STATE OF INDIANA

INDIANA UTILITY REGULATORY COMMISSION

IN THE MATTER OF THE VERIFIED PETITION OF INDIANA MICHIGAN POWER COMPANY FOR APPROVAL OF: (1) DEMAND SIDE MANAGEMENT (DSM) PLAN, INCLUDING ENERGY EFFICIENCY (EE) PROGRAMS, DEMAND RESPONSE PROGRAMS, AND ENHANCED CONSERVATION VOLTAGE; AND (2) ASSOCIATED ACCOUNTING AND RATEMAKING TREATMENT, INCLUDING TIMELY RECOVERY THROUGH I&M'S DSM/EE PROGRAM COST RIDER OF ASSOCIATED COSTS, INCLUDING PROGRAM OPERATING COSTS, NET LOST REVENUE, AND FINANCIAL INCENTIVES.	)	**CAUSE NO.**

SUBMISSION OF DIRECT TESTIMONY OF
GREGORY J. SOLLER

Applicant, Indiana Michigan Power Company (I&M), by counsel, respectfully submits the direct testimony and attachments of Gregory J. Soller in this Cause.

Respectfully submitted,

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing was served this 31st day of March, 2022, by email transmission, hand delivery or United States Mail, first class, postage prepaid to:

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I&M Exhibit: _____

INDIANA MICHIGAN POWER COMPANY

PRE-FILED VERIFIED DIRECT TESTIMONY

OF

GREG SOLLER

Content

DIRECT TESTIMONY OF GREG SOLLER
ON BEHALF OF
INDIANA MICHIGAN POWER COMPANY

I. Introduction

Q1. Please state your name and business address.

My name is Gregory Soller. My business address is 1 Riverside Plaza, Columbus, Ohio 43215.

Q2. By whom are you employed and in what capacity?

I am a Resource Planning Manager for American Electric Power Service Corporation (AEPSC).

Q3. Briefly describe your educational background and professional experience.

I earned a Bachelor of Mechanical Engineering from the University of Dayton in 1989 and a Master of Business Administration from Capital University in 2014. I have been a Professional Engineer registered in the State of Ohio since 1998. I began my career in 1989 with ABB Automation working in engineering in the Pulp and Paper industry, and later as a Project Manager in the Chemical and Textiles group, managing industrial controls systems projects for Chemical, Pharmaceutical and Textile plants. In 2001, I joined WCOM/Verizon Business as a Project Manager where I was responsible for managing web hosting data center construction and expansions. I joined AEPSC in 2005 as a Supervisor in Engineering Work Control where I was responsible for a team of coordinators supporting engineering work plans with the AEP Engineering Services organization. In 2014, I transferred to the Commercial Operations organization as an Energy Coordinator supporting the Day Ahead energy market planning and in 2016, I joined the Generation Business Services organization. In 2018, I

transferred into the Resource Planning group as a Resource Planning Analyst Staff, assuming my current position of Resource Planning Manager in September 2021.

Q4. Have you previously testified before any regulatory commissions?

No.

Q5. What are your responsibilities as Resource Planning Manager?

My responsibilities include supervising planning studies in the area of generation resource planning for the American Electric Power (AEP) electric utility operating companies, including Indiana Michigan Power Company (I&M or Company). These studies include supply-side and demand-side resources costs and performance expectations.

Q6. Are you sponsoring any attachments?

Yes. I am sponsoring Attachment GJS-1, which is a copy of I&M's 2021 Integrated Resource Plan (IRP) Report, and Attachment GJS-2, which is a copy of Appendix Volume 4 of the IRP, containing information related to the Public Participation Process.

Q7. Were these attachments that you sponsor prepared or assembled by you or under your direction?

Yes.

II. Purpose of testimony

Q8. What is the purpose of your testimony?

My testimony discusses the Company's 2021 IRP and specifically the demand-side resources included in the Company's Preferred Portfolio. I explain that the IRP provides the Company's demand-side management and energy efficiency (DSM/EE) planners an economic level of energy efficiency resources for the IRP planning period.

