ADVANCED ENERGY UNITED™

February 13, 2025

Indiana Utility Regulatory Commission
Attn: Dr. Bradley Borum
Research, Policy, and Planning Division
101 W. Washington Street, Suite 1500 E
Indianapolis, IN 46204-3407
via email: bborum@urc.in.gov

Re: Duke Energy Indiana 2024 Integrated Resource Plan

Dear Dr. Borum:

1. Introduction

Advanced Energy United ("United") respectfully submits this letter to offer comment regarding Duke Energy Indiana's ("Duke") 2024 Integrated Resource Plan ("IRP") submitted to the Indiana Utility Regulatory Commission ("Commission") on November 1, 2024. United appreciates the effort that Duke and other stakeholders have put into the 2024 IRP. Indiana's utilities are at a critical juncture in planning for the State's future, facing both projected load growth not seen in recent years as well as the need to temper rising energy costs.[1] Fortunately, proven and readily available advanced energy technologies exist to address both challenges. By embracing advanced energy technologies, Duke would be able to satisfy its obligation to cost effectively, reliably, and sustainably serve ratepayers.

United is the only national business association representing leaders in the advanced energy industry. Members include front-of-meter and behind-the-meter ("BTM") renewable energy and battery storage manufacturers and developers, electric vehicle ("EV") and EV charging equipment suppliers, providers of energy efficiency, demand response ("DR"), and virtual power plants ("VPP"), as well as larger users of energy wanting to ensure that clean energy is available on the grid to facilitate corporate sustainability goals. United members work to enhance the United States' competitiveness and economic growth through an efficient, high-performing energy system that is clean, secure, affordable, and reliable. United works with decision-makers at the state and national level as well as regulators of energy markets to achieve this goal. In Indiana, United aims to drive the development of advanced energy by identifying growth opportunities, removing policy barriers, encouraging market-based policies, establishing partnerships, and serving as the voice of innovative companies in the advanced energy sector.

[1] According to data collected by the United States Energy Information Administration ("EIA"), Indiana ranks 36th for electricity affordability. *Electric Utility Performance: A State-By-State Data Review*, Second Edition Table 4, available at: https://www.citizensutilityboard.org/wp-content/uploads/2022/09/Electric-Utility-Performance-Report-Second-Edition-final.pdf

Although the Commission is unable to direct changes to Duke's 2024 IRP, United would like to identify some concerns with Duke's plan in the hope that the Director's Report will encourage Duke to do better in the next IRP iteration. Four areas that United addresses include (1) questionable cost assumptions for large-scale electricity generation and storage technologies, (2) insufficient consideration of VPPs, (3) inadequate recognition of the value of BTM distributed energy resources ("DERs"), and (4) failure to coordinate electric utility planning with natural gas utility planning. United will address each of these in turn below. Silence regarding other aspects of Duke's 2024 IRP should not be taken as support or acquiescence.

2. Cost Assumptions for Electricity Generation and Storage Technologies

In Chapter 3 of the IRP, Duke sets forth the overnight capital cost ("OCC") assumptions used in its comparisons of various supply technologies.[2] At least with regard to solar, wind, and natural gas generators, Duke indicates that the technology costs are specific to the Midwest.[3] While the exact elements included in the IRP OCC for each technology are not clear, it appears that certain assumed costs used for large-scale non-fossil and energy storage supply resources may be overestimated by several hundred dollars per kilowatt ("kW") when compared to the OCC published by the EIA and used in its market forecasting. Specifically, when compared to the OCC provided in the EIA's *Assumptions to the Annual Energy Outlook 2023: Electricity Market Module*,[4] Duke's OCC for solar, solar with storage, stand-alone storage, and onshore wind all exceed the EIA's OCC assumptions, sometimes by a wide margin, while Duke's OCC for natural gas generation is more closely aligned with that of the EIA. The following table reflects Duke's OCC assumptions and those of the EIA for the Midcontinent ISO central region, which includes Duke's service area.

