



Connecticut Department of Energy and Environmental Protection



GC3 Meeting

June 13, 2017
10:00 — 12:00 p.m.



Agenda

10:00

Welcome & Announcements

10:05

Overview of stakeholder engagement event

10:10

Review electric sector scenarios

10:25

A review of policies and programs to decarbonize the electric sector

10:50

Electric sector policy discussion

11:25

GC3 projected timeline

11:30

Public comments



Overview of stakeholder engagement event

John Humphries



Review electric sector scenarios

Jason Rudokas



Review electric sector clean grid scenarios

- Scenario 1: Solar dominates zero carbon electricity
 - Even split between utility scale and BTM solar
- Scenario 2: Even split between wind and solar
 - Even split between utility scale and BTM solar
 - Wind is dominated by onshore development
- Scenario 3: Even split between wind and solar with expanded energy efficiency



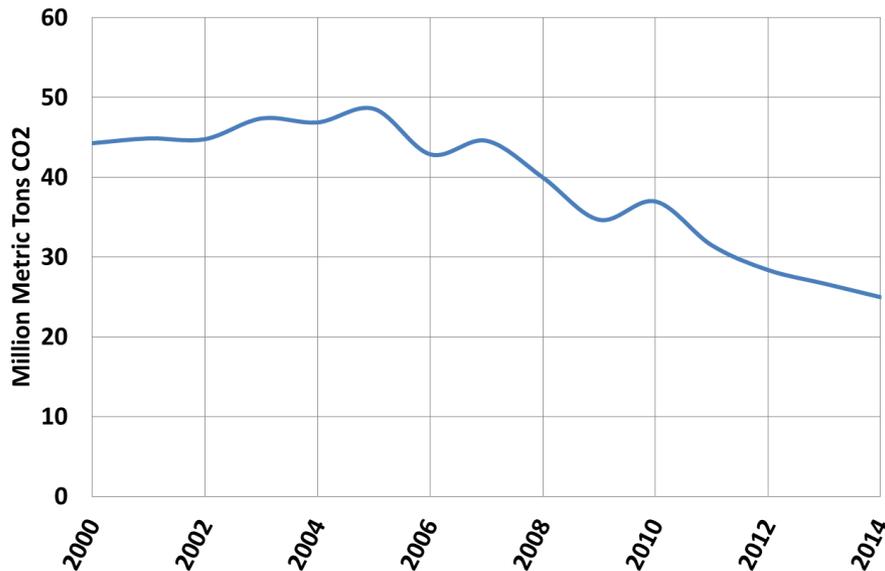
GHG Accounting in the Electric Sector

- We account for the states' consumption of electricity vs. the states generation of electricity
- This is because electricity consumed in CT is provided by generators throughout the ISO-NE grid

