



**Indiana Michigan Power Company**  
2021 Integrated Resource Plan  
Stakeholder Workshop #3A Meeting Minutes

**1. Welcome and Safety Moment – Andrew**

*Andrew kicked off the meeting at 9:30 and covered slides 1-5.*

Andrew kicked off the meeting and welcomed participants to the 2021 I&M Integrated Resource Plan (IRP) stakeholder workshop. Andrew reviewed a safety moment for heat safety.

**2. Meeting Guidelines – Jay Boggs, Siemens PTI**

*Jay covered slides 5-8*

Jay introduced the Meeting Guidelines section and its content and established the role of Moderator for the Stakeholder Meeting.

Meeting guidelines and agenda were discussed.

Jay also provided an overview of the Questions and Feedback process, including directing stakeholders to submit comments and stay informed at the I&M IRP Website: <http://www.indianamichiganpower.com/info/projects/IntegratedResourcePlan>.

In addition, stakeholders are encouraged to submit questions via email to [I&MIRP@aep.com](mailto:I&MIRP@aep.com)

**3. IRP Process and Tools – Peter Berini, Siemens PTI**

*Peter covered slides 9-19*

Peter covered definitions to be used throughout the presentation, specifically bolded definitions.

Peter covered the IRP overview and explained that the IRP is a roadmap of where the organization (AEP I&M) is going and how AEP I&M is going to get there. I&M partnered with Siemens to create the reference portfolio and set of candidate portfolios with the incorporation of stakeholder feedback. Reference and candidate portfolios will be analyzed to identify the preferred portfolio.

Peter then reviewed the 5-step process of creating, screening, analyzing, and reporting portfolios.

Peter went through each step-in detail on slides 14-19 and pinpointed which step in the 5-step process was completed and where Siemens is currently at in the process (Step 3 “Create Reference & Candidate Portfolios”)

On slide 16, Peter noted the 2 scenarios AEP I&M and Siemens have landed on which include #7-8 (Rapid Technology Advancement & Enhanced Regulation scenarios) and gave high level detail of the assumptions behind each.

## Feedback and Discussion

### Oral questions from the audience

**Comment** on Peters comment regarding “metrics and objectives vetted with stakeholders”; The following disagreements were noted: Already submitted comments related to metrics including AURORA not calculating NPV and diversity metric. Think balanced scorecard is biased. Does not believe their comments were considered.

Q: Question about Rockport 50% scenario and what the 50% represents.

A: Peter B clarified 50% was referring to ownership.

Q: Follow up if the selling of the remaining 50% not owned is included in the IRP process.

A: Andrew W responded with IRP only modeling 50% and other 50% is excluded all together from the modeling.

Concern given on capturing the total Rockport economics.

Q: OVEC sensitivity question.

A: Andrew responded with OVEC being a contract obligation incorporated into the modeling consistent with past IRP filings.

Q: Slide 16, concerned this is conflating portfolios and scenarios. 1-6 appear to be constraining resource selection based on items identified in notes. 7-8 appear to be actual changes to scenarios.

A: Peter B specified this is correct, 1-6 are sensitivities based off reference scenario and 7-8 are scenarios which produce more than 1 portfolio for inclusion.

## **4. Informational RFP's -Angelina Martinez**

*Angelina covers slides 21-25*

Angelina covers the process that Siemens PTI follows for the All-Source Informational RFP

Clarifying questions regarding acronyms including:

PPA- Power purchase agreement

BOT- Build own transfer

Small/local developers not analyzed, international companies included and analyzed (ex: NextEra).

Jay asks Angelina to cover the definition of non-compliant bid. Angelina explains this includes projects not interconnected to PJM, COD not after 2024 and locals without terms or conditions which are considered outliers.

## **5. I&M 2021 IRP Reference Case, Peter Berini and Thijs Everts**

*Peter covered slides 28-33*

Peter kicks off this section by reviewing the scenario inputs and key drivers on slide 28 as well as a review of AURORAxmp and the way the analysis will be using the model on slide 29.