III. IRP

Q9. Has I&M submitted an IRP and underlying Resource Assessment to the Indiana Utility Regulatory Commission (Commission)?

Yes, I&M submitted its 2021 IRP to the Commission on January 31, 2022 and made it available on I&M's website:

(https://www.indianamichiganpower.com/info/projects/IntegratedResourcePlan/).

Q10. What is the purpose of I&M's IRP?

I&M's IRP is a tool to help I&M management make decisions about long-term resource planning. While the IRP is a 20-year plan, it is not a commitment to specific resource additions or other courses of action. It explains how the Company plans to meet the projected capacity (i.e., peak demand) and energy requirements of its customers using both supply-side and demand-side resources. The IRP also provides a forum for I&M's stakeholders to learn about and provide input to I&M's long-term resource planning. In the context of the Company's DSM/EE planning efforts, the IRP informs the DSM/EE planners of EE bundles selected to provide insight into the development of the Company's proposed DSM/EE Plan.

IV. IRP Methodology

Q11. Please provide a brief overview of the methodology followed to conduct I&M's 2021 IRP.

For the Company's 2021 IRP, I&M engaged Siemens Power Technologies International (Siemens) to provide its expertise and perspective, facilitate the stakeholder engagement process, and support the modeling and development of the 2021 IRP Report. More specifically, the Company followed a 5-Step process facilitated by Siemens and reviewed Siemens' results to determine a Preferred Portfolio. Within this process, a set of optimized Candidate Portfolios were developed for resources under a set of inputs informed by different conditions. These Candidate Portfolios were then analyzed to determine respective cost and performance metrics through a probabilistic (stochastic) analysis. The results of the portfolio analysis were included in a Balanced Scorecard where various attributes could be compared to inform the Company in its selection of a Preferred Portfolio.

Q12. What inputs were provided and used in the development of the 2021 IRP?

Numerous inputs and assumptions were provided for Siemens' modeling efforts, including:

- I&M's load forecast assumptions,
- I&M's commodity price assumptions,
- I&M's existing generating and demand-side management (DSM) resources cost, performance and operating life assumptions and decisions,
- EIA, Siemens and RFP based inputs for supply-side resource alternatives,
- 2021 Market Potential Study to inform inputs for demand-side resource alternatives,
- I&M-identified cost effective CVR potential,

- Inputs for annual and cumulative resource additions limits,
- Limits on market energy imports and exports.

Q13. Please describe how I&M's load forecast was considered in its 2021 IRP?

I&M's load forecast was developed by AEP's Economic Forecasting organization and completed in June 2021. A detailed description of I&M's load forecast used in the 2021 IRP can be found in Section 5 of the Attachment GJS-1 and the testimony of Company witness Burnett.

Q14. Please describe how the commodity price forecasts were used in I&M's 2021 IRP.

I&M provided key inputs to Siemens in order to develop commodity pricing for the various Scenarios the Company evaluated in its 2021 IRP. These inputs included natural gas and coal price forecasts, CO2 prices, and capacity prices. A detailed description of the commodity price forecasts used in the 2021 IRP can be found in Sections 7.2 through 7.4 of Attachment GJS-1.

Q15. Please describe the existing generation resources included in I&M's 2021 IRP.

The 2021 IRP included existing supply-side resources as shown in Table GJS-1 below and discussed in Section 6.4 of Attachment GJS-1.

