

VECTREN'S RESPONSE TO STAKEHOLDER COMMENTS ON ITS 2019/2020 IRP

SUBMITTED January 13, 2021

Southern Indiana Gas and Electric Company d/b/a Vectren Energy Delivery of Indiana, Inc. ("Vectren") hereby submits this response to comments on its 2019/2020 Integrated Resource Plan ("IRP") submitted by a number of stakeholders mentioned specifically below. Vectren is not responding to every group that filed comments nor every comment raised by the stakeholders. Instead, Vectren has selected issues for this response designed to aid the Director of the Indiana Utility Regulatory Commission's ("Commission") Research, Policy and Planning Division in reviewing the methodology used to develop Vectren's 2019/2020 IRP and providing the Director's Report. While Vectren did not respond to all arguments or statements made by stakeholders, this does not indicate agreement with those arguments or statements.

Successful Stakeholder Engagement

Vectren would like to thank all stakeholders that took time to provide comments regarding its 2019/2020 IRP. Nearly all groups positively recognized Vectren for its approach in actively engaging stakeholders and directly incorporating their feedback throughout the process. Stakeholders praised Vectren for its continuous improvement efforts. Joint comments from CAC, CGI, Earthjustice, Solarize Indiana, SUN, Valley Watch, and Vote Solar (later referred to as "Joint Commenters") noted that "...Vectren deserves significant credit for the marked improvement it exhibited throughout this IRP in contrast to its prior IRP.¹" The Office of Utility Consumer Counselor ("OUCC") noted that "...Vectren listened and responded to its stakeholders throughout the process by updating various scenarios with specific inputs and modifications, as requested²." The OUCC also recognized Vectren's efforts in incorporating an All-Source RFP and recognizing MISO's planning around accreditation of solar resources within the IRP analysis³.

While Vectren knows that the Director's Report does not comment on the selection of the preferred portfolio, it is worth noting the unprecedented and diverse support for the plan. Vectren's plan was publicly supported by two of its largest industrial customers, Berry Global and AstraZeneca, and the Evansville Industrial Foundation. Comments emphasized the need to move to renewable energy, while maintaining reliability in a cost-effective manner. Additionally, Vectren received support from the City of Evansville and the Economic Development Coalition of Southwest Indiana given the plan supports economic development within Southwest Indiana through development of renewable resources that provide cost savings for Vectren customers. Finally, "Indiana AEE [Advanced Energy Economy] believes that on the whole, Vectren's new preferred portfolio of advanced energy resources offers a flexible, well-considered pathway forward, in addition to being cost-effective and reliable. By recognizing the potential of these technologies [renewables and DSM] in the short-term, Vectren is doing well by its ratepayers, creating new jobs, promoting economic development within Southwest Indiana⁴."

¹ Page 4 of joint comments

² Page 1 of OUCC comments

³ Pages 1-2 of OUCC comments

⁴ Page 10 of ACC comments

Gas Conversion Cost Estimates

While the OUCC was appreciative of Vectren's stakeholder process, they had concerns with the evaluation of gas conversion options within the IRP. Based on feedback from the last IRP, Vectren fully evaluated natural gas conversion options within the 2019/2020 IRP. While none of these options were selected economically, several were included within scenario and probabilistic modeling as a part of the full risk analysis. The OUCC's concerns lie in the cost estimates that were utilized within modeling. They noted that Vectren's modeled capital cost for conversion exceeded \$500 per KW. This is not the case. Vectren utilized Black and Veatch, a well-respected engineering company, to develop -30%/+ 50% cost estimates for conversion of resources. Three portfolios included **site-specific cost estimates** for the AB Brown plant. Vectren was unable to determine the OUCC's source for the claim. The real number that was modeled was approximately \$280 per KW (not counting AFUDC) to convert AB Brown 1&2 to natural gas. OUCC cited a range of \$150-\$200 per kW for conversion of IPL's Harding Street plant. From publicly available information, Vectren verified that approved costs at Harding were at the top end of the estimate accounting for inflation at approximately \$190 per kW⁵.

While there is a cost difference from the Harding Street plant number, it is not more than double and within the estimated range utilized by Vectren. Vectren in no way "stacked the deck"⁶ against conversion options as the OUCC asserts. As mentioned above, an independent third party produced a credible, site-specific estimate.

