June 9, 2023

Dr. Bradley K. Borum
Director of Research, Policy and Planning
Indiana Utility Regulatory Commission
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Indianapolis, IN 46204

Electronically Delivered

Dr. Borum,

AES Indiana appreciates the opportunity to respond to stakeholder comments submitted in response to the 2022 Integrated Resource Plan. The attached response addresses some of the key topics raised.

We look forward to reviewing the IURC Director's Report upon its release. In the meantime, please let me know if you have any questions.

Sincerely,

Erik Miller
Director, Resource Planning
AES Indiana

AES Indiana's Reply to Stakeholders' Comments to
AES Indiana's 2022 Integrated Resource Plan
June 9, 2023

Introduction

Indianapolis Power & Light Company d/b/a AES Indiana ("AES Indiana" or "Company") submitted its 2022 Integrated Resource Plan ("IRP") on December 1, 2022. Advanced Energy United, Citizens Action Coalition ("CAC"), Earthjustice, Solar United Neighbors, Vote Solar, Hoosier Environmental Council, Office of Utility Consumer Counselor ("OUCC"), Reliable Energy, Inc. ("Reliable Energy"), and Sierra Club submitted comments to the Indiana Utility Regulatory Commission ("Commission" or "IURC") regarding AES Indiana's IRP on March 31, 2023. AES Indiana appreciates the review and feedback provided by these stakeholders. The Company remains committed to engaging in a robust stakeholder process to continuously improve its IRP process.

AES Indiana engaged in a robust IRP stakeholder process that consisted of five public advisory meetings and five technical meetings in which stakeholders provided input to various aspects of the IRP. AES Indiana used this input to inform its modeling assumptions that balanced contrasting stakeholders' viewpoints around future market conditions and modeling approaches. This stakeholder input and collaboration ultimately shaped AES Indiana's selection of its Preferred Resource Portfolio.

AES Indiana would like to provide clarity or correction to several of the stakeholder comments and topics.[1] The relevant topics that AES Indiana is responding to are:

- AES Indiana Resource Planning and Its Parent Company's Corporate Targets
- Resource Portfolio Modeling
- Forecasting
- Demand Side Management
- Environmental
- Distribution System Planning

AES Indiana remains dedicated to reliably serving its customers in a cost-effective manner, while also addressing customers' desires for sustainable energy solutions. The 21st Century Energy Policy Development Task Force recognized these core concepts when developing the Five Pillars of Electric Utility Service ("Five Pillars"), which are reliability, affordability, resilience, stability, and environmental sustainability. The 2023 Indiana General Assembly further recognized the importance of the Five Pillars, as House Enrolled Act ("HEA") 1007 (P.L. 55-2023) was signed into law by Governor Holcomb on April 20, 2023. In relevant part, HEA 1007 provides it is the continuing policy of the state that decisions concerning Indiana's electric generation resource mix must consider each of five attributes (which attributes reflect the Five Pillars listed above). HEA 1007 also requires that in reviewing an IRP submitted to the Commission after June 30, 2023, the director of the Commission's research, policy, and planning division shall evaluate and comment in the Commission's final director's report for the plan as to whether the IRP

[1] The absence of a response to every issue raised by stakeholders in their comments to AES Indiana's IRP does not mean AES Indiana agrees with stakeholders on those issues.

takes account of the first attributes of electric utility service enumerated in the statute (and listed above). The Five Pillars served as a foundation for AES Indiana's 2022 IRP by guiding the Portfolio Metrics & Scorecard evaluation that was used to determine AES Indiana's Preferred Resource Portfolio and Short Term Action Plan. AES Indiana intends to continue to use the Five Pillars as a guiding framework for future planning and portfolio execution.

AES Indiana Resource Planning and Its Parent Company's Corporate Targets

During AES Indiana's 2022 IRP process, AES Indiana's global parent company, The AES Corporation ("AES"), announced its intention to "exit coal by 2025."[2] Most importantly, this announcement included the caveat that this target is "subject to necessary approvals."[3] AES also announced an initiative to achieve "net zero carbon emissions from electricity sales by 2040."[4] Through the IRP stakeholder engagement and IRP comment processes, stakeholder interest groups on both sides of the coal-as-a-resource/net zero debate have publicly stated their opinions regarding the Company's announcements as they pertain to the IRP results, for example:

- "Reliable Energy believes it is important for the Indiana Utility Regulatory Commission (IURC) to know that AES Indiana's IRP development and outcome were significantly influenced by the Company's previously announced plans to end coal generation by 2025." - *Reliable Energy*[5]
- "AES Indiana's preferred portfolio [includes Petersburg Conversion to natural gas] is inconsistent with its own parent company's commitments to achieve net-zero carbon emissions from electricity sales by 2040." - *Citizens Action Coalition*[6]
- "We urge AES to fully commit to this 2025 deadline and begin work to transition the units off coal-burning as soon as possible. We make this appeal, even in light of the Company's stated plan to transition off coal, because failure to act quickly to procure replacement resources can result in delayed retirement, as we have seen for some coal units in Indiana and across the country." - *Sierra Club*[7]
- "Advanced Energy United agrees that the AES Corporation's commitment to leave coal by 2025 will augment the AES portfolio and reflects financial prudence."[8]

  "Advanced Energy United strongly encourages AES Indiana to adopt approaches that will facilitate a rapid and responsible transition to clean energy resources. The Short-Term Action Plan appears consistent with the AES campaign to exit coal in

[2] The AES Corporation, AES Announces Intent to Exit Coal by 2025, February 24, 2022.
[3] *Id.*
[4] *Id.*
[5] Reliable Energy, Inc., Reliable Energy Inc.'s Comments on the AES Indiana 2022 Integrated Resource Plan, p. 1, March 31, 2023.
[6] Citizens Action Coalition, *et al.*, AES Indiana's 2022 Integrated Resource Plan, p. 3, March 31, 2023.
[7] Sierra Club, Sierra Club Comments on AES Indiana's 2023 Integrated Resource Plan, pp. 1-2, March 31, 2023.
[8] Advanced Energy United, AES 2022 Indiana Integrated Resource Plan, pp. 2-3, March 31, 2023.

the near term, but the 2022 IRP offers limited details about the expected refuel process." -*Advanced Energy United*[9]

AES Indiana has made it clear to stakeholders throughout its 2022 IRP process that the IRP is an objective analysis and that AES Indiana's global parent company's targets would not influence the analysis or the analysis outcomes. AES Indiana stands by this philosophy. The results were driven by reasonable assumptions to which the stakeholders provided input. The fact that the IRP demonstrated that transitioning Petersburg Units 3 and 4 off coal proved to be most cost effective for customers should not come as a surprise. This is a trend seen across the country where low gas prices combined with the high fixed cost of operating coal plants due to regulations make coal generation less competitive compared to alternatives, like gas.[10]

