

A complex financial chart with multiple data series, including candlesticks, moving averages, and volume bars, set against a dark blue background with a grid. The chart is partially obscured by a large purple triangle on the left side of the slide.

# Clean Energy Outlook: New York & New England

June 2019

*Presented at 2019 REMI Amherst Economic  
Analysis Conference*

*by Amrita Bhattacharyya*

# Discussion Topics for Today

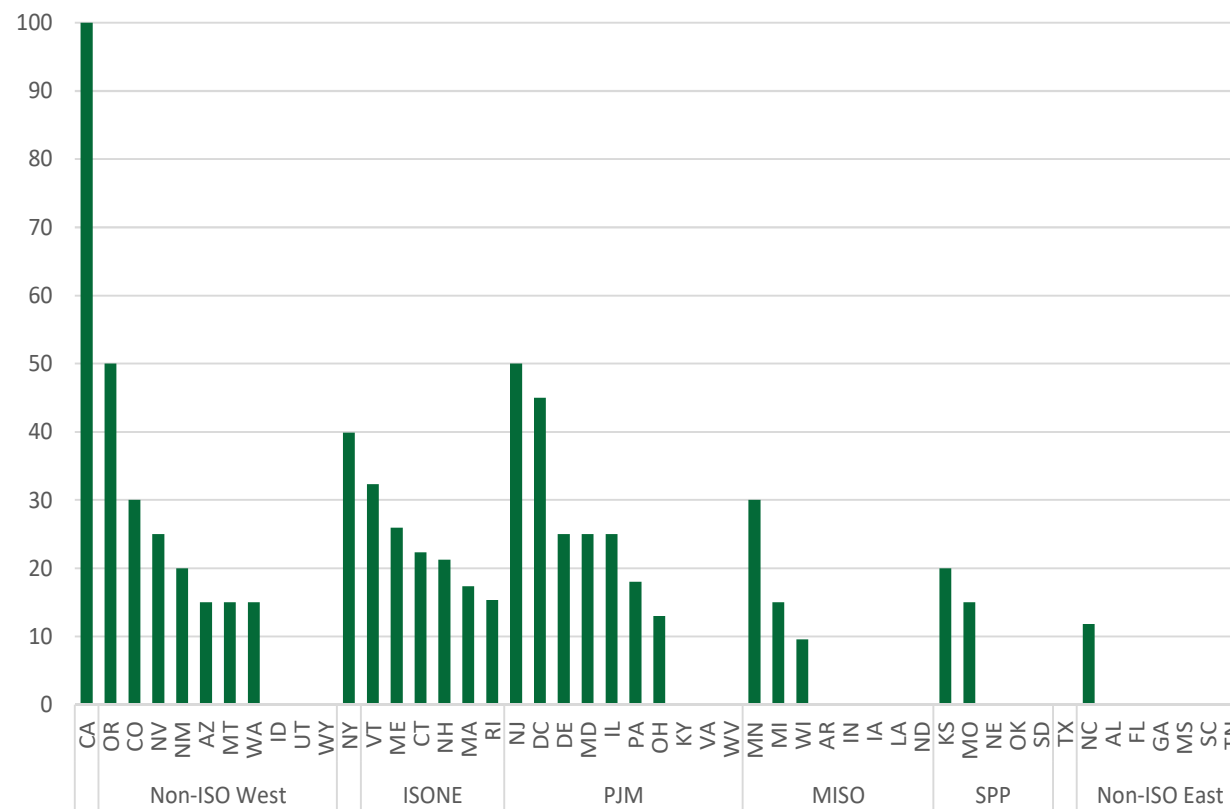
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- > Introduction
- > National Overview -- Clean Energy
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- > Power Market Outlook for NYISO and ISO-NE
- > Sensitivity Cases



