INDIANA INTEGRATED RESOURCE PLANNING REPORT

to the:

Indiana Utility Regulatory Commission

Appendix – Volume 3

Public Version

Submitted Pursuant to:

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March 28, 2025

Appendix Volume 3

Exhibit A Projected Fuel Costs

Exhibit B Capacity Contingency Risk Analysis Methodology

Indiana Michigan Power Company
2024 IN IRP: Appendix 3
Exhibit A: Projected Fuel Costs
PUBLIC VERSION

Year	Month	Donald C. Cook 1 ($/Mbtu)	Donald C. Cook 2 ($/Mbtu)	Base Reference Case Rockport 1 ($/MMBtu)	EER Case Rockport 1 ($/MMBtu)
2024	1				
2024	2				
2024	3				
2024	4				
2024	5				
2024	6				
2024	7				
2024	8				
2024	9				
2024	10				
2024	11				
2024	12				
2025	1				
2025	2				
2025	3				
2025	4				
2025	5				
2025	6				
2025	7				
2025	8				
2025	9				
2025	10				
2025	11				
2025	12				
2026	1				
2026	2				
2026	3				
2026	4				
2026	5				
2026	6				
2026	7				
2026	8				
2026	9				
2026	10				
2026	11				

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Year	Month	Donald C. Cook 1 ($/Mbtu)	Donald C. Cook 2 ($/Mbtu)	Base Reference Case Rockport 1 ($/MMBtu)	EER Case Rockport 1 ($/MMBtu)
2026	12				
2027	1				
2027	2				
2027	3				
2027	4				
2027	5				
2027	6				
2027	7				
2027	8				
2027	9				
2027	10				
2027	11				
2027	12				
2028	1				
2028	2				
2028	3				
2028	4				
2028	5				
2028	6				
2028	7				
2028	8				
2028	9				
2028	10				
2028	11				
2028	12				
2029	1				
2029	2				
2029	3				
2029	4				
2029	5				
2029	6				
2029	7				
2029	8				
2029	9				
2029	10				
2029	11				
2029	12				

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Year	Month	Donald C. Cook 1 ($/Mbtu)	Donald C. Cook 2 ($/Mbtu)	Base Reference Case Rockport 1 ($/MMBtu)	EER Case Rockport 1 ($/MMBtu)
2030	1				
2030	2				
2030	3				
2030	4				
2030	5				
2030	6				
2030	7				
2030	8				
2030	9				
2030	10				
2030	11				
2030	12				
2031	1				
2031	2				
2031	3				
2031	4				
2031	5				
2031	6				
2031	7				
2031	8				
2031	9				
2031	10				
2031	11				
2031	12				
2032	1				
2032	2				
2032	3				
2032	4				
2032	5				
2032	6				
2032	7				
2032	8				
2032	9				
2032	10				
2032	11				
2032	12				
2033	1				

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Year	Month	Donald C. Cook 1 ($/Mbtu)	Donald C. Cook 2 ($/Mbtu)	Base Reference Case Rockport 1 ($/MMBtu)	EER Case Rockport 1 ($/MMBtu)
2033	2				
2033	3				
2033	4				
2033	5				
2033	6				
2033	7				
2033	8				
2033	9				
2033	10				
2033	11				
2033	12				
2034	1				
2034	2				
2034	3				
2034	4				
2034	5				
2034	6				
2034	7				
2034	8				
2034	9				
2034	10				
2034	11				
2034	12				
2035	1				
2035	2				
2035	3				
2035	4				
2035	5				
2035	6				
2035	7				
2035	8				
2035	9				
2035	10				
2035	11				
2035	12				
2036	1				
2036	2				

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Year	Month	Donald C. Cook 1 ($/Mbtu)	Donald C. Cook 2 ($/Mbtu)	Base Reference Case Rockport 1 ($/MMBtu)	EER Case Rockport 1 ($/MMBtu)
2036	3				
2036	4				
2036	5				
2036	6				
2036	7				
2036	8				
2036	9				
2036	10				
2036	11				
2036	12				
2037	1				
2037	2				
2037	3				
2037	4				
2037	5				
2037	6				
2037	7				
2037	8				
2037	9				
2037	10				
2037	11				
2037	12				
2038	1				
2038	2				
2038	3				
2038	4				
2038	5				
2038	6				
2038	7				
2038	8				
2038	9				
2038	10				
2038	11				
2038	12				
2039	1				
2039	2				
2039	3				

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Year	Month	Donald C. Cook 1 ($/Mbtu)	Donald C. Cook 2 ($/Mbtu)	Base Reference Case Rockport 1 ($/MMBtu)	EER Case Rockport 1 ($/MMBtu)
2039	4				
2039	5				
2039	6				
2039	7				
2039	8				
2039	9				
2039	10				
2039	11				
2039	12				
2040	1				
2040	2				
2040	3				
2040	4				
2040	5				
2040	6				
2040	7				
2040	8				
2040	9				
2040	10				
2040	11				
2040	12				
2041	1				
2041	2				
2041	3				
2041	4				
2041	5				
2041	6				
2041	7				
2041	8				
2041	9				
2041	10				
2041	11				
2041	12				
2042	1				
2042	2				
2042	3				
2042	4				

