DOER / Synapse Low Demand Analysis
Stakeholder Meeting #2, October 30, 2014

Meeting Summary

Consultant Lead: Dr. Elizabeth A. Stanton, Synapse Energy Economics
Facilitator: Dr. Jonathan Raab, Raab Associates, Ltd.

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

Over 85 people attended the meeting, and additional people participated by phone (See Attendance list attached).

I. Introduction

DOER Commissioner Meg Lusardi welcomed the participants to the 2nd stakeholder meeting. Facilitator Dr. Raab reviewed the purpose of the meeting and the detailed agenda, including mixed small groups break-out sessions in the morning, and stakeholder group break-out sessions in the afternoon.

II. Key Modeling Assumptions

Dr. Stanton, lead consultant from Synapse, presented the key modeling assumptions including the winter peak event; base case; & sensitivity assumptions (gas prices & incremental Canadian transmission). See the detailed slides on the Synapse website above.

Each table (of 5-6 randomly assigned stakeholders) was asked to come up with 2-3 "group" questions to ask Synapse. We then went around the room and we had enough time for each table to ask Synapse one "group" question. Summary of these questions and Synapse's responses follow below.

Q: We understand the focus is on peak demand, but we want to understand how measures addressing peak give benefits throughout the year. Do you capture it and also how is the information used?
A: Synapse is not making policy recommendations. The scenario selection is by DOER. MEG – as we look at different scenarios and the low demand scenarios the study will identify if policy changes are needed. The study will provide this Administration and the next Administration information for any related policy decisions going forward.

Q: Will the modeling show and look at annual benefits, not just peak benefits? A: YES

Q: Is peak calculated using historic or forecasted peaks? Focus on a forecast of peak – lots of things are changing including load.
A: Looking at design days next 5 years and forecast forward. LDCs look at historic events when they put together their forecasts.

Q: LNG storage –how can we place emphasis in the study on LNG as it is already available? Why don't we build tanks for LNG? If looking, can we look at actual cap of LNG now rather than focus on their demand requirements, but look at our need for gas and base it on that?

A: More LNG over the base case is a topic for this afternoon. What exists is the cap on storage and vaporization on peak day. So, what if there is more vaporization on peak day, what does it do to the cap? Looking at full cap on LNG on a peak day.
Q: Does increasing vaporization mean more tanks or equipment? A: Additional infrastructure on existing tanks.

Q: What's the distinction between high demand event, and extreme weather event.
A.: Gas LDC says its design day is based on a day of extreme weather and we are looking at a cold snap and what happens to the system then.

Q: (Slide 14) Is annual cost of emissions on a design day, not extreme conditions.
A: Looking to model annual conditions some probabilities of winter peak and design days occurring. In a year there will be periods of cold weather.

Q: What are the assumptions for ISO winter program and Pay for Performance rules?
A. We will come back to that question this afternoon.

Q: When you assume (Canadian hydro) how sure are you it will be there, 2400 MW from Canada, on cold days, when Canada has similar cold weather and the energy could be shifted to Canada not us?
A: Clarifying between other cases and hydro sensitivity – the 2400 MW is incremental to today. We don't know for sure whether it will be there, but it's a sensitivity. On winter peak days Canada flows as much energy as possible since the prices are very high in New England. That's what we have seen on existing lines.

Q: Do you account for compressed gas storage tanks along the pipe route? Do you take into account alternative energy for thermal load. Does it anticipate technological changes and price reductions?
A: Those are topics for this afternoon.

Q: (slide 14) Study reserves right to adjust other forecasts if there are good critiques. If base case is sufficiency of pipe, but demand is lower, why reduction to their forecast in base case?
A: Corrections or adjustments that is well known and publicized and known in the industry. Where there are, we want to include them in the base case.

Q: The peak event in the cold snap, does it happen in the beginning, the middle or the end?
A: We haven't determined that yet. We look forward to feedback on the characteristics of the peak event, and what effects you would expect to see on the system

Q: Cold snap—it may be appropriate to start with LDC forecast but is that based on contractual generations…is there any probabilistic overlay in determining a 12 day cold snap based on worst case scenario
A: Not just primarily focused on electric sector, elements of both are included throughout our model. Secondly we should definitely keep track of the elements you're highlighting, looking for input from stakeholders on this. We are not looking for probabilities for the analysis, not setting up probabilities just looking at these 8 scenarios and what we think the outcomes will be. Cold snap is based on some historical actual analysis

Q: How are you going to communicate the limitations of the study and interpret it and will you work with an appropriate group of us to get that right

A: Part of our mandate includes caveats in the report so we want to represent all of the limitations and you can look and flag those.

