

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

Meeting Date: July 26, 2016

Meeting Time: 1:30—3:30 p.m.

Meeting Location:

Department of Energy and Environmental Protection
79 Elm Street, Hartford, CT

ATTENDANCE

| GC3 Members | Title | Organization | Present |
|---|--|--|----------------|
| Robert Klee | Commissioner | Department of Energy & Environmental Protection | Y |
| Katharine Wade | Commissioner | CT Insurance Department | N |
| Melody Currey | Commissioner | Department of Administrative Services | Y (phone) |
| Garrett Eucalitto on behalf of Secretary Barnes | Undersecretary for Transportation Policy and Planning | Office of Policy and Management | N |
| Bryan Garcia | President & CEO | Connecticut Green Bank | Y |
| T.J. Hanson | Product Manager | Thule | N |
| Kate Boucher on behalf of Chairman House | Staff Attorney | Public Utilities Regulatory Authority | Y |
| John Humphries | Organizer | CT Roundtable on Climate and Jobs | Y |
| David Kooris on behalf of Commissioner Klein | Director of Rebuild by Design and National Disaster Resilience | CT Department of Housing | Y |
| Jessica Leclair on behalf of Lynn Stoddard | Energy Technical Specialist | Institute for Sustainable Energy | Y |
| James O'Donnell | Executive Director | CT Institute for Resilience & Climate Adaptation | Y |
| Jay Bruns on behalf of David Robinson | | The Hartford Financial Services Group, Inc. | Y |
| Don Strait | Director | Connecticut Fund for the Environment | Y |
| James Redeker | Commissioner | Department of Transportation | Y |
| Catherine Smith | Commissioner | Department of Economic & Community Development | N |

| Associated Staff | Title | Organization | Present |
|-------------------------|-------------------------------------|--|----------------|
| Keri Enright-Kato | Director | DEEP Office of Climate Change, Technology & Research | Y |
| Jeff Howard | Environmental Analyst | DEEP Office of Climate Change, Technology & Research | Y |
| Katie Dykes | Deputy Commissioner | DEEP Bureau of Energy & Technology Policy | N |
| Tracy Babbidge | Bureau Chief | DEEP Bureau of Energy & Technology Policy | Y |
| Paul Miller | Deputy Director & Chief Scientist | NESCAUM | Y |
| Jason Rudokas | Climate Policy Analyst | NESCAUM | Y |
| Tom Maziarz | Bureau Chief of Policy and Planning | Department of Transportation | Y |

AGENDA & NOTES

Welcome and Review of Meeting Agenda

Rob Klee, ADM Working Group co-Chair

- Welcome to David Kooris, the Council's new Department of Housing representative on behalf of Commissioner Klein. He works on resilience and has a background in planning.
- Please be thinking about the [Home Energy Solutions](#) program. This is a key program for energy efficiency, and we need to get more people to participate. In 2015 it produced \$15 million in annual energy savings for CT households and dramatically reduced emissions. It is a no-regrets program. How can DEEP encourage state employees, university employees, and municipal employees to participate?
- Commissioner Redeker volunteers be a high-profile participant of HES and to promote staff within Department of Transportation to participate.
- No new items need to be added to the agenda.

2013 Statewide GHG Emissions Inventory

Keri Enright-Kato

- About 10.6% decrease since 1990, with slight uptick since 2012.
- Two methodological changes noted:
 - (1) Now using solid-waste data collected by the Department of Energy and Environmental Protection's municipal waste program, data that the agency believes to be more accurate than the default SIT data.
 - (2) Now including consumption-based accounting approach for the electricity sector while still monitoring generation-based approach.
- The inventory employs Energy Information Administration data on Connecticut electricity consumption, while emissions factors are based on comprehensive regional-grid carbon intensity data developed by the Massachusetts Department of Environmental Protection. These take into account the carbon intensity of electric generation within the ISO New England grid as well as electricity imported into the region from Canada, New York, and other jurisdictions.
- CT is working with other NE states to harmonize electricity sector inventory accounting, this includes utilizing a consumption-based accounting approach. Using a similar approach has benefits and avoids double counting.
- Emissions increases observed in the graphs in the mid-1990's are a result of CT's nuclear plants going off-line. This reduced the total amount of carbon free generation for CT and the region.
- Relative to 2012 there has been an increase in emissions, but the overall trend is downward. The increase from 2012 to 2013 is largely attributable to increases occurring in the residential, commercial and industrial sectors. These increases are almost entirely from increased heating demand, which is strongly influenced by winter weather. The winter of 2012 was the mildest since recordkeeping began in 1905 — with 19 percent fewer "heating degree days" than the winter of 2013.
- Connecticut's largest reduction has occurred in the electric power sector. This reduction correlates with state policies and programs that encourage investment in energy efficiency

in homes and businesses, a shift to cleaner fossil fuels and generators, and increased deployment of renewable energy sources.

- The transportation sector continues to be the single largest source of emissions in the state, principally from the use of fossil fuels in passenger cars and light trucks.
- The residential and commercial sectors have decreased 11 and 6 percent, respectively, since 1990. Further improvement will be achieved through programs encouraging investment in insulation and weatherization and deeper penetration of highly efficient equipment for space and water heating.
- Achieving the 2020 target is not a given, but federal and state policies on the books will continue to contribute to the state's downward trend. Full implementation of the RPS, which increases to 20% in 2020, direct contracting for renewables, achieving state waste diversion targets and the federal fuel economy standards for cars and light-duty vehicles are all mechanisms that are on the books that will lead to near-term reductions.
- The carbon intensity of Connecticut's economy has declined from nearly 1 pound of CO₂e per dollar of state gross domestic product in 1990 to less than 0.4 pounds per dollar in 2013.
- Connecticut's 2013 per capita emissions were 10.8 which is well below the national average of 16.7.
- Something for the Council to consider including in its final report is a forward projection of emissions to understand the potential for exceeding the 2020 target.
- Near term strategies for ensuring the state achieves the 2020 target will be included in the Comprehensive Energy Strategy.