AES Indiana is a vertically integrated Indiana utility that is subject to IURC jurisdiction and the laws enacted by the Indiana General Assembly. The Company's obligation and priority is to follow the rules and statutes governing utilities in the State of Indiana in an effort to provide energy service to its customers that is consistent with the Five Pillars of Utility Electric Service, as identified by the 21st Century Energy Policy Task Force: affordability, reliability, stability, resiliency, and sustainability. While the AES global parent company's targets are consistent with the "sustainability" pillar[11], the 2022 IRP was not determined by the global parent company's targets and, as the AES global parent company's announcement states, achieving these targets are "subject to necessary approvals." Accordingly, AES Indiana plans to make Certificate of Public Convenience and Necessity ("CPCN") filings for the Petersburg conversion from coal to natural gas and the other resource additions identified in the Short Term Action Plan of the 2022 IRP. These CPCN filings are subject to IURC approval through the public regulatory process consistent with the rules and regulations in the State of Indiana.

Further, Reliable Energy alleges that the Preferred Resource Portfolio, which includes the conversion of Petersburg Units 3 and 4 from coal to natural gas, was selected because AES Indiana deliberately included "IRP assumptions that would support these results."[12] Making a related point, the CAC et al. asserts on p. 2 of their comments that the capital costs for converting Petersburg Units 3 and 4 were "implausibly low" and seemed "predisposed from the beginning of their [AES Indiana's] IRP to move towards more natural gas." The assumptions that AES Indiana included in the IRP analysis were reasonable and defensible and were chosen because they were contemporary to the markets and cost estimates at the time. Additionally, the Company conducted a robust

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[9] *Id.* at 3.

[10] See Indiana Michigan Power Company's 2021 IRP Volume I, Sections 9.2-9.6; Northern Indiana Public Service Company's 2021 IRP Volume I, Sections 9.1-9.2; DTE Electric Company's IRP Application, Michigan Public Service Commission Case No. U-21193-0014, Direct Testimony of Joyce E. Leslie, Q/A 19; Louisville Gas and Electric and Kentucky Utilities Company's 2021 IRP Volume I, 5-17-5-19; and PacifiCorp's 2023 IRP Volume I, pp. 17-18.

[11] Regarding sustainability, the 21st Century Energy Policy Task Force Final Report notes on p. 8 - "The Task Force also heard from Indiana businesses and economic development professionals about the increasing demand from corporate and other consumers for environmentally sustainable sources of generation. Decisions regarding Indiana's generation resource mix must take into account both environmental regulations and consumers' demands for sustainable sources of generation."

[12] Reliable Energy, Inc., *supra* note 4, p. 1.

and unbiased scorecard evaluation process that stress tested portfolios by varying assumptions and evaluated metrics that corresponded to the Five Pillars of Utility Electric Services to select the Preferred Resource Portfolio. AES Indiana intends to update key assumptions in the Petersburg Conversion CPCN, including the estimated cost to convert Petersburg Units 3 and 4 to natural gas[13], and assess that updated estimate for consistency with its 2022 IRP Preferred Resource Portfolio.

Ultimately, AES Indiana's Preferred Resource Portfolio and Short Term Action Plan balances the interests of stakeholders and customers by providing an affordable strategy that maintains reliability while improving sustainability. In addition to converting Petersburg to natural gas, the Plan calls for significant renewable and dispatchable storage resource investment – up to 1,200 MW. The Company issued an all-source request for proposals ("RFP") on April 7, 2023 for up to 1,000 MW of resources with a focus on wind, solar, and storage.[14] Through this RFP, the company plans to take advantage of the Inflation Reduction Act ("IRA") benefits for renewables resources.

Resource Portfolio Modeling

a. Resource Accreditation

In September of 2022, FERC approved MISO's request to implement a Seasonal Resource Adequacy Construct starting in the 2023/2024 planning year. With guidance from MISO, AES Indiana included the new capacity construct in the 2022 IRP, which required meeting summer and winter capacity obligations using reserve margin estimates provided by MISO. MISO also received approval from FERC through the Seasonal Resource Adequacy Construct filing to implement a new thermal capacity accreditation methodology identified as the Seasonal Accredited Capacity ("SAC") for Schedule 53 resources. AES Indiana was not able to include the SAC for Schedule 53 thermal resources in the 2022 IRP because the SAC methodology is dependent on calculations made by MISO. AES Indiana did not have the necessary MISO calculations or history of these calculations to apply the methodology. Instead, the Company used the XEFORd/UCAP methodology that MISO used under the Summer Resource Adequacy Construct prior to FERC approval of the new seasonal construct. See Section 2.2 of AES Indiana's 2022 IRP for more information AES Indiana's modeling of MISO's Seasonal Resource Adequacy Construct in the IRP.

The CAC et al. notes on p. 21 of their comments to AES Indiana's IRP that since the IRP was conducted, MISO has released additional information for Schedule 53 resources. They believe that the traditional XEFORd/UCAP approach that the Company used in the IRP does not capture the full seasonal risk to accreditation and that AES Indiana should "incorporate the most recent information on the seasonal construct and resource accreditation from MISO in any resource proceedings relying on the 2022 IRP and in future IRPs." Now that the necessary information has been made available by MISO,

[13] AES Indiana intends to update costs for the Petersburg conversion in the CPCN to be consistent with a transactable Engineering, Procurement and Construction (EPC) estimate obtained in the RFP process.
[14] https://www.aesindiana.com/2023asrfp.

AES Indiana plans to make these SAC accreditation updates in the analysis performed for the CPCN for the Petersburg Conversion to natural gas and will also include the SAC methodology in future IRPs.

Additionally, the CAC *et al.* notes on p. 20 that accreditation impacts to Eagle Valley due to outage were not included in the IRP. At the time of the IRP, the Eagle Valley outage impacts would have had minor impact during the key planning years where the EnCompass model was selecting replacement resources: 2025-2042. However, AES Indiana intends to update Eagle Valley's accreditation to be consistent with the SAC methodology which will include historical outage impacts for analysis included in the Petersburg Conversion to natural gas CPCN.

The OUCC notes on p. 3 of its comments to AES Indiana's 2022 IRP:

> To better understand how AES plans to meet MISO seasonal requirements when Solar production is reduced, capacity ratings for winter need to be included. Solar resources, in particular, differ substantially in their capacity accreditation between Winter and Summer. For example, when presenting resource options, as in Section 6 of the IRP's Volume 1, AES needs to include accredited capacity for the winter months, or preferably include MISO's four seasons accreditation and Planning Reserve Margin Requirements (PRMR).

