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February 28, 2020

**RE: Inquiry by the Department of Public Utilities on its own Motion into Distributed Generation Interconnection, D.P.U. 19-55**

Dear Secretary Marini:

On May 22, 2019, the Department of Public Utilities (“Department” or “DPU”) opened an inquiry to review the current standards and procedures for interconnecting distributed generation (“DG”) facilities to the electric power system.<sup>1</sup> Subsequently, in a technical session held on October 3, 2019, the Department announced its intention to solicit proposals regarding cost allocation for DG interconnection costs. According to a DPU Hearing Officer memorandum issued on December 26, 2019, proposals should indicate either support for the Department’s current cost allocation principles or present an alternative cost allocation principle for circumstances in which an infrastructure modification is necessary to interconnect one or more DG facilities. Under existing cost allocation principles, cost causation provides that an interconnecting DG customer must pay for the infrastructure modification cost associated with the applicable interconnection. The DPU indicates that two proposals will be accepted from each stakeholder or group of stakeholders, including a proposal for residential customers and a separate proposal for medium and large DG facilities. Proposals are due on February 28, 2020. Accordingly, DOER submits this proposal for the Department’s consideration.

**I. OVERVIEW**

DOER’s proposal would create an alternative to supplement the DPU’s current cost allocation principle for DG interconnection-related modifications. DOER’s recommended cost allocation principle aims to ensure equitable access to DG and its associated benefits and continued development of DG. Responsible and continued development of DG will further the Commonwealth’s energy goals of affordability, reliability, and achieving clean energy

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<sup>1</sup> For the purposes of this document, DG refers to distributed generation and storage, which are both subject to the electric distribution companies’ DG interconnection tariffs. The electric distribution companies’ DG Interconnection Tariffs are as follows: (1) Fitchburg Gas and Electric Light Company d/b/a Unitil - M.D.P.U. No. 269; (2) Massachusetts Electric Company and Nantucket Electric Company, each d/b/a National Grid - M.D.P.U. No. 1320; and (3) NSTAR Electric Company d/b/a Eversource Energy - M.D.P.U. No. 55.

deployment. DOER's proposal allows for further progress towards meeting the Commonwealth's Global Warming Solutions Act ("GWSA") greenhouse gas emissions reduction targets recently strengthened by Governor Baker's commitment to net-zero greenhouse gas emissions by 2050.<sup>2</sup> Finally, continued development of DG will benefit the Commonwealth and ratepayers by providing reduced environmental compliance costs, increased reliability and power quality, a diversified fuel mix, and support for anticipated load increases from the Commonwealth's efforts to electrify the thermal and transportation sectors.

The scale of DG growth and its contribution to our overall electric supply presents an opportunity to reassess interconnection planning to equitably distribute costs and preemptively address distribution system upgrades. While the current model of cost causation can provide a beneficial price signal that drives DG development to locations that do not require substantial upgrades, it can also impede DG development, particularly in areas with saturated or near saturated distribution system circuits. Under cost causation, DG customers use available hosting capacity without paying upgrade costs, leaving future DG customers to pay for potentially cost-prohibitive upgrades and stalling residential DG interconnections in specific neighborhoods. Medium and large customers often opt to locate projects away from load to access available hosting capacity, or size projects to meet available hosting capacity, avoiding costly upgrades themselves, but making them necessary for the next interconnecting customer. Further, cost causation does not incentivize behind-the-meter use for DG facilities, and little if any opportunity exists for electric distribution companies to plan for future hosting capacity when selecting the size of interconnection-related system modifications.

DOER recommends addressing such drawbacks through the use of a cost-based interconnection fee structure for DG facilities. Interconnection fees would be fairly and equitably applied based on the size of a DG facility and assessed to all residential DG customers, as well as medium and large DG customer interconnections that do not require system modifications. Cost causation principles would continue to apply to medium and large DG facilities that require system modifications to preserve price signals as noted above. Collected fees would be used to offset the cost of system modifications caused by the interconnection of residential DG facilities and for a portion of the cost of system modifications caused by the interconnection of medium and large DG facilities. If system modification costs exceed the amount collected through fees, the EDCs could recover the remaining cost of system modifications from ratepayers. A mechanism may be included to cap rate recovery and adjust the level of the fee over time to readdress ratepayer costs.

