1435	1316
9/4/2013	1251	1203	1185	1193	1280	1423	1506	1554	1633	1732	1807	1875	1944	2018	2084	2127	2141	2107	2050	2027	1935	1765	1590	1435
9/5/2013	1346	1287	1264	1269	1359	1515	1596	1648	1748	1867	1959	2024	2105	2187	2253	2272	2271	2231	2176	2157	2063	1866	1663	1517
9/6/2013	1392	1311	1263	1255	1328	1476	1549	1580	1655	1737	1828	1907	2009	2090	2158	2201	2189	2137	2040	1997	1912	1770	1605	1465
9/7/2013	1359	1293	1249	1228	1243	1280	1291	1363	1483	1626	1770	1883	1969	2043	2117	2170	2184	2120	2052	2053	1992	1878	1737	1601
9/8/2013	1510	1438	1387	1352	1348	1365	1370	1449	1609	1759	1911	2039	2130	2194	2219	2212	2254	2225	2187	2209	2112	1957	1776	1624
9/9/2013	1527	1455	1423	1422	1517	1688	1803	1840	1924	2033	2162	2339	2486	2571	2647	2670	2655	2618	2556	2543	2459	2272	2068	1925
9/10/2013	1817	1729	1691	1683	1760	1937	2036	2083	2200	2360	2509	2647	2754	2809	2801	2804	2759	2669	2556	2506	2366	2172	1988	1837
9/11/2013	1705	1645	1613	1606	1678	1869	1970	2006	2118	2265	2405	2555	2664	2725	2776	2789	2754	2677	2578	2544	2412	2213	2002	1838
9/12/2013	1723	1648	1601	1591	1679	1836	1932	1932	1947	1915	1999	2025	2055	2122	2171	2220	2211	2148	2082	2039	1906	1718	1535	1395
9/13/2013	1306	1246	1223	1220	1289	1435	1510	1531	1573	1626	1679	1659	1663	1647	1637	1633	1612	1563	1515	1526	1476	1395	1273	1182
9/14/2013	1127	1082	1066	1064	1088	1142	1161	1218	1280	1331	1350	1362	1369	1384	1400	1422	1437	1435	1405	1445	1400	1316	1228	1154
9/15/2013	1096	1067	1041	1035	1042	1070	1083	1135	1207	1269	1315	1353	1385	1426	1464	1494	1502	1503	1539	1590	1529	1436	1324	1232
9/16/2013	1174	1133	1124	1140	1246	1424	1542	1552	1580	1616	1645	1674	1702	1696	1666	1645	1621	1608	1582	1629	1544	1425	1300	1203
9/17/2013	1158	1122	1113	1134	1211	1376	1474	1480	1518	1577	1616	1653	1689	1707	1703	1693	1680	1649	1635	1689	1615	1480	1352	1258
9/18/2013	1198	1168	1154	1171	1254	1427	1548	1551	1598	1666	1718	1785	1850	1922	1976	2013	2016	1986	1956	1998	1901	1753	1595	1466
9/19/2013	1380	1336	1320	1329	1418	1560	1685	1721	1742	1789	1794	1820	1914	1992	2059	2117	2127	2102	2068	2094	2014	1863	1692	1571
9/20/2013	1485	1432	1399	1406	1475	1657	1757	1786	1858	1973	2057	2084	2069	2039	2012	1949	1894	1828	1799	1789	1727	1626	1498	1387
9/21/2013	1283	1223	1173	1152	1163	1202	1244	1276	1345	1416	1459	1475	1482	1494	1500	1486	1486	1463	1433	1467	1420	1334	1234	1166
9/22/2013	1105	1065	1047	1033	1045	1073	1096	1133	1214	1268	1302	1328	1346	1362	1388	1414	1440	1443	1441	1495	1427	1334	1228	1147
9/23/2013	1103	1073	1070	1089	1183	1356	1467	1474	1513	1558	1596	1629	1644	1654	1663	1660	1650	1630	1610	1637	1553	1429	1295	1208
9/24/2013	1153	1114	1102	1118	1202	1381	1470	1482	1522	1580	1639	1663	1699	1704	1741	1750	1750	1713	1708	1736	1646	1512	1380	1270
9/25/2013	1201	1162	1140	1157	1236	1405	1517	1520	1554	1634	1709	1771	1811	1844	1865	1875	1861	1821	1774	1781	1670	1517	1372	1263
9/26/2013	1190	1145	1130	1140	1219	1379	1465	1476	1535	1599	1659	1707	1752	1792	1822	1838	1837	1807	1779	1788	1681	1538	1392	1276
9/27/2013	1212	1161	1147	1151	1229	1383	1482	1495	1535	1617	1674	1745	1796	1834	1850	1864	1854	1799	1728	1709	1611	1487	1368	1255
9/28/2013	1182	1135	1101	1097	1117	1167	1202	1247	1325	1409	1470	1532	1576	1626	1670	1701	1718	1679	1663	1664	1584	1485	1382	1283
9/29/2013	1208	1157	1132	1124	1132	1166	1213	1254	1325	1374	1406	1432	1434	1437	1432	1440	1446	1459	1508	1534	1477	1386	1288	1206
9/30/2013	1155	1128	1135	1162	1257	1438	1575	1589	1622	1681	1724	1766	1800	1811	1816	1804	1778	1743	1737	1762	1664	1539	1402	1297

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Date	**HE1**	**HE2**	**HE3**	**HE4**	**HE5**	**HE6**	**HE7**	**HE8**	**HE9**	**HE10**	**HE11**	**HE12**	**HE13**	**HE14**	**HE15**	**HE16**	**HE17**	**HE18**	**HE19**	**HE20**	**HE21**	**HE22**	**HE23**	**HE24**
10/1/2013	1231	1196	1183	1199	1283	1451	1587	1601	1633	1675	1694	1720	1731	1746	1765	1785	1776	1763	1772	1795	1709	1571	1439	1337
10/2/2013	1265	1221	1206	1213	1320	1507	1640	1661	1710	1760	1787	1811	1830	1860	1882	1912	1897	1854	1870	1880	1772	1639	1503	1393
10/3/2013	1319	1280	1260	1274	1361	1544	1678	1693	1726	1791	1860	1919	1927	1949	1989	2013	1995	1961	1963	1965	1868	1732	1576	1457
10/4/2013	1373	1320	1299	1300	1386	1542	1676	1689	1766	1839	1847	1873	1925	1999	2068	2095	2052	1975	1965	1941	1857	1742	1609	1504
10/5/2013	1416	1362	1327	1305	1325	1367	1442	1490	1570	1662	1703	1685	1675	1675	1679	1675	1667	1696	1720	1677	1600	1508	1413	1330
10/6/2013	1266	1220	1194	1185	1189	1225	1265	1309	1346	1362	1381	1391	1378	1374	1366	1368	1381	1385	1447	1463	1391	1297	1193	1134
10/7/2013	1084	1069	1065	1089	1179	1343	1471	1468	1499	1551	1551	1559	1562	1555	1523	1507	1492	1481	1534	1544	1474	1378	1266	1183
10/8/2013	1136	1117	1106	1131	1217	1389	1505	1495	1507	1555	1592	1617	1636	1632	1626	1614	1591	1556	1583	1589	1505	1392	1275	1196
10/9/2013	1144	1113	1111	1129	1217	1390	1508	1494	1515	1566	1597	1633	1656	1660	1653	1649	1635	1601	1625	1630	1540	1425	1293	1212
10/10/2013	1158	1124	1120	1139	1219	1372	1502	1508	1529	1576	1616	1648	1666	1671	1683	1660	1651	1611	1635	1623	1529	1413	1294	1203
10/11/2013	1147	1119	1114	1129	1201	1360	1477	1480	1517	1570	1604	1639	1655	1663	1656	1659	1641	1600	1583	1560	1482	1386	1275	1189
10/12/2013	1123	1084	1067	1057	1082	1137	1189	1223	1288	1343	1380	1409	1443	1471	1479	1467	1450	1438	1488	1490	1445	1374	1296	1220
10/13/2013	1170	1124	1090	1065	1063	1083	1122	1146	1215	1269	1313	1344	1360	1381	1393	1413	1426	1413	1453	1450	1378	1289	1203	1134
10/14/2013	1080	1060	1059	1077	1164	1312	1429	1436	1462	1503	1536	1558	1587	1594	1589	1566	1542	1528	1587	1558	1469	1373	1270	1185
10/15/2013	1128	1107	1095	1111	1193	1337	1465	1486	1518	1564	1585	1607	1612	1610	1591	1569	1559	1568	1622	1588	1521	1423	1318	1236
10/16/2013	1186	1155	1137	1141	1203	1342	1462	1464	1479	1509	1521	1516	1524	1512	1503	1487	1473	1458	1521	1504	1447	1354	1253	1184
10/17/2013	1126	1115	1109	1139	1224	1375	1492	1514	1530	1556	1569	1560	1578	1571	1537	1509	1490	1485	1570	1557	1511	1426	1331	1261
10/18/2013	1214	1195	1193	1216	1304	1439	1547	1550	1553	1559	1546	1543	1538	1518	1492	1454	1427	1420	1473	1458	1414	1342	1268	1204
10/19/2013	1163	1135	1128	1133	1163	1221	1286	1347	1393	1437	1441	1418	1373	1348	1319	1320	1319	1327	1415	1430	1408	1351	1293	1239
10/20/2013	1201	1184	1174	1171	1198	1239	1293	1316	1341	1351	1334	1328	1311	1304	1290	1294	1305	1331	1424	1418	1363	1307	1238	1187
10/21/2013	1140	1114	1118	1150	1257	1407	1531	1539	1544	1546	1565	1549	1540	1535	1511	1497	1503	1539	1585	1556	1491	1413	1331	1268
10/22/2013	1248	1239	1253	1299	1414	1593	1733	1719	1692	1667	1627	1602	1583	1560	1559	1554	1582	1618	1664	1635	1588	1499	1399	1338
10/23/2013	1302	1298	1316	1349	1450	1618	1727	1732	1739	1748	1711	1657	1623	1627	1634	1632	1630	1645	1710	1643	1646	1550	1459	1393
10/24/2013	1350	1329	1333	1353	1448	1610	1731	1726	1739	1766	1749	1737	1750	1737	1700	1696	1690	1725	1785	1762	1707	1623	1539	1480
10/25/2013	1452	1443	1460	1492	1592	1754	1878	1859	1771	1755	1724	1675	1632	1586	1540	1499	1492	1513	1606	1609	1586	1537	1464	1403
10/26/2013	1371	1362	1361	1376	1417	1484	1569	1589	1615	1621	1623	1599	1520	1440	1406	1429	1405	1418	1492	1484	1453	1411	1364	1312
10/27/2013	1303	1290	1301	1321	1354	1413	1480	1512	1504	1467	1414	1391	1361	1337	1321	1323	1331	1378	1502	1509	1470	1416	1350	1303
10/28/2013	1286	1288	1318	1367	1495	1685	1826	1803	1771	1714	1666	1630	1606	1573	1545	1510	1496	1533	1626	1608	1552	1468	1379	1311
10/29/2013	1275	1269	1272	1314	1419	1615	1742	1718	1699	1698	1672	1658	1651	1614	1593	1573	1564	1612	1655	1624	1562	1464	1353	1286
10/30/2013	1232	1208	1203	1219	1313	1483	1608	1621	1602	1633	1626	1638	1637	1615	1616	1595	1571	1610	1643	1611	1540	1434	1323	1258
10/31/2013	1196	1163	1154	1168	1267	1440	1561	1584	1582	1617	1631	1643	1643	1630	1618	1603	1608	1649	1652	1601	1515	1387	1286	1210

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11/1/2013	1168	1143	1150	1177	1270	1448	1586	1591	1602	1627	1612	1575	1558	1530	1505	1479	1451	1456	1498	1486	1464	1401	1329	1254
11/2/2013	1213	1181	1174	1188	1230	1299	1364	1403	1431	1442	1420	1392	1381	1361	1341	1358	1384	1423	1492	1482	1451	1405	1334	1276
11/3/2013	1238	1220	1220	1233	1260	1312	1376	1423	1451	1437	1397	1381	1358	1338	1325	1317	1338	1421	1539	1541	1528	1477	1409	1343
11/4/2013	1298	1261	1250	1253	1302	1417	1607	1681	1674	1666	1672	1657	1657	1636	1622	1623	1622	1659	1728	1697	1647	1568	1466	1363
11/5/2013	1305	1266	1239	1235	1261	1358	1528	1607	1590	1530	1546	1567	1629	1616	1608	1576	1555	1592	1690	1665	1625	1541	1431	1326
11/6/2013	1260	1209	1187	1177	1205	1305	1483	1568	1572	1589	1620	1638	1641	1644	1627	1610	1626	1673	1683	1665	1641	1583	1482	1394
11/7/2013	1332	1304	1291	1313	1361	1488	1685	1782	1754	1724	1699	1660	1631	1617	1573	1549	1552	1661	1745	1731	1699	1648	1572	1492
11/8/2013	1446	1425	1430	1441	1491	1610	1786	1869	1821	1780	1741	1690	1644	1624	1582	1539	1528	1588	1662	1637	1612	1567	1485	1410
11/9/2013	1346	1301	1291	1284	1303	1350	1414	1457	1488	1485	1474	1444	1414	1365	1339	1318	1329	1387	1475	1459	1436	1398	1353	1286
11/10/2013	1232	1202	1192	1193	1213	1247	1307	1349	1395	1417	1415	1402	1390	1358	1346	1336	1362	1465	1591	1606	1598	1556	1490	1422
11/11/2013	1378	1364	1363	1376	1405	1492	1663	1759	1743	1747	1738	1724	1720	1711	1682	1673	1692	1741	1770	1763	1741	1699	1625	1556
11/12/2013	1507	1478	1469	1485	1529	1650	1845	1950	1899	1856	1835	1807	1804	1780	1779	1790	1834	1913	1969	1957	1933	1870	1776	1691
11/13/2013	1637	1620	1622	1641	1695	1823	2001	2082	2016	1950	1906	1849	1807	1763	1729	1701	1711	1812	1920	1915	1897	1827	1740	1651
11/14/2013	1588	1558	1539	1548	1589	1699	1877	1943	1894	1839	1801	1746	1718	1684	1649	1603	1612	1694	1770	1764	1732	1671	1589	1497
11/15/2013	1427	1384	1369	1368	1399	1498	1660	1747	1737	1737	1755	1723	1698	1658	1604	1569	1588	1648	1683	1648	1609	1571	1500	1426
11/16/2013	1362	1315	1277	1264	1261	1294	1357	1401	1447	1500	1519	1510	1491	1455	1416	1388	1394	1481	1530	1500	1457	1413	1358	1277
11/17/2013	1212	1170	1143	1122	1119	1138	1173	1202	1236	1301	1341	1368	1389	1391	1405	1406	1367	1378	1457	1469	1452	1393	1329	1259
11/18/2013	1211	1177	1187	1199	1252	1384	1568	1675	1647	1630	1638	1630	1618	1597	1579	1564	1570	1669	1768	1768	1742	1684	1608	1511
11/19/2013	1458	1432	1427	1449	1495	1620	1818	1915	1874	1822	1789	1727	1706	1681	1641	1620	1651	1744	1855	1858	1832	1782	1680	1592
11/20/2013	1534	1509	1512	1524	1566	1694	1874	1955	1907	1883	1853	1795	1735	1697	1660	1657	1657	1764	1829	1803	1758	1681	1582	1469
11/21/2013	1399	1358	1333	1327	1362	1470	1649	1745	1734	1740	1746	1738	1709	1687	1675	1671	1681	1742	1751	1712	1677	1594	1501	1397
11/22/2013	1327	1279	1253	1250	1278	1372	1539	1657	1655	1669	1710	1721	1727	1747	1742	1716	1715	1793	1818	1797	1772	1720	1662	1585
11/23/2013	1539	1510	1501	1508	1540	1587	1669	1741	1771	1776	1762	1751	1740	1764	1779	1792	1826	1938	2002	2000	1991	1956	1896	1837
11/24/2013	1804	1763	1757	1761	1779	1817	1881	1935	1942	1901	1847	1796	1770	1733	1695	1684	1730	1893	1994	2005	1995	1955	1902	1830
11/25/2013	1782	1750	1736	1733	1769	1865	2016	2115	2103	2104	2113	2098	2074	2044	2015	2003	2004	2075	2084	2048	2006	1930	1822	1709
11/26/2013	1629	1590	1569	1568	1604	1711	1868	1961	1951	1968	1969	1969	1948	1924	1910	1867	1869	1954	1983	1972	1953	1904	1831	1749
11/27/2013	1683	1648	1633	1655	1713	1838	2003	2121	2135	2159	2187	2180	2162	2100	2000	1972	1979	2075	2140	2123	2103	2062	1983	1892
11/28/2013	1821	1770	1739	1739	1761	1783	1820	1856	1868	1865	1855	1815	1736	1639	1551	1499	1503	1592	1666	1679	1697	1709	1690	1666
11/29/2013	1650	1641	1640	1660	1704	1763	1850	1900	1883	1825	1753	1698	1644	1588	1566	1552	1585	1701	1787	1809	1797	1777	1730	1668
11/30/2013	1607	1575	1562	1563	1568	1599	1659	1700	1706	1688	1635	1590	1529	1481	1440	1412	1440	1548	1626	1641	1644	1622	1579	1518

Indianapolis Power & Light Company
2014 Integrated Resource Plan

IPL System Loads For Calendar Year 2013, MW																								
Date	HE1	HE2	HE3	HE4	HE5	HE6	HE7	HE8	HE9	HE10	HE11	HE12	HE13	HE14	HE15	HE16	HE17	HE18	HE19	HE20	HE21	HE22	HE23	HE24
12/1/2013	1463	1426	1401	1397	1409	1444	1487	1543	1555	1537	1505	1472	1436	1410	1384	1377	1416	1535	1642	1669	1661	1616	1544	1459
12/2/2013	1401	1377	1373	1387	1432	1560	1732	1865	1836	1830	1823	1785	1752	1725	1697	1679	1714	1799	1835	1816	1781	1721	1623	1512
12/3/2013	1443	1405	1390	1400	1453	1582	1765	1868	1838	1821	1824	1813	1777	1757	1738	1718	1724	1791	1818	1787	1752	1683	1575	1463
12/4/2013	1390	1350	1324	1313	1343	1449	1608	1728	1702	1693	1707	1707	1704	1704	1690	1671	1657	1722	1783	1752	1703	1626	1514	1396
12/5/2013	1314	1268	1232	1235	1271	1380	1587	1734	1733	1770	1823	1848	1866	1871	1868	1900	1945	2040	2085	2068	2049	1988	1906	1808
12/6/2013	1748	1708	1685	1689	1731	1831	1968	2058	2060	2065	2077	2073	2068	2054	2061	2053	2067	2156	2155	2119	2070	2015	1940	1843
12/7/2013	1792	1782	1791	1809	1840	1903	1987	2071	2085	2056	1996	1944	1893	1845	1816	1825	1866	2009	2086	2080	2071	2049	1996	1930
12/8/2013	1856	1807	1770	1761	1764	1796	1835	1898	1920	1961	1974	1974	1959	1930	1917	1917	1956	2050	2092	2070	2027	1957	1855	1746
12/9/2013	1679	1644	1637	1651	1700	1834	2007	2118	2116	2108	2114	2097	2089	2061	2033	2065	2048	2189	2246	2230	2197	2121	2023	1909
12/10/2013	1837	1798	1785	1791	1844	1953	2147	2276	2258	2206	2162	2130	2087	2069	2033	2021	2038	2174	2261	2249	2219	2165	2071	1978
12/11/2013	1931	1907	1917	1933	1956	2073	2246	2339	2283	2260	2218	2111	2041	2004	2036	2073	2114	2231	2289	2305	2305	2252	2180	2103
12/12/2013	2069	2051	2045	2057	2116	2236	2425	2537	2497	2419	2353	2283	2211	2167	2156	2152	2170	2311	2380	2365	2326	2271	2166	2060
12/13/2013	1989	1948	1924	1935	1980	2074	2233	2355	2293	2203	2118	2049	1985	1947	1955	1951	1967	2052	2063	2042	2015	1960	1889	1792
12/14/2013	1713	1646	1621	1608	1622	1668	1728	1812	1841	1879	1905	1895	1873	1844	1826	1822	1832	1937	1981	1974	1957	1933	1882	1810
12/15/2013	1757	1711	1692	1698	1708	1748	1805	1886	1947	2013	2039	1998	1943	1963	1999	2009	2047	2139	2190	2173	2142	2070	1984	1882
12/16/2013	1820	1786	1770	1782	1829	1939	2107	2224	2232	2218	2214	2194	2176	2163	2137	2133	2126	2203	2231	2194	2150	2083	1984	1877
12/17/2013	1802	1762	1750	1752	1787	1905	2094	2193	2193	2193	2192	2155	2120	2086	2050	2076	2096	2184	2236	2195	2166	2112	2001	1890
12/18/2013	1818	1797	1784	1809	1860	1973	2164	2282	2237	2158	2104	2027	1953	1903	1854	1832	1882	2017	2121	2101	2077	2001	1896	1763
12/19/2013	1687	1632	1615	1601	1624	1711	1868	1968	1942	1870	1861	1828	1795	1778	1767	1755	1770	1867	1886	1861	1821	1759	1665	1545
12/20/2013	1456	1401	1360	1358	1373	1470	1622	1733	1752	1742	1751	1743	1739	1727	1712	1695	1680	1714	1726	1682	1638	1584	1508	1419
12/21/2013	1327	1276	1249	1242	1252	1296	1372	1456	1544	1617	1674	1678	1667	1659	1648	1637	1661	1742	1744	1729	1701	1662	1603	1514
12/22/2013	1453	1386	1350	1334	1342	1374	1433	1503	1572	1621	1656	1682	1701	1706	1706	1712	1743	1818	1859	1850	1838	1813	1759	1682
12/23/2013	1622	1583	1567	1582	1627	1717	1860	1976	2022	2050	2068	2081	2074	2067	2050	2036	2043	2104	2154	2136	2123	2105	2067	1999
12/24/2013	1956	1940	1935	1953	1999	2093	2205	2295	2318	2312	2244	2157	2077	1987	1929	1891	1907	2031	2104	2103	2090	2073	2032	1976
12/25/2013	1908	1848	1812	1801	1803	1834	1873	1907	1934	1956	1967	1959	1938	1901	1854	1825	1807	1855	1876	1864	1855	1833	1781	1718
12/26/2013	1667	1640	1633	1627	1661	1756	1876	1972	1977	1948	1937	1897	1844	1788	1742	1713	1743	1872	1943	1932	1908	1866	1796	1717
12/27/2013	1650	1622	1595	1581	1617	1691	1807	1893	1892	1855	1806	1752	1703	1655	1618	1583	1600	1700	1791	1787	1782	1751	1693	1612
12/28/2013	1542	1507	1477	1473	1486	1532	1581	1639	1659	1639	1602	1569	1512	1463	1435	1434	1460	1565	1655	1657	1642	1601	1551	1485
12/29/2013	1432	1395	1372	1364	1375	1389	1431	1481	1534	1557	1581	1560	1511	1500	1584	1644	1724	1826	1865	1867	1861	1821	1763	1706
12/30/2013	1678	1657	1655	1663	1724	1820	1944	2052	2075	2058	2060	2036	2003	1950	1932	1945	1981	2089	2174	2157	2138	2081	1996	1910
12/31/2013	1843	1806	1789	1788	1810	1884	1990	2074	2074	2106	2056	1984	1924	1875	1846	1838	1855	1950	2008	1940	1878	1803	1737	1694

Load Research

Load shape data including annual load shapes, seasonal load shapes, monthly load shapes, selected weekly load shapes, and daily load shapes are maintained by IPL at the rate class/customer class level. The sample for the Small Commercial Class Rate SS is stratified using NAICS codes in to manufacturing low and high use and non-manufacturing low and high use. All load research is developed by IPL.

IPL currently maintains a load research sample of 501 load profile meters. The distribution of these meters by rate and class are shown in the following table.

Load Research Meters by Rate and Class			
Rate RS	96	Rate SS	103
Rate RC	83	Rate SH	68
Rate RH	151		
Residential	330	Sm C & I	171

In addition to the Residential and Small Commercial/Industrial meters outlined above, all Large Commercial/Industrial have 15 minute profile metering. The 15 minute information provides load research and billing increment data for our demand sensitive customers.

Table 1 shows the load research sample design. The stratification criteria are shown for the following rates:

RS – Residential Basic Service
RC – Residential Basic Service with electric water heating
RH – Residential Basic Service with electric heat
SS – Small Commercial & Industrial Secondary Service (Small)
SH – Small Commercial & Industrial Secondary Service (Electric Space Conditioning

Table 1

STRATIFICATION CRITERIA BY RATE

Rate	# of Strata	Criteria
RS	4	high/low winter and high/low summer
RC	4	high/low winter and high/low summer
RH	5	small/large heat pump houses, small/large resistance houses and apartments
SS	6	survey small/large by manufacturing; non-manufacturing; billing manufacturing/non-manufacturing

SH	4	annual kWh

Hourly 8760 data is retained in EXCEL spreadsheets.

<u>Historical Billing Data</u>

Historical billing data by account for the demand billed customers is maintained on an on-going basis.

IPL 2014 IRP

Attachment 3.2 (2013 Hourly Load Shape Summary) is provided electronically.

Petitioner's Exhibit ZE-2
2015-2017 Action Plan

This report was prepared by

EnerNOC Utility Solutions Consulting
500 Ygnacio Valley Blvd., Suite 450
Walnut Creek, CA 94596

I. Rohmund, Project Director
D. Costenaro, Project Manager
C. Carrera

CONTENTS

CHAPTER | 1

RESIDENTIAL LIGHTING PROGRAM

Program Description	The Residential Lighting program will encourage residential customers in improving the energy efficiency of their homes through lighting measures. The program will primarily focus on CFL lighting, but begin to phase in LED technologies as their market readiness increases. The program will provide upstream "buydowns" for certain products such as compact fluorescent lamps so that customers pay a lower price at the point of purchase without needing to apply for a rebate. The upstream buydown activity is a component of the program's focus on market transformation that will increase the demand for high efficiency products.
Objectives	The purpose of the Residential Lighting program is to increase the penetration of high-efficiency measures in the homes of IPL's residential customers. The program enables the adoption of these energy efficiency measures by offering point of purchase rebates for the purchase and installation of qualifying home equipment for lighting. The program has several objectives: • Increase consumers' awareness of the breadth of energy efficiency opportunities in their homes. • Make a significant contribution to IPL's energy savings achievements. • Demonstrate IPL's commitment to and confidence in the measures' performance and their ability to reduce home energy use. • Strengthen customer trust in IPL as their partner in saving energy. The Residential Lighting program is well-suited for accomplishing these objectives because the rebate-eligible measures are proven technologies about which customers can readily find supporting information.
Projected Savings	The estimated energy savings are given in terms of annual per-unit values. These values were applied to the estimated number of measures rebated under the program each year. The savings noted in each year reflect the savings from measures installed by customers through the program in that year. This does *not* include the impact of measures still in operation from previous years. Total Net Incremental Energy Savings (kWh)

	Total Net Incremental Energy Savings (kWh)		
Measure	2015	2016	2017
ENERGY STAR CFL	9,084,827	8,963,187	8,840,071
ENERGY STAR LED	746,254	937,060	1,129,565
ENERGY STAR Reflector CFL	1,297,832	1,140,769	982,230
ENERGY STAR Reflector LED	373,127	562,236	753,043
ENERGY STAR Specialty CFL	4,866,871	4,889,011	4,911,150
TOTAL	**16,368,911**	**16,492,264**	**16,616,059**

	Total Net Incremental Demand Savings (kW)

	Total Net Incremental Demand Savings (kW)		
Measure	2015	2016	2017
ENERGY STAR CFL	1,078.8	1,064.4	1,049.8
ENERGY STAR LED	89.2	112.0	135.1
ENERGY STAR Reflector CFL	154.1	135.5	116.6
ENERGY STAR Reflector LED	44.6	67.2	90.0
ENERGY STAR Specialty CFL	577.9	580.6	583.2
TOTAL	**1,945**	**1,960**	**1,975**

Administrative Requirements

IPL will administer the Residential Lighting program through an implementation contractor. IPL's role will be to ensure that:

- The implementation contractor performs all the activities associated with delivery of all components of the program, and
- IPL's educational and program messages are delivered accurately and clearly to ensure the effectiveness of program delivery and maximize customer satisfaction with the program.

The program is expected to operate according to the following administrative and total utility budget:

	Total Utility Budget		
Total Admin Costs	$480,021	$480,918	$475,420
Total Incentive Costs	$1,483,403	$1,486,392	$1,468,066
Total Utility Budget	**$1,963,423**	**$1,967,310**	**$1,943,486**

Cost-Effectiveness

The cost-effectiveness metrics of the Residential Prescriptive program are as follows:

	Cost Effectiveness Tests			
Program	TRC Ratio	UCT Ratio	PCT Ratio	RIM Ratio
Res Lighting	**1.05**	**2.25**	**3.05**	**1.00**

CHAPTER 2

RESIDENTIAL INCOME QUALIFIED WEATHERIZATION PROGRAM

Program Description

The Residential Income Qualified Weatherization program will provide energy efficiency services and energy education to IPL's low-income customers; helping them to reduce their energy usage and increase the affordability of their energy bills. This program will focus on education and the installation of measures in homes that meet the low income criteria.

Participating households will receive the following types of assistance:

- In-Home Audits and Education—These are on-site inspections and tests used to identify the applicability of energy-savings measures the program offers and to educate residents about ways to reduce their energy usage.
- Direct Installation of Measures—Install measures to reduce energy use in the home at no charge to residents.

Objectives

The purpose of the Residential Income Qualified Weatherization program is to educate and assist eligible residential customers with making their homes more energy efficient. Unlike other programs, a principle objective is to provide repairs necessary to install energy savings improvements in a part of the housing stock that is often old and substandard in comparison to middle and upper income housing.

Projected Savings

The estimated energy savings are given in terms of annual per-unit values. These values were applied to the estimated number of households participating in the program each year. The savings noted in each year reflect incremental or annual savings from measures installed by customers through the program in that year. This does *not* include the impact of measures still in operation from previous years.

Total Net Incremental Energy Savings (kWh)

	Total Net Incremental Energy Savings (kWh)		
Measure	2015	2016	2017
Attic Insulation	93,565	93,565	93,565
Audit Recommendations	77,340	77,340	77,340
CFLs	1,197,600	1,197,600	1,197,600
Faucet Aerator	221,240	221,240	221,240
Infiltration Reduction	101,478	101,478	101,478
Low Flow Showerhead	311,048	311,048	311,048
Pipe Wrap	17,478	17,478	17,478
Tank Wrap (EF 0.88)	37,205	37,205	37,205
TOTAL	**2,056,953**	**2,056,953**	**2,056,953**

Total Net Incremental Demand Savings (kW)

	Total Net Incremental Demand Savings (kW)		
Measure	2015	2016	2017
Attic Insulation	72.5	72.5	72.5
Audit Recommendations	5.0	5.0	5.0
CFLs	300.0	300.0	300.0
Faucet Aerator	30.0	30.0	30.0
Infiltration Reduction	17.5	17.5	17.5
Low Flow Showerhead	-	-	-
Pipe Wrap	2.5	2.5	2.5
Tank Wrap (EF 0.88)	5.0	5.0	5.0
TOTAL	**433**	**433**	**433**

Administrative Requirements

IPL will mainly administer the Residential Income Qualified Weatherization program with a program implementation contractor and through partnerships with weatherization program providers. The program is expected to operate according to the following administrative and total utility budget:

Total Program Budget

	Total Utility Budget		
Total Admin Costs	$993,729	$993,729	$993,729
Total Incentive Costs	$313,128	$313,128	$313,128
Total Utility Budget	**$1,306,858**	**$1,306,858**	**$1,306,858**

Cost-Effectiveness

The cost-effectiveness metrics of the Residential Income Qualified Weatherization program are as follows:

	Cost Effectiv ess Tests			
Program	TRC Ratio	UCT Ratio	PCT Ratio	RIM Ratio
Res IQW	**0.61**	**0.61**	**-**	**0.48**

CHAPTER | 3

RESIDENTIAL AC LOAD MANAGEMENT PROGRAM

Program Description

The Residential AC Load Management program typically occurs during times of high peak demand or supply-side constraints. During an event, participants' equipment is controlled by a one-way remote switch

- The one-way remote switch is connected to the condensing unit of the AC. When activated by a control signal, the switch will not allow the equipment to operate for the duration of the event. The compressor is shut down up to 50% of the time in discrete cycles during an event while the fan continues to operate. This allows cool air to be circulated throughout the home while the compressor is disabled. The operation of the switch is usually controlled through a digital paging network.

The program has the following components:

- Switch Installation – A small device is installed on the outside of the home near the air conditioner. The switch is connected to the condensing unit of the AC and activated by a control signal.
- Bill Credit – Participants receive a $5 credit on their monthly bill from June to September.

Objectives

The purpose of the Residential AC Load Management program is to lower the peak demand usage in the IPL service territory to provide system and grid relief. The program provides financial incentives for customers as a means to not only promote energy efficient behavior, but also lower the cost of peak energy.

Projected Savings

The estimated energy and demand savings are given in terms of annual per-unit values, split out here for single family and multifamily customers. These values were applied to the estimated number of participating customers under the program each year. The savings noted in each year reflect the savings of the entire participant population.

Total Net Incremental Energy Savings (kWh)

	Total Net Incremental Energy Savings (kWh)		
Measure	**2015**	**2016**	**2017**
Res SF ACLM switch (50% True Cycle)	404,965	414,645	424,325
Res MF ACLM switch (50% True Cycle)	19,712	21,863	24,014
TOTAL	**424,677**	**436,508**	**448,339**

Total Net Incremental Demand Savings (kW)

	Total Net Incremental Deman avings (kW)		
Measure	**2015**	**2016**	**2017**
Res SF ACLM switch (50% True Cycle)	33,133.5	33,925.5	34,717.5
Res MF ACLM switch (50% True Cycle)	1,612.8	1,788.8	1,964.8
TOTAL	**34,746**	**35,714**	**36,682**

Administrative Requirements	The Residential AC Load Management program will be administered through an implementation contractor. The utility's role will be to ensure that: • the implementation contractor performs all the activities associated with delivery of all components of the program The program is expected to operate according to the following administrative and total utility budget: Total Program Budget

	Total Utility Budget		
Total Admin Costs	$575,831	$591,750	$607,669
Total Incentive Costs	$1,445,231	$1,490,713	$1,536,196
Total Utility Budget	**$2,021,061**	**$2,082,463**	**$2,143,864**

Cost-Effectiveness	The cost-effectiveness metrics of the Residential New Construction program are as follows:

	Cost Effectiveness Tests			
Program	TRC Ratio	UCT Ratio	PCT Ratio	RIM Ratio
Res AC Load Management	**2.65**	**1.57**	**-**	**1.56**

CHAPTER | 4

RESIDENTIAL MULTI-FAMILY DIRECT INSTALL PROGRAM

Program Description	The Residential Multi-Family Direct Install program provides targeted, highly cost-effective measures to multifamily households in a quickly deployable program delivery mechanism. This will provide energy savings to the multifamily segment, which is typically an underserved market with respect to energy efficiency programs. This is largely because of the preponderance of rental units with the so-called split owner-renter barrier. In other words, since the landlord or owner does not pay the utility bill, there is very little incentive to install higher efficiency equipment. The program targets multifamily complexes with units that are both individually metered (residential ratepayers) and master metered (commercial ratepayers). The program is designed to go beyond providing financial incentives to multi-family households and aims to make them well-educated energy consumers. The services the program will provide, including in-home audits and referrals to contractors and financial resources, aim to help them gain a better understanding of their home energy use and achieve savings while also improving the comfort of their homes. As a program mainly designed to educate and empower multi-family customers to make energy-efficient home improvements, the program contains a set of direct install measures. The Residential Multi-Family Direct Install program has several components: • Walk-Through Audits—These are on-site inspections and tests used to identify energy efficiency opportunities; audit reports contain specific recommendations, including expected costs, energy savings, and resource referrals. • Direct Installation of Low-Cost Measures—During the audit visit, the auditor will install a package of low-cost energy-saving measures, at no additional charge to the customer, to immediately improve the energy performance of the house. • Assistance with Additional Measure Adoptions—the program will provide cash rebates to audit participants who install weatherization measures recommended from the audit, as well as assistance on how to access rebates offered as follow-on measures or under other programs.

Objectives	The purpose of the Residential Multi-Family Direct Install program is to help residential customers view the energy performance of their homes as more than the sum of independent decisions about individual components. It reflects the view that reducing residential energy use is more than a series of actions; it is an attitude and plan borne of knowledge. This is a "big picture" approach. The services are designed to bring customers to a more holistic view of home energy performance. The program is part of a long-term strategy to raise awareness of home energy savings opportunities among residential customers and to help them take action using incentives offered by IPL's energy efficiency programs. The program will achieve several objectives: • Improve customer understanding of how their homes use energy and how they can use it more effectively for less money • Procure immediate energy savings through installation of low-cost energy-saving measures • Encourage installation of additional energy-saving measures recommendations with additional incentives • Aid residential customers' perception of IPL as their partner in reducing home energy use

Projected Savings

The estimated energy savings are given in terms of annual per-unit values. These values were applied to the estimated number of measures installed under the program each year. This does *not* include the impact of measures still in operation from previous years.

Total Net Incremental Energy Savings (kWh)

	Total Net Incremental Energy Savings (kWh)		
Measure	2015	2016	2017
Bath Faucet Aerator	312,420	312,420	312,420
Candelabra	165,100	165,100	165,100
CFL - 18W	1,613,400	1,613,400	1,613,400
CFL - Globe	806,700	806,700	806,700
Kitchen Faucet Aerator	620,400	620,400	620,400
LED Nightlight	136,000	136,000	136,000
Low Flow Showerhead	2,059,800	2,059,800	2,059,800
TOTAL	**5,713,820**	**5,713,820**	**5,713,820**

Total Net Incremental Demand Savings (kW)

	Total Net Incremental Demand Savings (kW)		
Measure	2015	2016	2017
Bath Faucet Aerator	48	48	48
Candelabra	60	60	60
CFL - 18W	360	360	360
CFL - Globe	180	180	180
Kitchen Faucet Aerator	48	48	48
LED Nightlight	-	-	-
Low Flow Showerhead	138	138	138
TOTAL	**834**	**834**	**834**

Administrative Requirements	IPL will administer the Residential Multi-Family Direct Install program through an implementation contractor. IPL' role will be to ensure that: • The implementation contractor performs all the activities associated with delivery of all components of the program, and • Educational and program messages are delivered accurately and clearly to ensure the effectiveness of program delivery and maximize customer satisfaction with the program. The program is expected to operate according to the following administrative and total utility budget: Total Program Budget

	Total Utility Budget		
Total Admin Costs	$784,100	$784,100	$784,100
Total Incentive Costs	$386,000	$386,000	$386,000
Total Utility Budget	**$1,170,100**	**$1,170,100**	**$1,170,100**

Cost-Effectiveness	The cost-effectiveness metrics of the Residential Multi-Family Direct Install program are as follows:

	Cost Effectiveness Tests			
Program	TRC Ratio	UCT Ratio	PCT Ratio	RIM Ratio
Res MF Direct Install	**1.39**	**1.39**	**-**	**0.80**

CHAPTER | **5**

RESIDENTIAL HOME ENERGY ASSESSMENT PROGRAM

Program Description	The Residential Home Energy Assessment program provides education, an on-site audit, and a suite of energy efficiency measures to help single family customers reduce their energy bills. The program is designed to go beyond providing financial incentives to residential customers and aims to make them well-educated energy consumers. The services the program will provide include in-home audits and direct-install measures like CFL light bulbs and low-flow water fixtures. The Residential Home Energy Assessment program has several components: • Walk-Through Audits—These are on-site inspections and tests used to identify energy efficiency opportunities; audit reports contain specific recommendations, including expected costs, energy savings, and resource referrals. • Direct Installation of Low-Cost Measures—During the audit visit, the auditor will install a package of low-cost energy-saving measures, at no additional charge to the customer, to immediately improve the energy performance of the house.
Objectives	The purpose of the Residential Home Energy Assessment program is to help residential customers view the energy performance of their homes as more than the sum of independent decisions about individual components. It reflects the view that reducing residential energy use is more than a series of actions; it is an attitude and plan borne of knowledge. This is a "big picture" approach. The services are designed to bring customers to a more holistic view of home energy performance. The program is part of a long-term strategy to raise awareness of home energy savings opportunities among residential customers and to help them take action using incentives offered by the utilities and State programs. The program will achieve several objectives: • Improve customer understanding of how their homes use energy and how they can use it more effectively for less money • Procure immediate energy savings through installation of low-cost energy-saving measures • Aid residential customers' perception of IPL as their partner in reducing home energy use

Projected Savings	The estimated energy savings are based on annual per-unit values. These values were applied to the estimated number of measures installed under the program each year. This does *not* include the impact of measures still in operation from previous years.

Total Net Incremental Energy Savings (kWh)

	Total Net Incremental Energy Savings (kWh)		
Measure	2015	2016	2017
Audit Recommendations	1,051,680	1,051,680	1,051,680
CFLs	1,915,760	1,915,760	1,915,760
Faucet Aerator	833,376	833,376	833,376
Low Flow Showerhead	1,729,248	1,729,248	1,729,248
Pipe Wrap	110,700	110,700	110,700
Tank Wrap (EF 0.88)	209,232	209,232	209,232
TOTAL	**5,849,996**	**5,849,996**	**5,849,996**

Total Net Incremental Demand Savings (kW)

	Total Net Incremental Demand Savings (kW)		
Measure	2015	2016	2017
Audit Recommendations	160	160	160
CFLs	-	-	-
Faucet Aerator	144	144	144
Low Flow Showerhead	-	-	-
Pipe Wrap	12	12	12
Tank Wrap (EF 0.88)	36	36	36
TOTAL	**352**	**352**	**352**

Administrative Requirements

IPL will administer the Residential Home Energy Assessment program through an implementation contractor. IPL' role will be to ensure that:

- The implementation contractor performs all the activities associated with delivery of all components of the program, and
- Educational and program messages are delivered accurately and clearly to ensure the effectiveness of program delivery and maximize customer satisfaction with the program.

The program is expected to operate according to the following administrative and total utility budget:

Total Program Budget

	Total Utility Budget		
Total Admin Costs	$1,339,944	$1,339,944	$1,339,944
Total Incentive Costs	$269,650	$269,650	$269,650
Total Utility Budget	**$1,609,594**	**$1,609,594**	**$1,609,594**

Cost-Effectiveness

The cost-effectiveness metrics of the Residential Home Energy Assessment program are as follows:

	Cost Effectiveness Tests			
Program	TRC Ratio	UCT Ratio	PCT Ratio	RIM Ratio
Res HEA	**1.15**	**1.15**	-	**0.69**

CHAPTER | 6

RESIDENTIAL SCHOOL KIT

Program Description

The Residential School Kit program incorporates an educational module provided to grade school students, along with a take-home kit of energy efficiency measures. Measures include CFLs and low-flow fixtures. It targets students to help them learn about energy efficiency and how they can apply it at school and at home. Participating schools will receive education in the classroom and take-home kits filled with energy efficiency saving devices. The program is designed to educate both the students and their parents about simple energy efficiency and conservation practices, driving grassroots market transformation throughout the service territory.

Objectives

The program has several objectives:

- Increase consumers' awareness of the breadth of energy efficiency opportunities in their homes.
- Lay the foundation for future energy stewardship by educating young students.
- Make significant contribution to portfolio energy savings goals.
- Strengthen customer trust in IPL as their partner in saving energy.

Projected Savings

The estimated energy savings are based on annual per-unit values. These values were applied to the estimated number of measures provided under the program each year. This does *not* include the impact of measures still in operation from previous years.

Total Net Incremental Energy Savings (kWh)

	Total Net Incremental Energy Savings (kWh)		
Measure	2015	2016	2017
CFL - 13W	578,700	578,700	578,700
CFL - 23W	479,655	479,655	479,655
Faucet Aerator	1,533,216	1,533,216	1,533,216
FilterTone Alarm	110,614	110,614	110,614
LED Nightlight	61,462	61,462	61,462
Low Flow Showerhead	1,317,820	1,317,820	1,317,820
TOTAL	**4,081,469**	**4,081,469**	**4,081,469**

Total Net Incremental Demand Savings (kW)

	Total Net Incremental Demand Savings (kW)		
Measure	2015	2016	2017
CFL - 13W	75.6	75.6	75.6
CFL - 23W	63.3	63.3	63.3
Faucet Aerator	30.2	30.2	30.2
FilterTone Alarm	171.4	171.4	171.4
LED Nightlight	-	-	-
Low Flow Showerhead	62.4	62.4	62.4
TOTAL	**403**	**403**	**403**

Administrative Requirements	The program administration role will be to ensure that: • The implementation contractor performs all the activities associated with delivery of all components of the program, and • IPL' educational and program messages are delivered accurately and clearly to ensure the effectiveness of program delivery and maximize customer satisfaction with the program. The program is expected to operate according to the following administrative and total utility budget: Total Program Budget

	Total Utility Budget		
Total Admin Costs	$401,628	$401,628	$401,628
Total Incentive Costs	$229,143	$229,143	$229,143
Total Utility Budget	**$630,771**	**$630,771**	**$630,771**

Cost-Effectiveness	The cost-effectiveness metrics of the Residential Schools program are as follows:

	Cost Effectiveness Tests			
Program	TRC R	UCT Ratio	PCT Ratio	RIM Ratio
Res School **Kit**	1.90	**1.90**	**-**	**0.90**

CHAPTER | 7

RESIDENTIAL ONLINE ENERGY ASSESSMENT PROGRAM

Program Description	The Residential Online Energy Assessment program is an online engagement activity that provides customers with education and information regarding their home energy use. Customer who visit IPL's website and complete the engagement activity will receive a kit of low cost energy efficiency measures.
Objectives	The purpose of this program is to increase the penetration of high-efficiency measures in the homes of residential customers and increase consumers' awareness of the breadth of energy efficiency opportunities available. It will also strengthen customer trust in IPL as their partner in saving energy.
Projected Savings	The estimated energy savings are given in terms of annual per-unit values. These values were applied to the estimated number of measures provided under the program each year. This does *not* include the impact of measures still in operation from previous years.

Total Net Incremental Energy Savings (kWh)

	Total Net Incremental Energy Savings (kWh)		
Measure	**2015**	**2016**	**2017**
Bath Aerator	40,090	44,099	46,304
CFL - 13W	112,242	123,466	129,639
CFL - 19W	133,738	147,112	154,468
Hot Water Thermometer	-	-	-
Kitchen Aerator	186,703	205,374	215,642
Low Flow Showerhead	486,057	534,662	561,395
Refrigerator Thermometer	-	-	-
TOTAL	**958,830**	**1,054,713**	**1,107,449**

Total Net Incremental Demand Savings (kW)

	Total Net Incremental Demand Savings (kW)		
Measure	**2015**	**2016**	**2017**
Bath Aerator	9.2	10.1	10.6
CFL - 13W	25.0	27.5	28.9
CFL - 19W	29.2	32.1	33.7
Hot Water Thermometer	-	-	-
Kitchen Aerator	10.7	11.8	12.4
Low Flow Showerhead	29.1	32.0	33.6
Refrigerator Thermometer	-	-	-
TOTAL	**103**	**114**	**119**

Administrative Requirements	The program administrative staff's role will be to ensure that: • The implementation contractor performs all the activities associated with delivery of all components of the program, and • IPL educational and program messages are delivered accurately and clearly to ensure the effectiveness of program delivery and maximize customer satisfaction with the program. The program is expected to operate according to the following administrative and total utility budget: Total Program Budget

	Total Utility Budget		
Total Admin Costs	$113,809	$121,690	$126,024
Total Incentive Costs	$87,565	$96,322	$101,138
Total Utility Budget	**$201,374**	**$218,012**	**$227,162**

Cost-Effectiveness	The cost-effectiveness metrics of the Residential Online Energy Assessment are as follows:

	Cost Effectiveness Tests			
Program	TRC Ratio	UCT Ratio	PCT Ratio	RIM Ratio
Res Online Energy Assessment	**1.33**	**1.33**	**-**	**0.76**

CHAPTER | **8**

RESIDENTIAL APPLIANCE RECYCLING PROGRAM

Program Description	The Residential Appliance Recycling program achieves energy savings by offering a bounty payment to customers to remove their old, inefficient appliances and recycle them. It includes refrigerators, freezers and room AC units. The program offers free pickup of units from residences plus customer incentives and education about the benefits of secondary unit disposal, to encourage their participation. There are no costs to participating customers. The contractor will pick-up, disable, and recycle the units. Once IPL receives verification that the units have been recycled. The customer will receive a $40 incentive per refrigerator recycled and a $20 incentive per Room AC recycled. In addition to educating residential customers about the benefits of secondary unit disposal, the program provides services to enable disposal of the units. The two program components are: <u>Customer Incentives</u> • Pickup of units from homes will be by appointment directly with the program implementation contractor. • The program implementation contractor mails incentive checks to customers after units have been removed. • To qualify, refrigerator, freezer, or room air conditioning units must be in working condition, meet minimum size requirements, and be readily accessible for removal. <u>Environmental Disposal of Units</u> • Units will be removed to a collection facility and disassembled for environmentally responsible disposal of CFCs and recycling of remaining components.
Objectives	The purpose of the Residential Appliance Recycling program is to eliminate a very inefficient usage of electricity in homes: the retention of refrigerators, freezers, and room air conditioners for use as secondary units. This is a two-pronged goal: to remove existing secondary units from operation and to prevent existing primary refrigerators, freezers, and room air conditioners from being retained and used as secondary units when customers purchase new units. The program has several objectives: • Transform attitudes about retaining older, less efficient refrigerators, freezers, and room air conditioners as secondary units. • Accrue electricity consumption and demand savings toward IPL's savings achievements. • Demonstrate IPL's commitment to good stewardship of the environment by sponsoring proper disposal of units. Appliance Recycling is well-suited for accomplishing these objectives because: consumers are more willing than ever to help safeguard the environment and adopt behaviors that save energy without compromising their lifestyles. The program makes it

	convenient and cost-effective for customers to dispose of these older units, overcoming a past barrier to getting rid of them.

Projected Savings

The estimated energy savings are given in terms of annual per-unit values. These values were applied to the estimated number of appliances removed under the program each year. This does *not* include the impact of measures still in operation from previous years.

Total Net Incremental Energy Savings (kWh)

	Total Net Incremental Energy Savings (kWh)		
Measure	2015	2016	2017
Freezer Recycling	389,760	389,760	389,760
Refrigerator Recycling	1,879,360	1,879,360	1,879,360
Window AC unit Recycling	13,050	13,050	13,050
TOTAL	**2,282,170**	**2,282,170**	**2,282,170**

Total Net Incremental Demand Savings (kW)

	Total Net Incremental Demand Savings (kW)		
Measure	2015	2016	2017
Freezer Recycling	68.9	68.9	68.9
Refrigerator Recycling	327.0	327.0	327.0
Window AC unit Recycling	11.8	11.8	11.8
TOTAL	**408**	**408**	**408**

Administrative Requirements

IPL will administer the Residential Appliance Recycling program through an implementation contractor. IPL's role will be to ensure that:

- The implementation contractor performs all the activities associated with delivery of all components of the program, and
- IPL's educational and program messages are delivered accurately and clearly to ensure the effectiveness of program delivery and maximize customer satisfaction with the program.

The program is expected to operate according to the following administrative and total utility budget:

	Total Utility Budget		
Total Admin Costs	$153,479	$153,479	$153,479
Total Incentive Costs	$592,396	$592,396	$592,396
Total Utility Budget	**$745,875**	**$745,875**	**$745,875**

Cost-Effectiveness

The cost-effectiveness metrics of the Residential Appliance Recycling program are as follows:

	Cost Effectiveness Tests			
Program	TRC Ratio	UCT Ratio	PCT Ratio	RIM Ratio
Res Appliance Recycling	**1.42**	**1.21**	**-**	**0.75**

CHAPTER | 9

RESIDENTIAL PEER COMPARISON PROGRAM

Program Description

The Residential Peer Comparison program provides individualized Energy Reports that analyze their energy usage and offer recommendations on how to save energy and money by making small changes to their energy consumption. Reports are sent monthly or quarterly to customers throughout the year. A key component is a peer comparison, where they are shown energy usage relative to similar, nearby households. Peoples' intrinsic social competitiveness thereby increases the energy reductions and effectiveness of this program.

Objectives

The purpose of the Residential Peer Comparison program is to reduce energy consumption through socially-driven and information-driven behavioral change.

Another very important objective of the program is to raise general awareness regarding energy efficiency and to cross-sell and market other programs within the portfolio.

Projected Savings

The estimated energy savings are given in terms of annual per-unit values. . This does *not* include the impact of measures still in operation from previous years.

Total Net Incremental Energy Savings (kWh)

	Total Net Incremental Energy vings (kWh)		
Measure	2015	2016	2017
Peer Comparison Reports	23,000,000	23,000,000	23,000,000
TOTAL	**23,000,000**	**23,000,000**	**23,000,000**

Total Net Incremental Demand Savings (kW)

	Total Net Incremental Deman Savings (kW)		
Measure	2015	2016	2017
Peer Comparison Reports	6,762	6,762	6,762
TOTAL	**6,762**	**6,762**	**6,762**

Administrative Requirements

IPL will administer the Residential Peer Comparison program through an implementation contractor. IPL's role will be to ensure that:

- The implementation contractor performs all the activities associated with delivery of all components of the program, and
- IPL's educational and program messages are delivered accurately and clearly to ensure the effectiveness of program delivery and maximize customer satisfaction with the program.

The program is expected to operate according to the following administrative and total utility budget:

Total Program Budget

	Total Utility Budget		
Total Admin Costs	$101,800	$101,800	$101,800
Total Incentive Costs	$1,336,000	$1,336,000	$1,336,000
Total Utility Budget	**$1,437,800**	**$1,437,800**	**$1,437,800**

Cost-Effectiveness	The cost-effectiveness metrics of the Residential Behavioral Feedback Tools program are as follows:

	Cost Effectiveness Tests			
Program	**TRC Ratio**	**UCT Ratio**	**PCT Ratio**	**RIM Ratio**
Res Peer Comparison	**1.04**	**1.04**	**-**	**0.71**

CHAPTER | 10

BUSINESS PRESCRIPTIVE PROGRAM

Program Description	The Business Prescriptive program is designed to encourage and assist non-residential customers in improving the energy efficiency of their existing facilities through a broad range of energy efficiency options that address all major end uses and processes. This program offers incentives to customers who install high-efficiency electric equipment and engages equipment suppliers and contractors to promote the incentive-eligible equipment. This program, along with the Business Custom program, is likely to provide the bulk of the energy savings from business customers. It should be noted that since business energy efficiency efforts are very project-centric, there are many projects that may fit partially under both the Prescriptive and Custom programs. Therefore, a flexible delivery approach should be employed, with a method to share or allocate projects between the two programs. The program has the following components to accommodate the variety of customer needs and facilities in this sector: • Prescriptive Incentives—deemed per-unit savings for itemized measures; easy and appropriate for relatively low-cost or simple measures. • Specialized outreach to promote and enable prescriptive measures best suited to smaller facilities. • Customer referrals to qualified energy audit providers who can help customers identify appropriate and cost-effective retrofit opportunities. <u>Prescriptive Measure Incentives</u> • Quick and easy incentive application for measures with known and reliable energy savings. No pre-approval required. • Customers purchase and install qualified products from retailers and/or contractors. • Customers or their contractors submit incentive form to IPL's energy service provider with information that documents the qualifying sale/installation. The form allows customers to see the exact incentive they can receive. IPL mails rebate checks to customers or their contractors. • The prescriptive incentives are cash-back rebates that generally cover a portion of the incremental cost of the qualifying models; that is, the cost premium of qualifying models over less-efficient models available. In additional to prescriptive rebates for customers, the program will engage in upstream "buydowns" of certain products such as compact fluorescent lamps so that customers pay a lower price at the point of purchase without needing to apply for a rebate. The upstream buydown activity is a component of the program's focus on market transformation that will increase the demand for high efficiency products, and eventually decrease the availability of lower-efficiency products in the marketplace.
Objectives	The purpose of the Business Prescriptive program is to increase awareness of energy savings opportunities and assist customers in acting on those opportunities to decrease energy usage in commercial and industrial facilities and in master-metered multifamily residential buildings. This program is designed for retrofit and replacement projects.

	The program has several objectives: • Increase consumers' awareness and understanding of the breadth of energy efficiency opportunities in their facilities. • Make it easier for customers to adopt more energy-efficient equipment and equipment maintenance. • Make a significant contribution to attainment of IPL's energy savings achievements. • Demonstrate IPL's commitment to and confidence in the measures' performance and their ability to reduce business customer energy use. • Strengthen customer trust in IPL as their partners in saving energy.
Projected Savings	The estimated energy savings are given in terms of annual per-unit values. These values were applied to the estimated number of measures rebated under the program each year. The savings noted in each year reflect incremental or annual savings from measures installed by customers through the program in that year. This does *not* include the impact of measures still in operation from previous years.

Total Net Incremental Energy Savings (kWh)

	Total Net Incremental Energy Savings (kWh)		
Measure	2015	2016	2017
Bus Prescriptive Measures	40,140,145	42,147,152	44,254,510
TOTAL	**40,140,145**	**42,147,152**	**44,254,510**

Total Net Incremental Demand Savings (kW)

	Total Net Incremental Demand Savings (kW)		
Measure	2015	2016	2017
Bus Prescriptive Measures	7,326	7,692	8,077
TOTAL	**7,326**	**7,692**	**8,077**

Administrative Requirements	Program administrative staff's role will be to ensure that: • The implementation contractor performs all the activities associated with delivery of all components of the program, and • Educational and program messages are delivered accurately and clearly to ensure the effectiveness of program delivery and maximize customer satisfaction with the program. The program is expected to operate according to the following administrative and total utility budget:

Total Program Budget

	Total Utility Budget		
Total Admin Costs	$1,672,038	$1,746,739	$1,825,760
Total Incentive Costs	$3,917,596	$4,104,348	$4,301,899
Total Utility Budget	**$5,589,634**	**$5,851,088**	**$6,127,659**

Cost-Effectiveness	The cost-effectiveness metrics of the Business Prescriptive program are as follows:

	Cost Effectiveness Tests			
Program	TRC Ratio	UCT Ratio	PCT Ratio	RIM Ratio
Bus Prescriptive	**1.51**	**3.47**	**4.49**	**0.79**

CHAPTER | 11

BUSINESS CUSTOM INCENTIVES PROGRAM

Program Description	The Business Custom Incentives program is designed to encourage and assist nonresidential customers to save energy through customizable projects that are too complex to fit in the standard rebate offering. The program will promote the purchase and installation of efficient technologies and/or implementation of process improvements by working directly with key end-use customers and market providers. This program, along with the Business Prescriptive program, is likely to provide the bulk of the energy savings from business customers. It should be noted that since business energy efficiency efforts are very project-centric, there are many projects that may fit partially under both the Prescriptive and Custom programs. Therefore, a flexible delivery approach should be employed, with a method to share or allocate projects between the two programs.
	
	The program has the following components, to accommodate the variety of customer needs and facilities in this sector:
	• Custom Incentives—paid on fixed dollar per first-year-kWh-saved basis; appropriate for large and complex projects, often with multiple measures.
	• Emphasis on flexibility of custom projects to address variety of business and industrial process energy improvements.
	• Customer referrals to qualified energy audit providers who can help customers identify appropriate and cost-effective retrofit opportunities.
	
	<u>Custom Project Incentives</u>
	• Provides financial incentives on projects not suitable for prescriptive incentives because of size or multiple types of equipment involved.
	• More complex offering, with the following services and requirements:
	    o Review design/specification and savings estimates for completeness and applicability of incentives
	    o Pre- and post-project inspections to estimate and verify savings
	    o Incentives paid on a fixed $/kWh basis
	• Examples of custom projects include energy management systems, air compressor system optimization, building envelope improvements, and experimental technologies.

Objectives	The purpose of the Business Custom Incentives program is to increase awareness of energy savings opportunities and assist customers in acting on those opportunities to decrease energy usage in commercial and industrial facilities and in master-metered multifamily residential buildings. This program is designed for retrofit and replacement projects. The program has several objectives: • Increase consumers' awareness and understanding of the breadth of energy efficiency opportunities in their facilities.

- Make it easier for customers to adopt more energy-efficient equipment and equipment maintenance.
- Make a significant contribution to attainment of IPL's energy savings achievements.
- Strengthen customer trust in IPL as their partner in saving energy.

Projected Savings

The estimated energy savings are given in terms of annual per-unit values. These values were applied to the estimated number of projects rebated under the program each year. This does *not* include the impact of measures still in operation from previous years.

Total Net Incremental Energy Savings (kWh)

	Total Net Incremental Energy Savings (kWh)		
Measure	2015	2016	2017
Large Projects >$5K	15,000,000	15,750,000	16,537,500
Small Projects - $1-5K	2,083,333	2,187,500	2,296,875
TOTAL	**17,083,333**	**17,937,500**	**18,834,375**

Total Net Incremental Demand Savings (kW)

	Total Net I emental Demand Savings (kW)		
easure	2015	2016	2017
Large Projects >$5K	3,000	3,150	3,308
Small Projects - $1-5K	417	438	459
TOTAL	**3,417**	**3,588**	**3,767**

Administrative Requirements

Program administrative staff's role will be to ensure that:

- The implementation contractor performs all the activities associated with delivery of all components of the program, and
- Educational and program messages are delivered accurately and clearly to ensure the effectiveness of program delivery and maximize customer satisfaction with the program.

The program is expected to operate according to the following administrative and total utility budget:

Total Program Budget

	Total Utility Budget		
Total Admin Costs	$1,335,000	$1,396,500	$1,461,075
Total Incentive Costs	$2,050,000	$2,152,500	$2,260,125
Total Utility Budget	**$3,385,000**	**$3,549,000**	**$3,721,200**

Cost-Effectiveness

The cost-effectiveness metrics of the Business Custom Incentives program are as follows:

	Cost Effectiveness Tests			
Program	TRC Ratio	UCT Ratio	PCT Ratio	RIM Ratio
Bus Custom Incentives	**1.45**	**2.89**	**4.73**	**0.78**

CHAPTER | 12

SMALL BUSINESS DIRECT INSTALL PROGRAM

Program Description	The Business Direct Install program provides a suite of targeted, highly cost-effective measures to small businesses in a quickly deployable program delivery mechanism, along with education and program support to help business customers reduce their energy bills. The program will provide several direct-install measures at no additional cost to participants, such as lighting replacements, programmable thermostats, occupancy sensors, vending machine controls, and low-flow water fixtures. The program also connects customers with other programs in the portfolio and a network of qualified trade allies/contractors that can install follow-on measures to provide deeper energy savings. The Business Direct Install program has several components: • Walk-Through Audits—These are on-site assessments used to identify energy efficiency opportunities; audit reports contain specific recommendations, including expected costs, energy savings, and resource referrals. • Direct Installation of Measures—During the audit visit, the auditor will install a package of low-cost energy-saving measures, at no additional charge to the customer, to immediately improve the energy performance of the building. • Assistance with Additional Measure Adoption—IPL will usher participants into other business efficiency program offerings to provide cash rebates to participants who install additional measures recommended from the audit.
Objectives	The program is part of a long-term strategy to raise awareness of energy savings opportunities among business customers and to help them take action using incentives offered by IPL's energy efficiency programs. The program will achieve several objectives: • Improve customer understanding of how their buildings use energy and how they can use it more effectively for less money • Procure immediate energy savings through installation of energy-saving measures • Encourage installation of additional energy-saving measures recommendations with additional incentives • Aid business customers' perception of IPL as their partner in reducing energy use
Projected Savings	The estimated energy savings are given in terms of annual per-unit values. These values were applied to the estimated number of measures rebated under the program each year. This does *not* include the impact of measures still in operation from previous years.

Total Net Incremental Electricity Savings (kWh)

	Total Net Incremental Energy Savings (kWh)		
Measure	2015	2016	2017
CFL - 18W	1,400,140	1,540,154	1,617,162
LED Exit Sign	41,500	45,650	47,933
Occupancy Sensors	634,100	697,510	732,386
Programmable Thermostat	226,333	248,966	261,414
Vending Machine Timer	708,390	779,229	818,190
T8 lamps	463,083	509,391	534,860
RTU - Maintenance	7,150	7,865	8,258
Water Heater - Faucet Aerator Low Flow Nozzle	1,396,000	1,535,600	1,612,380
TOTAL	**4,876,695**	**5,364,365**	**5,632,583**

Total Net Incremental Demand Savings (kW)

	Total Net Incremental Demand Savings (kW)		
Measure	2015	2016	2017
CFL - 18W	435.4	478.9	502.9
LED Exit Sign	5.0	5.5	5.8
Occupancy Sensors	11.5	12.7	13.3
Programmable Thermostat	-	-	-
Vending Machine Timer	-	-	-
T8 lamps	119.6	131.5	138.1
RTU - Maintenance	-	-	-
Water Heater - Faucet Aerator Low Flow Nozzle	116.0	127.6	134.0
TOTAL	**687**	**756**	**794**

Administrative Requirements

Program administrative staff's role will be to ensure that:

- The implementation contractor performs all the activities associated with delivery of all components of the program, and
- Educational and program messages are delivered accurately and clearly to ensure the effectiveness of program delivery and maximize customer satisfaction with the program.

The program is expected to operate according to the following administrative and total utility budget:

Total Program Budget

	Total Utility Budget		
Total Admin Costs	$1,024,600	$1,120,060	$1,172,563
Total Incentive Costs	$444,000	$488,400	$512,820
Total Utility Budget	**$1,468,600**	**$1,608,460**	**$1,685,383**

Cost-Effectiveness

The cost-effectiveness metrics of the Business Custom Incentives program are as follows:

	Cost Effectiveness Tests			
Program	TRC Ratio	UCT Ratio	PCT Ratio	RIM Ratio
Bus Small Business Direct Install	**1.04**	**1.04**	**-**	**0.49**

CHAPTER | **13**

BUSINESS AC LOAD MANAGEMENT PROGRAM

Program Description

The Business AC Load Management program typically occurs during times of high peak demand or supply-side constraints. During an event, participants' equipment is controlled by a one-way remote switch

- The one-way remote switch is connected to the condensing unit of an AC. When activated by a control signal, the switch will not allow the equipment to operate for the duration of the event. The compressor is shut down up to 50% of the time in discrete cycles during an event while the fan continues to operate. This allows cool air to be circulated throughout the building while the compressor is disabled. The operation of the switch is usually controlled through a digital paging network.

The program has the following components:

- Switch Installation – A small device is installed on the outside of the building near the air conditioner. The switch is connected to the condensing unit of the AC and activated by a control signal.
- Bill Credit – Participants receive a credit on their monthly bill from June to September.

Objectives

The purpose of the Business AC Load Management program is to lower the peak demand usage in the IPL service territory to provide system and grid relief. The program provides financial incentives for customers as a means to not only promote energy efficient behavior, but also lower the cost of peak energy.

Projected Savings

The estimated energy savings are given in terms of annual per-unit values. These values were applied to the estimated number of participating customers under the program each year. The savings noted in each year reflect incremental or annual savings for the entire participant population.

Total Net Incremental Energy Savings (kWh)

	Total Net Incremental Energy Savings (kWh)		
Measure	2015	2016	2017
C&I ACLM switch (50% True Cycle)	22,820	24,214	25,608
TOTAL	**22,820**	**24,214**	**25,608**

Total Net Incremental Demand Savings (kW)

	Total Net Incremental Demand Savings (kW)		
Measure	2015	2016	2017
C&I ACLM switch (50% True Cycle)	1,781	1,889	1,998
TOTAL	**1,781**	**1,889**	**1,998**

Administrative Requirements	This program will be administered through an implementation contractor. The Utility's role will be to ensure that: • The implementation contractor performs all the activities associated with delivery of all components of the program, and • IPL's educational and programmatic messages are delivered accurately and clearly to ensure the effectiveness of program delivery and maximize customer satisfaction with the program. The program is expected to operate according to the following administrative and total utility budget: Total Program Budget

	Total Utility Budget		
Total Admin Costs	$103,032	$107,187	$111,343
Total Incentive Costs	$123,694	$131,250	$138,806
Total Utility Budget	**$226,726**	**$238,437**	**$250,149**

Cost-Effectiveness	The cost-effectiveness metrics of the Business AC Load Management program are as follows:

	Cost Effectiveness Tests			
Program	TRC Ratio	UCT Ratio	PCT Ratio	RIM Ratio
Bus AC Load Management	**1.40**	**0.73**	-	**0.72**

About EnerNOC Utility Solutions Consulting

EnerNOC Utility Solutions Consulting is part of EnerNOC Utility Solutions group, which provides a comprehensive suite of demand-side management (DSM) services to utilities and grid operators worldwide. Hundreds of utilities have leveraged our technology, our people, and our proven processes to make their energy efficiency (EE) and demand response (DR) initiatives a success. Utilities trust EnerNOC to work with them at every stage of the DSM program lifecycle – assessing market potential, designing effective programs, implementing those programs, and measuring program results.

EnerNOC Utility Solutions delivers value to our utility clients through two separate practice areas – Program Implementation and EnerNOC Utility Solutions Consulting.

- Our Program Implementation team leverages EnerNOC's deep "behind-the-meter expertise" and world-class technology platform to help utilities create and manage DR and EE programs that deliver reliable and cost-effective energy savings. We focus exclusively on the commercial and industrial (C&I) customer segments, with a track record of successful partnerships that spans more than a decade. Through a focus on high quality, measurable savings, EnerNOC has successfully delivered hundreds of thousands of MWh of energy efficiency for our utility clients, and we have thousands of MW of demand response capacity under management.
- The EnerNOC Utility Solutions Consulting team provides expertise and analysis to support a broad range of utility DSM activities, including: potential assessments; end-use forecasts; integrated resource planning; EE, DR, and smart grid pilot and program design and administration; load research; technology assessments and demonstrations; evaluation, measurement and verification; and regulatory support.

The EnerNOC Utility Solutions Consulting team has decades of combined experience in the utility DSM industry. The staff is comprised of professional electrical, mechanical, chemical, civil, industrial, and environmental engineers as well as economists, business planners, project managers, market researchers, load research professionals, and statisticians. Utilities view our experts as trusted advisors, and we work together collaboratively to make any DSM initiative a success.

