

Vectren 2019 IRP
1st Stakeholder Meeting Minutes Q&A
August 15, 2019, 9 am – 3 pm CDT

Lynnae Wilson (CenterPoint Energy Indiana Electric Chief Business Officer) – Welcome, Safety Message, Introduction to CenterPoint Energy/ Vectren, Personal background and Vectren team introductions, Updates and Goals for this 2019 IRP

Subject matter experts in the room: Natalie Hedde, Angie Casbon-Scheller, Justin Joiner, Christine Keck, Bob Heidorn, Wayne Games, Matt Rice, Ryan Wilhelmus, Rina Harris, Nick Kessler, Laurie Thornton, Jason Stephenson, Cas Swiz, Steve Rawlinson, Tom Bailey, Roland Rosario.

Gary Vicinus (Moderator, Managing Director for Utilities, Pace Global) – General Introduction to this IRP Process, Introductions for approximately 40 stakeholders in the room, List of affiliations include:

Country Mark
Deaconess Health Systems
EQ Research
Hallador Energy/Sunrise Coal
IBEW Local 702
IURC
NIPSCO
Orion Renewable Energy Group LLC
OUCC
Sierra Club
SUGF
Tr-State Creation Care
Valley Watch
Whole Sun Designs Inc.

More than 30 stakeholders attended on the phone. Those registered included representatives from:

Advanced Energy Economy
AECOM
AEMA
AEP
Applied Economics Clinic
Boardwalk Pipeline
CAC
Development Partners Group
Energy Futures Group
Enerwise Global Technologies, LLC d/b/a CPower; and Advanced Energy Management Alliance
Hoosier Energy
Indiana Distributed Energy Alliance

IPL
IURC
Lewis Kappes
MEEA
Morton Solar & Electric
Orion Renewable Energy Group LLC
OUCC
Sierra Club
St. Joe
Vote Solar

Matt Rice (Vectren Manager of Resource Planning) – Discussed the feedback received since the 2016 IRP, the 2019/2020 IRP process, and the role of the all source request for proposals.

- Slide 8 Director's Report Feedback:
 - Question: What was the suggestion given consideration for Warrick 4, and what does it mean to maintain optionality?
 - Response: In the 2016 IRP, we hard coded an assumption in for Warrick 4 shutdown. With respect to Warrick 4 the Director's report comment referred to evaluating running the unit longer or shutting it down sooner. While not addressed in the meeting, in 2016 the Director provided praise for building scenario inputs in the short, mid, and long term, thus maintaining optionality.
 - Follow-up: After the smelter shutdown, there was higher risk to Warrick 4. So why was there an extension to the Warrick 4 agreement?
 - Response: The agreement was extended through 2023. Please see Wayne Games for more questions. While not stated in the meeting, the extension supported ALCOA's decision to reopen its smelter.
- Slide 13 Proposed 2019/2020 IRP Process:
 - Question: Will you provide preparatory material, list of potential strategies, etc. ahead of the next meeting?
 - Response: Yes, we will post the presentation and potential strategies one week ahead of next meeting. Below is a list of potential strategies for you to think about it in advance.
 - Minimize CO2
 - Minimize cost
 - Continue to run existing plants
 - Maximize Energy Efficiency (EE) and renewables
 - Balanced/Diverse mix of resources (don't put all of your eggs in one basket),
 - Question: Regarding Slide 8 (Director's Report Feedback), how will scoring be done this time?
 - Response: We will cover details in the Objectives and Measures section today.
 - Statement: Please differentiate among stakeholders. Additionally, I have a concern about the loss of industrial load and support for the community, particularly low income customers.
 - Response: There are many different stakeholders, and we try to make this IRP process relevant to all stakeholders. Tom Bailey can speak to economic development, and we have scenarios with higher load. We hear your concern on

price impact, and we'll address those concerns during Objectives & Measures discussion.