Overnight Capital Cost Comparison

Technology	Duke 2024 $/kW	EIA 2024 $/kW
Solar PV, bifacial,[5] single access tracker	$1,850	$1,592
Solar PV, bifacial, single access tracker + Li ion storage	$2,950	$1,999
4-hour Li ion storage	$2,300	$1,399
Onshore wind	$2,050	$1,665
1x1 Advanced Class Combined Cycle	$1,450-$1,550	$1,466
2x1 Advanced Class Combined Cycle	$1,100-$1,250	$1,314
2x1 Advanced Class Combined Cycle w/ carbon capture & sequestration	$3,750	$3,383

[2] Duke 2024 IRP, Tables 3-11, 3-14, 3-16, 3-19, 3-21, and 3-24.
[3] *Id.*, at 87, 91, and 93.
[4] *Assumptions to the Annual Energy Outlook 2023: Electricity Market Module*, March 2023, Table 4, available at: https://www.eia.gov/outlooks/aeo/assumptions/pdf/EMM_Assumptions.pdf, Note that the EIA OCCs are provided in 2022 dollars. The 2022 dollars have been adjusted to 2024 dollars using the U.S. Bureau of Labor Statistics CPI Inflation Calculator available at: https://www.bls.gov/data/inflation_calculator.htm
[5] The EIA OCC assumptions do not indicate whether the subject panels are bifacial.

As with Duke's OCC, United is not certain of all of the elements contained in EIA's OCC, but given the large, and seemingly systematic disparity between the estimates for the non-fossil options, the accuracy of Duke's cost assumptions warrants careful scrutiny since inflated assumptions for some supply sources (but not for others), whether intentional or not, can significantly impact the selection of the preferred supply portfolio. Because IRPs are not litigated proceedings before the Commission, United strongly encourages Duke to use publicly available data in future IRPs to bolster confidence in the underlying assumptions. While the discovery conducted during a litigated docket concerning a certificate of public convenience and necessity ("CPCN") for new generation may shed needed light on the OCC assumptions, it would be preferable to have clarity on this issue earlier when considering the full portfolio of available supply options, as that could influence the decisions that Duke makes when selecting which resources to include in a CPCN. Should Duke wish to use its own estimates, it should, at a minimum, be expected to explain why this is necessary, and it should provide comparisons to EIA and other publicly available estimates and what is driving any material differences is the estimates.[6]

3. VPP Opportunities

Duke's 2024 IRP recognizes the value of DR as a demand-side resource but unfortunately neglects to appreciate the opportunity to harness the value available in VPPs for Indiana. Duke acknowledges that "customer-sited resources can be utilized to avoid or defer distribution investments and is piloting multiple methods in other Duke Energy service territories that it will bring to Indiana when ready."[7] United is troubled by the characterization that VPPs are not ready and notes that VPPs are currently providing significant results in multiple other jurisdictions. This characterization also suggests that VPPs provide only distribution system value, but obviously, VPPs that provide capacity relief will also support overall resource adequacy. Examples of current VPP programs include:

- The ConnectedSolutions VPP program is a 400-megawatt ("MW") VPP (as of April 2024) that serves ratepayers across several states in the Northeast.[8] Massachusetts' three investor-owned utilities (Eversource, National Grid, and Unitil) first piloted the program from 2016-2019. The pilot outperformed expectations from the program

[6] Additional resources for consideration regarding cost include United's February 14, 2023 report *Assessment of Clean Energy Alternatives to New Natural Gas Resources: Duke Energy Indiana Combined Cycle Project*, available at: https://blog.advancedenergyunited.org/reports/assessment-of-clean-energy-alternatives-to-new-natural-gas-resources, and May 2, 2023 report *Assessment of Clean Energy Alternatives to New Natural Gas Resources: Part 2*, available at: https://blog.advancedenergyunited.org/reports/assessment-of-clean-energy-alternatives-to-new-natural-gas-resources-0

[7] Duke 2024 IRP, App H, at 453.

[8] *Aggregated Distributed Energy Resources in 2024: The Fundamentals*, July 2024, at 66, available at: https://pubs.naruc.org/pub/98FBE453-02C0-1FE3-0249-3A456BA1E3E7?_gl=1*92549h*_ga*NTE1MzE0MzM2LjE3MjQ3MTE4NDM.*_ga_QLH1N3Q1NF*MTcyNDcxMTg1NC4xLjAuMTcyNDcxMTg1NC4wLjAuMA..

administrators' cost-benefit analysis, and the program was officially launched in 2019.[9] As of 2023, installed capacity across all Massachusetts participants totaled 227 MW from 95,766 customers. [10] The program currently covers parts of Rhode Island and Connecticut as well. ConnectedSolutions is a multi-technology VPP, initially leveraging battery storage (including energy export) and smart thermostats, but remains open to the possibility of adding electric vehicle charging and vehicle-to-grid technology. DERs that participate in the program are third-party owned (a "bring-your-own-device" or BYOD program model). ConnectedSolutions draws from utility energy efficiency budgets for program implementation costs and incentive payments to DER hosts. A third party Distributed Energy Resource Management System ("DERMS") provider implements the program on behalf of utilities, aggregating and directly controlling enrolled DERs. The program offers both up-front and performance-based incentives to customers whose DERs participate in the VPP. The program incentive levels currently offered are $50/customer for residential smart thermostats; $275/kW reduced per summer for residential battery storage, $35/kW for commercial and industrial ("C&I") demand response targeted dispatch, and $200/kW C&I demand response daily dispatch.

