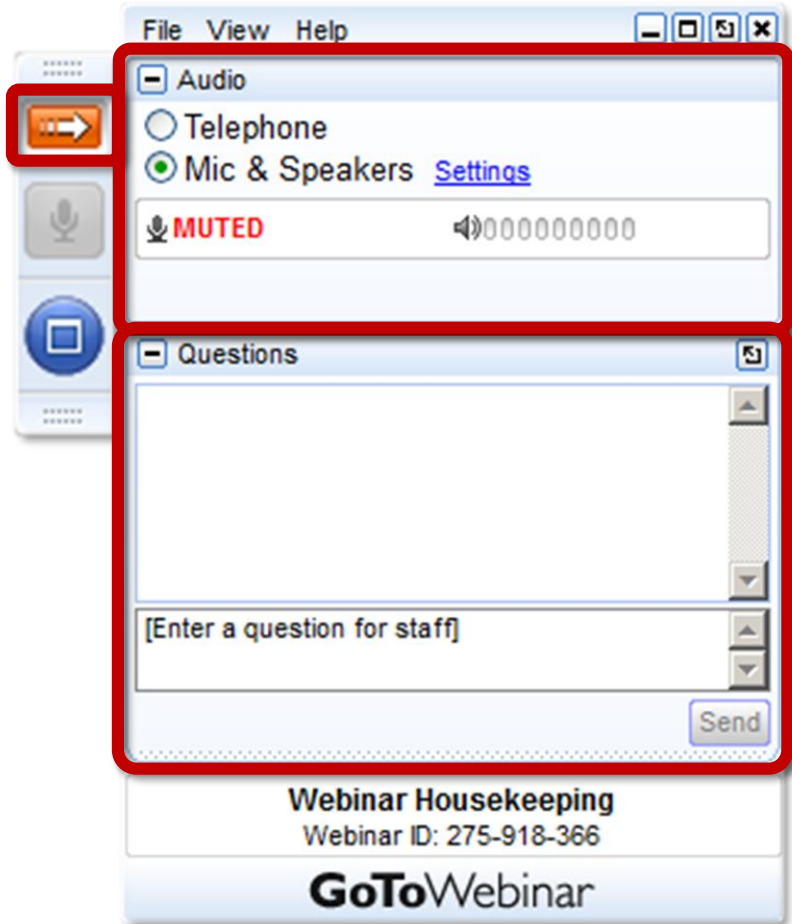


100% Clean Energy Collaborative Webinar

New Jersey's Plan for Achieving 100% Carbon- Neutral Electricity

July 29, 2020

Housekeeping



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CleanEnergy States Alliance



Webinar Speakers



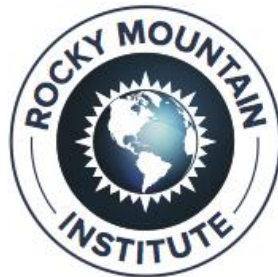
Hannah Thonet

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Warren Leon

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NEW JERSEY'S PLAN FOR ACHIEVING 100% CLEAN ENERGY

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Hannah Thonet
Senior Policy Advisor
New Jersey Board of Public Utilities

Chaz Teplin, PhD
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Who We Are



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Agenda

- Key Takeaways
- Introducing the NJ Energy Master Plan
- Modeling for Success
- Designing the Roadmap
- Implementing 100% Clean Energy

Key Takeaways

- What does a decarbonized energy system look like
- The cost of the energy transition (it's low!)
- The implications of timing: faster is better
- Getting started: top priorities for 2020-2021
- Adapting to the disruptors of 2020

