



ISO on Background

Energy-efficiency forecast

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Agenda

11:00-11:05 a.m.

Welcome and Introductions

Ellen Foley, Director, Corporate Communications

11:05-11:10 a.m.

About ISO New England

Anne C. George, Vice President, External Affairs and Corporate Communications

11:10-11:40 a.m.

ISO New England's Energy-Efficiency Forecast

Stephen J. Rourke, Vice President, System Planning

11:40 a.m.-12:00 p.m.

Question-and-Answer Session



About the *ISO on Background Series*

- Informal opportunity for media to learn more about trends affecting New England's electricity industry
- Hosted by ISO New England senior management
- Content is on-the-record
- Please hold questions until the Q&A session at the end of the presentation
- Presentation and remarks will be posted at www.iso-ne.com>News & Issues>Press Releases after the session

About ISO New England

- Not-for-profit corporation
 - Created in 1997 to oversee New England's restructured electric power system; regulated by Federal Energy Regulatory Commission
- Regional Transmission Organization
 - Independent of companies doing business in markets; no financial interest in companies participating in markets
- Major responsibilities
 - Maintain reliable operation of the electric grid
 - Administer wholesale electricity markets
 - Plan for future system needs



New England's Electric Power Grid at a Glance

- 6.5 million households and businesses; population 14 million
- 350+ generators
- 8,000+ miles of high-voltage transmission lines (115 kV and above)
- 13 interconnections to electricity systems in New York and Canada
- 32,000 megawatts (MW) of supply
 - About 2,000+ MW are demand resources
- 28,130 MW all-time peak demand, on August 2, 2006
- Over 400 participants in the marketplace
- \$5-11 billion annual wholesale electricity market value



Wholesale to Retail Connection



- **Bulk Power System**

- Electricity is produced in New England by more than 350 generators dispatched by ISO-NE
- Generators sell the electricity through either wholesale markets managed by ISO-NE or contracts with utilities and competitive suppliers
- Region's high-voltage transmission lines move power to substations where it is stepped down in voltage to feed into local distribution lines
- Federal regulation (FERC)

- **Local Distribution System**

- Region's 6.5 million households and businesses create demand for electricity
- Electric utilities and competitive suppliers buy electricity through markets or contracts with generators
- Local utilities distribute the electricity to businesses and homes over lower-voltage lines
- Customers' bills include both wholesale and retail costs of producing and delivering electricity
- State regulation (public utilities commissions)

ISO New England's Core Responsibilities

Operating the Power System

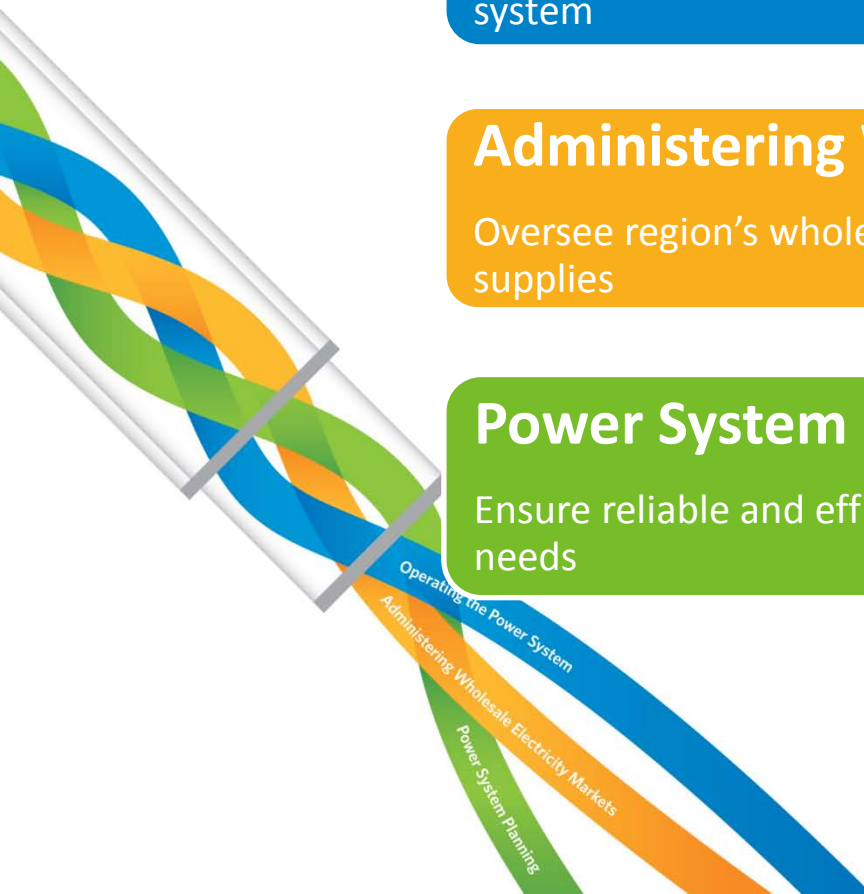
Minute-to-minute reliable operation of region's generation and transmission system

Administering Wholesale Electric Markets

Oversee region's wholesale marketplace for energy, capacity and reserve supplies

Power System Planning

Ensure reliable and efficient power system to meet current and future power needs



Energy Efficiency Basics

- Energy efficiency (EE): Consuming less energy while achieving the same level of service
 - On the other hand, energy conservation is going without a service in order to use less energy
- Energy-efficiency measures are installed devices or processes that use less electricity
 - Common measures: lighting, building insulation, HVAC upgrades, more efficient appliances, and industrial process improvements
- Individual states set goals for reduced electricity use
 - Energy-efficiency programs funded directly
- ISO New England-administered Forward Capacity Market compensates EE as a resource, the same as power plants
 - With FCM auction results, the EE levels for the next three years are known
 - But long-term system plans look ahead 10 years



State-Sponsored Energy-Efficiency Programs

- New England's state public utilities commissions generally responsible for EE programs
 - In 2012, 125+ EE programs in six states
 - Differing approaches to:
 - Funding sources
 - Budget periods
 - Program rules and duration
 - Performance reporting
- Funding sources:
 - Regional Greenhouse Gas Initiative (RGGI)
 - Forward Capacity Market (FCM)
 - System Benefit Charges (SBC)
 - Includes EE

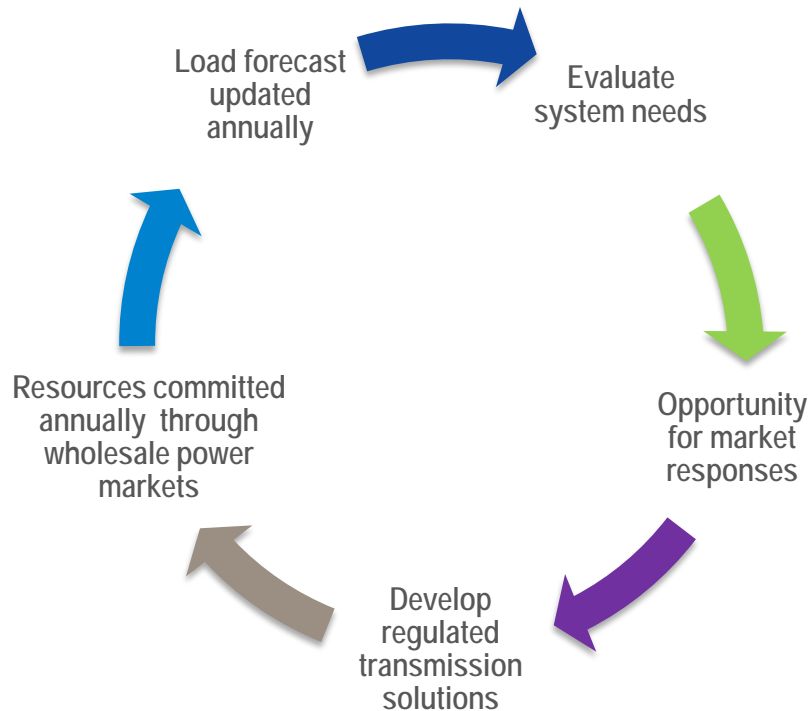
DETAIL OF CURRENT CHARGES				
Delivery Services				
Service Period	No. of days	Current Reading	- Previous Reading	= Total Usage
Jul 25 - Aug 27	33	37742 Actual	36538 Actual	1204 kWh
METER NUMBER	NEXT SCHEDULED READ DATE Sep 25			
RATE	Residential Regular R-1			
	Customer Charge			4.00
	Dist Chg First 600 KWH	0.03257 x 600 kWh		19.54
	Dist Chg Next 604 KWH	0.03919 x 604 kWh		23.68
	Transition Charge	0.00069 x 1204 kWh		0.83
	Transmission Charge	0.01738 x 1204 kWh		20.92
	Energy Efficiency Chg	0.00822 x 1204 kWh		9.90
	Renewable Energy Chg	0.0005 x 1204 kWh		0.60
	Total Delivery Services			\$ 79.47
Supply Services				
SUPPLIER National Grid				
	Basic Service Fixed	0.06718 x 1204 kWh		80.89
	Total Supply Services			\$ 80.89

