STATE OF INDIANA

INDIANA UTILITY REGULATORY COMMISSION

PETITION OF DUKE ENERGY INDIANA, LLC FOR APPROVAL OF A TARIFF RATE FOR THE PROCUREMENT OF EXCESS DISTRIBUTED GENERATION PURSUANT TO INDIANA CODE 8-1-40 ET SEQ.	**CAUSE NO. 45508**

DIRECT TESTIMONY OF BENJAMIN D. INSKEEP

ON BEHALF OF
INDIANA DISTRIBUTED ENERGY ALLIANCE

SEPTEMBER 20, 2021

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I. INTRODUCTION

Q. Please state your name, business address and current position.

A. Benjamin D. Inskeep, 1155 Kildaire Farm Road, Ste. 202, Cary, North Carolina 27511. My current position is Principal Energy Policy Analyst with EQ Research LLC.

Q. Please describe your educational and occupational background.

A. I earned a Bachelor of Science in Psychology from Indiana University in 2009 and both a Master of Science in Environmental Science and a Master of Public Affairs from the O'Neill School of Public and Environmental Affairs at Indiana University in 2012.

I was employed at the North Carolina Clean Energy Technology Center at North Carolina State University from June 2014 through February 2016, where I co-created and served as lead author and editor of *The 50 States of Solar*, a quarterly report series tracking net metering policies and rate design changes impacting residential solar. I also conducted policy research and contributed to the *Database of State Incentives for Renewables and Efficiency (DSIRE)* project. Finally, I provided technical support, conducted analysis, and led workshops for state and local governments on reducing solar soft costs through the U.S. Department of Energy's SunShot Solar Outreach Partnership.

I have worked for EQ Research LLC, a clean energy policy consulting firm, since 2016. In my current position, I oversee EQ Research's general rate case subscription service, which includes reviewing and analyzing investor-owned electric utility rate case filings, providing summaries to clients, and maintaining a client-facing database of rate case information. I also contribute as a researcher and analyst to other policy service offerings such as a legislative and regulatory tracking services and perform customized research and analysis for clients. I also help clients with their participation in regulatory proceedings, including serving as an expert witness on renewable energy policy issues, such as net metering. My *curriculum vitae* is attached as Attachment BDI-1.

Q. On whose behalf are you testifying?

A. I am testifying on behalf of Indiana Distributed Energy Alliance ("IndianaDG").

Q. Have you previously testified before the Indiana Utility Regulatory Commission ("IURC" or "Commission") or as an expert in any other proceeding?

A. Yes. I previously testified before the IURC in the following cases:

- Cause No. 45504 (AES Indiana's excess distributed generation case),
- Cause No. 45505 (Northern Indiana Public Service Company's excess distributed generation case), and
- Cause No. 45506 (Indiana Michigan Power's excess distributed generation case).

I have also previously testified before the Kentucky Public Service Commission in the following cases:

- Case No. 2020-00174 (Kentucky Power's 2020 rate case),
- Case No. 2020-00349 (Kentucky Utilities' 2020 rate case), and
- Case No. 2020-00350 (Louisville Gas & Electric's 2020 rate case).

Q. What is the purpose of your testimony in this proceeding, and how is it organized?

A. My testimony responds to the excess distributed generation rider ("EDG Rider," i.e., Exhibit 1-B to Roger A. Flick's Direct Testimony) and accompanying terms and conditions proposed by Duke Energy Indiana ("DEI" or the "Company"). It is organized as follows:

- Section II addresses DEI's calculation of the EDG Rider credit rate, describes the flaws in DEI's methodology, and proposes a more accurate methodology for crediting EDG. Next, I address DEI's EDG Rider proposal to end the policy that allowed DG customers to net electricity produced by their DG systems and supplied to the utility against electricity supplied by the utility to the DG customer during a monthly billing period. I detail the flaws of this proposal and describe why it is inconsistent with the principles underlying just and reasonable rates. I also explain why maintaining monthly netting is sound policy, is supported by the plain language of the DG Statutes, and makes logical and practical sense in this case. I then analyze the impacts of DEI's proposal on the financial value provided by DG and discuss various alternative policy options.

- Section III addresses other concerns I have with the terms and conditions of participation under the EDG Rider.
- Section IV contains my concluding remarks and summarizes my recommendations.

Q. What are your recommendations to the Commission?

A. For many reasons, especially but not exclusively the plain language of the DG Statutes, (Ind. Code ch. 8-1-40 and Senate Enrolled Act 309), I recommend that the Commission deny DEI's proposed "no netting" EDG Rider and proposal to end monthly netting. To the extent the Commission disagrees with my recommendation to maintain monthly netting under the EDG Rider, I recommend it consider alternative policies that are less punitive to customers than the "no netting" proposed by DEI.

If the Commission approves DEI's filing as proposed or with limited modifications, I recommend that the Commission direct DEI to provide additional consumer information and education regarding its Rate QF – Parallel Operation for Qualifying Facility tariff to ensure all eligible DG customers have access to and are fully informed of this rate option, which might be more financially beneficial to certain DG customers or under certain circumstances than the proposed EDG tariff.

I also recommend that DEI modify its calculation of the EDG Rider credit rate to accurately reflect the average marginal price at the daylight times solar DG systems are generating and exporting power to the grid.

Finally, I recommend the Commission reject DEI's proposal to take without compensation a DG customer's earned but unused EDG credits at the end of a DG customer's service and require DG customers to install an external disconnect switch.

II. DEI'S EDG RIDER "NO NETTING" PROPOSAL

A. Description of DEI Proposal

Q. What is DEI proposing in this case?

A. In response to Senate Enrolled Act 309 ("SEA 309"), DEI is proposing a new tariff, EDG Rider, for procurement of excess distributed generation ("EDG") under Ind. Code ch. 8-1-40 ("Distributed Generation Statutes" or "DG Statutes").

Specifically, DEI is proposing what it describes as "instantaneous netting"[1] under which customers taking service under the EDG Rider would not be able to net *any* electricity they export to DEI with electricity they import from DEI:

> Instantaneous netting, from an energy perspective, refers to a convention that accumulates all kWh delivered and separately and distinctly all kWh received from a customer in a given billing cycle. All kWh delivered to the customer in the billing cycle is billed at its applicable standard Tariff energy rate, and all kWh received in the billing cycle is paid the statutorily required Marginal DG Rate.[2]

[1] Direct Testimony of Roger Flick, p. 6.
[2] DEI Response to Solarize Indiana Data Request 2.2(i)(2).

I refer to this position in my testimony as DEI's "no netting" proposal, which I believe is an accurate and fair characterization because DEI is not actually proposing to "net" the kWh delivered by the utility to the DG customer and kWh received by the utility from the DG customer, as recorded by a customer's meter, over any time period.[3] Instead of applying monthly netting, *all electricity* that a DG customer does not instantly consume on-site behind-the-meter that is exported to DEI under the EDG Rider would be credited to the DG customer at a very low rate of $0.028981/kWh, and that rate would change each year.[4] All electricity that a DG customer imports from DEI would be charged at the applicable retail rate.

Q. How does DEI calculate the EDG Rider credit rate for EDG?

A. DEI calculated the average Real-Time Locational Marginal Price ("LMP") for its load zone for all hours of the entire 2020 year at a DEI pricing node, and multiplied that value by 1.25. The average LMP calculated by DEI in 2020 was $23.185/MWh, resulting in a calculated EDG rate of $0.028981/kWh.

Q. Does DEI provide customers access to information on their instantaneous electricity usage?

A. No. DEI customers do not have access to any tool provided by DEI that would enable them to know their instantaneous electricity usage.[5] As explained further below, DEI's "no netting" proposal would require a DG customer served under the EDG Rider to manage, to the extent they are capable, their instantaneous usage relative to their generation. Yet, DEI does not provide customers the basic information necessary to do so, let alone the tools or

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[3] *See*, *e.g.*, DEI Response to IndianaDG Data Request 2.15.
[4] Exhibit 1-B to Roger Flick's Direct Testimony.
[5] DEI Response to IndianaDG 2.13.

technologies that would help customers manage this onerous burden. In other words, DEI is proposing a tariff with price signals to which DG customers will be unable to effectively respond, absent the installation of potentially expensive additional equipment that would be at the DG customer's expense.

B. EDG Credit Calculation

Q. What does the language in the DG Statutes provide with respect to how the EDG credit rate must be calculated?

A. Please note, I offer no legal conclusions in my testimony. I only describe the plain language of the statutes and related documents I have read. Section 17 of the DG Statutes provides that the EDG credit rate must equal:

> the product of: (1) the average marginal price of electricity paid by the electricity supplier during the most recent calendar year; multiplied by (2) one and twenty-five hundredths (1.25).

Section 6 provides that marginal price of electricity:

> means the hourly market price for electricity as determined by a regional transmission organization of which the electricity supplier serving a customer is a member.

DEI's proposed hourly market prices are determined in each of the 24 hours in each day, including in daylight hours when customer solar is generating electricity and helping offset daylight demand, and including nighttime hours when solar is not generating electricity and DEI electric demand and wholesale market prices of energy are typically lower. No language in the statue specifies which hours or if all 8,760 hours (or 8,784 hours in a leap year) of a year should be included in the calculation.

Q. Is DEI's calculation of the EDG credit rate reasonable?

A. No. DEI has averaged the wholesale electricity price for *all hours* of the year. However, nearly all DG systems are solar facilities that only produce electricity and export power during daylight hours. DEI's calculation using *all hours* including nighttime hours does not align with the hours in which a DG system actually generates electricity, and therefore does not accurately reflect the marginal price of electricity during the hours in which a DG system is providing EDG to DEI. DEI's customers' highest demands for electricity generally occur during the afternoon in summer (e.g., its peak in 2020 occurred at 3 p.m. on August 25),[6] coinciding with when solar is typically generating electricity. Market prices for electricity are generally higher during these hours than the average of all hours over the year. Customer solar output shaves or eliminates their demand for electricity during these higher-priced hours, and their EDG exports help reduce the need for higher-cost market purchases during these hours. It would be an irrational exercise and result to calculate the value of customers' EDG based on hours of darkness when customers' solar facilities are not generating electricity and exporting power to the grid.

Q. What would be a more reasonable way of calculating the marginal price of electricity?

A. DEI could calculate "the average marginal price of electricity paid by the electricity supplier during the most recent calendar year" by using the average marginal price for when DG generation is being exported, i.e. daylight hours which would be more reflective of what is "paid by the electricity supplier." I recommend calculating the average marginal price of electricity for each hour of the previous year and applying an appropriate factor that weights the average price in each hour according to the amount of generation a typical DG system is expected to produce during that hour.

[6] Duke Energy Indiana, FERC Form 1, 2020/Q4, p. 401b.

I have conducted such an analysis based on the expected output of a typical residential solar DG system located in Plainfield, Indiana on Eastern Standard Time using the default assumptions and output produced using the National Renewable Energy Laboratory's ("NREL") PVWatts Calculator.[7] This analysis indicates that expected solar DG generation for systems located in Plainfield, Indiana, that are not paired with battery energy storage will occur between the hours of 5 a.m. to 8 p.m. For instance, a solar DG system will produce the most electricity during the noon hours, equating to 13.7% of the system's total production on an annual basis. Therefore, the LMP for the noon hour should be weighted accordingly by multiplying the average hourly LMP at noon for the previous year by 13.7%, conducting this same system hourly production calculation for each other hour of the day, and summing each calculated value to arrive at "the average marginal price of electricity paid by the electricity supplier during the most recent calendar year" as it applies to the generation profile of a typical DG customer. In contrast, the solar DG system produces no electricity during the midnight hour, equating to 0% of the system's total production on an annual basis, and therefore the LMP for the midnight hour is weighted by a factor of 0%.

<u>This approach results in a 2020 average LMP of $26.30/MWh, or $0.02630/kWh, which produces an EDG credit rate of $0.032879/kWh, which is 13.5% higher than DEI's proposed EDG credit rate</u> that incorrectly includes non-solar-generating hours in its calculation.

[7] National Renewable Energy Laboratory, PVWatts Calculator, available at https://pvwatts.nrel.gov/.

This would be a rational approach to applying the hourly wholesale market price to an EDG rate calculation that aligns with the time when solar DG facilities are generating electricity and would be consistent with the plain language of the DG Statutes. An alternative approach would be to take the hourly LMP price for each of the solar-generating hours and average them. But that approach would fail to give fair consideration to the hours that solar DG generation produces the most electricity. An even less accurate approach is the one taken by DEI where the individual 24 hours of LMP are averaged with total disregard to when solar DG is producing electricity.

Q. Would it be reasonable to apply the EDG credit rate you propose to biomass and wind EDG customers?

A. Yes. DEI reported that 58.091 MW out of 62.440 MW (93.0%) of its net metering capacity are solar resources, and that 100% of new capacity additions in 2020 were solar resources.[8] Based on current total deployment and deployment rates, biomass and wind resources currently have an immaterial effect on the overall value of DG on average, and recent trends do not indicate this is likely to change in the foreseeable future. Therefore, it is reasonable to use the methodology I propose that is based on the generation profile of a solar facility in Plainfield, Indiana.

Q. Does calculating the EDG rate based on daylight hour solar electricity production result in a rate that reflects the value of solar EDG exports and reach an overall just and reasonable EDG rate proposal?

[8] Indiana Utility Regulatory Commission, "2020 Year-End (2020YE) Net Metering Reporting Summary," March 2021, available at https://www.in.gov/iurc/files/2020-Year-End-Net-Metering-Required-Reporting-Summary.pdf

A. Calculating the solar EDG rate based on hourly market prices for electricity in daylight hours (i.e., solar-producing hours) simply avoids the irrational calculation and result of solar EDG based in part on the non-solar producing nighttime market price of wholesale electricity. But it does not result in a just and reasonable EDG rate as it still seriously undervalues electricity exported by an DG customer. More importantly, it will not yield a just and reasonable DEI EDG framework or result. The slightly higher solar EDG credit from my calculation is an improvement on DEI's EDG credit calculation, but it is not sufficient to offset to a meaningful degree the far more substantial negative impact of the "no netting" proposal. As I calculate below, the "no netting" proposal is the primary driver for significantly prolonging solar DG payback periods. In other words, while I believe correcting the EDG credit rate calculation as I describe above is logical, it is not a remedy for the harm to DG customers that will result from DEI's "no netting" proposal.

C. Measurement of EDG

Q. How does the language in the DG Statutes define EDG?

A. Section 5 of the DG Statutes provides:

> As used in this chapter, "excess distributed generation" means the difference between:
>
> (1) the electricity that is supplied by an electricity supplier to a customer that produces distributed generation; and
>
> (2) the electricity that is supplied back to the electricity supplier by the customer.

Q. Do you see any language in the enacted DG Statutes that specifies a change in netting methodology or prescribes a new method for measuring EDG; or otherwise directs the Commission to review and approve a new measurement or netting methodology?

A. No, I do not see such language. There is no language in the statute that says monthly netting should stop. Notably, the language in the DG Statutes requires the Commission to approve a *rate* – not consider a new methodology or netting measurement for determining EDG. I do not see language that requires or asks the Commission to consider a new methodology or netting measurement for determining EDG.

Q. Have you researched the legislative evolution of SEA 309 from publicly available documents?

A. Yes, I have. The variations of the bill and video of legislative public hearings on the bill are publicly available on Indiana General Assembly's website.

Q. What has your research found with respect to provisions addressing the issue of netting in the legislative history of the SEA 309 DG Statutes?

A. As introduced ("Version 1," which is my Attachment BDI-2), Section 15 of SEA 309 would have changed the netting methodology by expressly removing all netting. Specifically, it would have established a buy-all, sell-all tariff to replace net metering by providing that:

> all distributed generation produced by the customer shall be purchased by the electricity supplier at the rate approved by the commission under section 13 of this chapter; and (2) all electricity consumed by the customer at the premises shall be considered electricity supplied by the electricity supplier and is subject to the applicable retail rate schedule.[9]

This definitional language makes clear that netting would not be permitted, since "***all*** distributed generation produced by the customer" is being credited at the specified rate and "***all*** electricity consumed by the customer" is subject to the applicable retail rate charges

[9] Indiana General Assembly, 2017 Session, Senate Bill 309 (As Introduced), available at http://iga.in.gov/legislative/2017/bills/senate/309#document-6bef29ba

(emphasis added). A buy-all, sell-all tariff would have the DG customer pay retail rates for their full electricity usage, receive a set EDG rate for their electricity production, and their usage would not be offset by any of their own on-site DG generation output. A buy-all, sell-all policy would have been a change from the existing measurement methodology of monthly netting.