NJ's Energy Master Plan

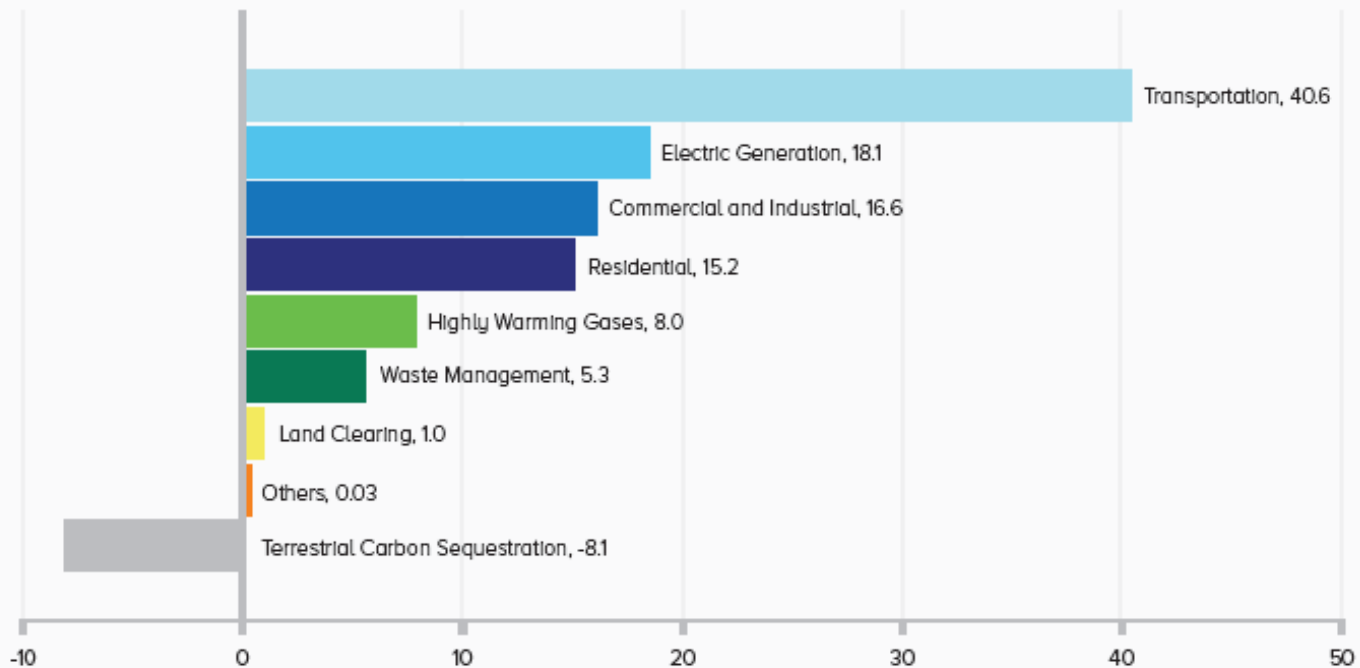
- The Energy Master Plan is built on three pillars:
 - ✓ 100% clean energy by 2050 (Exec Order No. 28)
 - ✓ 80% reduction in emissions by 2050 relative to 2006 levels (Global Warming Response Act of 2009)
 - ✓ Stronger and Fairer New Jersey
- New Jersey wanted to model to how achieve its legislative and executive mandates
- Stakeholder engagement was critical
- The EMP was released on January 27, 2020

NJ GHG Emissions Today

Estimated New Jersey Greenhouse Gas Emissions, 2018

(in million metric tons CO₂e)

Total Net Emissions, 97.0 million metric tons CO₂e



Modeling: Envisioning Success

- What is the best future we can envision for the state?
 - Balance of different, often competing objectives – e.g. equity, cost, reliability, jobs
 - Least cost pathways examine different priorities developed with stakeholders
- Understand the tradeoffs
 - How much does one pathway cost versus another?
 - Additional information for policymakers and stakeholders
 - Provides a target for near-term policy and action design
- Leading edge Evolved modeling tools designed for decarbonizing systems

Investigating policies

Transport Electrification

Building Electrification

Gas and Nuclear Generation

Evaluating uncertainties

Regional Coordination

Regional Emissions Policy

Clean Tech Cost Projections

Modeling: Complements Policy

- Inform near-term decisions in the long-term context
 - Common elements deployed 2020-2030: “no regrets”
 - Replace or avoid long-lived resources
 - Early action on long lead-time or hard to achieve energy transformations
 - Not prescriptive - uses best public cost and technology projections, but future plans will use updated information
- Complementary to policy design
 - Determines the cost of infrastructure and fuels
 - Policy determines who pays for them
 - Modeling starts at the end and works backwards – where do we want to go?
 - Policy starts now and works forwards – how do we get there?

Key Modeling Takeaways

NJ can meet its emissions targets with existing technologies

- Wind, solar, storage, electric vehicles, and heat pumps can be deployed today to reduce emissions
- Numerous options exist to meet the 'last bit'

The cost to decarbonize is small and less than the direct health benefits

- Total energy system spending is similar for either energy system
- Direct health benefits more than make up any cost difference