Example of a retail bill

ENERGY-EFFICIENCY FORECAST

Background

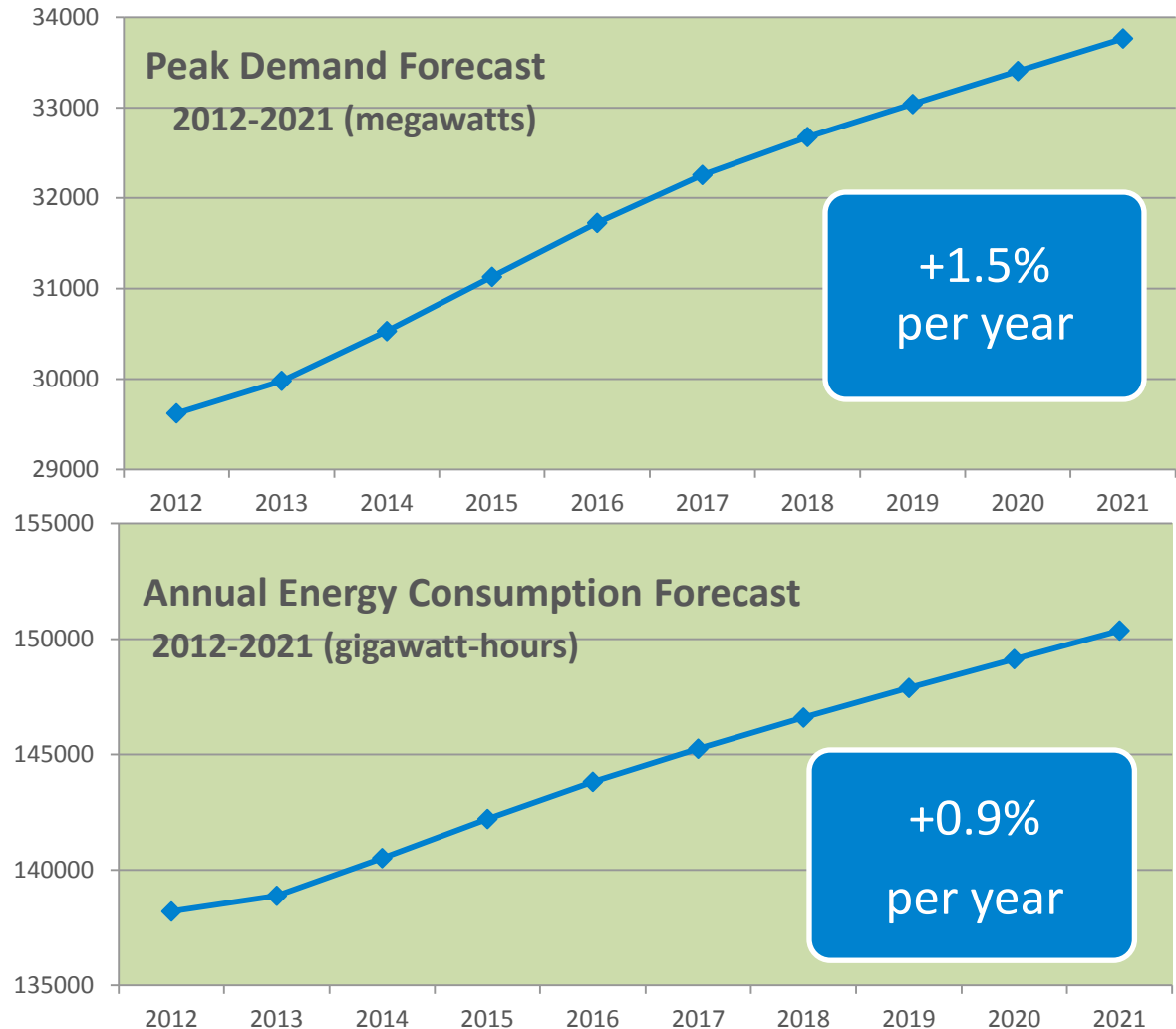
Comprehensive, Long-term System Planning at ISO New England



- Develop 10-year forecast of electric energy use and peak demand
- Identify system needs, evaluate alternatives and develop transmission plan to meet needs
- Ensure electric grid meets reliability standards
- Manage interconnection of new resources
- Ensure resources providing capacity are qualified

Long-term Load Forecast Projects Demand 10 Years Out

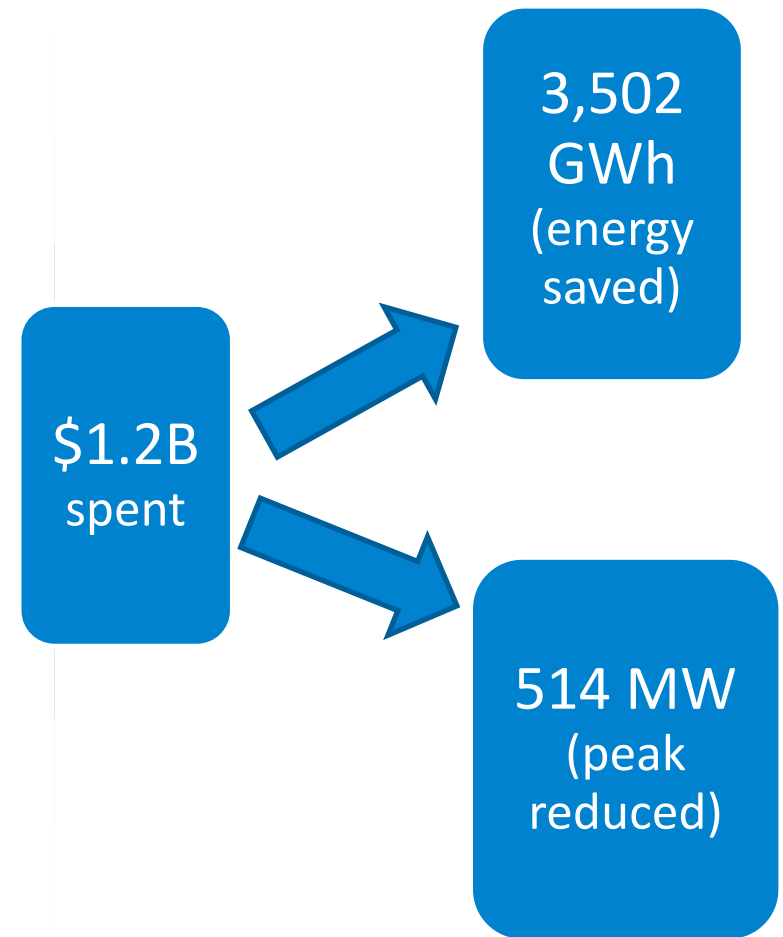
- **Baseline forecast developed with:**
 - State and regional economic forecasts
 - 40 years of New England weather history
 - Other factors:
 - US Dept of Energy projections of average retail prices
 - New EE standards for household appliances



