A GRCx Event: Accelerating the Decarbonization of the Wholesale Energy Market

GRCx is an interactive program series from the Boston Green Ribbon Commission designed to accelerate the implementation of the City's Climate Action Plan by providing high-quality, useful content on climate resilience and carbon mitigation to the Boston community.

GRCx

GREEN RIBBON COMMISSION
Climate Action Exchange

Introductions

Judy Chang
Undersecretary for Energy
Commonwealth of Massachusetts

Greg Geller
Senior Director of Regulatory Affairs
Enel X

Madeline Schuh
Philadelphia Energy Office
Member of PJM Cities and Communities Coalition

Massachusetts' Energy and Climate Initiatives

Judy Chang, Undersecretary of Energy and Climate Solutions
Massachusetts Executive Office of Energy and Environmental Affairs
July 28, 2021

S.9, An Act Creating a Next Generation Roadmap for Massachusetts Climate Policy

Following Governor Baker signing Senate Bill 9, EEA is currently working on the following:

- Updating the CECP for 2025 and 2030 to align with the GWSA-provisions within the legislation
- Developing a plan and timeline for the CECP update process, with new schedule
- Ensuring additional opportunities for engagement with stakeholders and members of the public

GWSA Updates

Offshore Wind

EE Building Code

Environmental Justice

2050 Roadmap: Key Findings

Commonwealth has a range of options, but the most cost-effective, low-risk pathways share core elements:

A balanced clean energy portfolio anchored by a significant offshore wind resource

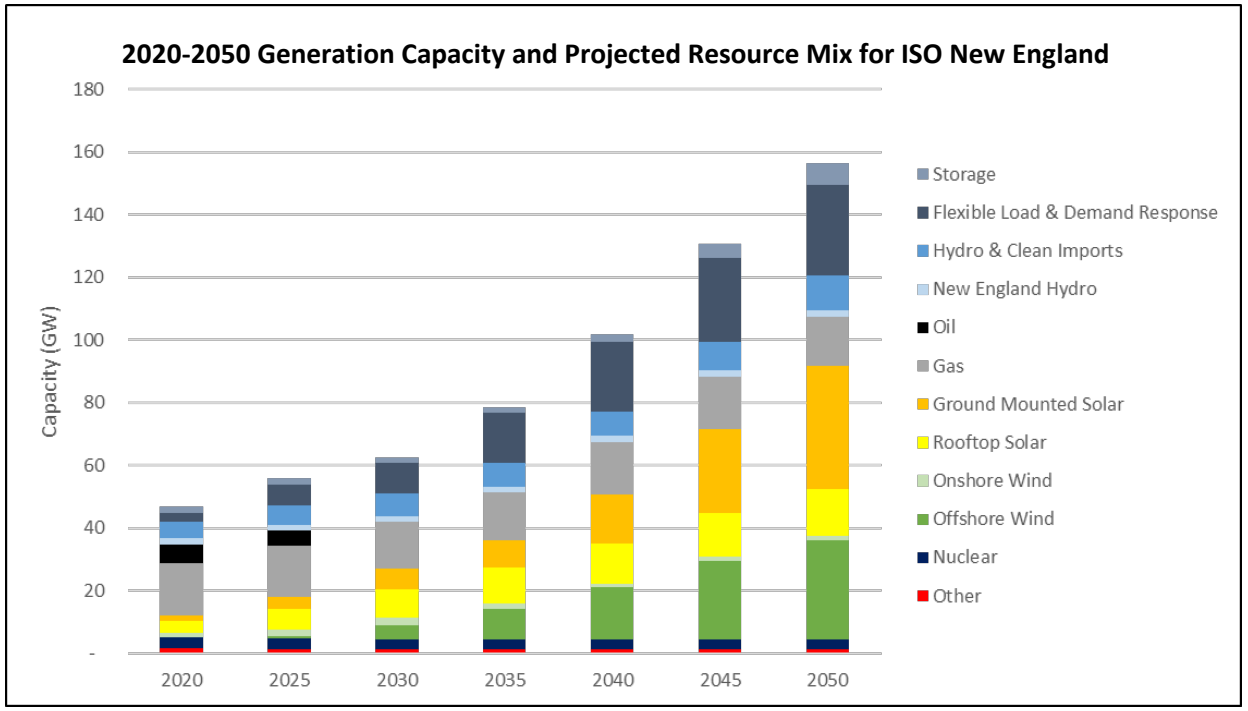
More interstate transmission to allow us to access renewable generation in other states and in Canada

Widespread electrification of transportation and building heat

Reduce cost by replacing energy infrastructure at end of service life.

Implications of Decarbonization for New England and Massachusetts

- Decarbonization and electrification is directionally the "least-regrets" option; details matter
- Implementation will require state-wide and regional system reforms and investments

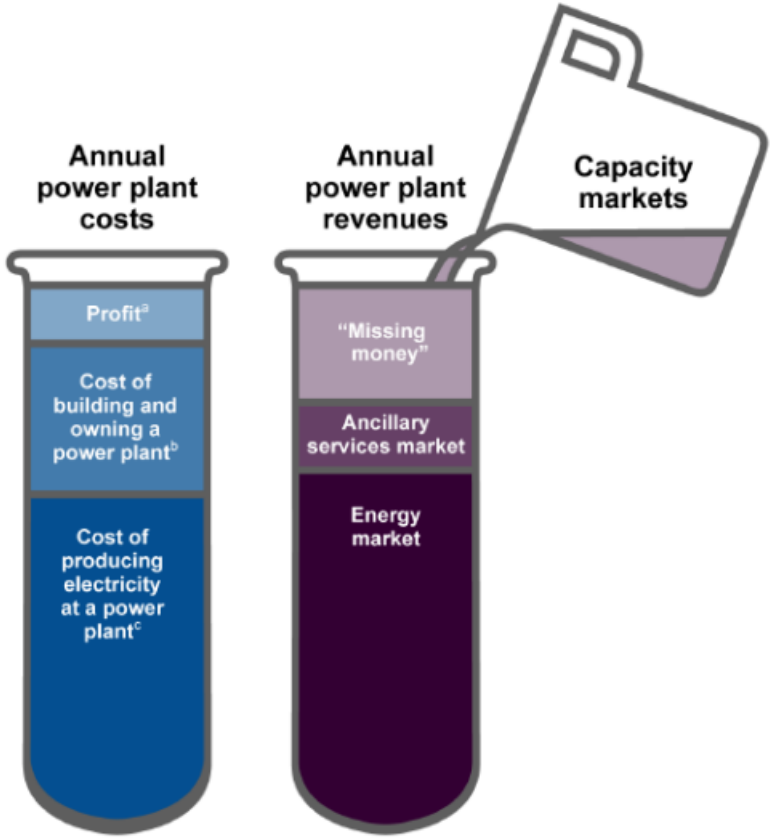


- ❑ Reform and advance distribution & transmission planning
- ❑ Deploy distribution & transmission upgrades
- ❑ Deploy Advanced Meter Infrastructure
- ❑ Deploy electric vehicle charging infrastructure
- ❑ Develop new clean energy financing mechanism
- ❑ Deploy wholesale electricity market reforms
- ❑ Ensure competitive electric rates for customers
- ❑ Address energy and environmental justice issues while advancing the systems

New England Energy Vision: Wholesale Electricity Market Design Reform

- Meet States' decarbonization mandates and maintain resource adequacy at the lowest cost by using market-based mechanisms
- Establish effective mechanisms that accommodate existing and future long-term contracts for clean energy resources executed pursuant to state law
- Integrate distribution-level resources effectively and efficiently
- Allow interested buyers and sellers to participate
- Provide for an appropriate level of state involvement in market design and implementation.