EnerNOC Utility Solutions Consulting
500 Ygnacio Valley Road, Suite 450
Walnut Creek, CA 94596

P: 925.482.2000
F: 925.284.3147

Indianapolis Power & Light Company
DSM Status Report
July 1, 2014

2014 IRP Attachment 4.2

Gross MWh Savings

CORE PROGRAMS	End Note	2010 Ex-ante*	2010 Verified**	2011 Ex-ante*	2011 Verified**	2012 Ex-ante*	2012 Verified**	2013 Ex-ante*	2013 Verified**	2014 YTD thru 5/31/14	2014 Forecast Year End
Prescriptive Lighting	1	1,735	1,735	12,459	17,161	20,790	16,392	31,416	28,250	10,653	15,993
Home Energy Assessment	2	678	363	3,844	2,279	10,680	5,691	26,829	24,950	8,698	16,729
Income Qualified Weatherization	2	375	375	272	195	1,051	446	1,454	1,154	1,337	2,767
Energy Efficient Schools - Kits	3	1,686	1,686	1,956	1,956	4,127	3,910	5,047	4,832	2,885	4,127
C&I Prescriptive	4	675	675	21,602	21,602	30,397	20,785	45,620	36,600	31,463	54,298
C&I Energy Efficient Schools - Audits		0	0	0	0	0	0	1,492	1,459	541	793
Total Core Programs By Year		5,149	4,834	40,134	43,193	67,046	47,224	111,858	97,245	55,577	94,707

Gross kW Savings

CORE PROGRAMS	2010 Ex-ante*	2010 Verified**	2011 Ex-ante*	2011 Verified**	2012 Ex-ante*	2012 Verified**	2013 Ex-ante*	2013 Verified**	2014 YTD thru 5/31/14	2014 Forecast Year End
Prescriptive Lighting	1,361	1,361	9,772	1,943	3,323	2,609	5,021	3,379	1,268	1,798
Home Energy Assessment	178	43	1,010	271	4,758	2,568	12,260	5,097	1,259	5,623
Income Qualified Weatherization	66	66	48	14	454	262	621	371	128	723
Energy Efficient Schools - Kits	125	125	126	0	0	0	0	0	0	0
C&I Prescriptive	138	138	4,804	4,804	6,611	3,664	6,196	6,876	5,167	33,210
C&I Energy Efficient Schools - Audits	0	0	0	0	0		54	89	38	56
Total Core Programs By Year	1,868	1,733	15,759	7,032	15,146	9,103	24,152	15,812	7,860	41,410

Program Expenditures (000's) excluding lost revenues and/or performance incentives

CORE PROGRAMS	2010	2011	2012	2013	2014 YTD thru 5/31/14	2014 Forecast Year End	Verified Gross MWh Savings By Program 2010-2014
Prescriptive Lighting	$114	$409	$1,229	$1,684	$639	$851	79,531
Home Energy Assessment	$127	$967	$3,690	$8,616	$2,930	$4,276	50,012
Income Qualified Weatherization	$289	$416	$717	$820	$856	$1,206	4,937
Energy Efficient Schools - Kits	$147	$119	$819	$990	$764	$540	16,511
C&I Prescriptive	$141	$1,373	$2,079	$6,509	$6,145	$12,945	133,960
C&I Energy Efficient Schools - Audits	$0	$43	$294	$343	$183	$389	2,252
Total Core Programs By Year	$818	$3,326	$8,828	$18,962	$11,517	$20,207	287,203

Core Plus Programs – Gross MWh Savings

CORE PLUS PROGRAMS	End Note	2010 Ex-ante*	2010 Verified**	2011 Ex-ante*	2011 Verified**	2012 Ex-ante*	2012 Verified**	2013 Ex-ante*	2013 Verified**	2014 YTD thru 5/31/14	2014 Forecast Year End
Residential-Appliance Recycling	5	760	760	959	711	2,235	2,235	2,366	2,306	524	2,273
Residential-Room AC Pickup and Recycling	6	0	0	0	0	6	6	see note	see note	see note	see note
Residential-New Construction		101	136	353	433	216	210	62	62	0	187
Residential-Energy Assessment		1,398	2,394	2,032	1,080	668	646	765	667	407	1,819
Residential-Renewable Energy Incentives		5	7	5	17	14	14	52	52	6	102
Res-Air Conditioning Load Management	7	41	41	40	89	23	23	370	370	374	429
Residential-High Efficiency HVAC Incentives		0	0	0	0	658	724	1,456	1,396	0	0
Residential-Peer Comparison Energy Reports	8	0	0	0	0	4,724	5,580	12,958	13,420	11,465	29,045
Residential-Multi-Family Direct Install		0	0	11,616	14,194	13,845	12,763	9,340	8,544	1,866	7,491
C&I Business Energy Incentive		0	0	7,702	6,353	13,806	13,806	18,494	18,093	6,530	20,071
C&I Air Conditioning Load Management	7	1	1	6	4	6	6	2	2	2	29
C&I Renewable Energy Incentives		10	7	14	28	6	6	19	18	19	32
On-line Energy Feedback		0	0	0	0	0	0	0	0	0	0
Indirect Costs attributable to all Core Plus programs											
Total Core Plus Programs By Year		2,316	3,346	22,726	22,909	36,208	36,019	45,884	44,930	21,193	61,478

Core Plus Programs – Gross kW Savings

CORE PLUS PROGRAMS	2010 Ex-ante*	2010 Verified**	2011 Ex-ante*	2011 Verified**	2012 Ex-ante*	2012 Verified**	2013 Ex-ante*	2013 Verified**	2014 YTD thru 5/31/14	2014 Forecast Year End
Residential-Appliance Recycling	168	168	183	113	419	419	397	400	94	399
Residential-Room AC Pickup and Recycling	0	0	0	0	32	32	see note	see note	see note	see note
Residential-New Construction	8	21	29	64	37	38	5	4	0	85
Residential-Energy Assessment	186	277	316	125	105	89	85	75	41	173
Residential-Renewable Energy Incentives	3	1	18	3	12	12	9	9	1	17
Res-Air Conditioning Load Management	3,752	3,752	3,599	17,325	2,126	2,126	29,925	29,925	30,301	34,936
Residential-High Efficiency HVAC Incentives	0	0	0	0	112	139	247	210	0	0
Residential-Peer Comparison Energy Reports	0	0	0	0	351	351	1,782	1,845	0	0
Residential-Multi-Family Direct Install	0	0	1,471	480	1,768	1,589	1,134	993	218	908
C&I Business Energy Incentive	0	0	2	2,208	2,425	2,425	3,598	3,528	1,159	3,540
C&I Air Conditioning Load Management	132	132	1	74	497	497	191	191	382	2,276
C&I Renewable Energy Incentives	6	1	0	5	5	5	3	3	3	6
On-line Energy Feedback	0	0	0	0	0	0	0	0	0	0
Indirect Costs attributable to all Core Plus programs										
Total Core Plus Programs By Year	4,254	4,352	5,619	20,397	7,889	7,722	37,376	37,183	32,199	42,340

Core Plus Programs – Program Expenditures (000's)

CORE PLUS PROGRAMS	2010	2011	2012	2013	2014 YTD thru 5/31/14	2014 Forecast Year End	Verified Gross MWh Savings By Program 2010-2014
Residential-Appliance Recycling	$122	$161	$499	$387	$105	$516	8,285
Residential-Room AC Pickup and Recycling	$0	$0	$5	see note	see note	see note	
Residential-New Construction	$46	$52	$114	$71	$28	$172	1,028
Residential-Energy Assessment	$120	$221	$214	$134	$37	$196	6,606
Residential-Renewable Energy Incentives	$32	$14	$36	$54	$12	$111	192
Res-Air Conditioning Load Management	$1,338	$1,317	$1,309	$1,325	$215	$2,046	952
Residential-High Efficiency HVAC Incentives	$0	$0	$515	$699	$0	$0	2,120
Residential-Peer Comparison Energy Reports	$0	$0	$293	$813	$721	$1,785	48,045
Residential-Multi-Family Direct Install	$0	$510	$657	$871	$228	$1,037	42,992
C&I Business Energy Incentive	$49	$562	$1,125	$1,750	$997	$2,830	58,323
C&I Air Conditioning Load Management	$21	$96	$134	$77	$12	$287	42
C&I Renewable Energy Incentives	$7	$30	$16	$14	$6	$38	91
On-line Energy Feedback	$0	$0	$432	$152	$7	$136	0
Indirect Costs attributable to all Core Plus programs	$212	$412	$689	$807	$277	$1,168	0
Total Core Plus Programs By Year	$1,947	$3,377	$6,038	$7,154	$2,645	$10,322	168,676

Portfolio Summary		**2010** Ex-ante*	**2010** Verified**	**2011** Ex-ante*	**2011** Verified**	**2012** Ex-ante*	**2012** Verified**	**2013** Ex-ante*	**2013** Verified**	**2014 YTD thru 5/31/14**	**2014 Forecast Year End**	**2010 - 2014 Summary View**
Total Gross MWh Core & Core Plus		7,465	8,180	62,860	66,102	103,254	83,243	157,742	142,175	76,770	156,185	455,885
Core & Core Plus MWh Generic Target		44,205		72,224		98,865		126,264			155,079	496,637
Total Program Expenditures Core & Core Plus		$2,765		$6,703		$14,866		$26,116		$14,162	$30,529	$80,978

*Ex-Ante savings are the savings reported by third party administrator and/or utility. Ex-Ante savings are a before the fact engineering review to determine deemed savings, and are used for planning and reported purposes.
**Verified Gross Savings per EM&V reports where available. Ex-ante savings used for programs that have not been evaluated.

Future Avoided Production and Capacity Costs Used to Evaluate DSM Programs		
Year	Energy Avoided Cost $ per MWh	Capacity Avoided Cost $ per KW
2015	[redacted]	
2016		
2017		
2018		
2019		
2020		
2021		
2022		
2023		
2024		
2025		
2026		
2027		
2028		
2029		
2030		
2031		
2032		
2033		
2034		

Notes:
1. All values expressed in real 2014$.
2. Avoided Energy cost from Ventyx Fall 2013 Reference Case - MISO-IN .
3. Avoided Capacity cost based on Levelized Avoided Cost of CT using Ventyx cost estimates for CT and includes avoided Fixed O&M and adjustment for system losses.
4. Avoided Capacity reflects a 10% adder to account for avoided T&D investment.

Indianapolis Power Light Company
2014 Integrated Resource Plan

Standard DSM Benefit/Cost Tests

DSM test objectives and valuation equation and components

	Standard Benefit / Cost Tests				
	RIM	TRC	UC	CBT	Participant
Goal/Impact of test					
Minimizes Utility costs			X		
Minimizes Customer rate impacts	X				
Achieves Customer fairness	X				
Minimizes Overall/Societal costs		X		X	
Maximizes Participant benefit					X
Test Benefit and Cost Components					
Benefits					
Production Cost Savings (energy)	X	X	X	X	
Capacity Cost Savings	X	X	X	X	
Participant Bill Savings					X
Costs					
Lost Revenue to Utility (Customer base)	X			X	
Incentives paid by Utility	X		X	X	
Program Administrative Costs	X	X	X	X	
Participant Costs (investment)		X		X	X

B/C test ratio (equation)

Benefit/Cost test equation is ratio of marked ("X" above). Benefits and Costs expressed as present values.

Benefit/Cost Ratios by Program and Market Segment (IURC Cause No. 44497)

Program	RIM	PCT	UCT	TRC	CBT
Residential Lighting	1.00	2.23	2.25	1.05	21.21
Income Qualified Weatherization	0.48		0.61	0.61	-0.59
Residential Air Conditioning Load Management	1.56		1.57	2.65	1.72
Multi-Family Direct Install	0.80		1.39	1.39	1.10
Home Energy Assessment	0.69		1.15	1.15	0.30
School Kits	0.90		1.90	1.90	4.24
Online Energy Assessment Kits	0.76		1.33	1.33	0.78
Appliance Recycling	0.75		1.21	1.42	0.91
Peer Comparison Reports	0.71		1.04	1.04	0.11
Residential Segment	**0.82**		**1.25**	**1.14**	**N/A**
Business Prescriptive	0.79	3.27	3.47	1.51	1.25
Business Custom	0.78	3.32	2.89	1.45	1.08
Small Business Direct Install	0.49		1.04	1.04	0.04
Business Air Conditioning Load Mgmt	0.72		0.73	1.40	0.75
Business Segment	**0.75**	**3.49**	**2.81**	**1.44**	**N/A**
Total Programs Only	0.80		2.16	1.39	N/A
Portfolio Level Including Indirect Costs + Shared Savings	**0.77**	**3.88**	**1.99**	**1.32**	**N/A**

Net Present Value Of DSM Program Benefits (UCT – Life Cycle)

	TRC Benefits	TRC Costs	Levelized UCT Cost $/kWh	Levelized UCT Cost $/kW
Res Lighting	$11,931,249	$11,312,525	$ 0.018	$ 152.48
Res Renewables	$61,777	$652,966	$ -	$ -
Res IQW	$2,142,414	$3,538,726	$ 0.077	$ 293.98
Res New Construction	$242,758	$1,477,383	$ -	$ -
Res AC Load Management	$8,867,246	$3,352,050	$ 4.302	$ 52.58
Res MF Direct Install	$4,402,647	$3,168,412	$ 0.031	$ 227.13
Res HEA	$5,015,531	$4,358,481	$ 0.032	$ 345.91
Res School Kit	$3,250,195	$1,708,010	$ 0.020	$ 262.89
Res Online Energy Assessment	$773,460	$582,372	$ 0.030	$ 290.54
Res Appliance Recycling	$2,434,207	$1,712,353	$ 0.037	$ 210.21
Res Peer Comparison	$4,067,063	$3,893,294	$ 0.056	$ 191.92
Bus Prescriptive	$54,939,336	$36,456,981	$ 0.012	$ 67.66
Bus Custom Incentives	$27,781,730	$19,121,551	$ 0.015	$ 74.29
Bus Schools Program	$226,899	$1,755,083	$ -	$ -
Bus Small Business Direct Install	$4,473,780	$4,288,469	$ 0.040	$ 278.98
Bus Renewables	$20,934	$280,838	$ -	$ -
Bus AC Load Management	$468,740	$334,717	$ 8.873	$ 113.71
Portfolio Total:	**$131,099,964**	**$97,994,212**	**$ 0.021**	**$ 98.82**

Program	Total Utility Costs (000$)			Total Net Energy Savings (MWh)			Total Net Demand Savings (MW)		
	2015	2016	2017	2015	2016	2017	2015	2016	2017
Res Lighting	1,963	1,967	1,943	16,369	16,492	16,616			
Res IQW	1,307	1,307	1,307	2,057	2,057	2,057			
Res ACLM	2,021	2,082	2,144	425	437	448			
Res Multi Family Direct Install	1,170	1,170	1,170	5,714	5,714	5,714			
Res HEA	1,610	1,610	1,610	5,850	5,850	5,850			
Res School Kit	631	631	631	4081	4081	4081			
Res Online Energy Assessment	201	218	227	959	1055	1107			
Res Appliance Recycling	746	746	746	2282	2282	2282			
Res Peer Comparison	1,438	1,438	1,438	23,000	23,000	23,000			
Bus Prescriptive	5,590	5,851	6,128	40,140	42,147	44,255			
Bus Custom Incentives	3,385	3,549	3,721	17,083	17,938	18,834			
Small Business Direct Install	1,469	1,608	1,685	4,877	5,364	5,633			
Bus AC Load Management	227	238	250	23	24	26			
Residential Total:	11,087	11,169	11,216	60,737	60,968	61,156			
Business Total:	10,670	11,247	11,784	62,123	65,473	68,747			
Portfolio Total:	**21,757**	**22,416**	**23,000**	**122,860**	**126,441**	**129,903**			

Indianapolis Power & Light Company

Demand-Side Management Potential Forecast

For 2018-2034

October 31, 2014

IPL engaged Applied Energy Group ("AEG") to complete a Demand-Side Management ("DSM") Potential Forecast for 2018-2034 for inclusion in the Company's 2014 Integrated Resource Plan.

IPL notes:

- AEG's forecast represents the market potential from a 2014 viewpoint
- IPL's future DSM filings and results will likely vary from the forecast
- Legislation and public policy will help shape future DSM
- Customer behavior including additional large customer opt-outs will affect outcomes
- Programs were included in the forecast based on a Total Resource Cost (TRC) threshold result of 1 or greater, while IPL's DSM portfolio offerings typically have an aggregate TRC value greater than 1

AEG's report is provided herein.

INDIANAPOLIS POWER & LIGHT
DEMAND-SIDE MANAGEMENT POTENTIAL FORECAST
FOR 2015-2034

Applied Energy Group
500 Ygnacio Valley Road
Suite 450
Walnut Creek, CA 94596
925.482.2000
www.appliedenergygroup.com

Prepared for:
Indianapolis Power & Light

Presented on:
October 15, 2014

This report was prepared by:

Applied Energy Group
500 Ygnacio Valley Blvd., Suite 450
Walnut Creek, CA 94596

I. Rohmund, Project Director
D. Costenaro, Project Manager
C. Carrera

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CHAPTER | 1

Introduction

This study represents an update to the prior report "Energy Efficiency Market Potential Study and Action Plan" dated December 21, 2012 (2012 MPS).[1] This report focuses on the work we did to update that analysis for Indianapolis Power & Light (IPL) to create forecasts of demand-side management (DSM) potential from 2015 to 2034 as part of the development of their integrated resource plan (IRP). For a detailed description of the analysis approach for the DSM potential forecasts, please refer to the 2012 MPS. In Chapter 2, Analysis Approach, we focus primarily on updates and revisions to the previous study.

The updated analysis Applied Energy Group (AEG) presents in this report identifies achievable potential based on cost-effectiveness criteria provided by IPL. It also delivers estimates of program costs, energy savings, and demand savings associated with the DSM programs and measures. Further, these estimates are calibrated to align with the DSM Action Plan (2015-2017) that were developed separately for IPL by AEG. IPL is using the Action Plan in its DSM filing to seek approval of DSM programs for 2015-2016.

Definitions of Potential

Unless otherwise noted, the DSM savings estimates provided in this report represent net savings[2] developed into three types of potential: technical potential, economic potential, and achievable potential. Technical and economic potential are both theoretical limits to efficiency savings. Achievable potential embodies a set of assumptions about the decisions consumers make regarding the efficiency of the equipment they purchase, the maintenance activities they undertake, the controls they use for energy-consuming equipment, and the elements of building construction. The various levels are described below.

- **Technical potential** is defined as the theoretical upper limit of DSM potential. It assumes that customers adopt all feasible measures regardless of their cost. At the time of existing equipment failure, customers replace their equipment with the most efficient option available. In new construction, customers and developers also choose the most efficient equipment option. Technical potential also assumes the adoption of every other available measure, where applicable. For example, it includes installation of high-efficiency windows in all new construction opportunities and furnace maintenance in all existing buildings with furnace systems. These retrofit measures are phased in over a number of years, which is longer for higher-cost and complex measures.
- **Economic potential** represents the adoption of all ***cost-effective*** DSM measures. In this analysis, the cost effectiveness is measured by the total resource cost (TRC) test, which compares lifetime energy and capacity benefits to the incremental cost of the measure. If the benefits outweigh the costs (that is, if the TRC ratio is greater than 1.0), a given measure is considered in the economic potential. Customers are then assumed to purchase the most cost-effective option applicable to them at any decision juncture.
- **Realistic Achievable potential** estimates customer adoption of economic measures when delivered through DSM programs under typical market, implementation, and customer preference conditions. The delivery environment in this analysis projects the current state of

[1] The 2012 report was completed by EnerNOC Utility Solutions Consulting Group, which has since been acquired by Applied Energy Group. The same team members completed the analysis in both studies.

[2] Savings in "net" terms instead of "gross" means that the savings do not include program "free riders" and that the baseline forecast includes naturally occurring efficiency. In other words, the baseline assumes that natural early adopters continue to make purchases of equipment and measures at efficiency levels higher than the minimum standard.

the DSM market in IPL's service territory and projects typical levels of expansion and increased awareness over time.

Abbreviations and Acronyms

Throughout the report we use several abbreviations and acronyms. Table 1-1 shows the abbreviation or acronym, along with an explanation.

Table 1-1 Explanation of Abbreviations and Acronyms

Acronym	Explanation
ACS	American Community Survey
AEO	Annual Energy Outlook forecast developed annually by EIA
AHAM	Association of Home Appliance Manufacturers
B/C Ratio	Benefit to cost ratio
BEST	AEG's Building Energy Simulation Tool
CAC	Central air conditioning
C&I	Commercial and industrial
CFL	Compact fluorescent lamp
DEEM	AEG's Database of Energy Efficiency Measures
DEER	State of California Database for Energy-Efficient Resources
DSM	Demand side management
EE	Energy efficiency
EIA	Energy Information Administration
EISA	Energy Efficiency and Security Act of 2007
EPACT	Energy Policy Act of 2005
EPRI	Electric Power Research Institute
EUEA	Efficient Use of Energy Act
EUI	Energy-use index
HH	Household
HID	High intensity discharge lamps
HPWH	Heat pump water heater
IURC	Indiana Utility Regulatory Commission
LED	Light emitting diode lamp
LoadMAP	AEG's Load Management Analysis and Planning™ tool
OUCC	Indiana Office of Utility Consumer Counselor
RAP	Realistic Achievable Potential
RTU	Roof top unit
Sq. ft.	Square feet
TRC	Total resource cost
UEC	Unit energy consumption

CHAPTER 2

Analysis Approach

In this section, we summarize our analysis approach and modeling tool, focusing on updates made to the original analysis from the 2012 MPS.

Overview of Analysis Approach

To develop the DSM potential forecasts, AEG used a bottom-up analysis approach following the major steps listed below. Following this, we describe our modeling tool and then focus briefly on each step, describing the areas where updates or revisions were applied. For a more detailed description of the analysis approach, please refer to the 2012 MPS.

1. Performed a market characterization to describe sector-level electricity use for the residential, commercial, and industrial sectors for the base year, 2011 within IPL's service territory. This included existing information contained in prior Indiana studies, specific updates to the IPL customer database since the 2012 MPS, AEG's own databases and tools, and other secondary data sources such as the American Community Survey (ACS) and the Energy Information Administration (EIA).
2. Developed a baseline projection of energy consumption and peak demand by sector, segment, and end use for 2011 through 2034. This 20-year timeframe was a requirement for the IPL integrated resource plan, and had not been developed in the 2012 MPS or previous Action Plans, which only focused on years through 2017.
3. Defined and characterized several hundred DSM measures to be applied to all sectors, segments, and end uses.
4. Estimated the Technical, Economic, and Realistic Achievable potential from the efficiency measures. This involved a step to calibrate the participation, savings, and spending levels of Realistic Achievable potential to align with those filed in IPL's 2015-2017 DSM Action Plan.

LoadMAP Model

For the DSM potential analysis, we used AEG's Load Management Analysis and Planning tool (LoadMAP™) version 3.0 to develop both the baseline projection and the estimates of potential. AEG developed LoadMAP in 2007 and has enhanced it over time through application to numerous national, regional, and utility-specific forecasting and potential studies. Built in Excel, the LoadMAP framework is both accessible and transparent and has the following key features.

- Embodies the basic principles of rigorous end-use models (such as EPRI's REEPS and COMMEND) but in a more simplified, accessible form.
- Includes stock-accounting algorithms that treat older, less efficient appliance/equipment stock separately from newer, more efficient equipment. Equipment is replaced according to the measure life and appliance vintage distributions defined by the user.
- Balances the competing needs of simplicity and robustness by incorporating important modeling details related to equipment saturations, efficiencies, vintage, and the like, where market data are available, and treats end uses separately to account for varying importance and availability of data resources.
- Isolates new construction from existing equipment and buildings and treats purchase decisions for new construction and existing buildings separately.
- Uses a simple logic for appliance and equipment decisions. Other models available for this purpose embody complex decision choice algorithms or diffusion assumptions, and the model

parameters tend to be difficult to estimate or observe and sometimes produce anomalous results that require calibration or even overriding. The LoadMAP approach allows the user to drive the appliance and equipment choices year by year directly in the model. This flexible approach allows users to import the results from diffusion models or to input individual assumptions. The framework also facilitates sensitivity analysis.

- Includes appliance and equipment models customized by end use. For example, the logic for lighting is distinct from refrigerators and freezers.
- Can accommodate various levels of segmentation. Analysis can be performed at the sector level (e.g., total residential) or for customized segments within sectors (e.g., housing type or income level).

Consistent with the segmentation scheme and the market profiles we describe below, the LoadMAP model provides forecasts of baseline energy use by sector, segment, end use, and technology for existing and new buildings. It also provides forecasts of total energy use and DSM savings associated with the various types of potential.

Market Characterization

AEG used the market characterization from the 2012 MPS for this study as a starting point. It describes electricity consumption for IPL's residential, commercial, and industrial sectors for the base year of 2011, which was developed using prior Indiana studies, in AEG's own databases and tools, and in other secondary data sources such as the American Community Survey (ACS) and the Energy Information Administration (EIA).

To update the market characterization within the LoadMAP files, IPL provided the following data updates that had been completed since the publication of the prior report:

- Historical billing data of customer counts by sector
- Historical billing data of annual energy consumption and system peak demand by sector
- Updates to NAICS codes on the billing system

As a result of these additional data, particularly NAICS codes, we refined the split between commercial and industrial customers. Using the IPL system peak data together with AEG's end-use load shape library, we developed estimates of peak demand by sector, segment and end use. We calibrated the values to IPL's system peak.

Baseline Projection

AEG used the existing LoadMAP model from the 2012 MPS and applied updates we made to the market characterization as the basis for a projection of baseline electricity use by sector, segment, and end use beginning in the base year of 2011 and ending in 2034. AEG applied the latest data sources regarding codes and standards, market conditions, and customer purchase decisions that had evolved since the 2012 MPS. The model was calibrated to exactly match IPL's actual sales for 2012 and 2013, and then compared and aligned to the official IPL load forecast through 2034. Similar to the 2012 MPS and most of the potential studies we conduct, the LoadMAP forecast does not exactly match IPL's official load forecast in every year, but is within a small, acceptable range that does not materially affect the results of the study.

This current study also developed a baseline end-use projection for peak demand by applying the end-use peak factors to the annual projection by segment and end use. The summary of the peak demand forecast is presented in Chapter 4.

DSM Measure Characterization

AEG used the measure characterization from the 2012 MPS and updated assumptions that have evolved in the marketplace since the completion of the previous work, primarily the projected cost and performance of LED lighting. Additionally, changes were made to the television market baseline to reflect that more efficient LCD and LED televisions have become available and are being purchased. Similarly, set-top-boxes have undergone a transformation through a manufacturer agreement and those savings are included in the baseline projection in 2017 and beyond.

We also added measures to represent the residential peer comparison program and air conditioning direct load control programs.

Estimate DSM Potential

AEG used the LoadMAP model as described above to estimate three levels of DSM potential: Technical, Economic, and Realistic Achievable. The DSM potential estimates incorporated updated avoided cost data and discount rates as provided by IPL.

For this analysis, we excluded potential savings associated with the large commercial and industrial (C&I) customers that have chosen to opt out of DSM programs. This was done by calibrating the participation and savings levels in the DSM potential forecast for the years 2015 through 2017 to the latest DSM Action Plan filed by IPL. In the 2015-2017 Action Plan, participation and savings levels exclude 25% of C&I customers based on current opt-out rates.

Calibration to IPL's 2015-2017 DSM Action Plan

AEG calibrated savings and costs in the first three years of the Achievable Potential forecast to align with the savings and costs in the 2015-2017 DSM Action Plan. This process involved adjusting participation rates by a constant so that measure savings matched the levels of the DSM Action Plan for 2015-2017. Due to variance in market segmentation, measure bundling, naming conventions, and other factors, the specific measures present in the LoadMAP models do not exactly match those in the 2015-2017 DSM Action Plan. As a result, the alignment and calibration of costs and savings do not produce an exact match in every year, but it is within an acceptable range that does not materially affect the results of the study. This process is described in more detail in Appendix A.

CHAPTER | 3

Market Characterization

This section summarizes how customers in the IPL service territory use electricity in the base year of the study, 2011. It begins with a high-level summary of energy use by sector and then delves into each sector in detail.

Overall Energy Use

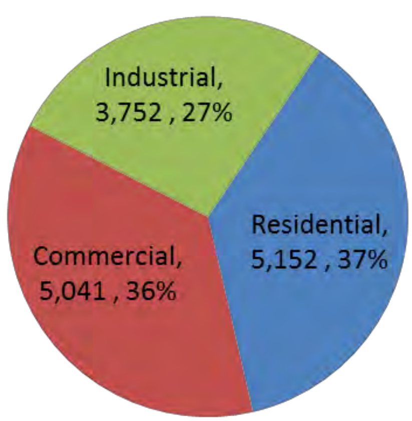
Total electricity use for the residential, commercial and industrial sectors for IPL in 2011 was 13,946 GWh. As shown in Table 3-1 and Figure 3-1, the largest sector is residential, which accounts for 37% of load at 5,152 GWh. Commercial accounts for 36% of the load at 5,041 GWh. The remaining use is in the industrial sector, at 3,752 GWh.

In this study, we used enhanced customer information and updates to NAICS codes in the IPL billing system to reclassify commercial and industrial accounts. This results in a different allocation of energy use to the commercial and industrial sectors. The current analysis shows that the commercial sector, at 36% of total use, is higher than the industrial, with 27% of total use.

Table 3-1 Sector-Level Electricity Use, 2011

Segment	Annual Use (GWh)	% of Sales
Residential	5,152	37%
Commercial	5,041	36%
Industrial	3,752	27%
Total	**13,946**	**100%**

Figure 3-1 Sector-Level Electricity Use, 2011



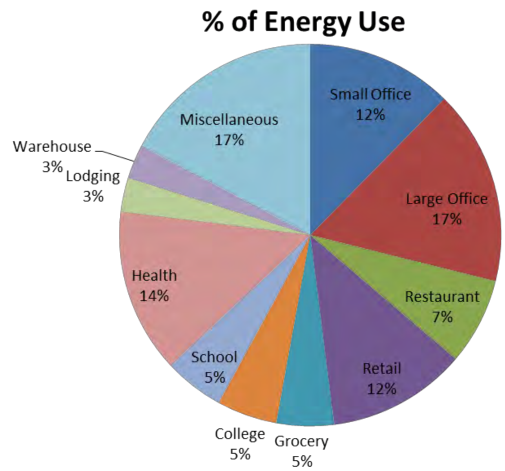
Commercial Sector Use by Building Type

In addition to revised sector-level control totals for the commercial and industrial sectors, the additional IPL data were used to develop refined energy use estimates for the eleven building-type identified for the analysis: Small Office, Large Office, Restaurant, Retail, Grocery, College, School, Health, Lodging, Warehouse, and Miscellaneous.

The values are shown in Table 3-2 below.

Table 3-2 Commercial Electricity Use by End Use and Segment (2011)

Segment	Electricity Use (GWh)	Intensity (kWh/SqFt)	Floor Space (million SqFt)
Small Office	624	15.2	41
Large Office	832	18.0	46
Restaurant	370	38.7	10
Retail	594	13.9	43
Grocery	245	48.9	5
College	257	11.5	22
School	257	8.0	32
Health	701	24.6	29
Lodging	145	13.7	11
Warehouse	145	6.4	23
Miscellaneous	870	7.6	114
Total	5,041	13.5	375

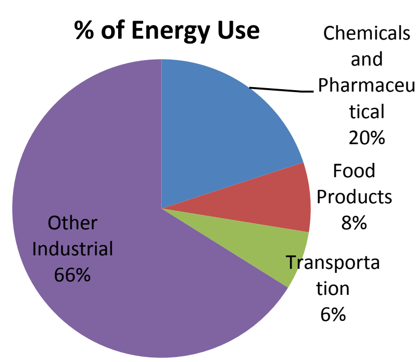


Industrial Sector Use by Industry

Similar to the commercial sector, we used the additional IPL data to develop refined energy use estimates for the four industries identified for the analysis: Chemical and Pharmaceutical (considered as one segment due to similarities in energy use and production methods), Transportation, and Food – with the remaining customers classified as Other Industrial. The values are shown in Table 3-3 below.

Table 3-3 Industrial Electricity Use by End Use and Segment (2011)

Segment	Electricity Use (GWh)	Number of Employees
Chemical and Pharmaceutical	751	3,079
Food Products	283	3,592
Transportation	238	4,054
Other Industrial	2,481	90,634
Total	**3,752**	**101,358**



Baseline Projection

Prior to developing estimates of DSM potential, we developed a baseline end-use projection to quantify what consumption is likely to be in the future in absence of new DSM programs. The baseline projection serves as the metric against which DSM potentials are measured. This chapter presents the baseline forecast for electricity for each sector. As mentioned above, we used the models from the 2012 MPS with a base year of 2011. To calibrate and exactly match the actual sales data from 2012 and 2013 that had become available since the 2012 study, we adjusted for actual weather, trends in exogenous forecast variables, and miscellaneous usage. The remainder of the forecast years, 2014 through 2034, were projected by the LoadMAP forecasting engine.

Residential Sector

The baseline projection incorporates assumptions about economic growth, electricity prices, equipment standards, building codes and naturally occurring energy efficiency.

Table 4-1 and Figure 4-1 present the baseline projection for electricity consumption for select years at the end-use level for the residential sector as a whole. Overall, residential use increases slightly from 5,152 GWh in 2011 to 6,266 GWh in 2034, an increase of 21.6%, or an average growth rate of 0.9% per year. This reflects the impact of the EISA lighting standard, additional appliance standards adopted in 2011, and modest customer growth. Fluctuations in the early years illustrate the calibration process to actual load data that was available for 2011 to 2013.

Table 4-1 Residential Electricity Baseline Projection by End Use (GWh)

End Use	2011	2015	2016	2017	2020
Cooling	785	804	813	820	843
Heating	978	1,021	1,037	1,049	1,084
Water Heating	462	465	466	463	452
Interior Lighting	653	577	543	537	517
Exterior Lighting	95	71	65	65	58
Appliances	1,107	1,004	987	971	941
Electronics	606	695	719	730	771
Miscellaneous	466	627	697	730	834
Total	**5,152**	**5,263**	**5,326**	**5,365**	**5,500**
End Use	**2025**	**2029**	**2034**	**% Change 2011-2034**	**Avg. Growth Rate 2011-2034**
Cooling	886	907	931	19%	0.7%
Heating	1,137	1,160	1,189	22%	0.8%
Water Heating	435	420	420	-9%	-0.4%
Interior Lighting	473	486	502	-23%	-1.1%
Exterior Lighting	42	42	43	-55%	-3.5%
Appliances	934	943	963	-13%	-0.6%
Electronics	841	856	876	45%	1.6%
Miscellaneous	997	1,153	1,343	188%	4.6%
Total	**5,744**	**5,966**	**6,266**	**21.6%**	**0.9%**

Figure 4-1 Residential Electricity Baseline Projection by End Use (MWh)

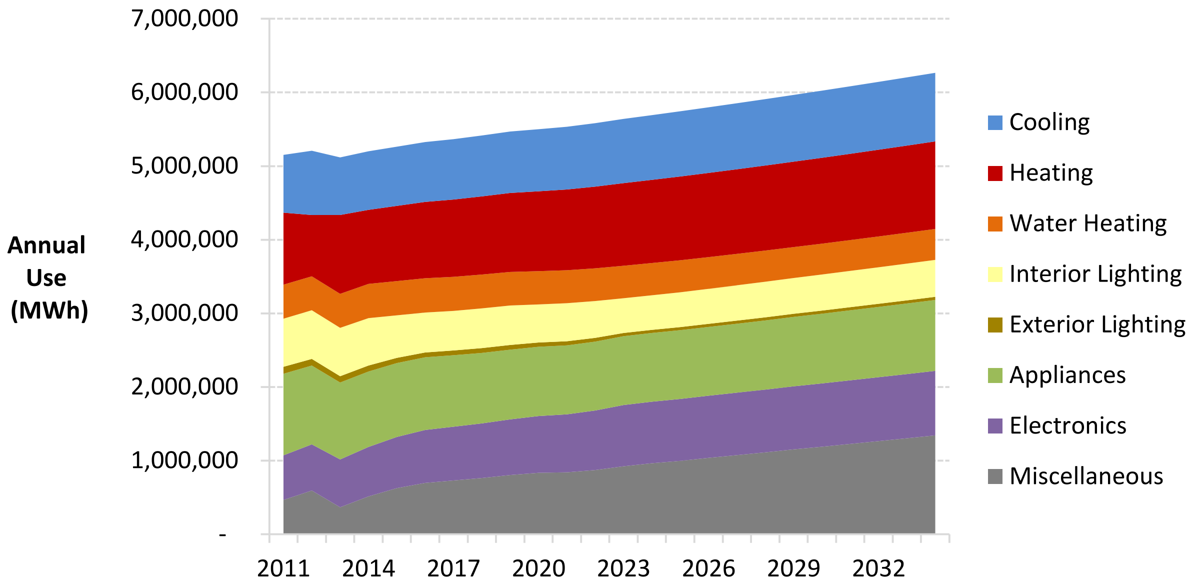
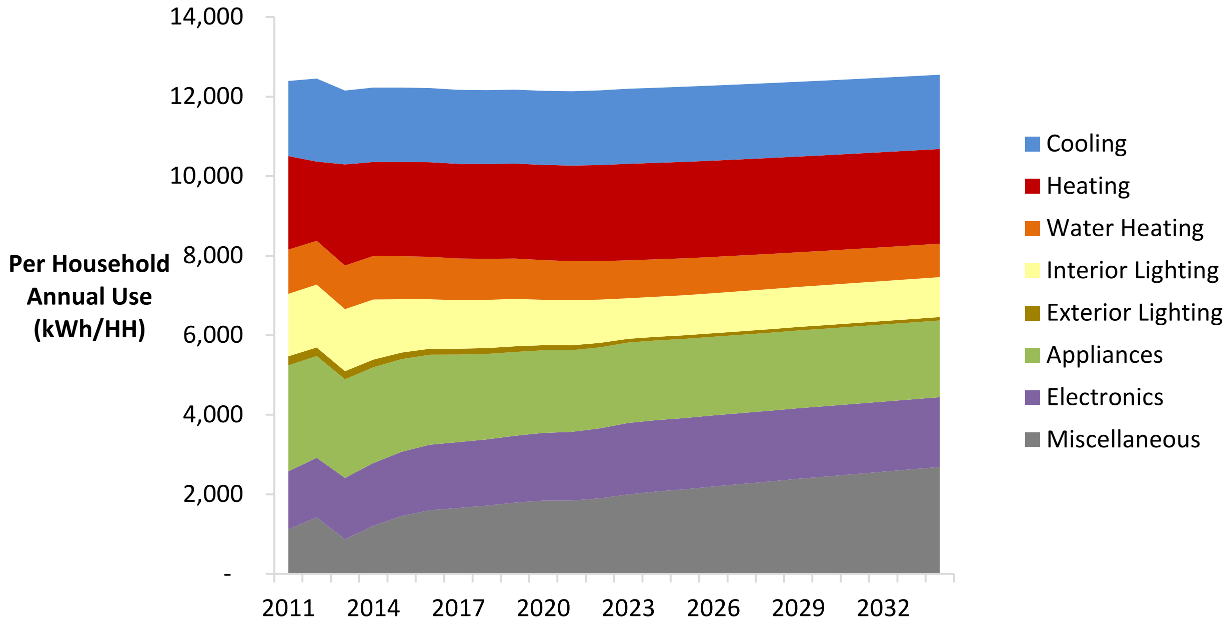


Table 4-2 and Figure 4-2 presents the forecast of use per household for select years. Most noticeable is that lighting use decreases significantly throughout the time period as the lighting efficiency standards from EISA come into effect.

Table 4-2 Residential Electricity Use per Household by End Use (kWh per HH)

End Use	2011	2015	2016	2017	2020
Cooling	1,887	1,868	1,864	1,859	1,861
Heating	2,351	2,371	2,377	2,380	2,394
Water Heating	1,112	1,081	1,068	1,050	997
Interior Lighting	1,571	1,341	1,244	1,218	1,142
Exterior Lighting	228	164	149	147	128
Appliances	2,664	2,331	2,263	2,201	2,077
Electronics	1,458	1,614	1,649	1,656	1,702
Miscellaneous	1,121	1,455	1,599	1,657	1,842
Total	**12,392**	**12,226**	**12,213**	**12,169**	**12,145**
End Use	2025	2029	2034	% Change 2011-2034	Avg. Growth Rate 2011-2034
Cooling	1,889	1,880	1,865	-1%	-0.1%
Heating	2,425	2,405	2,380	1%	0.1%
Water Heating	927	871	841	-24%	-1.2%
Interior Lighting	1,008	1,007	1,004	-36%	-1.9%
Exterior Lighting	89	87	85	-63%	-4.3%
Appliances	1,992	1,955	1,929	-28%	-1.4%
Electronics	1,793	1,775	1,754	20%	0.8%
Miscellaneous	2,125	2,390	2,689	140%	3.8%
Total	**12,248**	**12,372**	**12,549**	**1%**	**0.1%**

Figure 4-2 Residential Electricity Use per Household by End Use (kWh per HH)



Commercial Sector

The commercial baseline projection also incorporates assumptions about economic growth, electricity prices, equipment standards, building codes and naturally occurring efficiency.

Figure 4-3 and Table 4-3 present the baseline forecast for electricity for select years at the end-use level for the commercial sector as a whole. Overall, commercial use increases slightly from 5,041 GWh in 2011 to 5,722 GWh in 2034, an increase of 14%, or an average growth rate of 0.6% per year.

Figure 4-3 Commercial Electricity Baseline Forecast by End Use

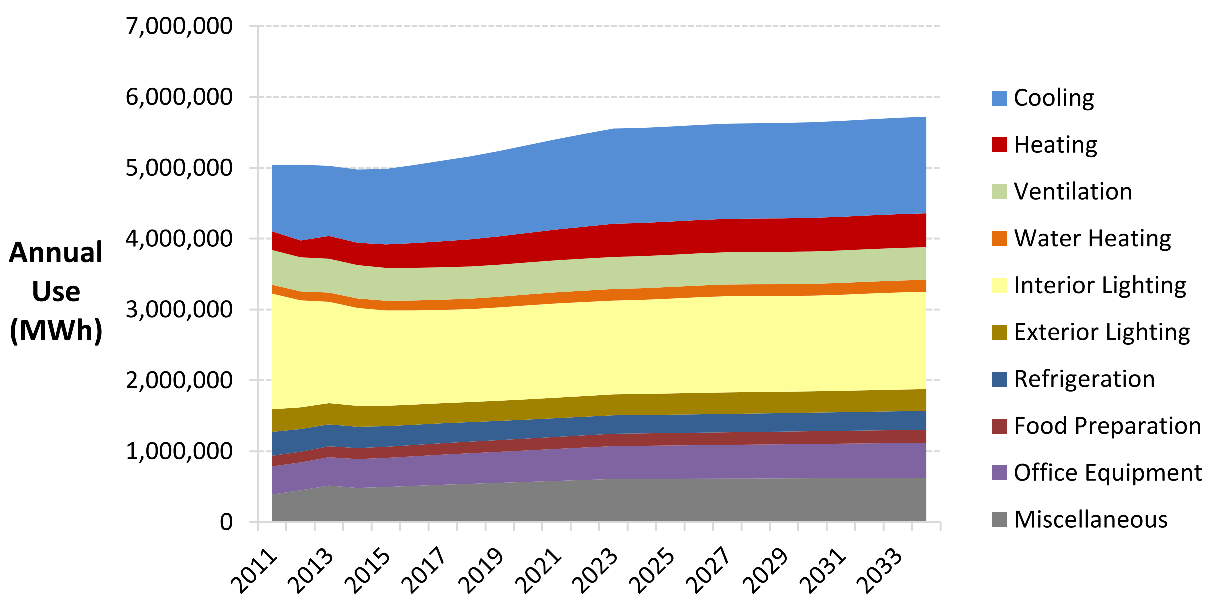


Table 4-3 Commercial Electricity Consumption by End Use (GWh)

End Use	2011	2015	2016	2017	2020
Cooling	938	1,066	1,102	1,139	1,240
Heating	263	330	348	366	416
Ventilation	492	465	461	459	453
Water Heating	123	136	140	143	153
Interior Lighting	1,633	1,347	1,330	1,318	1,327
Exterior Lighting	319	287	284	283	286
Refrigeration	337	292	286	281	267
Food Preparation	150	157	159	161	167
Office Equipment	396	410	418	425	445
Miscellaneous	390	495	511	527	568
Total	**5,041**	**4,984**	**5,040**	**5,102**	**5,322**
End Use	2025	2029	2034	% Change 2011-2034	Avg. Growth Rate 2011-2034
Cooling	1,341	1,347	1,364	45%	1.6%
Heating	469	472	477	81%	2.6%
Ventilation	455	458	462	-6%	-0.3%
Water Heating	163	165	168	36%	1.3%
Interior Lighting	1,339	1,352	1,375	-16%	-0.7%
Exterior Lighting	299	301	306	-4%	-0.2%
Refrigeration	259	261	267	-21%	-1.0%
Food Preparation	176	179	184	23%	0.9%
Office Equipment	470	481	494	25%	1.0%
Miscellaneous	611	617	625	60%	2.1%
Total	**5,582**	**5,634**	**5,722**	**14%**	**0.6%**

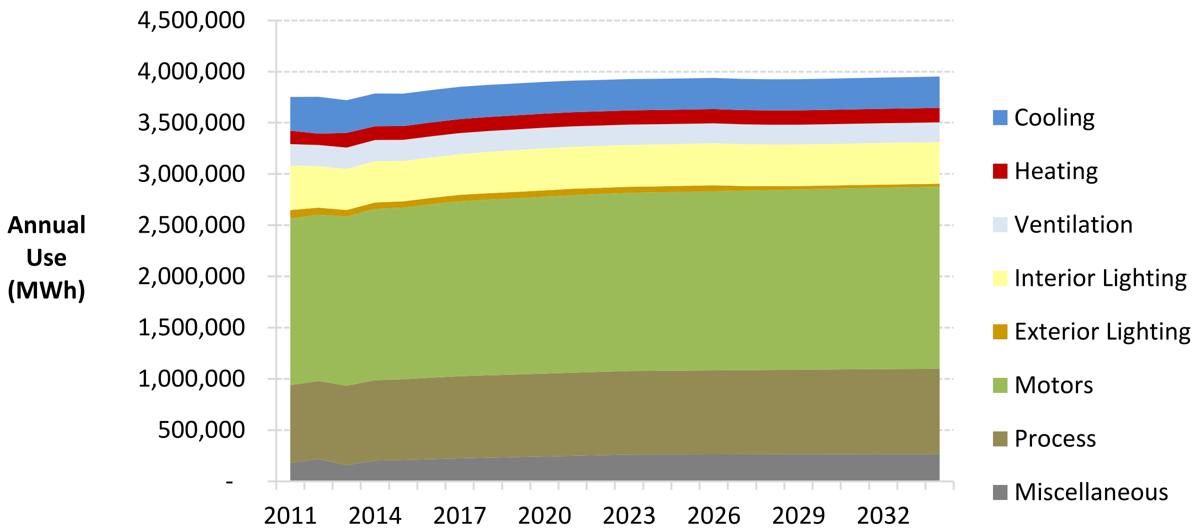
Industrial Sector

The baseline forecast incorporates assumptions about economic growth, electricity prices, equipment standards, building codes and naturally occurring energy efficiency. Table 4-4 and Figure 4-4 present the baseline forecast for electricity for select years at the end-use level for the industrial sector as a whole. Overall, industrial use increases slightly from 3,752 GWh in 2011 to 3,952 GWh in 2034, an increase of 5%, or an average growth rate of 0.2% per year.

Table 4-4 Industrial Electricity Consumption by End Use (GWh)

End Use	2011	2015	2016	2017	2020
Cooling	330	317	316	315	310
Heating	130	134	136	137	138
Ventilation	210	206	206	205	201
Interior Lighting	434	394	395	397	410
Exterior Lighting	83	61	62	62	63
Motors	1,626	1,676	1,694	1,709	1,726
Process	759	787	795	802	809
Miscellaneous	180	208	216	223	242
Total	**3,752**	**3,785**	**3,820**	**3,851**	**3,899**
End Use	2025	2029	2034	% Change 2011-2034	Avg. Growth Rate 2011-2034
Cooling	304	304	306	-7%	-0.3%
Heating	139	140	141	8%	0.3%
Ventilation	196	193	194	-7%	-0.3%
Interior Lighting	410	406	405	-7%	-0.3%
Exterior Lighting	58	33	29	-65%	-4.5%
Motors	1,746	1,760	1,777	9%	0.4%
Process	819	825	833	10%	0.4%
Miscellaneous	262	264	266	48%	1.7%
Total	**3,934**	**3,926**	**3,952**	**5%**	**0.2%**

Figure 4-4 Industrial Electricity Baseline Forecast by End Use



Baseline Projection Summary

Table 4-5 and Figure 4-5 provide a summary of the baseline forecast for electricity by sector for the entire IPL service territory. Overall, the forecast shows a 14.3% increase from 2011 to 2034 with an average annual growth rate of 0.6%. Most of the increase is attributed to the residential sector, followed by commercial, and then industrial. Table 4-6 and Figure 4-6 show the peak demand forecast for each sector.

Table 4-5 Electricity Projection by Sector (GWh)

Sector	2011	2015	2016	2017	2020
Residential	5,152	5,263	5,326	5,365	5,500
Commercial	5,041	4,984	5,040	5,102	5,322
Industrial	3,752	3,785	3,820	3,851	3,899
Total	**13,946**	**14,033**	**14,186**	**14,319**	**14,722**
Sector	2025	2029	2034	% Change 2011-2034	Avg. Growth Rate 2011-2034
Residential	5,744	5,966	6,266	21.6%	0.9%
Commercial	5,582	5,634	5,722	13.5%	0.6%
Industrial	3,934	3,926	3,952	5.3%	0.2%
Total	**15,260**	**15,526**	**15,940**	**14.3%**	**0.6%**

Figure 4-5 Electricity Baseline Projection Summary (GWh)

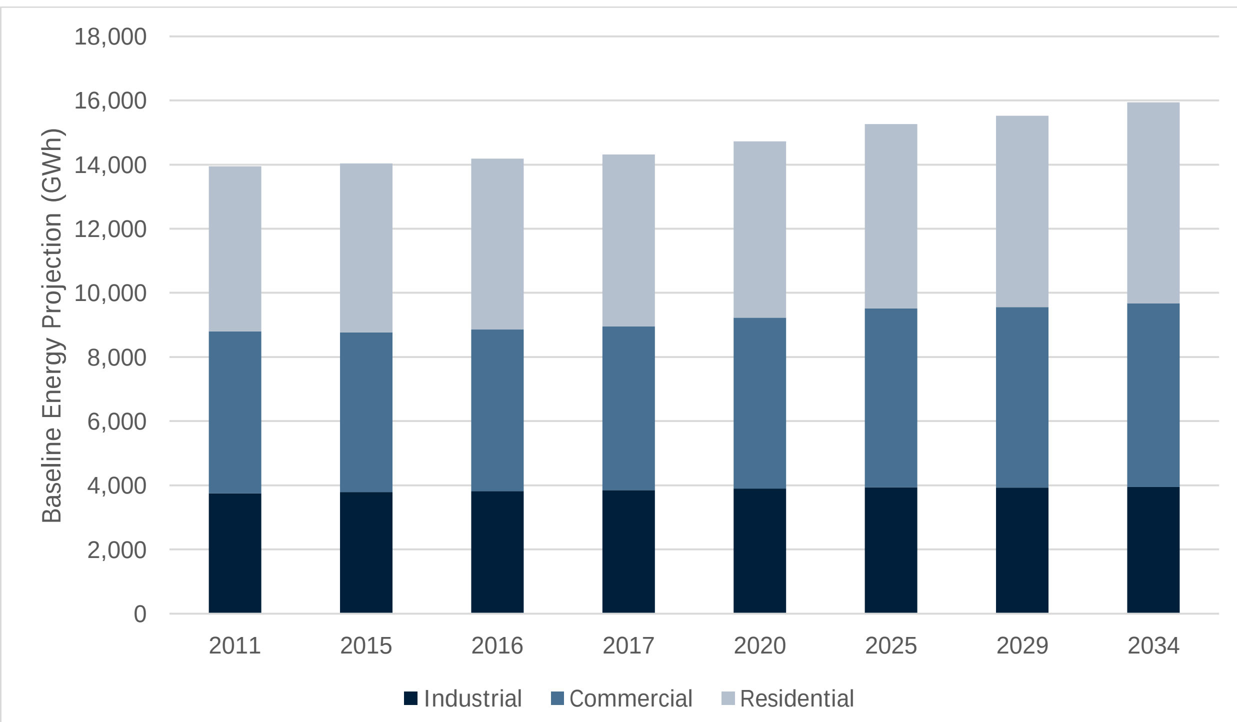
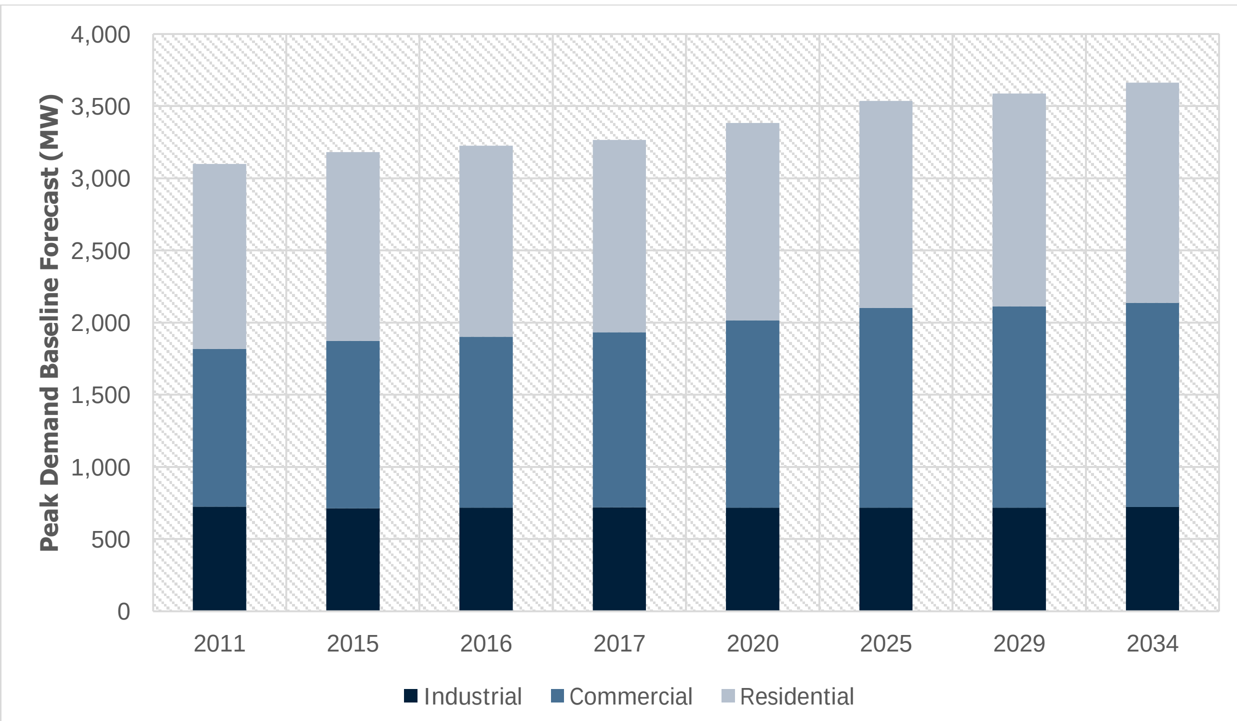


Table 4-6 and Figure 4-6 show the peak demand forecast for each sector.

Table 4-6 Peak Demand Consumption by Sector (MW)

Sector	2011	2015	2016	2017	2020
Residential	1,282	1,309	1,323	1,333	1,368
Commercial	1,094	1,158	1,185	1,213	1,297
Industrial	724	714	717	719	718
Total	**3,100**	**3,181**	**3,225**	**3,265**	**3,383**
Sector	2025	2029	2034	% Change 2011-2034	Avg. Growth Rate 2011-2034
Residential	1,434	1,474	1,525	19.0%	0.8%
Commercial	1,385	1,394	1,414	29.2%	1.1%
Industrial	717	718	723	-0.2%	0.0%
Total	**3,535**	**3,586**	**3,662**	**18.1%**	**0.7%**

Figure 4-6 Peak Demand Baseline Forecast Summary (MW)



CHAPTER | 5

DSM Potential – Overall Results

Table 5-1 and Figure 5-1 summarize the DSM savings for the different levels of potential relative to the baseline projection. Figure 5-2 displays the DSM potential forecasts in a line graph representing electricity consumption under the various analysis cases considered here. Potential forecasts in the model begin in 2013, but results here focus on the 2015-2017 time frame that corresponds to the latest IPL Action Plan, as well as milestone years through 2034, which represents the final year of consideration in IPL's IRP development.

By 2034, the cumulative energy savings under the Realistic Achievable Potential case are 10.4% of the baseline projection, or 1,665 net GWh.

Table 5-1 Summary of Overall DSM Potential

	2015	2016	2017	2020	2025	2029	2034
Baseline Forecast (GWh)	14,033	14,186	14,319	14,722	15,260	15,526	15,940
Cumulative Savings (GWh)							
Realistic Achievable	234	320	412	706	1,125	1,378	1,665
Economic Potential	1,163	1,323	1,495	2,057	2,914	3,438	3,911
Technical Potential	1,509	1,770	2,034	2,877	4,030	4,681	5,172
Energy Savings (% of Baseline)							
Realistic Achievable	1.7%	2.3%	2.9%	4.8%	7.4%	8.9%	10.4%
Economic Potential	8.3%	9.3%	10.4%	14.0%	19.1%	22.1%	24.5%
Technical Potential	10.8%	12.5%	14.2%	19.5%	26.4%	30.2%	32.4%

Figure 5-1 Summary of Energy Savings

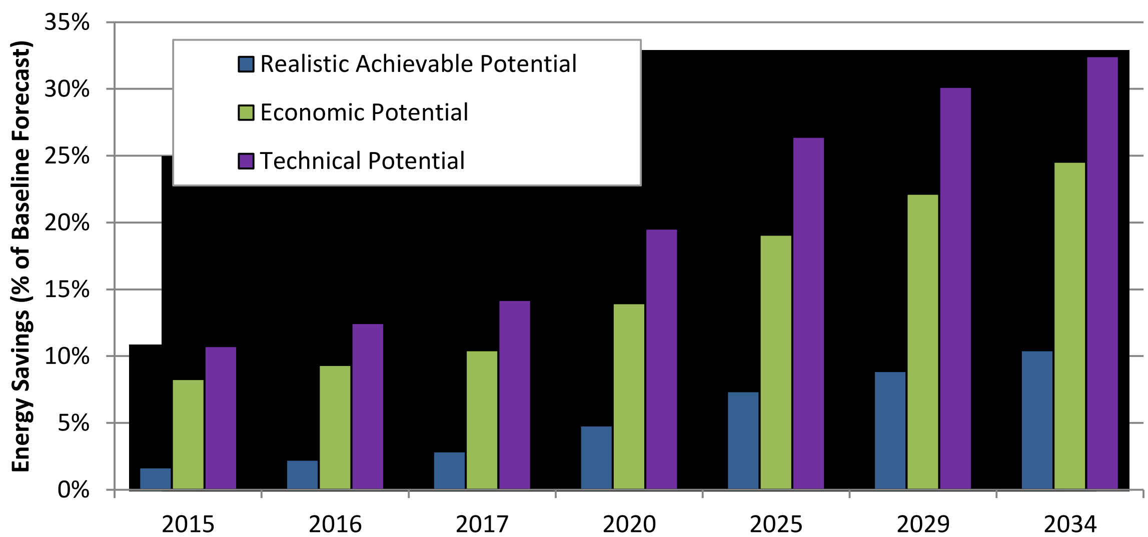


Figure 5-2 Forecasts of Potential (GWh)

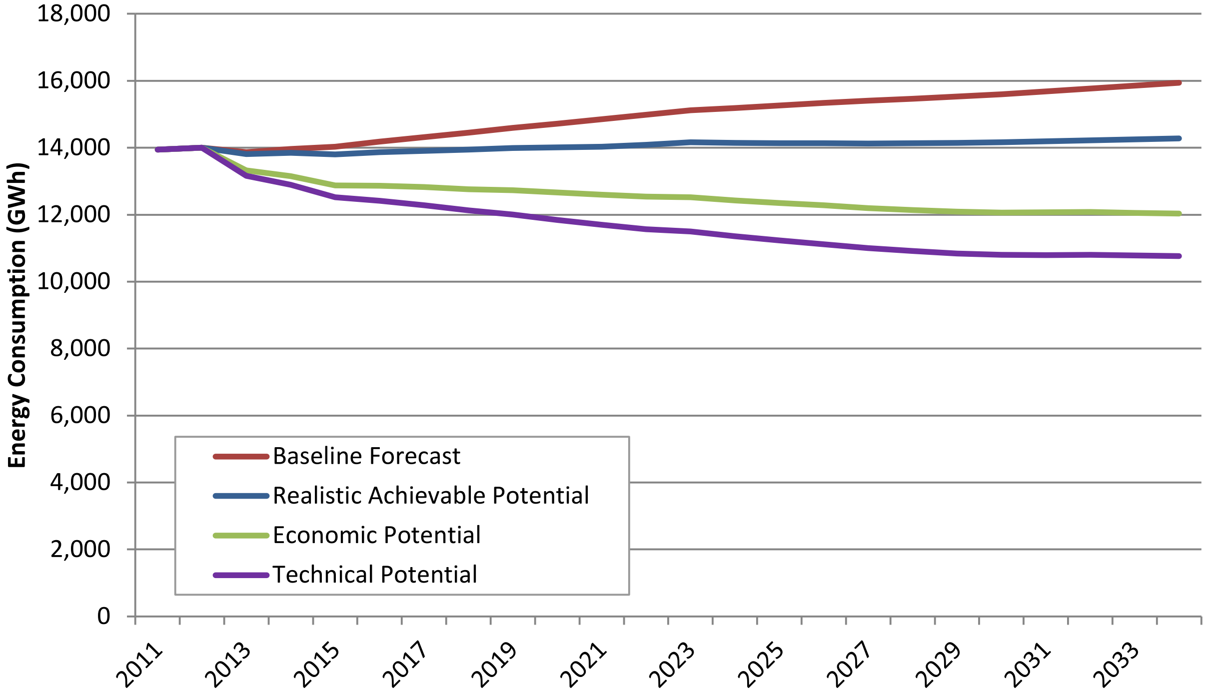
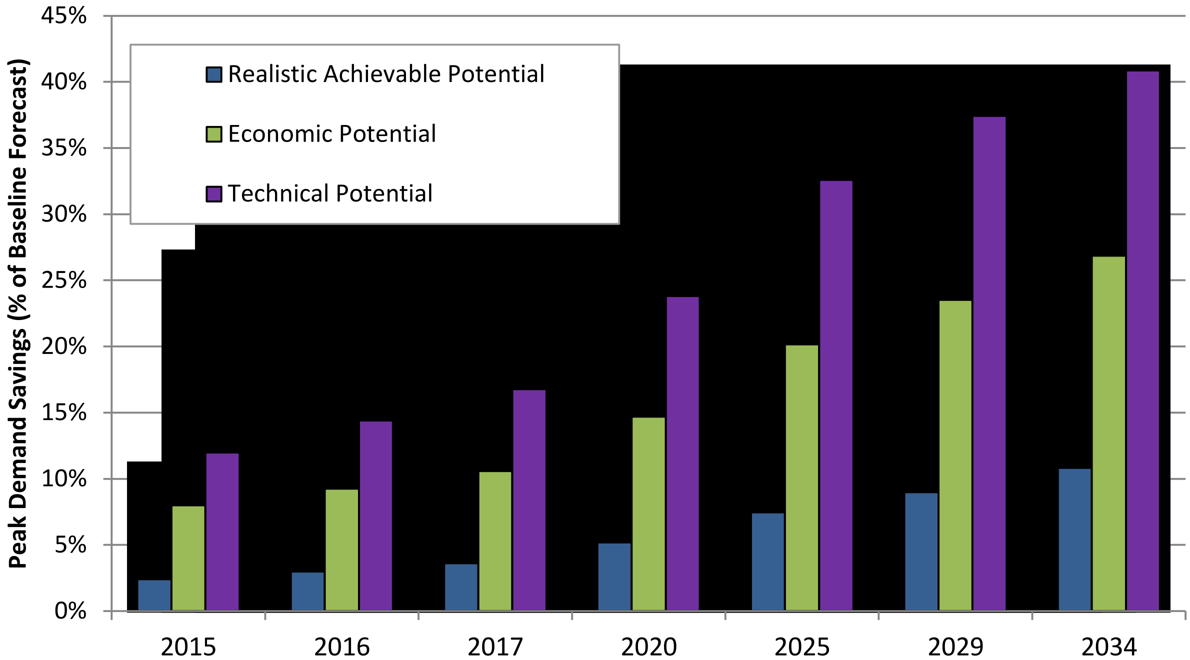


Table 5-2 and Figure 5-3 summarize the electric peak demand savings for the different levels of potential relative to the baseline forecast. By 2034, the cumulative peak demand savings under the Realistic Achievable Potential case are 10.8% of the baseline projection, or 396 net MW.

Table 5-2 Summary of Peak Demand Potential

	2015	2016	2017	2020	2025	2029	2034
Baseline Forecast (MW)	3,181	3,225	3,265	3,383	3,535	3,586	3,662
Cumulative Savings (MW)							
Realistic Achievable	76	96	117	175	263	322	396
Economic Potential	254	298	345	497	712	843	983
Technical Potential	381	464	547	805	1,152	1,342	1,495
Energy Savings (% of Baseline)							
Realistic Achievable	2.4%	3.0%	3.6%	5.2%	7.5%	9.0%	10.8%
Economic Potential	8.0%	9.2%	10.6%	14.7%	20.1%	23.5%	26.8%
Technical Potential	12.0%	14.4%	16.8%	23.8%	32.6%	37.4%	40.8%

Figure 5-3 Summary of Electric Peak Demand Savings



Overview of DSM Potential by Sector

Table 5-3 and Figure 5-4 summarize the realistic achievable electric energy savings potential by sector. The commercial sector accounts for the largest portion of the savings, followed by residential, and then industrial.

Table 5-3 Realistic Achievable Energy Savings by Sector (GWh)

	2015	2016	2017	2020	2025	2029	2034
Realistic Achievable Savings (GWh)							
Residential	95.5	122.6	141.3	223.2	291.7	368.9	472.5
Commercial	101.2	140.9	187.3	333.1	582.5	724.0	870.4
Industrial	37.2	56.3	83.2	149.8	250.5	285.2	322.0
Total	**234.0**	**319.8**	**411.9**	**706.2**	**1,124.8**	**1,378.1**	**1,664.9**

Figure 5-4 Realistic Achievable Energy Savings Potential by Sector (GWh)

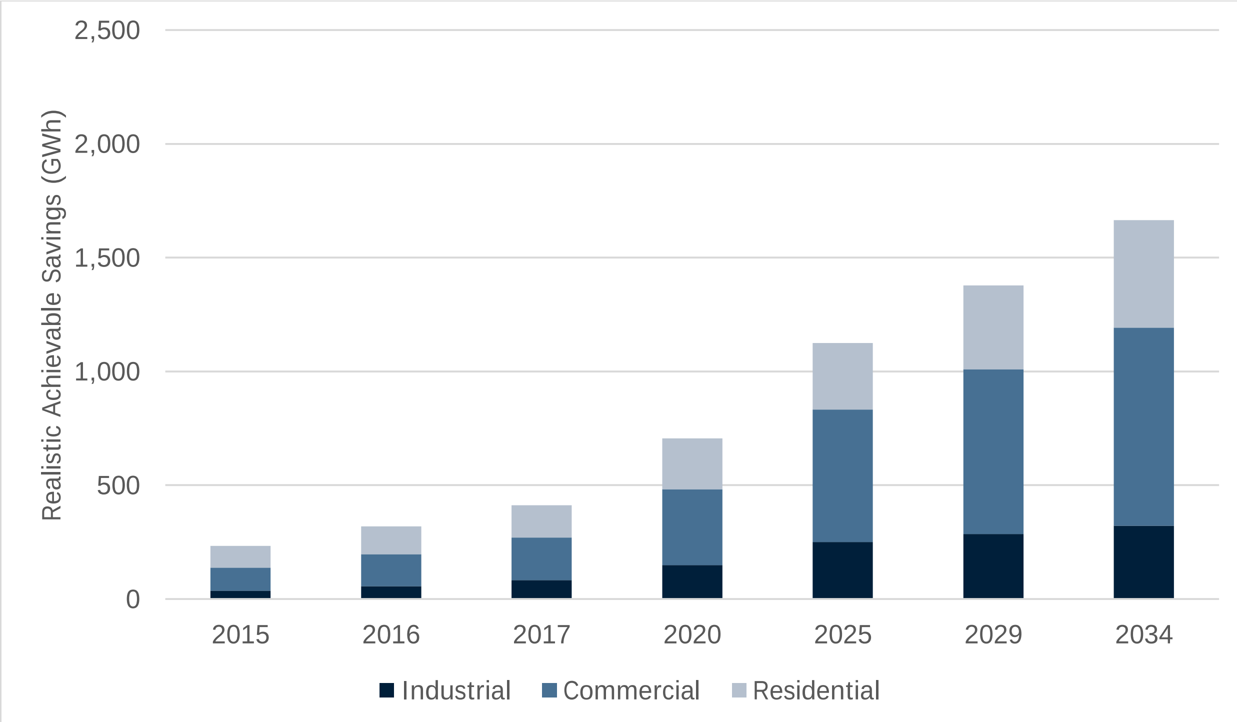
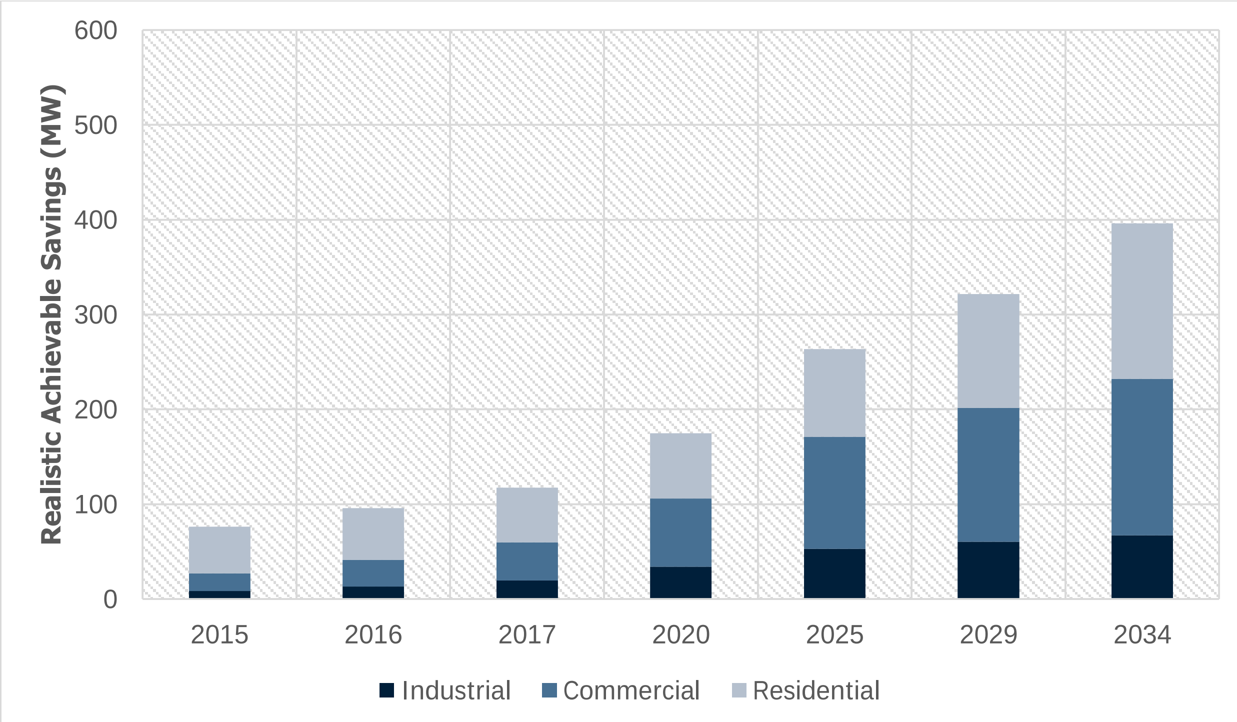


Table 5-4 and Figure 5-5 summarize the realistic achievable electric peak demand potential by sector. The commercial and residential sectors account for the largest portion of the savings, followed by industrial.

Table 5-4 Realistic Achievable Peak Demand Savings by Sector (MW)

	2015	2016	2017	2020	2029	2034
Realistic Achievable Savings (MW)						
Residential	49.4	54.8	57.8	68.9	120.3	163.9
Commercial	18.7	28.0	40.0	71.8	140.9	165.1
Industrial	8.3	13.1	19.7	34.1	60.4	67.1
Total	**76.4**	**95.9**	**117.5**	**174.8**	**321.6**	**396.1**

Figure 5-5 Realistic Achievable Peak Demand Savings Potential by Sector (MW)



Detailed potential results for each sector are presented in the following chapter.

CHAPTER | 6

DSM Potential By Sector

This chapter presents the results of the DSM potential analysis at the sector level. First, the residential potential is presented, followed by the commercial and industrial.

