The Commonwealth of Massachusetts

DEPARTMENT OF PUBLIC UTILITIES

D.P.U. 17-146-A February 1, 2019

Inquiry by the Department of Public Utilities on its own Motion into the eligibility of energy storage systems to net meter pursuant to G.L. c. 164, §§ 138-140 and 220 CMR 18.00, and application of the net metering rules and regulations relating to the participation of certain net metering facilities in the Forward Capacity Market pursuant to Net Metering Tariff, D.P.U. 09-03-A (2009).

NET METERING AND ENERGY STORAGE SYSTEMS

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I. INTRODUCTION AND PROCEDURAL HISTORY

On October 3, 2017, the Department of Public Utilities ("Department") opened this inquiry to investigate two issues: (1) the eligibility of energy storage systems to net meter and the appropriate definition of energy storage systems for net metering purposes, pursuant to 220 CMR 18.00; and (2) the qualification and participation of certain net metering facilities in the Forward Capacity Market ("FCM") administered by ISO New England Inc. ("ISO-NE"),[1] pursuant to Net Metering Tariff, D.P.U. 09-03-A (2009).[2] Net Metering, Energy Storage Systems, and the Forward Capacity Market Inquiry, D.P.U. 17-146 (2017).[3] The Department bifurcated its investigation in this docket. In this Order, the Department addresses issues related to the eligibility of energy storage systems to net meter.

Under the statutory and regulatory framework in Massachusetts, net metering allows customers to receive credits for excess electricity that net metering facilities generate. To qualify for the general net metering program, a customer may install any type of generating facility, regardless of fuel source, as long as the facility is 60 kilowatts ("kW") or less. 220 CMR 18.02.

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1 ISO-NE is a not-for-profit, private corporation that serves as the regional transmission organization for New England. ISO-NE operates the New England bulk power system and administers New England's wholesale electricity market. Investigation Into The Need For Additional Capacity In NEMA/Boston, D.P.U. 12-77, at 1 n.1 (2013).

2 The FCM is a market in which ISO-NE projects the needs of the power system three years in advance and then holds an annual auction to purchase power resources to satisfy the region's needs. D.P.U. 12-77, at 4.

3 Through inquiries and public comments received in relevant dockets, stakeholders expressed a desire for the Department to explore both the eligibility of energy storage systems to net meter and the participation of certain net metering facilities in the FCM. Massachusetts Electric Company and Nantucket Electric Company, D.P.U. 15-155, Interlocutory Order on Scope of Proceeding at 6-7 (February 9, 2016); Genbright LLC, D.P.U. 16-116 (2017); Tesla, Inc., D.P.U. 17-105 (2017).

Facilities of up to two megawatts ("MW"), or ten MW in the case of certain public facilities, are eligible for net metering if they generate electricity with renewable fuels (i.e., wind, solar photovoltaics, and anaerobic digestion). 220 CMR 18.02. On August 24, 2012, the Department issued Net Metering, D.P.U. 11-11-C (2012), clarifying which projects are eligible for net metering and which are not. D.P.U. 11-11-C at 21-23. On November 17, 2017, the Department issued an Order in D.P.U. 17-10 creating a small hydroelectric net metering program pursuant to G.L. c. 164, § 139A. St. 2016, c. 188, § 10; Net Metering Rulemaking, D.P.U. 17-10 (2017). To qualify for the small hydroelectric net metering program, a customer may install a facility that uses water to generate electricity, as long as the facility is two MW or less. 220 CMR 18.02.

The statutory framework concerning net metering is silent regarding energy storage systems. G.L. c. 164, §§ 138-140. While the Legislature defined energy storage system in G.L c. 164, § 1, it has not addressed the interaction between net metering facilities and energy storage systems.

> 'Energy storage system', a commercially available technology that is capable of absorbing energy, storing it for a period of time and thereafter dispatching the energy and which may be owned by an electric distribution company; provided, however, that an energy storage system shall: (i) reduce the emission of greenhouse gases; (ii) reduce demand for peak electrical generation; (iii) defer or substitute for an investment in generation, transmission or distribution assets; or (iv) improve the reliable operation of the electrical transmission or distribution grid; and provided further, that an energy storage system shall: (1) use mechanical, chemical or thermal processes to store energy that was generated for use at a later time; (2) store thermal energy for direct heating or cooling use at a later time in a manner that avoids the need to use electricity at that later time; (3) use mechanical, chemical or thermal processes to store energy generated from renewable resources for use at a later time; or (4) use mechanical, chemical or thermal processes to capture or harness waste electricity and to store the waste electricity generated from mechanical processes for delivery at a later time.

It is, however, the Legislature's intent to promote the use of energy storage systems in the Commonwealth. See An Act to Promote Energy Diversity, St. 2016, c. 188.[4] Moreover, the Legislature established policies to provide renewable and alternative energy for the immediate preservation of the public convenience. See An Act Relative to Green Communities, St. 2008, c. 169.

In this docket, the Department sought written comments on a series of questions related to the eligibility of net metering facilities paired with energy storage systems ("paired systems") to net meter.[5] In particular, the Department sought comments to safeguard against gaming and manipulation of the net metering program. D.P.U. 17-146, at 8. On January 31, 2018, the Department held a technical conference to discuss technical considerations related to the

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[4] St. 2016, c. 188, § 12, amending St. 2008, c.169 by inserting Section 83C, where Section 83C(d)(5)(vii) provides for offshore wind proposals that allow offshore wind energy generation resources to be paired with energy storage systems. St. 2016, c. 188, § 12, amending St. 2008, c.169 by inserting Section 83D, where Section 83D(d)(5)(v) allows long-term contracts for clean energy generation resources to be paired with energy storage systems. St. 2016, c. 188, § 15(a) providing that DOER may consider a variety of policies to encourage the cost-effective deployment of energy storage systems. St. 2016, c. 188, § 16 provides that the carbon reduction research center may include a research initiative into energy storage technology.

[5] The Department received comments from the following entities: Cape Light Compact JPE ("Compact"); Clean Energy Group ("CEG"); Department of Energy Resources ("DOER"); Edison Electric Institute ("EEI"); Green Charge and Stem, Inc.; Massachusetts Electric Company and Nantucket Electric Company, each d/b/a National Grid (collectively, "National Grid"); Northeast Clean Energy Council ("NECEC"); NSTAR Electric Company d/b/a Eversource Energy ("Eversource"); Office of the Attorney General ("Attorney General"); Sunrun, Inc. ("Sunrun"); Tesla, Inc. ("Tesla"); The Cadmus Group ("Cadmus"); and Town of Nantucket ("Nantucket").

The Department received reply comments from the following entities: Compact; DOER; Eversource; Metropolitan Area Planning Council ("MAPC"); National Grid; NECEC; Sunrun; Tesla; and The Energy Consortium.

eligibility of paired systems to net meter. In this Order, the Department establishes the eligibility of certain paired systems to net meter pursuant to G.L. c. 164, §§ 138-140 and 220 CMR 18.00, and clarifies the net metering rules and regulations applicable to such paired systems.

II. ELIGIBILITY OF PAIRED SYSTEMS TO NET METER

A. Summary of Comments

The majority of commenters assert that paired systems should be eligible to net meter (Attorney General Comments at 2; CEG Comments at 1-2; Compact Comments at 4; Compact Reply Comments at 2; DOER Comments at 7; DOER Reply Comments at 2; Eversource Comments at 2; MAPC Reply Comments at 1; Nantucket Comments at 1; National Grid Comments at 3; NECEC Comments at 2;[6] Sunrun Comments at 2; Sunrun Reply Comments at 1-2; Tesla Comments at 2). EEI opposes allowing paired systems to net meter, arguing that expanding net metering to include paired systems could have unintended consequences on the distribution companies,[7] customers, and energy markets, such as exacerbating the cost shift resulting from net metering (EEI Comments at 4). DOER and Tesla maintain that the legal requirement for net metering eligibility is that customers receive net metering credits for energy generated by an eligible net metering facility (DOER Comments at 7-8; Tesla Reply Comments at 2). Several commenters argue that an energy storage system by itself is not an eligible net

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6 Green Charge and Stem, Inc. are strong supporters of NECEC's comments (Green Charge and Stem comments at 1).

7 The electric distribution companies in the Commonwealth are Massachusetts Electric Company and Nantucket Electric Company, each d/b/a National Grid; NSTAR Electric Company d/b/a Eversource Energy; and Fitchburg Gas and Electric Light Company d/b/a Unitil ("Unitil") (collectively, "Distribution Companies" or individually "Distribution Company").

metering technology and that only the electricity generated by the net metering-eligible resource is eligible to net meter (Compact Comments at 5; National Grid Comments at 4 n. 5; NECEC Comments at 7). Many commenters assert that allowing paired systems to net meter is consistent with both the statutory intent and the Commonwealth's policy support for energy storage systems, including DOER's Solar Massachusetts Renewable Target ("SMART") program and storage adder (Attorney General Comments at 3; CEG Comments at 2 n.1; Compact Comments at 7-8; DOER Comments at 7-8; MAPC Reply Comments at 2; NECEC Comments at 3-5; Sunrun Comments at 4; Sunrun Reply Comments at 2-3; Tesla Comments at 3).