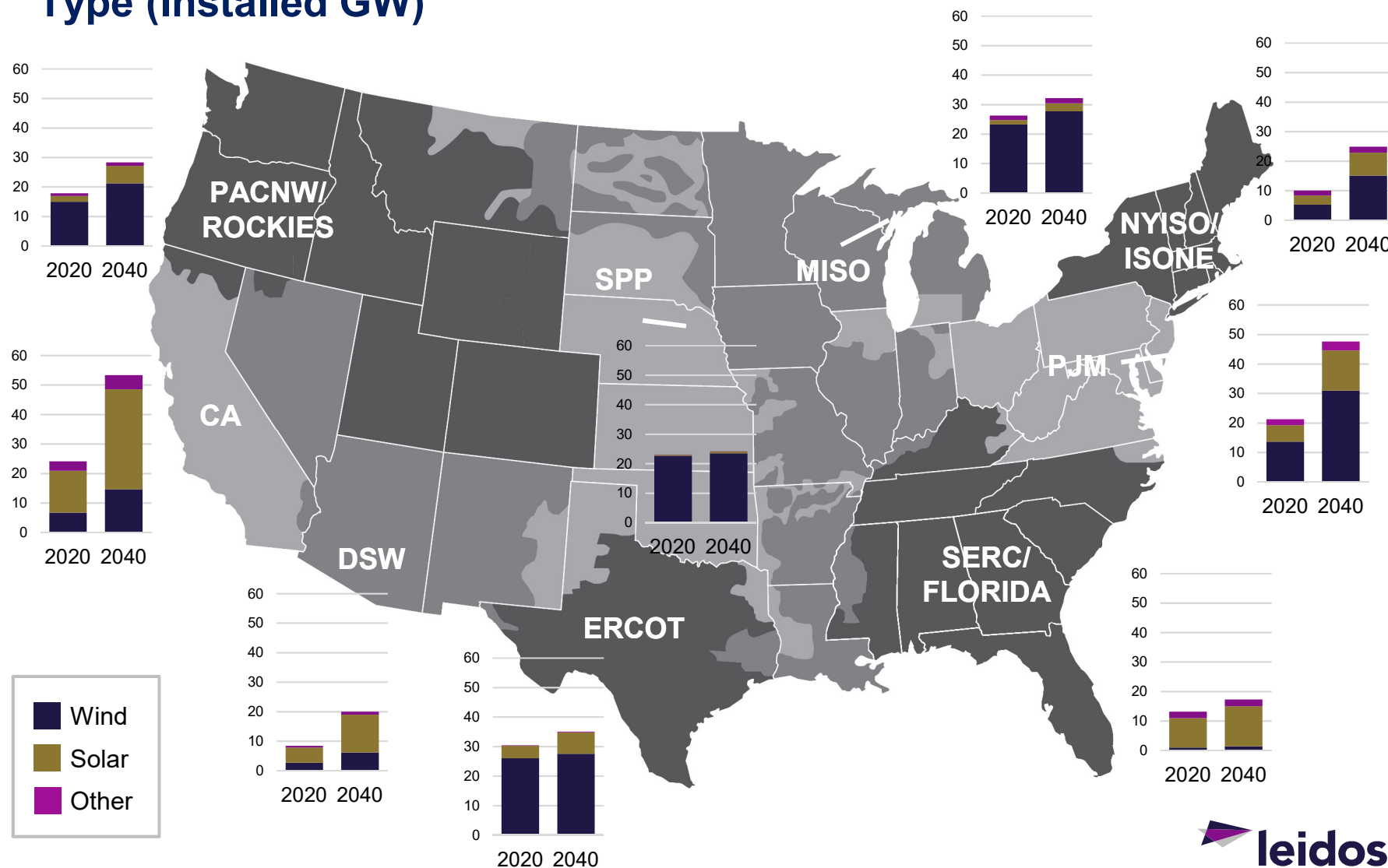
# **Clean Energy: National Overview**

# Current Renewable Portfolio Standards (RPS) by State

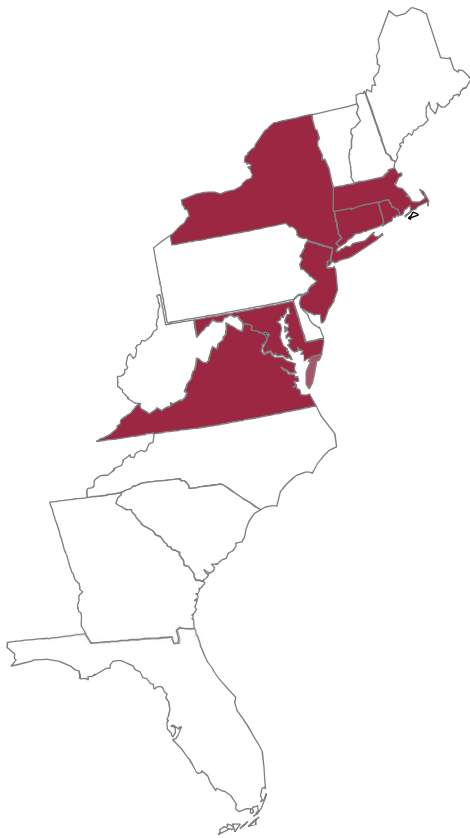


State	Year	Target (%)
AZ	2025	15
CA	2045	100
CT	2030	40
CO	2032	50
DC	2032	50
DE	2026	25
HI	2045	100
IL	2026	25
MA	2030	35
MD	2020	25
ME	2017	40
MI	2021	15
MN	2025	26.5
MO	2021	15
MT	2015	15
NC	2021	12.5
NH	2025	25.2
NJ	2030	50
NM	2020	20
NV	2025	25
NY	2030	50
OH	2026	12.5
OR	2040	50
PA	2021	18
RI	2035	38.5

# Leidos Q2-2019 Base Case Forecast: Total Renewables by Fuel Type (Installed GW)



## MA, NY, NJ Competing to be U.S. Off-Shore Wind Development Leaders



State	Target (MW)	Time Goal
MA	3,200	2035
RI	400	
CT	200	
NY	2,400	2030
NJ	3,500	2030
MD	368	
VA	12	

