

# MASSACHUSETTS ENERGY STORAGE FACTSHEET

The energy storage market in Massachusetts is rapidly expanding. This factsheet provides basic information on the local energy storage market and consumer opportunities. Additionally, it covers specific monetizable services available, the process of interconnecting assets to the power grid, energy costs by utility, and the evolving regulatory landscape. Additional information and resources regarding energy storage are available on the [MassCEC](#) and [DOER](#) websites.

## ENERGY STORAGE OPPORTUNITIES

Because energy storage resources can act as generators, loads, and transmission-type assets, there are many ways to realize their economic benefits in Massachusetts. Table 1 shows a high-level breakdown of key entities that can generate revenue, realize cost savings, or otherwise realize their organizational goals through the development and operation of energy storage assets. Other benefits, including increased reliability and resiliency, are currently non-monetizable in Massachusetts.

**TABLE 1. OVERVIEW OF KEY ENTITIES, THEIR ROLES, AND EXAMPLES OF BENEFITS FROM IMPLEMENTING ENERGY STORAGE ASSETS**

ENTITY	ROLE	TYPES OF BENEFITS AND GOALS
<b>Customer</b>	System Site, Service Agreements	Provide backup power, retail bill reduction through demand charge reduction and/or time of use (TOU), host-site payment, and wholesale market exposure for commercial and industrial (C&I) buildings
<b>Utility</b>	Programs, Incentives, Data, Interconnection	Receive grid support services, defer investment of distribution and transmission equipment <sup>1</sup>
<b>Independent System Operator New England (ISO-NE)</b>	Wholesale Market Integration	Increase system reliability, improve economic efficiency of wholesale market
<b>Distributed Energy Resource Management System (DERMS) Operator</b>	ISO/Utility Interface	Manage assets and resources to deliver contracts services
<b>Asset Developer</b>	Project Development, Permitting, Interconnection, Financing	Realize financial return on capital investment
<b>Retail Energy Supplier</b>	Manage customer electricity supply options	Profitably deliver energy services to customers

<sup>1</sup>Investment deferral for distribution and transmission equipment ultimately saves money for customers who would have been charged fees to cover the utility's capital expenses.

Energy storage systems can be implemented on varying scales and in different locations with a range of possible use cases and dispatch operations. Energy storage systems are either installed behind a retail customer's meter (i.e., customer-side or behind-the-meter, BTM) or interconnected directly into distribution and transmission infrastructure (i.e., in-front-of-meter, IFOM). Multiple manufacturers are responsible for energy storage system's components, but often a single entity—called the original equipment manufacturer (OEM)—will be responsible for the maintenance of hardware controls. Depending on the ownership model, another, separate entity will often specify the dispatch control strategy. This can be a facility manager, an energy service company, a distribution utility, the ISO, or another wholesale market participant, such as a merchant generator. It is also possible for a third-party aggregator to dispatch a portfolio of BTM energy storage systems in a coordinated dispatch strategy to provide grid services. This aggregator would be responsible for handling financial transactions between the market or purchasing entity and its customers. End-use customers can also use energy storage systems to provide emergency back-up power for islanding microgrids and critical facilities, with similar relationships with a third party for operations and maintenance (O&M) and control.

## MASSACHUSETTS INITIATIVES ON ENERGY STORAGE

Massachusetts launched the **Energy Storage Initiative** (ESI) in 2015 under Governor Baker to “evaluate and demonstrate the benefits of deploying energy storage technologies in Massachusetts.” As part of the ESI, the State of Charge report was published in 2016 as a comprehensive document designed to

analyze the storage industry, evaluate market opportunities, and investigate potential policies and programs to support the development of energy storage.

Since the publication of **State of Charge**, Massachusetts has established an **energy storage target** directing its electric delivery companies to procure at least 200 megawatt hours (MWh) by January 1, 2020.