AES Indiana included estimates for winter and summer accreditation for all resources modeled in the IRP. As previously noted, thermal resources used the XEFORd/UCAP approach and winter accreditation was held consistent with summer estimates. For non-thermal, the Company used the ELCC and peak hours-based approaches. In the IRP, AES Indiana included zero capacity value for solar in the winter using the peak hours-based accreditation. Perhaps the OUCC thought that AES Indiana failed to model winter capacity accreditation when it reviewed the zero value for solar; however, this was the actual result when using the peak hours-based approach – solar accreditation receives nearly zero value for winter. Additionally, AES Indiana used MISO's seasonal reserve margin estimates that MISO presented at Public Advisory Meeting #3 held on June 27, 2022 to calculate the seasonal planning reserve margin for 2022 IRP modeling.[15] Please see Section 6.2 on p. 63 of AES Indiana's 2022 IRP for accreditation assumptions used for supply side resources.

b. Replacement Resource Costs

The OUCC notes on p. 4 of its comments that "[a] discussion of renewable energy resources' Capital Cost risk shows high renewable generation scenarios to be the most expensive evaluated strategy. AES also should discuss whether thermal generation capital costs are at risk, especially if declining demand causes one or more capital equipment manufacturers to exit the market."

Generally, "high renewable generation scenarios", which were primarily portfolios that replaced early-retired Petersburg coal units with renewable generation, were more

[15] AES Indiana 2022 IRP, Volume I, p. 12.

expensive because the Company would have to build high volumes of renewables in order to replace the capacity associated with Petersburg. Building high volumes of renewables is necessary due to the low accreditation that renewables receive from MISO using ELCC estimation. Further compounding this issue, AES Indiana saw renewable prices increase significantly when comparing the Company's all-source RFP issued in 2020 to the one issued in 2022.[16] These high prices were used to inform the costs modeled in the Replacement Resource Cost Sensitivity Analysis. AES Indiana did not observe as much price volatility for thermal resources when comparing the Company's 2020 and 2022 all-source RFPs.[17] This was likely due to lower demand for these resources. However, the Company still included a high-cost sensitivity for thermal in the modeling. While it is possible lower demand could drive manufacturers to exit the market, causing more thermal price volatility, this was not explicitly modeled. AES Indiana will work with the OUCC in its next IRP to consider such a sensitivity.

c. Scorecard Metrics & Scorecard Results

The OUCC had several suggestions for improvements to the Scorecard metrics and evaluation process used in AES Indiana's IRP. AES Indiana appreciates the OUCC's feedback and will consider its suggestions for its next IRP. These suggestions and Company responses include:

- "Scorecard metrics such as Reliability/Resiliency, Environmental, and Affordability (Net Present Value of Revenue Requirements), did not have significant differences among the five strategies evaluated. The differences were typically less than 3%. The OUCC recommends weighting the metrics or stress testing them to identify meaningful differences between the scenarios." OUCC Comments, p. 4.

  In response, AES Indiana considered weighting metrics for the 2022 scorecard; however, this approach can lead to, what could appear to be, subjectivity in defining the weights. AES Indiana anticipates that there would likely be disagreement from some stakeholders over the weights given their diverging interests. AES Indiana will consider ideas for weighting or stress testing metrics in the next IRP and looks forward to working with the OUCC on a reasonable approach.

- "The OUCC recommends discussing the risk analysis from a customer rate affordability perspective. An example might be defining whether a $25 Million Present Value of Revenue Requirements difference is significant for a typical residential customer using 1,000 kWh per month." OUCC Comments, p. 4.

  In response, AES Indiana appreciates the OUCC's input and plans to work with the OUCC to develop rate risk metrics in the next IRP.

[16] This was mainly due to supply constraints and uncertainty around tariffs on solar resources.
[17] Replacement Resource Capital Costs can be found in Confidential Attachment 6-1 to AES Indiana's 2022 IRP.

- "AES addressed reliability with factors including Black Start, Volt-Ampere-Reactive (VAR) Deliverability, and Frequency Support. That analysis resulted in similar scores for four of the five strategies. The OUCC recommends reviewing the impact on portfolios when a constraint is introduced, or a capability is disabled." OUCC Comments, p. 2.

  In response, AES Indiana recognizes that the composite scores in the Reliability analysis performed by Quanta Services, Inc. ("Quanta") were very close, which was driven by certain categories. In order to further differentiate the scores, Quanta provided the cost of mitigation (mitigations which improve the reliability score to the highest level) for each of the portfolios.[18] The results demonstrate a greater reliability disparity between the portfolios when scores are monetized using mitigation costs. AES Indiana appreciates the OUCC's input and plans to work with them to develop the reliability analysis and ways to stress test reliability of portfolios in the next IRP.

- "The OUCC also recommends the addition of stress testing to existing and potential portfolios during IRP modeling to evaluate consumer impacts from changes in capacity accreditation." OUCC Comments, p. 4.

  In response, AES Indiana appreciates the OUCC's input and plans to work with the OUCC to look into further stress testing portfolios in the next IRP.

AES Indiana appreciates the OUCC's involvement in the IRP process and encourages them to continue providing its suggestions, particularly during the IRP stakeholder engagement process so they can be considered and possibly incorporated into the IRP.

Reliable Energy notes on p. 4 of its comments, "AES Indiana knows that the Net Present Value (NPV) analysis is not an accurate indicator of full ratepayer cost impacts of generation decisions, yet utilities continue to represent that it is an appropriate metric to evaluate affordability. … To determine affordability, AES Indiana should be doing an analysis of ratepayer impacts by year for at least the first 10 years."

In response, as part of the IRP process and to address Reliable Energy's concern, AES Indiana included a comparison of each portfolio's revenue requirements by year.[19] The analysis demonstrated that the Preferred Resource Portfolio, which converts Petersburg to operate using natural gas in 2025 provides generally a lower revenue requirement in each year over the 20-year analysis period when compared to the other strategy, including the strategy that keeps Petersburg on coal (No Early Retirement Strategy).[20]

d. Commodities

Reliable Energy notes on p. 3 of its comments, "AES Indiana used a coal price forecast that was unreasonably high. Namely, AES Indiana verbally indicated to Reliable Energy

[18] AES Indiana 2022 IRP, Volume I, pp. 241-242.
[19] AES Indiana 2022 IRP, Volume I, p. 237.
[20] See AES Indiana's 2022 IRP, Volume I, Section 9.4.2, pp. 235-237 – results from Annual Revenue Requirement analysis included in Figure 9-60 on p. 237 of AES Indiana's 2022 IRP.

that its methodology for forecasting coal prices was based upon bids received when prices were inflated to previously unseen levels (but only for a short period of time)."