This proposal aims to address several challenges resulting from the current cost allocation methodology. DOER's proposal provides cost predictability and affordable interconnection opportunities to residential customers, ensuring that no single residential DG customer gets assigned prohibitive system modification costs. DOER's proposal also aims to provide a mechanism to resolve future costly interconnection-related system modifications by ensuring that all interconnecting DG facilities contribute to offsetting those costs. Further, DOER's proposal aims to enable EDC sizing of system modifications to account for anticipated future DG deployment. The recommended fee structure aims to incentivize behind-the-meter DG facilities by ensuring that the customer will pay a reduced fee if they are locating the facility behind-the-meter.

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<sup>2</sup> Governor Baker Delivers 2020 State of the Commonwealth Address; <https://www.mass.gov/news/governor-baker-delivers-2020-state-of-the-commonwealth-address>

This cost allocation structure will require reporting, producing data on the cost of interconnection-related system modifications, and increased transparency in the current interconnection process. This increased transparency and the ability to size system modifications to meet future hosting capacity needs will help facilitate the transition to distribution planning coordinated with DG hosting capacity requirements.

## **II. CHALLENGES WITH THE CURRENT COST CAUSATION PRINCIPLES**

The Commonwealth's clean energy policies, including DOER's SMART program, have successfully spurred development of DG. Increases in the amount of DG interconnecting to the distribution system presents local distribution system challenges, and the current cost causation principles do not resolve the challenges in several cases.

The DG interconnection tariffs provide a process for the EDCs to determine whether the interconnection and operation of a DG facility may negatively impact the safe and reliable operation of the distribution system. Through that process the EDCs identify necessary system modifications required to enable the interconnection. The system modifications vary in cost, and often require significant financial investment. The costs of the system modifications get assessed to the interconnecting DG facility. DG facilities that interconnect utilizing available hosting capacity do not pay for that hosting capacity.

Residential customers typically have used the simplified interconnection process to interconnect DG facilities at no cost.<sup>3</sup> Historically, most distribution system circuits had hosting capacity to allow for the interconnection of residential DG facilities, even when the aggregate capacity of those projects is substantial. However, some residential customers have faced upgrade costs associated with changes to their service transformer and even these nominal upgrades (for example, shared secondary transformer replacement) are often cost prohibitive to project development.

More recently, heavily saturated circuits have developed where the aggregate capacity of existing DG triggers substantial upgrade requirements for new residential projects. On these saturated circuits, under the cost causation principle, the last residential customer to apply to interconnect would be deemed the cost causer of all necessary upgrades and assessed the entirety of the associated upgrade cost. A residential customer would likely have limited ability to pay for these costs and the ability of aggregating the costs across residential customers and DG service providers is logistically and economically challenging. When this occurs, residential DG interconnections are functionally suspended until the upgrade is paid by a willing customer.

Further, residential, medium, and large customers seeking to add a DG facility as a behind-the-meter unit may be subject to substantial upgrade costs, even when the customer intends to limit export or not export at all. DOER's understanding is that once a customer's load is included in the analysis of a circuit, its own on-site load may not be considered when it subsequently seeks to add DG. Therefore, such a customer could be prevented from self-serving its load with the addition of DG. Under cost causation in this scenario, the previously interconnected DG on the circuit did not pay for the hosting capacity they used, even though that hosting capacity was exclusively associated with another customer's load. This is a challenge because the cost causation principle creates a barrier to beneficial DG operations such as increased self-consumption and non-export.

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<sup>3</sup> See M.D.P.U. No. 55 at 59, Table 6.

