**DOER / Synapse Low Demand Analysis**
Stakeholder Meeting #1, October 15, 2014
Draft Meeting Summary
Consultant Lead: Dr. Elizabeth A. Stanton, Synapse Energy Economics
Facilitator: Catherine Morris, CBI

Presentations materials from the meeting are available on the website:
http://synapse-energy.com/project/massachusetts-low-demand-analysis

**Introductions of all attendees** (See Attendance list attached).

**I. Welcome and Purpose of the Project – DOER Commissioner Meg Lusardi**

- Patrick Administration requested this study to evaluate potential energy resources, taking into account GHG emissions, costs and system reliability. Must be completed by the end of the year.
- Administration has done a number of things to flatten demand for fossil fuels in the state, including increased energy efficiency and renewable energy.
- Despite these efforts, a number of factors contributed to high energy prices last winter:
  - MA is at the end of natural gas pipeline creating constraints for gas supply in the northeast
  - Retirements of base load generation like VT Yankee and other impending retirements
- MA has been in conversation with neighboring states to address this regional problem by increasing deployment of clean energy resources and whether additional natural gas infrastructure is needed.
- This study is designed to look at a range of solutions to the state's short and long-term energy needs.
- Study will not address any specific potential pipeline project.

**II. Overview of the Agenda and Overview of Stakeholder Process -- Catherine Morris, Consensus Building Institute**

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

- Overview of Stakeholder Process:
  - All the materials being used for the project are available on Synapse's website: http://synapse-energy.com/project/massachusetts-low-demand-analysis.,
  - All meetings are open to the public.
  - This meeting is being videotaped by a participant.
  - Summaries of the meetings will be available from Raab Associates/CBI.
  - DOER and Synapse want to gather input through public comments at these meetings and written comments.
  - Submit written comments directly to DOER via email within three business days after each meeting: lowdemandstudy@state.ma.us
  - Second Stakeholder meeting on Oct 30 to share results of feasibility analysis
  - Third Stakeholder meeting on Nov 20 to share final results of modeling
  - Final report released Dec 23

**III. Overview of Modeling Structure, Dr. Elizabeth A. Stanton, Synapse Energy Economics**

- Two study phases: 1) feasibility analysis of alternative resources, and 2) modeling of New England electric system and gas demand and supply for MA
  - Using Market Analytics model of ISO-NE electric system
  - Using Excel-based model of MA gas supply and demand
- Using ISO-NE's Capacity, Energy, Loads and Transmission (CELT) forecast data, adjusted for accuracy as needed, as input into Market Analytics Electric Dispatch Model
- Looking at annual costs and emissions and will focus on winter peak day to identify constraints on pipeline capacity
- Modeled years will at a minimum include: 2015, 2020 and 2030
- Two Scenarios: Base and Low Case
  - RGGI carbon price of for all scenarios and sensitivities
  - Making sure MA policies and generation mix are accurately captured
  - Reliability is the criteria applied to all scenarios
- Low Energy demand case will begin with the Base Case and be adjusted by adding as much alternative resources as technically and economically feasible
  - Alternative resources to be considered to meet unmet gas demand include incremental pipeline and gas storage capacity, incremental LNG imports, incremental transmission from Canada, and the ISO winter reliability program. Other alternative resources will be discussed in more detail in following presentation.
- Two sensitivity tests:
  - Natural gas prices (high and low)
  - Canadian hydro transmission line (additional 2,400 MW)
- DOER and Synapse are looking for further input on the definition of economic feasibility.

***Comments and Response to Questions***

- **Will Synapse monetize reliability impacts, e.g. using an adder to reflect the potential for gas reliability impacts from price spikes?**
  Dr. Stanton explained that this is still under consideration in model design and Synapse and DOER would welcome comments.

- **LNG is one resource that will be considered in the base case**. The suggestion was made that Synapse consider the impact of LNG facilities' three proposals for vaporization rates in their LNG processes.

- **ISO-NE pay-for-performance proposal** will be included in the base case analysis along with other market rule changes; Examining separately extended role for the Winter Reliability program.

- A participant suggested that **increased hydro be considered in combination with high natural gas prices** in the incremental hydro reference case. Commissioner Lusardi requested that the commenter follow up in writing.

- **Synapse is looking at both short-term natural gas price forecast and long term outlook including price volatility**. More information about fuel price forecasts and cost of alternatives will be provided in the next meeting.

