

**Governor's Council on Climate Change (GC3)  
Analysis, Data, and Metrics Working Group  
MEETING MINUTES**

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**Meeting Date:** May 5, 2016

**Meeting Time:** 1:00 p.m. —3:00 p.m.

**Meeting Location:** Department of Energy  
and Environmental Protection (DEEP)  
79 Elm Street, Hartford, CT

**ATTENDANCE**

<b>Working Group Members</b>	<b>Title</b>	<b>Organization</b>	<b>Present</b>
Robert Klee (chair)	Commissioner	Department of Energy & Environmental Protection (DEEP)	Y
Melody Currey	Commissioner	Department of Administrative Services (DAS)	Y
Bryan Garcia	President and Chief Executive Officer	CT Green Bank	Y
John Humphries	Organizer	CT Roundtable on Climate and Jobs	Y
James O'Donnell	Executive Director	CT Institute for Resilience & Climate Adaptation (CIRCA)	Y
James Redeker	Commissioner	Department of Transportation (DOT)	Y
Lynn Stoddard	Director	Institute for Sustainable Energy	Y
Don Strait	Director	Connecticut Fund for the Environment	Y
Katharine Wade	Commissioner	Department of Insurance	N
Kathryn Boucher (on behalf of Arthur House)	Staff Attorney	Public Utilities Regulatory Authority (PURA)	Y
Evonne Klein	Commissioner	Department of Housing	N
David Robinson	Executive Vice President and General Counsel	The Hartford	N
Catherine Smith	Commissioner	Department of Economic & Community Development (DECD)	N

<b>Associated Staff</b>	<b>Title</b>	<b>Organization</b>	<b>Present</b>
Katie Dykes	Deputy Director	DEEP, Bureau of Energy and Technology Policy	Y
Tracy Babbidge	Bureau Chief	DEEP, Bureau of Energy and Technology Policy	Y
Keri Enright-Kato	Director	DEEP Office of Climate Change, Technology & Research	Y
Jeff Howard	Environmental Analyst	DEEP Office of Climate Change, Technology & Research	Y
Stefanie Wnuck	CCT Research Analyst	DEEP Office of Climate Change, Technology & Research	Y
Paul Miller	Deputy Director and Chief Scientist	NESCAUM	Y
Jason Rudokas	Climate Policy Analyst	NESCAUM	Y

## AGENDA & NOTES

### Welcome and review of meeting agenda

*Rob Klee, ADM Working Group co-Chair*

- Review of agenda and announcement reminder of the stakeholder engagement event on Thursday, May 5 (5:30 – 7:30pm). The live session will be held at the Hartford Public Library with six participating satellite locations around the state. Thank you to John Humphries for organizing the event and to the GC3 members who are helping facilitate a discussion that will be occurring at each satellite location.

### Natural gas electric generation mix now and into the future

*Katie Dykes, Deputy Commissioner for Energy and Tracy Babbidge, Bureau Chief*

- The electricity market has evolved over time, first from a vertically integrated monopoly model to a deregulated model, beginning in the 1990's. The regional Independent System Operator New England (ISO-NE) was formed to operate and administer the regional grid, and to conduct future planning.
- The Federal Energy Regulatory Commission (FERC) governs the wholesale market exchanges between states whereas activities in-state are governed by state public utility commissions (PUCs).
- Importantly, while the ISO-NE market is *fuel neutral*, state policy is not fuel-neutral. As a result, there can be a misalignment between the market structure and state policy goals and objectives that needs to be addressed.
- Expansion of natural gas across the region:
  - A huge increase in natural gas combined cycle plans in the state and the ISO-NE region is due in large part to the deregulations of the electricity market and advancements in natural gas technologies. With a high capacity factor and generally decreasing fuel costs (due to fracking, etc.), natural gas generation bids on the ISO-NE market are low compared to other sources.
  - A number of new natural gas plants have been proposed in southern New England, and two in Connecticut.
  - Natural gas is used most often to generate the region's energy.
- The federal Clean Air Act has led to significant reductions in criteria pollutants (e.g., sulfur dioxide, nitrogen oxides), improving air quality in urban areas across the state. Between 2000 and 2016 there has been huge transition to generating electricity from oil and coal to natural gas which has resulted in large reduction in GHG emissions as well as criteria pollutants.
- ISO-NE website provides real-time data on electricity demand, pricing and fuel sources for the regional grid (<http://www.iso-ne.com/isoexpress/>).
- The price of natural gas is closely correlated with the price of electricity in New England, which has resulted in volatility for ratepayers in the past couple of years. This is in part due to constraints on the existing pipeline capacity, which isn't large enough to meet both home heating and electric generation demand. On cold winter days when natural gas is in high demand for heating needs, power plants have to utilize coal and oil to generate electricity rather than natural gas. These fuels are dirtier and more expensive resulting in emission increases and price spikes.
- During mild a mild winter (like this past one) we do not have the pipeline gas constraints that we saw in a few years ago. This winter was mild thus natural gas was s available for generating electricity and as a result we are seeing historically low electricity prices.