A decarbonized energy system looks very different than today's

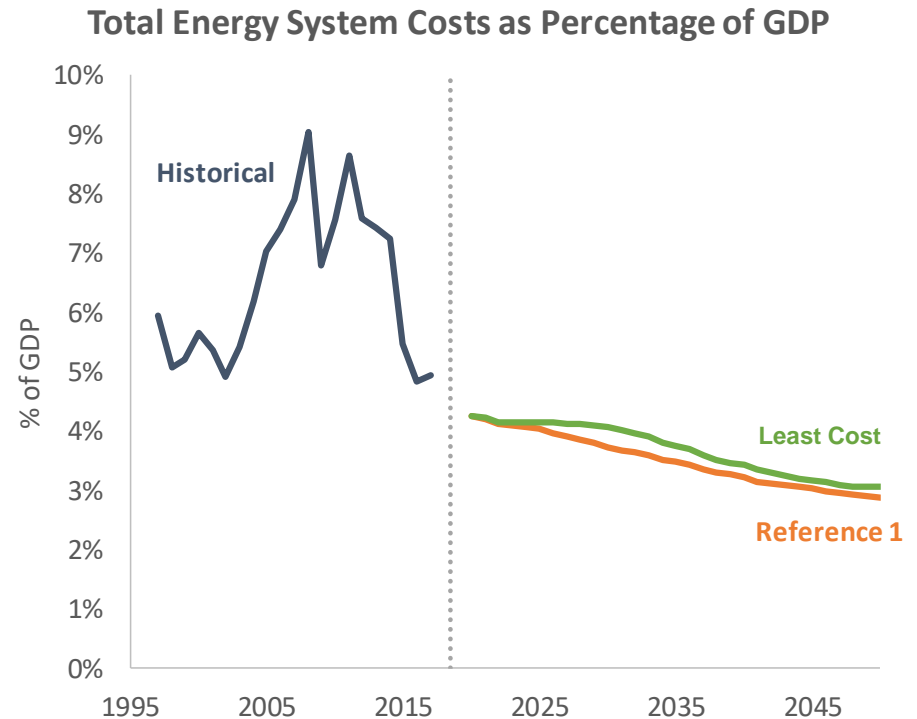
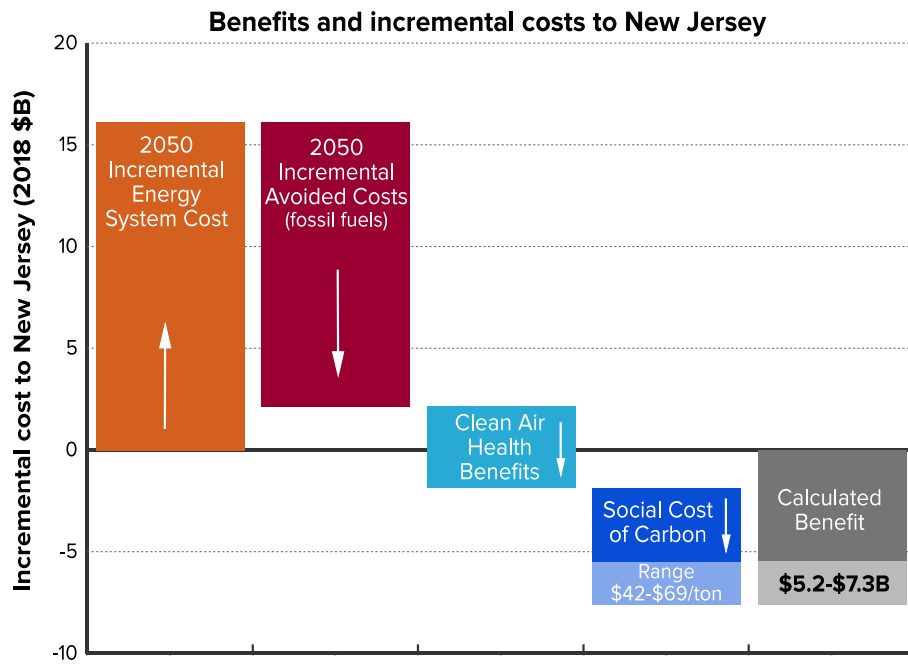
- Tremendous new electricity, transportation, and building infrastructure is needed
- After the transition New Jersey would spend very little on fuels from out of state

Existing policies are insufficient

- Because of the scale of the transition required, new policies are required
- Lower costs for clean energy are unlikely to overcome the status quo fast enough on their own