Eversource and National Grid argue that paired systems should be eligible to net meter subject to certain conditions (Eversource Comments at 2; Eversource Reply Comments at 2; National Grid Comments at 3). National Grid recommends eligibility subject to the following conditions: (1) the energy storage system charges only from a net metering facility; (2) the energy storage system is configured and operated with the paired system in a way that maximizes and does not interfere with the Distribution Companies' participation in ISO-NE wholesale energy and capacity markets; and (3) the charging and dispatch of the energy storage system is controlled to ensure compliance with any operating and net metering requirements (National Grid Comments at 3). Eversource recommends eligibility subject to the following conditions: (1) the paired system must be physically co-located on a single site; (2) the paired system must be behind the Distribution Company's service meter at the host customer's delivery point; (3) the energy storage system must receive all of its power by charging directly from the net metering facility; (4) the paired system must maintain common ownership; and (5) the

capacity of the energy storage system should be matched to the capacity of the net metering facility (Eversource Comments at 2-3).

Several commenters object to certain conditions proposed by Eversource and National Grid (see Compact Reply Comments at 3-4; DOER Reply Comments at 3; NECEC Reply Comments at 3-4; Tesla Reply Comments at 5-6). For example, several commenters object to Eversource's proposed condition that the paired system be owned by the same entity, arguing that this condition prevents the use of some business models in place today, thereby reducing the benefits realized by both the customers and the electrical grid (Compact Reply Comments at 3-4; NECEC Reply Comments at 4; Tesla Reply Comments at 5-6). Moreover, DOER argues that requiring an energy storage system to receive all of its power from the net metering facility is not the only way to ensure that only generation from the eligible net metering facility receives net metering credits (DOER Reply Comments at 3).

DOER supports reasonable eligibility requirements necessary to prevent parties from unfairly taking advantage of the net metering program, and it agrees with Eversource and National Grid that net metering facilities should be physically co-located with the energy storage system to limit administrative burdens and to safeguard against manipulation of the net metering program (DOER Reply Comments at 3). Cadmus confirms that, if paired systems are eligible to net meter, such paired systems could be incorporated into the System of Assurance of Net Metering Eligibility ("System of Assurance") process (Cadmus Comments at 1).[8] Cadmus states

[8] The System of Assurance is designed to (1) assure customers that they will be able to receive net metering services when their net metering facilities are ready to interconnect and (2) facilitate more efficient planning and development of distributed generation resources. Net Metering and Interconnection of Distributed Generation, D.P.U. 11-11-A and Appendix A (2012) (Order Adopting System of Assurance). Cadmus is the

that there are installed paired systems for resiliency that currently net meter as grandfathered facilities (Cadmus Comments at 1). Cadmus, therefore, maintains that prohibiting paired systems from net metering could exclude many systems already in operation (Cadmus Comments at 1).

B. Analysis and Findings

The Department acknowledges that the majority of commenters agree that adding an energy storage system to an otherwise eligible net metering facility should not impact eligibility to participate in the net metering program (Attorney General Comments at 2; CEG Comments at 1-2; Compact Comments at 4; Compact Reply Comments at 2; DOER Comments at 7; DOER Reply Comments at 2; MAPC Reply Comments at 1; Nantucket Comments at 1; National Grid Comments at 3; NECEC Comments at 2; Sunrun Comments at 2; Tesla Comments at 2). The Department finds that allowing paired systems to take service under a net metering tariff is consistent with the Commonwealth's energy policies. St. St. 2016, c. 188, §§ 12, 15(a), (b);[9] 225 CMR 20.07(4)(c) (compensation rates for solar-powered generation units include an energy storage adder). The Department recognizes, however, that there are technical and operational complexities that could result from allowing paired systems to participate in the net metering program. Therefore, the Department finds that paired systems are eligible to take service under the net metering tariff, subject to strict compliance with the net metering rules and regulations and requirements specific to paired systems set forth below.

Administrator of the System of Assurance. D.P.U. 11-11-B (2012); see also, System of Assurance, § 5 for creation of Administrator role.

9 See footnote 4.

III. DEFINITION OF "ENERGY STORAGE SYSTEM"

A. Summary of Comments

Commenters generally support the implementation of the statutory definition of an "energy storage system" set forth in G.L c. 164, § 1 (Attorney General Comments at 3; Compact Comments at 8; DOER Comments at 10; Eversource Comments at 3-4; Eversource Reply Comments at 6; MAPC Reply Comments at 2; National Grid Reply Comments at 3; NECEC Comments at 5-6; NECEC Reply Comments at 4). NECEC maintains that since this definition is located in G.L c. 164, § 1, it applies to all of Chapter 164, including the net metering provisions found in G.L c. 164, §§ 138-140 (NECEC Comments at 6).

Several commenters recommend that the Department accept a modified version of the statutory definition (see Compact Comments at 8; DOER Comments at 10-11; Eversource Comments at 7; National Grid Reply Comments at 3; Tesla Comments at 4). The Compact recommends that the Department clarify that electric vehicles are within the definition of energy storage systems that may be charged from net metering facilities (Compact Comments at 8). DOER and Tesla recommend that, consistent with the SMART regulations, the Department only accept the first clause of the statutory definition (i.e., a commercially available technology that is capable of absorbing energy, storing it for a period of time and thereafter dispatching the energy) since the remainder of the sentence relates to energy storage systems owned by a Distribution Company (DOER Comments at 10-11; Tesla Comments at 4, citing 220 CMR 20.02). Eversource disagrees with DOER's assertion that the latter part of the definition applies only to energy storage systems owned by a Distribution Company and, therefore, recommends that the Department accept the definition as written (Eversource Reply Comments at 6). National Grid

recommends that the Department exclude thermal storage from the definition because it cannot produce electricity and is effectively a load device for thermal management (National Grid Reply Comments at 3). Eversource recommends that the Department require any energy storage system that is paired with a net metering facility to not itself have the ability to produce or generate energy (Eversource Comments at 7). DOER argues that the statutory definition of energy storage precludes a generator technology from being considered as an energy storage system (DOER Reply Comments at 4). DOER does not oppose expanding the definition to clarify that any technology that has the ability to produce or generate energy not be considered energy storage for the purpose of net metering (DOER Reply Comments at 4).

Sunrun recommends defining an energy storage system as "any device that utilizes mechanical, chemical, or thermal processes to store energy generated at one time with the capability to dispatch that energy for use at a later time" (Sunrun Comments at 5; Sunrun Reply Comments at 3). Should the Department use the statutory definition as a template, Sunrun supports DOER's suggested modifications (Sunrun Reply Comments at 4).

Most commenters assert that the Department should not limit eligibility to specific types or technology of co-located energy storage systems (Attorney General Comments at 3; CEG Comments at 2, 7; Compact Comments at 9; DOER Reply Comments at 3-4; MAPC Reply Comments at 2; National Grid Comments at 4; NECEC Comments at 7; Sunrun Comments at 6; Tesla Comments at 4). Eversource asserts that eligibility should not be limited to particular types of energy storage systems, provided that they serve the on-site load of the customer (Eversource Comments at 4). NECEC argues that the energy storage system should not be restricted to only serve on-site load because (1) the energy storage system is separate from the

net metering facility and (2) the existing statute does not differentiate between on-site net metering and virtual net metering (NECEC Reply Comments at 5).

B. Analysis and Findings

While the definition of "energy storage system" in G.L. c. 164, § 1 applies to the totality of Chapter 164, as with other definitions sections in the General Laws, the definition does not apply when "context otherwise requires." Here, the net metering provisions of General Laws Chapter 164 contain a distinct set of definitions that do not define energy storage systems, and the statute does not address the interaction between net metering facilities and energy storage systems. G.L. c. 164, § 138. Consistent with general principles of statutory construction, the Department seeks to interpret statutes as a whole, where possible. District Attorney for the Northwestern District v. Eastern Hampshire Division of the District Court Department, 452 Mass. 199, 210 (2008) (finding wherever possible, statutes should be interpreted as a whole to constitute a consistent and harmonious provision). However, where a statutory gap exists, the agency charged with the administration of a statute is to spell out details of the legislative policy. Middleborough v. Housing Appeals Committee, 449 Mass. 514, 523 (2007), citing Zoning Board of Appeal of Wellesley v. Housing Appeals Committee, 385 Mass. 651, 654 (1982); United States v. Mead Corporation, 533 U.S. 218, 227 (2001), citing Chevron U.S.A., Inc. v. Natural Resources Defense Council, 467 U.S. 837, 843-844 (1984).

Here, there are statutory gaps with regard to the interaction of energy storage systems as defined in G.L. c. 164, § 1 and the net metering program and the participation of energy storage systems in the net metering program. Upon due consideration, the Department finds that the full definition of energy storage system in G.L. c. 164, § 1 is inconsistent with the context of the net

metering program, established under G.L. c. 164, §§ 138 – 140 and 220 CMR 18.00, where an energy storage system is paired with a net metering facility. Net metering requires a more concise and specific definition of this term. As such, we accept a portion of the definition in G.L. c. 164, § 1 and find that an energy storage system in the net metering program is a commercially available technology that is capable of absorbing energy, storing it for a period of time, and thereafter dispatching the energy. We further clarify that any technology with the ability to produce or generate energy is not an energy storage system for net metering purposes. Therefore, the Department defines "energy storage system" for net metering purposes ("ESS") as:

> a commercially available technology that is capable of absorbing energy, storing it for a period of time and thereafter dispatching electricity; provided, however, that an energy storage system shall not be any technology with the ability to produce or generate energy.

