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Indiana Utility Regulatory Commission
c/o Ryan Heater
101 W. Washington St., Ste. 1500E
Indianapolis, Indiana 46204
URCComments@urc.in.gov

Re: Duke Energy Indiana Comments on Proposed Commission HEA 1278 Study

Dear Mr. Heater,

Thank you for the opportunity to participate in the Indiana Utility Regulatory Commission's ("Commission") study of the statewide impacts of transitions in fuel sources and other electric generation resources, as well as the impacts of new and emerging technologies on electric generation capacity, system reliability, system resilience, and the cost of electric utility service for consumers ("Study"). In response to the Commission's request, Duke Energy Indiana submits the following comments:

Duke Energy Indiana's Overall Understanding of August 22, 2019 Stakeholder Meeting

To summarize Duke Energy Indiana's comprehension of the presentations by Dr. Doug Gotham and Mr. Dale Thomas at the Stakeholder meeting on August 22, 2019, we understand that the purpose of this effort is to provide input to the state's Energy Task Force discussing the transition of sources of electric generation within the state, as described by House Enrolled Act 1278 (2019). However, the intent of this modeling process is not to effectively perform a state-wide integrated resource plan. The State Utility Forecasting Group ("SUFG") does not intend to utilize their modeling tools to perform resource optimization (i.e., selecting generating unit retirements and new resource options). The goal of the study, rather, is to assess the performance and costs of various deterministically entered resource transitions and timing. Additionally, Lawrence Berkeley Lab will be supplementing the analysis with a focus on distribution infrastructure and distributed energy resources. There is not currently a plan to study detailed transmission infrastructure impacts, or electric vehicle penetration. Lastly, we acknowledge the legislature's time constraints imposed and the complexity of analysis required within that time. We understand that the Study's main focus metric is proposed to be cost, but that social aspects (such as environmental, local community, etc.) may be assessed if time allows.

Defining and Measuring Transition

The resource “transition” needs to be defined in terms of “what change by when”. It probably seems clear that the baseline” in this context is intended to be the existing fleet of coal-fired generating units that provide the majority of energy to the state of Indiana. The “what change” Indiana Utility Regulatory Commission and “by when” represent the deterministic portfolios for study. But, how is the degree of transition measured and how is the time window defined? This will be important for comparing the performance of various transition portfolios. This could be measured in terms of diversity of energy production from the various resource types; diversity of capacity serving load; or even CO2 emissions and/or CO2 emission intensity, or change therein from a reference baseline year. Specifying such measurements for the trajectories can help create scenarios that will describe various rates of transition and provide the state with the benefits, costs and tradeoffs of such various rates of transition.

Demand Growth

It appears that a significant effort is proposed to model load growth, but that electric vehicles will be excluded from that effort. Duke Energy Indiana suspects that most stakeholders probably agree load growth due to current drivers will be in a relatively narrow band of uncertainty. We recommend that spending more time modeling load impacts due to increasing penetration of electric vehicles and electrification (magnitude and load shape) would be more impactful to the requirements that need to be met by a transitioning generation fleet. Some political climate action plans propose dramatic electrification of passenger vehicles and light duty trucks. Such scenarios should be studied for their impact on the electric system.

New Resource Portfolio Mix

Establishing a baseline resource portfolio for the state based on the latest integrated resource plan of each utility, forecasting as far out in time as available, is a logical place to start. However, not all generating units’ retirements and replacements may be addressed in IRPs. In the absence of IRP direction, it may be necessary to backfill potential baseline generating unit retirement dates with deprecation study asset life dates (or otherwise query the utility for guidance). Once this baseline is fully established, a range of deterministic portfolios can be crafted that speed up or slow down the baseline rate of transition, as well as the resource mix (more or less gas, more or less renewables) that is being transitioned to. That range could theoretically extend from continuing to operate coal units through the entire study period, to rapid coal unit retirements with 100% renewables replacement, and anywhere in-between.