Energy Efficiency is a Priority in New England

*State EE spending and electric energy savings, 2008-2011**

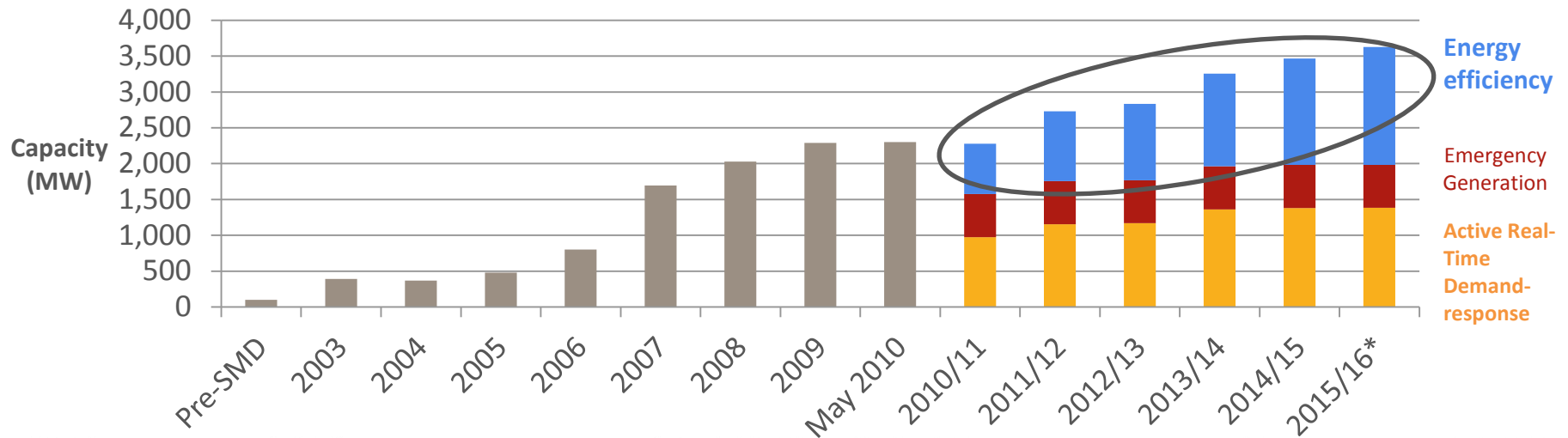
- Total NE states' spending on EE in four-year period: **\$1.2 billion**
 - Nearly \$500 million spent on EE in 2010 (most recent year w/complete data)
- Total reduction in electricity use: **3,502 gigawatt-hours (GWh)**
 - Average annual reduction in electricity use: 876 GWh
 - About 1,300 GWh of electricity savings in 2010
- Total summer peak demand savings: **514 MW**
 - Average annual summer peak demand reduction: 128 MW
- ISO collected data from EE programs back to 2008 or 2009; most programs are much older



*Not every state reported 2008 and/or 2011 data

EE in Forward Capacity Market

- Annual Forward Capacity Market (FCM) auction commits resources to be available three years in the future
- EE measures participate alongside generation
 - FCM provides a revenue stream that facilitates development of EE
- 2012 auction procured resources obligated for 2015-2016
 - 33,455 MW total capacity that will be needed
 - ~1,500 MW is EE
 - EE in FCM has more than doubled since 2008

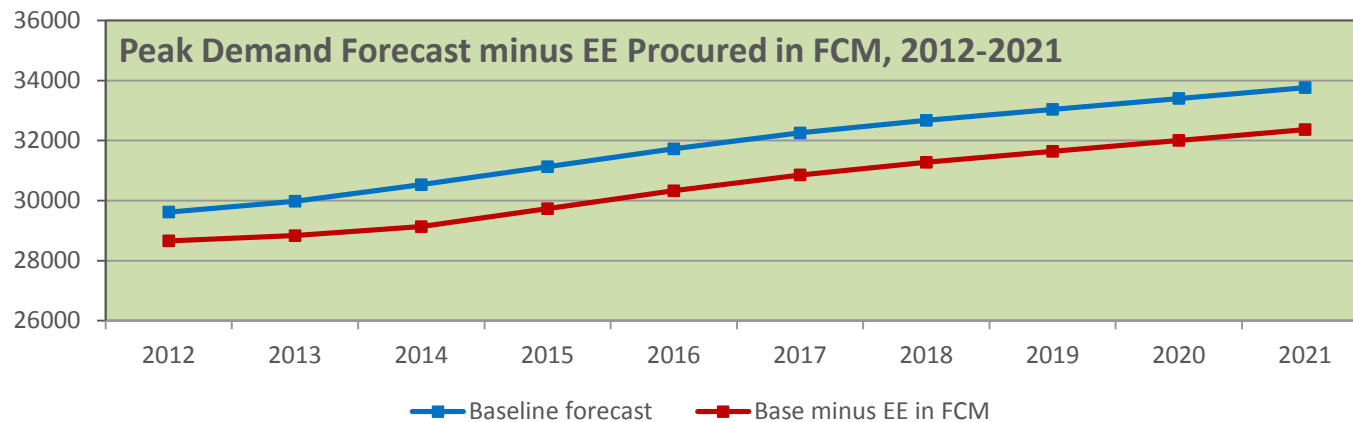


ENERGY-EFFICIENCY FORECAST

Development

EE in the Long-term Load Forecast

- FCM auction results tell ISO-NE exactly how much EE savings can be counted on for years 1 through 3 of the 10-year forecast
- Until now, the level of EE from the most recent auction was held constant for years 4 through 10 of the long-term planning horizon



- States encouraged ISO-NE to forecast incremental growth in energy savings instead of holding EE constant beyond the three-year FCM timeframe

Energy-Efficiency Forecast Model Development

- Previously, no well-established metrics for determining how much electricity will *not* be consumed in the future
- An EE forecast requires data on each program’s spending and level of energy savings achieved
 - No aggregated data available; required collection of data on 125+ individual programs with different funding sources, goals, and reporting methods
- ISO-NE developed a forecast of “EE savings”—how much electric energy will *not* be used—across a 10-year planning horizon by:
 - Modifying New York ISO EE forecast model based on production costs (dollars spent per megawatt-hour of savings) and budgets of EE programs
 - Factoring in uncertainty around future inflation, rising production costs as less-expensive EE measures are deployed first, changing technologies, state budget priorities
- First multi-state, long-term forecast of energy-efficiency savings*

* Forecast does not include estimates of how much money was saved

ENERGY-EFFICIENCY FORECAST

Regional Results

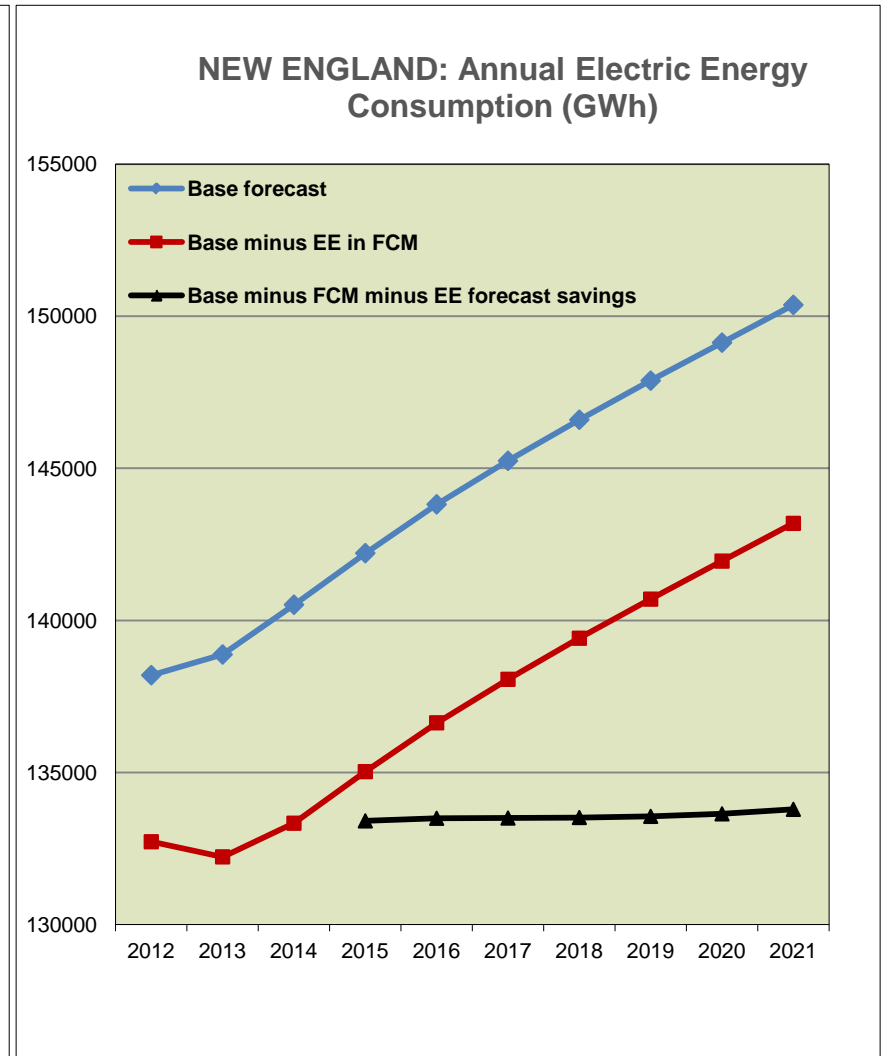
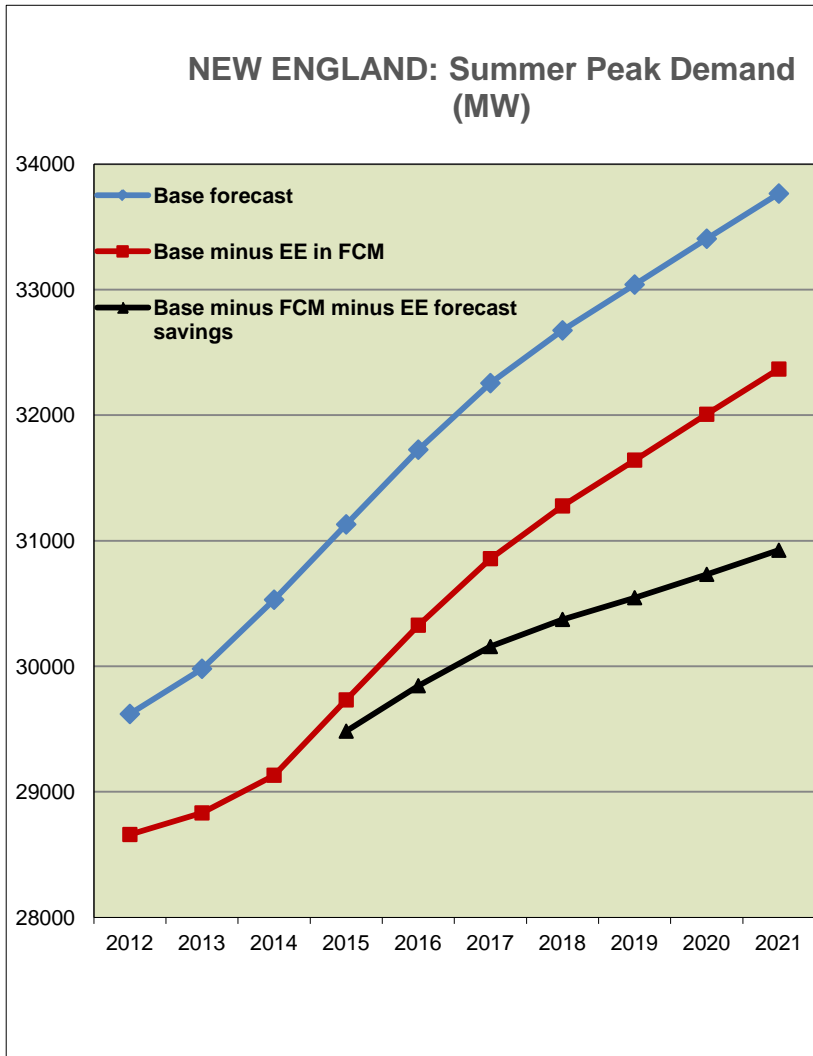
First Regional EE Forecast Results

