**STATE OF INDIANA**

**INDIANA UTILITY REGULATORY COMMISSION**

| | |
|---|---|
| **VERIFIED PETITION OF INDIANAPOLIS POWER & LIGHT COMPANY D/B/A AES INDIANA ("AES INDIANA") FOR (1) ISSUANCE OF CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO REPOWER PETERSBURG GENERATING UNITS 3 & 4 TO OPERATE ON NATURAL GAS ("PETERSBURG REPOWERING PROJECT"); (2) APPROVAL OF PETERSBURG REPOWERING PROJECT AS A CLEAN ENERGY PROJECT; AND (3) ASSOCIATED ACCOUNTING AND RATEMAKING, INCLUDING RECOVERY OF PROJECT COSTS, PROJECT DEVELOPMENT COSTS, FGD DEWATERING AND RELATED COSTS, THE REMAINING NET BOOK VALUE OF PETERSBURG UNITS 3 AND 4 RETIRED ASSETS, AND CERTAIN MATERIALS AND SUPPLIES INVENTORY.** | **CAUSE NO. 46022** |

**PETITIONER'S SUBMISSION OF DIRECT TESTIMONY OF**
**ERIK K. MILLER**

Indianapolis Power & Light Company d/b/a AES Indiana ("AES Indiana" or "Petitioner"), by counsel, hereby submits the direct testimony and attachments of Erik K. Miller.

Respectfully submitted,

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## CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing was served this 11th day of March, 2024, by email transmission, hand delivery or United States Mail, first class, postage prepaid to:

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**VERIFIED DIRECT TESTIMONY**

**OF**

**ERIK K. MILLER**

**ON BEHALF OF**

**INDIANAPOLIS POWER & LIGHT COMPANY**

**D/B/A AES INDIANA**

**SPONSORING AES INDIANA ATTACHMENTS EKM-1, EKM-2, AND EKM-3**

**VERIFIED DIRECT TESTIMONY OF ERIK K. MILLER**
**ON BEHALF OF AES INDIANA**

## 1. INTRODUCTION

**Q1. Please state your name, employer, and business address.**

A1. My name is Erik K. Miller. I am employed by Indianapolis Power & Light Company d/b/a AES Indiana ("IPL", "AES Indiana", or "Company"), One Monument Circle, Indianapolis, Indiana 46204.

**Q2. What is your position with AES Indiana?**

A2. I am Director, Resource Planning.

**Q3. On whose behalf are you submitting this direct testimony?**

A3. I am submitting this testimony on behalf of AES Indiana.

**Q4. Please briefly describe your educational background and business experience.**

A4. I hold a bachelor's degree from Indiana University's School of Journalism and a Master of Public Affairs degree from Indiana University's School of Public and Environmental Affairs. Prior to coming to AES Indiana, I worked as a Senior Project Manager for the energy efficiency consulting company, CLEAResult from 2012 – 2015 and prior to that as an Energy Efficiency Program Coordinator at Hoosier Energy Rural Electric Cooperative from 2009 – 2012.

**Q5. What are your current duties and responsibilities at AES Indiana?**

A5. I am responsible for the economics and decision support analysis in the areas of resource planning, environmental planning, and other strategic level analysis. This work includes

AES Indiana's Integrated Resource Plan ("IRP") that is filed with the Commission every three years per 170 IAC 4-7-2.

**Q6. Have you previously testified before this Commission?**

A6. Yes. I have previously testified before the Commission in Cause No. 44792, which concerned AES Indiana's DSM programs offered in 2017, Cause No. 44945, which concerned AES Indiana's DSM programs offered from 2018 – 2020, Cause No. 44945, which concerned AES Indiana's DSM programs offered in 2021 -2023 and Cause No. 45370, which concerned AES Indiana's DSM programs offered in 2024. Additionally, I testified in AES Indiana's CPCN proceedings for the Hardy Hills Solar Project, Cause No. 45493, the Petersburg Energy Center Solar + Storage Project, Cause No. 45591, and the Pike County Battery Energy Storage Project, Cause No. 45920.

**Q7. What is the purpose of your testimony in this proceeding?**

A7. My testimony: 1) presents AES Indiana's Preferred Resource Portfolio and Short Term Action Plan defined in the Company's 2022 IRP; and 2) demonstrates that the conversion of Petersburg Units 3 and 4 from coal to natural gas is consistent with AES Indiana's IRP Preferred Resource Portfolio and the "Five Pillars" as defined by the 21st Century Energy Policy Development Task Force[1] and HEA 1007 (Ind. Code § 8-1-2-0.6).

**Q8. Please provide an overview of how your testimony is presented.**

A8. My testimony is divided into the following sections:

- 1. Introduction

[1] 21st Century Energy Policy Development Task Force, Final Report, November 19, 2020, p. 8.

- 2. AES Indiana's 2022 IRP Preferred Resource Portfolio & the Petersburg Conversion – This section discusses the selection of the 2022 IRP Short Term Action Plan using the Five Pillars.

- 3. Consistency with AES Indiana's 2022 IRP – This section demonstrates that the Preferred Resource Portfolio which includes the conversion[2] of Petersburg Units 3 and 4 from coal to natural gas remains the most cost-effective strategy for customers based on the results of the updated IRP analysis (aka, 2024 IRP Update) performed for this filing.

- 4. Consideration of Resource Alternatives – Per Ind. Code § 8-1-8.5-4, this section discusses how AES Indiana considered resource alternatives to the project to repower Petersburg Units 3 and 4.

- 5. Draft Director's Report for AES Indiana's 2022 Integrated Resource Plan – This section discusses the Director's comments to AES Indiana 2022 IRP.

- 6. Consideration of the State Utility Forecasting Group ("SUFG") Indiana Electricity Projections and the Mid Continent Independent Service Operator ("MISO") Reliability Imperative Report – This section discusses how the SUFG Indiana Electricity Projections and the MISO Reliability Imperative Report were considered in the planning for the conversion of the Petersburg Units 3 and 4.

- 7. Ind. Code § 8-1-2-0.6 – This section discusses how the 2022 IRP and the updated analysis consider Ind. Code § 8-1-2-0.6 and, more specifically, the Five Pillars as defined in the code.

[2] For the purpose of this filing, the terms "repowering" and "conversion" are used interchangeably.

- 8. Conclusion.

**Q9. Are you sponsoring any attachments in this proceeding?**

A9. Yes. I am sponsoring the following attachment(s):

- AES Indiana Attachment EKM-1, which is a copy of AES Indiana's 2022 IRP Volume 1, which is public.
- AES Indiana Attachment EKM-2, which is a copy of AES Indiana's 2022 IRP Volume 2, which is public.
- AES Indiana Attachment EKM-3, which is a copy of AES Indiana's 2022 IRP Volume 3, which is public.

I would note that I did not include the IRP confidential volume or the IRP confidential attachments (Sections 1-8) to control the volume of my testimony. However, this information has been filed with the Commission and provided to IRP stakeholders who have executed a non-disclosure agreement with AES Indiana.

**Q10. Were these attachments prepared or assembled by you or under your direction and supervision?**

A10. Yes.

**Q11. Did you submit any workpapers?**

A11. Yes. The table below lists and describes the workpapers submitted with my testimony.

| Workpaper | File/Folder Name | Description |
|---|---|---|
| AES Indiana Witness EKM Confidential Workpaper 1 | Petersburg Conversion EPC Cost | Summary of the cost for the conversion of Petersburg Units 3 and 4 to natural gas |
| AES Indiana Witness EKM Confidential Workpaper 2 | Petersburg CapEx and FOM | Updated Petersburg fixed operation and maintenance cost and capital plan forecast for all strategies |
| AES Indiana Witness EKM Confidential Workpaper 3 | Petersburg CapEx, FOM, and VOM Support | Supporting documentation for the FOM and capital plan forecast |
| AES Indiana Witness EKM Confidential Workpaper 4 | Commodity Updates | Summary of coal, gas, power, and NOx price updates |
| AES Indiana Witness EKM Confidential Workpaper 5 | Existing Resource Accreditation | Summary of MISO accreditation updates for existing AES resources |
| AES Indiana Witness EKM Confidential Workpaper 6 | Replacement Resource Cost Updates | Summary of replacement resource cost updates using 2023 all-source RFP and vendor data |
| AES Indiana Witness EKM Confidential Workpaper 7 | Load Forecast | Updated energy and peak forecast |
| AES Indiana Witness EKM Workpaper 8 | 2024 IRP Update Resource Mixes | Resource mix results for each strategy from the 2024 IRP Update |
| AES Indiana Witness EKM Confidential Workpaper 9 | PVRR Results | PVRR and annual revenue requirement results for each strategy from the 2024 IRP Update |
| AES Indiana Witness EKM Confidential Workpaper 10 | Emissions Results and Capacity Factors | Emissions and Petersburg Capacity Factor results from the 2024 IRP Update |

## 2. AES INDIANA'S 2022 IRP PREFERRED RESOURCE PORTFOLIO & THE PETERSBURG CONVERSION

**Q12. Please provide an overview of AES Indiana's 2022 IRP and how it was developed.**

A12. The objective of AES Indiana's IRP is to identify a Preferred Resource Portfolio to provide safe, reliable, sustainable, and reasonable least-cost electric service to AES Indiana customers. The study period for the 2022 IRP was 2023-2042, giving due consideration to various options, potential risks, and stakeholder input. AES Indiana submits an IRP to the IURC in accordance with Indiana Administrative Code (170 IAC 4-7) every three years. The Company's 2022 IRP was submitted to the Commission on December 1, 2022. The IRP development included input from stakeholders through what is known as a "Public Advisory" process. AES Indiana hosted five public advisory meetings and five technical meetings to discuss the IRP process with interested parties and to solicit feedback from

stakeholders. A copy of AES Indiana's 2022 IRP is attached as AES Indiana Attachments EKM-1 – EKM-3.

