AES Indiana's Reply to Draft Director's Report for AES Indiana's 2022 Integrated Resource Plan Dated December 5, 2023

January 12, 2024

Introduction

Indianapolis Power & Light Company d/b/a AES Indiana ("AES Indiana" or "Company") appreciates the Director of Research, Policy and Planning Division of the Indiana Utility Regulatory Commission, Dr. Bradley Borum's, ("Director") draft comments to AES Indiana's 2022 Integrated Resource Plan ("IRP"). The Director's comments are generally positive and complimentary. In his comments (see p. 34), the Director concurs with the favorable comments made by the Citizens Action Coalition (and Energy Futures Group), Earthjustice, Solar United Neighbors, and Vote Solar ("Joint Commenters") with regard AES Indiana's stakeholder process. The Director notes (p. 34), "The Director agrees with the Joint Commenters that the stakeholder process used by AES Indiana was excellent and sets a high bar for future IRP processes by AES Indiana and other utilities. Especially important was AES Indiana's commitment to making available modeling inputs, outputs, and supporting data to stakeholders in a timely manner."

The Director noted areas in AES Indiana's IRP where further explanation and/or improvement are appropriate. This document responds to these areas. AES Indiana values the feedback the Director has provided and plans to use this input as guidance for the next IRP.

I. Load Forecasting

Director Comment #1:

> *Itron's document in Attachment 5-2 states that the end-use saturation and efficiency trends come from EIA's 2021 Annual Energy Outlook for the East North Central Census region; however, Section 5, page 36, in the IRP states that it was the 2020 version. Which version was used?*

(Director's Draft Report, pp. 9-10)

AES Indiana Response:

The 2020 reference on page 36 was a misprint. The forecast used the 2021 Annual Energy Outlook.

Director Comment #2:

> *The way AES Indiana and Itron are calculating normal weather using trend models is something relatively new and started with the 2019 IRP. The limitation of trend models is that they assume the trend will continue in the future, which may not be the case. Alternative ways of capturing the effects of global warming without using trend models would be to use NOAA's most recent set of 30-year normal weather or using shorter periods such as 15 or 20 years instead of the traditional 30-year period.*

(Director's Draft Report, p. 10)

AES Indiana Response:

The traditional approach for forecasting normal temperatures has been to use the average minimum and maximum temperature by month over a defined historical period and hold that temperature constant over the forecast period. However, analysis of Indianapolis historic weather data indicates a definite increasing temperature trend. Therefore, when applying the traditional approach, using a shorter normal period (e.g., 15 or 20 years) would provide a more accurate starting temperature than a longer 30-year period. However, assuming this temperature stays static does not account for trends identified in the recent weather history. Many in the energy forecasting industry, including other utilities as well as the Energy Information Administration ("EIA"), have transitioned to using trended normal weather.[1]

The Company recognizes that these trends may change. Accordingly, AES Indiana will continue to monitor and reassess if a trend in increasing temperatures persists in its future IRPs and adjust the weather normal methodology based on observations.

Director Comment #3:

> *Section 5, page 37, has a confusing labeling. There is a section called "Capturing Increasing Temperatures", however, only the first paragraph under it discusses weather data.*

(Director's Draft Report, p. 10)

AES Indiana Response:

The paragraphs following the section labeled "Capturing Increasing Temperatures" are missing labels. The paragraph that follows the "Capturing Increasing Temperatures" section that starts with "AES Indiana-sponsored DSM was included as an endogenous variable…" should be labeled "Modeling AES Indiana-sponsored DSM." And the following paragraph that starts with "In addition to the base forecast, AES Indiana developed a high and low load forecast…" should be labeled "Low, Base and High Load Forecasts." Including these labels should make the narrative less confusing.