Other programs currently under operation include these:

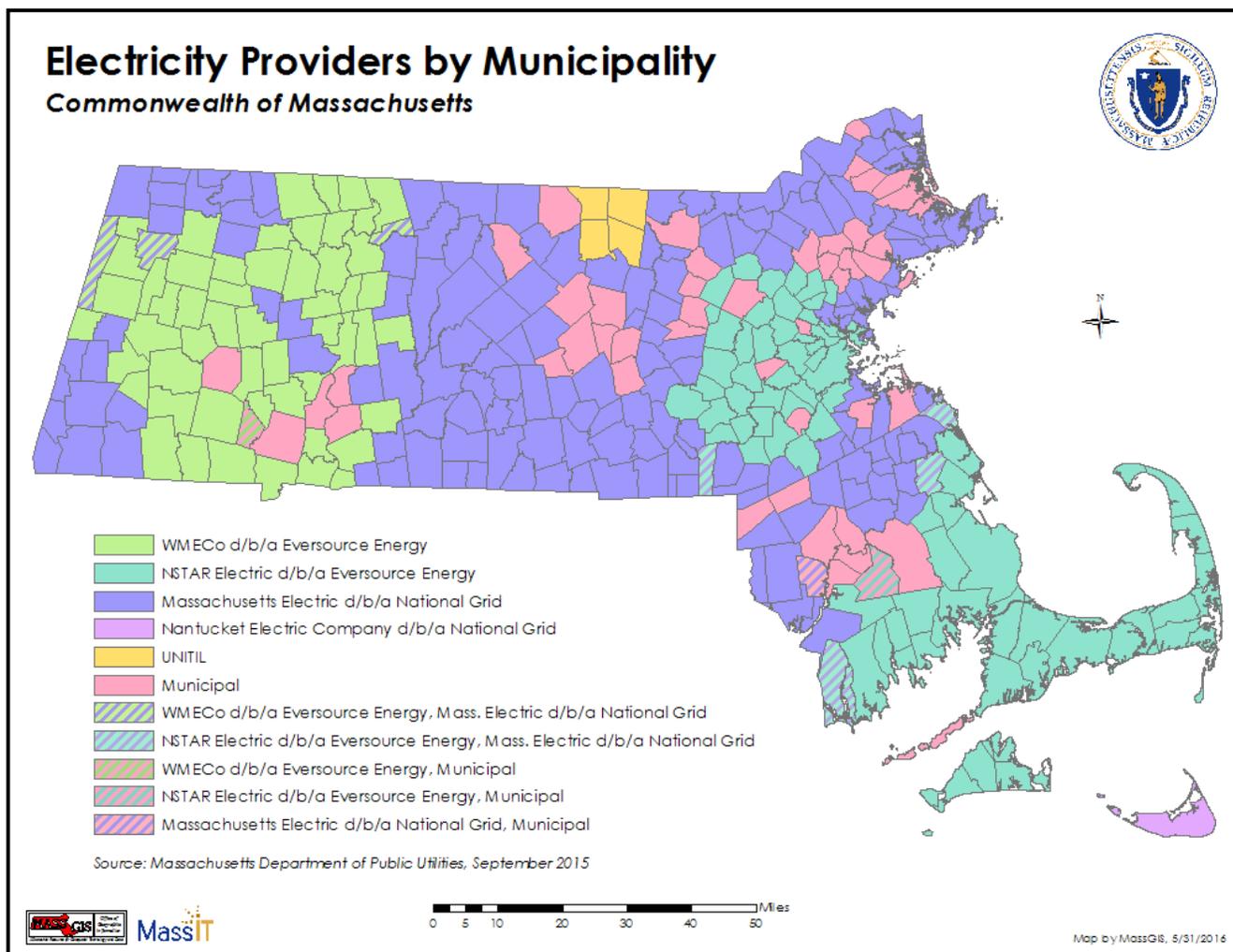
- **Advancing Commonwealth Energy Storage** (ACES): A series of grants for energy storage demonstration programs, with recipients announced in December 2017
- **Solar Massachusetts Renewable Target** (SMART): Incentives for incorporating energy storage into solar PV projects

There are also several initiatives currently in development further covered in the *Shifts in the Regulatory Landscape* section below.