Residential Electricity Potential

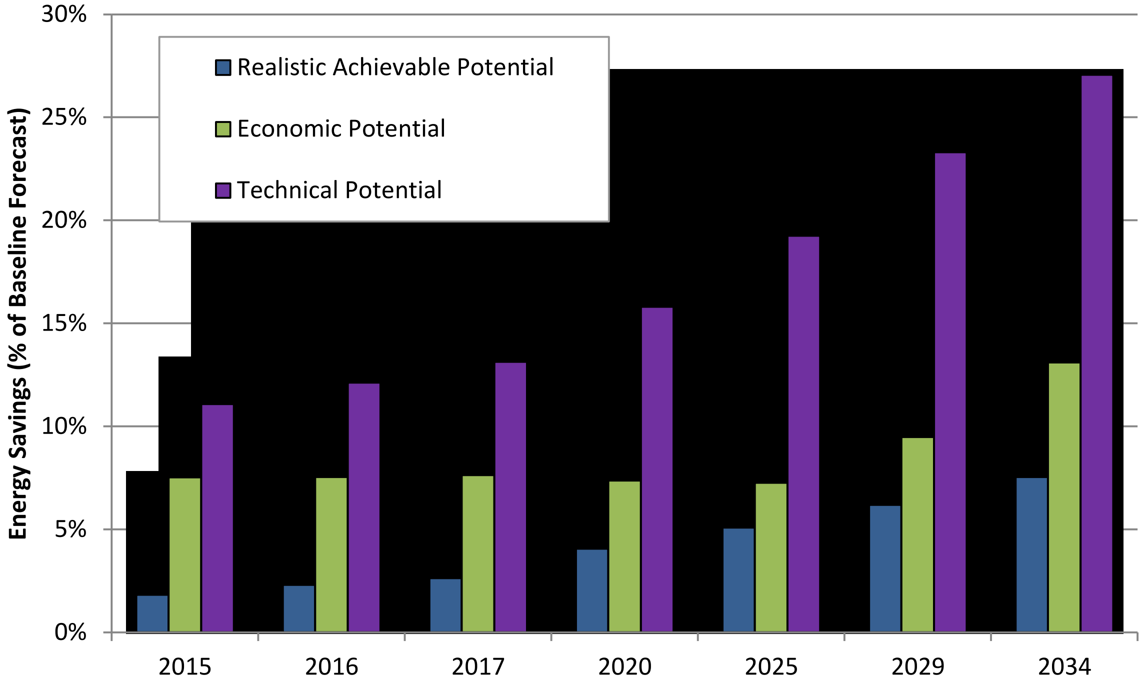
Table 6-1 presents estimates for the three types of energy savings potential for the residential electricity sector. Figure 6-1 depicts these potential energy savings estimates graphically.

- **Realistic Achievable potential** projects 473 GWh of energy savings in 2034, or 7.5% of the baseline forecast at that time.
- **Economic potential,** which reflects a theoretical limit to savings when all cost-effective measures are taken, is 820 GWh in 2034, representing 13.1% of the baseline energy forecast.
- **Technical potential,** which reflects the adoption of all DSM measures regardless of cost, is a theoretical upper bound on savings. By 2034, technical potential reaches 1,695 GWh, 27.1% of the baseline energy forecast.

Table 6-1 DSM Energy Savings Potential for the Residential Sector

	2015	2016	2017	2020	2025	2029	2034
Baseline Forecast (GWh)	5,263	5,326	5,365	5,500	5,744	5,966	6,266
Cumulative Savings (GWh)							
Realistic Achievable	96	123	141	223	292	369	473
Economic Potential	396	401	410	405	417	565	820
Technical Potential	583	645	704	869	1,106	1,391	1,695
Energy Savings (% of Baseline)							
Realistic Achievable	1.8%	2.3%	2.6%	4.1%	5.1%	6.2%	7.5%
Economic Potential	7.5%	7.5%	7.6%	7.4%	7.3%	9.5%	13.1%
Technical Potential	11.1%	12.1%	13.1%	15.8%	19.2%	23.3%	27.1%

Figure 6-1 Residential DSM Energy Savings Potential



Residential Electric Potential by End Use

Figure 6-2 focuses on the end-use break out for residential energy savings in 2034 under the Realistic Achievable Potential case. Lighting equipment replacements account for the highest portion of the energy savings, while cooling, heating, and water heating measures also make substantial contributions. Figure 6-3 shows the residential Realistic Achievable peak demand potential in 2034 by end use. It shows how cooling contributes the lion's share of savings because it is most peak coincident. Figure 6-4 and Figure 6-5 show how the cumulative energy and peak demand potential evolve by end use over time.

The key measures comprising the potential are listed below:

- Lighting: CFL lamps and specialty bulbs in the near term, but LED lamps going forward. While LED technologies are just becoming cost-effective, historic and forward-looking research indicates that performance and cost trends will continue to improve dramatically. We have incorporated these trends in our modeling and show that lighting opportunities will become dominated by LED lamps over the next 20 years.
- Demand Response: Direct load control of central air conditioning equipment is a prominent measure in the portfolio of peak demand savings.
- Removal of second refrigerator
- HVAC: efficient air conditioners, ducting repair/sealing, insulation, behavioral programs and programmable thermostats
- Water heating: efficient water heaters, low-flow showerheads, and faucet aerators.

Figure 6-2 Residential Realistic Achievable Potential by End Use in 2034 (Energy Savings)

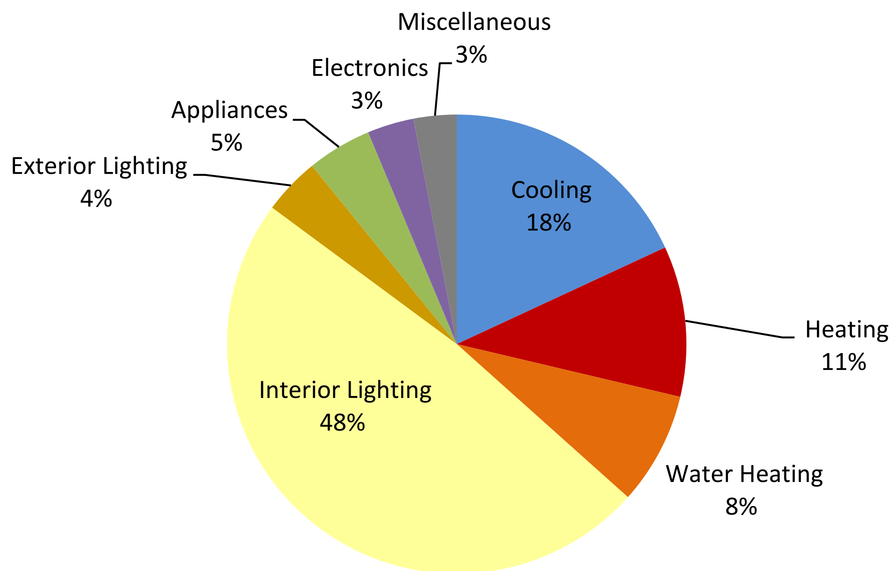


Figure 6-3 Residential Realistic Achievable Potential by End Use in 2034 (Peak Savings)

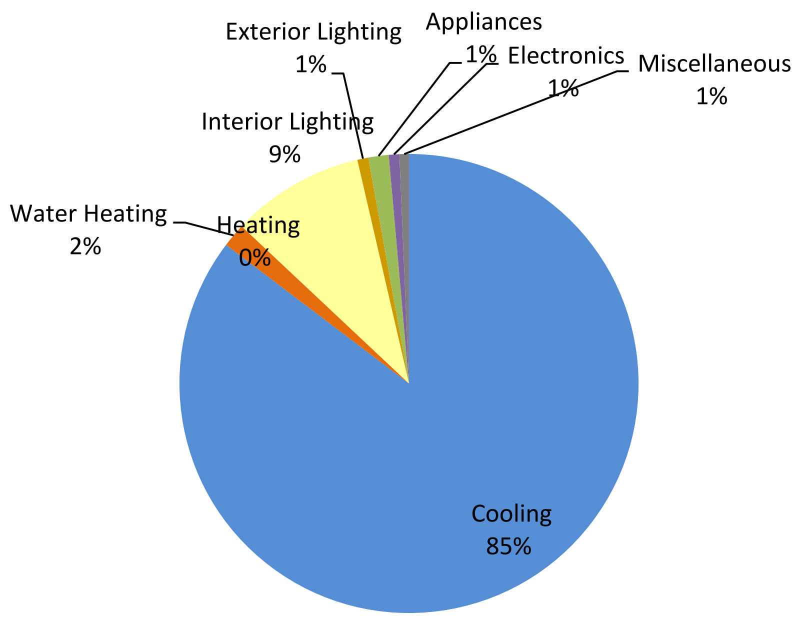


Figure 6-4 Residential % of Cumulative Achievable Energy Savings Potential by End Use Over Time

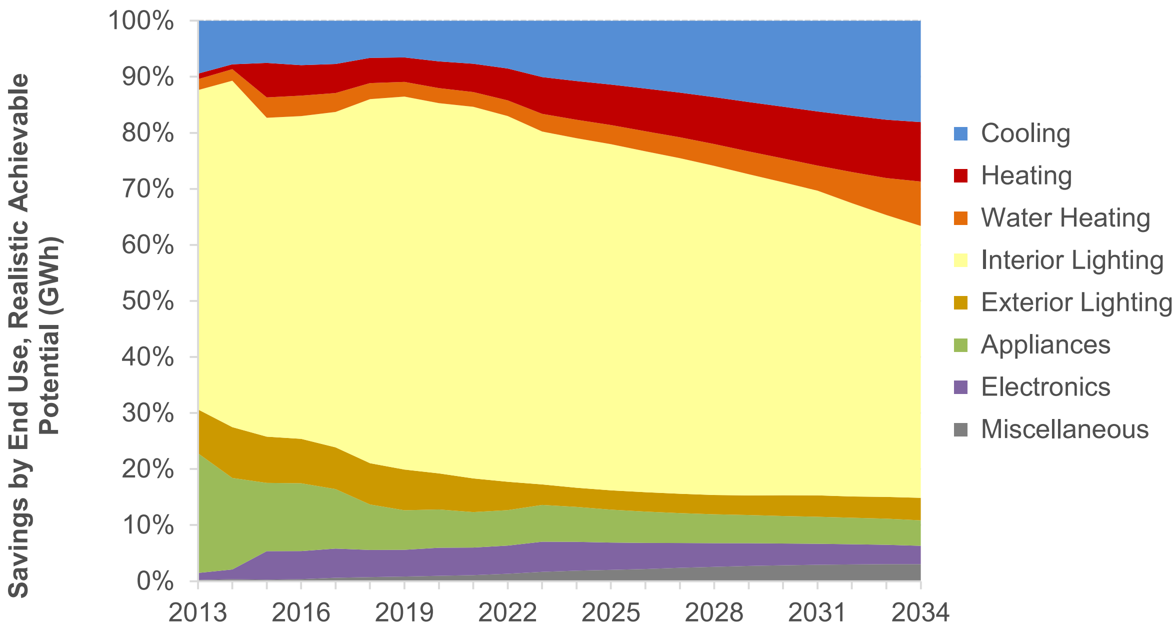
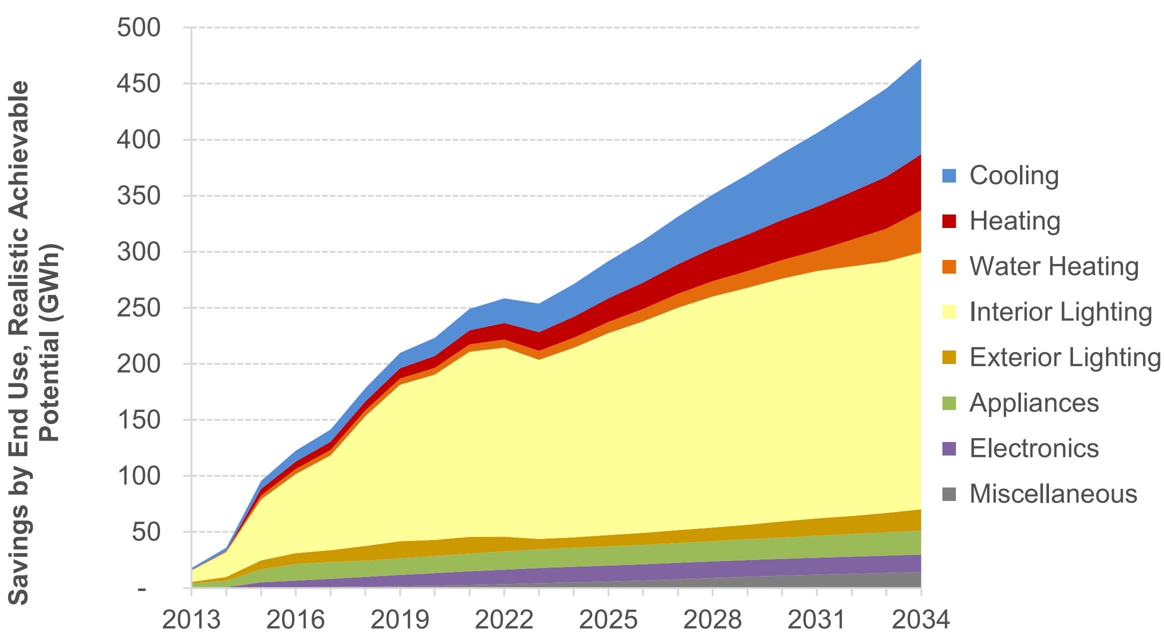


Figure 6-5 Residential Cumulative Achievable Energy Savings Potential by End Use Over Time (GWh)



Commercial DSM Potential

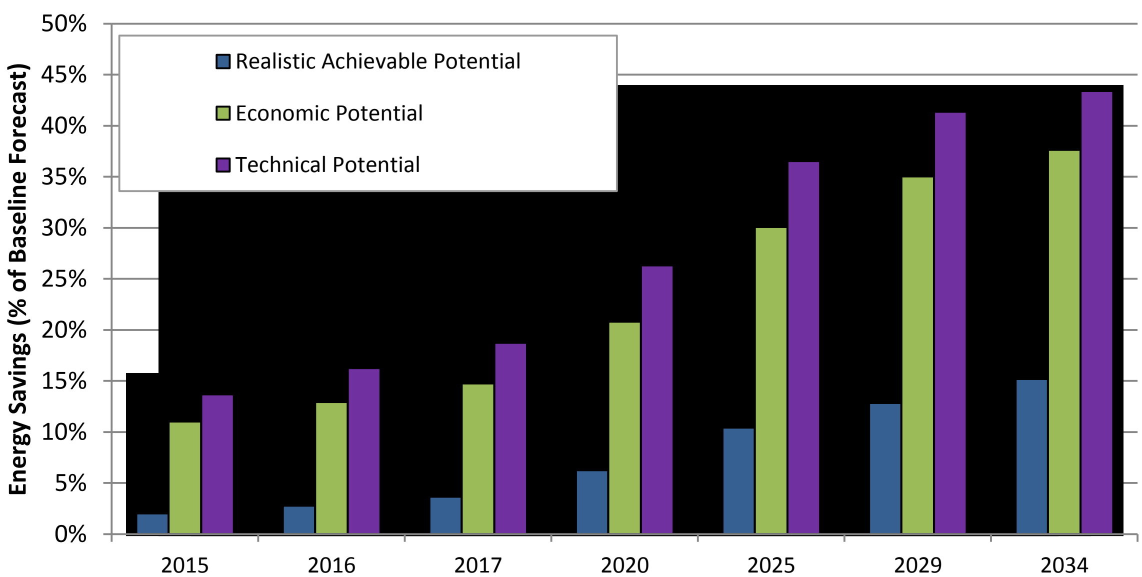
The commercial sector accounts for 36% of energy consumption, making for prime efficiency opportunities. Table 6-2 presents estimates for the three types of potential for the commercial electricity sector. Figure 6-6 depicts these potential energy savings estimates graphically.

- **Realistic Achievable potential** projects 870 GWh of energy savings in 2034, or 15.2% of the baseline forecast at that time.
- **Economic potential,** which reflects a theoretical limit to savings when all cost-effective measures are taken, is 2,154 GWh in 2034, representing 37.6% of the baseline energy forecast.
- **Technical potential,** which reflects the adoption of all DSM measures regardless of cost, is a theoretical upper bound on savings. By 2034, technical potential reaches 2,484 GWh, 43.4% of the baseline energy forecast.

Table 6-2 DSM Energy Savings Potential for the Commercial Sector

	2015	2016	2017	2020	2025	2029	2034
Baseline Forecast (GWh)	4,984	5,040	5,102	5,322	5,582	5,634	5,722
Cumulative Savings (GWh)							
Realistic Achievable	101	141	187	333	583	724	870
Economic Potential	550	652	752	1,107	1,679	1,973	2,154
Technical Potential	682	820	956	1,400	2,040	2,330	2,484
Energy Savings (% of Baseline)							
Realistic Achievable	2.0%	2.8%	3.7%	6.3%	10.4%	12.9%	15.2%
Economic Potential	11.0%	12.9%	14.7%	20.8%	30.1%	35.0%	37.6%
Technical Potential	13.7%	16.3%	18.7%	26.3%	36.5%	41.4%	43.4%

Figure 6-6 Commercial DSM Energy Savings Potential



Commercial Potential by End Use

Figure 6-7 focuses on achievable potential savings by end use. Not surprisingly, interior lighting delivers the highest achievable savings throughout the study period. In 2034, exterior lighting is second, and cooling is third. Figure 6-8 shows the peak demand potential in 2034. Cooling and lighting end uses hold the largest shares of peak coincident demand savings. Figure 6-9 and Figure 6-10 show how cumulative energy and peak demand potential evolves by end use over time.

The key measures comprising the potential are listed below:

- Lighting – LED lamps in screw-in, linear fluorescent, and high-bay style applications. While LED technologies are just becoming cost-effective, historic and forward-looking research indicates that performance and cost trends will continue to improve. We have incorporated these trends in our modeling and show that lighting opportunities will become dominated by LED lamps over the next 20 years.
- Cooling, HVAC, and Ventilation equipment replacements and controls/optimizations (e.g. variable speed controls)
- Energy management systems
- Refrigeration – efficient equipment, control systems, decommissioning

Figure 6-7 Commercial Realistic Achievable Potential by End Use in 2034 (Energy Savings)

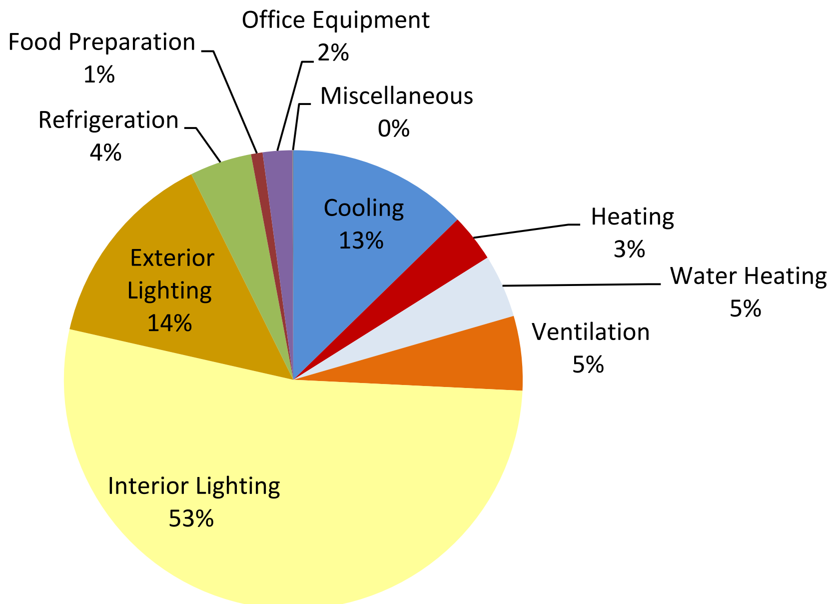


Figure 6-8 Commercial Realistic Achievable Potential by End Use in 2034 (Peak Savings)

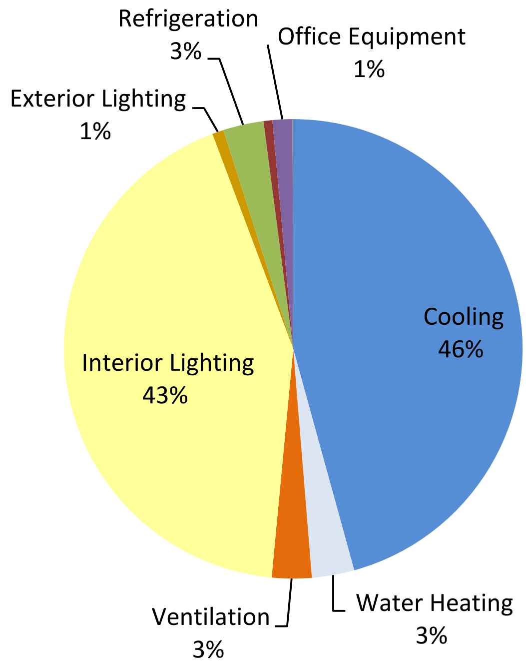


Figure 6-9 Commercial % of Cumulative Achievable Energy Savings Potential by End Use in 2034

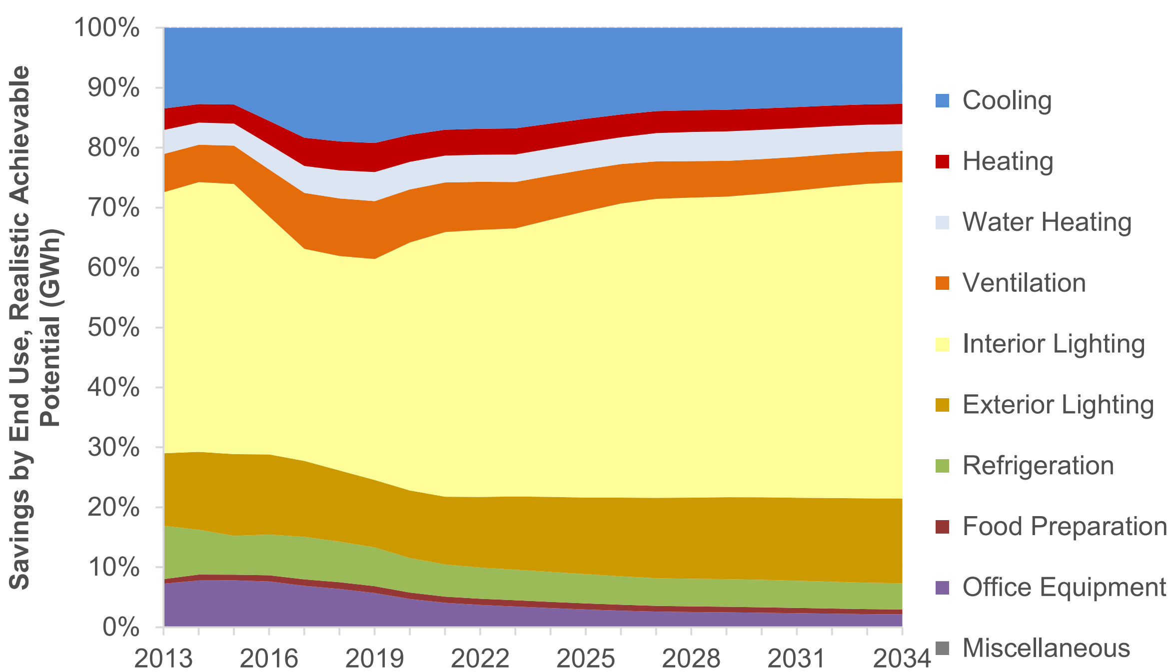
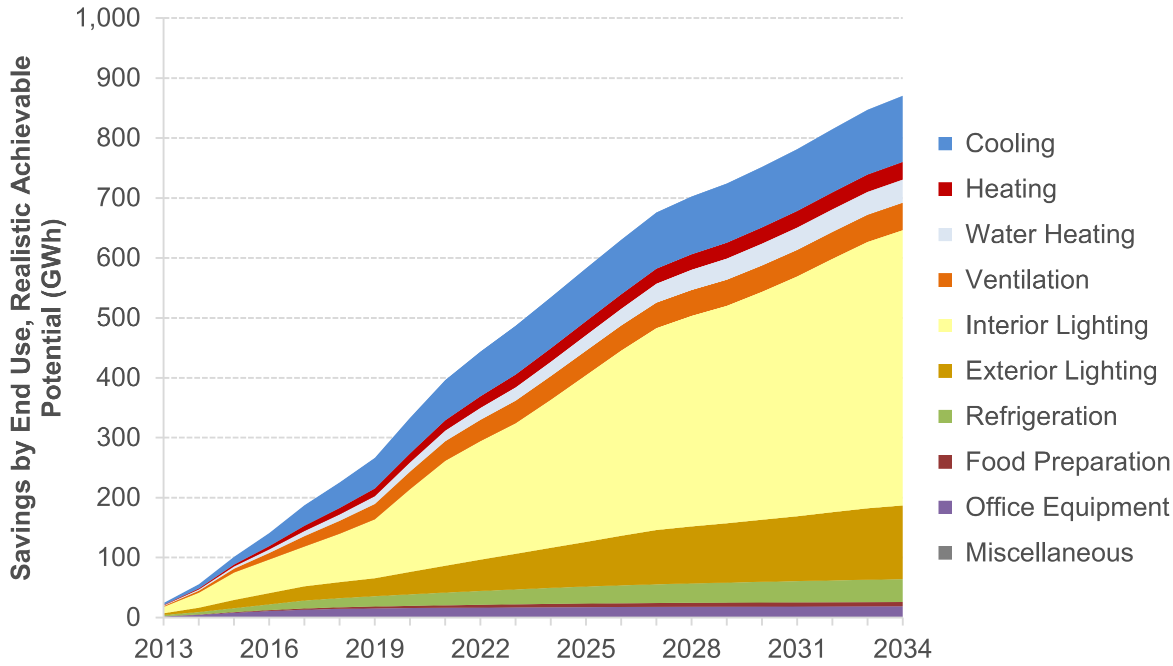


Figure 6-10 Commercial Cumulative Achievable Energy Savings Potential by End Use in 2034 (GWh)



Industrial Electricity Potential

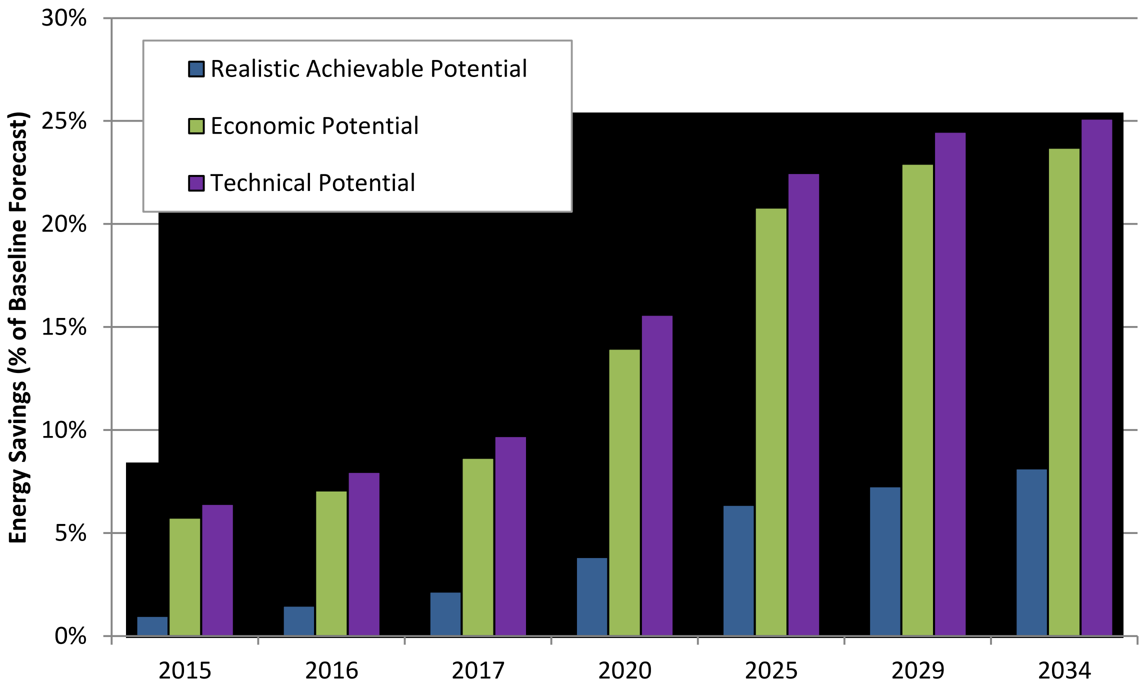
The IPL industrial sector accounts for 27% of total energy consumption. Table 6-3 and Figure 6-11 present the savings for the various types of potential considered in this study.

- **Realistic Achievable potential** projects 322 GWh of energy savings in 2034, or 8.1% of the baseline forecast at that time.
- **Economic potential,** which reflects a theoretical limit to savings when all cost-effective measures are taken, is 937 GWh in 2034, representing 23.7% of the baseline energy forecast.
- **Technical potential,** which reflects the adoption of all DSM measures regardless of cost, is a theoretical upper bound on savings. By 2034, technical potential reaches 993 GWh, 25.1% of the baseline energy forecast.

Table 6-3 DSM Energy Savings Potential for the Industrial Sector

	2015	2016	2017	2020	2025	2029	2034
Baseline Forecast (GWh)	3,785	3,820	3,851	3,899	3,934	3,926	3,952
Cumulative Savings (GWh)							
Realistic Achievable	37	56	83	150	251	285	322
Economic Potential	217	270	333	544	818	900	937
Technical Potential	243	305	374	608	884	961	993
Energy Savings (% of Baseline)							
Realistic Achievable	1.0%	1.5%	2.2%	3.8%	6.4%	7.3%	8.1%
Economic Potential	5.7%	7.1%	8.7%	13.9%	20.8%	22.9%	23.7%
Technical Potential	6.4%	8.0%	9.7%	15.6%	22.5%	24.5%	25.1%

Figure 6-11 Industrial DSM Energy Savings Potential



Industrial Potential by End Use

Figure 6-12 illustrates the achievable potential savings by electric end use in 2034 for the industrial sector. The largest shares of savings opportunities are in lighting and motors. For fluorescent lighting, efficient T5s and T8s transition to LEDs as the study progresses. For motors, potential savings for equipment replacements at end-of-life have been effectively eliminated due to the National Electrical Manufacturer's Association (NEMA) standards, which now mandate premium efficiency motors as the baseline efficiency unit. As a result, potential savings are incrementally small to upgrade to even more efficient levels. Many of the savings opportunities in this end use come from controls, timers, and variable speed drives, which improve system efficiencies where motors are utilized. Figure 6-13 shows the peak coincident end uses with the majority in cooling, followed by lighting and motors. Figure 6-14 and Figure 6-15 show how cumulative energy and peak demand potential evolve by end use over time.

The key measures comprising the potential are listed below:

- Efficient lighting technologies, primarily LED, for screw-in, fluorescent-style, high-bay, and HID applications
- Motor drives and controls, optimization
- Process timers and controls
- Application of optimization and controls for fans, pumps, compressed air
- Energy management systems & programmable thermostats

Figure 6-12 Industrial Realistic Achievable Potential by End Use in 2034 (Energy Savings)

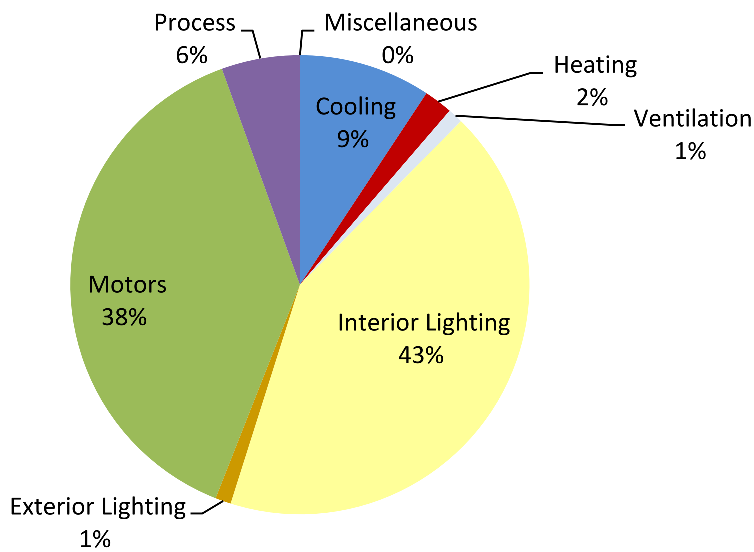


Figure 6-13 Industrial Realistic Achievable Potential by End Use in 2034 (Peak Savings)

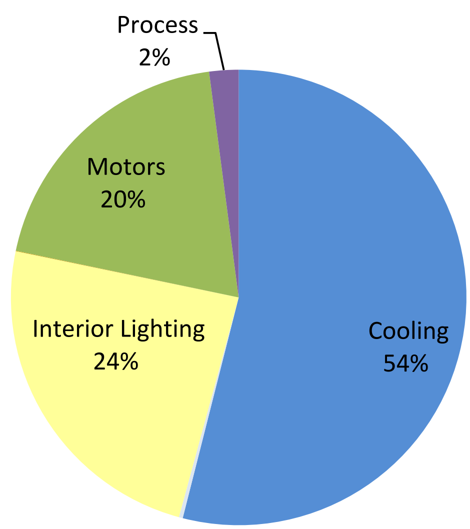


Figure 6-14 Industrial % of Cumulative Achievable Energy Savings Potential by End Use in 2034

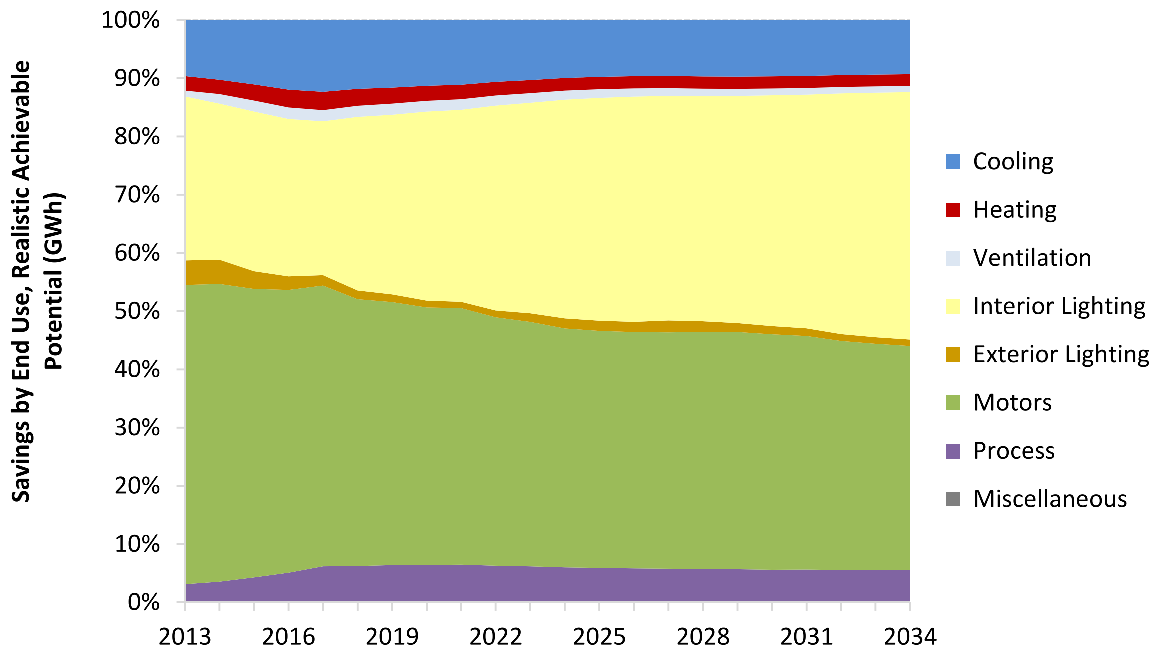
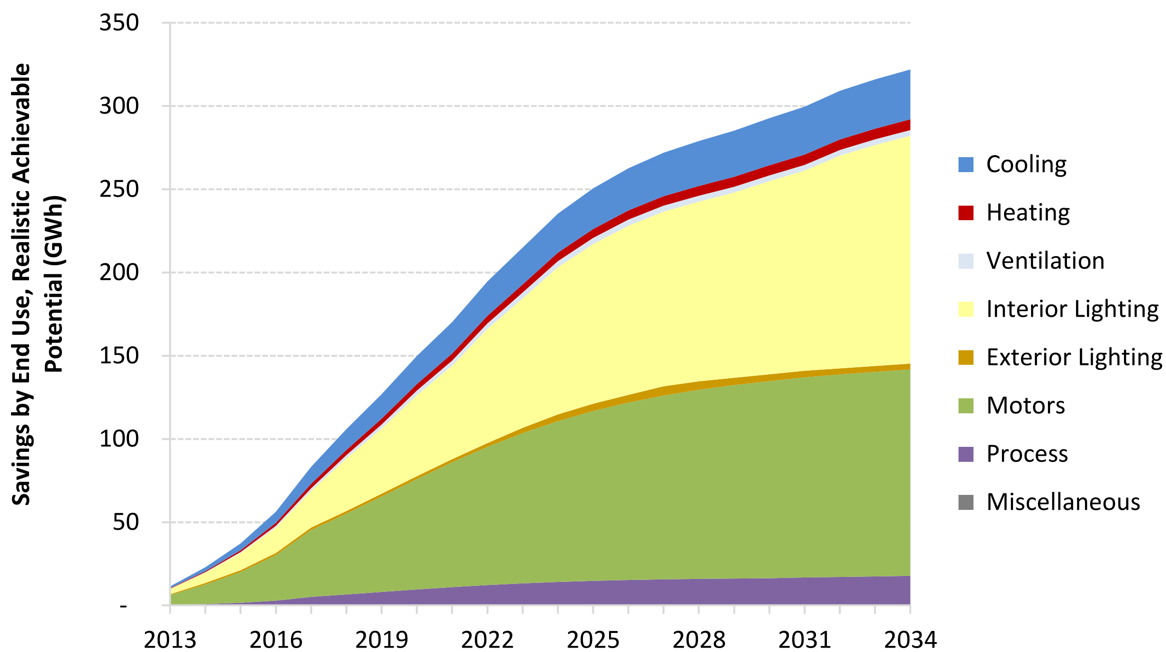


Figure 6-15 Industrial Cumulative Achievable Energy Savings Potential by End Use in 2034 (GWh)



APPENDIX | A

Calibration to Filed 2015-2017 IPL DSM Action Plan

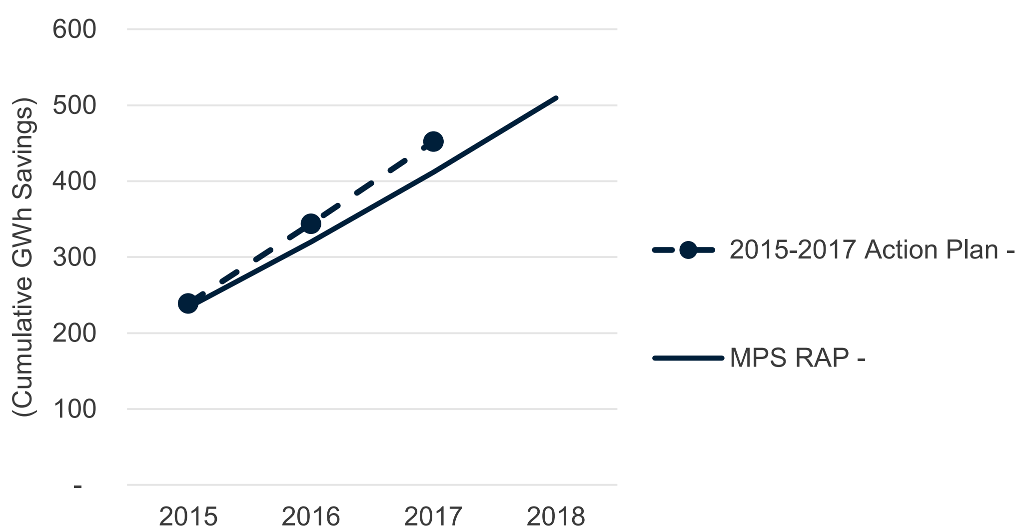
As mentioned in Chapter 2, this analysis also included a step to calibrate participation, savings, and spending levels to those filed in IPL's 2015-2017 Action Plan[3]. The 2015-2017 DSM Action Plan is based on the best available information from IPL programs currently in the field, as well as appropriate benchmarking information for comparable utility DSM programs. The implication is that we adjusted the participation rates, incentive amounts, and administrative cost assumptions that were in the 2012 MPS to be more specifically aligned with IPL past efforts and projected activity.

Another result of this calibration is that this analysis implicitly includes current opt-out levels of large commercial and industrial customers. In the 2015-2017 Action Plan, the planned levels for C&I programs were reduced relative to planned levels of Residential program activity in order to match current levels of program activity and reflect the amount of C&I customer load that had chosen to opt out of DSM programs. Aligning to the Action Plan means that these participation assumptions are incorporated into the DSM potential forecasts as they continue beyond 2017. This appendix shows the results of the calibration process.

The calibration was conducted on the separate but interconnected variables of energy savings, peak demand savings, and program budget; all of which underwent changes to their bottom-up composition in the modeling as described in previous sections, so an exact match with the 2015-2017 DSM Action Plan was neither obtainable nor required.

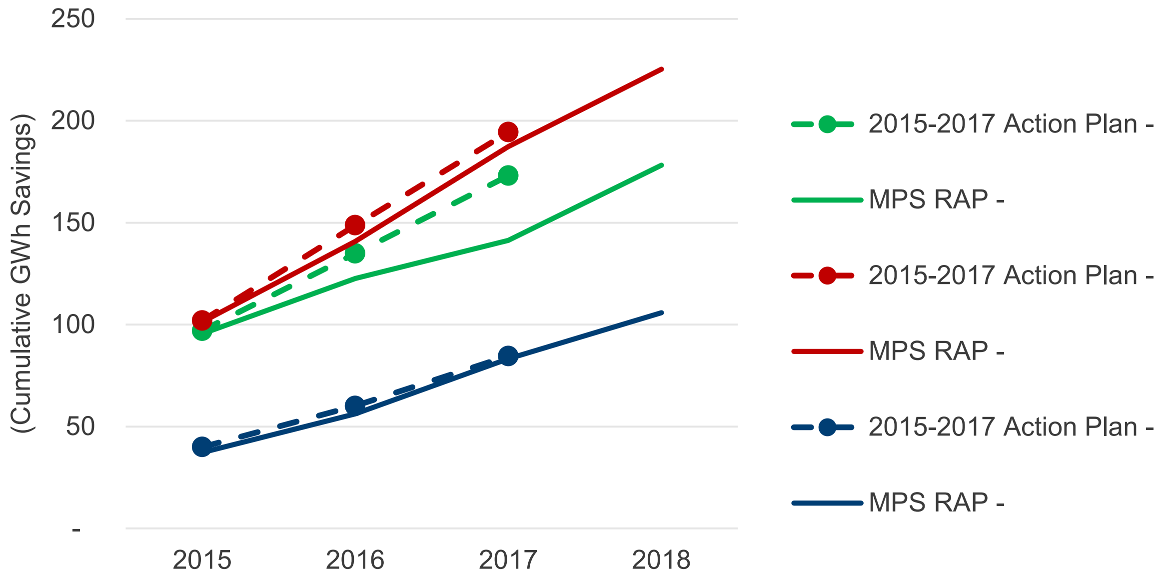
As shown in Figure A-1 and Figure A-2 below, the DSM Potential Forecasts of energy from the current analysis are a close match to the dotted line of the Action Plan for overlapping years. The first figure illustrates the calibration at the overall portfolio level, while the second shows the sector breakdown. The alignment was obtained by applying a constant scalar factor to participation levels in all years such that all measures within a given sector would align with the Action Plan. We then projected these trends into the future to 2034, which is the timeframe required for support of IPL's integrated resource planning process.

Figure A-1 Comparison of DSM Potential Forecast (RAP) and 2015-2017 Action Plan – Energy



[3] See Petitioners Exhibit ZE-2, Cause No. 44497 as filed on May 30, 2014.

Figure A-2 ***Comparison of DSM Potential Forecast (RAP) and 2015-2017 Action Plan - Energy by Sector***



As shown in Figure A-3 and Figure A-4 below, the DSM Potential Forecasts for peak MW from the current study are a close match to the dotted lines of the Action Plan for overlapping years. We then projected these trends into the future to 2034, which is the timeframe required for support of IPL's integrated resource planning process. The first figure illustrates the calibration at the overall portfolio level, while the second shows the sector breakdown.

Figure A-3 ***Comparison of DSM Potential Forecast (RAP) and 2015-2017 Action Plan – Peak Demand***

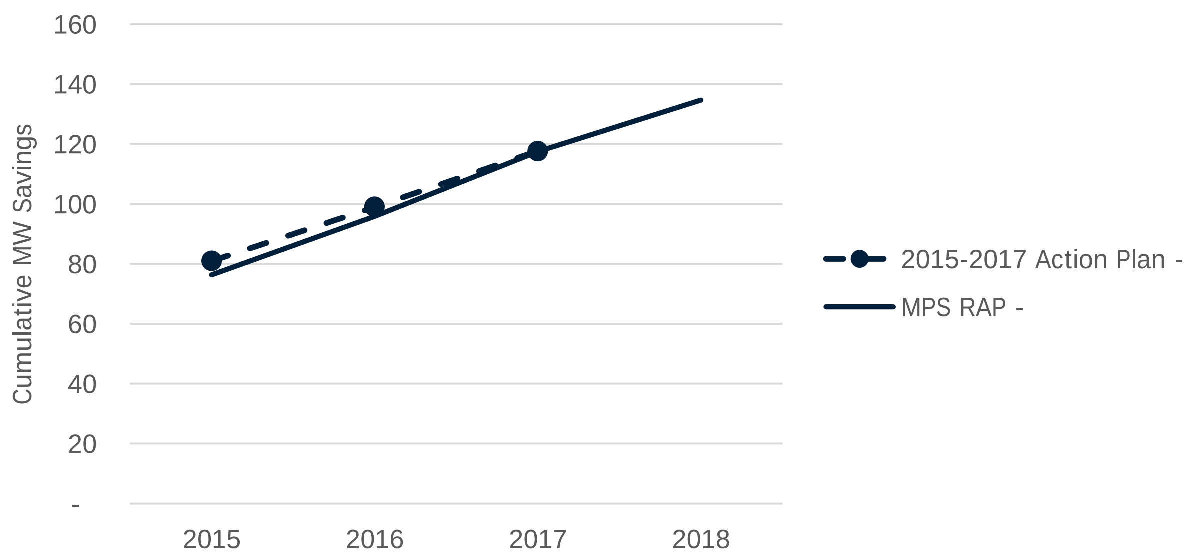
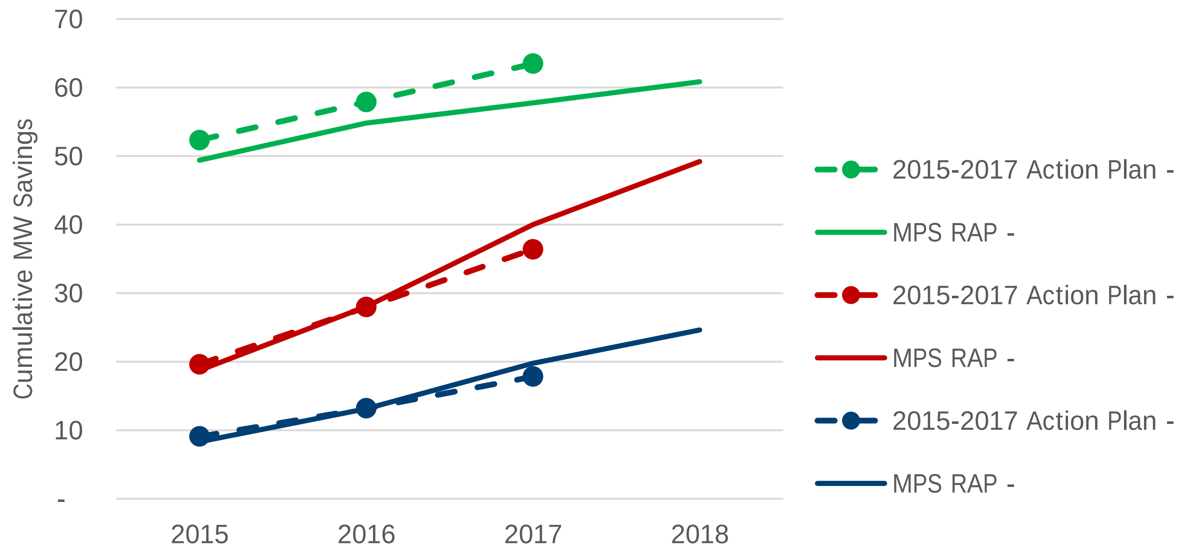


Figure A-4 Comparison of DSM Potential Forecast (RAP) and 2015-2017 Action Plan – Peak Demand by Sector



Finally, as shown in Figure A-5 and Figure A-6 below, utility budgets for the current study are also a close match to the Action Plan for overlapping years. We then project these trends into the future. The first figure illustrates the calibration at the overall portfolio level, while the second shows the sector breakdown. The figures represents a three-year moving average for spending to smooth some of the spikes introduced as an artifact of the modeling process. Dollar figures are given in real terms as of the study base year (2011).

Figure A-5 Comparison of DSM Potential Forecast (RAP) and 2015-2017 Action Plan – Utility Budget

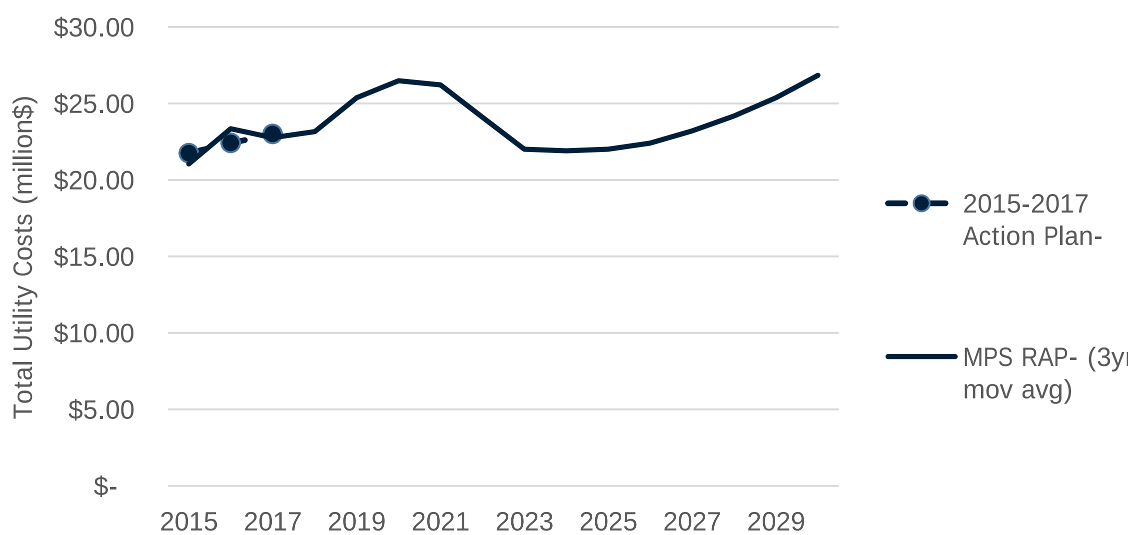


Figure A-6 Comparison of DSM Potential Forecast (RAP) and 2015-2017 Action Plan – Utility Budget by Sector

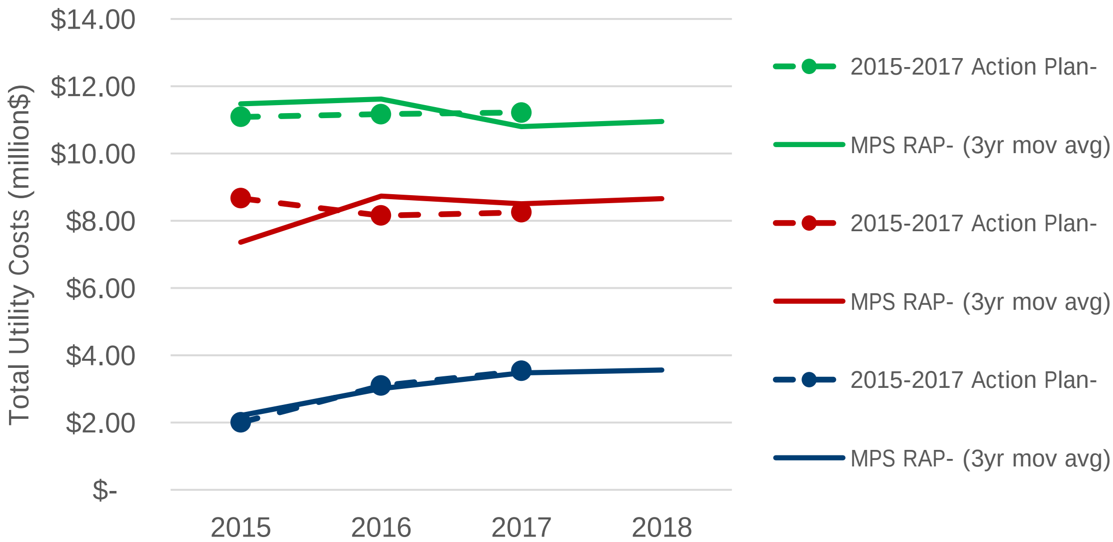
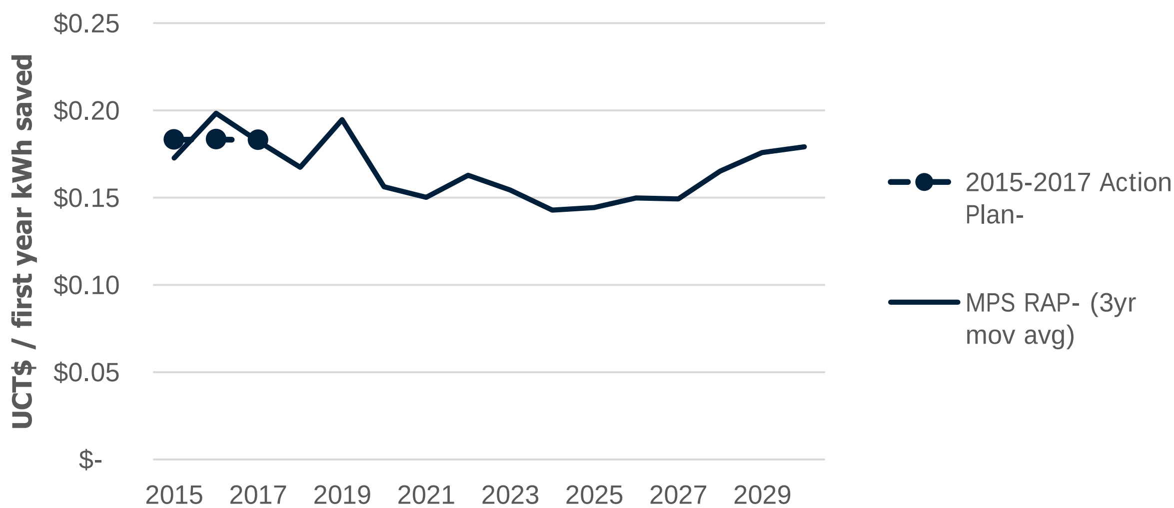


Figure A-7 below provides a view of the utility spending on a per-unit basis, where the unit is the number of kWh savings in the first year from newly installed measures. The utility budget consists of all program spending, including incentives and non-incentive or administrative costs. The data below represents a 3-year moving average of Utility Cost per first-year kWh saved, again to smooth some of the spikes introduced as an artifact of the modeling process. Dollar figures are given in real terms as of the study base year (2011).

Figure A-7 Comparison of DSM Potential Forecast (RAP) and 2015-2017 Action Plan – Utility Budget per First Year kWh Saved



Interpretation of this metric ($/first-year-kWh-saved) is subject to the following caveats: This metric includes programs with both short lives (like behavioral programs at 1 year) and long lives (like building shell or LED measures at 15+ years), so lifetime effects are difficult to gauge from first-year spending alone. Also, this metric includes spending on demand response programs, whose productivity is aimed at peak kW reductions rather than kWh energy reductions. It is an imperfect metric, but we note that the overall projections represent a rate and productivity of spending that is relatively stable over the 20 year time horizon.

APPENDIX | **B**

Annual Forecast Savings and Program Budgets

Table B-1 below shows the annual values for net cumulative energy savings, net cumulative peak demand savings, and the total utility program costs. Program costs are given in real terms as of the study base year (2011) on a 3-year moving average basis as explained in Appendix A above.

Table BB-1 Annual Forecast Savings and Program Budgets

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Net Cumulative Energy Savings (GWh)																						
Residential	18	36	96	123	141	178	210	223	249	258	254	271	292	310	331	351	369	388	406	426	446	473
Commercial	24	56	101	141	187	225	266	333	396	444	487	534	583	630	676	702	724	752	781	815	847	870
Industrial	11	23	37	56	83	106	127	150	170	195	215	235	251	263	272	279	285	293	300	309	316	322
TOTAL	**53**	**114**	**234**	**320**	**412**	**509**	**603**	**706**	**815**	**897**	**955**	**1,041**	**1,125**	**1,203**	**1,279**	**1,332**	**1,378**	**1,432**	**1,487**	**1,549**	**1,609**	**1,665**
Net Cumulative Peak Demand Savings (MW)																						
Residential	4	6	49	55	58	61	66	69	74	78	82	87	92	98	105	113	120	128	137	145	154	164
Commercial	5	10	19	28	40	49	59	72	84	94	103	110	118	125	132	137	141	146	150	156	161	165
Industrial	2	5	8	13	20	25	29	34	38	43	47	50	53	55	57	59	60	62	63	65	66	67
TOTAL	**10**	**21**	**76**	**96**	**117**	**135**	**154**	**175**	**197**	**215**	**231**	**248**	**263**	**279**	**295**	**308**	**322**	**336**	**350**	**366**	**382**	**396**
Total Utility Program Cost ($Millions, 3-year moving average)[4]																						
Residential	*N/A*	*N/A*	$11.48	$11.61	$10.80	$10.95	$12.74	$12.63	$11.86	$10.65	$9.52	$9.54	$9.71	$9.99	$10.80	$11.67	$12.97	$13.80	$14.80	$16.10	$18.13	$19.42
Commercial	*N/A*	*N/A*	$7.36	$8.73	$8.51	$8.66	$9.29	$10.54	$10.83	$9.90	$8.88	$8.95	$9.02	$9.15	$9.16	$9.25	$9.32	$9.82	$10.60	$11.62	$12.34	$12.80
Industrial	*N/A*	*N/A*	$2.21	$3.01	$3.47	$3.56	$3.36	$3.33	$3.54	$3.55	$3.60	$3.42	$3.29	$3.28	$3.25	$3.28	$3.09	$3.23	$3.50	$4.05	$4.38	$4.59
TOTAL	***N/A***	***N/A***	**$21.05**	**$23.36**	**$22.78**	**$23.17**	**$25.39**	**$26.50**	**$26.23**	**$24.11**	**$22.01**	**$21.92**	**$22.02**	**$22.42**	**$23.20**	**$24.20**	**$25.39**	**$26.85**	**$28.90**	**$31.78**	**$34.85**	**$36.81**

[4] Dollars are in real terms as of the study base year (2011).

About Applied Energy Group (AEG)

Founded in 1982, AEG is a multi-disciplinary technical, economic and management consulting firm that offers a comprehensive suite of demand-side management (DSM) services designed to address the evolving needs of utilities, government bodies, and grid operators worldwide. Hundreds of such clients have leveraged our people, our technology, and our proven processes to make their energy efficiency (EE), demand response (DR), and distributed generation (DG) initiatives a success. Clients trust AEG to work with them at every stage of the DSM program lifecycle – assessing market potential, designing effective programs, supporting the implementation of the programs, and evaluating program results.

The AEG team has decades of combined experience in the utility DSM industry. We provide expertise, insight and analysis to support a broad range of utility DSM activities, including: potential assessments; end-use forecasts; integrated resource planning; EE, DR, DG, and smart grid pilot and program design and administration; load research; technology assessments and demonstrations; project reviews; program evaluations; and regulatory support.

Our consulting engagements are managed and delivered by a seasoned, interdisciplinary team comprised of analysts, engineers, economists, business planners, project managers, market researchers, load research professionals, and statisticians. Clients view AEG's experts as trusted advisors, and we work together collaboratively to make any DSM initiative a success.

Applied Energy Group
500 Ygnacio Valley Road, Suite 450
Walnut Creek, CA 94596

P: 925.482.2000
F: 925.284.3147

IPL 2014 IRP

Attachment 4.8 (2012 MPS) is provided electronically.

Appendix B

Summary of Equations and Glossary of Symbols

Basic Equations

Participant Test

NPVP = BP - CP
NPVavp = (BP - CP) / P
BCRP = BP/CP
DPP = min j such that Bj > Cj

Ratepayer Impact Measure Test

LRIRIM	=	(CRIM - BRIM) / E	
FRIRIM	=	(CRIM - BRIM) / E	for t = 1
ARIRIMt	=	FRIRIM	for t = 1
	=	(CRIMt- BRIMt)/Et	for t=2,... ,N
NPVRIM	=	BRIM — CRIM	
BCRRIM	=	BRIM /CRIM	

Total Resource Cost Test

NPVTRC = BTRC - CTRC
BCRTRC = BTRC / CTRC
LCTRC = LCRC / IMP

Program Administrator Cost Test

NPVpa = Bpa - Cpa
BCRpa = Bpa / Cpa
LCpa = LCpa / IMP

Benefits and Costs

Participant Test

$$Bp = \sum_{t=1}^{N} \frac{BR_t + TC_t + INC_t}{(1+d)^{t-1}} + \sum_{t=1}^{N} \frac{AB_{at} + PAC_{at}}{(1+d)^{t-1}}$$

$$Cp \sum_{t=1}^{N} \frac{PC_t + BI_t}{(1+d)^{t-1}}$$

Ratepayer Impact Measure Test

$$B_{RIM} = \sum_{t=1}^{N} \frac{UAC_t + RG_t}{(1+d)^{t-1}} + \sum_{t=1}^{N} \frac{UAC_{at}}{(1+d)^{t-1}}$$

$$C_{RIM} = \sum_{t=1}^{N} \frac{UIC_t + RL_t + PRC_t + INC_t}{(1+d)^{t-1}} + \sum_{t=1}^{N} \frac{RL_{at}}{(1+d)^{t-1}}$$

$$E = \sum_{t=1}^{N} \frac{E_t}{(1+d)^{t-1}}$$

Total Resource Cost Test

$$B_{TRC} = \sum_{t=1}^{N} \frac{UAC_t + TC_t}{(1+d)^{t-1}} + \sum_{t=1}^{N} \frac{UAC_{at} + PAC_{at}}{(1+d)^{t-1}}$$

$$C_{TRC} = \sum_{t=1}^{N} \frac{PRC_t + PCN_t + UIC_t}{(1+d)^{t-1}}$$

$$L_{TRC} = \sum_{t=1}^{N} \frac{PRC_t + PCN_t - TC_t}{(1+d)^{t-1}}$$

$$IMP = \frac{\sum_{t=1}^{n}\left[(\sum_{i=1}^{n} \Delta EN_{it}) \ or \ (\Delta DN_{it} \ where \ I = peak \ period) \right]}{(1+d)^{t-1}}$$

Program Administrator Cost Test

$$B_{pa} = \sum_{t=1}^{N} \frac{UAC_t}{(1+d)^{t-1}} + \sum_{t=1}^{N} \frac{UAC_{at}}{(1+d)^{t-1}}$$

$$C_{pa} = \sum_{t=1}^{N} \frac{PRC_t + INC_t + UIC_t}{(1+d)^{t-1}}$$

$$LCPA = \sum_{t=1}^{N} \frac{PRC_t + INC_t}{(1+d)^{t-1}}$$

Glossary of Symbols

Abat	=	Avoided bill reductions on bill from alternate fuel in year t
AC:Dit	=	Rate charged for demand in costing period i in year t
AC:Eit	=	Rate charged for energy in costing period i in year t
ARIRIM	=	Stream of cumulative annual revenue impacts of the program per unit of energy, demand, or per customer. Note that the terms in the ARI formula are not discounted, thus they are the nominal cumulative revenue impacts. Discounted cumulative revenue impacts may be calculated and submitted if they are indicated as such. Note also that the sum of the discounted stream of cumulative revenue impacts does not equal the LRIRIM*
BCRp	=	Benefit-cost ratio to participants
BCRRIM	=	Benefit-cost ratio for rate levels
BCRTRC	=	Benefit-cost ratio of total costs of the resource
BCRpa	=	Benefit-cost ratio of program administrator and utility costs
BIt	=	Bill increases in year t
Bj	=	Cumulative benefits to participants in year j
Bp	=	Benefit to participants
BRIM	=	Benefits to rate levels or customer bills
BRt	=	Bill reductions in year t
BTRC	=	Benefits of the program
Bpa	=	Benefits of the program
Cj	=	Cumulative costs to participants in year i

Cp	=	Costs to participants
CRIM	=	Costs to rate levels or customer bills
CTRC	=	Costs of the program
Cpa	=	Costs of the program
D	=	discount rate
ΔDgit	=	Reduction in gross billing demand in costing period i in year t
ΔDnit	=	Reduction in net demand in costing period i in year t
DPp	=	Discounted payback in years
E	=	Discounted stream of system energy sales-(kWh or therms) or demand sales (kW) or first-year customers
ΔEgit	=	Reduction in gross energy use in costing period i in year t
ΔEnit	=	Reduction in net energy use in costing period i in year t
Et	=	System sales in kWh, kW or therms in year t or first year customers
FRIRIM	=	First-year revenue impact of the program per unit of energy, demand, or per customer.
IMP	=	Total discounted load impacts of the program
INCt	=	Incentives paid to the participant by the sponsoring utility in year t First year in which cumulative benefits are > cumulative costs.
Kit	=	1 when ΔEGit or ΔDGit is positive (a reduction) in costing period i in year t, and zero otherwise
LCRC	=	Total resource costs used for levelizing
LCTRC	=	Levelized cost per unit of the total cost of the resource
LCPA	=	Total Program Administrator costs used for levelizing
Lcpa	=	Levelized cost per unit of program administrator cost of the resource
LRIRIM	=	Lifecycle revenue impact of the program per unit of energy (kWh or therm) or demand (kW)-the one-time change in rates-or per customer-the change in customer bills over the life of the program.
MC:Dit	=	Marginal cost of demand in costing period i in year t
MC:Eit	=	Marginal cost of energy in costing period i in year t
NPVavp	=	Net present value to the average participant
NPVP	=	Net present value to all participants
NPVRIM	=	Net present value levels
NPVTRC	=	Net present value of total costs of the resource
NPVpa	=	Net present value of program administrator costs
OBIt	=	Other bill increases (i.e., customer charges, standby rates)
OBRt	=	Other bill reductions or avoided bill payments (e.g., customer charges, standby rates).
P	=	Number of program participants
PACat	=	Participant avoided costs in year t for alternate fuel devices

PCt = Participant costs in year t to include:

- Initial capital costs, including sales tax
- Ongoing operation and maintenance costs
- Removal costs, less salvage value
- Value of the customer's time in arranging for installation, if significant

PRCt = Program Administrator program costs in year t
PCN = Net Participant Costs
RGt = Revenue gain from increased sales in year t
RLat = Revenue loss from avoided bill payments for alternate fuel in year t (i.e., device not chosen in a fuel substitution program)
RLt = Revenue loss from reduced sales in year t
TCt = Tax credits in year t
UACat = Utility avoided supply costs for the alternate fuel in year t
UACt = Utility avoided supply costs in year t
PAt = Program Administrator costs in year t
UICt = Utility increased supply costs in year t

Indianapolis Power & Light Company
Annual Estimate - Based on 2015-2017 Action Plan (Cause No. 44497)
Reflects 2015 Annual Information - which is representative for each of the 3 years in the planning period

	Per Participant					
Program	**Estimated Participant Annual Bill Reduction**	**Participant Costs**	**Participant Incentive**	**Net Energy (kWh)**	**Net Demand (kW)**	**Estimated Penetration Rate**
Residential Lighting	$ 41	$ 61	$ 41	452	0.1	8.6%
Residential Income Qualified Weatherization	$ 75	NA	$ 125	823	0.2	0.6%
Residential Air Conditioning Load Management	$ 1	NA	$ 20	10	0.9	9.7%
Residential Multi Family Direct Install	$ 52	NA	$ 39	571	0.1	2.4%
Residential Home Energy Assessment	$ 133	NA	$ 67	1462	0.1	0.9%
Residential School Kits	$ 41	NA	$ 25	453	0.0	2.1%
Residential Online Energy Assessment	$ 37	NA	$ 37	409	0.0	0.6%
Residential Appliance Recycling	$ 74	NA	$ 212	815	0.1	0.7%
Residential Peer Comparison Reports	$ 10	NA	$ 7	115	0.0	47.5%
Business Energy Incentives – Prescriptive - PER MEASURE	$ 17	$ 39	$ 21	218	0.0	Varies
Business Energy Incentives – Custom	$ 4,136	$ 10,311	$ 6,308	52564	10.5	<0.1%
Small Business Direct Install - PER MEASURE	$ 17	NA	$ 20	222	0.0	Varies
Business Air Conditioning Load Management (TONS)	$ 0	NA	$ 28	5	0.4	<0.1%

IPL 2014 IRP

Confidential Attachment 5.1 (Ventyx IPL – IRP 2014 Report) is only available in the Confidential IRP.

IPL 2014 IRP

Attachment 6.1 (10 Yr Energy and Peak Forecast) is provided electronically.

IPL 2014 IRP

Attachment 6.2 (20 Yr Energy and Peak Forecast) is provided electronically.

IPL 2014 IRP

Confidential Attachment 6.3 (End Use Modeling Technique) is only available in the Confidential IRP.

IPL 2014 IRP

Confidential Attachment 6.4 (EIA End Use Data) is provided electronically.

IPL 2014 IRP

Confidential Attachment 6.5 (Energy – Forecast Drivers) is provided electronically.

IPL 2014 IRP

Attachment 6.6 (Energy – Input Data Set 1) is provided electronically.

IPL 2014 IRP

Attachment 6.7 (Energy – Input Data Set 2) is provided electronically.

IPL 2014 IRP

Attachment 6.8 (Energy – Input Data Set 3) is provided electronically.

IPL 2014 IRP

Attachment 6.9 (Peak – Forecast Drivers and Input Data) is provided electronically.

IPL 2014 IRP

Confidential Attachment 6.10 (Model Performance – Statistical Measures) is only available in the Confidential IRP.

IPL 2014 IRP

Attachment 6.11 (Forecast Error Analysis) is provided electronically.

INDIANAPOLIS POWER & LIGHT COMPANY

2014 Integrated Resource Plan Public Summary

What's Inside

- ◊ Existing Generation
- ◊ Public Advisory Process
- ◊ Capacity Position
- ◊ IRP Scenarios
- ◊ Planning Assumptions
- ◊ Preferred Portfolio
- ◊ Short Term Action Plan

October 31, 2014

IPL participates in an Integrated Resource Planning (IRP) process as required by the Indiana Administrative Code[1] (IAC) to identify a resource plan to reliably serve its customers for a forward looking twenty year period. Biannually, the IRP is filed with the Indiana Utility Regulatory Commission (IURC). The combination of projected customer load, existing resources, projected operating costs, anticipated environmental and other regulatory requirements, potential supply options and demand side resources are analyzed within the context of the risks of uncertain future landscapes to plan to provide electricity service in the most cost-effective and reliable way possible.