- Arizona Public Service's Cool Rewards for Summer Peak Reduction was launched in 2018 and as of October 2024, has enrolled 95,000+ thermostats and 160 MW of load-shedding capacity, up from 42 MW in 2020.[11]
- DTE Energy's Smart EV Charging for a Cleaner, Better Optimized Grid launched in July 2023 and ran through December 2024 as an expansion of a 2019-2022 EV Smart Charge Pilot. The 2022 -2023 pilot saw a reduction of 14 MW between 44 events from 663 participants. The program is expected to continue through June 2025.[12]

Other examples of VPP programs are noted in the US Department of Energy's ("DOE") recent *Pathways to Commercial Liftoff: Virtual Power Plants 2025 Update*.[13] The same DOE document

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[9] *Connected Solutions, A Program Assessment for Massachusetts*, September 2021, at 16, available at: https://www.cleanegroup.org/wp-content/uploads/ConnectedSolutions-An-Assessment-for-Massachusetts.pdf

[10] *Virtual Power Plant Flipbook, How Utilities and Their Customers are Already Benefitting from VPPs and Insights for Future Implementation*, at 42, available at: https://rmi.org/wp-content/uploads/dlm_uploads/2024/06/VP3_flipbook_v1.2.pdf. This document contains several examples of successful VPP programs in other states.

[11] Arizona Public Service. (2024, October 7). APS customers served with reliable power during record-breaking heat. Arizona Public Service. https://www.aps.com/en/About/Our-Company/Newsroom/Articles/APS_Customers_Served_With_Reliable_Power_During_Record-Breaking_Heat. United recognizes that Duke has a thermostat DR program, but the utilization is not clear from the IRP.

[12] DTE Energy, DTE Smart Charge. https://www.dteenergy.com/content/dam/dteenergy/deg/website/residential/Service-Request/pev/plug-in-electric-vehicles-pev/SmartChargeBrochure.pdf

[13] *Pathways to Commercial Liftoff: Virtual Power Plants 2025 Update*, available at: https://liftoff.energy.gov/wp-content/uploads/2025/01/LIFTOFF_DOE_VirtualPowerPlants2025Update.pdf

also notes that VPPs can be deployed in less than six months[14] and, when used to address peak energy needs, are 40% less expensive than a conventional peaker plant.[15, 16] While Duke acknowledges that it "aspires to operate a multi-season, multi-DER, manufacturer-agnostic VPP to be used for peak and normal load conditions," it characterizes the technology to control "this level of complexity" as "still nascent."[17] United strongly disagrees with this opinion. The success of the referenced programs in other jurisdictions is an effective counter to Duke's suggestion that it is premature to bring VPPs to Indiana. Similarly, Duke's efforts to downplay the usefulness or feasibility of VPPs[18] are belied by the success of VPPs elsewhere.

Given the load growth that Indiana anticipates, there is no reason for Duke to hesitate to deploy VPP in Indiana. In fact, United avers that it is now incumbent on all utilities to consider demand-flexibility solutions at scale as part of their core planning processes, to ensure they continue to bring all prudent, cost-effective options to bear. Even if MISO does not fully implement Federal Energy Regulatory Commission Order 2222 for a few more years, there is no reason that Duke cannot implement retail VPP programs, as it does with its current DR programs. Solar+storage, stand-alone storage, smart thermostats, EVs, and other devices exist now in Indiana and should be leveraged and scaled further through appropriate VPP programs to bring value to the grid and all Duke customers. Allowing third-party DER aggregators to participate will further benefit ratepayers by mitigating the need for Duke to implement (and pay for) a full DERMS. United recommends that the Director encourage Duke to roll out a VPP program even before its next IRP.