SEA 309 was subsequently amended four times ("Version 2," "Version 3," "Version 4," and "Version 5," respectively; see Attachments BDI-3, BDI-4, BDI-5, and BDI-6), with Version 5 ultimately enacted as the DG Statutes. None of the subsequent versions retained the buy-all, sell-all framework or stated a new netting or no netting methodology, i.e., something different from the existing monthly netting, or otherwise instructed the Commission to evaluate any need for a different netting proposal.

Q. What was the public reaction to Version 1 of SEA 309, which included revising the existing monthly netting methodology?

A. There was strong opposition with letters to the editors sent to newspapers and opposition voiced to the bill's author, Senator Brandt Hershman.[10]

Q. How did the author of SEA 309 and the General Assembly respond to the public reaction to Version 1?

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[10] *E.g.*, John Russell, "Bill Alarms Solar-Power Advocates," *Indianapolis Business Journal*, January 23, 2017; Dennis Shock, "Ending Net Metering Bad for Hoosiers" [Letter to the Editor], *The Indianapolis Star*, January 29, 2017; "A Bright Idea: Resist Urge to Tie Solar-Energy Producers' Hands," *The Journal Gazette*, January 27, 2017; Paul Steury, "Senate Bill 309 Could Kill Solar Buyback Program," *The Goshen News*, February 4, 2017; Christopher Rohaly, "Strengthen Solar Industry, Legislature" [Letter to the Editor], *Kokomo Tribune*, February 7, 2017; and Ray Wilson, "Don't Kill Indiana's Solar Industry" [Letter to the Editor], *The Indianapolis Star*, February 7, 2017.

A. Senator Hershman amended Version 1 of SEA 309. Version 2 and all subsequent versions of SEA 309 removed what had proved to be the highly contentious and controversial buy-all, sell-all provisions that had been included in Version 1, which neither allowed for on-site consumption, nor any form of netting exported electricity against imported electricity. Version 2 and all subsequent versions of SEA 309 contained the same definition for "excess distributed generation" that the General Assembly enacted through Section 5 of the DG Statutes, with no mention of altering the current monthly metering and netting.

Q. What statements did the author of SEA 309 make regarding the intent of the bill and its provisions with respect to EDG?

A. After amending Version 1 to remove the buy-all, sell-all provisions, Senator Hershman submitted a letter to the editor (Attachment BDI-7) in response to the strong public opposition to Version 1 of SEA 309, explaining that the buy-all, sell-all provisions had been removed from the bill and describing his view of the other aspects of SEA 309.[11] He characterized the amended bill as still "encourag[ing] renewable energy generation" while stepping down the compensation *rate* for EDG. He responded to the vocal opposition by clarifying in his letter that SEA 309 "has already been amended to address many of these concerns."[12]

Notably, none of the bill versions introduced after Version 1 was amended, including the enacted DG Statutes, have language that mentions, suggests, or contains provisions implying a change to the monthly netting methodology. What is clear is that the

[11] Brandt Hershman, "Utility Fairness for Hoosier Customers," *The Star Press,* available at https://www.thestarpress.com/story/opinion/contributors/2017/02/23/utility-fairness-hoosier-customers/98318350/.
[12] *Id*.

DG Statutes' language changes the *rate* at which EDG is compensated, moving from the full retail-rate rollover crediting under Net Metering to a credit rate based on an average marginal price, plus 25%. It also included provisions allowing existing net metering customers to continue to take service under net metering for a specified period of time, depending on when the system was installed.

In hearings on SEA 309, Senator Hershman made the following statements about SEA 309 (emphasis added):

- "That is what this tries to do: by stepping us down over a fairly long period of time, **so that we don't kill the solar industry, but we do start to transition them to a market-driven rate**, and as I said, I think the technology is going to allow that to happen and for them to continue to be a viable means of generation."[13]
- "The language in the bill itself is not all that complicated. It has the IURC determine the wholesale rate for a particular utility and then adds 25% to it, which you and I can do on the back of an envelope right here […] [A]nything that's even close to a ratemaking procedure at the IURC is an exhaustive and expensive process that oftentimes takes years […] **Simplicity and certainty was actually my goal in doing it this way**."[14]
- "The only real issue here is how many people may sell their excess power back to the utility, and at **what rate they will be paid** […] That's it."[15]
- "…that **[25% above average wholesale prices] premium recognizing that we do assign a public policy value to renewable power**."[16]
- "We are providing **a very, very slow ramp-down of the rates** while we provide a substantial grandfathering for anyone who is currently participating in the program, and **we move ourselves, recognizing the advances in technology, closer to a market rate over a very long period of time**."[17]
- He described the 25% premium above wholesale rates as "**putting in law a public policy preference for alternative energy**."[18]

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[13] Indiana Senate Utilities Committee, February 9, 2017, First Reading of SEA 309 [Timestamp 13:40].
[14] Indiana Senate Utilities Committee, February 9, 2017, First Reading of SEA 309 [Timestamp 25:30].
[15] Indiana Senate Utilities Committee, February 16, 2017 [Timestamp 14:45].
[16] Indiana Senate Utilities Committee, February 16, 2017 [Timestamp 17:10].
[17] Indiana Senate Utilities Committee, February 16, 2017 [Timestamp 17:10].
[18] Indiana House Utilities, Energy and Telecommunications, March 22, 2017 [Timestamp 25:30].

Although Senator Hershman spoke frequently in these hearings of modifying the ***rate*** by which EDG is compensated to slowly begin to align it with "market-based rates," I did not observe him or other members of the General Assembly in these hearings discuss any intent in the bill to modify the methodology or measurement for determining EDG. Senator Hershman's words are clear that the changing compensation rate was meant to be a gradual change, and not produce a devastating impact to the distributed solar industry in Indiana. Senator Hershman made clear that he was not opposed to distributed solar – in fact, he states this bill was enshrining in Indiana law a *preference* for technologies like distributed solar – and that the bill was not designed to harm the distributed solar market, but rather gradually align the State's policy based on the maturation of this technology. DEI's no netting methodology is contrary to those results in that it will have detrimental impacts on DG customers and the Indiana solar industry and is a huge reduction in DG customer financial value from monthly netting.

Q. What is the significance of the EDG definition with respect to determining the appropriate EDG measurement for compensation under the specified rate?

A. The DG Statutes expressly provide that the measurement of EDG requires a calculation between the "difference between" two values: (1) electricity supplied by the utility ("imports" of electricity from the DG customer's perspective) and (2) the electricity supplied by the DG customer to the utility ("exports" of electricity from the DG customer's perspective). Instead of calculating that difference, DEI proposes that EDG be measured so that ***all*** kWh supplied by a DG customer to DEI at any instant is credited at the low EDG Rider credit rate of $0.028981/kWh, and ***all*** kWh supplied by DEI to the DG customer is charged to the customer at that customer's applicable full retail rate – and not by first taking the *difference between* these kWh values and then applying the EDG rate to the total EDG. DEI distorts the plain language of the statutory definition of EDG beyond recognition by conflating a DG customer's exports with EDG, equating EDG to "kWh Exported" and "Exports" in its EDG Rider. The DG Statutes defines EDG as "the difference between" DG customer imports and exports – and *not* as all gross exports. DEI's "no netting" proposal is contrary to the plain words of the statute.

Although the EDG Rider is distinguishable from a buy-all, sell-all tariff in that it does allow a DG customer to self-consume electricity generated by its own private DG equipment behind the meter, by treating each of the two components of EDG in isolation, DEI's "no netting" proposal resembles the provisions of the initial Version 1 of SEA 309 that were subsequently removed. In contrast, the adopted statutory language functionally defines EDG as occurring over a period of time, and necessarily requires a netting calculation. *Netting*, by definition, is taking the *difference between* two values – in the context of net metering or the DG Statutes, the difference between electricity imports and exports over the billing period.

Finally, since electricity flows in one direction, a DG customer does not and cannot both supply electricity to the utility and receive electricity from the utility at the same instance – they are either providing electricity to the utility, or they are being supplied electricity by the utility at any given time. Therefore, a utility cannot calculate EDG as defined by the DG Statutes without measuring imported and exported electricity from a DG customer over a period of time. As further explained below, that period of time is the monthly billing period.

Q. Please provide a simple diagram to help visualize the statutory definition of EDG?

A. Figure 1.A provides a diagram of how a DG customer and a utility are connected through the utility meter. Everything to the left of the meter in this diagram is "behind the meter," and everything to the right of the meter is "in front of the meter," i.e., the utility's grid. The meter records electricity flows from the utility to the DG customer and from the DG customer to the utility, respectively, through Channel 1 and Channel 2 meter recordings.

Figure 1.A. Diagram of DG Customer Interactions with Their Utility

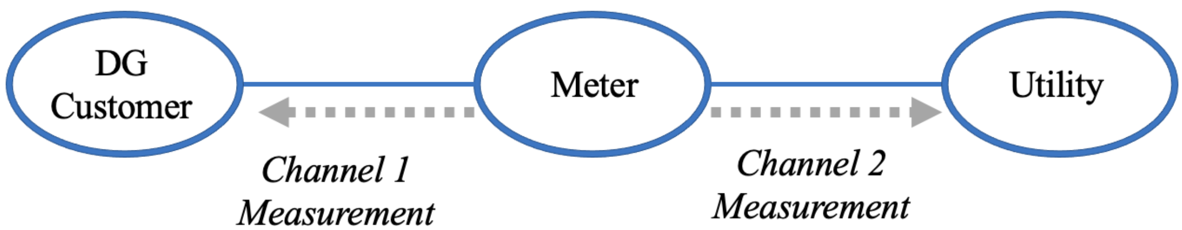


Figure 1.B and 1.C, respectively, correspond to the two components of the definition of excess distributed generation in the DG Statute. Figure 1.B illustrates part one of the statutory definition of EDG, i.e., "the electricity that is supplied by an electricity supplier to a customer that produces distributed generation." Meter Channel 1 records the amount of electricity (in kWh) supplied by DEI to the DG customer.

Figure 1.B. Electricity Supplied by an Electricity Supplier to a DG Customer

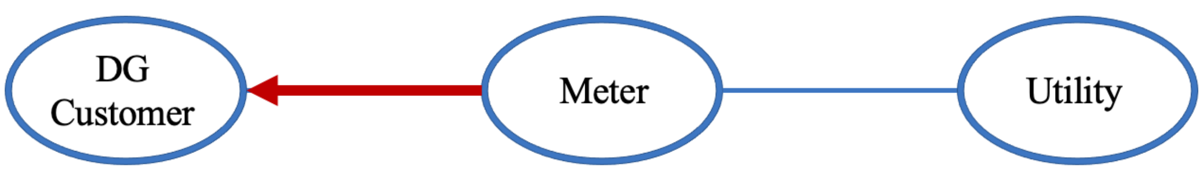
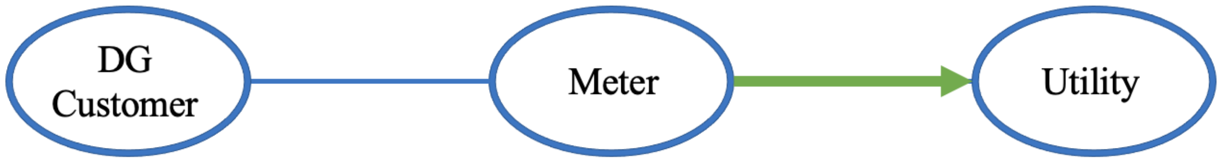


Figure 1.C. illustrates part two of the statutory definition of EDG, i.e., "the electricity that is supplied back to the electricity supplier by the customer." Note that the plain language of this part of the statutory definition only refers to electricity that passes through the customer's meter ("supplied back") to the utility. It does not include a

customer's consumption behind the meter of generation produced by the customer's DG facility, as this electricity is being immediately consumed by the customer and is not being "supplied back" to DEI.

Figure 1.C. Electricity that Is Supplied Back to an Electricity Supplier by the Customer.

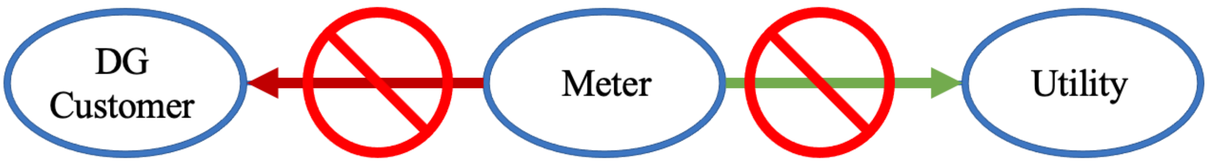


Finally, when a DG customer is neither receiving electricity from the utility, nor supplying electricity to the utility, no flows of electricity occur in either direction, and both meter Channels 1 and 2 will record a value of 0. This could occur if the DG customer is not using any electricity in that instant, or if the DG customer is meeting their electricity needs through behind-the-meter generation that perfectly matches their demand in that instant.

According to DEI, at any moment, electricity flows through DEI's bidirectional meter in only one direction (Figure 1.D).[19] Therefore, the situation represented in Figure 1.D – of having flows of both electricity being supplied by the utility to the DG customer and from the DG customer to the utility at the same time – will never occur, so the utility would never need to do any netting calculation of taking "the difference between" these two values for any moment, as it is physically impossible.

[19] DEI Response to IndianaDG Data Request 2.14.

Figure 1.D. Part 1 and 2 of the EDG Definition Never Occur at the Same Instant

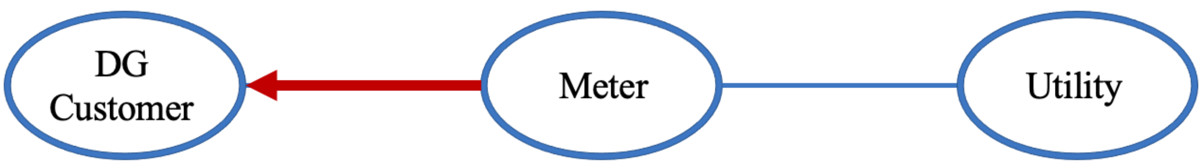


NEVER occurs at the same time

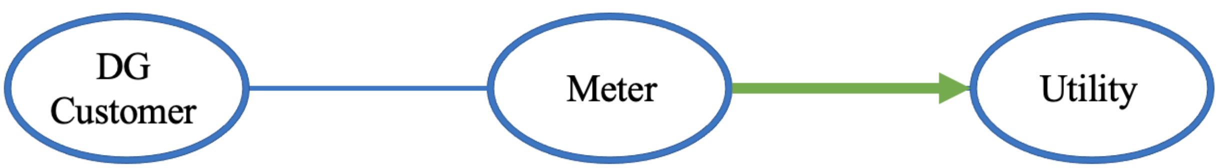
In Figure 1.E below, I have color coded the EDG definition to clearly connect the representations in my diagrams to the statutory definition of EDG:

Figure 1.E

> As used in this chapter, "excess distributed generation" means **the difference between**:
>
> **(1) the electricity that is supplied by an electricity supplier to a customer that produces distributed generation**; and



> **(2) the electricity that is supplied back to the electricity supplier by the customer**.



[Channel 2]

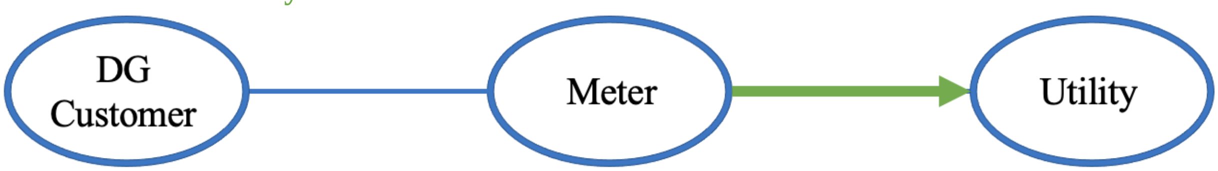
As illustrated in the above figures, the plain language of the statutory definition of EDG provides that EDG is a netting calculation between the difference in the amount of electricity (in kWh, as the definition refers to "electricity" and not "the monetary value of electricity," for instance) recorded on Channels 1 and 2.

Q. Does DEI's "no netting" policy align with the plain language of the DG Statutes with respect to the definition of EDG?

