

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

	<b>Simplified</b>	<b>Expedited</b>	<b>Standard</b>	<b>Simplified Spot Network</b>
	<b>Listed Small Inverter</b>	<b>Listed DG</b>	<b>Any DG</b>	<b>Listed Inverter ≤ 15 kW</b>
<b>Application Fee (covers Screens)</b>	0 (Note 1)	\$3/kW, minimum \$300, maximum \$2,500	\$3/kW, minimum \$300, maximum \$2,500	≤\$3/kW \$100, >3 kW \$300
<b>Supplemental Review or Additional Review (if applicable)</b>	N/A	Up to 10 engineering hours at \$125/hr (\$1,250 maximum) (Note2)	N/A	N/A
<b>Standard Interconnection Initial Review</b>	N/A	N/A	Included in application fee (if applicable)	N/A
<b>Impact and Detailed Study (if required)</b>	N/A	N/A	Actual cost (Note 3)	N/A
<b>Facility Upgrades</b>	N/A (Note 4)	Actual cost	Actual cost	N/A
<b>O&amp;M (Note 5)</b>	N/A	TBD	TBD	N/A
<b>Witness Test</b>	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 ( $\leq 20$  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**
  - $\leq 20$  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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