This definition applies to the net metering rules and regulations moving forward.

IV. TECHNICAL REQUIREMENTS FOR PARTICIPATION IN ISO-NE ENERGY AND CAPACITY MARKETS

A. Introduction

ISO-NE operates three wholesale electricity markets in New England - the energy, capacity, and ancillary services markets. The energy markets provide both day-ahead and real-time wholesale electric energy products to market participants. The FCM projects the needs of the power system three years in advance, and ISO-NE holds an annual auction, the Forward Capacity Auction ("FCA"), in February of each year to purchase power resources to satisfy the region's future power needs. Solar Massachusetts Renewable Target Provision,

D.P.U. 17-140-A at 110 (2018), citing Interlocutory Order on Scope of Proceeding, D.P.U. 15-155, at 2 (2016) ("Interlocutory Order"), citing D.P.U. 12-77, at 5.

In 2009, the Department required the Distribution Companies to register all Class II and III net metering facilities in the ISO-NE energy market as Settlement Only Generators ("SOG")[10] and to use any energy market payments received from ISO-NE to offset the total costs of net metering recovered from all ratepayers through the net metering recovery surcharge ("NMRS"). D.P.U. 09-03-A at 18-19. In D.P.U. 12-116-B, we granted Eversource the discretion to allow BTM NM facilities to act as load reducers. NSTAR Electric Company, D.P.U. 12-116-B at 5-7 (2014). The Department also granted Distribution Companies the right to assert title to the capacity associated with Class II and III net metering facilities, but did not obligate the Distribution Companies to participate in the FCM. D.P.U. 09-03-A at 18.

B. Summary of Comments

Some commenters recommend that the Department direct paired systems to meet ISO-NE rules and requirements to ensure that the net metering facility and ESS are individually eligible to participate in ISO-NE energy and capacity markets (Attorney General Comments at 4; DOER Reply Comments at 4-5; Eversource Comments at 5; National Grid Comments at 4; National Grid Reply Comments at 4-5). Other commenters argue that the Department should not implement any technical requirements related to ISO-NE market participation, particularly those proposed to maximize performance in the FCM (DOER Comments at 13; DOER Reply

[10] A SOG is a "unit that generates less than 5 MW and is entitled to receive capacity credit but is not centrally dispatched by the ISO control room and is not monitored in real time." ISO-NE Glossary and Acronyms, at https://www.iso-ne.com/participate/support/glossary-acronyms/#s (last visited January 31, 2019).

Comments at 4; NECEC Comments at 9; NECEC Reply Comments at 6; Sunrun Comments at 7; Sunrun Reply Comments at 4, 8). Many commenters recommend that the Department hold a technical conference with ISO-NE and other stakeholders to address requirements that pose a barrier to the participation of ESS co-located with net metering technologies in the ISO-NE markets (Compact Reply Comments at 2; DOER Comments at 13; DOER Reply Comments at 4-5; Eversource Reply Comments at 3, 5; National Grid Reply Comments at 8, 14; NECEC Comments at 10; NECEC Reply Comments at 6; Sunrun Comments at 7).

Several commenters note that the Distribution Companies are not required to register Class I net metering facilities in the ISO-NE markets (DOER Comments at 12; National Grid Reply Comments at 4; NECEC Reply Comments at 6; Sunrun Reply Comments at 1, 3, 6). Those commenters, therefore, recommend that no specific technical requirements apply to Class I net metering facilities paired with storage for participation in ISO-NE markets (DOER Comments at 12; National Grid Reply Comments at 4; NECEC Reply Comments at 6; Sunrun Reply Comments at 1, 3, 6).

With respect to Class II and III net metering facilities, the Attorney General, DOER, and National Grid assert that, if paired systems are permitted to net meter, these systems should be required to meet existing and future ISO-NE rules and requirements to ensure that the net metering facility and ESS are each eligible to participate in ISO-NE energy and capacity markets (Attorney General Comments at 4; DOER Reply Comments at 4-5; National Grid Comments at 4; National Grid Reply Comments at 5). The Attorney General also recommends that the Department require the Distribution Companies add to their respective interconnection tariffs upon completion of the investigation in this docket any new technical requirements or

configurations necessary for paired systems to participate in the ISO-NE energy and capacity markets (Attorney General Comments at 4-5).

National Grid maintains that it is required to register all Class II and III net metering facilities in the ISO-NE energy market, which in turn requires that all such facilities comply with the technical requirements necessary for such participation (National Grid Reply Comments at 5). DOER asserts that as a policy matter, net metering facilities should participate in ISO-NE markets to generate revenue to offset the cost of the net metering program to Distribution Company ratepayers (DOER Reply Comments at 5).

Eversource states that, under the Department's proposed configuration, it would apply the same technical requirements for energy market participation as those in place for net metering facilities, and the ESS would not be eligible to participate in the FCM if it is unable to export power to the electrical grid (Eversource Comments at 5). Eversource argues that the uncertainty regarding how ESS could participate in ISO-NE markets makes the value of allowing storage to export to the electrical grid unclear (Eversource Reply Comments at 4).

National Grid states that metering and interconnection requirements differ for behind-the-meter and front-of-the-meter systems (National Grid Comments at 5). National Grid asserts that for behind-the-meter systems, ISO-NE currently requires that each technology be independently metered in order to participate in the energy and capacity markets (National Grid Comments at 5, citing ISO New England Operating Procedure No. 18 Metering and Telemetering Criteria (OP-18)). National Grid asserts that, due to metering limitations, only systems using a separate inverter for the ESS should be eligible to net meter since alternate configurations for separating the resources are not allowed by ISO-NE's current rules and

storage participation guidance (National Grid Comments at 5-6; National Grid Reply Comments at 9-10). National Grid also recommends that the Department disallow the direct current ("DC") connection of an ESS behind the net metering facility's inverter(s) in light of the current requirements for participation in the ISO-NE energy and capacity markets (National Grid Comments at 10; National Grid Reply Comments at 9-10). National Grid further recommends that the Department require paired systems to comply with future technical requirements pursuant to ISO-NE market rules at the customer's sole expense (National Grid Reply Comments at 6).

While several commenters acknowledge that ISO-NE market rules currently require separate inverters, they recommend that the Department decline to accept this requirement and instead work with ISO-NE to revise its rules (DOER Comments at 13; NECEC Comments at 9; NECEC Reply Comments at 6; Sunrun Reply Comments at 4). The Compact argues that a configuration requiring a separate inverter for the ESS conflates the technical requirements for market participation with net metering eligibility, and the Compact asserts that there is no basis to conclude that wholesale market participation is a prerequisite for net metering eligibility (Compact Reply Comments at 5-6). Given the lack of clarity in current ISO-NE market rules, NECEC and Sunrun recommend that the Department not impose technical requirements for market participation (NECEC Comments at 10; Sunrun Comments at 7).

National Grid maintains that it imposes operational requirements to ensure that the ESS maximizes its value in the FCM to offset the costs of net metering services, such as the imposition of no-charge restrictions during FCM performance hours (National Grid Comments at 4-5; National Grid Reply Comments at 7). The Compact and Sunrun recommend that the

Department not allow the Distribution Companies the discretion to require technical configurations that allow for them to derive maximum value in the FCM as suggested by National Grid, arguing that customers should be allowed to maximize the value of their own investments in energy storage for themselves (Compact Reply Comments at 5; NECEC Reply Comments at 7; Sunrun Reply Comments at 5).

NECEC and Sunrun disagree with Eversource and National Grid's claim that the Distribution Companies have title to the wholesale bidding rights of an ESS co-located with net metering facilities (NECEC Comments at 8-9; NECEC Reply Comments at 7; Sunrun Reply Comments at 5). NECEC and Sunrun argue that pairing an ESS with a net metering facility does not confer to the Distribution Company any title or rights to the ESS' market attributes (NECEC Comments at 8-9; NECEC Reply Comments at 7; Sunrun Reply Comments at 5).

C. Analysis and Findings

Currently, consistent with D.P.U. 09-03-A, the Department requires National Grid and Unitil to register Class II and III BTM NM facilities as SOGs, while in D.P.U. 12-116-B, we granted Eversource the discretion to allow BTM NM facilities to act as load reducers. D.P.U. 09-03-A, at 18-19; D.P.U. 12-116, at 5-7; See M.D.P.U. No. 68F, § 1.08(8) (NSTAR Electric Company); M.D.P.U. No. 1404, § 1.08(8) (Massachusetts Electric Company/Nantucket Electric Company); M.D.P.U. No. 324, § 1.08(8) (Fitchburg Gas and Electric Light Company). Some commenters assert that allowing paired systems to net meter should not impede a Distribution Company's ability to fulfill this obligation, while other commenters argue that the Department should not impose specific technical requirements, at this time, because ISO-NE's technical requirements, such as the requirement for separate inverters, are burdensome and subject to

change (see Attorney General Comments at 4; DOER Reply Comments at 4-5; National Grid Comments at 4; National Grid Reply Comments at 5; NECEC Comments at 9; NECEC Reply Comments at 6; Sunrun Reply Comments at 4).