Background on Wholesale Electricity Market Design



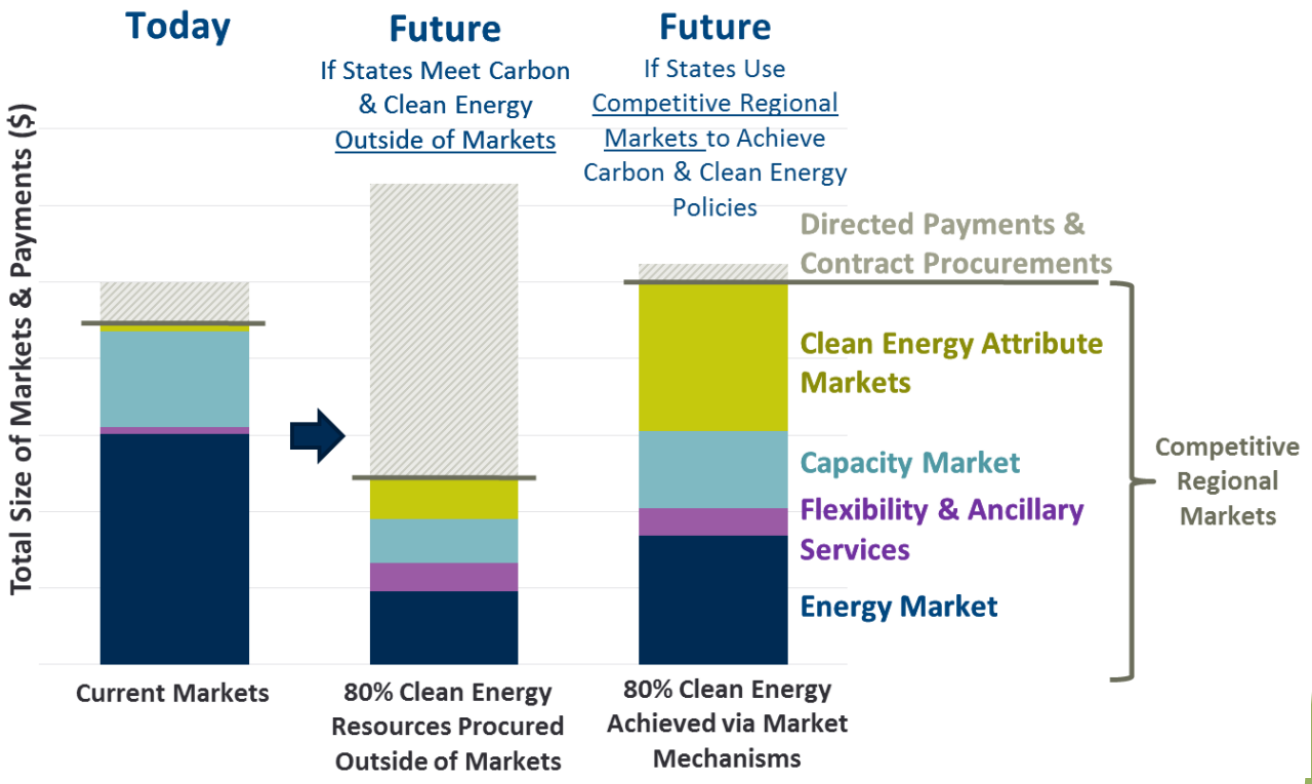
Source: U.S. GAO, Report to Congressional Committees, "Electricity Markets: Four Regions Use Capacity Markets to Help Ensure Adequate Resources, but FERC Has Not Fully Assessed Their Performance," December 2017

- Wholesale electricity market generally have three components:
  - "Energy Market"
  - "Capacity Market"
  - "Ancillary Services Market"
- The Federal Energy Regulatory Commission regulates these markets
  - Overarching objective: Just and reasonable rates; non-discriminatory
- In recent years, the capacity market rules fail to value the "capacity" from ratepayer contracted resources
  - Customers pay twice
  - States are analyzing alternatives

Wholesale Electricity Market Reform Needed

- The wholesale market design needs to evolve to meet region's clean energy needs
  - Goals for Next Phase of Renewable Development
  - Better integrate renewables into regional wholesale markets
  - Facilitate financing of new projects and retain existing
  - Optimize the benefit of renewables, including capacity
  - Utilize markets structures to reduce risk to ratepayers
- Forward Clean Energy Market (FCEM) is a preferred option for regional market. High level outline:
  - Regional entities place "demand bids" that represent desired targets for clean energy with a price cap
  - Entities may be states, towns, or even voluntary bids from organizations or corporations
  - Implementing agency runs a centralized procurement
  - Suppliers will offer their clean energy resources at a price
  - Market will clear at price that meets need
  - Market can operate annually, securing resources several years ahead of deployment
- Use of the FCEM would require separate pursuit of economic development, environmental justice, and diversity, equity, and inclusion goals

Future With and Without Centralized Clean Energy Attributes Markets



Source: Spees et al, "Harmonizing Environmental Policies with Competitive Markets: Using Wholesale Power Markets to Meet State and Customer Demand for a Cleaner Electricity Grid More Cost Effectively", July 2018

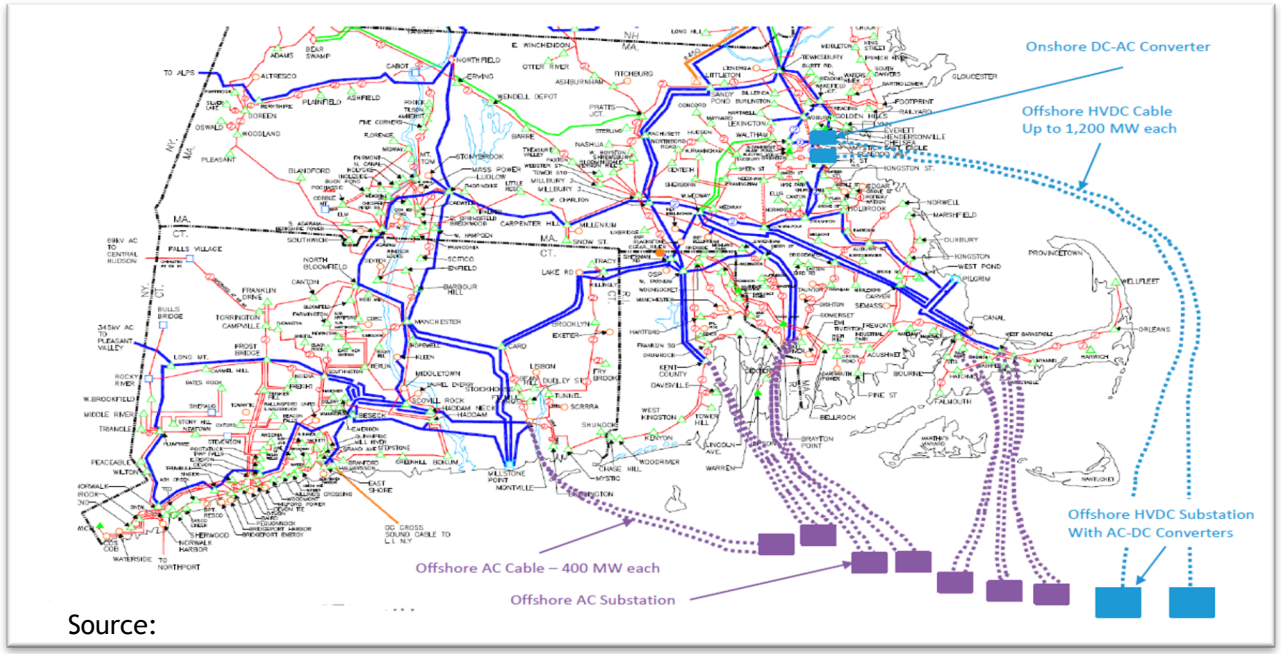
New England Energy Vision: Transmission Planning for the Future