## THE MASSACHUSETTS POWER GRID

Massachusetts is served by five investor-owned electric utilities, as well as 41 municipal utilities, dispersed throughout the state. The investor-owned utilities (IOUs) regularly assume legal pseudonyms and are said to be doing business as (d/b/a) their respective holding companies: Eversource, National Grid, and Unitil. Figure 1 and Table 2 outline the location and size of these electric power distribution companies.

FIGURE 1. MASSACHUSETTS ELECTRICITY PROVIDERS BY MUNICIPALITY (2015)



ISO-NE is the regional transmission organization, which also serves Connecticut, Maine, New Hampshire, Rhode Island, and Vermont. The ISO structure enables a connection to New York and Canada, through which electricity can be traded with these markets. Further information on the structure of ISO-NE is included on their [maps and diagrams webpage](#).

TABLE 2. SUMMARY OF MASSACHUSETTS INVESTOR-OWNED UTILITIES' CUSTOMER COUNTS AND TOTAL 2017 ENERGY SALES

UTILITY	RESIDENTIAL CUSTOMERS	COMMERCIAL CUSTOMERS	INDUSTRIAL CUSTOMERS	MWH SALES
Fitchburg Gas and Electric (d/b/a Unitil)	25,299	4,301	28	435,410
Massachusetts Electric Co (d/b/a National Grid)	1,154,508	158,129	3,965	19,903,988
Nantucket Electric Co (d/b/a National Grid)	11,761	1,626	5	155,380
Western Massachusetts Electric Co (d/b/a Eversource)	192,609	21,779	823	3,441,445
NSTAR Electric Co (d/b/a Eversource)	1,030,322	175,614	1,527	20,444,344

## MONETIZABLE SERVICES

There are a number of monetizable services available to entities installing energy storage in Massachusetts. Table 3 outlines the current and expected monetizable services, including type of service, resource owner, compensation mechanism and price, constraints and relevant regulations, and links to more information. The table also indicates if the system is located BTM or IFOM as the location often informs the kinds of services a system can provide. In general, BTM storage resources can perform the same functions as IFOM resources, though IFOM resources cannot provide BTM services. Some systems can value stack, or provide more than one of these services, which is discussed further in Value Stacking Considerations.

Not included in the table, **non-wires alternatives (NWA)** represent an emerging area for energy storage in Massachusetts, though the financial benefits are recognized indirectly. Utilities use storage as part of a NWA to defer distribution upgrades, saving ratepayers money from forgone distribution upgrade cost recovery. These storage resources can also be sited either BTM or IFOM. White papers by the **Solar Energy Industries Association** and the **Smart Electric Power Alliance** document several examples of NWA projects in United States that rely extensively on energy storage resources. It is also possible to stack other value streams on an NWA project.

Manuals outlining the procedures for market participant responsibilities related to ISO-NE's markets can be found here: <https://www.iso-ne.com/participate/rules-procedures/manuals/>

**TABLE 3. EXISTING AND EXPECTED MONETIZABLE SERVICES FOR ENERGY STORAGE IN MASSACHUSETTS**

SERVICE	STORAGE LOCATION	PROJECT TYPE AND RESOURCE OWNER	COMPENSATION MECHANISM AND PRICING	CONSTRAINTS AND RELEVANT REGULATIONS	LINKS TO FURTHER INFORMATION
<b>Solar Massachusetts Renewable Target (SMART)</b>	BTM/IFOM	Facility owner or project developer owns the storage system	Coupling of energy storage with distributed solar PV enables an "adder" for compensation for electricity generated. This ranges from \$0.025- 0.076/kWh based on ratio of storage capacity to solar capacity	Accompanying solar PV systems must not exceed 5 MW, must be installed at same time, limited space for subscribing for adder	<a href="http://masmartsolar.com/">http://masmartsolar.com/</a>
<b>Customer Demand Charge Management</b>	BTM	Facility owner or project developer owns the storage system	Customer savings from demand charges on utility bills	Bill savings generally encompasses only commercial and industrial customers with larger loads (>250-300 kW) as this requires interval metering and is best for "peaky" loads.	Refer to <b>Massachusetts Electric Rates and Tariffs</b> for demand charges
<b>Utility Demand Response</b>	BTM	Facility owner or project developer owns the storage system and dispatches the system in accordance with program requirements.	Customer payment based on specific program requirements. The 2019-2021 Massachusetts Three Year Energy Efficiency Plan will expand funding for energy storage through Active Demand Response programs.	May require additional metering; program participation could conflict with wholesale market participation	<a href="http://ma-eeac.org/plans-updates/">http://ma-eeac.org/plans-updates/</a> <a href="https://www.nationalgridus.com/MA-Business/Energy-Saving-Programs/ConnectedSolutions">https://www.nationalgridus.com/MA-Business/Energy-Saving-Programs/ConnectedSolutions</a>