- Slide 14 Role of the All-Source RFP:
 - Question: Please explain how resources will be modeled on a tiered basis?
 - Response: We will group resources by cost and by like-resources.
 - Question: How much modeling of RFP responses has Pace and Vectren done to-date?
 - Response: None, as we are still gathering inputs. RFP bids just came in last week so there's been very little analysis to-date.
 - Question: CenterPoint has a vested interest in using natural gas. How do you not bias toward natural gas in this plan?
 - Response: Portfolios will be evaluated based on tradeoffs presented in the scorecard, which we will talk about today. Vectren has no preconceived notion of what the portfolio will be. We are taking an unbiased approach to selecting resources.
- Slide 15 Key Vendors:
 - Question: Since bids are done, doesn't that limit us?
 - Response: No, we will use the RFP as an input into the IRP. We are looking for your input on how we evaluate portfolios of resources.
 - Question: Will RFP data be made available to all stakeholders, and can we learn the total number and type of bids?
 - Response: We will summarize data. We must protect confidential information, but we will work with some groups to try and find a way to show certain groups, like the OUCC, bid information. We will provide some summary data later today, and we will continue to provide more detailed information as analysis is completed.
- Slide 16 2019/2020 Stakeholder Process:
 - Question: We have an ongoing concern with use of Aurora for IRP purposes. It is not possible to export input/output files according to Energy Exemplar, and costs are large even for a read-only model. Additionally, we cannot see the manual without having a license.
 - Response: We will provide all of the inputs, outputs, and talk about the constraints. We have also determined that the cost for a read only license is \$5k. For those who obtain the license, we will provide modeling files for review. We will follow up about the owner's manual.
 - Follow-up: Still concerned about costs and would like to know if stakeholders can log-in using existing license.
 - Response: We can have a follow-up conversation and can discuss options. We chose Aurora based on capabilities, feedback, internal consistency, and run-times on the cloud.
 - Follow-up statement: We appreciate working with Vectren on how to gain access to data within Aurora, which will allow for a meaningful stakeholder process, no further questions here but we want to comment that this is critical.
 - Response: Vectren will work hard to provide useful information.
 - Statement: I am responding to the gentleman that said he has a concern about the loss of industrial load and support for the community, particularly low income customers. I have a concern that you will only try to encourage industrial growth. There are many businesses that we should be attracting.
 - Response: Vectren works to attract all types of customers.

Gary Vicinus – Discussed Objectives & Measures and gathered stakeholder feedback:

- Slide 23 Feedback and Discussion:

- Question: The concept of affordability is inclusive of all costs over time, including externalities. Clarify the concept of affordability.
 - Response: Cost is inclusive of relevant costs associated with portfolios. In the scenarios, we'll talk about costs of regulation (e.g., social cost of carbon in one scenario) where some of the costs considered go beyond direct cost of generation.
- Follow-up: Do we account for environmental and health impacts?
 - Response: In the high regulatory scenario, health impacts are one of the considerations that go into the social cost of carbon.
- Question: Where does the 15% band come from [for the Market Risk Minimization metric]?
 - Response: It was selected as a placeholder but we will continue to review to determine if it is reasonable, including looking at historical data.
- Question: How are you measuring impairment; how would it be calculated?
 - Response: We will run 200 iterations and track plant-level economics. We can determine how many scenarios would have shut down a unit for economics and track the number of MWhs over time that unit would have produced. The methodology for assessing potential asset impairment remains under review.
- Question: By only looking at CO2 emissions at a plant level, aren't we missing local impacts (ground level ozone, PM) and upstream impacts (methane fugitive emissions, flaring, etc.)?
 - Response: Would you have a suggestion for a better metric?
 - Response: You could use CO2-equivalent instead of CO2.
- Statement: It seems like MWh impairment is more of a price risk. Maybe this measure should be capital exposed rather than MWh.
- Question: I echo his questions and am also concerned that Market Risk measures. Would that bias toward excess sales/purchases?
 - Response: Just the opposite is the case. Excess sales and purchases above or below a band would be detrimental to portfolio performance.
- Statement: You should track other emissions within the modeling.
 - Response: CO2 isn't the only thing we'll track in the model. It is important to get the big picture, beyond the scorecard. We are going to be capturing a wide range of outputs from future scenarios going forward, including the implications of methane.
- Statement: It will be hard to quantify costs to methane emissions.
 - Response: It will be a challenge, and we'll bring our estimates to the next meeting and you will have a chance to comment if our inputs seem reasonable or not.
- Statement: CO2 emitted now is worse than CO2 emitted 20 years from now (as demonstrated by CCL models), so consider a NPV of CO2.
- Question: How do we incorporate feedback from initial steps to optimize the preferred portfolio? Are you considering feedback loops in determining the best or optimal portfolio?
 - Response: Can you clarify what you mean in "best" vs "optimal" portfolio?
 - Question: Yes, let's say we have 150 portfolios. How do you use something like Artificial Intelligence to improve the portfolio selection?
 - Response: IRPs are done every 3 years, which is in a way a feedback loop. We'd be interested in how to implement this within an IRP. If you have comments that you would like to send to us, we would be happy to look at it.
- Question: Are you measuring environmental harm from mining/ fracking? Also, if renewables costs are expensive, why does Vectren have the highest rates in the state despite using fossil generation?