- Regional planning effort that provides a high-level transmission system plan
- Use states' scenarios as a starting point for developing future transmission needs
- Develop a conceptual system plan for 2050 and conduct detailed analyses for specific pathways, with the objective being to understand the following:
  - Onshore system upgrades needed
  - Offshore systems that may be needed to support offshore wind resources
  - Potential options that should be explored, including non-transmission alternatives
- Engage with stakeholders to discuss the potential use of transmission to integrate all necessary energy resources in the region at the lowest cost possible
- Conduct detailed planning processes to maximize the use of existing transmission, build new transmission only where necessary, and use competitive processes to minimize costs to consumers

Background on Transmission System Planning

- Transmission planning is one of ISO-NE's core responsibilities
  - Regional planning can and should incorporate anticipated future needs to integrated renewable and clean resources
  - Lacking a vision, the region has spent billions of dollars in new transmission without an eye toward how to integrate the clean resources that the region needs

ISO-NE needs to make this its priority going forward



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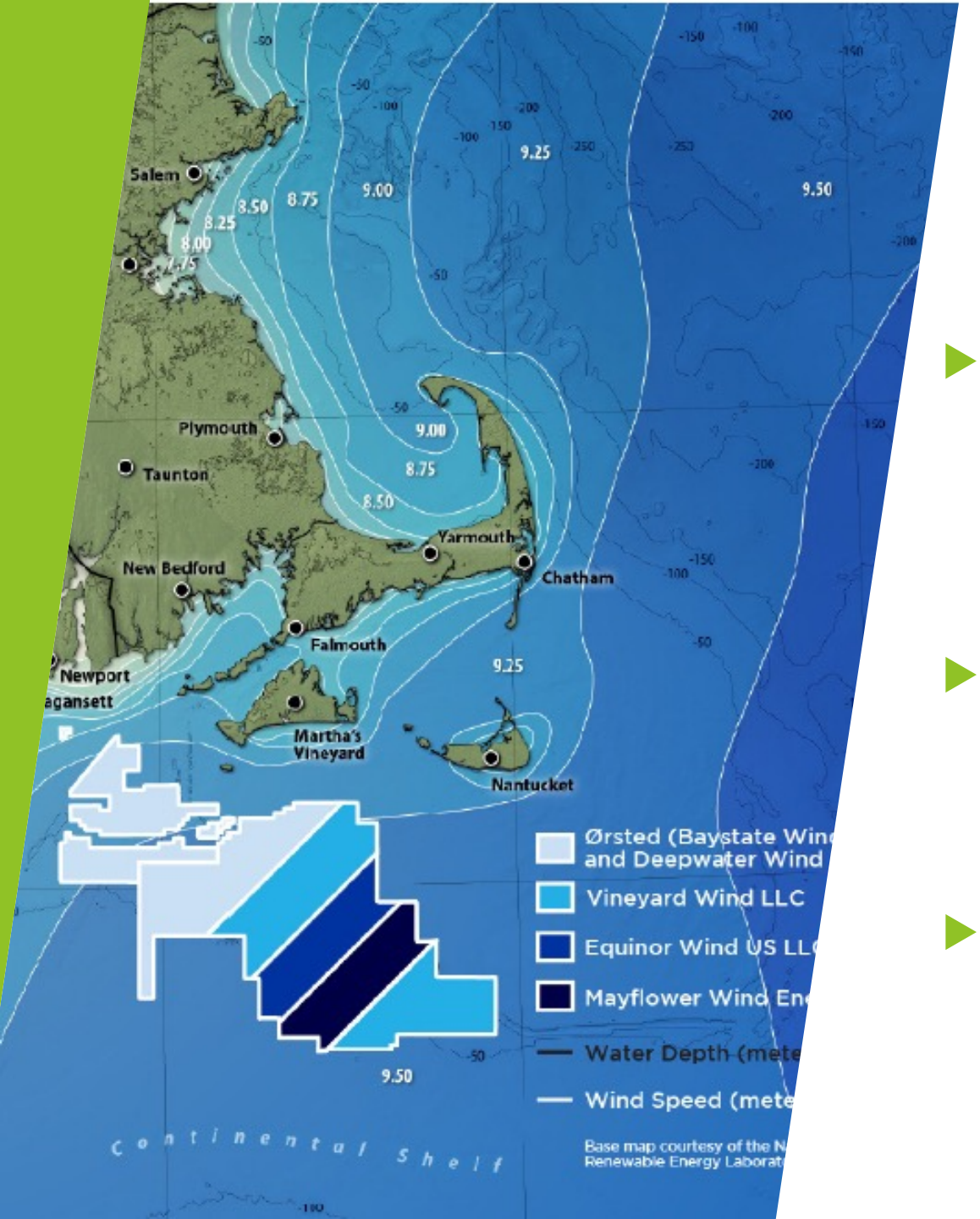