A. No. DEI's "no netting" policy does not take "the difference between" part one and two of the EDG definition. Instead, DEI's "no netting" policy completely ignores the first part of the EDG definition and compensates *all* "electricity that is supplied back to the electricity supplier by the customer" at the low EDG credit rate. DEI's "no netting" proposal re-imagines the DG Statutes to essentially "strike out" portions of the statutory definition of EDG by defining EDG as "Exports"[20] as illustrated in Figure 1.F.

Figure 1.F. DEI's "No Netting" Policy Incorrectly Measures EDG as All Electricity that Is Supplied Back to an Electricity Supplier by the Customer, Rendering Part 1 of the EDG Definition Meaningless

> As used in this chapter, "excess distributed generation" means ~~the difference between~~:
>
> **~~(1) the electricity that is supplied by an electricity supplier to a customer that produces distributed generation~~**~~; and~~
>
> ~~(2)~~ **the electricity that is supplied back to the electricity supplier by the customer**.



Q. Is DEI's "no netting" policy a reasonable application of the plain language of the definition of EDG?

A. No. DEI's application of the definition of EDG would render part 1 of the definition meaningless and extraneous. In other words, there is no real "difference between" any values ever being calculated, since DEI is assigning the value of the first number as 0 (zero). It would be a nonsensical interpretation of the plain language of the statutory

[20] Corrected Petitioner's Exhibit 1-B to Roger A. Flick's Direct Testimony.

definition of EDG to adopt a definition where only one part of the definition ever actually applied or had an effect. However, this is what DEI is proposing in this case – it will never actually take "the difference between" part 1 and 2 of the EDG definition because it admits they can never both occur at the same time.

Furthermore, when asked in a data request to identify and fully explain the components being netted under "instantaneous netting," DEI responded:

> Solar generation and a customer's load on the customer's side of the delivery point are instantaneously netted and result in either energy being delivered to the customer from Duke Energy Indiana or exported to Duke Energy Indiana's grid.[21]

As is clear from DEI's response, "instantaneous netting" as proposed by DEI is measuring EDG as the difference between a DG customer's *solar generation* and a *customer's load* – not taking the difference between electricity provided by the DG customer to the utility and the electricity provided by the utility to the DG customer, as required by the DG Statutes.

In my view, this contradicts the plain language of the statute and therefore the Commission should reject the Company's "no netting" proposal.

Q. Does DEI's recordings of aggregate Channel 1 and 2 flows on a 30-minute period basis impact its "no netting" proposal?

A. No. It is important to distinguish that the meter *recording* intervals (e.g., 30 minutes) are a separate issue from the *netting* intervals (e.g., monthly netting, 30-minute netting, no netting, etc.). Using a different meter recording interval, such as a recording interval of every second or minute, would <u>not</u> impact the actual amounts recorded on Channels 1 and

[21] DEI Response to IndianaDG Data Request 2.15(a).

2 over the monthly billing period or the calculation of EDG under DEI's "no netting" proposal.[22] DEI is <u>not</u> proposing to "net" Channel 1 and 2 recordings on a 30-minute basis (or over any time period), but rather record Channel 1 and 2 measurements to *separately* bill those measurements at the applicable retail rate or the EDG credit rate, respectively.

Q. What other support does the DG Statutes' plain language provide for continuing to use a monthly netting period for DG customers?

A. First, by defining "excess distributed generation" as the "difference between" exports and imports, the plain language of the DG Statutes suggests a netting calculation to determine the "difference." Had the General Assembly intended for *all* exported generation from a DG facility to be compensated at the EDG Rider rate, it could have easily done so by defining "excess distributed generation" as "the electricity that is supplied back to the electricity supplier by the customer" – i.e., using only the second part of the definition of EDG that was adopted, and completely omitting any reference to the first part of the definition regarding "the electricity that is supplied by an electricity supplier to a customer that produces distributed generation." Version 1 of SEA 309 contained provisions that would have required all generation by a DG facility to be credited at a prescribed rate, but in totally removing that provision without any similar replacement language in subsequent amendments, it is clear that these provisions were not endorsed by the General Assembly.

Second, Section 3 defines "distributed generation" to include DG facilities that are:

> sized at a nameplate capacity of the lesser of: (A) not more than one (1) megawatt; or (B) **the customer's average annual consumption of electricity on the premises**

[22] DEI Indiana Response to IndianaDG Data Request 2.15(h) and (i).

(emphasis added). In other words, a key limitation for becoming eligible for service under the EDG Rider is that the customer's DG system is sized to meet their "average annual consumption." There is no requirement – indeed, there is no indication in the statute's language – that the DG facility should be designed in a manner to limit exports on an *instantaneous* basis; instead, it expressly requires that DG systems be designed to generate electricity to meet a customer's *average annual* energy needs.

In addition, Section 18 of the DG Statutes provides, in relevant part, that:

> An electricity supplier shall compensate a customer from whom the electricity supplier procures EDG (at the rate approved by the commission under section 17 of this chapter) through **a credit on the customer's *monthly* bill**…

(emphasis added). This provision identifies that EDG is being calculated and credited on a **monthly** bill basis, and not on an instantaneous basis.

Q. Has the Commission established regulations implementing changes to netting since the enactment of the DG Statutes in 2017?

A. No. In response to SEA 309, the Commission held collaborative meetings, issued Emergency Rulemaking 17-04, and General Administrative Orders 2017-2 and 2019-2. However, it did not issue formal regulations that would modify the measurement of EDG as currently prescribed under its net metering rules to a new netting policy or a "no netting" policy.

170 IAC 4-4.2-7 provides, in part, that under net metering,

> The investor-owned electric utility shall measure the difference between the amount of electricity delivered by the investor-owned electric utility to the net metering customer and the amount of electricity generated by the net metering customer and delivered to the investor-owned electric utility during the billing period, in accordance with normal metering practices.

Normal metering practice is monthly netting, not a new "no netting" metering.

D. Drawbacks of DEI's "No Netting" Proposal

Q. Besides lacking support in the plain language of the DG Statutes, does DEI's "no netting" proposal have any significant drawbacks?

A. Yes, absolutely. In sum, DEI's proposal is insufficiently supported by its case-in-chief, creates perverse incentives rather than desirable price signals, substantially reduces the economic value of DG to customers thereby making it accessible primarily to higher income Hoosiers, produces a compensation rate that could be substantively worse than its Rate QF – Parallel Operation for Qualifying Facility tariff, is a radical departure from the current Indiana DG policy and the best practices established in other states, and is not based on sound ratemaking or cost-of-service principles.

It is difficult to overstate the devastating effect DEI's "no netting" proposal would have on Indiana's distributed solar market and solar industry, especially taken in context with the similar proposals filed by Indiana's other investor-owned utilities. It would significantly limit the ability of customers to benefit from more clean, local, on-site generation that supports the continued growth of Hoosier jobs. Similarly, it would reduce the ability of solar vendors and installers to do business in Indiana, leading to job losses and forgone economic development opportunities for the State. DEI's "no netting" proposal produces unjust and unreasonable rates and should be rejected.

1) DEI's "No Netting" Proposal Lacks Support

Q. Why do you say that DEI's proposal is insufficiently supported?

A. DEI's "no netting" proposal would result in a major policy change to how rooftop solar and other DG technologies will be compensated in the future compared to the monthly netting policy that has been in place for roughly the past 16 years in Indiana. Yet, its application and testimony are bereft of any meaningful analysis or justification to support this drastic change, meaning the Commission and parties have an extremely limited basis on which to consider the proposal and its intended and unintended impacts. The Company is proposing a major policy change without offering any meaningful analysis demonstrating its impacts. Net metering as it existed is ended by SEA 309. Imposing a "no netting" policy in addition to SEA 309's changes is unwarranted and very harmful.

DEI's proposal is also not supported with a class cost of service study or any other evidence demonstrating that moving to a "no netting" framework would produce just and reasonable rates. Furthermore, it did not provide a DG benefit-cost analysis or a value of distributed solar study that would demonstrate on a forward-looking basis (as opposed to a backwards-looking snapshot in time that is typical of an embedded cost of service study) that its "no netting" proposal produces net benefits rather than costs, or reflects an overall fair policy for compensating DG customers for the benefits that they provide to both DG and non-DG customers. Furthermore, DEI did not include any information on how its proposal will impact future DG growth, solar installation businesses, their employment levels, or related economic impacts in its service territory. Those ignored impacts will all be harmful to Indiana.

An important question related to determining whether a rate is just and reasonable is whether it reflects cost causation principles. By that, I mean DEI's harmful "no netting" filing provides the Commission with no ability to conclude that the EDG Rider would produce rates that reflect or are designed to recover DEI's cost to serve DG customers or are reflective of the value of the benefits DG customers provide. Importantly, DEI has not made any showing demonstrating its proposed "no netting" policy would not recover *more* *than* its cost to serve DG customers. And even if one argues monthly netting is overly generous to DG customers at the expense of non-DG customers – a position I do not endorse and which no evidence has been offered by DEI to substantiate – DEI has failed to provide any reasonable basis on which the Commission can conclude its specific "no netting" approach is the best or even a reasonable one compared to many alternative policies.

On this basis alone, the Commission should reject DEI's application, at least with respect to its "no netting" proposal, as insufficient and failing to demonstrate its resulting rates are just and reasonable.

Q. Does the "no netting" proposal in DEI's EDG Rider align with the longstanding principles of just and reasonable rates?

A. In my opinion, it does not. The EDG Rider rate itself is calculated through an arbitrary, albeit legislative, 25% adjustment to the average wholesale market locational marginal price, and not an objective assessment on the actual value provided by EDG. Applying such an arbitrary calculation to determine the export credit rate for *all* kWh exported is not conducive of reaching a just and reasonable rate result. DEI's proposal substantially worsens the impact of the statutorily prescribed credit rate by ignoring the statutorily prescribed "difference between" exports and imports in its measurement of EDG, resulting in an arbitrary rate untethered to any ratemaking principles and in a manner that will materially harm DG customers taking service under such a rate, as further analyzed below.

The negative impact of this combination will be worsened by the EDG rate changing every year, depriving an EDG customer of any certainty or stability in their rate and making it extremely difficult to reliably estimate the most basic financial metrics of purchasing a potential DG system, such as the savings potential and simple payback period of such a significant investment.

Finally, the negative impact DEI's proposal will have on DG adoption rates will also harm *non-DG* customers by both limiting their ability to later adopt DG and by reducing the benefits non-DG customers can realize from having more clean, local, distributed generation on the grid.[23]

2) DEI's "No Netting" Proposal Creates Perverse Incentives

Q. What do you mean when you say that DEI's proposal creates perverse incentives?

A. Utility ratemaking typically aims to provide price signals to customers that align, to at least some degree, with how the utility incurs costs and in a manner that discourages waste and promotes efficiency.[24] For example, DEI's Rate QF, Rate LLF, and Rate HLF each have a summer on-peak period of 11:01 a.m. to 6 p.m. on weekdays.[25] Other rate options also have time-of-day based pricing that includes most summer daylight hours within the designated peak period, including DEI Pilot Rates RS – CPP, RS – VPP, RS – VPPD, CS – CPP, CS – VPP, and CS - VPPD. These price signals discourage discretionary electricity use and encourage energy conservation and generation exports during on-peak periods, especially on weekday summer afternoons, relative to off-peak periods. These price signals

[23] *E.g., see* Lawrence Berkeley National Laboratory, Indiana 21st Century Energy Policy: Emerging Technologies on the Electricity Distribution System, pp. 55-56, available at https://www.in.gov/iurc/files/2020-Report-to-the-21st-Century-Energy-Policy-Development-Task-Force.updated-min.pdf; *see generally* National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources, 2020, available at https://www.nationalenergyscreeningproject.org/national-standard-practice-manual/

[24] *See* James Bonbright's Principle 8 ("Efficiency of the rate classes and rate blocks in discouraging wasteful use of service…"). Bonbright principles are discussed further below.

[25] DEI, "Electric Tariff," available at https://www.duke-energy.com/home/billing/rates/electric-tariff.

correspond to wholesale market prices. For example, the 2020 average LMP at the CIN.PSI load node for daylight hours (5 a.m. through 8 p.m.) was $25.73/MWh, whereas for nighttime hours (8 p.m. through 5 a.m.) the average 2020 LMP was only $18.94/MWh.[26]

In contrast, DEI's "no netting" proposal would create a perverse incentive by doing the *opposite* of what the price signals in these rates are designed to incentivize: ***The "no netting" component of the EDG Rider would encourage DG customers to <u>increase</u> their consumption during DEI's highest cost summer on-peak periods***. DEI's summer on-peak hours align with the production of solar generation, which is the predominant form of DG technology on DEI's grid now and anticipated into the future. A solar DG system designed to generate electricity in an amount equal to a customer's average annual electricity needs, as provided by the DG Statutes, will tend to produce more electricity during the daylight than the DG customer immediately consumes during daylight hours behind-the-meter. However, with "no netting" the DG customer no longer can net their exported electricity against their imported electricity over the billing period. That gives the DG customer a strong financial incentive to export as little electricity as possible.

To avoid the "penalty" of receiving this low EDG compensation rate, the economically rational DG customer would strive to shift all possible discretionary electricity consumption to hours when their DG system is generating more electricity than the customer is immediately consuming behind the meter (e.g., by cranking up their air conditioners on hot summer afternoons – during peak periods – to "pre-cool" their house for the nighttime hours; charging electric vehicles during the day instead of overnight; or washing and drying cloths and dishes during the daylight hours). Since this time period

[26] Based on data provided by DEI, Workpaper 1 (RAF).

aligns with the utility's on-peak period, it means DG customers will be strongly incentivized to increase their gross consumption during on-peak periods and decrease gross consumption during off-peak periods.

This perverse incentive baked into the "no netting" EDG Rider proposal would harm *non-DG customers* because these non-DG customers would no longer be able to benefit from the EDG exports the DG customer would otherwise have provided during higher-cost peak hours. A key objective of demand-side management programs and on- and off-peak pricing are to reduce utility peaks. DEI's "no netting" proposal would push in the opposite direction to the detriment of its customers.

3) DEI's "No Netting" Proposal Compensates EDG Customers at a Rate that Could Be Below DEI's Avoided Cost Rate

Q. Why do you claim that DEI's "no netting" proposal could be substantively worse than DEI's Rate QF – Parallel Operation for Qualifying Facility ("Rate QF") tariff?

A. DEI's Rate QF, available to eligible DG facilities, provides a compensation rate to DG customers that could, under certain circumstances or for certain customers, be higher than DEI's EDG Rider.[27] Under Rate QF, DG customers currently receive a payment of $0.027519/kWh for all generation, plus a capacity payment of $4.53/kW per month. While the energy rate under Rate QF is slightly below DEI's proposed EDG credit rate, the additional capacity credit DG customers can earn under Rate QF could be sufficient to result in a total compensation rate under Rate QF that exceeds the total compensation rate under the EDG Rider. Since both the EDG credit rate and the Rate QF rates are regularly

[27] DEI, Rate QF, available at https://www.duke-energy.com/home/billing/rates/electric-tariff.

updated, it is also possible that the Rate QF energy rate alone could exceed the EDG credit rate in future years.

Rider QF represents DEI's avoided cost rate under the Public Utility Regulatory Policies Act of 1978 ("PURPA"), and as such, reflects its incremental costs. Additionally, PURPA allows Qualifying Facilities to negotiate the length of the contract, whereas the DG Statutes provide for an annual change in the EDG rate. It would be an absurd result and illogical to assume the General Assembly intended for DG customers to be compensated at a rate that could be *below* DEI's avoided cost rate while also potentially experiencing less certainty in pricing from year-to-year. DG customers generally provide substantial value that goes beyond that of centralized power generation facilities, such as by directly serving on-site load, proportionately avoiding line losses, proportionately avoiding wear and tear on transmission and distribution facilities, mitigating congestion on the grid, and providing enhanced resilience opportunities, among other benefits. Providing a compensation rate for *all* exported electricity that could be below DEI's PURPA avoided cost rate would be unjust and unreasonable. It also conflicts with the statements made by the author of SEA 309 about the purpose of the legislation continuing to encourage DG and conferring a preference for DG technologies in statute, as described above in more detail.

