## CLIMATE JOBS NEW JERSEY:

# MOVING TOWARDS A RESILIENT FUTURE

ILR Climate Jobs Institute

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**SERVICE EMPLOYEES INTERNATIONAL UNION (SEIU) 32BJ NEW JERSEY**

**EASTERN ATLANTIC STATES REGIONAL COUNCIL OF CARPENTERS**

In addition, CJI is the academic and educational partner to the Climate Jobs National Resource Center (CJNRC). CJNRC educates workers and the public about policies that will build a clean energy economy at the scale climate science demands, create good union jobs, and create more equitable communities. CJNRC is a labor-led organization that works to combat climate change and reverse racial and economic inequality by building a worker-centered renewable economy.

This report is the culmination of a participatory process including robust legal, quantitative, and qualitative research; consistent educational convenings; and feedback sessions throughout the research process to develop a Climate Jobs Program for New Jersey. We hope this program will achieve the best outcomes for rapidly addressing the climate crisis while promoting justice, equity, and high-quality union jobs.

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# ABOUT US

The Climate Jobs Institute at Cornell University's ILR School is guiding the nation's transition to a strong, equitable, and resilient clean energy economy by pursuing three aims: to tackle the climate crisis; to create high-quality jobs; and to build a diverse, inclusive workforce.

Through cutting-edge policy studies, deep relationships with on-the-ground partners, and innovative training and education programs, CJI provides information that policymakers, the labor and environmental movements, industry leaders, and others need to navigate this historic transition to a zero-carbon economy.

### CORE ACTIVITIES AND OBJECTIVES

CJI delivers high-quality research, innovative policy solutions, and top-notch educational programming that connects key stakeholders to design and implement climate plans.

### CJI'S MAIN AREAS OF WORK

**Applied Research and Policy Development for Legislators and Labor, Environmental, and Industry Leaders.** CJI crafts equity- and worker-oriented climate policies and analyses indicating how states can address climate change while maximizing high-quality job creation and economic development. The Institute's research and policy efforts result in reports, case studies, policy briefs, and visual tools and maps meant to guide the nation's transition to a clean, equitable economy.

**Technical Assistance.** CJI provides rapid response data and policy analysis on the labor, employment, and economic impacts of climate and clean energy issues. The Institute's technical assistance work offers legislators, policymakers, and others real-time support. This work also generates legislative briefings, policy briefs, blog posts, op-eds, and other written materials targeting legislators, local government officials, and leaders in labor, environmental movements, and industry.

**Training and Education.** CJI organizes a variety of educational convenings that strengthen stakeholders' knowledge, confidence, and motivation to tackle climate change and to build a large, equitable clean energy economy with high-quality jobs. Programs include the Institute's biannual Climate Jobs Summit; the design and delivery of member trainings; legislative briefings; educational delegations for legislators, labor leaders, and others; and an online Climate Jobs certificate.

**Workforce Development.** CJI provides a critical link between the future clean energy workforce we need and workforce development programs that meet these needs. The Institute also provides a pipeline from front-line Black, Indigenous, and people of color communities to paid on-the-job training and high-quality careers.

**Student Engagement.** CJI enriches the ILR and Cornell student experience by engaging undergraduate and graduate students in important aspects of the Institute's core work through fellowships, research assistantships, hands-on clinical experiences, internships, labor-climate undergraduate and graduate courses, and more.

# DIRECTOR'S NOTE

**The Climate Jobs Institute at Cornell University's School of Industrial and Labor Relations was established to study the labor and employment impacts of climate change and be an excellent resource to labor unions, climate organizations and policymakers to navigate the transition to an equitable, worker- and equity-centered clean energy economy.**

In 2021, the Climate Jobs Institute, alongside our partners at the Climate Jobs National Resource Center (CJNRC), began meeting with union leaders in New Jersey to better understand how climate change and clean energy policy is impacting workers in the state, and the ways in which unions in New Jersey can craft an agenda to tackle climate change, create good union jobs in New Jersey, and build a more fair and equitable economy that addresses historic inequities.

Through a series of interviews, conversations and convenings, it became clear that workers in New Jersey understand that climate change is real and are acutely aware of the ways it increasingly impacts their communities and livelihoods. Union members in New Jersey are also concerned that the transition to a climate-safe economy will undermine the high-quality, family and community sustaining jobs that currently exist in carbon and energy intensive sectors, especially because many workers fought hard to make these jobs safe, high-paying, and give workers a voice in the workplace. Further, many workers have legitimate concerns that jobs in the new clean energy economy will not be high-quality, high-wage jobs that truly support workers and their families.

With a new gubernatorial administration starting in January 2026 and labor unions that were eager to advance an agenda that can benefit workers, communities and the climate, we knew that New Jersey was a place where we could collaborate with local and statewide unions to design a cutting-edge climate jobs plan that addressed the state's need to protect and grow high-quality union jobs, reduce emissions, and expand equitable economic opportunities across the state.

The process of creating this report included numerous informational labor interviews, educational convenings, quantitative, and qualitative research. After many months of collaboration, intensive research, and innovative thinking, we are proud to release this Climate Jobs Plan for New Jersey. Our report outlines fourteen highly researched recommendations that tackle emissions reductions, affordability, and high-quality jobs creation across the energy, buildings, resilience, transportation, and waste sectors. We look forward to watching these ideas transform into proactive, ambitious policies that can make New Jersey a leader in both addressing the climate crisis and promoting economic and social justice for its workers and communities.

Finally, we would like to extend our deep appreciation to the local and statewide unions in New Jersey that partnered with us to develop this Climate Jobs Plan. LIUNA, the Laborers International Union of America, partnered with CJI starting in 2012 to develop New York's climate jobs plan – the first in the nation. Building on the success of the union-led Climate Jobs New York coalition, LIUNA was encouraged to help initiate a similar process in New Jersey. Many other local and statewide unions partnered with CJI to make this process and report a success, including: the IUOE Local 825 (International Union of Operating Engineers), the Painters Union DC21 (International Union of Painters and Allied Trades), the IBEW Third District (International Brotherhood of Electrical Workers), the New Jersey State Association of Pipe Trades, Service Employees International Union (SEIU) 32BJ New Jersey, and the New Jersey State AFL-CIO.

**Dr. Lara Skinner**
Executive Director
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# EXECUTIVE SUMMARY

Climate change has arrived in the Garden State in the form of extreme heat, frequent heavy precipitation, and increased wildfire risk. Nowhere has the magnitude of accelerating climate impact been clearer than during Hurricane Sandy, when the state faced lasting major damage to critical infrastructure like roads, buildings, and energy systems that make New Jersey a linchpin of the northeast regional economy.

Damaged homes and extensive flooding along the Jersey shore following Hurricane Sandy in 2012.

Safeguarding New Jersey against the future effects of climate change will require significant, coordinated investments in key infrastructure upgrades across the state's varied economic sectors, including in energy and electricity, public and private buildings, water systems, roadways, and waste processing. All of these projects have the potential to generate significant in-state jobs. When these jobs are paired with a guarantee to generate high-quality, family sustaining, union careers, New Jersey has the chance to turn the economic risk posed by the climate crisis into a true economic opportunity to uplift working class people and build a resilient, thriving state.

As federal commitment to climate action dwindles, the Garden State must lead on pursuing a vision that not only makes the state safer for its residents, but also more affordable, healthy, and prosperous for all workers. The following report outlines a number of key policy pathways that would not only tackle the state's climate responsibilities, but also generate high-quality jobs for New Jersey's unions and workforce to create a more resilient future for New Jersey.

## POLICY PATHWAYS FOR A RESILIENT FUTURE

| | |
|---|---|
| **CONSTRUCT 24.2 GW OF NEW, UNION-BUILT CLEAN ENERGY BY 2035** | Establish legislative commitments to support the construction of 24.2 GW of new clean energy in-state; provide state support to spur development of both large-scale renewables and aggregated distributed energy resources (DERs) with high-road labor standard requirements; supercharge state transmission coordination to support new energy resources |
| **RAPIDLY SCALE A STATE-LED GREEN BUILDINGS AGENDA** | Establish a state program to build thermal energy networks in public buildings, prioritizing campuses located in overburdened communities; cultivate public-private partnerships to build thermal energy networks in public housing, and explore utility-led TENs for the residential sector; build 40,000 new energy-efficient, permanently affordable housing units by 2035 |
| **COORDINATE AND FUND AN EXPANSION OF UNION-BUILT STORMWATER RESILIENCE PROJECTS ACROSS THE STATE** | Expand watershed-level coordination capacity within the New Jersey Department of Environmental Protection to support new stormwater infrastructure projects; boost funding for the Resilience Infrastructure Bank to support stormwater infrastructure construction; encourage and adopt stormwater utility fee programs with layered incentives that target large commercial properties to tackle water resilience |
| **REINVENT AND RECONSTRUCT NEW JERSEY'S MAIN TRANSPORTATION CORRIDORS** | Strengthen New Jersey's existing commitment to eliminate pedestrian deaths by investing in rehabilitating the state's high-injury roadways to become safe, multimodal, EV-ready "Complete Streets"; expand existing NJDOT program to identify viable high-injury, state-owned street corridors for upgrades, aggregate bids, and condition funding with strong labor standards |
| **STRENGTHEN IN-STATE MUNICIPAL WASTE CIRCULARITY** | Diversify municipal solid waste initiatives and increase funding available to empower counties to build and operate waste stream separation, food waste and composting systems, source reduction programs, waste-to-energy facilities and procure sustainable trash fleets |
| **CULTIVATE QUALITY UNION JOBS IN THE CLEAN ENERGY TRANSITION** | Prioritize enforcement of New Jersey's labor laws to deter violations; expand labor standards to cover more public works and clean energy projects; expand New Jersey's skilled and trained local workforce by supporting high quality pre-apprenticeship and apprenticeship programs in-state; improve conditions for organizing in the private sector; utilize project labor agreements and labor peace agreements in manufacturing and service contracts and for the operation of facilities after construction is completed in which the state has a proprietary interest |

# INTRODUCTION

**More than a decade ago, Hurricane Sandy battered the New Jersey coast, upending the livelihoods of the state's communities and economy for years to come. For many New Jerseyans, that memory remains fresh. Residents were stranded without power for days to weeks, clamoring for access to dwindling resources[1] and basic safety measures[2] as essential workers banded together to restore life-saving services and bring the state's power grid,[3] flooded buildings and homes, damaged roads and bridges,[4] and entire communities back to life.[5] With the support of federal block grant funding and state financial support,[6] the state slowly began to repair its infrastructure and support the most affected residents in rebuilding their livelihoods alongside it.**

The long road to recovery from what remains the region's most devastating hurricane was not a perfect one. However, the difficult experience has also slowly produced key lessons for state leaders. Years later, New Jersey policymakers and union leaders alike still reflect on the lasting, tangible impression of what climate change can and will look like in the Garden State.[7] In response, New Jersey leaders and the state's labor movement have already taken significant steps to address both extreme weather and climate change via a commitment to achieve 80% greenhouse gas (GHG) emissions reductions by 2050[8]; clean energy installation goals that commit to 50% renewable generation by 2030 and includes 3.5 GW of offshore wind and 2 GW of storage[9]; and statewide climate resilience strategy[10] to protect against both inland risks as well as New Jersey's 1,800 miles of coastline.[11]

Despite these efforts, the state's emissions have remained relatively flat across the last decade.[12] As emissions stagnate rather than decrease, workers and their communities remain at risk of both increasing climate impacts and economic precarity. New Jerseyans experience some of the most intense impacts of climate change in the country, from extreme heat and wildfires to heavy precipitation and sea level rise. New Jersey is one of the fastest-warming states in the nation,[13] where temperatures have increased by 3.5 degrees Fahrenheit since 1895.[14] Outdoor workers – alongside children, older adults, unhoused, and low-income populations – are particularly vulnerable to the effects of extreme heat.[15] It is also one of the most at-risk states in the region for fires,[16] which leads to decreased air quality and is also particularly hazardous for outdoor workers and vulnerable groups.[17]

In addition, the state is struggling to handle an excess of water from both increasing precipitation and encroaching seas. Annual precipitation is expected to increase between 4% and 11% by 2050, and in the last 50 years extreme precipitation has already increased by 71% – higher than anywhere else in the country. At the same time, sea levels along the Jersey Shore are rising[18] faster than the rest of the world.[19] An inability to adequately handle excess water not only makes existing infrastructure unsafe, but also puts the state at significant economic risk; property damage from flooding alone cost $23.4 billion between 1960 and 2020.[20]

The links between climate and economic risks for New Jersey's most vulnerable residents are especially clear in the state's electricity sector, where New Jersey faces

Coastal damage to homes on Long Beach Island following Hurricane Sandy in 2012.

a chronic and growing electricity generation shortfall alongside rising ratepayer affordability concerns. With the state importing a fifth[21] of its power from out of state, New Jersey has become dependent on a regional grid operator that itself has struggled to keep pace with growing demand without driving up costs. In June 2025, ratepayers were caught in the lurch when increased energy costs were passed onto consumers in the form of a 20% rate hike.[22] Population growth, coupled with the projected growth of data centers to support artificial intelligence,[23] will put further pressure on New Jersey regulators and consumers alike. New Jersey faces these pressures in an increasingly challenging federal funding landscape. While the U.S. saw significant progress in supportive clean energy policy through the Inflation Reduction Act (IRA)[24] and the Infrastructure Investment and Jobs Act (IIJA),[25] much of that funding was phased out by the passage of the One Big Beautiful Bill Act (OBBBA) in July 2025.[26]

Following a decade of initial progress and facing a new federal funding shortfall, the question remains: how can New Jersey adequately and comprehensively prepare for what comes next? This report confronts that existential question and offers not just a clear response, but also a firm call to action: harness the existing power of New Jersey's labor union movement to build climate-safe infrastructure at both the pace and scale that science demands.

**NEW JERSEY MUST HARNESS THE EXISTING POWER OF NEW JERSEY'S LABOR UNION MOVEMENT TO BUILD CLIMATE-SAFE INFRASTRUCTURE AT BOTH THE PACE AND SCALE THAT SCIENCE DEMANDS.**

New Jersey is a union strong state, boasting one of the highest union densities in the country and a powerful, politically-engaged, and mobilized working class.[27]

Unions and their political allies have already made significant strides in making New Jersey a fairer, safer state to work, passing sweeping labor standards into law on clean energy and construction work. These wins include prevailing wage requirements on the construction of solar energy above 1 MW;[28] project labor agreements (PLAs) for public works projects above $5 million[29] as well as most public-private construction projects[30]; and robust community workforce agreements on large-scale clean energy construction projects, including community workforce targets and apprenticeship readiness resources for the New Jersey Wind Port.[31]

Despite these significant gains, New Jersey has still not been spared from the rising economic inequality that has swept across the nation. The state ranks ninth out of all U.S. states in income inequality, with the top 1% of earners making nearly 25 times more money than the rest of the state's workers.[32] Economic inequality also disproportionately affects people of color. The New Jersey Institute for Social Justice calculated that while white New Jersey households held a median wealth of approximately $662,500, Black and Latino/a households held just $20,000 — representing a wealth gap of over $600,000, double pre-pandemic levels.[33] Low-income households also face disproportionately high energy burdens compared to the state average. While 2% of New Jersey households pay more than 6% of their income on energy costs, that percentage jumps to 13% of households that earn less than 30% of the area median income (AMI).[34]

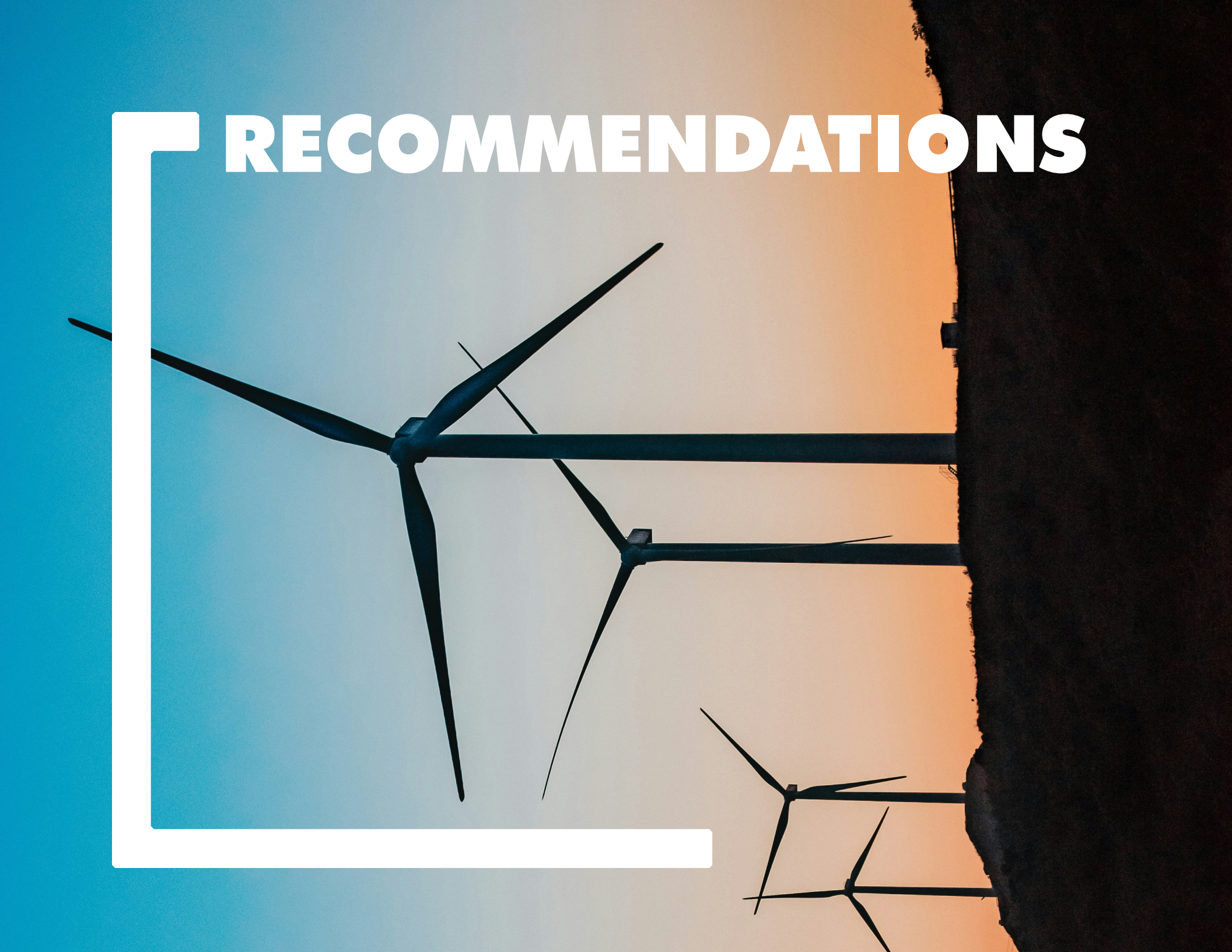
If approached without an equity framework in mind, New Jersey's transition to a clean energy economy has the potential to reproduce the economic changes that have increased inequality and eroded organized labor's strength, including privatization, deregulation, and the proliferation of policies that funnel wealth away from the working class and towards the highest earners. Ambitious and expansive climate policy has the ability to reverse these trends – but only when those policies and programs prioritize workers and public investments. New Jersey must meaningfully reduce risk for those facing the brunt of the climate and inequality crises in order to successfully mitigate and adapt to the effects of climate change. Creating more high-road, family-sustaining, union climate jobs is one way to address both crises directly.