Additionally, the OUCC had concerns about ongoing O&M costs⁷ for gas conversion. Vectren would like to clarify that firm gas supply was included in ongoing O&M estimates within modeling inputs, which caused the O&M to appear higher after conversion. Vectren believes that firm gas supply is a prerequisite to ensure reliability, allowing for the units to run when needed, 365 days per year. Conversion of two Brown units would require more firm gas supply than two CTs; cost estimates were therefore higher for conversion. Following completion of the IRP, Vectren confirmed that the price estimate for gas supply to the Brown site was accurate.

Load Forecast Too High, Particularly Industrial Sales Forecast

OUCC and Joint Commenters both were concerned with the load forecast being too high, particularly expressing concern with Vectren's industrial sales forecast. As described in the IRP⁸, Vectren utilized its internal estimate for large sales in the first 5 years of the forecast and then relied on modest long-term annual growth estimates thereafter. This process ensures that Vectren captures large expected shifts in load, up or down, based on conversations/negotiations with Vectren's largest active and prospective customers. Estimates from large customers not only feed Vectren's integrated resource planning but

⁵ Indianapolis Power & Light Company's Submission of Semi-Annual Progress Report (May 2018), Cause number 44339, page 14 of 16 of the PDF

⁶ Page 2 of OUCC comments

⁷ Page 3 of OUCC comments

⁸ IRP Vol 2, Attachment 4.1 2019 Vectren Long-Term Electric Energy and Demand Forecast report, pages 12-14

also the company budget and are submitted to MISO. Vectren only includes projects with the most certainty within the forecast.

Large shifts in load must be accounted for outside of econometric modeling. For example, when a large customer recently installed a co-generation facility, there was drop of about 80 MWs in the year that it was installed. A drop of this magnitude cannot be predicted within econometric modeling, nor is it reflective of potential future drops in large customer load. Additionally, Vectren continues to engage in confidential negotiations with potential customers for large load additions.

During the data request process for the IRP, Vectren was asked to provide the individual customer forecasts for large current and prospective customers. This information is competitively sensitive and must be kept strictly confidential. While Vectren cannot provide customer-level details, please be assured that the forecast is credible as demonstrated by use of consistent methodology for internal budgeting, IRP, and MISO. Vectren utilizes the best information available to derive its forecast and believes that its methodology is sound practice, given Vectren's amount of large customer load.

Treatment of Coal Options within Modeling

The Indiana Coal Council ("ICC") tried to paint the picture that the treatment of how coal options were modeled made the difference in their competitiveness. This is not the case. In the 2016 IRP, all coal options were levelized, and all coal was retired based on economics. In the 2019/2020 IRP, Vectren explored more resource options within the IRP, simultaneously. This required the model to be able to break existing coal resources into multiple paths (retire, convert to natural gas, or remain open). The outcome of the decision point was reflected in 2024. In order to facilitate this optionality, Pace Global's model included capital spend required to keep the Brown units operational (conversion, continue with existing scrubber, or replace existing scrubber) beyond 2024. These options required spend prior to 2024 to allow the units to comply with environmental regulations. As described in a data request to the CAC, Pace noted that the model is able to discern competitiveness among resources, regardless of method if the capital spend is included early in the forecast⁹. Coal is not uneconomic because of how Pace Global treated the resource within modeling; the answer would have been the same had Pace Global levelized these costs. The fact that coal is not the most economic resource is well demonstrated in other IRPs within the state and around the nation. That being said, Vectren believes in resource diversity; as such, Culley 3 was included in the preferred portfolio, just as it was in 2016.

Treatment of Demand Response Resources

As discussed in the IRP, Vectren included three Demand Response ("DR") resources within the IRP. First, Vectren plans to replace outdated Direct Load Control ("DLC") switches for residential and commercial customers with newer wi-fi enabled thermostats. Additionally, Vectren included additional DR as a selectable resource for a "bring your own thermostat" program. This resource was selected within the preferred portfolio. Finally, Vectren included ~35 MW of industrial interruptible contracts. The level of interruptible resources has fluctuated over the years, between ~35 MWs to ~50 MWs but currently is

⁹ CAC DR 4.4 "...The resources that were modeled as upfront investments included modifications to existing resources, for example adding an environmental control option or a conversion from coal-firing to natural gas-firing. These costs were modeled as upfront because they occurred early in the forecast (end of 2023) with 16 years remaining in the study period, a sufficient amount of time for the model to adequately compare the economics to alternatives. "

~35 MWs after a 7 MW interruptible contract dropped. Each of these contracts are for emergency use and traditionally have not been called on.

