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August 22, 2018

Dr. Bradley K. Borum
Director of Research, Policy and Planning
Indiana Utility Regulatory Commission
101 W. Washington St., Suite 1500 East
Indianapolis, IN 46204

Dear Dr. Borum:

In response to the Draft Report of the IURC Regarding Wabash Valley Power's (WVPA) 2017 Integrated Resource Plan, these are our comments.

4.1 Wabash Valley's Load Forecasting

4.1.2.1 Question: Since Wabash Valley has successfully utilized residential survey instruments to get appliance data as well as distributed generation data, does Wabash Valley plan to extend the surveys to commercial customers for appliance/end-use data as well as their interest in DER? Has Wabash Valley considered asking demographic information and other relevant information to enhance its understanding of their ultimate customers?

Wabash Valley may consider conducting a commercial saturation survey in the future. As a wholesale Generation &Transmission cooperative (G&T), we would need to work with our Members to gauge interest and likely participation levels. In addition, as stated on Page 27 of the IRP, Wabash Valley is in process of offering commercial and industrial (C&I) programs under our PowerShift® program umbrella. Through these programs, we may gain more insight into our C&I customers' end-use patterns and their interest in DER.

As part of Wabash Valley's current residential saturation survey, we do ask questions to understand our ultimate retail customer base. We ask questions such as age of respondent, type of property (i.e. primary or seasonal), number of people in home most of the year, type of home (i.e. site-built, single family, manufactured home, mobile home), etc.

4.1.2.2 Question: What changes have been made to the forecasting procedure to reduce the potential for over-forecasting Wabash Valley's load requirements other than using ITRON to develop the forecast?

Instead of building the load forecast using a complete bottom-up approach starting at the retail class level for each of our 23 Members, we changed our methodology to build it up from the *wholesale level for each of our 23 Members. Wabash Valley feels this approach will temper over-forecasting since it lessens the number of forecasts to be aggregated.*

4.1.2.3 Question: Consistent with Wabash Valley's concern that prior forecasts have systematically over-forecast energy and demand, could Wabash Valley please provide some additional information to help us better understand Table 3-2, Table 5-4, and Graph 5-6? That is, the load forecast summer peak shows consistent growth in Table 3-2, while the power supply requirements in Table 5-4 show a slight drop (15 MW) from 2027 to 2028. Furthermore, Graph 5-6 shows a much larger drop (about 200 MW) in peak demand at that same time. The IRP does not reconcile these discrepancies or explain the drop in Graph 5-6. (Pages 39, 79, and 81).

Table 3-2 shows Wabash Valley's Member summer coincident peak net of pass-through loads. Table 3-13 adds Member pass-through loads to obtain Member total system summer coincident peak. To reconcile to the power supply requirements in Table 5-4, add non-member non-interruptible load and reserve/loss requirements to Member total system summer coincident peak. The following table reconciles the various tables and graphs.

Source	2027 (MW)	2028 (MW)	Description
Table 3-2	1,568	1,586	Member Summer CP (net of pass-through loads)
Table 3-13	125	125	Pass-Through Summer CP
Table 3-13	**1,693**	**1,711**	**Member Total System Summer CP**
Section 2 Pg 13-14	195	0	Non-Member Load (expires 4/2028)
Graph 5-6	**1,888**	**1,711**	**Member & Non-Member Load**
Appendix A	(176)	0	Interruptible portion of Non-Member Load (expires 4/2028)
Appendix A	135	121	Reserve/Loss Requirements
Table 5-4/Appendix A	**1,847**	**1,832**	**Power Supply Requirements**

4.1.3.1 Question: Wabash Valley states "Commercial sales forecasts are consistent with forecast assumptions." (Page 48). Would Wabash Valley please explain what this means and how it affects the load forecast if the C&I forecast is determined as a remainder?