- **NESCOE wrote a statement on the ISO forecast. Is that information included in the model?** Yes, Synapse is looking at well-known critiques to public documents. That's a good example. We will look at which DG has been modeled in CELT and whether the state polices are captured accurately.

- **Northeast Utilities offered to provide the design criteria for winter peaks**, which includes the design season and a single cold snap in order to capture the impact on gas storage.

- An attendee suggested that Synapse **adopt an approach that looks at a long-term plan to achieve a clean energy economy and then look backwards to see where natural gas fits** in. Dr. Stanton explained that the low demand case is doing that. It considers all of the alternative resources first, and then what else we need in terms of natural gas capacity.

- **How do you deal with the interaction of policies that promote expansion of natural gas infrastructure, which may conflict with alternative resource incentives?**
  Synapse explained that compliance with current alternative resource policies (e.g., state RPS, Green Communities Act) is a requirement in each scenario and sensitivity. The Low Demand scenario explores the interaction of expanded alternative resource polices with expanded natural gas infrastructure.

- **Why is peak day analysis better than a time series analysis to determine the gas capacity requirements?** Synapse explained that they are trying to capture the moments when we use the most gas collectively (typically the winter peak days), so we want to do a test at that moment of constraint. Also looking over the whole year to evaluate prices.

- Dr. Stanton clarified that Synapse is **not restricting the model to electric side solutions** in addressing capacity constraints during peak. They will also look for direct gas demand reduction potential.

- **Has the Market Analytics model been benchmarked?** Synapse responded that they are not aware of efforts to benchmark the Market Analytics model, and it was not part of the current study.

- In response to questions regarding **how LNG will be handled in the model, including policy alternatives to LNG,** Synapse responded that more information would be shared at the next stakeholder meeting, but comments on how it should be addressed are welcome now, including the potential effect of exports

- An attendee suggested that Synapse also **consider the gas supply and demand potential in ME and Canada,** which may prove important.

- Synapse explained that **they will not be making policy recommendations as part of the study**. Commissioner Lusardi added that Synapse will present DOER with results and the state will look at this information to inform policy options. It is also information this Administration wants to pass along to the next Administration for them to consider in developing new policies.

- Synapse confirmed that **part of the study is to look at ISO-NE market rule changes**.

- An attendee **suggested that Synapse include model years between 2020 and 2030** when there could be a lot of development; and that the base case should include policy changes in New England states other than MA.

- Synapse clarified that **the selection of 2,400 MW of incremental Canadian electricity transmission is a common line size and is not related in any way to a particular project**. This addition is above all currently planned or existing electricity transmission.

- In response to a question about **the role of the existing RPS programs creating the demand for economically feasible alternative resources**, Synapse explained that everything in the Low Demand case will be incremental to what is required in policy today. And without an existing policy for incentives, full cost for that incremental resource is included. The evaluation of what is economically feasible will be made before it is added to the Low Demand case.

- An attendee suggested that **the base case model should take into account population growth and housing unit growth**, adding that commonly accepted numbers of 17-24% increase in housing units, would be a helpful component to include.

- In response to a question about **how the EPA power plant GHG regulation (111D) will be handled**, Dr. Stanton explained that only RGGI price for carbon will be included. She elaborated that at this moment there is not a study available indicating what, if any, further reductions will be required to meet the federal regulations. Still studying whether the RGBGI cap would need to be lower and the RGGI carbon price higher, so no adjustments are planned.

- Synapse clarified that **they will include in the Base Case all announced and expected retirements and the modeled retirements will be consistent through all cases**. Data on retirements from their earlier work on AESC 13 will be updated to capture the most recent information available.

- Synapse will model electricity generation on a peak winter day using economic dispatch. An attendee s**uggested that it would be more appropriate to use historical dispatch from the past 3 years.** Synapse responded that you would expect the dispatch model to be similar to historic generation if data inputs are accurate.

- Synapse **acknowledged the uncertainty regarding the impact of shale gas supplies on price, including the possibility that there could be a shale gas supply bubble**. However, they are using publically accepted forecasts and the examining the impact of extreme cases is beyond the scope of the study.

- Synapse clarified that **existing gas storage will be included as part of the study, and they are still exploring how it will be handled in the model design.** While storage is important, the rate at which you can convert the gas to deliverable gas is also important, so the focus will be on gas pipeline capacity to ensure deliverability.