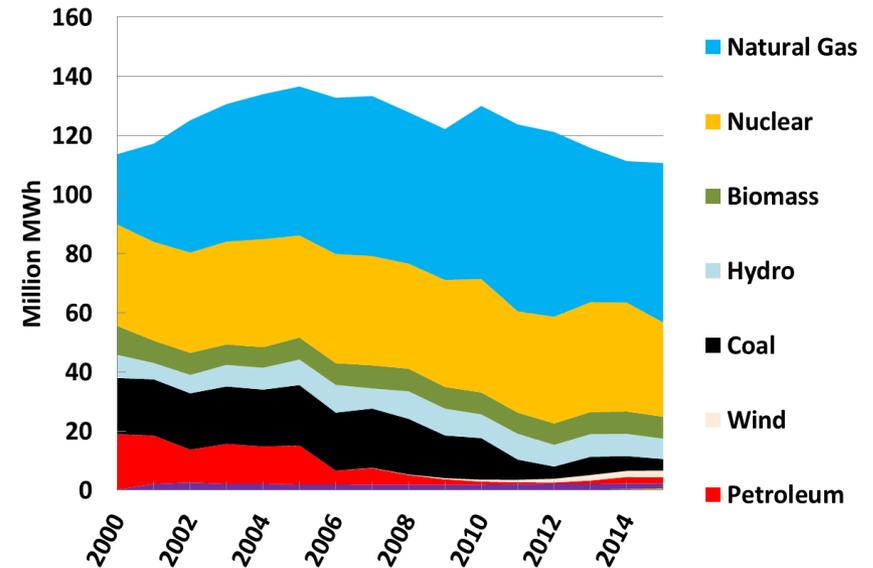


Historical Trends in Electric Sector GHG Emissions

New England Electric Sector GHG Emissions



New England Electricity Generation



- Electric sector GHG emissions declined 19 MMT 2000-2014
- 2014 GHG emissions 43.5% below 2000
- Principal drivers include fuel switching between coal and natural gas and energy conservation

A review of policies and programs to decarbonize the electric sector

Eric Annes



Comparative Electric Rates

Average Price of Electricity to Ultimate Customers by End-Use Sector (Cents per Kilo-watt hour)

Connecticut	17.05
Rhode Island	16.39
Massachusetts	15.97
New Hampshire	15.30
Vermont	14.44
Maine	12.21
New York	15.08
National Average	10.31



State Programs and Policies to Decarbonize the Electric Sector

Electric Demand Reductions	Zero and low-carbon technology deployment	Emission limits and Market-based mechanisms
<ul style="list-style-type: none"> • Energy Efficiency Resource Standards • Demand-side energy efficiency programs (Conservation & Load Management Plan) • Smart Meters, Time-Varying Rates • Appliance and Equipment Efficiency Standards • Incentives and Finance Mechanisms for Energy Efficiency (tax incentives, rebates, grants, performance contracts, green bank, etc.) 	<ul style="list-style-type: none"> • Renewable Portfolio Standard/Clean Energy Standard • Long-term contracts • Feed-in tariffs – net & virtual net metering • Clean energy incentives and finance mechanisms (tax incentives, rebates, grants, green bank, etc.) 	<ul style="list-style-type: none"> • Performance standards (e.g., lbs/MW hr) • Cap and trade/invest (RGGI) • Carbon pricing



CT Renewable Portfolio Standards (RPS)

State policy that requires electric providers to obtain a specified percentage of the energy they sell from renewable sources.

Year	Class I	Class II*	Class III	Total
2015	12.5%	3.0%	4.0%	19.5%
2016	14.0%	3.0%	4.0%	21.0%
2017	15.5%	3.0%	4.0%	22.5%
2018	17.0%	3.0%	4.0%	24.0%
2019	19.5%	3.0%	4.0%	26.5%
2020	20.0%	3.0%	4.0%	27.0%

Class I resources include: solar power; wind power; fuel cell; geothermal; landfill methane gas, anaerobic digestion or other biogas derived from biological sources; thermal electric direct energy conversion from a certified Class I renewable energy source; ocean thermal power; wave or tidal power; low emission advanced renewable energy conversion technologies; a run-of-the-river hydropower facility that began operation after July 1, 2003, and has a generating capacity of not more than 30 megawatts, provided the facility is not based on a new dam or a dam identified as a candidate for removal; and a biomass facility that uses sustainable biomass fuel

Class II resource include: a trash-to-energy facility; a biomass facility that began operation before July 1, 1998; run-of-the-river hydropower facility that has a generating capacity of not more than 5 megawatts, does not cause an appreciable change in river-flow and began operation prior to July 1, 2003.

Class III: CH&P; a waste heat recovery systems installed on or after April 1, 2007; the electricity savings from conservation and load management programs that started on or after January 1, 2006 (on and after January 1, 2014, programs supported by ratepayers are not eligible); and any demand-side management project awarded a contract pursuant to §16-243m



Current CT Legislation to Deploy Renewables

Behind the Meter (BTM)

Public Act 11-80; Public Act 12-2
Anaerobic Digestion (Green Bank) pilot program to install 5 AD facilities, up to 3 MW in size.