AES Indiana acknowledges that commodity prices in general were experiencing upward pressure because of European demand and the conflict in Ukraine at the time of the 2022 IRP. International markets were driving higher near-term prices for natural gas and coal, and the 2022 IRP commodity forecasts demonstrate this (see Figures 8-5 and 8-6 of AES Indiana's 2022 IRP for gas and coal prices respectively). AES Indiana's coal forecast was determined from bids received that indicated higher 2023 prices. These prices decreased materially by 2025 closer to historically seen levels. It is also important to point out that long-term growth rates were applied to 2025 and forward so that inflated market prices in 2023 did not set a long-term upward shift in prices. For 2025 forward, the price of coal was escalated using Horizon Energy's annual growth rate of Illinois Basin coal, which averages less than 2% per year. This was a more conservative growth rate than what was used for natural gas (approximately 2.5% per year), recognizing that coal producers will likely be able to offset inflation with cost efficiencies.

e. Miscellaneous

Harding Street Units 1 and 2 ("HS 1 and 2"), which are part of the AES Indiana's black start plan, reach age-based retirement at the end of 2024. In the IRP modeling, the Company had to include replacement resource options for these units that are capable of black start and meeting the needs of the Company's black start plan. These resource options included a 3.5 MW diesel generator or a 3.5 MW reciprocating engine.[21] The diesel generator was selected as the least cost option for HS 1 and 2 replacement in the IRP. The CAC et al. requests on p. 22 "that AES Indiana consider the ability for some or all the capacity [of Harding Street Units 1 and 2] to be replaced with battery storage resources. It is our understanding that battery storage resources with Grid-Forming Inverters ("GFI") have the capability to provide black start and that the technology is available."

The main objective of Harding Street black start is to provide in-rush power to cold start Harding Street Units 4 and 5 ("HS 4 and 5"), which utilize gas turbines ("GT"). Unfortunately, there are technical issues with trying to use battery storage resources to start the HS 4 and 5 GTs. In particular, the GTs have large motors and battery storage resources are unable to supply adequate in-rush power to start the motors. To confirm this, we have modeled the existing HSS BESS and determined that it cannot start the large motors needed to get the GTs started. The modeling also demonstrated that it becomes cost prohibitive to install invertors that are sufficiently sized to be able to support starting the large motors.

Additionally, according to interpretation of North American Electric Reliability Corporation ("NERC") standards[22], if a battery energy storage system ("BESS") is designated as a

[21] See AES Indiana's 2022 IRP, Volume I, p. 152.
[22] NERC Standards EOP-005, EOP-007, and EOP-009.

black start resource, then it must be fully charged and kept at that charge level all the time, thereby, limiting the BESS for black start purposes only. This means AES Indiana would not be able to capture any capacity or energy arbitrage value from the resource, which creates cost effectiveness challenges compared to fossil black start options.

Reliable Energy also notes on p. 3 of its comments:

> Except for the proposed conversion of Petersburg Units 3 and 4 to natural gas, the Preferred Plan provides for no additional dispatchable resources during the 20-year plan period. AES Indiana states it is continuing to evaluate resource options including "green hydrogen, small modular reactors, gravity storage, pumped-hydro and carbon capture and sequestration." These plans are nebulous at best, and whether they will ever result in additional dispatchable resources is unknown.

As Reliable Energy notes, the Preferred Resource Portfolio includes the 1,000 MW conversion of Petersburg Units 3 and 4. This conversion will maintain the reliability of the status quo portfolio, as demonstrated in the IRP reliability analysis and on the IRP Scorecard (No Early Retirement and Petersburg Conversion received the same reliability score).[23] Also, contrary to Reliable Energy's claim that "except for the conversion of Petersburg Units 3 and 4 to operate using natural gas, the Preferred Plan provides for no additional dispatchable resources during the 20-year plan period," the Preferred Resource Portfolio in fact identifies over 600 MW of dispatchable battery energy storage resources as replacement capacity for the retirement of Harding Street steam units 5, 6 and 7 and to fill winter capacity requirements by the 2030s.

Further, electric utilities in Indiana are required to file an IRP every three years. As such, AES Indiana anticipates that future IRPs will define a different resource mix beyond the Short Term Action Plan timeframe. As emerging dispatchable technologies become commercially viable, the Company intends to include them in future IRPs as replacement options. These options along with renewable and conventional gas options may or may not be included in future IRP Preferred Resource Portfolios depending on the cost effectiveness and performance on other scorecard metrics.

On p. 5 of its comments, Reliable Energy notes, "The proposed conversion of Petersburg Units 3 and 4 assumes a retirement date in 2042…. AES Indiana's economic analysis should reflect closure of the Units by 2040, otherwise the Company should assume that any undepreciated capital when the plant is closed would be a cost assigned to its shareholders."

As noted in the "AES Indiana Resource Planning and Its Parent Company's Corporate Targets" section, AES Indiana's parent global company's goals did not determine the analysis or the analysis outcomes. As such, a "net zero by 2040" target that would require

[23] See AES Indiana's 2022 IRP, Volume 1, p. 254.

the retirement of fossil burning assets to achieve net zero emissions by 2040 was not included in the analysis.

Forecasting

a. Load Forecasting

The load forecast for the 2022 IRP was performed by Itron, Inc. ("Itron") with input from stakeholders. Itron modeled a base, high and low forecast that varied based on projected economics. The base, high and low forecasts were used to vary the load assumptions in the different IRP scenarios. Importantly, for resource planning purposes, planned demand side management ("DSM") was removed from the load forecast because this DSM is treated as selectable by the planning model.[24] This resulted in the forecast showing a positive growth rate when historically AES Indiana load has been relatively flat. When the DSM that was selected in the IRP is included in the IRP load forecasts, the forecasts exhibit a flatter trend that is more consistent with the load history.

The OUCC suggests on p. 2 of its comments that "AES either reduce its projected residential customer growth rate or provide more justification for its current estimate." In a related comment on p. 2, the OUCC also notes, "AES notes a correlation of more than 90% between the Marion County population and its number of residential customers. Since population and residential customers are closely correlated, AES should explain not only why residential customer growth outpaces population growth but also how it affects load."

While it is true that population growth lags behind AES's projected customer growth, the driver for the residential forecast is the number of households. To calculate the number of households, one takes the population divided by the average household size. Since Marion county's average household size steadily decreases over the course of the forecast horizon, AES Indiana is expected to see an increase in the number of households.[25] The compounded annual growth rate of households in Marion County over the forecast time horizon is 0.98%, which closely matches the projected customer growth rate.