Q: While all of the price sensitivities are based on the assumptions that we have a long term supply of gas none of them look at the possibility that we are in a gas bubble right now that might end very soon. We might not have as much at the time you are analyzing.
A: We are still looking at input into the gas price. If you have studies about (gas bubble) we want to see them. DOE EIA said there's uncertainty in their forecast in the resource base so we choose their high and low. But they are not extreme as what you are saying.

Note: We then opened the floor for "individual" questions or comments on key modeling assumptions, and a summary of the questions and Synapse responses are shown below.

Q/C My concern is that you are not looking at methane which is 86 times more GHG potent per molecule than CO2 molecule.
A: It's accurate we are not looking at methane. You put your finger on what is and is not part of the law. We had to limit the study because of short time frame. To do another emission we could not include in the scope.

Q: How are you modeling peak? The LDCs study peak season and design cold season on top of it. Peak on top of design cold you are stressing the season in design cold and you drop in a design peak is what the LDC has to do. Given the LDC standard, shouldn't you adopt it here? You are just looking at what is left over from the LDC capacity.
A. It's a work in progress – what is the best way to do it? What gives the best scenario – we are looking for feedback.

Q: When you determine the effect on peak hour, how do you relate it to annual requirements?
A: We model peak and annual.

Q: Assume you have a definition of hour for pipe capacity. How does it relate to an annual cost?
A: We are looking for most appropriate way to connect the two and would like your feedback.

Q: Gas prices – not only EIA, there's 2012 study if you export on a significant level then the prices go higher than your prices in the study.
A: It is not set yet. We are still looking at comments on the gas prices. We just gave this presentation to DOER. We can't do another sensitivity on exports, so we need to think about that.

Q: Heat Rate – your analysis is the marginal generator – the exercise is how do we handle that peak moment. Alternative is an average. Are you leaning towards changing it to the lower one?
A: We are seeking feedback.

Q/C: There may be a role for increased heat rate on peak. Seems appropriate we measure things annually, but also what can we do on peak. So use the peak heat rate.
A. We are using Market Analytics which has lots of details on many heat rates so it captures the last generator an increased heat rate. The model captures it so in the feasibility analysis – we need to determine it.

Q: Reference Price for the fuel…is the analysis in the model going to spike those prices several times in the winter to reflect what happens and emissions spikes instead of using average reference price?
A: We are looking at variations over time and bringing that into it. In terms of emissions its looking at specific units being on or off in generation. All of the 8 scenarios are going to be scenarios in which the situation of extreme constraint has been solved. Not modeling a failure to supply demand. Adding resources to the system until we reach a balance between capacity and demand.

Q: Can you help us understand what you mean by annual net levelized cost?
A: Can't right now haven't looked into what has gone into it

Q: Do you make changes about peak event over time based on technology changes
A: Yes and the resources that are included in the peak demand scenario

Q: IS GWSA compliance a requirement/constraint?
A: Not an initial assumption that these scenarios are GWSA compliant, we are running the scenarios and looking at if they are compliant

Q: Could you talk about specific numbers in forecast that have reductions in output that don't make sense ex: wind in 2017 will ramp up and then drop and stay there, also nuclear power same generation..are you going to publish your numbers for what you are going to assume for those years?
A: Taking numbers from LOAD not from Generation. Other information published by ISO NE is not the basis for our base case. Our basis is in a study from last year for DOER where our goal for one of our runs is to match as closely as possible on Massachusetts policy in order to see what would be necessary to comply with those policies and what we could do today to make a change

Q: Other than CELT, to what extent are the adjustments balanced based on higher or lower load, and to what extent are they adjusted on alternative resource side?
A: The adjustments we haven't determined yet, we're not looking for a broad range of adjustments. If we make an adjustment to load, yes that will be an impact to renewables-- these adjustments are just to have CELT matching existing policy. The entire purpose is to make sure CELT follows current policy.
Q: Are you talking about beyond all included policy
A: Crosschecking with our info from DOER to make sure

Q: On the sensitivity of two 1200 MW lines – will it be per line or assume by 2030 2400 MW, will we see incremental sensitivity?
A: The lines are in in 2018 and 2020 for feasibility analysis. There are a number of estimates for the different possible lines for what they will cost. On the energy side a little more straight-forward, getting a sense of what the cost might be. We are making no assumptions that the resource makes a firm capacity

Q: In Base case what are the assumptions for energy efficiency energy and oil, and incremental transmission?
A: In Canadian transmission, our assumption is that energy coming in will be system power from Quebec. Trying to provide low demand assumptions based on being an increment above base case. In terms of oil and natural gas usage we are still searching for the best assumptions to make. We are trying to capture all of the LNG capacity.