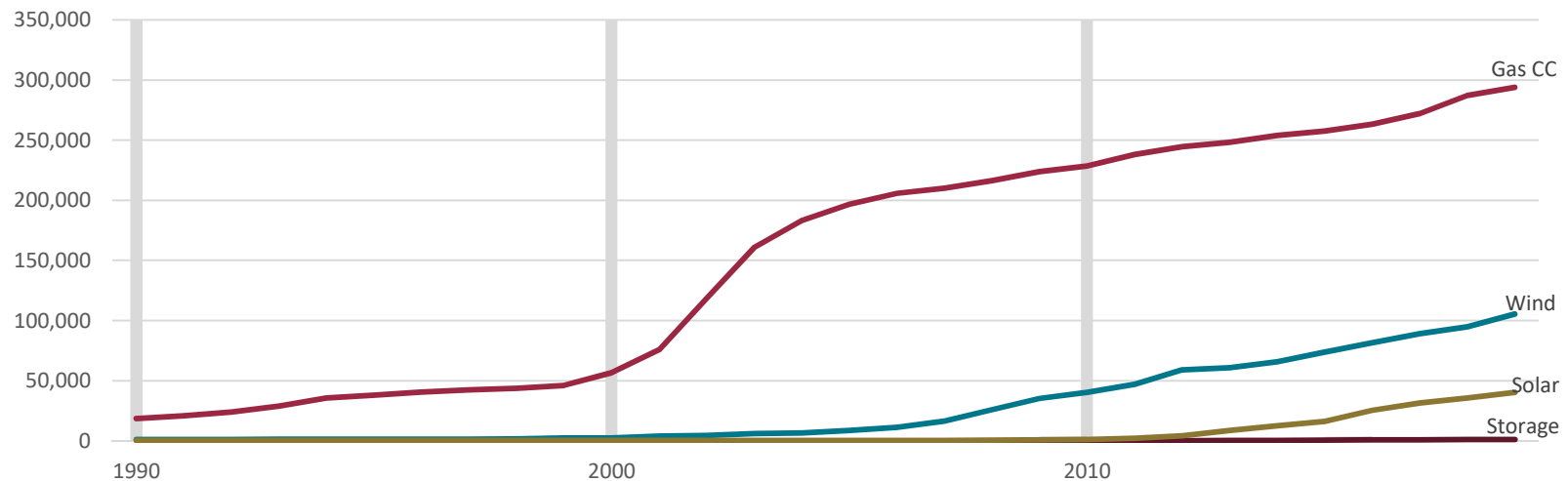
- > U.S. DOE estimates project pipeline to be 25GW
- > Earliest target online dates are ~2022
- > Transmission and support infrastructure build out pending

## State policy current drives storage development

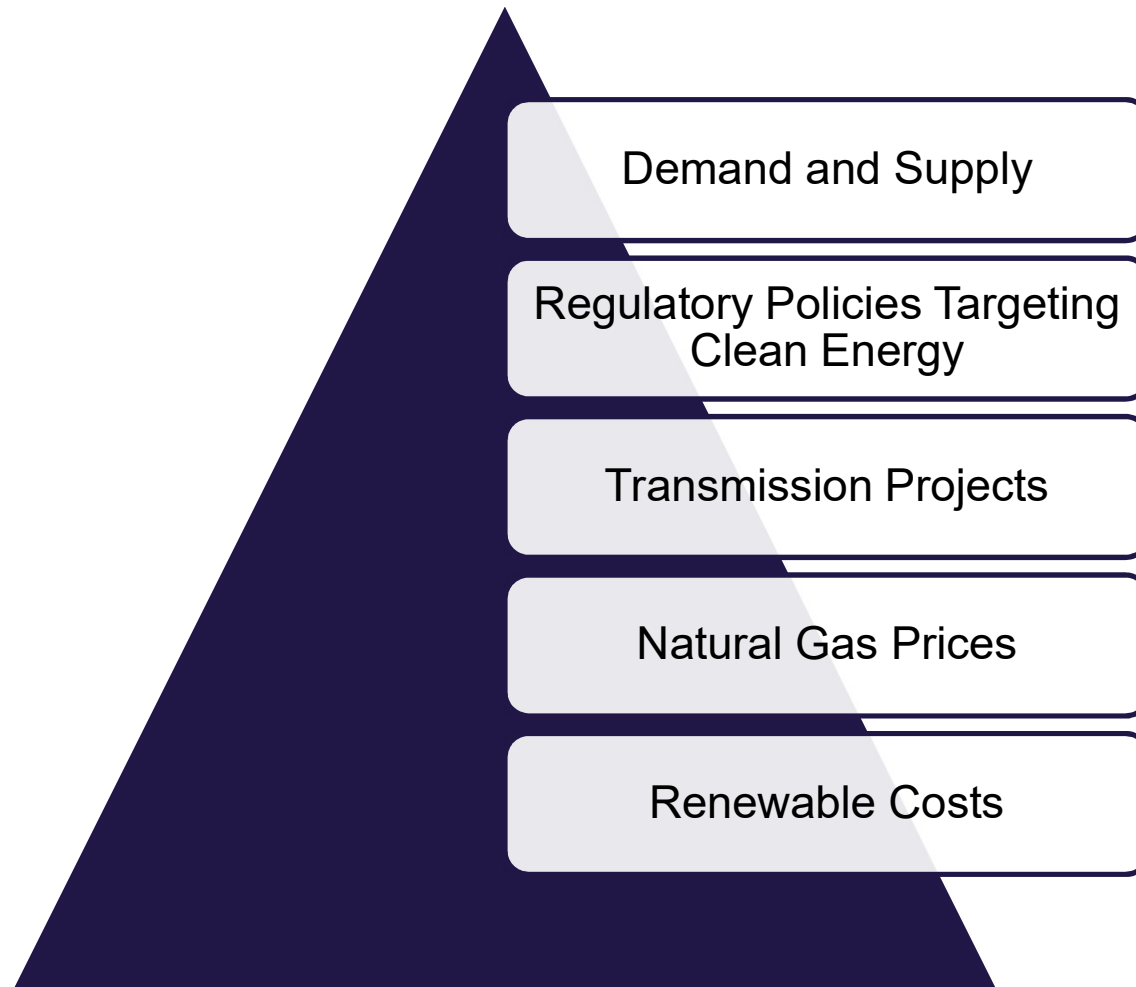
State	Target	Time Goal
CA	1.3 GW	2020
NJ	2.0 GW	2030
NY	1.5 GW	2025
MA	1,000 (MWh)	2025