**Q13. Please describe AES Indiana's Preferred Resource Portfolio and Short Term Action Plan, as identified in AES Indiana's 2022 IRP.**

A13. By definition, the "Preferred Resource Portfolio" represents AES Indiana's selected long term supply-side and demand-side resource mix that safely, reliably, efficiently, and cost-effectively meets the electric system demand, while taking cost, risk, and uncertainty into consideration.[3] The "Short Term Action Plan" is the schedule of activities and goals AES Indiana developed to begin efficient implementation of its Preferred Resource Portfolio.[4]

To select the Preferred Resource Portfolio and Short Term Action Plan in the IRP analysis, AES Indiana used the Five Pillars as defined by the 21st Century Energy Policy Development Task Force and further codified in HEA 1007 (Indiana Code § 8-1-2-0.6) to evaluate five discrete strategies for the remaining Petersburg coal units.[5] These strategies were referred to in the 2022 IRP as the "candidate portfolios" and included: 1) keeping Petersburg operating on coal for its remaining useful life; 2) converting Petersburg to operate using natural gas in 2025 (Petersburg Conversion); 3) retiring Petersburg Unit 3 in 2026 and keeping Petersburg Unit 4 operating on coal for its remaining useful life; 4) retiring both Units 3 and 4 in 2026 and 2028, respectively (this strategy selected a 300 MW combined cycle gas turbine ("CCGT") and energy storage resources as replacement for retiring the Petersburg Units); and 5) retiring Units 3 and 4 in 2026 and 2028, respectively,

[3] 170 IAC 4-7-1 (cc).
[4] 170 IAC 4-7-1(nn).
[5] 21st Century Energy Policy Development Task Force, Final Report, p.8 – The Five Pillars of Electric Service include Affordability, Reliability, Resiliency, Stability and Sustainability.

and replacing with only wind, solar, and storage resources. AES Indiana first conducted a scenario analysis that evaluated how the five strategies would perform in very different potential futures. Through this analysis, AES Indiana found that the strategy that converts Petersburg Units 3 and 4 to natural gas performed the best across the scenarios and potential futures. Next, using the Five Pillars to guide a robust Scorecard evaluation across 17 unique metrics, AES Indiana determined that the "candidate portfolio" that converts Petersburg Units 3 and 4 to natural gas performs the best overall for customers in terms of reliability, affordability, resiliency, stability, and environmental sustainability. This portfolio performs the best overall when compared to other strategies for the Petersburg units which includes continuing to burn coal and replacing the units with inverter-based, renewable resources or CCGTs. After considering the Scorecard results, the Company selected the Petersburg Conversion portfolio as the Preferred Resource Portfolio and Short Term Action Plan.[6]

The 2022 AES Indiana Preferred Resource Portfolio's Short Term Action Plan contains the following key elements:

1) Ceases coal-fired generation in 2025 after converting Petersburg Units 3 and 4 to natural gas.

2) Adds up to 1,300 MW of installed capacity ("ICAP") of wind, solar and storage for capacity and energy value, including:

[6] See AES Indiana Attachment EKM-1 for the Volume 1 of the IRP Report filed with the IURC on December 1, 2022. The IRP report discusses how the Company used the Five Pillars to define the metrics used to evaluate the IRP strategies.

a. Adds up to 240 MW ICAP of battery energy storage at Petersburg to fill winter capacity position in 2025.[7]

b. Adds 550 – 1,065 MW ICAP of wind and solar as energy replacement for Petersburg.

3) Identifies three-year annual average DSM savings targets of 130,000 – 134,000 MWhs (approximately 1.1% of 2021 sales) in 2024 - 2026.

All other existing AES Indiana owned generation continues to operate through their age-based retirement dates in AES Indiana's Preferred Resource Portfolio.

**Q14. Please explain how the 2022 IRP analysis evaluated reliability, affordability, resiliency, stability and sustainability to determine the Company's Preferred Resource Portfolio and Short Term Action Plan.**

A14. Guided by the IURC IRP rules, 170 IAC 4-7, AES Indiana strove to achieve a well-reasoned, transparent, and comprehensive 2022 IRP process with robust stakeholder engagement. The overarching purpose of the IRP is to develop a long-term plan to guide investments that provide safe, reliable, and sustainable electric power at a reasonable, least cost.

AES Indiana selected its Preferred Resource Portfolio and Short Term Action Plan by evaluating five strategies or "candidate portfolios" for Petersburg Units 3 and 4 as discussed in Q/A 13. The Company performed a robust IRP Scorecard process to rigorously evaluate and stress test the candidate portfolios across 17 discrete Scorecard

[7] AES Indiana filed with the Pike County Energy Storage Project with the IURC on 7/19/2023 under Cause No. 45920 which represents this line item in the 2022 IRP Short Term Action Plan. Pike County Energy Stroage was approved by the IURC on 1/17/2024.

metrics. These metrics quantified the candidate portfolios performance in the categories of Affordability, Environmental Sustainability, Reliability, Resiliency and Stability consistent with the Five Pillars of Utility Electric Service (addressed in detail later in my testimony – Q/A 43). Additionally, the metrics considered Risk & Opportunity and Economic Impact of the candidate portfolios. Figure 1 below provides the results from AES Indiana 2022 IRP Scorecard evaluation. The Scorecard results demonstrate that the Preferred Resource Portfolio (shown as row number 2 in Figure 1) performs the best overall across the Five Pillars and other Scorecard categories. See pp. 172 - 181 of AES Indiana Attachment EKM-1, Volume 1 of AES Indiana's 2022 IRP, for more details regarding the Five Pillars and the Scorecard evaluation process used to select the Preferred Resource Portfolio and Short Term Action Plan.

**Figure 1: 2022 IRP Scorecard Evaluation Results**[8]

| | Affordability | Environmental Sustainability | | | | | | Reliability, Stability & Resiliency | Risk & Opportunity | | | | | | | Economic Impact | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *20-yr PVRR* | *$CO_2$ Emissions* | *$SO_2$ Emissions* | *$NO_x$ Emissions* | *Water Use* | *Coal Combustion Products (CCP)* | *Clean Energy Progress* | *Reliability Score* | *Environmental Policy Opportunity* | *Environmental Policy Risk* | *General Cost Opportunity **Stochastic Analysis** * | *General Cost Risk **Stochastic Analysis** * | *Market Exposure* | *Renewable Capital Cost Opportunity (Low Cost)* | *Renewable Capital Cost Risk (High Cost)* | *Generation Employees (+/-)* | *Property Taxes* |
| | Present Value of Revenue Requirements ($000,000) | Total portfolio CO2 Emissions (mmtons) | Total portfolio SO2 Emissions (tons) | Total portfolio NOx Emissions (tons) | Water Use (mmgal) | CCP (tons) | % Renewable Energy in 2032 | Composite score from Reliability Analysis | Lowest PVRR across policy scenarios ($000,000) | Highest PVRR across policy scenarios ($000,000) | P5 [Mean - P5] | P95 [P95 – Mean] | 20-year avg sales + purchases (GWh) | Portfolio PVRR w/ low renewable cost ($000,000) | Portfolio PVRR w/ high renewable cost ($000,000) | Total change in FTEs associated with generation 2023 - 2042 | Total amount of property tax paid from AES IN assets ($000,000) |
| 1 | $ 9,572 | 101.9 | 64,991 | 45,605 | 36.7 | 6,611 | 45% | 7.95 | $ 8,860 | $ 11,259 | $ 9,271 [-$264] | $ 9,840 [$305] | 5,291 | $ 9,080 | $ 10,157 | 222 | $ 154 |
| 2 | $ 9,330 | 72.5 | 13,513 | 22,146 | 7.9 | 1,417 | 55% | 7.95 | $ 8,564 | $ 11,329 | $ 9,030 [-$334] | $ 9,746 [$382] | 5,222 | $ 8,763 | $ 9,999 | 99 | $ 193 |
| 3 | $ 9,773 | 88.1 | 45,544 | 42,042 | 26.7 | 4,813 | 52% | 7.86 | $ 9,288 | $ 11,462 | $ 9,608 [-$294] | $ 10,237 [$336] | 5,737 | $ 9,244 | $ 10,406 | 195 | $ 204 |
| 4 | $ 9,618 | 79.5 | 25,649 | 24,932 | 15.0 | 2,700 | 48% | 7.90 | $ 9,135 | $ 11,392 | $ 9,295 [-$287] | $ 9,903 [$321] | 5,512 | $ 9,104 | $ 10,249 | 74 | $ 242 |
| 5 | $ 9,711 | 69.8 | 25,383 | 24,881 | 14.8 | 2,676 | 64% | 7.57 | $ 9,590 | $ 11,275 | $ 9,447 [-$280] | $ 10,039 [$312] | 6,088 | $ 9,017 | $ 10,442 | 55 | $ 256 |
| 6 | $ 9,262 | 76.1 | 18,622 | 25,645 | 10.9 | 1,970 | 54% | 7.95 | $ 8,517 | $ 11,226 | $ 8,952 [-$324] | $ 9,629 [$352] | 5,136 | $ 8,730 | $ 9,909 | 88 | $ 185 |

## Strategies

1. No Early Retirement
2. Petersburg Conversion to 100% Natural Gas (est. 2025)
3. One Pete Unit Retires in 2026
4. Both Pete Units Retire in 2026 & 2028
5. "Clean Energy Strategy" – Both Pete Units Retire and replaced with Renewables in 2026 & 2028
6. Encompass Optimization without Predefined Strategy – Selects Pete 3 Refuel in 2025 & Pete 4 Refuel in 2027

[8] Note Strategy #6 – Encompass Optimization without Predefined Strategy was included in the IRP analysis to understand Encompass planning model results when left unconstrained. The results are intended to be used for comparison to and evaluation of the candidate portfolios and not for execution.

**Q15. Please describe the purpose of your testimony as it relates to the implementation of the key elements of the Short Term Action Plan identified in Q/A 13.**

A15. My testimony demonstrates that the implementation of the conversion of Petersburg Units 3 and 4 from coal to natural gas is a reasonable least cost, reliable, and sustainable option for customers that is consistent with the 2022 IRP. This Project is referred to interchangeably by the Company as the Petersburg Conversion or the Petersburg Repowering.

**Q16. Please discuss how the Petersburg Conversion maintains AES Indiana's level of capacity at Petersburg and ensures reliability, stability, and resiliency for customers.**