If DEI's EDG Rider is adopted as proposed, prospective DG customers that would be eligible for either the EDG Rider or Rate QF would likely want to conduct an analysis and comparison (likely with the assistance of their DG provider) to identify the impacts of these two options and select service under the one that provides the better financial value and terms and conditions to the customer. This analysis would require granular data about

DG customers historical usage, reinforcing my concern I discussed earlier in my testimony about the lack of access DEI customers currently have to their own usage data at a granular level. One benefit of Rate QF is that it does not contain provisions that would result in the utility taking excess generation from DG customers without providing compensation, unlike the EDG Rider that confiscates customer EDG credits at the end of service, as I discuss later in my testimony. However, other terms and conditions of Rate QF are unclear based on the filed tariff, such as how "contracted capacity" would be determined for small rooftop solar facilities, possible performance penalties (if any) that could apply if the DG facility delivers less capacity in a given month, and possible additional metering or interconnection charges (if applicable). Duke objected and refused to answer data requests from IndianaDG that sought clarification on how DG customers would be treated under Rate QF.[28]

If the Commission declines my recommendations and adopts DEI's EDG Rider as proposed or with only modest revisions, I recommend the Commission also direct DEI to ensure prospective DG customers are clearly presented with the option taking service under Rate QF on an equal basis to the EDG Rider. For example, the Commission should direct DEI to provide additional summary information on its Rate QF option on its website side-by-side with any descriptions of its EDG Rider, in a location on its website that is easy to find, and that describes and compares the tariffs' terms and requirements, including provisions on compensation, in a manner that are easily understandable to a typical residential customer so that they are able to compare and contrast taking service under Rate QF and the EDG Rider. In the past, this may not have been necessary since Rate QF was

[28] DEI Response to IndianaDG Data Request 2.11.

primarily used by sophisticated independent power producers and not residential customers. But with the termination of net metering for new DG customers, Rate QF may be utilized by many more types of customers than in the past. In addition, when existing net metering customers are no longer eligible to continue service under their net metering tariff, they should be presented with the option of which tariff they would like to take service under instead of being automatically defaulted onto the EDG Rider.

4) DEI's "No Netting" Proposal Is a Dramatic Departure from DG Policies Adopted in Most Other States

Q. While not necessarily controlling on any issue, do you think it appropriate and beneficial to sound public policy and intelligent regulatory discretion that utility regulatory Commissions stay apprised of regulatory trends in other states?

A. Yes, I do. It has been my experience that utility regulatory commissions inquire about and watch with interest how evolving regulatory matters in other states raise new ideas, address emerging issues, and integrate new technologies. Such knowledge is beneficial to regulators when navigating evolving or new regulatory and technology matters and in applying their discretionary findings to reach an overall balanced outcome on issues consistent with the public interest. This is particularly so when a multifaceted issue like EDG can be broken down into its subcomponents and each subcomponent is subject to a regulatory finding, and potentially differing levels of regulatory discretion. Knowledge and understanding facilitate a balanced outcome in the formation of just and reasonable rates and sound regulatory public policy.

Q. Have other state utility regulators decided to retain monthly netting after conducting a review or investigation into DG policies?

A. Yes. In fact, maintaining monthly netting has frequently been the outcome of state proceedings that have addressed DG policies in recent years. In states with relatively modest customer net metering adoption rates, regulators have typically preserved monthly netting and only made modest changes that would not fundamentally alter the viability of solar DG, **even when the utility regulator is acting to implement new legislation authorizing changes to net metering**. I consider customer DG adoption in Indiana to be very modest.

Q. Can you provide specific examples of state utility regulators retaining monthly netting after legislation was enacted authoring changes to net metering?

A. Yes. The Arkansas Public Service Commission ("PSC") issued an Order on June 1, 2020, addressing implementation of Act 464 (2019). Even though Act 464 authorized the Arkansas PSC to make changes to net metering, it elected to maintain monthly netting for the time being for residential and small commercial customers. It determined that:

> [b]ased upon the evidence currently showing very low levels of penetration of renewable distributed generation by solar facilities in Arkansas in the residential class and in any non-residential customers without a demand component, the Commission finds that the current 1:1 full retail credit for net excess generation should be retained for now as the default Net-Metering rate structure.[29]

The decision permits utilities to propose more substantive changes through filings submitted after December 31, 2022 but requires the utilities to justify such a proposal by using a "timely and properly designed cost-of-service study" that demonstrates the

[29] Arkansas Public Service Commission, Docket No. 16-027-R, Order, June 1, 2020, p. 525. [Footnote omitted.]

alternative DG policy is "in the public interest and will not result in an unreasonable allocation of or increase in costs to other utility customers."[30]

As I describe below, the Kentucky PSC also recently rejected changes to KPC's monthly netting policy, despite being granted discretion under Senate Bill 100 (2019) to make significant changes to DG policies.

Most states, including those with high DG adoption rates, have continued to offer monthly netting, while rejecting more significant changes or multiple changes that in combination could be detrimental to prospective net metering customers.

Q. Does DEI's "no netting" proposal align with broader industry trends with respect to policy changes to net metering?

A. No. In fact, as I will describe below, although they both have approved different netting policies, both the Kentucky PSC and Michigan PSC have established DG compensation rates for utilities in their respective states, that are roughly *three to four times* the EDG Rider credit rate proposed by DEI in this case in conjunction with its "no netting" proposal. Furthermore, while many utilities have *proposed* significant changes to DG policies like net metering, few state regulatory commissions or state legislatures have adopted dramatic changes to existing policies in a manner that would significantly harm the future growth of DG, such as would be the case under DEI's "no netting" proposal.

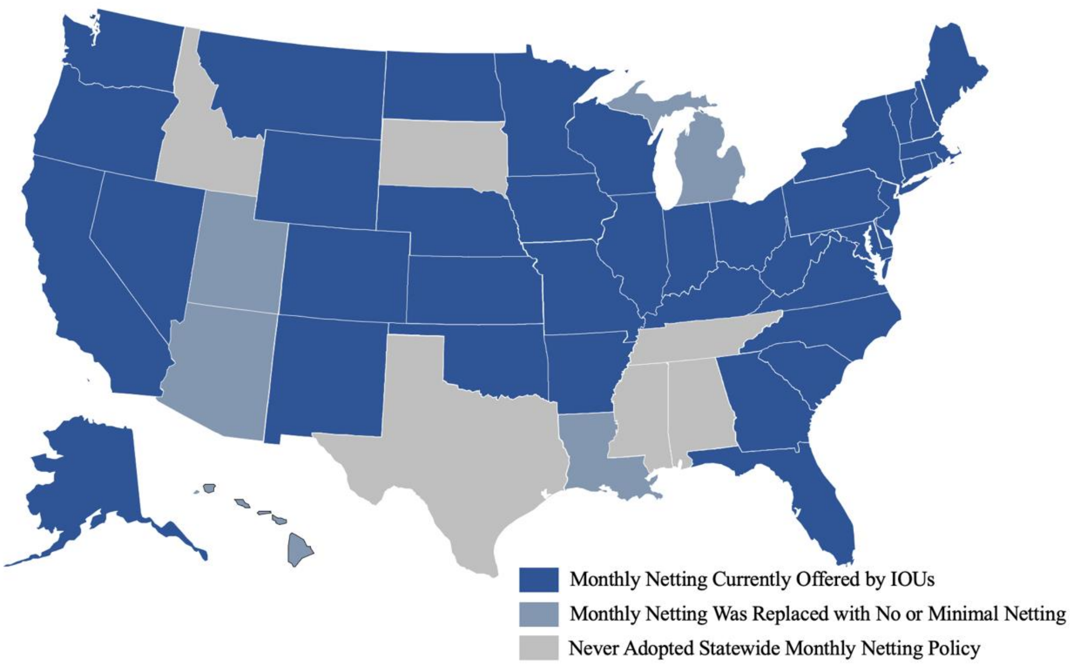
Q. How prevalent is monthly netting?

A. Monthly netting continues to be one of the most widespread and important components of DG compensation policies across U.S. states and utilities. At its peak, investor-owned utilities ("IOUs") in at least 43 states and the District of Columbia offered monthly netting

[30] *Ibid.*

to customers. Currently, most IOUs in 39 states and the District of Columbia offer monthly netting to new residential and small commercial customers, as identified in Figure 2. Only five states have transitioned from monthly netting to an "import/export" crediting scheme, characterized by no netting or a netting within only a short time interval (e.g., 15 minutes or one hour) and where exports are credited at a substantially lower rate than imports. In one state (Georgia), state regulators recently mandated a change *from* a "no netting" policy *to* monthly netting for Georgia Power, and two states (Nevada and Maine) that previously ended monthly netting subsequently restored it for residential customers through legislative changes.

Figure 2. Netting Policies for Residential and Small Commercial DG Customers of Investor-Owned Utilities



Q. Can you describe the types of DG policy changes that policymakers have approved?

A. States that moved from monthly netting to an alternative policy have, in most cases, established a compensation rate for exported electricity that is significantly higher than the EDG rate proposed by DEI. For example:

- In **Michigan**, new DG customers receive an export credit rate based on the power supply rate excluding transmission. The credit rate for Indiana Michigan Power customers is based on the specific rate schedule's combined Capacity and Non-Capacity Power Supply rates plus the Power Supply Cost Recovery factor. For residential customers, these values are $0.0762/kWh, $0.02689/kWh, and ($0.00285)/kWh, which results in a total compensation rate for exports of $0.10024/kWh, which is more than *three times* as much as DEI's proposed compensation rate in Indiana.[31] Similarly, the credit rate for Consumers Energy's residential customers is $0.119655/kWh for summer on-peak, $0.080485/kWh for summer off-peak, and $0.084785/kWh for all exports in non-summer months.[32]
- In **Arizona**, new residential DG customers of Arizona Public Service receive a specific export credit rate for a period of 10 years, with the amount depending on when the DG system is installed. A system installed October 1, 2021 through August 31, 2022 receives an export credit rate of $0.09405/kWh.[33]
- In **Utah**, new DG customers of Rocky Mountain Power receive summer and winter export credit rates of $0.05817/kWh and $0.05487/kWh, respectively.[34]

However, many state policymakers have rejected attempts to fundamentally alter the monthly netting framework when implementing other changes to a net metering policy. One notable recent example is the Kentucky PSC's rejection of a net metering replacement

[31] Indiana Michigan Power Tariffs, available at https://www.indianamichiganpower.com/lib/docs/ratesandtariffs/Michigan/IMMITBBk172021-06-21.pdf
[32] Consumers Energy, Rate Book for Electric Service, Original Sheet No. C-64.30, available at https://www.consumersenergy.com/-/media/CE/Documents/rates/electric-rate-book.ashx?la=en&hash=3EC495A835F623EFFD51C5486014D83F
[33] Arizona Public Service, Rate Rider RCP, available at https://www.aps.com/-/media/APS/APSCOM-PDFs/Utility/Regulatory-and-Legal/Regulatory-Plan-Details-Tariffs/Residential/Renewable-Plans-and-Riders/rcp_RateSchedule.ashx?la=en
[34] Utah Public Service Commission, Order on Agency Rehearing, Docket No. 17-035-61, April 28, 2021, available at https://pscdocs.utah.gov/electric/17docs/1703561/3184591703561ooar4-28-2021.pdf

tariff proposed by Kentucky Power Company ("KPC"). In that case, KPC requested to move from monthly netting for all imports and exports to having two netting periods within the month that KPC alleged corresponded to on-peak and off-peak time periods. The Kentucky PSC's May 2021 Order ("KPC Order") rejected KPC's net metering tariff proposal and retained standard *monthly netting* while reducing the EDG *rate* for monthly rollover from the retail rate to $0.09746/kWh for residential customers and $0.09657/kWh for commercial customers, based on a bottom-up calculation of various categories of benefits provided by EDG.[35]

Other examples of state utility regulators maintaining monthly netting policies include:

- In **South Carolina**, the PSC rejected a Dominion Energy proposal in May 2021 to replace monthly netting with netting on a 15-minute basis, where all exports would have been credited at time-based avoided cost rates, and charge DG customers additional surcharges. Instead, the PSC approved a tariff that has an annual netting period in which on-peak generation can offset on-peak usage on a 1:1 basis, and off-peak generation can offset off-peak generation on a 1:1 basis.[36] The PSC separately approved DG tariffs for Duke Energy customers that featured monthly netting within time-of-day periods.[37]
- In **New York**, the PSC has repeatedly decided to retain monthly netting for residential and small commercial customers, among others, even as it has moved other types of DG customers to its "Value of Distributed Energy Resources" tariff that differentially credits exported energy relative to imports.[38]
- In **Louisiana**, the PSC revised its net metering rules in December 2016 to maintain monthly netting while reducing the EDG credit rate to the applicable avoided cost rate after the utility reached its net metering cap.[39] Years later, in September 2019,

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[35] Kentucky Public Service Commission, Order, Case No. 2020-00174, May 14, 2021, pp. 39-40, https://psc.ky.gov/pscscf/2020%20Cases/2020-00174//20210113_PSC_ORDER.pdf
[36] South Carolina Public Service Commission, Docket No. 2020-229-E, Order No. 2021-391, May 29, 2021.
[37] South Carolina Public Service Commission, Docket Nos. 2020-264-E and 2020-265-E, Order No. 2021-390, May 30, 2021.
[38] New York Public Service Commission, Docket No. 15-E-0751, Order, July 16, 2020.
[39] Louisiana Public Service Commission, Docket No. R-33929, Phase I Order, December 8, 2016.

it replaced the monthly netting policy with a no netting policy effective January 1, 2020.[40]

- In **California**, the Public Utilities Commission maintained monthly netting under its revised net metering policy that applied after a utility reached its net metering cap ("NEM 2.0"). NEM 2.0 customers were required to take service under a time-of-day rate and pay certain non-bypassable charges (e.g., related to funding public purpose programs), but otherwise were allowed to use monthly netting within the time-of-day period.[41]

Q. Have some utilities proposed additional charges on DG customers either in lieu of, or in addition to, changes to monthly netting?

A. Yes, but relatively few are adopted. Utilities across the country have proposed a variety of other changes to DG policies, including new surcharges or fees, either in combination with proposals to modify or end monthly netting or in lieu of these changes. These include proposals for new capacity-based charges based on the size of the DG system, mandatory demand charges, minimum bill amounts that exceed the amount charged to non-DG customers, and additional monthly fixed charges. While numerous, these utility proposals, like changes to monthly netting, are seldom adopted. Specifically, since November 2012, there have been at least 27 distinct examples of investor-owned utilities in the U.S. proposing extra surcharges on DG customers. <u>In nearly every instance, those proposals were withdrawn by the proponent, denied by regulators, or overturned in court on appeal</u>. I provide an overview of these examples in Attachment BDI-8.

While DEI is not proposing a surcharge on DG customers in this case, its proposal to end monthly netting is analogous to utility proposals for DG surcharges insofar as both reduce the economic benefit to the customer of installing DG. These examples provide

[40] Phase II Order, September 19, 2019.
[41] California Public Utilities Commission, Docket No. R.14-07-002, Decision No. 16-01-044, February 5, 2016.

further evidence demonstrating that utility proposals of all types aimed at significantly undermining the growth of DG have broadly lacked policymaker support and failed to gain traction despite the substantial and numerous efforts by utilities to have them approved.

Q. How does DEI's proposed "no netting" policy compare to modifications adopted in other jurisdictions to their DG policies?

A. Over the last decade, DG policies like net metering have been extensively studied and investigated in many jurisdictions across the country.[42] While I have not quantitatively analyzed the impact of every utility proposal, based on my professional experience, I can say that DEI's proposed "no netting" policy in combination with its implementation of EDG Rider to replace net metering would likely be more detrimental than the vast majority of the changes adopted to DG policies in other jurisdictions, including those with far greater deployment rates of DG.

More fundamentally, DEI's proposal stands out when compared to most changes that have been adopted in other jurisdictions for its lack of underlying support and justification. Other jurisdictions, especially those that have higher penetration rates of DG, have undergone extensive investigation, study, and evaluation of DG policies over a period of several years *prior* to making significant modifications that were not expressly directed by legislation. Typically, state utility regulators have overseen investigations into net metering policies that include studies that quantify the costs and benefits of net metering or the value of distributed energy resources like solar prior to making significant changes to policies like monthly netting. The most common outcome of these proceedings is that

[42] *See, e.g.*, ICF International, "Review of Recent Cost-Benefit Studies Related to Net Metering and Distributed Solar" (May 2018).

the state utility commission adopts only limited and incremental changes to the overall design of the DG policy. Some states have gone through multiple iterations of this process, spanning multiple years, to collect evidence, gather input from a variety of parties, implement adjustments, monitor the results, and then restart the process in an iterative fashion to consider additional refinements.

I have developed Attachment BDI-9 to highlight a selection of jurisdictions that have examined net metering policies. The table identifies examples of studies that have been conducted, key regulatory proceedings that have investigated these issues, and a summary of the outcomes for each jurisdiction examined. The table is meant to be illustrative, and not entirely comprehensive of every jurisdiction, study, and docket.