Also, on p. 3, the OUCC notes more generally regarding the sales forecast included in the IRP, "AES should reevaluate its energy sales growth. Figure 3 of the IRP's Volume 3 shows declining energy sales since 2011. Between 2011 and 2021, energy requirements declined, on average, 1.0% annually. Excluding disruptions due to COVID-19, energy requirements averaged a 0.9% annual decline. Despite this historical drop in energy sales, Table 1-1 expects a 0.5% annual increase within the planning period. AES needs to use lower estimates for energy sales growth, to avoid raising consumer costs resulting from constructing or purchasing unnecessary generation. Otherwise, AES needs to justify why energy sales are expected to grow." In a similar comment on p. 11 of their comments, the CAC *et al.* notes that, "While the Company is projecting a relatively modest growth in its load, the trend is the opposite of the Company's recent experience with declining energy and peak demand."

[24] Historical DSM was still included in the IRP load forecasts.
[25] See Table 3-1 of Attachment 5-2 in AES Indiana's 2022 IRP, Volume III.

In response, the projected energy sales forecasted in the IRP do not contain any future DSM, only historical DSM that had occurred up to the point when the forecast was produced. This is to appropriately account for future DSM as a selectable resource during the capacity expansion analysis. Because of this, there is an expected growth in energy sales over the forecast time horizon. Increases in the assumed efficiencies in various end-uses are still captured using Itron's statistically adjusted end-use methods.[26] However, these baseline efficiency increases are not enough to offset the removal of DSM and therefore there is projected growth in energy sales.

The CAC et al. notes in reference to Table 1 "Base, Low, High Peak Load Forecast" on p. 10 of their comments that "there is little difference between the Company's base and high peak demand forecasts. This suggests either the Company's base forecast is too high, or the Company's high forecast provides little additional value to the IRP and Stakeholders."

The low and high peak load forecasts were constructed using Moody's Analytics Alternative Scenarios given the 10th and 90th percentile of economic performance for the Indianapolis MSA. These forecasts were meant to capture changes in load resulting from different economic futures, e.g., recession versus favorable economic outlook. However, load is not very responsive to changes in the economic inputs; thus, the differences are generally small and are considered within acceptable bounds. It is important to note that the table that the CAC et al. provides only includes economic differences and does not include the impacts from the electric vehicle ("EV") and behind-the-meter solar (i.e., photovoltaic ("PV")) forecasts. When these forecasts are included, the low and high forecasts demonstrate more deviation from the base.

b. Electric Vehicle and Solar

AES Indiana consulted with GDS Associates and its subcontractors ("GDS") to forecast the electric vehicle and behind-the-meter solar forecasts included in the IRP. GDS provided base, high and low forecasts for solar and base, low, high and very high forecasts for electric vehicles. The forecasts were used to vary the load assumptions in the different IRP scenarios.

The OUCC notes on p. 2 of its comments that "Section 5.4.2 [of AES Indiana's IRP] provides more information at the national level. The OUCC would like to see this information at a local/regional level for AES' service territory or, at a minimum, the State of Indiana."

The EV and PV forecasts used in the IRP included many local/regional specific data that was available at that time. The only inputs that are not specific to AES Indiana's service territory are: EV sales trend as percent of new vehicle sales, the ratio of cars to trucks/SUVs, miles driven per year, kWh per mile (EV efficiency), and average vehicle life. The latter four inputs listed do not show any significant variation across the United States. As is always the case, AES Indiana will work to include the most relevant and accurate data into its forecasting, in future IRPs as more local/regional EV and PV data becomes available AES will incorporate this information.

[26] See Appendices B and C of AES Indiana's 2022 IRP, Volume III.

The OUCC also notes on p. 2 that they "would like to understand how AES' Electric Vehicle Portfolio filing in Cause No. 45843 will impact AES's IRP over the near term. Specifically, whether the assumptions in this filing were included in AES' IRP load forecast."

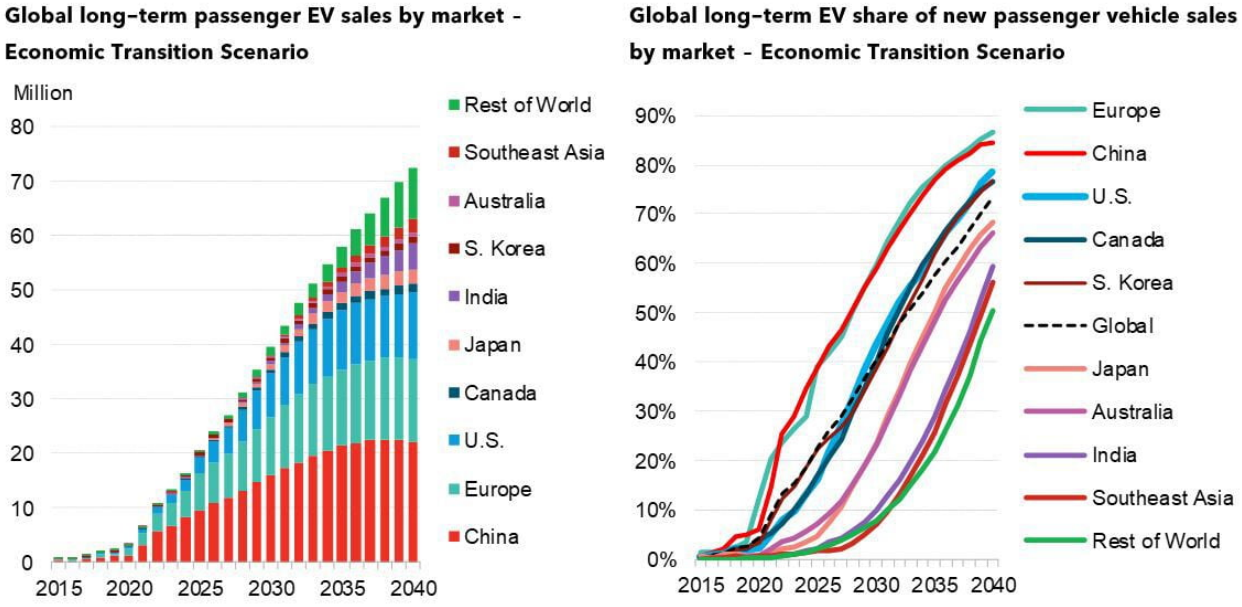
When estimating the EV adoption rate, AES Indiana attempted to capture the uncertainty around the future state of EVs by developing a low, base, high, and very high forecast. These forecasts were meant to capture the impacts of different policies that would significantly impact EV adoption in the AES Indiana service territory. AES Indiana worked internally to make sure the different forecasts sufficiently accounted for the possible impact contemporaneously proposed EV programs would have which the Company projects would be small. Additionally, AES Indiana's proposed EV portfolio is designed to gather important information (e.g., charging profiles) for a variety of customer segments not currently held by the Company. Information collected through the EV Portfolio will be used for load forecasting in future planning periods.