(2015 to 2021)

- Total projected spending on energy efficiency: **\$5.7 billion**
- Annual electricity consumption remains flat
 - Average annual energy savings: **1,343 GWh**
 - Total projected reduction over seven years: **9,399 GWh**
 - RI and VT forecasts show declining annual electricity consumption
- Peak demand rises more slowly
 - Average annual reduction in peak demand: **206 MW**
 - Total projected reduction over seven years: **1,444 MW**
 - In VT, forecasted peak demand declines



New England Results: Lower Peak Demand Growth, Level Energy Demand



New England Results: Long-term Forecast with EE Savings

Annual average, 2012-2021

1.5%



0.9%

Peak demand grows at a slower rate

0.9%



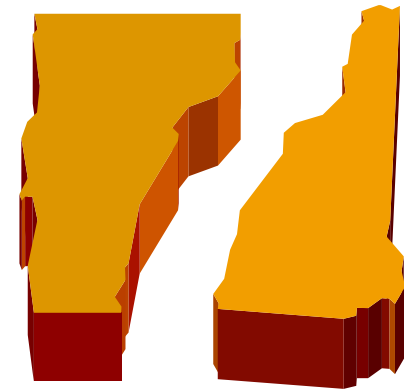
0.0%

Annual growth in energy consumption is flat



Impact of EE Forecast in Transmission Planning

- ISO-NE incorporated new information in its analysis of long-range reliability needs of the power system in Vermont and New Hampshire
 - EE forecast projects lower demand levels
 - New generation and demand resources added
 - Transmission upgrades
- Results:
 - Ten upgrades of transmission lines and other equipment can be deferred to years beyond 2020.
 - Deferring these upgrades saves the region about \$260 million.



Conclusions

- States continue to make large investments in EE
- ISO-NE worked successfully with stakeholders to fully integrate EE into ISO's planning and load forecast
- EE forecast shows the states' investment in EE is having a significant impact on electric energy consumption and peak demand
- About \$260 million in transmission expenses already deferred for New England customers
- Second EE Forecast (2016-2022) due out in February 2013
 - Preliminary results are consistent with those of first forecast
 - For more information see www.iso-ne.com/eefwg

For more information:

- ISO Newswire, our online newsletter
www.isonewswire.com
- ISO Express data portal
<http://isoexpress.iso-ne.com/guest-hub>
- ISO to Go mobile app
– For iPhone and Android
<http://www.iso-ne.com/support/isotogo/>
- @isonewengland on Twitter
www.twitter.com/isonewengland
- ISO website
www.iso-ne.com
- Northeast Energy Efficiency Partnerships
<http://neep.org/>
- Database of State Incentives for Renewables & Efficiency
<http://www.dsireusa.org/>