Medium and large DG projects more frequently trigger infrastructure modifications, especially those without on-site useful load (“standalone facilities”). Standalone facilities have greater ability than behind-the-meter projects to design systems to effectively avoid or reduce upgrade costs. They have siting flexibility and may re-site projects if the EDCs assess significant interconnection upgrade costs. They may also reduce proposed DG facility size to avoid or reduce upgrade costs.<sup>4</sup> If a standalone facility developer takes such actions to avoid or reduce paying for significant distribution system upgrades, the project will reduce the circuit’s remaining hosting capacity. Under cost causation, the next significant DG interconnection will likely be responsible for significant upgrade costs with little or no contribution from the previous DG facilities.

Finally, while cost causation can work as a principle, there are technological limitations that can result in individual customers effectively overpaying for the interconnection in practice. Specifically, under the current design, if the system modifications required for DG interconnections are also required for the distribution system generally, the costs of the upgrade are allocated between the interconnecting DG customer and the distribution company.<sup>5</sup> However, if they are not required for the distribution system the DG customer may pay for significant system modifications and it is foreseeable that those modifications could be oversized due to technology constraints, creating “lumpy” investments. This could act as a cost barrier to interconnections. Further, cost causation precludes the EDCs of the opportunity to upsize the upgrade to provide for anticipated future hosting capacity needs.

As DG deployment continues, these distribution grid challenges will likely become more common, increasing the risk that system modification costs will inhibit or stall the interconnection of DG in the Commonwealth.

### **III. DOER’S PROPOSED FRAMEWORK**

DOER recommends the Department consider its proposed alternative to supplement the current cost allocation principle for DG interconnection-related modifications. Under DOER’s proposal, interconnecting DG customers will be assessed a fee by their EDC to offset the costs of future interconnection-related system modifications within their service territory.<sup>6</sup> DOER presents the following principle acknowledging that details in this proposal will need to be refined and only implemented once the EDCs are able to provide data and information on interconnection-related system modification costs.

#### **A. Fee Structure**

The use of a cost-based fee to ensure all DG customers contribute to interconnection-related system modifications addresses an inequity in the current cost causation principle. Future DG customers should be assessed a cost-based fee that represents their estimated share of the average cost of distribution system upgrades necessary for the

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<sup>4</sup> In D.P.U. 19-55, stakeholders are currently collaborating on redlines to the EDC’s current DG interconnection tariffs that would incorporate an analysis of export capacity into the interconnection process.

<sup>5</sup> See M.D.P.U. No. 55 at § 5.4

<sup>6</sup> Any cost associated with the following are not included in this cost allocation principle and DOER recommends no changes from current cost principles: a) the review and studies conducted to determine the requirements of the interconnecting facility, b) costs associated with the installation and construction of the DG facility, and c) equipment which the customer requests to interconnect to an EDC’s system.

interconnection of DG. This fee structure should apply to residential, medium, and large DG facilities, as all customer groups utilize existing hosting capacity and impact the shared distribution network.

The fee should be based on the relative impact on the distribution system. DOER recommends that the fee be leveled by both the proposed DG facility's nameplate capacity in kilowatts ("kW") as well as its export capacity in kW. Using both nameplate and export capacity recognizes that DG used to serve onsite load impacts overall system hosting capacity, but not as significantly as exported energy, and provides a price signal for DG customers to maximize self-consumption of their generation. On February 26, 2020, the joint stakeholder consensus redlines<sup>7</sup> proposed that the interconnection tariffs recognize export capacity as a separate metric from nameplate capacity. The fee structure builds on that consensus, enabling mitigation strategies to reduce interconnection fees, while recognizing the reality that even non-exporting systems can impact the distribution system.

DOER does not have Massachusetts distribution system upgrade cost data necessary to calculate the average cost of system modifications. DOER offers a recommended fee structure on the assumption that the EDCs will provide a sufficiently reliable quantification of those costs to refine the fee structure in this proceeding.<sup>8</sup> Therefore, DOER recommends that the fee be based on the average cost of system modification upgrades to ensure that the fee is cost-based while providing cost certainty to interconnecting DG customers.