At this time, we find that the Distribution Companies do not have exclusive title to the energy rights associated with an ESS that is part of a paired system.[11] Furthermore we find that allowing paired systems to net meter does not alter a Distribution Company's obligation to (1) register Class II and III net metering facilities with ISO-NE as SOGs and (2) apply any energy market payments obtained to reduce the costs of net metering borne by all ratepayers. Therefore, all Class II and III net metering facilities paired with ESS must meet ISO-NE rules and requirements to ensure that the net metering facility can participate in the ISO-NE energy market.[12]

The Distribution Companies also have the option, but not the obligation, to bid the capacity of Class II and III net metering facilities into the FCM. D.P.U. 09-03-A at 18; See M.D.P.U. No. 68F, § 1.08(8) (NSTAR Electric Company); M.D.P.U. No. 1404, § 1.08(8) (Massachusetts Electric Company/Nantucket Electric Company); M.D.P.U. No. 324, § 1.08(8) (Fitchburg Gas and Electric Light Company). Most commenters object to the imposition of any technical requirements on the ESS designed to maximize value of the net metering facility in the FCM, as proposed by National Grid, arguing that such requirements represent significant risk and potential harm to the performance and revenue generation of ESS (Compact Reply

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11 This issue will be further addressed in D.P.U. 17-146-B.

12 The Distribution Companies are not currently required to register Class I net metering facilities in the ISO-NE markets. Therefore, we do not require or restrict participation of Class I net metering facilities paired with ESS in ISO-NE markets, at this time.

Comments at 5; National Grid Comments at 4-5; National Grid Reply Comments at 7; NECEC Reply Comments at 7; Sunrun Reply Comments at 5).

The Department will address matters related to the participation of net metering facilities in the FCM, including paired systems and the right to ownership of capacity associated with ESS that are part of a paired system, in D.P.U. 17-146-B.[13] At this time, we are not persuaded that the pairing of an ESS with a net metering facility alters the Distribution Companies' right to the capacity of Class II and III net metering facilities. Therefore, the Department directs all Class II and III net metering facilities paired with ESS to meet ISO-NE rules and requirements to ensure that the net metering facility is eligible to participate in the ISO-NE capacity market. The Department puts host customers of paired systems on notice that they must be aware of current and evolving ISO-NE rules and requirements. It is the host customer's and not the Distribution Company's responsibility to ensure that the net metering facility portion of a paired system remains eligible to participate in the ISO-NE energy and capacity markets.[14]

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13 On June 4, 2018, the Department held a technical conference in this docket concerning the FCM, which included a presentation from ISO-NE representatives on the technical requirements and configurations necessary for paired systems to participate in the energy market and FCM.

14 Customers seeking to net meter in the Commonwealth have a responsibility to ensure that they are fully compliant with all of the Department's rules, regulations, Orders, and other directives governing net metering services. C.H. Yates Rubber Corp., D.P.U. 17-34, at 14-15 (2017); Direct Energy Solar, D.P.U. 15-74, at 16 (2015). Net metering applicants themselves, not the Distribution Companies, are responsible for familiarizing themselves with and ensuring that their proposed facilities comply with all applicable net metering rules and regulations. D.P.U. 17-34, at 14-15; D.P.U. 15-74, at 16; BCC Solar Energy Advantage Inc., D.P.U. 14-149, at 10-11 (2015).

V. PERMISSIBLE CONFIGURATIONS

A. Introduction

In the Vote and Order opening this docket, the Department indicated that, to safeguard against gaming and manipulation of the net metering rules and regulations, we expect that, to be eligible for net metering, a net metering facility paired with an ESS would need to be configured to ensure that (1) the ESS is charged only from the net metering facility, and (2) the ESS cannot export power to the electric grid (referred to as "Configuration 1" below). Through public comment, three additional configurations were proposed. At the January 31, 2018 technical conference, the Department specifically sought input on the four proposed configurations. The Department considers each configuration below.

B. Summary of Comments

1. Possibility of Gaming

Many commenters generally agree that the Department must safeguard against manipulation of the net metering program, but do not agree that the eligibility to net meter should be contingent on the configuration set forth by the Department (Cadmus Comments at 3; CEG Comments at 2; Compact Comments at 6; DOER Comments at 14; Nantucket Comments at 1-2; NECEC Comments at 11; Sunrun Comments at 7; Sunrun Reply Comments at 6). Some commenters disagree with the premise that ESS could be used to game or manipulate the net metering rules and regulations (Compact Comments at 12-14; Compact Reply Comments at 6; Tesla Comments at 5; Sunrun Reply Comments at 7). Commenters identified two possibilities for gaming associated with paired systems: (1) price arbitrage; and (2) receiving credits for exported energy that is not generated by an eligible net metering facility (Attorney General

Comments at 5; CEG Comments at 3, 5-6; DOER Reply Comments at 5-6; EEI Comments at 5; Eversource Comments at 7; National Grid Comments at 4; NECEC Comments at 11-13; NECEC Reply Comments at 9-10; Sunrun Comments at 8; Sunrun Reply Comments at 2).

EEI argues that since the Distribution Companies offer time-varying rates ("TVR"), there is a risk that paired systems could engage in arbitrage, which would exacerbate the cost shift from net metering (EEI Comments at 5). The Compact maintains that most customers in Massachusetts are not on TVR, and, therefore, they have no incentive to game the system (Compact Comments at 12). The Compact, DOER, and Tesla further argue that customers on TVR can increase net metering credits in response to TVR price signals without necessarily imposing a cost on other ratepayers since discharging clean energy to reduce peak demand benefits all ratepayers (Compact Comments at 12-13; DOER Reply Comments at 11; Tesla Comments at 7). The Compact, however, does not oppose a temporary restriction against exporting from paired systems on TVR until advanced metering functionality has been deployed in compliance with the Department's grid modernization directives (Compact Comments at 13, citing Modernization of the Electric Grid, D.P.U. 12-76-B (2014)).

Some commenters assert that requiring the ESS to charge only from the net metering facility eliminates opportunities for gaming and manipulation by ensuring that any exported energy is generated from the eligible net metering facility (Eversource Comments at 7; National Grid Comments at 4; Sunrun Reply Comments at 2). Other commenters recommend that the Department accept configuration requirements that ensure that the paired system does not receive net metering credits or compensation for more output than the facility produces, while retaining the ability for systems to charge from and discharge to the electrical grid (Attorney General

Comments at 5; CEG Comments at 3, 5-6; DOER Reply Comments at 5-7; NECEC Comments at 11-13; MAPC Reply Comments at 3; NECEC Reply Comments at 9-10; Sunrun Comments at 10). These commenters maintain that while a prohibition on exporting power is a simple means to prevent gaming of the net metering program, it could limit the ability of customers to access the multiple value streams of energy storage that could benefit the electrical grid and the Commonwealth (Attorney General Comments at 6-7; CEG Comments at 3, 5-6; Cadmus Comments at 3; Nantucket Comments at 1-2; NECEC Comments at 11-13; Sunrun Comments at 8). CEG and DOER assert that technical solutions, such as metering solutions, programmable logic controller settings, software solutions, and/or power relay configurations, can be used to ensure that a facility is limiting exports or charging only from an eligible facility (CEG Comments at 3; DOER Comments at 14-15). Some commenters request that the Department hold a technical conference to investigate how best to balance the prevention of gaming with the potential benefits of storage exports to the electrical grid (Attorney General Comments at 7; Compact Reply Comments at 2; DOER Comments at 17; Eversource Reply Comments at 5; TEC Reply Comments at 1-2; Tesla Reply Comments at 4).[15] By contrast, Sunrun asserts that there is no need for technical conference to ascertain necessary limitations for configurations that charge only from the net metering facility, as it does not threaten the program (Sunrun Reply Comments at 8).

[15] On November 20, 2017, the Compact filed a letter supporting the Attorney General and DOER's recommendation for a technical conference (Compact Letter at 1-2).

2. Eligible Configurations

a. Configuration Types

Commenters identified and discussed four possible configurations for paired systems, which are described below. Some commenters recommend that the Department permit all four configurations to allow customers maximum flexibility to capture the benefits of the ESS (Attorney General Comments at 5; CEG Comments at 3, 5-6; DOER Reply Comments at 5-6; Green Charge and Stem Comments at 1-2; NECEC Comments at 12-16; NECEC Reply Comments at 9-10; Sunrun Comments at 8). Other commenters recommend that the Department allow some, but not all, configurations (EEI Comments at 5; Eversource Reply Comments at 2, 5; National Grid Reply Comments at 2, 5).

i. On-Site Net Metering ("Configuration 1")

Under this configuration, the ESS is charged only from the net metering facility and cannot export to the electrical grid (NECEC Comments at 13). NECEC asserts that this option would not impose additional costs on projects but presents strict restrictions on system operations (NECEC Comments at 13). DOER asserts that since the Department already has evaluated Configuration 1, there should not be any additional safeguards to prevent manipulation (DOER Reply Comments at 6). No commenters opposed this configuration (Eversource Reply Comments at 2; EEI Comments at 5; National Grid Reply Comments at 5).

ii. Net Metering and Exports ("Configuration 2")