SERVICE	STORAGE LOCATION	PROJECT TYPE AND RESOURCE OWNER	COMPENSATION MECHANISM AND PRICING	CONSTRAINTS AND RELEVANT REGULATIONS	LINKS TO FURTHER INFORMATION
<b>ISO-NE Demand Response: Price Responsive Demand (PRD)</b>	BTM	Storage owner offers storage system as a demand response asset (DRA) that is mapped to a demand response resource (DRR) that participates in the full range of wholesale electricity markets: energy, real-time reserves, and capacity	<p>Payments for energy and reserves based on economic dispatch. DRRs that are Active Demand Capacity Resources (ADCR) receive wholesale market capacity payments comparable to that of generating resources.</p> <p>PRD enables over-performing, energy-only resources in the Forward Capacity Market (FCM) to receive up to \$2,000/MWh of additional revenue during scarcity conditions, scheduled to increase to \$5,455/MWh</p>	<p>Minimum DRR and ADCR size is 100 kW with aggregation allowed. ADCR must offer requirement in energy market, performance measurement at retail delivery point</p> <p>Required 5-minute real-time telemetry, may not be co-located with other DRA or wholesale market generator at same location.</p> <p>Seasonal audit duration 1 hour, claimed capability audit duration 2 hours</p>	<p><a href="https://www.iso-ne.com/markets-operations/markets/demand-resources">https://www.iso-ne.com/markets-operations/markets/demand-resources</a></p> <p><a href="https://www.iso-ne.com/static-assets/documents/2017/04/20170411-webinar-energy-storage.pdf">https://www.iso-ne.com/static-assets/documents/2017/04/20170411-webinar-energy-storage.pdf</a></p>
<b>ISO-NE Forward Capacity Market (FCM)</b>	BTM/IFOM	Storage owner offers storage system as a generator or active demand capacity resource (ADCR) three years in advance of the delivery year. Capacity resources have must offer obligation in energy market.	<p>The capacity market is based on a two-settlement system also known as Pay-for-Performance (PFP). Capacity resources receive a base payment based on the primary auction clearing price. The second settlement is based on performance relative to the resource's capacity supply obligation during reserve deficiencies (capacity scarcity conditions). Resources can receive a performance bonus or a penalty based on their performance. Energy only resources can also earn a performance bonus under PFP.</p> <p>Capacity pricing from the latest auction year (2021-22) was \$4.63kW-month.</p>	<p>Minimum resource size for generators resource or ADCR size is 100 kW with aggregation allowed for ADCRs. ADCR performance measurement, telemetry and auditing is based on DRR performance (see above).</p> <p>Capacity resources undergo project monitoring until commercialization is demonstrated. Financial assurance is required as security that project will be built.</p>	<p><a href="https://www.iso-ne.com/markets-operations/markets/forward-capacity-market/">https://www.iso-ne.com/markets-operations/markets/forward-capacity-market/</a></p> <p><a href="https://www.iso-ne.com/about/key-stats/markets/#fcaresults">https://www.iso-ne.com/about/key-stats/markets/#fcaresults</a></p> <p><a href="https://www.iso-ne.com/static-assets/documents/2018/06/2018-06-14-egoc-a4.0-iso-ne-fcm-pay-for-performance.pdf">https://www.iso-ne.com/static-assets/documents/2018/06/2018-06-14-egoc-a4.0-iso-ne-fcm-pay-for-performance.pdf</a></p>
<b>Energy Supply Arbitrage</b>	BTM	Facility owner or third party owns and operates the storage resource	Compensation recognized as savings from buying/charging at a lower cost than when selling/discharging, which may result in decreased electricity bills	Requires energy contract with variable pricing	Refer to <a href="#">Massachusetts Electric Rates and Tariffs</a> for time of use rates
<b>ISO-NE Installed Capacity (ICAP) Tag Management</b>	BTM	Facility owner or third party owns and operates the storage resource	Avoided capacity charges of ~\$4.50 - 5.50/kW/month	Capacity charge must be explicit on bill, must not be profiled class customer, requires interval metering	See Installed capacity tags information for National Grid <a href="https://www1.nationalgridus.com/InformationAndForms-MA-RES">https://www1.nationalgridus.com/InformationAndForms-MA-RES</a>
<b>ISO-NE Frequency Regulation</b>	BTM/IFOM	The project developer is the resource owner	<p>Receive payment from ISO-NE</p> <p>Two clearing prices for capacity and service mileage.</p> <p>Regulation Capacity Offer (\$/MW, not to exceed \$100/MW) and Regulation Service Offer (\$/MW, not to exceed \$10/MW)</p>	<p>Extremely small market in NE: less than 100 MW of daily procurement, oversupplied</p> <p>Sometimes zero dollar offer priced regulation capacity, which may not clear economically</p> <p>Resource must be dispatched by ISO-NE</p>	<p><a href="https://www.iso-ne.com/markets-operations/markets/regulation-market">https://www.iso-ne.com/markets-operations/markets/regulation-market</a></p> <p>M-REG - <a href="https://www.iso-ne.com/participate/rules-procedures/manuals/">https://www.iso-ne.com/participate/rules-procedures/manuals/</a></p>