Offshore Wind Transmission Development

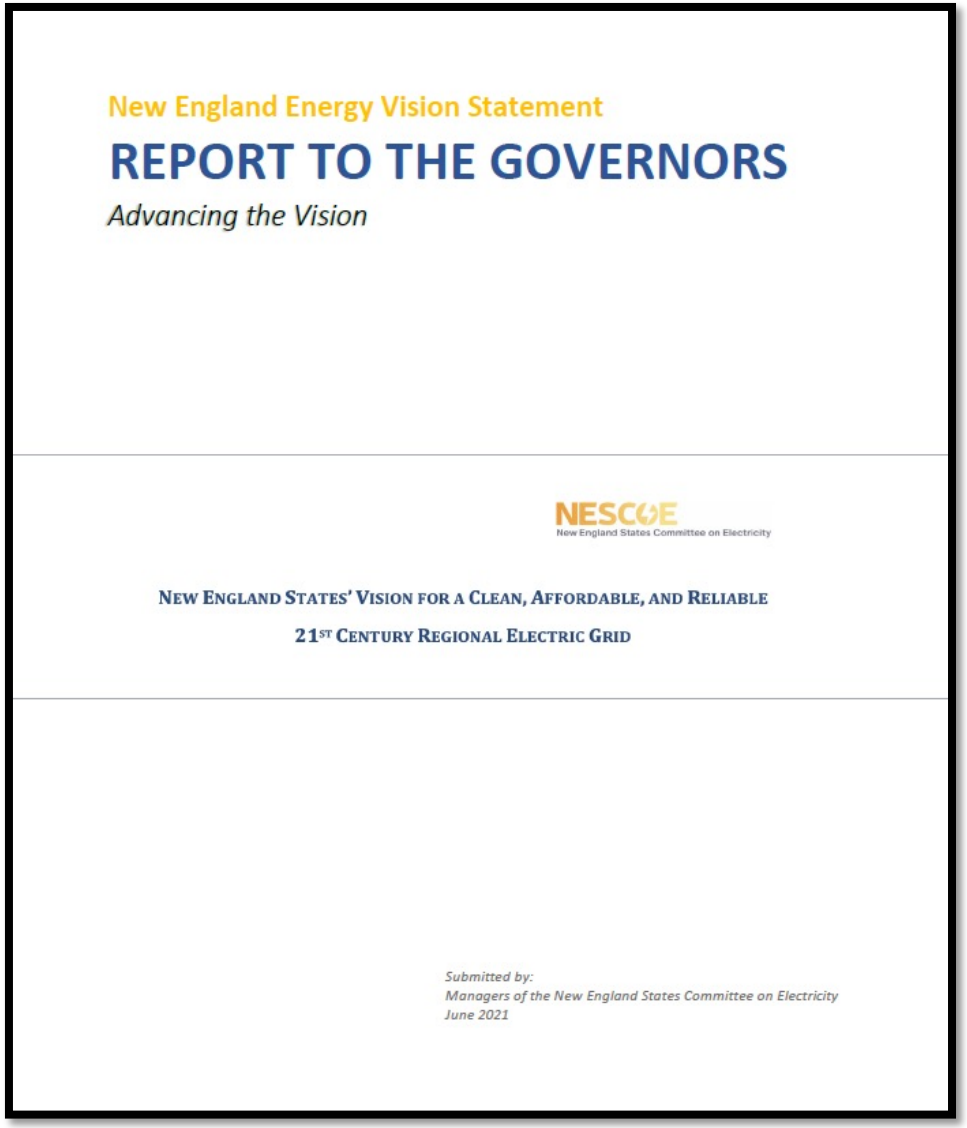
- A planned transmission system to accommodate a future expansion of offshore wind energy beyond the Massachusetts procurement authority may capture greater benefits
- ISO-NE is conducting a 2050 Transmission Study to inform the region on the amount and type of transmission need to integrate clean energy to meet state goals
- Regional planning should incorporate stakeholder input and close interaction with the states

New England Energy Vision: ISO-New England Governance Reform

- Objective: Adjust the ISO-NE's governance structure and mission to support States' needs
- Explore changes after analyzing whether and how ISO-NE's governance structure and mission statement can be adjusted to consider and internalize
  - Consumer costs
  - State policies/concerns

New England Energy Vision: Recommendations for ISO-New England Governance Changes

- ISO-NE Board of Directors establish a standing Board of Director Committee on State and Consumer Responsiveness, with a charter that includes explicit assessment of consumer costs and interests
- ISO-NE Board of Directors schedule at least annual public meetings of its Board of Directors
- ISO-NE Board of Directors provide increased substantive detail in Board reports
- ISO-NE management issue public summaries of reports to the Board in those circumstances when there are alternative proposals in order to provide some visibility
- ISO-NE updates its mission statement to appropriately balance and account for consumer and state interests
- In circumstances where ISO-NE rejects a proposal or amendments supported by at least a majority of the six New England states, ISO-NE details in writing prior to the NEPOOL Participants Committee vote on such matter how it balanced consumer costs and other state interests against other factors
- When developing future ISO-NE market rule changes, where such changes seek to execute or integrate state energy and environmental policies and requirements, ISO-NE should collaborate with the states



New England Energy Vision Statement

REPORT TO THE GOVERNORS

Advancing the Vision

NESCOE
New England States Committee on Electricity

NEW ENGLAND STATES' VISION FOR A CLEAN, AFFORDABLE, AND RELIABLE 21ST CENTURY REGIONAL ELECTRIC GRID

Submitted by:
Managers of the New England States Committee on Electricity
June 2021

For more information, please go to:

https://nescoe.com/resource-center/advancing_the_vision/

Thank You!

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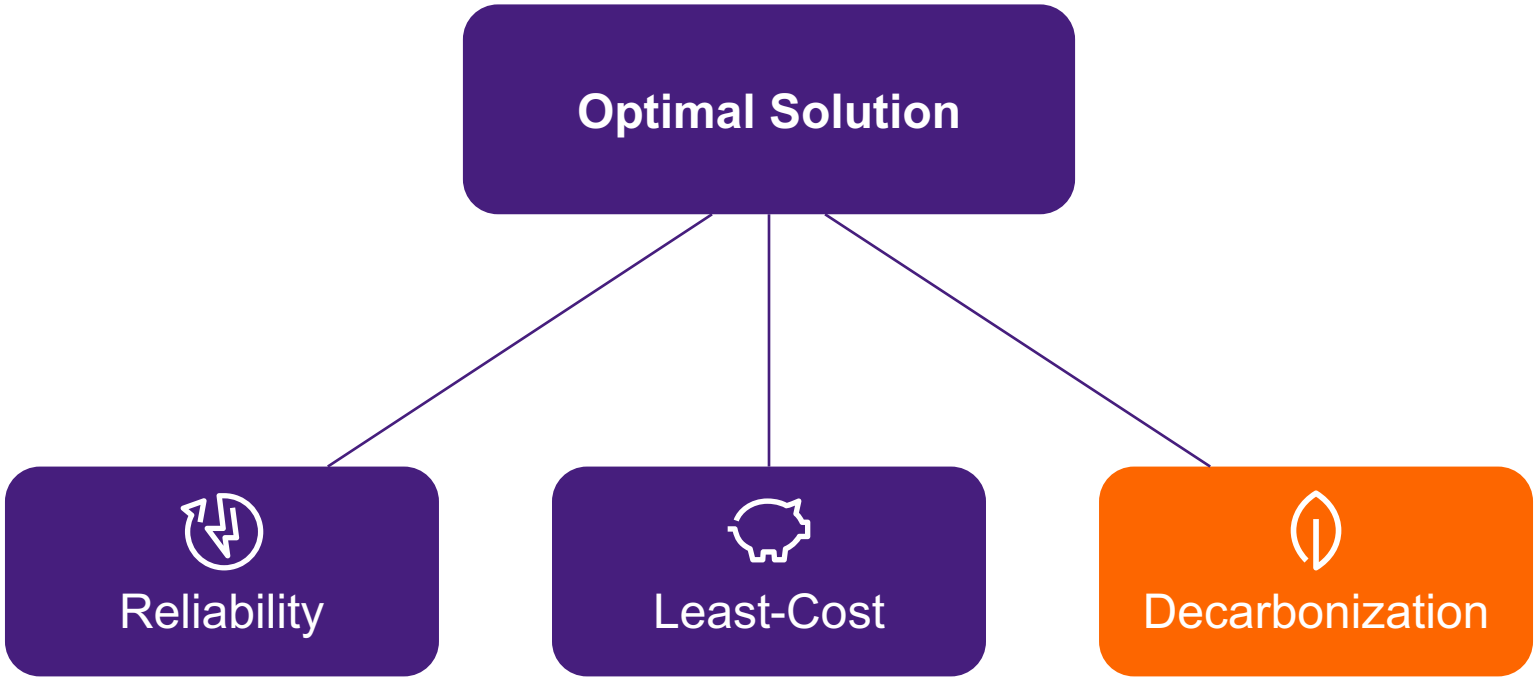
Competitive, Reliable Decarbonization

July 28, 2021

The problem we are trying to solve



More than 2/3 of all generation earning capacity payments is fossil!