Q. What other observations do you have regarding state practices used when considering modifications to monthly netting based on your review of DG policies in other jurisdictions?

A. There are several commonalities among many jurisdictions in how they have considered modifications of DG policies like net metering. At a high level, some of the commonalities evident from the numerous state public utility commission proceedings evaluating modifications to DG policies are:

- **Quantitative analysis is key:** Cost of service studies, cost-benefit analyses, and value of solar (or distributed energy resources more broadly) studies, or a combination thereof, have been used to quantify the impacts of DG policies. These studies have been paramount in informing discussions of DG policy changes, although they are not necessarily dispositive of the ultimate outcome, as larger policy considerations have also played an important role in shaping discussions. They can also be helpful in identifying policy solutions that align DG customer incentives with broader grid benefits in a manner that does not unfairly discourage the adoption of DG.
- **Gradualism is an important ratemaking principle:** After gathering robust evidence on net metering implementation, public utility commissions that have determined that changes should be made to existing net metering policies have adhered to the ratemaking principle of Gradualism by implementing modest changes. For example,

regulators in New Hampshire maintained monthly netting, excluding certain non-bypassable charges, when they implemented a reduced EDG credit rate for the rollover credit at the end of the month, while directing a multi-year study into DG to collect additional data. Most states that ultimately ended monthly netting, such as Arizona, Utah and Louisiana, only did so after many years, multiple investigations, and a transition period where a modified policy was in place that limited the immediate financial impacts on prospective DG customers.

- **Iterative process:** DG policy discussions are rarely resolved through one proceeding. Rather, the proliferation of rooftop solar has led many policymakers to study and evaluate DG policies on an iterative basis, incorporating new information as additional experience is gained and data is collected.
- **Insufficiently supported utility proposals are rejected:** Numerous utility requests to modify DG policies or related rate design changes impacting DG customers have been rejected by regulators across the U.S. when they have not been adequately supported and justified by the utility. Regulators have been reluctant to make drastic changes to DG policies that are not clearly directed by statute that could undermine customer adoption of rooftop solar when the utility has not met its burden to demonstrate that its proposed changes result in just and reasonable rates and are in the public interest. In other words, regulatory determinations on DG policies have typically required utilities to meet the same burden of proof standard that applies more generally. Such a standard is critical for ensuring that adopted policies or rates are well vetted and not discriminatory.
- **Monthly netting remains commonplace:** Despite numerous proceedings and legislation addressing DG policies in states across the country, monthly netting remains one of the most widespread DG policies currently in place in the U.S.

Q. Why have some states adopted changes to their DG policies in recent years?

A. Based on my experience closely tracking this industry for more than seven years, I conclude that two factors are the primary drivers of this trend. First, rooftop solar deployment has increased in recent years, driven by equipment cost declines. Most state net metering policies specify an aggregate capacity limit for net metering programs (“net metering cap”). Often, state legislatures and utility regulators have responded to utilities nearing or exceeding the specified net metering cap as a result of the proliferation of DG solar by increasing the net metering cap and/or by adopting policies to modify net metering or establish a pathway for adopting a net metering successor policy, which is often preceded by a study or formal investigation.

Second, utilities, their trade associations, and other aligned interests have waged a long-running campaign against policies encouraging the adoption of customer-owned rooftop solar, particularly net metering.[43] Net metering allows a customer to purchase less electricity from a utility, which can result in a decrease in a utility's revenue. In addition, electric utilities earn profit by making capital investments, on which they are permitted the opportunity to earn a return on equity. Investment in generation facilities such as solar DG by utility customers can therefore compete with a utility's generation investments, with a reduced need in new utility generation assets corresponding to a reduced profit opportunity for the utility. In states without retail choice, rooftop solar is one of the few examples of a utility facing a form of, albeit limited, competition, as utility customers otherwise need to be fully served by the electricity generated or procured by their monopoly utility.

Q. Have some state utility regulators <u>expanded</u> the availability of monthly netting after conducting a review or investigation into the policy?

A. Yes. For instance, the Iowa Utilities Board issued an Order in July 2016 maintaining monthly netting after investigating its net metering policy.[44] The Order created a three-year study process, while expanding the availability of net metering to all customer classes and increasing the maximum eligible system size from 500 kW to 1,000 kW.

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[43] *See, e.g.*, Joby Warrick, "Utilities Wage Campaign Against Rooftop Solar," *Washington Post* (March 7, 2015); Hye-Jin Kim, Rachel J. Cross, and Bret Fanshaw, "Blocking the Sun: Utilities and Fossil Fuel Interests That Are Undermining American Solar Power," Frontier Group and Environment America Research & Policy Center (November 2, 2017); Gabe Elsner, "Edison Electric Institute Campaign Against Distributed Solar," Energy and Policy Institute (March 7, 2015); *See Generally*, Energy and Policy Institute, "Category: Net Metering," https://www.energyandpolicy.org/category/solar/net-metering/.

[44] Iowa Utilities Board, Docket No. NOI-2014-0001, Order, July 19, 2016.

More recently, the Georgia Public Service Commission modified the DG compensation policy in place for Georgia Power in December 2019 by moving from no netting to monthly netting.[45]

Q. Why are other states' policy decisions on monthly netting or DG policy in general relevant to this proceeding?

A. All states and their Commissions value their autonomy. Their policy decisions are governed by their unique legal frameworks, policy priorities, and objectives. Knowledge about how other states regulatory commissions have approached new technologies and related ratemaking issues may provide useful insights for regulators reviewing similar matters. Despite inherent differences, it is significant that after substantial focus on DG policies in recent years, most states have elected to expand or maintain existing net metering policies, make only modest changes that retain monthly netting within a DG policy, or establish a future process for considering changes to DG policies while allowing customers to continue to use monthly netting in the interim.

5) DEI's "No Netting" Proposal Is Inconsistent with Longstanding *Ratemaking Principles*

Q. What other factors do you think the Commission should consider when evaluating DEI's "no netting" proposal?

A. In addition to the DG Statutes, the Commission should consider other relevant Indiana statutes and the same generally accepted ratemaking principles (*i.e.*, the Bonbright

[45] Georgia Public Service Commission, Docket No. 42516, Order, February 6, 2020.

principles) that govern utility ratemaking. With respect to other relevant Indiana statutes, IC § 8-1-2-4 specifies that:

> Every public utility is required to furnish reasonably adequate service and facilities. The charge made by any public utility for any service rendered or to be rendered either directly or in connection therewith shall be reasonable and just, and every unjust or unreasonable charge for such service is prohibited and declared unlawful.

Q. Is DEI's "no netting" proposal consistent with long-standing ratemaking principles?

A. No. In his seminal work that defined best practices in utility regulation, Professor James Bonbright enumerated a number of principles of utility ratemaking.[46] These principles have been foundational to determining rate structures that are just and reasonable. DEI's "no netting" proposal fundamentally conflicts with several of these key principles.

First, asking the Commission to approve moving from the long-running monthly netting policy to a harmful "no netting" policy at the same time DEI seeks to implement a statutorily prescribed reduction in the effective compensation rate does not comport with the ratemaking principle that is often described today as Gradualism.[47] It is an abrupt, far reaching, two-fold negative impact on prospective DG customers and the Indiana businesses that install solar. The DG Statutes made substantive changes to the treatment of DG customers, perhaps most significantly by reducing the compensation rate from an effective retail rate rollover credit to a credit at the EDG Rider rate. The principle of Gradualism would strongly caution against making additional dramatic changes, such as by adopting the "no netting" proposal, at the same time as making these changes to avoid

[46] James C. Bonbright, Principles of Public Utility Rates, Columbia Univ. Press (1961), p. 291.
[47] Bonbright, Principle 5 (stating "Stability of the rates themselves, with a minimum of unexpected changes seriously adverse to existing customers. (Compare 'The best tax is an old tax.')")

the negative impacts of "rate shock" and to maintain some level of rate stability. As discussed earlier, I see no language in the DG Statutes that requires or calls for consideration of the end of the normal monthly netting policy in favor of "no netting" or that seeks to impose the resulting harsh impact on EDG customers and Indiana's solar industry.

The Kentucky PSC's KPC Order, which retained *monthly netting* while reducing the EDG *rate* for monthly rollover, is instructive in this respect. It noted that:

> [c]ommitting to gradual compensation changes will provide customers and third parties with confidence to operate in Kentucky and, with improved integration, create significant benefits for all ratepayers.[48]

Second, moving to "no netting" violates the ratemaking principle of Simplicity, Understandability, Public Acceptability, and Feasibility of Application.[49] Monthly netting is understandable to, accepted by, and intuitive to customers. In contrast, DEI's "no netting" proposal creates an impossibly complicated compensation scheme for DG customers, most of whom lack the capacity and capability to manage their moment-by-moment consumption relative to their generation.

Again, the KPC Order is illuminating on this point. In rejecting a move from monthly netting to two netting intervals within a billing month, the Kentucky PSC found that, "The proposed netting periods also significantly increase the complexity of the [net metering service] rate design, without clear indication of their benefit."[50] DEI's "no netting" proposal is far more complicated than that proposed by KPC, and DEI has asserted no benefit(s) that justifies this unnecessary complexity.

[48] KPC Order, Case No. 2020-00174, May 14, 2021, p. 41.
[49] Bonbright, Principle 1.
[50] KPC Order, p. 24

Third, the "no netting" proposal violates the principle that Professor Bonbright described as, "Fairness of the specific rates in the apportionment of total costs of service among the different consumers."[51] As I further describe below, DEI has failed to offer any evidence demonstrating that its "no netting" proposal would recover the net costs to serve its DG customers – and no more than those costs – and thereby is appropriately and fairly apportioning costs to DG customers relative to non-DG customers.

Again, the KPC Order is insightful on applying this principle in the context of DG policy. It found that KPC's class cost of service study for DG customers, which was not based on load research on its actual DG customers, was "unreliable and not useful for ratemaking," noting the "lack of appropriate and sufficient data" the utility had on its DG customers, concluding that "[w]ithout such data, claims regarding a subsidy or differentiated load profiles [between DG and non-DG customers] is moot."[52]

Q. Have other utilities used, or have state utility regulators required, that utilities conduct load research on their actual net metering customers to produce an accurate cost of service study prior to significantly modifying DG policies?

A. Yes. Table 1 identifies some examples where other state utility regulators rejected proposed changes to net metering based on cost of service studies that failed to use appropriate load profiles for net metering customers, or where the utility used or planned to use such data to support its proposal to make changes to net metering.

[51] Bonbright, Principle 6.
[52] KPC Order, pp. 20-21.

Table 1: Examples of Net Metering ("NEM") Customer Load Research Used or Required in Other Jurisdictions[53]

State	Utility	Summary	Key Excerpts
MT	NorthWestern Energy	In Northwestern Energy's 2018 rate case, its embedded cost of service study used NEM customer load data that intervenors described as artificial and derived through a convoluted series of assumptions and adjustments, rather than load research sample data for NEM customers like it did for all other residential customers in the study. Accordingly, the Montana Public Service Commission denied the utility's request to place NEM customers in a separate rate class and charge NEM customers a demand charge rate design.	"The Commission finds that NorthWestern should **develop load research sample data for NEM customers of comparable quality to that used for the broader residential class** for use in future cost of service studies."[54]
NV	NV Energy	The Public Utilities Commission of Nevada found that NEM ratepayers had unique service and cost characteristics based on the actual net metering class load shapes of NV Energy net metering customers.	"NV Energy states that the **NEM ratepayer class load shapes were developed using all active NEM ratepayers** as of March 31, 2015, for the entire study period of June 2014 through May 2015. Actual generation data was used when available. Missing hourly generation data was estimated using the average of those ratepayers that have at least 95 percent of the necessary 15-minute generation data. The compiled data was then compared to the National Renewable Energy Laboratory's averages for reasonableness."[55]
NH	Eversource Energy Liberty Utilities Unitil Energy Systems	In its Order adopting an alternative net metering tariff that will be in place "while further data is collected and analyzed, pilot programs are implemented, and a distributed energy resource (DER) valuation study is conducted," the New Hampshire Public Utilities Commission found that "there is little evidence of significant cost-shifting from DG customers to customers without DG," and	"…[T]he **utilities should collect and make available load shape data** for individual distribution circuits, or at least for a selected sample of distribution circuits, **as well as customer load data on an hourly or shorter interval basis for at least a representative sample of customers**…Following completion of the value of DER study, and with the availability of the additional customer load and system planning and operations data, the Commission will open a new proceeding to determine whether and when further changes should be made to the net metering tariff structure."[56]

[53] Key portions of quoted excerpts have been bolded for emphasis. Footnotes from the excerpts have been omitted.
[54] Montana Public Service Commission, Docket No. 2018.02.012, Order, December 20, 2019, p. 63, available at http://psc.mt.gov/Portals/125/Documents/news/NWE%20Rate%20Case/2018212%20FO.pdf
[55] Public Utilities Commission of Nevada, Docket Nos. 15-07041 and 15-07042, Order, December 23, 2015, Paragraph 17, available at: http://pucweb1.state.nv.us/PDF/AxImages/DOCKETS_2015_THRU_PRESENT/2015-7/8412.pdf
[56] New Hampshire Public Utilities Commission, Order, June 23, 2017, pp. 66 and 72-73, available at: https://www.puc.nh.gov/Regulatory/Docketbk/2016/16-576/ORDERS/16-576_2017-06-23_ORDER_26029.PDF

State	Utility	Summary	Key Excerpts
		that additional load research needed to be collected on DG customers.	
OK	Oklahoma Gas & Electric	The Oklahoma Corporation Commission rejected the proposed separate rate classes with three-part rates for DG customers. The utility's cost of service study using smart meter data on its actual DG customers showed DG customers were not subsidized by non-DG customers.	"In the event OG&E proposes, in the future, a demand charge or any other substantive change to a tariff applicable to customers with distributed generation that OG&E deems necessary to comply with 17 O.S. § 156, the Commission will require OG&E to include as part of its case cost effectiveness tests, such as those performed for the company's demand programs, and make available to the parties detailed cost and benefit data."[57]
SC	Duke Energy Carolinas ("DEC") Duke Energy Progress ("DEP")	DEC and DEP used actual metered solar production data on its NEM customers to define solar customer's contributions to their cost of service, the same data that they used to calculate costs and benefits. The utilities reached a settlement agreement, approved by the PSC, on its Solar Choice Net Metering tariff that will replace their existing net metering tariffs in the future.	**"[T]he Companies [Duke Energy Carolinas and Duke Energy Progress] utilized the same factors—including utilizing the same underlying data, such as production meter data—in performing a forward-looking evaluation** for the Companies' proposed Permanent Tariffs (as defined below). In this way, the Commission will be able to compare 'apples to apples' when evaluating the Companies' Permanent Tariffs against the Existing NEM Programs."[58]
TX	El Paso Electric (EPE)	EPE began load research studies on DG customers in 2013. The load research was used by the utility in its rate case application to support its proposed DG tariff. The DG tariff was ultimately resolved through an approved settlement agreement with intervenors.	"EPE performed a sample study for the Texas residential customers who have installed rooftop solar. **The study provides data about the different load characteristics of these residential DG customers compared to residential customers (non-DG)** ….As of the end of the Test Year, EPE had 57 customers in its residential DG load study for Texas."[59]
UT	Rocky Mountain Power (RMP)	RMP performed load research on net metering customers in 2015 prior to the Commission adopting a net metering transition program in 2017.	"The magnitude of this subsidy, if it exists, will not be readily apparent if the analysis does not 'drill down' another level and separately allocate costs to net metering customers based on their usage characteristics. Analyzing costs at the customer class level ensures the cost to serve the net metering customers is also recognized. PacifiCorp represents **'[u]sing data from the load research study that is currently underway**, [PacifiCorp] will be able to

[57] Oklahoma Corporation Commission, Docket No. PUD 201500273, Order No. 662059, p. 13, March 20, 2017, available at: http://imaging.occeweb.com/AP/Orders/occ5360859.pdf
[58] Public Service Commission of South Carolina, Docket No. 2020-265-E, Direct Testimony of Bradley Harris for Duke Energy Carolinas, LLC and Duke Energy Progress, LLC, November 2, 2020, p. 6, available at ; *See also* Public Service Commission of South Carolina, Docket No. 2019-182-E, Direct Testimony of Bradley Harris for Duke Energy Carolinas, LLC and Duke Energy Progress, LLC, October 8, 2020, p. 6, available at: https://dms.psc.sc.gov/Attachments/Matter/3670a579-5fe0-41c8-82ab-7a4af9f5019b
[59] Public Utilities Commission of Texas, Docket No. 46831, Direct Testimony of George Novela, February 13, 2017, pp. 921-922, available at: http://interchange.puc.texas.gov/Documents/46831_2_929022.PDF (Note: Testimony appears at PDF 4-87 of 100 of that file).