Peter notes that all inputs seen today will be in 2019\$. Reviews input graphs in slides 30-33.

*Thijs covered slide 34*

Thijs reviews transmission topology on slide 34. Covers the AEP I&M to AEP zonal structure as well as specifying NYISO is running as well but is not shown on slide due to size constraints.

**Feedback and Discussion:**

**Oral questions from the audience**

Q: What is basis for 15\$/ton CO2 cost in 2028 and the annual increase?

A: Connie T responds saying it was developed internally with environmental team at AEP. She clarified it is not meant to be carbon tax, but a carbon burden. Escalation was reasonable estimate and timing was determined to be reasonable time to implement.

Q: Natural Gas is already above the forecasted price for next 30 years?

A: Connie T responds they do scenarios around base case. Was using EIA at the time this was developed. Stochastic analysis should cover the higher prices we are currently seeing in the market.

Q: Comments on OVEC not considered. I&M should evaluate OVEC sensitivities.

A: Andrew W responds saying I&M will provide supplemental analysis regarding OVEC in I&M's Michigan IRP filing in Dec 2021 as specified in the settlement agreement in I&M's last Michigan IRP filing

Q: Supplemental filing will include modeling that does not include OVEC units?

A: Will provide all information necessary to comply with the settlement agreement and other applicable Michigan orders.

**6. Resource Options – Supply Side – Thijs Everts**

*Thijs covers slides 36-42*

Thijs reviews different technologies as well as their advantages and disadvantages. He then covers renewable tax credits.

**Feedback and Discussion:**

All questions discussed in this section are recorded in the following Questions Section of the minutes.

**7. Resource Options – DSM/EWR, Thijs Everts, Siemens PTI, Chad Burnett, AEP Load Forecasting, Huber, GDS Associates**

*Thijs covered slides 44-46*

Thijs discussed a general overview of the various DSM options (EE, DR, DER). Levered info from GDS and Brightline.

*Jeffery covered slides 47-52*

Thijs passes slides onto Jeffery Huber (GDS) who begins to cover on slide 47 and goes through greater detail on the development of the EE bundle inputs. Cost based approach, end-use based approach and value-based approach were analyzed and ultimately the value-based approach was

decided to be used for the EE inputs. Jeffery goes into deeper detail regarding the clustering approach on creating the bundles.

**Question**

Q: Slide 49 – What do the cost and benefits metrics measure on slide 49?

A: Actual metric was lifetime NPV. Charts don't show that, they show statistical distribution points to create clusters/ basically how they relate to each other. Actual values don't mean anything, but the relationships are what is important here.

*Thijs covered slides 53-55*

Thijs covered the way Siemens PTI will be representing each bundle with graphs in slide 53. Solid line represents fixed cost, dotted lines represent O&M for both Indiana and Michigan separately but structured the same way. DR programs only turn on 5 hours a year, most for 2 hours in a day.

*Chad Burnett covered slides 56-59*

Chad begins with discussion on how AEP I&M reached out to other utilities in Indiana and Michigan to get different approaches as well as Itron for EE approach following stakeholder questions in 2<sup>nd</sup> stakeholder meeting. Majority use Itron approach across industry, specifically Indiana and Michigan.

**Feedback and Discussion:**

Q: Difference between Clusters vs Bundles vs Blocks? Different End use measures spread across different blocks or bundles?

A: Clusters like bundles, all relatively synonymous. Possibly a similar end use ends up in different cluster or bundle depending on end net use. It is possible measures occur in separate bundles depending on benefit and cost.

**8. Scenarios: Peter Berini**

*Peter covers slides 62-65*

Peter gives brief overview of proposed scenarios and highlights changes. Note's selection of proposed scenarios was selected by regulations and proposals as well as taking stakeholder feedback into account. Peter calls out last bullet on net zero carbon by 2050 on slide 63, specifying it is creating an economic incentive for portfolio to optimize around.

Peter goes into slightly deeper detail regarding the reference case and 2 scenario assumptions.