Director Comment #4:

> *The residential customer model driver in the 2022 IRP is Marion County population whereas in the 2019 IRP it was housing starts. It would be interesting to know why this change was made since it is not addressed in the report.*

(Director's Draft Report, p. 10)

AES Indiana Response:

The 2019 IRP used the Moody's Marion County number of households projections. In the 2022 IRP, the change was made to use Moody's Marion County population projections as the driver in the residential customer model. While the Moody's Marion County number

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[1] See p. 9 of Assumptions to the Annual Energy Outlook2023: Residential Demand Module https://www.eia.gov/outlooks/aeo/assumptions/pdf/RDM_Assumptions.pdf.

of households may provide a better estimate of the number of AES Indiana customers at a static moment in time, the growth trend in Moody's Marion County population data shows a stronger correlation to AES Indiana customer growth than the Moody's Marion County number of households. This is demonstrated in Figure 1 below. The correlation between population and customers is 0.982 while the correlation between households and customers is 0.975. This change was made as an improvement in methodology.

Figure 1: Moody's Marion County Population and Number of Households Correlation to the Number of Residential Customers

	Marion County Population	Marion County Number of Households
Correlation Coefficient to Total Number of Residential Customers	0.982	0.975

Director Comment #5:

The commercial model economic activity variable is weighted between non-manufacturing employment and non-manufacturing output at 65% and 35%, respectively. These weights are significantly different than in the 2019 IRP when they were 80% and 20%, respectively. What is the reason for this change?

(Director's Draft Report, p. 10)

AES Indiana Response:

Increasing the weight on non-manufacturing output improved the out-of-sample statistics resulting in a lower Mean Absolute Percent Error ("MAPE"). MAPE measures the accuracy of a forecast compared to actual results as a percentage with lower MAPE values representing more accurate forecasts. Using a 20% weight resulted in a 3.95% MAPE, while using 35% weight resulted in a 3.78% MAPE. Accordingly, AES Indiana used the 35% weight as this improved the accuracy of the forecast.

Director Comment #6:

The Industrial economic activity variable is weighted between manufacturing employment and manufacturing output with a higher weight on output than employment. This is an interesting change from the Industrial forecast in the 2019 IRP which put a higher weight on the employment piece. Why was this change made? Manufacturing employment can be a problematic driver for sales because as manufacturing processes become automated manufacturing employment and sales move in opposite directions. Is this why the change was made or was it for some other reason?

(Director's Draft Report, p. 10)

AES Indiana Response:

AES Indiana and Itron recognize the potential lack of correlation between manufacturing employment and sales due to automation. However, the reason for the change in the 2022 IRP was because the manufacturing employment data series from Moody's included a significant downturn due to COVID impacts in the historical data, whereas the Moody's output data series was less erratic, as seen in the charts below. Weighting the industrial economic activity variable more heavily to output helped to smooth the impact of the COVID downturn in the final combined economic activity variable used in the model. AES Indiana considers the weighting used to provide a more stable application of this driver.

Figure 2: Marion County Manufactering Employment in Thousands (1990 to 2040)