Questions

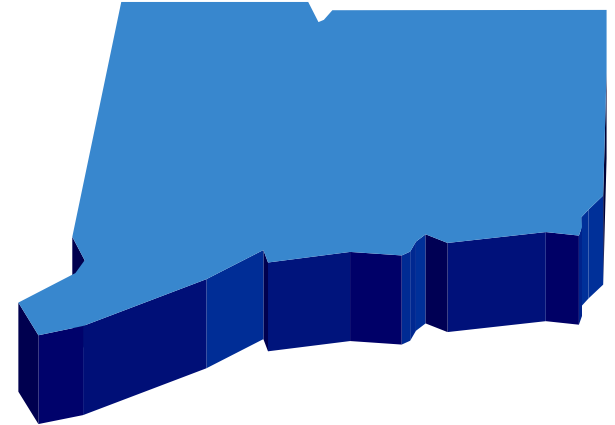


ENERGY-EFFICIENCY FORECAST

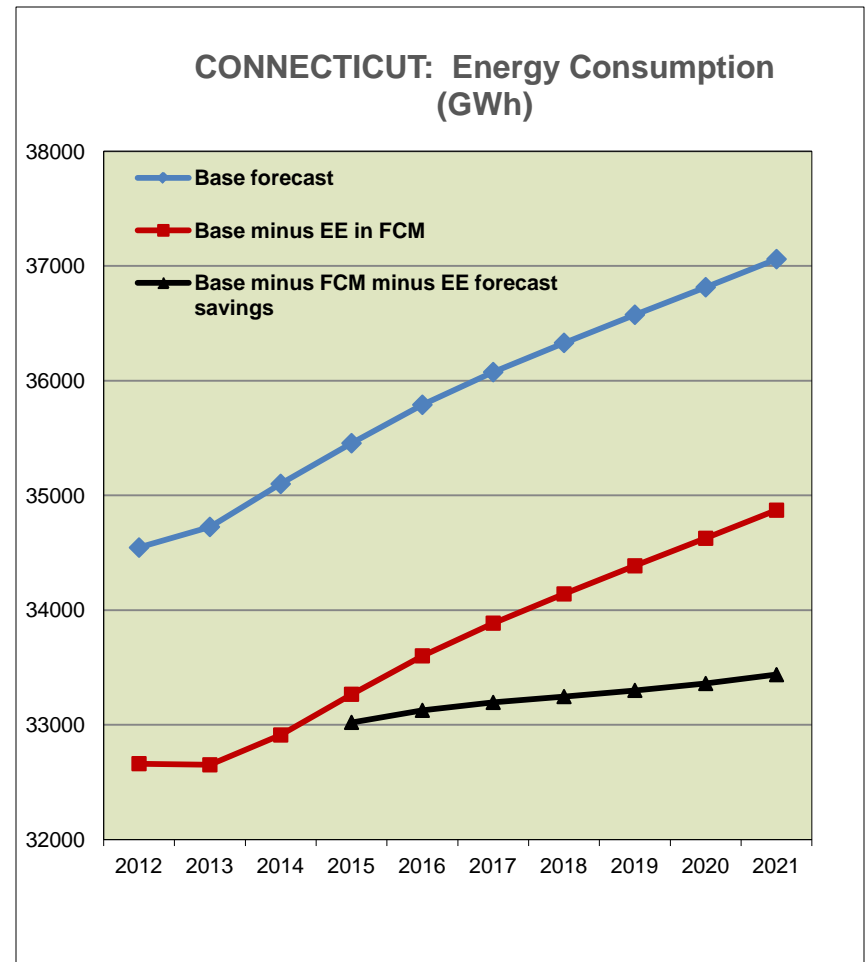
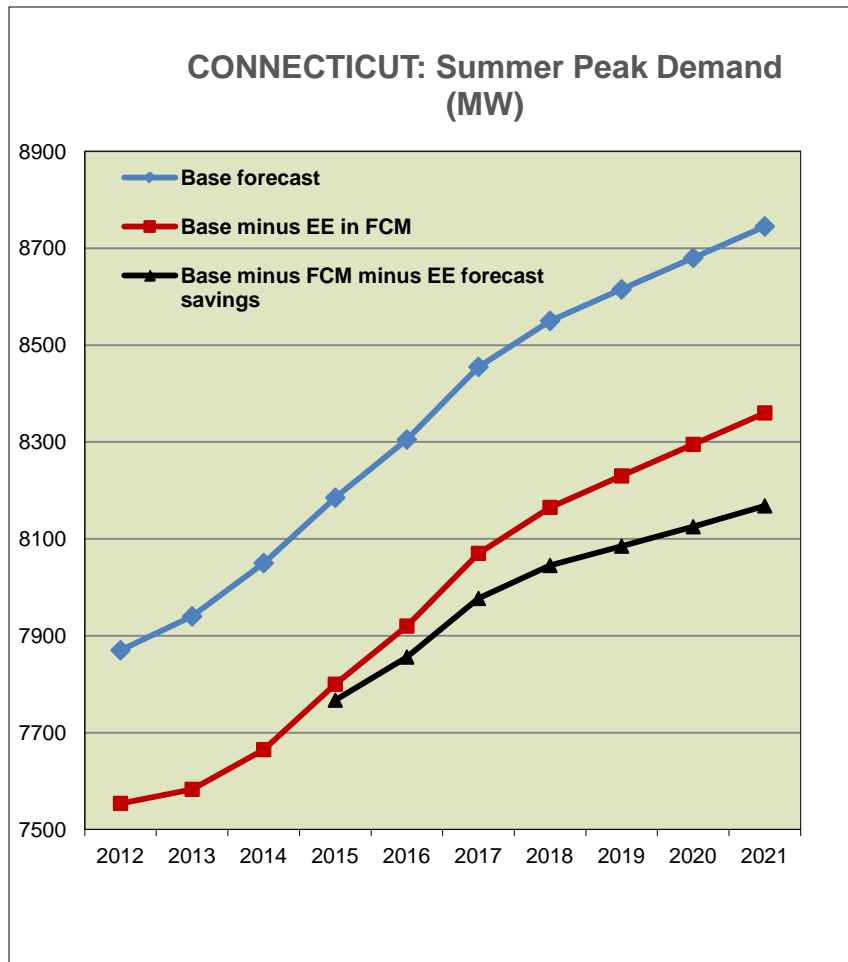
State-by-State Results

Connecticut: Energy Efficiency by the Numbers

- Energy-efficiency results, 2009-2011:
 - Total spending: \$337.8 million
 - Total energy saved: 1,009 GWh
 - Annual average energy saved: 336.5 GWh
 - Total peak demand savings: 127 MW
 - Annual average: 42 MW
- Energy-efficiency forecast, 2015-2021:
 - Total spending: \$775.5 million
 - Projected total reduction in energy consumption: 1,434 GWh
 - Annual average: 205 GWh
 - Projected total reduction in peak demand: 193 MW
 - Annual average: 28 MW
- CT program administrators:
 - CT Light & Power: <http://www.cl-p.com/Home>
 - United Illuminating Co.: <https://www.uinet.com/>

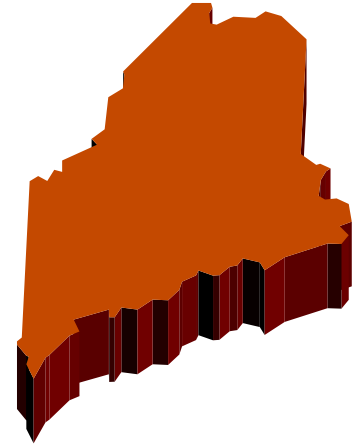


Connecticut Peak and Annual Energy Consumption Forecast, 2012-2021

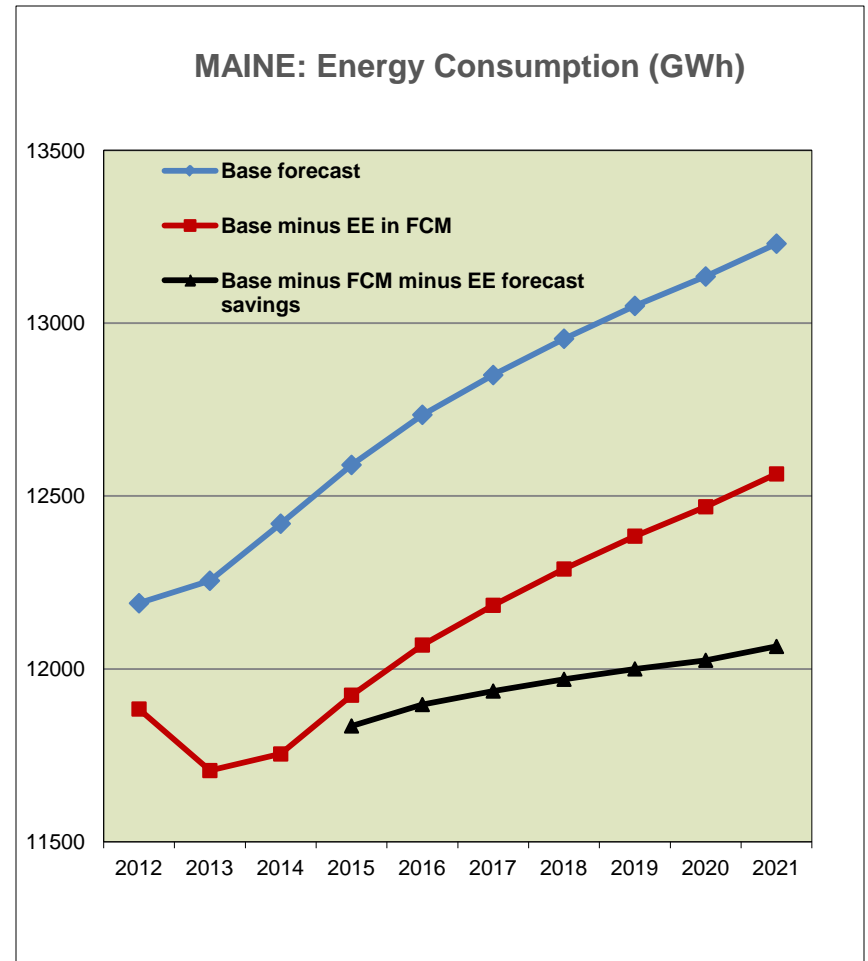
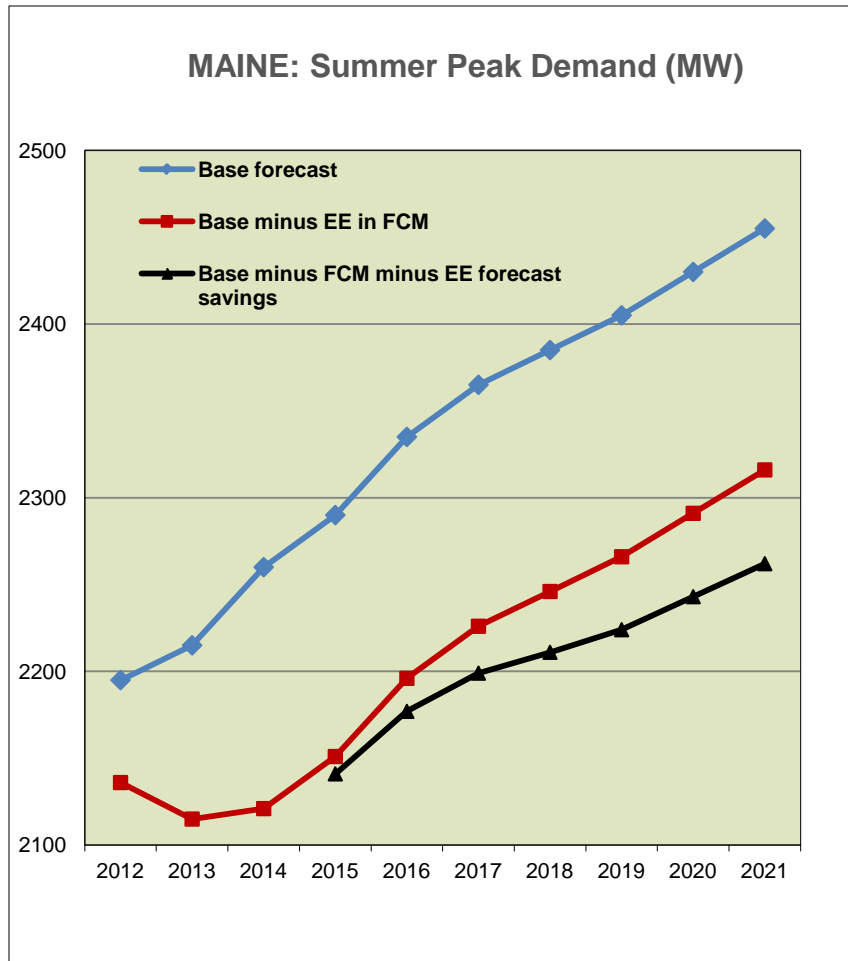