This means that the projected 1.1% average growth in commercial sales over the next twenty years seems reasonable when compared to the 1.6% annual sales growth experienced from 2010 to 2016. Although the projected average growth is lower than historical growth, the key composite economic variables depicted in Table 3-5 leads us to believe that the projected growth should be lower.

If the remainder C&I forecast seems reasonable, that gives us a good indication that both the overall load forecast and the residential load forecast are sound. On the other hand, if the remainder C&I forecast seems inconsistent with known factors (such as zero C&I load growth in a county like Boone where new businesses are thriving), that indicates that the energy requirements model and/or the residential customers and average use models need to be re-estimated.

4.1.3.2 Question: Since Wabash Valley's Members have historic billing information by month for each of the residential Members and the data needed to forecast "Other," couldn't Wabash Valley use this information to derive the commercial history? Given the relatively few industrial customers, wouldn't this information be readily available? With the approach Wabash Valley uses, only the total forecast really matters. It appears that the balance of the forecast is merely divvying up the total. Is this an accurate characterization? (Page 45 – Section 3). With the better load data, has Wabash Valley thought about revamping its load forecasting methodology?

As a wholesale supplier, Wabash Valley's primary focus is the total forecast by Member. Because C&I Members are less homogenous than residential Members, the C&I class is more difficult to forecast accurately. This methodology is a revamp of our previous methodology. In the past, we relied more on information provided by Member cooperative staff. In some cases, we found this information to be overly optimistic because the Member was attempting to be conservative in order to plan for potential load growth. Wabash Valley plans to retain this methodology for at least a few load forecast cycles. We will consider a change to this methodology if it proves to be inaccurate.

4.1.3.3 Question: Since "small and large commercial revenue classes are not specifically modeled" (Page 48), how does the following statement affect the forecast "commercial sales forecast is lower as both the GRP [Gross Regional Product] and household projections are lower than in the 2010 to 2016 period?" Similarly, how does the forecast utilize the following information: "Commercial sector end-use intensity projections are expected to decline as a result of federal energy efficiency standards and technological improvement in light, refrigeration, heating, and cooling?" (Page 48).

Both the Energy Requirements Model and the Coincident Peak Model described on Pages 43-45 utilize End-Use Intensity Indexes for heating, cooling and other use based on EIA's end-use saturation, efficiency, and intensity forecasts for the East North Central Census Division. We weighted residential and commercial intensities to reflect the mix of residential and commercial sales within the Member service area.

Similarly, both the Energy Requirements Model and the Coincident Peak Model described on Pages 43-45 utilize an Economic Index that incorporates GRP and household projections.

4.1.3.4 Question: With respect to the previous questions, on Page 42, would Wabash Valley please provide a brief explanation of what is meant by "(spot load adjustments) to account for specific expected expansions and retractions of large commercial load." How is this integrated into the forecast?

In three specific cases, we were made aware of expected changes in load for three commercial customers. Based on information provided by Member cooperative staff or developed through internal insights and discussions, we made spot load adjustments to both the total forecast and the C&I forecast.

4.1.4.1 Question: Based partially on the previous comment, is it a correct assumption that the reason historical class peak loads are not available is because Wabash Valley doesn't forecast C&I, rather than the lack of metering data that could provide this information? If so, wouldn't historical billing information be useful if Wabash Valley were to forecast C&I customers? Has Wabash Valley considered the value (e.g., added credibility for the forecast, better information for system planning and designing rates) of forecasting the contribution of each class to Wabash Valley's system peak? Do any of Wabash Valley's Members forecast their peak demand or their coincident peak demand with Wabash Valley? If so, does Wabash Valley give effect in the forecast?

That is not a correct assumption. Wabash Valley does not meter data for every retail customer and therefore cannot develop class peak loads. Wabash Valley meters and bills our 23 Members by delivery point. In many cases, these delivery points represent load of hundreds of retail customers from various classes. Wabash Valley forecasts each Member's coincident peak demand with Wabash Valley and that is how the Summer CP is developed.