Public Act 11-80: Sec. 103
Combined Heat and Power (Green Bank)

Public Act 11-80; Public Act 15-194:
RSIP/SHREC (Green Bank)

Public Act 11-80: Sec. 107/110
LREC/ZREC Procurement of Renewable Energy Credits

Public Act 15-113; Public Act 16-116:
Shared Clean Energy Facility Pilot Program (SCEF), Pilot Program to procure up to 6 MW of BTM Class 1 technologies

Public Act 11-80; Public Act 16-216: Virtual Net Metering

CGS 16-246h: Net Metering

Grid Side

Public Act 05-01: Project 150 Allows for Long Term PPAs (no additional solicitations will be issued)

Public Act 13-303: Section 6 Allows DEEP to procure clean energy for up to 4% of Electric Load

Public Act 11-80: Section 127 Allows for 30 MW of Class 1 projects to be installed (no additional solicitations will be issued)

Public Act 15-107: Large Scale Procurement (≥ 20 MW) Procure up to 15% of Electric load (combined with Sec B);

Public Act 15-107: Small Scale Procurement (<20 MW) DEEP may procure up to 10% of the state's Electric load (combined with Sec C)



Ongoing State Led Procurements

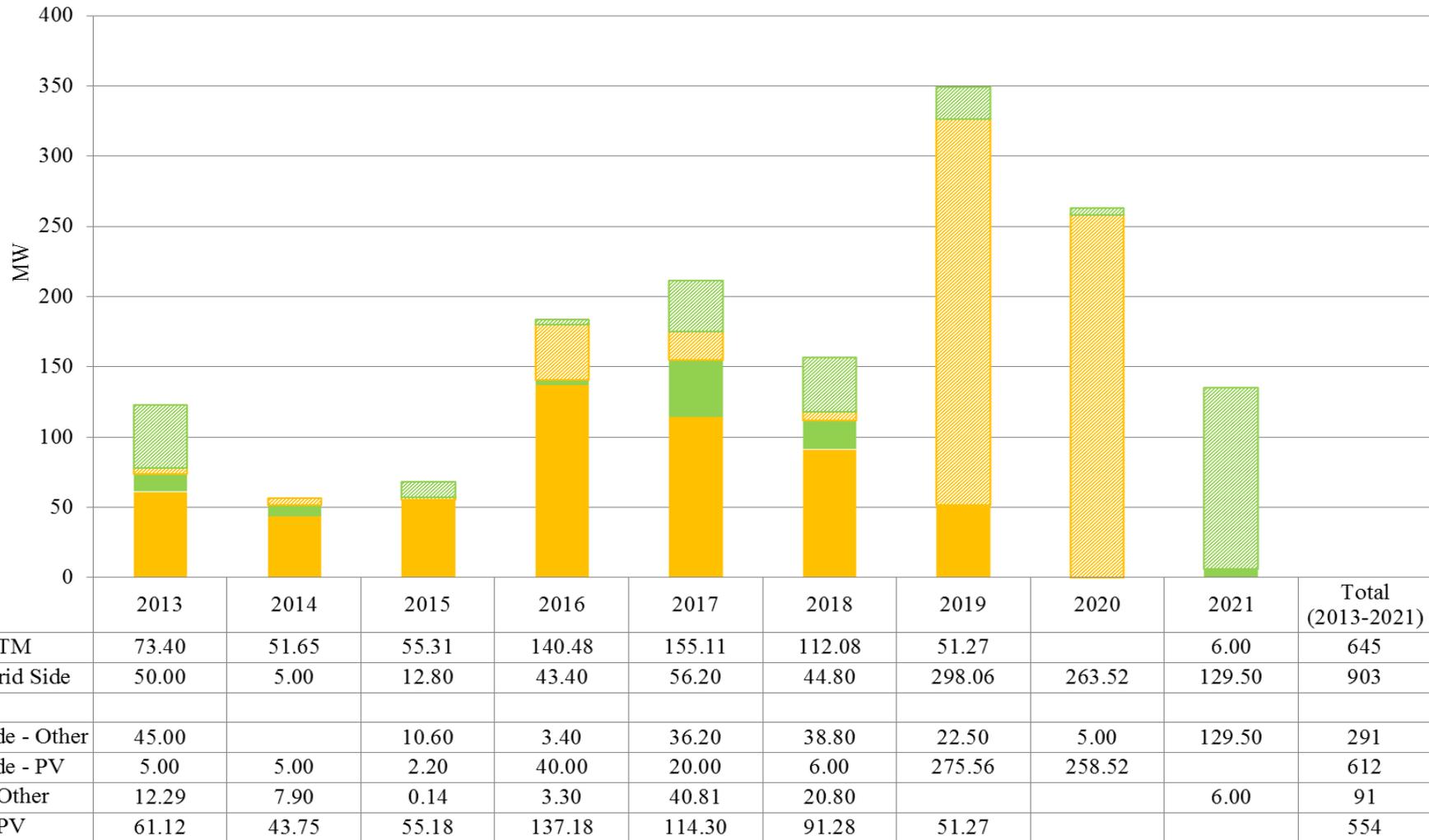
- Public Act 15-107/ Public Act 13-303: Authorized the DEEP Commissioner to direct the EDCs to enter into long term PPAs for clean energy to meet a total of 19% of Connecticut's Electric Load.