SERVICE	STORAGE LOCATION	PROJECT TYPE AND RESOURCE OWNER	COMPENSATION MECHANISM AND PRICING	CONSTRAINTS AND RELEVANT REGULATIONS	LINKS TO FURTHER INFORMATION
<b>ISO-NE Forward Reserves</b>	BTM/IFOM	The project developer is the resource owner	Receive payment from ISO-NE	Reserve market co-optimized with energy market, requires minimum duration of two hours (ISO-NE Tariff MR 1 Section III.1.5.1.3.j)	<a href="https://www.iso-ne.com/markets-operations/markets/reserves">https://www.iso-ne.com/markets-operations/markets/reserves</a>
			Forward Reserve Market (FRM) has two competitive reserve actions: one for summer reserve (Jun - Sep) and one for winter (Oct - May); payment calculated in \$/MW-month		
<b>ISO-NE Voltage Support</b>	IFOM	The project developer is the resource owner	Resources are compensated for providing voltage support services and qualifying resources may receive capacity compensation	Very small market: \$1.13/kVAR-yr, about \$20MM/year for 8089 MVAR	<a href="https://www.iso-ne.com/participate/rules-procedures/generator-nongenerator-var-capability/">https://www.iso-ne.com/participate/rules-procedures/generator-nongenerator-var-capability/</a>
			Non-monetary compensation: Value is in increased resiliency and energy security in the event of an outage		
<b>Emergency Islanding/ Backup Power</b>	BTM	Facility owner or project developer own the storage system	Non-monetary compensation: Value is in increased resiliency and energy security in the event of an outage	Resource could also be eligible for other values, such as energy arbitrage, demand shifting, or demand response during non-emergency times	<a href="https://www.energy.gov/oe/activities/technology-development/grid-modernization-and-smart-grid/role-microgrids-helping">https://www.energy.gov/oe/activities/technology-development/grid-modernization-and-smart-grid/role-microgrids-helping</a>
<b>Eversource Variable Peak Pricing</b>	BTM	Facility owner also owns and operates the storage system	savings in the form of less-expensive electricity at off-peak times	Customers must receive service under a time of use rate and have a meter that can measure and record on-peak usage on a daily basis	<a href="https://www.eversource.com/clp/vpp/vppqa.aspx">https://www.eversource.com/clp/vpp/vppqa.aspx</a>
			On-peak prices are set on a daily basis		

## Value Stacking Considerations

Value stacking of multiple revenue streams requires consideration of the following:

- Location of the facility relative to the metering interconnection
- Operational requirements of the service delivered and/or savings achieved
- Relative value of the that service or savings.

