Massachusetts Low Demand Analysis

First Stakeholder Meeting

October 15, 2014

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Welcome & Purpose of Project

Purpose of the Project

- Consider various solutions to address Massachusetts' short and long-term energy needs, taking into account greenhouse gas reductions, economic costs and benefits, and system reliability

Review of Agenda & Meeting Objectives

Objectives of This Meeting

- Describe the model and modeling process
- Review the alternative resources to be analyzed
- Review the schedule and process for stakeholder input
- Solicit feedback from participants

Overview of Agenda

9:25	Overview of the Stakeholder Process Q&A	Catherine Morris
9:45	Overview of the Modeling Process Q&A	Dr. Elizabeth A. Stanton, Synapse
10:45	Break	
11:00	Resource Alternatives in Scenario Development Q&A	Dr. Elizabeth A. Stanton
11:50	Wrap- up and Next Steps	Catherine Morris
12:00 PM	Adjourn	

Ground Rules

- State your name and affiliation when speaking
- Share your feedback with affirmations or alternatives
- Be succinct in your comments/questions
- Silence phones
- Dial-in participants will be muted during the presentations; You will have an opportunity to ask clarifying questions at the end of the questions in the room

Overview of the Stakeholder Process

Overview of Stakeholder Process

- Materials will be available on Synapse's website at: http://synapse-energy.com/project/massachusetts-low-demand-analysis
- All meetings are open to the public
- High-level summaries of Stakeholder Meetings will be provided
- This is not a consensus-seeking process
  - Input will be gathered at three Stakeholder Meetings
  - Written comments can be submitted to DOER within three business days after meetings
  - Email: lowdemandstudy@state.ma.us
  - Input will be considered by DOER and Synapse

Overview of Stakeholder Process (cont.)

- October 15, 9am-noon – **Stakeholder Meeting**: Provide an overview of the process and key resources alternatives
  - October 20 – Written comments due to DOER (lowdemandstudy@state.ma.us)
- October 30, 9am-4pm – **Stakeholder Meeting**: Review results of feasibility study of alternative resource penetration and supply curves for 2015, 2020, 2030; Detailed discussion of modeling process
  - Location: Hearing Room A at DPU, One South Station, Boston
  - Nov. 4 – Written comments due
- November 20, 9am-4pm – **Stakeholder Meeting**: Review results of modeling runs and their implications; Present an outline of final report
  - Location: Conference Room, One Ashburton Place, Boston
  - November 25 – Written comments due
- December 23 – **Final report** released