Table 1 GJS-1

Plant Name	Fuel Type	Nameplate Capacity (MW)	Unforced Capacity (MW)	COD	Siemens Study End Life
Cook 1	Nuclear	1084	986	1975	12/31/2034
Cook 2	Nuclear	1204	1125	1978	12/31/2037
Rockport 1 (A)	Coal	1122	1072	1984	12/31/2028
Rockport 2 (A)	Coal	1105	1051	1989	12/31/2024
Berrien Springs 1-12	Hydro	7	3	1908	through 2041
Buchanan 1-10	Hydro	4	1	1919	through 2041
Constantine 1-4	Hydro	1	0.2	1921	through 2041
Elkhart 1-3	Hydro	2	2	1913	through 2041
Mottville 1-4	Hydro	1.7	0.5	1923	through 2041
Twin Branch 1-8	Hydro	5	3	1904	through 2041
Deer Creek	Solar	3	1	2015	through 2041
Olive	Solar	5	3	2016	through 2041
Twin Branch Solar	Solar	3	1	2016	through 2041
Watervliet	Solar	5	2	2016	through 2041
St. Joe Solar	Solar	20	6	2021	through 2041
Clifty Creek 1-6 (C)	Coal	102	82	1956	ICPA ending in 2040
Kyger Creek 1-5 (C)	Coal	85	68	1955	ICPA ending in 2040
Fowler Ridge 1 (B)	Wind	100	13	2008	PPA ending in 2029
Fowler Ridge 2 (B)	Wind	50	7	2009	PPA ending in 2029
Headwaters (B)	Wind	200	26	2014	PPA ending in 2034
Wildcat	Wind	100	13	2014	PPA ending in 2032

(A) Represents I&M's share of these units (85%)
(B) Represents capacity from Power Purchase Agreements (PPAs)
(C) Represents I&M's share of the OVEC capacity under the ICPA

Q16. Please describe what new supply-side resources were considered in the 2021 IRP.

New supply-side resources available for consideration in the 2021 IRP are discussed further in Section 7.6 of Attachment GJS-1 and include a combination of thermal and carbon free resources. A summary of these resources is shown in Table GJS-2 below. New supply-side resources were available for selection beginning in 2025.

Table GJS-2

	Thermal				Carbon Free				
	Fossil				Storage	Nuclear	Renewables		
Technology	Advanced 1x1 w 90% CO2	Advanced 2x1 Combined Cycle	Advanced 1x1 Combined Cycle	Simple Cycle Frame CT	Batteries - Li-ion	Small Modular Reactor	Solar	Solar + Storage	Onshore Wind
Fuel	Nat.Gas	Nat. Gas.	Nat. Gas	Nat. Gas.	All	Ura.	Sun	Sun	Wind
Size (MW)	390	1,070	440	250	50MW/ 200MWh	600	50	100	200

Q17. Please describe how demand-side resources were considered in the 2021 IRP.

Demand-side resources were included as either existing "Going-In" resources (i.e., they were not required to compete with supply-side resources for selection by the Aurora model) or incremental new resources optimized for economic selection by the model.

Q18. What demand-side resources were included as "going-in" resources in the 2021 IRP?

The 2021 IRP incorporated existing demand-side resources included within the load forecast as part of the "Going-In" set of resources (i.e., they were not required to compete with supply-side resources for selection by the Aurora model). This is discussed further by Company witness Burnett and in Section 6.6.2 of Attachment GJS-1.

Q19. Were there any other DSM resources included as "going-in" resources?

Yes. Based on the 2021 Market Potential Study (MPS) discussed by witness Huber, the IRP included new demand-side resources for Low Income Qualified EE, distributed energy resources (DER), and demand response (DR). Conservation Voltage Reduction (CVR) resources were also included as "Going-In" resources and are discussed by Company witness Walter.

Q20. Why were these demand-side resources included as "going-in" resources in the 2021 IRP?

Each "Going-In" resource described above was included in the 2021 IRP in this way for resource-specific reasons. First, Income Qualified EE resources were included as "Going-In" because Commission rules supports the inclusion of this program in utility DSM Plans based on the acknowledged public betterment the program provides, regardless of the cost effectiveness screen other EE programs are required to pass.