Under this configuration, the ESS is charged only from the net metering facility but is programmed to allow exports to the electrical grid (NECEC Comments at 13-14). NECEC and Sunrun contend that there are no gaming concerns with this configuration because the ESS is

charged exclusively from the net metering facility (NECEC Comments at 14; Sunrun Comments at 9). NECEC asserts that the net metering and exports configuration can be achieved either by locating both resources behind a one-way inverter or through a metering setup demonstrating that charging only occurs when the net metering facility generates enough electricity to charge the ESS (NECEC Comments at 14). NECEC maintains that this option imposes no additional project costs and offers additional export flexibility (NECEC Comments at 14). National Grid supports this configuration provided that the paired systems meet the net metering, interconnection, operational, and technical requirements, including ISO-NE's energy and capacity market requirements (National Grid Reply Comments at 5). Eversource does not support this configuration because stakeholders have not demonstrated how they will prevent manipulation of the net metering rules if allowed to export to the electrical grid (Eversource Reply Comments at 7).

iii. Non-Export ("Configuration 3")

Under this configuration, the ESS charges from both the net metering facility and the electrical grid, but cannot export to the electrical grid (NECEC Comments at 14). NECEC maintains that non-export could be verified either through a non-export relay, similar to the requirements in California, or through software controls included in the interconnection agreement (NECEC Comments at 14). NECEC asserts that this option increases flexibility for storage use at an additional cost to the developer/customer (NECEC Comments at 15). National Grid is supportive of Configuration 3 but is concerned with the use of configuration 3 with TVR and notes that additional metering, meter reading capabilities, and billing system changes could be required by National Grid to separate the output of the eligible net metering facility from that

of the grid charged ESS (National Grid Reply Comments at 11-12). Eversource does not support this configuration because it has concerns that paired systems may receive net metering credits for ineligible energy (Eversource Reply Comments at 3).

iv. Net Generation Output Meter ("Configuration 4")

Under this configuration, the ESS is not restricted to a charging source, and it is allowed to export to the electrical grid (NECEC Comments at 15). NECEC maintains that under this configuration, a facility should be required to install a net generation output meter at the cost of the developer or customer to measure the output for the net metering facility (NECEC Comments at 15). NECEC proposes that the Distribution Companies use the data from the net generation output meter and the export at the bidirectional meter to calculate the appropriate net metering credit (i.e., the lower of the two readings) (NECEC Comments at 15). CEG and NECEC assert that California has approved this technology for participation in its net metering program, and they recommend that the Department accept similar requirements (CEG Comments at 4, 7; NECEC Comments at 15). NECEC maintains that this option provides the greatest flexibility for the ESS at the highest cost to the developer or customer (NECEC Comments at 15). DOER and NECEC suggest that the Department require that a paired system have its net metering kilowatt-hour ("kWh") credits capped at the amount of kWhs generated by the net metering facility to prevent gaming while allowing flexibility for how the customer uses its ESS (DOER Comments at 17; NECEC Reply Comments at 12). Sunrun maintains that prohibiting a paired system from exporting to the electric grid would sacrifice a significant portion of the benefits that energy storage can deliver, reducing both the temporal range of responsiveness and the magnitude of the response (Sunrun Comments at 8).

Eversource does not support Configuration 4 noting that it is unclear how ESS could participate in ISO-NE markets even if the Department allows exports and maintaining that care should be exercised before introducing any regulatory requirements surrounding participation in such markets to avoid conflicts between state and ISO-NE regulations (Eversource Reply Comments at 4-5). National Grid requests that the Department further investigate whether a benefit-cost analysis should be conducted and whether appropriate safeguards can be put in place before offering this configuration to customers (National Grid Reply Comments at 12).

b. Additional Criteria

Commenters suggest further requirements to prevent gaming (EEI Comments at 6; DOER Reply Comments at 10-12; Tesla Reply Comments at 4-5). EEI and Eversource recommend that the Department require that the ESS be co-located with the net metering facility (EEI Comments at 6; Eversource Comments at 2). DOER agrees that facilities should be co-located and recommends that the Department define co-located as sharing a common point of coupling (DOER Reply Comments at 10).

Further, EEI recommends that the Department require that the ESS be of equal or smaller size to the net metering facility (EEI Comments at 6). Tesla argues that EEI's concerns with oversizing ESS are unfounded because there are measures in place today, such as the investment tax credit, that discourages oversizing the ESS (Tesla Reply Comments at 4-5). DOER disagrees with recommendations to limit the size of the storage facility since metering solutions can address gaming or manipulation concerns related to pairing a net metering facility with a large ESS (DOER Reply Comments at 11-12).

National Grid recommends that customers be prohibited from "oversizing" their systems by adding DC generation equipment in excess of the net metering facility's alternating current ("AC") inverter capabilities to charge an ESS (National Grid Comments at 9; National Grid Reply Comments at 9). DOER and National Grid maintain that projects subject to net metering caps already have an effective limit on overproduction in place given the relationship of DC capacity to a system's cap allocation (DOER Reply Comments at 9; National Grid Reply Comments at 9). National Grid proposes applying a limit for cap exempt facilities of 125 percent or less of the AC capacity of the inverter capacity proposed (National Grid Reply Comments at 9). NECEC and Sunrun oppose National Grid's recommendations, arguing that statutory requirements and Department regulations have never imposed restrictions on the AC-DC ratio of net metering facilities and doing so prohibits various beneficial applications of ESS (NECEC Reply Comments at 12; Sunrun Reply Comments at 9).

Eversource proposes that the power capacity of the co-located ESS match the power capacity of the net metering facility (Eversource Comments at 3). NECEC opposes Eversource's suggestion arguing that (1) the enabling statute and Department regulations have never imposed restrictions on the AC-DC ratio of net metering facilities and to do so now would prohibit many types of beneficial, useful applications of ESS and (2) Eversource provides no technical support or policy rationale for its suggestion (NECEC Reply Comments at 12).

C. Analysis and Findings

The Department's longstanding precedent is to consider whether our acceptance of policies or rules will allow or encourage artificial and unfair manipulations of a regulatory system. Net Metering and Interconnection of Distributed Generation, D.P.U. 11-11-C at 19, 22

(2012); see, e.g., Pricing and Procurement of Default Service, D.T.E. 99-60-B at 5-6, 10 (2000). In addressing the possibility of gaming and manipulation of the net metering program, we are mindful that all ratepayers bear the costs of the net metering program. Allowing paired systems to net meter introduces two significant opportunities for manipulation of the net metering program that could result in undue financial gain or allow participants to circumvent the Commonwealth's intent that net metering support the development of renewable energy projects.[16] First, it is possible for a customer with a paired system, who takes service on a TVR, to receive a higher net metering credit value for the system's excess generation by using the ESS to shift the export of generation between peak and off-peak hours.[17] Net metering customers taking service on a TVR are charged and earn a different rate for electricity, based on block periods of time designated as peak and off-peak by the Distribution Companies.[18] Most of the TVR that are currently in place in the Commonwealth were designed decades ago, before widespread deployment of ESS was contemplated and before the GWSA was enacted. See

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16 Generally, facilities are eligible for net metering only if they generate electricity with renewable fuels. Facilities that are 60 kW or less are eligible for net metering regardless of fuel source. G.L. c. 164, § 138; 220 CMR 18.02 (definition Class I Net Metering Facility). Facilities greater than 60 kW are eligible for net metering if they generate electricity with renewable fuels (i.e., wind, solar photovoltaics, and anaerobic digestion). G.L. c. 164, § 138; 220 CMR 18.02 (definitions Class II Net Metering Facility and Class III Net Metering Facility). There is an established small hydroelectric net metering program for facilities that are two MW or less. G.L. c. 164, § 139A; 220 CMR 18.02, 18.11.

17 In this Order, all references to TVR refer to only distribution TVR, not supply TVR.

18 For example, G-3 customers in National Grid's service territory have a distribution charge of 1.464 cents per kWh during peak hours and a distribution charge of 0.864 cents per kWh during off-peak hours. See TOU Electric Service Rates, https://www.nationalgridus.com/MA-Business/Rates/Service-Rates (last visited January 31, 2019).

D.P.U. 15-155, Exh. DPU 3-12 (citing Department Investigation as to the Propriety of Rates and Charges, D.P.U. 89-21, at 46-48, (1989)) ("The monthly 2,500 kWh threshold for Rate R-4 was established in D.P.U. 89-21."); Boston Edison Company, D.P.U. 1720, at 117-119 (1984)). Furthermore, these TVR only vary with respect to distribution rates, whereas it is likely that TVR designed for ESS would also need to address supply. Thus, a host customer of a paired system who takes service on a TVR could manipulate the net metering program to inflate the value of their facility's excess generation.

Second, absent restrictions on the charging or discharging of an ESS, it may be possible for a customer to receive net metering credits for generation that does not come from an eligible net metering source. For example, if an ESS is allowed to both import and export electricity from the electric grid, without restrictions, a customer with a paired system could import electricity from the electric grid and then export that same electricity claiming that it is excess generation produced by its net metering facility. This import/export maneuver would result in fraudulent receipt of net metering credits and an increase in the overall costs of the net metering program borne by all ratepayers.