Modeling Results: Cost

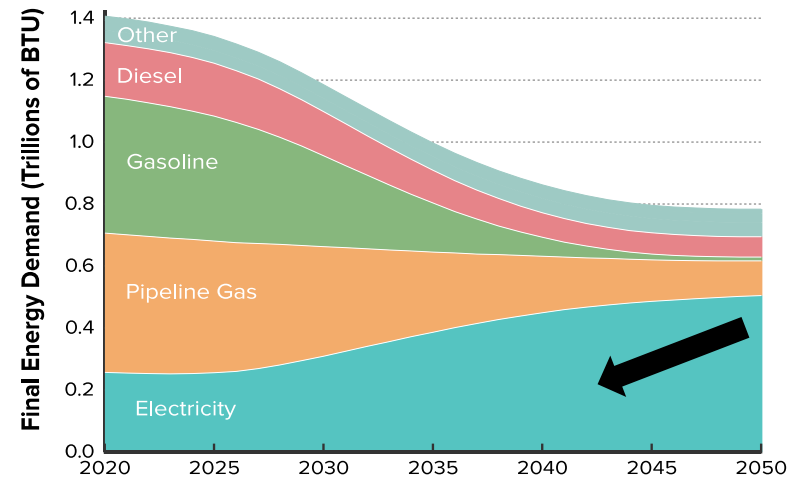
- Costs are small compared to total energy system spending, and offset by clean air and carbon benefits
 - Consistent with findings in other states
- Decreasing GDP share spent on energy when reaching decarbonization goals



Modeling Results: Electricity

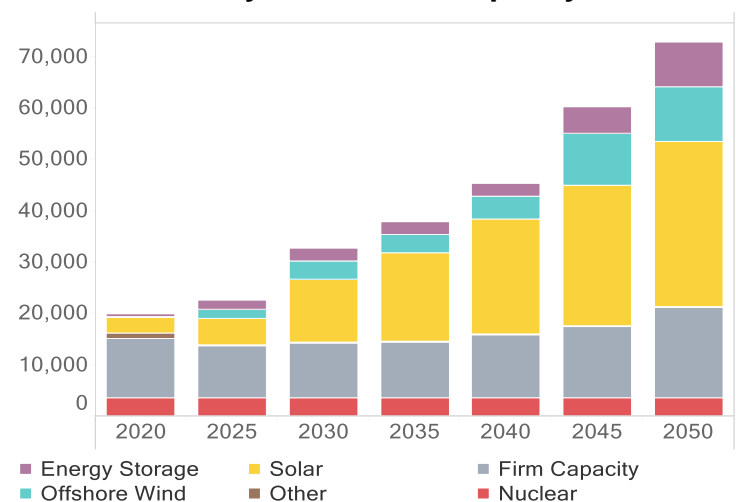
- Doubling of electric load due to electrification and 3.5x generating capacity of today's fleet
- Nuclear fleet is extended
- 20% of energy in 2050 from out of state wind
- Retain existing gas fleet but use it less
 - Valuable infrastructure for balancing renewables
 - Potential to be converted to clean fuels after 2035
- Offshore wind and energy storage above current mandates
 - Offshore wind: 11 GW in 2050
 - Storage: 9 GW in 2050

Final Energy Demand – Least Cost Scenario



Installed Capacity
MW

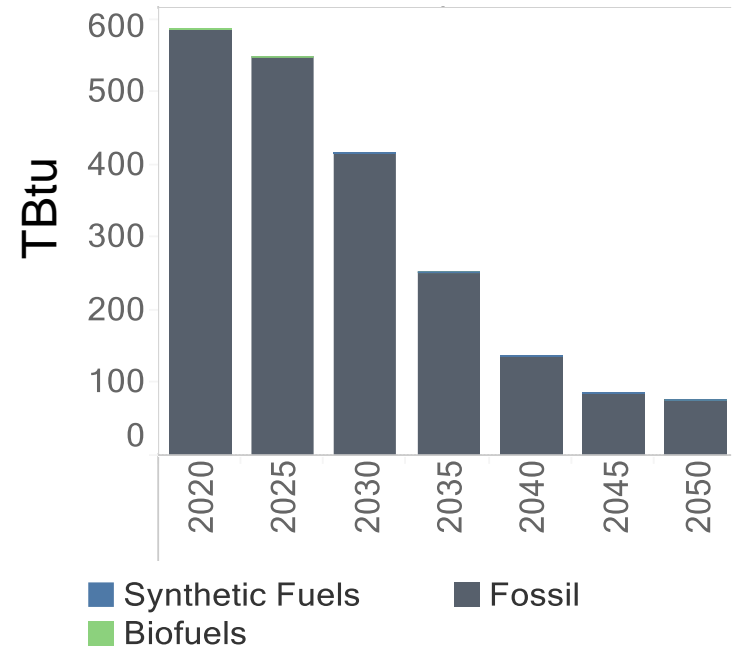
Electricity Generation Capacity



Modeling Results: Transportation

- Last internal combustion light-duty vehicle sold in 2035
 - 330k EVs by 2025
- Medium & Heavy Duty Vehicles also electrify
- We tested a scenario where EV adoption was slower. Costs increased \$4.4B annually and ~40% of vehicle fuel had to come from expensive, clean fuels