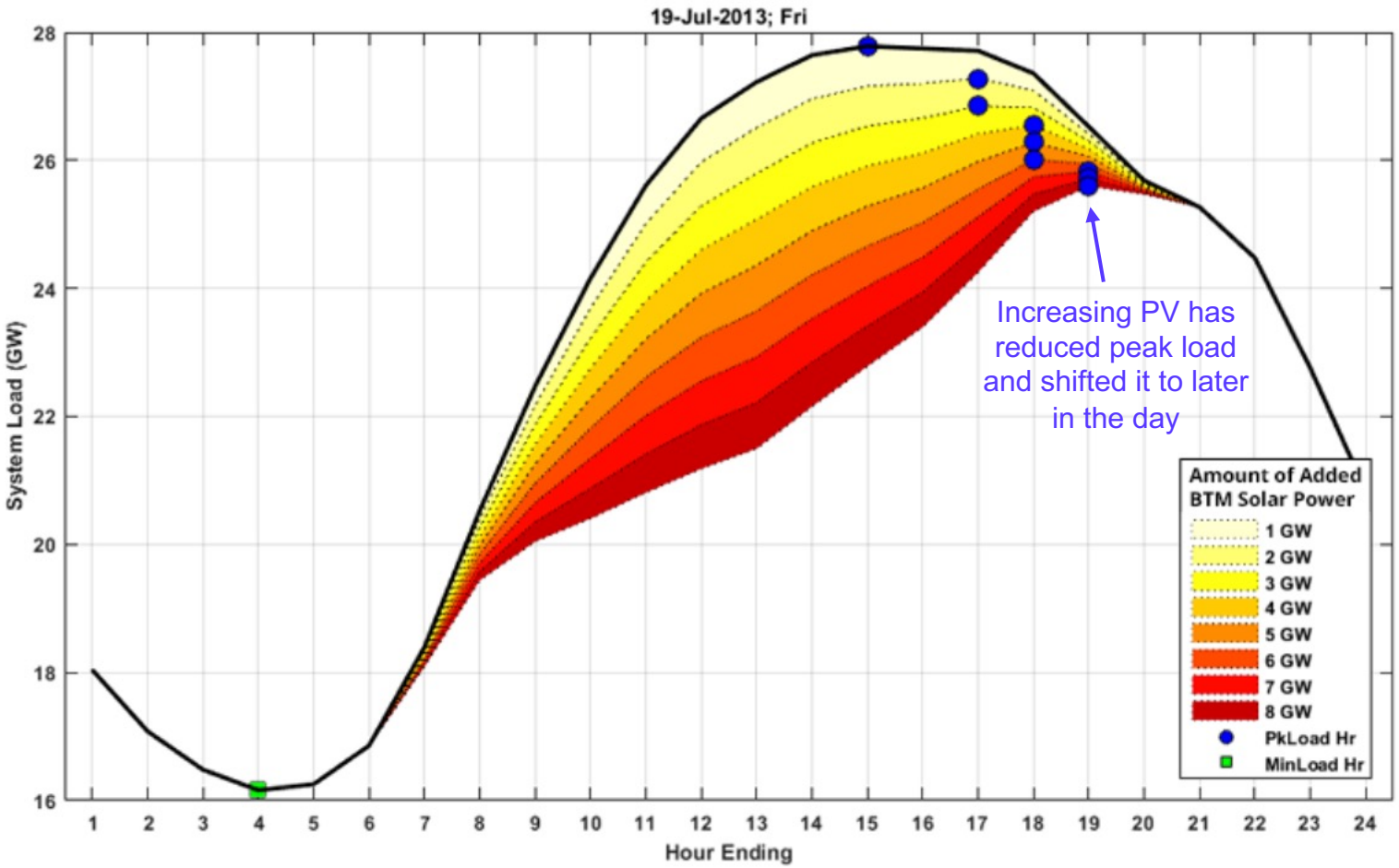
Decarbonization will require a LOT of clean, flexible resources

Summer comprises the highest electricity use in New England, largely because of air conditioning.

PV clearly helps “shave the peak” when the peak falls during daylight hours.

Because greater amounts of PV will shift the timing of peak demand for grid electricity to later in the afternoon or evening, PV’s ability to reduce peak demand will diminish over time.

Summer Load Profile with Increasing Behind-the-Meter Solar Power



Source: ISO New England

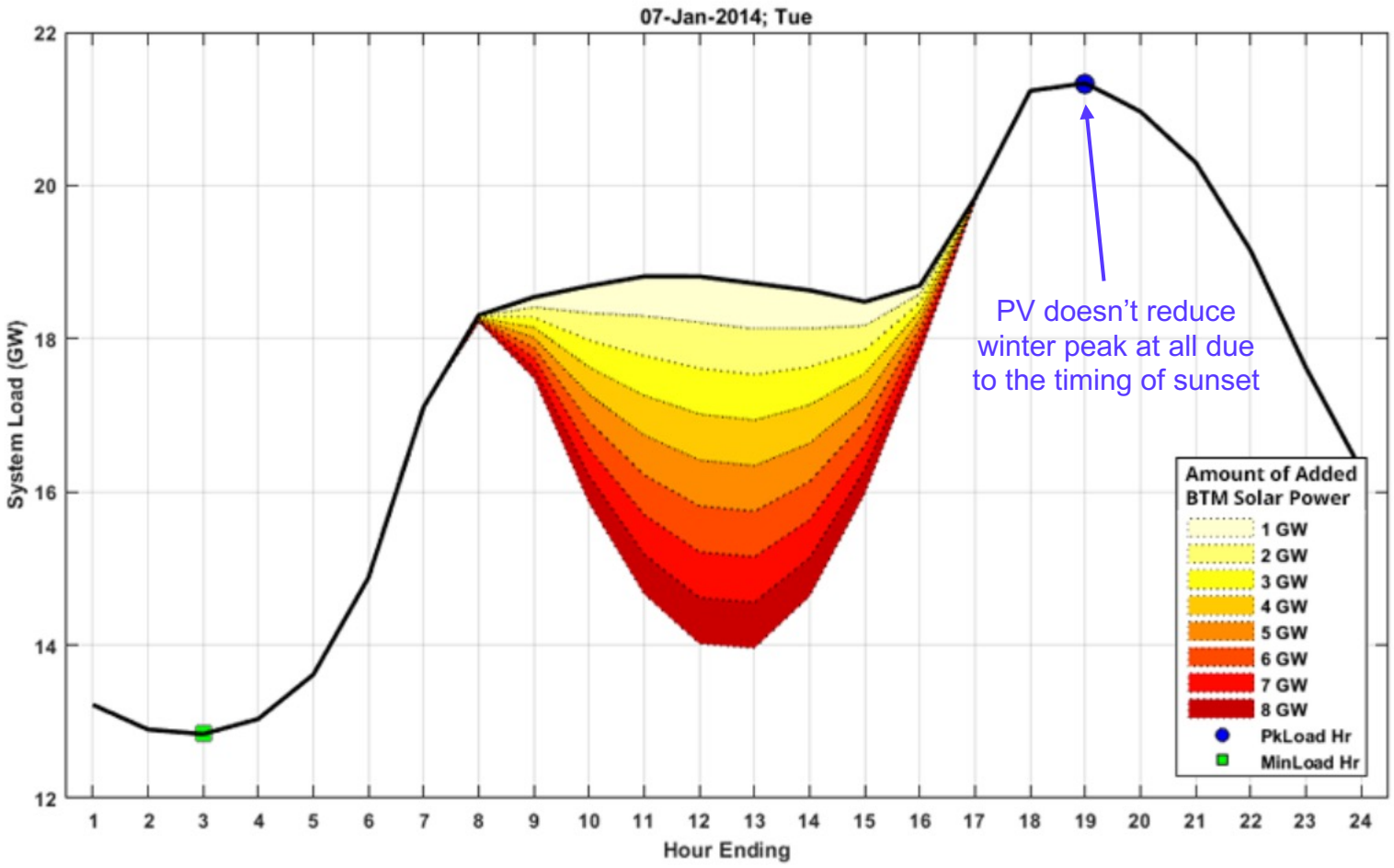
Decarbonization will require a LOT of clean, flexible resources