- **An attendee urged Synapse to consider the effect of Maryland LNG exports and new pipelines in the south and west**, adding that all these factors will have an impact on natural gas availability and prices.

- **Synapse clarified that they are not using one single gas price for each year; we have a forecast going out over each year and a shape that prices take during the year.**

- **Additions include "planned and approved" resources including transmission, generation, new pipelines, etc. over the next 15 years**. They are not considering speculative or undecided projects.

- Synapse acknowledged the comment of an attendee that **contracting policies of power companies may have contributed to supply shortages last winter and they are looking for input on how that might be considered.**

- Synapse clarified that **the Base Case and the Low Case both use business-as-usual forecasts for expected economic growth and gas demand.** However the Low Case will add additional alternative resources to meet energy needs.

- **Projections of natural gas demand will not include a boost in gas demand that could come from recent MA legislation** passed on gas infrastructure and expansion, since this boost is not included in recent LDC's forecasts.

- Dr. Stanton confirmed that Synapse is **considering in the feasibility analysis the possible reduction in gas projections that might result from repairs to gas leaks.** She encouraged stakeholders to provide any information that might inform those assumptions.

- In response to a question about how efficiency in the residential sector will be handled, Dr. Stanton responded **that Synapse is including expected conservation and efficiency measures for all six states in the Base Case. In Low Demand Case, they are planning to include measures that are technically and economically feasible for MA only.** She noted, however, that Synapse has not yet finished the study of additional measures.

- A participant **suggested that DOER and Synapse consider a third scenario that is designed to avoid adding any additional fossil fuel use in MA**. Dr. Stanton explained that such a scenario would require a different approach and a different type of model. Synapse and DOER have designed an approach that does not have a goal or criteria in the future. To do what the participant suggests would require an optimizing model with low fossil fuel generation. Commissioner Lusardi added that DOER has a number of futures they would like to see and the low demand scenario comes close to what the participant suggests.

- **Concerns were raised by a number of attendees about the study timeline and the lack of time needed to do an evaluation of a fuller range of scenarios.** A participant suggested that without additional information that recognizes the uncertainty of the shale gas supply, the results might indicate the need for infrastructure that proves uneconomic or unneeded in the long run. Another participant argued that the study should be designed to achieve a future without additional fossil fuels, which was described as the request of the citizens who asked the Administration address whether new gas pipeline is needed. Other participants argued that a scenario that reflects no additional fossil fuel use is more compatible with the need to address climate change risks.

- **Commissioner Lusardi acknowledged again the limited timeframe to finish the study** because Governor Patrick wanted to see this done within his administration; despite this, DOER has worked with Synapse to accomplish a reasonable work plan within this timeframe to answer questions around the need for new gas capacity. She also emphasized the need to consider all three factors of emissions, costs and system reliability.

**Undersecretary of Energy Mark Sylvia** provided welcoming and thank you comments. He stressed the importance for stakeholders to file comments. The Governor made it clear that it is imperative to get the study done by December so we can provide him and the next Administration with information.

**V. Overview of the Alternative Resources Feasibility Study, Dr. Elizabeth A. Stanton (presentation materials posted on the website)**

- Synapse is looking at a wide range of resource analyses available to us.
- Still in the process of developing those definitions, but she explained that they are not trying to maximize each resource. Rather the objective is to define what amount is reasonable and economically feasible.
- The results will be reflected in a supply curve representing all analyzed resources available during winter peak, the amount technically available and the cost ($/MMBtu) of each resource
- The resources will be compared to a benchmark for economic feasibility during the winter peak. Synapse developing a basis for a comparison similar to what you would expect to see in a marginal abatement curve. What is the maximum costs you want to pay for alternative resources?
- Incorporating policy technology for savings on a particular resource.
- Some resources will have negative costs, that is they will provide dollar savings in addition to MMBtu savings
- Everything on the supply curve will be incremental to what should be available based on existing or expected policies
- Looking for input from stakeholders on how the benchmark on economic feasibility should be defined
- Also looking for input on what additional resources Synapse should consider in the Feasibility Analysis

***Comments and Response to Questions***

- The Synapse team will be evaluating existing data and forecasts to develop the expectations for the cost of resources over the study timeframe, including **assumptions about cost trends as technology costs decline.**

- **Demand response and efficiency will be included only up to the point that their full costs and technical feasibility is considered reasonable in a year**.