Q: What are the data sources?
A: We are still looking at data sources, we don't have something to share in terms of iterative effect.

III. Feasibility Analysis

Following lunch, Synapse made a detailed presentation on their feasibility analysis including their overall approach, tables on each potential resource, the appropriate threshold, and supply curves in 2015,2020, and 2030. [See slides on Synapse website.]

Before breaking into stakeholder groups, participants had the following questions about the feasibility analysis:

Q: Gas Efficiency--if you include residential commercial industrial on a peak hour is there really that much savings?
A: Sounds like an error

Q: Clarify storage calculations to cover peak loads as an alternative?
A: In terms of storage resources, we are only including electric resources considered on annual terms. All resources not included on annual basis will be reconsidered again later in modeling in terms of balancing load during peak periods. Just looking at what is feasible on an annual basis here.

Q: Why aren't we considering gas storage?
A: For gas storage, there are still measures planned to include in the balancing piece that are not in the feasibility analysis

Q: Cost savings for T&D for DG, there's a cost if its net metered. The total capacity is its nameplate, then capacity factor X heat rate to get to the factor. Annual heat rate for 2012 was 7.56, so the numbers will change if you go to a different heat rate.
A: This was our approximation of what we thought was appropriate

C: CELT includes current policy

C: On shore wind – we encourage you to make 1 transmission line be HVDC pure hydro and the other ACDC to pick up wind

Q: Like to know a little bit more about the calculations to get to the costs
A: The tables in our memo break it out to some extent but not every possible avenue…not every single element is broken down

Q: Briefly describe what benefits are included?
A: Only benefits will be avoided costs

Q: So what is on the cost side if avoided costs are on benefit side?
A: Captial and operating costs, sometimes transmission and distribution charges

Q: What about costs for renewables?
A: Everything is incremental on what is currently in place

Q: Is your cost net of the renewable certificate values or looking at an extension of that in the future?
A: There is no REC costs included

Q: There's been a lot of growth in PV from 2013 to 2014, so your numbers seem low.
A: Everything you see here is incremental to policy goals (including MA 1600 MW goal)

Q: The LBNL $ are too low. How did you reach the cost numbers and low income cost numbers? LBNL does not separate them out.
A: Took the budgets from study, used 2015 plans, held costs flat in real terms over time. But doesn't look right to me either. All cost effective is on a portfolio basis. The determination for MA is on a portfolio level, the whole portfolio meets the constraint, but the individual sectors are not.
Efficiency costs studies looking at recent history don't capture 2013-2015 but history shows that costs do not increase as much over time, we hold the costs flat in real terms over time because there are scale efficiencies that can still be achieved…we do feel that economies can scale over time…cost that decline for new technologies do offset that over time. Great evidence for cost decline as size of program increases. So consider that in U shaped curved

Q: Conversion between MMBtu and MWH?
A: Not approaching this as purely electric sector, interested in electric and gas side. We have specific electric sector model

Q: In terms of efficiency…have you looked at European studies for efficiency
A: Have not looked overseas but would be willing. Looking not to change what we have now but to add on efficiency measures

Q: Are all other resources financed over 20 or 30 years?
A: Plant lifetime assumptions specific to each technology
C: When you have a specific number of MW generated you have to consider what that electricity is being used for at peak hour today in 2020 and 2030…so I ask you to include that in analysis.

Q: Gas pipelines added you're including the cost of construction but are all of the expansion costs included or only the transmission
A: Not including gas expansion beyond what is already in the forecast

Q: RPS assumptions, where does it show?
A: RPS compliance for all 6 states in base case. Above and beyond RPS in the reference case, without RECs is what's in feasibility analysis.

Q: In the final study, will you publish the entire technical range?
A. The feasibility analysis will be a chapter in the report with all the measures in it.

Q: For energy efficiency, there may be more aggressive measures coming in other states, is the supply curve just MA?
A: Yes, and that's a caveat in the report

Following a short break, the participants were divided into four separate stakeholder groupings:
1) Environmental/consumer NGOs and citizen groups;

2) Gas industry;
3) Electricity industry; and
4) State and local government.

The stakeholder groups were given nearly an hour to develop comments/recommendations for Synapse/DOER, and identify any remaining questions. Synapse circulated among the break-out groups to respond to any pressing questions. The break-out groups then reported back to the full group as follows:

Gas Group Comments/Questions:

- How are you converting annual capacity factors and certain numbers can be adjusted?
- Examples of avoided cost calculations would be helpful to see how you're thinking through this…details on avoided costs and benefits would be helpful too.
- No matter which solution of the analysis might be better, is there any part of the study that will say what the results/impacts would be if nothing happened?
- Thought one of the outputs would be what the constraint level was and what the cost would be to consumers.