- > U.S. Energy Storage Association estimates 11 GW of storage to be installed in U.S. by 2023

Cumulative US Installed Capacity by Fuel Type (MW)



# Major Uncertainties for Future Market Outcomes

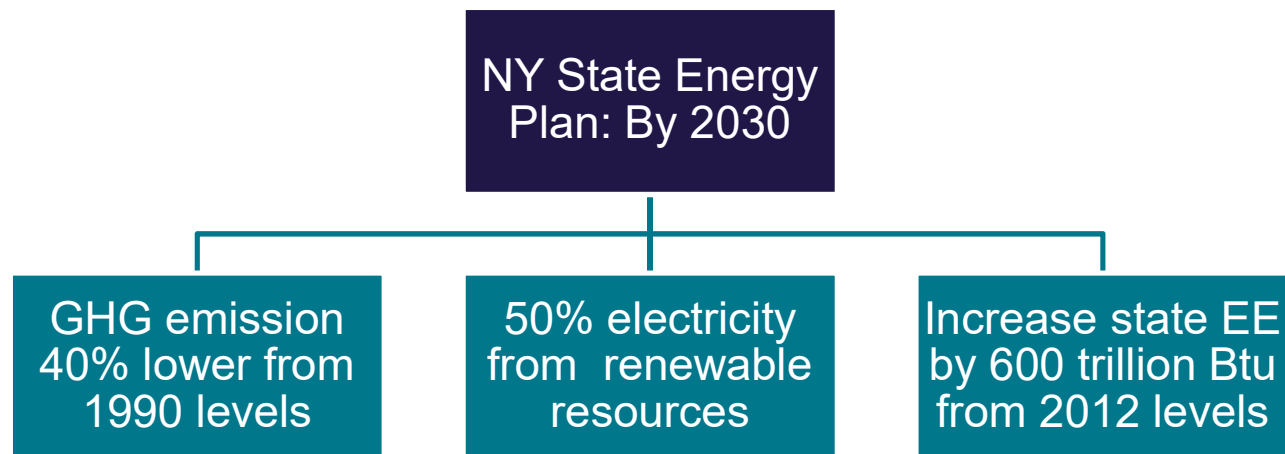






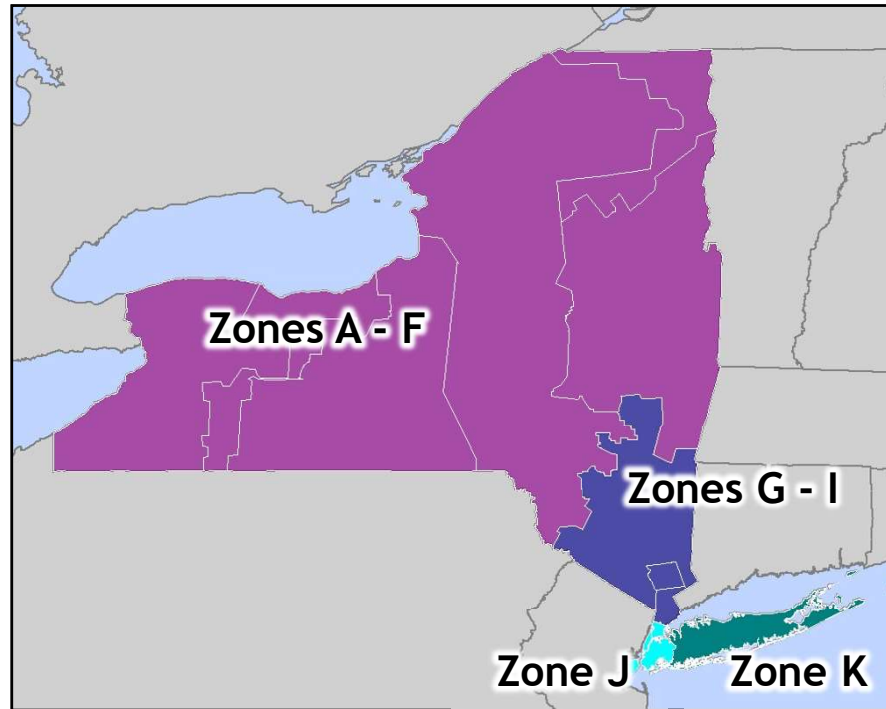
# **NYISO Policy Initiatives**

## Governor Cuomo's Reforming Energy Vision For NY



- > Various clean energy initiatives underway: CES, off-shore wind, CO<sub>2</sub> pricing, transmission upgrades, nuclear subsidies, other initiatives
- > As part of Green New Deal announced, new offshore wind goals of 9 GW by 2035, 3 GW of storage, and 70 percent clean energy by 2040

## NYISO Load Zones



- Zone J and K represent about 50 percent of NYISO load; about 30 percent of capacity
- About 90 percent of energy produced upstate is already from carbon-free resources
- About 70 percent of energy produced downstate comes from fossil fuel resources

# Clean Energy Standard: 50% by 2030

## Tier I: RES

- New renewables
- 2018 REC \$17.01/MWh
- 2018 ACP \$18.71/MWh
- 2019 target for LSEs: 2% of load