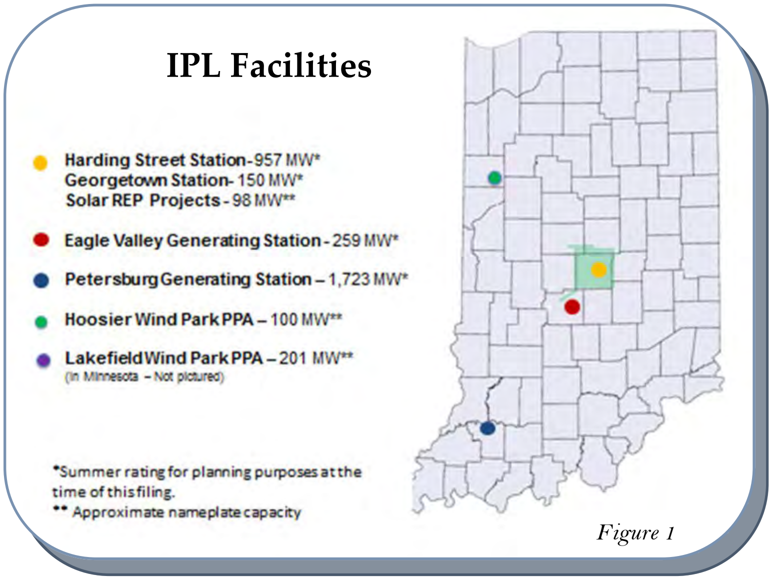


Figure 1

- ◊ IPL serves approximately 470,000 households and businesses in ten counties in Central Indiana, mainly in Marion County and adjoining counties.
- ◊ About 88% of IPL's customers are residential, yet the largest percentage of the Company's energy usage is from the Large Commercial and Industrial customers.

IPL owns and efficiently operates approximately 3,089 MW[2] of generation at four plants, over 800 miles of transmission lines, and over 11,600 miles of distribution lines as a vertically integrated investor owned utility.

See *Figure 1* for generation sites and IPL's service territory. IPL also has purchase power agreements for approximately 98 MW of local solar generation and approximately 300 MW of wind generation.

[1]http://www.in.gov/legislative/iac/T01700/A00040.PDF

[2]Summer rating for planning purposes at the time of this filing

Projected 2017 Resource Portfolio

IPL has made great strides to diversify its portfolio by changing the fuel mix from 79% coal and 14% natural gas in 2007 to the projected mix of 44% coal and 45% natural gas in 2017. The Company has also added 10% wind and solar resources to its portfolio since 2007. See *Figure 2* for detail. The shift in IPL's generation mix is due to the Company's new 671 MW Eagle Valley CCGT and the refueling of Harding Street units 5 through 7[1] from coal to natural gas to ensure compliance with new environmental regulations.

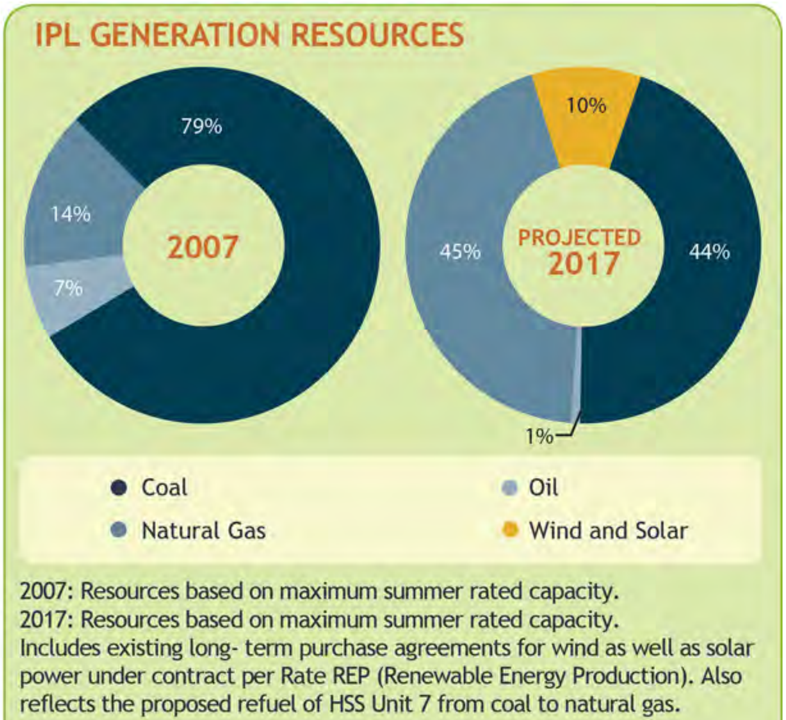


Figure 2

[1]HSS 7 refuel is pending IURC approval in Cause No. 44540

As part of a new public advisory process with our stakeholders, IPL conducted three stakeholder workshops to discuss the IRP process with interested parties and gather feedback. With the guidance of a third party facilitator, IPL provided information to and gathered information from stakeholders. After the first workshop, the Company responded to 112 comments and questions and an additional 29 comments and questions following the second meeting. The modifications made as a result of stakeholder participation are highlighted in the second presentation and incorporated in the third presentation. The three workshops and related agendas are summarized below:

May 16, 2014

◊ Introduction to IPL and Integrated Resource Planning Process
◊ Energy and Peak Forecasts
◊ Demand Side Management: Energy Efficiency and Demand Response
◊ Planning Reserve Margin
◊ Generation Overview
◊ Environmental Overview
◊ Distributed Energy Resources
◊ Proposed Modeling Assumptions

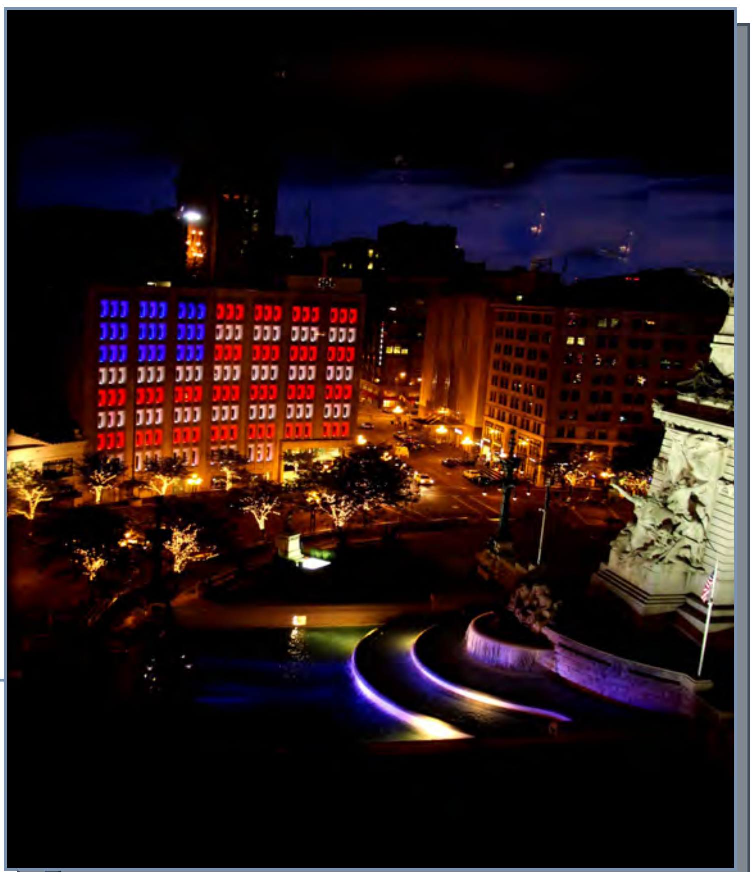
July 18, 2014

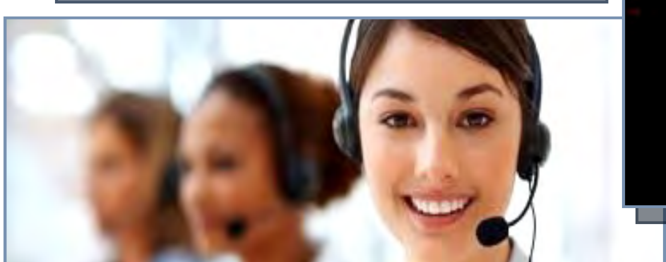
◊ Demand Side Management Update
◊ Environmental Update
◊ Incorporating Stakeholder Input
◊ Presentation of Initial Scenario Results

October 10, 2014

◊ Waste Water Analysis Results
◊ Updated Modeling Assumptions
◊ Presentation of Scenario Results
◊ Short Term Action Plan

Meeting materials, stakeholder comments and questions, and meeting summaries are available at https://www.iplpower.com/irp/.





IPL's energy and peak load requirements are expected to grow at a compound annual growth rate of 0.8% and 0.9%, respectively, through 2033. IPL is required to maintain an adequate reserve margin to satisfy its load obligation as a retail jurisdictional utility in Indiana and as a member of the Midcontinent Independent System Operator (MISO).

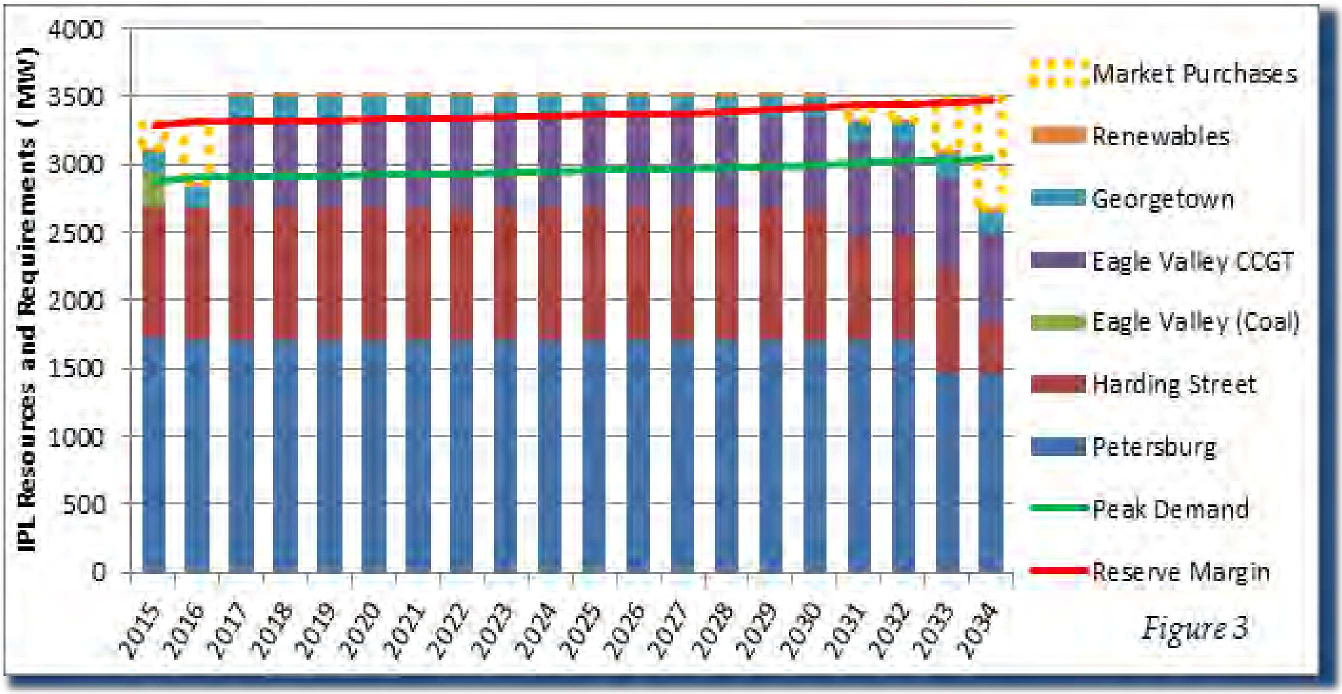


Figure 3

Figure 3 shows IPL's projected reserve margin compared to the available resources, assuming no resource additions other than those proposed and approved by the IURC as described on page 3. The capacity deficit prior to 2017 is met by market purchases. Once refueling and new generation construction is complete in 2017, IPL does not experience a capacity shortfall until 2030.

The electric utility industry continues to evolve through technology advancements, fluctuations in customer consumption, changes in state and federal energy policies, uncertainty of long-term fuel supply and prices, and a multitude of other factors. Since the impacts these factors will have on the future utility industry landscape remains largely uncertain, IPL models multiple possible scenarios to evaluate various futures.

IPL, with assistance from its stakeholders and consultants, created eight scenarios (depicted below in *Figure 4*) to target three major resource drivers– potential Greenhouse Gas regulation, natural gas prices, and load variation. Potential Greenhouse Gas regulation is quantified using four distinct CO_2 costs: IPL-EPA Shadow price (Moderate-EPA), Federal legislation Ventyx Fall 2013 price (High), Mass Cap ICF price (Moderate-ICF), and a zero cost scenario (Low). Additionally, high, low, and base forecasts were used for natural gas and load forecasts.

The use of multiple scenarios allows IPL to identify a Preferred Portfolio that will be competitive in a wide range of future landscapes.

No.	Scenario Name	Gas/Market Price	CO_2 Price	Load Forecast
1	Base	Base	Moderate-EPA	Base
2	High Load	Base	Moderate-EPA	High
3	Low Load	Base	Moderate-EPA	Low
4	High Gas	High	Moderate-EPA	Base
5	Low Gas	Low	Moderate-EPA	Base
6	High Environmental	Environmental	High	Base
7	Environmental	Mass Cap	Moderate-ICF	Base
8	Low Environmental	Base	Low	Base

Figure 4

The future impacts on IPL's resource plan continue to be uncertain amidst anticipated regulations pertaining to waste, water, air and emissions coupled with dynamic fuel cost forecasts, electricity market structural change and variable electricity price forecasts. In addition to the future landscapes, the selection of a Preferred Portfolio is dependent on a variety of input assumptions, including the customer growth rate and the cost assumptions in *Figure 5.*

Modeling Cost Inputs

1. Natural gas costs
2. Coal costs, by region
3. Energy costs, peak and off-peak
4. Capacity costs purchased on the open market
5. Demand side management costs and benefits
6. Costs of constructing or retrofitting generation
7. Costs of future environmental regulations

Figure 5

Assumptions 1 through 4 were provided to IPL by Ventyx, a consulting firm known nationwide to produce reliable forecasts. Assumption 5 was guided by Applied Energy Group ("AEG"), a consulting firm with energy efficiency and demand response expertise. Assumptions 6 through 8 were developed internally by IPL experts based on current and future regulations and market research and trends.

IPL assumed that there will be a cost associated with emitting CO_2 in seven of its eight scenarios due to the EPA's proposed Clean Power Plan rule. This cost will result in coal generation being partially replaced with natural gas fired generation resulting in higher off-peak energy prices (as coal generation normally sets the off-peak price). It may also result in additional renewable generation.

Aside from the planned retirement of Eagle Valley coal fired units 3 through 6 in 2016 and the planned refuel of Harding Street units 5 through 7[1] from coal to natural gas in 2016, the model was allowed to choose optimal unit retirement dates based on production costs.

IPL's Preferred Portfolio

From the eight scenarios, IPL used sophisticated modeling techniques to develop five resource expansion plans and their corresponding cost to customers. Plans one and two included no early retirements while plans three through five included the early retirement of Petersburg units 1 and 2. At the conclusion of modeling, the Base Case, or plan one, provided the reasonable least cost to customers over the planning period and was identified as the Preferred Portfolio.

Plan one is expected to provide the lowest reasonable cost of power to IPL's customers while meeting environmental and reliability constraints and reflecting emerging preference for, and the viability of customer self-generation. Plan one only adds new generation when an IPL unit is retired, which is reflective of the projected moderate energy growth rate for Indianapolis. As seen in *Figure 6*, IPL has sufficient resources to meet its load requirements until 2031 when Harding Street units 5 and 6 are planned to retire and be replaced with new natural gas generation.

[1]IPL's request to refuel HSS 7 is pending with the IURC in Cause No. 44540.

Plan one provides reliable electric utility service, at a reasonable cost, through a combination of existing resources, new resources and demand-side management programs. IPL will maintain adequate capacity resources to serve its customers' peak demand and required MISO reserve margin needs throughout the planning period.

The following *Figure 6* provides a long–term yearly description of the Preferred Portfolio—Plan one.

YEAR	Retirements	New Resource
2015-2030	None	None
2031	Harding Street Units 5 and 6	Combined Cycle Natural Gas 200 MW
2032	None	None
2033	Petersburg Unit 1	Combined Cycle Natural Gas 200 MW
2034	Harding Street Unit 7	Combined Cycle Natural Gas 400 MW

Figure 6

Short Term Action Plan

IPL's short-term action plan covering 2015 through 2017 identifies the initial steps toward the Company's longer-term resource strategy, as described in the Preferred Portfolio. The short term action plan focuses on managing the impacts of implementing the recommendations that resulted from the 2011 IRP. The following recommendations from the 2011 and 2014 IRP are in the process of being implemented over the 2015-2017 period:

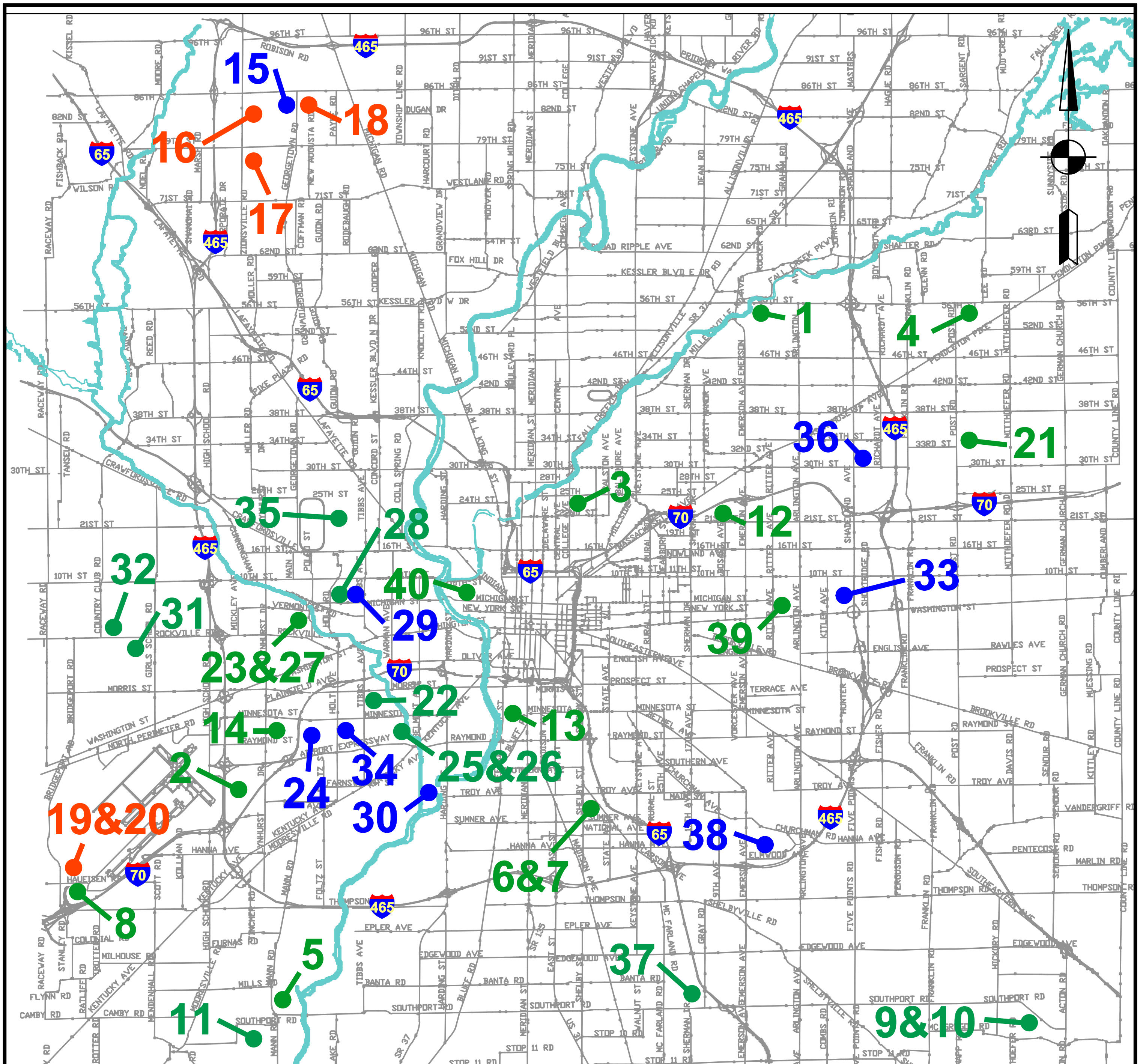
- ◊ Continue to offer Commission approved cost-effective DSM programs (See IURC Cause No. 44497)
- ◊ Retire Eagle Valley Units 3 through 6
- ◊ Construct the new 671 MW Eagle Valley CCGT (See IURC Cause No. 44339)
- ◊ Refuel Harding Street Units 5 and 6 from coal to natural gas (See IURC Cause No. 44339)
- ◊ Install environmental control equipment to comply with MATS regulations (See IURC Cause No. 44242)
- ◊ Plan for the refueling of Harding Street Unit 7 from coal to natural gas to comply with NPDES permits—pending Commission approval (See IURC Cause No. 44540)
- ◊ Complete construction of transmission facilities
- ◊ Purchase capacity for MISO planning years 2015-2016 and 2016-2017

Because Integrated Resource Planning is an iterative process, IPL will complete another IRP in 2016 incorporating updated and/or new assumptions. IPL thanks stakeholders for their involvement in the 2014 IRP. Please visit https://www.iplpower.com/irp/ to access detailed presentations and the IRP document.

FINAL RATE REP PARTICIPANTS

Count	Customer	Address	Nameplate Capacity (kW, AC)	Ground / Roof
1	Cathedral High School	5525 E. 56th St.	50	R
2	ES by JMS	5925 Stockberger Place	90	R
3	Indiana Veneers	1121 E. 24th Street	85	R
4	GSA Bean Finance Center	8899 E. 56th Street	1,800	R
5	Melloh Enterprises	6627 Mann Road	39	G
6	L&R #1 (Laurelwood Apts.)	Building #6, 3340 Teakwood Dr	30	R
7	L&R #2 (Laurelwood Apts.)	Building #16, 3340 Teakwood Dr	28	R
8	Airport I	7800 Col. H. Weir Cook Memorial Drive	9,800	G
9	Indy Solar I	10321 East Southport Road	10,000	G
10	Indy Solar II	10321 East Southport Road	10,000	G
11	Indy Solar III	5800 West Southport Road	8,640	G
12	Indy DPW	3915 E 21st Street	95	R
13	Indy DPW	1737 S. West St	95	R
14	Schaefer Technologies	4901 W. Raymond St, 46241	500	G
15	Citizens Energy (LNG North)	4650 W. 86th	1,500	G
16	Duke Realty #98	8258 Zionsville Rd, 46278	3,000	R
17	Duke Realty #87	5355 W. 76th St., Indpls., 46268	3,000	R
18	Duke Realty #129	4925 W. 86th St. Indianapolis, IN 46268	4,000	R
19	Airport Phase IIA	Intersection of Haueisen Rd& Bridgeport F	2,500	G
20	Airport Phase IIB	4250 W Perimeter Rd	7,500	G
21	Celadon Trucking Services	9503 E. 33rd Street, 46235	82	R
22	Vertellus	1500 S. Tibbs Ave, 46241	8,000	G
23	Merrell Brothers	4251 W. Vermont ST	96	R
24	Grocers' Supply Co.	4310 Stout Field Dr. North	1,000	R
25	A-Pallet Co.	1225 S. Bedford St.	48	G
26	A-Pallet Co.	1305 S. Bedford St.	96	R
27	Town of Speedway, IN	4251 W. Vermont ST	750	G
28	GenNx Properties VI, LLC (Maple Creek Apts)	3800 W. Michigan Street (Bldg 17)	20	R
29	GenNx Properties VI, LLC (Maple Creek Apts)	3800 W. Michigan Street (Bldg 1)	20	R
30	CWA Authority	2700 S. Belmont (WWTF)	3,830	G
31	Rexnord Industries	7601 Rockville Road	2,800	G
32	Equity Industrial A-Rockville LLC	7900 Rockville Road	2,725	R
33	Lifeline Data Centers	401 N. Shadeland Ave	4,000	R
34	Omnisource	2205 S. Holt	1,000	G
35	Indianapolis Motor Speedway	3702 W 21st Street	9,594	G
36	DEEM	6900 E. 30th Street	500	R
37	Indy Southside Sports Academy	4150 Kildeer Dr	200	R
38	Marine Center of Indiana	5701 Elmwood Ave	500	R
39	5855 LP	5855 E. Washington St.	78	R
40	IUPUI	801 W. Michigan Rd	48	R
		Total	98,138	

4	10/2/2014	Under Construction	17,500
27		Operating	65,816
9		In Development	14,823



1. CATHEDRAL HIGH SCHOOL
2. ES by JMS
3. INDIANA VENEERS
4. GSA BEAN FINANCE CENTER
5. MELLOH ENTERPRISES
6. L&R #1 (LAURELWOOD APTS.)
7. L&R #2 (LAURELWOOD APTS.)
8. AIRPORT I
9. INDY SOLAR I
10. INDY SOLAR II
11. INDY SOLAR III
12. INDY DPW
13. INDY DPW
14. SCHAEFER TECHNOLOGIES
15. CITIZENS ENERGY (LNG NORTH)
16. DUKE REALTY #98
17. DUKE REALTY #87
18. DUKE REALTY #129
19. AIRPORT PHASE IIA
20. AIRPORT PHASE IIB
21. CELADON TRUCKING SERVICES
22. VERTELLUS
23. MERRELL BROTHERS
24. GROCERS' SUPPLY CO.
25. A-PALLET CO.
26. A-PALLET CO.
27. TOWN OF SPEEDWAY, IN
28. GenNx PROPERTIES VI, LLC. (MAPLE CREEK APTS.)
29. GenNx PROPERTIES VI, LLC. (MAPLE CREEK APTS.)
30. CWA AUTHORITY
31. REXNORD INDUSTRIES
32. EQUITY INDUSTRIAL A-ROCKVILLE LLC.
33. LIFELINE DATA CENTERS
34. OMNISOURCE
35. INDIANAPOLIS MOTOR SPEEDWAY
36. DEEM
37. INDY SOUTHSIDE SPORTS ACADEMY
38. MARINE CENTER OF INDIANA
39. 5855 LP
40. IUPUI

LEGEND

- OPERATING

- UNDER CONSTRUCTION

- IN DEVELOPMENT

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INDIANAPOLIS POWER & LIGHT CO.

SOLAR FACILITIES

DRAWN BY: RLW

10-2-14

solar-REP-GIS-map

Indianapolis Power & Light Company

Attachment 9.1 (IRP Public Advisory Process Presentations)

Meeting #1: May 16, 2014
Meeting #2: July 18, 2014
Meeting #3: October 10, 2014

IRP Public Advisory Meeting #1

Workshop with IRP Stakeholders

May 16, 2014

The Hall

202 N. Alabama St

Welcome and Introductions

Meeting Agenda and Guidelines

Presented by Marty Rozelle, PhD, Meeting Facilitator

IRP Public Advisory Meeting #1

Agenda Topics

- Introduction to IPL and Integrated Resource Planning Process
- Energy and Peak Forecasts
- Demand Side Management: Energy Efficiency and Demand Response
- Planning Reserve Margin
- Generation Overview
- Environmental Overview
- Distributed Energy Resources
- Proposed Modeling Assumptions

Meeting Objectives

- Enhance understanding of IPL's IRP process and IPL's resource portfolio
- Gather comments and feedback
- Continue relationship built on trust, respect and confidence

Meeting Guidelines

- Time for clarifying questions at end of each presentation
- Parking lot for items to be addressed later
- The phone line will be muted. During the allotted question time frames, you may press *6 to un-mute yourself.
- To inquire about confidential information please contact Teresa Nyhart with Barnes & Thornburg, LLP at teresa.nyhart@btlaw.com

Written Comments and Feedback

- The email, IPL.IRP@aes.com, will be open for a period of two weeks after this meeting, until May 30, for additional comments and feedback

- All IPL responses will be posted on the IPL IRP website on June 13

Questions?

Introduction to IPL

Presented by Herman Schkabla, Director of Resource Planning

Profile

- 470,000 customers*
- 1,400 employees*
- 528 sq. miles territory
- 144 substations

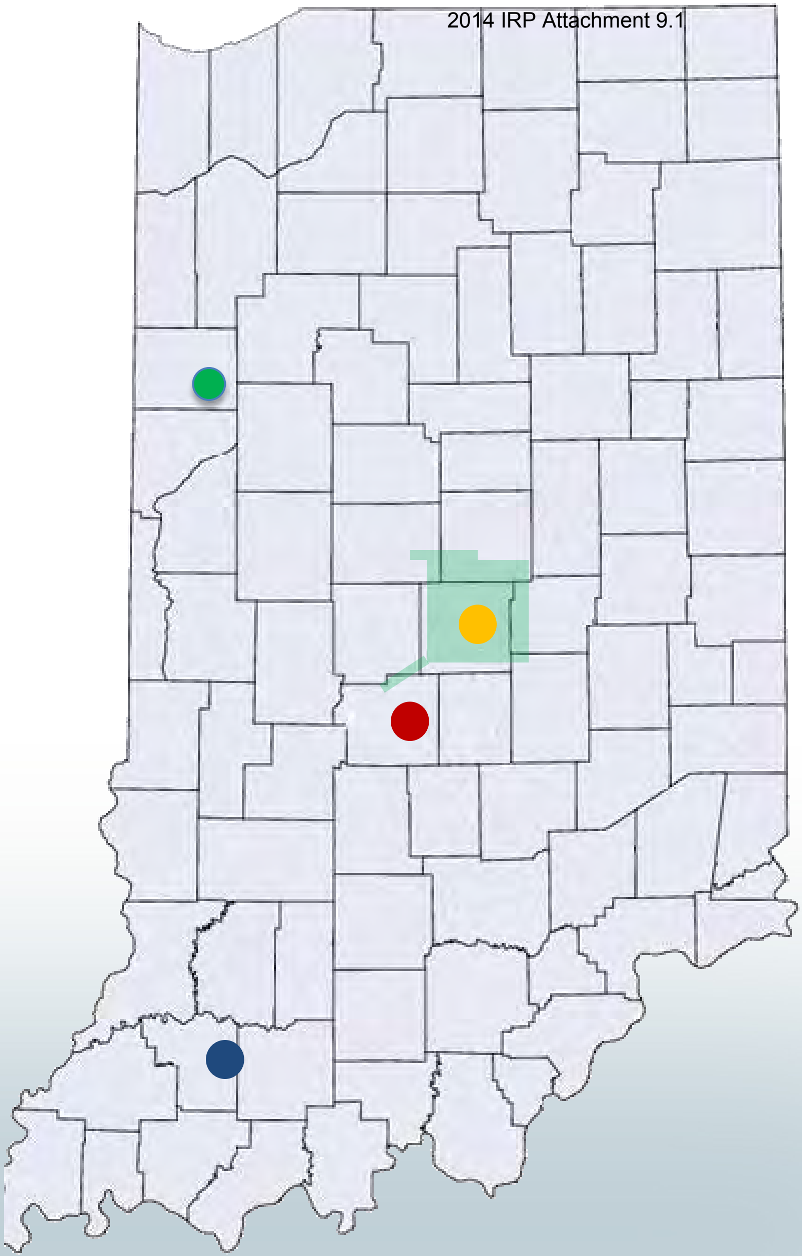
Harding Street Station, Georgetown Station, Solar REP Projects - 1,322 MW**

Eagle Valley Generating Station - 263 MW**

Petersburg Generating Station – 1,760 MW**

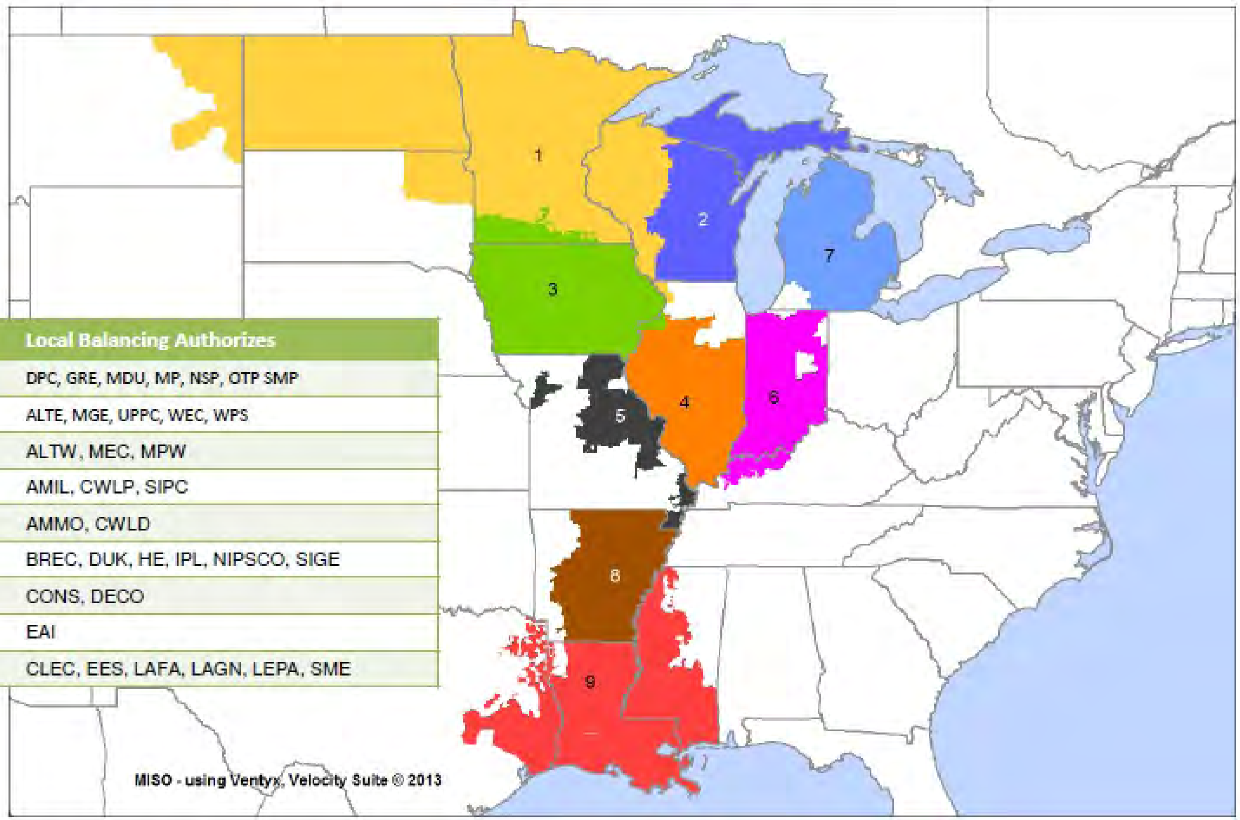
Hoosier Wind Park PPA – 100 MW**

Lakefield Wind Park PPA – 201 MW**
(In Minnesota – Not pictured)



*approximate numbers
**nameplate capacity

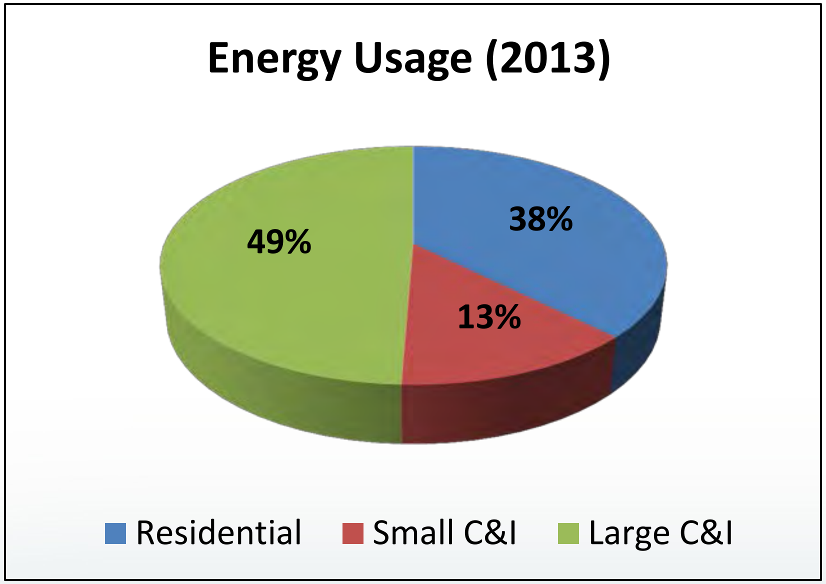
IPL Is In MISO Load Resource Zone (LRZ) 6

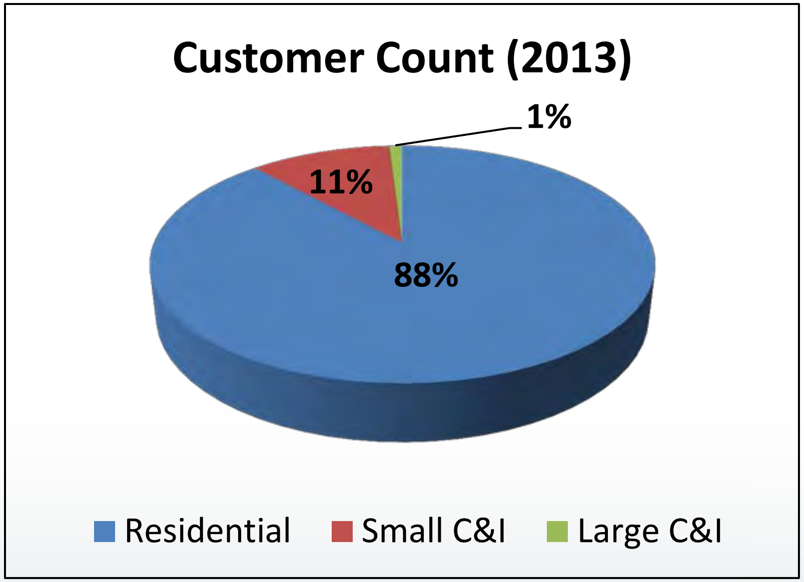


LRZ	Local Balancing Authorizes
1	DPC, GRE, MDU, MP, NSP, OTP SMP
2	ALTE, MGE, UPPC, WEC, WPS
3	ALTW, MEC, MPW
4	AMIL, CWLP, SIPC
5	AMMO, CWLD
6	BREC, DUK, HE, IPL, NIPSCO, SIGE
7	CONS, DECO
8	EAI
9	CLEC, EES, LAFA, LAGN, LEPA, SME

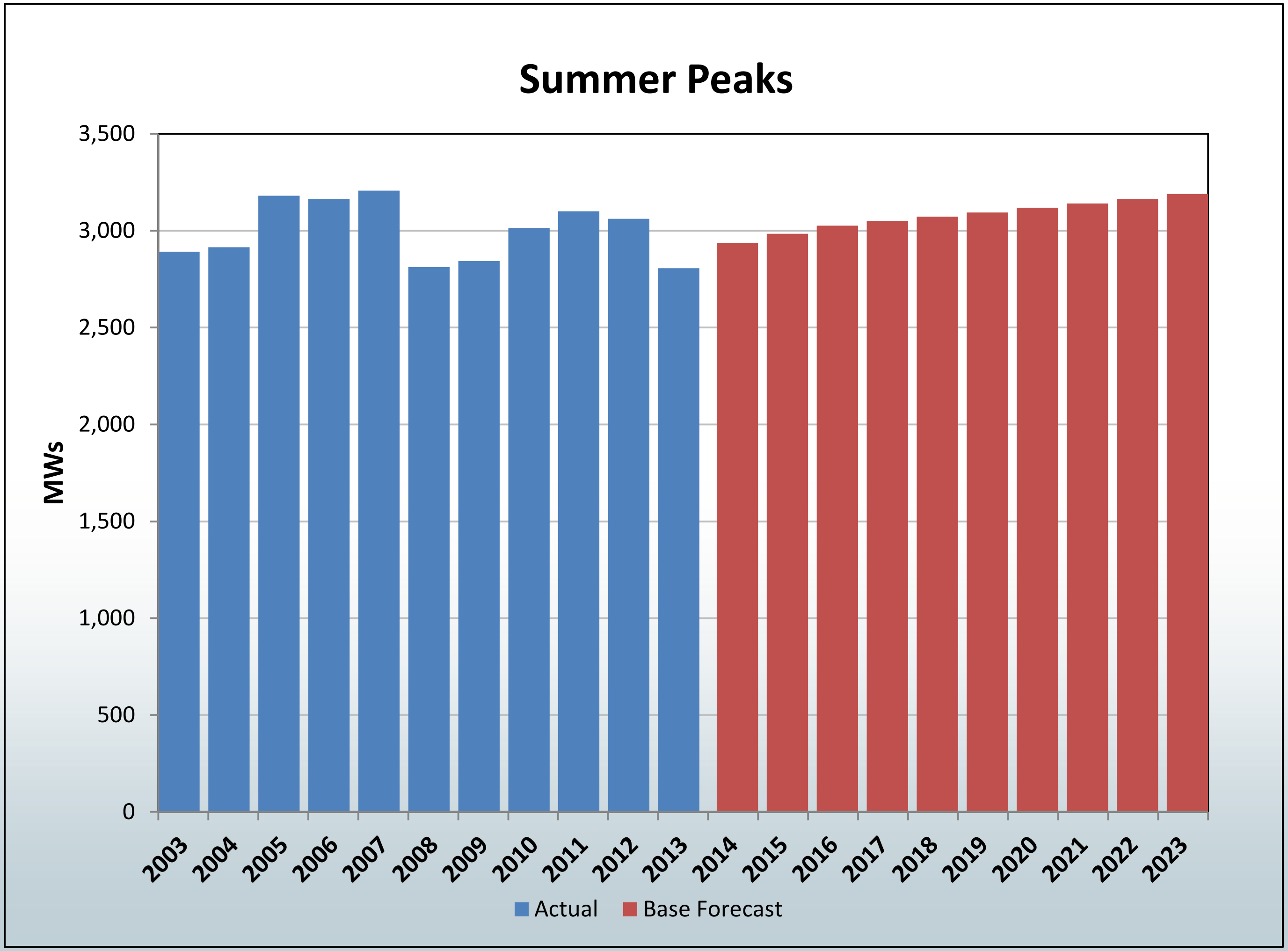
MISO – Midcontinent Independent System Operator, Inc.

Retail Energy Usage is Well Balanced between Residential and C&I Customer Classes





IPL Summer Peaks – Slow Recovery from Post-Recession Levels



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Integrated Resource Planning Process

Presented by Herman Schkabla, Director of Resource Planning

IRP Process Overview

Develop IPL's **Total** Supply Resource Needs

Determine IPL's **New** Supply Resource Needs

Identify Key Risk Parameters

Identify and Screen Resource Technologies

Evaluate Resource Expansion Plans

Identify IPL's Reference and Short Term Action Plans

IPL's Total Resource Needs

Net Load Forecast and Reserve Margin Requirement

- Net Load Forecast includes:
  - Load Forecast – economic driven
  - Less the projected Demand Side Management (DSM): Energy Efficiency (EE) and Demand Response (DR) resources

- Reserve Margin Requirement – amount of generation capacity needed to meet expected demand in a planning horizon
  - Percentages set by MISO 1 year in advance
  - Impacted by IPL's generating unit availability

- These two components make up the Total Resource Needs

Net Load Forecast *times* (1 + Reserve Margin)

IPL's Total Supply Resource Needs

Demand Response Programs and Distributed Generation Projects

- Demand Response (DR) Programs and Distributed Generation (DG) Projects are subtracted from the Total Resource Needs to yield the Total Supply Resource Needs
  - DR Programs are primarily focused on reducing electric demand at peak times
  - DG Projects generate electricity from many small energy sources and are generally non-dispatchable

IPL's New Supply Resource Needs

Compare Projected Resources with Total Supply Resource Needs

- To determine if IPL needs any New Supply Resources, IPL evaluates its existing generation plan as needed based on environmental compliance
  - Existing generation plan includes projects approved and/or pending at the IURC (e.g. Replacement Generation CPCN)
  - IPL will also apply any portfolio mandates such as DSM/EE or RPS, if required
- Then, IPL can compare its projected resources with its forecasted Total Supply Resource Needs to see if there is a shortfall

CPCN – Certificate of Public Convenience and Necessity
RPS – Renewable Portfolio Standard

Identify Key Risk Parameters

Ventyx Screening Model Inputs

- Define key risk parameters for modeling and portfolio evaluation
- Stakeholder feedback on key risk parameters

Identify and Screen Resource Technologies

- Identify supply technologies for modeling
  - Input from Ventyx, IPL, and stakeholders
  - Subject to environmental constraints
- For defined scenarios, the Ventyx Capacity Expansion Screening Model will identify the top resource plan with the lowest Present Value Revenue Requirement (PVRR) to meet IPL's New Supply Resource Needs
- If appropriate, IPL may also select other resource alternatives that were not chosen by the Ventyx Capacity Expansion Screening Model for further evaluation

Evaluation of Resource Expansion Plans

- Resource(s) identified in the Capacity Expansion Screening Model will be used to:
  - Construct resource portfolios that will be evaluated using the more detailed Midas Gold Portfolio Simulation Production Cost model
    ➔ Determine cost effectiveness

Identify IPL's Reference and Short Term Action Plans

- Select the plan that best meets the company's projected need for additional resources while balancing reliability, environmental responsibility, efficiency and cost.

IURC Mission

Assure that utilities and others use adequate planning and resources for the provision of safe and reliable utility services at reasonable cost.

IPL Mission

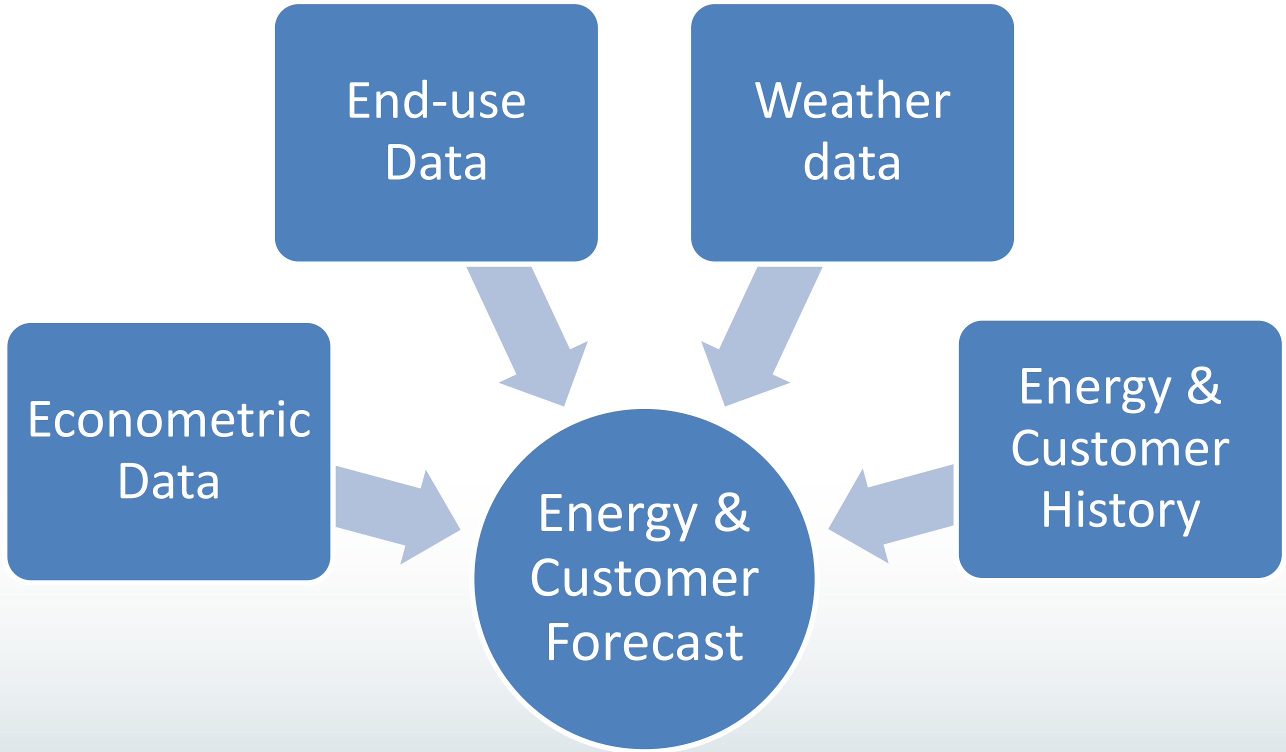
Improving lives by providing safe, reliable and affordable energy solutions in the communities we serve.

Questions?

Energy and Peak Forecasts

Presented by Swetha Sundar, Resource Planning Analyst

Energy Forecast Model

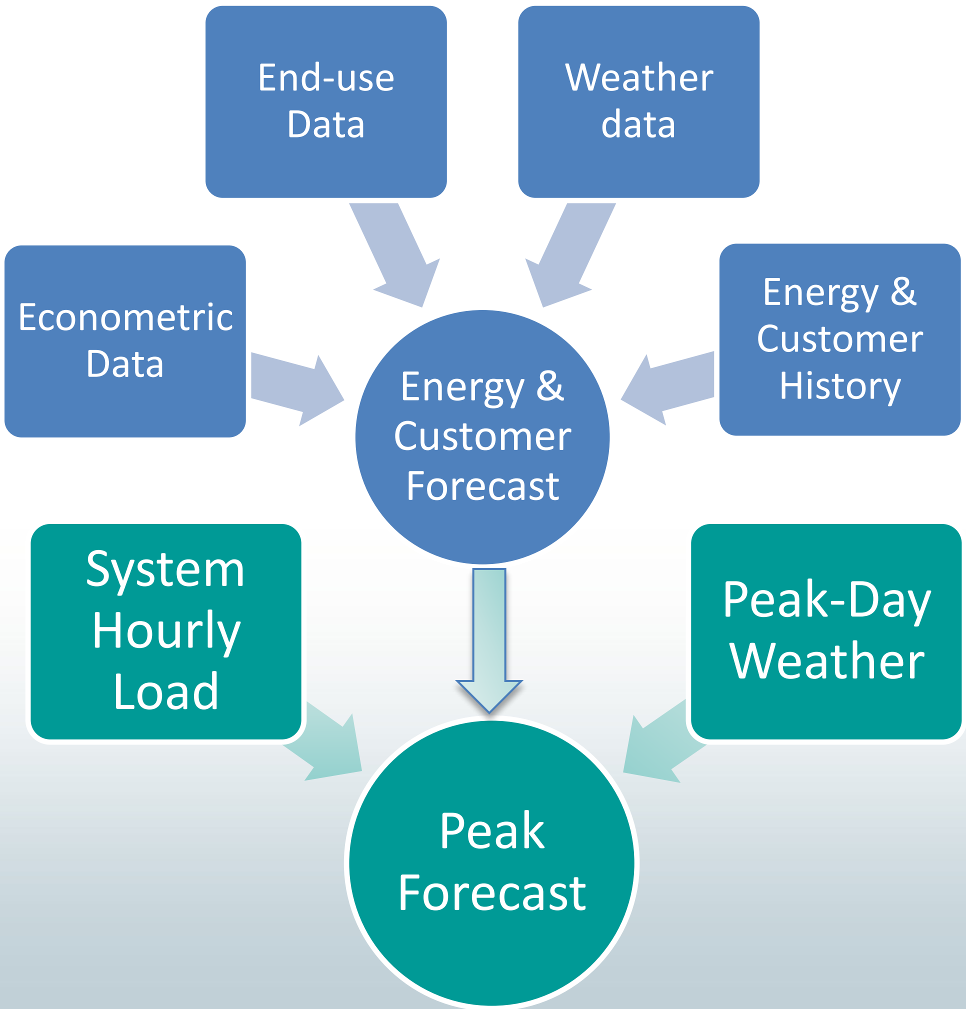


Hybrid model captures economic effects as well as energy-efficiency trends.

Energy Forecast Process

- 10-year historical data used as starting point
- 30-year average monthly degree-days used as normals
- Residential forecast:
  - Hybrid average-use model; customer-growth trend model
  - Average Use *times* Customer Count = Energy
- Small Commercial & Industrial forecast:
  - Hybrid energy model
- Large Commercial & Industrial forecast:
  - Econometric energy model

Peak Forecast Model –
Linked to Energy forecast for consistency



Peak Forecast Process

- 10-year historical actual data used as starting point
- 15-year average peak-producing degree-days used as normals
- Peak forecast:
  - Hybrid model tied to energy forecast
  - Developed based on integrated econometric and end-use variables

The Drivers –
Reflect economic and technological changes

Economic
(Source: Moody's)

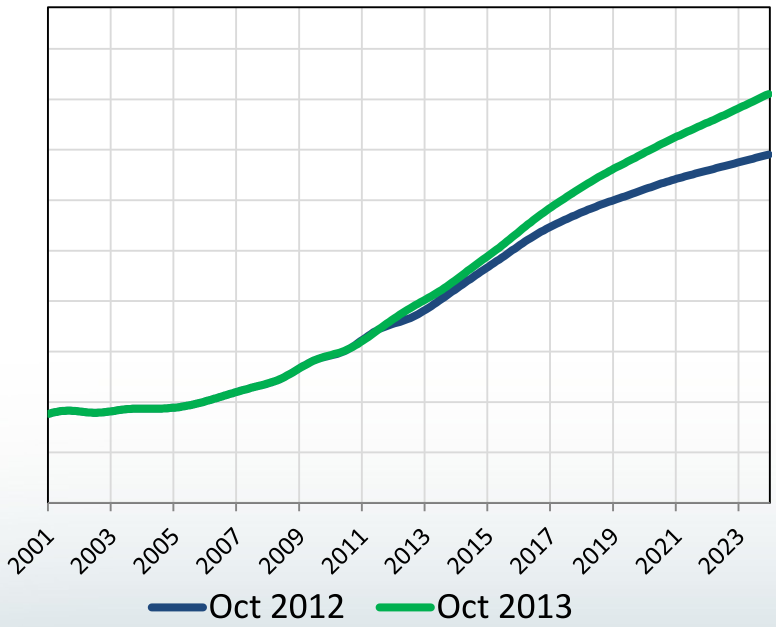
- No. of households; Household income; Employment
- Updated quarterly

End-Use
(Source: EIA/Itron Inc.)

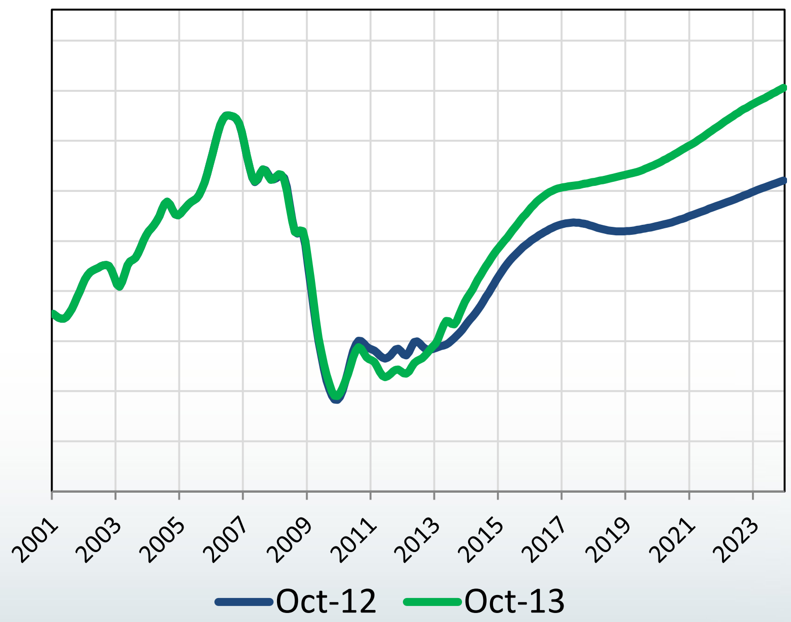
- EIA forecast for appliance saturation and efficiency
- Updated Annually

Residential Economic Drivers –
No. of households to grow at 1%

Marion County No. of Households



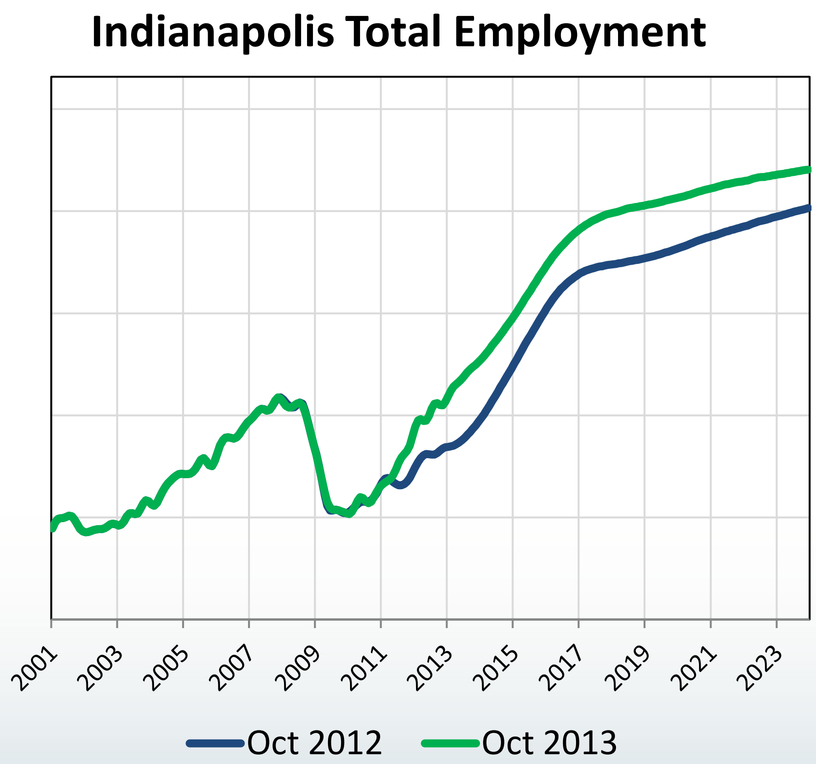
Marion County Household Income



Projected Growth rates (2014 – 2023)
- # of households: 1%
- Household income: 1.2%

Source: Moody's Analytics

Commercial & Industrial Economic Drivers – Employment to grow at 1%



Projected Growth rates (2014 – 2023)

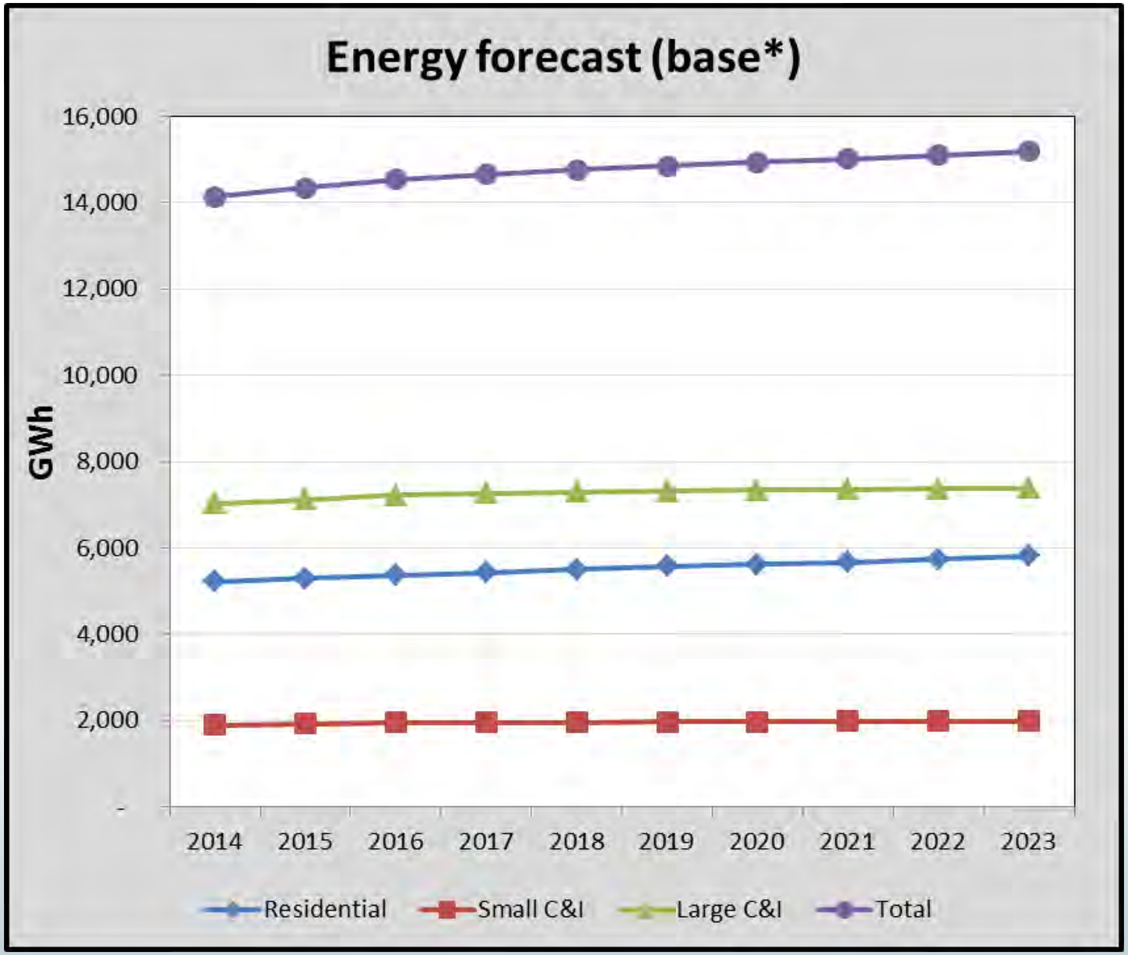
- Manufacturing employment: 0.1%
- Non-Manufacturing employment: 1.1%

Source: Moody's Analytics

Federal standards reflected in EIA data (examples)

Product	Compliance Date for Original Standard and Updates	Authorizing Legislation*
RESIDENTIAL PRODUCTS		
Clothes Washers (Water and Energy)	1988, 1994, 2004/2007, 2015/2018	NAECA 1987
Clothes Dryers	1988, 1994, 2014	NAECA 1987
Dishwashers (Water and Energy)	1988, 1994, 2010, 2013	NAECA 1987
Refrigerators and Refrigerator-Freezers	1990, 1993, 2001, 2014	NAECA 1987
Freezers	1990, 1993, 2001, 2014	NAECA 1987
Room Air Conditioners	1990, 2000, 2014	NAECA 1987
Central Air Conditioners and Heat Pumps	1992/1993, 2006, 2015	NAECA 1987
Water Heaters	1990, 2004, 2015	NAECA 1987
Furnaces	1992, 2013	NAECA 1987
Boilers	1992, 2012	NAECA 1987
Direct Heating Equipment	1990, 2013	NAECA 1987
Cooking Products	1990, 2012	NAECA 1987
Pool Heaters	1990, 2013	NAECA 1987
Ceiling Fans and Ceiling Fan Light Kits	2007	EPACT 2005
Torchieres	2006	EPACT 2005
Dehumidifiers	2007, 2012	EPACT 2005
External Power Supplies	2008	EISA 2007

The Forecast : Energy

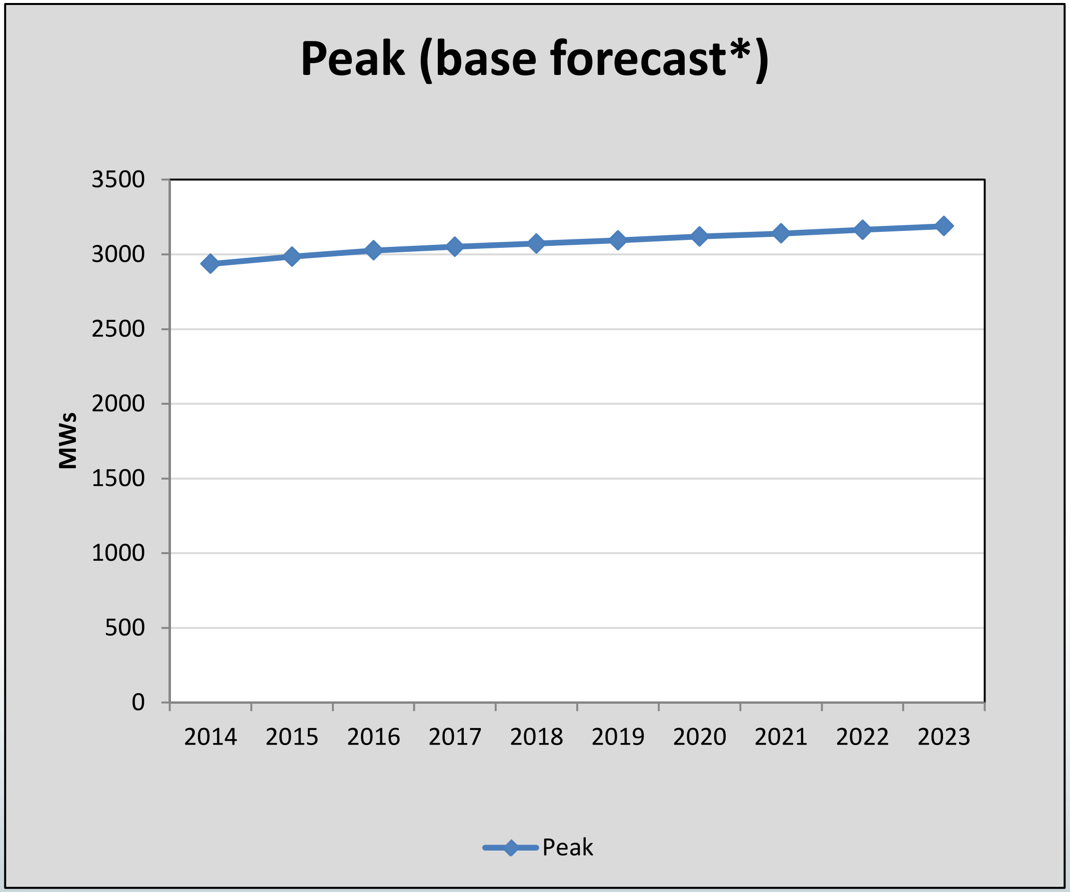


Average **Energy** growth rates (2014-23):

- Residential: 1.2%
- SCI: 0.6%
- LCI: 0.6%
- **Total: 0.8%**

* The forecast does not reflect company-sponsored DSM savings.

The Forecast : Peak



Average **Peak** growth rate (2014-23): **0.9%**

* The forecast does not reflect company-sponsored DSM savings.

IPL Forecast Is Consistent with Other Sources

- Itron, Inc. reviewed and updated models and forecasting practices
- Observed forecast-trend consistent with industry-wide expectations
- Impact of large C&I customers' changes are monitored and reflected in forecast

Questions?

Demand Side Management: Energy Efficiency and Demand Response

Presented by Jake Allen, DSM Program Development Manager

What is Demand Side Management (DSM)?

- Per Indiana Administrative Code (170 IAC 4-7-1 (g)):
  - "Demand-side management" or "DSM" means the planning, implementation, and monitoring of a utility activity designed to Influence customer use of electricity that produces a desired change in a utility's load. DSM includes only an activity that involves deliberate intervention by a utility to alter load.

- Includes conservation, energy efficiency and demand response

DSM Rules and Requirements

- Historically, utilities have followed the Integrated Resource Planning rules (170 IAC 4-7) requiring that:
  - o The utility shall consider alternative methods of meeting future demand for electric service
  - o Include consideration of demand-side resources as a source of new supply in meeting future electric service requirements
  - o For DSM programs, a cost-benefit analysis is performed using the four standard cost-benefit tests

Evolving DSM Rules and Requirements

- In December 2009, the Indiana Utility Regulatory Commission (IURC) established DSM targets for all Indiana jurisdictional electric utilities (Cause No. 42693-S1)
  - Targets increased in annual increments from 0.3% in 2010 to 2.0% in 2019
  - Established a set of "Core" DSM programs to be administered by a statewide 3rd party administrator
  - Utilities supplemented the Core Programs with Additional Core Plus programs

- In March 2014, the Indiana General Assembly passed legislation which modified DSM requirements in Indiana
  - Removes requirement to deliver statewide "Core" DSM programs and to meet the savings targets after 2014
  - Allows for opt-out by large customers (if greater than 1 MW demand)

Program Savings Are Verified Annually

- Both demand response programs and DSM programs are subject to cost-effectiveness testing as outlined by the Indiana Administrative Code
    - Used to gauge the costs versus benefits of each program

- All DSM programs are evaluated annually to verify the energy saving impacts
    - Programs are evaluated by an independent statewide evaluator: TecMarket Works

Current Demand Response Programs

- IPL's Demand Response programs are primarily focused on reducing electric demand at peak times
  - o Load Displacement and Interruptible Contracts: contracts with large commercial and industrial customers that are willing to reduce electrical consumption at peak times
    - IPL has approximately 44 MW of Load Displacement and Interruptible Contracts
  - o Cool Cents: a voluntary energy management program for residential and commercial customers that cycles cooling equipment during periods of peak electricity demand
    - IPL has approximately 40,000 participants
    - Cool Cents program participants can earn bill credits up to $20 per cooling system over June through September
    - Approximately 30 MW of peak load reduction

Current DSM Programs

Core Programs
(Energizing Indiana)

Together we'll do powerful things.

- Residential Lighting
- Home Energy Assessment
- Income Qualified Weatherization
- School Education & Assessment
- Commercial & Industrial Prescriptive

Core Plus Programs
(By IPL)

Residential

- Appliance Recycling
- Multi-Family Direct Install
- Residential New Construction
- Peer Comparison Report
- Air Conditioning Load Management
- Online Energy Assessment w Kit
- Renewables

Commercial & Industrial

- Business Energy Assessment
  - Prescriptive
  - Custom
- Air Conditioning Load Management
- Renewables

Recent DSM Achievement

2015 to 2017 DSM Action Plan Is Being Finalized

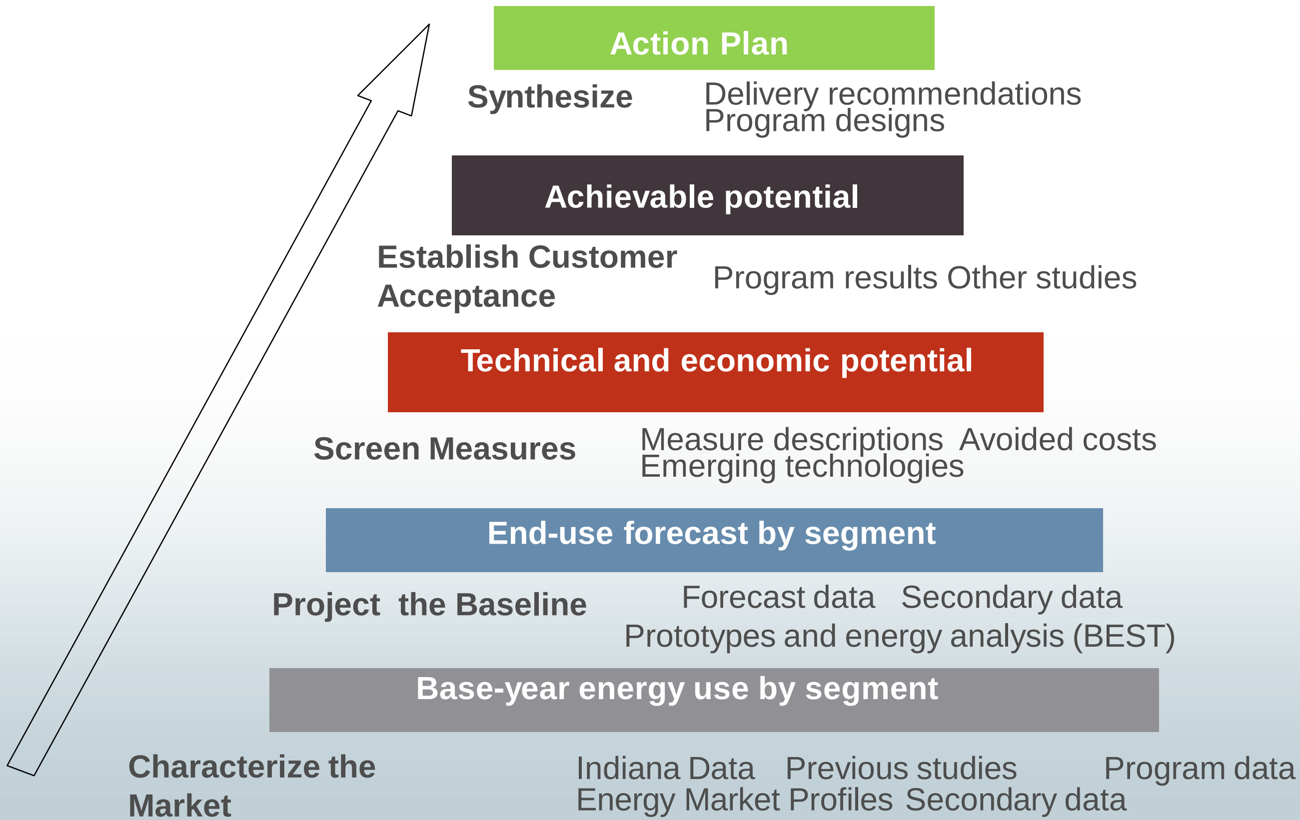
- In 2012, IPL completed a DSM Market Potential Study (MPS) in cooperation with the DSM Oversight Board to identify the potential savings from energy efficiency programs
  - The Oversight Board is comprised of IPL, the OUCC, and the CAC
  - IPL contracted with EnerNOC to perform the MPS
  - The EnerNOC MPS ultimately provided a low and high Achievable Potential for DSM program savings as well as an Action Plan

- IPL is in the process of working with EnerNOC to update this Action Plan
  - Factor in changes that have occurred since 2012, including the opt-out opportunity for the large Commercial and Industrial customers and the completion of the Indiana Technical Resource Manual

Updated Action Plan = key evidence in IPL's anticipated
<u>May 30, 2014</u> filing for approval of future DSM programs

2018 to 2034 DSM Forecast Will Be Created

- Next step after the update of the Action Plan ➔ Have EnerNOC provide a forecast of IPL DSM for the period 2018 through 2034



Key Assumptions for the 2014 IRP

- IPL will continue to offer cost-effective DSM to assist customers in managing their energy bills and meet future energy requirements

- The load forecast also includes an ongoing level of energy efficiency related to codes and standards embedded in the load forecast projections
  - Natural occurring savings includes the impacts of new appliance efficiencies, changes in Federal standards regarding appliance efficiency, new building codes

- Demand Response impacts are an important part of resource planning but are generally customer driven

DSM Integration into IPL's Planning and Portfolio

- IPL has offered DSM programs on essentially a continuous basis since 1993
- IPL expects to continue to provide cost effective DSM programs to help our customers reduce their energy use and better manage their energy bills
- IPL considers an ongoing level of DSM in preparation of our base case load forecast, which helps mitigate the need for future generation

IPL WILL CONTINUE TO OFFER A BROAD PORTFOLIO OF DSM PROGRAMS

Questions?