To deliver comprehensive climate and clean energy benefits to its 9.2 million residents[35] in 3.4 million homes,[36] and along its 39,000 miles of public roads[37] across 564 of municipalities[38] in 21 counties,[39] New Jersey must preemptively plan and develop ambitious programs that can support and expedite new large-scale construction projects across the state. It also must do as much as it can before the next superstorm strikes, and prepare to continue to push work in the face of a changing federal funding landscape (see: *Funding Menu* on page 53). Each of these necessary and significant capital projects will require a bold, whole-of-government political approach to climate change. These projects must also be built efficiently and on-time, with high-quality safety standards and economic benefits for workers – which unions are often best-positioned to deliver.[40]

The ideas outlined in *Climate Jobs New Jersey: Moving Towards A Resilient Future* offers a first pass at outlining key and emerging cross-sectoral opportunities that not only address climate change, but also envision a path in which the work is done by union labor with standards that promises high-quality delivery. Each idea within this report tackles a core issue in one economic sector – energy, buildings, transportation, adaptation and resilience, industry, and labor policy – and weaves a potential policy solution into other sectors to envision a union climate economy.

Taken together, this report offers a glimpse into the climate-safe, equitable future that can be molded into New Jersey's reality – but only when a coalition of union leadership links arms with policymakers to take a bold, proactive approach to tackling climate change head-on. This plan is by no means comprehensive; rather, it merely reflects a set of promising first steps. In this critical time for New Jersey, the moment to build bold and build union is now

# RECOMMENDATIONS



RECOMMENDATION: CLEAN ENERGY

# CONSTRUCT 24.2 GW OF NEW, UNION-BUILT CLEAN ENERGY BY 2035

- Establish legislative commitments to support the construction of 24.2 GW of new clean energy in-state by 2035, including 9.7 GW of solar (3.1 GW utility and 6.6 GW distributed); 5 GW energy storage; 7.7 GW offshore wind; 0.7 GW onshore wind; 1 GW of new nuclear; and 925 GW-miles of transmission
- Provide state support to spur development of both large-scale renewables and aggregated distributed energy resources (DERs) with high-road labor standard requirements
- Supercharge state transmission coordination to support new energy resources

**NEW CLEAN ENERGY IN NEW JERSEY, 2035**

| Clean Technology | New Construction by 2035 |
|---|---|
| Utility Solar | 3.1 GW |
| Distributed Solar | 6.6 GW |
| Onshore wind | 0.7 GW |
| Offshore wind | 7.7 GW |
| Nuclear | 1 GW |
| Energy storage | 5 GW (3.2 GW short duration; 1.8 GW long duration) |
| Transmission & Distribution | 925 GW-miles |

New Jersey is facing a mounting energy crisis. After decades of low energy demand growth, the state is now anticipated to more than double its current electricity demand by 2050, driven by sustained population growth, increasing electrification, and data center expansion.[1] Generation expansion projects have struggled to keep pace, with New Jersey steadily increasing its electricity imports while falling behind on clean energy construction goals.

New Jersey is now starting to see the effects of this mounting crisis take shape. The state's utility regulator, the Board of Public Utilities (BPU), approved a 20% hike in electricity rates on June 1, 2025,[2] representing an average jump of $25 on consumer bills.[3] The sudden shift has brought energy resilience to the front of state residents' and politicians' minds, with a flurry of bills brought forward in the 2025 legislative session aimed to curtail rate hikes and address electricity demand.[4]

New Jersey has been a net importer of electricity for decades, drawing 16% of its electricity from beyond its borders to meet its needs in 2023.[5] Net imports have only increased in recent years, with officials quoting the state's share of imports to be as high as 35% in 2025.[6] Utilities purchase this out-of-state electricity through the market known as the Pennsylvania-New Jersey-Maryland Interconnection (PJM). Increasing reliance on this regional grid operator has, in part, driven up electricity rates in the state, and has brought consumer anxiety levels up with it (see: *PJM Interconnection and Electricity Affordability Implications*) below.

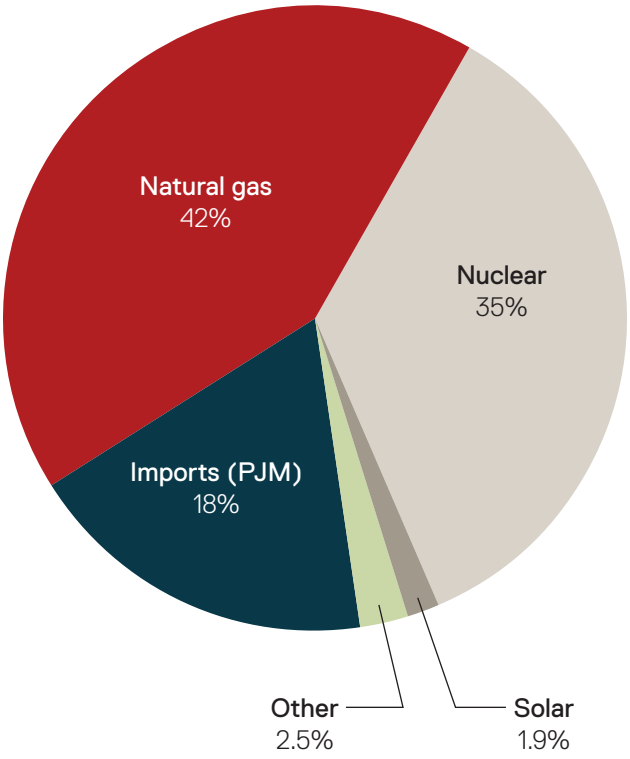
## PJM INTERCONNECTION AND ELECTRICITY AFFORDABILITY IMPLICATIONS

Between 2013 and 2023, New Jersey lost more than 2,500 MW of in-state electricity generation.[7] At least one fifth[8] of the state's electricity is imported across borders from the regional transmission organization known as the Pennsylvania-New Jersey-Maryland Interconnection, or PJM.[9] This nonprofit power management organization[10] that now serves 13 states plus Washington, D.C. allows the investor-owned utilities that distribute electricity to consumers to purchase additional "capacity" to ensure they can meet peak demand. PJM's "capacity" market is regulated at the federal level, meaning that the state's energy regulators currently have little control over the market conditions.

Dependence on the PJM network has, in part, driven the sharp increase in New Jersey's electricity rates in the last year. The latest two regional capacity auctions saw a major spike in prices, which jumped nearly ten times higher than the previous years'.[11] Analysts have cited a variety of factors for this sudden jump in price, including energy load growth,[12] supply chain issues, market regulation shifts,[13] and interconnection delays.[14] Ultimately, the consequences of the jump in capacity market prices have been passed down to the state's ratepayers.

As summer heat intensifies, New Jersey's population grows,[15] data centers begin to come online following state incentives,[16] and the state simultaneously electrifies its buildings, transportation, and industrial sectors, New Jersey will continue to be vulnerable to capacity market volatility – which the latest PJM capacity market verifies is all but set to continue.[17] This could not only drive uncertainty in new generation development projects, but also fall down to ratepayers to bear the brunt of the burden without strategic state intervention. As New Jersey joins other states in demanding more control over PJM's decisionmaking,[18] the state must also pursue swift and multifaceted strategies to generate more in-state power and work towards energy independence. This could include expanding upon recent legislative efforts that would require investor-owned utilities to meet capacity requirements through either contracting with generation owners or developing their own generation assets – creating an exception to the current prohibition of utility ownership of generation – and pairing such enabling legislation with a guarantee of high-road labor standards and labor representation within the BPU planning process.[19]

**NEW JERSEY ELECTRICITY GENERATION BY SOURCE (INCLUDES IMPORTS), 2022**




"Other" includes coal, hydroelectric, petroleum, and wind.
Chart: Cornell Climate Jobs Institute
Source: EIA (Sheets 5 & 10) / View on Datawrapper

New Jersey's in-state electricity generation comes primarily from natural gas, producing 42% of the state's total generation mix in 2022, with another 0.27% generated by other fossil fuels.[20] These facilities produce 10.2% of the state's total greenhouse gas emissions.[21] Another 35%[22] of New Jersey's in-state generation is produced by nuclear energy at the Salem and Hope Creek nuclear power plants.[23]

New Jersey has made strong commitments to both decarbonize its electricity mix and grow its in-state generation. The state has set renewable electricity goals of 35% by 2025 and 50% by 2030 via its current Renewable Portfolio Standard (RPS), which includes an offshore wind buildout goal of 3.5 GW and an energy storage buildout goal of 2 GW by 2030.[24] In the last few years, executive orders have pushed for further commitments of 100% clean electricity by 2035[25] and 11 GW of offshore wind by 2040[26] (See: *Supporting New Jersey's Efforts to Pursue Offshore Wind And Support A New Manufacturing Industry* on page 25). While these targets represent strong ambition, just 2% of the state's consumption comes from in-state renewable sources like wind, solar, and hydroelectric power,[27] meaning the state is falling behind on its clean energy infrastructure goals.

The flashpoint political moment around New Jersey's acute electricity challenges presents a unique opportunity to not only enhance the state's energy security, but also do so in a way that reduces its reliance on GHG-emitting power sources, expands the state's portfolio of clean and reliable in-state generation, and protects ratepayer affordability. Achieving each of these goals means putting the labor unions that currently serve as the backbone of the state's existing generation system in the driver's seat of making that change. Union tradesworkers possess the core technical expertise needed to construct a wide variety of new energy resources and safely connect them to the electricity grid. Importantly, rigorous training programs and union benefits ensure that this growing workforce is not only highly proficient and safe, but also uplifts New Jersey's working class into positions of economic security, providing additional benefits to the state's economy.

The state's prevailing wage law – which applies to solar projects above 1 MW that participate in the state's Renewable Energy Credit (REC) program[28] – as well as New Jersey's efforts to ensure the nascent wind industry is built by union labor (See: *Supporting New Jersey's Efforts to Pursue Offshore Wind And Support A New Manufacturing Industry* on page 25). – represent strong initial progress toward ensuring the state's clean energy transition creates a stronger union economy. Now is the time for unions to lead on delivering the clean and expanded generation mix of the future. New Jersey must commit to an additional 24.2 GW of clean, union-built energy generation, with associated transmission and distribution infrastructure, to help power the state's grid by 2035.

## HOW WE GET THERE

### ESTABLISH A 100% CLEAN ENERGY STANDARD (CES)

New Jersey should formally commit to the above build-out of new clean energy. The state could enact new legislation to establish a new 100% Clean Energy Standard (CES), or opt to directly revise and expand its existing Renewable Portfolio Standard (RPS), which establishes mandatory minimum thresholds of clean energy production that utilities and other energy providers must agree to supply customers as part of their generation mix.[29]

**NEW JERSEY MUST COMMIT TO AN ADDITIONAL 24.2 GW OF CLEAN, UNION-BUILT ENERGY GENERATION, WITH ASSOCIATED TRANSMISSION AND DISTRIBUTION INFRASTRUCTURE, TO HELP POWER THE STATE'S GRID BY 2035.**

The backbone of New Jersey's decarbonized grid will come from solar energy, paired with a significant build-out of both short- and long-duration battery storage. However, New Jersey will also need to depend significantly on offshore wind power, where development has halted following several federal executive orders[30] and permit revocations[31] in early 2025.[32] This stoppage of offshore wind development poses a significant threat to New Jersey's energy security, as well as real risks to New Jersey families already struggling with energy insecurity. While the short-term outlook for wind power is challenging, state leadership can and must commit to a long-term vision that includes the benefits of large-scale zero-carbon offshore wind generation in order to meet its decarbonization targets while centering affordability for New Jersey families (See: *Supporting New Jersey's Efforts to Pursue Offshore Wind And Support A New Manufacturing Industry* on page 25).

New Jersey must also ensure the climate safety of both existing and new nuclear power. The entirety of New Jersey's nuclear fleet is located on an island in the Delaware River, which faces low to moderate flood risk above three feet of sea level rise; access roads to the facility are projected to flood with even lower levels of sea level rise, furthering risks to plant operations.[33] This fleet is integral to New Jersey's existing energy infrastructure and, given new federal support for nuclear energy, is under consideration for expansion by state regulators and utilities.[34] Climate risks facing this island must not only be evaluated now, but should also continue to be evaluated and addressed as climate risk modeling changes. An analysis from the Government Accountability Office (GAO) in 2024 indicated that federal nuclear licensing and renewal processes failed to consider the full range of climate effects on evaluated sites across the country, including those in New Jersey.[35] While GAO recommended closer and expanded reviews of nuclear permitting processes, the office's recommendation is misaligned with current federal executive orders that aim to expedite nuclear permitting and reduce scrutiny.[36]

To protect the safety of its residents and ecosystems, New Jersey must invest in parallel adaptation and defense measures to its nuclear generation sites. These upgrades may range from seawalls surrounding the island to ensuring new plants are fitted with robust pumping systems, as well as retrofitting existing plants with closed water loop systems or alternative cooling systems to mitigate drought and heatwave risk.[37] Importantly, these large-scale adaptation projects must be covered under public works where high-quality labor standards apply.

However, as the state's experience has shown, establishing clean energy generation goals alone is not enough. Ensuring that New Jersey meets each of these ambitious targets requires parallel strategic investments and creative policies that support both new development and union jobs. Alongside an updated CES, New Jersey should expand the state's role in developing in-state clean energy generation, leveraging tools such as state procurement and aggregation, public power

development, utility ownership, and transmission planning to accelerate the deployment of clean energy infrastructure.

### STATE PROCUREMENT OF LARGE-SCALE RENEWABLES

State procurement of clean energy generation is one way to support developers' efforts to design and construct new clean energy projects. Importantly, New Jersey must ensure that these new projects preference high-road developers that comply with high-quality labor standards. To achieve both these goals, New Jersey must explore avenues to incentivize and procure new clean energy generation.

As a model for centralized utility-scale clean energy procurement, New Jersey could look north to New York state's Large Scale Renewables Program.[38] Administered via the state's clean energy authority, NYSERDA (New York State Research and Development Authority), the program allows NYSERDA to act as both the buyer and seller of Renewable Energy Credits (RECs), which correspond to a specified number of MW generated by a qualifying clean energy source.[39] NYSERDA runs competitive procurements wherein qualifying clean energy developers bid to sell their RECs, NYSERDA purchases those credits based on price and preferred criteria, and then NYSERDA resells those credits to utilities obligated to procure them as mandated for their compliance with the state's RPS. By acting as a market participant, NYSERDA strategically guides the state's clean energy transition in a way that aligns with the state's emissions reduction and job quality goals.

New Jersey could design a similar centralized procurement program, either administered through the BPU or through the establishment of a novel state agency similar to NYSERDA in New York. Such a program should incorporate labor standards including payment of prevailing wages, utilizing project labor agreements for the construction work, and labor peace agreements for associated operations and maintenance work., Though interventions like PLAs and LPAs, the state can ensure that these vital projects occur efficiently, on time, and without work stoppages.[40] The state could also prioritize projects that boost in-state generation by favoring bidders that commit to local benefits and job creation, and only allowing out-of-state projects if additional public interest criteria are met. In addition to this new procurement framework, the state could also explore creating midstream incentives that support job quality by bulk purchasing certain necessary equipment, like solar or battery components, from responsible producers that meet minimum labor standards, and reselling them to developers.

### AGGREGATE INVESTMENTS IN DISTRIBUTED ENERGY RESOURCES WITH HIGH-ROAD LABOR STANDARDS

Next, New Jersey must directly support efforts to expand the high-quality buildout of distributed energy resources (DERs) such as rooftop and community solar, batteries, and smart meters.[41] An expansive DER buildout is particularly important in a state like New Jersey, which is not only the most densely populated and most urbanized state in the country,[42] but is also home to an abundance of natural resources where renewable energy siting would be counterproductive, such as protected wetlands, wildlife refuges, and beneficial forest and farmland.[43] Relatively low open land availability means that the projected need for renewable energy generation far exceeds the state's technical capacity for large, utility-scale renewable energy development. New Jersey must therefore spur high-road renewable resource development on its large amount of already-developed land – including but not limited to building rooftops, parking lots, brownfields, and croplands where the colocation of agrovoltaics is viable and productive – to maximize the potential for in-state clean generation.

New Jersey's two main incentive programs for solar deployment on the residential and community scale – the Administratively Determined Incentive (ADI), and the Competitive Solar Incentive program (CSI)[44] – have successfully supported the construction of approximately 5 GW solar generation as of 2024, 80% of which is distributed-scale.[45] However, achieving the target buildout of 6.6 GW of new distributed generation requires that New Jersey more than double production over the next ten years.

## SCALING NEW JERSEY'S HYDROGEN ECONOMY

Clean hydrogen, produced with zero carbon emissions, can support widespread decarbonization efforts and has the potential to become a significant new industry of its own in New Jersey. Hydrogen is a lightweight, energy-carrying gas that can be burned as a fuel or passed through a fuel cell to produce electricity, and its ability to be stored as a gas or liquid allows it to be used for energy storage.[46] Although burning hydrogen releases nitrous oxides, neither the burning nor fuel cell processes produce point-source carbon emissions; in fact, the only by-product when converting hydrogen to electricity is water.[47] Today, the majority of hydrogen produced in the U.S. is produced on-site via fossil fuel-based steam methane reforming, and is used mainly for petroleum refining and ammonia production.[48] However, hydrogen can also be produced via electrolysis—the process of splitting of water into hydrogen and oxygen—powered by electricity.[49] When powered by renewables or nuclear energy, this method requires no fossil fuel feedstock and yields a carbon-free fuel.[50] The large-scale expansion of hydrogen production by electrolysis should be carefully managed, as it competes for large amounts of carbon-free electricity and fresh water.[51] However, clean hydrogen offers decarbonization solutions for energy storage, heavy transportation,[52] and industrial processes,[53] and may be vital for sectors that cannot readily be electrified in New Jersey.