Referencing the AES Indiana IRP, the OUCC notes on p. 2, "On p. 48, AES states, 'The number of residential customers is essentially the number of households served by AES Indiana; therefore, the number of residential customers can be multiplied by the number of vehicles per household to estimate the total number of vehicles within the AES Indiana service territory.' This seemingly exaggerates the number of electric vehicles forecasted, as lower middle income and low-income customers will be unlikely to purchase an electric vehicle in the near term, as the used EV market will, most likely, take time to materialize."

Auto manufacturers have announced aggressive target dates to roll production over to 100% EVs. Using these dates, combined with the Indiana Bureau of Motor Vehicles new vehicle registration in Indianapolis for guidance, the base forecast included in the IRP yielded an EV adoption forecast that was realistic, if not conservative. To make a comparison that demonstrates AES Indiana's conservative view, Figure 1 below provides Bloomberg New Energy Finance's ("BNEF") market share outlook for new EV passenger vehicles. By 2040, EVs are expected to account for approximately 78% of the new passenger vehicle market share across the United States. Whereas, AES Indiana's base forecast reaches approximately 40% EV market share by 2040. The Company's very high EV forecast reaches closer to the 78% prediction from BNEF.[27] It should also be noted that the overall EV sales trend used in the forecast does incorporate the affordability of electric vehicles. The price premium of electric vehicles will reduce as manufacturers offer more EV models that are cost-competitive with traditional fuel vehicles, leading to more consumers purchasing electric vehicles. Again, this trend is reflected in the increasing sales trend of the forecast. Additionally, the EV forecast is only projecting new EV sales, as once a vehicle is sold and registered in the AES Indiana service territory, it is assumed that the EV "life" will follow a traditional fuel vehicle life, i.e., used vehicle market for both EV and traditional fuel vehicle will be the same in the trend of vehicles being sold, bought, and registered/used in the AES service territory.

[27] See AES Indiana's 2022 IRP, Volume I, p. 53.

Figure 1. BNEF Electric Vehicle Outlook 2022 – Vehicle Sales by Market



Source: BNEF. Note: Europe includes the EU, the U.K. and EFTA countries. EV includes BEVs and PHEVs.

Advanced Energy United notes on p. 6 of its comments that AES doesn't fully capture IRA assumptions in BTM solar in forecast.

In response, it is likely that AES Indiana did not fully capture the effects of the IRA on behind-the-meter solar in the forecast. At the time the forecast was created in early 2022, the IRA had not been finalized nor signed into law; therefore, the Company and its consultants did not have a full understanding of the IRA solar benefits. That being said, the solar forecast did consider a base, low and high growth scenarios to capture the uncertainty inherent in the future state. The Company believes that the impact of the IRA would be sufficiently captured by the solar scenario modeling.

Demand Side Management

On p. 2 of its comments, the OUCC "recommends including the avoided cost calculation for its demand-side management programs and its avoided transmission and distribution capacity costs similar to its 2019 IRP. AES should include the methodology and assumptions used (e.g., transmission and distribution components and capacity costs assumed, cost per mile, etc.) in an avoided cost calculation along with the justifications behind those assumptions."

The methodology used in the avoided cost calculations has not changed since AES Indiana's 2019 IRP. The calculation and calculation details are included in AES Indiana's 2022 IRP filing as Attachment 1-1 – T&D Avoided Costs, which is attached to this document as Attachment 1.

Referencing the AES Indiana IRP, the OUCC notes on p. 3 of its comments, "On p. 108, AES states 'GDS also examined the full potential in the C&I sector if these customers were no longer able to opt-out of utility-funded electric energy efficiency programs.' The OUCC would like clarity regarding what is meant by 'full'" potential (versus technical, economic, or achievable potential)."

This simply means that GDS looked at the Realistic Achievable Potential ("RAP") with and without opt outs included.

The CAC et al. notes on p. 13 of their comments, "A notable inconsistency with the IRP is that the MPS did not consider the avoided cost of carbon." "Had the MPS included a similar assumption for future carbon regulation, the UCT scores for all measures would have improved, thereby enabling additional measures to be considered cost-effective."

Unfortunately, the Market Potential Study's ("MPS") cost effectiveness modeling had already concluded by the time AES Indiana had decided to include a carbon tax in the current trends (reference case) scenario in the IRP. The Company did not have time to remodel the DSM in the MPS with a carbon tax concluded. The CAC et al. was intimately involved in the DSM planning process during the IRP and agreed that the analysis was sufficient with the avoided costs that were modeled that excluded carbon. Also worth noting, in the commercial sector, most measures were cost-effective and the gap between technical and economic was minimal, so increased avoided costs would not have had a significant impact. AES Indiana looks forward to working with the CAC in the future on the MPS/DSM/IRP work and will try to better align timing of the MPS modeling and IRP modeling of avoided costs.

The CAC et al. also discusses on pp. 14-19 of their comments their issue with AES Indiana only modeling RAP in the IRP planning model. More specifically, they indicate, "[w]hile CAC agrees with the process to bundle and model RAP savings, we disagree with the approach to use RAP as the only source of EE savings [in the planning model]."

In response, the use of RAP as the only source of EE and DR savings is considered appropriate by AES Indiana as RAP considers the various budget constraints that any DSM program faces. When constructing the RAP estimates, GDS closely calibrated its assumed incentive levels with historical levels but was not constrained by any previously determined spending levels over the 20-year analysis timeframe. In comparison, Maximum Achievable Potential ("MAP") estimates the achievable potential on paying incentives equal to 100% of measure incremental cost and uses aggressive adoption rates. AES Indiana anticipates challenges in achieving the RAP level of savings selected in the planning model, much less a higher MAP level. Including the MAP would result in significant increases to incentive and implementation spending relative to the overall increase in savings and associated benefits.

On p. 16 of their comments, the CAC et al. notes, "The MPS analysis made no accommodation for any emerging technology to be included in the later years of the analysis if/when the measure becomes cost-effective."

In response, GDS considered several specific emerging technologies as part of analyzing future potential (see p. A-26 of Volume III of the IRP). GDS acknowledged that the emerging technologies that were considered were not an exhaustive list; however, GDS considered many of the known technologies that are available today but may not have widespread market acceptance or availability. The list of emerging technologies considered by GDS was constructed with the assistance of stakeholders. GDS's analysis did not make any explicit assumptions about unknown future technologies. The methodology used assumes that subsequent equipment replacement, which occurs over the course of the study timeframe and at the end of the initial equipment's useful life, will

continue to achieve similar levels of energy savings relative to improved baselines and at similar incremental cost. This simplifying assumption attempts to capture the complexities of different technologies entering and exiting the DSM portfolio while not developing a false sense of precision.