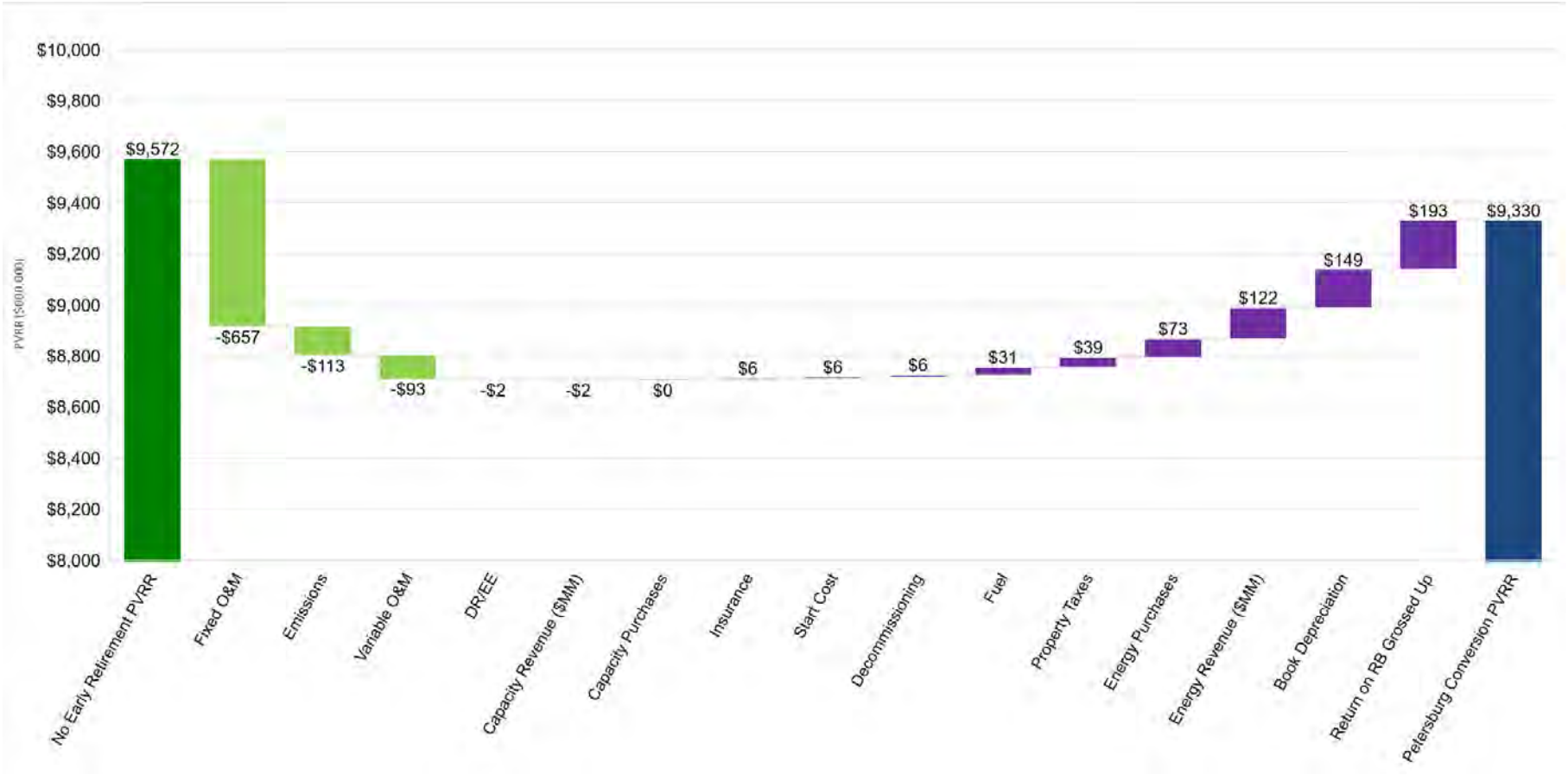
A16. The conversion of Petersburg Units 3 and 4 will result in a near one-for-one capacity change with the Units going from a total ICAP of 1,040MW on coal to 1,052MW on natural gas. The units are forecasted to continue to provide firm dispatchable capacity near or above 90% accreditation in all four seasons of MISO's Seasonal Resource Adequacy Construct when operating on natural gas. Additionally, in the 2022 IRP, AES Indiana hired Quanta to perform a Reliability Analysis of the Petersburg strategies described in Q/A 13.[9] Quanta assessed the reliability of the "candidate portfolio" resource mixes forecasted for planning year 2031. The Reliability Analysis scores (shown in Figure 1 above) demonstrated that the Preferred Resource Portfolio, which converts Petersburg Units 3 and 4 to natural gas, is as reliable as continuing to fuel those units with coal, and more reliable than retiring those units and replacing them with other resources like wind, solar, and storage.

[9] See AES Indiana's 2022 IRP, Volume 1, Section 9.4.4 Reliability, Resiliency, and Stability on p. 240.

**Q17. Did the 2022 IRP demonstrate that the Petersburg Conversion is a reasonable least cost option for customers? If so, please explain how this was demonstrated.**

A17. Yes. The IRP analysis demonstrated that the Preferred Resource Portfolio, which includes the Petersburg Conversion, is the most cost effective for customers out of the strategies considered (see Affordability metric in Figure 1 above). The Preferred Resource Portfolio has a lower present value revenue requirement ("PVRR") by approximately $240M over the 20-year IRP planning period compared to the economically next best option or keeping Petersburg as coal-fired, *i.e.*, No Early Retirement strategy. Figure 2 below is from the IRP results (2022 IRP Volume 1, p. 255); it provides a breakdown of the PVRR compared to economically next best option. This chart demonstrates that the largest savings to PVRR are from a $657 million reduction in fixed O&M costs primarily associated with ancillary processes specifically for coal operation, *e.g.*, coal handling and coal pollution controls. The Preferred Resource Portfolio also results in a $113 million reduction in emissions costs and $93 million reduction in variable O&M costs over the period. The Preferred Resource Portfolio includes $342 million in costs partly associated with book depreciation and financing to implement the Petersburg Conversion strategy. The $342 million also includes additional renewable resources throughout the IRP planning period in addition to the cost of the conversion. Overall, the Preferred Resource Portfolio, which includes the Petersburg Conversion, provides an economic opportunity to continue utilizing the Petersburg infrastructure as a firm dispatchable capacity resource.

**Figure 2: PVRR of the Petersburg Conversion Compared to PVRR of Continuing to Operate Petersburg on Coal – 2022 IRP**



**Q18. Please discuss how the Petersburg Conversion performed in terms of Environmental Sustainability compared to the other Petersburg strategies in the 2022 IRP.**

A18. The Preferred Resource Portfolio, which includes the Petersburg Conversion, performed the best in terms of sustainability in most categories compared to the other Petersburg strategies evaluated in the 2022 IRP. In the 2022 IRP, AES Indiana evaluated the Environmental Sustainability of the strategies for Petersburg by calculating the total CO2, SO2, NOx, Water Use, Coal Combustion Products ("CCP") and progress in terms of clean energy by 2032 in each of the strategies. Figure 3 below provides the 2022 IRP Scorecard Environmental Sustainability results.

**Figure 3. AES Indiana 2022 IRP Environmental Sustainability Results**

| | | Environmental Sustainability | | | | | |
|---|---|---|---|---|---|---|---|
| | | *$CO_2$ Emissions* | *$SO_2$ Emissions* | *$NO_X$ Emissions* | *Water Use* | *Coal Combustion Products (CCP)* | *Clean Energy Progress* |
| | | Total portfolio CO2 Emissions (mmtons) | Total portfolio SO2 Emissions (tons) | Total portfolio NOx Emissions (tons) | Water Use (mmgal) | CCP (tons) | % Renewable Energy in 2032 |
| **No Early Retirement** | **1** | 101.9 | 64,991 | 45,605 | 36.7 | 6,611 | 45% |
| **Petersburg Conversion to 100% Gas (2025)** | **2** | 72.5 | 13,513 | 22,146 | 7.9 | 1,417 | 55% |
| **One Pete Unit Retires (2026)** | **3** | 88.1 | 45,544 | 42,042 | 26.7 | 4,813 | 52% |
| **Both Pete Units Retire (2026 & 2028)** | **4** | 79.5 | 25,649 | 24,932 | 15.0 | 2,700 | 48% |
| **Both Pete Units Retire and Replaced with Wind, Solar & Storage (2026 & 2028)** | **5** | 69.8 | 25,383 | 24,881 | 14.8 | 2,676 | 64% |

**Q19. Did the 2022 IRP demonstrate other benefits from the Petersburg Conversion?**

A19. Yes, Petersburg Conversion continues to utilize AES Indiana assets in Petersburg, IN. Thereby, from a qualitative perspective, the Project will continue to contribute to the Petersburg, IN community through employment opportunities and property tax contributions. Being an existing asset, the project will also continue to take advantage of the existing MISO interconnection at Petersburg.

Additionally, compared to the other strategies, the Petersburg Conversion strategy demonstrated the best general performance across the risk and opportunity metrics (shown under "Risk & Opportunities" (purple heading in Figure 1 above) that AES Indiana evaluated in the 2022 IRP.[10]

Also, the Petersburg Conversion provides excellent support for intermittent renewable resources because they provide firm capacity that is required for a reliable and stable grid.

## 3. CONSISTENCY WITH AES INDIANA'S 2022 IRP

**Q20. Turning now to the proposed Project in this docket, please briefly describe this Project.**

A20. As described in detail in AES Indiana witness Bigalbal's testimony, the proposed Petersburg Conversion Project converts the existing Petersburg Units 3 and 4 coal-fired boilers to use natural gas for fuel. This Project corresponds to the Petersburg Conversion project identified in the Preferred Resource Portfolio and Short Term Action Plan of AES Indiana 2022 IRP detailed in Q/A 13.

[10] 2022 AES Indiana IRP Volume 1, Section 9.4 Scorecard Results, p. 234.

**Q21. Please describe the modeling performed by AES Indiana to evaluate replacement options for Petersburg and the cost effectiveness of the "Candidate Portfolios" in the 2022 IRP.**

A21. In the 2022 IRP, AES Indiana performed a two-part analysis to evaluate replacement options for Petersburg and the cost effectiveness of the "Candidate Portfolios." First, the Company used the Resource Planning tool, Encompass, to conduct a capacity expansion analysis of the different strategies for Petersburg or "Candidate Portfolios." The capacity expansion analysis optimizes AES Indiana's generation portfolio to meet the MISO Planning Reserve Margin Requirement with a least cost mix of resources. For example, in a strategy that evaluates retiring and replacing Petersburg Units 3 and 4, the capacity expansion selects the most economic mix of resources to replace these units upon retirement. Once completed, each of the "Candidate Portfolios" included an optimized least cost mix of resources to meet MISO planning reserve margin requirements.

Second, AES Indiana ran the optimized "Candidate Portfolios" through a Production Cost Analysis using the Encompass model. The Production Cost Analysis calculates all cost, revenue, and emission components of a portfolio by analyzing production and market dispatch of the resources in the portfolio against power and fuel price forecasts. The results of the Production Cost Analysis are used to quantify the total portfolio PVRR which is the metric that AES Indiana included on the IRP Scorecard to evaluate affordability.

**Q22. Has AES Indiana updated the modeling to determine if the Preferred Resource Portfolio and Short Term Action Plan, which include the Petersburg Conversion, remain the least cost strategy and consistent with the results of the 2022 IRP?**

A22. Yes.

**Q23. Please provide an overview of the update.**

A23. AES Indiana updated key planning assumptions to contemporary data and then replicated the IRP analysis described in Q/A 21. To elaborate, the Company updated key planning assumptions further described in the next Q/A and reran the capacity expansion analysis which optimized the resource mixes in the "No Early Retirement", "Petersburg Conversion", "Both Units Retire", and "Clean Energy" strategies. The Company then ran the Production Cost Analysis on these optimized portfolios to calculate the PVRR and compare the cost effectiveness of the Petersburg strategies. The analysis described in this Q/A will be referred to as the 2024 IRP Update.

**Q24. Please describe the planning assumption updates that AES Indiana included in the 2024 IRP Update.**

A24. AES Indiana included the following planning assumption updates in the 2024 IRP Update:

- Fine-tuned conversion and retirement dates – AES Indiana moved the Petersburg Conversion from 2025 to 2026 based on the updated conversion schedule. Because there was not a specific conversion plan, in the 2022 IRP, both units were assumed in the IRP to immediately convert at the beginning of 2025. The updated analysis assumes Peterburg Unit 3 will be on outage for conversion for the first half of 2026 and Petersburg Unit 4 will be on outage for the conversion for the second half of 2026. This is consistent with the conversion dates that AES Indiana witness Bigalbal identifies in Q/A 50. Additionally, the updated analysis assumes the retirement dates of Petersburg Units 3 and 4 in the "Retirement and Replacement" and "Clean Energy" strategies move from 2026 (Unit 3) and 2028 (Unit 4) to 2027

(Unit 3) and 2029 (Unit 4). This update was made to allow a minimally feasible time to replace these units with other replacement resources.