Electric Group Comments/Questions:

- How did you come up with the avoided costs without having an avoided cost basis for natural gas…how do you come up with a levelized cost for those resources?
- In terms of analysis, you'll take these resources and put them in a simulation model, will the alternatives be on an equivalent reliability level as natural gas?
- What about increased demand for gas for export—assuming demand for natural gas which seems to be around LDC and power generation but what about export for natural gas given the economics, could that be a scenario?

Environmental Group Comments/Questions:

- Please give us the megawatt equivalent on all calculations. Legislators and people are all thinking in those terms.
- It would be helpful to know the base case, can you run it sooner and post it so we can see it.
- We think there should be a special focus between now and 2020 because that is where a lot of the outside world is focused right now.
- You may have covered this but there are some short-term resources that can help like air source heat pumps; copying CT's commercial pace program; and more LNG.
- We think that energy efficiency is the lowest cost resource, and even though MA is #1 in America we are nowhere near other parts of the world. Look at whatever studies there are on efficiency. Be sure that you take account of the non-energy benefits of energy efficiency as is done already by the DPU. Cost Effective measures—other benefits.
- Cost of natural gas and natural gas price volatility-what are the actual numbers. ..Consider a wider range of prices and the cost of volatility itself. Also the possibility of fracking regulations, the possibility of a boom/bust.
- Make sure you flag very clearly delineate the limitations of the study.
- Make sure you score every scenario in terms of GWSA targets.

State/City/ISO Group Comments/Questions:

- This study looks at MA and the energy status from a MA viewpoint but naturally we want to be aware and acknowledge that we are part of a New England system and this can be a pool for data (and alternative resources).
- Looking at the numbers we want to have a closer look at the efficiency assumptions. And think longer about the gas pipeline benchmark costs and in reality those costs might vary.
- Not entirely clear whether the supply curves are - annual average results or peak demand day/hour results.
- And for demand response, we weren't clear if the MW includes time varying rates, advanced metering, and if not we have data we can share with you on that. Would be very useful in this kind of study.

Synapse then responded to the various questions/suggestions from the four stakeholder groups as follows:

- Avoided cost calculations--Can definitely add to our report as a memo to help people understand how we derived avoided cost numbers and other important calculations.
- The cost of doing nothing-- there is no estimate in this study of what the cost is of not doing anything to address constraints…the scenarios will all have that in common for balancing capacity and demand. Just the design of the study.
- Including the basis in avoided costs—yes the avoided costs numbers used are from AESC 2013, in which there are assumptions about the basis. What we are assuming is that avoided costs of energy is proportional to city-gate gas price…well supported by AESC report. So far we have made our estimates using Henry Hub only.
- Two potential sensitivities: no plan of losing a nuclear plant and other sensitivities-- those are not in the scope of the study: MW equivalents—we will be doing that to show the resources in both ways
- More detail on the base case outputs and early release--we haven't planned that in our time schedule we are on a tight deadline, there is no objection to more review there is just probably not enough time
- 2015-2020 short-term resources—most of these are already captured in the study. We are examining and happy to hear comments and if there are more to be included.
- Energy efficiency—good idea to look abroad for deeper savings examples, send us materials
- Gas price range/volatility—we are still deciding on High and Low gas prices, we will take these comments into consideration
- Including a separate risk analysis--not planned in this time frame
- Fracking regs and other potential regs—Not capturing, belongs in caveats
- Boom/bust cycle for natural gas--could be captured in higher gas price
- Non Energy benefits–want to figure out the best way to do that
- Flagging limitations –all in caveat section
- GWSA compliant--Intending to show if scenario is in GWSA compliance
- MA viewpoint--yes part of a NE system within the ISO, but separate for the gas side. There are some good caveats to capture there too
- Other energy efficiency resources—looking for ideas and suggestions
- Gas pipeline whether at different scales there will be different costs—absolutely, when we balance, scale is very important.
- Supply curve horizontal axis is annual MMBtus

- Demand response and time varying rates-- we'll do our best to incorporate into the base case; not intending to have an additional incremental amount above that. We can use assistance on bringing the TVR order into the base case. Assuming if we capture TVR will be capturing advanced metering. However, there's a great deal of uncertainty legally around DR currently, so the amount you will see in the base case is very low.