4. Valuing BTM DERs

Although Duke acknowledges that BTM solar generation has a small offsetting impact on its load forecast,[19] it apparently did not evaluate whether incentivizing further deployment of BTM solar would be a cost-effective means of addressing growing load. Nor does it appear to have evaluated whether encouraging deployment of other DERs would further address load through a VPP, as discussed above. Duke reports that it currently has 3,677 customers with BTM solar and 582 customers with BTM solar and storage, which collectively account for nearly 87 MW of generation.[20] Using Duke's 2023 customer count of 894,160 customers,[21] this means only 0.47% of Duke's customers utilize BTM solar. If 0.47% of Duke's customers can supply 87 MW of their own load, a simple extrapolation of this ratio means that 5% of Duke's customers could theoretically supply 925 MW. Although it is admittedly not this simple in practice, the calculation demonstrates the potential that exists among Duke's customers to help offset the

[14] US DOE, *Pathways to Commercial Liftoff: Virtual Power Plants 2025 Update*, January 2025, at 31.
[15] *Id.*, at 10.
[16] Additional information concerning the cost advantages of VPPs is in *Real Reliability, The Value of Virtual Power*, May 2023, available at: https://www.brattle.com/wp-content/uploads/2023/04/Real-Reliability-The-Value-of-Virtual-Power_5.3.2023.pdf
[17] Duke 2024 IRP, App. H, at 457.
[18] *Id.*, at 458.
[19] *Id.*, at 369-370.
[20] *Id.*, App. B, Figure B-17.
[21] *Id.*, App. B, Figure B-8.

growing demand Duke must meet in the coming years. The concept of distributed generation as a resource is not new. A study in a recent DTE Electric Company IRP case in Michigan demonstrated that a $500/kW incentive for BTM solar installations would help the utility meet demand at a lower overall cost to ratepayers.[22]

While incentivizing customers to install BTM solar may be perceived as supporting specific customers, the fact remains that so long as the cost of the incentive is lower than the cost of alternatives to satisfy demand, all ratepayers benefit from the reduced overall spending. To support other grid needs and maximize benefits, such a mechanism can be targeted to areas where Duke's distribution system is strained, thereby providing high-value load relief when customers self-generate. When considering distributed generation as a resource, Duke could also couple it with an energy efficiency program and target low-income customers. It is reasonable to expect Duke to cast a broad net as it evaluates ways to enhance energy affordability for all of its ratepayers.[23]

United recommends that the Director encourage Duke to model and identify what level of utility-provided financial incentive ($/kW installed) would produce a desired MW volume of BTM distributed generation and then evaluate whether the total program cost is cost-effective compared to other means of meeting customer demand.

5. Coordinated Utility Planning

As Americans increasingly forego natural gas appliances and heating systems, and move toward more efficient and cleaner electric versions, it is appropriate for electric utilities to consider such electrification trends in their planning, particularly in light of the relatively long planning horizon of an IRP. An example of this transition is apparent in that 2024 was the third consecutive year of heat pump sales exceeding natural gas furnace sales in the United States.[24] Understanding the impact of this trend on gas utility planning, which correspondingly can impact electric utility planning, should not be ignored. It is reasonable for Duke to confer and coordinate with the gas utilities serving customers within its territory as it plans for growing electricity demand. United recommends that the Director encourage Duke, when preparing its next IRP, to coordinate with the gas utilities in its area in order to become better informed of gas usage trends that may impact electricity consumption.

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[22] Michigan Public Service Commission Case No. U-21193, Direct Testimony of William Kenworthy and Boratha Tan, March 9, 2023, available at: https://mi-psc.my.site.com/s/case/5008y000002yQhVAAU/in-the-matter-of-the-application-of-dte-electric-company-for-approval-of-power-purchase-agreements-and-other-relief

[23] Although providing fair compensation for exported energy is not an incentive, Duke could also consider improving its export calculation methodology to more accurately value the energy and benefits it receives when distributed generation customers export energy to the grid.

[24] Air-Conditioning, Heating, & Refrigeration Institute, November 2024 U.S. Heating and Cooling Equipment Shipment Data, available at: https://www.ahrinet.org/sites/default/files/Stat%20Release%20Nov%2024/November%202024%20Statistical%20Release.pdf

6. Conclusion

Under any of the options that Duke considered, the company and its customers are looking at more than $20 billion in investments.[25] Duke owes it to its customers to ensure that it is making the most prudent and cost-effective decisions for meeting its customers' energy needs. This includes utilizing the full scope of advanced energy technologies, enabled by supportive programs. Not only should Duke reflect United's recommendations set forth above, but it should also consider other pathways, such as supporting true community solar for Indiana residents. The full scope of solutions is necessary to move Indiana to a modern energy system.

John Albers, Director
Advanced Energy United

[25] Duke 2024 IRP, Figure 5-5.