Winter has the second highest electricity use in New England.

Load reductions from PV can be significant during midday hours on sunny winter days.

As more PV is installed, the steeper curves of changing demand will increase the need for power resources with the operational flexibility to quickly ramp output up or down.

Winter Load Profile with Increasing Behind-the-Meter Solar Power



Source: ISO New England

Current siloed approach is unsustainable

Evolution is necessary to decarbonize as competitively and reliably as possible

Procurement Mechanism	Shortcoming
ISO-NE Forward Capacity Market	Chooses least-cost resource, even if inflexible fossil plant from the 1960s with minimal going forward costs. No accounting for decarbonization.
Clean Energy Procurements	Treats all MWh the same, regardless of when or where they are produced, and how much they contribute to decarbonization or reliability. Aside from MA Clean Peak and MA Connected Solutions, limited procurements for flexibility for resources such as DR, storage, EVSE

Three principles for achieving competitive, reliable decarbonization

1

Enable state and customer choice for clean energy **and capacity**; break the silo between the two procurements

2

Leverage regional competition and locational price signals to reduce combined costs for capacity and clean energy and to maintain and enhance reliability

3

Send price signals for clean, flexible, resources needed for reliability to balance intermittents and to meet GHG goals

Recommendations for competitive, reliable decarbonization

Procurement Mechanism	Recommendation
ISO-NE Forward Capacity Market	1. Prioritize the procurement of flexible resources (e.g. flex capacity) and scrutinize value of fossil resources, not just clean resources 2. Allow consumers to purchase as much clean capacity as they want 3. ISO-NE should publish data to enable informed state/city/consumer clean energy procurements
Clean Energy Procurements	Better value resources based off avoided emissions and contributions to reliability

Value the resource that can reliably deliver on a cold winter night and displace inefficient fossil

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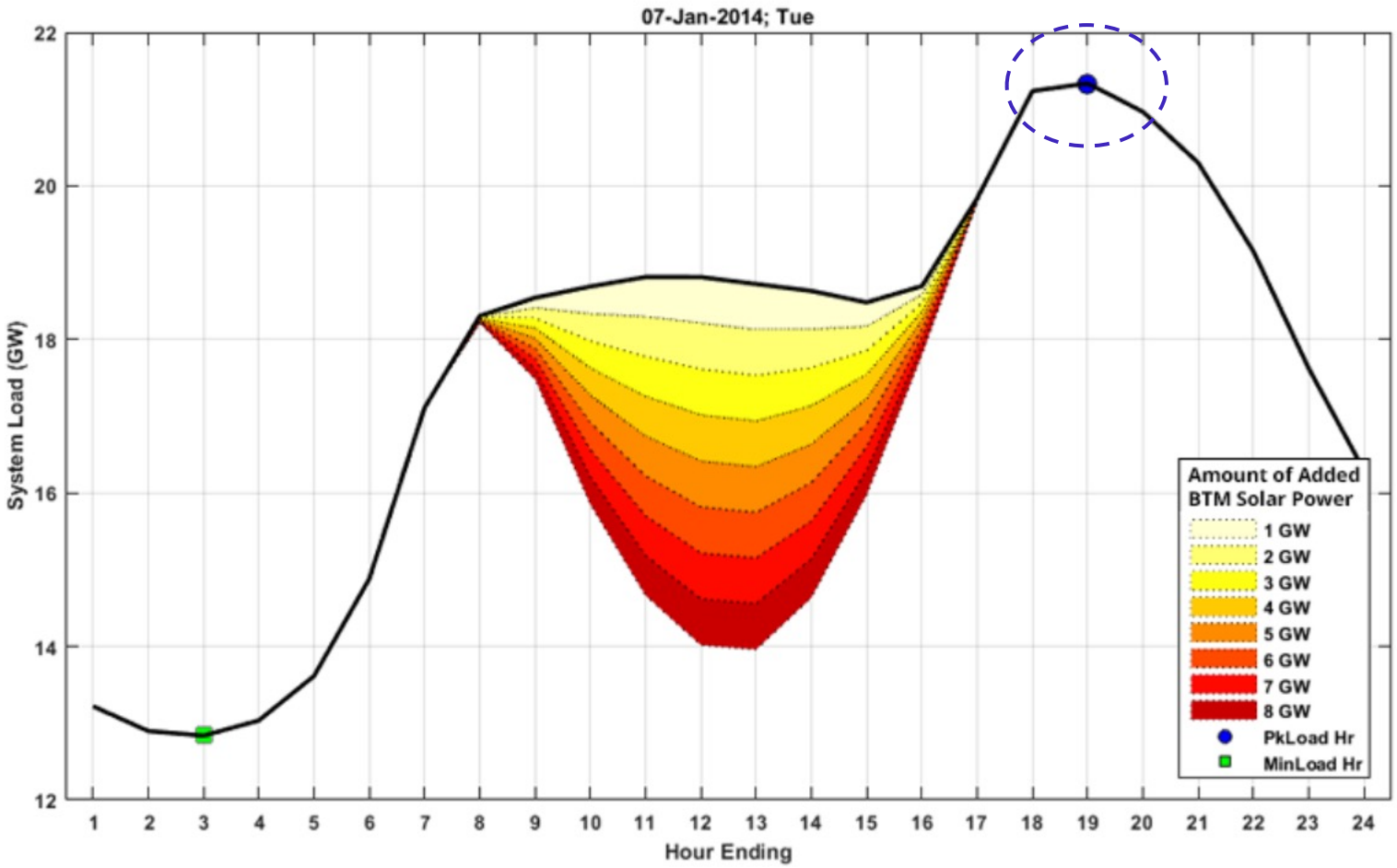
Winter Load Profile with Increasing Behind-the-Meter Solar Power



Source: ISO New England

Brattle's ICCM offers a potential solution

What is an "Integrated Clean Capacity Market"?