- This low cost for natural gas affects the energy market because it is putting pressure on units that have higher costs, this is currently the case for nuclear generation which has a high operating cost. We are seeing the retirement of nuclear facilities in NE. But this could be a detriment to our carbon mitigation goals because nuclear is low-carbon.
- If left to regional market forces, the transition to a greater reliance on natural gas will continue (for the reasons cited above). However, the state has utilized various policy tools to support clean energy deployment (e.g., Renewable Portfolio Standard, Regional Greenhouse Gas Initiative, Conservation & Load Management plans, etc. – see slide 23 for more examples).
  - Air emission regulations
  - Siting is big lever as well – siting renewables, transmission, power plants, etc.
  - Regional Greenhouse Gas Initiative (RGGI) which is a cap and invest program that drives down the emission of power plants in the RGGI states.
  - The state RPS has not led to a substantial increase in new renewables generated. As a response, DEEP is holding a competitive bidding process to procure long-term contracts for renewable energy.
  - Conservation and Load Management - energy efficiency initiatives have successfully flat-lined energy demand overall, however demand at peak times continue to rise. The state is working with ISO-NE to get credit for load reductions achieved through energy efficiency.
  - Smart meters and demand response programs help reduce peak demand.
  - Incentives for behind the meter generation – distributed clean energy generation.
- Overall, the more renewables that are deployed through ISO-NE region, the more higher-priced coal and oil sources are displaced from the grid because renewables do not have any fuel costs and can bid in at lower prices. But this also pushes out nuclear which is low-carbon and poses a real issue for meeting our climate goals.
- Balancing the intermittency of renewables is a key issue. How do we ensure reliability? Natural gas and hydro can ramp up quickly to meet demand. The state is also examining the role of energy storage which is hopefully becoming more cost-effective.
- A key question is the role of natural gas to balance intermittent renewables, especially as we ramp up renewables.

*Questions and discussion:*

- ISO-NE's primary concerns are to ensure reliability at the lowest cost possible, whereas states aim to also affect fuel mix (clean generation) through policy.
- Is the current and expected growth of natural gas in the region incompatible with state policy and the GWSA, and if so, what can one state do to address this?
  - The regional electricity market system is not necessarily incompatible with state policy. States are currently trying determine what the levers/tools are to meet to state policy goals. Some may include:
    - Nuclear as a carbon-free resources, ensuring they do not retire prematurely.
    - Long-term contracts. This has proven to be useful tool to brining in large-scale renewable energy.
    - Integration of distributed renewable energy resources, storage, etc.
    - Increased RPS's
    - Tightening of the RGGI cap is another potential mechanism.
- What is the remaining lifespan of existing nuclear facilities in CT?

- The Millstone nuclear facility in Waterford, CT is the largest plant in New England. There are currently two operating units, each generating approximately 1,000 MW. The licenses for each unit expire in 2035 and 2045, respectively, although there is a possibility of extending the licenses. Nuclear power plants are regulated by FERC and it is a lengthy process to request an extension that must begin many years before the license expires (7-10 years).
- One critical issue with nuclear facilities is that they may be pushed out of the market due to the low cost of natural gas and renewables. As a large low-emitting source this could affect the state's carbon reduction goals.
- The state spends a lot of money on building maintenance and construction. Perhaps the state could expand the energy code or require all new buildings to install renewables (e.g., geothermal).
- Energy efficiency and conservation is a very important GHG reduction tool and should be seen as an "energy resource."
- Does the regional market measure volatility and if so how does it incorporate volatility in price?
  - ISO-NE forecasts peak demand for the regional grid and requires enough generation capacity to meet peak demand at any given time. Price volatility is somewhat controlled by having a fixed price for electricity for six months (for customers on the standard offer, or default provider). Long-term contracting can also be an effective tool to insulate against volatility. Importantly, renewable generation isn't subject to volatility in fuel prices, as there are no fuel costs.
  - A challenge for regional electric grid planning and climate change planning is two different planning horizons. Regional grid planning is shorter-term and may not take into account the effects of climate change. We are behind in understanding and planning for the vulnerabilities of climate change and the electric infrastructure (e.g., substations, transmission lines, distributed generation). Planning for a resilient system is essential.

### **Opportunities for interaction between the State Comprehensive Energy Strategy and the GC3 climate change mitigation analysis**

*Katie Dykes, Deputy Commissioner for Energy and Tracy Babbidge, Bureau Chief*

- Approximate timeline for the CES:
  - May 24, 2016: First public scoping meeting at DEEP's New Britain Office ([9:00am, Hearing Room 1](#))
  - October 2016: Draft CES
  - November 2016: Technical meetings
  - December 2016: Public hearings
  - January 2017: Finalize CES

### *Questions and discussion*

- What is the relationship between the work of the GC3 and the Comprehensive Energy Strategy?
  - The GC3 is focused on how to meet GHG reduction targets (visionary), and NESCAUM is modeling scenarios against a reference case of CT emissions, which are affected by the regional grid and market forces.
  - The Comprehensive Energy Strategy (CES) is focused more specifically on planning for the next three years, implementing the near term implementation list (more tactical), but will coordinate with GC3 recommendations to align policy objectives. This will be an iterative process.