Maine: Energy Efficiency by the Numbers

- Energy-efficiency results, 2009-2011:
 - Total spending: \$53.5 million
 - Total energy saved: 282 GWh
 - Annual average: 94 GWh
 - Total peak demand savings: 32 MW
 - Annual average: 11 MW
- Energy-efficiency forecast, 2015-2021:
 - Total spending: \$195.9 million
 - Projected total reduction in energy consumption: 499 GWh
 - Annual average: 71 GWh
 - Projected total reduction in peak demand: 55 MW
 - Annual average: 8 MW
- ME Program Administrators:
 - Efficiency Maine: <http://www.energymaine.com/about>
 - Maine Public Service Commission: <http://www.maine.gov/mpuc/electricity/index.shtml>

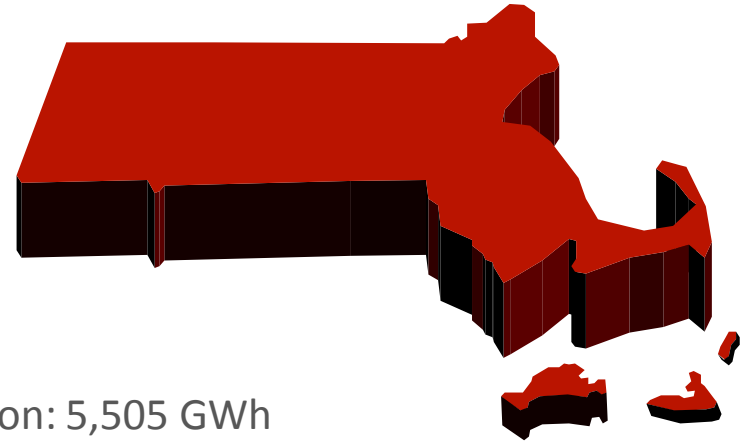


Maine Peak and Annual Energy Consumption Forecast, 2012-2021

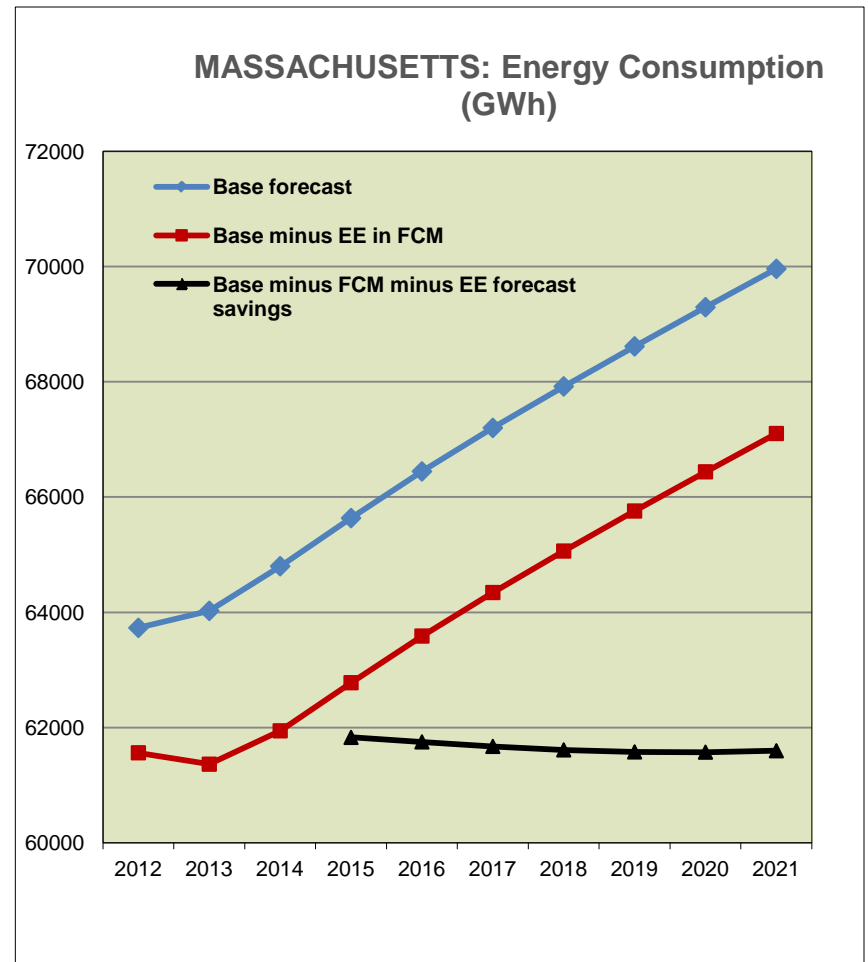
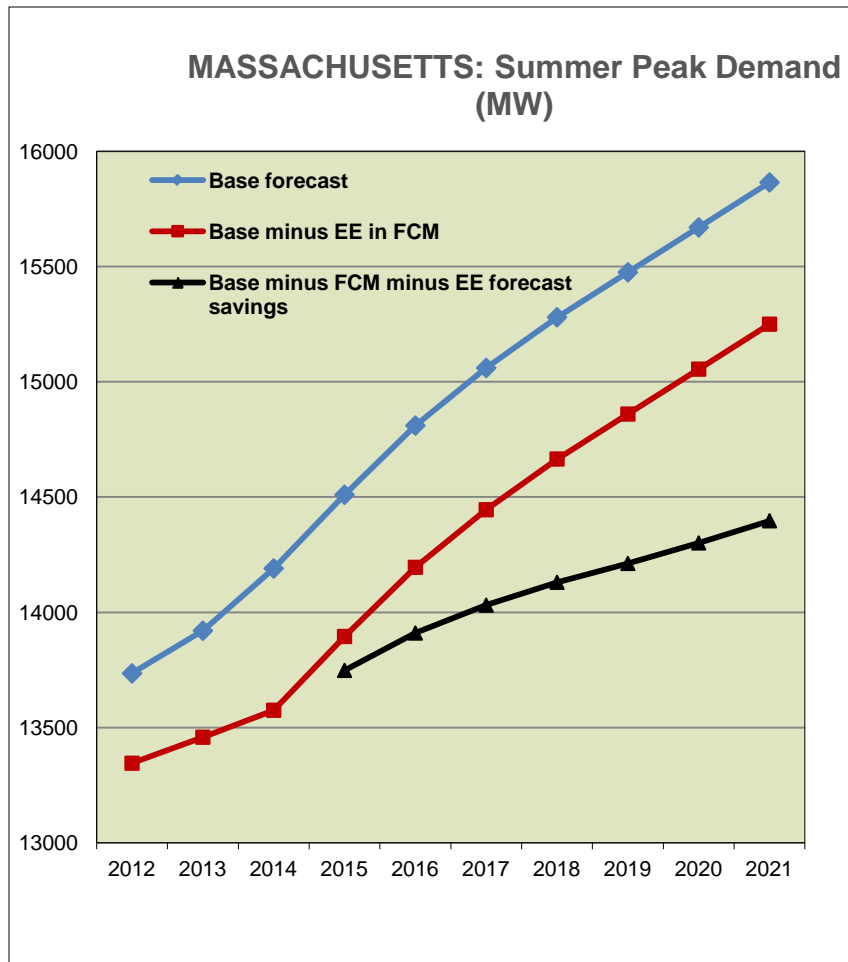