Planning Reserve Margin

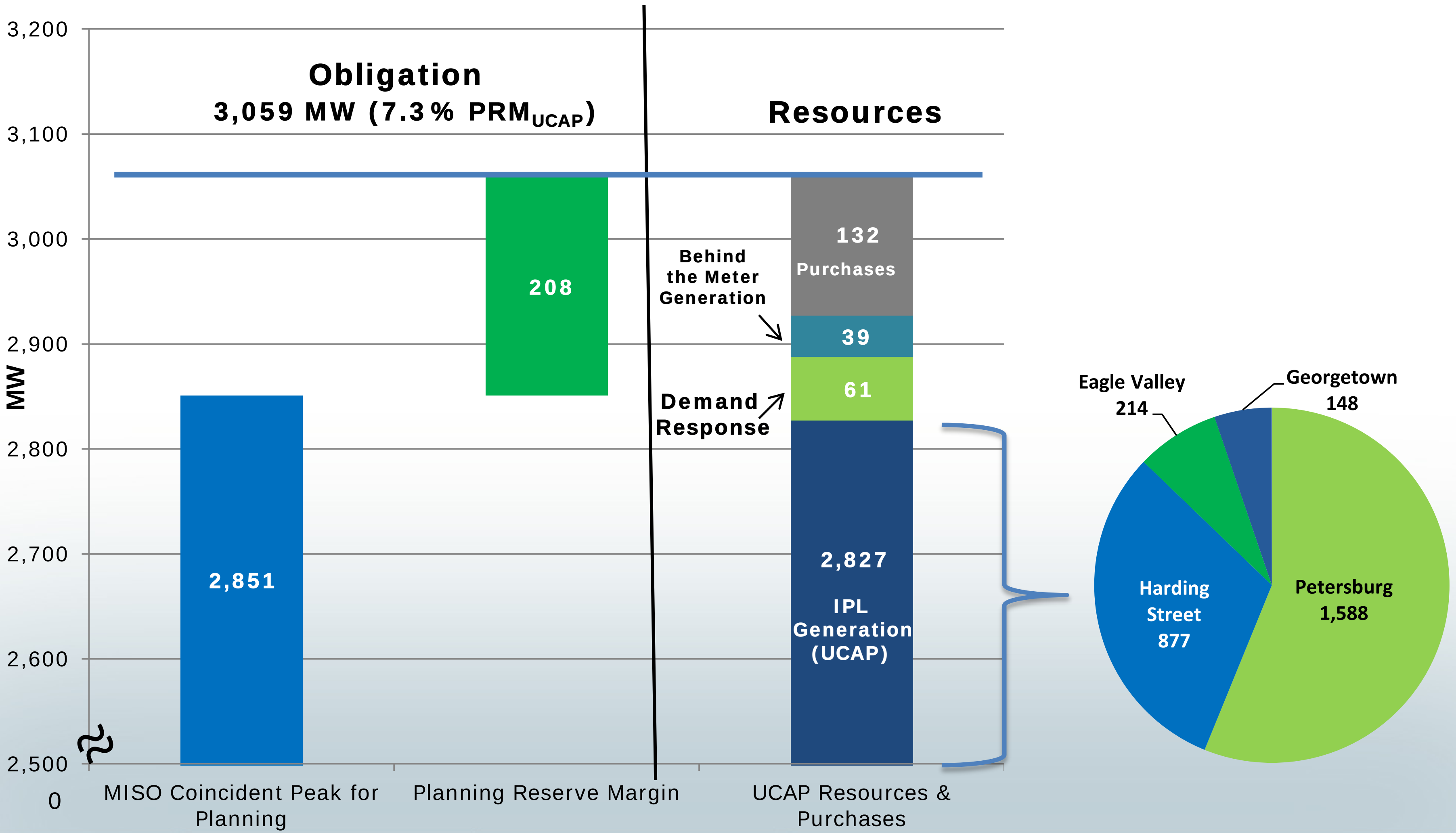
Presented by Herman Schkabla, Director of Resource Planning

MISO Capacity Construct - Installed Capacity vs. Unforced Capacity

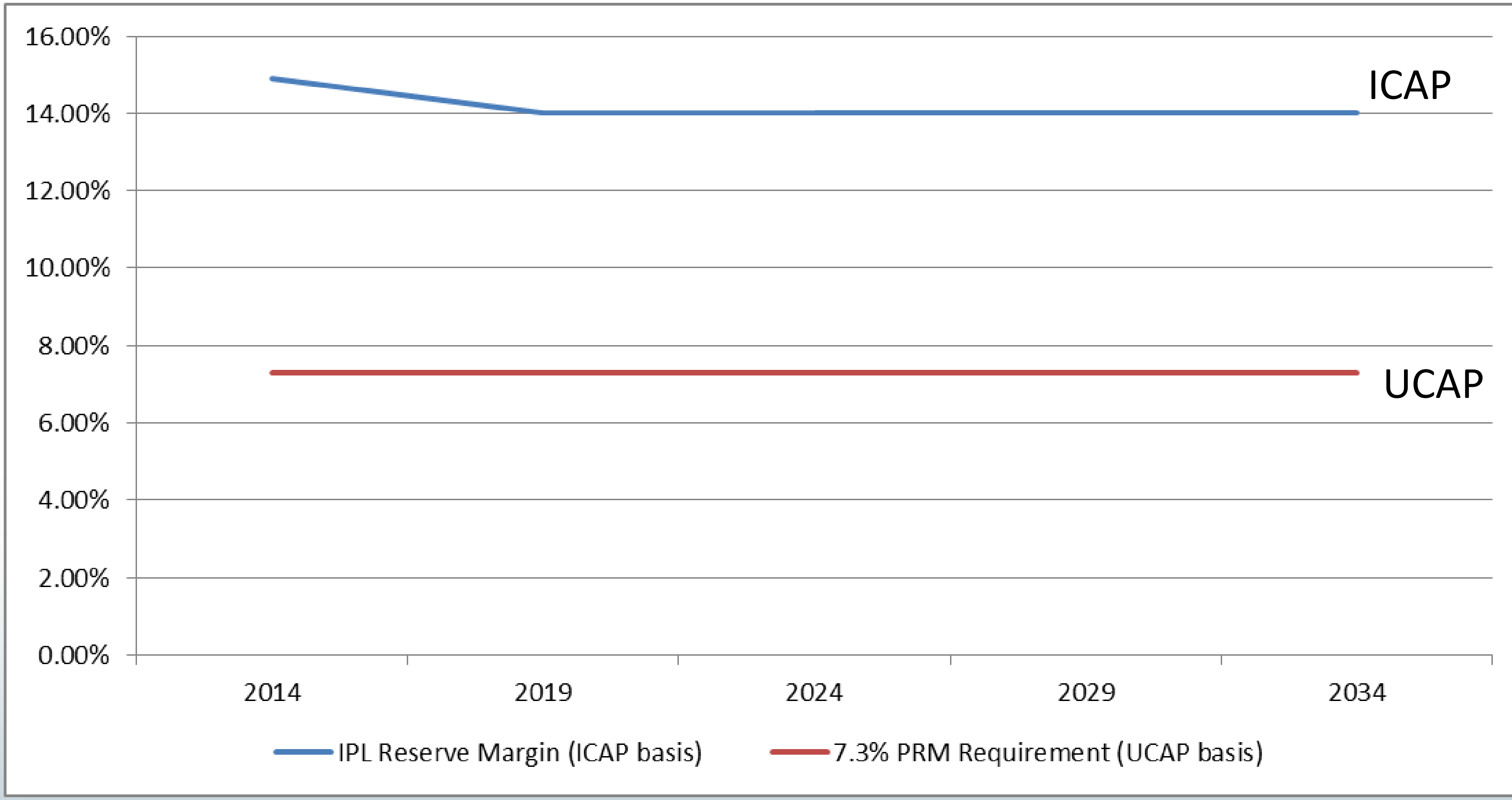
- The Unforced or "UCAP" capacity is what can be counted at the time of the annual peak load
- For thermal generating units, it reflects Installed Capacity rating adjusted for past three year average availability performance
- For wind and solar, IPL currently does not receive UCAP credit from MISO
  - Wind Purchase Power Agreement's do not have NRIS
  - Criteria for behind the meter solar credit yet to be established by MISO, IPL assumes 30% of nameplate as credit for IRP planning

NRIS - Network Resource Integration Service

IPL MISO Obligation vs. Capacity Resources Summer 2014



IPL Planning Reserve Margin (PRM)



Questions?

Generation Overview

Presented by Herman Schkabla, Director of Resource Planning

Petersburg

Hoosier and Lakefield Wind Parks

Georgetown

Generation

Harding Street

Solar Projects

Eagle Valley

IPL Generating Stations - Coal Fired Units

	Unit #	Fuel	Commercial Date	Age	MW
Petersburg	1	Coal	Jun-67	46	232
	2	Coal	Dec-69	44	435
	3	Coal	Nov-77	36	540
	4	Coal	Apr-86	28	545
Harding Street	5	Coal	Jun-58	55	106
	6	Coal	May-61	53	106
	7	Coal	Jul-73	40	427
Eagle Valley	3	Coal	Dec-51	62	43
	4	Coal	Jan-53	61	56
	5	Coal	Dec-53	60	62
	6	Coal	Oct-56	57	99

IPL Generating Stations – Oil and Gas Units

	Unit #	Fuel	Commercial Date	Age	MW
Petersburg	DG	Diesel	Aug-67	46	8
Harding Street	CT-1	Oil	May-73	40	20
	CT-2	Oil	May-73	40	20
	CT-4	Oil/Gas	Apr-94	20	82
	CT-5	Oil/Gas	Jan-95	19	82
	CT-6	Gas	May-02	12	158
	DG	Diesel	Apr-67	47	3
Eagle Valley	DG	Diesel	Apr-67	47	3
Georgetown	GT-1	Gas	May-00	14	79
	GT-4	Gas	Feb-02	12	79

IPL Generating Stations— Wind and Solar

	Fuel	Commercial Date	Age	MW
Hoosier Wind Park PPA	Wind	Nov-09	4	100
Lakefield Wind Park PPA	Wind	Sep-11	2	201
Rate REP Solar Projects	Solar	Oct -14	N/A	98*

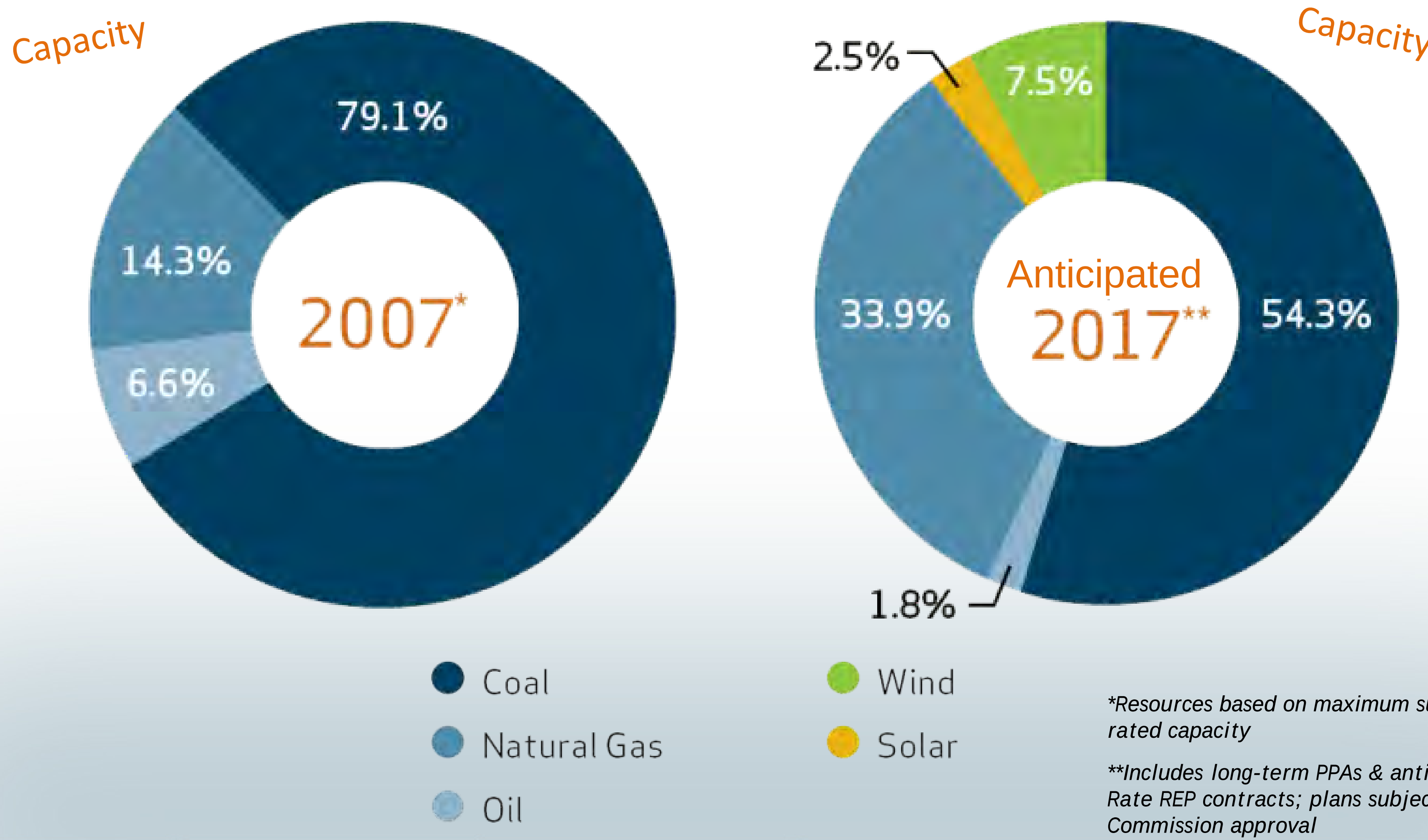
*As of 5/16/2014, approximately 53 MW are in service

Planning for the Future | Generation

- Diversifying portfolio by retiring or refueling less efficient coal & oil units and replacing with CCGT
- Investment in wind and solar resources

IPL's Proposed Eagle Valley CCGT

Adapting our Generation Portfolio to Respond to EPA Rules and Market Dynamics



**Resources based on maximum summer rated capacity*

***Includes long-term PPAs & anticipated Rate REP contracts; plans subject to Commission approval*

Questions?

Environmental Overview

Presented by Angelique Oliger, Director of Environmental Policy

Current Environmental Controls

Unit	In Service Date	Generating Capacity	SO_2 Control	NO_x Control	PM Control
Eagle Valley 3	1951	43 MW			ESP (1975)
Eagle Valley 4	1953	56 MW		LNB, SOFA (2004)	ESP (1973)
Eagle Valley 5	1953	62 MW		LNB, SOFA (2004)	ESP (1972)
Eagle Valley 6	1956	99 MW		LNB, COFA (1996), NN (2002)	ESP (1971)
Harding Street 5	1958	106 MW		LNB (1993), NN, SNCR (2004)	ESP (1968)
Harding Street 6	1961	106 MW		LNB (1996), NN, SNCR (2004)	ESP (1975)
Harding Street 7	1973	427 MW	Scrubber (2007)	LNB (1978), NN (2001), SCR (2005)	ESP (1978)
Petersburg 1	1967	232	Scrubber (1996)	LNB (1995)	ESP (1967)
Petersburg 2	1969	435	Scrubber (1996)	LNB (1994), SCR (2004)	ESP (1977)
Petersburg 3	1977	540	Scrubber (1977)	SCR (2004)	ESP (1986)
Petersburg 4	1986	545	Scrubber (1986)	LNB (2001)	ESP (1986)

SO_2 = Sulfur dioxide
NO_x = Nitrogen oxides
MW = Mega Watts

ESP = Electricstatic Precipitator
SCR = Selective catalytic reduction
LNB = Low NO_x Burners

SOFA = Separated Overfire Air
COFA = Closed Coupled Overfire Air
SNCR = Selective Noncatalytic Reduction

Environmental Regulations

- Current Environmental Regulations/Environmental Projects
  - o Mercury and Air Toxics Standard (MATS)
  - o NPDES Water Discharge Permits

- Future Environmental Regulations
  - o Coal Combustion Residuals (CCR)
  - o 316(b) – Cooling water intake structures
  - o Greenhouse Gas (GHG) New Source Performance Standards (NSPS)
  - o National Ambient Air Quality Standards (NAAQS)
  - o Clean Air Interstate Rule (CAIR) Replacement Rule

NPDES= National Pollutant Discharge Elimination System

Mercury and Air Toxics Standard (MATS)

- Regulates mercury and other air toxics from utilities

- Status
  - o Compliance Date of April 16, 2015
  - o One-year extensions obtained
  - o Potential Agreed Order with EPA for one additional year

- Impact
  - o $511 million in controls approved by IURC in 2013
  - o Retire or repower older, smaller coal-fired units
  - o 80% reduction in Mercury emissions

Mercury and Air Toxics Standard (MATS)

Plant	Unit	Mercury (Hg)		Metal HAPs (PM)	Acid Gas (HCl)	Monitoring	Complete Installation
Petersburg	1	ACI SI	NA	ESP Enhancements	Scrubber Upgrade	PM CEMs HCl CEMs Hg CEMs	Spring 2015
	2		Full – size Baghouse				Summer 2015
	3		Polishing Baghouse		No Additional Controls		Spring 2016
	4		NA				Spring 2016
Harding Street	5	Convert to Natural Gas*					Spring 2016
	6						
	7	ACI SI System Upgrade		ESP Upgrade	Scrubber Upgrade	HCl CEMs Hg CEMs	Spring 2016
Eagle Valley	3	Retire					Spring 2016
	4	Retire					Spring 2016
	5	Retire					Spring 2016
	6	Retire					Spring 2016

* Pending IURC Approval

ESP = Electrostatic Precipitator
ACI = Activated Carbon Injection
SI = Sorbent Injection
PM = Particulate Matter

CEMs = Continuous Emissions Monitors
Hg = Mercury
HCl = Hydrchloric Acid
CCGT = Combined Cycle Gas Turbine

NPDES Water Discharge Permits

- NPDES compliance date: September 2017
  - new metal limits for Harding Street and Petersburg
- IPL is now in the final stages of evaluating compliance options
- Costs are still under development but expected to be material

Future Environmental Regulations – Coal Combustion Residuals Rule

- Currently a majority of fly-ash and scrubber product is beneficially used in encapsulated concrete and synthetic gypsum applications
- Ash is currently treated in on-site ponds
- New regulations proposed in May 2010
  - Hazardous (Subtitle C) vs. solid waste (Subtitle D)
  - Timing for Final Rule: December 2014
  - Beneficial use (encapsulated uses) allowed in both Subtitle C and D proposals
  - Timing and costs of existing pond closures unknown.

Future Environmental Regulations – Cooling Water Intake Structures Rule

- 316(b) of the Clean Water Act regulates environmental impact from cooling water intake structures (CWIS) associated with impingement and entrainment of fish at the intake structure.
- Based on the proposed rule closed cycle cooling systems may be required.
- Three of IPL's five Units are already equipped with this technology.
- Timing
  - Final Rule: May 16, 2014
  - Compliance required in 2020 or later depending on final rule

Future Environmental Regulations – Greenhouse Gas Regulations

- Greenhouse Gas Rulemakings driven by Administration's Climate Action Plan
- New Source Performance Standards for **new sources** (CAA Section 111(b))
  - Comments due on May 9, 2014
  - Emission standards for coal-fired and natural gas combined cycle units
  - Emission standard for new coal-fired units would require at least partial carbon capture and sequestration (CCS)

CAA = Clean Air Act
EPA = Environmental Protection Agency
GHG = Green House Gas

Future Environmental Regulations – Greenhouse Gas Regulations (cont'd.)

- New Source Performance Standards for **existing sources** (CAA Section 111(d))
  - o EPA to issue emission guidelines for states to implement through State Implementation Plans
    - Proposed June 2014: Finalized June 2015
    - State Implementation Plans due June 2016
  - o Standard based on emission limit achievable by best system of emission reduction adequately demonstrated
    - taking into consideration costs, environmental impacts, energy requirements, remaining useful life of unit
  - o Based on IPL's current plans, GHG emissions reduced by 20% in 2017 over 2005

Future Environmental Regulations – NAAQS and CAIR Replacement Rule

- National Ambient Air Quality Standards (NAAQS)
  - o SO2
    - Compliance required in 2017
    - Unscrubbed units would likely be unable to comply
  - o PM2.5
    - Compliance required by 2020
    - EPA believes most areas will be in attainment by 2020 due to other requirements
  - o Ozone
    - Lowered standard expected to be proposed in 2014 with compliance required as early as 2019
    - Could require SCR installation

- Clean Air Interstate Rule Replacement
  - o Cross State Air Pollution Rule vacatur overturned by Supreme Court
  - o Impact under evaluation

NAAQS = National Ambient Air Quality Standards
CAIR = Clean Air Interstate Rule
$PM_{2.5}$ = Particulate Matter less than 2.5 microns in diameter

SO_2 = Sulfur Dioxide
SCR = Selective catalytic reduction
EPA = Environmental Protection Agency

Model Assumptions and Inputs

Potential Impacts of Pending Environmental Regulations

Regulation	Expected Implementation Year	Cost Range Estimate* ($MM)
Coal Combustion Residuals	2019	50-80
Cooling Water Intake Structure	2020	10-160
Effluent Limitations Guidelines	2018	50-80
National Ambient Air Quality Standards	2019	0-150

Pending Regulations Requirements are Being Monitored

* Subject to change as data is updated.

Questions?

Distributed Generating Resources

Presented by John Haselden, Principal Engineer, Regulatory Affairs

Examples of Distributed Generating Resources

- Customer-Sited Emergency Generators
- Combined Heat and Power
- Wind
- Biomass
- Solar
- Other Distributed Energy Resources

IUPUI

Characteristics of the Technologies

- Size
- Location
- Fuel
- Cost
- Operating characteristics
- Contribution to capacity

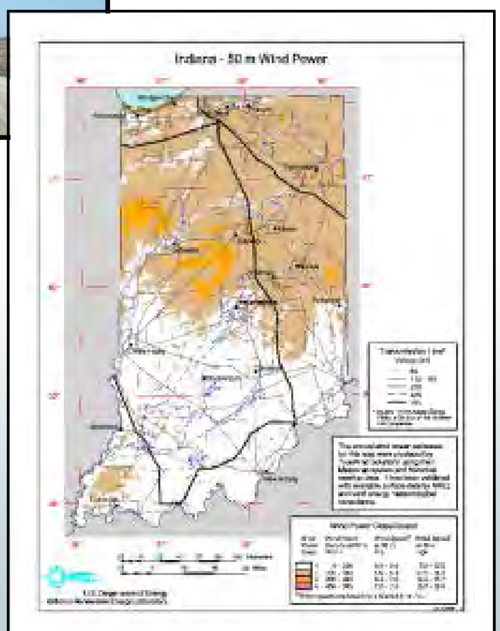
Characteristics – Customer-Sited Emergency Generation

- Typically diesel generators
- Usually not synchronous with IPL
- New EPA regulations restrict availability to run during non-emergencies
    - 2014: 31.7 MW
    - 2010: 40.1 MW
- Size: 0.1 MW – 16 MW
- Quick start, high variable cost

Combined Heat and Power (CHP)

- Combined Heat and Power
  - Usually customer sited and owned
  - Heat requirements
- Technology options
  - Conventional
    - Natural gas reciprocating engines
    - Natural gas turbines
  - Advanced
    - Fuel cell
    - Microturbine
    - Micro-CHP

Characteristics - Wind



- Poor wind resources in IPL's service territory – low energy output
- Height is important for production
- Siting/zoning issues
- Noise
- Low coincidence with system peak, intermittent production
- Consequently few installations in the IPL territory despite available incentives

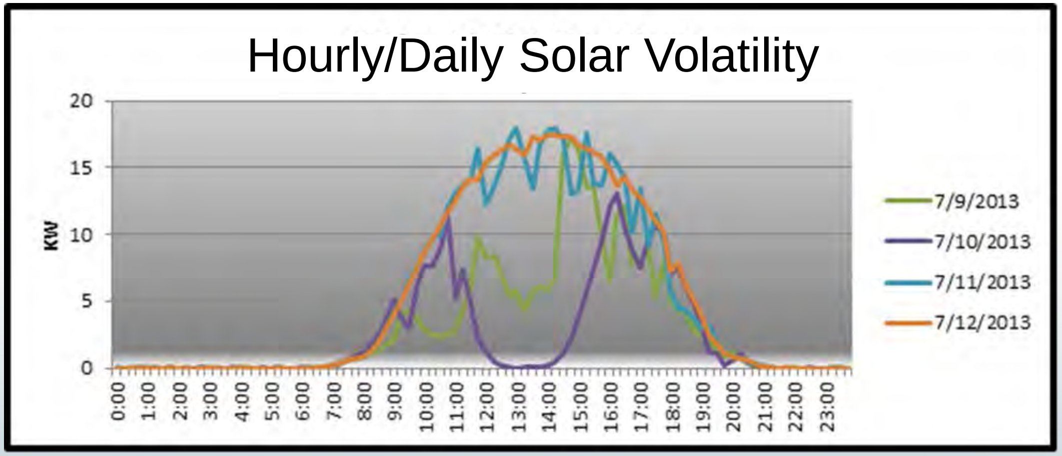
Characteristics - Biomass

- Includes anaerobic digesters and combustion of organic products
- Siting and zoning issues
- Usually base load generation
- Customer choice to install
- Consequently no installations in the IPL territory despite available incentives

Characteristics - Solar Photovoltaic

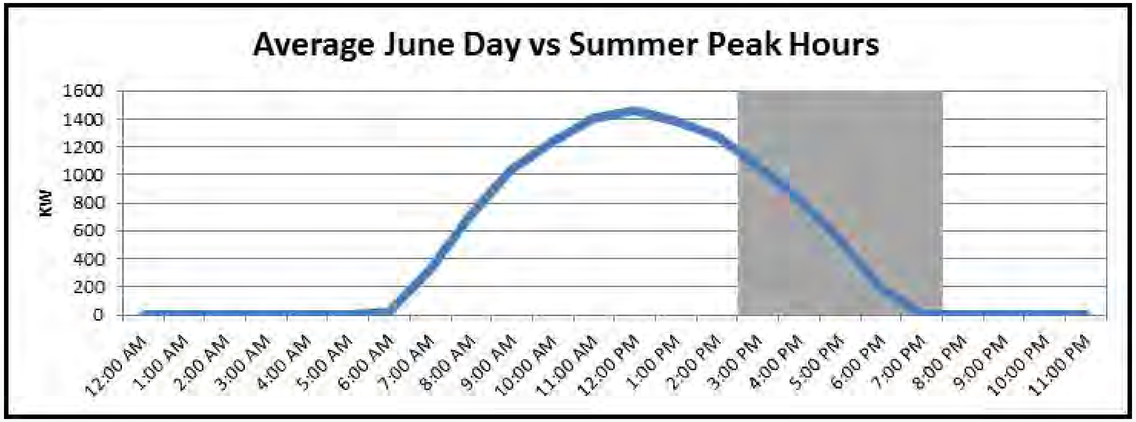
- Permitting and construction are usually quick and not complicated
- Location determined by others
- Requires large space
- Low capacity factor – 15%. Intermittent production

Johnson Melloh



Characteristics - Solar Photovoltaic (continued)

- Some coincidence with system peak



- High relative costs and subsidization

IPL Experience with Solar PV

- Net metering
  - o Small projects – Total capacity 0.45 MW
- Solar Rate REP (Feed-In Tariff)
  - o 53 MW operating
  - o 98 MW total
  - o 1.8% estimated rate increase as a result of Rate REP
  - o Approx. 25 MW contribution to capacity
  - o Not the least cost resource

Indianapolis Airport

Maywood Solar Farm

Other Distributed Energy Resources

- IPL recognizes technology innovation is impacting the industry
- "Distributed Energy Resources" go beyond "Distributed Generation" and will be considered as they mature
    - Microgrids
    - Energy storage
    - Voltage controls
    - Electric vehicles

Summary

- Distributed generation can be difficult to implement on a large scale
- Solar has the best opportunity for growth but is currently challenging as a least cost resource
- Actively monitoring trends in Distributed Generation and Distributed Energy Resources

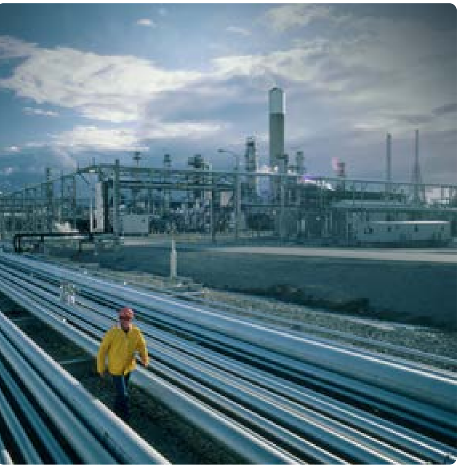
Questions?

VENTYX™
AN ABB COMPANY

Indianapolis Power & Light

2014 Integrated Resource Plan (IRP) Proposed Modeling Assumptions

Presented by Diane Crockett, Ventyx Lead Consultant




Agenda

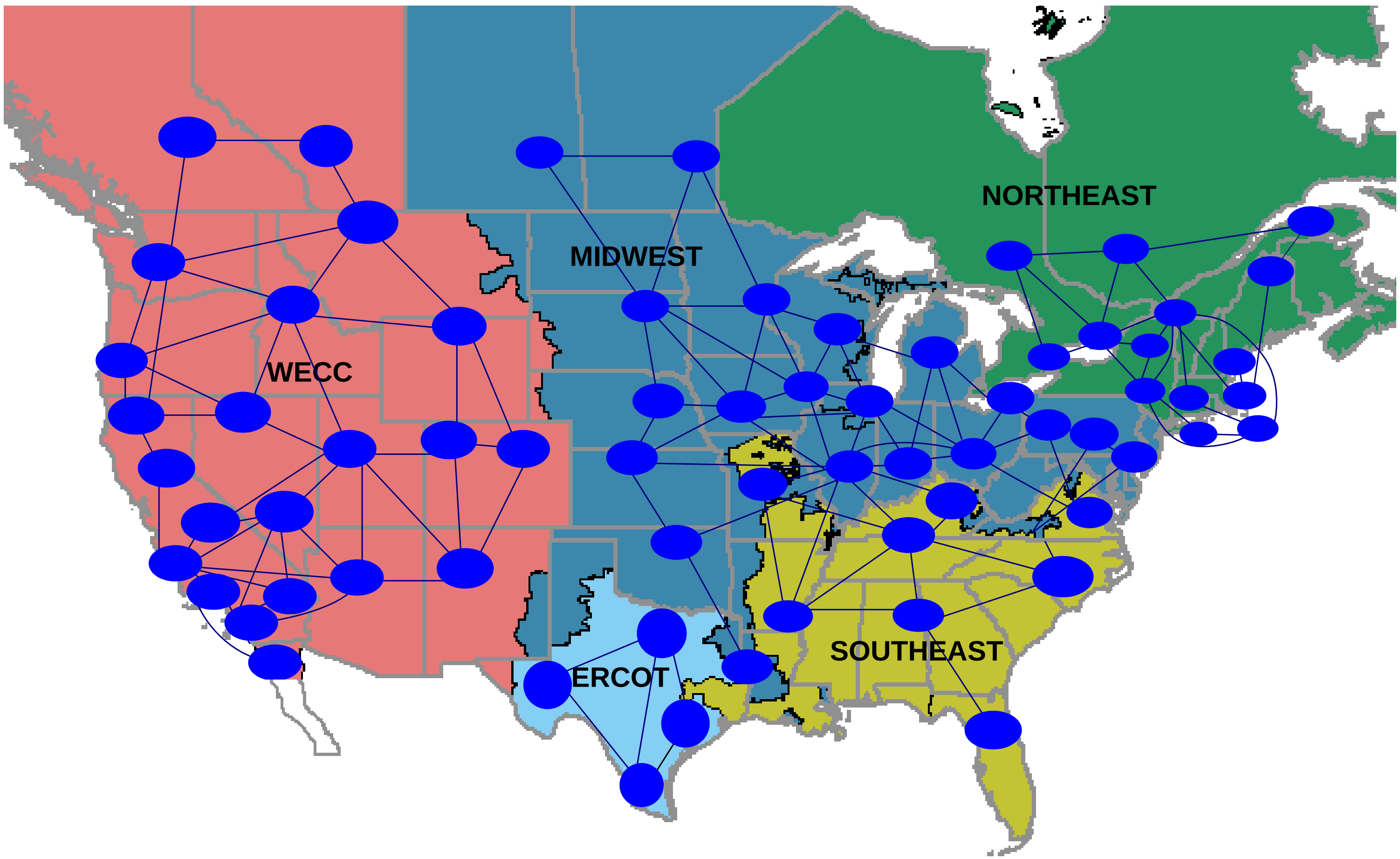
- Introduction to North American Power Reference Case
  - Load and Resources
  - Natural Gas
  - Coal Forecast
  - Emissions Market
  - Renewables
  - Scenarios

- Proposed IPL Modeling Assumptions
  - Natural Gas Prices
  - Market Power Prices
  - Carbon Policy
  - Modeling

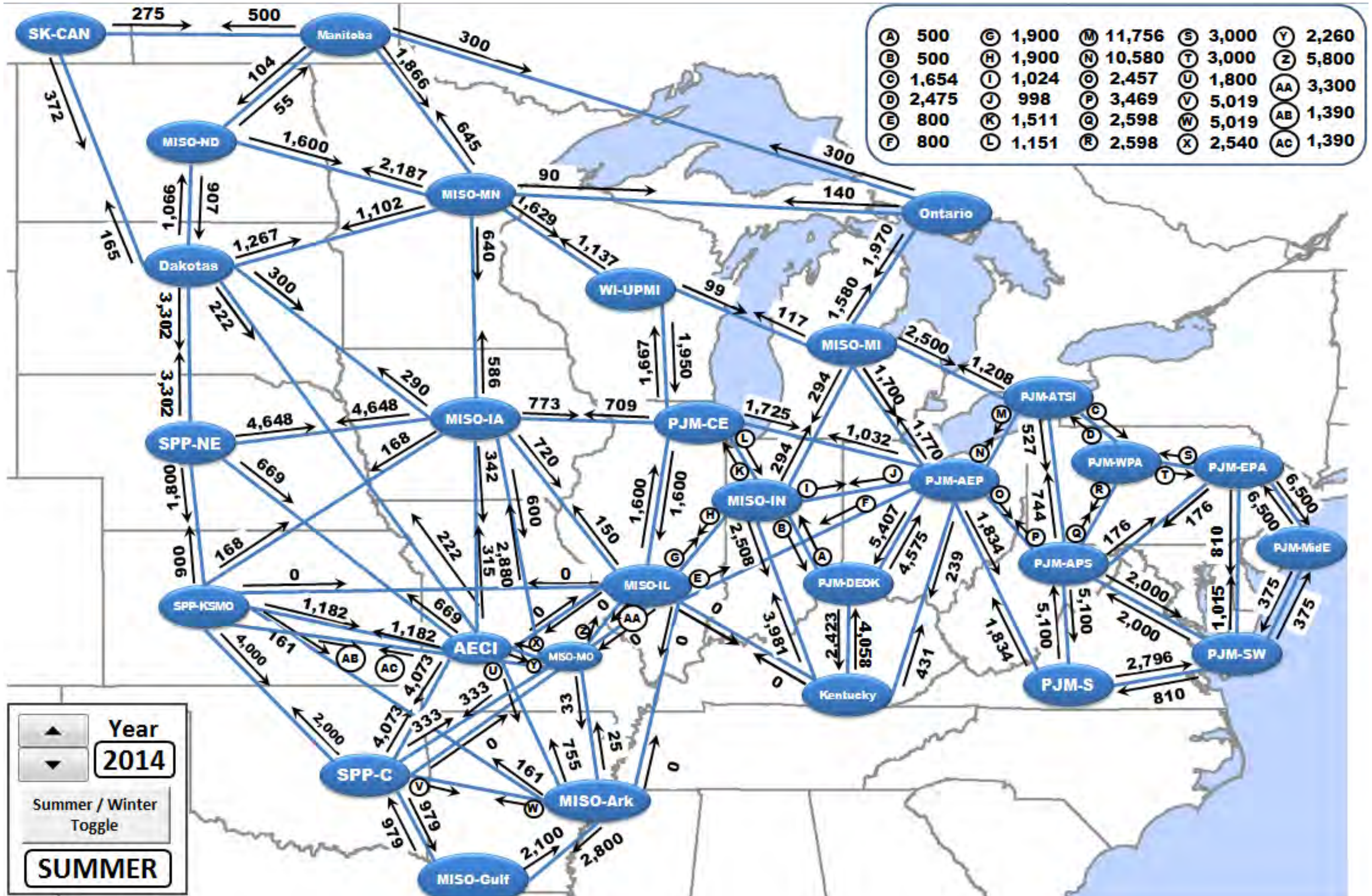
What is the Ventyx North American Power Reference Case?

- Assessment of conditions and trends in North American and regional markets: power, fuels, and environmental
- Forecast of future conditions in these markets
  - Based on fundamentals of demand and supply in these markets
  - Independent and un-conflicted – used by all types of market participants to make decisions
  - Utilizes Ventyx's market-leading software and intelligence products
- Created twice a year – Spring case and Fall case
  - IPL will be using the most recent case – Fall 2013

Region and Market Area Definitions



Midwest Transaction Groups

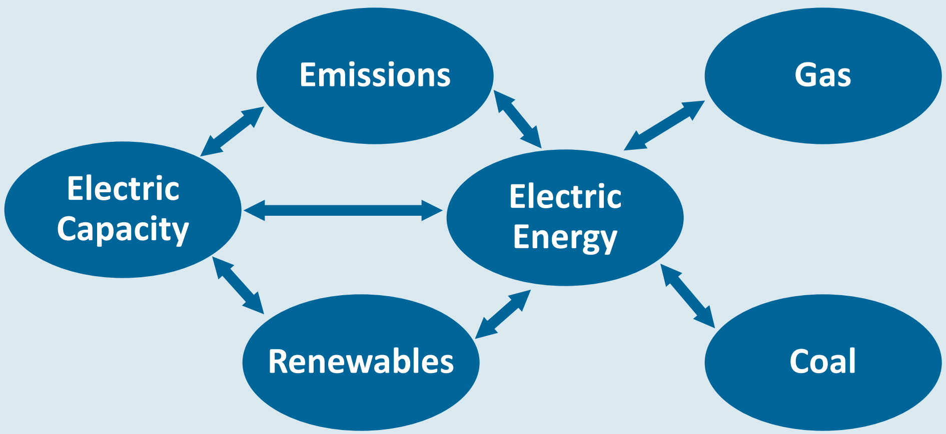


Methodology Overview

Data

- Loads
- Generating unit characteristics
- Gas/coal supply and non-power demand curves
- Non-gas/coal fuel prices
- Transmission topology
- Non-power emission reduction supply curves
- Power market, emission, and renewables rules

Horizons Interactive



Capacity
- Additions
- Retirements
- Retrofits

Prices
- Electric capacity
- Fuel
- Emissions
- RECs

PROMOD

- Final electric energy prices

Compound Annual Energy Growth (%)

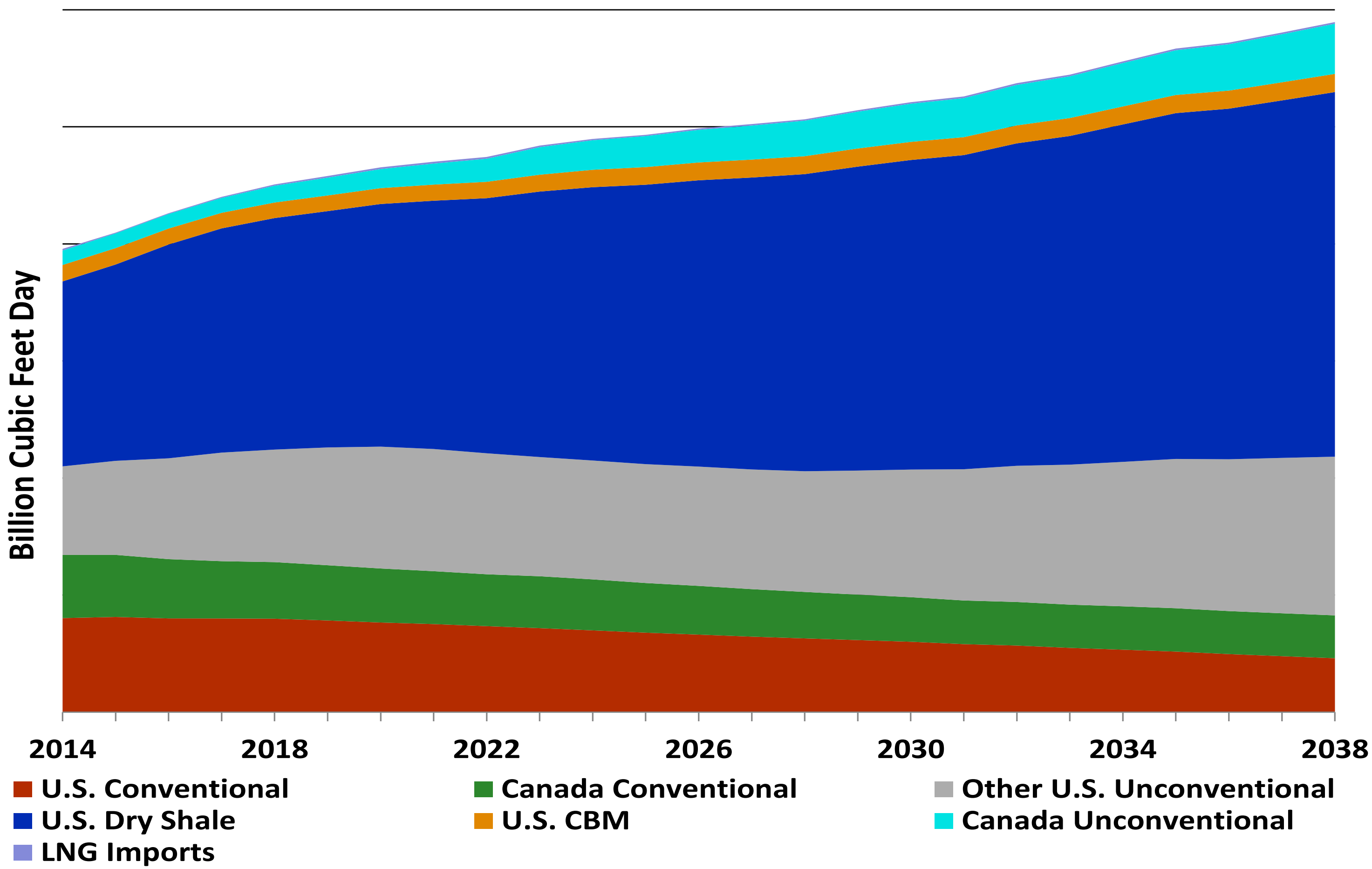
	2014 - 2019	2019 - 2024	2024 - 2038
ERCOT	2.0	0.9	0.7
NWPP	2.1	1.2	1.0
California	0.7	1.0	0.8
DSW+RMPA	1.4	1.4	1.2
NYISO	0.5	0.5	0.4
ISONE	0.4	0.1	0.3
NPCC Canada	0.3	0.6	0.5
SERC	1.2	1.1	0.9
FRCC	1.5	1.1	0.9
MISO/MRO	1.0	0.9	0.8
PJM	1.5	1.1	0.8
SPP	0.5	0.7	0.7
Total	1.2	1.0	0.8

Please note the forecast does not reflect company-sponsored DSM savings.

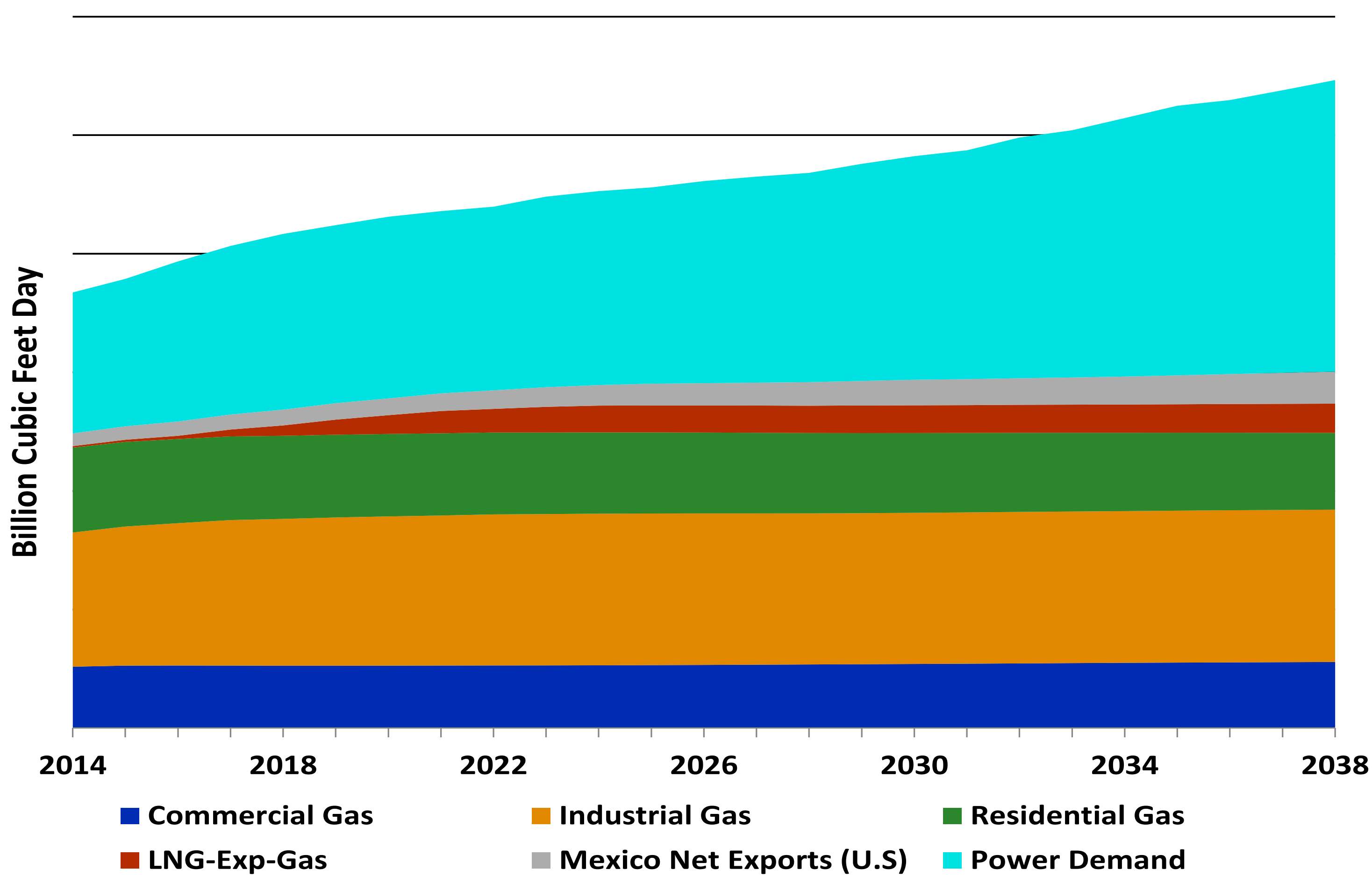
Reference Case Supply Side Technology Options

	Summer Capacity (MW)	On-Line Year
Nuclear	1,000	2018
Combined Cycle F-Class	450	2014
Combined Cycle G-Class	350	2014
Combined Cycle H-Class	400	2020
Combustion Turbine	160	2014
Geothermal Steam Turbine	10	2014
Landfill Gas	10	2014
Biomass	10	2014
Photovoltaic	10	2014
Wind Turbine	10	2014

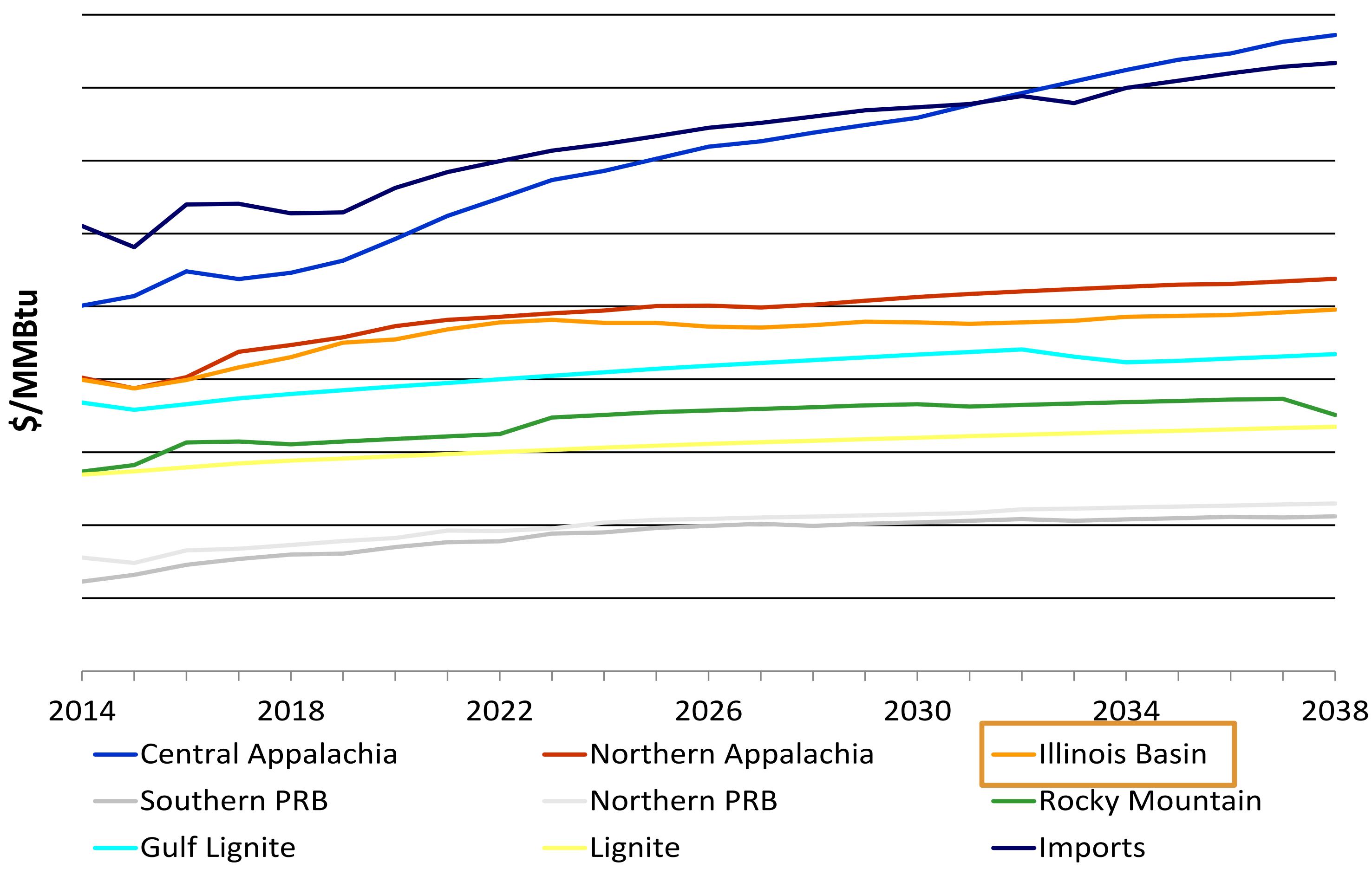
North America Gas Supply Forecast (Bcfd)



North America Gas Demand Forecast (Bcfd)



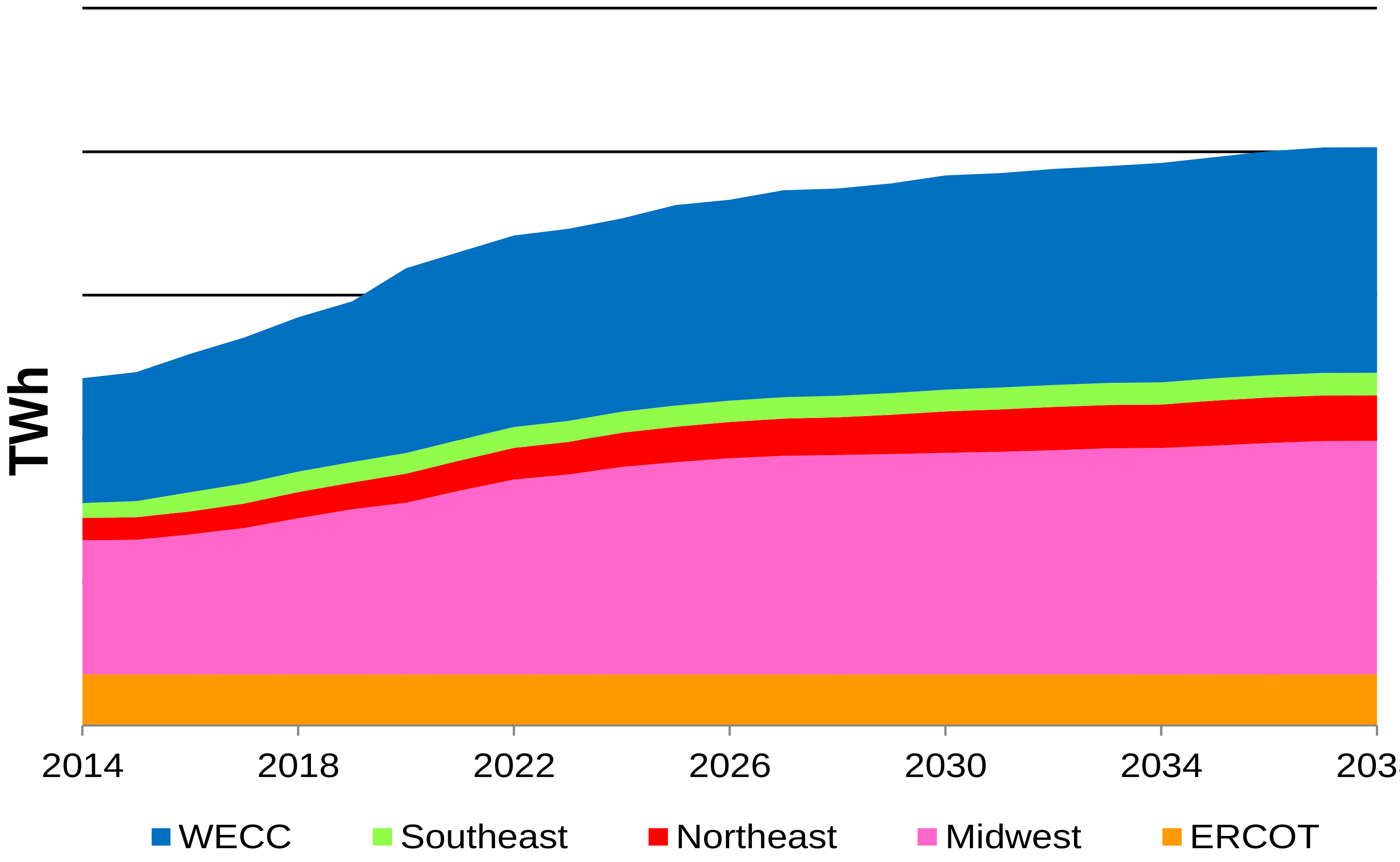
FOB Mine Coal Price Forecast (2013 $/MMBtu)



Emissions Markets

- Included in Fall 2013 Reference Case
  - Clean Air Act (CAIR) for NO_x and SO_2
  - MATS related coal retirements
  - California AB32 starting in 2013
  - CO_2 taxes in British Columbia and Alberta Only
  - RGGI in Northeastern State (excl. NJ)

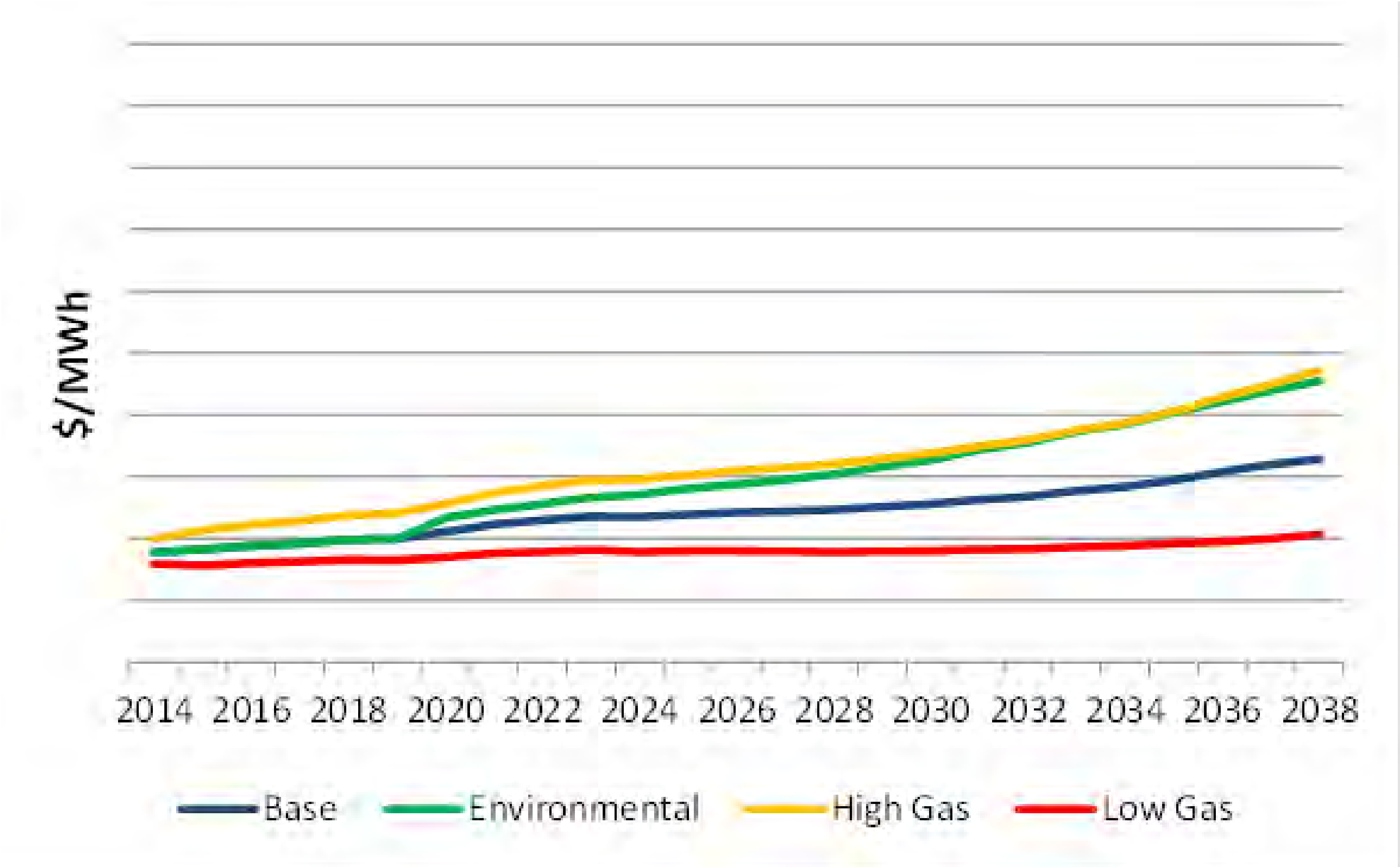
U.S. Renewable Energy Generation Forecast (TWh)



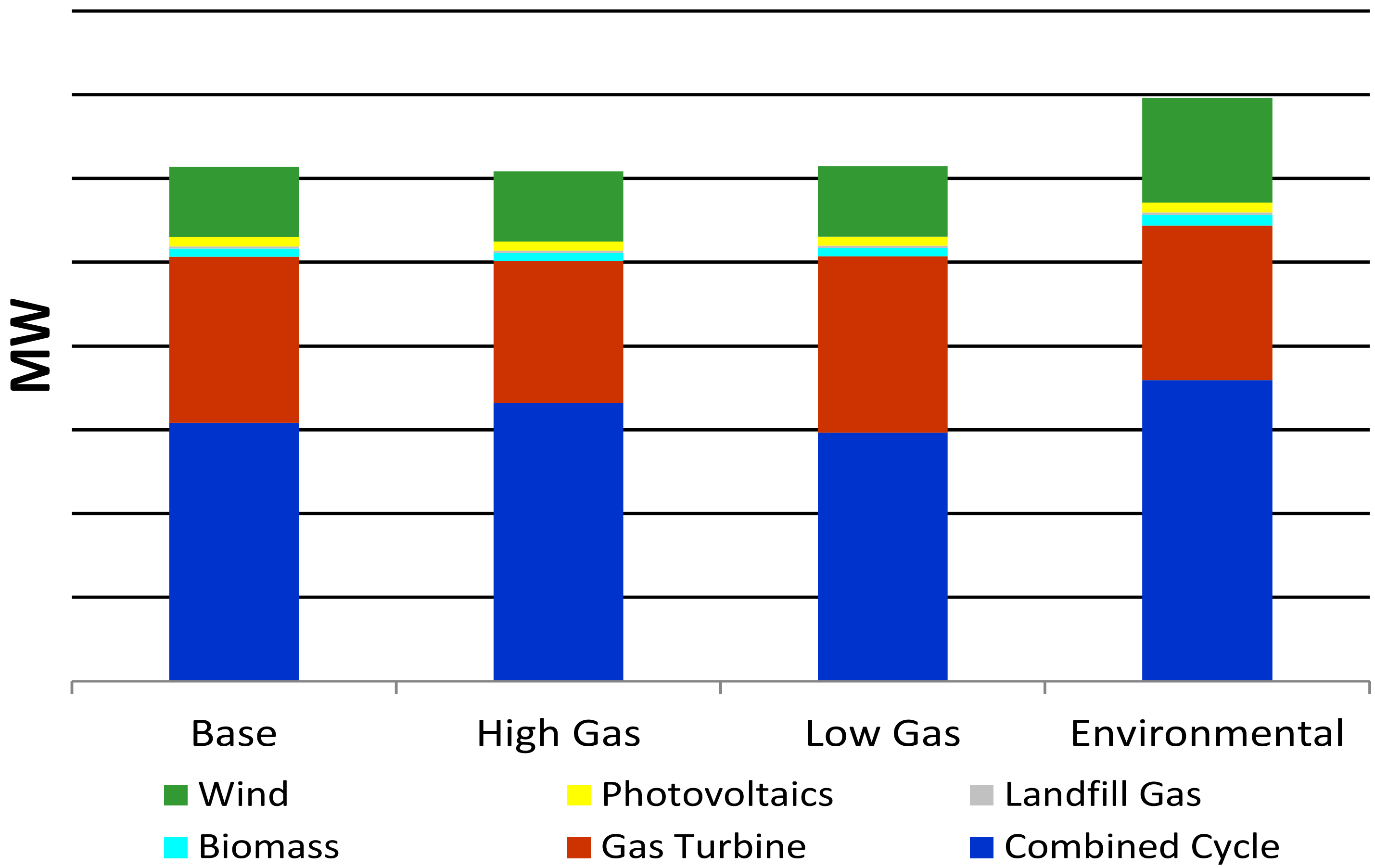
Reference Case Scenario Descriptions

- Base Gas Price
  - Base Reference Case assumptions
  - NoCO2 emissions cap
- Low gas price
  - Ventyx subjective view of 10th percentile of probability distribution
  - Corresponds to production costs for best shale plays
- High gas price
  - Ventyx subjective view of 90th percentile of probability distribution
  - Corresponds to limited shale supply scenario
- Federal environmental legislation
  - CO2 emissions cap 2020 start, 80% below 2005 levels by 2050
  - RPS begins in 2020 and later target is 12% of retail sales by utilities with load greater than 4 Terawatt hours (TWh)

National Scenario Price Comparison (7x24)(Fall 2013 Reference Case $/MWh)



Midwest Reference Case Scenario 2034 Resource Mix Comparison

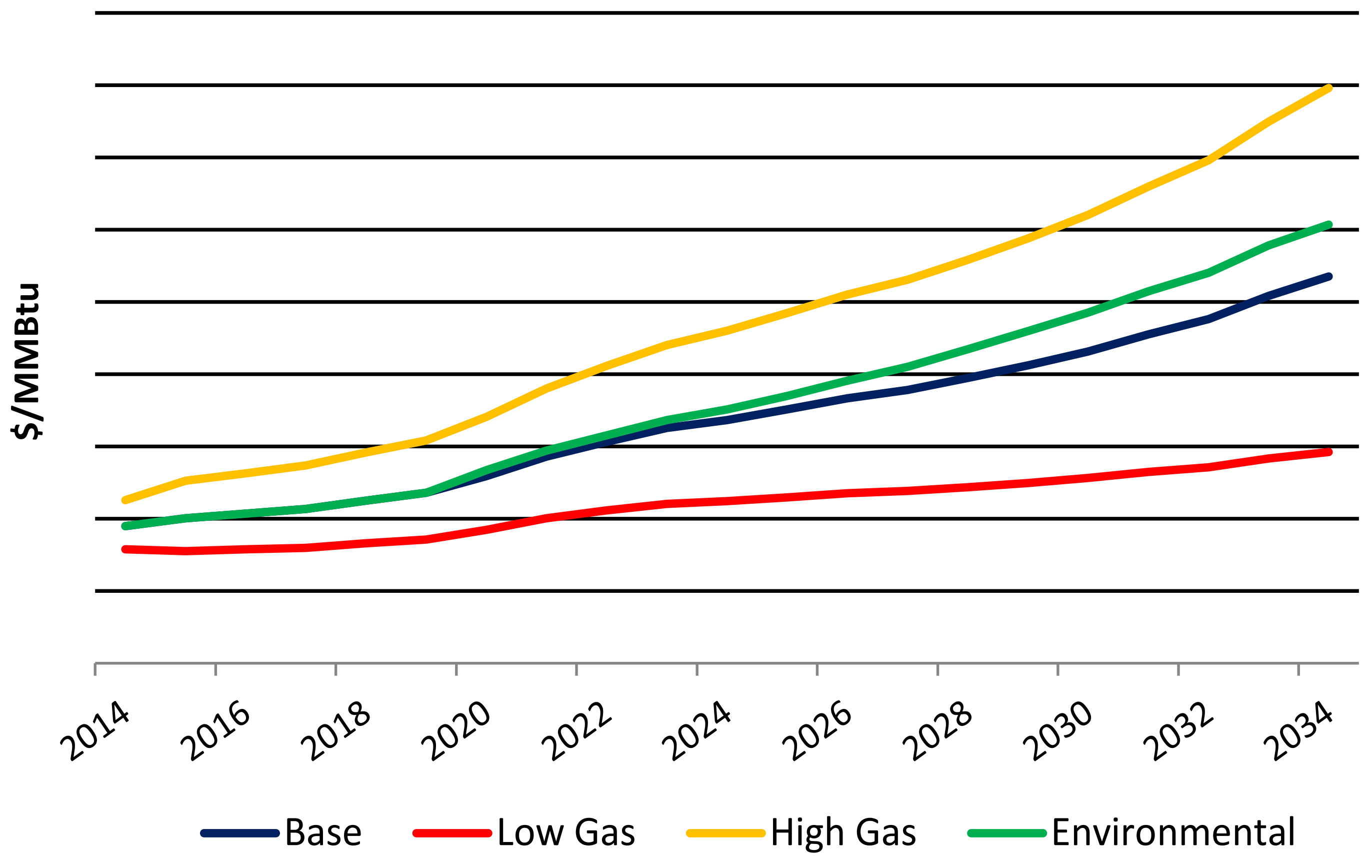


Proposed IPL Modeling Assumptions

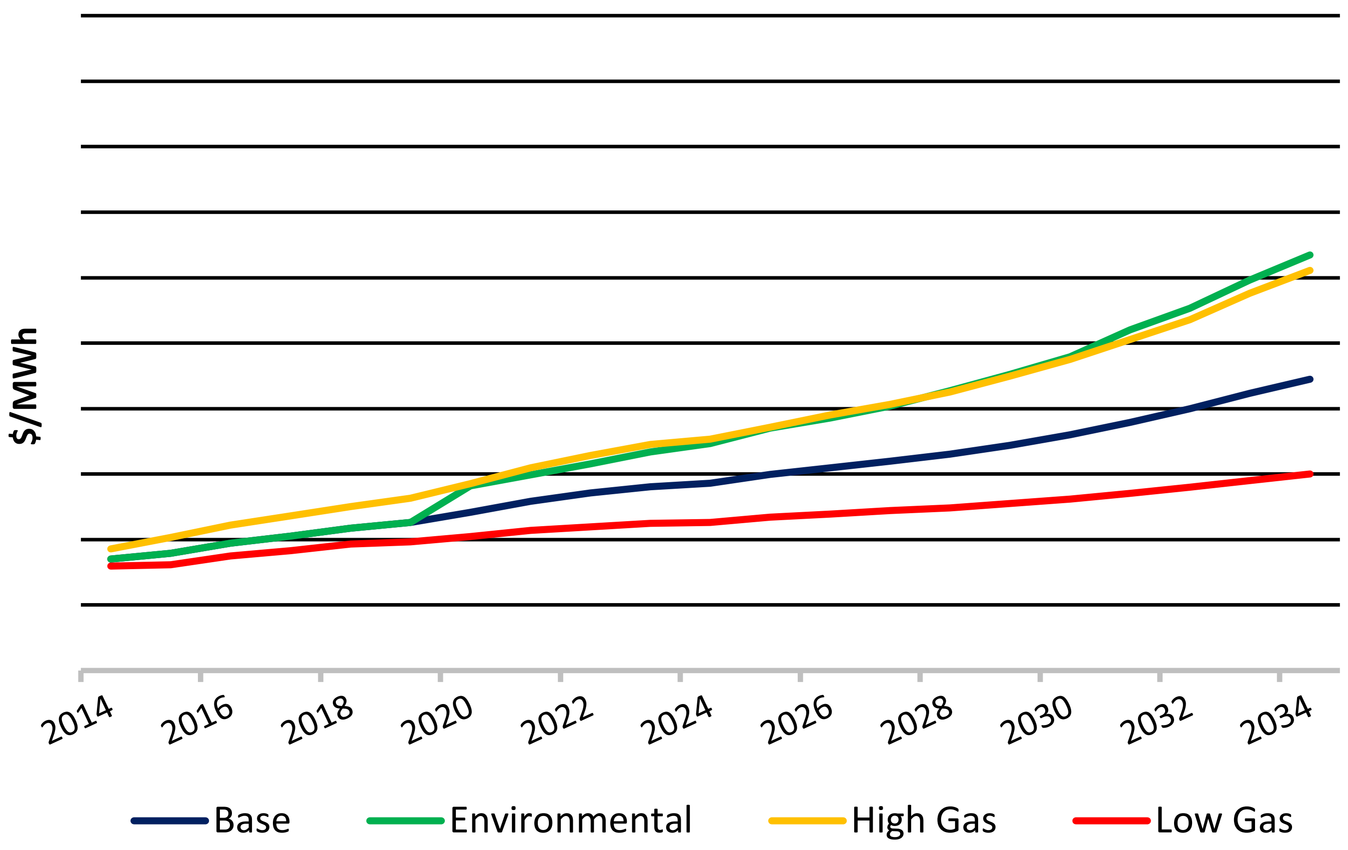
Strategic Planning *powered by Midas Gold®*

- Strategic Planning includes multiple modules for an enterprise wide strategic solution. The following modules will be used for IPL's IRP:
  - Capacity Expansion (Optimization Screening Model)
  - Portfolio Simulation
  - Financial (Incremental only)

Henry Hub Proposed Annual Gas Price Forecast (Fall 2013 Reference Case $/MMBtu)



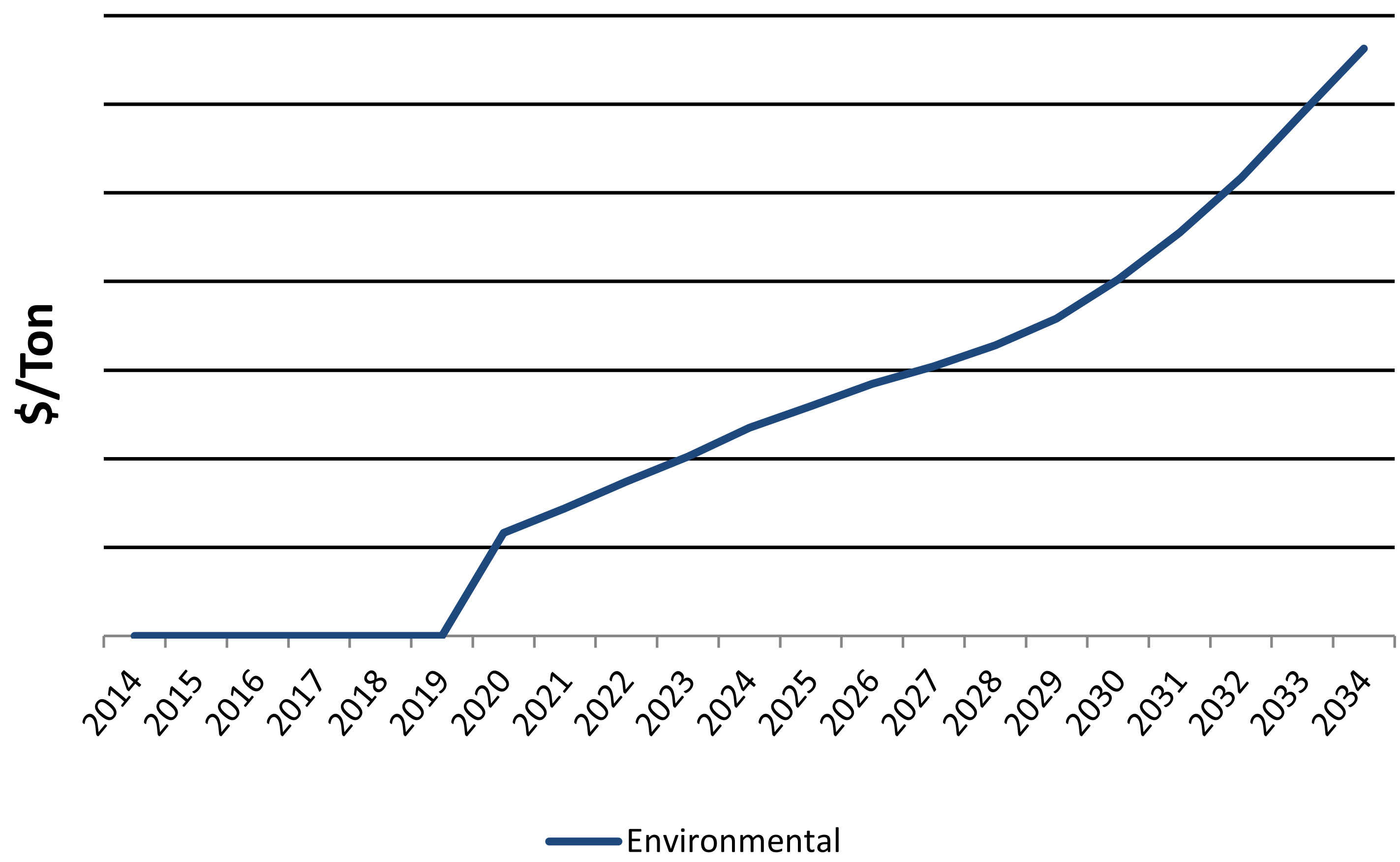
Proposed Annual MISO-Indiana Market Prices (7x24)(Fall 2013 Reference Case $/MWh)



IPL's Proposed Carbon Policy Assumptions

- **Base Case**
  - No Carbon Tax
- **Future CO_2**
  - Ventyx Environmental Scenario with Carbon Tax beginning in 2020
  - IPL also evaluating other 3rd party CO_2 policy scenarios

Proposed Carbon Prices ($/Ton)



Modeling Considerations

- Critical Key Risk Parameters to be included:
  - Fuel and market prices
  - Load growth/DSM/EE
  - Carbon policy
  - Others based on evaluation of stakeholder feedback

- Alternate Resource Plans
  - Include any portfolio mandates such as DSM/EE or RPS, if required
  - Various utility/stakeholder specified plans – may also select other resource alternatives that were not chosen by the Ventyx Capacity Expansion Screening Model for further evaluation

Questions?