Value streams can be broken down into two categories: **revenue** and **avoided costs** (shown in Table 4). Revenue streams are values for which the system owner receives payment, while avoided cost streams are those for which usual costs or bills are not incurred due to the specified system service.

**TABLE 4. VALUE STREAMS BROKEN DOWN BY REVENUE AND AVOIDED COSTS**

REVENUE	AVOIDED COST
• Energy/Reserves	• Demand Charge Management
• Ancillary Service (Regulation)	• Peak Energy
• Capacity	• ICAP Tag
• State Incentives (SMART, Net Metering)	• Regional Network Service
• Investment Tax Credits (Federal, State and Local)	• Emergency Power/ Resiliency
• NWA	
• Transmission Services	

The economics of developing storage facilities often require multiple value streams to provide financial benefits. However, it may be difficult to realize multiple value streams depending on the purpose and configuration of the storage. For a storage system with the capability to deliver certain services, the various sets of services may only be combined under the following constraint levels:

- **Mutually Exclusive:** Storage asset may only serve different, mutually exclusive services
- **Only Stackable Across Time:** Storage asset may perform multiple services, but at different times
- **Stackable Simultaneously:** Storage asset may perform multiple services at the same time

Details of operational requirements, risks, and value propositions should go into any economic model built to justify investment. Energy storage cannot perform all available services at the same time, or within a particular time window (e.g., hour or day). This will restrict what services can be provided and affect the

monetary value calculus for the system. An example of the value proposition for multiple value stacks in storage is discussed in a recent publication by [Lazard](#).

## Energy and Demand Costs by Utility and Service Class

Billing rate schedules and tariffs vary by utility, customer, and service type. Rates vary based on type of customer and application. **Fixed volumetric rates and charges** are the same regardless of when energy is consumed, while **time-of-use rates** vary based on peak and off-peak times established by the utility based on demand. **Demand charges** are additional fees based on peak power usage during a billing period, charged in cost per KW. Current examples for commercial or commercial time-of-use customers are shown in Table 5. For comprehensive lists of rates and tariffs for Massachusetts utilities, see the following links:

- [Massachusetts Electric Rates and Tariffs](#)
- [Eversource](#)
- [National Grid](#)
- [Unitil](#)

**TABLE 5. EXAMPLES OF COMMERCIAL CUSTOMER RATES**

UTILITY	SERVICE CLASS	CHARACTERISTIC	COST
<b>National Grid (Nantucket Electric)</b>	G-3 (Time of Use)	Fixed Customer Charge	\$223.00
		Demand Charge	\$5.76
		Peak kWh - Summer	\$0.05376
		Off Peak kWh - Summer	\$0.04776
		Peak kWh - Winter	\$0.05168
		Off Peak kWh - Winter	\$0.04568
<b>National Grid (Mass Electric)</b>	G-3 (Time of Use)	Fixed Customer Charge	\$223.00
		Demand Charge	\$5.76
		Peak kWh	\$0.04466
		Off Peak kWh	\$0.03866
<b>Eversource</b>	G-3 (General Service, Boston)	Fixed Customer Charge	\$250.00
		Demand - Summer	\$24.09
		Demand - Winter	\$17.92
		kWh	\$0.01953

Note: kWh charges reflect total delivery charge

## Microgrids

Another opportunity for energy storage is in microgrid applications. Microgrids can be characterized as groups of loads and distributed energy resources that can operate connected to the grid or independently in “island mode.” In addition to furthering the integration of renewable resources to the energy system, battery storage within the microgrid context provides resilience in the face of grid outages. Storage resources can deliver fast response power supply to critical loads during grid outages, and can continue to supply power for longer durations when coupled with solar PV and other onsite generators.

