Come Together, Right Now, Over ZNC

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New York State Energy Research and Development Authority

Getting to Zero Forum
Oakland, California
October 11, 2019
"There is no documented historic precedent for the changes needed to prevent even worse disasters from coming."

IPCC “Global Warming of 1.5°C”
October, 2018
Joining, and Raising the Stakes for the 100% Clean Electricity Club

Anticipated, Proposed or Enacted 100% Standards and Studies – MARCH 2019

- **MN:** 2045-2050 (Clean)
- **IA:** 2050 (Renewables)
- **IL:** 2030 (Clean), 2050 (Renewables)
- **MI:** 2050 (Clean)
- **MA:** 2045 (Renewables)
- **NJ:** 2035 (Renewables)
- **MD:** 2040 (Renewables)
- **DC:** 2032 (Renewables)
- **VA:** 2036 (Clean)
- **CT:** 2050 (Clean)
- **NY:** 2030, 2050 (Clean)
- **WA:** 2045 (Clean)
- **CA:** 2045 (Clean)
- **NM:** 2045-2050 (Clean)
- **HI:** 2045 (Renewables)

**KEY**

- Legislation Anticipated on 100% Clean Electricity to be Introduced in 2019
- Non-Binding Goal Introduced 100% Clean Electricity Goal legislation has been introduced
- Non-Binding Goal Enacted 100% Clean Electricity Goal legislation has been enacted
- Legislation Introduced on 100% Clean Electricity Standard
- Legislation Enacted on a 100% Clean Electricity Standard

Source: EQ Research Policy Vista™ Legislative Tracking Database
Joining, and Raising the Stakes for the 100% Clean Electricity Club

Anticipated, Proposed or Enacted 100% Standards and Studies – MAY 2019

Source: EQ Research Policy Vista™ Legislative Tracking Database

**Legislation Introduced on 100% Clean Electricity Standard**

- MA: 2045 (Renewables)
- NJ: 2035 (Renewables)
- MD: 2040 (Renewables)
- DC: 2032 (Renewables)
- VA: 2036 (Clean)
- CT: 2050 (Clean)
- NY: 2030, 2050 (Clean)
- WA: 2045 (Clean)
- CA: 2045 (Clean)
- NM: 2045-2050 (Clean)
- HI: 2045 (Renewables)

**Non-Binding Goal Introduced**

- MN: 2045-2050 (Clean)
- IA: 2050 (Renewables)
- IL: 2030 (Clean), 2050 (Renewables)
- MI: 2050 (Clean)

**Non-Binding Goal Enacted**

- MA: 2045 (Renewables)
- NJ: 2035 (Renewables)
- MD: 2040 (Renewables)
- DC: 2032 (Renewables)
- VA: 2036 (Clean)
- CT: 2050 (Clean)
- NY: 2030, 2050 (Clean)
- WA: 2045 (Clean)
- CA: 2045 (Clean)
- NM: 2045-2050 (Clean)
- HI: 2045 (Renewables)
Joining, and Raising the Stakes for the 100% Clean Electricity Club

Anticipated, Proposed or Enacted 100% Standards and Studies – AUGUST 2019
Climate Leadership and Community Protection Act (CLCPA)

Legislation Introduced on 100% Clean Electricity Standard
Legislation Enacted on a 100% Clean Electricity Standard
Legislation Anticipated on 100% Clean Electricity to be Introduced in 2019

State Clean Electricity Goals:

- NY: 2040 (Clean)
- WA: 2045 (Clean)
- CA: 2045 (Clean)
- NM: 2045-2050 (Clean)
- HI: 2045 (Renewables)
- NV: 2050 (Clean)
- CO: 2050 (Clean)
- MA: 2045 (Renewables)
- NJ: 2035 (Renewables)
- MD: 2040 (Renewables)
- DC: 2032 (Renewables)
- VA: 2036 (Clean)
- CT: 2050 (Clean)
- PA: 2050 (Clean)
- ME: 2050 (Clean)

Source: EQ Research Policy Vista™ Legislative Tracking Database
New York State Clean Energy Goals
Climate Leadership and Community Protection Act (CLCPA)