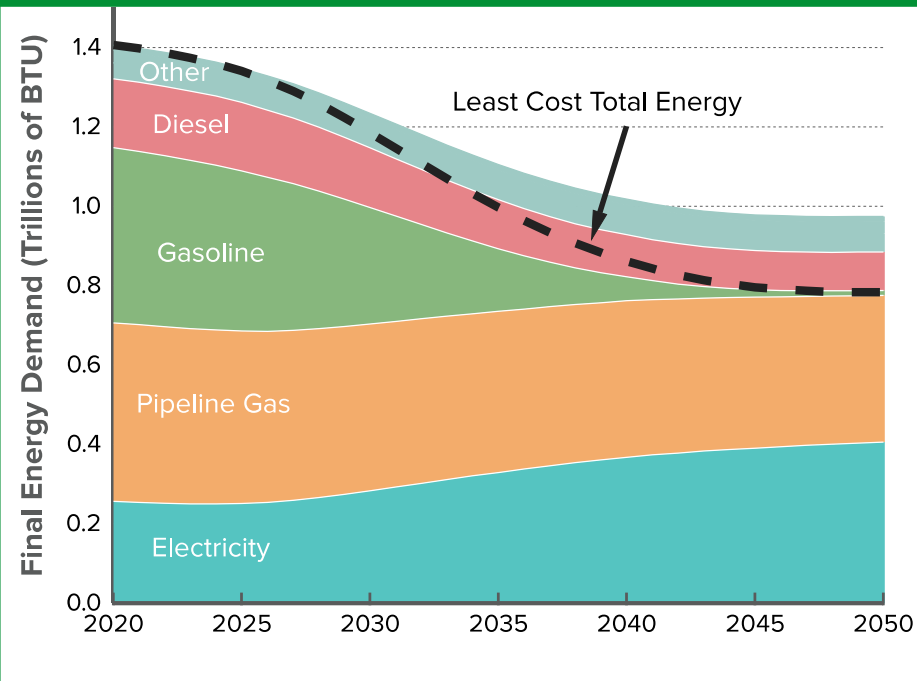
Transportation Fuel Use



Modeling Results: Buildings

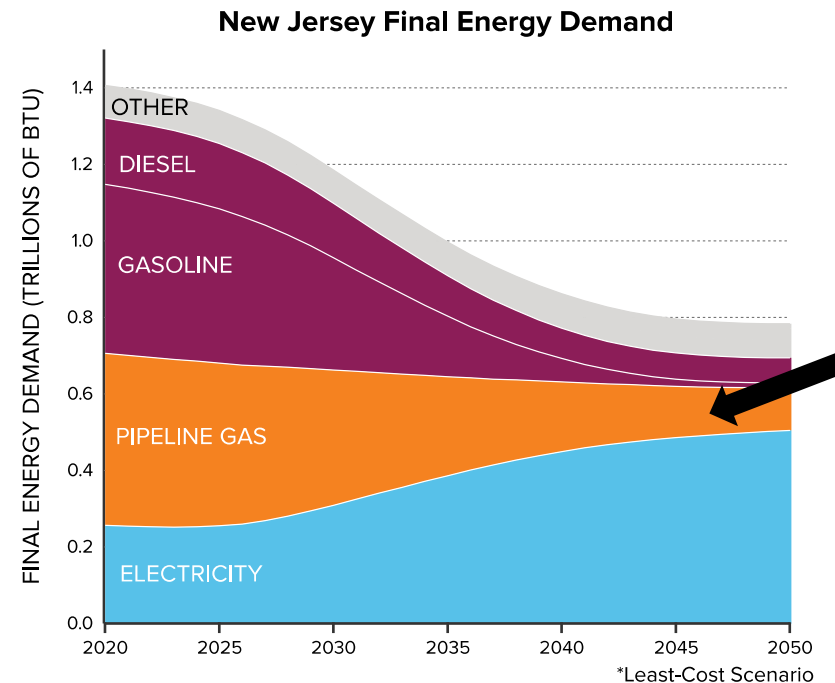
- Electrification is an effective form of efficiency
 - Building electrification reduces energy needs ~18%
- If buildings retain fossil use, other sectors must make up the difference to meet goals.
 - Retaining gas use in buildings increases the challenge for other sectors and makes it even more difficult to further reduce emissions