As these alternate transition portfolios are crafted in the absence of modeled optimization however, it will be important to remember that numerous service obligations must be met by the portfolio. That not only includes total energy, but also energy for every hour of every day, load following, reserves requirements, etc. The RTOs are continuing to develop market products that acknowledge and value important aspects of service that different types of resources provide to the grid. Caution must be exercised in the design of the study portfolios or we may find the SUFG's model failing to converge. For example, we may expect that as solar becomes a larger portion of the generating mix, the planning peak may change. This could also be true at higher levels of electric vehicle penetration. With significant amounts of solar on the system, the critical time for reliability could become winter mornings, so thought must be given to the portfolio as a whole in its ability to serve load continuously. This means that the respective resources' capacity contributions-to-peak will change as the composition of the generating fleet changes. Solar resources may be worth about 50% contribution to peak in RTOs today, but incremental amounts may be worth less in the future.

Along those same lines, it should also be noted that gas fired generation (simple cycle and combined cycle) provides considerable capacity contribution as well as operational flexibility, and should not be summarily overlooked in favor of battery storage. Batteries can fit some applications, but getting though a cloudy week in January would require a significant amount of batteries and over-paneled solar. An examination of such fuel flexibility should be part of the study: what generation is available during average days and what generation can or cannot be readily available during peaks. This calls for a realistic view of environmental constraints and technology advancement rates such as in batteries and other technologies. Such tradeoffs can be modeled through appropriately designed study portfolios.

Lastly, Indiana's generating fleet will not transition in a vacuum. The State should ideally plan for a set of resources that can serve customer load, but also take advantage of economic purchases and sales within the MISO and PJM markets. That said, we must be cautious of over-reliance on such markets. As each utility performs its IRP independently, they each develop forecasts of the market, and model that as an infinite source and sink of hourly energy. Independently, if every utility were to model transition to a significant amount of solar, for example, they would each assume (again independently) they could sell excess solar energy into the market during the day, and buy shortfall energy from the market at night. But, clearly, if such plans were all put together at once, the market mechanism would fail to function. Therefore, given that such long-term market uncertainty is at least partially a function of the portfolio, at a minimum as a sensitivity, the SUFG should perform analysis of the portfolios' ability to serve Indiana's customers without reliance on any market. While the markets can and should continue to be opportunistically utilized, when all else fails, the portfolios should at least be physically capable of serving customer load on their own in order to provide for a reliable system.

Sensitivities

Assessing the impact of those most critical variables that hasten or slow the transition will be beneficial to policy makers as trade-offs are considered. Fuel prices (coal and natural gas, as well as natural gas supply infrastructure costs), the initial and ongoing costs of new resources including both fossil and renewables, and the potential for additional environmental costs (such as a CO2 emission allowance or tax) are likely to be primary drivers in this analysis. Additional variables of interest could include Federal and/or State tax policy (such as incentives for renewables), and the cost and penetration of energy efficiency and demand response. The combined effects of these variables should also be considered, although we certainly acknowledge that the number of possible combinations likely exceeds the allotted time for study. Within each developed scenario or sensitivity, however, thought must be given to the practical internal consistency of the assumptions. Combinations of assumptions that produce economically or physically improbable circumstances should be avoided.

Conceptual Modeling Structure

The example chart below could be a potential framework for examining various scenarios under which generation in Indiana transitions to new resources, depicting the potential impacts under each scenario. This is a starting point and additional information and sensitivities likely need to be added.

		TRANSITION TRAJECTORY				
TRANSITION SCENARIOS		No Retirements	Gas Focused Transition (Partial)	Gas Focused Transition (Full)	Renewables Focused Transition (Partial)	Renewables Focused Transition (Full)
		No retirements other than those required due to environmental compliance	50% of coal gen retires by 2040; replacement gen mostly gas	All coal gen retires by 2040; replacement gen mostly gas	50% of coal gen retires by 2040; replacement gen mostly renewables	All coal gen retires by 2040; replacement gen mostly gas mostly renewable
PERFORMANCE METRICS OVER TIME	Coal MWh					
	Renewable MWh					
	Gas MWh					
	Distributed MWh					
	Rates					
	CO2 Emissions					
	Reliability					
	Resiliency					
	Diversity					

SENSITIVITIES

Gas Prices
CO2 Regulation — Recalculate Performance Metrics with respect to changes in Sensitvity variables
Load Growth

DATA SOURCE

Utility IRP's
MISO/PJM data
EIA AEO

Again, thank you for the opportunity to participate and provide input at this important stage of the process. Please let us know if you have any questions or comments. I can be reached at 317-838-1254 or beth.herriman@duke-energy.com.

Sincerely,

DUKE ENERGY INDIANA, LLC

Elizabeth Herriman

Elizabeth A. Herriman
Associate General Counsel

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