To support resilience and microgrids, Massachusetts developed the **Community Clean Energy Resiliency Initiative** and **Community Microgrids Program** to finance projects related to clean energy, with an emphasis on resilience throughout the Commonwealth. Additionally, the Municipal Vulnerability Preparedness (MVP) program provides grant funding to municipalities for planning and implementing climate resiliency projects. Energy storage projects may be

eligible to receive funding through the Redesign and Retrofit component of the **MVP Action Grant**. For more about opportunities in this area, visit the MassCEC **microgrids** and **energy resilience** websites.

## INTERCONNECTING STORAGE RESOURCES

Interconnection of distributed energy resources in Massachusetts involves the system owner, utility, local inspectors, and project contractor. Written approval from utilities is required in the form of an Interconnection Service Agreement and Authorization to Connect. These processes apply to systems connected to investor-owned utilities (IOUs). **Municipal utilities** are not subject to the same regulations, but may have their own requirements on a municipality-by-municipality basis.

As summarized in Table 6, there are three interconnection review paths: simplified, expedited, and standard. As an inverter-based technology, energy storage is evaluated by interconnection location, system size and other characteristics to determine which path can be utilized for a given interconnection application.

**TABLE 6. MASSACHUSETTS INTERCONNECTION REVIEW PATHS**

	<b>SIMPLIFIED</b>	<b>EXPEDITED</b>	<b>STANDARD</b>
<b>Project Type</b>	Inverter-based technologies served by radial systems, 15 kW or less 1-Phase or up to 25 kW 3-Phase	Inverter-based systems greater than 15 kW 1-Phase or greater than 25 kW 3-Phase and other systems of all sizes that are served by radial systems and meet other requirements	All projects not eligible for simplified or expedited review, including all systems on networks
<b>Typical Projects</b>	Rural residential systems	Rural commercial or industrial systems	Uncertified large projects, unusually complex projects, or projects of any size located on networks
<b>Total Maximum Days of Review Time, Without Delays</b>	15 Add additional 5 days for projects that fail Screen #5 (must be single-phase or all 3-phase)	40 - 60	125-150 If substation modifications are needed, add 20 days. If necessary system modifications are likely to cost over \$200,000 in electric power system upgrades, add 45 days
<b>Application Fee</b>	Fixed Fee (\$0-\$28 per application)	\$4.50/kW (\$300 minimum, \$7,500 maximum)	\$4.50/kW (\$300 minimum, \$7,500 maximum)

Source: **Massachusetts Interconnection Project Review Paths**

The application process time starts on the date that the interconnection application is deemed complete and ends on the date the interconnection agreement is sent. This varies by project and distributed energy resource type. For all resources, this process has taken 25 days or less for 50% of applications. For the only energy storage interconnection request processed to date in Massachusetts, the process took less than 25 days. A running list of interconnection requests is available on the [MA Distributed Generation and Interconnection website](#), supported by the Massachusetts Department of Energy Resources and U.S. Department of Energy .

The detailed requirements vary by utility and can be viewed at the following links:

- [National Grid Standards for Interconnection of Distributed Generation](#)
- [Unitil Standards for Interconnection of Distributed Generation](#)
- [Eversource Standards for Interconnection of Distributed Generation](#)

## Interconnection and ISO-NE

The interconnection process for ISO-NE is defined in the [Open Access Transmission Tariff](#) (OATT) and is integrated with the [Forward Capacity Market](#) rules as of 2009 to establish Capacity Network Resource Capability. ISO-NE requires interconnection studies to make a determination of “no significant adverse impact” from the addition of new storage resources. An interconnection agreement for energy only, without capacity rights, is also permitted. All generators connecting to the bulk power system must follow one or more interconnection processes administered by ISO-NE each beginning with

the [I.3.9 requirements in the OATT](#). In general, projects greater than 5 MW will require more substantial information and time for review. The ISO has the right to recover costs for the study process in the form of a fee, which is described in the OATT. Regional transmission planning that includes the Network Capacity Interconnection Standard should follow ISO planning procedures, [available online](#).