4.1.5.1 Question: Is it correct to say that "pass-through" loads are non-conforming loads and these loads take on the attendant financial responsibilities of arranging for power purchases and ancillary services to customize their power supply portfolio based on their respective risk tolerances? Is it also correct "[T]he large power customers are included in Wabash Valley's total planning load because the Company has the ultimate responsibility to meet the large power customers' energy requirements and make purchases at market to meet the minimum reliability requirements." (Page 42).

Yes, these statements are correct.

4.1.6.1 Question: Would Wabash Valley explain the rationale and ramifications of using binary variables to account for unexplained data? Using binary variables without an accompanying rationale raises a red flag. (Page 45 – Section 4).

Wabash Valley is modeling data at the Member level, for 23 Members, as depicted in Figure 3-1 on Page 38. As such, anomalies in the data are revealed that would not become evident if we were modeling solely by revenue class at the Wabash Valley level. On a limited basis, we use binary variables to exclude these anomalies. With unlimited time and resources, we would attempt to investigate each irregularity. Using the binary variables provided a slight improvement in model statistics. However, as would be expected, the Cooling, Heating and Other Use model variables provided the greatest explanatory value.

4.1.6.2 Question: The load forecast summer peak shows consistent growth in Table 3-2, while the power supply requirements in Table 5-4 show a slight drop (15 MW) from 2027 to 2028. Furthermore, Graph 5-6 shows a much larger drop (about 200 MW) in peak demand at that same time. Would Wabash Valley be able to reconcile these discrepancies and explain the drop in Graph 5-6? (Pages 39, 79, 81)

The reason for this discrepancy is that Table 3-2 is net of all pass-through loads; while Table 5-4 and Graph 5-6 include pass-through loads. One 195 MW pass-through load contract expires in April 2028. This load has 176 MW of interruptible load (or net 19 MWs of Power Supply Requirements). Please see the response to Question 4.1.2.3 for a detailed reconciliation.

4.2 Wabash Valley's DSM Programs

4.2.1.1 Question: How were energy efficiency and demand response resource alternatives developed and analyzed on as comparably to other resources as reasonably feasible? For example, based on prior IRPs, we understood Wabash Valley incorporates demand response measures as part of the power supply portfolio and approached them as a resource (treated similar to a peaking plant.) Therefore, demand response is chosen after competing with other most economic supply-side resources which may not reflect the full value of demand response for Wabash Valley or its Members under several possible events.

As stated in Section 4 (page 63), "we are evaluating our demand-side resource options on a comparable basis to our supply-side resources. For DR, we utilized current internal cost estimates based on recent experience building out our programs. For EE, we obtained high-level program cost estimates from a condensed study of achievable efficiency potential". Both DR and EE were co-optimized with other resources so that PLEXOS could select these resources if/when economic.

*Wabash Valley does not understand the IURC's comment, "*Therefore, demand response is chosen after competing with other most economic supply-side resources which may not reflect the full value of demand response for Wabash Valley or its Members under several possible events."

4.2.2.1 Question: Does Wabash Valley and its Members have any intention of seeking to expand the MISO and PJM programs? How wide is the participation?

Wabash Valley is always looking to expand our program. Currently, 19 of our 23 Members participate in our programs, which includes 26,840 retail customers.

4.2.3.1 Question: Given the implementation of DERMS, how did this system enhance the development of load shapes for the demand side resource alternatives developed from the individual measure characteristics? Is DERMS suitable for providing more granular information for energy efficiency programs and their effect on demand reduction as well as energy use?

DERMS data was not used to model demand response or energy efficiency. These alternatives were modeled as supply- side options (not reductions in load). Demand response acts as a peaker and "dispatches" during times of very high load; therefore, it does not require a shape. Wabash Valley's DERMS system was not designed to provide information on our energy efficiency programs.