IV. Next Steps and Wrap-Up

Dr. Stanton reviewed the remaining steps in the modeling, and Dr. Raab reviewed the remaining steps in the stakeholder process (See slide deck on Synapse website. Commissioner Lusardi thanked everyone for the helpful participation, and the meeting was adjourned.

In-Person Attendance - October 30, 2014 Low Demand Stakeholder Meeting MA DPU, One South Station, Hearing Room A, Boston		
Last Name	**First Name**	**Organization**
Altermose	Craig	A Better Future
Jacobson	Elliott	Action, Inc.
Clish	Heather	Appalachian Mountain Club
Winn	Jane	Berkshire Environmental Action Team
Papali	Alex	Clean Water Action
Wool	Joel	Clean Water Action
Britt	Carolyn	Community Investment Associates
Cleveland	Shanna	Conservation Law Foundation
Blackman	Roger	Emera Energy
McAdam	Robin	Emera Energy
Jacobs	Mitchell	Energy Management, Inc.
Shattuck	Peter	Environment Northeast
Hartman	Berl	Environmental Entrepreneurs
Goodman	Nancy	Environmental League of Massachusetts
Dalton	Joel	GDF Suez
Cowan	Rich	Green Dracut
Berthiaume	Kenneth	independent
Breslow	Marc	independent
Carlton-Foss	John	Independent
Elan	Ariel	independent
Grammer	Elisa	Independent
Maloney	David	independent
Widdoes	Bonni	independent
Giamo	Michael	ISO-NE
Winkler	Eric	ISO-NE
Whitten	Melissa	La Capra Associates, Inc.
Oppenheim	Jerrold	LEAN
Bolgen	Nils	MA CEC
Federspiel	Seth	MA DEP
Morris	Madelyn	MA DEP
Bessette	Thomas	MA DPU
Menino	Mary	MA DPU
Halfpenny	Christina	MA EOEEA
Gay	James	MA-House-Office of State Rep Peter V. Kocot
Tuohey	David	MMWEC
Chretien	Larry	Mass Energy
Gibbons	Eugenia	Mass Energy

Woll	Edward	Massachusetts Sierra Club
Marusiak	Jenny	Mothers Out Front
Wirth	Kelsey	Mothers Out Front
Johnson	Leonard	Mount Grace Land Conservation Trust
Hartlage	Ken	Nashoba Conservation Trust
Rand	Rob	Nashoba Conservation Trust
Howat	John	National Consumer Law Center
Arangio	Elizabeth	National Grid
Brennan	Tim	National Grid
Hewitt	Amber	National Wildlife Federation
Ulrey	Peri	Natural Gas Supply Association
Hennequin	Sandi	NEPGA
D'Antonio	Ben	NESCOE
Eklof	Dennis	New England Municipal Gas Pipeline Coalition
Leahy	Stephen	NGA
Frenette	Michael	No Fossil Fuel
Wessel	Rosemary	No Fracked Gas in Mass
Daly	James	Northeast Utilities
Armstrong	Cynthia	PNGTS/TransCanada
Pope	Doug	Pope Energy
Borowski	Robert	Preti Flaherty
Dickerson	James	Sent by David O'Connor
Werlin	Haskell	Solar Design Associates
Jeffrey	Peter	SPCC Groton
Wrick	Doreen	Spectra
Kristofferson	Cathy	StopNED
Nelson	Jennifer	Sussex Economic Advisors
Ormsbee	Stuart	TransCanada
Scorzoni	Christian	Travaglini, Eisenberg, Kiley LLC
Rosa	Rick	UIL Holdings Corporation
MA DOER		
Aminpour	Farhad	MA DOER
Breger	Dwayne	MA DOER
Claeys	Bram	MA DOER
Evans	Rachel	MA DOER
Fimiani	Marissa	MA DOER
Lusardi	Meg	MA DOER
McBrien	Joanne	MA DOER

Consultant Team		
Daniel	Joe	Consulting Team - Synapse
Fagan	Bob	Consulting Team - Synapse
Hurley	Doug	Consulting Team - Synapse
Kallay	Jenn	Consulting Team - Synapse
Knight	Pat	Consulting Team - Synapse
Keith	Geoff	Consulting Team - Synapse
Malone	Erin	Consulting Team - Synapse
Ong	Wendy	Consulting Team - Synapse
Raab	Jonathan	Consulting Team - Raab Associates
Rivo	Susan	Consulting Team - Raab Associates
Silvestrini	Leo	Consulting Team - Synapse
Stanton	Elizabeth	Consulting Team - Synapse

***In addition to the above in-person attendees, 18 people participated by phone**