

Connecting to the Grid

Permitting Renewable Energy Projects in New England

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Overview

- Connecting to the Local Distribution Grid
 - Massachusetts Net Metering Regulations
 - Massachusetts Renewable Portfolio Standard
 - Massachusetts Model LDC Interconnection Tariff
- Connecting to the ISO-NE Transmission Grid
 - NEPOOL Membership Process
 - ISO-NE Interconnection Process
- FERC Market-Based Rate Authorization



Connecting to the Local Distribution Grid

- Massachusetts Net Metering Regulations
- Massachusetts Renewable Portfolio Standard
- Massachusetts Model Interconnection Tariff



Net Metering: Overview

- Massachusetts DPU Docket 08-75-A (6/26/09)
- “Host Customer” is a “Customer” with a Class I, II or III Facility or Neighborhood Facility that generates electricity on the Customer’s side of the meter
- “Customer” is person or entity that obtains distribution service at a customer delivery point
 - No minimum load required



Net Metering: Facility Types

- Class I: Any facility \leq 60 kw
- Class II: Agricultural, Wind or Solar from 60 kw to 1 MW
- Class III: Agricultural, Wind or Solar from 1 to 2 MW
- Capacity limits are per unit for Class II / III Facilities owned or operated by municipal/government Customer
- Neighborhood Net Metering: A Class I, II, or III Facility owned by, or that serves the needs of, a group of ten or more residential Customers in a single Neighborhood that are served by a single LDC



Net Metering: Credits

- Excess kwh *times* the sum of the following LDC charges applicable to the Customer's rate class:
 - Class I Wind/Solar/Agricultural, Class II, and Class III where Host Customer is municipality/government entity
 - Default service, distribution, transmission, transition charges
 - Non-Solar/Wind/Agricultural Class I Facility
 - ISO-NE average monthly clearing price
 - Neighborhood or Non-municipal/government Class III Facility
 - Default service, transmission, transition charges



Credits for Net Excess Generation

- Net Excess Generation Credits
 - Can be carried forward indefinitely
 - Can be allocated to other Customers in same LDC service territory and ISO-NE load zone
 - Can be cashed out only at the LDC's election and only for Class III Facilities



Net Metering: Limitations

- Revenue grade meter must be installed (at Customer's cost) for Class II and III Facilities
- LDC cap on availability of net metering set at 1% of LDC's highest historical peak load
- No automatic entitlement (direct or indirect) of LDCs to renewable or environmental attributes
- No requirement to participate in the REC market
- Third party ownership, operation, financing of net metering facilities permitted



Renewable Portfolio Standards

- Class I RPS
 - 1% (2003), 5% (2010), 10% (2015), 15% (2020)
- Class II RPS Alternative Resource Provider
 - Minimum Class II RPS of 3.6%
 - Minimum Class II Waste Energy RPS of 3.5%
- Alternative Portfolio Standard
 - 1% (2009) to 5% (2020)
- RECs created/traded on NE GIS platform
 - Aggregation of units allowed
- Proposed Solar RPS Carve-Out



Class I RPS

- RPS Class I Renewable Generation Unit
 - Solar (PV or thermal electric), wind, ocean (thermal/wave/tidal), marine/hydrokinetic, geothermal
 - Subject to limitations: fuels cells, landfill methane gas, hydroelectric (≤ 25 MW), low-emission/advanced biomass
 - Commercial Operation date after December 31, 1997
 - Off-grid generation only in Massachusetts
 - Behind-the-meter units only in ISO-NE Control Area
 - Non-intermittent unit capacity commitment to FCM
 - Special rules for incremental generation, repowered units, imports, and units in control areas adjacent to ISO-NE
- DOER Statement of Qualification Required



Class II RPS

- RPS Class II Renewable Generation Unit
 - Similar to Class I RPS, with following exceptions:
 - Commercial Operation date prior to December 31, 1997
 - Hydropower limited to 5 MW
 - Waste energy generation must participate in MassDEP authorized recycling program
 - Behind-the-meter units limited to 25 MW



Alternative Portfolio Standard

- Eligible facilities include coal gasification, CHP, flywheel energy storage, energy efficient steam technology, paper-derived fuel cubes at coal plants
 - CHP receives credit for thermal energy used in MA
 - Flywheel energy storage must participate in ISO-NE Regulation Market
 - Use of paper-derived fuel cubes at coal plants subject to MassDEP Beneficial Use determination (BUD)
- Commercial operation date on/after January 1, 2008
- Units must meet DOER/DEP emissions standards



