



Indiana Michigan Power Company
2021 Integrated Resource Plan
Stakeholder Workshop #3B Meeting Minutes
October 14, 2021

1. Welcome and Safety Moment – Andrew Williamson

Andrew kicked off the meeting at 9:30 and covered slides 3-4.

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 autumn safety.

Andrew announced the Stakeholder Meeting #4 date has been set to November 18, 2021, pending confirmation with the regulating authorities.

Andrew also explained that the Reference Case that will be presented today has been updated to remove the Rockport Unit #2 after 5/31/2024, as a result of the recent settlement agreement IURC Cause No. 45546.

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

3. Candidate Portfolio Development – Peter Berini, Siemens PTI

Peter covered slides 9-16

Peter covered the candidate portfolio development process (Step 3 of the 5-step process.)

Peter covered the IRP process overview (slide 10), explaining 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 a set of **Candidate Portfolios** with the incorporation of stakeholder feedback. Reference and candidate portfolios will be analyzed to identify the preferred portfolio.

Peter reviewed each of the following slides, which outline the key inputs and assumptions used in the development of the Reference Portfolio:

Slide	Description
11	Reference Case Fundamental Drivers and Resource Options
12	Generating Resources

13	Demand Side Management Resources
14	Resource Limitations

Peter then reviewed slide 15, which outlines the **Reference Portfolio** (referred to as “Reference Case” on slide 15), as well as the 8 sensitivities and 5 additional scenarios performed.

Peter indicated that there may be additional sensitivities and scenarios performed as part of the analysis. Once the preferred portfolio is selected, additional sensitivities will be performed to further analyze the portfolio.

Finally, Peter noted that while the results of all of the sensitivities and scenarios are included in the PowerPoint presentation materials, those designated as “Appendix” in the Details column have been included in the Appendix at the end of the presentation materials and will not be covered in the presentation.

Feedback and Discussion

As part of the oral questions from the audience not captured in the Appendix, there were two topics discussed:

- The initial discussion was around the treatment of tax credits, particularly the PTC and ITC. The Siemens team confirmed the PTC is assumed to be available for wind resources coming online before the end of 2025 and that the ITC is assumed to be available for solar resources coming online through the forecast horizon, starting at 26% and reaching 10% in 2026 and beyond.
- There was also a discussion around the constraint of resources used in the analysis. Siemens noted that the limits, which were informed by the all-source RFP, were discussed on Slide 14, and that two additional sensitivities were developed to test the impact the limits had on the portfolio selection.

4. Reference Case Portfolio Results - Peter Berini, Siemens PTI

Peter covers slides 17-25

Peter provided an introduction to the Reference Case Results, highlighting the following two important points:

1. The Reference Case Portfolio is the optimized portfolio, based on existing resources and the expected conditions (as outlined in the previous section.) It is intended to be used as the basis for comparing other strategic choices.
2. The Reference Case Portfolio does **not** represent I&M’s preferred portfolio, but provides a basis to conduct sensitivities and portfolio comparisons

Key details about the Reference Case Portfolio:

1. The Reference Case portfolio has approximately 7 GW of new nameplate capacity (mostly renewable) through the forecast horizon
2. Energy Efficiency resources are selected with total Energy Efficiency generation as compared to retail load growing to 5% in 2030
3. Wind resources selected in 2025 and 2026 take advantage of the Production Tax Credit¹

4. Solar and Solar Hybrid resources selected in 2025 and 2026 take advantage of the Investment Tax Credit¹
5. Gas resources are selected with Rockport and Cook Retirements to support portfolio needs for capacity and energy. The resources selected are a combination of hydrogen convertible simple cycle and combined cycle
6. The carbon free generation declines after the retirement of the Cook Nuclear facilities and would require market offsets to meet targets thereafter

Peter then explained Slides 19-21, which provide a visualization of Reference Case Results of the I&M Total Portfolio Capacity, Cumulative Capacity Expansion, and Capacity Additions of Renewables and Gas CT/CC resources.