- Capital Cost to convert Petersburg Units 3 and 4[11] – The 2024 IRP Update includes the best estimate of the cost for the Petersburg Conversion reflected in Company witness Bigalbal's testimony. For the 2024 IRP Update, the necessary demolition costs, including the FGD dewatering costs, were removed from the best estimate because this cost would occur in all strategies. As discussed by AES Indiana witness Bigalbal (Q/As 18-19), this best estimate reflects pricing from the competitive bidding process (which is higher than the estimated cost assumed in the 2022 IRP) and includes a contingency.

- Fixed O&M ("FOM") for Petersburg Units 3 and 4[12] – AES Indiana updated the estimated Fixed O&M costs over the 20-year planning horizon for each of the "Candidate Portfolios" to account for budgetary and inflationary changes. These costs have increased by approximately 16% over the planning horizon.

- Variable O&M for Petersburg Units 3 and 4[13] – AES Indiana updated the estimated Variable O&M costs over the 20-year planning horizon for Petersburg Units 3 and 4 to account for budgetary and inflationary changes. These costs have increased by approximately 42% for coal operation and decreased by approximately 54% for gas.

[11] See AES Indiana Witness EKM Confidential Workpaper 1 for further details.
[12] See AES Indiana Witness EKM Confidential Workpapers 2 and 3 for further details.
[13] See AES Indiana Witness EKM Confidential Workpaper 3 for further details.

- Capital Plan[14] - AES Indiana updated the estimated Capital Plan over the 20-year planning horizon for each of the "Candidate Portfolios" to account for outage schedule and inflationary changes. These are required capital expenditures to maintain assets.

- Gas Prices[15] – AES Indiana updated the natural gas price forecast to Horizon's 2023 Spring Fundamental forecast blended with natural gas forward prices for Henry Hub from 2/20/2024.[16] Natural gas prices in the 2022 IRP were at a 15-year high due to the Russia/Ukraine war and European energy crisis. The gas price forecast has since decreased by approximately 10.6% over the planning period.

- Coal Prices[17] – AES Indiana used actual contracted coal prices through 2025 and applied Horizon Spring 2023 Illinois Basin Fundamental Forecast growth rates over the planning horizon to forecast coal prices. Coal prices have decreased by 11.9% in the updated analysis based on updated coal agreement pricing.

- On- and Off-peak Power Prices[18] – To update power prices, AES Indiana used the gas prices and power prices included in the 2022 IRP to calculate a monthly implied heat rate which is the average monthly power price divided by the average monthly gas price. This implied heat rate calculation was then multiplied by the new monthly gas price forecast to arrive at a new power price forecast. This approach was used for both on- and off-peak price forecasts. The application of this implied heat rate approach indicates that, within MISO, natural gas resources are anticipated

[14] See AES Indiana Witness EKM Confidential Workpaper 3 for further details.
[15] See AES Indiana Witness EKM Confidential Workpaper 4 for further details.
[16] The blending methodology is described on pp. 136-137 of AES Indiana's 2022 IRP Volume 1.
[17] See AES Indiana Witness EKM Confidential Workpaper 4 for further details.
[18] See AES Indiana Witness EKM Confidential Workpaper 4 for further details.

to continue to be the marginal unit and thus set the power price, especially for the relative near term. On-peak and off-peak power prices have decreased by 10.5% over the planning period.

- Unit Accreditation[19] – AES Indiana updated the accreditation for all existing and replacement Schedule 53 thermal resources from MISO's UCAP-based accreditation to MISO's new Seasonal Accredited Capacity ("SAC") accreditation. The Company used the SAC accreditation provided by MISO for the Company's thermal resources to make these updates. Generally, unit accreditation changes were minor when updating to SAC accreditation.

- Replacement Resource Costs[20] – AES Indiana updated the Replacement Resource Costs using the same methodology that was used in the 2022 IRP.[21] The Company used results from its 2023 All Source RFP to update the costs for the following replacement resources – solar, wind, solar + storage, storage, CCGT, and Combustion Turbine ("CT"). These costs were originally estimated in the 2022 IRP using the 2022 all source RFP. This RFP-based approach provides a first-year cost estimate for the resources. To forecast how these costs will change over the planning period, AES Indiana applied the trends by resource from Wood Mackenzie, National Renewable Energy Laboratories ("NREL") and Bloomberg New Energy Finance ("BNEF") long term capital cost forecasts to the first-year cost estimates from the 2023 RFP. The Wood Mackenzie, NREL and BNEF data

[19] See AES Indiana Witness EKM Confidential Workpaper 5 for further details.
[20] See AES Indiana Witness EKM Confidential Workpaper 6 for further details.
[21] The methodology to develop the replacement resource capital cost in the IRP is described in detail Section 6.2 Supply Side Resource Options (Capital Costs) starting on p. 64 and Section 9.3 Replacement Resource Capital Cost Sensitivity Analysis starting on p. 230 of AES Indiana's 2022 IRP.

was also updated for this analysis to these vendors' second half 2026 forecasts. Compared to the 2022 IRP, the replacement resource costs changed on average over the period as follows due to the updates from the noted sources:

- Solar decreased 3%
- Wind increased 26%
- Solar + Storage increased 1%
- 4-hr Storage decreased 10%
- 6-hr Storage decreased 11%
- CCGT increased 62%
- CT increased 54%

- Replacement Resource Fixed O&M Costs[22] – In the 2022 IRP, the wind and storage fixed O&M costs were estimated using the average of Wood Mackenzie, NREL and BNEF forecasts for fixed O&M. These forecasts were updated for this analysis to the forecasts from these vendors for the second half 2023. In the 2022 IRP, the first-year fixed O&M costs for solar were estimated using cost estimates from AES Indiana's Hardy Hills Solar Project (Cause Nos. 45493 and 45493 S1). The trends from the average of the Wood Mackenzie, NREL and BNEF fixed O&M cost forecast were applied to the first-year solar fixed cost estimates to create a forecast for the planning period. To reflect inflation and current forecasts, AES Indiana updated the replacement resource fixed O&M costs to the average of the second half of 2026 forecasts from Wood Mackenzie, NREL and BNEF fixed O&M cost forecasts for solar for this analysis. In the 2022 IRP, AES Indiana based the fixed O&M cost estimate for CCGT on the forecasted fixed O&M cost, at the time, for the CCGT at Eagle Valley Generating Station. This forecast was updated for this

[22] See AES Indiana Witness EKM Confidential Workpaper 6 for further details.

analysis using the current fixed O&M forecast for Eagle Valley. In the 2022 IRP, AES Indiana based the fixed O&M cost estimate for CT on the forecasted fixed O&M cost, at the time, for the CTs at Harding Street Generating Station. This forecast was updated for this analysis using the average of the forecasts from Wood Mackenzie, NREL and BNEF for CT.[23] Compared to the 2022 IRP, the fixed O&M costs for replacement resources changed on average over the period as follows due to the updates from the noted sources:

- Solar increased 53%
- Wind decreased 15%
- Solar + Storage increased 53%
- 4-hr Storage increased 43%
- 6-hr Storage increased 43%
- CCGT increased 16%
- CT decreased 18%

- Load Forecast[24] – AES Indiana updated the load forecast for this analysis to the load forecast that was submitted to MISO for the 2024/2025 Planning Resource Auction ("PRA") which will be held in March of 2024. As in the 2022 IRP, this load forecast was developed by AES Indiana's load forecasting partner, Itron. The summer peak loads decreased on average by 6% and the winter peak loads increased on average by 1% in the updated forecast compared to the 2022 IRP forecast. Note that electric vehicle and behind the meter ("BTM") solar forecasts are included separately from the load forecast in the Resource Planning model. The base case versions of the EV and BTM solar forecasts analysis are conservative and

[23] The replacement resource fixed O&M costs included in the IRP are described in detail Section 6.2 Supply Side Resource Options starting on p. 64.
[24] See AES Indiana Witness EKM Confidential Workpaper 7 for further details.

still provide a reasonable outlook for these items and therefore were used in the 2024 IRP Update.

- Seasonal MISO Planning Reserve Margins ("PRM") – AES Indiana updated the seasonal MISO PRMs. Figure 4 below compares the PRMs included in the 2022 IRP to the PRMs updated for the updated analysis.[25]

**Figure 4. MISO PRM Comparison**

| | 2022 IRP | 2024 IRP Update |
|---|---|---|
| Winter | 21.4% | 27.4% |
| Spring | 26.3% | 26.7% |
| Summer | 7.5% | 9.0% |
| Fall | 11.8% | 14.2% |

- Pike County Energy Center – AES Indiana included the recently approved Pike County Energy Center[26] in this analysis.

- Seasonal NOx[27] – AES Indiana updated the seasonal NOx forecast to the approximate current NOx price ($3,500/ton) held flat for the planning period. During the 2022 IRP, NOx prices reached unprecedented highs driven by high coal capacity factors across the industry from favorable dark spreads. The trends at that time were largely the result of high power and gas prices resulting from the Russian-Ukrainian war. Power, gas, and, in turn, NOx markets have returned to more typical pre-2022 levels. The Company has captured these trends in this analysis. NOx prices have decreased by 63.8% on average in the 2024 IRP Update.

[25] See Section 2.2 Resource Adequacy on p. 10 of the IRP for more detail regarding the PRMs included in the 2022 IRP
[26] See the Commission's Order in Cause No. 45920.
[27] See AES Indiana Witness EKM Confidential Workpaper 4 for further details.

**Q25. As noted in Q/A 22 and 24, the capacity expansion analysis performed for the 2024 IRP Update optimizes a least cost mix of resources. Please discuss the updated resources mix compared to the 2022 IRP?**

A25. The 2024 IRP Update resource mix is shown in Figure 5 below.[28] Generally, across all strategies, the model is now picking additional energy storage over other resource options when capacity is needed. This is occurring for two reasons: 1) After updating to the most recent higher MISO planning reserve margins, AES Indiana now needs approximately 200 MW of additional capacity starting in 2025. The model is picking additional energy storage to fill this capacity need in every strategy. AES Indiana plans to use its 2023 RFP to fill this capacity need. 2) After updating to the new data for the replacement resource costs and FOM, the CCGT resource has increased in cost making this option less cost effective when compared to storage. As such, it is now more generally more cost effective for the model to select energy storage for needed capacity in the Both Units Retire strategy.

Also, the resource mixes for the Retirement & Replacement strategy and the Clean Energy Strategy are now nearly identical over the entire planning period. In aggregate, these strategies add exactly the same volume of resources over the 20-year period; they only differ in terms of the timing of when some of these resources are added. This resource mix alignment is due to the increased replacement cost and FOM for a CCGT detailed above which eliminates that resource from the Both Units Retire strategy.

[28] See AES Indiana Witness EKM Workpaper 8 for further details.