Second, DER was included as a "Going-In" resource because the Company is not proposing to influence customer decision-making to install DER. However, an informed forecast of DER penetration was needed to appropriately consider the future impacts of DER in the 2021 IRP. The MPS analysis provided this forecast. While DER resources connected to the load-side of the utility meter did not pass the economic screen in the MPS, as discussed in Section 7.8.3 of the 2021 IRP Report, an incremental level of DER generation identified by the MPS was applied in all Candidate Portfolios based on the MPS forecast customer adoption rates. The inclusion of DER generation as a going-in resource in the 2021 IRP allowed IRP modelling to account for the impacts of these type of resources in the load shapes used in the IRP based on an MPS potential analysis that addressed the entire planning period of the 2021 IRP.

Third, DR and CVR were included in the 2021 IRP as going-in resources because it was not necessary to additionally screen these resources through IRP selection. Further, these resources are already screened for cost

effectiveness, either through I&M MPS modelling or through internal analysis performed by the Company. Company witness Walter supports the cost effectiveness of these resources in his testimony and attachments and discusses the extent of Company plans for these resources.

Q21. Please describe what additional demand-side resources were considered in the 2021 IRP.

In addition to the new "going-in" demand-side resources discussed previously, additional or "incremental" EE resources were identified and ultimately modeled based on I&M's 2021 MPS performed by GDS Associates and Brightline Group (the GDS Team) and discussed by witness Huber.

Q22. How were incremental EE resources identified for modeling in the IRP?

As explained in Section 5.6.2 of Attachment GJS-1, for the years beyond 2022, the IRP model selected optimal levels of incremental economic EE based on projections of future market conditions, the future expected costs of available supply-side resources, and the level of available incremental EE.

For the IRP, incremental proxy EE resource inputs were developed by GDS Associates and further described by witness Huber. In summary, the EE potential savings identified in the MPS were grouped into class bundles (Residential and C&I) based on feedback received during the 2021 I&M IRP Stakeholder Engagement process. The GDS Team provided the energy efficiency cost and performance proxy IRP inputs across three different vintage bundles: 2023-2025, 2026-2028, and 2029-2040 to better optimize the value of energy efficiency to the system over time periods that align with subsequent I&M planning periods.

Additionally, within each vintage bundle, the GDS Team identified five residential bundles, one income-qualified bundle, and eight C&I bundles for IRP inputs. Witness Huber provides a high level overview of the end-uses included within each bundle and the relative magnitude of each bundle compared to total

sector savings over the initial vintage (2023-2025) timeframe. The energy efficiency MWh and MW impacts for each vintage block[1] provided the cumulative annual lifetime savings. A summary of the rank ordered (Levelized $/MWh) 2023-2025 bundles included in the IRP modeling is shown in Table GJS-3 below. A detailed description of all the additional DSM resources evaluated in the 2021 IRP can be found in Sections 7.7 through 7.9 of Attachment GJS-1.

Table GJS-3

2023-2025 Vintage	Total Energy (MWh)	Peak Capacity (MW)	Levelized Cost ($/MWh)	Unit Cost Rank Order #
C&I Block 8	37,512	33	12	1
C&I Block 7	250,221	19	15	2
C&I Block 3	1,191,081	188	20	3
C&I Block 1	311,008	44	35	4
Res Block 6	654,673	72	42	5
Res Block 3	85,888	54	62	6
C&I Block 4	63,995	13	77	7
C&I Block 6	15,376	3	104	8
C&I Block 5	36,234	6	112	9
C&I Block 2	4,491	0.01	183	10
Res Block 2	14,841	27	242	11
Res Block 4	564	1	490	13
Res Block 1	1,517	0.18	914	14

Q23. Please describe how incremental EE resources were modeled in the 2021 IRP.

Non-income qualified EE programs were modeled on a comparable economic basis as supply-side programs. Because the MPS provided cumulative annual lifetime savings for each vintage block, for IRP modeling purposes it was necessary to develop proxy annual cost and performance characteristics for each year of the bundle potential. Siemens accomplished this by spreading the

[1] The use of the term “Block” is the same as the reference to “Bundle”. The term “Block” was introduced during the transformation of the Class Bundles to annual IRP inputs

cumulative annual savings of the bundle evenly across the bundle vintage years. An example of this process for one bundle is illustrated in Table GJS-4 below.