Massachusetts: Energy Efficiency by the Numbers

- Energy-efficiency results, 2008-2010:
 - Total spending: \$571.8 million
 - Total energy saved: 1,432 GWh
 - Annual average: 477.5 GWh
 - Total peak demand savings: 221 MW
 - Annual average: 74 MW
- Energy-efficiency forecast, 2015-2021
 - Total spending: \$3.6 billion
 - Projected total reduction in energy consumption: 5,505 GWh
 - Annual average: 786 GWh
 - Projected total reduction in peak demand: 853 MW
 - Annual average: 122 MW
- MA program administrators:
 - Cape Light Compact: <http://www.capelightcompact.org/>
 - Fitchburg Electric: <http://www.unitil.com/customer-configuration?loc=http%3A//www.unitil.com/>
 - Mass. Electric Co. (Nantucket Electric Co.): <https://www1.nationalgridus.com/CorporateHub>
 - NSTAR: <http://www.nstar.com/residential/>
 - Western Mass. Electric Co.: <http://www.wmeco.com/>



Massachusetts Peak and Annual Energy Consumption Forecast, 2012-2021

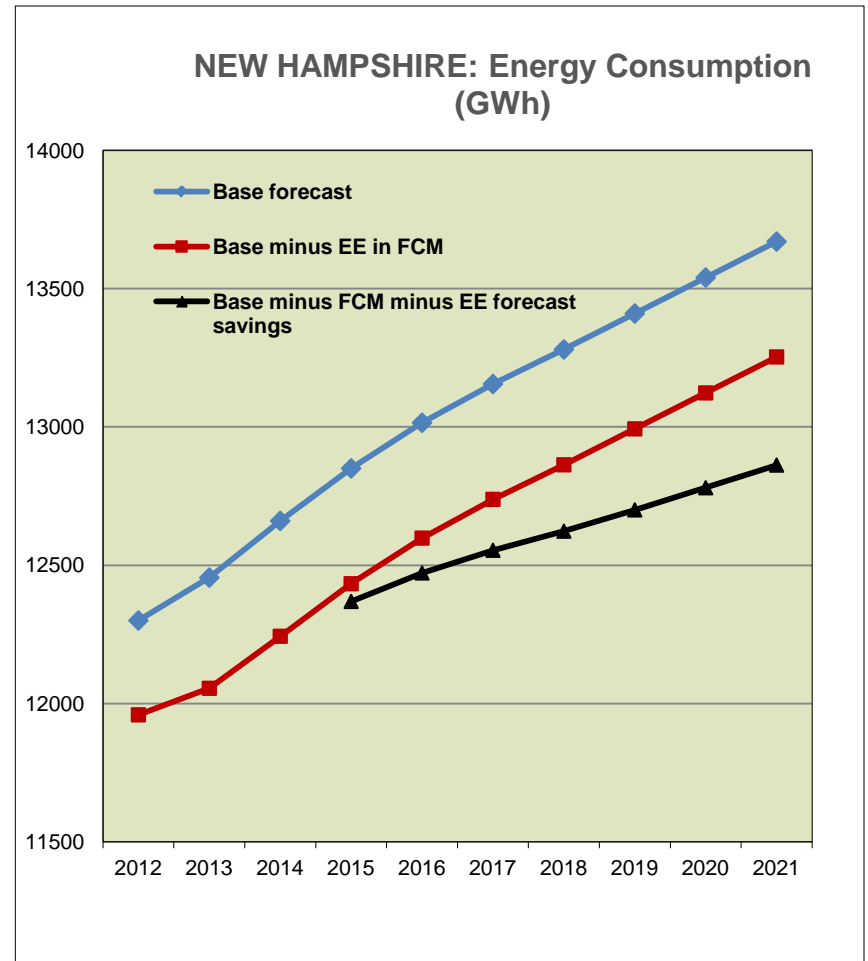
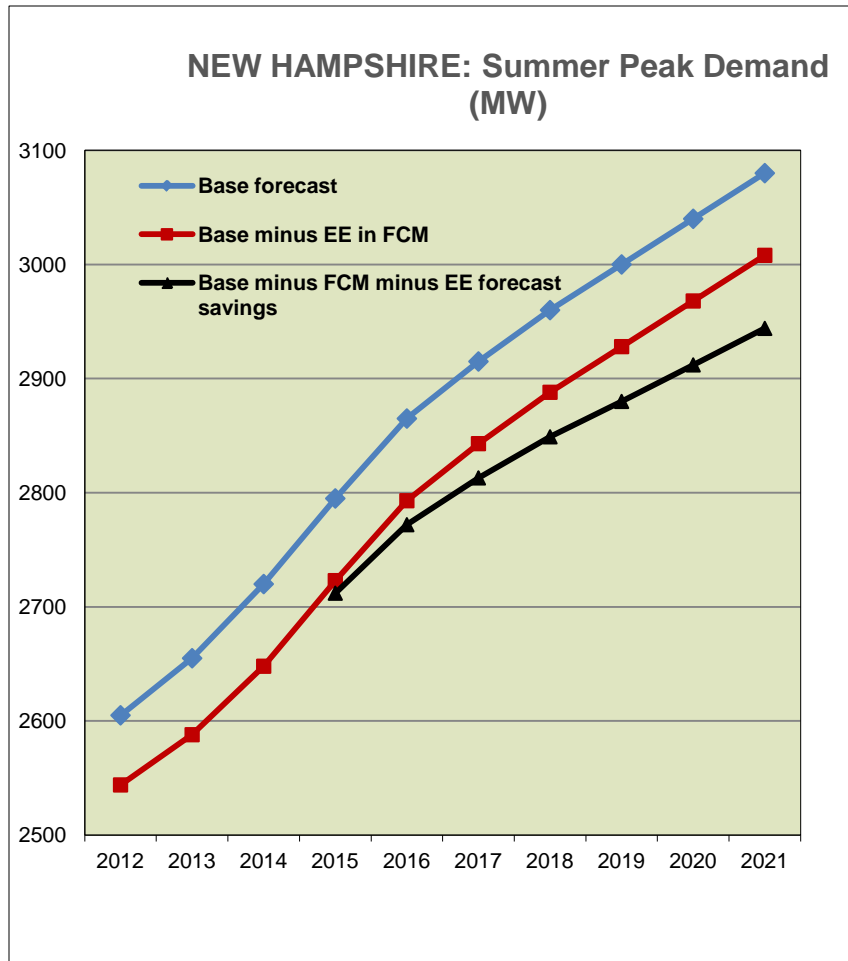


New Hampshire: Energy Efficiency by the Numbers

- Energy-efficiency results, 2008-2010:
 - Total spending: \$57.9 million
 - Total energy saved: 194.6 GWh
 - Annual average: 64.9 GWh
 - Total peak demand savings: 43 MW
 - Annual average: 14 MW
- Energy-efficiency forecast, 2015-2021:
 - Total spending: \$181.6 million
 - Projected total reduction in energy consumption: 393 GWh
 - Annual average: 56 GWh
 - Projected total reduction in peak demand: 65 MW
 - Annual average: 9 MW
- NH program administrators:
 - Public Service of New Hampshire: <http://www.psnh.com/For-My-Home.aspx>
 - Unitil: <http://www.unitil.com/customer-configuration?loc=http%3A//www.unitil.com/>
 - Granite State Electric Co.: <https://www1.nationalgridus.com/CorporateHub>