Additional Feedback and Comments

Facilitated by Marty Rozelle, PhD, Meeting Facilitator

Next Steps

Presented by Marty Rozelle, PhD, Meeting Facilitator

Next Steps

Schedule for the Rest of 2014

May 23, 2014	IRP Public Advisory Meeting #1 Notes Posted to IPL Website
May 30, 2014	Deadline to Submit Comments/Questions to IPL.IRP@aes.com
June 13, 2014	IPL's Response to Comments/Questions Will be Posted to IPL Website
July 18, 2014	IRP Public Advisory Meeting #2
September 23, 2014	IRP Public Advisory Meeting #3
October 31, 2014	Submit IRP Document to the IURC

Give us your feedback. IPL is here to listen to you.

Thank You!

IRP Public Advisory Meeting #2

Workshop with IRP Stakeholders

July 18, 2014

Barnes & Thornburg

11 South Meridian St.

Welcome and Introductions

Meeting Agenda and Guidelines

Presented by Marty Rozelle, PhD, Meeting Facilitator

Meeting Objectives

- Continue conversation on the Integrated Resource Plan, including providing new information and incorporating stakeholder feedback
- Gather comments and feedback – specifically on the four Ventyx Scenario results presented
- Continue relationship built on trust and respect

IRP Public Advisory Meeting #2

Agenda Topics

- Summary of IRP Public Advisory Meeting #1
- Demand Side Management Update
- Environmental Update
- Overview of Stakeholder Comments and Questions
- Incorporating Stakeholder Input
- Presentation of Ventyx Scenario Results
- Stakeholder Feedback and Comments

Meeting Guidelines

- Time for clarifying questions at end of each presentation
- Parking lot for items to be addressed later
- The phone line will be muted. During the allotted question time frames, you may press *6 to un-mute yourself or type a question through the web-chat function.
- To inquire about confidential information please contact Teresa Nyhart with Barnes & Thornburg, LLP at teresa.nyhart@btlaw.com

Written Comments and Feedback

- Please email comments and questions to IPL.IRP@aes.com
- All comments and questions received by August 1 will have responses posted on the IPL IRP website by August 15

Questions?

Summary of IRP Public Advisory Meeting #1

Presented by Herman Schkabla, Director of Resource Planning

IRP Public Advisory Meeting #1

May 16, 2014 --- Agenda Topics

- Introduction to IPL and Integrated Resource Planning Process
- Energy and Peak Forecasts
- Demand Side Management: Energy Efficiency and Demand Response
- Planning Reserve Margin
- Generation Overview
- Environmental Overview
- Distributed Energy Resources
- Proposed Modeling Assumptions

Company Profile

- 470,000 customers*
- 1,400 employees*
- 528 sq. miles territory
- 144 substations

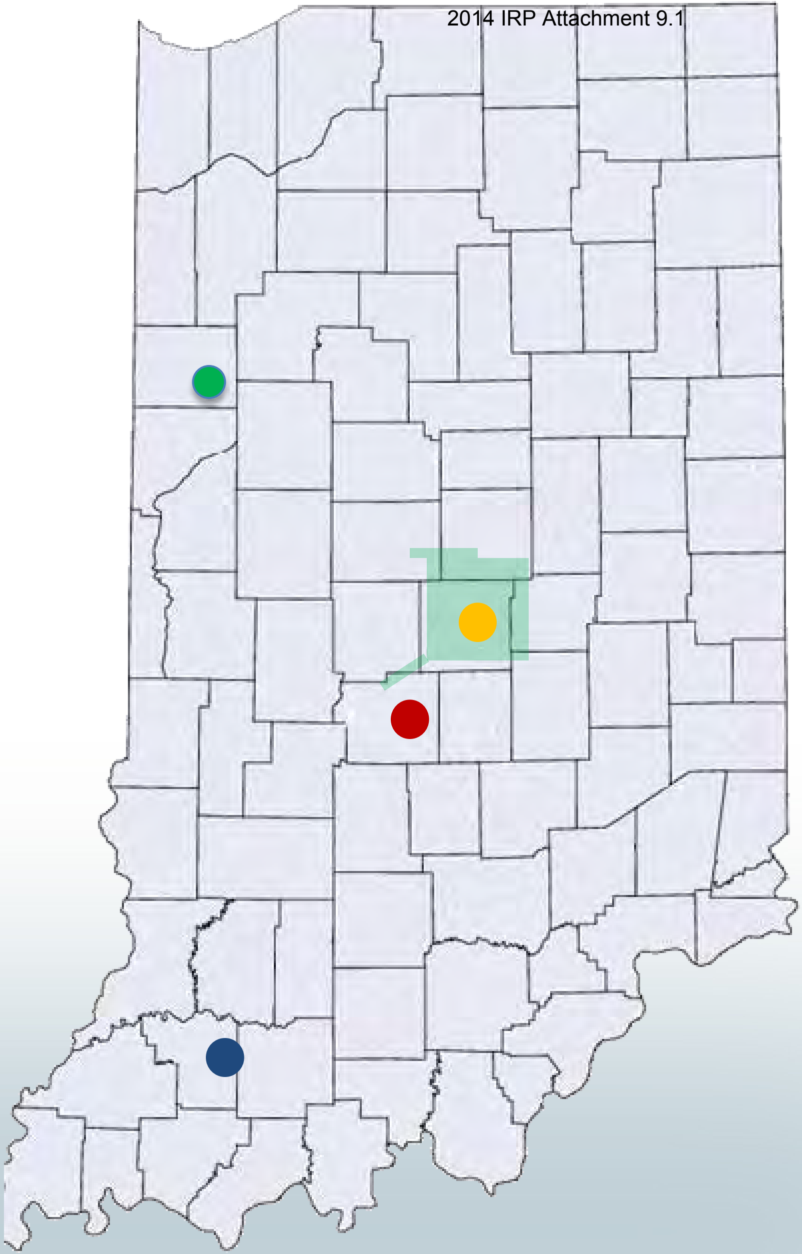
Harding Street Station, Georgetown Station, Solar REP Projects - 1,322 MW**

Eagle Valley Generating Station - 263 MW**

Petersburg Generating Station – 1,760 MW**

Hoosier Wind Park PPA – 100 MW**

Lakefield Wind Park PPA – 201 MW**
(In Minnesota – Not pictured)



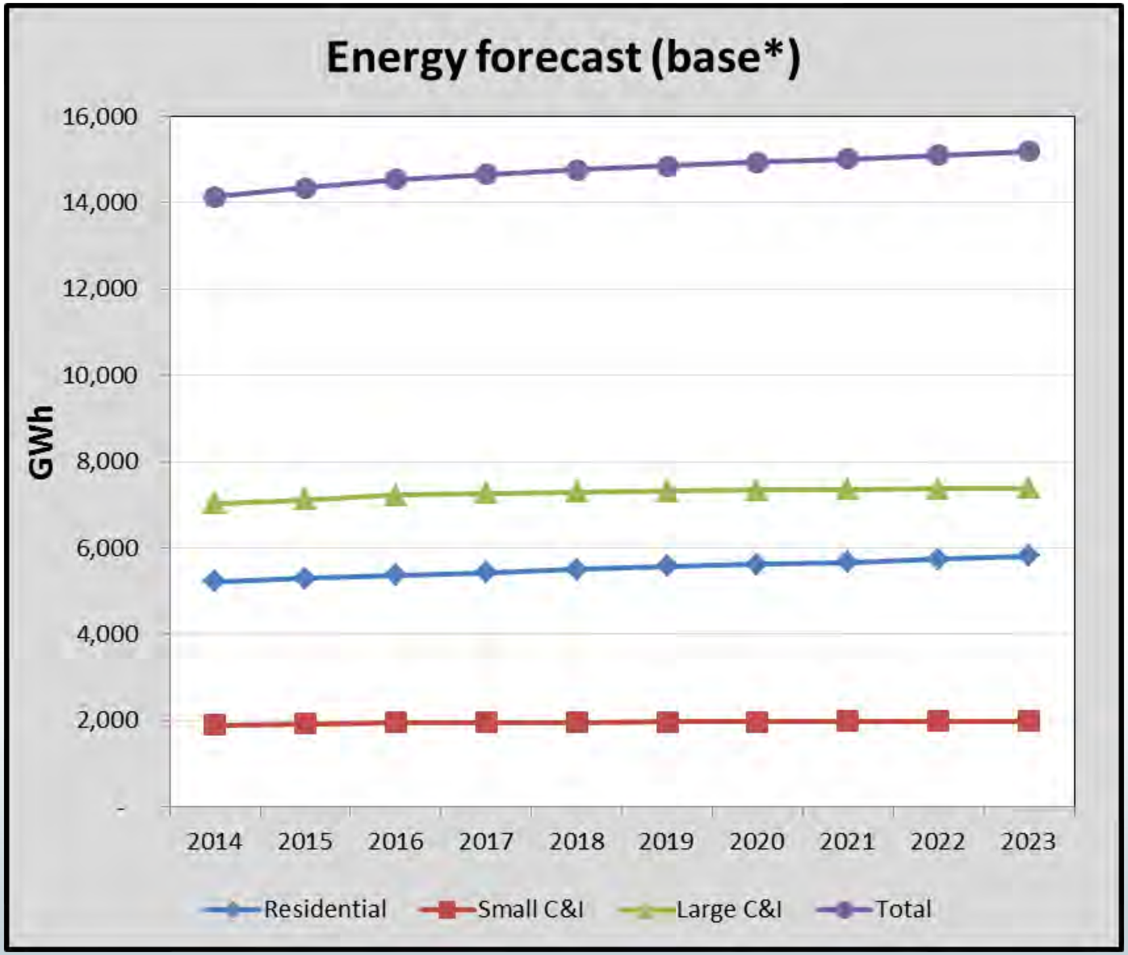
*approximate numbers
**nameplate capacity

IRP Process Overview

Develop IPL's **Total** Supply Resource Needs → Determine IPL's **New** Supply Resource Needs → Identify Key Risk Parameters

→ Identify and Screen Resource Technologies → Evaluate Resource Expansion Plans → Identify IPL's Reference and Short Term Action Plans

The Forecast : Energy

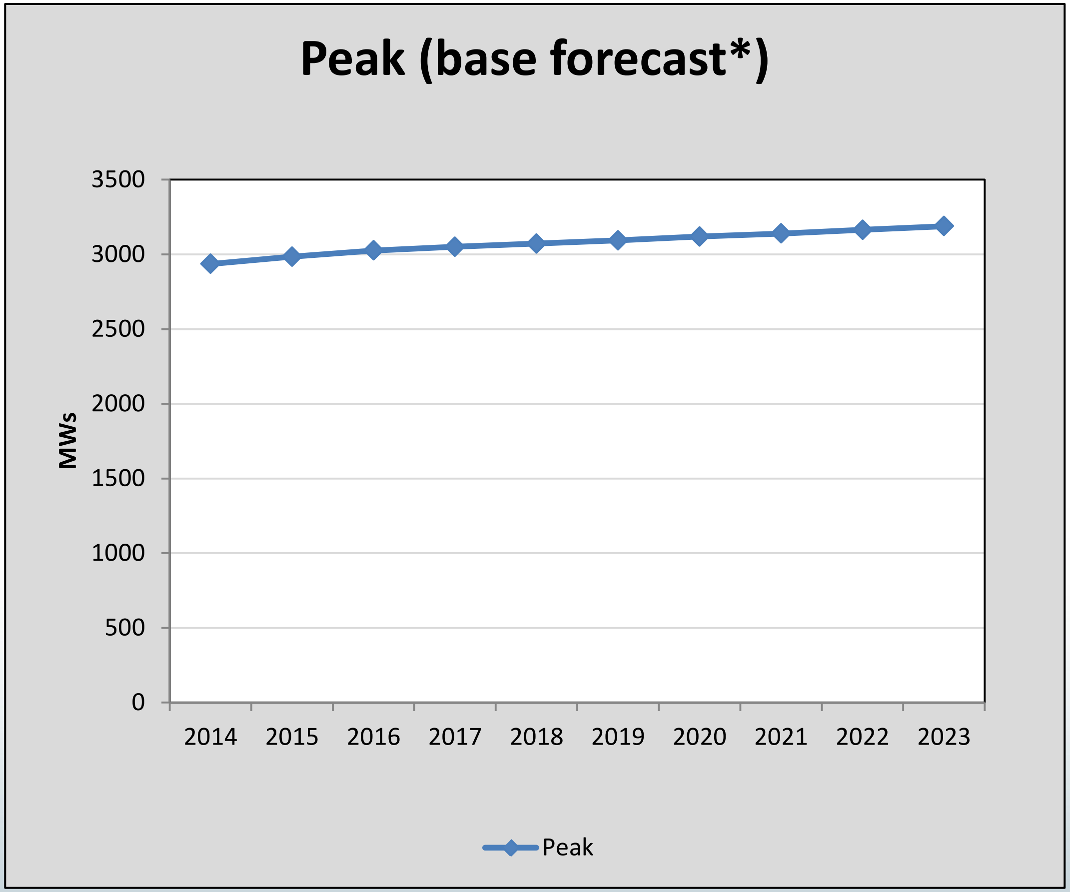


Average **Energy** growth rates (2014-23):

- Residential: 1.2%
- SCI: 0.6%
- LCI: 0.6%
- **Total: 0.8%**

* The forecast does not reflect company-sponsored DSM savings.

The Forecast : Peak



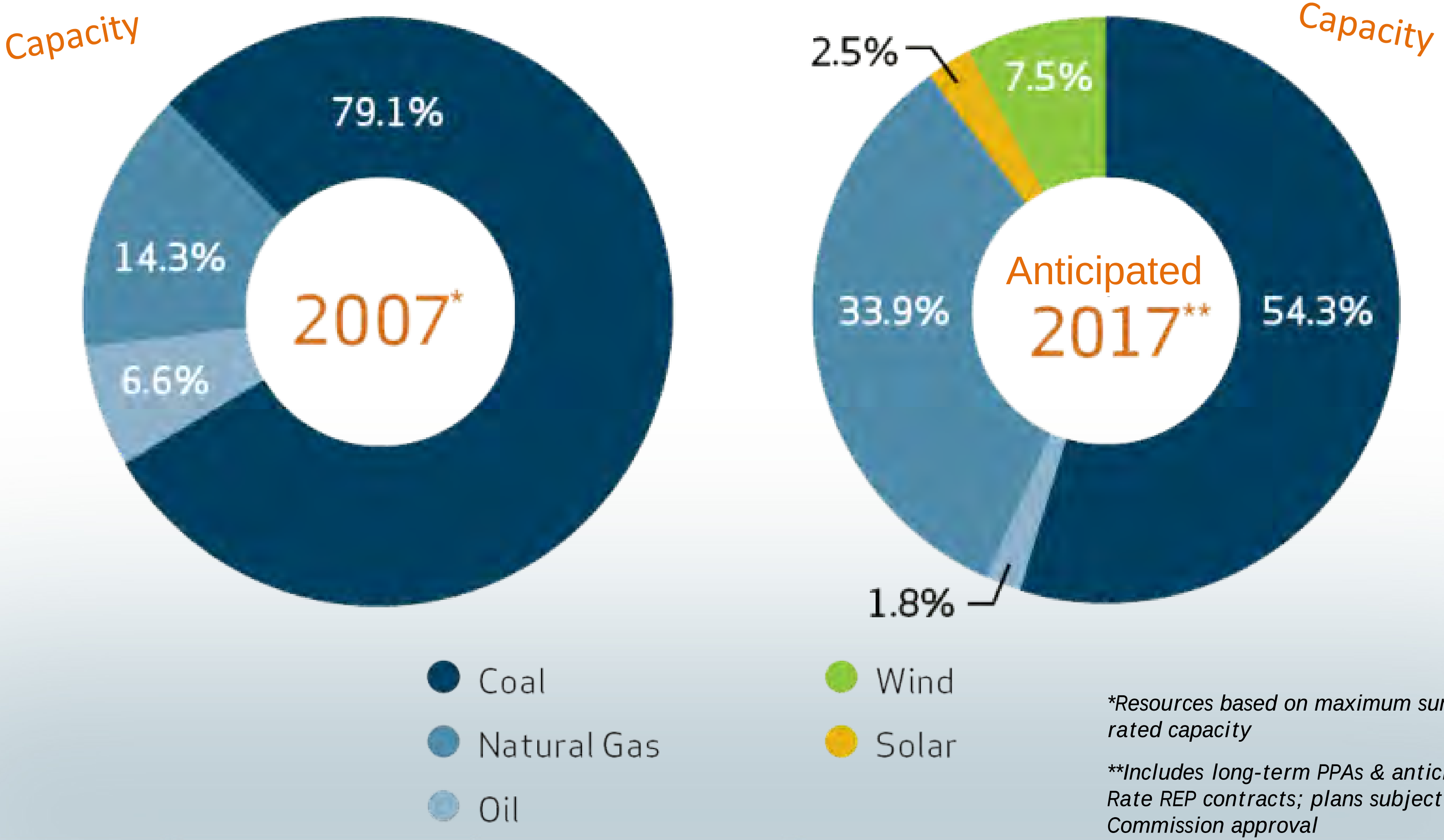
Average **Peak** growth rate (2014-23): **0.9%**

* The forecast does not reflect company-sponsored DSM savings.

DSM Integration into IPL's Planning and Portfolio

- IPL has offered DSM programs on essentially a continuous basis since 1993
- IPL expects to continue to provide cost effective DSM programs to help our customers reduce their energy use and better manage their energy bills
- IPL reflects an ongoing level of end-use Energy Efficiency (ex. home appliance improvements) in preparation of our base case load forecast
- The 2015-2017 DSM Action Plan is being finalized
- The 2018 and beyond DSM forecast will be developed with the support of EnerNOC

Adapting our Generation Portfolio to Respond to EPA Rules and Market Dynamics



*Resources based on maximum summer rated capacity

**Includes long-term PPAs & anticipated Rate REP contracts; plans subject to Commission approval

Environmental Regulations

- Current Environmental Regulations/Environmental Projects
  - Mercury and Air Toxics Standard (MATS)
  - NPDES Water Discharge Permits
- Future Environmental Regulations
  - Coal Combustion Residuals (CCR)
  - 316(b) – Cooling water intake structures
  - Greenhouse Gas (GHG) New Source Performance Standards (NSPS)
  - National Ambient Air Quality Standards (NAAQS)
  - Clean Air Interstate Rule (CAIR) Replacement Rule

NPDES= National Pollutant Discharge Elimination System

Distributed Generation

- Distributed generation can be difficult to implement on a large scale
- Solar has the best opportunity for growth in the IPL service territory but is currently challenging as a least cost resource
- Actively monitoring trends in Distributed Generation and Distributed Energy Resources

Ventyx's Agenda

- Introduction to North American Power Reference Case
  - Load and Resources
  - Natural Gas
  - Coal Forecast
  - Emissions Market
  - Renewables
  - Scenarios

- Proposed IPL Modeling Assumptions
  - Natural Gas Prices
  - Market Power Prices
  - Carbon Policy
  - Modeling

Reference Case Scenario Descriptions – Modeling results were not presented at the May 16, 2014 meeting

- Base Gas Price
  - Base Reference Case assumptions
  - No CO_2 emissions cap
- Low gas price
  - Ventyx subjective view of 10th percentile of probability distribution
  - Corresponds to production costs for best shale plays
- High gas price
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- Federal environmental legislation
  - CO_2 emissions cap 2020 start, 80% below 2005 levels by 2050
  - RPS begins in 2020 and later target is 12% of retail sales by utilities with load greater than 4 Terawatt hours (TWh)

Questions?

Demand Side Management Update

Presented by Jake Allen, DSM Program Development Manager

Recent Developments

- IPL has made a filing for approval of a DSM Plan for 2015/2016 in Cause No. 44497
- Testimony filed in Cause No. 44441 regarding large customer's ability to opt-out of DSM
    - First window for opt-out (July 1, 2014) has closed
- Numerous comments on the IURC General Administrative Order have been made, providing recommendations for future DSM in Indiana

2015-2016 DSM Plan Filed - Cause No. 44497

- Cause No. 44497 seeks Commission approval of a 2 Year Plan (2015-2016); however, a 3 Year Action Plan (2015-2017) was included in the prepared filing
- Petition filed on May 30, 2014
- Plan includes 13 DSM Programs (9 Residential; 4 Business)
- Target EE Savings approx. 1.2% of sales (total sales before large customer opt-out)
- Expect to continue collaboration with Citizens Gas

IPL's Proposed DSM Programs - Cause No. 44497

Segment	2015/2016 Proposed Programs	Program Description
RES	Lighting	Prescriptive lighting buy down
RES	Income Qualified Weatherization	Audit with direct install measures including air sealing and insulation
RES	Home Energy Assessment	Walk through assessment with direct install measures and energy efficient recommendations
RES	School Education – Kits	Energy efficient kits and education to eligible students
RES	Multifamily	Direct install measures delivered in multifamily housing units
RES	Online Energy Assessment	Online assessment with kit delivery as fulfillment
RES	Appliance Recycling	Recycling of inefficient refrigerators, freezers, and window AC units
RES	Peer Comparison	Home energy reports
RES	Air Conditioning Load Management	Direct load control
BUS	Prescriptive Rebates	Prescriptive rebates for qualifying measures
BUS	Custom Rebates	Custom rebates for qualifying measures
BUS	Small Business Direct Install	Walk through assessment with direct install measures and energy efficient recommendations
BUS	Air Conditioning Load Management	Direct Load Control

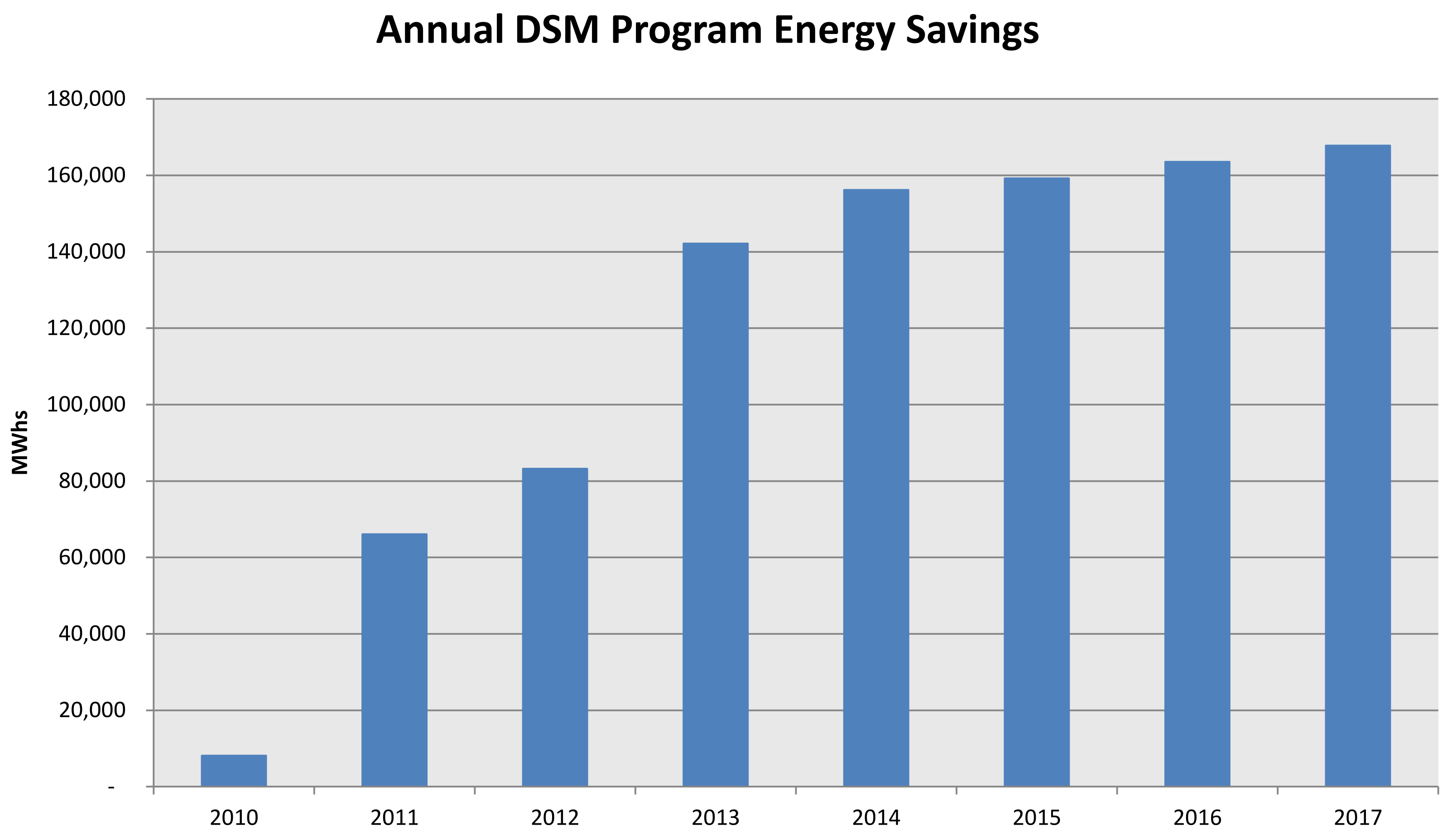
Proposal for Current Offerings - RESIDENTIAL

Current Residential Programs	2015/2016 Proposal
Home Energy Assessment (was Energizing Indiana Program)	IPL will begin to administer
Income Qualified Weatherization (was EI Program)	IPL will begin to administer
Residential Lighting (was EI Program)	IPL will begin to administer
Energy Efficient Schools – Education (was EI Program)	IPL will begin to administer
Residential New Construction	Program not continued
Online Energy Assessment w/ Kit	IPL will continue to administer
Multifamily Direct Install	IPL will continue to administer
Appliance Recycling	IPL will continue to administer
Peer Comparison Report	IPL will continue to administer
CoolCents® Residential ACLM	IPL will continue to administer
Residential Renewables	Program not continued

Proposal for Current Offerings - BUSINESS

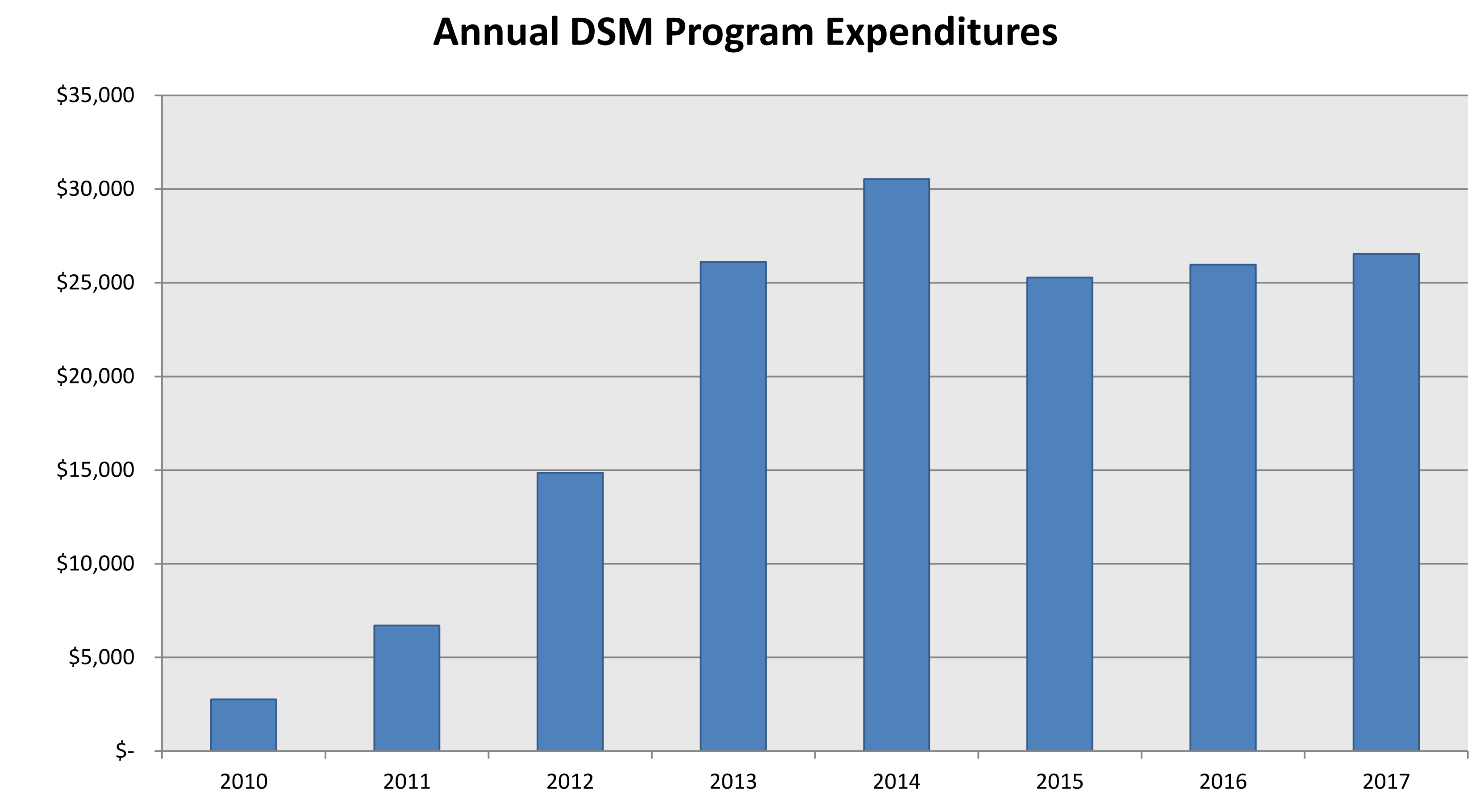
Current Business Programs	2015/2016 Proposal
Energy Efficient Schools - Audit & DI (was EI Program)	Program discontinued; Schools will continue to have EE opportunities
C&I Prescriptive – Core (was EI Program)	IPL will administer moving forward; measures merged with IPL Business Energy Incentives
C&I Renewables	Program not continued
CoolCents® C&I ACLM	IPL will continue to administer
C&I Renewables Multifamily Direct Install	IPL will continue to administer
Business Energy Incentive Program – Prescriptive/Custom	IPL will continue to administer. Combined with Prescriptive Measures from EI Core

DSM Energy Savings



Note: 2014 is forecasted. 2015-2017 is as filed in Cause No. 44497.

DSM Spending



Note: 2014 is forecasted. 2015-2017 is as filed in Cause No. 44497.

Other DSM Considerations

- Update on Large Commercial & Industrial Customer opt-out of participation in IPL DSM Programs
  - First opt-out opportunity was July 1, 2014
  - Next opt-out opportunity is January 1, 2015
  - 41 IPL customers opted out
  - These 41 customers had 231 services
  - Annual sales to these customers are about 1,800 GWH or about 13% of total IPL sales

- Working with Applied Energy Group (formerly known as EnerNOC) on 2018-2034 DSM potential

- EPA Clean Power Plan
  - Proposed rule issued June 2, 2014

Other DSM Considerations

- Commission Report to Legislature
  - Recommendations on future DSM
  - Due not later than August 15, 2014 – pursuant to SEA 340
  - Review of recent DSM efforts in Indiana

- Procurement of Energy Service Providers
  - For Program Delivery (2015-2016)
  - Collaboration with Citizens Gas and Oversight Board

IPL Remains Committed to Providing Cost Effective DSM to Our Customers

- In Cause No. 44497, IPL is requesting approval to spend about the same amount as the current level for DSM, while achieving…
- …About the same amount of annual savings in 2015/2016 as the current level for DSM
- IPL is retaining most of the existing programs and adding a new program – Small Business Direct Install

Questions?

Environmental Update

Presented by Angelique Oliger, Director of Environmental Policy

Environmental Updates

- 316(b)
    - o Final Rule Released May 19, 2014
    - o Consistent with Proposed Rule
- Clean Power Plan
    - o Proposed Rule Released June 2, 2014

Clean Power Plan

- EPA's Clean Power Plan would reduce Carbon emissions from the power sector nationwide by 30% by 2030 from 2005 levels
- State-specific rate-based (lbs CO_2/MWhr) goals for carbon intensity
    - 1,607 lb/MWh – 2020-2029 average
    - 1,531 lb/MWh – 2030+
- Best System of Emission Reductions
    - cost
    - technical feasibility
    - other factors
- States must develop plans to achieve these reductions
- State Plan or Multi-state Plan

Timing

- 120 day comment period begins after publication in Federal Register
- Four public hearings will be held
- Final Rule expected June 1, 2015
- State Plans due June 30, 2016 with potential for 1-2 year extension
- Compliance with “interim goal” on average over the ten-year period from 2020-2029
- Compliance with “final goal” in 2030 and thereafter

EPA's Building Blocks

- EPA based required reductions on "building blocks" which States may incorporate into State Plans

  - o Heat Rate improvements at EGUs;
  - o Substituting generation from coal-fired EGUs with generation from existing NGCCs;
  - o Substituting generation from coal-fired EGUs with generation from renewables;
  - o Demand Side Energy Efficiency; and/or

- <u>State may elect to use some or all of these measure to varying degrees in their State regulations or they may use other measures</u>

EGU-Electric Generating Unit
NGCC- Natural Gas Combined Cycle

Potential Impacts

- Impacts will be heavily dependent upon State Plans and remain largely uncertain at this time, but may include:
    - Required heat rate improvements
    - Decreased dispatch of coal-fired units
    - Increased dispatch of renewables and existing NGCCs
    - Additional demand side EE measures

- Eagle Valley CCGT is not subject to the Rule because construction will commence after January 2014

Questions?

Overview of Stakeholder Comments and Questions

Facilitated by Marty Rozelle, PhD
Explanations by IPL Team

IPL's Feedback Response Table

- IPL responded to 112 stakeholder comments and questions
- All questions and responses were posted in IPL's Feedback Response Table on the IPL IRP webpage on June 20
- Today, IPL will briefly review selected questions and responses

Energy and Demand Forecast

- 10 year forecast but 20 year plan?
- DSM assumptions in the forecast?
- Forecast consistent with industry-wide forecasts?

Please see the Feedback Response Table on IPL's IRP webpage for all questions and answers.

Demand Side Management

- How will IPL meet future DSM goals?
- Status of Applied Energy Group's 2018 and beyond DSM forecast?

Please see the Feedback Response Table on IPL's IRP webpage for all questions and answers.

Renewables/ Environmental

- Keep Renewable Energy Certificates (“REC”) in Indiana?
- Combined heat and power opportunities?
- Many questions addressed the proposed EPA rule on CO2. An update will be provided today.

Please see the Feedback Response Table on IPL’s IRP webpage for all questions and answers.

IPL's Modeling

- Define base case and reference case?
- Regional model vs. company specific model?
- Does IPL's model compare the cost of running generating units to the cost of purchasing or selling energy on the market?

Please see the Feedback Response Table on IPL's IRP webpage for all questions and answers.

IPL's Modeling (cont.)

- How are off system sales treated within the model?
- Retirement dates of all IPL plants?
- What would motivate an earlier retirement?
- Harding St 7 upgrades cost vs. Harding St 7 replacement generation costs?

Please see the Feedback Response Table on IPL's IRP webpage for all questions and answers.

Modeling Assumptions/ Inputs

- Many of the questions asked how DSM and CO2 will be treated in the model. An update on both will be provided today.

- There were also detailed modeling questions that can be addressed as we cover the initial modeling results today

Please see the Feedback Response Table on IPL's IRP webpage for all questions and answers.

Questions?

Incorporating Stakeholder Input

Presented by Herman Schkabla, Director of Resource Planning

Results from Public Advisory Meeting #1

Key Risk Factor	Number of Responses
Amount and cost of energy generated by natural gas	4
Amount and cost of energy generated by coal	6
Amount and cost of energy generated by wind turbines	7
Amount and cost of energy generated by solar facilities	5
Amount and cost of energy generated by other renewable sources (biomass, landfill gas, geothermal, etc.)	7
Amount and cost of consumer-initiated energy generation ("rooftop solar" / net metering)	10
Level of federal "carbon tax" imposed on power plant emissions	11
Level of government environmental regulations for air and water quality	10
Level of consumer energy conservation through voluntary programs (energy efficiency, etc.)	8
Load forecast	2
Cost of electricity delivered to the consumer ($ / megawatt hour)	5

Other Key Risk Factors Identified: (1) Level of energy conservation through mandatory programs, **(2)** Cost of climate change resulting in weather calamities, **(3)** Effects of water scarcity, **(4)** Health effects of emissions, **(5)** Industrial customers dropping load through constructing own generation or co-generation

Addressing Top Stakeholder Risk Factors

- Cost assumptions for wind turbines
  - Reduced the Ventyx reference case cost assumption for new wind resources by $200/KW to reflect declining costs for wind generation

- Carbon/GHG Assumptions
  - Included in the Ventyx environmental scenario
  - Will incorporate the "EPA Clean Power Plan" into the IPL base case scenario

Addressing Top Stakeholder Risk Factors

- DSM/EE
  - Will incorporate updated projections from Applied Energy Group analysis
  - Provide transparency on cost/benefit analysis evaluated on a consistent basis with supply-side options
  - Ventyx Model is not the best tool for DSM cost/benefit analysis
- Distributed Generation Impact
  - Will reduce energy forecast to reflect increasing level of customer dis gen (e.g. 2% by 2020, 4% by 2030)

Retirement Timing of Remaining Coal Units

- IPL is conducting a detailed parallel assessment of continued operation of its big 5 coal units
    - o Part of upcoming IURC regulatory filing to develop a compliance plan for waste water rules (NPDES)
    - o Unable to provide results at this time

- The NPDES compliance plan and supporting analysis will be integrated into the final 2014 IRP

NPDES – National Pollutant Discharge Elimination System

Questions?

Presentation of Ventyx Scenario Results

Presented by Diane Crockett, Ventyx and
Herman Schkabla, Director of Resource Planning

Reference Case Scenario Descriptions

- **Base Gas Price**
  - Base Reference Case assumptions
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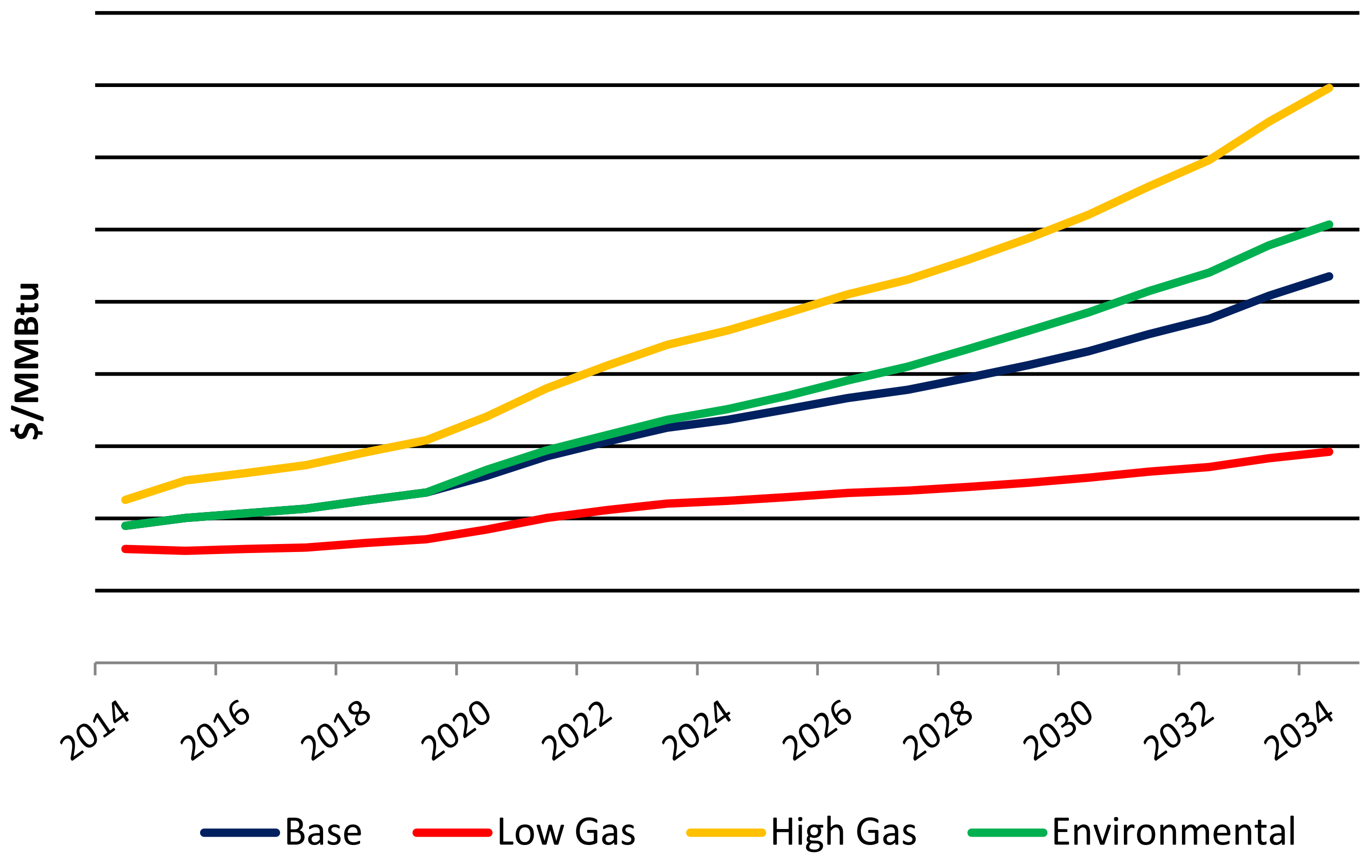
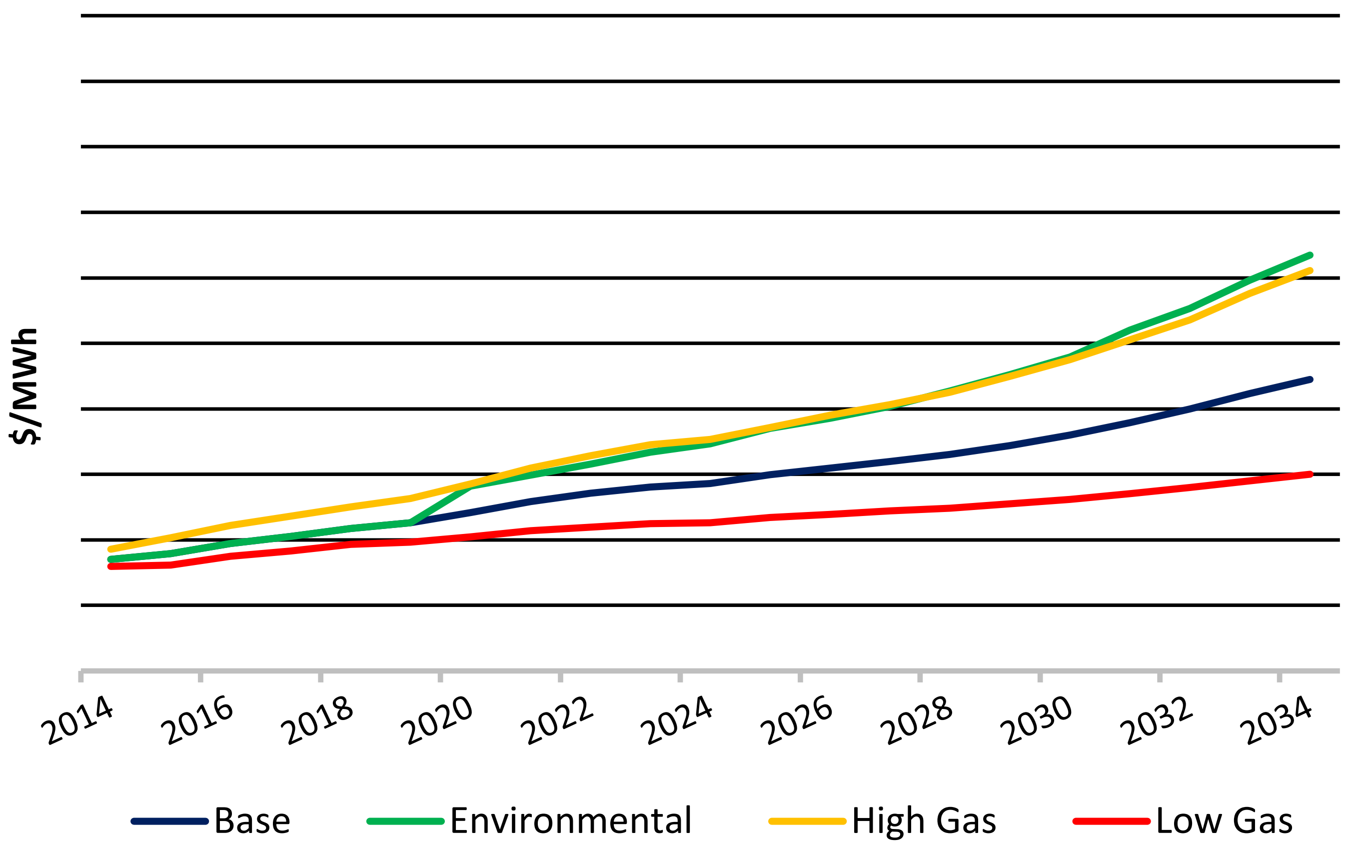
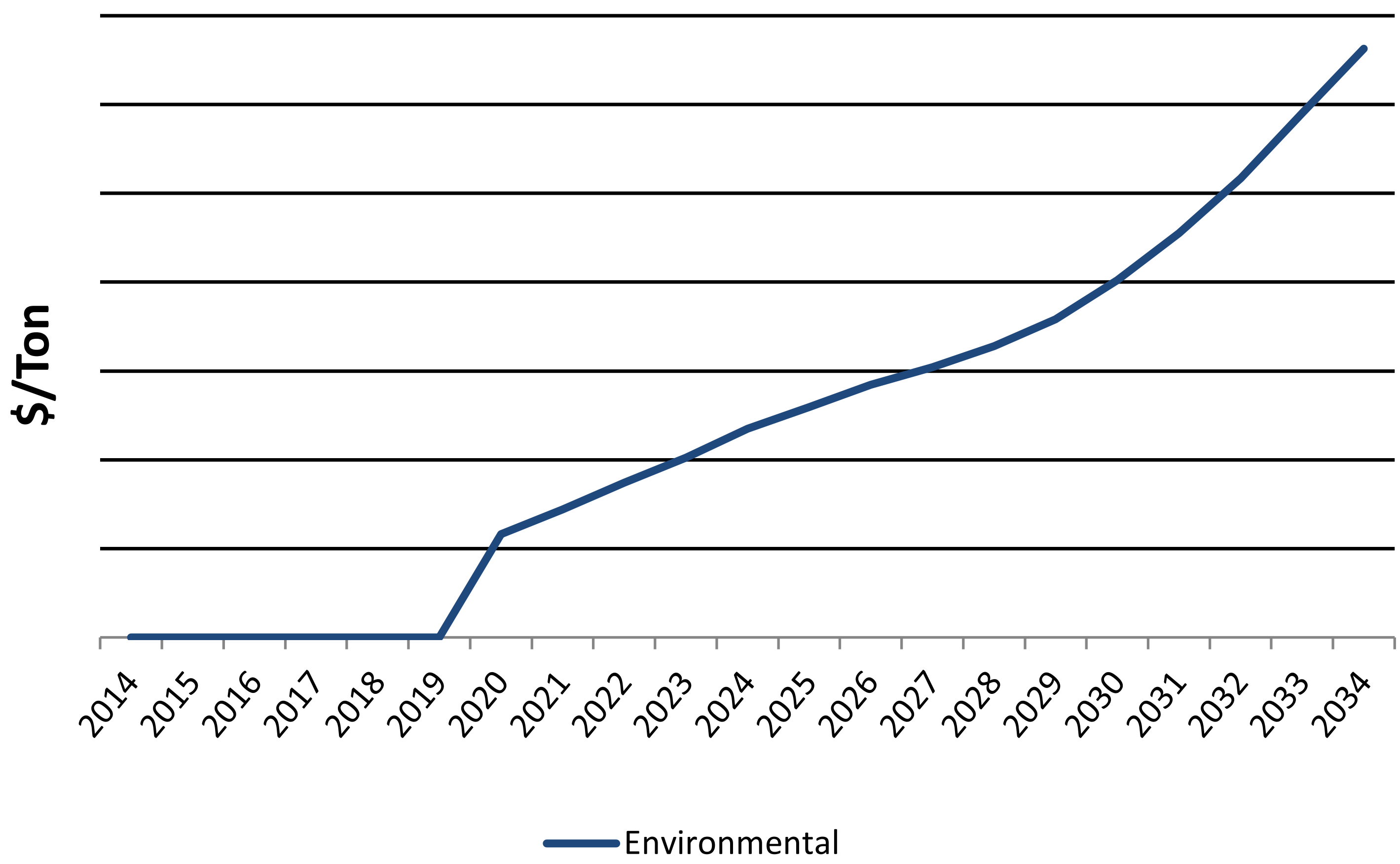
Henry Hub Proposed Annual Gas Price Forecast (Fall 2013 Reference Case $/MMBtu)



Proposed Annual MISO-Indiana Market Prices (7x24)(Fall 2013 Reference Case $/MWh)



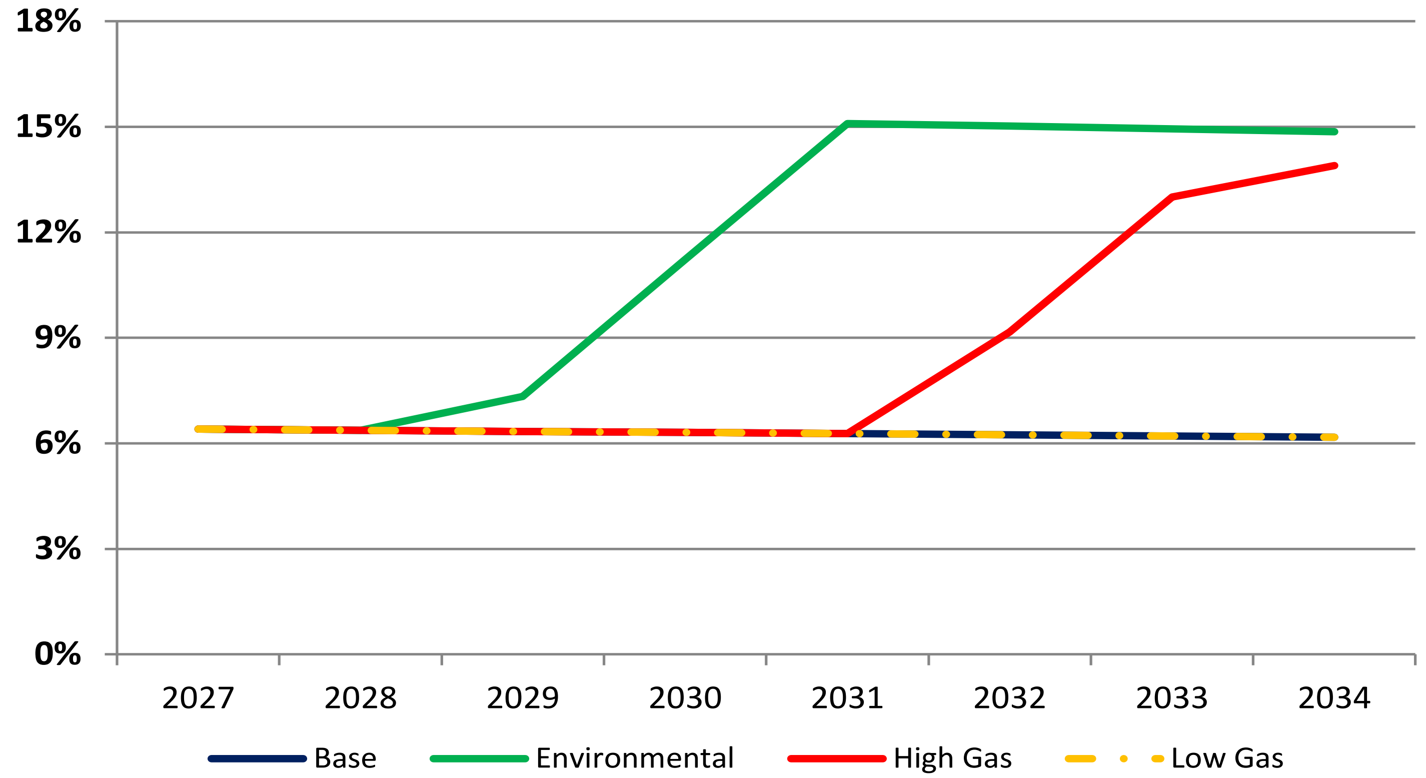
Proposed Carbon Prices ($/Ton)



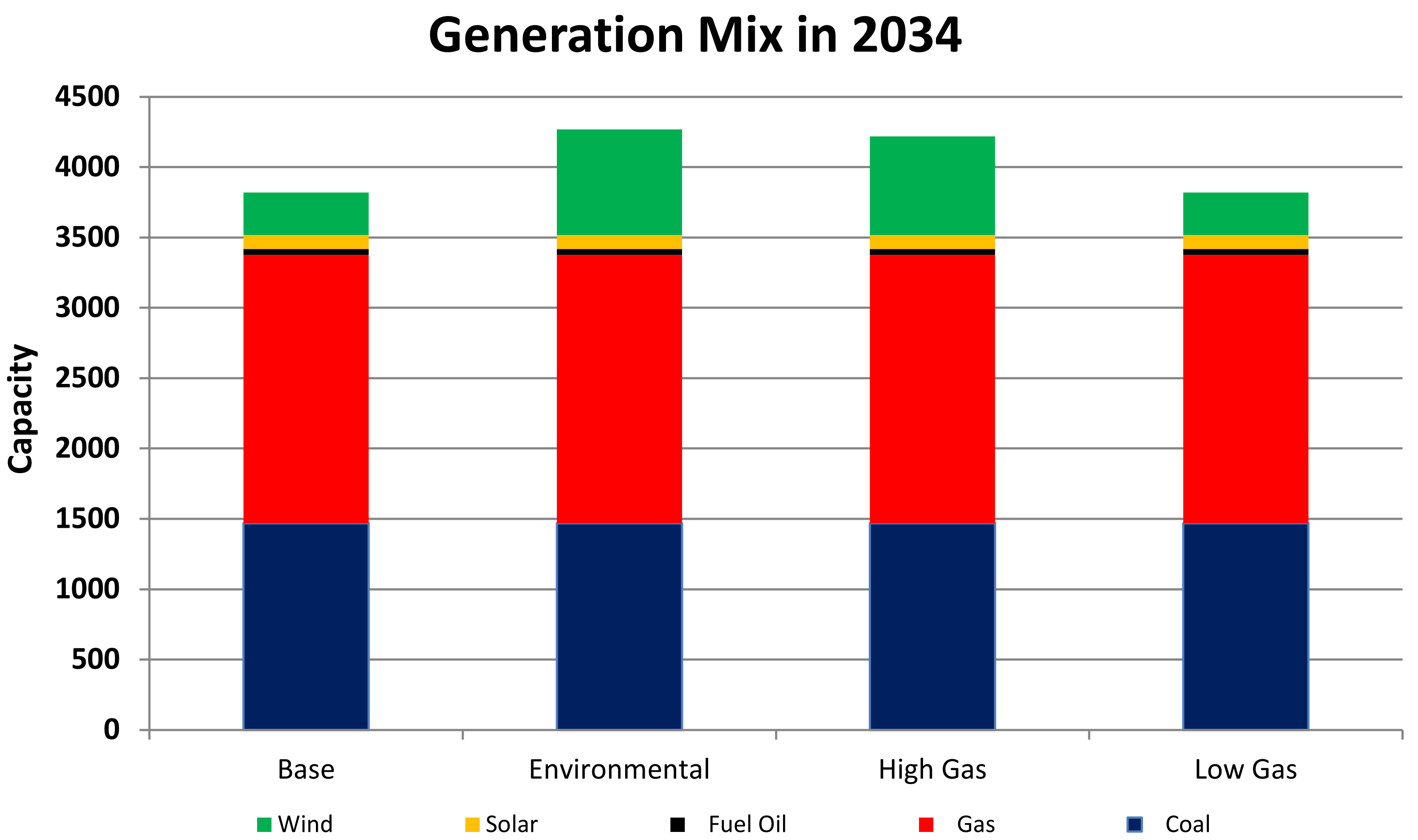
Results - Expansion Plans

YEAR	Base	Environmental	High Gas	Low Gas	Unit Retirements
2015	Market 150 MW	Market 150 MW	Market 150 MW	Market 150 MW	
2016	Market 450 MW	Market 450 MW	Market 450 MW	Market 450 MW	
2017	EV CCGT 644 MW	EV CCGT 644 MW	EV CCGT 644 MW	EV CCGT 644 MW	
2018 - 2028					
2029		Wind 50 MW			
2030	Market 50 MW	Wind 200 MW	Market 50 MW	Market 50 MW	
2031	CC 200 MW Market 50 MW	CC 200 MW Wind 200 MW	CC 200 MW Market 50 MW	CC 200 MW Market 50 MW	HS ST5 100 MW HS ST6 100 MW
2032	Market 100 MW	Market 50 MW	Wind 150MW Market 50 MW	Market 100 MW	
2033	CC 200 MW Market 150 MW	CC 400 MW	Wind 200 MW CC 200 MW Market 100 MW	CC 400 MW	Pete1 220 MW
2034	CC 400 MW Market 150 MW	CC 200 MW Market 100 MW	Wind 50 MW CC 400 MW Market 100 MW	CC 200 MW Market 150 MW	HS7 405 MW

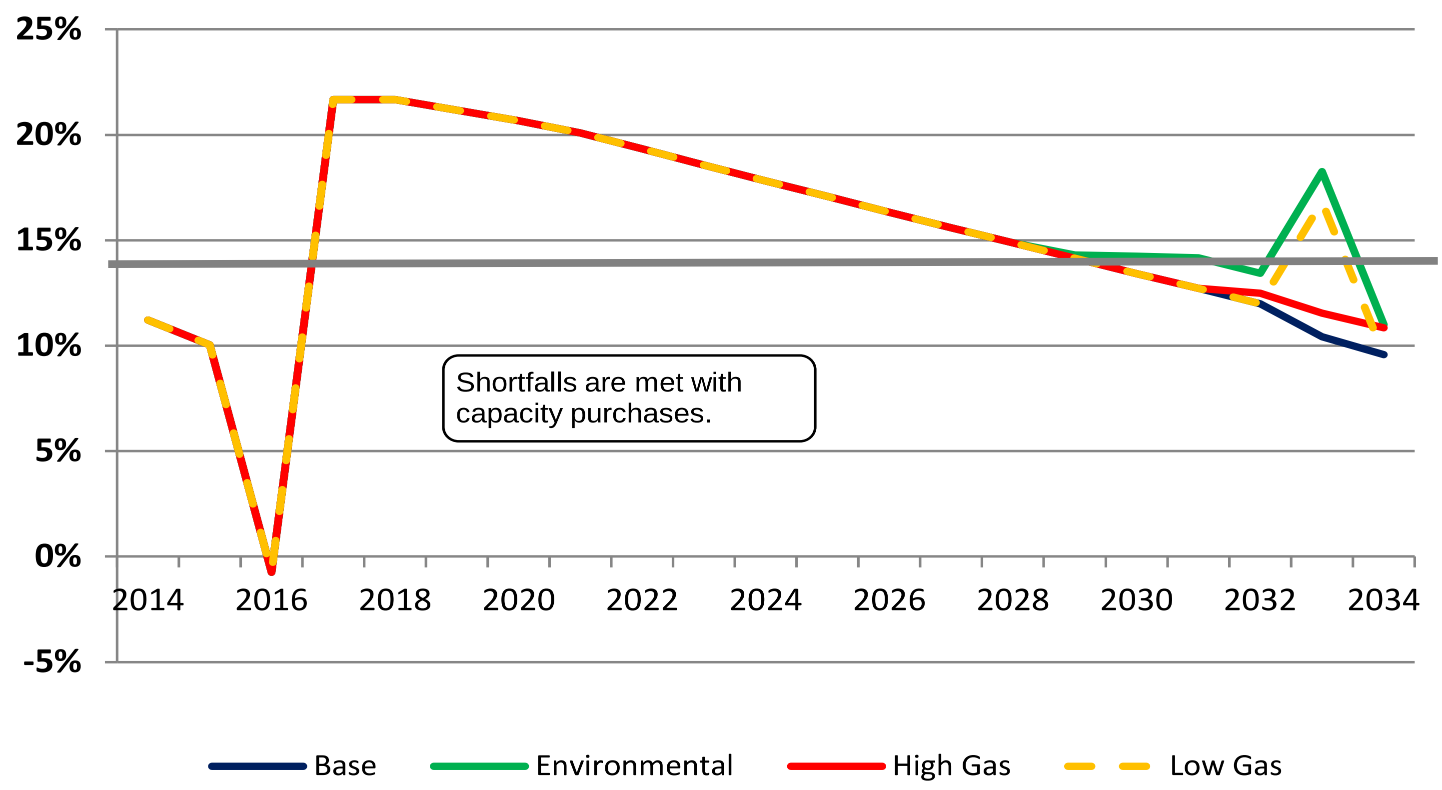
Wind/Solar Generation as Percent of Load