**Feedback and Discussion:**

Q: Is there the ability for Natural Gas Combined Cycle 2x1 to be built at smaller increments (allowing partial builds)?

A: Yes, the Natural Gas Combined Cycle 2x1 is only resource that was allowed to be partially build (and EE).

Q: Are there various potential limits on solar, particular to low tier solar costs?

A: The plan is to present any technology limits, incremental and cumulative in stakeholder meeting 3B. These items are still under review.

## **9. Stakeholder Session**

Jay reviews slide 68 and the process for this stakeholder session to take place.

In previous stakeholder meeting, polls were taken to solicit feedback if the proposed scenarios were sufficiently broad and diverse for the IRP analysis. The results of the polling suggested stakeholders were not sure if they were.

As a result of this polling and other stakeholder feedback, it was felt by the I&M IRP Team and I&M leadership that we need to provide the opportunity for stakeholders to comment further, providing guidance on specific strategies that should be analyzed. This can be in the form of scenarios, sensitivities from already identified scenarios, or the designation of specific market, economic, resource-specific, or other not previously identified options.

Once again, key in this process is obtaining feedback from stakeholders. This will only improve the process and end result.

Jay asked for feedback from the stakeholder group. Comments:

Anna Sommer responds – gas prices appear to be assuming stable prices throughout year, not seasonal which could be an important thing to look at. Feb 16 126\$/MMBtu as an example. Look at hourly level the value of different resources on those types of assumptions. Jay clarifies are you looking to incorporate black swan event? Anna responds if this becomes frequent event and if prices spike in similar winter events, how would that affect value of resources?

Jennifer Washburn: back to SEA, could they have separate meeting dedicated entirely to SEA discussion.

Doug Jester: Mentions Anna volatility question. Gas prices are volatile in short term even absent extraordinary event. Anything regarding storage is absent when using averages as the idea of storage is to take advantage of those extremes/volatility.

Reliability/resource adequacy is different than customer reliability. Customer reliability issues are largely distribution issues. Micro grids don't affect all but do affect some. Thinking about DG to customers should be accounted for in evaluating those resources. Refers to EE resources as well. We tend to not value customer benefits of those types of generation.

Art responds to Anna and Doug on volatility: we will try to address very high and very low gas prices in step 4. Capture "extremes" and uncertainty is all areas (gas/coal/etc.) in stochastics.

Anna: what do those look like? How do you correlate from day to day? Art: Correlations are considered. Not many strong correlations except for a small one between gas and CO2. Allow for extreme weather events to impact load. Intent is to look at 95<sup>th</sup> and 99 percentiles.

Anna: still does not capture the volatility this refers to since they are averaged.

Jay reviews slide 71 and stakeholder process timeline. Session 3B in August.

**10. Closing Remarks**

Andrew Williamson responds regarding EE/SEA questions brought up throughout the presentation. I&M has taken significant steps to thoroughly evaluate the stakeholder feedback we have received, including the benchmarking results that were discussed by Chad Burnett earlier today. I&M is committed to providing customers with options to better manage their electric bills in a cost-effective manner. We will continue to consider this matter as we are completing our modeling and determining our preferred plan. EE is an important component to the IRP for I&M and many of its stakeholders, but it is one component of a much larger IRP that I&M will use to evaluate and support significant near-term resource actions. Given the timing of these resource actions and our regulatory filing requirements it is necessary we maintain our IRP timeline.

**11. Appendix A: List of Questions Answered on Call**

List of questions addressed on the call:

Question Asked	Answer
Do you ever run R-A Sensitivity and R-B Sensitivity together? Do you ever consider an earlier retirement of the whole Rockport plant?	As answered by Andrew
I have some questions for Peter when he's at a stop pointing.	As answered by Andrew W and Peter B
Does that mean that I&M is considering buying Rockport unit 2 now and then sell it right away	Expectation is that ownership would be consistent with today's structure whereby I&M and AEG have 50% of Rockport 2, respectively, with the difference being Rockport Unit 2 will be owned by both entities, not leased.
What about Anna's OVEC question? Thanks.	As answered by Andrew
Why is resource diversity only baseload resources?	The metric for resource diversity should have been related to the number of distinct resources and technologies in the I&M portfolio (not limited to baseload resources). We will present our proposed approach for calculating this metric in the Stakeholder meeting. .
To follow up on Peter's questions, will you be dispatching to price or load? And if the latter, will you put in a maximum reserve margin constraint?	The analysis will be conducted to ensure that load is served reliably and affordably and with consideration of AEP's sustainability objectives.  A maximum reserve margin metric would be inappropriate and produce potentially perverse outcomes, but surplus capacity will be captured in the cost metrics.

<p>Is I&amp;M considering buying Rockport unit 2 and then selling it or a portion of the unit to another AEP subsidiary?</p>	<p>Andrew W responds AEP I&amp;M has no plans to buy Rockport 2 and selling. Expectation is that ownership would be consistent with what it is today at 50% ownership.</p>
<p>What is BOT? Is that Build Transfer?</p>	<p>As answered by Angelina Martinez</p>
<p>One question that I didn't get to ask: Could you please provide more detail as to how you plan to implement what you mentioned as modeling to implement AEP's goal of net zero carbon by 2050? If you don't have time to talk about that today a written response would be fine.</p>	<p>AEP's IRP will consider the requirements for a net 0 carbon by 2050 goal. Since the IRP filing will only be through 2040, actual achievement of that goal will not be reflected in the IRP filing, but the necessary progress toward that goal will be.</p>
<p>To what extent do the renewable prices/LCOEs include federal tax credit availability? Does that vary across the responses?</p>	<p>Renewable cost and performance inputs into the IRP process reflect the benefits of ITCs and PTCs to the extent those credits are available in the years that resources enter commercial operations.</p>
<p>Which companies bid into the RFP?</p>	<p>As answered by Angelina Martinez</p>
<p>Are you considering future stranded asset costs associated with any new CC/CT generation?</p>	<p>Any new CC and CT capacity will be modeled to operate through the Forecast Horizon.</p>
<p>Do you have a list of companies? The other IOUs have been providing a list of those who submitted bids.</p>	<p>As answered by Jessica.</p>
<p>How do these prices for utility scale solar compare to the EDG rate for rooftop solar under HEA 309?</p>	<p>The proposed EDG rate in Cause No. 45506 is \$0.02451/kW for nameplate capacities not more than one (1) megawatt. LCOE's for Utility Scale Solar range from \$52- \$56/MWh.</p>
<p>Why were the smaller bidders not compliant?</p>	<p>A few bidders did not conform to the requirements of the bid and were thus considered non-compliant. Examples include not being in the PJM Zone, proposals missing price and not credit worthy offtakers.</p>
<p>Does I&amp;M have a theory about why this RFP got so few responses? NIPSCO received over 100 renewable bids in response to its last RFP.</p>	<p>No, we do not.</p>
<p>Could you please provide a list of why bidders were eliminated?</p>	<p>As answered by Jessica.</p>
<p>What was the basis for the \$15/ ton co2 cost in 2028 and the annual increase?</p>	<p>As answered by Connie</p>
<p>Natural gas prices are already above your forecasted prices for the next 30 years. Does that price forecast need to be changed to reflect the recent large runup in prices?</p>	<p>As answered by Connie</p>