Peter then reviewed slides 22-23, which introduce the calculation of Key Metrics for the Reference Case Portfolio. The metrics calculated for each portfolio are as follows, with their calculation formula:

Metric	Calculation Formula
Capacity Position against FPR	$(UCAP \text{ of resources} / PJM \text{ Capacity Obligation with Reserve}) - 1$
Energy Balance	$I\&M \text{ energy generation} / \text{energy demand}$
Imports I&M	$\text{imported energy} / \text{energy demand}$
Exports I&M	$\text{exported energy} / \text{energy demand}$
Carbon Free Generation	$\text{carbon free generation} / \text{total generation}$
Energy Efficiency (EE)	$\text{all EE generation} / \text{retail energy demand}$

Peter also pointed out that the color coding on the metrics values is intended as a visual aid only and should not be used to compare portfolios.

On slide 23, Peter presented the results of the metrics for the Reference Case Portfolio, highlighting the following:

Metric	Notes related to the Reference Case Results
Capacity Position against FPR	Short-term capacity contracts are required in 2024 to account for shortage in capacity. Capacity position maintains healthy margins through forecast period.
Energy Balance	Energy Balance is high in the early years as renewable energy is being selected to meet capacity position.
Imports I&M	Imports maintain reasonable balance without any years exceeding +30%
Exports I&M	Exports maintain reasonable balance without many years exceeding +30%
Carbon Free Generation	Carbon free generation meets targets until the retirement of Cook Nuclear facilities.
Energy Efficiency (EE)	EE Penetration for new and existing programs reaches ~5% of retail load obligation by 2030

5. Sensitivity Based Candidate Portfolios, Siemens PTI IRP Team

The Siemens PTI IRP Team covered slides 26-40

Peter kicks off this section by reviewing the listing of scenarios and sensitivities listed on slide 27 that will be reviewed in this section of the meeting. A summary of the results is as follows:

Slides	Alternative Scenario/Sensitivity
28-29	Rockport Unit 1 Early Retirement (2024)
30-31	Rockport Unit 1 Early Retirement (2025)
32-33	Cook Unit 1 and Unit 2 License Extensions
34-35	Cook Unit 1 and Unit 2 License Extensions and No Conventional Gas
36-37	35% Reduction in Renewable, Storage and EE Costs
38-39	Increased Environmental Regulations Leading to High Gas, Coal and CO2 Prices

Feedback and Discussion:

Oral questions from the audience

As part of the oral questions from the audience not captured in the Appendix, there was a lengthy discussion on how the analysis considers federal policy that is currently being debated. The IRP process is meant to develop future states of the world that capture the impacts of future policy changes in the energy space. Both the enhanced regulation and the rapid technology advancement scenarios capture potential states that allow us to draw conclusions about the impact of pending policy changes.

6. IRP Alignment Discussion – Art Holland and Peter Berini, Siemens PTI

Art covers slides 41-48

The Siemens PTI team introduced this section of the meeting as an opportunity for all stakeholders to post questions and provide their feedback related to any part of the 2021 I&M IRP process. To provide a guide to the discussion, the Siemens PTI will walk through each step of the IRP process, soliciting feedback at each step along the way.

Slide	Process Step
43	Step 1: Determine Objectives
44	Step 2: Assign Metrics
45	Step 3: Create Reference Case and Candidate Portfolios
46	Step 4: Analyze Candidate Portfolios
47	Step 5: Develop Balanced Scorecard

Feedback and Discussion:

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

7. Stakeholder Next Steps and Data Provision Plans – Jay Boggs, Siemens PTI

Jay covered slides 50-51

Jay reviewed the timeline for stakeholder meetings.

Jay also explained that we continue to work with the Technical Stakeholders to provide data in accordance with the original email to the technical stakeholders. While we have experienced delays in the schedule, the original intent for data provision remains the same.

8. Closing Remarks, Andrew Williamson

Andrew concluded the meeting expressing thanks on behalf of the I&M leadership for the active participation in today's meeting.