Table GJS-4

Operating Life	**5**	**C&I Vintage 2023-2025 Block 4**			
SOURCE	**GDS**	**SIEMENS**			
Year	**DSM MWh Cumulative Bundle Savings**	**DSM MWh Average Annual Savings**	**2023 Program Annual Savings**	**2024 Program Annual Savings**	**2025 Program Annual Savings**
2021					
2022					
2023	6,647	6,647	6,647		
2024	12,754	6,377	6,377	6,377	
2025	18,662	6,221	6,221	6,221	6,221
2026	13,195	4,398	4,398	4,398	4,398
2027	7,859	2,620	2,620	2,620	2,620
2028	3,778	1,889		1,889	1,889
2029	1,100	1,100			1,100
2030	0	0			

In total, the GDS-supplied EE bundles were included as 39 different incremental EE Resources with annual cost and energy savings. The incremental EE cost and performance characteristics identified in the proxy EE bundles were input into the model to allow for competition amongst demand-side and supply-side resources. These programs were subject to the optimization routine, and both the capacity and energy impact was determined by the economic need for these programs.

Q24. How were the EE costs captured in the model?

EE costs for each year of the bundle vintage were provided by GDS and applied in the year that the resource bundle was selected.

A summary of the annual costs for the 2023-2025 EE Bundles is shown in Table GJS-5 and Table GJS-6:

Table GJS-5

	Residential					
	Block 1	Block 2	Block 3	Block 4	Block 6	IQW
2023	$293,480	$652,185	$1,245,214	$49,296	$6,543,886	$1,254,075
2024	$293,759	$759,672	$1,349,911	$58,446	$6,724,282	$1,283,958
2025	$294,060	$855,950	$1,416,050	$66,634	$7,169,047	$1,314,519

Table GJS-6

	C&I							
	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7	Block 8
2023	$2,611,506	$107,162	$5,607,727	$1,138,153	$1,010,069	$406,456	$1,121,165	$81,177
2024	$2,764,678	$226,329	$5,215,648	$1,282,091	$1,053,383	$417,873	$844,504	$102,117
2025	$2,798,200	$363,795	$5,222,623	$1,531,135	$1,233,779	$472,586	$535,787	$128,440

Q25. Please summarize I&M's stakeholder process.

The Company held five Stakeholder meetings during development of its 2021 IRP, including one specific to Energy Efficiency and demand-side resources. During these meetings, stakeholders had an opportunity to engage with the Company about the 2021 IRP modeling efforts. Stakeholders were also able to submit questions to the Company throughout the IRP development process. Information related to that process is included in Attachment GJS-2.

Q26. Please explain how I&M incorporated stakeholder input in developing its 2021 IRP and its Preferred Portfolio.

The feedback received from the second stakeholder meeting focused on Energy Efficiency and demand-side resources was primarily related to the assessment and selection of the EE bundling method used in the 2021 IRP and resulted in further coordination and review with the GDS Team. Various bundling methods were reviewed, including Value Based, Load-shape based and Cost-based approaches. Through discussions with stakeholders and external technical conferences, a sector-level value based approach was used. Further discussion

of the method used by GDS to determine which measures to assign to the individual sector-level bundles is discussed by witness Huber and in section 7.8.1.1 of Attachment GJS-1.

V. IRP Results

Q27. What levels of incremental EE resources were selected for inclusion in the 2021 IRP Preferred Portfolio for the DSM planning years 2023-2025?