Clean hydrogen is well suited to transition difficult-to-decarbonize processes. For example, achieving high-temperature industrial process heat over 500°C (932°F) is more technically feasible and provides economic advantages over alternative decarbonization solutions, like electrification.[54] This will also help decarbonize industrial processes where hydrogen is used as an input like treating metals, producing fertilizer, and processing fuels.[55] In specific areas of transportation like shipping, long haul trucking, and commercial aviation, hydrogen's high energy-to-mass ratio makes it preferable over large, heavy batteries.[56] Hydrogen's ability to be stored for extended periods of time as a gas or as a compressed liquid make it a candidate to provide large-scale long duration energy storage (LDES) and a solution for clean, remote backup power.[57]

New Jersey is a member of the federal Mid-Atlantic Hydrogen Hub (MACH2),[58] a national hub selected in October 2023[59] by the Biden Administration for targeted IIJA investments of up to $750 million of total federal cost share to jumpstart a national hydrogen industry.[60] MACH2 plans to integrate renewable and nuclear facilities across New Jersey, Pennsylvania, and Delaware to produce hydrogen for industrial and transportation decarbonization, as well as construct new hydrogen pipelines along existing rights of way.[61] In January 2025, the Department of Energy directed an initial $18.1 million in federal funding for the hub's initial development, including planning, design, and community and labor engagement activities.[62] However, the status of MACH2 remains in question, with the OBBBA accelerating the expiration of the IRA's clean hydrogen production tax credit (45V) by five years, requiring that new projects begin construction by the end of 2027 in order for the credit to apply.[63] (For more information on how the OBBBA changed federal support for climate infrastructure, see: *Funding Menu* on page 53.)

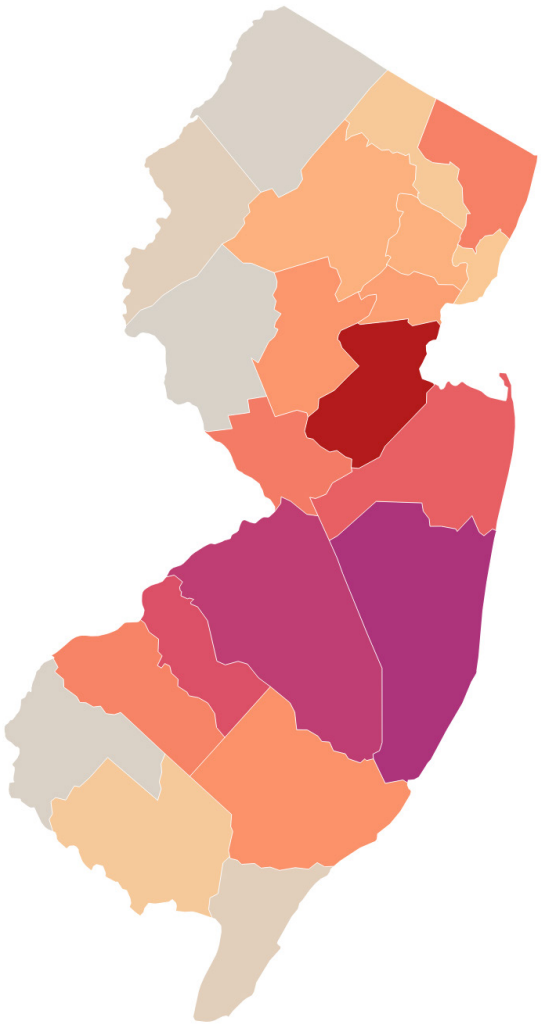
Despite federal setbacks, MACH2's initial development must continue and New Jersey, along with its partner states, must continue to lay the groundwork for the region's hydrogen development. New Jersey must uphold the strong labor standards, community engagement efforts, and transparency requirements that these hubs were designed to promote while supporting the nascent industry's development. The state should take immediate actions to facilitate the industry's growth such as exploring supportive funding avenues to make up for lost federal funding, creating regulatory frameworks that support sustainable production of clean hydrogen with strong labor standards, planning infrastructure that supports the use of hydrogen for hard-to-decarbonize sectors, facilitating community outreach, and continuing to pursue the construction of new renewable energy projects. These actions will ensure the state and region are prepared to sustainably develop this emerging industry, especially should IIJA-level federal support return.

New Jersey must simultaneously take definitive steps towards ensuring that new DER construction is performed by union labor. Research conducted by the Climate Jobs Institute revealed poor working conditions in the predominantly nonunion solar construction industry, characterized by an often transient workforce facing precarious worksite conditions, a lack of employer benefits, and racial disparities in payment and wage theft that disfavored workers of color.[64] New Jersey must proactively address the low road working conditions within this sector while also guaranteeing an expedient, efficient, and equitable buildout of distributed energy resources across the state.

**NEW JERSEY MUST PROACTIVELY ADDRESS THE LOW ROAD WORKING CONDITIONS WITHIN THIS SECTOR WHILE ALSO GUARANTEEING AN EXPEDIENT, EFFICIENT, AND EQUITABLE BUILDOUT OF DISTRIBUTED ENERGY RESOURCES ACROSS THE STATE.**

To ensure New Jersey's DER buildout delivers its full benefits to workers and communities, the state must move away from project-by-project small-scale distributed energy construction, and instead develop programs that aggregate multiple types of DERs into more efficient, large-scale projects. One potential approach for New Jersey is to design and implement a BPU program that, similar to the large-scale renewable procurement program outlined for utility-scale resources, issues competitive solicitations for aggregated DER projects to meet a threshold of no more than 500 KW. This program would operate similarly to NYSERDA's Large-Scale Renewables Program outlined above, where projects are competitively selected based on price as well as other qualitative factors. In this case, the BPU could prioritize projects that aggregate DERs into Virtual Power Plants, or VPPs, which link multiple types of resources into one coordinated entity that can be managed as if they were a singular traditional power plant. VPPs offer flexible, dispatchable electricity sources that help balance real-time grid demand, relieve grid congestion, and enhance grid reliability.[65] To create

**NEW JERSEY RESIDENTIAL & COMMUNITY SOLAR INSTALLATIONS BY COUNTY, 2000-2025 (KW)**



Residential and Community Capacity (kW)

0 700

Data published on November 27, 2024; covers all solar PV installations from January 1, 2000 to January 31, 2025.

Map: Cornell Climate Jobs Institute (CJI)

Source: NJ County Solar PV Dashboard / View on Datawrapper

a market for these aggregated DER credits, the program could be paired with legislation that requires the state's utilities to deploy certain megawatt thresholds of DER construction, along with good faith efforts to begin construction before July 4, 2026 to take full advantage of federal clean electricity tax credits (for more information on potential funding mechanisms for such a program, see: *Funding Menu* on page 53). An aggregated procurement program must include high-quality labor standards attached to all construction work, including payment of prevailing wages, project labor agreements, hiring from within local zip codes, supporting quality pre-apprenticeship programs, and setting apprenticeship utilization quotas.

In addition to this novel procurement framework, New Jersey could further support the aggregated deployment of DERs while creating opportunities for high-road contractors in several different ways. The state could create a Public Renewable Energy Program by establishing a new state entity that aggregates various forms of public financing, awards bundled DER projects with high-road labor standards, and prioritizes developments in low- and middle-income communities as a means to improve energy security.[66] New Jersey can also support high-road aggregated DER development by allowing utilities to construct and own distributed generation assets in a way that enhances grid resilience, is cost-effective, and creates high-quality jobs. In short, the state has several policy pathways to support aggregated, scaled DER construction in a way that benefits both workers and communities alike.

## SUPERCHARGE STATE TRANSMISSION COORDINATION TO SUPPORT NEW ENERGY RESOURCES

Alongside the construction of 24.2 GW of new clean energy generation by 2035, New Jersey must also ensure that all of this new generation can connect to the grid via new and upgraded transmission and distribution lines. For new generation new projects, transmission can quickly become the missing link that delays project grid connections. PJM's interconnection queue has become one of the longest in the country,[67] with an average of over three years between interconnection request and interconnection agreement.[68] Moreover, transmission interconnections are often expensive and difficult to get sited and permitted.[69] In a state as dense as New Jersey, these siting challenges are exacerbated.[70]

Proactive transmission and distribution planning and construction are essential to not only reducing the interconnection backlog, but also in ensuring energy affordability.[71] While the Federal Energy Regulatory Commission (FERC) has issued several orders to address the interconnection process at grid authorities like PJM[72] and support coordinated alignment of transmission planning across states,[73] these federal processes can be paired with supportive state programs and financing to support the most efficient, expansive transmission buildout possible.

## SUPPORTING NEW JERSEY'S EFFORTS TO PURSUE OFFSHORE WIND AND SUPPORT A NEW MANUFACTURING INDUSTRY

Over the last few years, New Jersey's government, labor leaders, and other stakeholders laid strong groundwork to prepare the state for a new and promising offshore wind industry. With direct investments in both the New Jersey Wind Port in Lower Alloways Creek and the offshore wind monopile factory at the Paulsboro Marine Terminal,[74] the state took significant steps towards welcoming offshore wind to its coastline while also supporting high-quality job creation through the use of project labor agreements and workforce equity measures.[75]

The New Jersey Wind Port was designed to become the nation's first purpose-built port dedicated to offshore wind staging and assembly.[76] The location was selected in part due to its large greenfield capacity and unrestricted access to the ocean, which is unique for many northeastern ports.[77] Plans for the wind port also included on-site turbine manufacturing, with an estimated creation of 1,500 direct jobs in operations and manufacturing as well as support for up to 20,000 indirect jobs in the wind sector by 2030.[78] To facilitate staging efforts at the wind port, New Jersey also developed the nation's first monopile factory at the Paulsboro Marine Terminal, with a goal to construct 100 monopiles per year.[79]

Although there has been strong support and collaboration in preparing for the Atlantic offshore wind industry, New Jersey's offshore wind project solicitations struggled to catalyze wind farm development due to market, regulatory, and political uncertainties.[80] New Jersey's early solicitations in 2019[81] and 2021[82] awarded several projects to Orsted; however, the Danish developer pulled out of all its New Jersey projects citing supply chain uncertainty and rising inflation in 2023.[83] In late 2024, the Atlantic Shores South project received final federal permit approval,[84] while the state's two remaining projects – Leading Light Wind and Attentive Energy Two – were awaiting final federal permit approval[85] in October 2024.

Beginning in early 2025, unfavorable federal policy triggered a significant slowdown to the entire U.S. offshore wind industry. All projects without final federal permit approval were effectively paused with a new memorandum issuing a pause on all new permitting activity for offshore wind.[86] These changes not only sent shocks throughout the industry, but also in New Jersey, where Atlantic Shores South sought a pause on development citing regulatory uncertainty.[87] In response, New Jersey's Economic Development Agency (EDA) announced that it would accelerate a "strategic review" of alternate uses for the New Jersey Wind Port,[88] and existing monopiles in Paulsboro have been deconstructed for new purposes.[89]

Port infrastructure investments remain a crucial tool for economic development in the state, as they can drive both local and regional economic growth and generate high-quality, family-sustaining union construction jobs. However, New Jersey must also not lose sight of the need for offshore wind development along the state's coastline, especially as a tool to reach clean energy goals, meet regional electricity needs, and to modernize and future-proof the grid. The state's existing work to identify viable ports, award lease sites, and develop partnerships with labor unions represent progress that could still be pursued under a more favorable environment. New developments to port infrastructure should keep the initial vision for offshore wind in mind by avoiding projects that would reduce a site's ability to host offshore wind staging or component manufacturing. New Jersey and its regional state, grid, and utility partners must also prepare for and invest in building the transmission infrastructure necessary to accommodate future power generation. Despite present challenges, New Jersey must continue to lead in facilitating the offshore wind industry to unlock thousands of local jobs and many more domestic regional supply chain jobs; its unions remain eager to build and maintain these essential offshore wind projects.

New Jersey must explore alternative transmission financing and development models to both scale the necessary transmission network necessary to support new clean energy generation as well as generate ratepayer savings.[90] One potential option involves the establishment of a state Grid Development Authority, modeled after similar state siting authorities in Colorado[91] and New Mexico.[92] This independent public authority would be authorized to coordinate with BPU and other state agencies to proactively plan transmission line development; streamline the siting and permitting process; finance, build, own, and operate new transmission infrastructure; and enter into public-private partnerships that alleviate ratepayer burden. Using its bonding power, New Jersey's new Grid Development Authority could issue competitive solicitations on large-scale transmission and distribution infrastructure, where it could select for projects that maximize emissions reduction impact, alleviate grid congestion, and provide the greatest benefits to the public. These benefits would include high-quality labor standards including project labor agreements on construction, prevailing wages, apprenticeship and pre-apprenticeship utilization, and local hire provisions (for more information on how to fund such a program, see: *Funding Menu* on page 53).

This authority should also conduct community outreach for neighborhoods where transmission lines will be developed, including seizing opportunities for the establishment of new community benefits agreements for areas affected by development. To align the authority's mandate with other state initiatives focused on building more clean electricity, the state could also explore giving this authority the ability to preemptively build transmission capacity in anticipation of new projects, while also pursuing the option of constructing additional renewable power on undersubscribed lines of transmission under high-quality labor standards.

# ADDITIONAL RECOMMENDATION DETAILS

## COSTS

### Large-Scale Renewables and Distributed Energy Resources

| Technology | Total Cost by 2030 | Cost per Year |
|---|---|---|
| Utility Solar | $1,455,000,000 | $291,000,000 |
| Distributed Solar | $4,770,000,000 | $954,000,000 |
| Onshore Wind | $715,000,000 | $143,000,000 |
| Offshore Wind | $6,200,000,000 | $1,240,000,000 |
| Short Duration Storage | $3,480,000,000 | $696,000,000 |
| Long Duration Energy Storage | $945,000,000 | $189,000,000 |
| Total Generation & Storage | $17,565,000,000 | $3,513,000,000 |

### Transmission

| Technology | Total Cost by 2030 | Cost per Year |
|---|---|---|
| Transmission | $419,000,000 | $83,800,000 |

## JOBS

### Large-Scale Renewables and Distributed Energy Resources

| Technology | Total Direct Jobs Through 2030 | | Direct Jobs Per Year | |
|---|---|---|---|---|
| | All Occupations | Construction Trades Jobs | All Occupations | Construction Trades Jobs |
| Utility Solar | 2,200 | 405 | 440 | 81 |
| Distributed Solar | 8,700 | 1,600 | 1,740 | 320 |
| Onshore Wind | 850 | 155 | 170 | 31 |
| Offshore Wind | 2,850 | 500 | 570 | 100 |
| Short Duration Storage | 950 | 180 | 190 | 36 |
| Long Duration Energy Storage | 260 | 50 | 52 | 10 |
| Total Generation & Storage | 15,810 | 2,890 | 3,162 | 578 |

### Transmission

| Technology | Total Direct Jobs Through 2030 | | Direct Jobs Per Year | |
|---|---|---|---|---|
| | All Occupations | Construction Trades Jobs | All Occupations | Construction Trades Jobs |
| Transmission | 2,650 | 485 | 530 | 97 |

### Emissions Reductions

Emission reductions by 2030 and 2035 are **4.73 million** MTCO2e/yr and **15.1 million** MTCO2e/yr, respectively.

RECOMMENDATION: CLEAN BUILDINGS

# RAPIDLY SCALE A STATE-LED GREEN BUILDINGS AGENDA

- Establish a state program to build thermal energy networks in public buildings, prioritizing campuses located in overburdened communities
- Cultivate public-private partnerships to build thermal energy networks in public housing, and explore utility-led TENs for the residential sector
- Build 40,000 new energy-efficient, permanently affordable housing units by 2035, prioritizing municipalities that have not met their Mount Laurel affordable housing quota

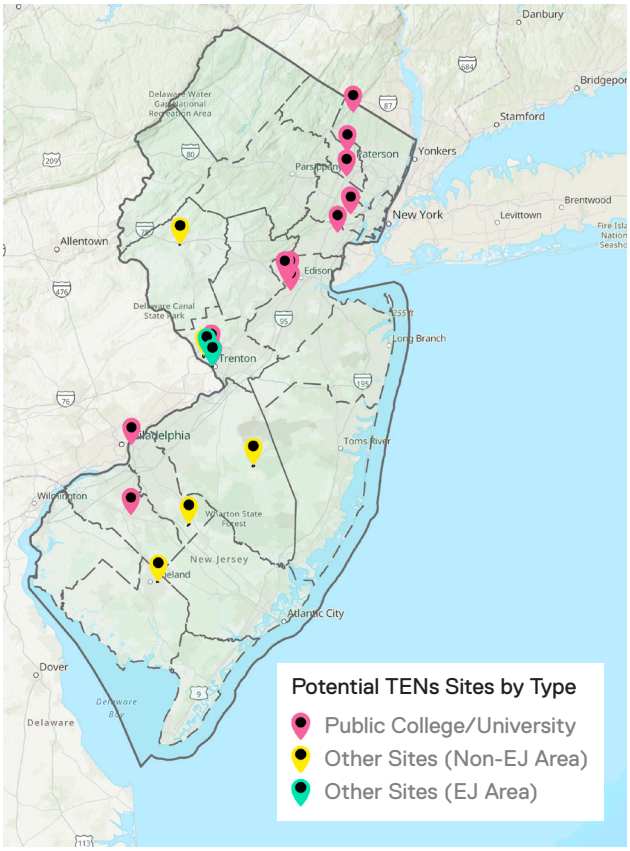
Buildings sit at the intersection of multiple social dilemmas. They are the largest stationary sources of greenhouse gas emissions;[1] there is a critical lack of affordable housing; and unions are underrepresented in the residential construction industry. To equitably address these problems, New Jersey will require a dynamic green buildings agenda that not only centers energy efficiency and affordable housing development, but also union job creation for the state's most overburdened communities (OBC). New Jersey has about 3.4 million residential buildings,[2] 14,100 commercial buildings,[3] 2,506 public K-12 schools,[4] and 29 public universities and colleges.[5] Most of these buildings still rely on inefficient fossil fuels for heating and cooling,[6] and most are among the oldest in the country.[7]

These aging and inefficient buildings come at a great cost. The electricity bill for New Jersey's public buildings alone is $61 million.[8] On the residential side, low-income residents spend nearly $1,500 annually on energy costs;[9] equating to an average energy burden of 11%[10] – significantly higher than the national average of 3%.[11]

Public housing supports many of the state's extremely low-income (ELI) communities, but it is nowhere near sufficient to house New Jersey's most housing-vulnerable population. A total of 41,437 tenants, 57% of whom are elderly or have a disability, live in social housing as of 2024.[12] However, 200,000 more units are needed to shelter all of the state's ELI residents, according to the National Low-Income Housing Coalition (NLIHC).[13] The public housing that does exist is concentrated in regions at risk of extreme climate events,[14] and almost 20% of it is in disrepair.[15]

Both public and private actors have attempted to tackle these issues with varying levels of success, but often their efforts move slowly, are underfunded, and do not provide adequate resources to support building owners with their decarbonization needs. As of the most recent data, New Jersey's main public building decarbonization program, administered by the Board of Public Utilities (BPU), has only worked on 167 projects statewide.[16] Further, many of the residential rebate programs administered by utilities either do not offer sufficient incentives for critical energy efficiency upgrades or exclude larger buildings from their programs altogether. In fact, only one utility rebate program provides a pathway for multifamily buildings to transition to clean energy, and it only started in 2024.[17] The few utilities that do administer programs for larger buildings only offer low-hanging fruit upgrades, like faucet aerators and air sealing. This

### POTENTIAL SITES FOR NEW JERSEY THERMAL ENERGY NETWORK PROJECTS




Building groups across the state identified as potential sites for Thermal Energy Network (TEN) construction. However, site feasibility should be confirmed with more in-depth, state-funded studies. (Source: CJI Analysis of New Jersey Department of Treasury data obtained via Open Public Records Act request.)

programmatic gap leaves cash-strapped owners of larger affordable housing buildings without the resources they need to make their buildings energy efficient.