**Figure 5. Near-term Resource Mix Comparisons: 2022 IRP vs 2024 IRP Update[29]**

Resource Additions (MW ICAP)
Period: 2025 - 2030

| | Conversion | CCGT | Storage | Hybrid | Solar | Wind |
|---|---|---|---|---|---|---|
| **No Early Retirement** | | | | | | |
| 2022 IRP | | | 240 | 45 | | 500 |
| 2024 IRP Update | | | 500 | 45 | | |
| **Petersburg Conversion** | | | | | | |
| 2022 IRP | 1,052 | | 240 | 45 | | 500 |
| 2024 IRP Update | 1,052 | | 500 | 45 | | |
| **Both Units Retire** | | | | | | |
| 2022 IRP | | 325 | 760 | | | 600 |
| 2024 IRP Update | | | 1,180 | 90 | 358 | 550 |
| **Clean Energy Strategy** | | | | | | |
| 2022 IRP | | | 700 | 45 | 280 | 900 |
| 2024 IRP Update | | | 1,200 | 90 | 455 | 500 |

**Q26. Please provide the Affordability results based on the 2024 IRP Update.**

A26. Figure 6 compares the Affordability results from the 2022 IRP to the Affordability results from the 2024 IRP Update using both a 20-year and 10-year PVRR period. This figure demonstrates that the Petersburg Conversion remains the reasonable least cost strategy for Petersburg Units 3 and 4 and AES Indiana customers in both 20- and 10-year cases. Focusing on the 20-year PVRR comparison, the Petersburg Conversion is lower in PVRR by $281M over the planning period compared to the next best strategy, which is keeping Petersburg on coal.[30]

[29] In Figure 4, the energy storage volumes in both the 2022 IRP and the 2024 IRP Update includes the 200 MW Pike County Energy Storage Project since this project was included in the 2022 IRP Short Term Action Plan. This project was approved by the IURC on February 17, 2024 in Cause No. 45920.
[30] See AES Indiana Witness EKM Confidential Workpaper 9 for further details.

**Figure 6. 2024 IRP Update Affordability Results**[31]

| 20-yr PVRR | 2022 IRP ($M) | 2024 IRP Update ($M) |
|---|---|---|
| No Early Retirement | $ 9,572 | $9,449 |
| Petersburg Conversion to Natural Gas (est. 2026) | $ 9,330 | $9,168 |
| Both Petersburg Units Retire (2026/2027 and 2028/2029) | $ 9,618 | $9,596 |
| Clean Energy Strategy - Both Petersburg Units Retire and Replaced with Wind, Solar and Storage (2026/2027 and 2028/2029) | $ 9,711 | $9,604 |

| 10-yr PVRR | 2022 IRP ($M) | 2024 IRP Update ($M) |
|---|---|---|
| No Early Retirement | $ 5,815 | $5,513 |
| Petersburg Conversion to Natural Gas (est. 2026) | $ 5,750 | $5,513 |
| Both Petersburg Units Retire (2026/2027 and 2028/2029) | $ 5,914 | $5,641 |
| Clean Energy Strategy - Both Petersburg Units Retire and Replaced with Wind, Solar and Storage (2026/2027 and 2028/2029) | $ 6,037 | $5,638 |

**Q27. Please provide a comparison of the annual revenue requirements over the planning period of the strategies shown in Figure 6 and explain the results.**

A27. Figures 7 and 8 compare the annual revenue requirements of the Petersburg Conversion and Retirement & Replace/Clean Energy strategies to keeping Petersburg on coal in both nominal and real dollars. Note that the Retirement & Replace and Clean Energy strategies are combined in these charts because, as previously noted, these portfolios are essentially the same. The annual revenue requirement displayed in these figures can be thought of as a general proxy for customer rate impact by year over the planning period. The comparisons demonstrate that, after the initial capital cost investment to convert the

[31] In the 2022 IRP, AES Indiana also evaluated a strategy for Petersburg that only retires and replaces one unit (Unit 3). This strategy is inherently not cost effective because when only one unit retires, a portion of the operation costs for ancillary processes from the retired unit are still necessary and remain in the economics. Thus, the strategy that retires one unit is not cost competitive with the other strategies. For this reason, AES Indiana did not review this strategy. Also, AES Indiana did not re-evaluate the Encompass Optimization analysis because the results from this analysis were nearly the same as the Petersburg Conversion strategy.

Petersburg Units in 2026, the annual revenue requirement is approximately $30M lower per year in real dollars on average over the remainder of the planning period.

**Figure 7. 2024 IRP Update Annual Revenue Requirement Comparison 2023 – 2042 Nominal**

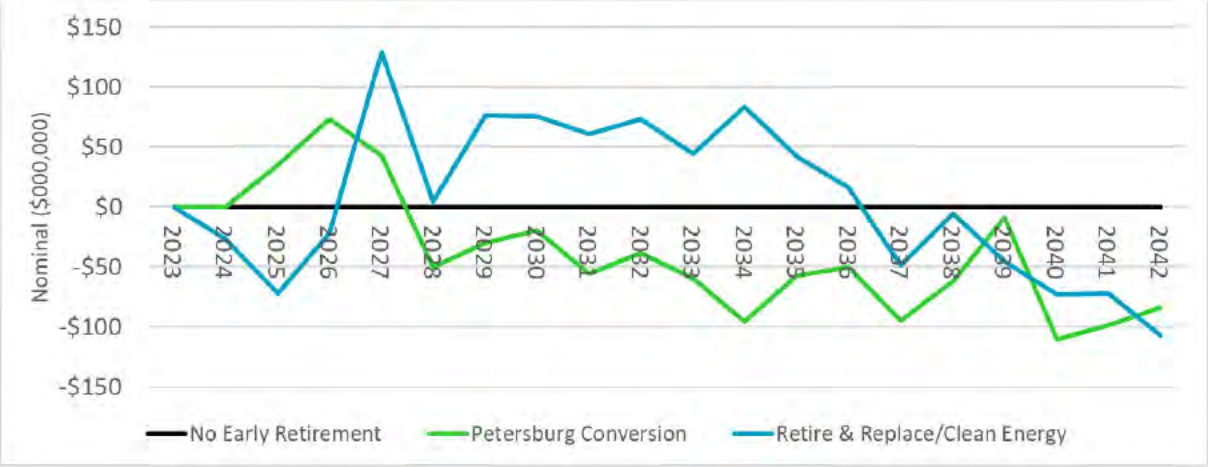
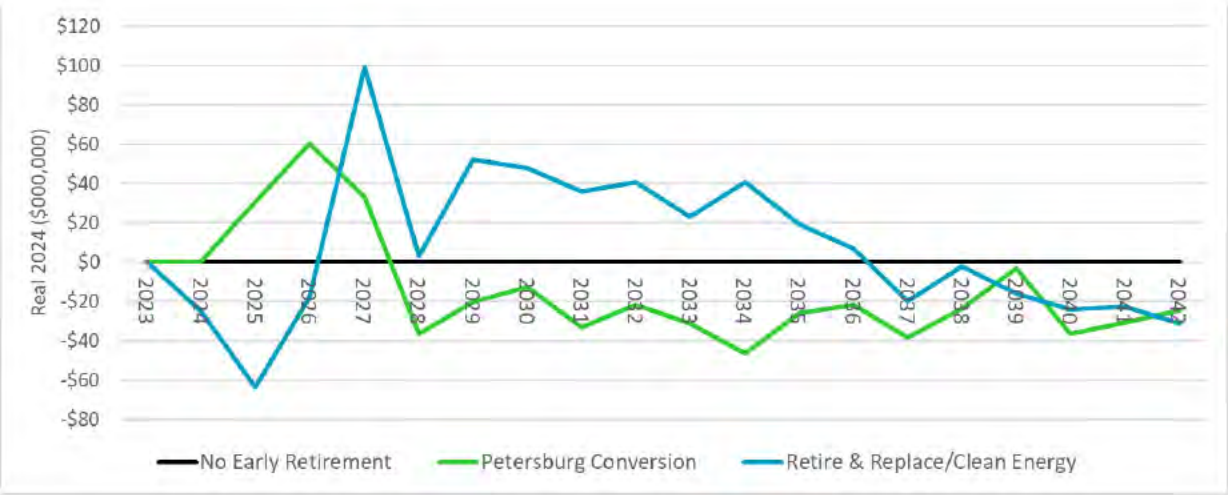



**Figure 8. 2024 IRP Update Annual Revenue Requirement Comparison 2023 – 2042 Real**

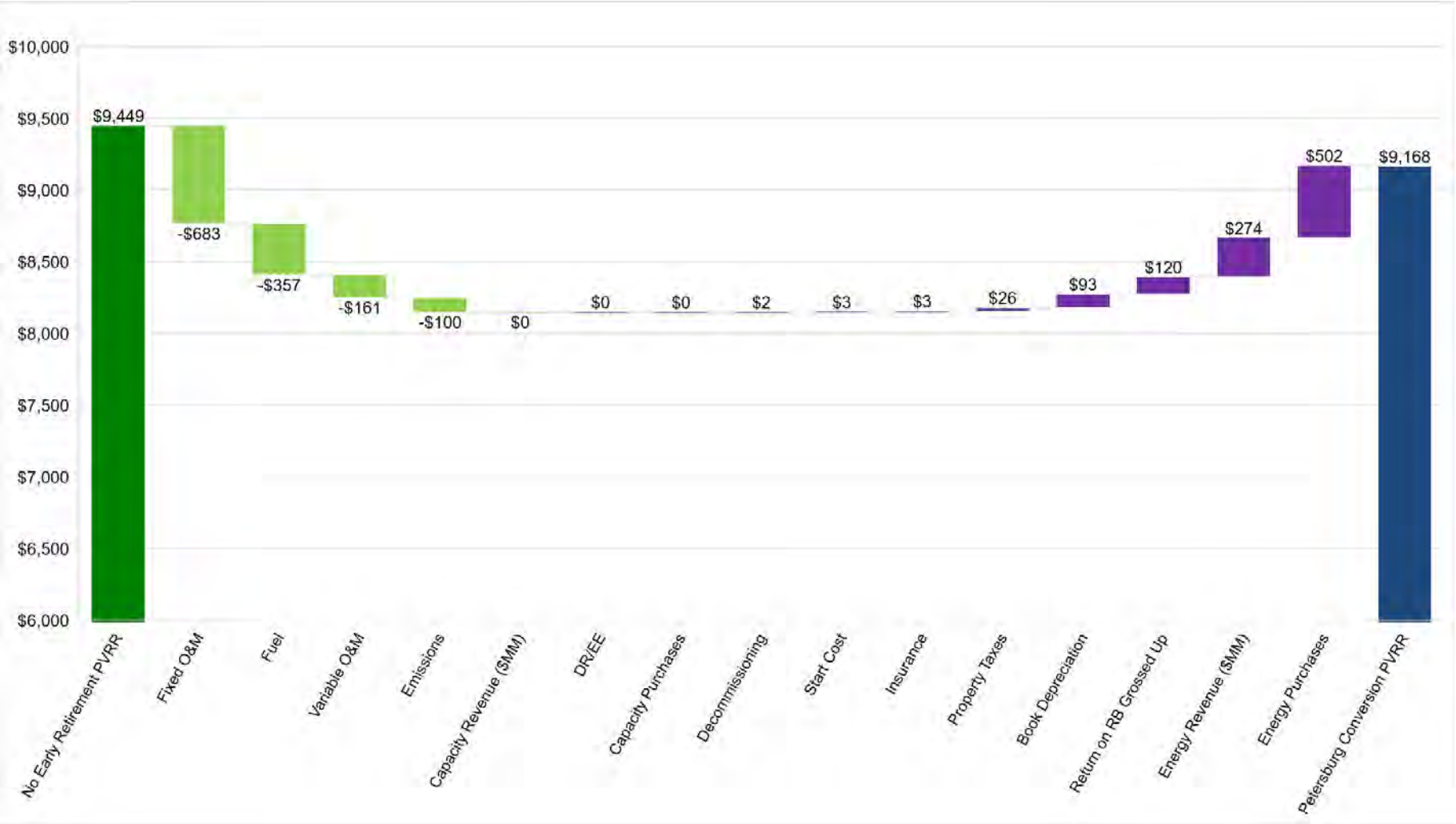



**Q28. What attributes to the lower PVRR from converting the Petersburg Units to natural gas?**

A28. Like Figure 2 presented early in my testimony, Figures 9 below provides a waterfall comparison of the changes in the cost components of the PVRR when going from