DEEP Selected Grid Side Projects, approximately 5% of CT's electric load, under 2 RFPs:

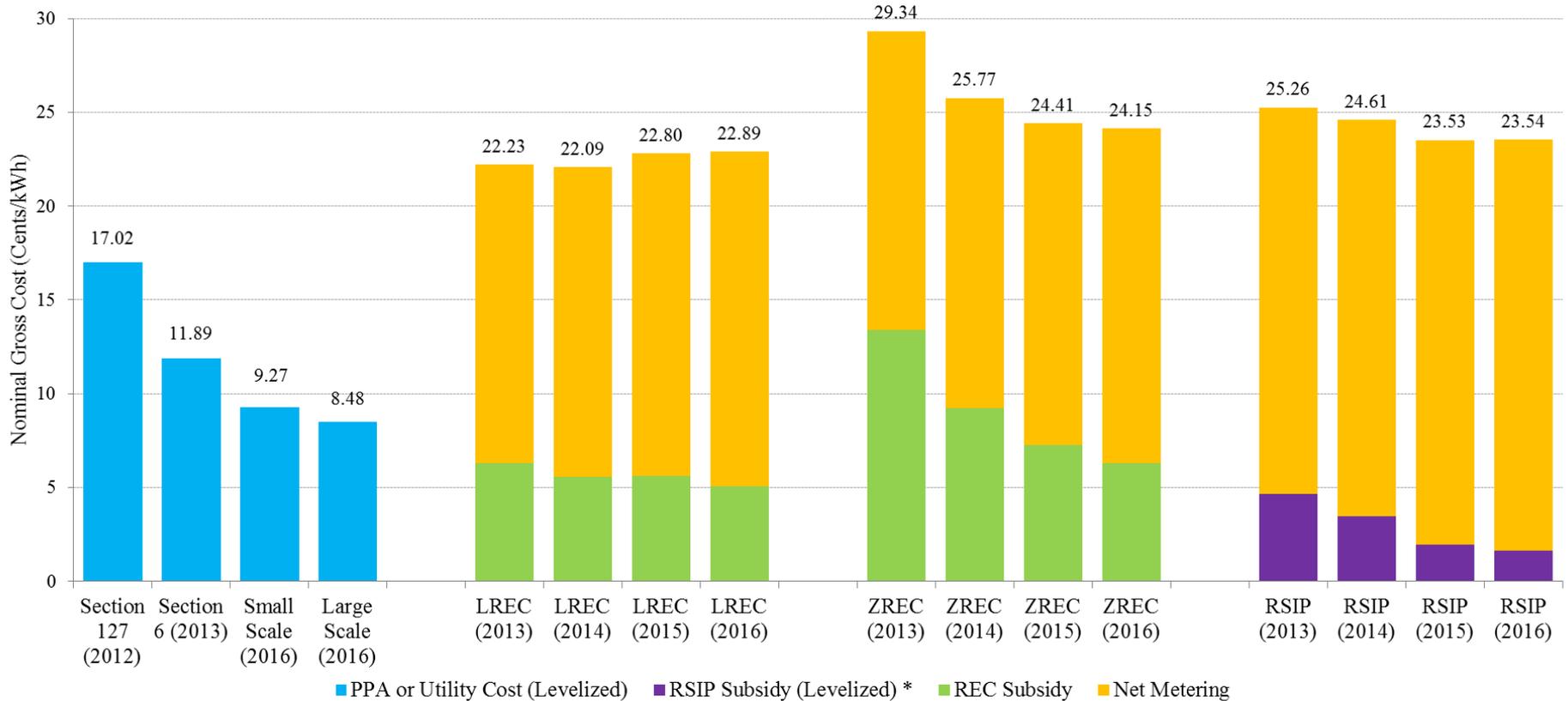
- Large Scale Regional Procurement, jointly with Rhode Island and Massachusetts.
 - Projects selected were 20 MW or greater
- Small Scale Procurement
 - Projects selected were less than 20 MW
- Shared Clean Energy Facility Pilot Program (SCEF): Under the current RFP terms, projects are expected to come online by 2021 . The program is capped at 6 MW.