State	Utility	Summary	Key Excerpts
			create a class profile for residential NEM customers, in the same manner done for other types of customer classes' and '[t]his will enable [PacifiCorp] to assign costs to the NEM customers based on how they use the utility system.'"[60]

6) DEI's "No Netting" Proposal Is Not Based on the Company's Cost to Serve DG Customers

Q. Is the "no netting" proposal consistent with DEI's cost to serve a DG customer?

A. DEI has provided no evidence that it is, nor has it asserted as much. In response to an IndianaDG request to provide the cost to serve DG customers, DEI responded that it "does not identify or maintain this information."[61]

Q. How is a utility's cost to serve a specific set of customers typically determined?

A. To reliably identify the costs to serve a customer segment or class, a utility typically conducts load research and develops a class cost of service study based on that load research for the customer segment in question. In instances in which a utility operates in multiple jurisdictions, it will perform a jurisdictional cost of service study prior to its class cost of service study to determine its jurisdictional revenue requirement.

Q. Is it important that conclusions about cost of service for a customer segment be supported by a full class cost of service study of that specific group of customers?

A. Yes. There are several reasons why, but ultimately it amounts to a need for equity and fairness in ratemaking. It is unfair to use one standard of evidence, such as full cost of

[60] Utah Public Service Commission, Docket No. 14-035-114, Order, November 10, 2015, p. 10, available at: https://pscdocs.utah.gov/electric/14docs/14035114/270449140351140.pdf
[61] DEI Response to IndianaDG Data Request 2.1.

service study, for customers in general but permit a different standard to be applied to certain customer segments, particularly when they are facing drastic rate changes such as DEI proposes here. Likewise, the results of a shoddy or incomplete evaluation could result in unfair rates that charge customers in excess of their cost of service. Nothing in the DG Statutes suggests that the Commission should depart from the typical standards it applies for the establishment of just and reasonable rates, or generally accepted ratemaking principles.

Without a targeted cost of service evaluation, the Commission has no way of knowing at what level DG customers pay for service relative to their cost of service, and how that might vary within the class. Not only does that lack of information raise the potential for customers to be overcharged, but it also prevents a more informed evaluation of the options necessary to remedy any issues that are present. For example, the simple fact that a DG customer purchases less electricity from a utility than they would have had they not installed a DG system is insufficient evidence that they are being "subsidized" by other customers.

Q. Can you cite to any other examples illustrating this possibility?

A. Yes. In a 2015 general rate case, Oklahoma Gas and Electric ("OG&E") proposed to establish special demand rates for customers that install DG and eliminate *all* compensation for exported generation on the basis that the changes were necessary to eliminate an alleged "subsidy" to DG customers. As it turns out though, OG&E's class cost of service study, which evaluated residential DG customers as a separate class, showed that the residential DG class actually produced a considerably *higher* rate of return than the residential class as a whole (7.23% compared to 5.33%).[62] In other words, residential DG customers were subsidizing non-DG customers to a significant degree. Not surprisingly, the changes sought by OG&E were not adopted.[63]

Q. In what ways could DG affect DEI's cost allocation in its cost of service study?

A. DEI objected when asked in a data request by IndianaDG how customer-sited DG would affect the allocators used in its cost of service study and did not answer the question.[64] When properly factored into a class cost of service study, DG customers can provide a number of benefits to non-DG customers in their class including, but not limited to, the following examples, which are based on how DEI described its cost allocation in its last rate case:

- DEI allocates demand-related generation and transmission costs based on customers' peak demands.[65] For production plant, the coincident peaks during each of the four months of the test period ("4CP") were used by DEI to allocate costs.[66] The 4CP months are January, June, August, and September, or three summer months and one winter month.[67] To the degree DG customers can aid in reducing their class's total coincident peak demands, either by generating electricity during those coincident peak hours with their DG systems or by themselves having a lower average demand during those hours than non-DG customers in their class, they will reduce costs allocated to their customer class.
- DEI allocates facility-related distribution costs based on the customers' diversified class electricity demand, non-coincident peak electricity demands, or directly assigned to a customer.[68] In addition, certain connection-related costs are allocated based on non-coincident peak demands.[69] To the degree DG customers can aid in

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[62] Oklahoma Corporation Commission, Docket No. PUD 201500273. Direct Testimony of Mark Garrett. March 31, 2016, p. 14, available at: http://imaging.occeweb.com/AP/CaseFiles/occ5272383.pdf
[63] Oklahoma Corporation Commission, Docket No. PUD 201500273. Order No. 662059. March 20, 2017, available at: http://imaging.occeweb.com/AP/Orders/occ5360859.pdf
[64] DEI Response to IndianaDG Data Request 2.7.
[65] Direct Testimony of Maria T. Diaz, IURC Cause No. 45253, p. 22; *See also*, IURC, Order, June 29, 2020, Cause No. 45253.
[66] *Id.*, pp. 26-27.
[67] *Id.*, p. 27.
[68] *Id.*, p. 29.
[69] *Id.*

reducing their class's total non-coincident peak demand or diversified class electricity demand, such as by generating electricity during the applicable peak or by themselves having a lower demand during those hours than non-DG customers in their class, they will reduce costs allocated to their customer class.

- DEI allocates energy-related production costs to rate classes based on the amount of energy used by each class.[70] All of the electricity generated by a DG facility reduces the amount of electricity that a utility needs to generate at its own facilities or through purchases. To the degree DG customers reduce kWh consumed as a result of self-consumption and reduced purchases from DEI, they will reduce cost allocation to their customer class on a 1:1 basis. In other words, for costs allocated on the basis of energy, there can be no "subsidy" to DG customers.

These are examples and not meant to be a comprehensive accounting of all of the ways in which DG customers could impact cost allocation in DEI's cost of service studies.

Q. But you previously cited SEA 309's sponsor as saying he did not want complicated lengthy ratemaking proceeding. Is a cost of service study, or another type of analysis such as a cost-benefit analysis, actually needed in an EDG case?

A. In general, such studies are not required in an EDG case <u>when the utility is merely implementing a calculation of the EDG rate</u> in accordance with the statute. However, if the utility is *also* proposing additional, major policy changes not expressly directed in the statute that are a significant departure from important existing policies, such as DEI's "no netting" proposal, then it is the utility's responsibility and burden to demonstrate these additional changes are just and reasonable as well as consistent with the DG Statutes. That has not occurred here.

[70] *Id.*

7) DEI's "No Netting" Proposal Would Undermine Solar Jobs and Economic Development in Indiana

Q. How would DEI's "no netting" proposal impact the Indiana solar industry?

A. Based on my analysis of DEI's proposal and my professional experience, I believe DEI's proposal would significantly harm Indiana's residential and commercial sector solar industry, leading to job losses and reduced economic development benefits for local communities. For instance, abrupt changes to net metering and other DG policies at other utilities and states, including NV Energy in Nevada, Salt River Project in Arizona, Hawaiian Electric Company in Hawaii, and several smaller utilities in California, consistently demonstrate devasting impacts to DG deployment rates after drastic negative changes are implemented.[71]

Overall, the solar industry has created more than 3,300 solar jobs in Indiana, with solar jobs increasing by 114% since 2015.[72] DEI's "no netting" proposal, and the similar proposals filed by other utilities in Indiana, would imperil many of these jobs through the abrupt and substantial decrease in the economic value of customer-sited solar. They would also create a substantial negative outlook and chilling effect for the State in terms of its ability to attract new residential and commercial sector-focused solar companies, and significantly diminish any additional job creation potential at existing companies operating in Indiana. DEI's "no netting" policy will materially harm Indiana solar installation businesses by reducing demand for solar installations. The sum of the negative impacts

[71] Prepared Direct Testimony of Brad Heavner and Joshua Plaisted on Behalf of the California Solar and Storage Association [Third Amended Version dated August 2, 2021], California Public Utilities Commission, Docket No. R.20-08-020.
[72] The Solar Foundation, National Jobs Census 2020, available at https://www.thesolarfoundation.org/national/

will include loss of Indiana jobs, loss of economic development, and loss of state and local tax revenues from those companies and their employees, and the indirect ripple effects that will emanate from these direct impacts.

8) Monthly netting does not cause harm to DEI and non-DG customers.

Q. Would retaining monthly netting harm DEI or non-DG customers?

A. No. Whereas retaining monthly netting is of utmost importance for the nascent but growing Indiana distributed solar industry, and for Indiana residents that want financially viable on-site solar options, there is little to no imperative to change this policy from DEI's or its non-DG customers' perspective.

In fact, DG customers are likely providing substantial net benefits, as discussed further below, meaning the Commission should exercise its discretion in a manner that encourages the continued growth of DG in Indiana. For instance, the Lawrence Berkeley National Laboratory was commissioned by the Commission in response to a legislative request to provide a detailed analysis of emerging technologies and their impact on generation capacity, reliability, resilience, and rates ("LBNL DER Study"). It concluded that "[i]n general, scenarios with high adoption of rooftop solar PV result in system-wide savings," and "[r]ates tend to go down in the short term for the High [solar] PV scenarios."[73] These findings generally echo the results from studies commissioned on net metering or the value of solar in other states, some of which are discussed in more detail in the following section. The harmful impact of DEI's "no netting" policy in conjunction

[73] Indiana 21st Century Energy Policy: Emerging Technologies on the Electricity Distribution System, pp. 55-56, available at https://www.in.gov/iurc/files/2020-Report-to-the-21st-Century-Energy-Policy-Development-Task-Force.updated-min.pdf

with a very low EDG credit rate would hinder the State from realizing these substantial benefits.

Regardless of how the benefits of DG are quantified and considered, it is important to emphasize that the costs of DG are very modest on DEI and non-DG customers. Through the end of 2020, DEI had a meager 1,914 net metering customers out of more than 852,000 customers (*i.e.*, about 0.2% of customers) and 62.44 MW of installed net metering capacity compared to its peak demand of 5,573 MW.[74] DEI's annual revenue requirement is approximately $2.7 billion.[75] Even under conservative assumptions and assuming no value is provided by EDG, it would only amount to a *de minimis* "subsidy" or cost shift to non-DG customers that would not justify the major policy change being proposed by DEI. But when the benefits are considered, even that *de minimis* "subsidy" would not exist, or would be substantially reduced.[76]

Q. What if DG adoption continues to grow, causing the credit amount to also grow?

A. The revenue requirement for the EDG credit is so small that there would have to be unprecedented and abrupt growth in DG adoption rates for it to be a legitimate concern. Indiana's solar DG adoption rates are relatively modest to date, and there is no indication that such dramatic growth is likely. Net Metering and EDG customers' usage and credits are a *de minimis* cost in the context of DEI's $2.7 billion revenue requirement. Furthermore, focusing only on growth in the annual EDG credit fails to account for

[74] Indiana Utility Regulatory Commission, "2020 Year-End (2020YE) Net Metering Reporting Summary," March 2021, available at https://www.in.gov/iurc/files/2020-Year-End-Net-Metering-Required-Reporting-Summary.pdf; DEI, FERC Form 1, Q4 2020, pp. 304 and 401b.
[75] IURC Cause No. 45253, Final Order, June 29, 2020.
[76] DEI was unable to provide information on monthly customer excess generation carryover and gross kWh amount of net metering customers' excess energy carryover into 2021. *See* DEI Response to IndianaDG Data Requests 1.7 and 1.8.

offsetting associated benefits customer-sited DG provides, and these benefits would need to be holistically and comprehensively analyzed on a forward-looking basis to fairly evaluate whether the existing policy is causing a net benefit or a net cost to Hoosier residents. Utilities are permitted to recover the costs of EDG credits under the plain language of Section 15 of the DG Statutes.

E. The Benefits of Retaining Monthly Netting

Q. What factors help explain why monthly netting policies have been popular and widely adopted in the U.S.?

A. Monthly netting offers a number of key advantages that have contributed to it becoming widely adopted, popular among customers, and effective at growing DG:

- **Understandable to customers.** Monthly netting makes sense to consumers. The simplicity of netting of kWh exports against kWh imports over the duration of a billing period is intuitive and understandable to customers, who are accustomed to the monthly character of typical billing.
- **Ability to estimate the financial benefit of a DG investment.** Monthly netting allows solar installers to provide reasonably accurate estimates of the financial viability of a distributed solar facility, whereas "no netting" policies add substantial complexity and uncertainty to these estimates. Monthly netting allows customers to make informed decisions about a potential solar investment that is sized to generate electricity sufficient to meet their expected annual electricity usage. Smaller systems (e.g., those designed to only offset a customer's minimum usage and never export electricity) typically have higher per-kW costs that can substantially erode the solar value proposition.
- **Technologically simple**. It does not take new or expensive metering equipment, such as advanced metering infrastructure, to implement monthly netting. Monthly netting can be implemented using existing metering equipment.
- **Fair compensation.** The full crediting of DG exports against imports from the grid over the duration of a billing period is generally perceived and accepted as a fair compensation rate by customers. In addition, numerous studies from across the country have shown this crediting rate is a reasonable approximation of the value provided by rooftop solar during a month, particularly at low levels of rooftop solar deployment like in place in Indiana.
- **Benefits non-DG customers.** By facilitating DG growth, monthly netting produces greater systemwide DG benefits that flow to all grid users. The LBNL DER Study

found that the estimated incremental economic impact on power system investment and operation in its High PV scenario relative to its Base case was $265.2 million in savings by 2025 and $549.2 million in savings by 2040.[77]

- **Bill certainty and stability.** Since compensation for excess generation takes the form of kWh credits, future changes to the utility's underlying kWh rates do not impact the economics of the system, as the customer continues to fully offset their electricity exports and imports during the month, giving a customer additional "peace of mind" about their financial investment.
- **Local and State economic development.** Monthly netting policies have proven effective at transforming nascent rooftop solar markets into significant job creators. Rooftop solar installer jobs are inherently local jobs and cannot be outsourced.

Q. Have states studied the costs and benefits of policies with monthly netting, or the value provided by DG solar net metering systems?

A. Yes, there have been numerous studies in recent years that have examined the costs and benefits of such policies or the value of solar DG or other distributed energy resources more broadly.

Q. What have these studies found regarding the costs and benefits or the value of solar DG?

A. As shown in Figure 3 below, these studies have generally found that policies that employ monthly netting frameworks result in net benefits to all customers or only small net costs, prior to taking into consideration larger policy objectives and less directly quantifiable benefits (*e.g.*, societal benefits, local economic development benefits, etc.). Similarly, studies calculating the value of solar DG have often found the total value *exceeds* the current retail rate. One recent review found that 14 out of 24 value of solar analyses conducted in 2012-2018 calculated that the value of solar was at or above the retail rate, and only one analysis calculated a value that was below 50% of the residential retail rate

[77] Indiana 21st Century Energy Policy: Emerging Technologies on the Electricity Distribution System, pp. 55-56, available at https://www.in.gov/iurc/files/2020-Report-to-the-21st-Century-Energy-Policy-Development-Task-Force.updated-min.pdf

(Figure 4). For comparison, DEI's EDG Rate is only 24.3% of DEI's current total residential energy charges. Stated differently, **DEI is proposing to reduce the effective compensation rate for exported generation by a residential DG customer by approximately 76% in this case**.