4.2.3.2 Question: An issue of concern is the method of offering different energy efficiency measures in a single resource group. The use of this methodology would reduce the ability to capture potential differences in cost and load characteristics between measures within each group. Has Wabash Valley considered this concern? If so, how?

Wabash Valley models energy efficiency in three separate resource groups: residential, small commercial and large commercial. These resource groups are based on achievable efficiency potential, not on current programs or even expansion of current programs. Greater granularity is not readily available.

4.3 Interrelationships between the Load Forecast and DSM

4.3.1.1 Question: Is it possible that energy efficiency is being double counted in the Wabash Valley load forecast? Is it also possible that Wabash Valley's is still over forecasting Wabash Valley's electric requirements by not giving full consideration to how DSM and the load forecast affect each other?

The effects of all currently implemented energy efficiency programs are reflected in historical metered data and consequently included in Wabash Valley's load forecast. Energy efficiency expansion alternatives are treated as a resource and not included as a reduction of the load forecast. Wabash Valley believes that our load forecast provides a reasonable estimate of our future power supply requirements as of the time we developed the 2017 IRP.

4.3.1.2 Question: Has the MISO or PJM called upon emergency demand response from other utilities but not called upon Wabash Valley's emergency demand response? If so, is it possible that revisions could be made to increase the benefit of the DR program?

Wabash Valley is not aware of MISO or PJM calling any events with other utilities.

4.3.1.3 Question: On Table 2-1, Page 10, the qualifier for coincident demand states "Coincident demand includes pass-through load but excludes interruptible load." For clarity, does this mean that Member load was interrupted at the time of each winter and summer peak? On Table 3-2 on Page 39, does the coincident demand also exclude interruptible customers?

On Table 2-1, the load was not necessarily interrupted at the time of each winter and summer peak. The Coincident Demand column includes only the firm service level for the two large customers whose demand may be interrupted.

On Table 3-2, the Summer Coincident Peak (MW) column excludes the interruptible customers as well as the other pass-through loads.

4.3.1.4 Question: Regarding the Base Resource Plan and Scenario Results – A total of exactly 50 MW of energy efficiency is selected consistently across all portfolios (note the timing varies). Is this the result of a pre-selected limit on available energy efficiency? (Pages 69, 74-79).

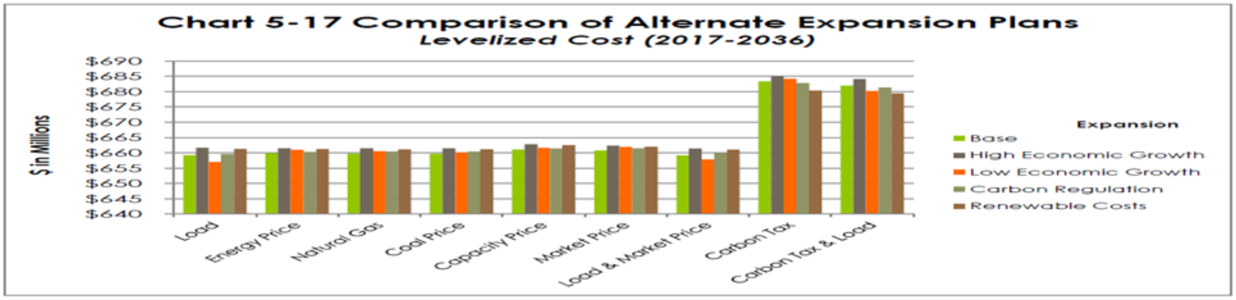
Yes, as stated in Section 4 Page 64, "For EE, we obtained high-level program cost estimates from a condensed study of achievable efficiency potential".

4.4 Resource Optimization and Risk Analysis

4.4.2.1 Question: Consistent with the draft IRP rule for continuing improvements, does Wabash Valley anticipate changes to the processes to make better use of the AMI data, information on DSM, and PLEXOS capabilities?