Behind the Meter and Grid Side Installations, 2013-2021



Cost of Clean Energy Programs



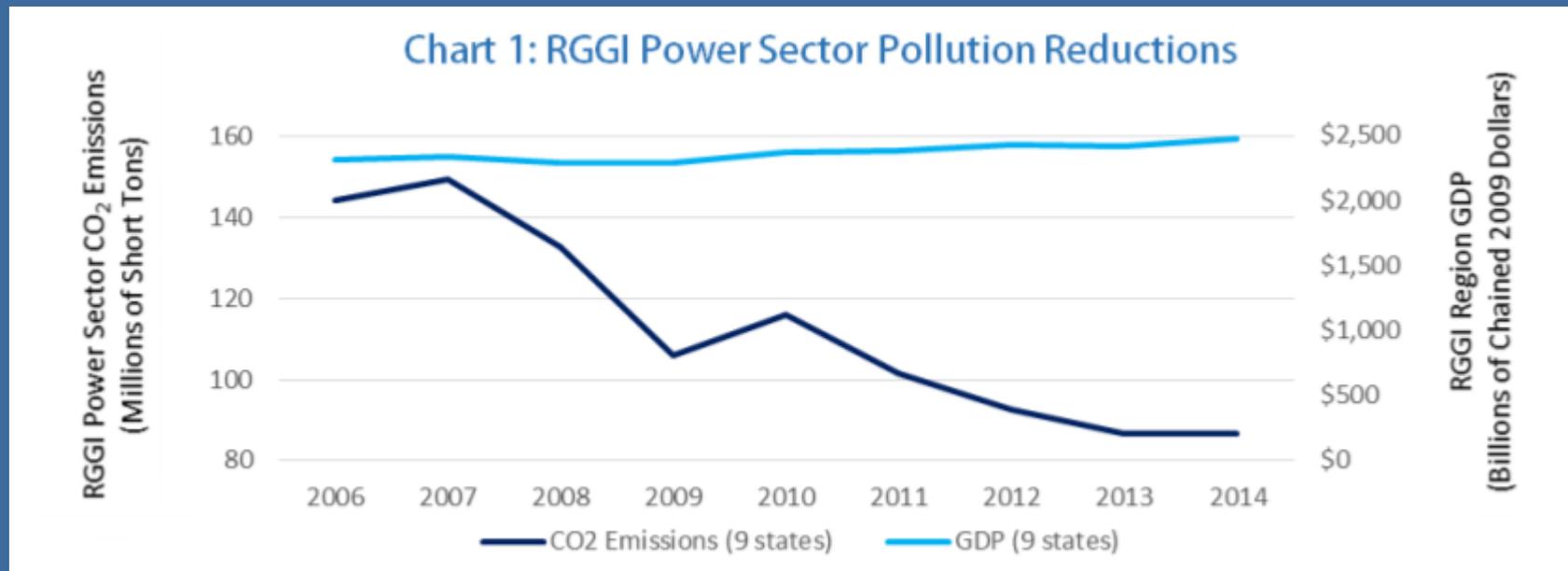
* Average cost for RSIP was levelized over 20 years for Purchased Residential PV systems and not leased systems.