Relevant documents (available on the [OATT Website](#)) include the following:

- **Schedule 22: Large Generator Interconnection Procedures (LGIP):** provides terms and conditions for interconnecting large generating facilities (>20 MW) to the administered transmission system.
- **Schedule 23: Small Generator Interconnection Procedures (SGIP):** provides terms and conditions for interconnecting small generating facilities (20 MW or less) to the administered transmissions system.
- **Schedule 25: Elective Transmission Upgrade Interconnection Procedures (ETU IP):** provides terms and conditions for interconnecting other transmission facilities to the administered transmissions systems that are not a Generator Interconnection Related Upgrade, a Regional Transmission Upgrade, or a Market Efficiency Transmission Upgrade.

## Additional Interconnection Resources

Additional resources on interconnection in Massachusetts and New England are available at the following links:

- [Distributed Generation and Interconnection in Massachusetts](#)

- [ISO New England Interconnection Planning Procedure for Generation and Elective Transmission Upgrades](#)
- [MassCEC Energy Storage Safety](#)

## SHIFTS IN THE REGULATORY LANDSCAPE

As energy storage continues to evolve, nationwide and in Massachusetts, regulatory requirements and opportunities for energy storage will also develop. Some examples of upcoming changes for energy storage in Massachusetts are detailed below.

### ISO-NE Activities

#### FERC Order 841

FERC Order 841, set to become effective December 3, 2019, is designed to remove barriers to the participation of electric storage resources in wholesale markets. This expands the opportunities for energy storage to participate in wholesale energy and capacity markets and to provide ancillary services including frequency regulation. Prior to Order 841, ISO-NE had market structures in place that enabled energy storage participation, but these were largely designed for binary storage technologies like pumped hydro, as opposed to continuous storage facilities like batteries. ISO-NE also had rules in place to allow alternative technology regulation resources (ATRRs) but had not developed clearer rules about bidding, scheduling and dispatch for continuous storage resources that co-optimize multiple services delivered coincidentally. Compliance under FERC Order 841 by ISO-NE will require changes to Market Rule 1 to do the following:

- Lower the minimum size requirement for electric storage facilities (ESFs) to 0.1 MW

and to allow energy storage resources to set price in ISO administered markets

- Ensure all storage technologies are eligible under the ESF participation model addressing registration, market facing administration, and ISO dispatch
- Expand the existing binary storage facility rules to all storage technologies through the newly defined Continuous Storage Facilities (CSF)

[Read More: ISO-NE FERC Order 841 Compliance Filing](#) or the [ISO-NE Energy Storage Device Project Page](#)

#### Energy Storage Device Project

The ISO-NE [Energy Storage Device \(ESD\) Project](#), targeted to launch in April 2019, will enable grid-scale energy storage assets (5 MW or larger) to perform in various markets, without requiring major changes to software and processes. Registration as an ESD allows for simultaneous asset registration as the following:

- Alternative technology regulation resource (ATRR)
- Non-regulation capable generator
- Dispatchable-asset-related demand (DARD) asset

Thus, energy storage resources classified as ESDs can continue to operate as a dispatchable energy market resource, while also serving fully in the regulation market. Classification as a DARD excludes the resources from paying transmission or ancillary service fees, making consumption and production costs lower-risk for the storage device. For complete definitions and technical requirements for generators, ATRRs, and DARDs, refer to Operating Procedure 14 (OP-14): [ISO Operating Procedures](#).

An overview of registering assets with ISO-NE can be found here: [Asset Registration](#).

## Massachusetts Activities

### Clean Peak Energy Standard

The **Massachusetts Clean Peak Standard** is the product of “An Act to Advance Clean Energy” signed into law in August 2018. The program will be designed to incentivize technologies that can supply clean electricity or reduce demand during seasonal peak demand periods. The Clean Peak Standard is still under development, with the 2019 minimum standard percentage requirement set to 0%. The Clean Peak Standard is anticipated to further incentivize the use of energy storage, which can discharge stored electricity to reduce electrical demand during peak times defined by DOER.