Leading by Example Program

Commonwealth of Massachusetts

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Discussion Topics

- Leadership
- Legislative Context
- LBE Program Management
- Energy Projects
- Energy Tracking
- Financial Resources
- What’s Next
Executive Order No. 484

Issued April 2007 by Governor Deval Patrick

- Sets short, medium and long-term goals for state agencies:
  - GHG emission reductions
  - Energy reductions
  - Renewable energy
  - Water conservation
- Applies to all executive agencies, state colleges and universities (29)
- Trial court and authorities participate voluntarily

![EO 484 Targets](chart.png)
EO 484 Requirements

- Comprehensive energy projects at all facilities over 100,000 square feet
- Retro-commissioning at all buildings over 50,000 sf
- Energy conservation behaviors
- Ban on incandescent bulbs
- Install LED exit signs and programmable thermostats
- Procure only EnergyStar rated computers, printers, copiers and other office equipment

- Mass. LEED Plus for all new and major renovation projects over 20,000 square feet
- Standard includes:
  - LEED Certification, with the following requirements
    - 20% better than Mass Energy code
    - 3rd party commissioning
    - 50% outdoor water reduction and 20% indoor water reduction over baseline projections
    - Meet smart growth criteria
With this letter, I am directing all state agencies to plan and initiate agency-wide measures that will result in dramatic reductions in energy use and associated emissions. In taking action to reduce energy consumption and switch to cleaner fuels, I am asking agencies to take advantage of a wide-range of opportunities, including (but not limited to) the following:

- Work with DCAM to build new buildings and retrofit existing facilities using both tested and innovative technologies, from greater insulation, daylighting and LED lights to improved building orientation, site design, and on-site renewable energy;

- Direct staff to reduce individual energy consumption by turning off lights and equipment when not in use;

- Purchase and install only energy efficient equipment and make sure that all Energy Star features on equipment are enabled; and

- Maintain equipment so that it runs efficiently and ensure that automated building operating systems are running as efficiently as possible.
Summer of 2008 5 bills were passed that will essentially transform the way Massachusetts addresses energy:

1. Green Communities Act
2. Global Warming Solutions Act
3. Green Jobs Act
4. Biofuels Act
5. Oceans Management Act

- Sets long-term statewide GHG emission reduction of 10-25% by 2020 and 80% by 2050
- Will result in new funding opportunities for efficiency and renewables
- Decoupling rule promulgated
- Creates ocean planning process to include renewables
- Mandates minimum % of biofuels and bioheat in 2010
### Legislative Context

#### Key Statewide Provisions
- Requires utilities to fund efficiency first when it is cheaper than supply
- Allows renewable incentives for non-electric generating resources
- Allows “virtual” net metering for distributed generation wind and solar installations
- Permits utilities to own and operate up to 50 MW of solar
- Establishes Green Communities Division to provide funding and T/A to municipalities

#### Key State Government Provisions
- Permits public agencies to undertake efficiency projects through utilities without competitive procurement when projects cost less than $100k
- Permits public agencies to purchase solar pv installations through OSD contract when project costs less than $100k
- Raises payback period for state 25A energy projects from 10 to 20 years
- Allows DCAM to delegate to agencies 25A projects that cost less than $1 million (was $200k)
Leading by Example Council

- Meets every other month – generally in the State House
- Includes:
  - agencies with environmental expertise (e.g. DEP, DOER, DPH)
  - Agencies with operational support (e.g. OSD)
  - Agencies with large impacts (e.g. higher education, colleges/universities, DOC, DPH, authorities)
- Other agencies are welcome to participate
Energy Strategies

- **Green Buildings**
  - LEED Certification required on all new buildings or major renovation

- **Energy Conservation**
  - Behavioral changes, student groups

- **Energy Efficiency**
  - Comprehensive Energy Projects, DCAM

- **Energy Efficient Products**
  - Energy Star Products, OSD

- **Co-generation**
  - Best for 24/7 facilities

- **On-site renewables**
  - MTC grants available- solar, wind, biomass, etc.