9. Appendix A: List of Questions Answered on Call

List of questions addressed on the call:

Question Asked Date/Time	Question Asked	Answer Given
09:51:35 AM EDT	As a number of us articulated in the last meeting, we feel like I&M/Siemens has utilized very little of our feedback so far. If you are legitimately interested in what we have to say for the rest of the process it would be very helpful to know what about this presentation you consider finalized and will not change and what can change.	As answered by Andrew
10:01:18 AM EDT	I may have misheard but did I&M earlier say its preferred plan may be a combination of portfolios?	As answered by Andrew
10:04:25 AM EDT	Hi Andrew, so anything about the Reference Case is final and all of the input assumptions are final as well? So what can we provide feedback on as it relates to the non-Reference Case scenarios?	As answered by Andrew
10:04:34 AM EDT	On slide 11, Candidate Portfolio Development, it shows DG solar as 0 in 2021, 1.1 in 2023 and so on. I believe these estimates are on the very low side for what can and probably will be developed. As of right now, my company, Lakeshore Die Cast has ~1.4MW of generation (150kW currently up and 1.4MW waiting on some interconnection paperwork with I&M). I'm certainly not the only person in the territory with solar so this number just strike me as off.	As answered by Andrew
10:05:30 AM EDT	And not to be a broken record, but it's really difficult to provide feedback on modeling choices and results without seeing the modeling files.	As answered by Peter Berini and Jay Boggs
10:07:22 AM EDT	What did you use as the basis for UCAP values for resources (especially renewable resources)? Also, did	As answered by Peter Berini

	you model impose any limits as to net reliance on the PJM energy market by hour?	
10:10:09 AM EDT	Regarding my earlier question about how preferred plan can be a combo of portfolios, how can you avoid concerns about I&M cherry picking?	As answered by Andrew
10:13:44 AM EDT	I get flexibility but I'm sure you can understand our concern and would appreciate you all considering that.	As answered by Jay Boggs
10:14:56 AM EDT	Is it also likely that an optimized portfolio may not be buildable as the model constructs it because there is not an ability to build a certain level of particular resources overnight? Therefore there may be a need to adjust the portfolio to address what can actually be installed in certain timeframes?	As answered by Andrew
10:15:58 AM EDT	What kind of analysis have you done as to the capital cost for relicensing Cook? Will those numbers/analysis be available for review?	As answered by Andrew
10:16:01 AM EDT	Hi, Sameer Doshi of Earthjustice here, on behalf of Citizens Action Coalition of Indiana. The September 2020 settlement in the Michigan PSC required that "I&M will work with stakeholders to define the modeling inputs for the IRP" -- including on several specific areas. What is I&M's plan to work with stakeholders and incorporate their advice on defining modeling inputs?	As answered by Andrew
10:16:08 AM EDT	I raised my hand Jay, but you may not have seen it.	Anna posed several observations and a question that were addressed by the IRP Team.
10:21:40 AM EDT	To follow up, if you did not do an analysis of the cost of relicensing Cook, what did you use in the "Cook Sensitivity" model runs?	As answered by Andrew
10:23:51 AM EDT	Has I&M's consulted with other utilities and taken into account industry accepted methods and siting constraints for consideration of capital costs, tax credits, resource build and siting limitations per year, etc?	As answered by Art Holland and Greg Soller and Andrew
10:28:03 AM EDT	Does the Company plan to conduct a full Cook relicensing analysis in another IRP in some future filing?	As answered by Andrew
10:34:36 AM EDT	Yes, sorry!	No problem! :)
10:38:56 AM EDT	Peter, the ITC isn't sunseting, it's declining to 10% indefinitely. Is there a reason you all didn't reflect that?	As answered by Peter Berini
10:46:38 AM EDT	Since the cumulative totals for wind, hybrid storage, hybrid solar, and solar don't change after 2026, does	As answered by Peter Berini