Over the past two years, MISO has been making changes to the Load Modifying Resources (“LMR”) provisions within its Open Access Transmission, Energy and Operating Reserve Markets Tariff (“Tariff”) as part of its Resource Availability and Need (“RAN”) initiative. The changes include new annual testing requirements and updated accreditation methodology. After planning year 2023/2024, LMRs will only receive capacity credit if they are able to be called upon at least ten (10) times per year and require 6 hours or less advanced notification to curtail their load. MISO has said that these changes are being implemented to ensure that LMRs are available when called upon because of the increasing number of emergency events that have taken place and the expectation by MISO that the frequency of emergency events will increase in all seasons of the year.

Vectren is in the process of aligning its interruptible tariff with these MISO changes and will present the modified version to its DSM oversight board early this year. Vectren anticipates that MISO will make additional changes to LMRs in the future, as MISO continues working through its RAN initiative. Vectren believes it will be a challenge to achieve greater potential for more interruptible customers within Vectren’s territory due to the new accreditation guidelines and increased demands placed upon the resources. In fact, Vectren expects less given the makeup of its large customers. Some industries, such as steel companies, can take advantage of these programs, as demonstrated in the NIPSCO territory. It is much harder for plastics companies, automotive manufacturing, health care, universities or pharmaceutical manufacturing to participate; all of which are a large part of Vectren’s customer base. Given the greater expectation for MISO emergency events and the unique make up of its customer base, Vectren chose to hold the level of interruptible DR at ~35 MWs throughout the forecast. It is a reasonable modeling assumption.

Meeting Rule Requirements

Joint Commenters provided a summary of the IRP rule, along with **their opinion** as to whether Vectren did not meet, partially met, mostly met, or met each section of the rule. By their estimation Vectren met ~47% of the rule, mostly met ~8%, partially met ~39%, and did not meet ~6% of the rule. In some instances, Joint Commenters made specific arguments as to why specific portions of the rule were not fully met, but in the vast majority of instances, Joint Commenters made a general assertion without any supporting comments as to the basis for their belief. Vectren takes the IRP rule very seriously and works hard to address every portion of the rule to the best of its ability. It would be overwhelmingly cumbersome to debate each instance where the Joint Intervenors charged that Vectren partially met the rule; the focus below is on items listed as “not met.”

4-7-4 (7) & 4-7-7 requires a resource screening analysis. In the past, Vectren conducted a screening analysis based on Levelized Cost of Energy (“LCOE”) of resources. This was done due to modeling limitations in Strategist software that did not allow for modeling of multiple resources at one time, which was a large source of contention in the last IRP. To improve the analysis in response to prior CAC comments from the 2016 IRP, Vectren utilized Aurora, which allowed for modeling of a large number of resources simultaneously, eliminating the need for a screening analysis. As described in the IRP and in the third stakeholder meeting, a couple of smaller gas resources were screened from modeling due to cost per kW and high pressures required on the gas system. At the outset of this analysis, Vectren was not sure if it would be necessary and included it in the original outline. A typo referencing an LCOE

analysis regrettably remained in the cross-reference table. As described above, Vectren made a big improvement in this area, and the screening analysis was ultimately not necessary.

4-7-8 (c) calls for “An evaluation of the utility’s DSM programs designed to defer or eliminate investment in a transmission or distribution facility, including their impacts on the utility’s transmission and distribution system.” Vectren does not have any DSM programs designed to defer or eliminate T&D. Rather, Vectren programs are designed primarily to reduce energy consumption and provide demand benefits to customers. While Vectren does not have any “DSM programs designed to defer or eliminate T&D” Vectren Energy Efficiency programs do provide a benefit in helping avoid or defer T&D. Avoided cost estimates for T&D are included in Figure 11.34 on page 313 of the IRP.