## Tier II: RES

- Some existing renewables
- Maintenance contract
- Case by case

## Tier III: ZEC

- NYSERDA purchase ZEC from upstate nuclear plants till March 21, 2029
- LSEs buy ZEC from NYSERDA
- 2018 ZEC price \$17.48/MWh

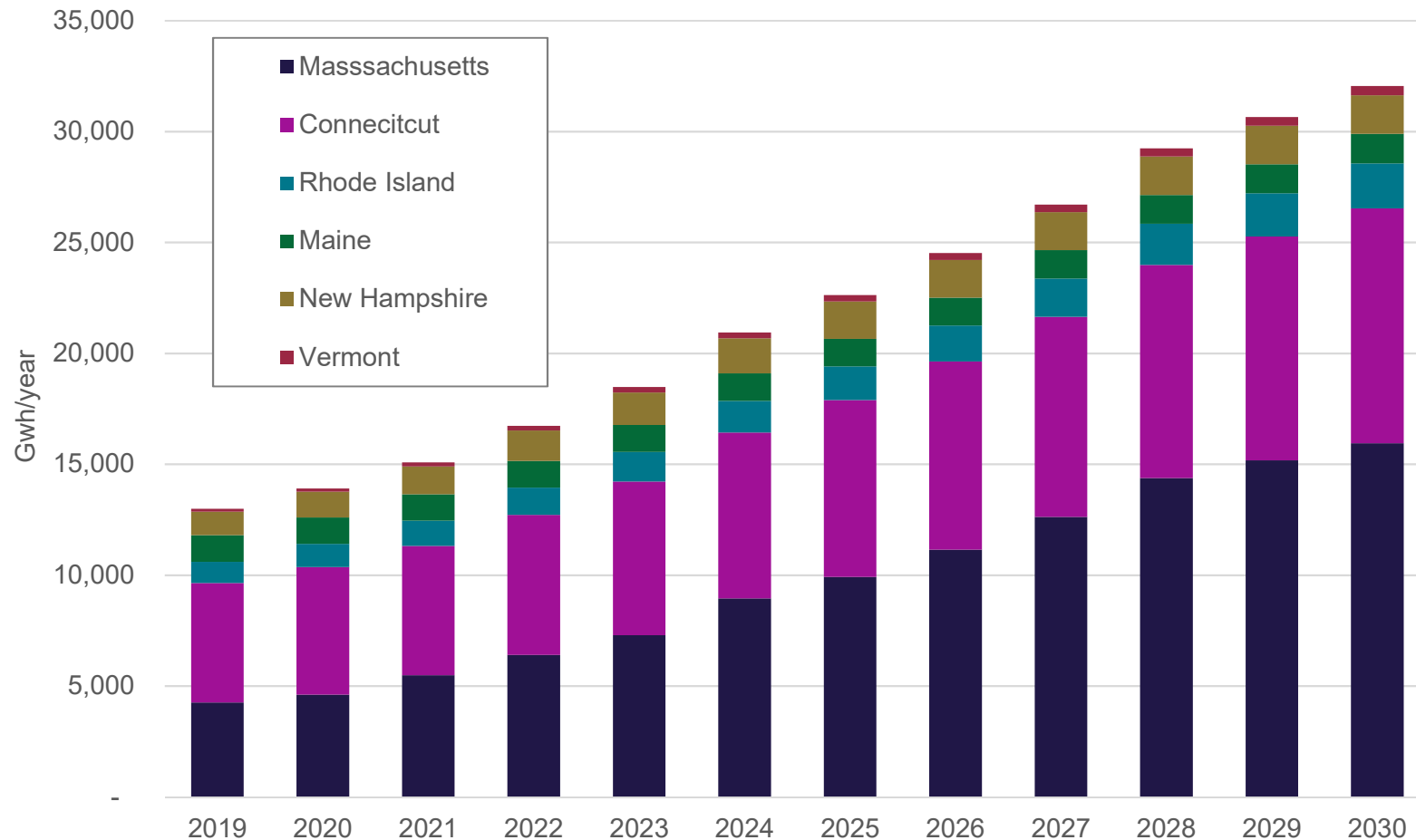
## NY Regulatory Policies: Other Initiatives

- > Discussion of CO<sub>2</sub> pricing in NY based on social cost of carbon is ongoing but uncertain; earliest implementation in 2022
  - > CO<sub>2</sub> price impact: \$50/ton CO<sub>2</sub> price increases LMP by ~ \$22/MWh
  - > Electric sector presents only 17 percent of CO<sub>2</sub> emission in NY
- > Additional CO<sub>2</sub> and NOx regulations in motion targeting coal and older oil/gas peaking plants
  - > State-wide environmental regulations (NOx, CO<sub>2</sub>) by DEC targeted towards inefficient peaking units (~3.3 GW) and coal (~900 MW)
  - > Somerset and Cayuga to retire by 2020; coal-free NY excluding imports
  - > NYC residual oil elimination by 2025 (~2.9 GW in-city generators); study on potential for replacing in-city gas-fired generation with battery storage



# **New England Policy Initiatives**

# Status of Renewable & Clean Energy in New England



# Status of Renewable & Clean Energy in New England

- > Massachusetts
  - > Class I RPS target 35% by 2030
  - > GHG emission reduction program targeting power plants
  - > Offshore wind target recently doubled to 3,200 MW; Clean energy and off shore RFPs
- > Connecticut
  - > Class I RPS target 40% by 2030
  - > Clean Energy RFP; Zero Carbon Resources RFP
  - > Recent legislation approves up to 2,000 MW of offshore wind
- > Rhode Island
  - > RPS target 38.5% from new resources by 2035
- > New Hampshire
  - > Class I RPS target of 15% by 2025 and thereafter
- > Maine
  - > RPS requirement of 10% from new and 30% from existing
- > Vermont
  - > 1% by 2017, increasing to 10% by 2032



