

Leading by Example Program

Commonwealth of Massachusetts

March 19, 2009

Eric Friedman
Director LBE Program
617-626-1034

eric.friedman@state.ma.us
www.mass.gov/eea/leadingbyexample

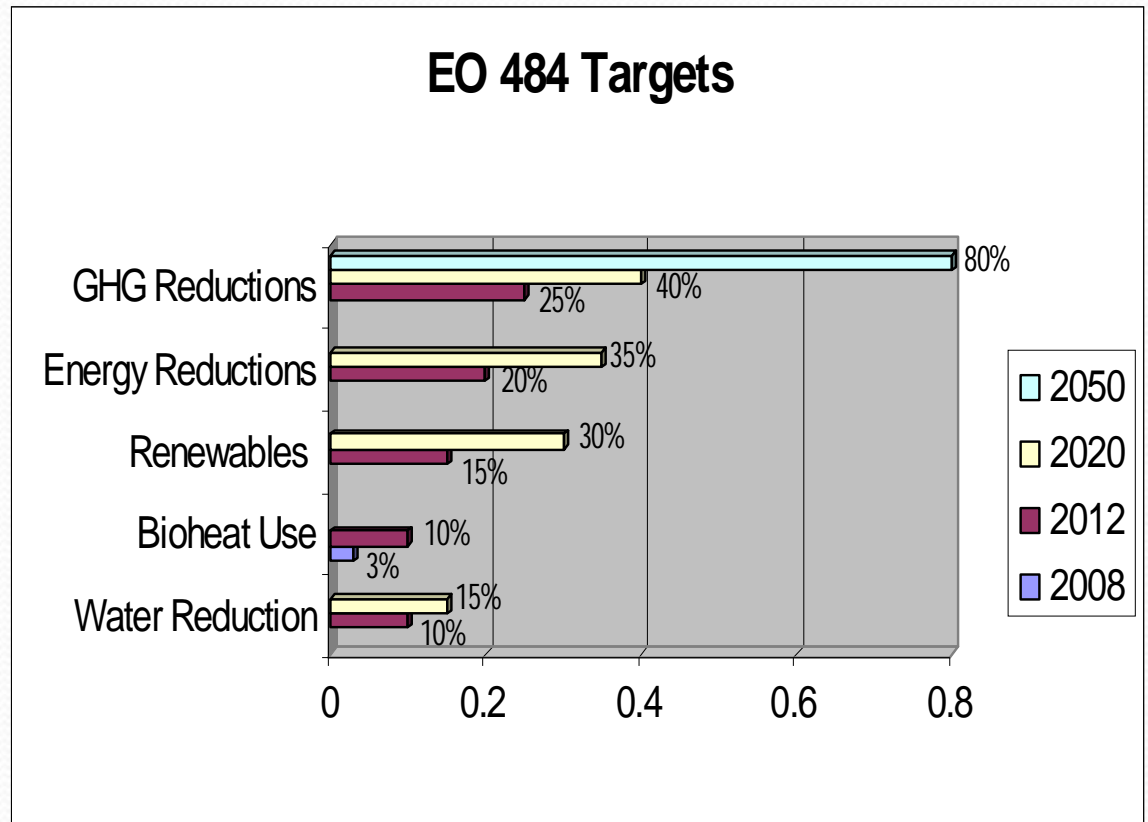
Discussion Topics

- 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 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.

Legislative Context

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 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

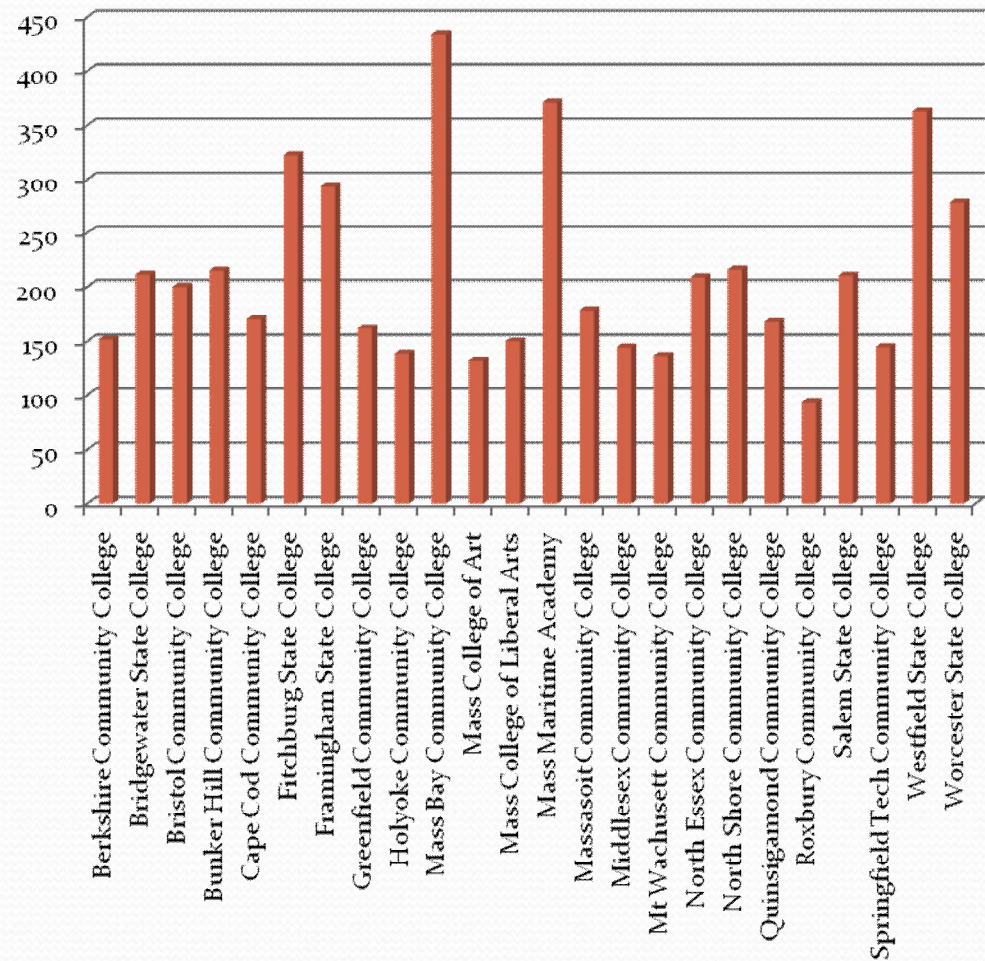
- **B5 biodiesel to be used in all diesel vehicles as of July 1, 2007**
- **UMass Amherst used 265,000 gallons of B20 in diesel vehicles over last 6 years**
- **B3 Bioheat to be used in place of #2 oil in large boilers and emergency generators, starting winter of 2007-08 in zones 2 & 3**
- **Bioheat 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

Total source kBtu/sq ft



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 Developing 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