- Response: Renewables costs may be more or less expensive. The RFP process provide inputs that will provide useful information regarding the cost of renewables. Also, fracking will be captured in the scenario analysis.
- Question: Are you looking at measuring other GHGs (methane) and water pollution on a lifecycle basis? If so, where does that fit?
 - Response: We'll take into consideration CO2-equivalent and also will measure the impact of methane emissions regulations. If we don't answer your question within the scenario discussion, you will have a chance to ask again at the end of the day.
- Question: Where is the optimal nexus of the Venn diagram on Slide 20 (Each Portfolio Will have Tradeoffs) to explore tradeoffs vs synergies?
 - Response: We are not just exploring tradeoffs but also synergies, which should point towards the optimal solution.
- Statement: I have a concern with weighting metrics.
 - Response: We have presented the metrics, and we will talk about how we plan to evaluate the metrics over time.
- Statement: On slide 72 (Definitions Cont.) the definition of optimal portfolio includes consideration for sustainability. My comment is that fossil fuel is inherently unsustainable.
- Question: Why did Vectren not do an open source RFP last IRP (2016)?
 - Response: The traditional approach for an IRP is to utilize a technology assessment. There is a very large cost difference between a technology assessment [a study of costs and operating characteristics of various resources] and a RFP. Also, it's only recently that IRPs have begun to incorporate the use of RFPs.
- Question: Is 15% on slide 21 (IRP Objectives and Measures) based on expected load or expected purchases and sales?
 - Response: It's based on a range around expected purchases/ sales with +/- 15% from those levels.

Matt Lind – Discussed the Request For Proposals (RFP) methodology, scoring, role, and provided high level statistics for Vectren's RFP.

- Slide 25 [RFP] Overview:
 - Question: Are you considering existing resources with alternatives? Does that include the OVEC contract? I'm concerned about ratepayers being impacted by extra cost now that FirstEnergy has pulled out of that contract. Also, is Vectren involved in the decision on coal ash ponds?
 - Response: FirstEnergy is not out of the contract yet.
 - Question: Is it covered in the IRP?
 - Response: To the extent all resources are considered, yes.
- Slide 32 Proposal Requirements:
 - Question: Why set the limit at 10 MW when you already have two 2 MW projects.
 - Response: Those two 2 MW projects are pilot projects.
 - Question: Will you share the bidder list, and will there be an opportunity to bid in again later on?
 - Response: We will share a list with bidder names. We do not plan to obtain bids again for this IRP.
 - Question: Were there any bidders that came too late or any that were rejected because they were unacceptable?
 - Response: At this point no bids have been rejected because they were deemed unacceptable. We accepted bids from all that provided bids on time with an NOI and NDA.
 - Question: Were bidders allowed to offer in existing resources in the RFP?
 - Response: Yes.

- Question: Did you provide information on your existing situation?
 - Response: No.
- Question: Why was the RFP deadline extended?
 - Response: We did not get responses back regarding credit review to bidders within our stated timeframe on the RFP, so we extended the due date proportionately.
- Question: Can you tell us how many respondents NIPSCO had to its RFP?
 - Response: We believe somewhere close to 90 proposals.
- Slide 33 Preliminary RFP Statistics:
 - Question: How big is the solar portion of the pie to the right?
 - Response: Solar is about 19,500 MW, but there is double counting here (multiple PPA vs build options).
 - Question: Is this nameplate capacity or accredited capacity?
 - Response: This is ICAP (nameplate), not UCAP (accredited).
 - Question: Did Vectren or its related companies submit proposals to the RFP.
 - Response: No.
- Slide 37 [RFP] Evaluation Summary:
 - Question: I'm afraid that the way you are conducting this RFP process won't allow the most affordable options to rise to the top.
 - Response: The RFP at this point is providing information about the cost of each resource and will feed IRP modeling. The IRP will be the process that picks the preferred portfolio mix. Gas is not competing with solar and wind within the RFP scoring. Like groups of resources will be grouped so that solar resources are competing with solar within the RFP and gas is competing with gas.
- Slide 40 Feedback and Discussion:
 - Question: Why do projects within your service territory get 100 points? I would like to get more clarity about how this may hamper projects not within this area.
 - Response: Potential local points are additive to the 500 points. It is not a given that they will be applied. It is an option to apply 100 additional points based on a preference for local resources and the benefits that local resources provide to transmission reliability, lower congestion risk, and economic development. In terms of the local preference, we will provide the criteria at a later date. If we apply it, we will give rational.
 - Question: I have a concern over delivery date, why penalize based on early delivery (before 2023/24 date)?
 - Response: To the extent capacity is needed early, we'll capture that in the IRP process.
 - Question: Fuel sources have to compete with one another in this process. Is that what is being done in the IRP?
 - Response: Yes. The resources compete with one another within the IRP.
 - Question: You mentioned that there is an Import/Export limit on resources, who sets the value and what is the limit?
 - Response MISO does an annual (public) LOLE study that determines I/E limits for Local Resource Zone-6. Currently about 70% of Vectren resources need to be located within MISO zone 6.
 - Question: Will point scoring be an input in any way or via weighting in the Aurora Model?
 - Response: No.
 - Follow-up: How are local vs. non-local resources going to be evaluated?
 - Response: Cost information from bids will be evaluated in Aurora based on the cost to deliver energy to Vectren's load node. Burns and McDonnell will also do an evaluation of congestion costs for RFP scoring.
 - Follow-up: I'm still unclear on RFP scoring and how it relates to the IRP.