Taken together, these issues demonstrate the need for a state-led agenda that reduces emissions, improves affordability, and revitalizes New Jersey's construction industry. Rehabilitating the state's buildings and increasing housing supply will help close the state's affordable housing gap and create new construction jobs. The state must also ensure the new jobs created from this work are high-road union jobs. This is critical considering the large size of New Jersey's construction workforce, and, in particular, the low-road employment practices that have degraded many of these jobs.[18] Construction is the second-largest industry in the state, with more than 200,000 workers,[19] and yet 30% of them lack health insurance and their families are 27% more likely to participate in safety net programs compared to all working families.[20] Research shows a union job can improve work well-being, benefits, pay, and equity.[21] As New Jersey fashions a green buildings agenda, it is paramount that the state prioritize solutions that not only address climate mitigation, but also create high-quality union jobs.

A dynamic, equitable, green buildings agenda will lead to a statewide reduction of greenhouse gas emissions, an increase in efficient and affordable homes, and a swell of good, unionized jobs. New Jersey should start this agenda by first decarbonizing its public building stock using well-trained, well-paid, local union labor, and then by decarbonizing its residential buildings, all the while making them more affordable in the process. This work will set the stage for New Jersey's transition to a fully zero-carbon economy of the future.

## HOW WE GET THERE

### CONSTRUCT THERMAL ENERGY NETWORKS IN PUBLIC BUILDINGS

New Jersey has very few programs that cater to public buildings, and the programs that do exist are insufficient to comprehensively decarbonize the state's public building stock. Specifically, the state's main public building decarbonization program, the Energy Savings Improvement Program (ESIP), has only worked on roughly 5% (167) of the state's 3,700 public buildings.[22]

New Jersey can scale its public building decarbonization efforts by constructing thermal energy networks (TENs). These are systems of interconnected underground pipes that use non-combusting and non-emitting thermal sources to heat and cool buildings.[23] **The state can start this work by establishing a program that builds TENs in public buildings,**

**prioritizing those located in OBCs.** New Jersey's public colleges and universities, the state capitol complex in Trenton, and a number of development centers operated by the state's Department of Human Services (NJDHS), as well as other state agency building complexes, offer strong potential for initial public building TENs projects.

Decarbonizing public buildings through the use of TENs can significantly reduce New Jersey's greenhouse gas emissions. Programs that incentivize the adoption of TENs-like technology in places like public buildings have already successfully reduced emissions in New Jersey.[24] TENs are six times more effective than the most energy-efficient furnace on the market,[25] and could yield substantial cost savings for the state. Public schools are already making the biggest cuts to building emissions compared to other building types through the adoption of TENs-like technology.[26] Replacing New Jersey's aging gas infrastructure with TENs would create high-road union jobs, save energy when heating and cooling buildings, and lower energy costs for the state overall.

Beyond emissions reductions and cost savings, decarbonizing the state's public buildings with TENs also means improved public health and occupational safety. Greenhouse gas emissions from public schools in particular negatively impact the health, wellness, and performance of students and faculty.[27] Addressing poor air quality in schools can have a considerable impact on New Jersey's second-largest workforce: elementary and secondary school workers.[28] With TENs, schools can have improved air quality, emissions can be largely reduced, and the state can recoup funding that would have otherwise been spent on energy and healthcare.

### CULTIVATE PUBLIC-PRIVATE PARTNERSHIPS TO BUILD THERMAL ENERGY NETWORKS IN PUBLIC HOUSING, AND EXPLORE UTILITY-LED TENS FOR THE RESIDENTIAL SECTOR

The traditional building-by-building decarbonization approach is not enough to meaningfully cut emissions statewide, especially in the residential sector, which is responsible for 46% of New Jersey's total building emissions.[29] As a result, large-scale decarbonization projects in homes can make a significant impact. To do this, the state needs to address the multiple compounding issues with its housing stock, including unaffordability,[30] energy inefficiency,[31] and disrepair.[32] These issues are felt most deeply by low-income communities. Public and rental housing is often poorly managed,[33] and homes in disrepair are unsafe, undignified, and require more energy to maintain.[34] Twenty percent of New Jersey's public housing, for example, failed inspection.[35] Furthermore, many people living in subpar homes, which include renters, rely upon natural gas. There is an urgent need to preserve and rehabilitate New Jersey's affordable housing stock to ensure its most vulnerable residents have access to safe, dignified, and energy-efficient homes.

**NEW JERSEY SHOULD CULTIVATE PUBLIC-PRIVATE PARTNERSHIPS TO CONSTRUCT TENS IN PUBLIC HOUSING CAMPUSES.**

To address these challenges, New Jersey should cultivate public-private partnerships to construct TENs in public housing campuses. The state can start this work by facilitating partnerships between the state's utilities and the public housing authorities, as seen in Boston[36] and New York (see: *Franklin Field Geothermal Network* on page 31).[37] Transitioning older building systems off of fossil fuels through TENs can create high-road union jobs, lower energy bills,[38] and improve public health.[39] The BPU's Ratepayer Impact Study notes that household energy costs in 2030 may be lowered if residents adopt electric heating technologies and participate in energy efficiency programs.[40] The same study also found that the avoided costs of reduced emissions from electrified New Jersey homes could generate up to $1.75 billion annually by 2030.[41] Maximizing both public and private capital through these partnerships will help the state garner the funding needed to reduce emissions, improve the daily living conditions for LMI residents, and create union jobs (see: *Funding Menu* on page 53).

### FRANKLIN FIELD GEOTHERMAL NETWORK

In January 2025, the Boston Housing Authority (BHA) announced its partnership with National Grid to decarbonize Franklin Field, a public housing complex located in Dorchester, Massachusetts.[42] Using federal capital funds, redirected BHA investments, American Rescue Plan funds, and state grants,[43] the project will construct a geothermal network with ground-source heat pumps and fully retrofit the buildings. The geothermal network will replace a 20-year-old gas-fired boiler, and heat and cool between 7-13 public housing buildings, an area totaling 165,000 square feet of space.[44] National Grid will lead on the construction of the geothermal network, the BHA will lead on work on building upgrades (i.e., retrofits, rewiring, appliance and heating equipment replacement, etc.), and both partners will collaborate on energy efficiency investments. The project is expected to reduce energy use by 55%.[45]

These upgrades will also significantly improve the quality of living for the 1,000-plus tenants of the complex. Home to Black and Brown working-class residents who earn up to $30,000 annually, Franklin Field was previously a sore spot for the BHA. The complex was notorious for its disgraceful living conditions, with hundreds of unanswered work orders and complaints about heating, hot water, mold, and rodents.[46] BHA's partnership with National Grid provides an example of how public agencies can work with private entities to reduce emissions and provide dignified, affordable housing for low-income communities.

The state should also rehabilitate its other privately-owned affordable housing buildings to be TENs-ready. The state can start this work by expanding the New Jersey Whole House pilot, a weatherization program serving income-eligible Trenton residential buildings with one to 14 units,[47] to more cities across the state. These projects should be bundled and also prioritize buildings in OBCs. Utilities should also expand their budgets for residential energy efficiency programs to serve multi-family buildings with more than 14 units. These programs should adjust their income eligibility to allow buildings with an average 80% area median income (AMI) to participate, instead of the existing 250% of the federal poverty rate threshold. Utilities must incentivize a more expansive range of efficiency upgrades for home and building owners, including, but not limited to: health and safety measures, electric vehicle charging stations, electrical panel upgrades, battery storage, and solar. It is also important that these programs remind participants of the still extant Inflation Reduction Act's (IRA) 48a geothermal tax credits, which homeowners may use to support the adoption of ground-source heat pumps. (for additional details on the remaining IRA tax credits, see: *Funding Menu* on page 53) These actions will allow a larger segment of buildings to address their varied needs and become more efficient.

To safeguard residents from displacement – which can occur from rising property values – it is imperative that both these recommendations include robust tenant protections, similar to those established in Pennsylvania's Whole-Homes Repairs Program.[48] These protections would include no annual or monthly rent increases for 15 years, no serious code violations, and a three-year lease extension offered to occupying tenants.

In addition to ensuring the state's most vulnerable residents receive the benefits of TENs, New Jersey should explore the viability of utility-led TENs networks to maximize the impact of building decarbonization across regions and building types. This could include utility-driven development of pilot projects in residential areas across the state, similar to how New York state is implementing its efforts to decarbonize the residential sector using utility-led thermal energy networks.[49]

### EXPAND ENERGY-EFFICIENT AFFORDABLE HOUSING

Affordable housing has become increasingly out of reach for New Jersey's working-class residents. The state is underproducing affordable housing units, and a majority of low-income tenants are severely rent-burdened.[50] Solving this crisis is not out of reach, and there is already precedent in New Jersey for trying to address it. Northern New Jersey underwent a historic housing

construction boom from 2010 to 2022. Hudson, Essex, Bergen, Union, and Passaic counties issued permits for over 200,000 housing units,[51] amounting to nearly one-third of all such permits in the tri-state region during this period.[52] In Newark, existing buildings on city-owned land were rehabilitated to create more units, and existing affordable housing was renovated to preserve existing units.[53] The city also implemented other initiatives, including loan forgiveness programs, low-cost mortgages for first-time homebuyers, and homeownership pathways for Section 8 voucher holders.[54]

But not all regions of the state are building their fair share of affordable housing; some are even actively opposing it.[55] Many towns across New Jersey are going so far as suing the state in an attempt to block the Mount Laurel Doctrine – New Jersey's foundational legal framework that requires all municipalities to build affordable housing[56] – from being implemented.[57]

New Jersey must take action to ensure its hard-working residents have access to affordable and energy-efficient

**NEW JERSEY SHOULD COMMIT TO BUILDING 40,000 NEW ENERGY-EFFICIENT AFFORDABLE HOUSING UNITS BY 2035.**

housing. One action is to commit to building 40,000 new energy-efficient affordable housing units by 2035, prioritizing municipalities that are not in compliance with the Mount Laurel Doctrine. The state currently builds about 2,700 affordable units annually;[58] this new target would add 1,300 units to the state's annual production. These units would be permanently affordable, have income restrictions, and require anti-discrimination provisions. The state can implement and regulate its construction through a newly-created Green Social Housing Development Program within the Housing and Mortgage Finance Agency, and use project labor agreements, apprenticeship quotas, and pay the prevailing wage rate to ensure its projects have maximal benefit for the state and its residents. Once built, the Program could offer two leasing models for the energy-efficient units: one for renters who earn up to 120% AMI, another for homeowners who earn between 80% and 120% AMI. These two leasing programs would help energize New Jersey's housing supply by expanding access to affordable, energy-efficient units and establishing a homeownership pathway for workers.

New Jersey needs more affordable housing, and this has become even more urgent amid federal funding cuts to safety net programs.[59] The state can take this moment of housing development to also reduce its greenhouse gas emissions from buildings. Research shows that building newly constructed residential buildings fossil fuel-free can be cost-effective.[60] Investing more in this type of affordable housing construction will help the state make meaningful gains in cutting emissions, while also desegregating its housing stock.

# ADDITIONAL RECOMMENDATION DETAILS

## COST

### Public building thermal energy networks

| Building Group* | Geothermal Conversion Cost | TENs Installation Cost | Total Cost by 2035 |
|---|---|---|---|
| Public Colleges/Universities (4-year)** | $1,030,000,000 | $1,110,000,000 | $2,140,000,000 |
| Capitol Complex | $16,900,000 | $18,300,000 | $35,200,000 |
| New Lisbon Developmental Center | $10,400,000 | $11,300,000 | $21,700,000 |
| Hunterdon Developmental Center | $6,810,000 | $7,380,000 | $14,200,000 |
| Vineland Developmental Center | $12,700,000 | $13,700,000 | $26,400,000 |
| Ancora Psychiatric Hospital | $17,800,000 | $19,300,000 | $37,100,000 |
| Katzenbach School for the Deaf | $11,100,000 | $12,000,000 | $23,100,000 |
| New Jersey Department of Transportation (NJDOT) | $9,600,000 | $10,400,000 | $20,000,000 |
| **TOTAL** | **$1,110,000,000** | **$1,200,000,000** | **$2,310,000,000** |

* All costs are rounded up to three significant figures for reporting purposes and are adjusted for the latest economic data as of Q2 2025.

**Includes the following colleges and universities: Kean University; Montclair State University; New Jersey Institute of Technology; Ramapo College; Rutgers University (New Brunswick, Camden, and Newark campuses – excluding the existing thermal energy network at the New Brunswick campus); Rowan University; The College of New Jersey; Thomas Edison State College; and William Paterson University.

### Affordable housing

The following cost estimates assume the use of air-source heat pumps (ASHPs) in all unit and building HVAC systems.

| Additional Annual Production (units) | Approximate Total Annual Production (units) | Estimated Annual Cost | Total Cost (10-Year Cost) |
|---|---|---|---|
| 1,300 | 4,000 | $422,000,000 | $4,220,000,000 |

## JOBS CREATED & LABOR STANDARDS

| Total Job Creation for Project Type | Direct Jobs Per Year | | Direct Jobs Through 2030 | |
|---|---|---|---|---|
| | All Occupations | Construction Trades Jobs | All Occupations | Construction Trades Jobs |
| Affordable Housing | 2,000 | 530 | 10,000 | 2,650 |
| Thermal Energy Networks | 1,000 | 260 | 5,000 | 1,300 |

Labor standards note: While the adoption of any particularly labor standards depends on the particular approach taken, potential labor standards and requirements for building decarbonization can include: including project labor agreements, prevailing wages, targeted local hiring, apprenticeship utilization quotas, pre-apprenticeship program support, all-American manufacturing of structural steel and iron, and coordinated bulk purchasing of electric appliances on all types of building decarbonization programs named in this report. To further support underrepresented workers in joining the building trades, the state should work with unions to invest in wraparound services (e.g., childcare assistance, transportation stipends, etc.) and construction-related workforce development and job-readiness programs.

The new green buildings agenda will require dedicated oversight by the Department of Labor to ensure all projects comply with labor standards. The current practice of self-certification is not sufficient. Public reporting to assess progress on public works installations and unionized contracting has been effective in administering labor standards elsewhere.

## EMISSIONS REDUCTIONS

Public building thermal energy networks

| Building Group | Total GSF (Gross Square Feet) | Estimated Annual Scope I Emissions (MTCO2e) |
|---|---|---|
| Public Universities (4-year) | 48,839,572 | 380,513 |
| Capitol Complex | 804,729 | 1,522 |
| New Lisbon Developmental Center | 495,201 | 1,162 |
| Hunterdon Developmental Center | 324,327 | 709 |
| Vineland Developmental Center | 603,239 | 1,110 |
| Ancora Psychiatric Hospital | 846,971 | 2,654 |
| New Jersey School for the Deaf | 527,001 | 1,250 |
| New Jersey Department of Transportation (NJDOT) | 457,159 | 832 |
| **TOTAL** | **52,898,199** | **389,752** |

RECOMMENDATION: STORMWATER RESILIENCE

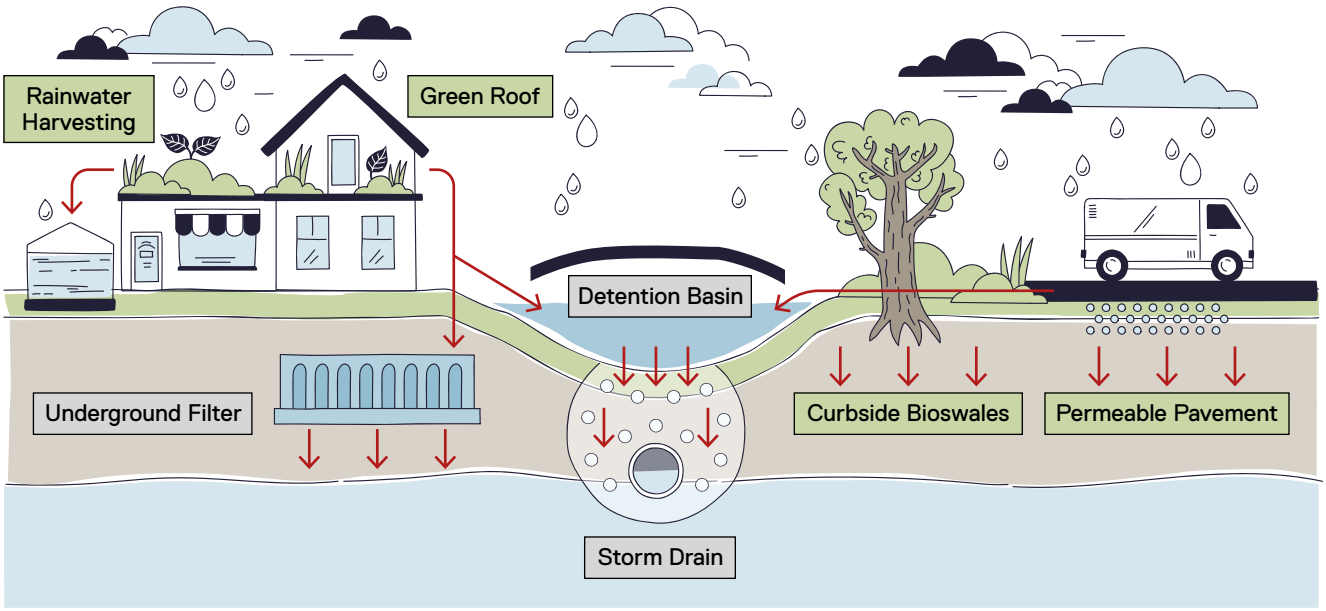
# COORDINATE AND FUND AN EXPANSION OF UNION-BUILT STORMWATER RESILIENCE PROJECTS ACROSS THE STATE