4-7-9 (4) calls for “a budget with an estimated rate for cost to be incurred for each resource or program and expected system impacts.” As mentioned in the Short-Term Action Plan on page 182 of the IRP, estimates [costs and system impacts] for each portion of the plan can be found in Confidential Attachment 8.2 Aurora Input Model Files.

Vectren acknowledges not meeting one section of the rule, specifically section 4-7-8 (b) (3), which calls for: “The present value of revenue requirement for each candidate resource portfolio in dollars per kilowatt-hour [kWh] delivered, with the interest rate specified.” Vectren provided the average total revenue requirement for each candidate resource portfolio with interest rate specified for both deterministic modeling and stochastic modeling. While Vectren could possibly provide this information on a per kWh basis, it is not relevant to the analysis. As described in the IRP, portfolios that produced much more energy than needed by customers adds risk because of heavy reliance on the wholesale market for energy sales, beyond the needs of customers. Vectren did measure this in the risk score card and eliminated portfolios from consideration, partially on this basis. Dividing the total revenue requirement for portfolios that produce more energy than what customers need may drive this per kWh metric lower but adds risk to customers.

MISO Accreditation of Renewable Resources

Joint Commenters suggest that Vectren’s preferred portfolio is overbuilt and that Vectren does not need to build a second CT. They suggest that MISO’s projected changes to accreditation of renewable resources should be a scenario, not a reference case assumption. Since filing the IRP, changes to MISO resource accreditation has become more certain, not less. In the December 2020 MISO Resource Adequacy Sub Committee meeting, MISO indicated that sub-annual planning and Planning Resource Auction reform are imminent. Concept design is expected in the first quarter of 2021, with a FERC filing following in Q2-Q3 of 2021. While the final design is yet to be shared, all presented options indicate the need to consider resource accreditation sub-annually. Vectren is not speculating about this reality, it is responsibly planning for it by considering how much resources could be accredited in the winter and the summer.

The Joint Commenters appeared to misunderstand how Vectren ultimately implemented a summer/winter construct. While Vectren tried to model winter and summer accreditation during portfolio development, this proved to be too difficult. Vectren ultimately built portfolios based on summer peaking requirements, as done in the past; however, Vectren ensured portfolios would meet both summer and winter requirements. This is particularly important with solar resources, which are

expected to receive little to no accreditation in the winter. As such, portfolios that have too much solar pose a big risk to Vectren and its customers (more discussed below).

Additionally, Joint Commenters don't deny that MISO's Effective Load Carrying Capability ("ELCC") treatment of wind and solar resources will mean lower future accreditation of these resources; they simply say that Vectren is overstating the potential buildout of solar will happen as fast as predicted in Vectren's IRP. Even if the steep drop in accreditation of solar resources occurs a few years later, this does not point to the need for more solar resources. Vectren's preferred portfolio calls for 700-1,000 MWs of solar. The range was provided to help ensure that Vectren adds solar resources responsibly as to not overbuild.

Limiting the Amount of Early Solar to 1,150 MWs

As described on page 248 of the IRP, Vectren chose to limit solar resources within optimization modeling to 1,150 MWs, about the amount of its peak load, in years 2023 and 2024. As mentioned in the IRP, there is risk in heavily weighting a portfolio with too much of any one resource. This is particularly true with solar, as MISO moves towards seasonal accreditation for resources. As discussed in the IRP, portfolios that may be able to meet the current MISO construct, may receive zero accreditation in the winter. Joint Commenters mentioned that wind receives accreditation for what it is able to cover in the three consecutive hours¹⁰ at the time of peak. Should MISO accredit solar resources in this manner for a seasonal winter peak, this resource would receive zero accreditation.

Additionally, Vectren mentioned that "...solar was limited by practical considerations about logistics and operational feasibility¹¹." Beyond Vectren's stated goal for resource diversity, Vectren believes that a staged approach to incorporating large amounts of solar resources protects customers and ensures reliability. Vectren learned a tremendous amount about constructing solar resources through the 50 MW Troy solar project, which is scheduled to be online in early 2021. Vectren's customers benefit from this experience because Vectren is in a better position to evaluate project risk, including cost increases. Vectren's experience in bringing online the Troy project and its expected ability to bring online 700-1,000 MWs of solar prior to 2024 validates its modeling assumption, as it has experienced increasing prices, projects dropping from the MISO queue, projects going to other utilities, lengthy negotiations with winning bidders, project delays, etc. It should be noted that Vectren did include portfolios for the risk analysis with greater levels of solar resources, one of which was included in the final four portfolios.