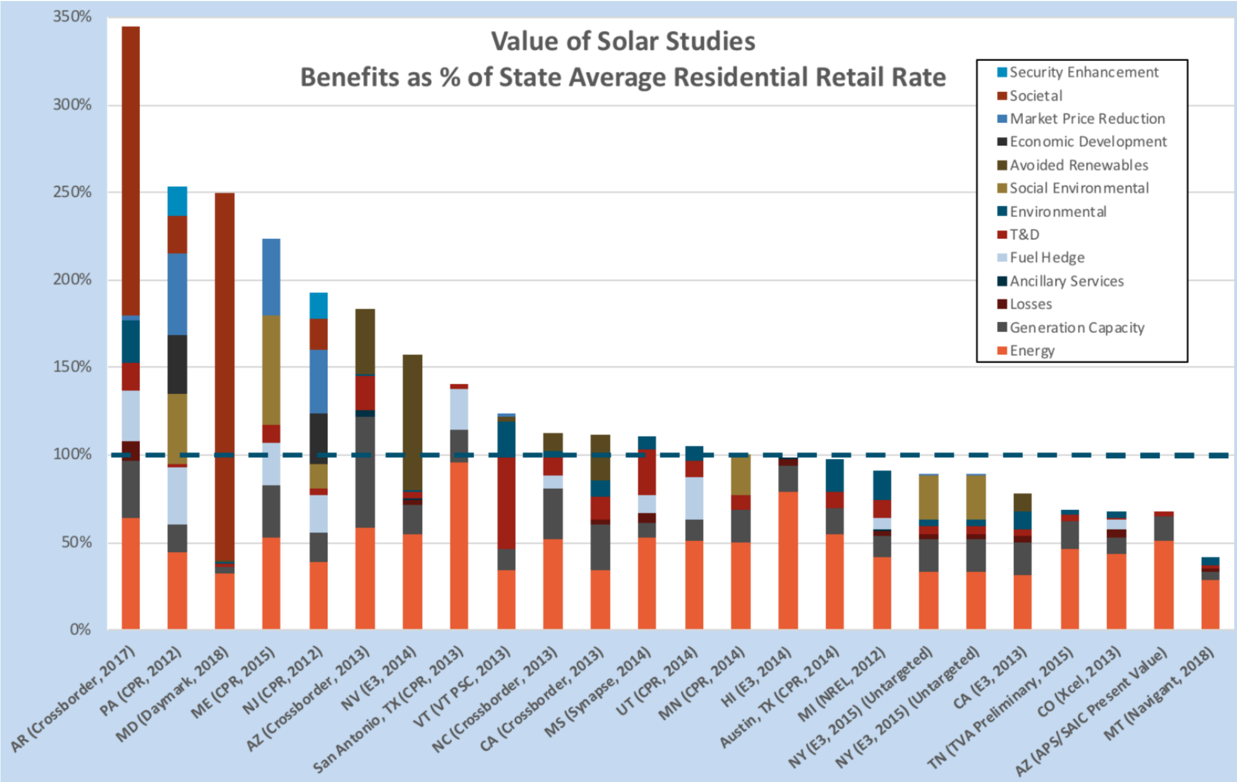
There is considerable variation across these studies in the methodology used, the categories of costs and benefits or values included, and the entity performing the study, which can all significantly impact the conclusions reached. Therefore, it is important that the specific context of a utility or state be fully evaluated in a rigorous and transparent way by an independent or neutral entity to determine what the impacts of net metering are in a specific jurisdiction.

Figure 3. Summary of State Cost-Benefit Study Results[78]

State	Year	Prepared by	Principal Findings
NEM Cost-Benefit Analysis			
Arkansas	2017	Crossborder	Benefits of residential distributed generation (DG) exceed the costs; do not impose a burden on other ratepayers.
Nevada	2016	E3	Cost-shift amounts to a levelized cost of $0.08/kWh for existing installations.
Louisiana	2015	Acadian	Costs associated with solar NEM installations outweigh their benefits.
South Carolina	2015	E3	NEM-related cost-shifting was *de minimus* due to the low number of participants.
Mississippi	2014	Synapse	NEM provides net benefits under almost all of the scenarios and sensitivities analyzed.
Vermont	2014	PSD	NEM results in "close to zero" costs to non-participating ratepayers, and may be a net benefit.
VOS/NEM Successor			
District of Columbia	2017	Synapse	Utility system VOS is $132.66/MWh (2015$); cost-shifting remains relatively modest.
Georgia	2017	Southern Company	Provides a methodology for assessing costs and benefits; no specific estimate is produced.
Hawaii	2015	CPR	Provides a methodology for assessing costs and benefits. Preliminary results suggest a net benefit.
Maine	2015	CPR	Value of distributed PV is $0.337/kWh (levelized).
Oregon	2015	CPR	Provides a methodology for assessing costs and benefits; no specific estimate is produced.
Minnesota	2014	CPR	Provides a methodology for assessing VOS; no specific estimate is produced.
Utah	2014	CPR	VOS is $0.116/kWh levelized.
DER Value Frameworks			
California	2016	CPUC	Provides a methodology for assessing costs and benefits; no specific estimate is produced.
New York	2016	NY DPS	Provides a methodology for assessing costs and benefits; no specific estimate is produced.

[78] Figure is from ICF International, "Review of Recent Cost-Benefit Studies Related to Net Metering and Distributed Solar," May 2018, available at: https://www.energy.gov/sites/default/files/2020/06/f75/ICF%20NEM%20Meta%20Analysis_Formatted%20FINAL_Revised%208-27-18.pdf

Figure 4. State Value of Solar Study Results[79]



Q. What do you conclude based on your review of these studies?

A. I conclude that monthly netting has been one of the key factors enabling the growth of DG in the U.S., and that DG has been shown in numerous studies across the country to provide substantial value that all customers benefit from. Approving DEI's "no netting" policy would harm the growth of DG, and the corresponding benefits it can provide to both DG and non-DG customers alike.

[79] Figure is from Kush Patel, "Act 236: Version 2.0," Energy+Environmental Economics, August 7, 2018, available at http://energy.sc.gov/files/Act%20236%20Follow%20Up%20-%20Stakeholder%20Meeting%2008.07.18_Final.pdf

F. Other Netting Periods

Q. Has the Commission previously stated it has discretion in EDG proceedings to determine the appropriate netting period?

A. Yes, the Commission previously stated that it may "exercise its expertise and discretion in determining the reasonableness of a utility's proposed netting period for EDG."[80] As I will discuss further later, longer netting periods, including monthly netting, weekly or daily netting, rather than no netting or netting on a short time interval (e.g., 15-minute or hourly netting), are fairer to EDG customers. But again, I see no language in the DG Statutes that requires or invites a change from monthly netting.

Q. What netting period is most consistent with producing just and reasonable rates in this case?

A. As explained previously, monthly netting is most consistent with the plain language in the relevant provisions of the applicable statutes and long-standing ratemaking principles.

In addition, retaining monthly netting also represents a "no regrets" policy option for the Commission in this case. Adopting monthly netting for the time being would allow the Commission to monitor the impacts of the transition to the EDG Rider and avoid a hasty move to a "no netting" policy that would further compound the negative impacts of the EDG Rider rate on future DG growth. If the Commission believes it has discretion to adjust the netting period, then there is little or no risk from preserving monthly netting for the time being, while reserving the right to move away from monthly netting in the future, should a compelling case based on actual facts, data, and analysis be made for that significant policy change.

[80] IURC Cause No. 45378, Final Order, April 7, 2021, p. 38.

A comparative analysis of the impacts of various netting methodologies is described in the following section.

Q. Is monthly netting a continuation of net metering?

A. No. Net metering closes to new customer participation after June 30, 2022 under the DG Statute. The DG Statutes implement a new EDG credit rate to apply to EDG for customers served under a utility's EDG tariff and made other changes to DG policy in Indiana. This is a significant reduction in the value of a DG system and a significant change from the past net metering policy. Maintaining monthly netting while implementing these legislative changes is consistent with the plain language of the DG Statutes and prudent policy.

G. Analysis of Impacts

Q. Did DEI estimate the bill impact for a typical residential DG customer or for commercial DG customers under its "no netting" EDG tariff proposal compared to the current net metering policy or compared to monthly netting and the EDG credit rate?

A. No. DEI has not offered any analysis whatsoever about the impacts of its "no netting" proposal.

Q. How would DEI's "no netting" policy affect residential DG customer bill savings?

A. <u>I estimate that DEI's "no netting" policy would reduce residential customer bill savings by roughly 45.3% for a solar DG facility sized to produce an approximate 100% load offset on an annual basis (*i.e.*, 9.3 kW-dc) compared to monthly netting where EDG is credited at the EDG credit rate</u>.

I arrived at this estimate through a multi-step process. First, I developed a typical residential solar production profile for a DG system located in Plainfield, Indiana, using the default assumptions in, and the output from, the National Renewable Energy Laboratory's ("NREL") PVWatts Calculator, which is a public, freely available modeling tool.[81] The default solar system size used in PVWatts is 4 kW-dc, so I scaled up the size of the DG facility to 9.3 kW-dc so its production offset approximately 100% of the typical DEI residential customer's annual electricity consumption.

Next, I utilized the representative Residential Service 8,760-hour load profile provided by DEI as a confidential data response. Based on the residential load profile provided by DEI and the solar generation profile I developed, I calculated the value diminishment and payback period of DEI's proposal and several alternative policies.

Using *hourly* production and load figures as opposed to more granular data means that this analytical method will understate the actual amount of exported electricity (*i.e.*, my methodology is akin to using an *hourly* netting interval instead of the *no netting* measurement proposed). Therefore, the reduction in customer bill savings produced by this method is a conservative estimate, and the actual reduction to bill savings will be more drastic under DEI's "no netting." To develop a rough estimate of the additional reduction in value from moving from an hourly netting to a "no netting" policy, I used the same reasonable deduction calculated in direct testimony by Joint Intervenors' witness William Kenworthy in Vectren's EDG case (IURC Cause No. 45378). Mr. Kenworthy reasonably estimated that the annual bill for an average customer under the Dual-channel Billing methodology ("no netting") would be approximately 12% more than the average customer would pay under his Hourly Net Billing methodology.[82]

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[81] https://pvwatts.nrel.gov/
[82] IURC Cause No. 45378, Direct Testimony of William Kenworthy, p. 19.

Finally, I also analyzed an alternative netting policy that would allow netting of imports against exports on a *daily* basis. The results of my analysis indicate daily netting is substantially less harmful to DG participants than either no netting or hourly netting. Specifically, no netting and hourly netting result in a 48.9% and 43.7%, respectively, value diminishment in the value of solar produced by a DG system relative to the current net metering policy, and a 45.3% and 39.7%, respectively, value diminishment relative to monthly netting with EDG credited at the EDG Rider rate. Daily netting, on the other hand, results in only a 15.4% value diminishment of DG generation compared to the current net metering policy, and a 9.4% value diminishment relative to monthly netting with EDG credited at the EDG Rider rate. As shown in Table 2, the total value of DG generation (i.e., on-site consumption plus exported generation) in the first year after installing a solar DG facility is estimated to range from a high of $1,485 under net metering to a low of about $758 under DEI's no netting proposal, with the other policy options analyzed reflecting a less significant reduction in total value. The results of this analysis are presented in Table 2.

Table 2. Annual Value Diminishment to a Residential Solar Customer in DEI's Service Territory under Alternatives to Net Metering

Compensation Category	No Netting	Hourly Netting	Daily Netting	Monthly Netting (EDG Credit)	Net Metering (Retail Rate)
On-Site Value	*Unknown*	$627.96	$627.96	$627.96	$627.96
Export Credits Value	*Unknown*	$208.35	$628.77	$759.00	$857.17
Total Value	$758.21	$836.30	$1,256.73	$1,386.96	$1,485.13
Value Diminishment Compared to Net Metering (Retail Rate)	**48.9%**	**43.7%**	**15.4%**	**6.6%**	--
Value Diminishment Compared to Monthly Netting (EDG Credit)	**45.3%**	**39.7%**	**9.4%**	--	--

While there will be a fair amount of variation between individual customers with respect to their hourly load profiles, my estimates are reasonable comparisons. Customers with lower daytime loads would produce a greater quantity of exports than those with higher daytime loads and, consequently, forfeit more value due to excess daytime generation being compensated at the low EDG Rider rate, instead of the volumetric retail rate compensation that the customer would receive under monthly netting. Second, system orientation and other site characteristics would influence the solar production shape and, correspondingly, the amount of hourly exports. However, I believe my estimate provides a useful and reliable illustration of the financial impacts of DEI's proposal on a typical residential customer installing a solar DG system.

The daily netting results further demonstrate just how financially disastrous DEI's "no netting" proposal would be on prospective solar DG customers compared to more reasonable alternatives. Even allowing solar customers to retain their export credits for a day yields a 15.4% diminishment in customer value compared to a 48.9% value diminishment from "no netting" relative to net metering.

Q. How would DEI's "no netting" proposal affect residential DG customer payback periods?

A. I calculate that the payback period for a 9.3 kW system costing a residential customer \$3.05/watt,[83] or a total upfront cost of \$28,365, would be 25.9 years under DEI's "no netting" proposal, compared to 13.4 years under the current net metering policy, or 14.4 years under monthly netting with EDG credited at the EDG Rider rate (Table 3). DEI's proposals in the case would nearly double the payback period for a typical residential customer DG investment, to the point where it no longer would save a customer money over an assumed 25-year life of a rooftop solar facility.

Table 3. Payback Period of a 9.3 kW Residential Solar Facility in DEI's Service Territory (With ITC)

DG Compensation Policy	Payback Period (Years)
Net Metering (Current)	13.4
Monthly Netting (EDG Credit for Excess Distributed Generation)	14.4
Daily Netting	15.9
Hourly Netting	23.6
No Netting	25.9

[83] Energy Sage, https://www.energysage.com/local-data/solar-panel-cost/in/ (Showing that "[a]s of July 2021, the average solar panel cost in Indiana is \$3.05/W.")

The payback periods above include the current 26% federal investment tax credit ("ITC"), discussed in more detail below. The payback period of a DG system will get worse in future years as the ITC phases out. For a residential DG system installed on or after the end of the ITC on January 1, 2024, the payback period would increase to 17.5 years under monthly netting and to 32.5 years under DEI's "no netting" proposal (Table 4).

Table 4. Payback Period of a 9.3 kW Residential Solar Facility in DEI's Service Territory With (No ITC)

DG Compensation Policy	Payback Period (Years)
Net Metering (Current)	17.5
Monthly Netting (EDG Credit for Excess Distributed Generation)	18.7
Daily Netting	20.5
Hourly Netting	29.9
No Netting	32.5

Q. What is the impact of DEI's "no netting" proposal relative to the application of the EDG credit rate?

A. As demonstrated in Tables 2 through 4, DEI's "no netting" proposal is the primary driver of the reduced value of installing solar DG and would result in a significantly longer payback period. In contrast, maintaining monthly netting and applying the EDG credit rate to all monthly net EDG produces a less drastic decrease in the value of installing solar DG and a smaller increase in the payback period relative to the current net metering policy.

Q. Would non-residential customers be similarly impacted?

A. Yes. Schools, churches, governments, and businesses would likely see a similar, negative impact on their potential bill savings from installing a DG system designed to meet their annual electricity usage under DEI's proposed "no netting" policy. The specific magnitude of the impacts would depend on the customer's rate schedule, usage characteristics, and generation profile, among other factors.

Q. Will federal subsidies for DG technologies like solar make up for DEI's dramatic reduction in compensation under its "no netting" proposal?

A. No. The federal ITC has been a factor in customer payback periods since it started, and it is factored into my payback period analysis described above. To say the existing ITC credit – even if it is extended by Congress – is a cure for or reduction to the financial harm that would be caused by DEI's "no netting" proposal would be false. The ITC for solar is currently being phased out. The ITC currently provides a 26% tax credit for solar systems on residential (under Section 25D) and commercial (under Section 48) properties. In 2023, or only six months after DEI's EDG Rider is scheduled to become effective for all new DG customers, the ITC will step down to a 22% tax credit. Beginning in 2024, the commercial ITC drops down to 10% in perpetuity, whereas the residential ITC will be *eliminated* for new systems.[84]

It is also important to note that entities without federal income tax liability like churches and municipal governments cannot directly benefit from current federal ITC. This means that solar sited at government buildings, public schools, and nonprofit organizations in Indiana are generally unable to benefit from the ITC.

Third-party power purchase agreements ("PPAs") are a financing mechanism that has been widely used in many other states, allowing entities without federal income tax liability to indirectly benefit from the federal ITC through the pass-through of the benefits

[84] Solar Energy Industries Association, "Solar Investment Tax Credit (ITC)," available at https://www.seia.org/initiatives/solar-investment-tax-credit-itc.

realized by the third-party owner(s) to the customer purchasing the solar facility's output. However, this financing mechanism has not been explicitly authorized in Indiana, so its legal status is unclear here. As a result, Indiana taxpayers are paying for the ITC (to the extent all U.S. taxpayers bear the costs of federal tax credits) associated with solar PPAs that other state regulators or policymakers have expressly allowed as part of their DG policies, meaning Hoosiers bear the costs but are not getting their fair share of the benefits of the ITC associated with solar PPA financing models.

Q. What would be the impact of the "no netting" proposal on the adoption rate of technologies like distributed solar and the type of customer that would be able to make such an investment in DEI's service territory?