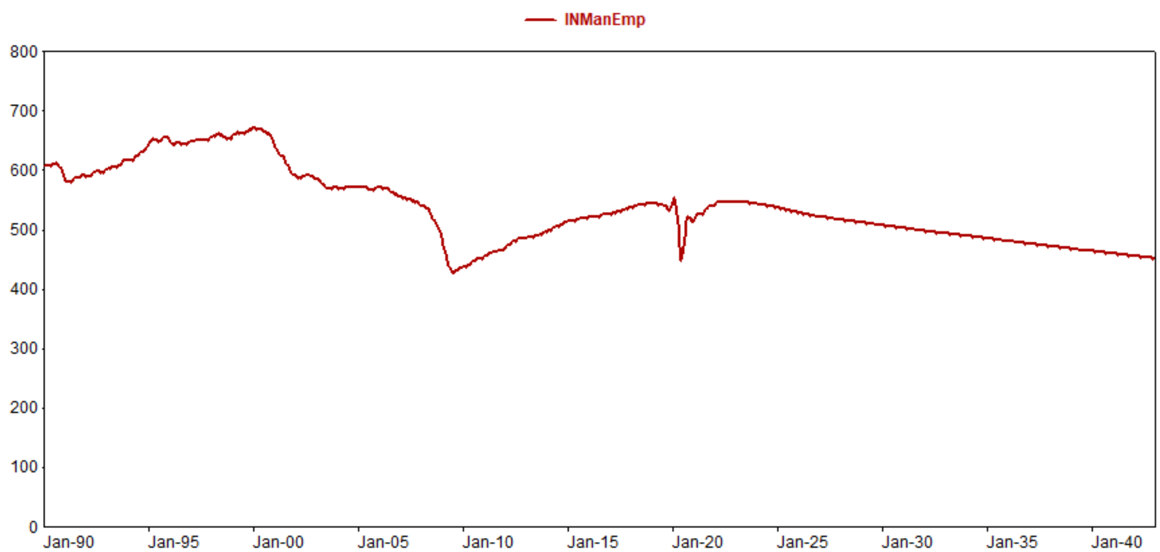
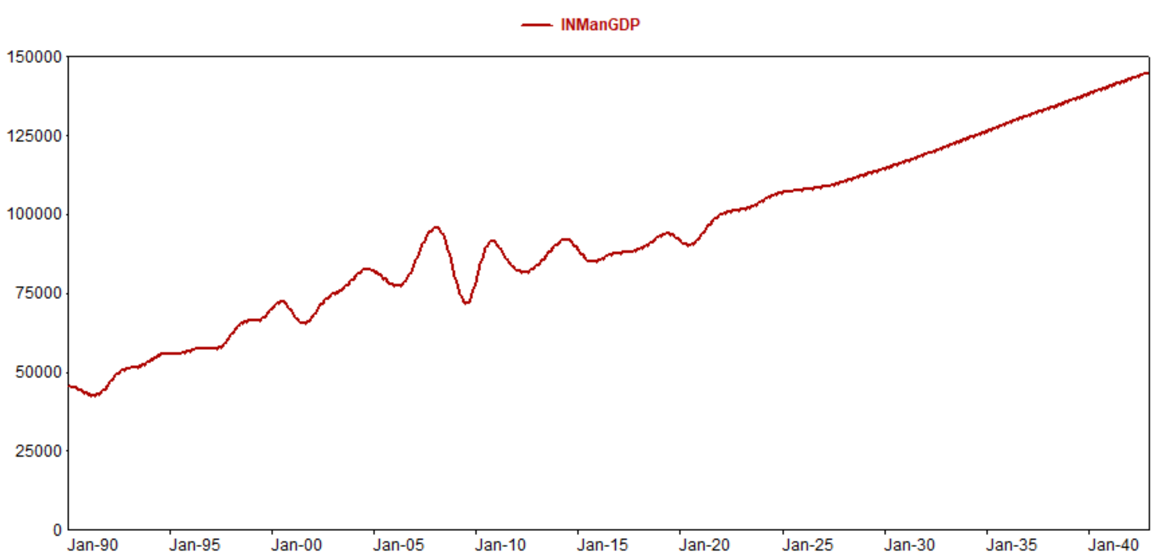


Figure 3: Nominal Marion County Manufacturing GDP in Thousands (1990 to 2040)



Director Comment #7:

Figure 5-3 lacks a legend to indicate whether the bars represent energy and the line is peak demand or vice versa.

(Director's Draft Report, p. 10)

AES Indiana Response:

In Figure 5-3 from AES Indiana's 2022 IRP (p. 34), the blue bars represent the energy in megawatt hours ("MWh") and the green line represents the peaks in megawatts ("MW").

Director Comment #8:

On page 36, AES Indiana says how the historical prices used in the load forecast were derived but does not indicate the source for future prices. The Itron report shows the prices graphically but does not show how future prices were projected. It also appears the price forecast did not vary by scenario.

(Director's Draft Report, p. 10)

AES Indiana Response:

Future prices are based on AES Financial Services projections. The price forecast used to develop the load forecast does not vary by scenario. The estimation is based estimated operating expenses and return on rate base with approximate adjustments for future rate cases.

Capturing the impacts to rates is somewhat circuitous in IRP modeling because a utility's rates are largely determined by the portfolio that results from the capacity expansion analysis using the base price forecast. Therefore, you won't understand the impacts to rates by scenario until you have the results. Ultimately, the price elasticity included in the load forecast modeling is low ~0.05%. Thus, changing the price forecast has an immaterial impact on the resulting forecast and load obligation. These are reasons why the price forecast was held constant across portfolios.