Wabash Valley expands its Plexos modeling capabilities regularly. Any data source (including AMI data and DSM information) deemed to have a material impact on our ability to forecast energy costs and requirements will be utilized for our long-term modeling. However, we do not currently anticipate the need to change our approach of modeling demand response or energy efficiency as supply side resources.

4.4.3.1 Question: If the natural gas prices had a wider range of prices, would there be more separation in the analysis? How would the Expansion Plans change if there was a wider stochastic analysis of market price? A reasonable reading of this chart could be that, if there was a carbon tax, the least risky Expansion Plan would be to rely more heavily on renewable resources.



Due to the high correlation of natural gas prices to energy prices, Wabash Valley agrees that a broader range of prices would lead to greater separation in this analysis. On the high side, renewable resources would become less costly due to their lack of fuel costs.

4.4.3.2 Question: Would Wabash Valley discuss, in greater detail, how these apparent stochastic sensitivities were used in the consideration of the portfolios that emanated from the Base Case and the four other scenarios?

Wabash Valley examined how the different expansion plans reacted to the stochastic sensitivities. Wabash Valley's focus was on minimizing both levelized average cost as well as overall risk.

4.4.4.1 Question: Given Wabash Valley's experience with fluctuating membership and the increasing potential for DERs and the loss (or gain) of new customers, would it have provided useful insights to expand the load forecasts bandwidth for all of the scenarios? (Page 54).

All Wabash Valley Members operate under an "All Requirements Contract". This contract contains notification requirements and certain conditions that safeguard Wabash Valley and its remaining Members from any one Member leaving the cooperative. This contract also limits the amount of distributed generation a Member may purchase directly. Both of these requirements are in place to protect Wabash Valley's financial wellbeing and provide rate stabilization for our Members.

In the end, Wabash Valley could gain new Members or lose a Member. For future IRPs, Wabash Valley will consider whether we should include these assumptions to widen our load forecasts bandwith.

4.4.5.1 Question: To help explain how Wabash Valley intends to mitigate risk, would Wabash Valley describe how it anticipates procuring future resources?

As stated in Section 5 Page 91, "While the Company may consider sole ownership of a generation asset, it is more likely that we will participate in a joint ownership project or enter into a long-term power purchase agreement in order to diversify our portfolio while taking advantage of economies of scale. Because of this, the models in this IRP are designed to look at different fuel options along with energy efficiency and demand response alternatives as well as participation in RTO capacity markets."

4.5 Base Case

4.5.1.1 Question: What was the rationale for Gibson 5 retirement not being a selectable option? From the discussion of energy efficiency and demand response and the use of Plexos, is it accurate to say that energy efficiency and demand response were treated on a reasonably comparable basis to other resources and optimized? If no, please say why? If energy efficiency and demand response were modeled and optimized with other resources, please provide a brief description of how this was done, beyond the brief descriptions on pages 63-67.

Wabash Valley does not own a controlling interest in any of our generation assets, with the exception of Wabash River Highland CT, landfill gas generators and a few small solar projects. Wabash Valley did not model the retirement of Gibson 5 in our base case because retiring it is not a stand-alone decision. Under carbon regulation, Wabash Valley believes that coal retirement is a probable consequence; therefore, we allowed Plexos to retire our coal generation if the economics warranted.

Wabash Valley did allow Energy Efficiency and Demand Response to compete with fossil fuel and renewable resources to meet Wabash Valley's energy requirements. Plexos uses inputs such as fuel, variable O&M, fixed O&M, build cost and life span to determine the most economical approach to meet Wabash Valley's energy requirements. Demand Response is treated like a peaker, offering very little energy value. Energy Efficiency is shaped to follow our load curve. They both compete with other supply-side options, adding energy and capacity to our portfolio as opposed to subtracting load.