Petersburg on coal to the Petersburg Conversion using the 2024 IRP Update. Figure 9 demonstrates that the bulk of cost savings from converting the Petersburg Units from coal to natural gas will come from reduced fixed O&M associated with ancillary processes specifically for coal operation, *e.g.*, coal handling and coal pollution controls. These savings are estimated to be approximately $683M over the planning period. Figure 9 also demonstrates that the converted Petersburg Units will serve more as a capacity resource with a lower capacity factor compared to keeping Petersburg on coal. This is represented by a reduction in Energy Revenues (presented in the Figure as a positive $274M) over the planning period.

**Figure 9. PVRR of the Petersburg Conversion Compared to PVRR of Continuing to Operate Petersburg on Coal – 2024 IRP Update**



**Q29. How is Reliability considered in the 2024 IRP Update?**

A29. Quanta's 2022 IRP Reliability Analysis (discussed in Q/A 16) was not updated for the 2024 IRP Update; however, the analysis still provides a good approximation for the reliability of the updated strategies. As previously discussed, the 2022 IRP Reliability Analysis results depend on the types of resources in each of the portfolios. The portfolio resource mixes have changed in the 2024 IRP Update. Q/A 25 provides an overview of the resource mix changes that have resulted from the 2024 IRP Update. As noted, the resource mixes in the No Early Retirement, Petersburg Conversion, and the Clean Energy strategies did not change significantly with the 2024 IRP Update. Thus, the results of the 2022 IRP Reliability Analysis are still approximately accurate for these strategies. The Both Units Retire strategy, however, no longer includes a CCGT as replacement for the retiring Petersburg units in the 2024 IRP Update. Instead, the portfolio now includes inverter-based, renewable resources as replacement for the retiring units. This portfolio is now nearly identical to the Clean Energy strategy. Therefore, the 2022 IRP Reliability Analysis results for the Clean Energy strategy provide a better approximate estimate for the Both Units Retire strategy.

As part of the 2022 IRP Reliability Analysis, Quanta also calculated the cost to mitigate the reliability issues in each of the 2022 IRP "candidate portfolios". The results, provided in Figure 10, demonstrate that the portfolios with more invertor-based resources require higher costs to mitigate their reliability issues through the installation of synchronous condensers, BESS and grid forming inverters. These additional costs were not included in the Affordability (20-yr PVRR) results in the 2022 IRP or the 2024 IRP Update, but rather provide a way to further differentiate the portfolios in terms of Reliability performance and

the relative cost of the strategies. These mitigation costs can still be applied to the updated 2024 IRP Update portfolios. As described above, the results for the No Early Retirement (shown as $126M), Petersburg Conversion (shown as $136M), and the Clean Energy Strategy (shown as $929M) still approximately apply to these updated portfolios, which did not materially change. The Both Units Retire strategy now aligns with the results from the Clean Energy Strategy (shown as $929M) since these portfolios are now nearly identical. The increased mitigation cost is driven by the inverter-based replacement resources now included in the Both Units Retire strategy. In summary, the Both Units Retire and Clean Energy strategies would have material mitigation costs compared to the Petersburg Conversion, – $700-$800 million more that would add to the calculated PVRR.

**Figure 10. Estimated mitigation costs (2022 dollars) for the "Candidate Portfolios" from 2022 IRP Reliability Analysis**

| | No Early Retirement | Petersburg Conversion to Natural Gas (est. 2025) | Both Petersburg Units Retire (2026 and 2028) | Clean Energy Strategy – Both Petersburg Units Retire and Replaced with Wind, Solar, and Storage (2026 and 2028) |
|---|---|---|---|---|
| GFM Inverter Premium ($M) | $6 | $5 | $2 | $6 |
| Additional BESS ($M) | $120 | $131 | $20 | $52 |
| Additional Synchronous Condensers ($M) | $0 | $0 | $135 | $871 |
| Estimated Reliability Cost ($M) | $126 | $136 | $157 | $929 |

Applying the mitigation cost results from the table above to the 2024 IRP Update results in the following mitigation cost estimates:

- No Early Retirement – approximately $126M.
- Petersburg Conversion – approximately $136M.

- Both Units Retire – approximately $929M (this portfolio is now nearly identical to the Clean Energy Strategy).
- Clean Energy Strategy – approximately $929M.

**Q30. Please discuss the Sustainability pillar based on the 2024 IRP Update.**

A30. Figure 11 below provides the total CO2, NOx, SO2, water use and coal combustion products for each strategy over the planning period based on 2024 IRP Update.[32]

The results demonstrate that the strategy that converts Petersburg Unit 3 and 4 from coal to natural gas in 2026 performs the best from an environmental sustainability perspective. That is because the conversion provides the earliest exit from coal.

**Figure 11 – Updated Production Cost Analysis Environmental Sustainability Results**

| | CO2 | SO2 | NOx | Water Use | Coal Ash |
|---|---|---|---|---|---|
| | Total portfolio CO2 Emissions (mmtons) | Total portfolio SO2 Emissions (tons) | Total portfolio NOx Emissions (tons) | Water Use (mmgal) | CCP (tons) |
| No Early Retirement | 94.5 | 54,921 | 40,137 | 31.2 | 5,620 |
| Petersburg Conversion | 62.2 | 14,957 | 18,165 | 8.6 | 1,555 |
| Both Petersburg Units Retire | 69.7 | 27,991 | 24,868 | 16.3 | 2,931 |
| Clean Energy Strategy | 69.7 | 27,991 | 24,866 | 16.3 | 2,931 |

**Q31. Please provide your evaluation of the results detailed above.**

A31. The results above demonstrate the "candidate portfolio" that converts Petersburg Unit 3 and 4 from coal to natural gas in 2026 still performs the best overall for customers in terms of affordability, sustainability and reliability, resiliency & stability.

**Q32. Are the other "candidate portfolios" a reasonable alternative to the portfolio that converts Petersburg Units 3 and 4 from coal to natural gas in 2026.**

[32] See AES Indiana Witness EKM Confidential Workpaper 10 for further details.

A32. No. I will walk through each of the other "candidate portfolios" and explain why they are not a reasonable alternative to converting Petersburg Units 3 and 4.

- **No Early Retirement** – As demonstrated in the 2024 IRP Update detailed above, the "No Early Retirement" portfolio is more costly for customers and produces more emissions when compared to converting Petersburg Unit 3 and 4 from coal to natural gas. Additionally, in the "No Early Retirement" strategy, Petersburg Units 3 and 4 would continue to operate on coal through the analysis period: 2023 – 2042. As noted by AES Indiana witness Collier (Q/A 29), the EPA intends to issue a final rule on the proposed Greenhouse Gas New Source Performance Standard under CAA Section 111(d) that would require stringent emissions guidelines for coal-fired units that plan to operate after January 1, 2032. These guidelines would require that coal units meet emissions limits based on 40% co-firing with natural gas or full carbon capture and sequestration ("CCS"). These proposed rules pose significant compliance cost risk to this portfolio. Compliance with the proposed rule was not included in the 2024 IRP Update. Including these compliance impacts in the analysis would make the Petersburg Conversion more prudent and reasonable for AES Indiana customers as keeping Petersburg on coal would require excessive costs for CCS.

- **Both Petersburg Units Retire (2027 & 2029) and "Clean Energy Strategy" (2027 & 2029)** – As demonstrated in the 2024 IRP Update detailed above, these strategies are more costly for customers and produce more emissions when compared to converting Petersburg Unit 3 and 4 from coal to natural gas. It is important to note that the Petersburg Conversion portfolio provides the earliest exit

from coal and therefore the greatest emissions reductions of the "candidate portfolios." Additionally, these strategies would require significant costs for reliability as identified in the 2022 IRP Reliability Analysis. As shown in Figure 10, the bulk of these costs come in the form of synchronous condensers to increase the grid's short circuit strength.

**Q33. Please discuss further how the proposed conversion impacts the MISO capacity accreditation for Petersburg Units 3 and 4.**

A33. Figure 12 below provides a comparison of the MISO capacity accreditation of Petersburg Units 3 and 4 pre and post the natural gas conversion after including the assumption updates described in Q/A 24. As demonstrated in the comparison, converting the units from coal to natural gas maintains the capacity value and dispatchable characteristics of Units 3 and 4 thereby maintaining the reliability of the Petersburg resource.

**Figure 12 – Comparison of MISO SAC of Petersburg Units 3 and 4 on Gas Versus on coal**

**Petersburg Units 3 and 4 on Coal MISO SAC MW**

| | Summer | Fall | Winter | Spring |
|---|---|---|---|---|
| Unit 3 | [redacted] | [redacted] | [redacted] | [redacted] |
| Unit 4 | [redacted] | [redacted] | [redacted] | [redacted] |

**Petersburg Units 3 and 4 on Gas MISO SAC MW**

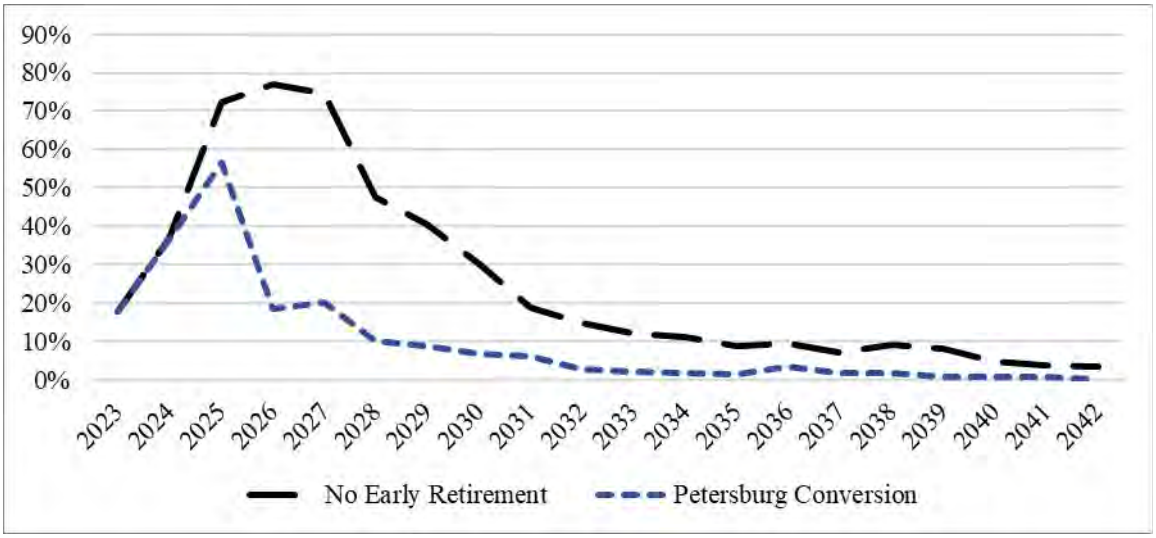
| | Summer | Fall | Winter | Spring |
|---|---|---|---|---|
| Unit 3 | [redacted] | [redacted] | [redacted] | [redacted] |
| Unit 4 | [redacted] | [redacted] | [redacted] | [redacted] |