Director Comment #9:

Pages 44-45 indicate the street lighting model is a trended time series model. Are there concerns that this may result in a forecast that shows future efficiency gains that are not achievable, since the recent history includes the conversion to LED lights? That is, since the history shows a trend of significantly improving efficiency, will the future be able to continue this trend.

(Director's Draft Report, p. 10)

AES Indiana Response:

To clarify the narrative in the 2022 IRP report "Streetlighting" (pp. 44-45), the streetlighting modeled in the IRP load forecasts were held constant at the 2021 level after the LED conversions were complete. Therefore, no efficiency trends attributed to the LED conversions were captured in the IRP load forecast.

Director Comment #10:

The residential EV forecasting methodology is discussed on pages 48-49. It appears the EV forecast is based on the percentage of new vehicle sales that are EVs in each year while the total vehicles within the AES Indiana service territory is a function of the number of households multiplied by the number of vehicles per household. It is unclear how the number of new vehicles is determined each year. Is it the incremental additions based on the change in households, or is there a consideration of the replacement of existing vehicle stock? If it is assumed that some existing vehicles will be replaced (either through equipment failure or accidents), the number of new vehicles each year will be higher, as will the number of EVs. On page 54 the of [sic] vehicle lifespan is briefly mentioned but does little to clarify the basic question. The sentence on page 54 states "The projection of the total number of EVs accounts for the typical 'lifespan' of a vehicle as well."

(Director's Draft Report, p. 10)

AES Indiana Response:

The electric vehicle ("EV") forecast accounts for new EV sales from customer growth based on the change in the number of households each year, as well as new EV sales from existing customer vehicle replacements. Essentially, for each year of the forecast, two separate projections are made: 1) The total number of vehicles being replaced due to accidents/failures is calculated and then multiplied by the projected EV sales percentage. 2) The number of new vehicles added due to customer growth is calculated and then multiplied by the EV sales percentage. The result of adding both projections together is the total number of additional EV's on the AES Indiana system in each year from both existing vehicle replacements and new vehicle sales.

II. DSM & Energy Efficiency

Director Comment #11:

The business survey process did not achieve the industry-standard 90/10 statistical significance but met 85/15 statistical significance level. What needs to be improved in the future to achieve that standard? How significant would be the impact in the final results of using this 85/15 level instead of the standard level? One sentence says that "the length of the business survey could have been a factor in the low completion rate." Is there a problem with the design of the survey? (See Attachment 6-3, p. 10)

(Director's Draft Report, p. 14)

AES Indiana Response:

AES Indiana's contractor, GDS Associates, Inc. ("GDS"), targeted the industry-standard 90/10 statistical significance level for both the baseline end-use survey and the willingness to participate ("WTP") survey. The WTP survey was prioritized for this study, as the data collected is important to understanding which energy efficiency programs may have the highest adoption rate and what the incentive levels need to be for the largest impact. The WTP survey conducted for the MPS did meet the 90/10 statistical significance level overall.[2]

However, the baseline end-use survey had a lower completion rate than the WTP survey and a somewhat lower completion rate than what is typical for this type of survey. This is a common challenge with baseline end-use surveys in the business sector, as many businesses surveyed may not know the specific appliances used in their building or do not have the expertise to answer some of the detailed end-use questions, resulting in partially or fully incomplete surveys. It is possible that dividing the baseline survey into several smaller surveys could boost the completion rate (although in this scenario the survey results for any individual respondent do not provide a full picture of energy end-uses). Another potential avenue for increasing the statistical precision in future iterations of market research would be to increase the incentive for completing the survey. Alternatively, including other modes of delivery for the survey could increase the overall recruitment sample, in an effort to ensure that even with lower response and completion rates the number of completed surveys would be sufficient for a 90/10 statistical significance level. A physically mailed survey may increase the recruitment sample, as a customers are enrolled on a “Do Not Email” list.