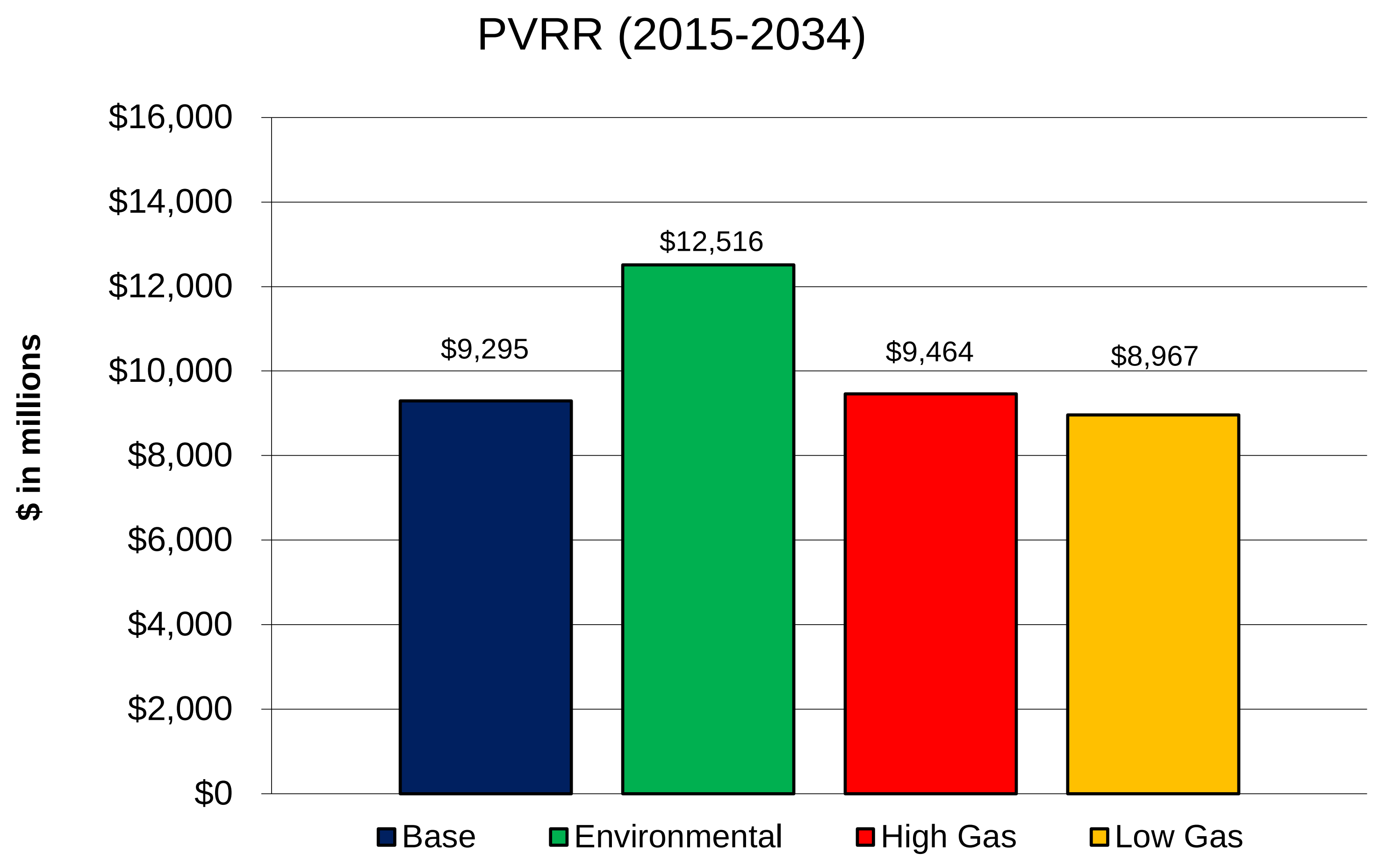
Generation Mix in 2034



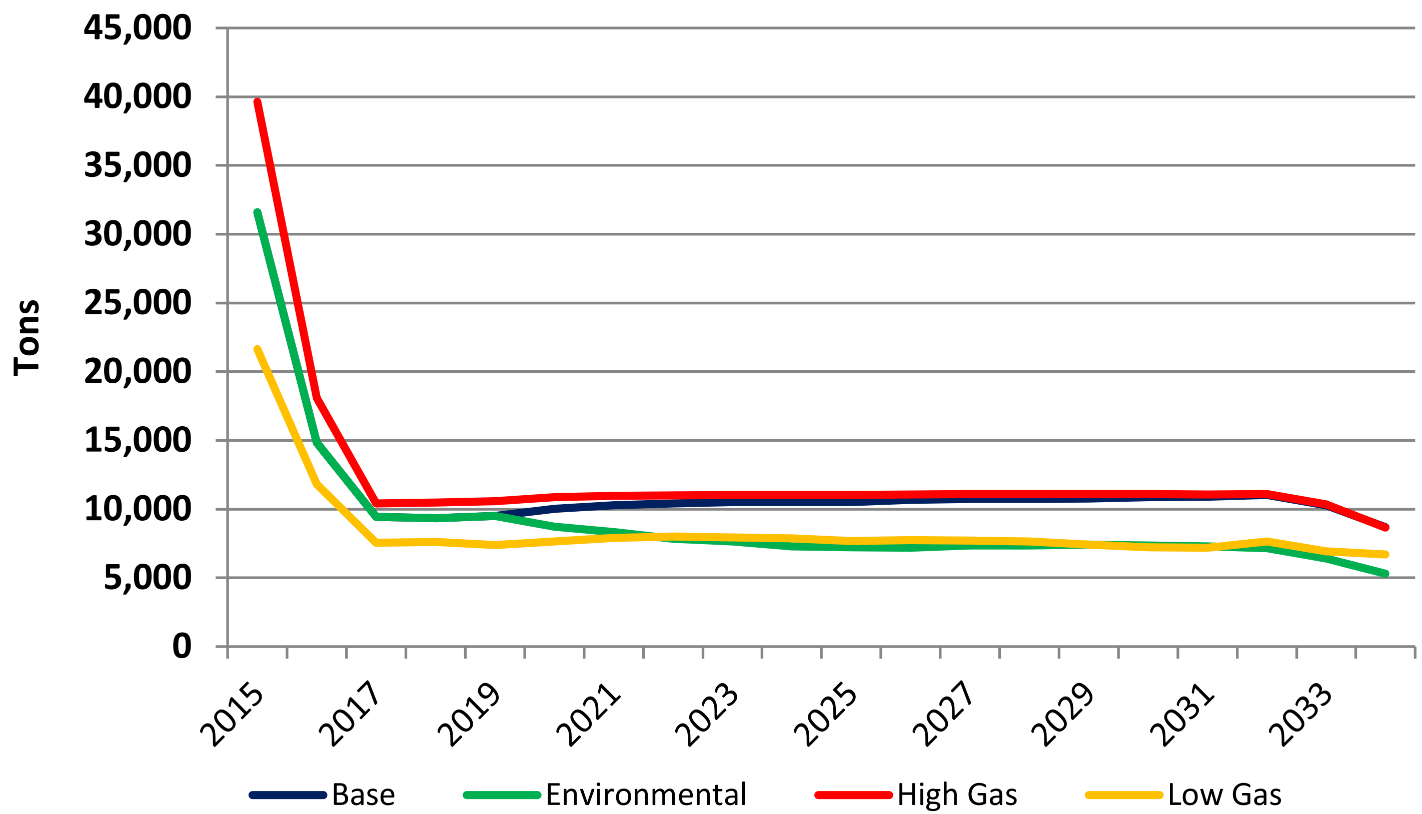
Reserve Margins



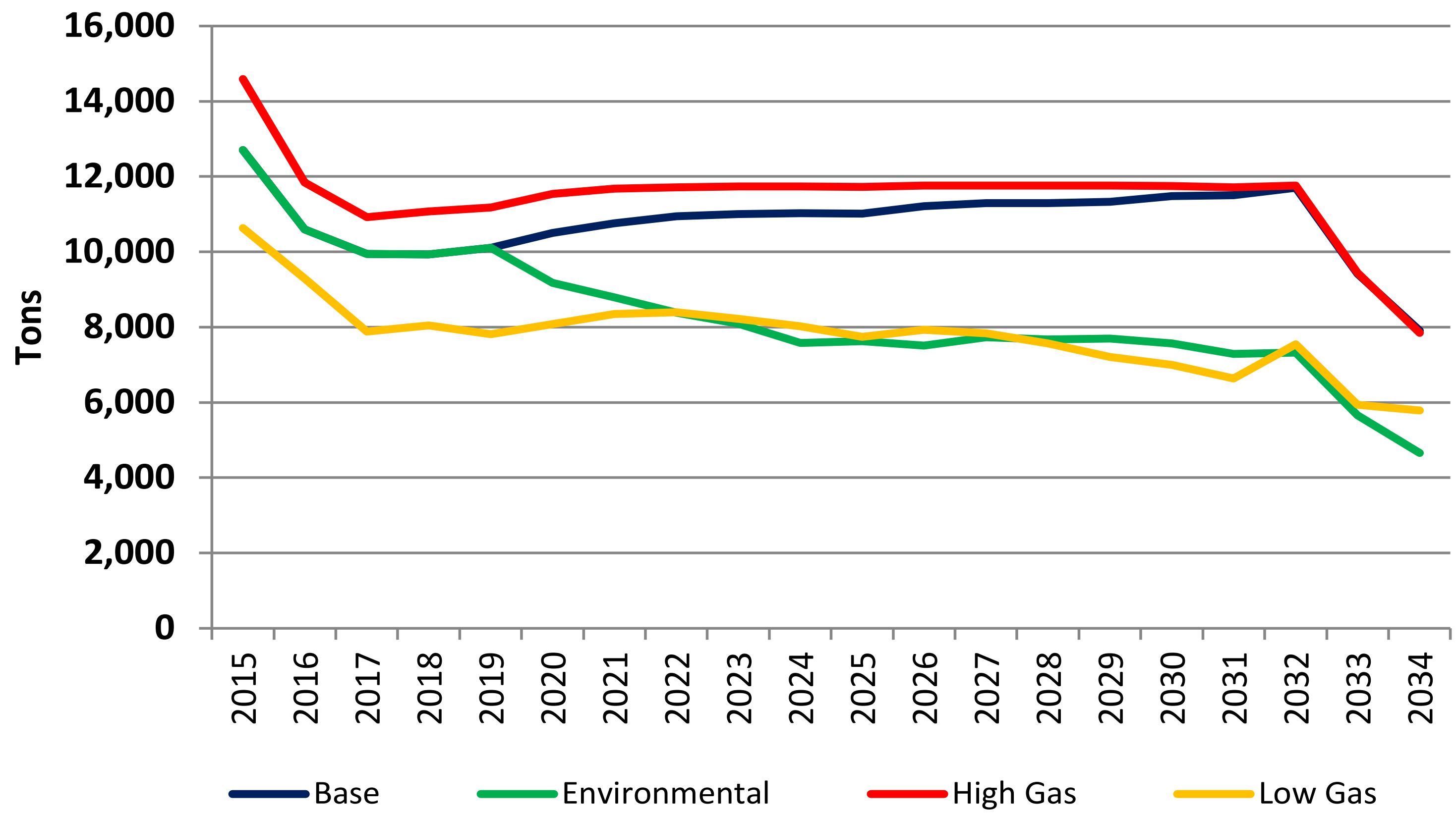
Present Value of Revenue Requirements



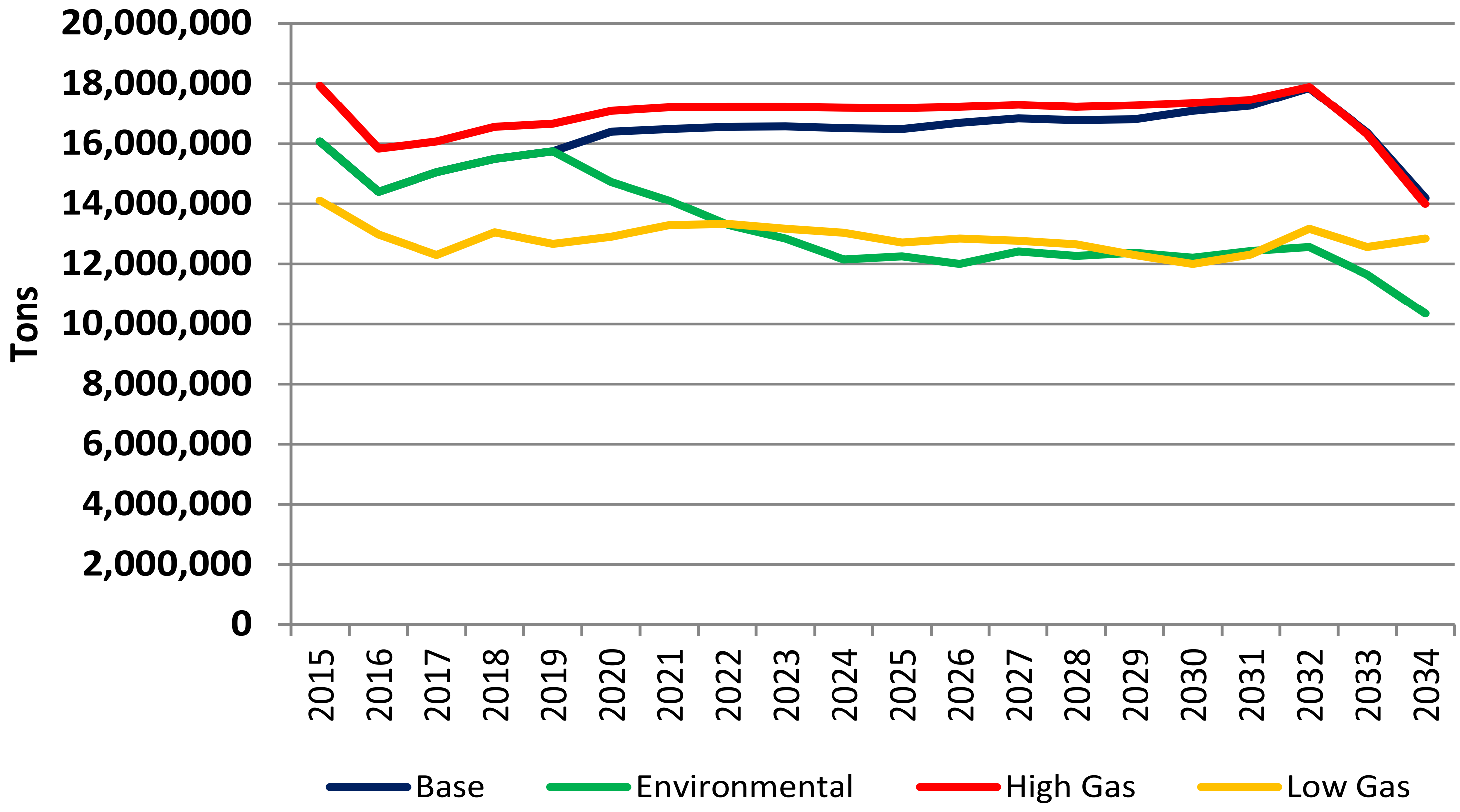
SO_2 Emissions



NO_x Emissions



CO_2 Emissions



Conclusions from IPL's Initial Modeling

- IPL does not have a need for new capacity resources for the next 15 years
  - o Eagle Valley CCGT in 2017
  - o Low load growth + DSM/EE
  - o Subject to change if NPDES evaluation indicates earlier retirement of big 5 coal units
- Combined cycle is a preferred capacity resource addition in all scenarios
- Wind is added in the environmental and high gas scenarios

Questions?

Stakeholder Feedback and Comments

Facilitated by Marty Rozelle, PhD

Next Steps

Presented by Marty Rozelle, PhD

Next Steps

Schedule for the Rest of 2014	
July 25, 2014	IRP Public Advisory Meeting #2 Notes Posted to IPL Website
August 1, 2014	Deadline to Submit Comments/Questions to IPL.IRP@aes.com
August 15, 2014	IPL's Response to Comments/Questions Will be Posted to IPL Website
September 23, 2014	IRP Public Advisory Meeting #3 – Final modeling results presented
October 31, 2014	Submit IRP Document to the IURC

Give us your feedback. IPL is here to listen to you.

Thank You!

IRP Public Advisory Meeting #3

Workshop with IRP Stakeholders

October 10, 2014

Barnes & Thornburg

11 South Meridian St.

Welcome and Introductions

Meeting Agenda and Guidelines

Presented by Marty Rozelle, PhD, Meeting Facilitator

Meeting Guidelines

- Time for clarifying questions at end of each presentation
- Parking lot for items to be addressed later
- The phone line will be muted. During the allotted question time frames, you may press *6 to un-mute yourself or type a question through the web-chat function.
- To inquire about confidential information please contact Teresa Nyhart with Barnes & Thornburg, LLP at teresa.nyhart@btlaw.com

Meeting Objectives

- Provide the NPDES analysis results driving the conversion of Harding Street Unit 7 to natural gas
- Provide updated IRP modeling assumptions and inputs
- Explain the resource modeling scenarios and preferred resource portfolio
- Present the Short Term Action Plan

NPDES – National Pollutant Discharge Elimination System

IRP Public Advisory Meeting #3

Agenda Topics

- Summary of IRP Public Advisory Meeting #1 and #2
- NPDES Analysis
- Updated Modeling Assumptions and Inputs
- Presentation of Scenario Results
- Short Term Action Plan
- Next Steps

Questions?

Summary of IRP Public Advisory Meetings #1 and #2

Presented by Joan Soller, Director of Resource Planning

IRP Public Advisory Meeting #1

May 16, 2014 --- Agenda Topics

- Introduction to IPL and Integrated Resource Planning Process
- Energy and Peak Forecasts
- Demand Side Management: Energy Efficiency and Demand Response
- Planning Reserve Margin
- Generation Overview
- Environmental Overview
- Distributed Generation
- Proposed Modeling Assumptions

Company Profile

- 470,000 customers*
- 1,400 employees*
- 528 sq. miles territory
- 144 substations

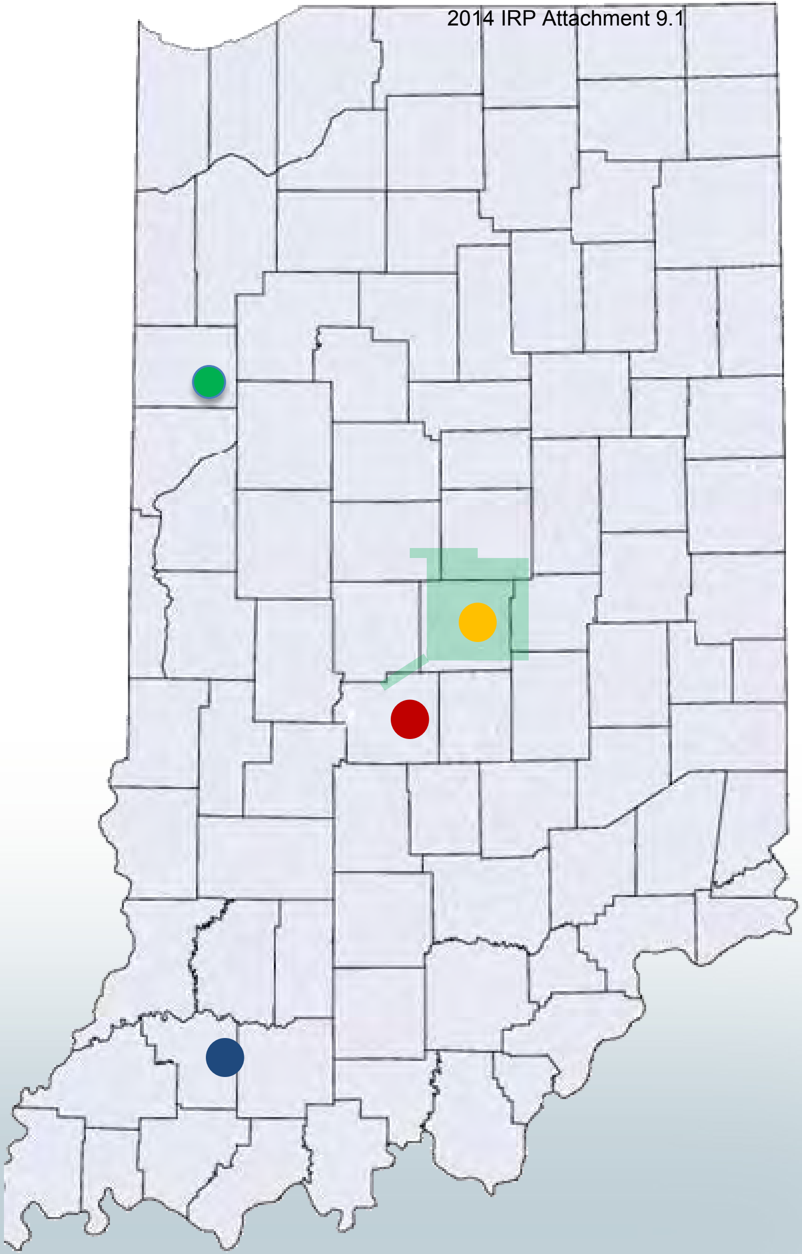
Harding Street Station, Georgetown Station, Solar REP Projects - 1,322 MW**

Eagle Valley Generating Station - 263 MW**

Petersburg Generating Station – 1,760 MW**

Hoosier Wind Park PPA – 100 MW**

Lakefield Wind Park PPA – 201 MW**
(In Minnesota – Not pictured)



*approximate numbers
**nameplate capacity

IRP Process Overview

1. Develop IPL's **Total** Supply Resource Needs
2. Determine IPL's **New** Supply Resource Needs
3. Identify Key Risk Parameters
4. Identify and Screen Resource Technologies
5. Evaluate Resource Expansion Plans
6. Identify IPL's Reference and Short Term Action Plans

Environmental Regulations

- Current Environmental Regulations/Environmental Projects
  - Mercury and Air Toxics Standard (MATS)
  - NPDES Water Discharge Permits

- Future Environmental Regulations
  - Coal Combustion Residuals (CCR)
  - 316(b) – Cooling water intake structures
  - Clean Power Plan (Greenhouse Gas (GHG) Rule)
  - National Ambient Air Quality Standards (NAAQS)
  - Cross State Air Pollution Rule (CSAPR)

NPDES - National Pollutant Discharge Elimination System

Distributed Generation

- Distributed generation can be difficult to implement on a large scale
- Solar has the best opportunity for growth in the IPL service territory but is currently challenging as a least cost resource
- Actively monitoring trends in Distributed Generation and Distributed Energy Resources

IRP Public Advisory Meeting #2

July 18, 2014 --- Agenda Topics

- Summary of IRP Public Advisory Meeting #1
- Demand Side Management Update
- Environmental Update
- Overview of Stakeholder Comments and Questions
- Incorporating Stakeholder Input
- Presentation of Scenario Results
- Stakeholder Feedback and Comments

Recent DSM Developments

- IPL has made a filing for approval of a DSM Plan for 2015/2016 in Cause No. 44497
- Testimony filed in Cause No. 44441 regarding large customer's ability to opt-out of DSM
- Numerous comments on the IURC General Administrative Order have been made, providing recommendations for future DSM in Indiana

2015-2016 DSM Plan Filed - Cause No. 44497

- Cause No. 44497 seeks Commission approval of a 2 Year Plan (2015-2016); however, a 3 Year Action Plan (2015-2017) was included in the prepared filing
- Petition filed on May 30, 2014
- Plan includes 13 DSM Programs
  - 9 Residential and 4 Business
- Forecast EE Savings approx. 1.12% of sales (total sales before large customer opt-outs)
- Expect to continue collaboration with Citizens Gas

Proposed Clean Power Plan

- EPA's Proposed Clean Power Plan would reduce carbon emissions from the power sector nationwide by 30% by 2030 from 2005 levels
- Compliance with "interim goal" on average over the ten-year period from 2020-2029. Compliance with "final goal" in 2030 and thereafter.
- Impacts will be heavily dependent upon the final rule (expected June 1, 2015) and State Implementation Plans and remain largely uncertain at this time, but may include:
  - Required heat rate improvements
  - Decreased dispatch of coal-fired units
  - Increased dispatch of renewables and existing NGCCs
  - Additional demand side EE measures

Addressing Top Stakeholder Risk Factors

- Cost assumptions for wind turbines
  - Reduced the Ventyx reference case cost assumption for new wind resources by $200/KW to reflect declining costs for wind generation

- Carbon/GHG Assumptions
  - Included in the Ventyx environmental scenario
  - Will incorporate the “EPA Clean Power Plan” into the IPL base case scenario

Addressing Top Stakeholder Risk Factors

- DSM/EE
  - o Incorporate updated projections from Applied Energy Group analysis
  - o Provide transparency on cost/benefit analysis evaluated on a consistent basis with supply-side options
  - o Ventyx Model is not the best tool for DSM cost/benefit analysis
- Distributed Generation Impact
  - o Will reduce energy forecast to reflect increasing level of customer dis gen (e.g. 2% by 2020, 4% by 2030)

Conclusions from IPL's Initial Modeling

- IPL does not have a need for new capacity resources for the next 15 years
  - Refuel HS units in 2015/2016
  - Eagle Valley CCGT in 2017
  - Low load growth + DSM/EE
  - Subject to change if NPDES evaluation indicates earlier retirement of big 5 coal units
- Combined cycle is a preferred capacity resource addition in all scenarios
- Wind is added in the environmental and high gas scenarios

IPL's Feedback Response Tables

	May 16, 2014 IRP Meeting	July 18, 2014 IRP Meeting
Number of Comments and Questions Received	112	29
Date IPL's Response Was Posted on IRP Webpage	June 20, 2014	August 15, 2014

- IPL responded to all stakeholder comments and questions received
- The Feedback Response Tables are posted on the IPL IRP webpage (https://www.iplpower.com/IRP/)

Stakeholder Comments and Questions from IPL's July 18th IRP Public Advisory Meeting

Feedback topics included:

- DSM 2018-2034 Forecast
- Future Environmental Cost Estimates
- Clean Power Plan Evaluation
- NPDES Analysis Results
- Wind Congestion Assumptions
- Flexible Retirement Dates within the Model

Questions?

START OF NEW MATERIAL

NPDES Analysis

Presented by Tate Ayers, Director Corporate Planning and Analysis

IPL Maintains NPDES Permits on Each of its Power Plants

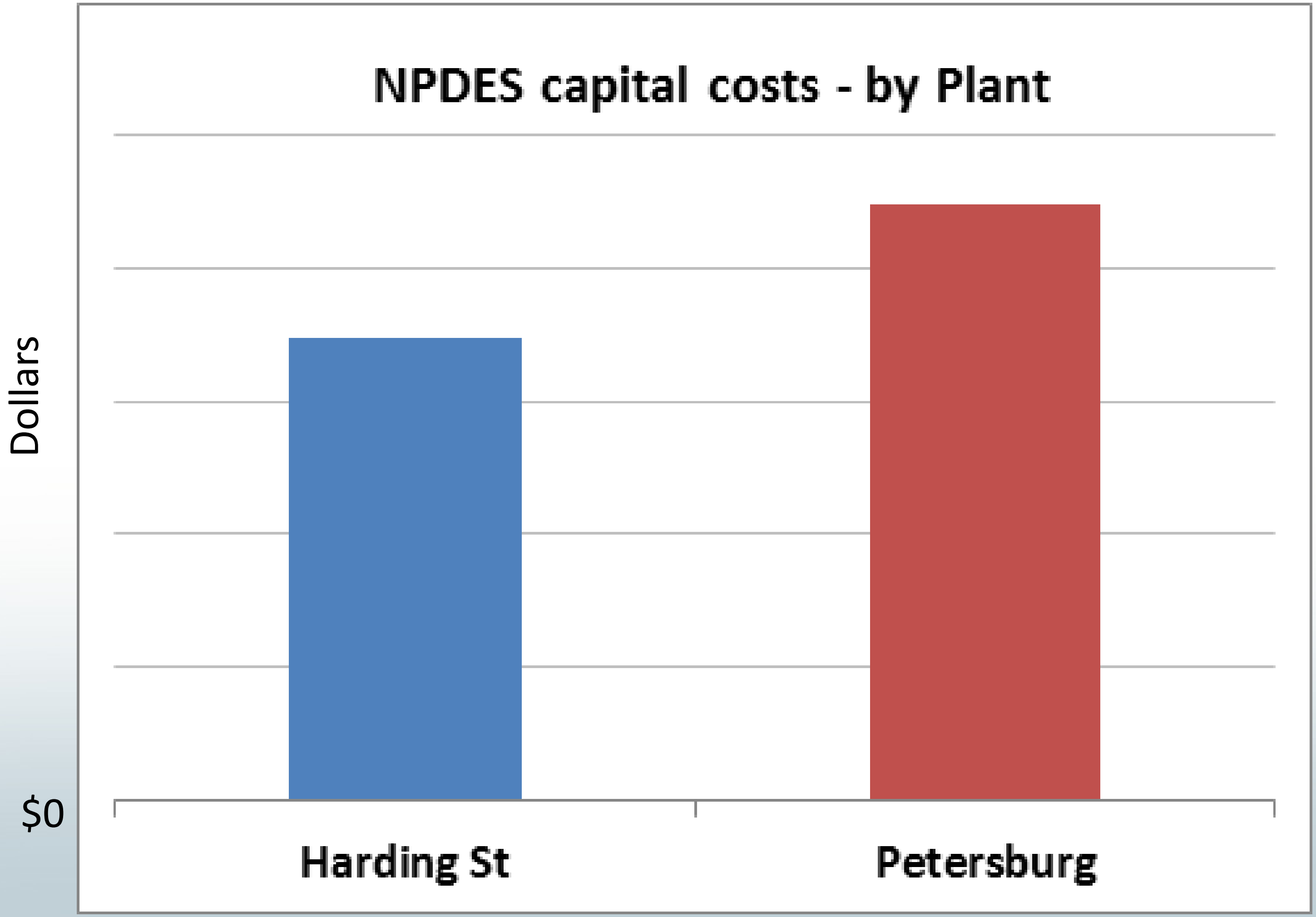
- The NPDES permits require compliance with the following:
  - Technology based and water quality based effluent limitations
  - Monitoring and reporting requirements
- On August 28, 2012, the IDEM issued NPDES permit renewals to IPL's Petersburg and Harding Street generating plants
  - The permit includes new technology based and water quality based effluent limitations
  - These new limitations and requirements drive the need for additional wastewater treatment technologies
  - Compliance due by September 2017

NPDES - National Pollutant Discharge Elimination System
IDEM- Indiana Department of Environmental Management
CWA – Clean Water Act

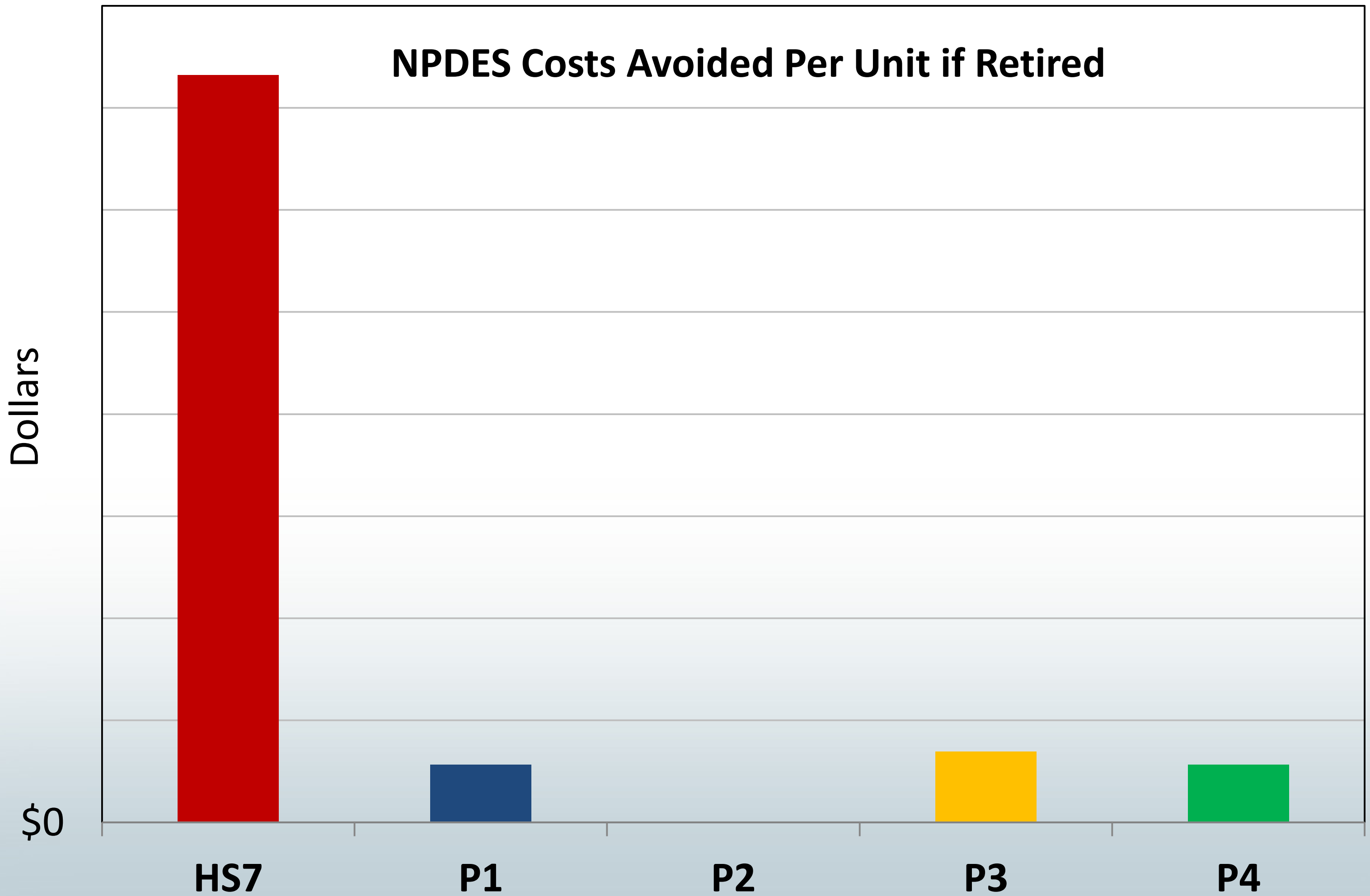
NPDES Analysis

- Performed for IPL Coal units: HS 7 and Petersburg 1-4
- Full life-cycle evaluation to capture impact of potential future risks
  - o Multiple composite risk-scenarios were used to perform decision-tree analysis
  - o Probabilities and costs applied to risks to derive an overall ‘expected’ revenue-requirement
  - o Simple payback assessment
- Evaluated against alternative resource-options

Petersburg Plant Costs Compared to Harding St Plant Costs with HS 7 on Coal



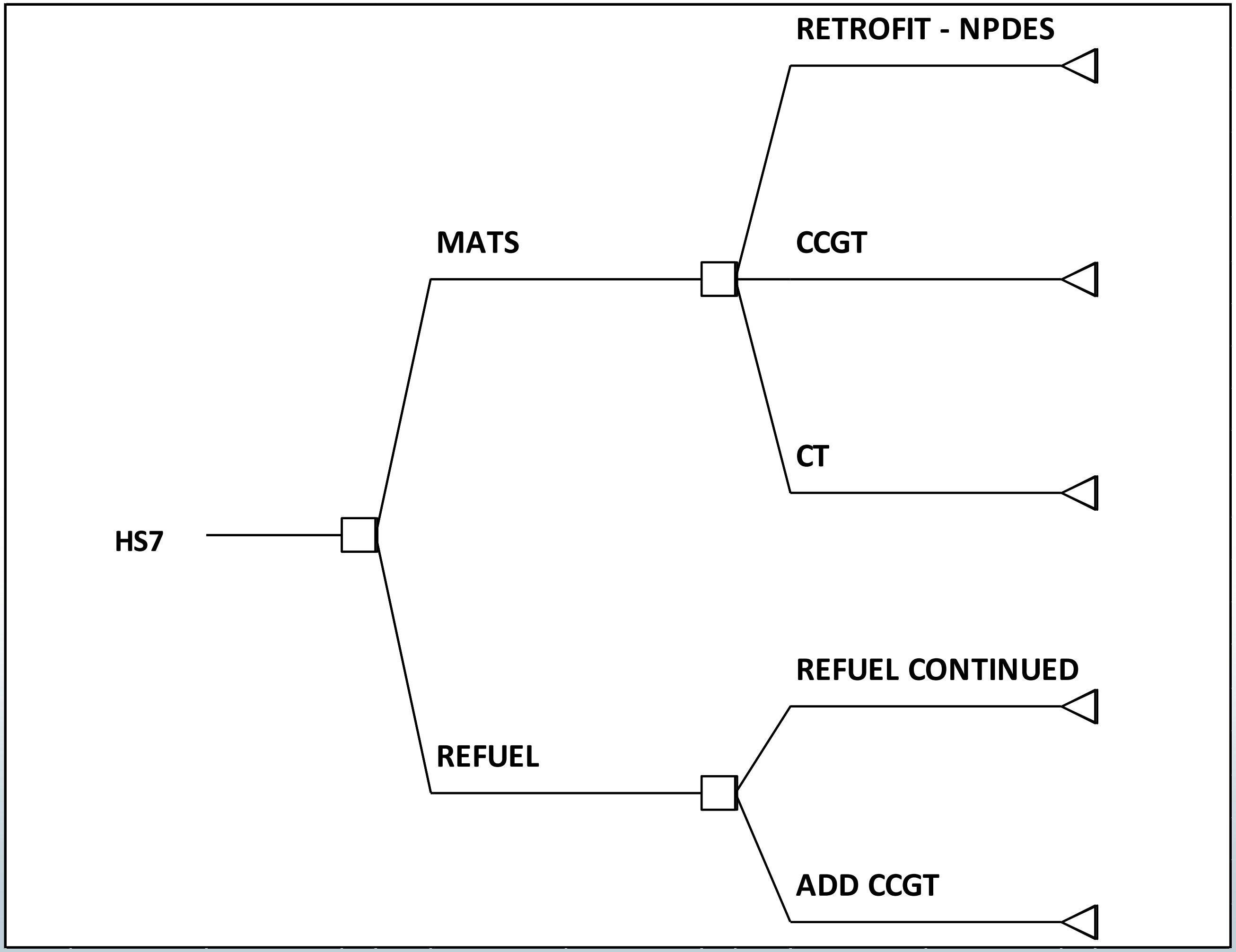
IPL Coal Unit Incremental Capital Costs



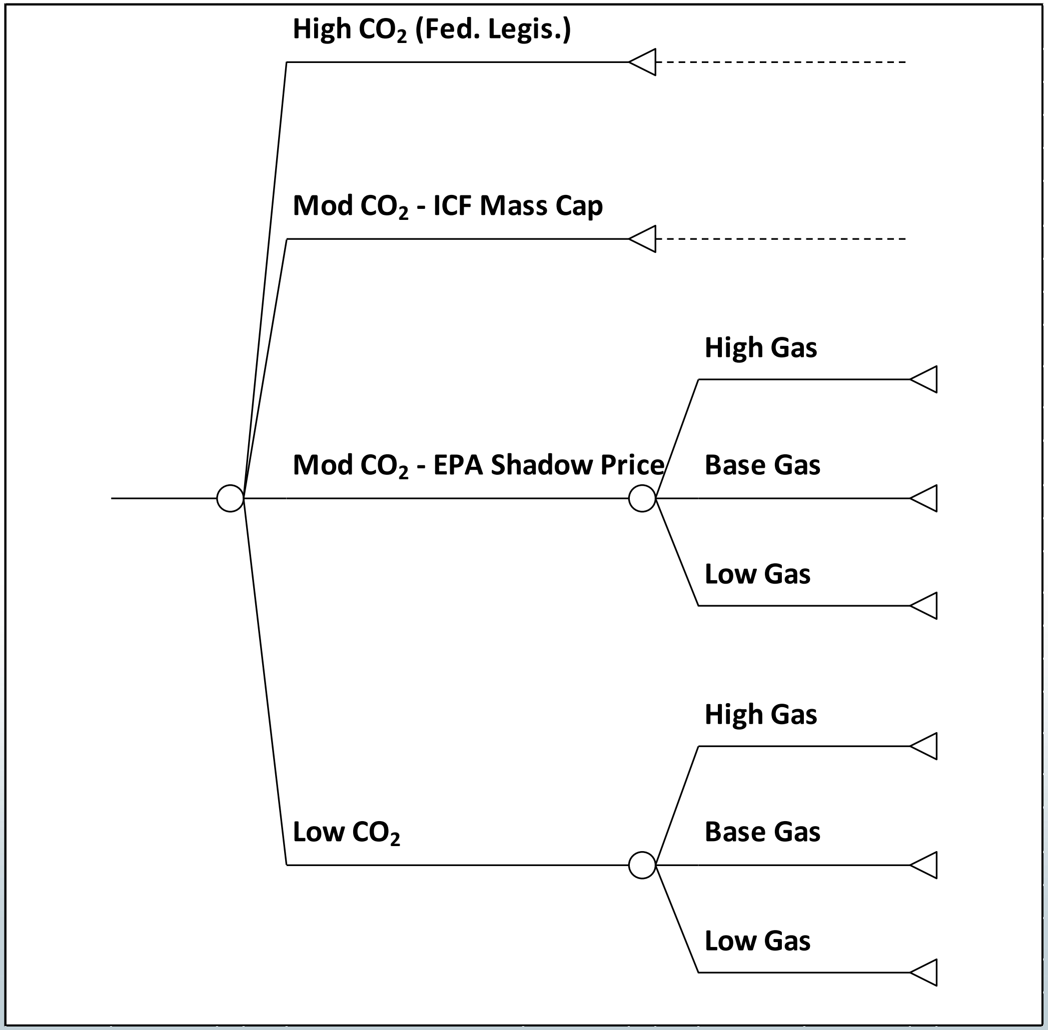
Future Risks Considered

- Natural Gas prices
- GHG/CO_2 requirements
  - o Clean Power Plan
  - o Federal Legislation
- Other Environmental regulations including:
  - o Coal Combustion Residuals (CCR)
  - o 316(b) – Cooling water intake structures
  - o National Ambient Air Quality Standards (NAAQS)
- Reliability (HS7)

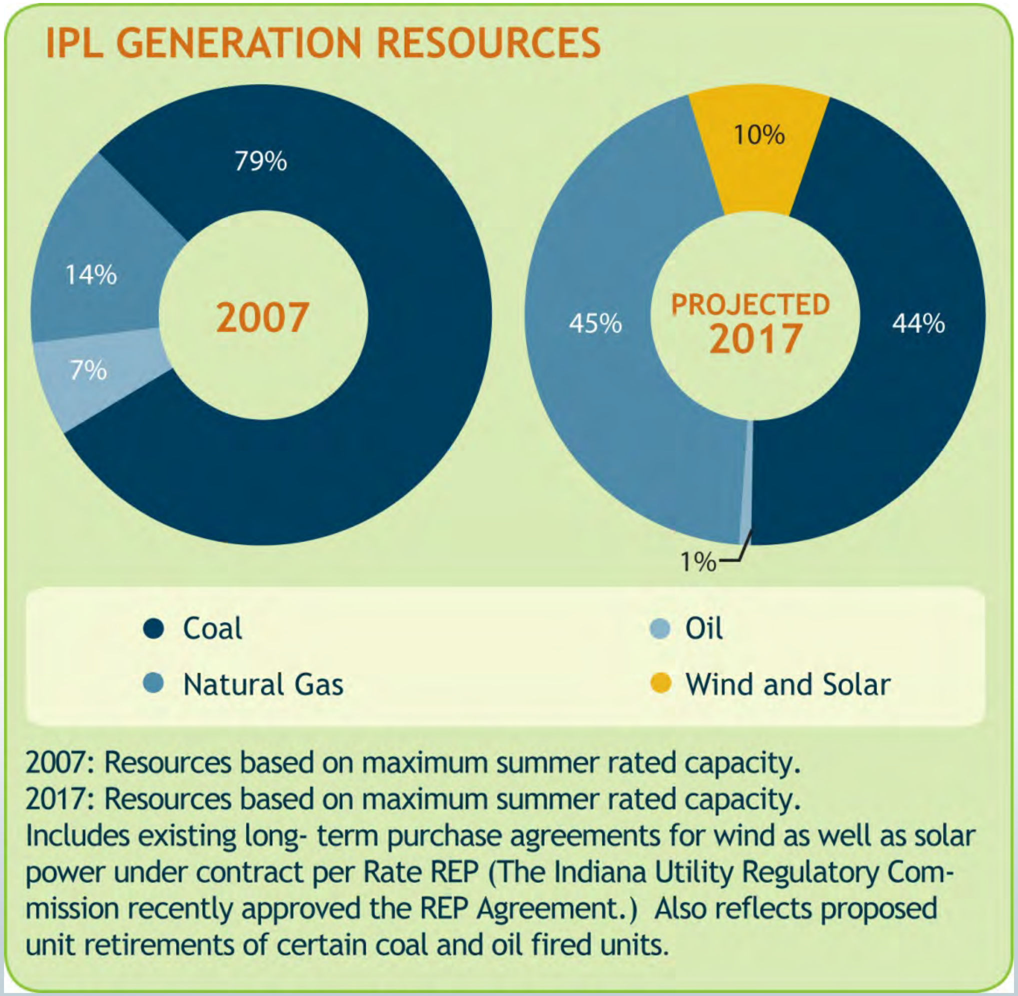
HS7 Decision Tree Resource Options



Decision Tree –
CO2 and Natural Gas Risk Scenarios



Converting Harding Street Unit 7 to Natural Gas is the Reasonable Least Cost Plan



IPL modeled HS 7 as a natural gas unit in the IRP and as shown here in the 2017 projection

Questions?

Updated Modeling Assumptions and Inputs

Presented by:
Joan Soller, Director of Resource Planning
Dave Costenaro, Applied Energy Group
John Haselden, Principal Engineer, Regulatory Affairs
Lake Hainz, Resource Planning Analyst
Angelique Oliger, Director of Environmental Policy

Additional Modeling Adjustments to Incorporate New Information and Stakeholder Feedback

1. DSM Forecast was developed for the full 20-year planning period
   - Developed and presented today by AEG
2. Load sensitivities were included (high/low/base)
3. IPL modeled a sensitivity for wind
4. IPL estimated possible future environmental cost ranges
5. Possible environmental effects of the Clean Power Plan were included in most scenarios through CO_2 costs
6. Modeled economic generation retirements vs full planning life

AEG
Applied Energy Group

Indianapolis Power & Light DSM Potential Forecast

Prepared for IRP Stakeholder Meeting

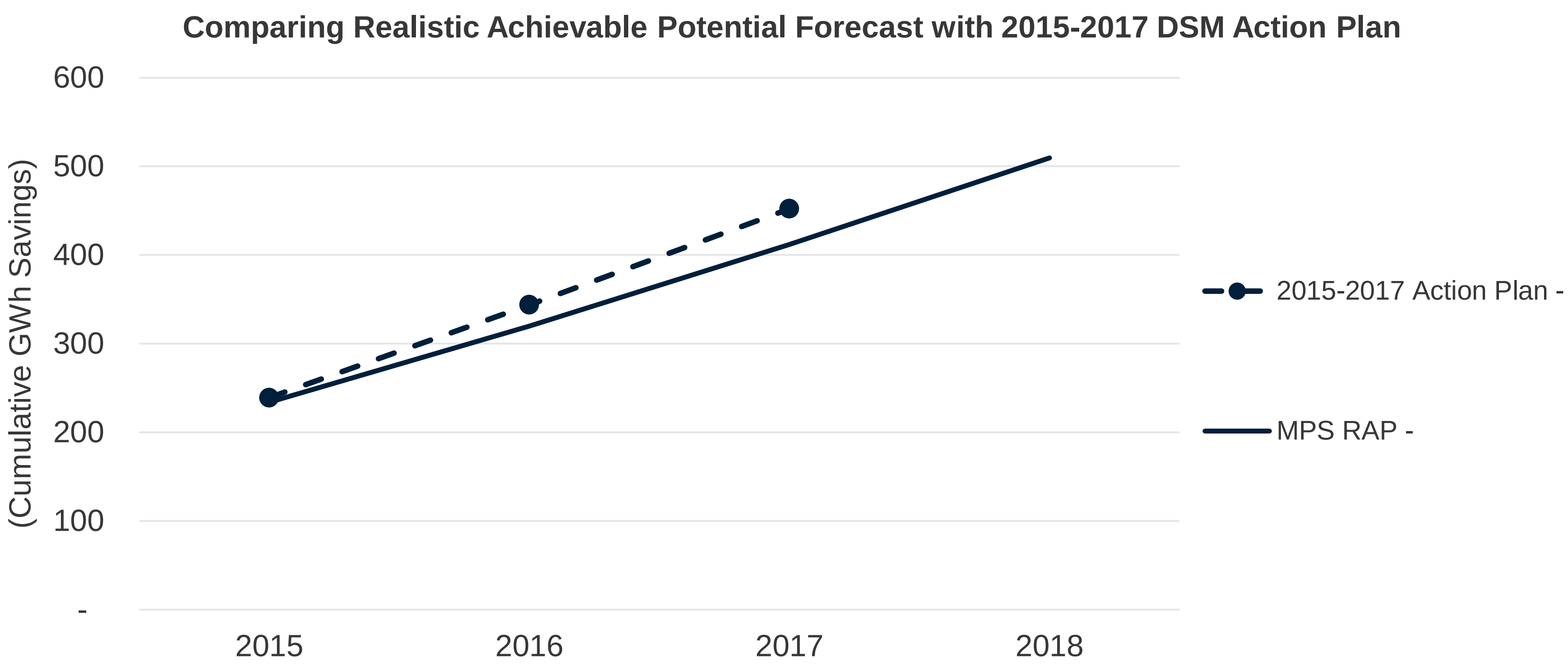
Forecasting DSM Potential for IPL

- Began with AEG's LoadMAP Model from 2012 DSM Potential Study* and made the following updates:
  1. Refined base year energy use based on improved IPL customer data
  2. Calibrated kWh sales to match 2012 and 2013 actual sales
  3. Updated forecast variables such as avoided costs and discount rates
  4. Aligned measure mix to Filed IPL 2015-2017 DSM Action Plan (added Residential Peer Comparison Program, Residential & Business AC Management Programs)
  5. Updated measure & baseline assumptions for LED lamps, TVs, and Set-top boxes
  6. Tuned market adoption rates, impacts, and budget to align with Filed IPL 2015-2017 DSM Action Plan

** "Energy Efficiency Market Potential Study and Action Plan" dated December 21, 2012 was completed by EnerNOC Utility Solutions Consulting Group, which has since been acquired by Applied Energy Group. The same core team members completed the analysis in both the previous and present work.*

Forecasting DSM Potential for IPL

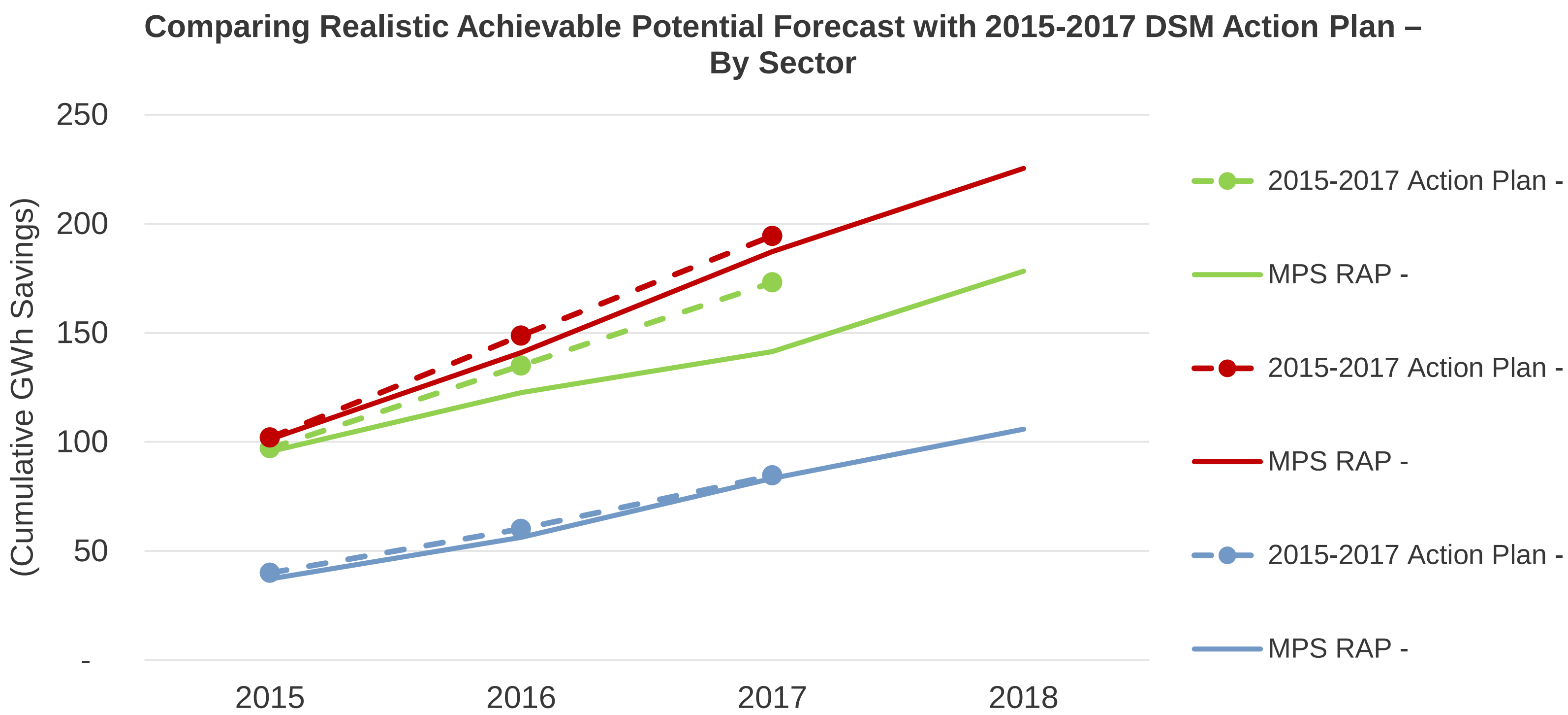
- DSM Potential Forecasts are a close match to the Action Plan. We then project trends into the future, to 2024 (last year of previous MPS) and beyond to 2034 (timeframe required to support current IRP).



** "Energy Efficiency Market Potential Study and Action Plan" dated December 21, 2012 was completed by EnerNOC Utility Solutions Consulting Group, which has since been acquired by Applied Energy Group. The same core team members completed the analysis in both the previous and present work.*

Forecasting DSM Potential for IPL

- Customer segment breakdown of the DSM Potential Forecasts are a close match to the Action Plan.



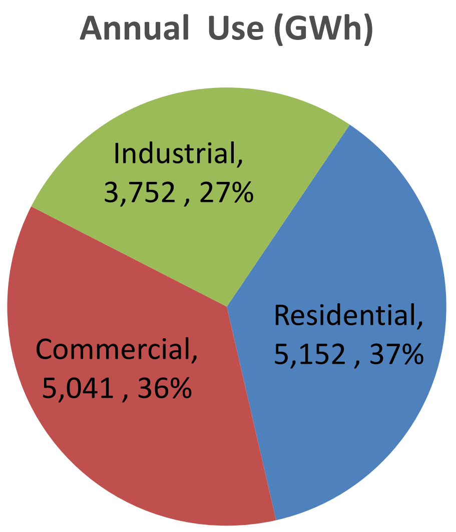
Green – Residential, Red – Commercial, Blue - Industrial

** "Energy Efficiency Market Potential Study and Action Plan" dated December 21, 2012 was completed by EnerNOC Utility Solutions Consulting Group, which has since been acquired by Applied Energy Group. The same core team members completed the analysis in both the previous and present work.*

Overall Market Characterization

All Sectors in 2011 (Base Year)

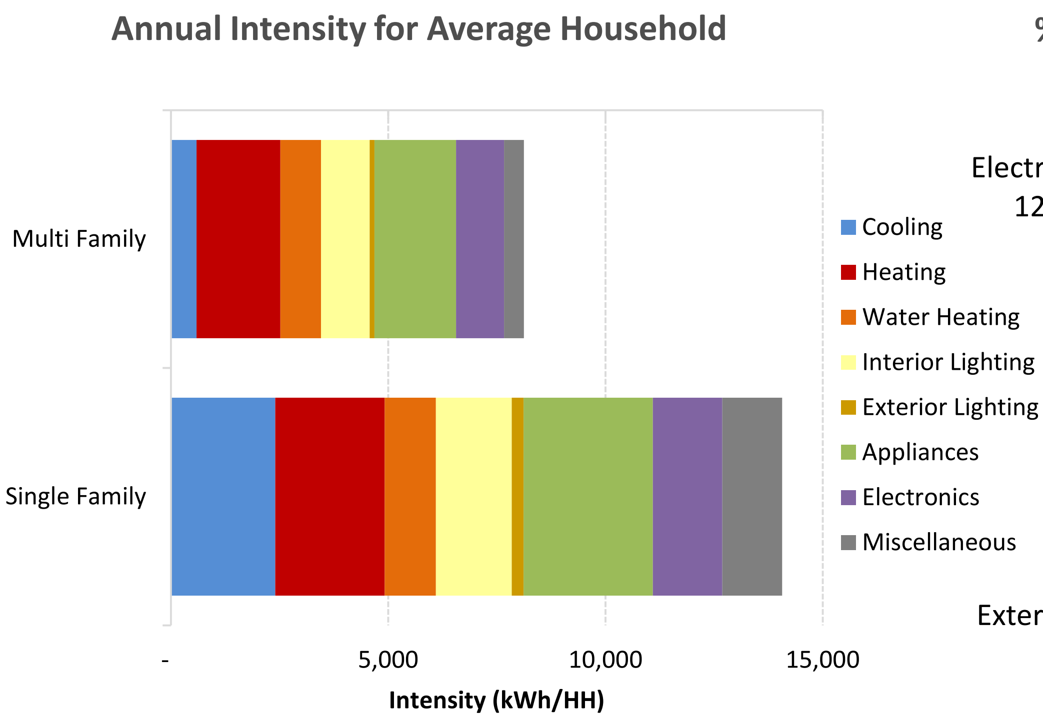
Segment	Annual Use (GWh)	% of Sales
Residential	5,152	37%
Commercial	5,041	36%
Industrial	3,752	27%
Total	**13,946**	**100%**

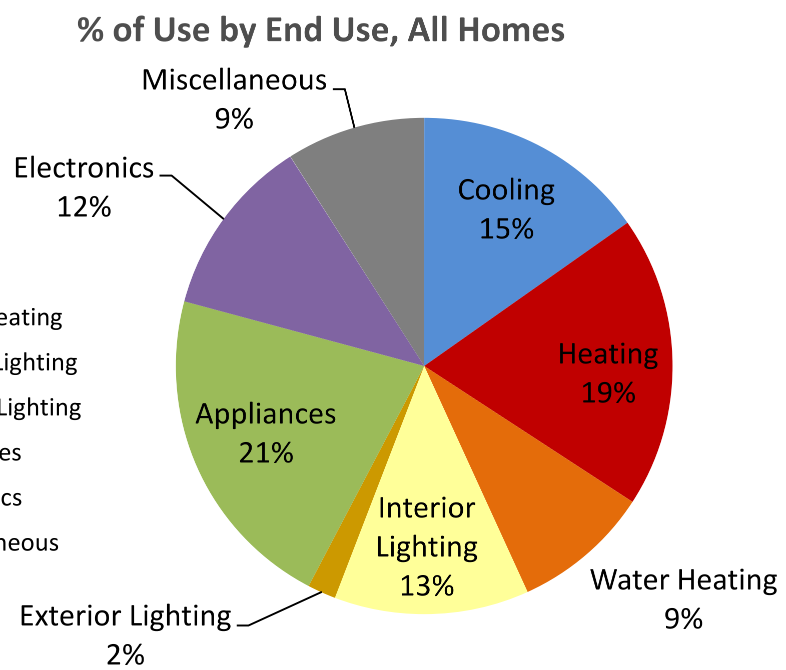


- Relative to the 2012 MPS, the split between commercial and industrial usage has shifted.
- Estimated 27% commercial and 36% industrial usage in 2012 MPS based on regional averages and investigation of IPL's top 30 customers
- Updates to NAICS codes in the IPL billing system refined this split to be the opposite: 36% commercial and 27% industrial.
- The residential control totals were not affected.

Residential Market Profile, 2011

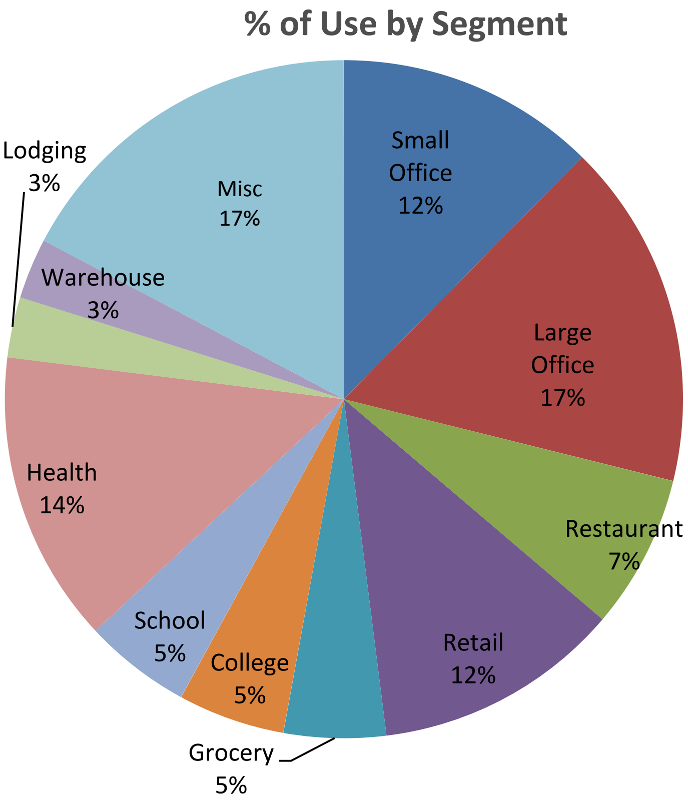
Segment	Households	Intensity (kWh/HH)	2011 Electricity Use (GWh)
Single Family	298,461	14,071	4,200
Multi Family	117,307	8,120	952
Total	**415,768**	**12,392**	**5,152**





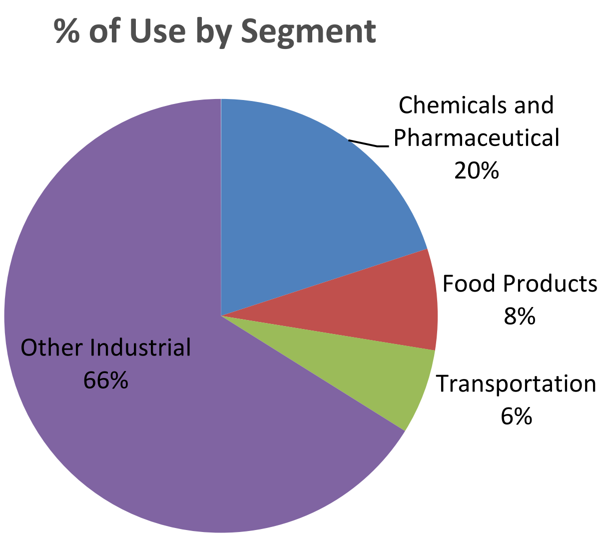
Commercial Market Profile, 2011

Segment	Floor Space (1,000 Sq.Ft.)	2011 Electricity Use (1,000 MWh)	Summer Peak Demand (MW)
Small Office	41,023	624	186
Large Office	46,263	832	125
Restaurant	9,571	370	63
Retail	42,648	594	135
Grocery	5,023	245	88
College	22,259	257	61
School	31,959	257	67
Health	28,537	701	106
Lodging	10,609	145	21
Warehouse	22,553	145	49
Miscellaneous	114,106	870	193
Total	**374,553**	**5,041**	**1,094**

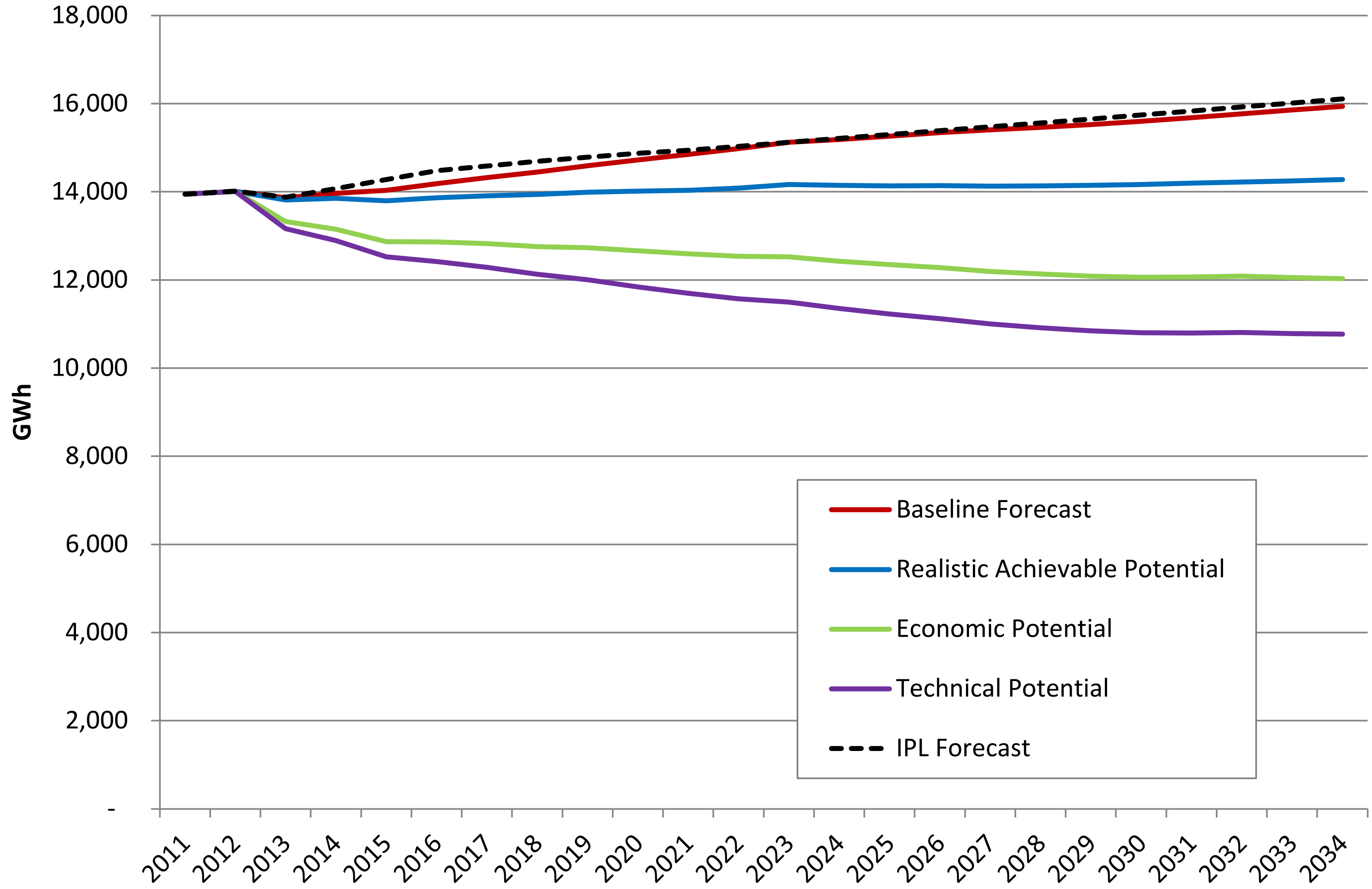


Industrial Market Profile, 2011

Segment	Number of Employees	2011 Electricity Use (GWh)	Summer Peak Demand (MW)
Chemicals and Pharmaceutical	3,079	751	100
Food Products	3,592	283	38
Transportation	4,054	238	46
Other Industrial	90,634	2,481	540
Total	**101,358**	**3,752**	**724**

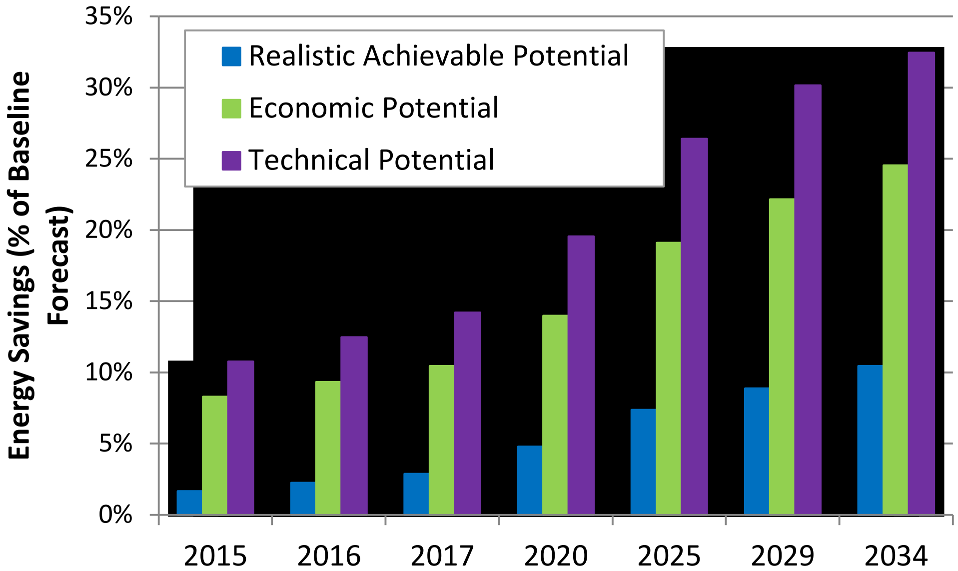


Impact of DSM Potential on Load Forecast



Overall DSM Potential (Energy)

For 2015 to 2034, 20-year Realistic Achievable Potential savings are 10.4% of the baseline forecast. This is 1,665 net* GWh.

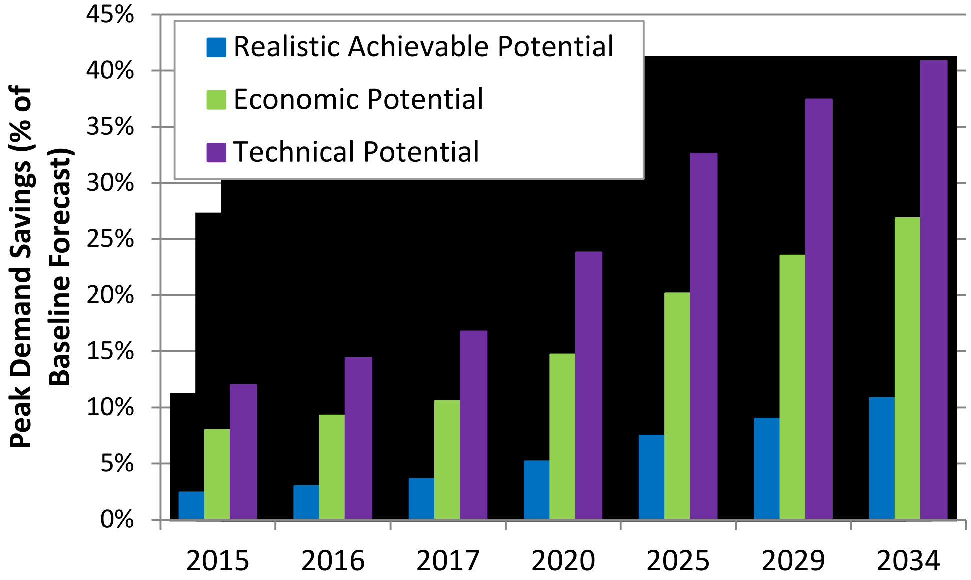


	2015	2016	2017	2020	2025	2029	2034
Baseline Forecast (GWh)	14,033	14,186	14,319	14,722	15,260	15,526	15,940
Net Cumulative Savings (GWh)							
Realistic Achievable Potential	234	320	412	706	1,125	1,378	1,665
Economic Potential	1,163	1,323	1,495	2,057	2,914	3,438	3,911
Technical Potential	1,509	1,770	2,034	2,877	4,030	4,681	5,172
Net Energy Savings (% of Baseline)							
Realistic Achievable Potential	1.7%	2.3%	2.9%	4.8%	7.4%	8.9%	10.4%
Economic Potential	8.3%	9.3%	10.4%	14.0%	19.1%	22.1%	24.5%
Technical Potential	10.8%	12.5%	14.2%	19.5%	26.4%	30.2%	32.4%

All savings, unless otherwise noted, are provided as net values rather than gross, because LoadMAP uses a baseline forecast that includes naturally occurring EE.

Overall DSM Potential (Peak Demand)

For 2015 to 2034, 20-year Realistic Achievable Potential savings are 10.8% of the baseline forecast. This is 396 net* MW.

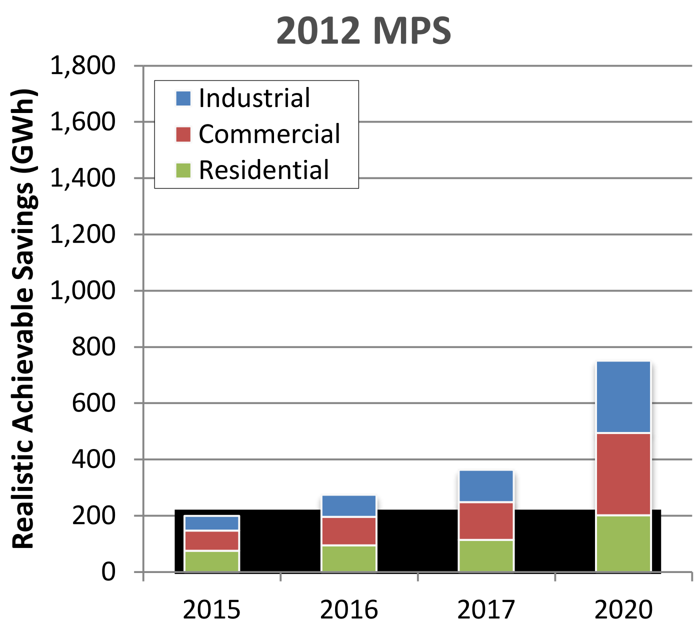


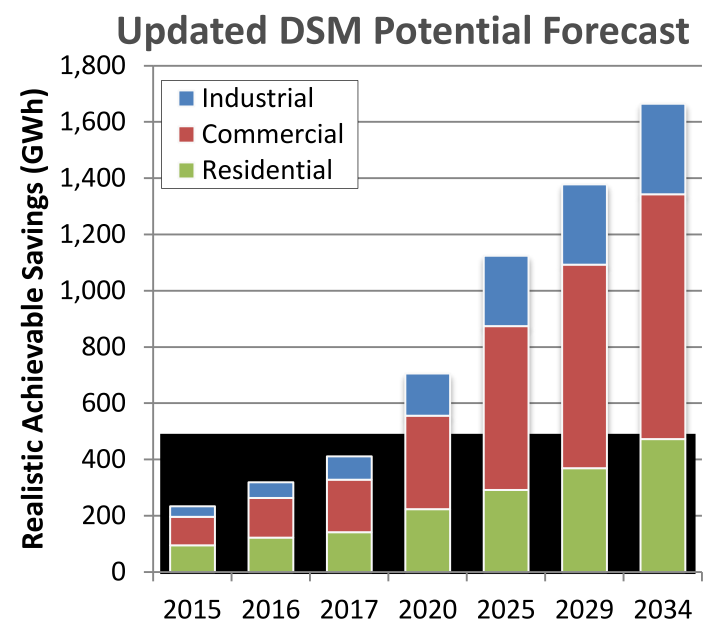
	2015	2016	2017	2020	2025	2029	2034
Baseline Forecast (MW)	3,181	3,225	3,265	3,383	3,535	3,586	3,662
Net Cumulative Savings (MW)							
Realistic Achievable Potential	76	96	117	175	263	322	396
Economic Potential	254	298	345	497	712	843	983
Technical Potential	381	464	547	805	1,152	1,342	1,495
Net Energy Savings (% of Baseline)							
Realistic Achievable Potential	2.4%	3.0%	3.6%	5.2%	7.5%	9.0%	10.8%
Economic Potential	8.0%	9.2%	10.6%	14.7%	20.1%	23.5%	26.8%
Technical Potential	12.0%	14.4%	16.8%	23.8%	32.6%	37.4%	40.8%

*All savings, unless otherwise noted, are provided as net values rather than gross, because LoadMAP uses a baseline forecast that includes naturally occurring EE.