- Expand watershed-level coordination capacity within the New Jersey Department of Environmental Protection (NJDEP) to support the development of new stormwater infrastructure projects
- Boost funding for the Resilience Infrastructure Bank (I-Bank) to support stormwater infrastructure construction alongside high-quality labor standards
- Encourage and adopt stormwater utility fee programs with layered incentives that target large commercial properties to tackle stormwater resilience and mandate labor standards

New Jersey is an increasingly flood-prone state. In the last 50 years, extreme rain events have already increased by 71% – representing a faster pace of change than any other state in the nation.[1] The impacts of storms in New Jersey are only set to magnify under a changing climate. As higher concentrations of greenhouse gases in the atmosphere continue to drive up temperatures, these warmer conditions allow the atmosphere to hold more water vapor, leading to supercharged and more frequent intense storms. By 2050, New Jersey can expect to see anywhere from 4% to 11% more annual precipitation, with heavy precipitation events becoming two to five times more frequent compared to the twentieth century.[2]

Importantly, the effects of repeated extreme weather crises have already hit the state. Since 2011, New Jersey has faced 14 FEMA-declared disasters, all of which involved extreme precipitation.[3] Collectively, these disasters cost the state more than $7.9 billion, giving New Jersey the fifth-highest per capita spending on climate disaster response in the country.[4] The state's Hazard Mitigation Plan analyzed that under current conditions, annual potential losses from the impact of extreme flooding on the built environment alone could exceed $2.7 billion dollars, or 2% of the state's total building stock.[5] Flood risks not only present broad risks to the nearly 1.3 million New Jerseyans that live in increasingly dangerous floodplains, but also create especially acute risks to the 650,000 lower-income residents who live in floodplains and have fewer resources to relocate to safety.[6] Just as New Jersey takes on the work of mitigating its impact on climate change by decarbonizing the state's energy system, building stock, and transportation

## GREEN AND GRAY STORMWATER INFRASTRUCTURE




Visualization of green versus gray infrastructure options. Gray infrastructure includes detention basins, physical filters and storm drains, while green infrastructure includes green roofs, permeable pavement, bioswales, and other nature-based interventions.

network, it must also invest in adapting to the shifted climate and environment that the state will face as flooding and storms become stronger and more frequent.

Even in today's climate, the state's stormwater management infrastructure struggles to handle the water that passes through the network of drains and pipes, reflected by the scale of flood-related damage increasingly impacting the state. Water system insufficiencies are particularly dire in the older urban areas of New Jersey, where combined stormwater-sewer systems constructed in the nineteenth century remain in place and often discharge contaminated water into waterways during periods of intense rain and flooding.[7] Combined sewer overflows (CSO) resulting from these overwhelmed systems disproportionately occur in low-income communities of color,[8] meaning that wholescale stormwater system reform is not only an issue of safety, but one of justice and equity.[9] **To protect the vitality of the communities and generate a significant pipeline of union work, New Jersey must proactively invest in stormwater management and resilience projects**.

Both green and gray infrastructure offer a promising opportunity to adapt to the effects of climate change in New Jersey. Traditional gray infrastructure like pipes, drains, gutters, and concrete basins offer hard interventions to quickly divert stormwater from undesired locations without necessarily reabsorbing water back into local ecosystems. Green infrastructure, like permeable pavement, rain gardens, bioswales, and other water flow interventions that integrate natural elements, can work in tandem with gray infrastructure to divert, store, or reabsorb water back into natural systems.[10] When both technologies are integrated across watersheds, communities benefit from a more stable stormwater system that better handles projected increases in rain and stormwater flooding.

Fortunately, New Jersey has already developed a strong foundation of green and gray stormwater management, setting the groundwork to envision and plan for what resilient stormwater infrastructure could look like in its most vulnerable communities. New Jersey's municipalities have begun investing in their own green and gray infrastructure projects to handle increases in


Flooding in Bound Brook, New Jersey following heavy rain in the spring of 2007.

stormwater, especially in response to disaster events[11] (See: *Hoboken's Hurricane Recovery Model: "Resist, Delay, Store, Discharge"* on page 38). In 2023, New Jersey also upgraded all its municipalities to a Tier A MS4 designation[12] under the federal Clean Water Act,[13] which was previously reserved only for the most high-risk areas.[14] This new designation now requires all of the state's municipalities to more comprehensively analyze local stormwater impacts and submit a Watershed Improvement Plan (WIP) by 2026.[15] The state also offers some technical assistance funding to municipalities in the development of these plans.[16] However, while these plans are required to consider watershed impacts, they are not required to coordinate project ideas between municipalities and across watersheds.[17]

New Jersey has also begun investing in community engagement-driven resiliency planning via the Resilient NJ program.[18] Utilizing multiple sources of federal and state funding, this NJDEP program developed four cross-municipal Resilience Action Plans within particularly climate-vulnerable communities: northeastern New Jersey,[19] coastal Atlantic County,[20] the Raritan River and Bay,[21] and Long Beach Island.[22] Having gone through extensive community engagement and project scoping processes, New Jersey is fortunate to have already developed blueprints for initial projects for investment and construction in especially at-risk areas of the state. However, many of these projects remain unbuilt, with participating communities receiving just $26.5 million in funding actual construction towards resilience actions as of early 2025.[23]

**NEW JERSEY MUST STEP IN TO SUPPORT THE COORDINATION AND FINANCIAL BACKING OF NEW, LARGE-SCALE ADAPTATION INFRASTRUCTURE BY HARNESSING ITS UNION LABOR WORKFORCE.**

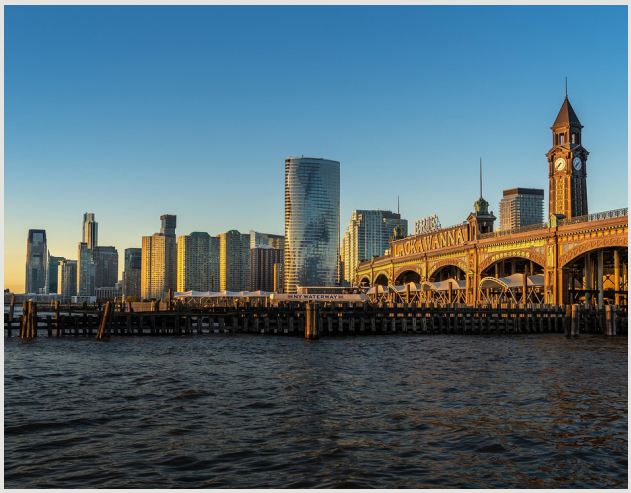
## HOBOKEN'S HURRICANE RECOVERY MODEL: "RESIST, DELAY, STORE, DISCHARGE"

The city of Hoboken offers a model for how to strategically rebuild and enhance resilience following extreme weather events. Spanning just over one square mile,[24] Hoboken is the fourth most densely populated city in the state.[25] During Hurricane Sandy in 2012, Hoboken was inundated with 500 million gallons[26] of a 14-foot storm surge that left many residents stranded and without power for days[27] and caused more than $110 million in property damage.[28] As former City Manager Stephen Marks reflected, "Hoboken pretty much filled up like a bathtub."[29]

In the years following hurricane recovery efforts, Hoboken applied for and successfully won $230 million from the U.S. Department of Housing and Urban Development (HUD) to implement portions of a new, comprehensive stormwater management strategy developed by a team of interdisciplinary designers focused on improving the city's resilience.[30] The overarching strategy – known as "resist, delay, store, discharge" – deployed both gray and green infrastructure interventions towards four distinct methods of handling extreme flooding from both storm surge and flash flooding.[31]

As per the city's plan, "resist" elements target coastal defense to eliminate excess water entry into the city, including the construction of hard infrastructure like floodwalls and gates paired alongside green landscaping elements like raised coastal embankments.[32] "Delay" and "store" elements work together to both slow rainwater runoff from entering the city's combined sewer system too quickly and hold onto water temporarily, and include the construction of sunken basketball courts, rain gardens, and permeable pavement that drains into underground cisterns.[33] Finally, "discharge" elements strengthen or expand drainage systems back into the ecosystem, including new high-velocity pumping stations and upgrading the existing combined sewer system.[34]

The Hoboken project was designed and developed alongside an extensive community engagement process that included input from a wide range of stakeholders.[35]




View of Hoboken's Lackawanna Railroad Terminal, which has been targeted for significant resilience upgrades due to both its importance for regional transportation as well as the station's historic value.

Hoboken was able to supplement its $230 million of HUD funding with $150 million raised by the city through direct funding from the state, as well city funds via low-interest loans from the New Jersey Infrastructure Bank.[36] As of 2024, Hoboken had already separated parts of its combined sewer system, built new high-velocity flood pumps and pump stations, and constructed three "Resiliency Parks" that include rain gardens, permeable pavement, and green roofs that drain into underground storage facilities.[37] The city partnered with union labor to construct and implement larger-scale projects.

While the construction of additional project elements are still underway, there have been initial indications that the project is already delivering enhanced safety and resilience benefits: when Hurricane Ida hit the region a decade later, the city experienced significantly less flooding and damage.[38] The Hoboken model has been internationally recognized as a best practice for flood resilience,[39] and demonstrates the power of locally-driven adaptation action that utilizes a union workforce to design and deploy innovative, durable solutions that strengthen communities' abilities to withstand a changing climate. New Jersey should continue exploring ways to support other municipalities in the development of resilience projects that account for specific flooding vulnerabilities, siting considerations, and community needs.

New Jersey is now at a point where all these existing and forthcoming plans and projects must secure dedicated funding for construction under high-road labor standards. To rapidly scale coordinated projects that account for the impacts of stormwater movement across entire watersheds rather than isolated municipalities, **New Jersey must step in to support the coordination and financial backing of new, large-scale adaptation infrastructure by harnessing its union labor workforce**.

## HOW WE GET THERE

First, New Jersey can **expand the coordination capacity at NJDEP to support the development of WIPs that consider cross-municipal, comprehensive watershed impacts**. Intra-watershed collaboration has long been considered the gold standard for stormwater management planning, because it creates inherent alignment between stormwater infrastructure projects and natural water flow.[40] While some municipalities and watersheds have historically attempted to coordinate stormwater impact planning at the watershed level, this work must be revisited and scaled across the entire state.[41]

The state should legislatively mandate that a specific office within NJDEP develop and staff a program to support stronger coordination across municipality-submitted WIPs. The new Division of Watershed Protection and Restoration, which was formed to coordinate efforts in the Watershed and Land Management programs, could be an ideal office for this expansion of responsibility. This coordinating body would be authorized to convene municipalities within the same watershed management area (WMA) – New Jersey currently has 20 WMAs[42] – as a means to develop cross-plan collaboration and prevent redundant project projects across municipalities. The coordinating office must also prioritize integration of the plans developed by Resilient NJ regional project ideas[43] into these coordinated plans, wherever possible, as these are the result of a multiyear community-vetted process and have the added benefit of large-scale community buy-in.

Concurrently, the state must prepare itself to support municipalities to apply for stormwater resilience project funding. Research shows that providing supportive funding alongside coordination support for these plans is a key success factor in the implementation of comprehensive watershed management.[44] New Jersey can **prepare the state's Resilience Infrastructure Bank (I-Bank) to fund low-interest loans and grants to support the construction of future stormwater projects in a way that guarantees high-quality labor standards on the construction work**.

So long as Resilient I-Bank funds remain, municipalities with coordinated WIP project ideas should be encouraged to apply for New Jersey Community Hazard Assistance Mitigation Program (NJ CHAMP), the state's existing revolving loan program to finance hazard mitigation projects as per the state's Hazard Mitigation Plan.[45] However, to reduce inter-municipality competition between projects and enable more expansive funding, New Jersey should also create an additional funding stream within the Resilience I-Bank specifically dedicated to funding these projects.

An initial infusion of funds could be supported by numerous state measures. The green design firm Rebuild by Design has identified two possible ways to fund large-scale adaptation work in New Jersey: either a large-scale Resilient Infrastructure bond, or relatively small property and casualty insurance surcharge.[46] The program could also be set up as a revolving fund so as to match the structure of other programs within the I-Bank (for more details on these funding structures see: *Funding Menu* on page 53).[47] For smaller-scale green infrastructure projects like rain gardens or bioswales, municipalities should be required to aggregate grant and loan applications to a minimum financial threshold wherever possible, so as to ensure an efficient use of state resources. Importantly, **the state should protect its proprietary interest in the disbursement of such public funds by conditioning awards on high-quality labor standards that ensure the pipeline of work is completed efficiently and effectively by high-road contractors.**

Given the revolving loan model for these funds, municipalities should be encouraged to pay back their low-interest I-Bank loans by taking advantage of the state's recent stormwater utility legislation. This law enables cities, counties and regional governing bodies to establish fees on properties based on the property's proportionate contribution of stormwater runoff.[48] Stormwater fee structures have existed in the United States since the 1960's and have now reached 42 states, with an average monthly fee of $6.19 for single family residential properties.[49] Fees can be equitably designed to integrate environmental and socioeconomic factors in the local fee structure.[50]

Despite a slow start to adoption,[51] as of July 2025 at least three municipalities have already advanced stormwater utility ordinances,[52] with more municipalities assessing the feasibility of such a utility.[53] The state should continue to support the adoption of these local stormwater fee programs. New Jersey should also consider amending the law to enable a state-based stormwater fee structure that would apply across municipalities and counties, targeting fee revenue to directly fund new resilience projects. New Jersey would not be the first state to consider instituting a statewide stormwater utility; for example, Vermont has also evaluated the viability of a statewide stormwater utility.[54]

The creation of strong local stormwater utilities is particularly useful for municipalities interested in incentivizing large private properties to build green infrastructure beyond baseline state requirements. Warehouses in particular have become an expanding large-scale use of private property land; as of June 2024, the state has 3,034 warehouses occupying at least 527 million square feet of land, representing a 17% increase in the last decade.[55] Warehouses have resulted in disproportionate environmental health impacts on low-income communities of color,[56] while also resulting in increased flood impacts to local areas.[57] As the warehouse boom continues – and as new data centers also begin to occupy large amounts of land and create impervious surfaces[58] – New Jersey must proactively direct financial and administrative resources towards the largest tracts of private land to improve flood safety in adjacent communities.

Studies have shown that even with strong MS4 or WIP-equivalent stormwater planning, municipalities face significant barriers addressing runoff that come from private properties, and that layering incentives on private property owners is one of the strongest ways to ensure private property participation in green infrastructure installation.[59] Philadelphia, for example, expanded on a pre-existing stormwater utility to design a credit program for commercial property owners who manage at least the first inch of runoff from their property through green infrastructure to receive credit of up to 80% off their property's stormwater fee. This incentive was paired with two grant programs, one for non-residential property owners to front the cost of their green infrastructure, and the other awarded to developers who aggregated multiple projects in the same area.[60]

**New Jersey municipalities – or, under a revised stormwater utility fee law, the entire state – could model a similar program of layered incentives atop a baseline stormwater utility fee to encourage the adoption of green infrastructure on private land.** These incentive programs should also go a step further by requiring high-quality labor standards for the construction of that new private infrastructure, including mandating the use of prevailing wages and hiring from within local zip codes.

RECOMMENDATION: SAFE ROADWAYS

# REINVENT AND RECONSTRUCT NEW JERSEY'S MAIN TRANSPORTATION CORRIDORS

- Strengthen New Jersey's existing commitment to eliminate pedestrian deaths by investing in rehabilitating the state's high-injury roadways to become safe, multimodal, EV-ready "Complete Streets"
- Expand NJDOT's existing "Complete Streets" program to identify viable high-injury, state-owned street corridors for targeted upgrades; aggregate bids to a minimum dollar threshold; and condition funding with strong labor standards

New Jersey serves as the linchpin of mid-Atlantic and northeast regional transportation infrastructure. The state's dense networks of roads, highways, and turnpikes have been described by the previous governor as the "primary artery of the American economy,"[1] connecting not just its own residents to each other, but also moving people across the region and world. Importantly, this infrastructure has also generated a steady source of high-quality jobs for union members for decades.

Unfortunately, New Jersey's transportation sector is also its highest emissions driver. Nearly 35% of the state's total emissions came from transportation-related activities in 2021, with the vast majority of these emissions coming from gas-powered vehicles.[2] Meanwhile, the critical infrastructure sustaining these vehicles is straining under the continued pace of both population growth and climate change. The American Society of Civil Engineering found that 22% of the state's roads were in poor or fair condition, with motorists paying an average of $430 per year due to driving on roads in need of repair.[3] New Jersey faces the second-highest commute times in the country at 31.4 minutes, behind New York and tied with Maryland.[4] It is also a state where road deaths[5] outnumber deaths from gun violence[6] by nearly 50%.

Taken together, the current transportation system is not serving New Jerseyans as well as it could. The state is now at a crossroads and must seize the opportunity promised by continued, robust investments in existing transportation infrastructure[7] to strategically build a climate-safe transportation network that serves the needs of the next century and beyond.

## HOW WE GET THERE

One element of building a safer transportation system that works for all residents is investing in upgrades to New Jersey's existing roads. According to data from the U.S. Department of Transportation's National Highway Traffic Safety Administration, traffic deaths in New Jersey are only increasing.[8] New Jersey reported 695 traffic fatalities in 2024, up from 606 in 2023, representing a 14.7% increase and making New Jersey one

of just 14 states that saw a rise in road fatalities.[9] Given that pedestrian deaths in New Jersey are at a 30-year high,[10] former Governor Murphy signed a bill in January 2025 to develop a plan of action to eliminate pedestrian deaths by 2040.[11] However, achieving meaningful progress towards this vision will require targeted and sustained investments, including in improving the safety of New Jersey roadways.