Q&A: Stakeholder Process

Overview of the Modeling Process

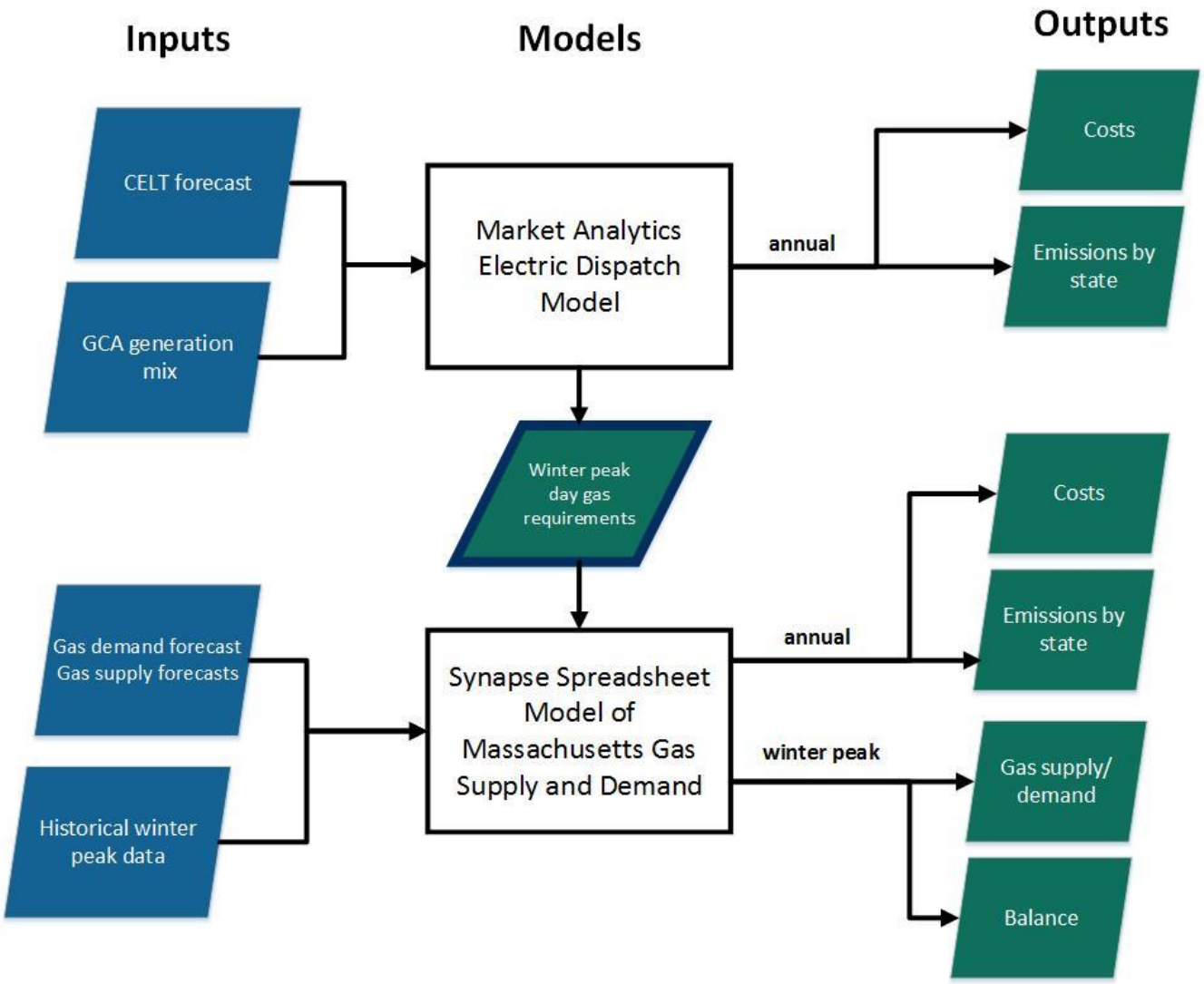
Overview of the Modeling Process

- Model structure
- Overview of scenarios and sensitivities
- Scenarios
- Sensitivities
- Years modeled
- Model outputs

Model Structure

- Synapse will use Market Analytics together with purpose-built Excel-based spreadsheets to analyze the following for each year under analysis:
  - Sufficiency of gas pipeline capacity under winter peak day conditions: We will model New England gas supply and demand under conditions defined by a historical winter peak day taking account of the impact on energy storage of a “cold snap” or series of three winter peak days.
  - Annual costs and emissions: We will model fuel use, electric generation, energy costs and greenhouse gas emissions on an annual basis. Annual costs and emissions will be modeled based on expected (most likely) weather conditions, not extreme conditions. These expected weather conditions will include the occurrence of winter high demand events.

Model Structure (cont.)



Model Structure (cont.)

- In addition, we will investigate the technical and economic feasibility of alternate mechanisms to address unmet gas demand: incremental gas pipeline capacity; incremental LNG supply; incremental transmission capacity for Canadian hydro; and an extension of ISO-NE's Winter Reliability program.
- Note that meeting reliability requirements will be a basic criterion for all modeled scenarios.