	that mean that the max resource constraint(s) is/are binding?	
10:48:32 AM EDT	Is Aurora able to recognize the ITC and post ITC period for the solar hybrid resources or is the assumption that the solar and storage would be paired together for the entire planning period?	As answered by Peter Berini
10:50:45 AM EDT	Are the gas peaker and gas cc units new units that are going to be built (if so when?) or is that generation going to come from PPAs?	As answered by Peter Berini
11:02:06 AM EDT	Given the high energy balance and export numbers from 2026-2034, is there any concern that the model is adding resources primarily to sell energy on the market?	As answered by Art Holland
11:02:11 AM EDT	Peter, since you aren't dispatching to price, but rather are simulating load and gen in I&M's territory and in neighboring BAs why would I&M's system preferentially overbuild for purposes of selling energy?	As answered by Art Holland
11:02:19 AM EDT	Do you plan to add somewhere what the upstream gas emissions are?	As answered by Peter Berini
11:09:31 AM EDT	Is there any concerns that gas units that are built in the late 2030s early 2040s might lose out on running for their lifespan given that we are likely looking for carbon neutrality around 2050? Does the model look at how storage might be able to replace those gas units or is it to far out for the model to see how that technology might progress?	As answered by Art Holland
11:09:42 AM EDT	Can you describe how you add a constraint to the model secifically to keep imports and exports within "bounds"?	As answered by Art Holland
11:09:48 AM EDT	Yes, I understand why you are trying to fix this, but I wonder if there is a deeper issue. If the neighboring BAs have access to the same resource choices as I&M then it seems like I&M wouldn't have some special arbitrage opportunity. Does that make sense?	As answered by Art Holland
11:09:55 AM EDT	specifically...	As answered by Art Holland
11:10:35 AM EDT	MISO is in the process of proposing a seasonal construct. It seems potentially important to wonder whether PJM will be led to the same approach and the extent to which such an approach might affect your optimal portfolio. Have you thought about that and/or plan to do any modeling on that?	As answered by Art Holland
11:37:31 AM EDT	To follow up on Anna's questions, you are modeling PJM energy market prices based on your assumptions about resource builds in neighboring utilities by hour?	As answered by Art Holland

11:59:08 AM EDT	There seems to be a consistent cliff between 2034 and 2035 where the energy balance drops by about a third. However, it's not clear why that's happening in 2035 because the first loss of Cook capacity happens in 2034. Do you have any thoughts about why that is happening?	As answered by Peter Berini
12:00:04 PM EDT	Why would you not model for zero carbon by 2050 or 2040 given the dire threat posed by climate change?	As answered by Andrew
12:00:24 PM EDT	And do you have any thoughts about why the cumulative limits on the renewables and storage through 2035 seem to hold for the entire planning period even though the limits are relaxed after 2035?	As answered by Peter Berini
12:23:57 PM EDT	In looking at the sensitivity that removed the max build constraints on renewables (last slide of the Appendix), the energy balance and exports blow up. Is this indicative of a bigger modeling issue where the model is building to export, similar to the discussion earlier with Anna? It seems like the max build constraint in the reference case may be hiding a problem.	As answered by Art Holland - will provide additional discussion during the alignment session of the meeting.
12:25:43 PM EDT	Thanks for the answer on net zero. If you can't extend Cook or do lock into gas CC, wouldn't that create policy risk and stranded asset risk for customers to reach your goal of 100% by 2050?	As answered by Andrew
01:38:54 PM EDT	Would like to reinforce the need for actual rate analysis, not based on NPV but actual rates. This is critical to evaluating both affordability and rate stability.	As answered by Art Holland
01:46:37 PM EDT	Have you considered using the HHI approach used in market power analysis to better measure resource diversity? Just measuring the number of resource types doesn't capture how much you are relying on specific resources.	As answered by Art Holland
01:49:28 PM EDT	HHI = Herfindahl-Hirschman Index	As answered by Art Holland
02:07:02 PM EDT	Did you remove the constraints on wind and solar or did you impose a higher constraint, which is still binding? The numbers look like the latter.	As answered by Art H and Peter B
02:17:18 PM EDT	Is the increased gas price volatility being incorporated into the analysis? Also concerns related to the ability to build new pipelines.	As answered by Peter Berini
02:20:17 PM EDT	I wonder if reliability would be better modeled as related to the peak hours for imports or exports for energy from the I&M system in that these are they hours in which the transmission system (and potential issues with transmission) could be most important to maintaining reliability..	As answered by Art Holland

02:47:43 PM EDT	Thanks, Anna and Jay. Yes, the more we can weigh in now and get changes to modeling, the fewer controversies in the years to come. We appreciate it.	You are very welcome!
02:49:49 PM EDT	Thanks folks!	