Proposed Solar Carve-Out

- Commonwealth goal of 250 MW PV by 2017
- DOER “straw man” proposal (8/26/09)
 - Carve-out from Class I RPS (“S-RECs”)
 - 0.05% (2010), 0.5 % (2017), 1.1% (2020)
 - ACP: \$700 (2010), \$527 (2015), \$311 (2020)
- On-site facilities \leq 2 MW in Massachusetts
- Commercial operation date after 12/31/07
- LDCs obtain 75% of obligation thru long-term contracts
- Draft Regulations (10/09), Public Hearing (11/09), Final Regulations (12/31/09)



Model Interconnection Tariff

- Massachusetts DPU Docket 09-03-A (8/20/09)
 - Application Process Overview
 - Simplified Process (≤ 10 kw or 25 kw)
 - Expedited Process (listed facilities on radial EPS)
 - Standard Process (all facilities on network EPS)
 - Application Content
 - If generation equipment not selected, can identify data for up to three suppliers

Interconnection Time Frames



Review Process	Simplified	Expedited	Standard	Simplified Spot Network
Eligible Facilities	Listed Small Inverter	Listed DG	Any DG	Listed Inverter ≤ 15 kW single-phase
Acknowledge receipt of Application	(3 days)	(3 days)	(3 days)	(3 days)
Review Application for completeness	10 days	10 days	10 days	10 days
Complete Review of all screens	10 days	25 days	↓	Site review 30/90 days (Note 2)
Complete Supplemental Review (if needed)	↓	20 days	↓	↓
Complete Standard Process Initial Review		↓	20 days	
Send Follow-on Studies Cost/Agreement		↓	5 days	
Complete Impact Study (if needed)	↓	↓	55 days	↓
Complete Detailed Study (if needed)			30 days	
Send Executable Agreement (Note 3)	Done	10 days	15 days	Done (comparable to Simplified for radial)
Total Maximum Days (Note 4)	15 days	40/ 60 days (Note 5)	125/150 days (Note 6)	40/ 100 days
Notice/ Witness Test	< 1 day with 10 day notice or by mutual agreement	1-2 days with 10 day notice or by mutual agreement	By mutual agreement	1 day with 10- day notice or by mutual agreement



Interconnection Fee Schedule

	Simplified	Expedited	Standard	Simplified Spot Network
	Listed Small Inverter	Listed DG	Any DG	Listed Inverter ≤ 15 kW
Application Fee (covers Screens)	0 (Note 1)	\$3/kW, minimum \$300, maximum \$2,500	\$3/kW, minimum \$300, maximum \$2,500	≤\$3/kW \$100, >3 kW \$300
Supplemental Review or Additional Review (if applicable)	N/A	Up to 10 engineering hours at \$125/hr (\$1,250 maximum) (Note2)	N/A	N/A
Standard Interconnection Initial Review	N/A	N/A	Included in application fee (if applicable)	N/A
Impact and Detailed Study (if required)	N/A	N/A	Actual cost (Note 3)	N/A
Facility Upgrades	N/A (Note 4)	Actual cost	Actual cost	N/A
O&M (Note 5)	N/A	TBD	TBD	N/A
Witness Test	0	Actual cost, up to \$300 + travel time (Note 6)	Actual Cost	0 (Note 7)



Additional Requirements

- Minimum Technical Interconnection Requirements
- Customer pays System Modification Costs
 - Grossed up basis
 - Payment plan option with financial assurance
- Dispute Resolution
 - Senior management negotiation, mediation or non-binding arbitration, DPU hearing
- Insurance
 - \$500K (\leq 100 kw) to \$5M ($>$ 5 MW)
- Interconnection Service Agreement
- Application for Net Metering Service



Connecting to the ISO-NE Transmission Grid

- NEPOOL Membership Process
- ISO-NE Interconnection Process



Registration as Market Participant

- NEPOOL
 - Voluntary association of > 300 Participants that buy and sell in NE's wholesale electric markets
 - Alternative Resource Provider, Cogenerator, EWG, QF, IPP, Vertically Integrated Utility, Others (brokers, load aggregators, etc.)
- Individual Participants
 - Meet NEPOOL requirements, but can act independently on issues affecting system reliability, markets or transmission
 - To date, no Individual Participants in New England



NEPOOL Membership

- Membership Application and Fee
- Credit Application
- Financial Assurance Requirements
- Market Participant Service Agreement
- Participants Agreement / Second Restated NEPOOL Agreement
- Standard Conditions and Waivers
- NEPOOL Membership Subcommittee Review
- FERC Approval



ISO-NE Interconnection Procedures

- Interconnection Request
- Scoping Meeting
- Feasibility Study, System Impact Study, and/or Facilities Study
- “Re-Study” and Optional Interconnection Study
- Engineering & Procurement Agreement
- Interconnection Agreement
- Section I.3.9 Approval