**Q34. Please discuss further impact of the conversion on the capacity factors for Petersburg Units 3 and 4.**

A34. Figure 13 below provides a comparison of the capacity factors of Petersburg Units 3 and 4 fueled on coal versus Petersburg Units 3 and 4 fueled on natural gas after including the

assumption updates described in Q/A 24.[33] The comparison demonstrates that the units will have a lower capacity factor operating as a natural gas resource due to underlying fundamental market economics. Ultimately, the converted Petersburg Units will serve as a firm reliable and dispatchable capacity resource leaving room for other sustainable non-dispatchable resources to provide clean energy value.

**Figure 13 – Comparison of Capacity Factors of Petersburg Units 3 and 4 on Gas Versus on Coal**



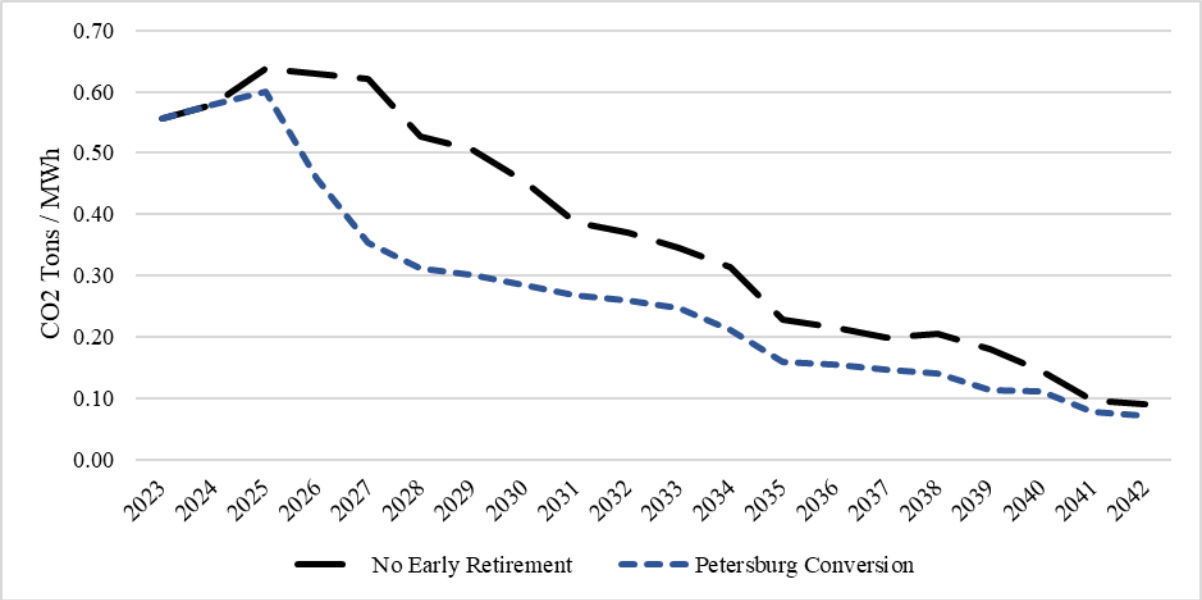

**Q35. Please provide an evaluation of the CO2 intensity (CO2/MWh) changes from converting Petersburg Units 3 and 4 from coal to natural gas.**

A35. Figure 14 below provides a comparison of the CO2 intensity of the No Early Retirement "candidate portfolio" (Petersburg Units 3 and 4 fueled on coal) versus Petersburg Conversion "candidate portfolio" (Petersburg Units 3 and 4 fueled on natural gas) after including assumption updates described in Q/A 24. The Petersburg Conversion portfolio achieves approximately a 70% reduction in CO2 intensity by 2030 compared to 2018

[33] See AES Indiana Witness EKM Confidential Workpaper 10 for further details.

levels. This reduction is possible because the units will emit approximately half the CO2 on a per MWh basis as compared to coal. Additionally, as noted above, Units 3 and 4 are anticipated to have lower capacity factors operating on natural gas compared to coal.

**Figure 14 – Comparison of CO2 Intensity of Petersburg Units 3 and 4 on Gas Versus on Coal**




**Q36. Based on the above discussion, does the "Candidate Portfolio" that converts Petersburg Units 3 and 4 from coal to natural gas (Petersburg Conversion) remain the Preferred Resource Portfolio and Short Term Action Plan?**

A36. Yes. After conducting the 2024 IRP Update which includes known and current assumptions, the "Candidate Portfolio" that converts Petersburg from coal to natural gas performs the best overall across the Five Pillars and remains the reasonable least cost option.

**Q37. Are there changes to the 2022 IRP Short Term Action Plan that have resulted from the 2024 IRP Update that should be noted?**

A37. Yes. In addition to moving the Petersburg Conversion from 2025 (2022 IRP) to 2026 (2024 IRP Update), the results of the 2024 IRP Update indicate a need for approximately an additional 200 MW of energy storage for winter capacity that has resulted from MISO increasing the seasonal planning reserve margin for winter since the 2022 IRP was conducted. As previously noted, AES Indiana is working to fill this capacity need through the Company's the 2023 RFP.

**Q38. Is the Petersburg Conversion consistent with the results of the 2022 IRP and the 2024 IRP Update?**

A38. Yes. The Petersburg Conversion is consistent with the original and 2024 IRP Update results which identifies the Petersburg Conversion as a main component of the Short Term Action Plan.

## 4. CONSIDERATION OF RESOURCE ALTERNATIVES

**Q39. Ind. Code § 8-1-8.5-4 provides that in acting upon a petition under this statute, the Commission shall take into account the utility's other resource options. Did AES Indiana consider other resource options?**

A39. Yes, that is the purpose of the IRP. I elaborate on this in the following Q/As.

**Q40. Was the purchase of power through the spot energy market considered as an alternative to the proposed Petersburg Conversion?**

A40. Yes. However, at approximately 1,000 MW, Petersburg Units 3 and 4 are needed as a capacity resource in AES Indiana's resource portfolio. Relying on the spot energy market would put AES Indiana in a long-term position of relying on market transactions for large

amounts of capacity. This would be at odds with Ind. Code § 8-1-8.5-13(g), which requires utilities to enter the annual MISO Planning Resource Auction ("PRA") with a deficit of no more than 15% of their Planning Reserve Margin Requirement. Ultimately, relying on MISO capacity market transactions in the long-term puts AES Indiana customers at risk for market price volatility and reliability issues due to insufficient capacity planning.

**Q41. Please comment on the "interchange of power" or "pooling of facilities" as these phrases are used in Ind. Code § 8-1-8.5-4.**

A41. These statutory references predate the development of MISO and AES Indiana's membership in MISO. The current MISO market is effective at fully utilizing the existing capacity resources in the region. However, it does not eliminate the need for new capacity resources to address potential load growth and the retirements of older, less efficient coal fired units in the region.

**Q42. Were wind and other solar resources considered as an alternative?**

A42. Yes. As noted in Q/A 25, the "Clean Energy Strategy" was considered as an alternative to converting Petersburg Units 3 and 4 to natural gas. This strategy evaluates retiring the units in 2026 and 2028 and replacing them with only wind, solar and storage. The updated IRP analysis demonstrates that this alternative path is more expensive and less reliable for AES Indiana customers compared to the "Petersburg Conversion" strategy.

**Q43. Is AES Indiana's target of DSM savings in 2024-2026 consistent with its 2022 IRP?**

A43. Yes. In its 2022 IRP, AES Indiana included demand response and energy efficiency as viable generation alternatives. These resources were evaluated on a consistent and comparable basis with supply-side resources per the IURC rule 170 IAC § 4-7-8(c)(4).

Through this process, the Short Term Action Plan identified an average annual target of roughly 130,000-134,000 net MWh of DSM in 2024-2026.

AES Indiana filed a one-year DSM plan for programs in delivered 2024 with the Commission on May 26, 2023 under Cause No. 45898 and received approval of the plan on December 27, 2023. The Company intends to file a two-year plan in 2024 for programs delivered in 2025 and 2026 and receival approval of this plan by the end of 2024.

**Q44. Can DSM eliminate the need for the proposed generation project?**

A44. No. The volume of energy efficiency and demand response selected in the IRP is not enough to fill the need for generation under the new seasonal resource adequacy construct, particularly in the winter season.

## 5. DRAFT DIRECTOR'S REPORT FOR AES INDIANA'S 2022 INTEGRATED RESOURCE PLAN

**Q45. Have you reviewed the Draft Director's Report for AES Indiana's 2022 Integrated Resource Plan?**

A45. Yes. The draft Director's Report for AES Indiana's 2022 Integrated Resource Plan was made public on December 5, 2023. AES Indiana's responses to the Director's comments were submitted to the IURC on January 12, 2024.[34]

**Q46. Can you briefly summarize the Director's overarching comments to AES Indiana's 2022 Integrated Resource Plan?**

A46. Yes. The Director's comments were generally positive indicating that:

[34] AES Indiana's reply to the Draft Director's Report for AES Indiana's 2022 IRP, filed 1/12/2024

*"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 Indiana utilities. Especially important was AES Indiana's commitment to making available modeling inputs, outputs, and supporting data to stakeholders in a timely manner."*

Additionally, regarding the IRP Scorecard evaluation, the Director stated:

*"…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."*

The Director also provided comments and posed questions regarding the load forecast, electric vehicle forecast, and demand side management ("DSM") planning included in the 2022 IRP. AES Indiana responded to these comments and questions in AES Indiana's reply to the Draft Director's Report for AES Indiana's 2022 IRP. The Director also responded to Stakeholder comments to AES Indiana's 2022 IRP in the Report.