To safeguard against gaming and manipulation of the net metering rules and regulations, the Department proposed Configuration 1 for public comment. D.P.U. 17-146, at 8. While commenters generally approve of Configuration 1, and some agree that the Department must safeguard against manipulation of the net metering program, most commenters suggest that more than one configuration could provide safeguards and still allow operational flexibility to enable customers to access the multiple value streams associated with energy storage (Cadmus Comments at 3; CEG Comments at 2; Compact Comments at 6; DOER Comments at 14;

Nantucket Comments at 1-2; NECEC Comments at 11; Sunrun Comments at 7; Sunrun Reply Comments at 6). To that end, commenters proposed four eligible configurations: (1) the ESS charges only from the net metering facility and cannot export (Configuration 1); (2) the ESS charges only from the net metering facility and can export (Configuration 2); (3) the ESS charges either from the grid or the net metering facility and cannot export (Configuration 3); and (4) the ESS charges either from the grid or the net metering facility and can export (Configuration 4) (see Attorney General Comments at 5; CEG Comments at 3, 5-6; DOER Reply Comments at 5-6; Green Charge and Stem Comments at 1-2; NECEC Comments at 12-16; NECEC Reply Comments at 9-10; Sunrun Comments at 8).

Upon due consideration, the Department finds that three of the proposed configurations balance the need to safeguard against manipulation of the net metering program with the need for operational flexibility to take advantage of revenue streams associated with ESS that could benefit the electrical grid and the Commonwealth. We find that limiting the ability of the ESS to export to the grid guards against both types of possible manipulation previously mentioned. Therefore, the Department finds that paired system configurations in which the ESS cannot export to the grid are eligible to take service under the net metering tariff, regardless of whether the ESS charges from the net metering facility or the electric grid (i.e., Configurations 1 and 3). We further find that allowing a paired system to export to the grid while limiting the ability of the ESS to charge only from the net metering facility ensures that any excess generation for which net metering credits are received comes from an eligible net metering source (Configuration 2).

We are concerned that limiting the ability of an ESS to charge only from the net metering facility will not appropriately safeguard against the possibility of a host customer who takes service on a TVR artificially inflating the value of the net metering facility's excess generation. The Department recognizes, however, that current TVR may reduce peak demand and that reducing peak demand, especially by enabling clean resources, may reduce energy costs and emissions, both of which are key policy objectives of the Commonwealth. See An Act Relative to Green Communities, St. 2008, c. 169; An Act to Promote Energy Diversity, St. 2016, c. 188; An Act to Advance Clean Energy, St. 2018, c. 227. We further recognize that additional information is necessary to fully understand the risk of this manipulation. As such, at this time, we will allow host customers of paired systems to take service on TVR; however, the Department directs Distribution Companies to submit an informational filing as part of their annual NMRS that (a) indicates how many host customers currently take service under a TVR, including total AC capacity and (b) whether each host customer has a paired system. If, upon review, the Department finds evidence of potential gaming or manipulation of the net metering program, we may consider prohibiting certain host customers of paired systems from taking service under a TVR, until a comprehensive review of the TVR design is conducted to ensure ratepayer benefits and achieve public policy goals. Host customers, as well as net metering stakeholders, are on notice that the rates underlying net metering credits are subject to change. NSTAR Electric Company and Western Massachusetts Electric Company, D.P.U. 17-05-B at 162 (2018).

Finally, the Department is not persuaded that allowing a paired system to net meter using Configuration 4 is appropriate. Although Configuration 4 allows customers the most operational

flexibility, it also has the most associated costs and uncertainty with respect to compliance and enforcement of the net metering rules and regulations (see Section VIII). We find that, at this time, under Configuration 4, the risk of irregularities or non-compliance with essential rules and regulations is too high for a customer to receive net metering credits for generation that does not come from an eligible net metering source. The Department may consider such a configuration again once developers, the Distribution Companies, other stakeholders, and the Department gain experience with the deployment of paired systems.[19] Therefore, the Department establishes the eligibility of paired systems in compliance with the requirements of Configurations 1, 2, or 3 to take service under the net metering tariff.

The Distribution Companies are responsible for maintaining a safe and reliable electric system for their customers. Massachusetts Electric Company and Nantucket Electric Company, D.P.U. 11-85-A/11-119-A at 12 (2012); NSTAR Electric Company, D.P.U. 11-85-B/11-119-B at 13 (2012); Western Massachusetts Electric Company, D.P.U. 11-119-C at 12 (2012). Because they have the most knowledge about their customers and the electric distribution system infrastructure, the Distribution Companies are best situated to determine the technical requirements necessary for interconnecting paired systems to ensure compliance with the three permissible configurations established above (i.e., Configurations 1, 2, and 3). Accordingly, the Department makes no findings with respect to the technical requirements necessary to ensure compliance with the three permissible configurations for paired systems.

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[19] The Department recognizes that in-field deployment, technological changes, and industry best practices could create solutions to be considered once these practices demonstrate the ability to limit or prevent gaming of net metering credits.

VI. INADVERTENT EXPORT

A. Introduction

On May 18, 2017, Tesla filed a petition pursuant to G.L. c. 30A, § 8 and 220 CMR 2.08 seeking emergency declaratory relief or, in the alternative, an advisory ruling with respect to the eligibility for net metering of certain solar power generation systems paired with battery storage, pursuant to G.L. c. 164, §§ 138-140 and 220 CMR 18.00.[20] Specifically, Tesla sought a determination that solar power generating systems paired with battery storage that meet the following criteria qualify as a solar net metering facility under G.L. c. 164, § 138 and 220 CMR 18.02: (1) the solar net metering facility has a nameplate capacity of 60 kW or less alternating current; (2) the battery storage charges only from the solar net metering facility; and (3) the battery storage component of the facility does not export power to the electric grid ("Small Scale Solar & Battery Storage Facilities").

The Department received comments from net metering stakeholders in D.P.U. 17-105 during the written comment period.[21] On September 12, 2017, the Department issued a limited scope Advisory Ruling applicable to Tesla only, offering the advisory opinion that Small Scale Solar & Battery Storage Facilities should be eligible to net meter pursuant to G.L. c. 164, §§ 138-140 and 220 CMR 18.00. Tesla, Inc., D.P.U. 17-105 (2017).

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[20] The Department docketed Tesla's petition as D.P.U. 17-105.

[21] The Department received comments from the following entities: Attorney General; DOER; National Grid; NECEC; and Sunrun. The Department summarized these comments in its Advisory Ruling. D.P.U. 17-105, at 4-8 (2017). Pursuant to 220 CMR 1.10(3), for purposes of addressing this issue of inadvertent export, the Department hereby incorporates by reference into D.P.U. 17-146 all comments filed in D.P.U. 17-105.

Following issuance of the Department's Advisory Ruling, the Department became aware that inadvertent export of electricity to the electric grid from ESS of Small Scale Solar & Battery Storage Facilities was occurring and, therefore, certain Distribution Companies were unable to confirm compliance of Small Scale Solar & Battery Storage Facilities with the Department's Advisory Ruling. Upon consideration, the Department determined that due process was necessary to identify whether inadvertent export of electricity to the electric grid is an acceptable aspect of a Small Scale Solar & Battery Storage Facilities or paired system and how to define an inadvertent export to differentiate it from export generally. Accordingly, on June 19, 2018, the Department issued a Hearing Officer Memorandum seeking public comments in D.P.U. 17-146, including the following request: please provide a definition for inadvertent export to the electric distribution system, and the types of configurations that could experience inadvertent export.

B. Summary of Comments

Several stakeholders support defining inadvertent export to provide clarity on the eligibility of non-export systems to net meter, and they recommend definitions similar to those used in other jurisdictions (DOER Comments at 14; DOER Reply Comments at 6-7; Eversource Energy Comments at 15; National Grid Reply Comments at 23; Sunrun Comments at 15-16; Sunrun Reply Comments at 3). DOER and Eversource Energy state that the California Public Utilities Commission defined inadvertent export as "the unscheduled and uncompensated export of real power from a generating facility for a limited duration" (DOER Comments at 14 citing PG&E Rule 21 Generating Facility Interconnections Tariff, Sheet 237; DOER Reply Comments at 7; Eversource Energy Comments at 15). DOER maintains that UL-1741-SA compliant

inverters consider a limited duration to be 30 seconds (DOER Comments at 14).[22] National Grid proposes that inadvertent export be defined as "an initial release of current up to the full kVA nameplate rating of the distributed energy resource onto the distribution system until the limiting mechanism (non-export relay) ceases the export condition" (National Grid Comments at 23). National Grid contends that it would need to work with the customer and/or inverter manufacturer to determine the appropriate time delay to limit export (National Grid Comments at 23). Sunrun recommends using the following definition: "the unscheduled export of active power from a generating facility, beyond a specified limited duration, generally due to fluctuations in load-following behavior" (Sunrun Comments at 15). Sunrun agrees with DOER and maintains that the duration of inadvertent export should not exceed 30 seconds for any single event, with no limit to the number of events (Sunrun Comments at 15-16).

Tesla maintains that it is unnecessary to define inadvertent export as a criterion of a net metering eligible non-exporting configuration (Tesla Comments at 15, 19). Should the Department determine that a definition is required, Tesla supports Sunrun's definition (Tesla Reply Comments at 7).[23] While Tesla argues that compensability is a non-issue, it recommends that, to the extent the Distribution Companies believe that compensability of inadvertent export

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22 DOER maintains that inverter interconnections in New England must be 1741-SA compliant in accordance with "Inverter Source Requirement Document of ISO New England," released February 2, 2018 (DOER Reply Comments at 7).