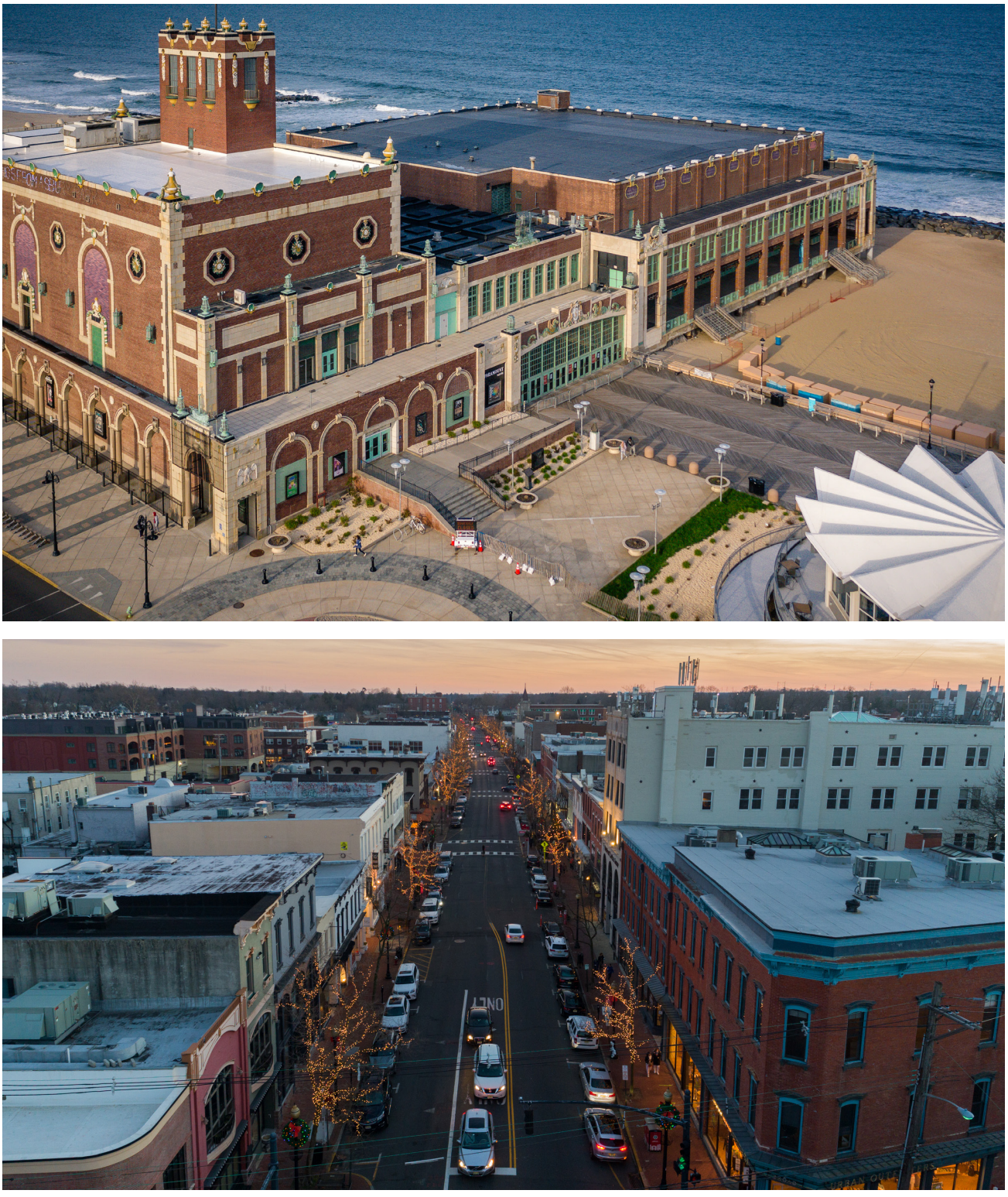
New Jersey has approximately 39,000 miles of public roadways, of which 2,329 miles and 415 miles are under the jurisdiction of the New Jersey Department of Transportation (NJDOT) and New Jersey Transportation Authority (NJTPA), respectively.[12] Road design plays a crucial role in reducing traffic fatalities.[13] New Jersey's arterial state highways—particularly the U.S. and New Jersey routes managed by the NJDOT—include hundreds of miles of high-speed, car-dense corridors designed for through-traffic that also serve driveways, commercial centers, and local access points. These types of multi-purpose roads are particularly dangerous, as they combine the high speeds and wide lanes of a road (designed to move vehicles quickly between places) with the many access points, turning movements, and local interactions of a street (designed for slower movement, commerce, and people walking and moving).[14]

**NEW JERSEY HAS THE OPPORTUNITY TO IMPROVE UPON ITS THOUSANDS OF MILES OF DENSE PUBLIC ROADWAYS TO BUILD SAFE, MULTIMODAL, EV-READY, AND COMPLETE STREETS.**

While these corridors in New Jersey connect communities by facilitating access to stores and commerce, they also often lack additional safe infrastructure for pedestrians, bicyclists, or transit users. This design can have fatal consequences: non-freeway arterial roads accounted for 60% of pedestrian deaths nationally in 2021.[15] Examples include many wide suburban arterials lined with commercial strips of retail, gas stations, and restaurants, such as Route 1, Route 22, or Route 46 in New Jersey.

New Jersey has the opportunity to improve upon its thousands of miles of dense public roadways to build safe, multimodal, EV-ready, and complete streets. A complete street is a street design paradigm that prioritizes safety and accessibility.[16] While there is no defining formula across states and regions, the framework provides an adaptive approach to designing streets dependent on situated community needs and community context across urban, suburban, and rural areas.[17] The complete streets framework moves away from designing roads that prioritize automobiles and speed, and towards designs that allow for multimodal forms of transport such as walking and biking.[18] Common elements of a complete street include traditional and elevated sidewalks; protected bike lanes and bus lanes; median islands and other safe crossing areas for pedestrians; curb extensions; bus stop bulb outs; and other infrastructure upgrades that improve road conditions for pedestrians and drivers alike.[19] New Jersey also has the opportunity to pair these typical upgrades with forward-looking e-bike and vehicle charging networks, which will be increasingly necessary as electric vehicle adoption accelerates.

Transforming New Jersey's existing high-injury corridors into multimodal, EV-ready, and complete streets that prioritize community safety and mobility is essential to achieving several established state goals. In addition to eliminating pedestrian deaths as part of the state's new Strategic Highway Safety Plan,[20] benefits of complete streets include improved accessibility and safety for pedestrians and drivers alike; sustainability enhancements by encouraging mode shift and reducing vehicles miles traveled; economic benefits from more accessibility to local businesses; and a host of community cohesion, public health, and lifestyle benefits. Where the state funds and contracts for the construction work, the project would be considered a public work and subjected to the state's prevailing wage and project labor agreement acts.



Smart Growth America recently named both Red Bank and Asbury Park as having two of the nation's best Complete Street approaches, with both towns included in the top 10 nationwide. Asbury Park has invested in constructing new sidewalks, bike lanes, and safer intersections, while Red Bank has pursued pedestrian safety measures like bump-outs as well as safer bike lanes.

*Top photo*, Asbury Park boardwalk; *Bottom photo*, street in Red Bank

**New Jersey should expand the scale of its existing Complete Streets program to support more projects that specifically target key state-owned roads of interest**. The current iteration of the state's Complete Streets program,[21] administered via the Bureau of Safety, Bicycle and Pedestrian Programs under NJDOT,[22] requires that all projects under the NJDOT Capital Plan incorporate some complete streets elements into projects, while also providing supportive funding for counties to implement their own complete street upgrades. NJTPA also provides technical assistance for municipalities interested in designing complete streets.[23] However, the state's existing Complete Streets program is not specifically designed to intervene on New Jersey's most dangerous streets, which risks leaving these significant, larger-scale, high-impact interventions behind in favor of smaller-scale upgrades to local and municipal streets.

To adequately capture that body of work, New Jersey can create an expanded Complete Streets program specifically targeted for areas alongside major arterial roadways that have enough density and local economic activity to support these projects. The new program could continue to be managed under NJDOT and would provide project site identification, technical assistance to determine the most impactful project elements, and direct financial support. New Jersey could design this specific programmatic track within its Complete Streets policy by modeling its program after a proposal in Washington, where the state hopes to evaluate viable county roads for complete street projects and aggregate projects into large-scale bids that qualify as public work projects with high-quality labor standards.[24]

To the extent that a Complete Streets program administered by NJDOT involves publicly-funded construction contractors, those projects would constitute public works law, triggering high-road labor standards such as prevailing wage requirements. In order to ensure that projects are completed on-time and uninterrupted, the state should require project labor agreements on publicly funded projects of at least $10 million. Guaranteeing these strong labor standards on these large-scale Complete Streets upgrades will unlock a significant and additional body of work for New Jersey's union construction workforce, many of whom already build and maintain New Jersey's expansive existing network of roadways. When these projects are appropriately scoped and scheduled, new and improved complete streets can serve as a source of high-quality work across the state for years to come.

## THE PUBLIC TRANSIT PUZZLE: NEW JERSEY'S NEED FOR CONSISTENT CAPITAL AND TECHNICAL SUPPORT ACROSS MAJOR AGENCIES


A robust public transportation system is vital to the health of New Jersey's economy. New Jersey is home to three public transit systems: New Jersey Transit (NJ Transit),[25] which serves the entire state; the Port Authority Trans-Hudson (PATH),[26] which serves the urban area near Jersey City and New York City; and the Port Authority Transit Corporation (PATCO),[27] which serves the urban area around Camden and Philadelphia.

NJ Transit is by far the largest of the three agencies in terms of ridership and expansiveness. The agency operates the sixth largest public transit system in the country, serving 225,620,400 passengers in 2024[28] and spanning 5,236 square miles[29] with 6,140 miles of bus routes, 920 miles of commuter rail, and 116 miles of light rail.[30] However, the agency has also faced chronic and significant funding challenges due to the unusual lack of dedicated state funding for an agency of its size; in 2024, NJ Transit received only 5% of its total funding from state and local sources, compared to over 50% that comparably-sized transit agencies received.[31] To plug financial gaps, NJ Transit has attempted to balance its budget by repeatedly transferring its capital dollars to stabilize its operations budget since 1990[32] as well as pulling money from the state's Clean Energy Fund initially meant to support renewable generation projects.[33] Despite several years of fare hikes – including a 15% fare hike in 2024[34] – the agency still struggles to amass enough funding to maintain operations, let alone expand into the robust, far-reaching system the state and its residents deserve.

NJ Transit's aging infrastructure has also begun to buckle under extreme heat. The agency faced significant service disruptions and cancellations due to extreme weather-related issues during 2024's "summer of hell,"[35] driven in part by aging infrastructure and issues with catenary infrastructure it shares with Amtrak.[36] These disruptions hurt low-income communities first and worst: more than half of NJ Transit bus riders earn an annual income of less than $35,000; almost half lack access to a car; and 80% rely on bus transit more than five times per week. In addition to commuting, research shows that 40% of these riders also rely on these services to access healthcare, education, and food needs.[37] A recent Regional Plan Association study evaluated the benefits of NJ Transit to generate $2.5 billion annually, meaning the agency created $5 in economic value per operating dollar spent.[38] In a state where the transportation sector represents a plurality of state-based emissions,[39] the Garden State cannot neglect to invest in an efficient, high-quality, reliable, decarbonized public transportation system that serves the people that need it most.

New Jersey has begun to make progress on addressing its public transit needs, including making a first step towards a dedicated revenue stream via a corporate transit fee of 2.5% on businesses with a taxable net income over $10 million.[40] However, the state's largest transit agency – as well as its two smaller ones – require not just consistent supportive funds, but also new and imaginative transportation policies that create consistent on-time operations of existing critical services, the construction of new services lines that drive high-quality, family sustaining, union job creation across the state. New Jersey must invest in public transit as both a climate solution and a driver of quality careers for its residents.

RECOMMENDATION: WASTE

# STRENGTHEN IN-STATE MUNICIPAL SOLID WASTE CIRCULARITY

- Diversify municipal solid waste initiatives and increase funding available to empower counties to build and operate waste stream separation, food waste and composting systems, source reduction programs, waste-to-energy facilities and procure sustainable trash fleets

Industry has long been the bedrock of the Garden State's economy. New Jersey was the center of the industrial revolution as early as the 18th century, where Paterson was designed as the first planned industrial city in the country and was initially a textiles hub.[1] Other New Jersey cities also developed around major industries, from ceramics, iron and steel in Trenton to goods manufacturing in the Newark and Jersey City regions.[2] By the turn of the 20th century, New Jersey had become one of the country's most industrial, urban, and diverse states, making it a cradle for union organizing in industrial cities like Paterson, Passaic, and Seabrook.[3]

An industry that has and continues to be central to New Jersey's economy is waste. From waste collection to disposal, processing, and treatment, the waste industry is essential across the state. Waste collection alone accounts for 3.4% of the state's GDP, with $2.9 billion in revenue and $754.6 million of wages to the state.[4] This industry is expected to continue to expand as the state's population steadily grows and per capita consumption increases.[5]

At the same time, the waste industry significantly contributes to New Jersey's greenhouse gas emissions. Emissions stem from trash fleet vehicle emissions from vehicle miles traveled, in-state processing and disposal facilities, and the export and processing of waste out of the state. In fact, landfills for New Jersey's waste alone account for more than the state's total electricity greenhouse gas emissions.[6] While waste is an inevitable byproduct of our society, these figures show that New Jersey must strategically increase the circularity of its waste by investing in efforts that reduce overall waste, increase the lifespan of materials, and increase in-state waste processing and disposal to minimize the export of waste beyond the state's borders. Counties in New Jersey are a great locus for strategic interventions, as they are each responsible for the municipal solid waste they produce.

**NEW JERSEY MUST STRATEGICALLY INCREASE THE CIRCULARITY OF ITS WASTE BY INVESTING IN EFFORTS THAT REDUCE OVERALL WASTE, INCREASE THE LIFESPAN OF MATERIALS, AND INCREASE IN-STATE WASTE PROCESSING AND DISPOSAL TO MINIMIZE THE EXPORT OF WASTE BEYOND THE STATE'S BORDERS.**

## HOW WE GET THERE

In 2022, New Jersey disposed of over 5.9 million tons of municipal solid waste in the state.[7] Recycling rates of municipal solid waste varied from 23 to 63%, with only three counties (Cumberland, Gloucester, and Middlesex) reaching or surpassing the statewide 50% recycling goal for municipal solid waste.[8] Currently, counties across New Jersey receive funding through Recycling Enhancement Act County Grant, which is funded through a recycling tax that charges solid waste facilities $3 per ton of solid waste accepted for in-state disposal or transfer.[9] In 2025, $16 million in grants were awarded to counties to enhance their recycling efforts through investment into recycling collection, depots, waste collection events, leaf composting operations, and public recycling collection cans.[10]

Diversifying municipal solid waste initiatives by increasing funding available for counties is vital to address waste emissions in the state. To increase funding available to counties, New Jersey's Green Bank – which currently focuses funding on zero-emission transportation, building decarbonization and resiliency, and clean energy generation and storage (see: *Funding Menu* on page 53) – should consider expanding funding circular municipal waste programs at the county level. This funding should focus on circularity of waste and support county-level efforts to build and operate waste stream separation; food waste and composting programs; source reduction initiatives; and waste-to-energy facilities (see: *Drawing from International Waste-To-Energy Best Practices* on page 48).

To ensure that this additional waste management work leads to high-quality job creation for local communities, the Green Bank's new funding stream should also apply high-road labor standards like prevailing wage, project labor agreements, labor peace agreements, and targeted hire from within local zip codes as a condition to the distribution of the funding. The inclusion of labor standards like local hire could also create jobs for communities that have been historically most impacted by waste injustice. Through a diversified county-led and circular focused waste management approach, New Jersey can tackle waste emissions while continuing to be a leader in waste management.

## DRAWING FROM INTERNATIONAL WASTE-TO-ENERGY BEST PRACTICES

International examples of creative, ambitious waste-to-energy projects provided should serve as a model for New Jersey's municipalities that choose to invest in creative and sustainable waste-to-energy infrastructure. Copenhagen's Amager Bakke plant, also known as Copenhill, is one such example of a waste-to-energy facility that utilizes the city's municipal solid waste to generate both electricity for the local grid, as well as provide waste heat for the city's underground district heating system[11] (for more information on zero-carbon district heating systems, see: *Rapidly Scale A State-Led Green Buildings Agenda* on page 28). Notably, the facility also serves as a community recreation center, complete with a ski slope park located on the top of the facility.[12]

Copenhagen's Amager Bakke plant processes anywhere from 250 to 300 trucks of presorted, unrecyclable municipal solid waste each day.[13] The plant's operators conduct routine inspections and random checks on trucks throughout the day to ensure that there is no recyclable, improper, or dangerous waste entering the plant.[14] Waste is first unloaded into a large silo that holds up to 22,000 tons of solid waste, where it is then mixed for uniformity to prepare it for incineration. Operators then lift the waste into one of two incinerators, each of which can process over 40 tons of waste per hour.[15] The energy generated by incineration is converted into high pressure steam, which is used to generate electricity. The remaining heat is then diverted towards district heating.[16] Importantly, the plant's operators have the ability to be flexible regarding how much energy is directed towards either electricity or district heating.[17] For example, on colder days, when the city requires more district heating, Amager Bakke can bypass its electric generation steam turbines for electricity to supply and direct additional energy resources towards the city's district heating system.[18]

Amager Bakke produces 2.7 MWh of district heating and 0.8 MWh of electricity per hour for each ton of waste processed.[19] The plant is also equipped to

mitigate the environmental and health risks from harmful pollutants.[20] It processes byproducts like slag and fly ash using a method that prevents heavy metals from entering the environment; has a flue gas purification system that scrubs harmful chemicals out of the air, including heavy metals, nitrogen oxides (NOx), and sulfur dioxide; and includes an onsite water purification system that treats wastewater generated by the incineration process.[21]

## COPENHILL WASTE PROCESSING AND ENERGY PRODUCTION CAPABILITIES

| | |
|---|---|
| **Waste Intake Each Day** | 250-300 truckloads |
| **Waste Silo Capacity** | 22,000 tons |
| **Incinerators On Site** | 2 |
| **Incinerator Processing Capacity** | 40 tons / hour |
| **Heat produced** | 2.7 MWh per hour |
| **Electricity produced** | 0.8 MWh per hour |

Ultimately, Amager Bakke redirects Copenhagen's municipal waste emissions: rather than emitting greenhouse gases at a traditional landfill, the emissions occur at incineration while extending the use of the resources and generating useful energy.[22] This shifts greenhouse gas emissions from the city's unavoidable municipal waste towards more productive uses for the city's electricity and heating. The facility has plans to further reduce its emissions by retrofitting the plant with carbon capture technology.[23]

RECOMMENDATION: JOB QUALITY

# CULTIVATE QUALITY UNION JOBS IN THE CLEAN ENERGY TRANSITION

- Prioritize enforcement of New Jersey's labor laws to deter violations
- Expand labor standards to cover more public works and clean energy projects
- Expand New Jersey's skilled and trained local workforce by supporting high quality pre-apprenticeship and apprenticeship programs in-state
- Improve conditions for organizing in the private sector

The Garden State boasts some of the most pro-worker laws in the country, with substantial protections regarding compensation, safety, job quality, and equity. At the same time, as the clean energy economy emerges with the potential to create tens of thousands of new jobs in the state, policymakers and leaders can take steps to address existing challenges and areas for improvement. New Jersey must ensure that employers in the emerging clean energy industry adhere to existing labor laws through enhanced enforcement efforts. Further, the state can support high-quality job readiness programs to prepare the next generation of workers to fill the jobs locally. Additionally, the government can improve conditions for organizing in the state so that more workers can freely exercise their rights and unionize in this nascent industry.