Without building electrification, total energy use is higher



Fossil Gas in Buildings and Electricity

- Least-cost scenario calls for continual decrease in the use of fossil gas
- To meet IPCC targets, fossil gas use must decrease faster and further
- Modeling shows removing fossil gas from buildings is least-cost and adds the most flexibility
- Decarbonized gas could play a role in the 'last 10%'



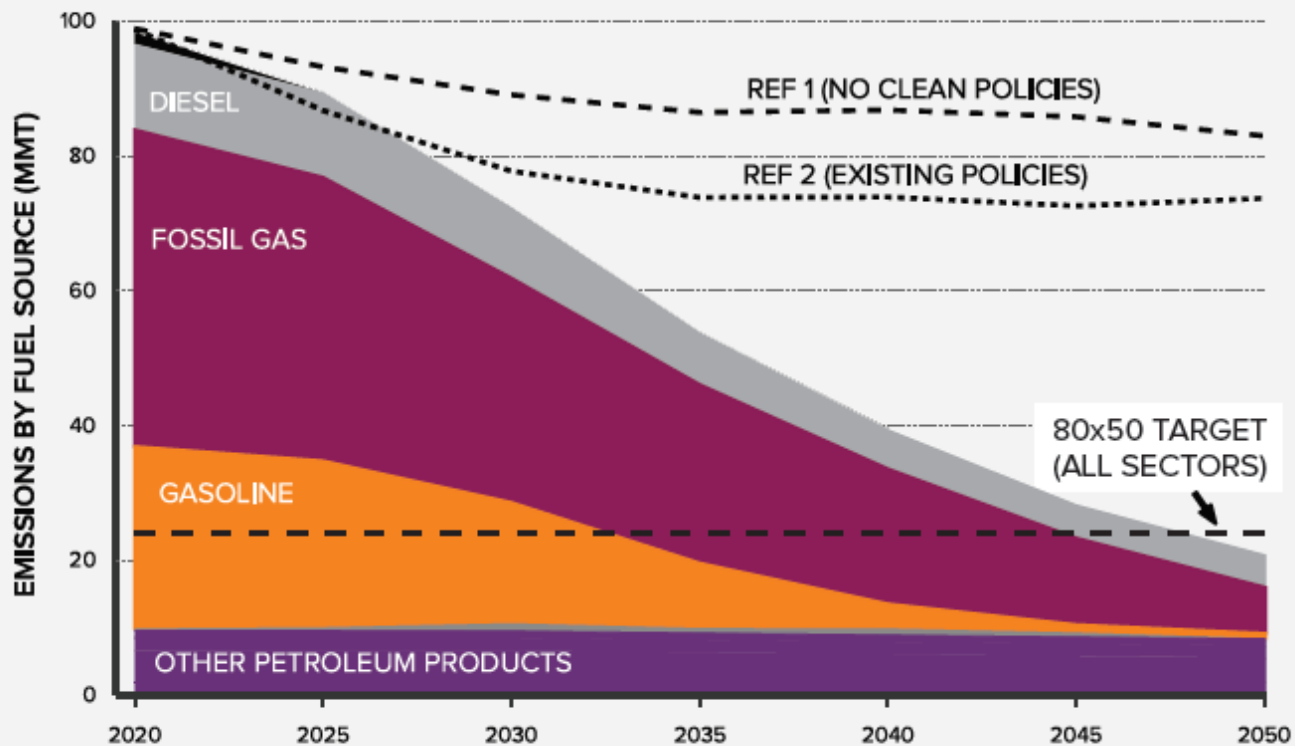
Near-term actions are clear. The 'last 10%' cannot delay action.

- The faster we act, the easier the transition will be
- Numerous actions today are least-regrets
 - Begin long-timeline investments: Transmission & Distribution, market structures (PJM), EV infrastructure
 - Avoid new fossil infrastructure before 2035
 - Accelerate EV transition. Begin building electrification.
- There are many technology options for eliminating the 'last 10%' of electricity emissions
 - Consistent with findings of many decarbonization studies
 - Numerous technology options but the best choice is not clear today