The overall final results of both the WTP and baseline surveys are still appropriate to incorporate into the study. The impact of achieving a statistical significance level of 85/15 on the baseline end-use survey compared to a level of 90/10 is that we are slightly less confident and there is a slightly higher margin of error when interpreting the results and applying to the general population of businesses served by AES Indiana. As an example, it is possible that the actual population of businesses served by AES Indiana has a higher saturation of electric space heating end-use appliances than the survey results indicate; however, it is equally possible that the actual population of businesses served by AES Indiana has a lower saturation of electric space heating end-use appliances than the survey results indicate. In short, the baseline survey results are still an appropriate estimate for the end-use energy characteristics of the AES Indiana business population.

Director Comment #12:

> *GDS affirms that the impacts of free riders and spillover customers were considered in the development of DSM inputs. However, there are no details or clear explanation in any of the 2022 IRP Volume documents on how these impacts were estimated or handled. How or where were free-riders and spillover customers potential considered and how did these affect the final efficiency savings estimates, program participation/saturation rates or the adoption incentive levels? (See Attachment 6-3, p. 27)*

(Director’s Draft Report, p. 14)

AES Indiana Response:

GDS developed measure-level net-to-gross (“NTG”) ratio assumptions by leveraging the most currently available AES Indiana program evaluation reports at the time of the study.

[2] See AES Indiana’s 2022 IRP Report, Volume III, Attachment 6-3, p. 10.

These NTG ratios were then applied to the estimates of achievable potential to develop net savings for the achievable potential scenario, which then formed the basis of the DSM inputs. The methodological approach taken by the study attempts to recognize that customers that already have efficiency measures installed will not be eligible for participation, while also recognizing that some customers that have not yet installed efficiency measures will be free riders in the future. By leveraging NTG ratios in the analysis, the study also implicitly captures not just free ridership but future spillover as well.

Director Comment #13:

> *The development of the bundles considered sector and vintage segmentation to have a more appropriate approach to model DSM measures. However, there is a concern in combining unrelated measures with very different load shapes in the same bundle. How appropriately does the bundle's load shape reflect the load shapes of the individual measures in the same bundle? Would GDS consider alternative approaches for including only measures with similar load shapes in one bundle?*

(Director's Draft Report, p. 14)

AES Indiana Response:

Although the IRP bundles are aggregated at the sector/vintage level, GDS did consider the impact of different end-use load shapes in the overall creation of the overall bundle load shape. For each year, GDS calculated the contribution of energy savings by end-use and created a weighted average 8,760 bundle load shape that reflects the contribution of the various end-uses included in each bundle. This was an important step to maintain an understanding of when, throughout the year, the annual energy savings occur.

GDS and AES Indiana developed the large sector-level bundles based on feedback provided by the Citizens Action Coalition ("CAC") (and their consultants) as a way to facilitate the IRP energy efficiency savings selection. More granular bundles could be developed that reflect measures with similar load shapes, but there was concern that some higher cost efficiency measures might not get selected if separated from other lower cost measures. In addition, at some point, the increased granularity will have a negative impact on the IRP modeling run-time, which needs to be considered when developing bundles in IRPs.

AES Indiana and its consultants appreciate the Director's comment and will consider alternative bundling approaches in the next IRP including bundling based on similar load shapes.

Director Comment #14:

> *The analysis and discussion of rate structures in the MPS is helpful but has limitations that make it difficult to understand exactly what was evaluated. The*

MPS prepared by GDS includes a brief description of each rate evaluated but little specific detail for the individual rates was provided. For example, there is little or no explanation of the detailed design of the time-varying rates considered beyond a description of the general components of the rates evaluated.
(Director's Draft Report, p. 14)

AES Indiana Response:

The following assumptions were made for each of the rate programs analyzed in the MPS. Generalized secondary research was used to determine the rate program designs, program assumptions and calculate potential demand savings. Specific assumptions for each demand response program beyond the below descriptions can be found in the demand response ("DR") Appendix of the Market Potential Study ("MPS") report.