The CAC et al. notes on p. 18 of their comments that "Demand response bundles do not include residential space heating and water heating direct load control."

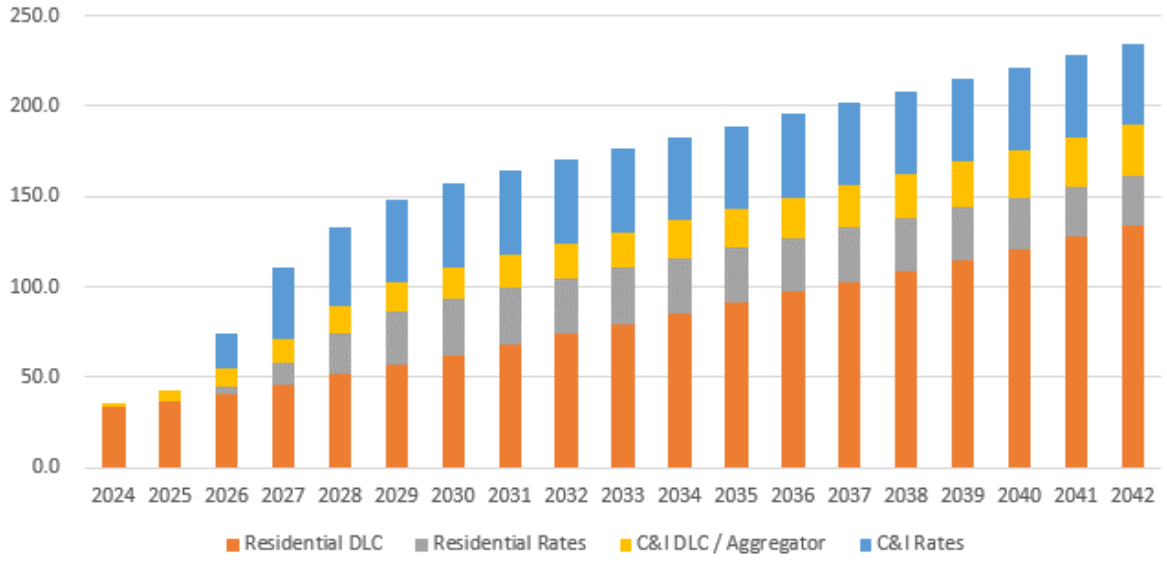
The AES Indiana and GDS teams investigated the CAC's comment and found that the Residential DLC bundle that was included in the IRP planning model did include direct load control of water heating; however, the water heating was errantly left out of the original table and corresponding chart in the Market Potential Study report (Figure 6-75 and 6-76 on pg. 118). This is likely the source of the CAC's view that it was not included. The corrected table below includes water heating in the Residential DLC bundle.[28]

Figure 2. Corrected Demand Response Inputs Used in the IRP Modeling

Bundle 1 – Residential DLC	Bundle 2- Residential Rates	Bundle 3 – C&I DLC / Aggregator	Bundle 4 – C&I Rates
DLC AC Switch DLC AC Thermostat DLC Electric Vehicles DLC Water Heating	Time of Use Rate Behavioral DR	DLC AC Thermostat DLC Water Heating Capacity Bidding	Time of Use Rate Interruptible Rate

Figure 3. Corrected Annual Demand Response Savings by Bundle

The demand response chart below has also been corrected to reflect the accurate numbers that were modeled in the IRP.[29]



[28] Correction of Figure 6-75 on p. 118 of AES Indiana's 2022 IRP, Volume I.
[29] Correction of Figure 6-76 on p. 118 of AES Indiana's 2022 IRP, Volume I.

Advanced Energy United notes on p. 6 of its comments that AES Indiana should "expand DSM in IRP." Advanced Energy United provided a report titled "Indiana Opportunities for Demand-Side Resources" to help guide DSM planning in future IRPs.

AES Indiana continues to be committed to engaging with stakeholders in the IRP process and appreciates the insight presented in the Report "Indiana Opportunities for Demand-Side Resources." AES Indiana recognizes DSM as an important asset in meeting the needs of customers and will continue to pull from this and all relevant sources to incorporate DSM in future IRPs.

Environmental

The OUCC notes on p. 3 of its comments, "Groundwater contamination from coal ash disposal in groundwater that exceed groundwater protection standards is a violation of the Indiana Groundwater Quality Standards (327 IAC 2-11) and the federal CCR Rule (CFR 257.90). … AES should be responsible for costs associated with remediation of coal ash groundwater contamination at these sites, not its ratepayers."

A groundwater remedy employed to comply with 40 CFR 257, Subpart D, is a compliance measure; it is not a fine, penalty, consent decree or indication of violation. Furthermore, AES Indiana's sites have not violated 327 IAC 2-11.

Regarding 40 CFR 257, groundwater monitoring results indicating a groundwater constituent at a level above a groundwater protection standard referenced in 40 CFR 257.90 of the Coal Combustion Residuals ("CCR") Rule is not a violation or a noncompliance event. Rather, such results trigger assessment of corrective measures. AES Indiana completed an assessment of corrective measures that evaluates potential corrective measures to remediate for the constituents present above groundwater protection standards. The report evaluates and compares potential corrective measures based on criteria identified in the rule. Prior to selection of remedy, a public meeting will be held to discuss the results of the corrective measures assessment with interested and affected parties.

Regarding 327 IAC 2-11-2(e), the rule sets forth certain criteria applicable to drinking water supply wells. There are no drinking water supply wells identified as having exceedances of these criteria attributed to AES Indiana's sites. 327 IAC 2-11-2(f) applies to nondrinking water supply wells such that: "No person shall cause the ground water in a nondrinking water supply well, including an industrial, commercial, or agricultural supply well, to have a contaminant concentration that, based on best scientific information, renders the well unusable for its current use." There is no nondrinking water supply well that has been rendered unusable for its current use.

Additionally, on p. 4, the OUCC notes, "AES needs to clarify the source of remaining selenium discharges, and why selenium discharges are not eliminated by the preferred portfolio and its conversion of remaining generators using coal to natural gas."