## MA – Global Warming Solutions Act

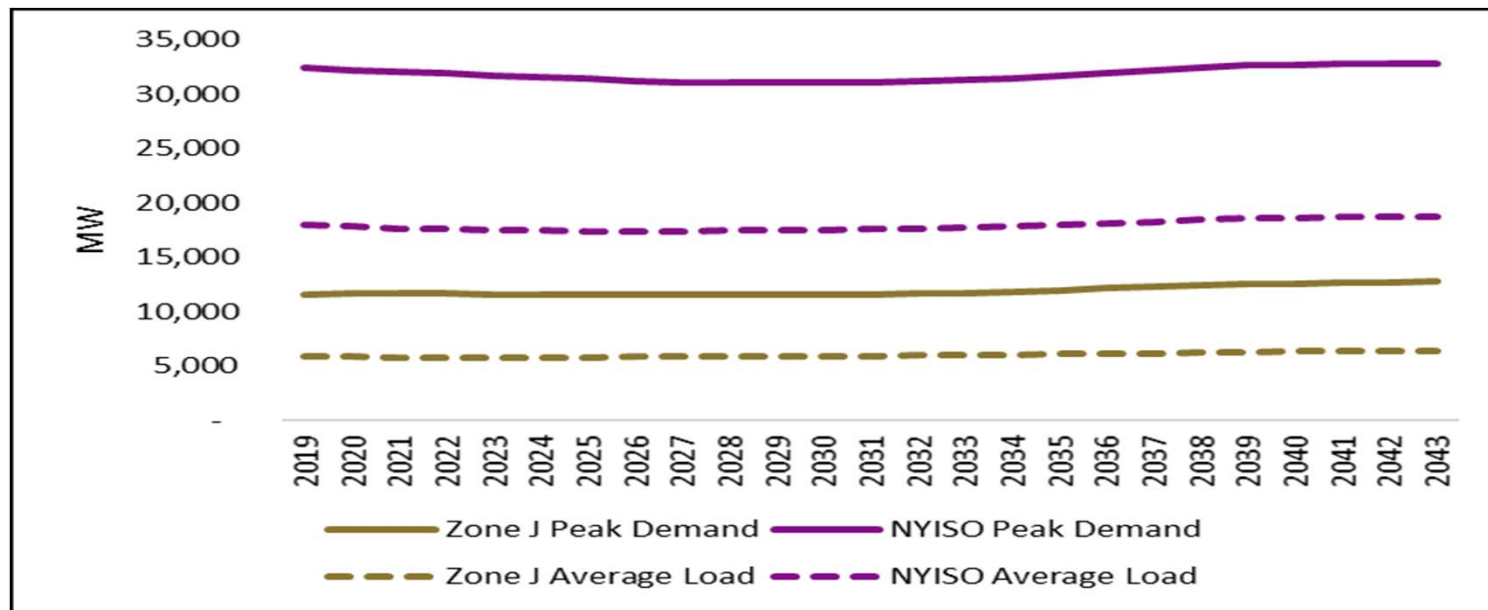
- > Signed into law in 2008
  - > Requires GHG reductions across a variety of sectors
    - > 10-25% below 1990 level by 2020
    - > 80% below 1990 levels by 2050
- > Prompted by a court ruling, regulations published by DEP in 2017
  - > Creates Clean Energy Standard for electricity sales
    - > Requires 16% in 2018, increasing 2% annually to 80% by 2050
    - > Defines “clean” as RPS-eligible or at least 50% cleaner than NG (e.g., nuclear, hydro, etc.)
  - > Creates a statewide CO<sub>2</sub> trading program for generators
    - > Declining limit on aggregate emissions from 21 fossil plants.
    - > From 8.96 million metric tons of CO<sub>2</sub> in 2018 down to 1.8 million metric tons by 2050.
    - > Allowance procured through trading and auction programs
    - > Challenged by generators – upheld by State Supreme Court in September 2018

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# **NYISO and ISO-NE Power Market Outlook**