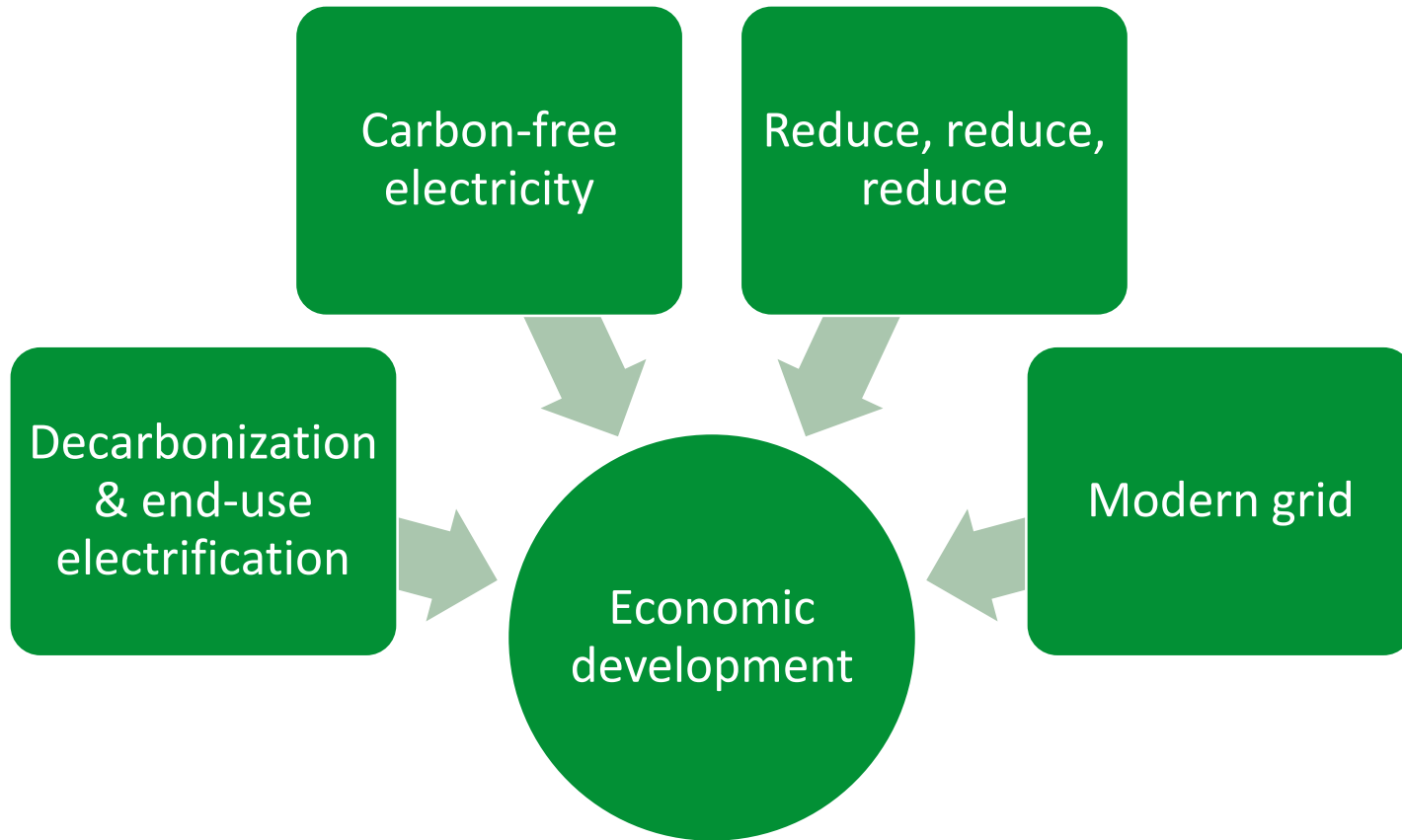


Priorities Today to Achieve Goals

Energy Emissions by Fuel Source, Least Cost Scenario



EMP 101 Summary



The Seven EMP Strategies

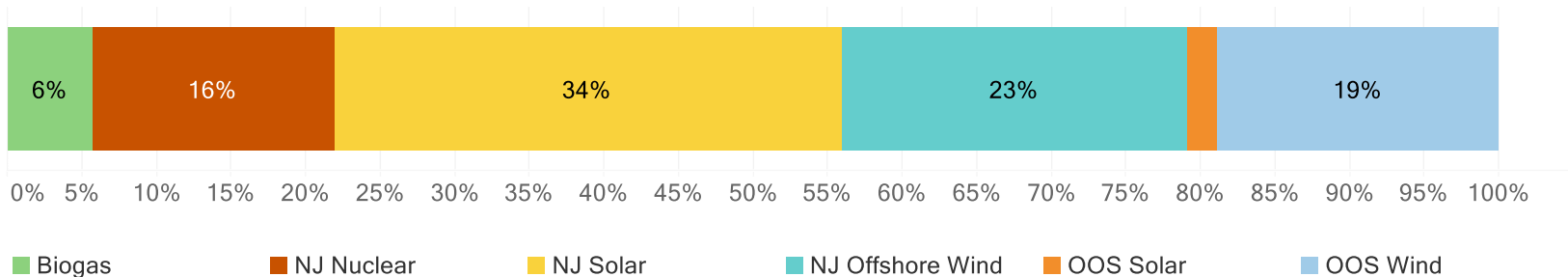
1. Reduce energy consumption and emissions from the transportation sector
2. Accelerate deployment of renewable energy and distributed energy resources
3. Maximize energy efficiency and conservation and reduce peak demand
4. Reduce energy consumption and emissions from the building sector
5. Decarbonize and modernize New Jersey's energy systems
6. Support community energy planning and action with an emphasis on encouraging participation by low- and moderate-income and environmental justice communities
7. Expand the clean energy innovation economy

What is NJ Doing Now?

2050 Least Cost Scenario

NJ 100% Clean Requirement: Supply Sources

% of supply



Offshore Wind

- 7,500 MW by 2035 target (Exec Order No. 92, Nov. 2019)
- Increased from original mandate of 3,500 MW by 2030 (Exec Order No. 8, Jan. 2018)
- 1,100 MW awarded in June 2019; Ørsted's Ocean Wind Project anticipated to begin operations in 2024
- Draft *Second Solicitation Guidance Document* targeting up to 2,400 MW released July 2020; solicitation will open in fall 2020
- Draft *Offshore Wind Strategic Plan* released in July 2020
- Developing ports, Offshore Wind Supply Chain Registry, Tax Credit Program, Technical Assistance Program

Solar

- To meet EMP modeling targets, NJ needs to add ~ 950 MW of solar per year
 - ~ 3 GW of solar built in legacy solar program, averaging 320 MW annually in last few years
 - New Jersey will launch a new solar program in Winter 2020-2021; must remain under a legislated cost cap
- New community solar pilot program launched, focused on equity
 - Awarded 78 MW, all serving majority LMI households in Project Year 1
 - Project Year 2 opening fall 2020
 - Permanent program in Feb. 2022

Energy Efficiency

- Energy efficiency resource standard of 2.15% and 1.10% for electric and gas savings, respectively, adopted, as required by the Clean Energy Act of 2018; new programs will begin July 2021