23 In its initial comments, Tesla recommended the definition used in Colorado, which defines inadvertent export as the unscheduled and uncompensated export of real power, and limits the magnitude and duration of the export to the facility's nameplate rating and 30 seconds, respectively (Tesla Comments at 17-19 citing Xcel Energy Guidelines for Interconnection of Electric Energy Storage with the Electric Power Distribution System at 7).

is an issue, the Department place the onus on the Distribution Companies to install appropriate metering technology (Tesla Comments at 19)

C. Analysis and Findings

As discussed in Section V, the Department finds it appropriate to permit non-export configurations to net meter (i.e., Configurations 1 and 3). The Department agrees with commenters that possible inadvertent export under a non-export configuration should not affect the eligibility of paired systems to net meter, and we find it necessary to define inadvertent export to provide clarity. We further agree with commenters that such a definition should be, to the extent possible, consistent with national standards and existing definitions used in other jurisdictions, to avoid creating confusion and an unnecessary regulatory burden. Accordingly, for the purposes of clarifying the eligibility of paired systems to net meter, the Department accepts the following definition for inadvertent export consistent with the definition adopted by the California Public Utilities Commission: the unscheduled and uncompensated export of real power from a generating facility for a limited duration. In this context, the Department finds that limited duration shall mean a period of time not to exceed 30 seconds. This definition shall apply to the net metering program only and is not applicable to other programs or the interconnection of distributed generation facilities generally.[24]

[24] The Department recognizes that there may be a need in the future to address inadvertent export as it concerns the interconnection of distributed generation facilities outside of the net metering program. If such a need arises, the Department will separately investigate inadvertent export as it concerns the interconnection of distributed generation facilities.

VII. SYSTEM OF ASSURANCE

A. Summary of Comments

1. Cap Allocation

Commenters generally agree that the net metering cap allocation for a paired system should reflect only the capacity of the net metering generation facility, arguing that the ESS will not alter the effective capacity of the net metering facility (Attorney General Comments at 7; Cadmus Comments at 4; CEG Comments at 6; Compact Reply Comments at 7; DOER Comments at 17; Eversource Comments at 7-8; MAPC Reply Comments at 3; National Grid Comments at 10; NECEC Comments at 16-17; Sunrun Comments at 11; Tesla Comments at 10-11). The Attorney General and NECEC argue that since ESS are not eligible for net metering, the capacity of any co-located ESS should not be reflected in the cap allocation (Attorney General Comments at 7; NECEC Comments at 16). NECEC further maintains that this should be the case regardless of whether the ESS charges only from the net metering facility or the electrical grid (NECEC Reply Comments at 13).

Several commenters assert that if the cap allocation reflected the combined capacity, otherwise exempt facilities that choose to install storage could cross the exemption threshold, which would require them to submit an Application for Cap Allocation ("ACA") with the System of Assurance (Cadmus Comments at 4; DOER Comments at 18; Sunrun Comments at 11). Commenters argue that these customers could be at risk of losing their ability to net meter by having to submit an ACA in a service territory in which the net metering caps are full (Cadmus Comments at 4; DOER Comments at 18; Sunrun Comments at 11). Cadmus maintains that using a combined capacity could be problematic because current cap allocation requirements

are determined by 80 percent of a net metering facility's DC capacity, but an ESS' capacity is measured in AC (Cadmus Comments at 4). Cadmus recommends that paired systems applying for net metering eligibility should be required to submit a one-line diagram for technical review, or, in the alternative, Cadmus recommends that the Department consider including terms in the interconnection agreement or a self-certification on the ACA to ensure customer compliance if the one line diagram is insufficient (Cadmus Comments at 3). The Attorney General argues that cap-exempt facilities should be required to submit an ACA with the System of Assurance to ensure compliance with Department requirements (Attorney General Comments at 5 n. 3).

2. Existing and New Net Metering Facilities

Commenters agree that there should not be any distinction between existing and new net metering facilities for the purpose of determining net metering cap allocations (DOER Comments at 19; MAPC Reply Comments at 3; NECEC Comments at 17-18; Sunrun Comments at 12; Tesla Comments at 11). The Attorney General asserts that existing net metering facilities should be allowed to add ESS subject to the same technical and regulatory requirements as new facilities (Attorney General Comments at 8). DOER, Eversource, and National Grid note that, while the addition of an ESS to an existing net metering facility should not change the manner in which the cap allocation is determined, an addition would require a new interconnection application where additional operational and interconnection considerations would be studied (DOER Comments at 19; Eversource Comments at 8; National Grid Comments at 10). NECEC opposes any requirement that an existing net metering facility seeking to add energy storage to submit a new interconnection application, arguing that it this is not the appropriate forum to address new interconnection standards for ESS (NECEC Reply Comments at 13-14). NECEC

recommends a multi-stakeholder process to develop such standards (NECEC Reply Comments at 14).

Cadmus recommends grandfathering existing net metering facilities that pursue energy storage (Cadmus Comments at 4). Cadmus maintains that such a change could be approved through a quarterly report and that the Administrator of the System of Assurance ("Administrator") could require an amendment to the interconnection service agreement ("ISA"), one-line diagram, and self-certification from the applicant (Cadmus Comments at 4). Cadmus states that if the Department makes a distinction between existing and new net metering facilities, but still requires an ESS to register in the System of Assurance, there are already questions in place within the ACA process to identify these expanded facilities (Cadmus Comments at 4).

B. Analysis and Findings

1. Cap Allocation

When a statute's language is certain, we afford its ordinary meaning. Engie Gas & LNG LLC v. Department of Public Utilities, 475 Mass. 191, 197 (2016). The language of the statute is "the primary source of insight into the intent of a legislature." Commissioner of Correction v. Superior Court Dept. of Trial Court For the County of Worcester, 446 Mass. 123, 124 (2006) citing International Fidelity Insurance Company v. Wilson, 387 Mass. 841, 853, (1983). Here, it is clear from the statute that the Legislature intended to limit the administrative burden of net metering for small, residential solar facilities. G.L. c. 164, §§ 138-140 (for example, small net

metering facilities are exempt from applying for a cap allocation).[25] To require otherwise cap exempt facilities to apply for a cap allocation upon adding an ESS would contravene explicit and clear statutory requirements and Legislative intent.[26] In addition, we agree with commenters that requiring a paired system to apply for a cap allocation reflecting its total capacity would result in unnecessary administrative and operational burdens, such as application of the 80-Percent Rule.[27] Furthermore, we find that the addition of an ESS (in compliance with the configurations discussed above) will not alter the effective capacity of a net metering facility because installing an ESS will not change the overall kWh produced by the net metering facility, but rather shift the time during which the generation is consumed or exported. Therefore, a host customer of a paired system, that is not a cap exempt facility, must submit an ACA reflecting only the capacity of the net metering facility.

To ensure compliance with this Order, the Department requires host customers of paired systems, that are not cap exempt facilities, to provide certain information related to the ESS of the paired system during the ACA process (e.g., whether the ESS charges solely from the net

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25 A cap exempt facility means a Class I net metering facility that is a renewable energy generating facility and has a nameplate capacity rating equal to or less than (1) ten kilowatts ("kW") on a single-phase circuit or (2) 25 kW on a three-phase circuit. G.L. 164, § 139(i); 220 CMR 18.02 (definition Cap Exempt Facility).

26 The Attorney General requested that cap exempt facilities paired with an ESS be required to submit an ACA with the System of Assurance to ensure compliance with Department requirements (Attorney General Comments at 5 n. 3). For the same reason, the Department declines to accept the Attorney General's recommendation.

27 The capacity of a "Solar Net Metering Facility" is defined as "80 per cent of the facility's direct current rating at standard test conditions [("STC")]" for purposes of determining a cap allocation ("80-Percent Rule"). G.L. c. 164, § 139(f); 220 CMR 18.07(4)(a); Net Metering and Interconnection of Distributed Generation, D.P.U. 11 11 D, Appendix, § 5(B) (2012).

metering facility or the electric grid, whether the ESS exports to the electric grid, a one-line diagram to review the technical capabilities of the ESS, a specification sheet). The Department intends to coordinate with the Administrator to modify the ACA to incorporate questions specific to paired systems in compliance with this Order. The Department directs the Administrator to update its guidance documentation to include information specific to paired systems following modification of the ACA.

2. Existing and New Net Metering Facilities

While commenters generally agree that existing and new net metering facilities paired with an ESS should be treated the same with regard to net metering cap allocations (Cadmus Comments at 4; DOER Comments at 19; MAPC Reply Comments at 3; NECEC Comments at 17-18; Sunrun Comments at 12; Tesla Comments at 11), some commenters disagree on whether existing net metering facilities that choose to add an ESS should be required to meet additional operational and interconnection requirements (Compare DOER Comments at 19; Eversource Comments at 8; National Grid Comments at 10 to NECEC Reply Comments at 13-14). Here, the Department must balance the burden on existing net metering customers to meet additional operational and interconnection requirements with the need for safeguards against gaming and manipulation of the net metering program. Upon consideration, the Department finds that it cannot adequately safeguard against manipulation of the net metering system without requiring existing non-cap exempt net metering facilities that choose to add an ESS to provide some additional information to ensure compliance with this Order.