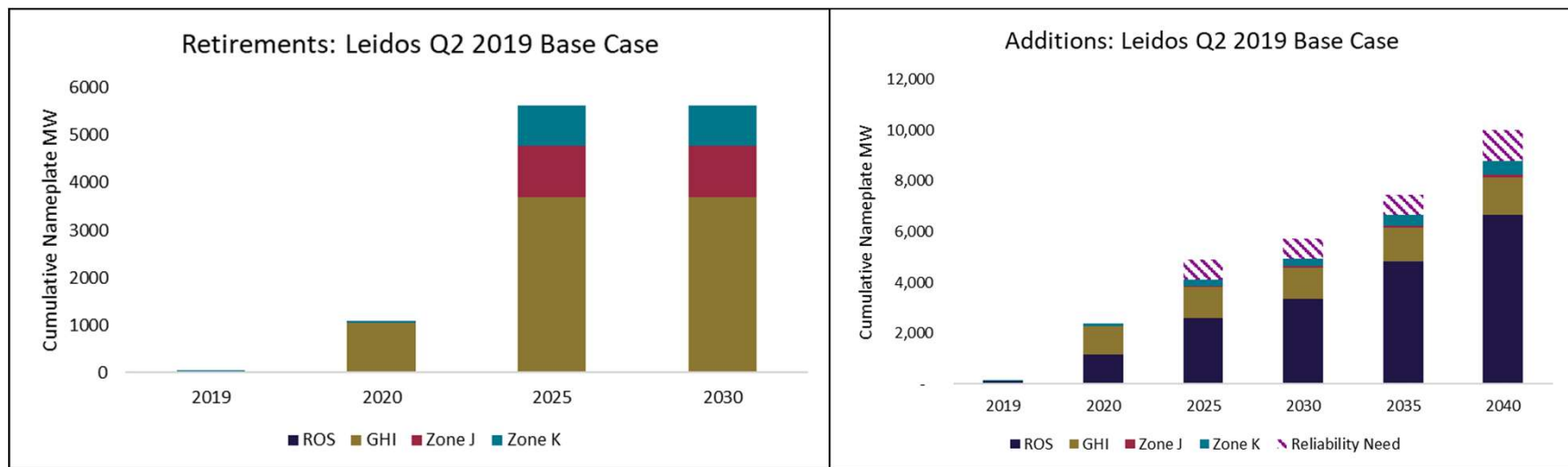
## Peak Demand Outlook Sluggish Due to EE and Behind-the-Meter Generation Penetration

- > Between 2019 and 2031, net peak demand falls by 1.3 GW from 32.4 GW to 31.1 GW
- > By 2030 about 400 MW demand is associated with EV
- > DR presents about 4 percent of summer peak demand



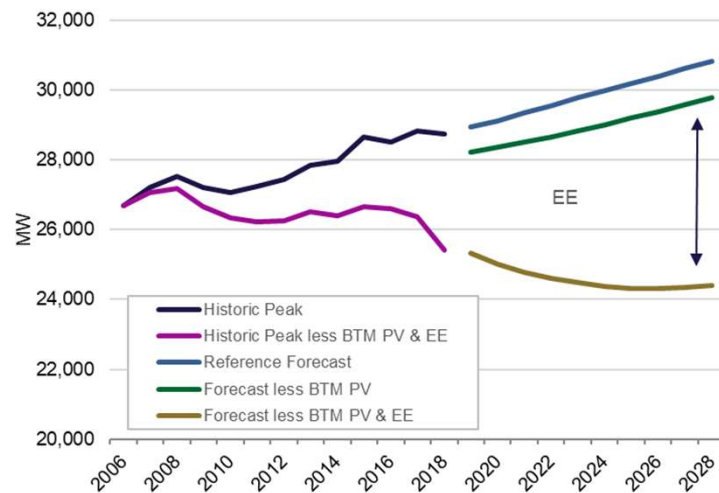
# Reserve Margin is Projected to Tighten as Fossil Fuel Capacity Retires: What Fills The Gap?

- > Planned
  - > New gas-fired CC builds ~ 1.7 GW (CVEC, CPV Valley) – relaxes supply-demand balance in near-term
  - > Firm planned capacity addition of about 3 GW since renewable capacity credit is low
  - > Indian Point nuclear retirement by 2021 ~ 2 GW; expected recovery of capacity value after that
- > Economic
  - > About 3.5 GW retirement of total 5.6 GW is projected as “economic”
  - > About 1.2 GW of projected generic CC addition