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Year	Month	Donald C. Cook 1 ($/Mbtu)	Donald C. Cook 2 ($/Mbtu)	Base Reference Case Rockport 1 ($/MMBtu)	EER Case Rockport 1 ($/MMBtu)
2042	5				
2042	6				
2042	7				
2042	8				
2042	9				
2042	10				
2042	11				
2042	12				
2043	1				
2043	2				
2043	3				
2043	4				
2043	5				
2043	6				
2043	7				
2043	8				
2043	9				
2043	10				
2043	11				
2043	12				
2044	1				
2044	2				
2044	3				
2044	4				
2044	5				
2044	6				
2044	7				
2044	8				
2044	9				
2044	10				
2044	11				
2044	12				

Indiana Michigan Power Company

2024 IN IRP: Appendix 3

Exhibit B: Capacity Contingency Risk Analysis Methodology

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Capacity Contingency Risk Model Summary

Executive Summary: Objectives and Summary

The Capacity Planning Risk Model (CPRM) is a risk assessment application which provides the framework to estimate a capacity contingency that I&M should add to the PJM Forecast Pool Requirement (FPR) to ensure that the Company meets the load obligation with 95% confidence. This document provides details on the methodology used to develop the capacity contingency results include in Appendix Volume 1 Exhibit K.

To do this, CPRM aggregates simulated accredited capacity for each resource in the portfolio based on historical performance and other projected uncertainty and subtracts the simulated load obligation, which is also uncertain. It completes this simulation thousands of times to characterize the probability distribution of the surplus capacity. This probability distribution is used to determine an appropriate capacity contingency to add to the FPR to achieve specified confidence of procuring sufficient accredited capacity to meet the load obligation in a selected year.

The variability in this distribution is driven by uncertainty in the peak load forecast and uncertainty in factors affecting the accreditation process. Factors affecting the accreditation process include variability around effective load carrying capability (ELCC) for all resources and extended outage risk for dispatchable resources utilizing historical performance (Equivalent Forced Outage Rate (EFOR)).

Methodology

The application uses simulation to characterize the range of possible accredited capacity minus the forecasted PJM load obligation with its associated uncertainty. The following formula is used to calculate the surplus capacity on each simulated scenario, where *RM* is the FPR percentage required by PJM:

$$Surplus = D + R + C + (1 + RM)(P - d)$$

Table 1 below defines the variables in the above formula. Each of these variables are uncertain and contribute to the overall variability in the surplus for each planning year, adding to the capacity contingency value.

Table 1: Primary Risk Drivers

Variable	Factor
P	Peak Load Forecast
D	Dispatchable Generation
R	Renewable Generation
d	Demand Side Resources
C	PPA/Contracted Capacity
RM	PJM FPR

All the factors identified above are assumed to be statistically independent. Many outcomes are simulated for each factor and the surplus is calculated on each repetition. This characterizes the distribution of the surplus.

Capacity Contingency

A key statistic from the simulation is the amount by which the median exceeds the 5th percentile of the surplus distribution, expressed in megawatts (MW) or as a percentage of the forecasted PJM load obligation. This is regarded as the Capacity Contingency and is added to the FPR when defining the accredited capacity Target Obligation, ensuring the forecasted PJM load obligation is met with 95% confidence.

When making this calculation, it is assumed that the additional capacity can be obtained without risk, thus the only risk in the resulting distribution of the surplus would already be accounted for. This is assumed because there are innumerable ways of acquiring the required capacity, each with its own degree of risk. This assumption will be optimistic for planning years with significant capacity shortfalls, in which case the capacity contingency should be estimated reflecting the approximate accreditation uncertainty of the resource composition to be added.

The following data presented in Table 2 are required to run the CPRM analysis.

Table 2: CPRM Inputs and Descriptions

Input	Description
Peak load forecast and standard error	Forecasted peak load by year, jurisdiction, with uncertainty (standard error estimate).
Dispatchable generation performance history	7years historical EFOR performance by generating unit and month to project extended outage risk.
ELCC range estimates	Projected lower and upper bounds on ELCC values for all asset classes using ELCC for accreditation by year.
Credit risk estimates	Likelihood of default per resource identified as None, Low, Medium, or High risk.*

*Probabilities corresponding to these levels are also required as parameters.

Model Details

P: Peak Load Forecast

Each year, AEP must demonstrate that they have procured enough accredited capacity to meet or exceed the FPR as defined for that year. Due to the length of time it takes to procure or construct resources to serve the forecasted PJM load obligation for a given year, it is important to understand the degree to which the load forecast for that given year will fluctuate. AEP's Economic and Supply Forecasting organization provides a standard error with each peak load forecast estimate, which is used to characterize its uncertainty.

The CPRM aims to reflect the volatility exhibited by these forecasts for different degrees of "aheadness." Table 1 below is an illustration of historical forecasts for a particular load serving entity and how they fluctuate until finalization:

Table 3: Historical Forecasts

[redacted]

[redacted]

[redacted]

D and R: Dispatchable and Renewable Generation

PJM defines a class average ELCC rating for each generating class and applies a performance adjustment factor for each individual unit on top of this. [redacted]

Extended outage risk is modeled for units using the historical EFOR. [redacted]

d: Demand Side Resources

Demand side resources are estimated and subtracted from the peak load forecast. [redacted]

C: Contracted Capacity

The following source of uncertainty can impact the likelihood of procuring capacity from a particular generating resource in a particular planning year:

- Credit Risk: A counterparty does not deliver contracted capacity as promised.

[redacted]