- Residential Behavioral DR: this program was assumed to be similar to a Peak Time Rebate program. Participants are paid for load reductions (estimated relative to a forecast of what the customer otherwise would have consumed). If customers do not wish to participate, they simply pay the existing rate. There is no rate discount during non-event hours. Customers stay on the standard rate at all hours. GDS assumed there would be approximately 80 hours of on-peak event hours each year. Participants would be paid $1 per kWh they reduced during the control hours.
- Time of Use ("TOU") (with and without Enabling Technology): A TOU rate divides the day into time periods and provides a schedule of rates for each period. The price would be higher during the peak period and lower during the off-peak period, mirroring the average variation in the cost of supply (including marginal capacity costs). In some cases, TOU rates may have a shoulder period, or particularly in the winter season, two peak periods. Additionally, the prices and period definitions might vary by season. With a TOU rate, there is certainty as to what the prices will be and when they will occur. A TOU rate can be coupled with an enabling technology, such as a smart thermostat. In this instance, the utility would provide a smart thermostat to participants, and in return, would likely get higher savings.
- Curtailable Rate or Interruptible Rate: With the interruptible rate, the utility enters financial agreements with businesses to reduce load when dispatched. Load curtailment potential is driven by incentive payments, the frequency of events, the duration of events, and the level of notification participants are given about pending events. Results were calculated for both a "day-ahead" notification design and a "day-of" notification design. "Day-ahead" notification assumes an approximately 24-hour notice, and "day-of" notification assumes a three- to six-hour notice. The potential is higher under the "day-ahead" notification design, as this provides participants greater opportunities to shift energy-intensive tasks to off-peak periods. The expected control hours for this program are 28 for the year, with a four-hour event duration and a maximum of seven events.
- Capacity Bidding and Demand Bidding: these programs are not considered rates. They are flexible bidding programs offering businesses payments for agreeing to reduce load when an event is called. Participants make monthly nominations and

receive capacity payments based on the amount of capacity reduction nominated each month, plus energy payments based on actual kilowatt-hour ("kWh") energy reduction when an event is called. The amount of capacity nomination can be adjusted on a monthly basis. The program can be internet-based, providing ready access to program information and ease-of-use. Penalties occur if load nominations are not met.

III. Scenario & Risk Analysis

Director Comment #15:

Regarding the Scenario & Risk Analysis, the Director noted that AES Indiana modeled capacity expansion for six strategies under four scenarios, resulting in 24 capacity expansion portfolios. The Director commented that "without further evaluation, the candidate portfolios [24 capacity expansion portfolios] were narrowed to the six portfolios generated from the Reference Case only." The Director indicated that the reason AES Indiana provided for narrowing to the six Reference Case portfolios in the IRP was insufficient and that further analysis is needed. The reason provided by AES Indiana on pg. 186 of the 2022 IRP was that the Current Trends/ Reference Case were used because this set of portfolios was "optimized assuming AES Indiana's most probable view of the future." Regarding this reasoning and analysis conclusion, the Director notes that "It seems that conclusions have been made before doing a thorough analysis."

(Director's Draft Report, p. 20)

AES Indiana Response:

The Scenario Analysis conducted for the 2022 IRP was intended to compare the cost effectiveness of resource mixes developed under the Current Trend/Reference Case scenario to resource mixes developed under more extreme, "bookend" scenario assumptions in the No Environmental Action, Aggressive Environmental, and Decarbonized Economy scenarios. Ultimately, the analysis answered the question, "Which Petersburg strategy performs generally the best across the different potential futures?" The analysis demonstrated that converting Petersburg Units 3 and 4 to operate using natural gas generally performs the best in the No Environmental Action, Current Trends/Reference Case, and Decarbonized Economy scenarios and is more cost effective than continuing to burn coal at Petersburg Generating Station ("Petersburg") in every scenario. AES Indiana performed the final IRP Scorecard evaluation on only the Current Trends/Reference Case portfolios because this scenario assumes the most probable view of the future. This conclusion was not made without analytical support. As noted, the other scenarios were modeled as "bookend" scenarios or scenarios that represent extreme futures that while unlikely are possible. This analysis is further discussed below.