On August 11, 2021, the Indiana Department of Environmental Management ("IDEM") finalized revisions to Indiana's Aquatic Life and Human Health Ambient water quality

criteria ("WQC") for Metals (Rule) [Indiana Register 20211201-IR-327140058FRA]. The Rule includes the incorporation of final federal Selenium ("Se") WQC. The revised Se WQC is fish-tissue based and results in a Se water quality aquatic life criterion that is reduced by more than 80% from the prior Se WQC. AES Indiana Petersburg NPDES discharge data collected after elimination of bottom ash and flue gas desulfurization ("FGD") wastewater discharges indicates that the facility would exceed future Se Water Quality Based Effluent Limits ("WQBELs") if no action is taken to meet the anticipated revised limits. Se discharges are not eliminated by the conversion of Petersburg Units 3 and 4 to operate using natural gas due to the background Se concentration of the source water (i.e., the White River) being cycled up three to five times as part of the facility's closed cycle cooling water process and contact stormwater. In addition, the receiving water body stream, Lick Creek, has a zero-flow rate, which results in the inability for the facility's wastewater discharge to obtain any dilution allocation. As a result of these factors, the conversion to natural gas does not eliminate Se discharge.

Reliable Energy notes on p. 5 of its comments, "The Good Neighbor Rule (GNR) enables Petersburg Unit 3 to continue to operate year-round until the 2030 ozone season, without being retrofit with Selective Catalytic Reduction (SCR). This regulatory relaxation potentially affects the economics of decisions related to any gas conversion. Any IRP analysis is a point-in-time analysis, and when AES Indiana requests a CPCN, its analysis needs to be updated to reflect changes in law, including whether the GNR FIP has been stayed by a federal court."

Petersburg Unit 3 has already been retrofitted with Selective Catalytic Reduction; therefore, the Good Neighbor Rule ("GNR") does not affect this unit.

In regard to GNR, the final 2015 Ozone National Ambient Air Quality Standards ("NAAQS") Federal Implementation Plan (88 FR 36654) to address "good neighbor" obligations with respect to downwind states' ability to meet the NAAQS was released on March 15, 2023, subsequent to AES Indiana's IRP filing. Unit-level allocation amounts for 2026 and later are not yet available as they will be released approximately one year prior to the beginning of the associated ozone season. AES Indiana tracks environmental regulatory developments closely and agrees that if any CPCN were to be requested in the future for costs related to compliance with "good neighbor" obligations, that request should indeed be based on an analysis of needs reflecting applicable requirements to affected units and best available information at that time.

Distribution System Planning

Advanced Energy United notes on p. 5 of its comments, "AES Indiana should elevate distributed and demand-side resources as powerful tools to serve both customer and grid needs." More specifically, Advanced Energy United suggests that the Company aggregate DERs, like customer owned solar and storage, and characterize them as supply-side resources to help fill capacity need in the IRP.

In a similar comment, Solar United Neighbors, Vote Solar, and CAC note on p. 2 of their comments that AES Indiana should "allow DG solar and other DERs to be included as resources eligible for selection in modeling."

Additionally, the Hoosier Environmental Council notes on p. 2 of its comments, "Community solar is a valuable tool for increasing MW of solar, developing communities, and increasing grid resiliency and reliability."

AES Indiana views distributed energy resources ("DER") and Community Solar integration into distribution system planning and the IRP as a Company target for the next IRP. In 2022, the Company did not have the appropriate distribution system planning tools in place to sufficiently forecast DERs as a resource. The intention will be to use products like LoadSEER and DSMore to aggregate and model DERs as a supply-side option in the next IRP. AES Indiana looks forward to working with Advanced Energy United, Solar United Neighbors, Vote Solar, CAC, and Hoosier Environmental Council and others to help implement this DERs-as-a-resource approach in the next IRP.

Solar United Neighbors, Vote Solar, and CAC notes in their comments, "The Company should explain, in its forthcoming integrated distribution plan ("IDP"), how its distribution plan will put the Company on track to meet or exceed the level of DER deployment in its approved IRP."

To help facilitate day-to-day DER integration into longer term distribution system planning, AES Indiana researches and seeks new and innovative technologies to enable the grid of the future. PowerCleark was selected to be the customer and installer facing portal for distribution interconnections. PowerClerk allows customers, distributed energy resource developers, and AES Indiana to be able to manage and track the status of multiple interconnection requests submitted at the same time. This aids in streamlining the processing of requests while providing tracking capabilities for developers, customers, and AES Indiana. AES Indiana is working to coordinate PowerClerk, LoadSEER, and CYME for forecasting, modeling, and analyzing DER growth and impacts. AES Indiana is pursuing all new evolving technologies which can allow for more DER penetration within the distribution system while maintaining system reliability and power quality.

T&D Avoided Cost Calculation (2017$)

Avoided Long-Term Distribution Capital Costs	$	19.05	$/kW-yr	Reflects % of IPL circuits that may require upgrades based on the avoided cost of a new distribution circuit and % of peak reduction
Avoided Long-Term Transmission Capital Costs	$	1.91	$/kW-yr	No study was performed to estimate Transmission related avoided costs. Assumed to be 10% of Distribution Cap Costs
T&D Avoided Cost	$	20.96		

2018	$	21.48
2019	$	22.02
2020	$	22.57
2021	$	23.13
2022	$	23.71
2023	$	24.30
2024	$	24.91
2025	$	25.53
2026	$	26.17
2027	$	26.82
2028	$	27.49
2029	$	28.18
2030	$	28.89
2031	$	29.61
2032	$	30.35
2033	$	31.11
2034	$	31.89
2035	$	32.68
2036	$	33.50
2037	$	34.34
2038	$	35.20
2039	$	36.08
2040	$	36.98
2041	$	37.90
2042	$	38.85
2043	$	39.82
2044	$	40.82
2045	$	41.84
2046	$	42.88
2047	$	43.95
2048	$	45.05
2049	$	46.18
2050	$	47.33

Estimated Cost of Distribution Circuit
Based on assumptions provided by IPL T&D Planning

	Cost / Mile	Avg Length (miles)	Circuit Cost
Overhead Circuit			
3 Phase	$ 270,000	15.50	$ 4,185,000
2 Phase & Single Phase	$ 230,000	5.00	$ 1,150,000
Underground Circuit			
3 Phase	$ 230,000	5.50	$ 1,265,000
2 Phase & Single Phase	$ 120,000	8.50	$ 1,020,000
	Total	34.50	$ 7,620,000

Average cost $/kW of a distribution circuit $ 220,870 $/kw-mile

Circuit size 10,000 kW

	Underground	Overhead	
$/kW	$ 228.50	$ 533.50	Installed cost
Levelized Fix Charge Rate	0.125	0.125	Rate CGS - approximation for T&D Assets
Annual Fixed Charges	$ 28.56	$ 66.69	
Sum Fixed Charges	$ 95.25		$/kW-yr
20% of Sum Fixed Charges	$ 19.05		$/kW-yr Based on number of Circuits that are at or near capacity
	$ 0.00217		$/kWh