Review and discussion of NESCAUM's draft emissions reduction scenarios

Jason Rudokas and Paul Miller

- Review and discussion of draft mitigation scenarios and building blocks.
- A key transition across all scenarios includes significant electrification across all sectors.
- A primary building block includes starting with a decarbonized electricity sector which requires energy efficiency and development of utility-scale renewables.
- Review of mitigation building blocks (slide 13).
- Mitigation wedges are incremental and build off of the previous measure. For instance decarbonization of the electric grid as a first measure will allow electrification of transportation to have a larger impact.
- In scenario 2-4 nuclear retires at end of licenses which is reflected in the reference case.
- Scenarios 1, 3, and 4 are engineered to achieve 2050 target of 80% below 2001 levels.
- Scenario 1: Pilgrim nuclear plant retires and is replaced by natural gas; remaining nuclear plants continue to operate through 2050; the New England grid evolves toward zero carbon, with utility-scale solar the dominant resource.
 - Assumptions made about nuclear are same in reference case and scenario 1.
 - Look at increasing the amount of behind-the-meter solar wedge. NREL is a good source for obtaining numbers on technical potential.

- It would help to calculate acreage of land that would be needed to actualize the “utility-scale renewables” in the scenario and compare this with acres of available land space.
 - New England has lots of off-shore wind potential, but cost is certainly a factor in its deployment. . NREL is a good source for obtaining numbers on technical potential for offshore wind.
 - Natural gas conversion program is included in the reference case.
 - The natural gas capacity expansion is not included in the projection.
 - Council members can provide NESCAUM with data to incorporate into the reference case on the potential natural gas capacity expansion impacts if they can identify a widely-accepted study.
- Scenario 1.1: Same as scenario 1 except that expanded efficiency efforts significantly reduce electricity demand.
 - Scenario 2: All nuclear plants retire when current licenses expire and are replaced with natural gas. Grid evolves toward zero-carbon, with utility-scale solar the dominant resource. Mitigation wedges remain the same.
 - Look at incorporating fuel cells replacing natural gas in the electricity sector.
 - Scenario 3: All nuclear plants retire when current licenses expire and are replaced with on-shore wind in New England. Grid evolves toward zero-carbon, with rough even split between utility-scale solar and on-shore wind. Mitigation wedges remain the same.
 - Look at increasing hydro imports.
 - Look at increasing demand response sooner (prior to 2038).
 - The wedges provide only an aggregate view and are not intended as a policy prescription. In designing policy recommendations, GC3 will need to weigh factors such as CT’s good offshore wind potential, growing opposition to “industrial wind” in Maine, and emerging obstacles to expanded electrical transmission.
 - Scenario 4: Pilgrim retires and is replaced with natural gas, remaining 2 nuclear plants continue operating through 2050, and grid evolves towards zero-carbon with utility-scale solar the dominant resource. Difference from scenario 1 is that earlier and steeper reductions are modeled to illustrate what would be needed to achieve 55% overall reduction (from 2001) by 2030.
 - Corresponding figures for accelerated adoption of electric vehicles and residential air source heat pumps are shown in slide 30 (e.g., 67% EVs and 60% heat pumps by 2030).
 - The “moderate” numbers represent 40% reduction in 2030 and “accelerated” numbers represent a 55% reduction in 2030 (from 2001 levels).
 - We should consider whether the vehicle turnover rate (% of vehicles replaced each year) makes even the “moderate” scenario plausible; and we should look at how this compares with the ZEV MOU.
 - We should consider the possibility of logarithmic change, such as the change that occurred during the Solarize Campaign for PV deployment. Designing a program for EV deployment similar to the Solarize Campaign could potentially achieve such logarithmic adoption curves, helping to achieve the penetration rates suggested here.
 - Mass transit is captured in the VMT (vehicle miles traveled) reduction wedge.
 - Look at greater reductions in VMT.

- Look at earlier deployment of renewables and EVs, but ground-truth deployment rates over time by comparing to the California Pathways deployment approach.
- Look at the new buildings designed to be energy efficient.
- Be careful about current condition bias. Deployment of technologies could be faster than originally anticipated due to changes in prices, technology leaps, etc.
- Additional modeling should be completed before recommendations on interim targets are discussed and determined.
- NESCAUM and DEEP staff will take the recommendations they heard today and incorporate them into the next iteration of scenarios for review at the next meeting.

Public Comments

Ray Albrecht, National Biodiesel Board:

- In New England, 4 billion gallons of liquid fuel are used to produce electricity. A reasonable goal would be replacement of this petroleum with biodiesel made from sustainable, renewable feedstock. Transmission infrastructure is already in place.

Joel Gordes, Environmental Energy Solutions

- Raise temperature indoors and reduce the state deficit in the process.
- Home Energy Solutions price is increasing to \$125, and this is going to hurt participation.
- Need shift to time-of-use rates for electricity.
- GC3 must bring also bring climate change adaptation into the picture. Long transmission lines are a form of centralized infrastructure that is fragile and vulnerable. Must think holistically about these things.
- HPs are now capable of going down to -17F.

NOTE: Slides are available on GC3 web page: www.ct.gov/deep/gc3