When comparing the resource mixes across the scenarios during the key decision-making time frame or Short Term Action Plan period, the primary difference is the volume of wind and solar energy resources driven by more or less aggressive environmental policy assumptions. The Petersburg Units 3 and 4 capacity replacements are filled by either the natural gas conversion or battery energy storage systems ("BESS") across all scenarios. In other words, **the key capacity replacement decisions are nearly the same regardless of scenario.** The scenarios only vary in terms of the volume of wind and solar being added primarily for energy value if the scenario assumptions support it. To elaborate on this point, AES Indiana refers to the tables contained in Figure 4 below, which compare the resource mixes across scenarios for the 2025-2028 period, and discusses this information further below the tables:

Figure 4: Resource Mix by IRP Strategy (2025-2028)

No Environmental Action (Additional MW)

Period: 2025 - 2028

	Conversion	CCGT	Storage	Hybrid	Solar	Wind
No Early Retirement	-	-	180	-	-	-
Pete Conversion	1,052	-	180	-	-	-
One Unit	-	-	620	-	-	-
Retire & Replace	-	325	760	-	-	-
Clean Energy	-	-	640	-	420	100
EnC Opt	1,052	-	180	-	-	-

****Reference Case** (Additional MW)**

Period: 2025 - 2028

	Conversion	CCGT	Storage	Hybrid	Solar	Wind
No Early Retirement	-	-	240	45	-	500
Pete Conversion	1,052	-	240	45	-	500
One Unit	-	-	700	-	-	500
Retire & Replace	-	325	760	-	-	600
Clean Energy	-	-	700	45	280	900
EnC Opt	1,052	-	240	45	-	500

Aggressive Environmental (Additional MW)

Period: 2025 - 2028

	Conversion	CCGT	Storage	Hybrid	Solar	Wind
No Early Retirement	-	-	260	45	65	1,250
Pete Conversion	1,052	-	260	90	845	1,500
One Unit	-	-	700	90	553	1,450
Retire & Replace	-	-	780	45	293	2,100
Clean Energy	-	-	780	45	293	2,100
EnC Opt	526	-	400	45	260	1,900

Decarbonized Economy (Additional MW)

Period: 2025 - 2028

	Conversion	CCGT	Storage	Hybrid	Solar	Wind
No Early Retirement	-	-	260	45	390	500
Pete Conversion	1,052	-	260	45	390	500
One Unit	-	-	680	45	293	600
Retire & Replace	-	325	760	45	260	650
Clean Energy	-	-	1,060	45	293	850
EnC Opt	1,052	-	260	45	423	500

The following paragraphs summarize what is shown in Figure 4 above.

1. The key decision being made in the Short Term Action Plan period concerns the future of the Petersburg coal-fired Units 3 and 4 (approximately 1,000 MW). This decision boils down to three options, AES Indiana could a) continue to fire these units with coal; b) convert them to burn natural gas as fuel; or c) retire and replace these units with some other capacity. Any other strategies developed beyond the IRP Short Term Action Plan period regarding other AES Indiana resources will be addressed again in the next and future IRPs.
2. Referring to the tables below – if we focus on the first three resource columns (i.e., Conversion, combined-cycle gas turbine ("CCGT"), and storage), notice that across the scenarios, the resource mixes when comparing strategies are approximately the same. The model selects approximately 200 MW of BESS to fill the 200 MW capacity needed for winter capacity under MISO's seasonal resource adequacy construct in every strategy.[3] And, in strategies that retire Petersburg Units 3 and 4, the model replaces the capacity with either BESS or BESS and CCGT. To summarize, the Current Trends/Reference Case scenario is representative of the other scenarios in terms of capacity strategies at Petersburg.
3. Focusing now on the last three columns (i.e., Hybrid, Solar, and Wind) in the tables. As the environmental policy assumptions become more aggressive, the model selects more clean energy (solar and wind) primarily for its energy value. For example, in the Aggressive Environmental Scenario, a high carbon tax, starting at $19.47 per ton in 2028, was captured in the fundamental power price forecast as higher power prices that are available to solar and wind resources. This drove the model to take advantage of the higher prices and select greater amounts of wind and solar resources for the energy revenue. Additionally, the Decarbonized Economy Scenario assumes a clean energy mandate that requires utilities to serve a percentage of their load from clean energy (wind, solar and storage). This percentage increases to over 80% by the end of the planning period. This mandate drove the model to select higher amounts of wind and solar resources to meet the energy requirement of the mandate.
4. In conclusion, the analysis demonstrates that, regardless of the scenario, the Current Trends/Reference case portfolios provide a good representation of the capacity strategies at Petersburg. The primary difference between the resource additions when comparing across scenarios is that as the environmental policies in the scenarios become more or less aggressive, the model adds more or less wind and solar, respectively, over the planning period. These wind and solar additions are primarily driven by energy benefits and not capacity need. AES Indiana would only add this level of renewable energy resources if environmental policy creates an economic incentive to do so. Considering these points, the

