

Delivering the Wind: Transmission and Interconnection Issues and Challenges



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Introduction

- ISO-NE Interconnection Process
- What you can (and can't) learn from your interconnection studies
- Other ways to evaluate deliverability
- Market developments
- Regional transmission planning and funding

ISO-NE Interconnection Process Overview

- Interconnection Request
 - \$ 50k deposit
- Entry into Interconnection Queue
- Scoping Meeting
- Studies done serially in queue order to determine required upgrades and cost responsibility

ISO-NE Interconnection Process Overview

- Feasibility Study
 - Optional, recommended
 - \$95k avg cost in 2010

- System Impact Study
 - Required
 - \$121k avg cost in 2010

- Facilities Study
 - Optional, rarely done
 - \$5k - \$150k historically

ISO-NE Interconnection Process Overview

- Interconnection Agreement
 - Deposit of 20% of upgrade cost due after signing unless all major permits in hand
- Timeline specified in Tariff with limited ability to delay between major steps
- Despite timeline in Tariff, whole process takes 2.3 years on average (2010 data)
- Renewable Energy New England (RENEW) working with ISO to improve wind interconnection process. To learn more:
http://renew-ne.org/?page_id=306

What Do Interconnection Studies Tell You?

- Minimum cost, upgrades to connect
- Whether a planned reliability upgrade will reduce interconnection costs
- After interconnecting you will be able to **compete** in the energy markets to sell power

What Don't Interconnection Studies Tell You?

- All system conditions under which you will or won't be able to operate
- How much competition you may face for existing transmission capacity
- How much curtailment you might expect

What About the FCM Overlapping Impact Study?

- To sell capacity in the Forward Capacity Market, must pass the overlapping impact test
- Can request a **preliminary** analysis of **potential** upgrade requirements to pass the overlapping impact test during Feasibility Study
- Assumes all wind plants producing at summer capacity values (about 22% of nameplate)
- Does not ensure concurrent deliverability at higher wind output, low loads, or while non-FCM resources are operating

What Other Options Are There?

- With system knowledge, can sometimes identify deliverability challenges and solutions before beginning studies
- With detailed simulations of the system under varying conditions, can identify more precisely
- ISO Elective Transmission Upgrade
 - Can specify operating assumptions, deliverability goal
 - Study should identify upgrades required
 - Upgrades are customer-funded
 - No priority access to use transmission once built

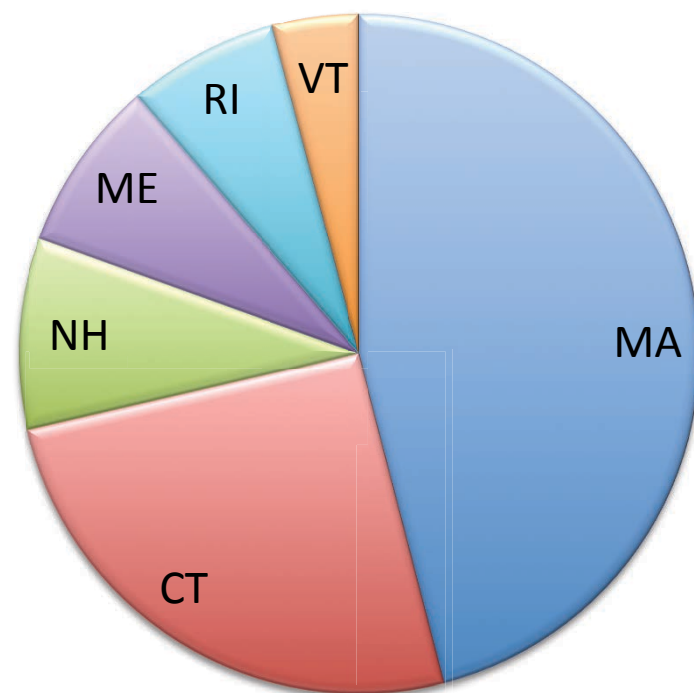
How the Markets Enable or Constrain Wind Deliverability

- Under constrained conditions, generators with Day Ahead Market positions have priority
 - Intermittents with FCM obligation are the only resources not required to offer in the DAM
- Centralized Wind Forecasting
 - Will launch in Q1 2013
- Wind Real Time Dispatch, Negative Energy Pricing
 - Under development, expected 2014 or 2015

How Regional Transmission Upgrades Get Planned and Funded

- Reliability Upgrades
 - Planned to meet reliability criteria for bulk electric system (BES)
 - \$5 billion built since 2002
- Market Efficiency Transmission Upgrades
 - Designed to reduce total production cost for supplying load
 - Not used to date

Cost Allocation
(Based on 2011 Load Share)



How Regional Transmission Upgrades Get Planned and Funded

- Order 1000 Public Policy Upgrades
 - Planning process must consider transmission needs driven by public policy requirements
 - Cost allocation methodology still under consideration (state opt-in?)
 - Compliance filings due in October

Questions?



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