## HOW WE GET THERE

### PRIORITIZE ENFORCEMENT OF NEW JERSEY'S LABOR LAWS TO DETER VIOLATIONS

New Jersey has strong labor laws and an active labor movement, with the sixth highest rate of union density nationwide.[1] New Jersey recently instituted criminal penalties for wage and hour violations, including increased penalties and potential imprisonment.[2] However, enforcement is a major concern for workers' rights groups and unions because the Department of Labor and Workforce Development (NJDOL) is grossly underfunded, and nonunion employers have found ways to skirt, or violate, the laws, particularly in the construction industry. For example, from 2019 to 2023, 80% of wage theft cases that led to stop work orders involved construction jobs, more than half of which were public works projects where workers were owed, but did not receive, the prevailing wage rate.[3] The state has also ordered over $1 million in back pay for two solar companies that illegally underpaid their workers in 2020[4] and 2021.[5] None of these cases led to imprisonment, which is a potential penalty for any "knowing" violation of the Wage Payment Law,[6] and is seldom used.[7] To ensure that New Jersey's strong labor standards translate into real protections for workers, the state must modernize and strengthen its enforcement approach. This means building the institutional capacity to effectively address the most systemic and high-impact violations, identifying opportunities to ensure the penalties have a deterrent effect, and improving transparency and reliability of employer reporting systems.[8]

Further, New Jersey should mandate electronic reporting of prevailing wage and PLA compliance, ensuring

International Union of Painters and Allied Trades (IUPAT) DC21 members working on crucial infrastructure projects. (Credit: IUPAT DC21.)

that workers and worker-supporting organizations can easily monitor certified payroll for compliance issues. This will alleviate some of the burden from the state agencies and allow them to allocate resources to the strongest cases where advocates have already identified patterns of violations. Finally, the state should increase funding for NJDOL to support enforcement efforts for the clean energy industry (projects like the Grow NJ Assistance Program[9] and NJ Emerge[10]), including through statutory changes authorizing the state to redirect some of its Regional Greenhouse Gas Initiative (RGGI) funds toward increased staffing.

## EXPAND LABOR STANDARDS TO COVER MORE PUBLIC WORKS AND CLEAN ENERGY PROJECTS

In the construction industry, project labor agreements (PLAs) – prehire collective bargaining agreements laying out the terms and conditions applicable to work on a construction project – are the gold standard for ensuring that all workers on covered projects receive family-sustaining wages and benefits, which match the collectively bargained levels of union members. In New Jersey, PLAs are optional, but permitted, for public works projects over $5 million on a project-by-project basis[11] (such as for the offshore wind port),[12] and required on all building construction projects contracted through public-private partnerships that expend at least $10 million in public funds.[13] The state could lower these thresholds to $1 million to ensure more workers benefit from this protection, and that public dollars are used responsibly on projects that will benefit the local economy. As studies have consistently shown, when projects are built using strong labor standards like PLAs, they receive more competitive bids, and are more likely to come in on time and under budget and promote the hiring of minority and veteran residents, all without any impact on project costs, thus giving taxpayers more bang for their buck.[14] Further, the state could mandate that all public entities consider requiring PLAs for construction, or labor peace agreements (LPAs) for manufacturing and service contracts and the operation of facilities after construction is completed, on all public procurements and public financial assistance that involve renewable energy, energy efficiency, battery storage, electric vehicles, chargers, and related fields in order to protect the state's strong proprietary interest in these public investments.

## EXPAND NEW JERSEY'S SKILLED AND TRAINED LOCAL WORKFORCE BY SUPPORTING HIGH-QUALITY PRE-APPRENTICESHIP AND APPRENTICESHIP PROGRAMS IN STATE

New Jersey is among the 21 states that does not register or oversee apprenticeships, but rather, leaves that to the U.S. Department of Labor.[15] Through legislation, the state could create its own office within NJDOL and have more oversight over program requirements. States that register and oversee their own apprenticeship programs are not only able to exert more control over the registration process, but also pursue higher standards for apprenticeship programs.[16] Colorado recently took this step, with a nominal additional cost of roughly $485,000 to fund the programmatic, legal,

and administrative costs.[17] New Jersey could follow suit, setting stronger requirements for registered programs, such as graduation rates, robust facilities, and expanding representation among disadvantaged communities.

New Jersey has made substantial strides in promoting pre-apprenticeship programs that partner with Registered Apprenticeship programs in the state. However, NJDOL does not independently certify pre-apprenticeship programs.[18] Additionally, the state prioritizes supporting those pre-apprenticeship programs that have relationships with secondary or technical education programs, rather than those affiliated with unions or labor-management partnerships.[19] New Jersey could establish a statutory requirement for licensing pre-apprenticeship programs that establishes minimum standards and benchmarks for these job readiness programs, and transparency in reporting on curriculum, graduation, and placement rates. New Jersey could also require these registered programs to partner with registered apprenticeship programs through direct entry or direct access agreements to ensure that they prioritize apprenticeship placement. Finally, the state should offer financial support to those programs that provide financial assistance, such as stipends, transportation vouchers, and childcare assistance, which better enable members of historically underrepresented groups to participate and enter into these family-sustaining careers. This would be akin to legislation in states like Maine,[20] which has led to successful clean energy pre-apprenticeships and partnerships with unions.[21] New Jersey is already leaning into these areas through administering its PACE grant program,[22] however, the legislature could codify these requirements for future funding and support.

The state can also drive demand for these programs by enhancing its use of apprentices and pre-apprentice graduates on public procurement contracts. For example, subcontractors on energy savings improvement contracts must certify that all employees have completed registered apprenticeship programs and pay prevailing wages.[23] This requirement could be extended to other fields in the clean energy industry, as well as a provision for employing pre-apprenticeship graduates.

As an alternative to creating a state apprenticeship program, New Jersey can modify its state procurement process to also award additional points to applicants who work with apprenticeship programs that have direct entry agreements with pre-apprenticeship programs. This, too, should drive demand for these job readiness programs, and when coupled with high standards and state funding, help the strongest programs to succeed.

### IMPROVE CONDITIONS FOR ORGANIZING IN THE PRIVATE SECTOR

In a time of growing inequality, New Jersey's workers and their families are feeling the impact of being among the least equal states.[24] Collective bargaining is a well-researched mechanism to support increased quality of life for the working and middle classes, and a tested way to raise wages statewide. In New Jersey, fewer than one in ten private sector workers belong to a union, but average full-time union wages are 3.4% higher.[25] In the construction industry, union workers earn nearly 33% higher wages than their nonunion counterparts.[26] As the Garden State expands the clean energy industry and employs considerably more workers in construction, it should take steps to ensure that these new jobs uplift and support its residents and the economy.

As the clean energy sector grows, workers face new and time-tested forms of employer opposition to organizing. One such way is by terminating workers who support a union for seemingly innocuous reasons, or for no reason at all. New Jersey could break new ground and pursue a statewide "just cause" termination requirement for employees in the state. It would be second only to Montana to enact such a statewide series of protections for workers,[27] although the U.S. Virgin Islands[28] and Puerto Rico[29] also have similar protections. Alternatively, the state could pursue these protections specifically for workers engaged in the clean energy economy, including in construction, manufacturing, operations, and maintenance. This would be akin to New York City's just cause law that is tailored to the fast food industry,[30] another sector where workers face exploitative practices.

# FUNDING MENU

**Sustained, robust public financial support to build climate-safe infrastructure is a crucial element to rapidly achieving climate goals at scale. In the United States, this support has been choppy rather than sustained.**

In recent years, the federal government made significant progress in developing a supportive policy environment for clean energy development, namely via the passage of the Inflation Reduction Act[1] (IRA) and the Infrastructure Investment and Jobs Act[2] (IIJA). Both laws created robust financial incentives for clean energy development that incorporated high-road labor standards; the IRA alone was projected to more than double the number of clean energy jobs in the country.[3] Over the course of just a few years, there were indications that a high-road clean energy expansion was beginning to take shape, with $291.3 billion in announced investments and 357,000 announced jobs as of September 2025.[4]

The passage of the One Big Beautiful Bill Act (OBBBA) on July 4, 2025 altered the landscape for sustaining these investments at scale.[5] The law phases out supportive tax credits for several clean energy technologies, including: wind and solar projects that begin construction after July 4, 2026, which now must begin service by 2027 in order to receive the full credit; a suite of residential and commercial energy efficiency upgrades, whose credits progressively sunset by July 4, 2026; electric vehicle charging stations, which must be in service before July 2025 to receive the full credit; clean hydrogen production, which now must begin construction five years earlier (December 31, 2027) to receive the full credit; and wind energy components, which will no longer receive the credit after December 31, 2027. However, the OBBBA did not alter all tax incentives established by these previous laws. The credits for installing geothermal heat pumps; wind and solar projects that begin construction before July 4, 2026; nuclear power generation; carbon sequestration; and prevailing wage and apprenticeship utilization bonus credits each remain intact.

The continuation of some, but not all, of the federal political and financial support for clean energy projects is highly useful to ensure that New Jersey can build the requisite climate-safe infrastructure it needs to protect its residents. New Jersey should harness the remaining tax credits and federal support to the best of its ability when designing new clean energy projects in-state. However, the remaining federal support is ultimately insufficient to scale all of the necessary work in New Jersey as quickly and efficiently as possible. At a time of uncertainty and in the absence of sustained, robust federal funding and support, the state must step up to the plate to deliver funding stability to ensure New Jersey continues to work towards a climate-safe, equitable future that generates high-quality careers for its residents.

Below is a list of funding options for these recommendations that offer ways for New Jersey to increase its pool of funding for state climate projects. Each of these ideas can be paired and adjusted to fit each recommendation based on political feasibility. To further expand its pool of funding, New Jersey should also identify opportunities to collaborate with nearby states, sharing financial and technical resources across the region to achieve shared climate goals.

# GREEN BONDS

New Jersey has successfully issued bonds to finance a variety of large capital projects, including for library construction upgrades in 2017[6] and infrastructure improvements to vocational and technical schools in 2018.[7] To ensure the efficient use of these public funds, the state may require high-road labor standards such as the payment of prevailing wages and the use of project labor agreements on bond-financed projects.

The state could pursue similar bonding strategies to finance several of the recommendations contained within this report. Bonds are particularly well-suited to finance recommendations that include a means of generating relatively consistent public revenue to pay down the bond principal over time, and/or create a meaningful reduction in state appropriations as a result of the bond-supported activity. To support the ability to pay down the bond principal and avoid overloading the state's debts, bond financing can be paired with novel State Revolving Funds, which typically use an initial infusion of capital to provide low-interest loans to developers or other private actors, who later pay back the loans with a small amount of interest. For example, bond-financed construction of clean energy projects could generate revenue by selling energy back to consumers, which could then be used to pay down the bond principal. Similarly, rental or lease payments on newly-constructed affordable housing buildings could be utilized to pay down the initial bond.

Importantly, New Jersey should take care not to exceed its debt limit of no more than one percent of annual appropriations[8] when considering pursuing a bond-based financing strategy for these recommendations. New Jersey's total budget appropriations for the 2026 fiscal year came out to approximately $58.7 billion dollars in state funding alongside $31 billion in federal funds,[9] and the total bonded debt held by the state of New Jersey was calculated at $39.7 billion as of 2024.[10] In addition, the state may require voter approval depending on the type and purpose of the bond.

### CASE STUDIES

**New York's 2022 $4.2 billion Environmental Bond:**[11] Approved via ballot proposition, the bond was designed to finance environmental and community projects and was made accessible to state agencies and authorities. The bond specifically allocated $1.5 billion for climate change mitigation; $1.1 billion for restoration and flood risk; $650 million for water quality, improvement, and resilient infrastructure; and $650 million for open space land, conservation land, and recreation. In total, the bond is projected to create 84,000 jobs.[12] High-quality labor assurance requirements included the payment of prevailing wages; the use of labor peace agreements; apprenticeship utilization for projects in which a state entity or municipality received at least $25 million of assistance on a project over $50 million; and Buy America provisions on steel and iron.[13] Importantly, the state's bond directs at least 35% of funding towards disadvantaged communities.

**Montgomery County, Maryland's Revolving County Housing Production Fund:**[14] Montgomery County's Housing Opportunities Commission operates a $50 million Revolving Housing Production Fund, which is projected to create 750 units of municipally owned social housing. The initial $50 million from a bond, which is backed by $3.1 million annual appropriations from the county budget for 20 years, was used to loan funds to developers as construction capital at a 5% interest rate, which amounts to roughly $2.5 million in interest payments. Those interest payments help pay off the principal of the bond, as well as pay down the county's annual appropriations for the program, resulting in a total net annual cost of $600,000. Each housing project is designed to pay for itself in 20 years, after which the unit becomes an asset for the Commission to leverage for future social housing project capital. Note that if pursued to support the affordable housing strategy outlined in *Expand Energy Efficient Affordable Housing* on page 31, New Jersey could layer this fund on top of existing state funds that are already available for affordable housing development, including the New Jersey Affordable Housing Trust Fund and the DCA Neighborhood Revitalization Tax Credit Program.[15]

## PUBLIC-PRIVATE PARTNERSHIPS

Formal partnerships between the public sector and the private sector offer one means of funneling private capital to support the development of critical public infrastructure. New Jersey state law already requires the use of project labor agreements on all building construction projects contracted through public-private partnerships expending at least $10 million in public funds.[16] New Jersey can continue to establish projects and programs that efficiently harness private capital for the public's benefit. This may include engaging the state's investor-owned utilities in the construction of thermal energy networks and/or new clean energy projects, establishing independent development authorities with the ability to use both private and public capital to finance transmission or clean energy projects, or other similar partnerships. The state should also strategically utilize capital from the Regional Greenhouse Gas Initiative (RGGI) to finance clean energy projects, and include the use of high-quality labor standards in the disbursement of those funds for clean energy projects.[17]

### CASE STUDIES

**State Grid Development Authorities:** Both Colorado[18] and New Mexico[19] have established independent Grid Development Authorities to support the construction of transmission projects across the state. These authorities exist separately from the state and have the ability to finance their own development either independently or in partnership with the state government.

**Public Solar NYC program:** A proposed program by the New York City Office of the Comptroller would establish a Local Development Corporation to blend both public finance with private resources to finance and develop rooftop solar across the city.[20] While the status of public funding for this program is now unclear, similar public-private program models could be leveraged for other types of clean energy projects across New Jersey.

## NEW JERSEY'S GREEN BANK & INFRASTRUCTURE BANK

In April 2024, the New Jersey Economic Development Authority (NJEDA) created the New Jersey Green Bank (NJGB) to finance a suite of clean energy projects as a means to both reach the state's climate goals and generate high-quality jobs for residents.[21] The NJGB currently supports projects between $1 million and $20 million related to renewable energy and battery storage, building retrofits and net-zero construction, and zero emission vehicles and charging infrastructure for eligible borrowers including redevelopment agencies/independent authorities at the municipal, county, regional, and state level.[22] Importantly, all NJGB-funded projects must pay prevailing wages to employed workers.

While the state's green bank finances clean energy projects specifically, New Jersey also has an Infrastructure Bank (I-Bank, or NJIB) that offers specific low-interest loans for water, transportation, and resilience infrastructure projects.[23] Collectively across these three interest areas, the I-Bank had $9.5 million in unencumbered contingencies available for low-interest loans in the 2026 fiscal year.[24] While this amount is not sufficient to finance all necessary infrastructure upgrade projects outlined in this report, the bank itself represents a strong financial mechanism to support large-scale climate infrastructure investment; since the bank requires the payment of prevailing wages on construction project infrastructure,[25] financing through the I-Bank can also support high-road jobs and careers. In addition to allocating more funding for these banks, New Jersey can consider expanding the types of projects these banks fund to include other sectors such as waste circularity and an expanded resilience portfolio.

### CASE STUDIES

**26 States:** Green banks have taken off across the country, with 26 states as well as Puerto Rico already having a green bank. While many of these banks are nonprofits or quasi-public entities, New Jersey's is among a few states that established a public bank.[26] Another ten states have considered or are in early stages of

establishing a state green bank.[27] A report that analyzed green bank investments across the country estimated that these banks had invested $4.2 billion from 2011 through 2022, including on projects that provide energy efficiency upgrades for affordable housing, community solar for low-income neighborhoods, and pair solar installations with battery storage in energy-burdened households.[28]

## PROGRESSIVE TAXES

Progressive taxes offer a means for the state to generate revenue while improving economic equity. Unlike regressive taxes, which require a greater share from low- and middle-income households than high-income households, progressive taxes are specifically designed such that the tax rate increases proportional to income. While New Jersey's sales tax and property tax are examples of regressive taxes, the state's income tax is structured more progressively, with lower-income households a smaller percentage than higher earners.[29]

New Jersey can institute a range of progressive tax reforms to both generate funding towards state climate projects as well as improve economic equity within the state. Careful attention should be paid to managing the impact of additional taxes on New Jersey's population, as the state is already one of the most heavily-taxed states in the country;[30] reducing the impact of regressive taxes in tandem with the implementation of progressive tax reform is tantamount.

An analysis conducted by New Jersey Policy Perspective in 2024 found that the state could raise approximately $1.7 billion annually should it implement a combination of tax code revisions, including revising income tax brackets to include new rates on the highest earners in the state while expanding working-family tax credits ($772 million); reforming inherited wealth taxes ($450 to 598 million); and establishing a graduated supermansion tax on the sale of homes over at least $1 million ($410 million).[31] A portion of these funds could be reserved for climate-related infrastructure projects. In addition, the green design firm Rebuild by Design found that instituting a mandatory 2% insurance surcharge on property and casualty insurance could generate up to $5.2 billion to support state resiliency projects.[32]

## REMAINING FEDERAL FUNDING SUPPORT

While the 2025 federal budget reduced overall support for climate projects, several credits and funding opportunities still exist. To the extent possible, New Jersey should take advantage of the following remaining federal tax credits and funding opportunities:

**Wind and solar under construction before July 4, 2026**: Projects underway before the bill goes into effect still receive full tax credits. As such, New Jersey should work to provide swift support for existing projects under development to ensure they begin construction before this deadline.