2012 MPS vs Updated Potential Forecast (by sector)

Allocation of cumulative achievable potential over time





	2015	2016	2017	2020
RAP Savings (GWh)				
Residential	75.5	95.7	114.8	202.5
Commercial	71.8	100.2	133.7	292.6
Industrial	52.4	79.4	115.5	256.6
Total	**199.7**	**275.3**	**364.0**	**751.7**

	2015	2016	2017	2020	2025	2029	2034
RAP Savings (GWh)							
Residential	95.5	122.6	141.3	223.2	291.7	368.9	472.5
Commercial	101.2	140.9	187.3	333.1	582.5	724.0	870.4
Industrial	37.2	56.3	83.2	149.8	250.5	285.2	322.0
Total	**234.0**	**319.8**	**411.9**	**706.2**	**1,124.8**	**1,378.1**	**1,664.9**

- In 2020, Updated forecast of 706 GWh is slightly lower than previous study at 751 GWh
- Updated potential includes the estimated effects of C&I customers opting out of DSM programs, based on current levels of opt-out. 2012 MPS does not.

Thank You!

David M Costenaro
Senior Project Manager
dcostenaro@appliedenergygroup.com

IPL's View on AEG's 20 Year DSM Forecast

- AEG's forecast represents the market potential from a 2014 viewpoint
- IPL's future DSM filings and results will likely vary from the forecast
  - Legislation and public policy will help shape future DSM
  - Customer behavior including additional large customer opt-outs will affect outcomes
  - Programs were included in the forecast based on a Total Resource Cost (TRC) threshold result of 1 or greater, while IPL's DSM portfolio offerings typically have an aggregate TRC value greater than 1

IPL has Created its High, Low, and Base Load Forecasts

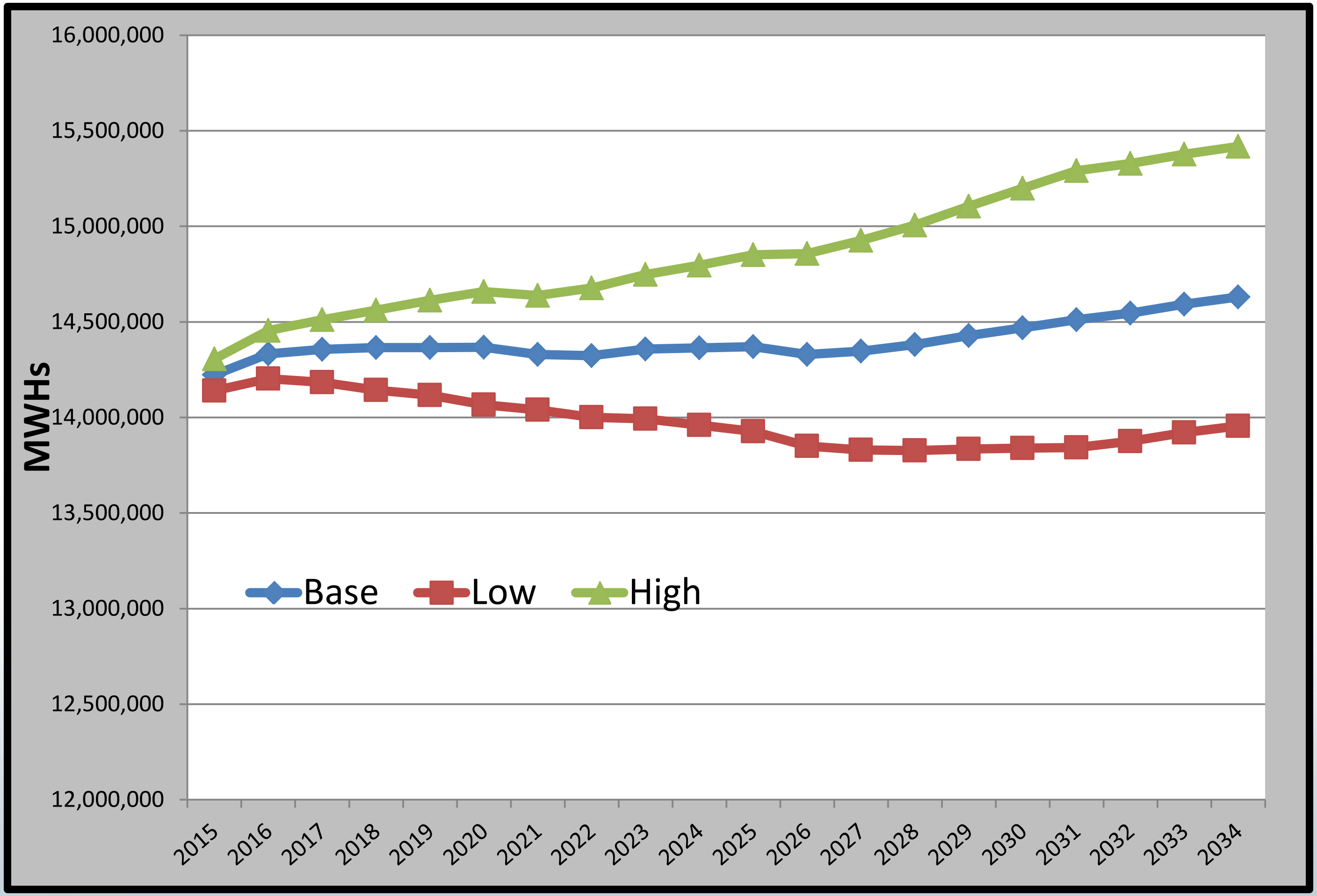
- AEG's Realistic Potential DSM Savings Forecast was deducted from the Gross Internal Demand ("GID") to establish the Base Forecast

- High and Low Forecast were developed using range from IPL-specific State Utility Forecasting Group ("SUFG") forecast

- Range reflects uncertainty stemming from the following factors:

Factors Causing Potential Variance
Economic Activity
Changes in Technology
Consumer Behavioral Changes
State and Federal Energy Policies

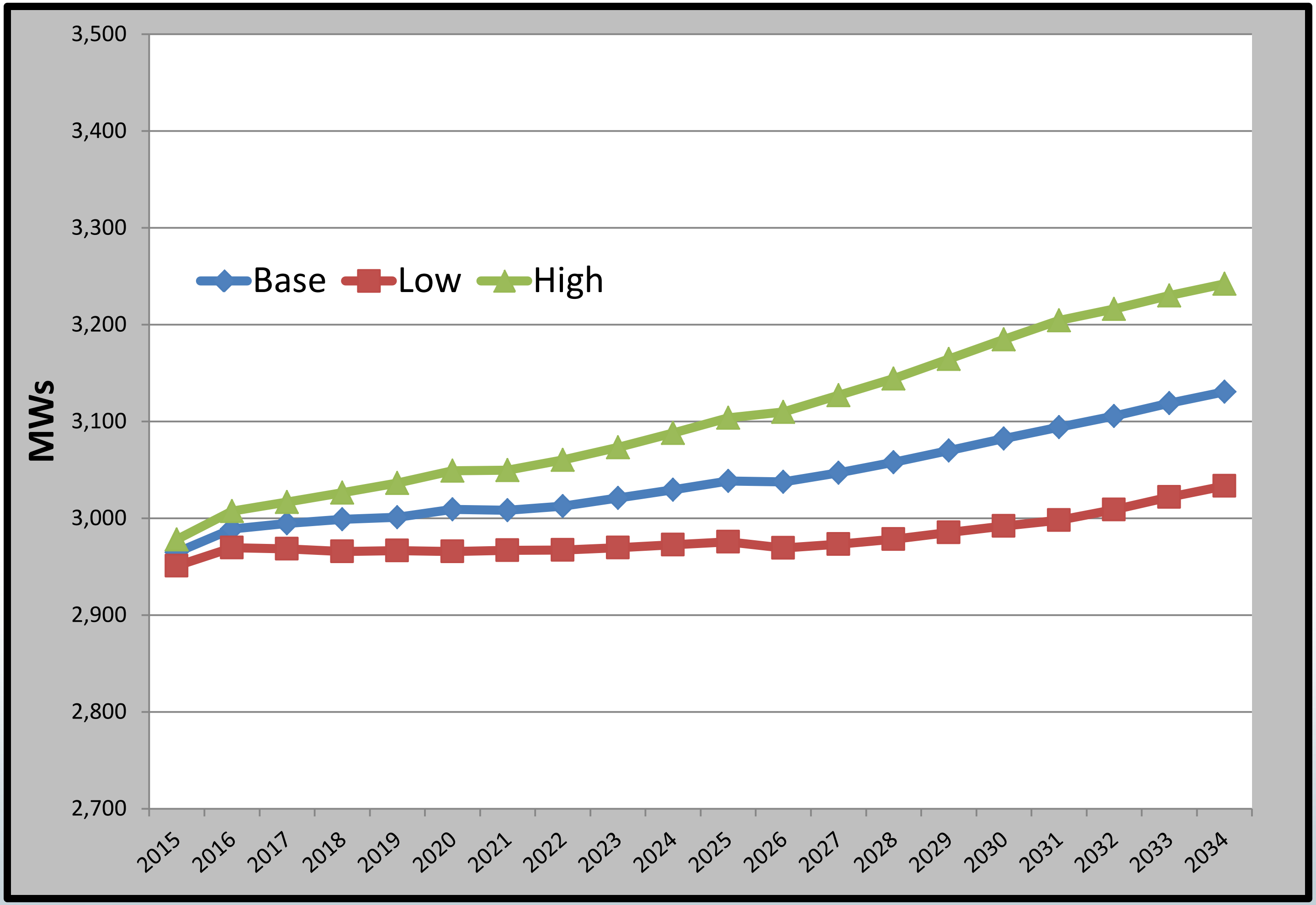
Energy Forecast (Net of DSM)



Average **Energy** Growth Rates (2015-2034):

- Base: 0.1%
- Low : -0.1%
- High: 0.4%

Peak Forecast (Net of DSM)



Average **Peak** Growth Rates (2015-2034):

- Base: 0.3%
- Low : 0.1%
- High: 0.4%

IPL has Modeled a Sensitivity for Wind

- New Wind Resources are modeled using a 35% Capacity Factor and Locational Marginal Price (LMP) equivalent to MISO-IN Market Prices

- Sensitivities focus on applying present characteristics of wind along with potential wind improvements to new wind resources

    - Current Transmission Congestion Characteristics
        1. Market price differences
        2. Current Capacity Factors(≈25%)

    - Potential Improvements
        3. Pair with batteries to relieve transmission congestion
        4. 50% Capacity Factor

IPL has Estimated Possible Future Environmental Compliance Costs

- The potential Rules in the table below could possibly require IPL to incur additional expenses for compliance

Potential Rule	Earliest Expected Compliance Date	Preliminary Estimated Capital	Preliminary Estimated Annual O&M
CSAPR	January 2015	$0	$0
CCR*	Late 2019	$21M-$30M	$3M-$35M
CWA 316(b)	2020	$6M-$154M	$0M-$6M
ELG	2018	$0M-$43M	$0M-$1M
GHG	2020	TBD	TBD
NAAQS	2017	$27M-$174M	$13M-$15M

*Includes estimated pond closure costs.

Please see slide 12 for potential Rule explanations.

IPL has Evaluated Potential Impacts of Greenhouse Gas Requirements

- Five (5) scenarios include the EPA's shadow price for CO_2 starting in 2020
- The environmental scenario includes ICF's Mass Cap CO_2 price starting in 2020
- The high environmental scenario is based on federal legislation modeled after Waxman-Markey in Ventyx's Fall 2013 CO_2 price starting in 2025
- The low environmental scenario does not include a CO_2 price

Questions?

Presentation of Scenario Results

Presented by Joan Soller, Director of Resource Planning and Swetha Sundar, Resource Planning Analyst

Supply and Demand Resource Alternatives - Costs & Performance Attributes

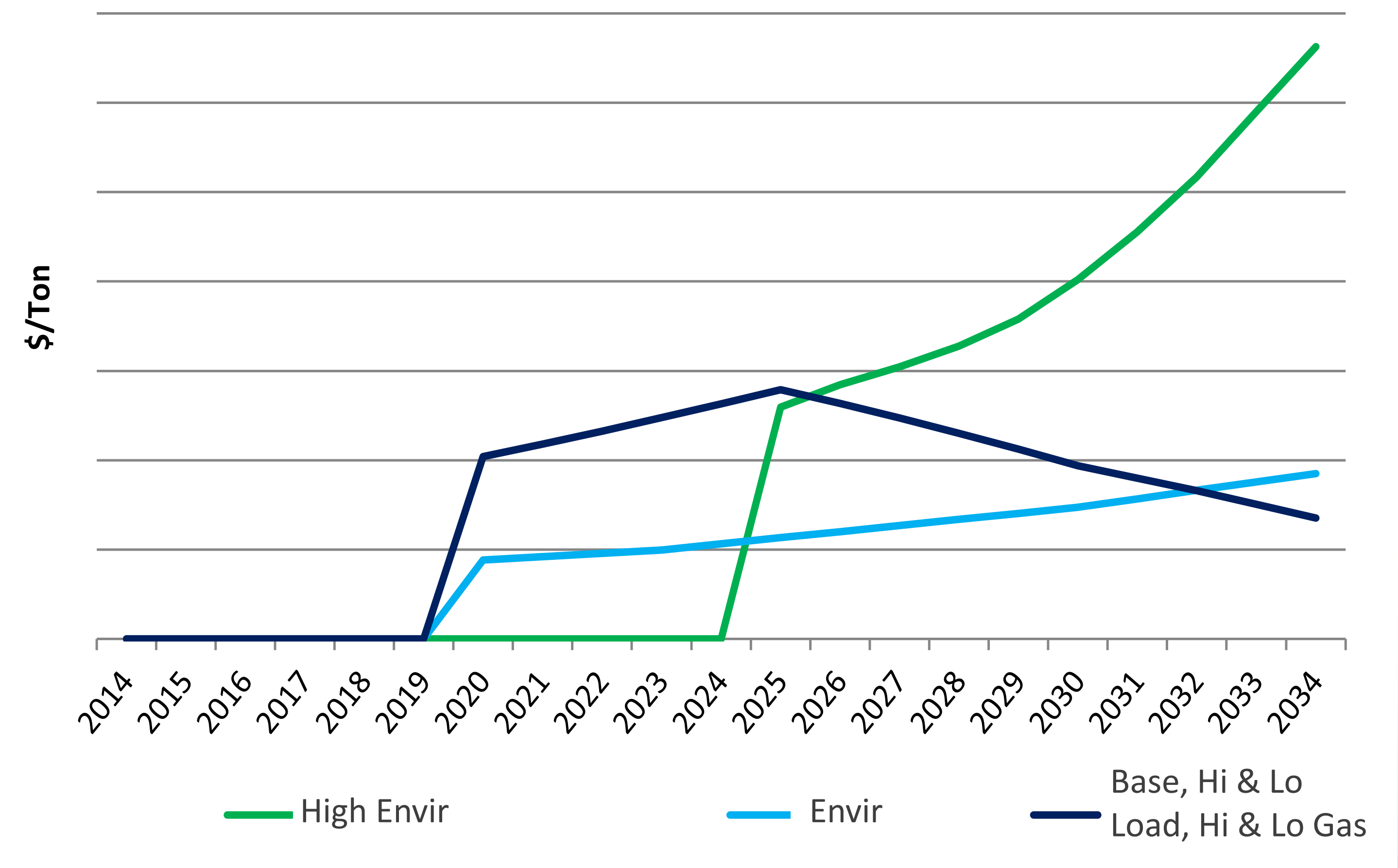
IRP Resource Technology Options			
	MW Capacity	Performance Attributes	Representative Cost per Installed KW*
Simple Cycle Gas Turbine	160	Peaker	$676
Combined Cycle Gas Turbine - H-Class	200	Base	$1,023
Nuclear	200	Base	$5,530
Wind	50	Intermittent	$2,213
Solar	10	Intermittent	$3,873
Demand Response/Interruptibles	62	Peak Use	Varies by Program
Smart Grid - Conservation Voltage Reduction	20	Peak Use	Field assets are in place for this capacity

*These costs from EIA Updated Capital Cost Estimates for Utility Scale Electricity Generating Plants Report (published April 2013) are shared as proxies for IPL's confidential costs.
http://www.eia.gov/forecasts/capitalcost/pdf/updated_capcost.pdf

IPL's Eight IRP Scenarios

Scenario No	Scenario Name	Gas/Market Price	CO2 Price	Load Forecast
1	Base	Ventyx Base	IPL-EPA Shadow price starting 2020	Base
2	High Load	Ventyx Base	IPL-EPA Shadow price starting 2020	High
3	Low Load	Ventyx Base	IPL-EPA Shadow price starting 2020	Low
4	High Gas	Ventyx High	IPL-EPA Shadow price starting 2020-	Base
5	Low Gas	Ventyx Low	IPL-EPA Shadow price starting 2020-	Base
6	High Environmental	Ventyx Environmental	Waxman-Markey proxy Ventyx Fall 2013 prices starting 2025	Base
7	Environmental	Ventyx Mass Cap	Mass Cap ICF Prices beginning in 2020	Base
8	Low Environmental	Ventyx Base	None	Base

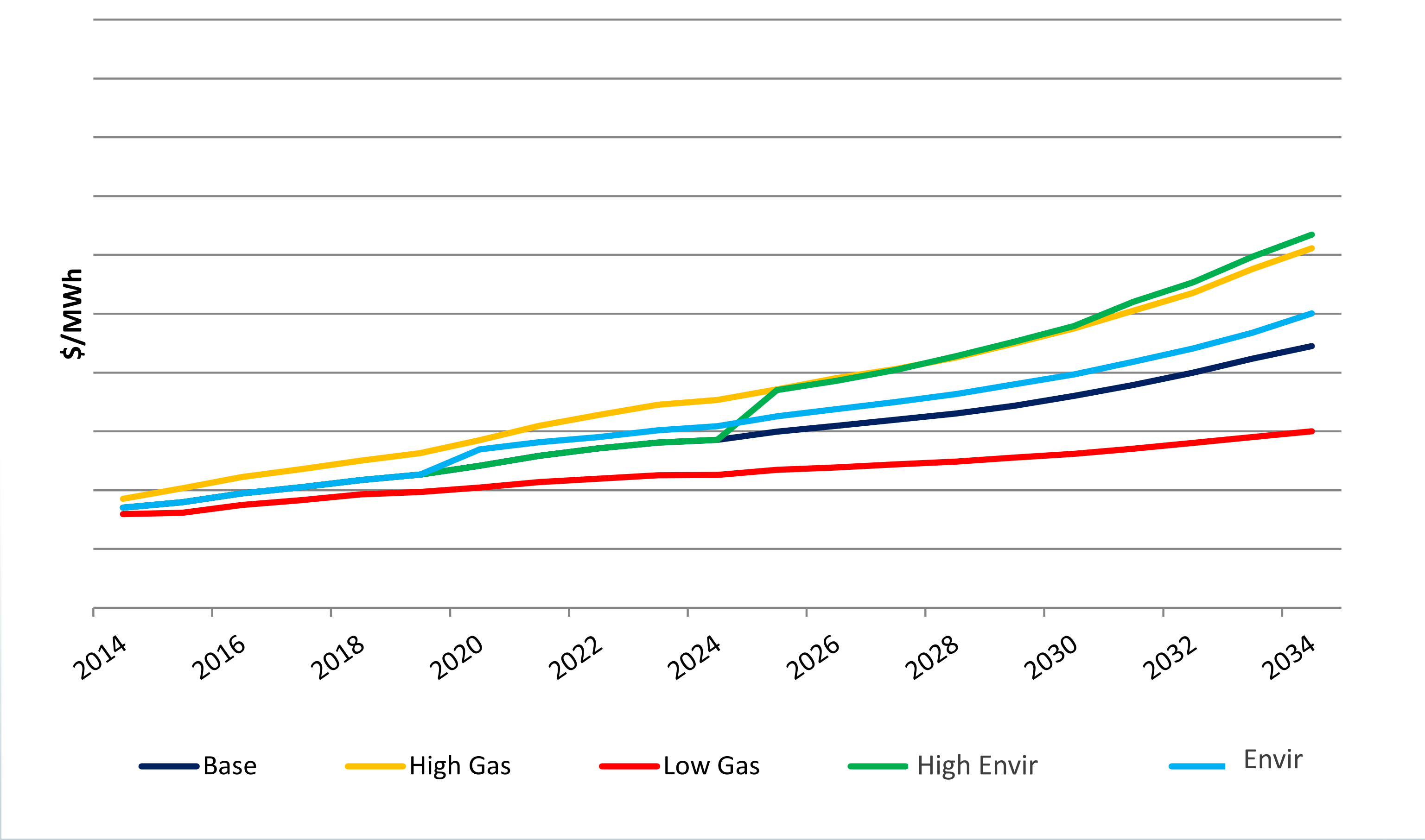
Carbon Prices ($/Ton)



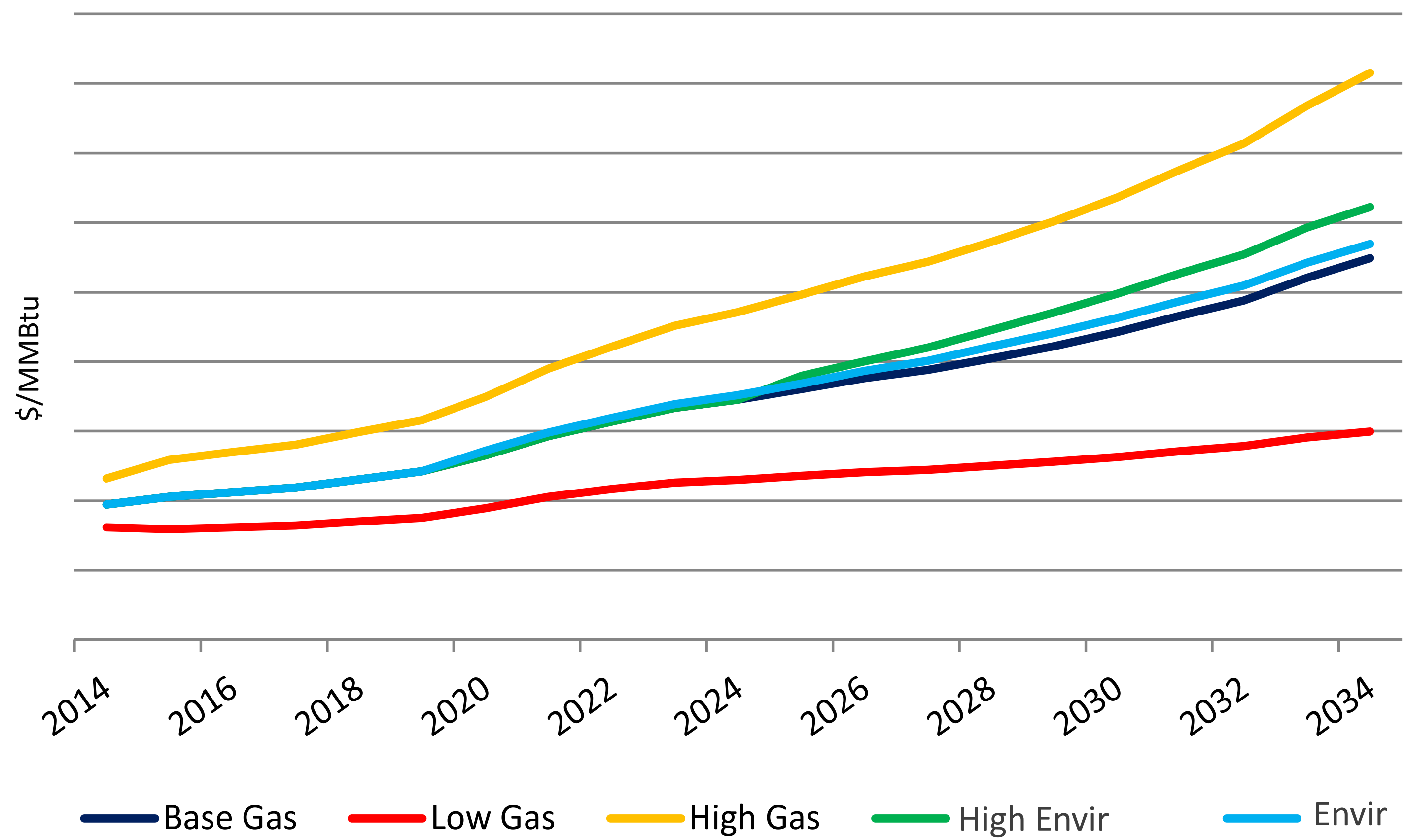
NOTE: These carbon costs are applied differently to the scenarios and not directly comparable. Although, the shape shows the carbon costs' projection.

*Coal Units Only

Annual MISO-Indiana Market Prices (7x24)(Fall 2013 Reference Case/Ventyx Advisors $/MWh)



Henry Hub Annual Gas Price Forecast (Fall 2013 Reference Case/Ventyx Advisors $/MMBtu)



Capacity Expansion Plan Results

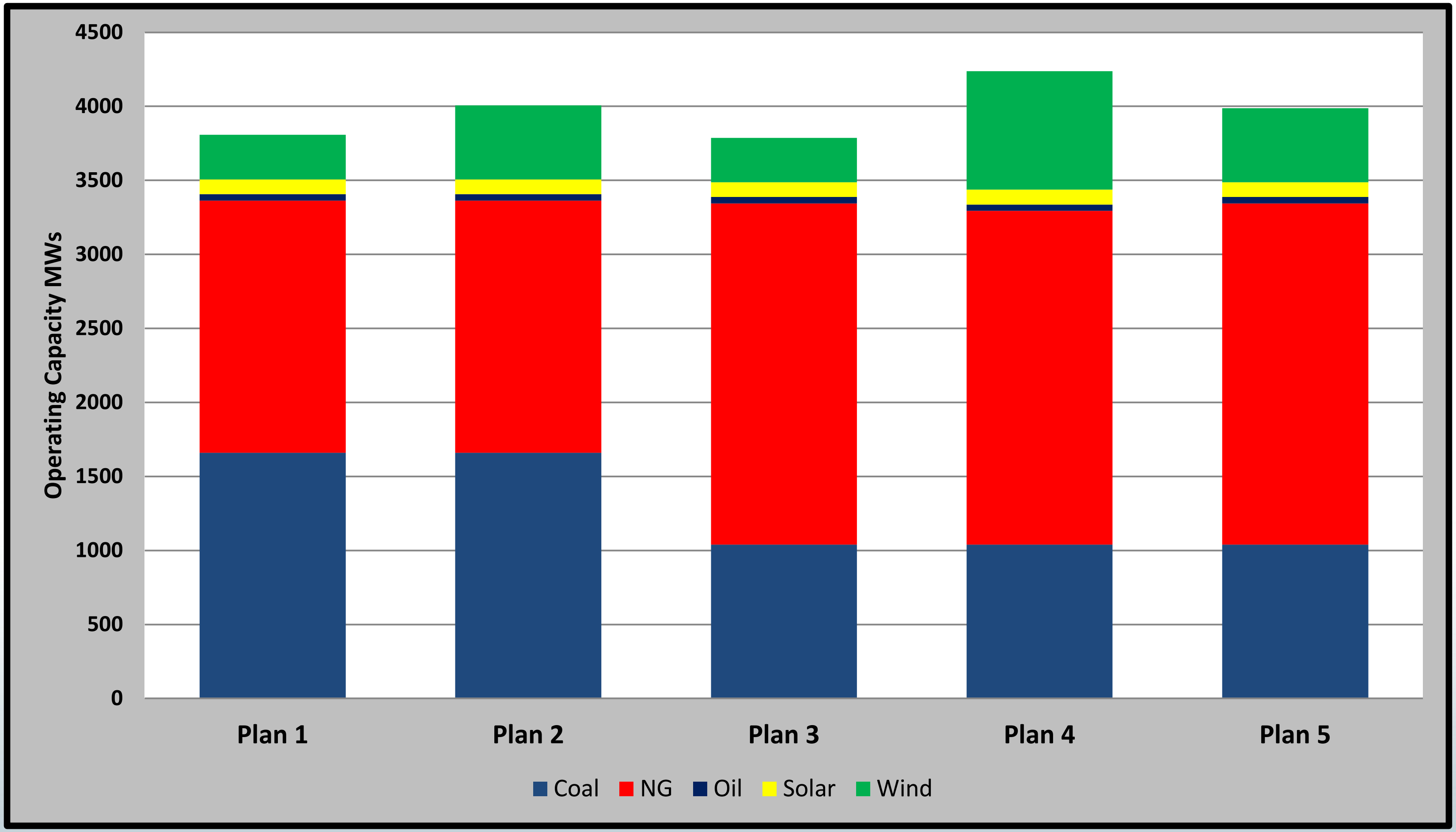
YEAR	Base	High Gas	Low Gas	High Load	Low Load	High Environmental	Environmental	Low Environmental
2015	Market 200 MW	Market 200 MW	Market 200 MW	Market 200 MW	Market 200 MW	Market 200 MW	Market 200 MW	Market 200 MW
2016	Market 450 MW	Market 450 MW	Market 450 MW	Market 500 MW	Market 450 MW	Market 450 MW	Market 450 MW	Market 450 MW
2017 -2019								
2020			Retire Pete 1,2, and 4 CC 200 MW					
2021			CC 800 MW Market 100 MW					
2022			CC 200 MW					
2023								
2024				Market 50 MW		Retire Pete 1		
2025				Market 50 MW		CC 200 MW		
2026				Market 50 MW				
2027				CC 200 MW				
2028						Wind 100 MW		
2029						Wind 150 MW		
2030	Market 50 MW	Wind 100 MW				Wind 100 MW	Market 50 MW	Market 50 MW
2031	Retire HS 5 and 6 CC 200 MW Market 50 MW	Retire HS 5 and 6 CC 200 MW Wind 150 MW	Retire HS 5 and 6 CC 200 MW	Retire HS 5 and 6 CC 200 MW	Retire HS 5 and 6 CC 200 MW	Retire HS 5 and 6 CC 200 MW Market 50 MW Wind 50 MW	Retire HS 5 and 6 CC 200 MW Market 50 MW	Retire HS 5 and 6 CC 200 MW Market 50 MW
2032	Market 50 MW	Wind 100 MW				Market 50 MW	Market 50 MW	Market 50 MW
2033	Retire Pete 1 CC 200 MW Market 100 MW	Retire Pete 1 CC 200 MW Wind 50 MW Market 50 MW	Market 50 MW	Retire Pete 1 CC 200 MW Market 50 MW	Retire Pete 1 CC 200 MW	Market 50 MW	Retire Pete 1 CC 200 MW Market 100 MW	Retire Pete 1 CC 200 MW Market 100 MW
2034	Retire HS7 CC 400 MW Market 150 MW	Retire HS7 CC 400 MW Market 100 MW	Retire HS7 CC 400 MW Market 100 MW	Retire HS7 CC 400 MW Market 50 MW	Retire HS7 GT 180 MW CC 200 MW Market 50 MW	Retire HS7 CC 400 MW Market 100 MW	Retire HS7 CC 400 MW Market 150 MW	Retire HS7 CC 400 MW Market 150 MW

IPL Selected Plans

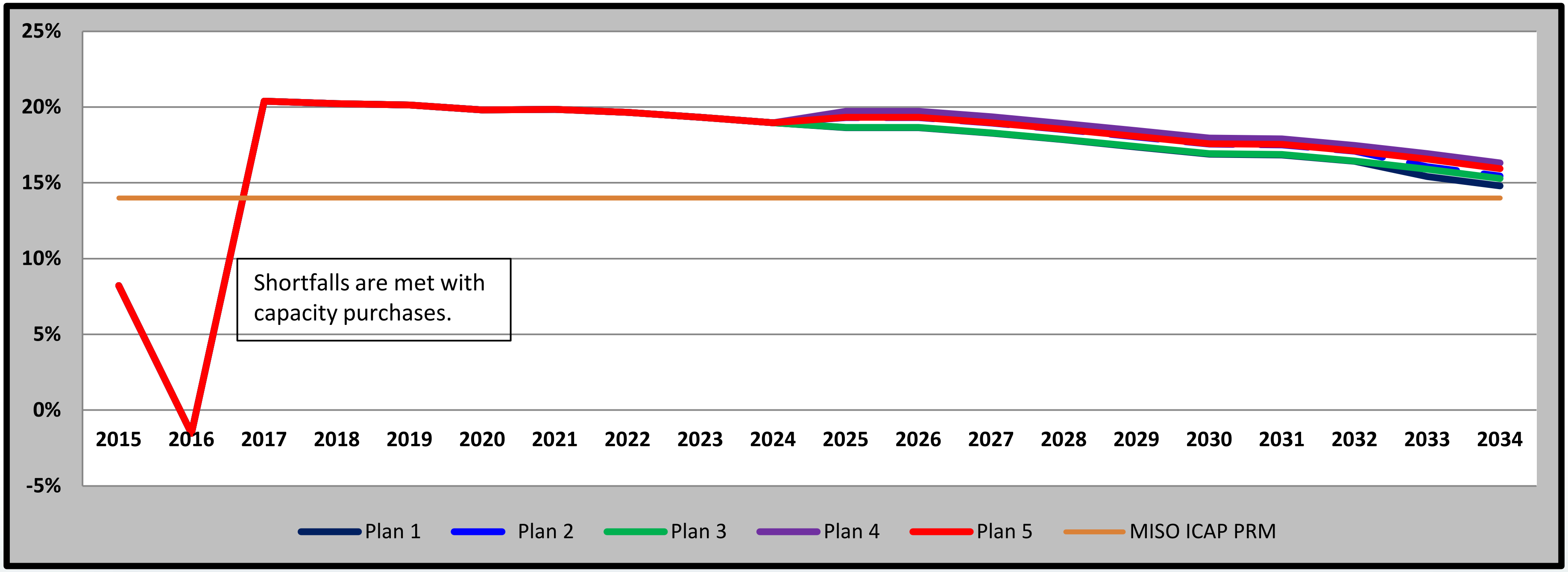
- Based on the Capacity Expansion Plan Results, the following five build out plans were created and modeled each in six of the eight scenarios:

No Early Retirements	
Plan 1	Base Case Expansion Plan
Plan 2	Additional 200 MW Wind (2025)
Pete 1 and 2 Retire in 2024	
Plan 3	600 MW CCGT (2025)
Plan 4	550 MW CT and 500 MW Wind (2025)
Plan 5	600 MW CCGT and 200 MW Wind (2025)

Generation Mix in 2025

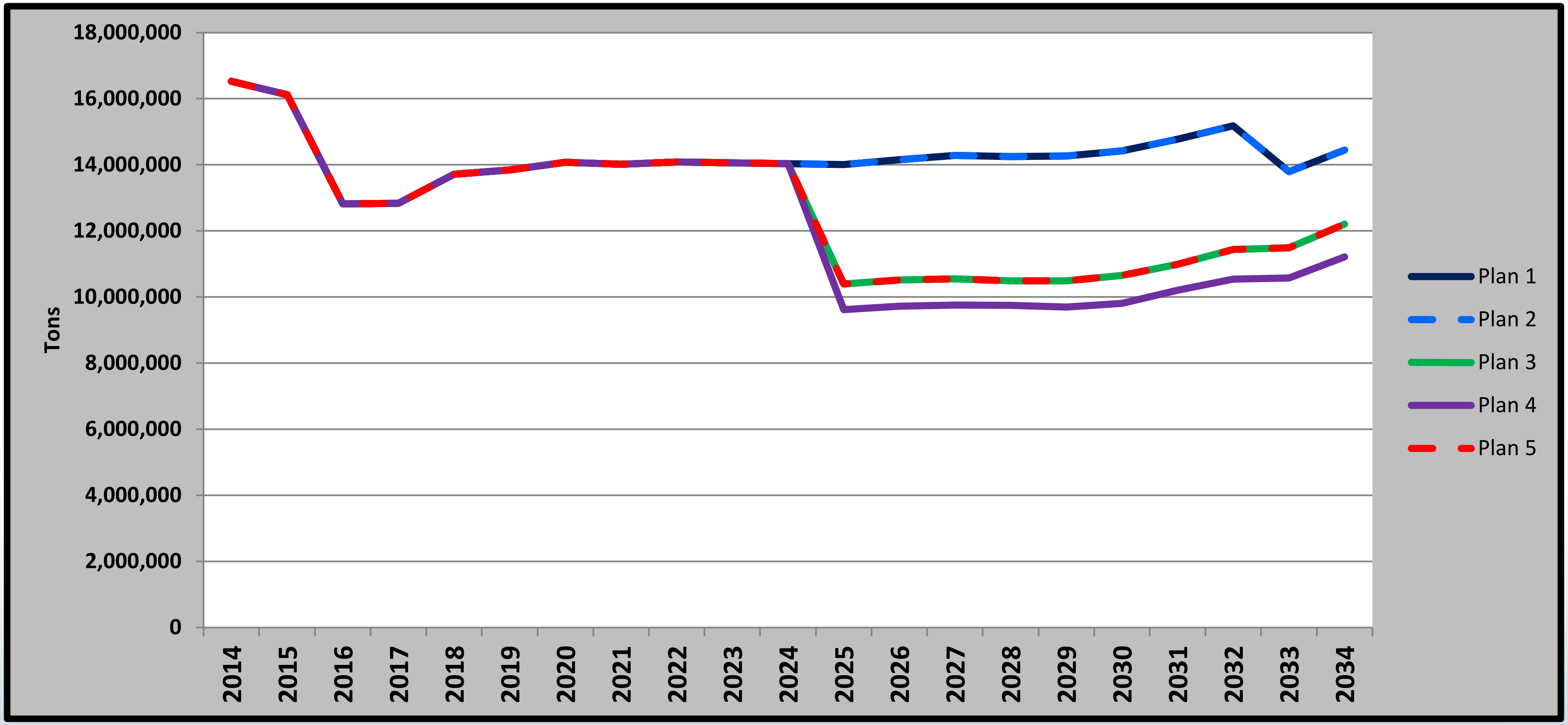


Reserve Margin Per Plan



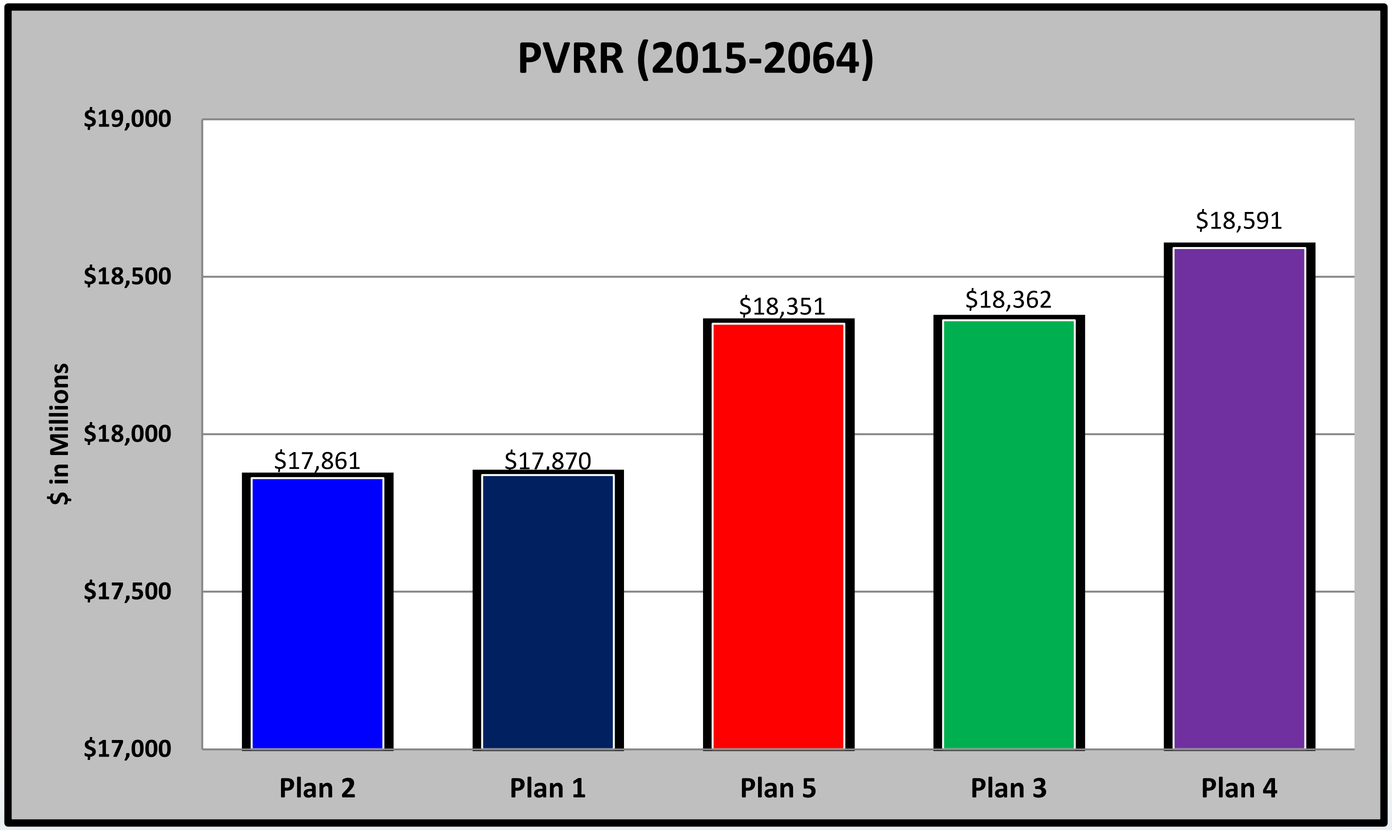
IPL meets its projected 14% reserve margin without capacity purchases for all years after 2017.

CO_2 Emissions Per Plan



Base

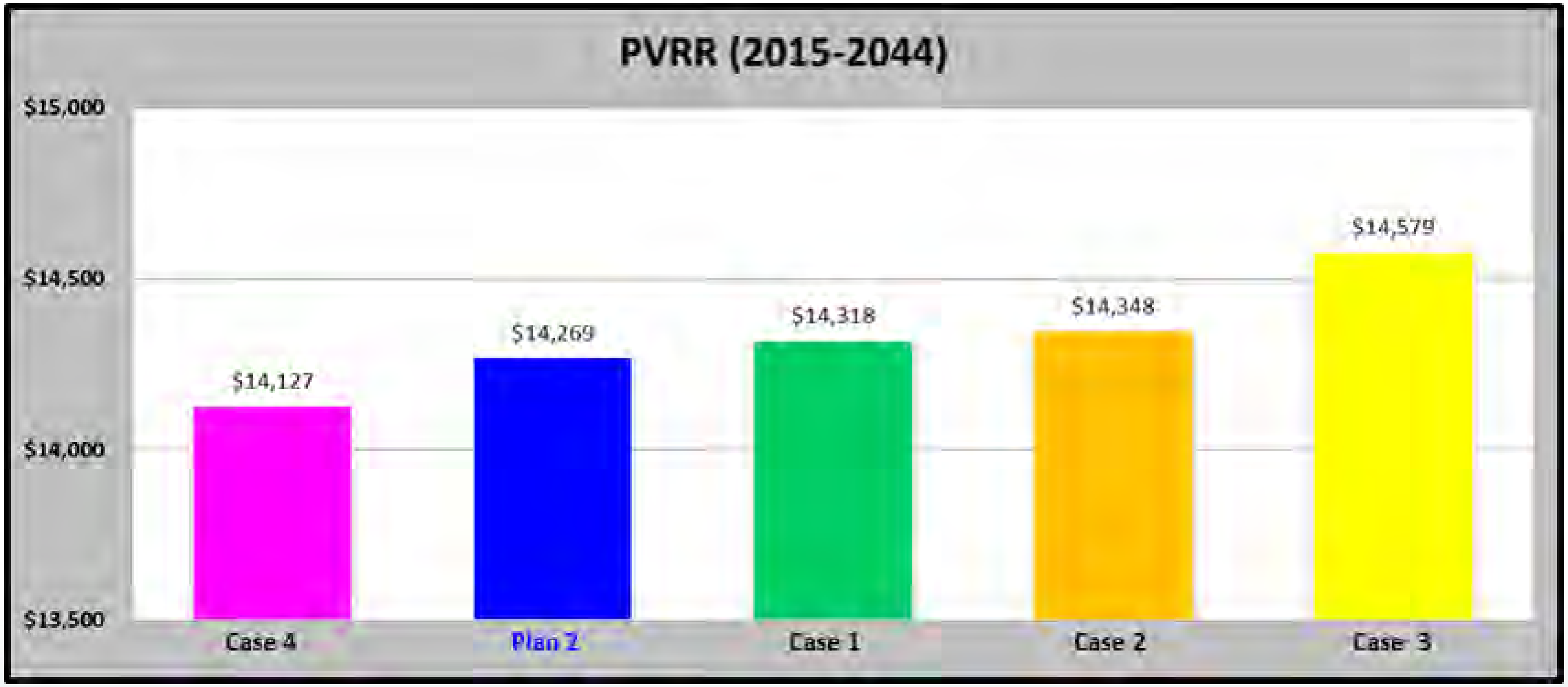
IPL's existing portfolio is cost effective.



Plan 1	Base Case Expansion Plan
Plan 2	Additional 200 MW Wind (2025)

Plan 3	600 MW CCGT (2025)
Plan 4	550 MW CT and 500 MW Wind (2025)
Plan 5	600 MW CCGT and 200 MW Wind (2025)

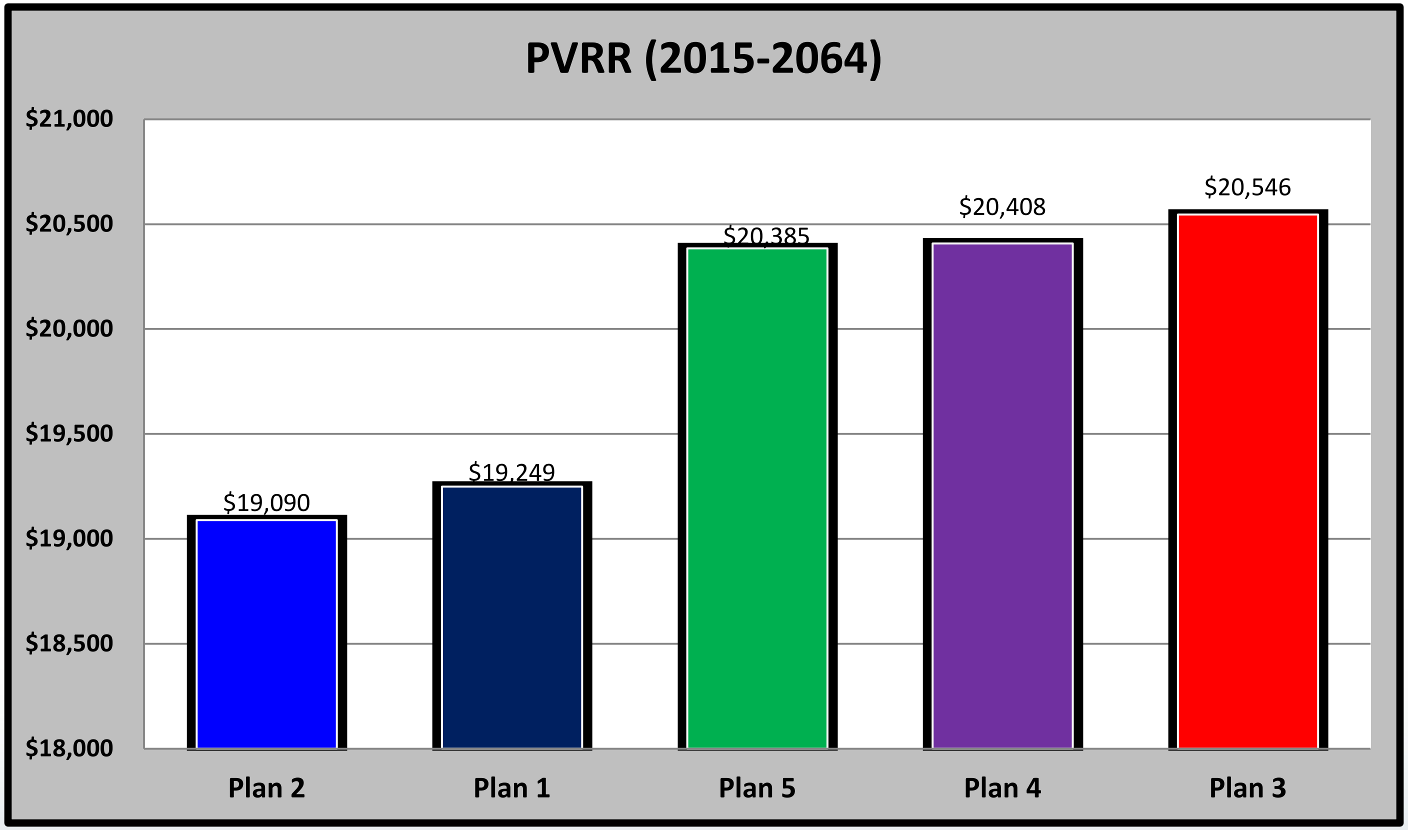
Wind Sensitivity Results



Case 1	LMP Differential Applied
Case 2	25% Capacity Factor
Case 3	Wind with 12 MW Battery
Case 4	50% CF Wind PPA

Wind resources are less cost-effective under current market-characteristics

High Gas



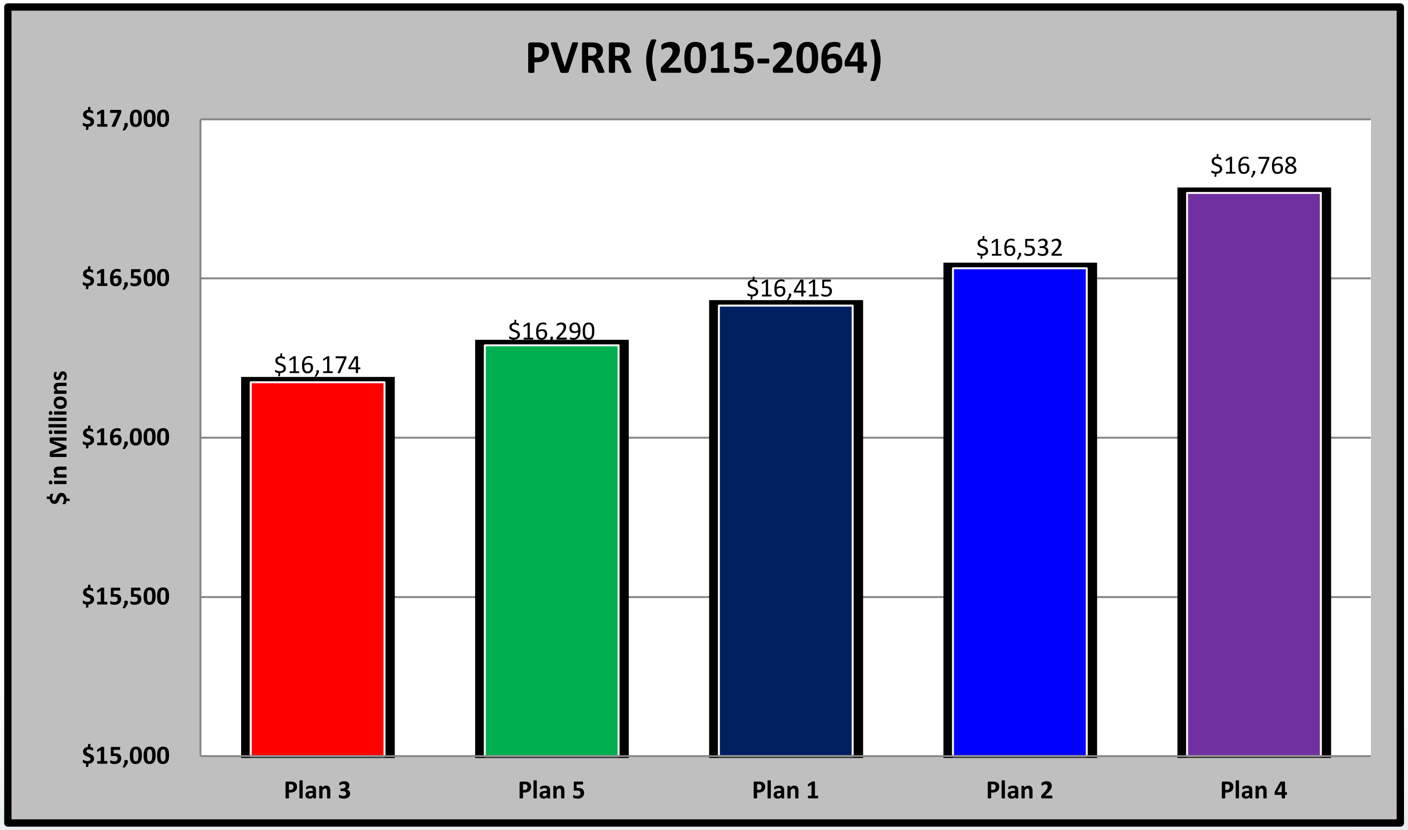
IPL's existing portfolio is cost effective.

Plan 1	Base Case Expansion Plan
Plan 2	Additional 200 MW Wind (2025)

Plan 3	600 MW CCGT (2025)
Plan 4	550 MW CT and 500 MW Wind (2025)
Plan 5	600 MW CCGT and 200 MW Wind (2025)

Low Gas

Plans with more gas-fired generation are cost effective.

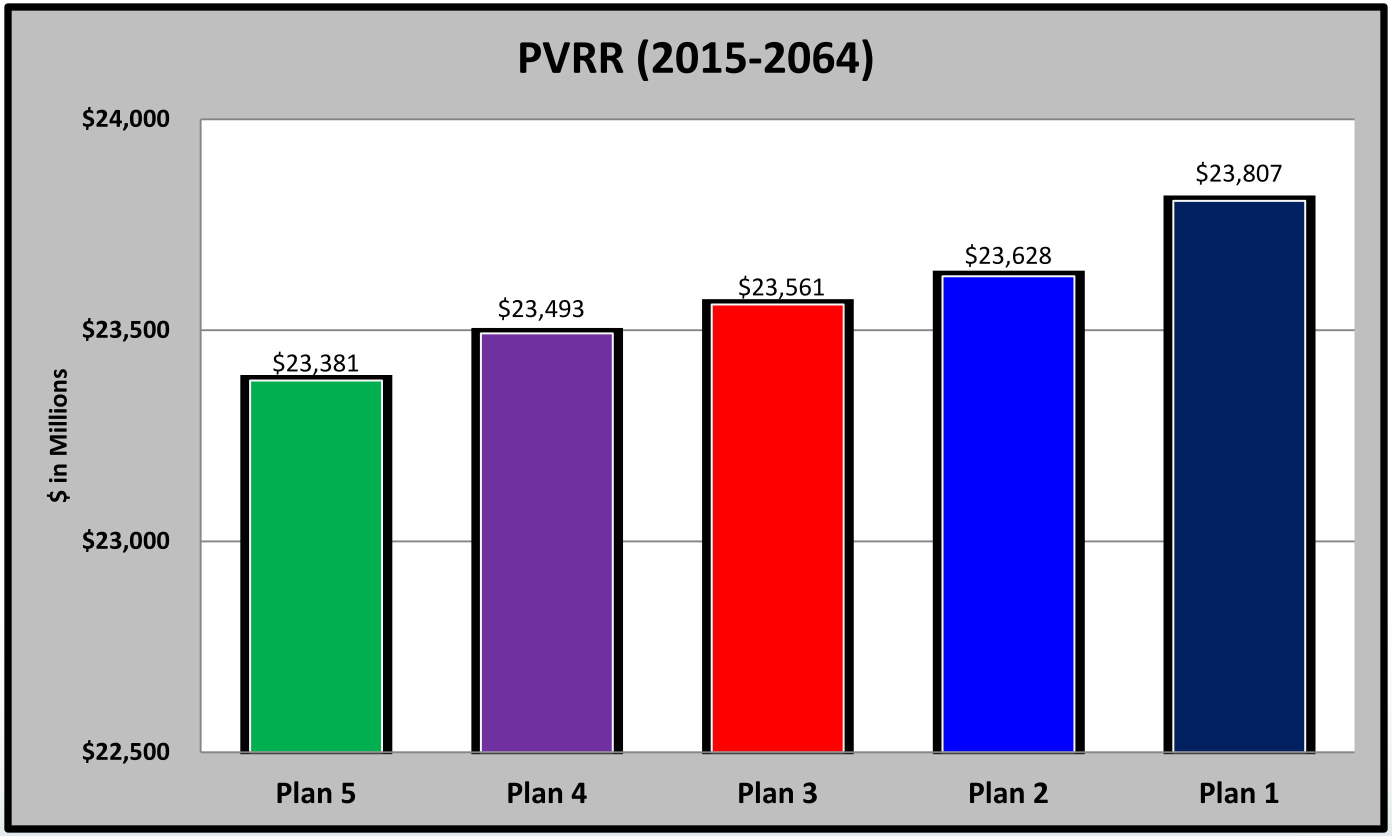


Plan 1	Base Case Expansion Plan
Plan 2	Additional 200 MW Wind (2025)

Plan 3	600 MW CCGT (2025)
Plan 4	550 MW CT and 500 MW Wind (2025)
Plan 5	600 MW CCGT and 200 MW Wind (2025)

High Environmental

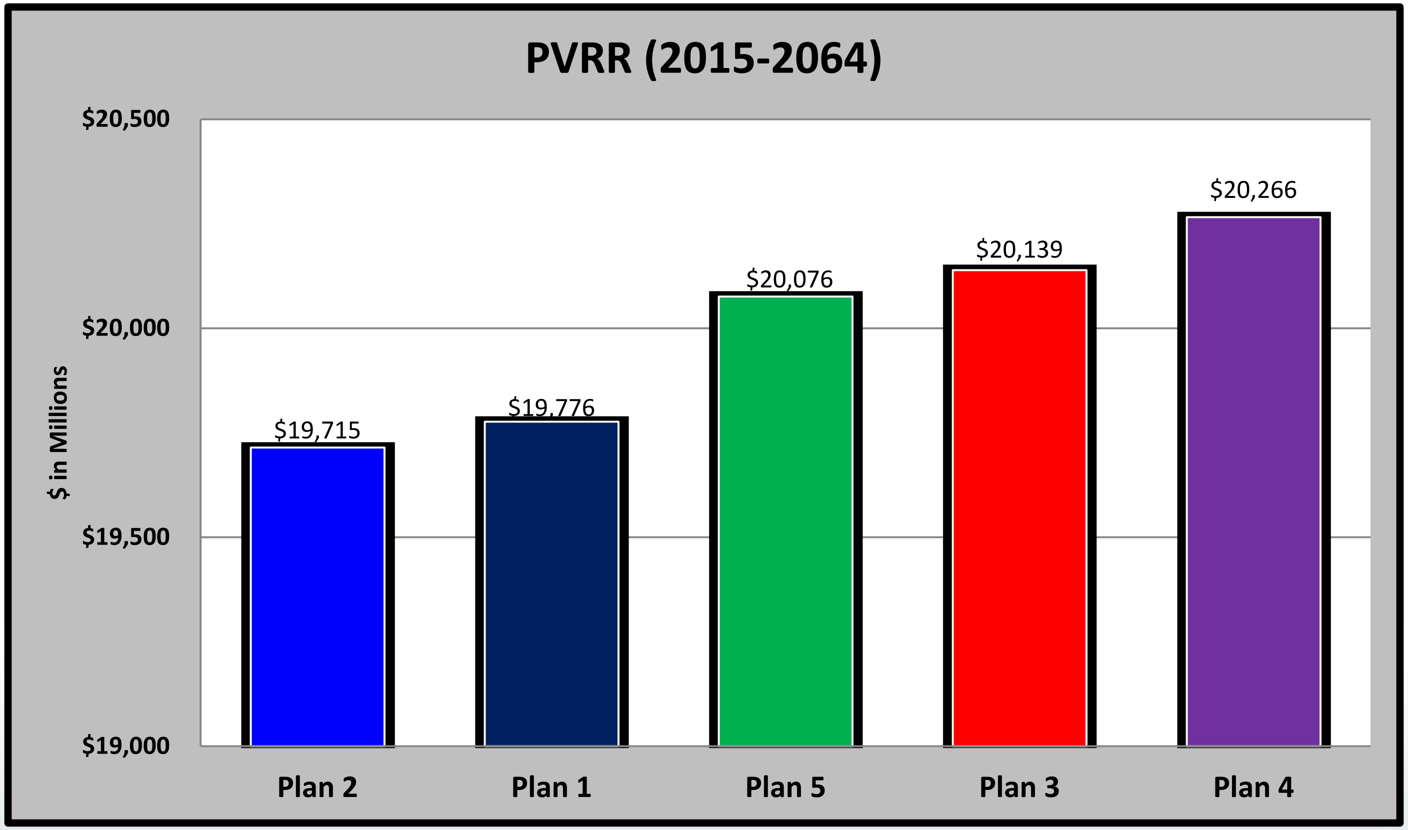
Significantly higher costs exist for all plans.



Plan 1	Base Case Expansion Plan
Plan 2	Additional 200 MW Wind (2025)

Plan 3	600 MW CCGT (2025)
Plan 4	550 MW CT and 500 MW Wind (2025)
Plan 5	600 MW CCGT and 200 MW Wind (2025)

Environmental

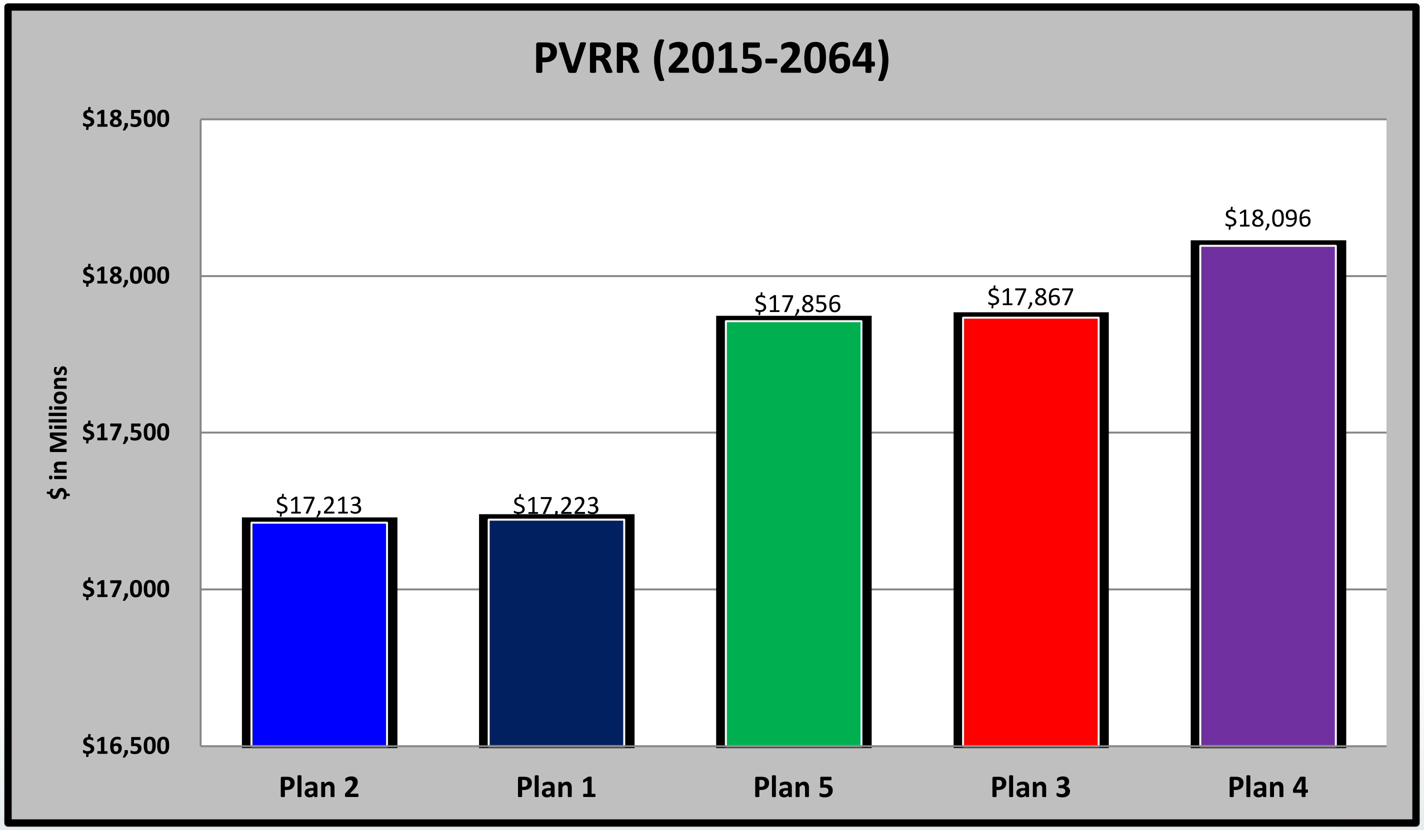


IPL's existing portfolio is cost effective.

Plan 1	Base Case Expansion Plan
Plan 2	Additional 200 MW Wind (2025)

Plan 3	600 MW CCGT (2025)
Plan 4	550 MW CT and 500 MW Wind (2025)
Plan 5	600 MW CCGT and 200 MW Wind (2025)

Low Environmental



IPL's existing portfolio is cost effective.

Plan 1	Base Case Expansion Plan
Plan 2	Additional 200 MW Wind (2025)

Plan 3	600 MW CCGT (2025)
Plan 4	550 MW CT and 500 MW Wind (2025)
Plan 5	600 MW CCGT and 200 MW Wind (2025)

Rationale for Determining Preferred Resource Portfolio

- IPL’s base case reflects a combination of the most likely inputs and risks

- Risk management strategies were also incorporated into the development of seven (7) additional scenarios

- The preferred supply-side resource portfolio is the most reasonable cost option based on the lowest Present Value Revenue Requirement (PVRR)

IPL's IRP Preferred Resource Portfolio

- Plan 1 – Base Case Expansion Plan with no additional build is the Company's preferred resource portfolio
- IPL will continue to monitor risks associated with resource planning
- Additional resources may be added to mitigate CO_2 risks
- Since IPL files an IRP every two years, subsequent IRPs will re-analyze future options

Risks Associated with Resource Planning

IPL manages the following risks as a part of everyday business operations and in the IRP planning process

- Weather
- **Load Variation**
- Workforce Availability
- Reliability
- Technology Advancements
- Construction
- **Fuel Supply**
- **Fuel Costs**
- Production Cost Risk
- Generation Availability
- **Environmental Regulation**
- Access to Capital
- MISO Market Changes
- Regulatory
- Miscellaneous - Catastrophic Events

Risk mitigation will be discussed further in the IRP filing

Questions?

Short Term Action Plan

Presented by Joan Soller, Director of Resource Planning

Short Term Action Plan
Criteria Proposed in 170 IAC 4-7

- Explanation of the previous short term action plan and differences based on what actually transpired
- 3 year view (2015 through 2017)
- Description of preferred resource portfolio elements
- Implementation schedule

IAC – Indiana Administrative Code

IPL's 2011 IRP Short Term Action Plan

Summary	Implementation as of Sept 2014
• Retire the six (6) small unscrubbed coal-fired units by 2016 (EV Units 3-6 and HSS 5 and 6)	• Eagle Valley Units 3-6 will be retired by April 16, 2016 • Harding Street Station Units 5 and 6 will be refueled to natural gas
• Retire four (4) oil-fired units by 2015 (HSS Units 3 and 4 and EV Units 1 and 2)	• In 2013, IPL retired the four oil-fired units (HSS Units 3 and 4 and EV 1 and 2) mentioned along with HSS GT 3
• Retrofit "Big 5" to comply with EPA MATS regulation (Pete 1 through 4 and HSS 7)	• IPL received IURC approval to proceed to retrofit Petersburg units and construction is underway • IPL will seek approval to refuel HS7 to natural gas
• Meet IURC established DSM targets (Cause No. 42693)	• IPL expects to be at or near cumulative targets at the end of 2014. IURC targets have been suspended with the passage of SEA 340. IPL will continue to offer cost-effective DSM.
• Select and implement preferred resource to replace retirements	• IPL received approval to construct 671 MW EV CCGT (Cause No. 44339)
• Reduce capacity exposure resulting from IPL shortage in Planning Years 2015-2016 and 2016-2017	• IPL has purchased 100 MWs of Capacity for the two stated planning periods and continues to negotiate future needs
• Complete Distributed Automation and Advanced Metering Infrastructure Projects	• Projects have been completed and are fully operational

2014 Short Term Action Plan
Generation Portfolio

- Existing Generation
  - Refuel HSS Units 5-7 to natural gas in 2016
  - Retire EV Units 3-6 by April 16, 2016
  - Retrofit Petersburg Units to comply with MATS and NPDES regulations by the end of 2017
- New Generation
  - 671 MW Eagle Valley CCGT expected to be in-service by summer 2017
  - Additional generation is not needed to supply energy in the short term action plan

2014 Short Term Action Plan
Demand Side Management

- Continue to offer cost-effective DSM
- 2015-2017 Action Plan has been filed and is pending IURC approval (Cause No. 44497)
- Possible programs from BlueIndy Case settlement are pending IURC approval (Cause No. 44478)
  - LED street lighting
  - Demand response study with electric vehicle batteries
  - Energy management pilot program using ISO 50001

2014 Short Term Action Plan
Capacity Needs

- Purchased 100 MW of capacity for MISO Planning Years 2015-2016 and 2016-2017
- Waiting for FERC Waiver order for remaining PY 15-16 requirements
- Evaluate purchase options for PY 16-17 capacity shortage
    - o Bi-lateral agreements
    - o MISO auction purchases

FERC – Federal Energy Regulatory Commission

2014 Short Term Action Plan
Transmission and Distribution

- Transmission
  - o Install Static VAR system for voltage regulation & VAR support
  - o Improve import capability using the following:
    - Upgraded and new circuits (138 kV and 345 kV)
    - Upgraded autotransformers
    - New 345 kV breakers
    - New 138 kV breakers
- Distribution
  - o Utilize & expand Smart Grid (SG) technology for operations
  - o Complete distributed solar integration (~67 MW on line as of Sept 2014 plus additional 30 MW planned)
  - o Utilize SG data for asset management planning

VAR – Volt-Ampere Reactive

2014 Short Term Action Plan Research, Development, and Technology Applications

- IPL will continue exploring new technologies and resources that are safe, reliable, and efficient such as:
  - Energy Storage (Batteries)
  - Enhanced Combustion Turbine Output (Fogging)
  - Transportation Electrification
  - Leverage AMI Metering Technology

AMI – Advanced Metering Infrastructure

Questions?

Next Steps

Presented by Marty Rozelle, PhD

Next Steps

October 17, 2014	IRP Public Advisory Meeting #3 Notes Will Be Posted to the IPL IRP Website
By November 1, 2014	IPL to Submit IRP Document to the IURC
90 days after filing: ~February 1, 2015	Interested Party Deadline to Submit Comments to the IURC. See 170 IAC 4-7-2* for details.
120 days after filing: ~March 1, 2015	IURC Director's Draft Report will be Published

IAC – Indiana Administrative Code
*The draft proposed rule is available at: http://www.in.gov/iurc/2674.htm

IPL.IRP@aes.com

Thank You!