A centralized, three-year forward market for procuring capacity and clean energy needs.

Demand

- **Capacity:** ISO-NE establishes the quantity of capacity need (mandatory)
- **Clean Energy:** States & customers establish demand for unbundled clean energy attribute credits (CEACs)

Co-Optimized Auction Clearing

- Broad regional market
- Three-year forward auction
- Co-optimized procurement of unbundled capacity and CEACs
- 7-12 year price lock-in for new

Supply

- All resources can compete
- Fossil resources can sell only capacity
- Clean resources can sell both capacity and CEACs

Source: Brattle

Brattle's ICCM offers a potential solution

Design Element	Resource Adequacy Objectives	Clean Electricity Objectives
Who Sets Demand?	• **RTO**	• **State policymakers** • **Voluntary buyers** (retailers, companies)
Product Definition	• Unforced capacity (UCAP MW) • Keep locational specificity (as today) • Accurate accounting of capacity needs and values of resource types	• Buyer selects which product to buy: state-defined RECs, state-defined ZECs, or regionally-defined clean energy attribute credits (CEACs) • ***Consider:*** CEAC accreditation tied to carbon abatement value
Supply Eligibility	• All clean and fossil resources are eligible • ELCC-based accounting for resource-neutral capacity values (by location, season, and flexibility)	• State REC/ZEC: utilize current eligibility rules from each state • Regional CEAC: PJM-wide product with uniform eligibility (likely renewable, nuclear, and storage charged from clean energy)
Quantity to Procure	• Quantity needed to support 1-in-10 • Based on advanced reliability modeling that considers emerging flexibility needs in the clean grid • ***Consider:*** State option to impose a maximum on the share of capacity procured from fossil plants	• States and customers decide the quantity needed • Pre-existing contracts enabled as self-supply • In vertically integrated or other Fixed Resource Requirement states, the resource mix is approved by the state and not subject to ICCM
Willingness to Pay for Each Product	• Sloping demand curves for each system-wide and locational capacity requirement • ***Consider:*** Separate demand curves for summer/winter needs and "flexible" capacity needs	• States submit sloping demand curves for state-mandated clean energy demand • Voluntary buyers can submit price-quantity pairs to exceed state mandates

Source: Brattle

Innovations in REC procurements

Data-driven renewable energy procurements can better account for carbon abatement

Access to greater data allows organizations to make **more informed decisions** to lower their carbon emissions

Greater decarbonization comes from **truly matching – hour for hour –** energy use to renewable sources

Integrating hourly data will help users account for renewable energy use **more accurately and reliably** by ensuring each hour of operation is matched to actual renewable energy produced at the same time

In a first step toward establishing these markets and this process, M-RETS worked with Google to complete the first hourly REC transaction in early 2021.

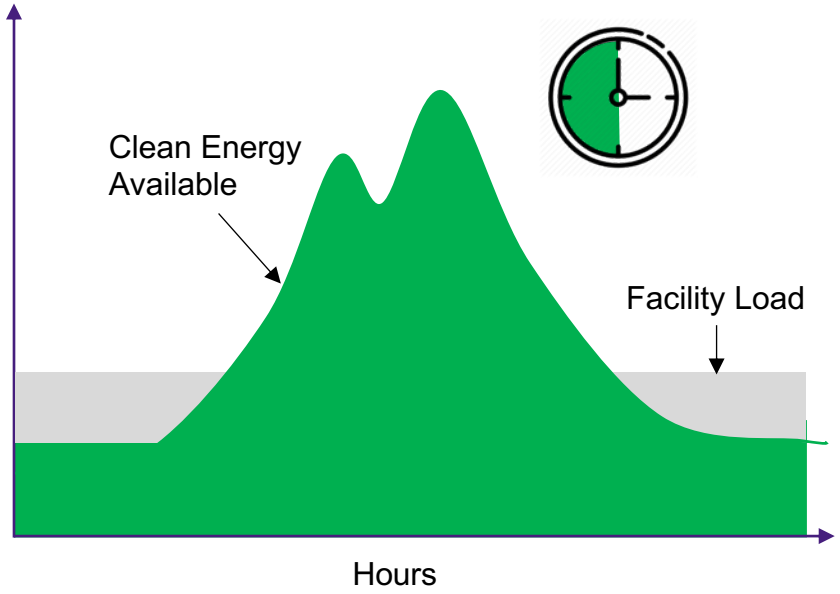
Source: M-RETS

Evolution of clean energy targets

Data-driven REC purchasing strategy allows for 24/7 carbon tracking

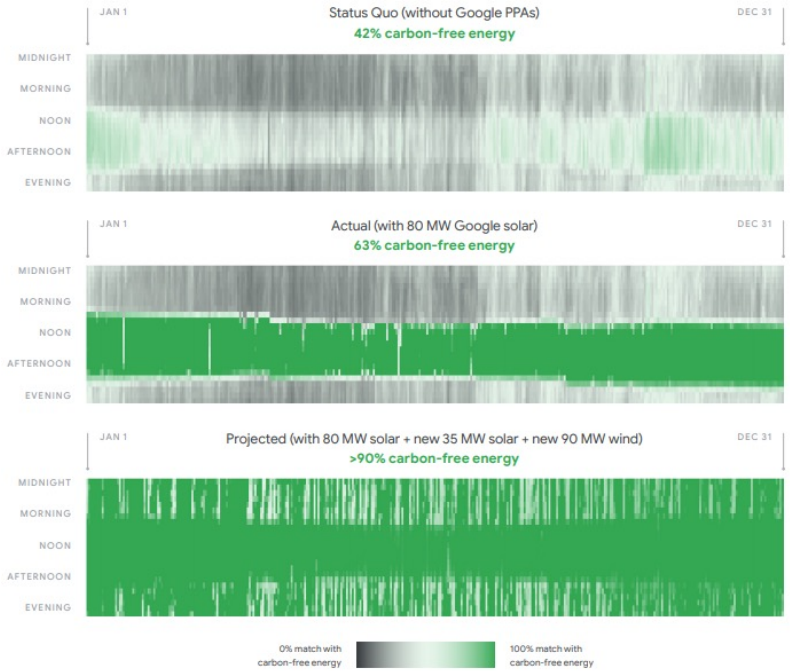
100% Renewable Energy

Organizations committing to 100% renewable purchases on an annual basis (by matching annual consumption with annual REC purchases) have **hourly exposure to fossil-fuel generation** due to the **intermittency of renewable energy resources**



24/7 Carbon Free Energy

By tracking hourly energy consumption and renewable energy asset production, today's leaders are implementing REC purchasing strategies to match consumption with carbon-free energy every hour of their operations



https://www.gstatic.com/gumdrop/sustainability/247-carbon-free-energy.pdf

PJM CITIES & COMMUNITIES COALITION (PJMCCC)

LEVERAGING CITY ACTION TO ADVANCE CLEAN ENERGY IN THE PJM REGION

Green Ribbon Commission
July 28, 2021

WHAT IS PJMCCC?