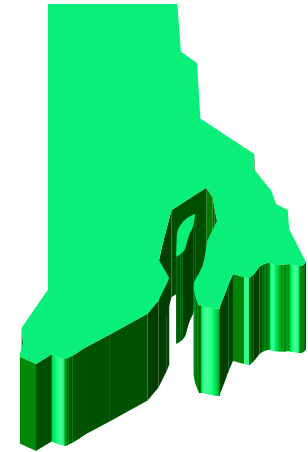


New Hampshire Peak and Annual Energy Consumption Forecast, 2012-2021

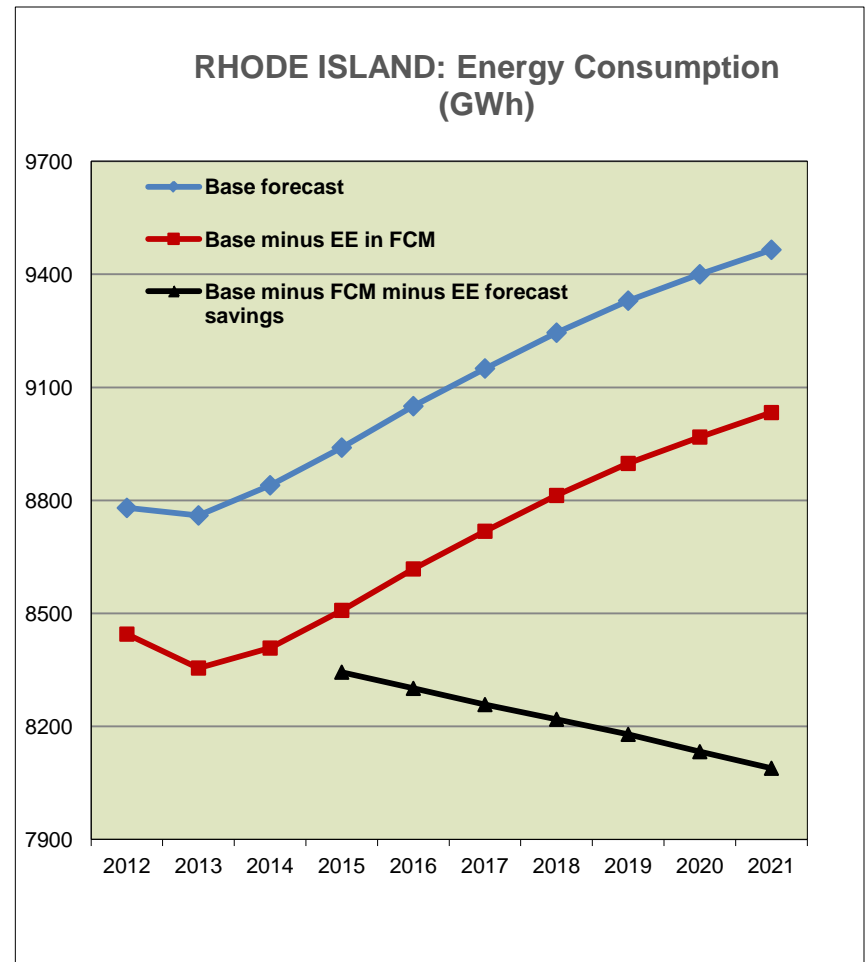
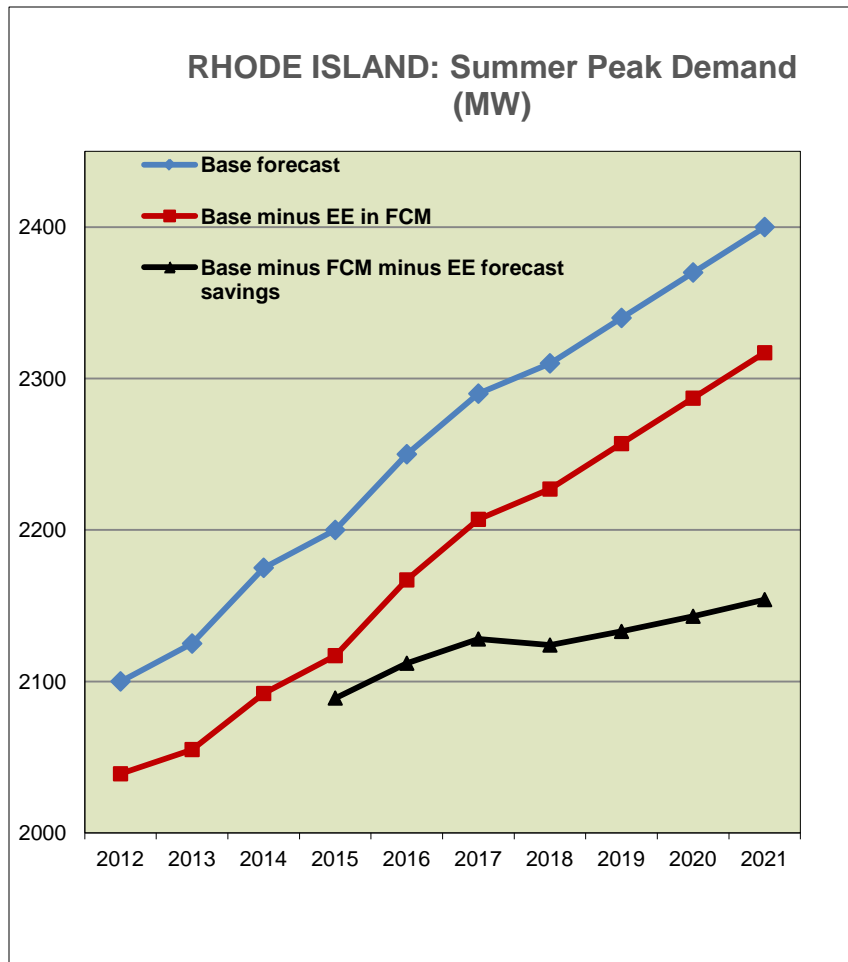


Rhode Island: Energy Efficiency by the Numbers

- Energy-efficiency results, 2008-2010:
 - Total spending: \$70 million
 - Total energy saved: 221.9 GWh
 - Annual average: 74.3 GWh
 - Total peak demand savings: 38 MW
 - Annual average: 13 MW
- Energy-efficiency forecast, 2015-2021:
 - Total spending: \$550.5 million
 - Projected total reduction in energy consumption: 944 GWh
 - Annual average: 135 GWh
 - Projected total reduction in peak demand: 163 MW
 - Annual average: 23 MW
- RI program administrator:
 - Narragansett Electric Co.:
<https://www1.nationalgridus.com/CorporateHub>

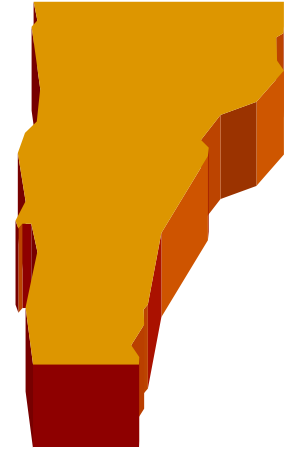


Rhode Island Peak and Annual Energy Consumption Forecast, 2012-2021



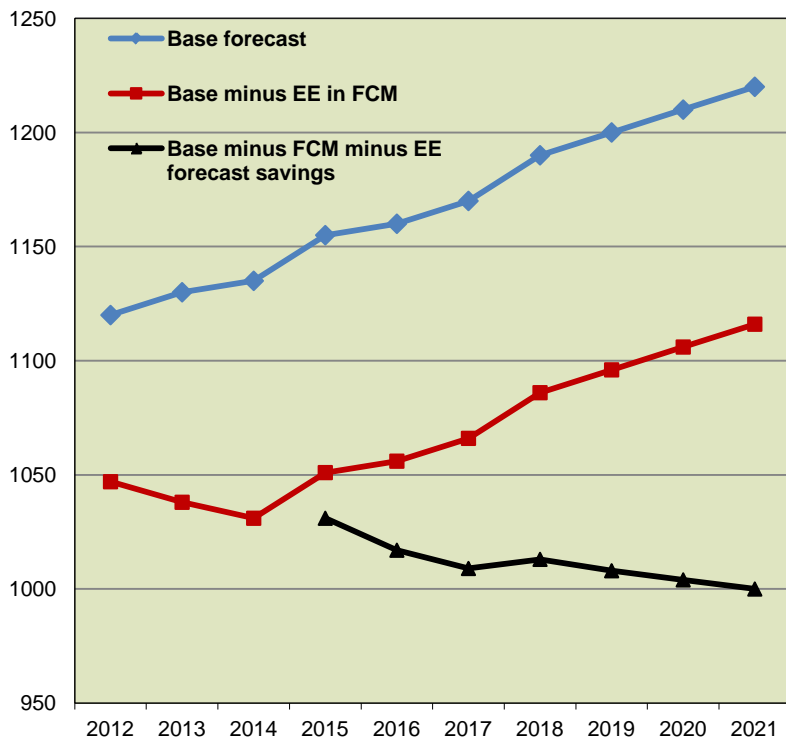
Vermont: Energy Efficiency by the Numbers

- Energy-efficiency results, 2008-2010:
 - Total spending: \$95.4 million
 - Total energy saved: 357.9 GWh
 - Annual average: 119.3 GWh
 - Total megawatts of peak saved: 52 MW
 - Annual average: 17 MW
- Energy-efficiency forecast, 2015-2021:
 - Total spending: \$321.3 million
 - Projected total reduction in energy consumption: 625 GWh
 - Annual average: 89 GWh
 - Projected total reduction in peak demand: 115 MW
 - Annual average: 16 MW
- VT program administrators:
 - Efficiency Vermont: <http://www.encyvermont.com/Index.aspx>
 - Burlington Electric: https://www.burlingtonelectric.com/page.php?pid=62&name=e_e_incentives



Vermont Peak and Annual Energy Consumption Forecast, 2012-2021

VERMONT: Summer Peak Demand (MW)



VERMONT: Energy Consumption (GWh)