- Response: The IRP will identify a preferred resource mix [portfolio] and then we may go back to the RFP proposals for best offers within each resource category.
- Question: I'm concerned about options from the RFP. Two nearby dams can provide approximately 700 MWs of hydroelectric power. So why is hydro not in bids?
 - Response: No hydro bids were received. Within IRP modeling, we will supplement bid information with technology assessment information for resources where we did not receive a bid, including hydro.

Angila Retherford – Discussed the current regulatory environment as it pertains to generation, including, but not limited to, CCR, ELG, the Clean Water Act 316B, and ACE.

- Slide 48 Affordable Clean Energy (ACE) Rule:
 - Question: What is the conversion rate that you are using for CO₂?
 - Response: We will have to verify, but it is around 26x. We will clarify at the next meeting.
 - Question: Are you talking about CO₂-equivalence as a measured life-cycle or at the stack?
 - Response: At the stack, but we will get closer to life-cycle with one of our scenarios.
 - Question: How do you justify the ACE rule will stand for 20 years?
 - Response: The ACE is the current regulation for CO₂ and is therefore included as the base case. Your question is focused around a base case. We're going to construct scenarios around more stringent regulations. This is a business as usual scenario.
 - Question: Have you evaluated compliance costs for 100% solar?
 - Response: No, but we would need to also consider upstream environmental costs of renewable energy the same as we consider them for fossil.
 - Question: Are you accounting for methane leaks in Vectren's system?
 - Response: Not in terms of the distribution system, but the high reg scenario will capture higher methane costs for regulations.

Gary Vicinus – Discussed base case inputs and draft scenarios and asked for feedback.

- Slide 53 Base Case Consensus Fuel Forecasts [Coal]:
 - Question: Can you provide delivered coal prices to compare to these forecasts?
 - Response: Yes. We will provide delivered historic prices compared to these projections. Note that delivered prices are included in modeling.
 - Question: Some coal plants are designated as "must-run" due to take-or-pay coal contracts. Do you designate your plants under must run status? Is that how any of your coal contracts are set up?
 - Response: No, we do not designate our plants as must run unless there is a reliability issue and our system operator tells us we need to run a plant. It is not a function of coal supply contracts.
 - Question: Gary mentioned both coal and gas have a \$1/MMBtu difference [between the high and low inputs], but in absolute terms these are very different. Comment?
 - Response: These consensus forecasts are showing a difference of about a \$1/MMBtu. The distinction though is that one is off of a three dollar base and the other is off of about a dollar and a half base.
 - Question: Is Vectren's gas price similar to Henry Hub?
 - Response: We're showing commodity only, but we'll factor in transportation costs.
 - Question: 4/5 vendors gas forecasts were close. One was quite different. Do you know why?

