Wind Energy Progress in Massachusetts

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Why Wind?

• Economic Development
  • Business and Job Creation
  • Tax/Lease Payments

• No Emissions

• No Water Use

• No Toxic Discharge

• No Drilling/Extraction

• Energy Security

• Price Stability

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Concentrations of Greenhouse Gases from 0 to 2005

- **Red** line: Carbon Dioxide ($\text{CO}_2$)
- **Blue** line: Methane ($\text{CH}_4$)
- **Black** line: Nitrous Oxide ($\text{N}_2\text{O}$)

$\text{CO}_2$ (ppm), $\text{N}_2\text{O}$ (ppb) vs. Year

Year

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MA has High Electricity Prices ...

2009 Average Retail Electric Price
(Cents per kWh)

Source: EIA Form 826

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Unknowable Future Energy Prices

![Graph showing annual EIA NG price forecast compared to actual NG price. The graph includes colored lines for forecast and a black line with diamonds for actual price. The years range from 1985 to 2007.]
Clean Energy Economic Opportunity

• > 11,000 people in clean energy sector; up 65% since 2007
• Jobs in solar manufacturing, installation and services have doubled since 2007
• Jobs in energy efficiency services have doubled since 2007
• Companies leading the charge: A123; CSG; FloDesign; TPI Composites; Boston Power; Siemens; American Superconductor; Nexamp; First Wind
Clean Energy Legislation 2008

• Green Communities Act
  - Expands EE delivery mechanisms and goals
  - RPS – expansion and strengthening targets of 1997 Act
  - Net metering provisions
  - Establishes DOER’s Green Communities Program

• Global Warming Solutions Act
  - 2020 commitments – 10-25% below 1990 levels
  - 2050 commitments – 80% or more below 1990 levels

• Oceans Management Act
  - Provides zoning-like planning of state waters
  - Identifies presumptive areas for wind development

• Clean Energy Biofuels Act
  - Mandate for advanced biofuels
  - Paves way for transition to LCFS

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MA RPS Class I Technology Trend

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<th>Year</th>
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<th>Landfill Methane</th>
<th>Biomass</th>
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Global Trends

• Global wind energy capacity increased by 22% (35.8 GW) in 2010 - majority of growth in Asia

• 194.4 GW installed globally (up from 158.7 GW last year)

• 2011 a rough year for wind – 5,115 MW installed (half of 2009 installed) but wind approaching cost parity with fossil fuels

• China surpasses US in installed capacity - on track to reach 200 GW by 2020

  • China: 42.3 GW  US: 40.1 GW

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MA Wind Energy

- 10-fold increase in wind – from 3.1 MW to more than 30 MW by end of 2010;
- Building the wind cluster:
  - Wind Blade Test Facility;
  - Cape Wind
  - Vestas R&D
  - Siemens Offshore
  - MassTank/EEW
  - New Bedford Port;
  - FloDesign
  - American Superconductor
  - First Wind

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MA Wind Energy Capacity Trend

- 26 turbines installed
- 18.82 MW of installed capacity
- >30 MW expected to be installed by end of 2010
- Tenfold increase during Governor Patrick’s administration
Massachusetts Installed Projects

Installed Wind Turbines in Massachusetts

Mean Wind Speed
(at 50 meters, m/s)
- Poor < 5.5
- Marginal 5.5 - 6.0
- Good 6.0 - 7.0
- Very Good 7.0 - 8.0
- Excellent > 8.0

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Regional Activity: ISO

• ISO New England completed their ‘New England Wind Integration Study’ (NEWIS) in 2010

• Primary conclusions:
  - NE could meet up to 24% of energy needs from wind by 2020 (10-12 GW)
  - Increasing amounts of wind energy will require investments in operational capacity (e.g. wind forecasting) and transmission from high wind areas to areas of high load
  - Wind could reduce fossil fueled generation in NE
  - Wind in NE has very healthy capacity factors & values
  - 200 GW of wind energy potential in NE
Regional Activity: ISO

Proposed Resource Development in Massachusetts

- Natural Gas: 53%
- Offshore Wind: 25%
- Biomass: 7%
- Hydro: 6%
- Onshore Wind: 6%
- Coal: 2%
- Oil: 1%

Total: 1871 MW

Source: ISO-NE Generator Interconnection Queue, January 1, 2011

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Regional Activity: ISO

Renewable Projects Proposed by Fuel Type
+3,300 MW of Renewables in ISO Queue, Wind dominant fuel

MW Renewables in January 2011 Queue by Fuel Type

- Wind, 2836, 85%
- Hydro, 33, 1%
- Biomass, 431, 13%
- Landfill Gas, 34, 1%

Includes: Landfill Gas, Hydro, Wind, Solar and Biomass. Pump Storage projects in the ISO Queue are not included.
Regional Activity: ISO