In the Preferred Portfolio, the optimization selected some level of nearly all available EE bundles for 2023-2025 as shown in Table GJS-7, excluding the two highest cost Residential bundles (Residential Vintages 1and 4) and the highest cost C&I bundle (C&I Vintage 2). Furthermore, the IRP selected over 98% of the system level potential savings identified in the MPS from the available EE resources modeled in years 2023-2025 as illustrated in Figure GJS-1 with an associated capacity of 136 MW. These results were provided to Company witness Walter to help inform development of the 2023-2025 DSM Plan (DSM Plan) proposed in this proceeding.

Table GJS-7

2023-2025	2023	2024	2025
CI Block 1	1	1	1
CI Block 2	0	0	0
CI Block 3	1	1	1
CI Block 4	1	1	0
CI Block 5	1	1	0
CI Block 6	1	1	0
CI Block 7	1	1	1
CI Block 8	1	1	1
Res Block 1	0	0	0
Res Block 2	1	1	1
Res Block 3	1	1	1
Res Block 4	0	0	0
Res Block 6	1	1	1

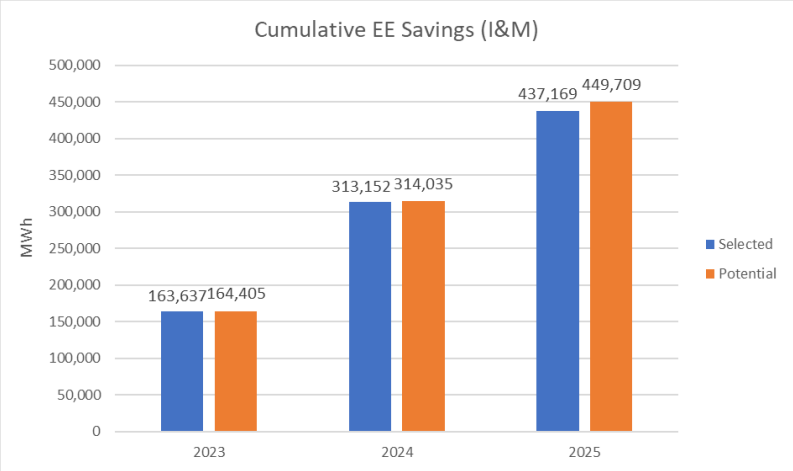

Figure GJS-1

Q28. Are the savings in I&M's Preferred Portfolio reasonable?

Yes. The overall level of EE savings in I&M's IRP Preferred Portfolio is reasonable based on the process the Company followed in conjunction with the GDS Team to develop the MPS and the associated IRP EE bundle inputs. The IRP allowed these proxy incremental EE resources to compete against other supply-side alternatives in the IRP model that incorporated the Company's load forecast, commodity forecast and EE resources to identify an optimized mix of resources to meet the Company's obligations. The optimized levels of EE resources in the 2021 IRP of EE resources are consistent with the MPS and reflect a reasonable and cost effective level of EE savings to pursue through the DSM Plan.

Q29. Are the bundles modeled in the 2021 IRP intended to represent the actual EE measures that would be implemented in the Company's DSM plan?

No, not specifically. All of the incremental resources modeled in the 2021 IRP are proxies. The resources modeled in the 2021 IRP represent various types of either supply-side or demand-side resources that can be utilized to meet the Company's projected capacity and energy requirements. While the EE bundles

are proxy resources based on the Company's MPS; they align with the retail customer classes; they align with the load shapes within the retail customer classes; and they provide a cost and savings level that provides the IRP model over 39 different incremental EE options over a 20 year planning horizon. Ultimately, the EE bundles selected provide insight for the DSM planner to utilize in the development of the Company's proposed DSM Plan.

Q30. Does this conclude your pre-filed verified direct testimony?

Yes.

VERIFICATION

I, Greg Soller, Resource Planning Manager of American Electric Power Service Corporation, affirm under penalties of perjury that the foregoing representations are true and correct to the best of my knowledge, information, and belief.

Date: 3-30-2022

Greg Soller

Greg Soller

See Attachment GDS-1

Bound Separately

See Attachment GDS-2

Bound Separately