- Response: One of the benefits of a consensus forecast is that it is a best guess, but the drawback is you can't always look at underlying assumptions. Vectren's view is that these are all credible vendor forecasts.
- Slide 55 Base Case Renewables and Storage Long Term Cost Curves:
 - Question: Am I interpreting this chart correctly, that solar cost will decline ~30% and storage ~40%?
 - Response: Yes.
 - Question: Are capital cost decline indices a combo of NREL, B&M, and Pace?
 - Response: Yes.
 - Comment: At some point technology advances are less important to cost because of other costs, like land, become larger.
 - Response: Absolutely correct.
 - Question: We've historically underestimated solar costs. How do you account for that? Will you consider a steeper decline curve.
 - Response: We will evaluate bid costs and assess if these curves still make sense. Additionally, a steeper decline curve will be assessed in the high technology scenario.
- Slide 58 Draft Scenarios:
 - Question: How did you determine Economy? What is higher and lower and how did you determine?
 - Response: These are all in relation to the Base Case.
 - Follow-up: Please look at the Economy again. It may not be valid that a High Regulation case leads to Lower-than-Base-Case economy.
 - Response: Perfectly valid concerns. That is why we want your input.
 - Question: What are the ACE rule implications?
 - Response: ACE means there is greater investment to increase efficiency to meet targets in the rule.
 - Comment: I want to echo the concern that correlates High Reg with Low Economy. I think that it is a false assumption. There is a bipartisan bill in congress that has been analyzed using REMI analysis that says High Reg (carbon dividend, specifically) would in fact *improve* the economy.
 - Response: That is the kind of input that we are looking for. We will look into the study/bill that you suggest.
 - Question: Where is the 100% clean energy scenario? NIPSCO, Xcel, others have committed to 100% renewable.
 - Response: There is a distinction between scenario and strategy. You described a strategy. Here, we're looking at scenarios, but portfolio construction can be designed to achieve 100% renewable energy. You could construct a scenario with a high 80-100% renewable portfolio standard.
- Slide 62 Scenario Narratives [80% CO2 Reduction by 2050 (aka 2 degrees scenario)]:
 - Comment: I disagree in the 80% scenario that you'd see that battery storage prices would increase with more demand, just like computer prices didn't increase with greater demand.
 - Response: We will consider, but we need to make sure to capture boundary conditions within scenarios. These are not cast in stone. We appreciate your input.
- Slide 63 Scenario Narratives:
 - Comment: Please don't set boundaries to disadvantage renewables.
 - Response: Remember that we'll also expose the portfolios not only to these scenarios but also 200 iterations.
 - Question: The base case is supposed to be most likely, so the idea that in the Base Case that the ACE rule will last 20 years is not realistic. Also, I don't think we would

raise solar prices due to higher regulatory restrictions, particularly over 30 years to 2050.

- Response: Fair point, that feedback is valuable. Keep in mind that when you see higher, this is higher relative to the base case. In other words, the costs will decline more slowly.
- Comment: Again, Base Case assumption of ACE rule is unrealistic.
 - Response: The most likely future is probably a misnomer, but it is the rule on the books. Don't focus too much on this since we are modeling lots of other scenarios. Ignoring the CO2 law on the books that exists now is problematic from a process standpoint.

Open Q&A Session

- Question: I have a question on the October 10th meeting on what portfolios are vs. strategies.
 - Response: We will be looking for your input on strategies for portfolio development.
- Question: How reliable are your coal plants?
 - Response: There are a couple of ways to measure reliability. Capacity factor is around 60-65% over last 4-5 years. Our forced outage rate is around 4.5%.
- Question: Can you confirm that each tiered resource modeled in Aurora will consist of the average price of the prices from each tier, and will each tier consist of the sum of MWs within that tier, and will all tiers compete with one other simultaneously? Will the price of each tier simply be the average or will there be adders of any kind from congestion layered on top of them.
 - Response: Within each category there will be tiers to the extent that there are multiple proposals represented within that tier. Not in every case (e.g., DR, which had one response), but yes - we'll capture in the tiers various cost levels that may include congestion. We'll revisit in next meeting. To add with our own experience, we have a wind PPA that sits in the northern part of the state. So when the transmission system is loaded, we have to pay MISO to get that energy. The congestion component based on where these plants are is a big deal. We will do the best we can to capture the costs that our customers are going to see.
- Question: How are you using stakeholder input in IRP process; will it be tangibly used?
 - Response: We will be transparent in how we use or not use stakeholder inputs. If we chose not to use a suggestion, we will tell you why.
- Question: How do Objectives & Measures work, and will they be weighted?
 - Response: At this point nothing is weighted. We are looking at tradeoffs for portfolios. The balanced scorecard is a tool to understand tradeoffs. At the end of the day, the scorecard is not going to produce a score and rank order portfolios. It is a tool to understand where the differences lie and how each portfolio meets these multiple objectives. We can place an emphasis on certain measures but that is in the realm of judgement. We can't take ultimate decision-making out of management's hands and reduce it down to a formula. The tradeoffs have to be considered fully by management, with transparency of the body of evidence of performance and implications among tradeoffs.
- Comment: We received a serious warning one year ago from the IPCC. I appreciate your expertise, and we need your knowledge and skills. But I also want you to inject a morale urgency into your decision-making to ensure we're creating a pathway to respond to the warnings of climate experts. We would like to see you indicate which portfolios meet the IPCC standards.