4.6 High Economic Growth

4.6.1.1 Question: Consistent with prior questions, is it conceivable that Wabash Valley's load will be greater (perhaps a new Member, electric vehicles, etc.)? While Wabash Valley's forecast range seems reasonably expansive, what was Wabash Valley's rationale for the ranges used in this scenario, beyond the brief description on page 54? Would Wabash Valley agree that it is possible that greater incremental energy efficiency is possible in the High Economic Growth environment (beyond the amount in Table 5-1 on page 74)? Did Wabash Valley consider conducting any stochastic analysis to see the implications of greater energy efficiency? Similarly, did Wabash Valley consider demand response? Were DERs considered?

Wabash Valley chose to limit our High Economic Growth scenario because we felt that our range in prior IRPs was excessively broad. We used EIA data to develop our High scenario to remain consistent with the assumptions we utilized. Wabash Valley agrees that our load ranges may be too narrow and that we should consider widening our load forecasts bandwith by perhaps adding a new Member scenario.

Wabash Valley did not perform stochastic analysis on energy efficiency as the model typically selects as much EE as allowed. Allowing unobtainable amounts of EE just taints the desired purpose behind expansion modeling. However, Wabash Valley agrees that we could expand energy efficiency and demand response parameters for the High scenario. Furthermore, as distributed energy starts to take on more base load characteristics (such as rooftop solar) and becomes more economical, DER generation could be included in future IRPs in both base and alternate expansion plans and stochastic analysis as adjustments to load and/or supply-side alternatives.

4.7 Low Economic Growth

4.7.1.1 Question: Also consistent with prior questions, suppose Wabash Valley experiences lower growth than anticipated in this scenario (perhaps due to a loss of a Member or major load, or customer-owned distributed generation). Would Wabash Valley agree that it is possible that some incremental energy efficiency is possible in the Low Economic Growth environment? Did Wabash Valley consider that keeping energy efficiency at "0" might be unrealistic and conduct any stochastic analysis to see the implications of greater energy efficiency?

See answers to questions 4.4.4.1 and 4.6.1.1.

4.7.1.2 Question: For future IRPs, does Wabash Valley intend to expand the risk of lower than expected load growth? Similarly, did Wabash Valley consider demand response? Were DER considered?

See answers to questions 4.4.4.1 and 4.6.1.1.

4.8 Carbon Regulation and Renewable Costs

With regard to the potential costs associated with carbon regulation, based on Wabash Valley's risk analysis, carbon tax seems to be the most influential factor. In this scenario, Gibson 5 was retired in 2030, which seems reasonable. Similarly, retaining the Prairie State unit due to its lower operating costs that "more than offset the carbon tax" seems reasonable.

4.8.1.1 Question: Is this Wabash Valley's interpretation? If so, why doesn't Wabash Valley's Action Plan show increased activity in cultivating energy efficiency, demand response, renewables, and other non- or low-carbon emitting resources in order to hedge such risk. In short, how were the results of risk analysis incorporated into the Action Plan and longer-term resource planning?

As stated in Section 5 Page 91, "if the cost of renewable energy continues to decline, wind, solar and battery resources may become viable baseload/intermediate resource options especially in a carbon regulated environment. As stated earlier, the primary obstacles preventing the model from selecting renewable resources is their cost, capacity factor and UCAP value."

Wabash Valley strives to limit costs as well as risk. At the time the IRP was prepared, investing in renewables, specifically solar, would have hedged risk at a very large cost to our Members. Since then, Wabash Valley has been active in procuring the energy and capacity from various solar projects at a cost that is competitive with other generation options.

4.8.1.2 Question: On page 77, Wabash Valley mentioned that a carbon tax of $7.78 / ton in 2030 was imposed. The tax increased to $26.30 / ton in 2036. Did Wabash Valley conduct stochastic sensitivities to determine the point of inflection for higher carbon taxes to change (higher and lower carbon tax) the retirement decisions?

No, we did not conduct the described stochastic sensitivities as part of Wabash Valley's 2017 IRP.

Sincerely,

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