**Clean Energy Economy**
- over 151,000 clean energy jobs

**Renewable Energy**
- 6,000 MW of distributed solar

**Renewable Energy/Clean Energy Standard**
- 9,000 MW of offshore wind
- 70% electricity from renewable energy
- 100% clean electricity

**Resilient and Distributed Grid**
- 1,500 MW of energy storage

**Energy Efficiency**
- 185 TWh end-use savings in buildings and industrial facilities

**GHG Reduction**
- 85% reduction in greenhouse gas emissions from 1990 levels

- 40% reduction in greenhouse gas emissions from 1990 levels
- 3,000 MW of energy storage
- 30,000 employed in storage sector

**By 2025**
- Now

**By 2025**
- By 2025

**By 2030**
- By 2030

**By 2035**
- By 2035

**By 2040**
- By 2040

**By 2050**
- By 2050
Climate Leadership and Community Protection Act (CLCPA) – Overview

- Most aggressive greenhouse gas reduction goals of any major economy: 40% by 2030, 85% by 2050
- 70% renewable energy by 2030, 100% zero-carbon electricity by 2040
- Path to carbon neutrality
- Codifies clean energy targets
- Commitments to environmental justice, disadvantaged communities, and just transition
- First statutory Climate Action Council
Greenhouse Gas Emissions Reduction Target

85 by 50

New York’s 85x50 emissions reduction target will require a carbon neutral statewide building stock.
Carbon Neutral Buildings Roadmap

• Identify potential pathways to a carbon neutral building stock
• Research critical decarbonization issues / engage Stakeholders
• Send long-term market signal & mobilize different sectors
• Create jobs and spur economic development
• Raise awareness of the benefits of carbon neutrality
  • Energy savings
  • Health, comfort, and productivity
  • Resilience
• Guidance for other state agencies and local governments
• Living document
NYSERDA Programs Informing the Roadmap

- RetrofitNY
- Buildings of Excellence
- Codes to Zero
- Lead by Example
- Net Zero Energy for Economic Development
- Net Zero in New Construction: All Sectors & Portfolio Support
- Net Zero Manufactured Housing
- Single Family Net Zero Market Segmentation
Adapting the Successful Energiesprong Model to New York State

- 4,500 rehabs
- 5,000 new construction
- 20,000 in pipeline
Key Components of Net Zero Retrofit Solution

Elements

• Highly insulated building envelope
• New, downsized all-electric mechanical works
• [On-site] distributed generation
• Grid interactivity
REV principle: engage private sector capital

Cost reduction

Carbon Neutral Buildings at
business-as-usual cost
Adapting the Successful Energiesprong Model to New York State

- 4,500 rehabs
- 5,000 new construction
- 20,000 in pipeline
Then vs Now
SUPPLIER

^  ^  ^

^  ^  ^

MARKETING

CUSTOMER

SALES MAINTENANCE
Reinventing construction through a productivity revolution
Productivity evolution, 1995–2015

Gross value added\(^1\) per hour worked

Index: 100 = 1995

<table>
<thead>
<tr>
<th>Year</th>
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<td>100</td>
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<tr>
<td>2015</td>
<td>140</td>
<td>100</td>
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</tbody>
</table>

Compound annual growth rate
- Total: 1.76%
- Construction: -1.04%

Source: McKinsey Global Institute, Reinventing Construction: a Route to Higher Productivity, 2017
Action in **seven areas** can boost sector productivity by **50–60%**

- Reshape regulation
- Rewire contracts
- Rethink design
- Improve procurement and supply chain
- Improve onsite execution
- Infuse technology and innovation
- Reskill workers

**5–10X** productivity boost possible for some parts of the industry by moving to a manufacturing-style production system

MCKINSEY GLOBAL INSTITUTE
Conventional Process
Prefabricated High Performance Components
Conventional Configuration
Integrated Mechanical Systems
Key Achievements of the Energiesprong Program

Net Zero Energy Buildings at 40% of the Cost of Initial Pilots
Adapting the Successful Energiesprong Model to New York State

- 4,500 rehabs
- 5,000 new construction
- 20,000 in pipeline
Strategic Partners:

Demonstrating Demand to the Manufacturing Sector
New York City Q1 2021