- Will the CES outline how to put CT on the pathway toward meeting interim GHG targets, once they are set by the GC3? The last CES had language stating the policies outlined in the planning document alone would not achieve the state’s long-term GHG reduction targets.
  - Yes, the CES will focus on putting the State on a pathway to meet its climate goals. But, it will also focus on how we stay on the pathway in a cost-effective manner. There has to be a balance, and if the state makes all of the investments immediately in shifting toward clean energy, ratepayers would experience high rate increases. The overlapping in timing in updating the CES with the GC3 process presents a great opportunity to align planning efforts across all sectors, not just the electric sector.
  - The CES in 2013 focused on Cheaper, Cleaner and more Reliable. BETP sees the GC3 helping to think through the “Cleaner.” But the CES also needs to evaluate cost-effectiveness and ensure reliability.

**Review revised list of GHG mitigation technologies and measures and discuss potential grouping of various technologies and measures for future scenarios for modeling**

*Paul Miller and Jason Rudokas, NESCAUM*

- The purpose of the hypothetical scenarios is to help GC3 members understand impacts of bundling technologies and measures, as well as their trade-offs.
- Presented an example of a hypothetical bundle of technologies and measures (scenario) modeled through LEAP. The hypothetical was based on efficiency and conservation measures and technologies.
- Summarized barriers and opportunities in the electric sector (see slide 39 for details).
- The LEAP modeling takes into account the dynamics of the ISO-NE grid. The region will have to engage in a significant planning effort to address the realities Deputy Commissioner Dykes outlined. Through this process, there is also great potential for market and job creation.
- The LEAP reference case assumes nuclear generation in CT remains constant through 2050.
- The LEAP reference case assumes 80% of buildings today will exist in 2050. Therefore, a policy mandating standards for new buildings may only affect 20% of the total building stock in 2050. Fuel switching in existing residential, commercial, and industrial building is an important consideration and at what pace?
- To meet CT’s goal of an 80% reduction by 2050, fossil fuels will likely need to be limited to 20% of the fuel mix. Policymakers will need to decide which fossil fuel in which sector (electric, residential, industrial, commercial, or transportation) in particular will make up that 20%.
- NESCAUM is still building out the cost benefit aspect of the LEAP model analysis.

*Questions and discussion:*

- How can we mobilize people to make decisions that support decarbonization in both the electric and transportation sectors, so that we’re taking advantage of benefits on electrification of vehicles?
  - The state has been focused on how can we make “cleaner” solutions also be “cheaper”, but we must also focus on how to achieve maximum benefits from limited state resources (e.g., solar residential system paired with electric vehicle purchase).

**To do:** As a homework assignment, DEEP staff will develop 2-3 example scenarios for ADM members to review and use as examples for building additional scenarios for discussion at the June 16<sup>th</sup> GC3 meeting. DEEP staff will send out the homework via email in the next few weeks.

**June 16<sup>th</sup> meeting agenda items to consider:**

- Review and discussion of proposed scenarios to model
- Discussion of setting interim target(s)

**Public comments***Joel Gordes, Environmental Energy Solutions:*

- Pleased to see energy security language has been included in the list of technologies and measures. The risk to the increasingly popular “internet of things” makes utility companies more vulnerable.
- Dominion Energy, owner of the Millstone nuclear facility, should open its books to show policymakers exactly how much they claim to be suffering from competition due to low natural gas prices. The Millstone plant cost ~\$4 billion to construct and Dominion bought the plant for only ~\$1.3 billion.
- Time of use energy pricing was not included in the list of technologies and measures, but recommends it should be. It can be an effective tool, even if it may not be very popular.
- Support decentralization of the grid.

*Ray Albrecht, National Biodiesel Board:*

- There is a huge opportunity to expand biodiesel renewable fuels and the economics are favorable by capturing Renewable Energy Credits (RECs).
- Recommend adding a lever to the LEAP model for natural gas plants using renewable fuels.
- Globally, the use of corn as a fuel is viable and should be pursued in a sustainable manner.

*Jamie Howland, Acadia Center:*

- Questions for NESCAUM:
  - Does the model have the ability to make non-linear GHG reductions?
    - Yes
  - Request for clarity on how the energy efficiency component of the scenario calculates actual fuel savings. There is confusion about how annual savings accumulate over time in the model (from slide 34: “CT EE programs for natural gas and electricity increase 5x by 2030 and 10x by 2050”).
    - NESCAUM calculates savings based on the number of projects as opposed to percentage savings, and assumes the rate of energy savings is constant.
- Would like the opportunity to comment on how the reference case was developed and the assumptions that were made as the model is still being developed.

**NOTE:** Slides are available on GC3 web page: [www.ct.gov/deep/gc3](http://www.ct.gov/deep/gc3)