Interconnection Request (“IR”)

- Specifies whether Participant wants to be a **Capacity Resource** (subject to Capacity Network Resource Interconnection Service requirements)
- Proposes capacity
 - Small (≤ 20 MW) vs. Large Generating Facility
- Proposes schedule (initial synchronization, in-service, operation dates)
- Provides evidence of site control



IR: Capacity Resources

- Ensure adequate availability of electric supply
 - Resource must produce specific MW value for future commitment period
 - Annual Forward Capacity Auction to purchase and set the price paid to Capacity Resources (starting 2010/11)
- To qualify:
 - Submit IR and follow interconnection process
 - Submit Show of Interest Form / Qualification Package
 - Provide post-FCM deposit for Financial Assurance
 - Qualification Determination Notice, subject to FERC review



Interconnection Request

- Required for new generators, or increases or material modifications to existing generators
- **Small Generators**
 - ≤ 20 MW nameplate
 - \$500 (nonrefundable) processing fee for Fast Track (< 2 MW), otherwise \$1,000 study process deposit
 - Technical data required with IR
- **Large Generators**
 - > 20 MW nameplate
 - \$50,000 deposit (nonrefundable in most cases)
 - Technical data required with Interconnection Study Agreement



Scoping Meeting

- Participants
 - ISO-NE, Interconnection Customer, Interconnecting Transmission Owner, Any Affected Party
- Schedule (from submission of IR)
 - Large Generator (30 days), Small Generator (10 days)
- Purpose
 - Estimate timeline for completing interconnection studies and analyzing alternative options
 - Exchange and analyze pertinent information that would impact reasonable interconnection options
 - Determine feasible Points of Interconnection



Interconnection Studies

- Feasibility Study
- System Impact Study
- Facilities Study
- “Restudy”
- Optional Interconnection Study



Feasibility Study

- Evaluates feasibility of proposed interconnection to transmission system using available data
 - Power flow analysis (thermal and voltage analysis)
 - Short circuit analysis
 - List of facilities required due to Interconnection Request
 - Non-binding good faith estimate of costs/time to construct
 - Required protection upgrades
 - Siting and permitting evaluation
- Considers existing “base case” and pending transmission and generation projects
- May be part of System Impact Study



System Impact Study

- Determines impact of proposed generation on local transmission provider's system and regional system
- Identifies specific modifications needed to incorporate new generation (such as transmission lines, terminal equipment, protection and control systems)
- Provides cost estimate and construction schedule for transmission upgrades and additions to the system



Facilities Study

- May be waived for expedited interconnection
- Specifies and estimates cost of equipment, engineering, procurement and construction work needed to implement conclusions of System Impact Study, including any necessary interconnection facilities or network upgrades
- Estimates time required to complete construction and installation of such facilities.
- Identifies electrical switching configuration of connection equipment



“Re-Study” and Optional Interconnection Study

- “Re-study” of prior interconnection study if:
 - Higher-queued project modified or drops out of the queue
 - Auction / bilateral transaction establishes obligation to provide capacity
- Optional Interconnection Study:
 - At customer’s request, and only for informational purposes
 - Provides sensitivity analysis based on customer’s assumptions
 - Identifies required facilities / network upgrades, and estimated costs, required for transmission or interconnection service



Engineering & Procurement Agreement

- Provides for engineering and procurement of long lead-time items necessary for establishment of interconnection
- Optional (may be offered by transmission owner or any affected party to advance implementation of interconnection)
- Does not alter interconnection queue position or initial synchronization date



Interconnection Agreement

- Three-party agreement:
 - 1) Interconnection Customer
 - 2) Interconnecting Transmission Owner
 - 3) ISO-NE
- Sets forth responsibilities for construction, operation, maintenance, inspection, testing, and repair of facilities, systems, and upgrades
- Identifies scope of service selected by customer, billing and payment procedures, milestones, financial security arrangements



Section I.3.9 Approval

- Regardless of whether Interconnection Procedures apply, generators interconnecting with incremental net output greater than 5 MW must submit a **Generation Proposed Plan Application** to ISO-NE
- Pursuant to Section I.3.9 of Tariff, ISO-NE approves application if implementation of proposed plan will not have significant adverse effect on stability, reliability or operating characteristics of any transmission facilities or other market participant's systems



FERC Market-Based Rate Authorization

- Wholesale sales of electric energy, capacity and ancillary services require market-based rate authorization from FERC
- Public utility sellers must demonstrate that they and their affiliates lack (or mitigate) horizontal and vertical market power
- Market-based tariff must comply with FERC Order Nos. 614, 697, and 697-A



Questions?

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