Scenarios and Sensitivities Overview

- Two scenarios: base and low
- Two sensitivities: gas prices and Canadian hydro
- All scenarios and sensitivities will include the assumption of the RGGI carbon price and no federal carbon price; RGGI prices will be assumed to remain constant in real terms at their 2020 forecasted level for the remainder of the modeled period

Scenarios: Base Case

- **Base Case**
  - Base case energy demand will be modeled using existing, well-recognized projections including ISO-NE's latest CELT forecast for electric demand, the LDCs gas demand forecasts, and the most up-to-date information available regarding capacity exempt customers.
  - Where critiques of these forecasts are well-known in the literature, we will incorporate appropriate adjustments to these forecasts.
  - The base case electric generation resource mix will be modeled using the Market Analytics scenario designed by Synapse for DOER in early 2014 to provide an accurate presentation of Green Communities Act (GCA) policies as well as the Renewable Portfolio Standards—by class—of the six New England states. Synapse's GCA analysis for DOER was developed using the NERC 9.5 dataset, based on the Ventyx Fall 2012 Reference case. We will verify and update these data with the most current information on gas prices, loads, retirements, and additions. We will also accurately model LNG usage and the Winter Reliability program.

Scenarios: Low Energy Demand Case

- **Low Energy Demand Case**
  - The low energy demand case will be designed by making adjustments to the base case. In the low case all alternative resources will be utilized to the greatest extent that is determined to be simultaneously technically and economically feasible. In this scenario, changes to public policy will be assumed for Massachusetts only and not for the neighboring states.

Sensitivities

- **Natural gas prices:** We will investigate the sensitivity of modeling results to both increases and decreases in the expected price of natural gas
- **Canadian Hydro Transmission:** We will investigate the sensitivity of modeling results to the addition of 2,400 MW of new transmission from Canada to the New England hub

	No Incremental Hydro			2,400-MW Incremental Hydro
	Reference NG Price	**Low NG Price**	**High NG Price**	**Reference NG Price**
Base Case	Base Case No Hydro Ref NG Price	Base Case No Hydro Low NG Price	Base Case No Hydro High NG Price	Base Case 2,400-MW Hydro Ref NG Price
Low Case	Low Case No Hydro Ref NG Price	Low Case No Hydro Low NG Price	Low Case No Hydro High NG Price	Low Case 2,400-MW Hydro Ref NG Price

Years Modeled

- Modeled years will, at a minimum, include 2015, 2020, and 2030.
- Synapse understands that modeling additional years—including 2016, 2017, 2018, and 2019—in order to capture the effects of discrete events such as retirements and additions is a high priority for DOER. We will make this a key consideration in model design.

Model Outputs

- Model outputs will include, but not be limited to, the following:
  - Sufficiency of gas pipeline capacity for the modeled winter peak day in each year analyzed
  - Annual energy costs in each year analyzed
  - Annual emissions for New England and Massachusetts in each year analyzed
- Model outputs will be presented for each of eight combinations of scenarios and sensitivities as shown here:

	No Incremental Hydro			2,400-MW Incremental Hydro
	Reference NG Price	**Low NG Price**	**High NG Price**	**Reference NG Price**
Base Case	Base Case No Hydro Ref NG Price	Base Case No Hydro Low NG Price	Base Case No Hydro High NG Price	Base Case 2,400-MW Hydro Ref NG Price
Low Case	Low Case No Hydro Ref NG Price	Low Case No Hydro Low NG Price	Low Case No Hydro High NG Price	Low Case 2,400-MW Hydro Ref NG Price