DOER offers this illustrative fee equation:

$$\text{Interconnection Fee (\$)} = [\text{Average Cost of System Modifications (\$/kW)}] \times [(0.2 \times \text{Nameplate Capacity}) + (0.8 \times \text{Export Capacity})]^{9}$$

The interconnection fee is weighted to ensure that limiting export capacity enables a substantial reduction in interconnection fees, driving customers to self-consume onsite DG generation. Weighting export capacity in this manner is appropriate because a non-export customer only uses hosting capacity associated with their own onsite load, and the project is not reliant on using shared hosting capacity of the circuit. A non-export customer thus pays substantially less toward the shared upgrades required to increase shared hosting capacity. While a non-exporting customer can substantially reduce their interconnection fee, the nameplate capacity portion of the equation ensures that non-exporting DG still contributes to system upgrade requirements.

The figures in the equation could be adjusted so the fee is slightly above the average cost of distribution upgrades for facilities with an export capacity equal to their nameplate capacity. This construct anticipates that upgrades will be more frequent, and the average cost of the fee will increase accordingly. Finally, DOER recommends that the fee structure include a mechanism to adjust the "Average Cost of System Modifications" over time and to balance DG customer costs.

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<sup>7</sup> D.P.U. 19-55; Consensus Proposal for Interconnection of ESS (Filed February 26, 2020).

<sup>8</sup> See Massachusetts Electric Company and Nantucket Electric Company, D.P.U. 15-155 at 511 (September 30, 2016).

<sup>9</sup> DOER provides this equation as an illustrative example of the calculations necessary to establish the fee.

## **B. Application of a Fee to Residential DG Customers and Associated Benefits**

For residential DG customers,<sup>10</sup> the cost-based fee would be assessed during the application process and be due at the time of the interconnection service agreement (“ISA”). This should be the only interconnecting cost assessed to a residential DG customer. The EDC would publish the fee equation with the average cost of distribution system upgrades to provide transparency in how costs will be determined.<sup>11</sup>

An interconnection fee for residential DG customers provides a predictable and relatively affordable interconnection process. In addition, the fee structure incentivizes a DG developer to evaluate and offer a residential customer self-consumption strategies that could reduce export and thereby reduce the fee. Pairing solar and other DG with electrification has been shown to be a cost-effective mechanism to reduce emissions in the residential sector.<sup>12</sup>

## **C. Application of a Fee to Medium and Large DG Customers and Associated Benefits**

Medium and large DG facility customers would either: (1) be assessed a cost-based fee when there are no necessary interconnection upgrades or (2) pay for distribution upgrades under cost causation principles. Like small projects, the EDCs would publish the fee structure in their respective tariffs with included average costs of distribution upgrades on a per kW basis in attachments to the tariffs. As part of the Department’s consideration of the fee proposal in this proceeding, specific examples of estimated customer costs would be used to evaluate the precise mechanism for establishing a reasonable cost-based fee.

Preserving cost-causation provides DG developers with the appropriate price signal to site projects closer to load particularly when hosting capacity maps are available. DOER acknowledges and supports the Department’s proposal requiring the EDCs to post hosting capacity maps, as they provide greater transparency on available hosting capacity. This will help developers assess the risk of distribution upgrade costs and strengthen the effectiveness of the price signals provided by cost causation.<sup>13</sup>

## **D. Offsetting Upgrade Costs**

All fees, whether for residential, medium, or large DG facilities, will be assessed and collected by each EDC from projects within their service territory. The EDCs will use the collected fees from each service territory to offset the costs of fee-eligible distribution upgrades. Distribution upgrades triggered by DG interconnections of residential DG facilities are fee-eligible upgrades. Preemptive upgrades scaled to host future interconnecting customers but associated with individual medium and large DG facilities would also be fee-eligible upgrades.

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<sup>10</sup> For this fee structure, DOER defines small customers as those with a nameplate capacity of 60 kW or less in accordance with the definition of Class I Net Metering Facilities included in each EDC’s DG interconnection tariff. *E.g.*, M.D.P.U. No. 55 at 5. All projects larger than 60kW are herein considered medium and large DG projects.

<sup>11</sup> The equation should be included in the interconnection tariff to ensure the tariff is clear as to what costs are covered by the fee. The average cost of distribution system upgrades will change over time, and therefore, the dollar amounts should be incorporated into the tariff by reference through use of a schedule or tariff attachment.