<p>Are you modeling this full topology as part of portfolio optimization? Or is just the topology you are using for market price forecasting?</p>	<p>The topography shown in the stakeholder presentation is used to construct candidate portfolios and to conduct the analysis of the candidate portfolios for any metrics that are determined through computer simulation modeling.</p>
<p>At what point will I&amp;M turn over the documents, workbooks, etc. supporting the reference case assumptions? It's hard to react to these on the fly and in a vacuum of understanding how they were developed.</p>	<p>Once the Reference Case is completed, we will immediately proceed to prepare for stakeholder review the collection of inputs related to the Reference Case. Our goal is to have these items ready for stakeholders to review prior to Stakeholder Meeting #4.</p>
<p>Could you explain your electric vehicle demand? That demand will vary with the rate of charging, won't it? Is it some kind coincident demand?</p>	<p>The electric vehicle demand was derived off the EV energy forecast provided to Siemens PTI. The forecast was used to calculate a MW number and then Siemens applied a typical charging shape to determine the MWs of EV.</p>
<p>Are you also going to relax the integer settings on other resources then?</p>	<p>No. Furthermore, we removed this option for the CC 2x1</p>
<p>Why is CC and CT FOM so low?</p>	<p>As answered by Holt B and Thijs E</p>
<p>Are FOM assumptions that are prepared by AEP IM confidential/proprietary (w/reference to note on slide 39)?</p>	<p>As answered by Greg S</p>
<p>how much of each resource will you let the model pick? This is one of the assumptions that the MI IRP settlement requires I&amp;M to work with stakeholders on.</p>	<p>The MI Settlement includes an agreement to “work with stakeholders to define the modeling inputs for the IRP”. During this meeting, we specifically asked for input and feedback related to strategies, scenarios, sensitivities, and the designation of specific market, economic, resource-specific options. Receiving specific stakeholder input around these inputs is very important to the process. We encourage all stakeholders to provide <b>at any time</b>, specific feedback so that we can incorporate your comments into the analysis. You can register your feedback on the I&amp;M website, via email, and during stakeholder meetings.</p> <p>We intend to continue to provide specific assumptions related to capital costs, amounts of resources and other inputs during the next stakeholder meeting.</p>
<p>Do the CVR measures represent existing deployments, new deployments, or both?</p>	<p>As answered by John W</p>
<p>Does it make sense to treat CVR for residential customers separately from C&amp;I? They are often on the same circuit.</p>	<p>As answered by John W</p>

<p>The restrictions on hours of DR call seem pretty small compared to what is often used. This would be especially true for residential adjustments such as thermostat adjustments</p>	<p>IRP model inputs for DR were reviewed and modified to be consistent with the I&amp;M summer cooling season DR event-hour opportunity set forth in I&amp;M's DR tariffs, which allows I&amp;M the opportunity to call up to 15 events/year with the typical per-event window at 3 hours/event. The hours modeled exceed the Company's experience of actual DR hours called over the past several years.</p>
<p>What do the "cost" and "benefit" metrics measures on slide 49?</p>	<p>As answered by Jeffrey H</p>
<p>How will costs of EE be modeled, as levelized costs or in as spent dollars?</p>	<p>EE costs will be analyzed as incurred and will not be levelized to ensure a fair comparison to all other competing resources.</p>
<p>Why are there no optimized DR bundles? During the 2nd workshop Jeffrey said that they would also be evaluating new DR measures.</p>	<p>As discussed in the stakeholder presentation, Siemens PTI will use the results of the Market Penetration Studies to determine potentially varying amounts of DR to be included and tested across candidate portfolios. DR will not be optimized in each candidate portfolio to minimize computer resource burdens and ensure that credible results emerge from the optimization process for each candidate portfolio.</p>
<p>Additional questions for slide 49: • Do each of the colors represent bundles?</p>	<p>As answered by Jeffrey H</p>
<p>What does each individual point represent? Is each point a single measure?</p>	<p>As answered by Jeffrey H</p>
<p>Questions for Jeffrey: What is the difference between a cluster, bundle, and block? Is it possible that similar end-use measures will be spread across different blocks/bundles?</p>	<p>As answered by Jeffrey H</p>
<p>You can delay the IRP submission in IN and MI, and we will support you on that. This has shown to be terrible for EE investments.</p>	<p>As answered by Andrew W</p>
<p>But there's only one DR bundle per sector, so how would you test different levels of DR?</p>	<p>Different candidate portfolios can have differing amounts of DR. By comparing the performance characteristics of different candidate portfolios with differing amounts of DR we can assess the relative contribution of varying levels of DR. To take full advantage of this approach, we will need to structure competing candidate portfolios that are largely similar except for their varying levels of DR.</p>
<p>Please allow for good discussion. We are okay running late. This is important.</p>	<p>As answered by Andrew W</p>