Q&A: Modeling Process

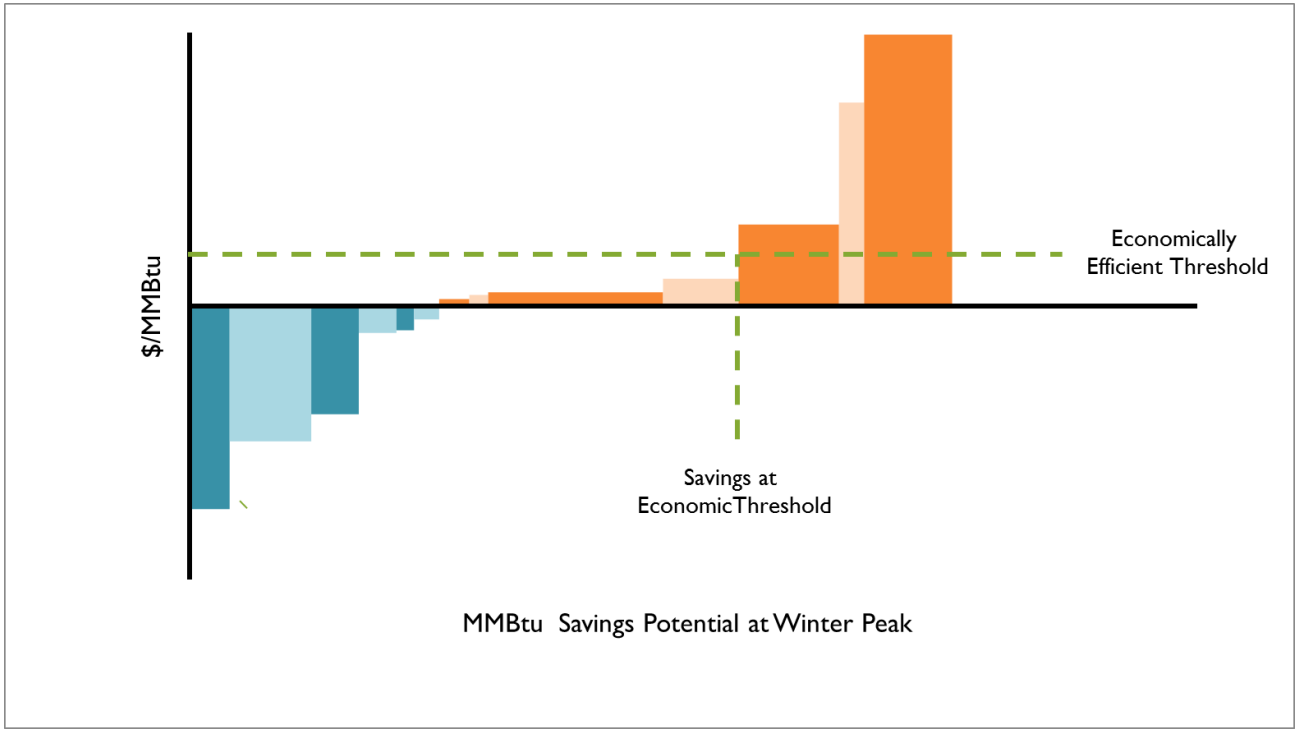
Break

Resource Alternatives in Scenario Development

Alternative Resource Supply Curves

- The Synapse project team will conduct a literature review and feasibility study of alternative resource penetration in Massachusetts and New England over the next 5 to 15 years, summarized in the form of supply curves for the years 2015, 2020, and 2030.

Example supply curve: Savings potential at winter peak



Feasibility Analyses

- The focus of each resource feasibility analysis will be on the costs and potential for minimizing the use of natural gas during a peak winter day
  - Alternative energy (distributed solar PV, utility-scale PV, small wind, large wind, biomass, digesters, solar hot water, air heat pumps, ground heat pumps, pumped hydro, combined heat and power, energy storage potential)
  - Electric and gas: energy efficiency, demand response
  - End-use fuel switching
  - Existing LNG
  - Extension of the Winter Reliability Program and other market rule changes
  - Repairing gas distribution leaks
  - Transmission for Canadian hydro
  - New natural gas pipeline capacity

Q&A: Resource Alternatives

Wrap-up & Next Steps

Schedule, Materials and Comments

- Stakeholder process materials available on the Synapse website at: http://synapse-energy.com/project/massachusetts-low-demand-analysis
- Written comment deadline for today's meeting: October 20, 5 PM
- Send comments to: lowdemandstudy@state.ma.us
- Remaining Stakeholder Meetings:
  - Oct. 30th (9-5) Location: Hearing Room A at DPU (One South Station)
  - Nov. 20th (9-5) Location: Conference Room, One Ashburton Place
- Final Report: Dec. 23rd