<sup>12</sup> DOER’s 2018 Comprehensive Energy Plan (<https://www.mass.gov/files/documents/2019/01/10/CEP%20Report-%20Final%2001102019.pdf>).

<sup>13</sup> D.P.U. 19-55; Hearing Officer Memorandum (December 26, 2019), Att. B. DOER will be providing further comment on this attachment consistent with the procedural schedule set out in this memorandum.

Upgrades that were identified as triggered by medium and large projects will be paid for by that DG customer, and therefore are not fee-eligible upgrades.

Importantly, allowing the EDCs to plan for and perform fee-eligible upgrades in advance of significant circuit saturation will prevent delays in DG interconnections, particularly for small projects. Also, the offsetting of fee-eligible upgrade costs enables the EDCs to consider sizing upgrades to meet hosting capacity needs in the future and may improve the overall efficiency of distribution planning.

### **E. Fee Setting**

In this proceeding, specific examples of estimated customer costs based on actual upgrade costs provided by the EDCs would be used to determine a reasonable fee structure. To inform the fee, EDCs must provide a sufficiently reliable quantification of the costs to allow for determination of the average upgrade cost per kW of DG interconnection.<sup>14</sup> At the highest level, annual total kW of interconnected DG and annual total upgrade costs would be sufficient to determine the year's average upgrade cost. The average cost should be normalized over several years to account for annual variations in costs.

Once a cost-based fee is implemented for DG customers, DOER recommends the EDCs be required to file a compliance filing on a regular schedule to ensure that the fee amounts are reasonable, predictable, and are not a barrier to DG development. These filings could be done quarterly, bi-annually, or annually as the Department deems appropriate.

### **F. Rate Recovery**

When fee collections do not offset the cost of fee-eligible upgrades attributed to DG facilities in a given year, the balance of the upgrade costs would be recovered from ratepayers. Recovery mechanisms could include a separate reconciliation factor, rate base recovery, or factor within a performance-based rate mechanism ("PBRM"), as the Department deems appropriate.<sup>15</sup> DOER proposes rate recovery for a portion of the upfront DG interconnection costs, given associated ratepayer benefits. All ratepayers benefit from having affordable access to interconnecting DG to the distribution system and the avoided costs of GWSA compliance, increased reliability, and fuel diversity. Any total cost to be recovered from ratepayers could be capped, protecting against unforeseeable upgrades with significant cost and the fee would be adjusted to limit total ratepayer costs over time.

### **G. Flexibility to Tailor the Methodology to Maximize Benefits and Minimize Costs**

DOER's proposal includes flexibility to reduce or waive fees for certain facility types or specific geographic regions that have no or minor impact on the distribution system or have a higher quantifiable benefit to the distribution system. For example, a medium sized behind-the-meter solar carport may provide substantial benefits of locating generation near load. Such projects may incur similar costs to other similarly sized facilities but provide higher quantified benefits, such as avoided future distribution system upgrades, which justify reducing or waiving

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<sup>14</sup> See Massachusetts Electric Company and Nantucket Electric Company, D.P.U. 15-155 at 511 (September 30, 2016).

<sup>15</sup> Recovery mechanisms could be adopted in future grid modernization proceedings.

the fee. There may be other facility types or locational considerations which could similarly benefit from such treatment.

#### **IV. RECOMMENDED NEXT PROCEDURAL STEPS**

Respectfully, DOER requests that the Department establish a technical session to allow for a stakeholder discussion on the February 28 proposals and the provision of interconnection upgrade data. DOER anticipates that several stakeholders will present alternative cost allocation principles for circumstances in which an infrastructure modification is necessary to interconnect one or more DG facilities. As the topic requires innovative solutions and additional technical data, a stakeholder discussion will best facilitate an understanding of stakeholders' respective proposals and a common understanding of the type of interconnection upgrade data that is available through the EDCs.

After this session, the EDCs should provide data on average cost of typical upgrades needed for interconnection, as outlined in Section IV.E. above. As deemed appropriate by the Department, additional technical sessions may be necessary.

Respectfully submitted by,

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