**Q47. Are there any comments provided by the Director to AES Indiana's 2022 IRP that you would like to address herein?**

A47. Yes. 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. For context – as the Director notes, AES Indiana modeled capacity expansion for the five strategies described in Q/A 13 across four future views or scenarios – *No Environmental Action* (characterized by no new environmental regulation and the Inflation Reduction Act ("IRA") renewable incentives cease), *Current Trends* (Reference Case that included IRA renewable incentives), *Aggressive Environmental* (characterized by a high approximately $28/MWh carbon tax starting in 2028), and *Decarbonized*

*Economy* (characterized by and aggressive Renewable Portfolio Standard that requires over 80% electricity sold to customers come from clean energy by 2040). The results of this 2022 IRP scenario analysis are shown in Figure 15 below. 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." These six Current Trends/Reference Case portfolios were then evaluated using the Scorecard methodology described in Q/A 14. 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 p. 186 of the 2022 IRP was that the Current Trends/Reference Case were used because this set of portfolios were "optimized assuming AES Indiana's most probable view of the future." Regarding this reasoning, the Director notes that "It seems that conclusions have been made before doing a thorough analysis."

**Figure 15 – Scenario Analysis results from AES Indiana' 2022 IRP**

Portfolios for Scorecard Evaluation

| | 20-Year PVRR | Scenarios: No Environmental Action | Current Trends (Reference Case) | Aggressive Environmental | Decarbonized Economy |
|---|---|---|---|---|---|
| Generation Strategies | No Early Retirement | $7,111 | $9,572 | $11,349 | $9,917 |
| | Petersburg Conversion to Natural Gas (est. 2025) | $6,621 | $9,330 | $11,181 | $9,546 |
| | One Petersburg Unit Retires (2026) | $7,462 | $9,773 | $11,470 | $9,955 |
| | Both Petersburg Units Retire (2026 and 2028) | $7,425 | $9,618 | $11,145 | $9,923 |
| | Clean Energy Strategy Both Petersburg Units Retire and Replaced with Wind, Solar, and Storage Resources (2026 and 2028) | $9,211 | $9,711 | $11,184 | $9,690 |
| | EnCompass Optimization without Predefined Strategy | $6,610 | $9,262 | $10,994* | $9,572 |

*Encompass Optimization Results by Scenario:*

| | | | |
|---|---|---|---|
| Converts Petersburg Units 3 and 4 in 2025 | Converts Petersburg Unit 3 in 2025 and Converts Petersburg Unit 4 in 2027 | Converts Petersburg Unit 4 in 2027* | Converts Petersburg Unit 3 in 2025 & Converts Petersburg Unit 4 in 2027 |

**Q48. How do you respond to the Director's comment regarding the Scenario & Risk analysis?**

A48. The Scenario Analysis conducted for the 2022 IRP compared resource mixes developed under a Current Trends/Reference Case set of assumptions to more extreme, "bookend" scenario assumptions in the No Environmental, Aggressive Environmental and Decarbonized Economy scenarios. As shown in Figure 8, the analysis demonstrated that converting Petersburg to Natural Gas performs the best in the No Environmental, Current Trends/Reference Case, and Decarbonized Economy scenarios and is more cost effective than continuing to burn coal at Petersburg in every scenario. AES Indiana made the decision to narrow the portfolios to the Current Trends/Reference Case scenario for Scorecard evaluation because this scenario assumes the most probable view of the future; as noted, the other scenarios were modeled as "bookend" scenarios. Additionally, when comparing the resource mixes across scenarios during the Short Term Action Plan period, the main difference is the volume of wind and solar energy resources driven by more or less aggressive environmental policy. The core Petersburg Units 3 and 4 capacity replacements are filled by either the natural gas conversion or battery energy storage across all scenarios. In other words, the key capacity replacement decisions are nearly the same regardless of scenarios. The scenarios only vary in terms of the volume of wind and solar being added mainly for energy value.

**Q49. Please elaborate.**

A49. To elaborate on this point, I will refer to Figure 16, which compares the resource mixes across scenarios, for the following discussion.

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, 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.[35] 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 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.

[35] 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.

**Figure 16 – Scenario Analysis results from AES Indiana' 2022 IRP**

**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 |

This is also the response I gave to the Director's comment in AES Indiana's reply to the Director's Report to AES Indiana's 2022 IRP.

## 6. CONSIDERATION OF THE STATE UTILITY FORECASTING GROUP (SUFG) INDIANA ELECTRICITY PROJECTIONS AND MISO RELIABILITY IMPERATIVE REPORT

**Q50. Has AES Indiana considered the State Utility Forecasting Group ("SUFG") Electricity Projections?**

A50. Yes, AES Indiana reviewed the SUFG's most recent Indiana Electricity Projections report from 2023.[36] In the report, the SUFG projected that the State of Indiana will need additional resources in the first half of the forecast driven by units that will be retiring in that time. Resource additions in the second half of the forecast will be driven by both retirements of existing units and increasing demand. As previously noted, converting Petersburg Units 3 and 4 to natural gas will provide a near one-for-one capacity replacement at Petersburg. As such, the Petersburg Conversion will not create a need for additional resources identified in SUFG's 2023 Electricity Projections.

**Q51. Are you familiar with MISO's 2024 Reliability Imperative Report?**

A51. Yes. MISO's 2024 Reliability Imperative Report was published on February 21, 2024.[37] In this report, MISO identified challenges that are driving the reliability imperative and identified areas of focus to address these challenges. The challenges MISO identified that are driving the reliability imperative include: changes to the MISO fleet; regulations, policies, and investment criteria; and fuel assurance.[38]

MISO stated retiring and replacing dispatchable resources with intermittent resources, such as solar and wind resources, presents a challenge as these intermittent resources do not

[36] Indiana Electricity Projection: The 2023 Report, State Utility Forecasting Group, December 2023
[37] https://cdn.misoenergy.org/2024%20Reliability%20Imperative%20report%20Feb.%2021%20Final504018.pdf?v=20240221104216.
[38] *Id.* at 2.

provide the same critical reliability attributes as coal or natural gas resources.[39] MISO explained that environmental policies, such as EPA's proposed Greenhouse Gas New Source Performance Standards under CAA Section 111(d) that was published in May 2023, have the potential to increase the number of coal- and natural gas-powered resources retirements in the future.[40] Finally, MISO stated that fuel assurance issues specifically associated with coal and natural gas present reliability risks. MISO explained that coal units have experienced increased risks of being unable to perform due to lack of fuel availability because coal supplies have tightened in recent years due to many factors, including reduced mining, transportation availability, and supply chain issues.[41] MISO stated gas-fired resources are also subject to fuel-assurance risks because they rely on pipeline systems that were largely built for home-heating and manufacturing purposes that can cause gas power plants to sometimes face challenging economic conditions to procure the fuel they need to operate.[42] MISO stated extreme winter weather events in the MISO region have historically driven home heating needs for gas and impact the availability of gas for natural gas-fired generators that do not have firm transportation contracts.[43]

**Q52. Please discuss how the Petersburg Repowering Project addresses the challenges MISO identified in its Reliability Imperative Report that you described above.**

A52. As I stated above, the Petersburg Repowering Project maintains the capacity of the existing Petersburg Units 3 and 4. This will ensure that Petersburg Units 3 and 4 will maintain the

[39] *Id.*
[40] *Id.* at 2, 11-12.
[41] *Id.* at 10.
[42] *Id.*
[43] *Id.* at 10-11.

vital reliability, resiliency, and stability attributes they currently provide upon completion of the Petersburg Repowering Project.

As explained by AES Indiana witness Collier (Q/A 29), future environmental requirements, such as the requirements of a final CAA Section 11(d) rule, remain uncertain. However, the Petersburg Repowering Project allows the Company to significantly reduce most air emissions[44] and avoid the significant risks associated with operating a coal-fired resource in the future.

Finally, as explained by AES Indiana witness Cooper, AES Indiana has secured enough firm transportation on the Midwestern Gas Transmission pipeline to ensure firm service for a maximum burn day. Additionally, the Petersburg Repowering Project will allow the Company to cease coal-fired operation at Petersburg Generating Station, which removes all of the fuel supply risks MISO identified that are unique to coal-fired generators.

## 7. IND. CODE § 8-1-2-0.6

**Q53. Has AES Indiana considered Ind. Code § 8-1-2-0.6?**

A53. Yes. Ind. Code § 8-1-2-0.6 defines the Five Pillars of Utility Electric Service and State Energy Policy as reliability, affordability, resiliency, stability, and environmental sustainability. As discussed in the code – decisions concerning Indiana's electric generation resource mix, energy infrastructure, and electric service ratemaking constructs must consider each of these attributes. The Commission adopted GAO 2023-04, which encourages utilities to include discussions around the Five Pillars in Clean Energy Project filings.

[44] See AES Indiana witness Collier's direct testimony at Q/A 11.

AES Indiana understands the importance of considering the Five Pillars in utility electric service and Integrated Resource Planning. As discussed in Q/A 14, in the 2022 IRP, the Company's IRP Scorecard evaluated the Five Pillars of Utility Electric Service and State Energy Policy. The Scorecard included metrics representing the Five Pillars as follows:

1) Affordability – The Scorecard evaluated 20-year PVRR to measure portfolio cost effectiveness to customers.

2) Sustainability – The Scorecard quantified total CO2, SO2, NOX, Water Use and CPP production by candidate portfolio to measure and evaluate environmental impacts of the portfolios.

3) Reliability, Resiliency and Stability – AES Indiana hired Quanta Technology LLC to perform an in-depth analysis of the Reliability, Resiliency and Stability of the candidate portfolios. Composite scores from this analysis were used to evaluate the candidate portfolios.

Additionally, AES Indiana's IRP Scorecard included metrics that measured and evaluated the Risk & Opportunity and Economic Impacts of the candidate portfolios.

AES Indiana found that the Preferred Resource Portfolio that converts Petersburg Units 3 and 4 from coal to natural gas performed the best overall across the IRP Scorecard categories and was therefore selected as the reasonable, least cost plan. AES Indiana Attachment EKM-1, Section 9.5: Preferred Resource Portfolio and Final Scorecard of the 2022 IRP Report Volume 1 (pp. 252 – 253) evaluates the Preferred Resource Portfolio against the Five Pillars using the IRP Scorecard results. As described above, the 2024 IRP Update confirms this conclusion.

## 8. CONCLUSION

**Q54. Please summarize your recommendation.**

A54. In summary, AES Indiana's decision to convert Petersburg Units 3 and 4 from coal to natural gas is a reasonable, least cost option that performs the best overall across the Five Pillars. The Project will contribute to a sustainable and affordable future for AES Indiana customers and provide reliable and dispatchable capacity under MISO's seasonal resource adequacy construct. Therefore, I recommend Commission approval of the conversion of Petersburg Units 3 and 4 from coal to natural gas as proposed by AES Indiana.

**Q55. Does this conclude your verified prepared direct testimony?**

A55. Yes.

**VERIFICATION**

I, Erik K. Miller, AES Indiana Director, Resource Planning, affirm under penalties of perjury that the foregoing representations are true and correct to the best of my knowledge, information and belief.

Dated March 11, 2024

Erik K. Miller

**AES Indiana Attachment EKM-1**

2022 AES Indiana IRP Public Volume 1

[BOUND SEPARATELY - NOT REPRODUCED HEREIN]

**AES Indiana Attachment EKM-2**

2022 AES Indiana IRP Public Volume 2

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**AES Indiana Attachment EKM-3**

2022 AES Indiana IRP Public Volume 3

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