Preserving Interconnection Rights at the Brown Facility

It is worth noting that Vectren cannot preserve interconnection rights at the Brown facility with solar or wind resources. MISO has a process in place to utilize existing interconnection rights for facilities that offer similar benefits to the grid. Dispatchable resources can be replaced with other dispatchable resources, pending a study which takes six months to a year to complete. Replacing dispatchable generation with intermittent resources could require a full interconnection study, the same process all new resources go through to determine if upgrades are necessary to move forward. Projects later in the MISO queue bear more risk of costly transmission upgrades than projects that are earlier in the queue. With the volume of new, speculative projects in the queue, MISO has gotten further and further behind.

¹⁰ Page 17 of Joint Comments

¹¹ Page 248 of Vectren's 2019/2020 IRP

Vectren is confident that replacing the Brown units with highly flexible CTs will preserve interconnection rights, shielding customers from risk of costly upgrades that could be realized in a full DPP study.

Continued Delay of AB Brown Replacement and Flexibility of CTs

Indiana AEE and the Joint Commenters both argue for more delay in the replacement of AB Brown with highly efficient combustion turbines. One argues that storage is a viable option now, while the other argues for delay, as storage will be affordable by the 2030's. Various groups caution against spending on CTs because they may become stranded assets before being fully depreciated. As mentioned in the IRP, CTs are not designed to generate revenues to offset their cost. However, they do provide a physical hedge against high energy and capacity costs, while providing numerous reliability benefits, including complimenting a renewables buildout consistent with Indiana's recent task force findings.

Combustion Turbines ensure Vectren will continue to meet capacity requirements with MISO in the near and long-term, providing long-duration capability. Customers can rest easy knowing that these resources are available during renewables droughts (long durations of no wind or sun). Short duration 4-hour batteries are currently a much more expensive resource, as demonstrated by 2 recent Vectren RFPs, and do not provide the same level of coverage. Vectren believes that batteries have their place in a balanced portfolio, but currently do not provide the level of assurance needed to support the grid 24 hours a day, 365 days a year.

Vectren has a real capacity need in the near term and long-term to make up for the lack of capacity accreditation for renewable resources within MISO. Some commenters suggest that renewable accreditation is and will remain high and capacity prices will remain artificially low in the long term. Based on data and recent MISO communications, this is not likely. As you know, 2023 will be another significant year for coal retirements. With less dispatchable resources in the market, capacity prices are expected to increase dramatically. Recent Vectren bids confirm this. Additionally, as mentioned above, high penetrations of renewables lead to lower accreditation in MISO.

The Sierra Club argued that CTs are a stranded cost risk because they do not offer flexibility. As demonstrated by recent articles and further research, modern CTs currently have the ability to burn about 30% hydrogen and are anticipated to have the ability to move to 100% hydrogen by 2035¹², including green hydrogen which can be produced by renewables or biogas. Demonstration projects will be in place over the next several years, and GE Gas Power Emergent Technologies Director Jeffery Goldmeier predicts this technology will be cost effective by the 2030s, warranting consideration in future IRPs¹³. Vectren is not suggesting that conversion to hydrogen in 15-30 years is the plan; however, this is a potential off-ramp in the future, which adds flexibility to the plan. Vectren continues to monitor developments in this area.

¹² Source: <https://www.greenbiz.com/article/you-say-old-coal-plant-i-say-new-green-hydrogen-facility>

¹³ Source: <https://www.utilitydive.com/news/utility-interest-in-hydrogen-beyond-staggering-ge/592185/>

Conclusion

Vectren utilized sound methodology in developing its 2019/2020 IRP. The data intensive analysis, which included extensive participation/input from Vectren stakeholders, led to the selection of the preferred portfolio. Continuous improvement efforts helped to shape the analysis and will continue with future IRPs. Vectren would like to thank stakeholders for their critiques and it looks forward to the reading the Director's Report.