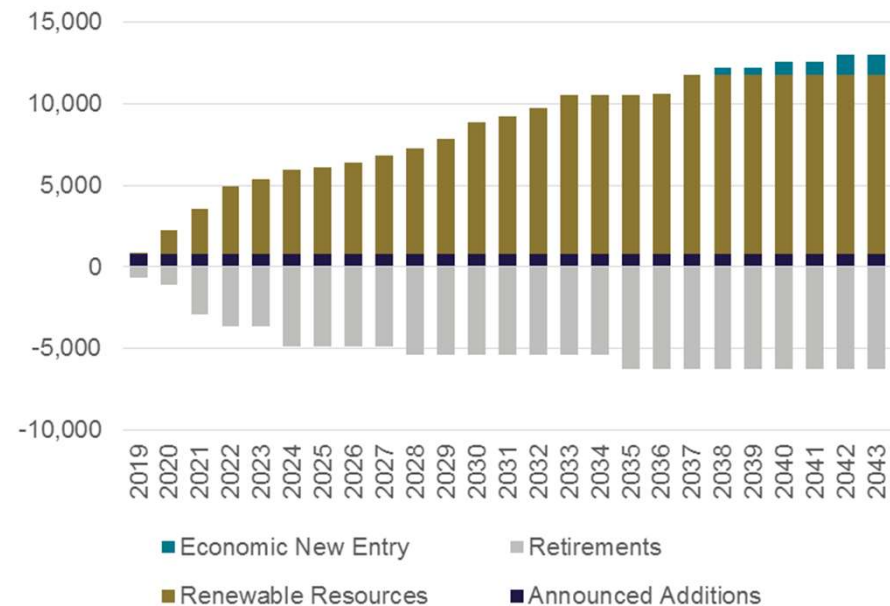


# ISO-NE Demand Supply Balance Tightens Closer To 15 Percent Target Despite Falling Demand

Net Peak Demand Forecast Continues To Decline



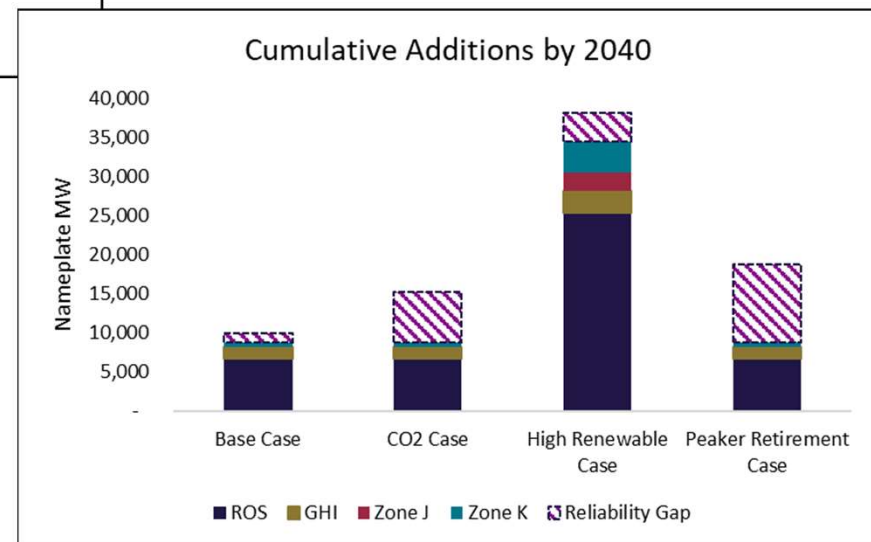
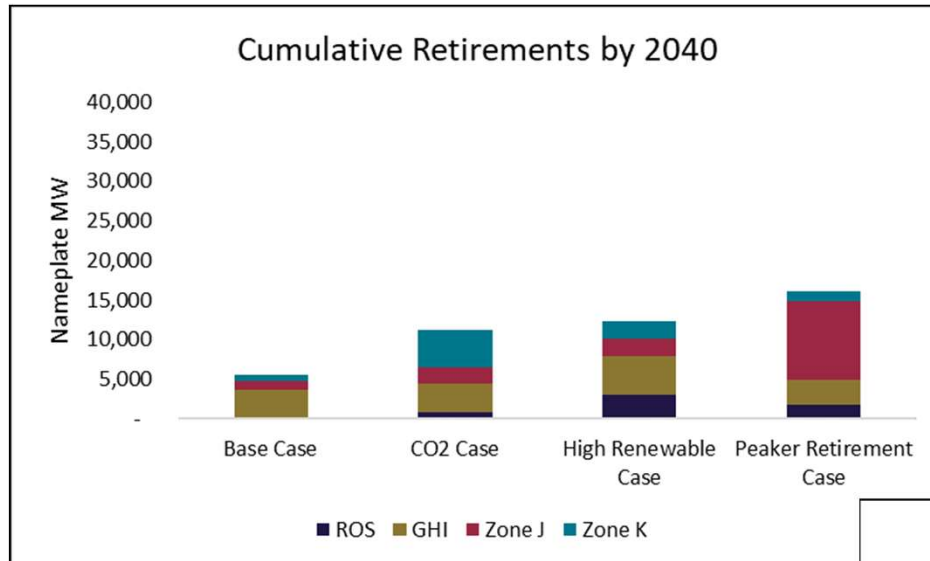
Cumulative Capacity Additions/Retirements (MW)



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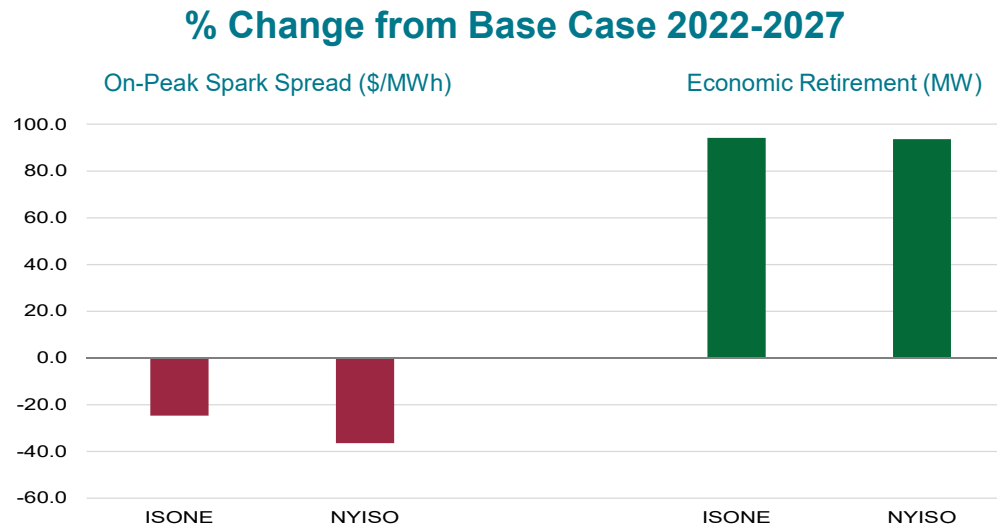
## **NYISO and ISO-NE Sensitivity Cases**

# Impact On Supply Demand Balance: Examples From NY Sensitivity Cases



# Impact of Additional Transmission Adding Hydro

- > Added 1.2 GW of transmission expansion from Hydro Quebec to ISONE in 2023
- > Added 1 GW of transmission expansion from Hydro Quebec to NYJ in 2022
- > Added 0.6 GW of transmission expansion from Hydro Quebec to NYJ in 2023







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