[3] In Cause No. 45920, AES Indiana filed with the IURC for the Pike County Energy Center, a 200 MW/4-hour BESS project to fill this capacity need.

decision to only use the Current Trends/Reference Case portfolios in the IRP Scorecard analysis was reasonable but in hindsight AES Indiana understands that a more robust discussion of this analysis in the IRP would have better facilitated understanding.

IV. The Five Pillars

In the Five Pillars section of the Director's Comments, the Director notes AES Indiana uses of the Five Pillars (Affordability, Reliability, Resiliency, Stability and Environmental Sustainability) as the basis for the 2022 IRP portfolio metrics and Scorecard. The Director indicates (p. 19) that "The discussion of the metrics and the scorecard results were well done and very helpful. Understanding how AES Indiana interpreted and applied the results is critical."

The Director goes on to comment on some of the metrics in more detail. AES responds to these comments where appropriate below.

The Director concludes the "The Five Pillars" section of the Director's Draft Report (p. 20) by noting that the purpose of the scorecard is to highlight the tradeoffs across the various metrics for different portfolios under different scenarios and circumstances. He also notes (p. 20) that "Despite the basic difficulties discussed above [by the Director in the Five Pillars section], AES Indiana provided an excellent discussion of the modeling results and the key takeaways as the modeling progressed. The discussion of the scorecard evaluation results in section 9.4 of the IRP report (IRP pages 234-252) was informative and helped the Director to understand how AES Indiana interpreted and used the different modeling results to inform AES Indiana's selection of the preferred portfolio."

Director Comment #17:

> *Quanta also states that the reliability, stability, and resiliency assessments are screening level indicative analyses. Quanta goes on to say that "detailed system studies are essential and should be conducted to properly assess system reliability of the short-listed Portfolios." The Director wonders when these detailed system studies should be conducted and by whom.*

(Director's Draft Report, pp. 19)

AES Indiana Response:

Screening-level assessments are a reasonable means to evaluate and rank the system reliability under each of the candidate portfolios. This approach is also practical due to not only time and resource constraints, but also the uncertainties in the surrounding environments.

AES Indiana recognizes that detailed system studies are necessary. Toward that end, AES Indiana works both as a partner with MISO and within the MISO generator interconnection process framework to develop detailed studies for transmission system generator interconnections. This is consistent with the “reliability imperative” that MISO, its members (e.g., AES Indiana), and states (e.g., Indiana) all share. Some of the detailed studies are driven by MISO, like an overall system impact study, and some are driven by the transmission owner, like a specific facilities study. AES Indiana engages in this interconnection study process wherever appropriate, either as an interconnection customer or a transmission owner. The timeline for these studies is driven by MISO, as the administrator of the so-called queue. AES Indiana also internally leads distribution system generator interconnection reliability studies. Finally, as necessary, the Company conducts detailed system studies when evaluating specific projects prior to initiating an investment decision. For example, in preparation for Cause No. 45493, AES Indiana conducted a detailed interconnection study for the Hardy Hills Solar Project.

V. Summary

AES Indiana appreciates the Director’s thoughtful comments regarding the 2022 IRP stakeholder process, and the Company intends to continue this approach in future IRPs. AES Indiana looks forward to implementing many of the suggestions that have been provided. The Resource Planning team is confident the Company’s IRPs will continue to improve, especially in the area of Distribution System Planning where the Company is implementing best-in-class tools[4] to assist in EV and distributed energy resource planning.

Overall, AES Indiana endeavors to constantly improve its IRPs that are guided by the Five Pillars of Utility Electric Service. The Company will continue to look effective ways to evaluate and measure Affordability, Reliability, Resiliency, Stability and Environmental Sustainability in making significant IRP decisions.

[4] See https://www.in.gov/iurc/files/IURC-042418-Integral-Analytics.pdf.