As such, the Department directs host customers of existing non-cap exempt net metering facilities that seek to add an ESS to supplement their current ACA with the same information and

documentation that is required for a similarly situated new paired system.[28] Should the Administrator find that the paired system does not meet the requirements set forth in this Order or the rules governing the System of Assurance, the host customer shall forfeit its cap allocation. Furthermore, the Department finds that it is within the Distribution Companies' discretion whether a host customer of an existing net metering facility that seeks to add an ESS will require a new interconnection application and the study of additional operational and interconnection considerations. If a new interconnection application is required, the host customer must update its ACA to include the new ISA. However, if a host customer of an existing net metering facility that seeks to add an ESS is required to submit a new ISA, it shall be allowed to maintain its cap allocation as long as the only difference between the original ISA and the new ISA is the addition of an ESS.[29] The Department also clarifies that if there is an existing ACA that includes both the net metering facility's capacity and the ESS' capacity, then the Administrator shall reduce the capacity to reflect only the net metering facility's capacity. A reduction in capacity for an existing facility with a cap allocation in this limited instance will not invalidate an ACA.

VIII. COMPLIANCE AND ENFORCEMENT

A. Summary of Comments

EEI asserts that expanding the net metering program to include paired systems will result in the need for an increase in metering and other smart technologies to ensure that there is no manipulation of the net metering program (EEI Comments at 8). EEI, therefore, recommends

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[28] The Administrator may collect the information by way of a quarterly report or other means as it deems appropriate.

[29] Should the new ISA include capacity changes, the new ISA would invalidate the cap allocation and the host customer would forfeit its cap allocation.

that any expansion of net metering eligibility to include ESS come with support for the infrastructure necessary to ensure compliance, visibility, and the ability to leverage storage to improve system operations and efficiency (EEI Comments at 8).

Other commenters state that compliance with any requirements necessary to safeguard against gaming of the net metering program can be accomplished through the ACA process and the requirements and procedures under the interconnection tariff, which should be updated, as necessary, to reflect these requirements (Attorney General Comments at 5; DOER Reply Comments at 8-9; Eversource Comments at 6; Sunrun Comments at 10; Tesla Comments at 8-9; Tesla Reply Comments at 5). DOER and Eversource maintain that it is the customer's responsibility to ensure compliance with the net metering rules and regulations (DOER Reply Comments at 8; Eversource Comments at 6).

National Grid asserts that the process to certify, ensure, and enforce compliance with interconnection, operating, and eligibility requirements should include, at a minimum, the following: (1) a detailed description in the interconnection application of how the ESS can charge only from the net metering facility and not from the electrical grid; (2) acknowledgement in the interconnection application, the ISA, the retail customer agreement, and Schedule Z, that the customer understands and agrees to net metering eligibility requirements; (3) additional operating requirements determined by the Distribution Company included in the ISA; (4) the Distribution Company's right to verify compliance and to require the customer to provide any necessary documentation to demonstrate continued compliance; and (5) the Distribution Company's right to terminate the ISA and/or suspend net metering service in the event of noncompliance (National Grid Comments at 7-8). National Grid maintains that these

requirements could be used to verify initial compliance with any eligibility and operational requirements the Department establishes, but asserts that on-going verification of compliance would be challenging since it could not be accomplished remotely (National Grid Comments at 8-9). National Grid states that any costs related to maintaining, verifying, and enforcing compliance with the interconnection, operating, or eligibility requirements would be borne solely by the customer (National Grid Comments at 9). National Grid asserts that any costs it incurs to implement new requirements are fully recoverable (National Grid Comments at 9).

Some commenters oppose the cost treatments proposed by National Grid (Compact Reply Comments at 6; NECEC Reply Comments at 8, 11; Sunrun Reply Comments at 8). The Compact argues that National Grid should not have the discretion to determine which costs related to net metering eligibility are borne by customers because it may be unfair to customers that have not been provided advanced metering functionality by their Distribution Company (Compact Reply Comments at 6). NECEC asserts that it is unfair and premature to determine that these costs must fall to the customer or project developer, arguing that customers should not bear the costs of what could be viewed as basic electric distribution system or grid modernization investments (NECEC Reply Comments at 8, 11).

NECEC asserts that National Grid's proposal to include additional operating requirements in the ISA is not well defined and could lead to the imposition of overly restrictive requirements (NECEC Reply Comments at 11). Sunrun argues that it is not necessary to grant the Distribution Companies additional and unilateral rights of inspection or the ability to require customers to provide any documentation to verify compliance (Sunrun Reply Comment at 8). Sunrun recommends that the Department consider a process by which a customer would be

notified of a suspected violation with increasing penalties or remedial actions imposed for successive violations (Sunrun Comments at 10).

Tesla objects to National Grid's proposed requirement that existing processes be supplemented by affidavits signed by multiple parties, arguing that such a requirement is burdensome and unnecessary (Tesla Reply Comments at 5). Tesla further argues that customers must first be given a warning and an opportunity to correct system operation in the event of noncompliance to prevent customers from losing their net metering status or forfeiting net metering credits (Tesla Reply Comments at 5).

B. Analysis and Findings

The Department is cognizant that compliance and enforcement mechanisms are necessary to safeguard against gaming and manipulation of the net metering system.

The Department agrees with the majority of commenters that initial compliance assurances can be sufficiently obtained through the cap allocation and interconnection application processes (Attorney General Comments at 5; DOER Reply Comments at 8-9; Eversource Comments at 6; Sunrun Comments at 10; Tesla Comments at 8-9; Tesla Reply Comments at 5). As discussed above, host customers of paired systems that are not cap exempt facilities will be required to provide information and documentation in their ACA evidencing compliance with eligible system configurations. The Department directs the Distribution Companies to collect all information necessary to confirm that a paired system is in compliance with the net metering programs rules and regulations, including this Order. If a Distribution Company finds that a

paired system is not in compliance with the requirements set forth in this Order, that paired system will not be eligible to take service under the net metering tariff.[30]

Cadmus, DOER, and Eversource recommend that host customers self-certify that the information that they provide about their paired systems is accurate and that they are in compliance with the net metering rules and regulations (Cadmus Comments at 3; DOER Reply Comments at 8-9; Eversource Comments at 6). The Department agrees, but finds that both the System of Assurance's ACA process and the Distribution Companies' interconnection application process already include sufficient self-certification requirements. The ACA process requires a host customer to complete a self-certification before submitting an ACA. As such, the self-certification will apply to all ESS information and documents included in the ACA. Similarly, the interconnection application process requires that the host customer certify that all information in the application is true prior to submission (Standards for Interconnection of Distributed Generation tariff, Exhibit A and C). Therefore, the Department finds that additional self-certifications are unnecessary to ensure compliance of paired systems with the net metering rules and regulations. Nevertheless, if the Administrator or the Distribution Companies deem the current self-certification process insufficient, they may amend the certification to ensure compliance with this Order.

The total costs of the net metering program are recovered from all ratepayers through the NMRS. The Department finds that the current costs related to maintaining, verifying, and enforcing compliance with the net metering program rules and regulations will not be

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30 A host customer must be given a reasonable opportunity to demonstrate whether it is in compliance with the requirements set forth in this Order prior to the termination of its service under the net metering tariff.

substantially affected by the requirements set forth in this Order. Therefore, the Department does not direct any modification to the current cost recovery mechanisms associated with the net metering program. The Department will closely monitor and review costs recovered through the NMRS and provide further direction, if it deems necessary. To ensure that the Department obtains sufficient information to make such a determination, it directs the Distribution Companies to supplement all future NMRS filings with an informational component detailing costs incurred, if any, that can be directly associated with implementation of paired system participation in the net metering program.

While the Department does not, at this time, direct inspections of paired systems to ensure continued compliance with the configuration requirements set forth in this Order, the Department strongly reminds customers seeking to net meter in the Commonwealth that the customers themselves have a responsibility to ensure that they are fully compliant with all of the Department's rules, regulations, Orders, and other directives governing net metering services, whether or not they have an ESS. D.P.U. 17-34, at 14; D.P.U. 15-74, at 16. Furthermore, noncompliance with the net metering program's rules and regulations will result in discontinuation of service under the net metering tariff.

IX. CONCLUSION

With this Order the Department announces three configurations pursuant to which paired systems are eligible to participate in the net metering program: (1) the ESS charges only from the net metering facility and cannot export (Configuration 1); (2) the ESS charges only from the net metering facility and can export (Configuration 2); and (3) the ESS charges either from the grid or the net metering facility and cannot export (Configuration 3). The Department also sets forth certain other requirements related to the eligibility of paired systems to net meter and a process through which the host customer of a paired system must self-certify compliance with all net metering rules and regulations.

X. ORDER

Accordingly, after notice, opportunity for comment, and due consideration it is hereby

ORDERED: That host customers with net metering facilities paired with energy storage systems that meet the criteria set forth herein are eligible to seek to take service under the net metering tariff, and shall submit information to the electric distribution companies and the Massachusetts System of Assurance of Net Metering Eligibility to evidence compliance with such criteria; and it is

FURTHER ORDERED: That Fitchburg Gas and Electric Light Company d/b/a Unitil, Massachusetts Electric Company and Nantucket Electric Company, each d/b/a National Grid, and NSTAR Electric Company d/b/a Eversource Energy shall comply with all relevant directives and guidelines contained in this Order; and it is

FURTHER ORDERED: That the Secretary of the Department shall send a copy of this Order to each electric distribution company subject to the jurisdiction of the Department under G.L. c. 164, and ensure service on stakeholders on the distribution list in D.P.U. 17-146, which service in D.P.U. 17-146 may be made by electronic means.

By Order of the Department,

/s/
Angela M. O'Connor, Chairman

/s/
Robert E. Hayden, Commissioner

/s/
Cecile M. Fraser, Commissioner