- **Renewable Energy Certificates**
  - Additional Revenue for projects

- **Alternative Fuels**
  - Bio-diesel heating

- **Load Reduction**
  - Demand Response

- **Efficient vehicles and Fleet management**
  - Hybrids and Electric Cars
Green Buildings

Cape Cod CC

- First State LEED building (Gold)
- 35% better than code
- 27 kW PV system
- daylighting
- recycled materials
- greywater system for toilets
Energy Efficiency

Bridgewater State College

- Comprehensive Energy Performance Contract
  - Lighting, VFDs, new boiler controls, steam lines, water conservation
- Project costs - $10.4 million (non capital funds)
- Project savings - $956,000 guaranteed annual savings
Energy Efficient Products

- ITD computer power management standard issues last fall requires all agencies to implement power management for all desktops (approx 50,000)
  - Anticipate savings of 8-10 million kWh and $2 million annually
  - Evaluating compliance now
- Banning incandescents, installing LED lights on pilot basis

The Massachusetts Department of Revenue installed computer management software, resulting in savings of over $248,000 over 5 years, with a payback of 13 months, a ROI of 360%, and a CO2 reduction of 288 tons
On-Site Renewables - Wind

- MMA 660 kW wind turbine generated 1.1 million kWh in the last year, eliminating 725 tons of CO2 equal to 35% of campus electricity.
- Four other facilities in process: DOC Gardner, MWCC, CCCC, Plymouth County Correctional.
- Studies at UMD, Norfolk County, Templeton DMR, Worcester Sherriff’s.

660 kW Wind Turbine @
Mass Maritime Academy
On-Site Renewables - Solar

- Through federal CREBS, MTC and state funds, 1 MW of solar being installed at 12 sites, including 5 state and community colleges, CHE, MWRA, & 5 DOC sites
- Statewide solar PV assessment underway for 27 sites
- New state program to achieve 250 MW (from current 4 MW) by 2017 in development

Governor Patrick at the MWRA ribbon cutting of the 1st of 12 solar projects to be installed at state facilities
On-Site Renewables - Biomass

- MWCC heats entire campus with wood chips
- Biomass heating system installed at DCR Quabbin facility
- Adding 2+ MW CHP wood boiler at Umass Amherst
Alternative Fuels

- B5 biodiesel to be used in all diesel vehicles as of July 1, 2007
- UMass Amherst used 265,000 gallons of B20 in diesel vehicles over last 6 years
- B3 Bioheat to be used in place of #2 oil in large boilers and emergency generators, starting winter of 2007-08 in zones 2 & 3
- Bioheat pilot project at 4 agencies showed no detrimental effects, and resulted in cleaner equipment
Energy Tracking

- Tracking of state government energy consumption required by EO484
- Measure progress statewide, by agency, by facility
- Help to prioritize energy projects based on performance
- On-line energy information system will provide total BTU usage for electricity, gas, oil, rank on a per sf basis and track emissions
Financing Options - Renewables

- **Mass Renewable Trust**
  - funds for state facilities for renewable projects related to electricity generation and hopefully thermal
  - funds from electricity bills into statewide pot

- **Commonwealth Solar**
  - $16M reserved for public buildings – per watt rebate per project

- **Small Solar**
  - Green Communities Act allows public facilities to procure small solar installations through OSD contract when projects cost less than $100k
Financing Options-Efficiency

- **Tax Exempt Lease Purchase or ESCO Financing**
  - Projects paid for through with energy savings
  - Now allowed up to 20 year term
  - No up front capital required
  - Address long-term energy reduction and improve facility maintenance

- **Least Cost Energy Procurement**
  - Legislation now requires Utilities to pay for lowest cost energy projects, which generally means efficiency
  - Could double or triple current $125 million efficiency funds
  - Utilities anxious to find projects to fund

- **Small Efficiency Projects**
  - Legislation now allows public entities to contract directly with utilities and subcontractors for efficiency projects that cost less than $100k and pay for projects through utility bills
Financing Options - Other

- **3rd Party Ownership**
  - Long-term agreement (up to 20 years) to purchase power from renewable installation at similar cost to current power
  - Private party owns and maintains equipment and takes advantage of depreciation and U.S. tax credits
  - Considering primarily for solar PV

- **CREBS (Federal Clean Renewable Energy Bonds)**
  - Provides zero interest loans for public projects that cannot get tax credits
  - Waiting for federal guidance
  - Can be a complicated financing mechanism

- **Demand Response**
  - State has earned over $405k since 2006; DOC earned $300,000 in one year
  - Considering establishing Revolving Loan Fund
What’s Next?

Over the next few 3-18 months, LBE Plans to:

• Review and implement new state building standard as per the Governor’s Zero Net Energy buildings Task Force Recommendations – move to a performance BTU per sf basis
• Construct 1-3 zero net energy buildings over the next several years
• Adopt a new low carbon fuel standard which will determine whether to move forward with biofuels
• Possibly oversee a large scale PV installation using Power Purchase Agreement(s)
• Use federal stimulus funds to re-craft how we do efficiency and ramp up number of projects by bundling sites and streamlining the process
• Identify good renewable opportunities for future projects (e.g. solar thermal at pools
• Complete a plug-in hybrid pilot and evaluation
• Install several large scale wind turbine – multi MW
• Implement a fully operating energy tracking system