<p>We disagree. It will have material change.</p>	<p>As answered by Andrew W</p>
<p>We support you on turning IRP in late</p>	<p>As answered by Andrew W</p>
<p>Please note that I&amp;M can turn in IRP late. This is important to fix now</p>	<p>As answered by Andrew W</p>
<p>Setting aside our disagreement about whether degradation is proper or not, if it doesn't change the load forecast, then leave the forecast alone but remove it for EE. It has a huge impact on EE. And as Chad noted, none of the utilities I&amp;M reviewed making any adjustments to EE bundles. That is what we care about the most and has the biggest impact. And that can be removed easily and without causing a delay to this IRP.</p>	<p>The Company pointed out on slide 56, that the average DSM variable coefficient was within 1% of the total impact over the life of the program from using the Company's Supplemental Efficiency Adjustment matrix. The mix of DSM programs (which classes and end-uses are targeted) would determine the size of the change in the load forecast compared to the SEA approach. As discussed by Mr. Burnett during the meeting, the survey of peer utilities confirmed that the majority of utilities that are using Itron's SEA models are making adjustments to the DSM savings amounts, consistent with the Company's approach, to prevent double counting the energy efficiency amounts in the forecast.</p>
<p>We provided feedback on this SEA problem early on and in prior IRPs. Please make the change now in this IRP cycle. It warrants turning in the IRP late. We would like a meeting with IN and MI PUC staff to discuss this ASAP</p>	<p>As answered by Andrew W. The proposed meeting is being taken under consideration.</p>
<p>The fact that we are not talking about those technology limits is symptomatic of our concerns about I&amp;M not utilizing stakeholder feedback. We should be talking about them now and not when they are finalized.</p>	<p>Specific assumptions related to capital costs, amounts of resources and other inputs will be provided in next stakeholder meeting.</p>
<p>Just to clarify, when we get a chance to see the specific assumptions around resource capital costs, amounts of resources that the model will be able to select from, etc., we will have additional feedback on whether these scenarios capture a reasonable range of scenarios.</p>	<p>Furthermore, Stakeholders are also encouraged to submit their questions and comment at any time through the I&amp;M IRP email address at any time.</p>
<p>I believe I mentioned this at the first meeting, but Sierra Club does question the inclusion of reliability as a metric, since you would not plan a system that doesn't meet reliability metrics.</p>	<p>Reliability is considered an <b>objective</b> and not a metric of I&amp;M's Integrated Resource Plan, as was explained and affirmed by feedback received in Stakeholder Meeting #1.</p> <p>Correct, AEP I&amp;M would not plan an unreliable system. This does not mean that we would not include reliability as an objective of the IRP process.</p> <p>As AEP I&amp;M continues the process of refining and measuring candidate portfolios for a balance of</p>

	<p>reliability, affordability, and sustainability, additional attention may be required on reliability to ensure a reliable system is maintained. However, there are varying degrees of reliability that may be related to economic risk.</p> <p>We ask all stakeholders to continue to provide recommendations as to what <b>metrics</b> (qualitative and quantitative) you believe we should use to properly assess our stated <b>objectives</b>.</p>
<p>Jay, I think your tone with Jennifer Washburn was inappropriate - it caught me off guard and made me feel uncomfortable. Additionally, while I appreciate there's been conversations offline on this subject, having you provide some background on what the exchange was about for those who weren't part of those discussions would have been helpful.</p>	<p>We sincerely apologize if the tone was believed to be inappropriate. The intent was to continue to keep the conversations related to the topics being presented. We will arrange for more time for Q&amp;A in Stakeholder Meeting 3B.</p>
<p>It would be helpful to see everyone's questions even if you aren't planning to address them all. Will that be available afterwards at least?</p>	<p>Yes, the questions will be available in the posted Meeting Minutes</p>