- Additional focus on issues of equity and delivery of programs to low- and moderate-income communities, local workforce development, and supplier diversity
- Established Equity Working Group and Workforce Development Group to ensure continued stakeholder engagement

Electric Vehicles

- NJ is a signatory to the Multi-State Zero Emission Vehicle MOU
 - 330,000 EVs on the road by 2050 (June 2019)
 - 30% MHDV ZEV sales by 2030; 100% by 2050 (July 2020)
- EV Bill enacted on January 17, 2020
 - Codified commitment to 330,000 registered EVs by 2025; 2 million registered by 2035; 85% of new sales and leases by 2040
 - Additional commitments on state-owned LDVs, charging infrastructure build out, Transit Authority buses
- EVs for underserved communities
 - Grant from U.S. DOE to study EV adoption in urban areas and underserved communities
 - RGGI funds dedicated to EVs, particularly MHDV in underserved communities
- Lead by example
 - EVs are now included in the State Purchasing Contract
 - New grant programs for local government fleet; private purchases
- Charging Infrastructure
 - BPU released straw proposal to set minimum utility filing guidelines to expedite charging infrastructure build out

What Comes Next

- More uncertainty, more opportunity
- Plan for success, and take action today
- Prioritize environmental justice and equity
- Advocate for national policy that supports state climate goals



THANK YOU



Thank you for attending our webinar

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Learn more about the 100% Clean Energy Collaborative at:
<https://www.cesa.org/projects/100-clean-energy-collaborative/>

Upcoming Webinars

Expanding Grid Capacity with Energy Storage in Decorah, Iowa

Thursday, July 30, 1-2:30pm ET

State Leadership in Clean Energy: NYSERDA's Offshore Wind Program

Tuesday, August 4, 2-3pm ET

Valuing Resilience in Solar+Storage Microgrids: A New Critical Load Tiering Approach

Tuesday, August 11, 1-2pm ET

State Leadership in Clean Energy: SMUD's Energy StorageShares Program

Thursday, August 20, 2-3pm ET

Read more and register at: www.cesa.org/webinars