Renewable Projects Proposed by State

MW Renewables in January 2011 Queue

REGION

- RI, 598, 18%
- VT, 222, 7%
- NH, 356, 11%
- MA, 719, 21%
- CT, 38, 1%

MAINE

- ME Hydro, 60, 0%
- ME Wind, 1336, 40%
- ME Biomass, 60, 2%

Includes: Landfill Gas, Hydro, Wind, Solar and Biomass. Pump Storage projects in the ISO Queue are not included.
Regional Activity: NEWEEP

- New England Wind Energy Education Project
- Provide siting decision-makers & the public with objective information on which to make informed decisions about proposed wind energy projects throughout New England by:
  - Collect and disseminate accurate, objective, up-to-date information on critical wind energy issues impacting market acceptance of the hundreds of land-based and off-shore wind development projects proposed in the region
  - Enhancing the region’s public acceptance of appropriately-sited wind energy generation
Regional Activity: NEWEEP

Grant Co-applicants:
- Sustainable Energy Advantage, LLC (SEA)
- National Renewable Energy Laboratory (NREL)

NEWEEP is:
- Coordinated by SEA
- Directed by a Steering Committee consisting of New England state agencies, regional and national research organizations and New England’s regional grid operator, who have committed to participate in the project. Their tasks include:
  - Convening for planning meetings
  - Providing Guidance
  - Planning & Prioritizing
  - Outreach

Steering Committee Members
- National Renewable Energy Laboratory (NREL)
- Connecticut Clean Energy Fund (CCEF)
- Massachusetts Clean Energy Center (CEC)
- University of Massachusetts - Wind Energy Center (WEC)
- Efficiency Maine (EM)
- ISO-New England (ISO-NE)
- Utility Wind Integration Group (UWIG)
- Lawrence Berkeley National Laboratory (LBNL)
- Massachusetts Department of Energy Resources (DOER)
- Clean Energy States Alliance (CESA)
- New Hampshire Office of Energy & Planning (OEP)
- Renewable Energy New England (RENEW)*
  - An organization consisting of environmental advocates & wind businesses

* An organization consisting of environmental advocates & wind businesses
Regional Activity: NEWEEP

• 2-year project through Dec 2011
• 8 free webinars open to public
• Full-day, in-person Conference (June 2011)
• Outreach/Awareness
  • Web-based home for webinar-related materials – the New England Wind Forum (NEWF)
    http://www.windpoweringamerica.gov/newengland/neweep/
MA Wind Initiatives

• Policy
  - Commonwealth Wind Goals: 2000 MW by 2020
  - RPS (Renewable Energy Portfolio Standard)
  - LTC (Long term contracts)
  - Wind Energy Siting Reform Act
    ▪ Refiled in 2011
  - Net Metering
  - Interconnection
MA Wind Initiatives

• Public Outreach/Awareness
  - Environmental Business Council (EBC)
  - New England Wind Energy Education Project (NEWEEP)
  - MA Wind Working Group
  - New England Clean Energy Council
  - Cape & Islands Wind Information Network

• Technical Assistance
  - MA Clean Energy Center (CEC)
  - Green Communities
  - MassGIS Wind Viewer
Wind Energy Siting Reform Act

- Re-filed January 2011 and same as bill passed (but not enacted) in 2010
- Misinformation about wind energy rife in MA
- Consistent and scientifically accurate and robust siting standards are critical to wind energy development in MA
- State will continue to play an active and vital role developing wind energy siting standards and educating stakeholders

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Net Metering

• Changes made via the Fall 2010 supp. Anticipate DPU to open a docket in very near future with a revised draft regulation to implement these changes:
  
  ➢ Separate caps for public (2%) and private (1%)
  ➢ New definition of a public NM facility (owned or operated or 100% of output assigned to municipality or other governmental entity)
  ➢ Aggregated cap for public entities of 10 MW
  ➢ DPU create a process for public projects to provide assurance of nm status

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Interconnection

• Opportunities to develop more efficient, consistent, and faster process

• Increasingly high volume of DG applications

• Enhance awareness and education regarding interconnection process

• Prevent miscommunication and mishaps that can delay projects and increase project costs
Social Acceptance

• Common cited concerns
  
  ➢ Health effects
    ▪ Sound, Flicker, Wind Turbine Syndrome
  
  ➢ Property values
    ▪ December 2009 Lawrence Berkeley National Lab study
  
  ➢ Cost
    ▪ Subsidies, increased cost
  
  ➢ Visibility
  
  ➢ Popularity
    ▪ September 2010 Financial Times/Harris Poll
      87% in US favor new wind farms

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State Resources

• MASSACHUSETTS CLEAN ENERGY CENTER (CEC)
  – Commonwealth Wind Program
    • 617-315-9355
    • www.masscec.com

• MASSACHUSETTS DEPARTMENT OF ENERGY RESOURCES (DOER)
  • http://www.mass.gov/energy/wind

• MASSGIS WIND VIEWER
  – http://maps.massgis.state.ma.us/wind/

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Suggestions?

• MA will continue to be a global and national leader - let's continue the momentum

• This will require leadership, vision, persistence, and compelling communication & outreach

• The opportunity is large, but time is limited

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