- **Both offshore and land-based wind will be included among the alternative resources.**

- **Compressed natural gas could be included** and additional information how to represent it would be helpful.

- **Dr. Stanton explained that capital costs of alternatives will be levelized** (as if you were financing the investment) over the study period and combined with variable costs in each year.

- **Synapse is also considering how to incorporate in the feasibility study the sensitivity of alternative resources to changes in natural gas prices**.

- In response to a question about how the risk of volatile fossil fuel prices will be reflected compared to the stable cost of renewable energy, **Dr. Stanton acknowledged that technologies may have different risk profiles, but current literature about monetizing risk doesn't lead to a commonly agreed approach** and is still under review. These types of risks might be best reflected in the discussion of caveats about the study, which DOER has asked to be included.

- **When looking at winter potential**, **Synapse will begin by analyzing capacity constraints during peak periods.** We will quantify the net costs (including economic benefits) in both the peak period and annually.

- **CO2 costs reflected by RGGI carbon prices will be captured**, but the study will look only at market costs not human health or environmental impacts.

- Dr. Stanton explained that **at the end of the study the need for new gas capacity will be determined by the economic threshold selected.** Based on the economic threshold, you can make a decision about which is less expensive -- adding pipeline or alternative resources. **It would be helpful for stakeholders to provide input on what is economically efficient.** But it is a matter of judgment, so Synapse will look at the data, stakeholder input and DOER.

- A participant commented that **there is a lot of confusion about the impact of new pipelines on short-term natural gas prices,** even though the construction of new gas infrastructure will likely not have any impact in the near term. Therefore the analysis of the prices up to 2020 is extremely important to shaping public opinion.

- According to Dr. Stanton, **compliance with MA Global Warming Solutions Act (GWSA) will be evaluated after the analysis**, that is, in each scenario, Synapse will determine if the results are GWSA compliant or not? Synapse will look at rate of change in GHG emissions outside of electric and gas sectors such as transportation and heating fuels. Synapse also will need to make an assumption about what it means to be GWSA compliant in 2030.

- A participant **suggested that since Synapse is relying on LCD forecasts, they should consider the possibility that LCDs might over estimate demand for gas**, leading to excess gas projections.
- Dr. Stanton responded that Synapse will make adjustments to forecasts based on well-founded critiques.

- **The study will take into account increased throughput in existing natural gas pipeline** if appropriate.

- **NG storage capacity in Nova Scotia will be in the base case if it has been approved**. A participant suggested that new storage has been approved in the past 3 months.

- **An attendee suggested that the study should account for New England-wide markets for natural gas, not just Massachusetts**, adding that the broader market, including exports will determine the supply and price of natural gas in the state. Synapse confirmed that they are considering NE markets in their price forecasts.

- **Synapse agreed to publish citations to all assumptions and data used in the study**, which will be the best data publically available.

- **Dr. Stanton encouraged stakeholders to contribute additional resources to be considered for the low demand case and comments on adjustment to the CELT data.**

- **Unanswered question**: Is the Forward Capacity Market (FCM 8) data included in the analysis? Since FERC was split on the approval of the auction, would it make sense to look at the previous auctions to determine what the rate might be? How might the model make adjustments to reflect potential improvements in the recent forward capacity market auction?

  A. To the extent that our model includes capacity costs for the time period covered by FCA-8 (June 2017 – May 2018), we will include the price paid to existing resources ($7.025/kW-month) and new resources ($15) as appropriate. We have a FERC approval of the rate from FCA-8 "by operation of law" and we should use those prices. Other relevant data from FCA-8 will also be included, namely the planned retirement of Brayton Point. That station will not be included in our model starting June 2017, along with other known retirements (Salem Harbor, Vermont Yankee, Norwalk Harbor, demand response, etc.).