A. Simply put, as a result of the large reduction in potential savings for installing DG, DEI's "no netting" proposal would have a devastating impact on the adoption rate of DG technologies like solar by preventing most customers from being able to install such a DG system based on the economics. For example, a rooftop solar system can have an upfront cost (prior to applying the federal ITC) of roughly $15,000 to $30,000, depending on system size and other factors.[85] If DEI's "no netting" proposal is approved, solar companies will likely struggle to attract new customers and will be less likely to be able to offer financing arrangements like leasing, which can make rooftop solar economically viable for families that cannot afford the upfront costs of a solar system, because such leasing services are usually made available on the basis of demonstrating a net cost reduction to customers.

[85] The median price for residential solar in the U.S. in 2019 was $3.76/watt, according to Lawrence Berkeley National Laboratory's "Tracking the Sun" data, available at https://emp.lbl.gov/tracking-the-sun. More recent and regionally specific data suggest the price in Indiana is currently around $3.05/watt: https://www.energysage.com/solar-panels/in/.

Without a reasonable opportunity to save money from a solar investment, most customers are unlikely to install a system.

Only customers who are not sensitive to the economics of such a large investment would be able to make such an investment. Unfortunately, this leads me to conclude that DEI's "no netting" proposal would likely mean that primarily high-income Hoosiers and perhaps some larger businesses would be able to afford investment in on-site DG technologies like rooftop solar, making solar out of reach for the average Hoosier household, small business, or school. In contrast, trends in rooftop solar adoption across the country show that the median household income for solar adopters is falling over time.[86]

DEI's proposal is a step backwards in improving equity and access to the diverse benefits of DG solar.

Q. Could customers mitigate the adverse impacts of the "no netting" proposal by adding battery energy storage system to their DG facilities?

A. While battery energy storage is an extremely promising resource that can provide all customers, the utility, and the grid with many benefits, they are typically too expensive for individual customers to install, especially lower and moderate-income residential customers, and therefore the installation of this technology should not be *de facto* mandatory for participation in a DG program. For instance, one 5.8 kW / 13.5 kWh Tesla Powerwall costs $7,000, and that is before consideration of supporting hardware that can cost about $1,000, sales tax, plus installation costs that are site dependent and can run into

[86] Lawrence Berkeley National Laboratory, "Residential Solar-Adopter Income and Demographic Trends: 2021 Update," available at https://eta-publications.lbl.gov/sites/default/files/solar-adopter_income_trends_final.pdf.

thousands of dollars.[87] Most residential solar installations would need to be paired with multiple batteries for the customer to fully serve their entire load on an annual basis without importing or exporting any electricity.

Notably, DEI offers no proposal to mitigate the upfront cost of customer investments in battery energy storage systems, or innovative proposals, akin to those I discuss later, that would help customers and the grid benefit from batteries' capacity located on the customer's premises. Instead, DEI seeks to impose the most unfavorable EDG paradigm possible, which will result in many customers not being able to install solar and the potential demise of solar installation businesses in Indiana. The DG Statutes' plain language does not require DG customers to install battery storage, and it would be unfair, unjustified, and unreasonable to impose a policy that would require such a financial burden on DEI EDG customers.

Q. Couldn't DG customers limit their exported electricity through other means besides installing a battery energy storage system?

A. Only to a limited extent. DG customers do not generally have the ability or the capacity to monitor their instantaneous minute by minute electricity usage and generation and align the two, meaning customers are limited in their capability to respond to the "price signals" under "no netting." Similarly, residential customers of Indiana investor-owned utilities are not exposed to real-time wholesale market price fluctuations that would require closely monitoring and responding to sub-hourly price fluctuations, and are instead served under

[87] Energy Sage, "The Tesla Powerwall home battery complete review," April 29, 2021, available at https://news.energysage.com/tesla-powerwall-battery-complete-review/

rate schedules that use flat energy rates, block rates, or time-of-day rates with a limited number of time periods.

Furthermore, only a portion of electricity usage is discretionary and can be shifted across time. Many customers will have limited ability to do so and maintain those behaviors, which further limits the customer's ability to avoid exporting generation by using the DG output behind the meter for on-site consumption. Some types of customers will be particularly constrained in their ability to shift usage during the day or across seasons (e.g., schools; residential customers with schedule constraints that prevent shifting when they cook dinner or do the laundry; etc.).

Finally, as discussed above, there is no reason customers should be discouraged from exporting EDG in the first place, particularly given that it will tend to overlap with DEI's on-peak period in the summer and shave peak demand during these times.

Q. If a customer were to install battery storage, would a "no netting" policy provide a good price signal for maximizing the value that the battery can provide to the grid?

A. No. No netting or limited duration netting policies (e.g., hourly netting) prompt customers to use the battery to avoid exports, since those exports have a diminished value relative to electricity consumed on-site. This results in the battery charging during daylight hours, and discharging when solar production is not available at night. Discharge is limited to the customer's load at any given point in time.

By contrast, maximizing the value of a battery to the larger grid is achieved by maximizing discharge during the peak periods irrespective of on-site load. This characteristic is reflected in the "Bring Your Own Device" ("BYOD") battery storage grid services framework that is becoming increasingly common. For instance, in a recent proposal for a home battery program, Consumers Energy in Michigan proposed such a design for dispatch of enrolled batteries based on findings from a preliminary test deployment where it "learned that the usable battery energy was reduced when only offsetting customer home load – and it would be more efficient to maximize battery discharge beyond the customer home load during system peak conditions."[88] Likewise, in Hawaii, Hawaiian Electric is now offering substantial financial incentives to incentivize residential and commercial customers to add a battery energy storage facility to an existing or new solar facility and use and/or export electricity stored in the battery between 6 p.m. to 8:30 p.m. daily in order to help contribute to resource adequacy during those times after an AES coal plant retires in September 2022.[89]

In other words, the greatest benefits to the grid accrue when exports, either from on-site solar alone or battery storage, are maximized during peak conditions. Devaluing exports during peak periods as DEI proposes does exactly the opposite. It sends exactly the wrong signal to customers from the standpoint of maximizing the benefits of a DG system.

Q. Does monthly netting require the utility to serve as the EDG customer's battery?

A. No. The utility is neither acting as nor providing services comparable to a battery. Electricity exported by a DG customer flows onto the grid and is used by other customers. The utility charges those other customers the retail rate for that electricity and credits the DG customer for the electricity provided. The utility does not store the solar electricity

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[88] Michigan Public Service Commission, Docket No. U-20963, Direct Testimony of Priya D. Machi at 6:9-12, March 1, 2021.

[89] Hawaiian Electric, "New 'Battery Bonus' program to offer Oahu customers cash incentive to add energy storage to rooftop solar system," July 19, 2021, available at https://www.hawaiianelectric.com/new-battery-bonus-program-to-offer-oahu-customers-cash-incentive-to-add-energy-storage-to-rooftop-solar-system.

generated by the DG customer and provide that electricity back to the customer when the DG customer needs it. Monthly netting is merely a compensation framework that provides fair compensation measurement to a DG customer for excess generation they provide to the utility and to the benefit of other customers.

Battery storage provides distinguishable and separate services compared to the utility's grid, including as a back-up power source for when the utility experiences a grid outage, a method for a customer to manage their demand (e.g., to manage their demand charges or take advantage of time-of-use pricing), and a means for the customer of storing electricity generated on-site for future use. DG customers, like non-DG customers, can use electricity provided by the utility when they need it under the terms of their rate schedule and in line with the utility's obligation to serve all customers in its service territory. DEI is neither an EDG customer's battery nor is acting as a battery under monthly or any other netting method.

III. OTHER ISSUES WITH DEI'S EDG RIDER

A. EDG Credits at End of Service

Q. Does DEI's EDG Rider allow the full amount of EDG credits to be carried forward?

A. No. DEI would confiscate any credits remaining when the customer discontinues service:

> 4) When customer elects to discontinue Net Metering service, any unused credit will be granted to the Company.[90]

This practice would deprive departing customers of earned EDG credits for energy already supplied to DEI without any clear justification.

Q. Is this provision fair and consistent with the plain language of the DG Statutes?

[90] Corrected Petitioner's Exhibit 1-B to Roger A. Flick's Direct Testimony, July 19, 2021.

A. No, I do not believe this is fair to EDG customers or consistent with the plain language of the DG Statutes. Section 18 of the DG Statutes provides that:

> An electricity supplier shall compensate a customer from whom the electricity supplier procures excess distributed generation (at the rate approved by the commission under section 17 of this chapter) through a credit on the customer's monthly bill. Any excess credit shall be carried forward and applied against future charges to the customer for as long as the customer receives retail electric service from the electricity supplier at the premises.

The language in the DG Statutes does not expressly specify how unused credits should be treated when a customer no longer receives retail electric service from the utility. It certainly does not direct a utility to confiscate the property of its DG customers and socialize the benefits across all customers by taking a DG customer's unused credits without compensation. Those credits represent electricity generated by the customer's privately owned DG system, delivered to DEI, and sold by DEI at retail rates to other customers. To not compensate a departing DG customer for their EDG credits strikes me as taking without compensation.

Q. Do other jurisdictions allow DG customers to cash out unused credits?

A. Yes. In my experience, it is common for states to allow net metering customers to cash out unused net metering credits, such as on an annual basis for any credits that accrued over the year, or at the end of service. For instance, in 2016, Iowa regulators directed utilities to allow unused credits to be banked monthly and cashed out at the end of the year at the utility's avoided cost rate under net metering tariffs.[91]

I am not aware of any negative impacts that these customers have experienced as a result of such policies.

[91] Iowa Utilities Board, Docket No. NOI-2014-0001, Order, July 19, 2016.

Q. What do you recommend?

A. I recommend that earned EDG credits be refundable to customers upon service termination. Those credits represent the approved value of electricity the customer generated and sent to DEI. To not compensate DG customers for that valuable electricity is, in my view, to take the DG customer's property without compensation. Likewise, if the customer moves to a different premise, but remains a DEI customer, they should receive their EDG credits on their subsequent DEI bill. They earned it, it has value, and it should be theirs to keep.

An unused credit represents electricity a DG customer has generated through their investment in a DG system and provided to the utility to the benefit of its customers. The utility effectively sells EDG provided by a DG customer to other customers at the retail rate. Confiscating unused EDG credits takes the economic value of exported electricity provided by DG customers, but provides no compensation to the DG customer for that benefit.

B. External Disconnect Switch

Q. Are there any other requirements of taking service under the EDG Rider that raise concerns?

A. Yes. DEI confirmed in response to a data request from IndianaDG that it "will continue to require the installation of an external disconnect for all generation interconnections" and that "[t]he disconnect, by mechanical operation, must interrupt the flow of energy on the electric conductors physically connected to the generation source. The use of contactors, relays, inverters or other similar equipment are not permitted."[92] However, when asked in

[92] DEI Response to IndianaDG Data Request 2.10.

the same data request, DEI was unable to identify the number of times it needed to use a DG customer's external disconnect switch.

Q. Why is this term problematic?

A. My understanding is that external disconnect switches are not necessary for isolating a small, inverter-based DG facility, and that this has been robustly established and demonstrated for well over a decade now. For instance, modern inverters included in rooftop solar facilities today meet Underwriters Laboratory ("UL") Standard 1741, which means the inverter has passed rigorous testing requirements that demonstrate the inverter provides for anti-islanding protections that will safely and quickly isolate the solar facility in the event of a grid outage. A 2008 report by the Solar America Board for Codes and Standards detailed the practical, legal, and technical reasons for eliminating the external disconnect switch requirement.[93]

Accordingly, many states and utilities have moved away from this onerous and unnecessary requirement. In Indiana, Vectren's approved EDG tariff does not require Level 1 interconnections to install an external disconnect switch.[94] Likewise, AES Indiana does not require Level 1 interconnections to install an external disconnect switch.[95] Both utilities have been able to safely interconnect hundreds of DG customers and allow DG customers to operate their systems in parallel with the grid without imposing the unnecessary requirement that these systems include an external disconnect switch.

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[93] Michael T. Sheehan, "Utility External Disconnect Switch: Practical, Legal, and Technical Reasons to Eliminate the Requirement," 2008, available at http://www.solarabcs.org/about/publications/reports/ued/pdfs/ABCS-05_studyreport.pdf.
[94] IURC Cause No. 45378, Final Order, April 7, 2021, p. 41.
[95] IPL, "Level 1 Application for Interconnection," available at https://www.aesindiana.com/electrical-system-interconnection-agreements-and-applications.

Furthermore, other states have also moved away from requiring external disconnect switches for small, inverter-based DG systems. For example, New York's Standardized Interconnection Requirements do not require a disconnect switch for inverter-based DG system sizes 25 kW or less.[96] None of California's three large investor-owned utilities have required the installation of an external disconnect switch.[97] This is particularly notable because these three California utilities have collectively installed more than 1 million solar net metering facilities to date.[98] For instance, since January 1, 2010 – i.e., for more than 11 years – San Diego Gas and Electric has not required external disconnect switches to be installed.[99]

If an external disconnect switch was needed for safety reasons, these states and utilities would clearly be requiring them. Modern inverters that are installed as part of small distributed solar facilities can safely isolate the DG system from the grid in the event of an outage. This has been a well-established and documented fact for well over a decade based on the installation of millions of small solar facilities. Because installing an external disconnect switch can be expensive and burdensome to DG customers, but is not necessary

[96] New York Department of Public Service, available at https://www3.dps.ny.gov/w/pscweb.nsf/all/dcf68efca391ad6085257687006f396b

[97] Brandon Carlson, "Alternating Current Disconnect Requirements for Photovoltaic Operation within California," September/October 2017, IAEI Magazine, available at https://iaeimagazine.org/features/renewables/alternating-current-disconnect-requirements-for-photovoltaic-operation-within-california/.

[98] U.S. Energy Information Administration, Form EIA-861M, June 2021, available at https://www.eia.gov/electricity/data/eia861m/.

[99] Brandon Carlson, "Alternating Current Disconnect Requirements for Photovoltaic Operation within California," September/October 2017, IAEI Magazine, available at https://iaeimagazine.org/features/renewables/alternating-current-disconnect-requirements-for-photovoltaic-operation-within-california/.

for safety purposes, this provision in DEI's EDG rider is unnecessary, unfair, and unjustified.

Q. What do you recommend?

A. I recommend the Commission direct DEI to clarify in its EDG Rider that disconnect switches are not required for Level 1 interconnections. If the Commission declines to adopt this recommendation at this time, I recommend that it direct DEI to keep records of the number of instances as well as then circumstances in which its personnel use a DG customer's external disconnect switch so that the Commission has more data to assess the reasonableness of this requirement in the future.

IV. CONCLUSION

Q. Please summarize your recommendations to the Commission.

A. I recommend that the Commission reject DEI's EDG Rider to the extent it would implement a "no netting" methodology for measuring EDG. DEI's proposal is inconsistent with the plain language of the DG Statutes.

DEI's case in chief in my view has also failed to prove its case and has not demonstrated that this major policy change to "no netting" would produce rates that are just and reasonable. As my testimony demonstrates, there are many good reasons for the Commission to reject this radical departure from past methodologies and maintain the longstanding, widely adopted, and commonsense monthly netting framework for measuring EDG as it transitions away from net metering through implementation of the EDG Rider.

To the extent the Commission disagrees with my recommendation to maintain monthly netting under the EDG Rider, I recommend it consider less punitive alternatives to the "no netting" policy DEI has proposed, such as daily netting.

If the Commission approves DEI's filing as proposed or with limited modifications, I recommend that the Commission direct DEI to provide additional consumer information and education regarding its Rate QF to ensure all eligible DG customers have access to and are fully informed of this rate option, which could provide a more favorable compensation rate than the EDG Rider as proposed for certain DG customers.

I also recommend that the Commission direct DEI to modify its calculation methodology for the EDG Rider credit rate as described in my testimony to recognize the fact that solar is producing and exporting generation only during daylight hours and should be compensated accordingly.

Finally, I recommend the Commission ensure that all DG customers are provided fair terms and conditions under net metering and the EDG Rider. Specifically, I recommend the Commission reject DEI's taking without just compensation of EDG credits remaining at the end of a customer's service and require DG customers to install an external disconnect switch. These terms are unjustified and would further harm EDG customers by imposing additional, unnecessary costs or take away benefits to which DG customers are entitled without providing fair compensation.

Q. Does this conclude your testimony?

A. Yes, at this time. I may need to supplement this testimony in the future.

VERIFICATION

I, Benjamin Inskeep, affirm under penalties of perjury that the foregoing representations are true and correct to the best of my knowledge, information and belief.

Benjamin Inskeep

September 20, 2021