Regional Greenhouse Gas Emissions(RGGI)

RGGI is the first mandatory market-based program in the United States to reduce greenhouse gas emissions.

RGGI is a cooperative effort among the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont to cap and reduce CO₂ emissions from the power sector.



RGGI CO₂ power sector emissions have declined more than 45% since 2005 while the regional economy has continued to grow



Integrating Markets and Public Policy (IMAPP)

IMAPP is a focused NEPOOL stakeholder process to identify and explore potential changes to the wholesale power markets that could be implemented to advance state public policy objectives in New England.

Growing tension between state procurements to purchase resources not being developed (or retained) by the market to meet public policy goals and the ability of the markets to send efficient price signals.

State Concern: Resources purchased by states are excluded from the capacity market by operation of market rules causing the procuring states to pay twice for capacity and leading to an over-built market

Investors' concern: Resources procured by the state suppress the capacity market price. This could make existing resources uneconomic and hamper the market's ability to attract new resources if needed.



Integrating Markets and Public Policy (IMAPP)

Objectives of any solution:

1. Competitive capacity pricing. Maintain competitively-based capacity auction prices, by minimizing the price-suppressive effect of out-of-market subsidies on competitive resources
2. Accommodate entry of subsidized resources into the FCM over time. Minimize the potential to end up overbuilt for Resource Adequacy needs, an inefficient and costly outcome
3. Avoid cost shifts. To the extent possible, minimize the potential for one state's consumers to bear the costs of other states' preferred policy resources
4. A sustainable, market-based approach that minimizes administrative mechanisms and extends, rather than upends, the existing capacity market framework



Integrating Markets and Public Policy (IMAPP)

- Any solution will be within the jurisdiction of the Federal Energy Regulatory Commission (FERC)
- FERC held a two day technical conference on May 1-2 for the three eastern RTO's (ISO-NE, NYISO, and PJM).
- Absent a solution through the IMAPP process, a solution likely will be imposed by FERC or the courts.



Electric Sector Policy Discussion



GC3 Projected Timeline

Date	Task
June 13, 2017 GC3 meeting	Electric sector scenario and policy discussion
June 20, 2017 ADM meeting	Discussion of REMI inputs and assumptions
July GC3 meeting	Review and discuss mitigation scenario(s) as means to discuss and evaluate a mid-term target recommendation
September G3 meeting	Discuss and determine mid-term target recommendation
October GC3 meeting	Discuss and determine policy options to achieve recommended mid-term and 2050 target/
Nov. 2017 -Jan. 2018	Draft economy-wide GHG reduction strategy
January GC3 meeting	Review draft GHG reduction strategy
Jan.-Feb. 2018	Stakeholder Engagement
Feb. 2018	Finalize and release GHG reduction strategy



Public Comments