| In-Person Attendance - October 15, 2014 Low Demand Stakeholder Meeting<br>100 Cambridge Street, Saltonstall Building, Rooms C & D, Boston | | |
|---|---|---|
| **Last Name** | **First Name** | **Organization** |
| Clish | Heather | Appalachian Mountain Club |
| Rio | Bob | Associated Industries of MA |
| Winn | Jane | Berkshire Environmental Action Team |
| Marcum | Marla | Better Future Project |
| Sheehan | Travis | Boston Redevelopment Authority |
| Swing | Bradford | City of Boston |
| Wool | Joel | Clean Water Action |
| Ferro | Joseph | Columbia Gas of MA |
| Cleveland | Shanna | Conservation Law Foundation |
| Tatarka | Janice | Dewey Square Group |
| McAdam | Robin | Emera Energy |
| Weseen | Gerald | Emera Energy |
| Shattuck | Peter | Environment Northeast |
| Ramey | Jeanne | Environment, Economics and Society Institute |
| Hartman | Berl | Environmental Entrepreneurs |
| Goodman | Nancy | Environmental League of Massachusetts |
| Dalton | Joe | GDF Suez/Distrigas |
| Cowan | Rich | Green Dracut |
| O'Connor | Carolyn | Hydro Quebec US |
| Breslow | Marc | independent |
| Coppin-Sundberg | Lindsey | independent |
| Wicks | Stephen | independent |
| Widdoes | Bonni | independent |
| Giamo | Michael | ISO-NE |
| Winkler | Eric | ISO-NE |
| Murphy | Joseph | JPM Consulting |
| Skipworth | Dodson | Kinder Morgan/Tennessee Gas |
| Ricci | Heidi | MA Audubon |
| Bolgen | Nils | MA CEC |
| Weber | Sharon | MA DEP |
| Aminpour | Farhad | MA DOER |
| Blumkin | Anna | MA DOER |
| Breger | Dwayne | MA DOER |
| Claeys | Bram | MA DOER |
| Fimiani | Marissa | MA DOER |
| Kaplan | Susan | MA DOER |
| Lusardi | Meg | MA DOER |
| McBrien | Joanne | MA DOER |
| Savery | Jane | MA DOER |
| Zaltman | Alexandra | MA DOER |
| Bessette | Thomas | MA DPU |
| DeBoer | Charlene | MA DPU |
| Ferrer | Ashley | MA DPU |
| Howard | Margaret | MA DPU |
| Halfpenny | Christina | MA EOEEA |

| | | |
|---|---|---|
| Hanh-Chu | Hong | MA EOEEA |
| O'Shea | Aisling | MA EOEEA |
| Sylvia | Mark | MA EOEEA |
| Upal | Hinna | MA EOEEA |
| Rittershaus | Alexander | MA House |
| Eisenman | Katy | MA Pipeline Awareness Network |
| Peterson | Cammy | MAPC |
| Gibbons | Eugenia | Mass Energy |
| Woll | Edward | Massachusetts Sierra Club |
| Hartlage | Ken | Nashoba Conservation Trust |
| Rand | Rob | Nashoba Conservation Trust |
| Terrasi | Paula | Nashoba Conservation Trust |
| Cohen | Arielle | National Consumer Law Center |
| Arangio | Elizabeth | National Grid |
| Stanzione | James | National Grid |
| O'Reilly | Jim | NEEP |
| Hennequin | Sandi | NEPGA |
| D'Antonio | Ben | NESCOE |
| Eklof | Dennis | New England Municipal Gas Pipeline Coalition |
| Garwood | Steve | New Hampshire Transmission, LLC. |
| Cankardes Ulrey | Peri | NGSA |
| Wessel | Rosemary | No Fracked Gas in Mass |
| Leahy | Stephen | Northeast Gas Association |
| Daly | James | Northeast Uilities |
| Goldman | Michael | Northeast Utilities |
| Smith | Patrick | Northeast Utilities |
| Armstrong | Cynthia | PNGTS/Transcanada |
| Paglia | Rich | Spectra |
| Kristofferson | Cathy | StopNED |
| Martin | Karen | Town of Andover Dept. of Public Works |
| Ormsbee | Stuart | TransCanada |
| Scorzoni | Christian | Travaglini, Eisenberg, Kiley LLC |
| **Consulting Team** | | |
| Hurley | Doug | Consulting Team - Synapse Energy Economics |
| Knight | Pat | Consulting Team - Synapse Energy Economics |
| Kuschner | Sarah | Consulting Team - Synapse Energy Economics |
| Morris | Catherine | Consulting Team – CBI (Raab Associates) |
| Rivo | Susan | Consulting Team - Raab Associates |
| Silvistrini | Leo | Consulting Team - Synapse Energy Economics |
| Stanton | Liz | Consulting Team - Synapse Energy Economics |

***In addition to the above in-person participants, around 50 people participated by phone**