The PJM Cities and Communities Coalition (PJMCCC) is an emerging coalition of 10 chartered members and additional observing cities dedicated to pursuing solutions to climate change and reducing carbon emissions. Its members represent over 9% of customers in the PJM territory.

Philadelphia, PA

100% carbon-free electricity by 2050

Pittsburgh, PA

100% renewable energy use by 2030, 80% GHG reduction by 2050

Newark, NJ

20% reduction in municipal energy consumption by 2025

Washington, DC

50% Renewable Portfolio Standard (RPS) by 2043, 100% by 2050

Cincinnati, OH

100% renewable energy for government by 2035

Richmond, VA

45% GHG reduction by 2030 and net zero emissions by 2050

Alexandria, VA

100% renewable energy in city-owned facilities by 2020

Chicago, IL

100% renewable energy community-wide by 2035

Charlottesville, VA

45% emissions reductions by 2030, carbon neutrality by 2050

MISSION

The PJM Cities & Communities Coalition has been launched to coordinate the efforts of cities in the PJM territory that are interested in **removing and preventing barriers to decarbonization solutions in their regional wholesale electricity market.**

The Coalition provides a platform for members to:

- Educate and build capacity on these issues
- Form partnerships to collaborate with similarly aligned organizations and
- Create opportunities for members to work collectively to drive decarbonization within the PJM region.

Leading Clean Energy Cities in the PJM Territory

PJMCCC

STRUCTURE

SHARED GOVERNANCE

- Organized under a **Charter Agreement** being adopted across city members
- Strategy and structure are guided by a **Steering Committee**
- Education and policy action driven by a **Policy Committee**
- **Annual Meeting** used to set agenda and priority areas

TIERED MEMBERSHIP

- **Dual Members Cities Tier***: Cities who are participating members of the coalition but also members of the PJM stakeholder process
- **Participating Cities Tier**: Cities playing an active role in decision making, may participate in standing committees or working groups, sign on to public statements or other actions, and have access to educational materials
- **Observing Cities Tier**: Cities with a non-active role but may join public action and have access to education

PJMCCC VALUE PROPOSITION

PJMCCC allows members to overcome engagement barriers by providing education on relevant issues, connections and partnerships with non-city or community stakeholders for opportunities for organized or joint action.

- Wholesale market level issues are vast and complex
- Traditionally stakeholders with technical support, capacity and funding can meaningfully track and participate
- For wholesale markets to continue evolving, a wider set of stakeholders are needed to participate in this space and drive planning towards clean energy
- A shared voice among cities and communities amplifies the impact of actions

PJMCCC

PJMCCC ENGAGEMENT AND OUTCOMES

- PJMCCC has engaged along all pathways: public, FERC, RTO, and NGOs

- The engagement has made PJM more aware of city needs, established city-RTO relationships, and built city capacity to work at a regional level.

- Working as a Coalition provides a robust platform for engagement - sharing knowledge/education, creating relationships with other organizations, and combining the cities into a unified voice.

PJMCCC

PUBLIC STATEMENTS AND LEADERSHIP:
Letter to PJM Board of Managers

Comments from
PJM Cities Coalition
on
Leadership Transition at PJM

July 24, 2019

The PJM Board of Managers
C/O Neil Smith, Board Member
PJM Interconnection LLC
2750 Monroe Boulevard
Audubon, Pennsylvania 19408

Dear PJM Board of Managers,

We are writing you today, as leaders of cities across the PJM Interconnection territory and members of the informal PJM Cities Coalition, to strongly support and encourage the consideration of clean energy policy as the Board prepares to choose a new Chief Executive Officer. The PJM Cities Coalition is a group of 18 U.S. cities dedicated to pursuing solutions to global warming and who collectively represent more than 70 million Americans. We are also joined in support by additional local governments who are not currently part of our coalition, but also view this leadership transition as an opportunity to support clean energy development.

The letter allowed PJM CCC to publicly highlight the importance of selecting a CEO that would prioritize keeping markets open to clean energy, governance, transparency, and other city priorities.

PJMCCC

PUBLIC STATEMENTS AND LEADERSHIP:
Storage Policy Statement

- PJMCCC supports updated market rules and operational changes that support deployment of energy storage.

- Our policy statement acknowledging that cities have a specific role in supporting storage because of its ability to support and advance renewable energy integration, resilience and equity

PJMCCC

Issued November 18, 2020

PJM CCC Policy Statement on the Benefits of Reducing Barriers to Energy Storage in the PJM Region

The PJM Cities and Communities Coalition (PJM CCC) calls for updated market rules and operational changes within the PJM wholesale market that support deployment of energy storage technologies. Energy storage is an essential underpinning for a resilient grid that relies on clean energy resources, which is integral to the mission of PJM CCC. Further, energy storage represents a tool for these cities to use in their efforts to address environmental injustices faced by frontline communities in terms of air quality. PJM should support increased storage deployment by increasing revenue available to storage resources participating in the PJM wholesale capacity markets, which its recent Effective Load Carrying Capability (ELCC) filing to the FERC intends to do. Energy storage is critical to meeting PJM CCC members' climate, clean energy, resilience, and equity goals and aligns with PJM CCC's collective goal to reduce barriers to low-carbon solutions.

The statement allowed our members to communicate the connections between market rules and city priorities.

PJMCCC

ENGAGEMENT WITH FERC:
Public Statements and Attendance at FERC Events

- Public statements (verbal and written) to FERC regarding the creation of the Office of Public Participation (OPP)
- PJMCCC members have attended FERC technical conferences
- City participation in public events has helped our members understand future changes at the FERC level, like potential carbon pricing, and the range of options considered

Engagement in public events provide our members with education and awareness of what future action FERC might take.

PJMCCC

ENGAGEMENT WITH AN RTO (NONMEMBER):
Direct Engagement/Public Events

- In 2020, PJMCCC established direct communication with PJM's State Policy and Member Services department
- The engagement allowed the PJM to better understand the Coalition's mission and recognize them as a stakeholder group with specific interests
- The Coalition also had direct conversations with staff to discuss the impacts of the expanded Minimum Offer Price Rule (MOPR) on city purchases.

Building a direct line of communication has built relationships between our members and their RTO and new forum to address wholesale market impacts on city goals.

PJMCCC

TAKE-AWAYS AND OUTCOMES

- Cities and communities have a unique lever as both large electricity users and public sector entities.
- Our unified voice advocating for decarbonization in our regional electricity market is stronger than individual ones.
- Building capacity through knowledge sharing enables more robust participation in a complex field.
- Be flexible, patient, and establish a charter/mission early

PJMCCC

THANK YOU

PJMCCC

Thank You! Coming Up:

Date TBA – GRCx *Climate Change Past, Present, and Future: How Different Perspectives on Time Affect our Responses to Climate Change*

GRCx

GREEN RIBBON COMMISSION
Climate Action Exchange