**Nuclear, geothermal, storage, and carbon sequestration:** Tax credits for these advanced technologies do not phase out until 2032.

**Geothermal heat pumps:** The Investment Tax Credit for ground-source heat pumps remains in place through the end of 2034. Moreover, new Foreign Entity of Concern (FEOC) restrictions do not apply. Continued federal support for ground-source heat pumps represents a strong opportunity for New Jersey to invest in thermal energy networks (TENs) via federal support.

**Prevailing wage and apprenticeship bonus credits:** IRA tax credit bonuses for the use of high-road labor standards have already created high-quality jobs through climate investments.[33] These bonuses will continue to be in place for remaining tax credits.

# APPENDIX

**The authors used IMPLAN – an economic input output modeling software – to estimate job creation in this report. The 2023 IMPLAN model year was used for all analyses. Yearly direct job estimates were based on the average yearly cost of implementing the recommendation. Estimates through 2030 were based on the yearly direct jobs impacts multiplied by the five years from 2026 through 2030. Direct jobs and construction trades jobs estimates were independently rounded to two significant digits. The scope of the economic impact analyses in this report were restricted to direct effects only. IMPLAN's basic assumptions should be taken into account when interpreting job creation estimates in this report.**

Job creation estimates include part-time and full-time jobs and are for one year; in other words, one job should be interpreted as one person working in a single job for one year. Construction trades job creation represents a subset of the total direct job creation estimated for each recommendation. Construction trades workers are defined as occupations that fall under the Standard Occupational Classification code "47-2000 - Construction Trades Workers," as defined by the Bureau of Labor Statistics for 2022. These occupations include electricians, laborers, painters, carpenters, and construction equipment operators among others.

Inflation adjustments for cost and jobs estimates in this report were made based on national data from the U.S. Bureau of Economic Research's Price Indexes for Private Fixed Investment in Structures by Type.1 Unless otherwise noted, all final costs are reported in 2025 dollars for Q2. Costs were rounded to three significant digits. Cost estimates are based on current or near-term cost information and do not account for how costs will evolve. Consequently, cost estimates in this report are likely to overestimate the cost of emerging technologies further into the future.

Annual emission reductions reported for recommendations are only applicable to the target year and onwards. Emission equivalencies reported in the summary table are shown only for comparison and were estimated with the Greenhouse Gas Equivalencies Calculator.2 Emissions were independently rounded to three significant digits. Unless otherwise noted, emission reductions include only scope 1 emissions (i.e. those emitted from a directly identifiable source).

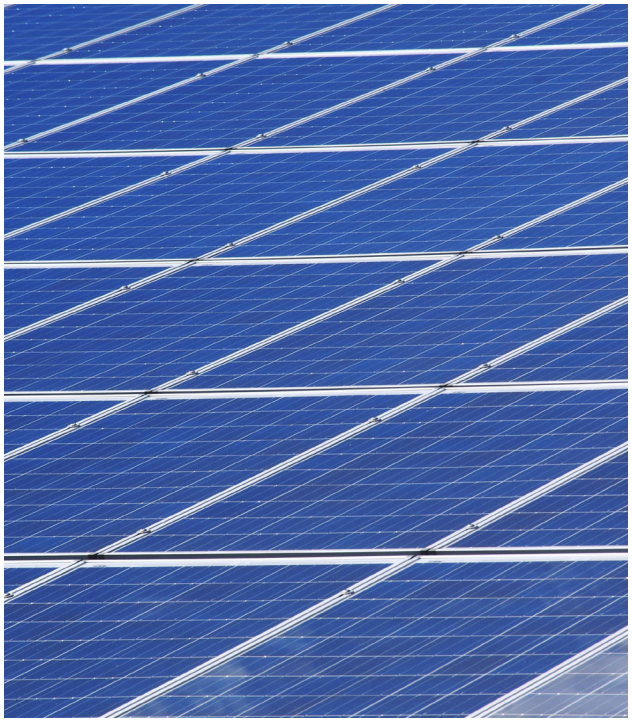
Barring the analysis for the renewable energy buildout, the costs and impacts of implementing the recommendations in this report were calculated independently of one another. Cost estimates and job creation estimates may shift due to changes in technology, supply chains, and markets. Any implementation of these recommendations in new policies should entail an additional review process to account for potential changes.

For questions about methodology, please contact Alec Goodwin, Economic Analysis Lead, (ag2539@cornell.edu).

# CLEAN ENERGY

**RECOMMENDATION**

## CONSTRUCT 24.2 GW OF NEW, UNION-BUILT CLEAN ENERGY BY 2035



### FUTURE ELECTRICITY DEMAND

A high electricity demand growth (HDG) scenario from the Cambium Model was chosen as the primary source for electric load profiles in New Jersey by 2035.[3] Clean generation, storage discharge, and imports were calculated assuming New Jersey commits to achieving its 100% percent in-state clean energy by 2035 through a reduction of fossil fuel generation.[4] Electricity demand for non-power sector hydrogen by 2036 was calculated from the 2035 net-zero high-hydrogen HDG scenario for New Jersey from the *2023 Standard Scenarios Report: A U.S. Electricity Sector Outlook* report, assuming efficiencies for electrolyzers and hydrogen combustion turbine efficiencies are constant throughout all year.[5]

Since New Jersey is a net-importing state, it is assumed that electricity from neighboring states can meet any reliability needs not fulfilled by new firm generation or energy storage deployed within state borders.[6] Net-imports were cross-referenced with historical import rates to ensure that current infrastructure could sustain any increases to New Jersey's electricity import profile. New storage calculated above the Cambium Model's baseline projections HDG scenario is assumed to fulfill the reliability needs of 12h-long peaks pre-2035 and 14h-long peaks post-2035, based on moderate forecasts for duration limits on inter-day battery storage that could be deployed in the future.[7]

### CLEAN ENERGY CAPACITY

New capacity build-outs account for New Jersey's current nameplate capacity of solar, wind, energy storage, and other generation sources.[8] Present capacity factors for technologies deployed near-term were assumed in calculations for converting electricity to capacity.[9] Capacity factors for projects deployed in the long term were from the 2035 net-zero high-hydrogen HDG scenario in the Standard Scenarios model.[10]

Onshore wind capacity was based on the Standard Scenarios model and cross-referenced directly with the technical potential of onshore wind in New Jersey.[11] Offshore wind capacity was determined from market projections documenting pipeline projects in the state.[12] The annual load from wind power projected in the Cambium model was scaled accordingly and balanced with the state's energy generation profile. Transmission infrastructure for New Jersey was calculated as a share of regional transmission capacity projections for the Mid-Atlantic region (PJM), under a high clean energy and electricity demand scenario.[13] This share is assumed to be proportional to the electricity load of New Jersey relative to the rest of PJM expected under the Standard Scenarios Model's hydrogen HDG scenario by 2036.[14]

New pumped hydropower storage capacity implied by the Cambium Model HDG scenario was balanced out with 6-hour duration battery storage instead, as the state has low reservoir potential and present pumped hydro resources in the state only support 6-hour storage.[15] Energy storage capacity above the Cambium Model's baseline was calculated from the difference

in baseline gas generation identified during the peak demand day of the modeled year and the maximum amount of gas power needed in 2035, assuming gas generation is substituted with energy storage discharges at a maximum period of 12 hours per day for pre-2035 and 14 hours per day for 2035 during moments of peak firm generation demand.[16] Fossil fuel phase-outs account for 1 GW of new nuclear for which the utility Public Service Enterprise Group (PSEG) has secured site permits.[17] Nuclear capacity was cross-referenced with growth rates under an advanced nuclear deployment scenario from the Annual Technological Baseline after scaling capacity projections to reflect the United State's most recent goal of 400 GW nuclear by 2050.[18]

Additional solar generation above the Cambium Model HDG Scenario's projections were calculated to fulfill the charging load needed for energy storage units, assuming standard roundtrip efficiencies.[19] The capacity mix of new solar capacity deployed as utility-scale and distributed-scale is based on the present split of planned front-of-the-meter and behind-the-meter solar projects – discussed further in the cost methodology.[20]

## COSTS

### Large-Scale Renewables and Distributed Energy Resources

Utility-scale solar, onshore wind, and offshore wind capital costs were assessed from costs per kilowatt for benchmark projects regionally adjusted for New Jersey, assuming labor costs are consistent with wage rates in Newark.[21] Offshore wind costs were calculated assuming only 1.5 GW of capacity are able to be built by 2030.[22] Near-term projections for solar capacity and the distribution of front-of-the meter versus behind-the-meter solar were cross referenced with industry and public utility reports.[23] Solar cost calculations assume minimal changes to the pipeline of planned solar capacity and that any utility or large distributed solar projects built above this limit is prioritized to be sited on brownfields and parking canopies respectively.[24] The minimum solar potential available for brownfield and parking lot solar was determined based on a land analysis of geospatial data and the upper end of a solar power plant's land use per MW.[25] Residential solar, small non-residential solar (< 1MW), and large / community solar (> 1 MW) units were cost based on local median installation prices and are assumed to have standard inverter loading ratios of 1.21, 1.23, and 1.25, respectively.[26]

Costs for energy storage were scaled from the capital expenditures of utility-scale battery storage systems with equivalent duration capacities and multiplied by a regional cost factor for New Jersey based on benchmark data from 2022.[27] The price index for Private Fixed Investment in Electric Structures was used to adjust total costs for all energy technologies in the recommendation to the present dollar year.[28]

### Transmission

Transmission costs were based on the normalized cost of deploying high-voltage transmission lines scaled by the state's transmission capacity needs, assuming deployment of direct-current and alternating current lines will be cost effectively balanced to meet long distances and short distances respectively.[29] The total cost was adjusted using the price index for Private Fixed Investment in Electric Structures.[30]

## JOBS

Various capital expenditure breakdown studies were analyzed to estimate the share of construction costs for solar, onshore wind, offshore wind, battery storage, and transmission projects. IMPLAN industry 47 - "Construction of new power and communication structures" was used to estimate direct jobs in the construction industry based on the capital costs of each technology after omitting manufactured components, equipment, and other leakages.

### Large-Scale Renewables and Distributed Energy Resources

CJI analysis of DOE's Solar Cost Benchmarks[31] found that the construction industry labor income share of the total capital cost estimate for solar power is 12.6% for utility-scale, 1.36% for residential rooftop, and 17.6% for community and commercial systems. Note that since CJI modeled transmission separately, the transmission cost for utility-scale projects is excluded from

the analysis. In addition, since the DOE model specifies that the benchmark commercial system was a community-solar system in 2023, CJI used the commercial component cost breakdown for all community and commercial solar projects. The construction industry share of total capital cost for battery storage and onshore wind was found to be 4.5% and 17.9% based on 2025[32] and 2024[33] NREL cost studies respectively. The construction industry share of the overall capital cost for fixed-bottom offshore wind was estimated to be 7.1% based on a CJI analysis of a 2025 cost study from BVGA.[34]

The offshore wind estimate does not include the additional port infrastructure and manufacturing in a domestic offshore wind supply chain and the related construction work, which is outside of the scope of this analysis. It was assumed that 100% of spending on onboard vessel technician services would flow to in-state construction firms and that 100% of spending on undersea cable laydown would go to an in-state firm. In addition, since only one US-based offshore wind installation vessel exists,[35] contracts for offshore wind installation vessels were treated as leakages in the model and excluded. It is also worth noting that the costs in the primary report used for this technology, published by BVGA,[36] are for a UK-based project. Because of this, and the fact that NREL's wind farm estimates[37] feature soft costs not included in the BVGA paper, the percentage shares in CJI's analysis were normalized based on NREL's soft cost estimates. The NREL report was also used to disaggregate rotor costs into blades and hub assembly costs.

### Transmission

The construction industry share of the overall capital cost for transmission was determined after analyzing the underlying data for the cost breakdown table in DeSantis et al. (2021),[38] which draws from Black & Veatch (2014).[39] The Labor cost line in that table actually represents Allowance for Funds Used During Construction (AFUDC) and Overhead. Accordingly, CJI treated AFUDC and Right of Way costs as leakages; the remaining cost – about 91.32% of the total cost – was used for the purposes of economic modeling.

### EMISSIONS

New Jersey's fossil fuel generators emit 15 million MTCO2e.[40] Achieving 100% Clean Electricity by 2035 would reduce 15,091,340 MTCO2e per year of in-state power sector emissions.

# CLEAN BUILDINGS

**RECOMMENDATION**

## ESTABLISH A STATE PROGRAM TO BUILD THERMAL ENERGY NETWORKS IN PUBLIC BUILDINGS, PRIORITIZING CAMPUSES LOCATED IN OVERBURDENED COMMUNITIES

### COST

Through the New Jersey Open Public Records Act, data on the state's building stock was obtained from the Department of Treasury (Division of Housing and Community Resources).[41] Buildings with areas less than 5,000 gross square feet (GSF) were not considered in any cost or emissions calculations. The dataset was analyzed in order to identify building groups (buildings within proximity to one another) that might be suitable for thermal energy networks (TENs). Given that TENs have been constructed on college campuses across the country, it is assumed that land areas with similar building densities are feasible sites for TENs. The following sites were identified: New Jersey's Capitol Complex, New Lisbon Developmental Center, Hunterdon Developmental Center, Vineland Developmental Center, Ancora Psychiatric Hospital, Katzenbach School for the Deaf, and NJ DOT's headquarters and surrounding buildings in Ewing Township.

Geothermal conversion, and TEN installation cost values were sourced from a geothermal networks feasibility study.[42] From Table III-I (PSS Composition and Characteristics) of the feasibility study, a characteristic commercial building area of 13,500 square feet was

Construction workers from the International Union of Painters and Allied Trades (IUPAT) DC21. (Credit: IUPAT DC21.)

used to calculate low- and high-end cost estimates (in dollars per square foot) for commercial geothermal conversion (utilizing table IV-6: Estimated Commercial Conversion Costs for the Medium Density Mixed-Use PSS). Average installation cost (in dollars per square foot) was calculated according to the data in Table IV-I (Characteristics for Existing Vertical and Horizontal GSHP Systems Installed in Massachusetts). For the purpose of these cost estimates, all sites were classified as medium-density, mixed-use land areas; all buildings were classified as commercial. All cost estimates were adjusted based on the price index for the "Other structures" category under "Private Fixed Investment in Structures by Type." [43]

While the study was based on residential and commercial geothermal installation data in Massachusetts, on the basis of climate zone similarity it was assumed that these cost estimates are applicable to New Jersey.[44] Richard Stockton College of NJ was excluded from cost and emissions calculations given the campus' existing geothermal system,[45] and New Jersey City University was also excluded due to lack of data availability.

## JOBS

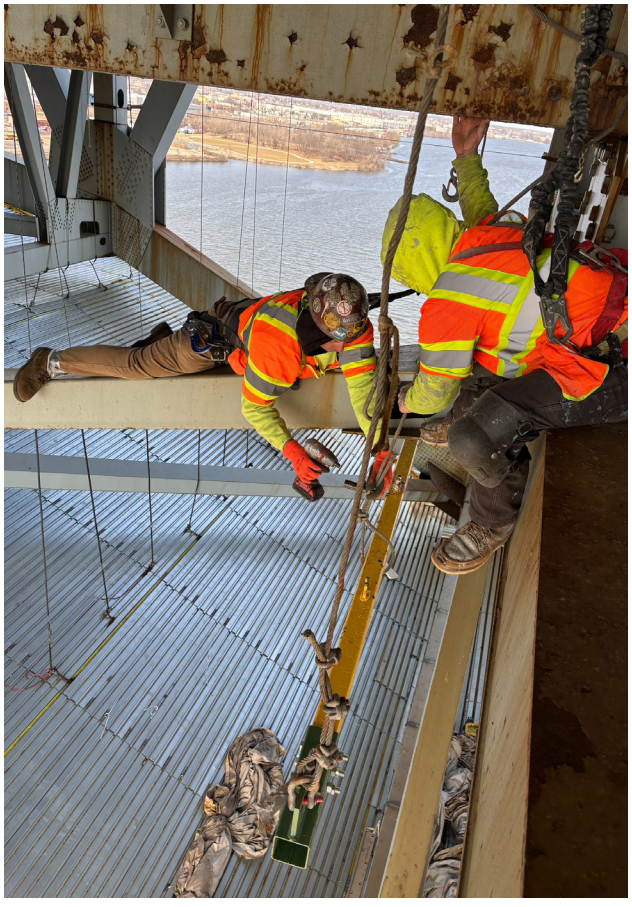
IMPLAN industry 51 – "Construction of other new nonresidential structures" was used to estimate direct construction jobs from installation of the thermal energy network in the public right-of-way, including borehole drilling, loop piping, and service connections[46.] IMPLAN industry 55 – "Maintenance and repair construction of nonresidential structures" was used to estimate direct construction jobs from the retrofits and conversions of the connected buildings to ground source heat pumps (GSHP). To exclude manufactured equipment from the GSHP conversion, CJI analyzed the DOE report, *Pathways to Commercial Liftoff: Geothermal Heating & Cooling.*[47] Based on this analysis, CJI removed the share of the unit cost representing non-loop mechanical HVAC, about 27% of total cost. No costs were removed for the energy-efficiency retrofits unit cost. The appliances unit cost was treated as a leakage. Overall, CJI determined that the cost of TENs conversion, excluding manufactured equipment, was approximately 73% of the total conversion cost for the purposes of modeling within IMPLAN.

## EMISSIONS

Emissions for state-owned buildings were estimated based on specific building type natural gas intensities by climate zone or census division (depending on data availability) according to the 2018 Commercial Buildings Energy Consumption Survey (CBECS).[48] For most public colleges/universities, annual emissions were directly reported. Annual campuswide carbon emissions were estimated for Ramapo College, Thomas Edison State University, and William Patterson University assuming a natural gas intensity of 34.9 cubic feet per square foot, according to CBECS Table C30.[49] A carbon dioxide emissions factor of 0.05291 MTCO2/MMBtu was applied.[50]

**RECOMMENDATION**

## BUILD 40,000 NEW ENERGY-EFFICIENT, PERMANENTLY AFFORDABLE HOUSING UNITS BY 2035, PRIORITIZING MUNICIPALITIES THAT HAVE NOT MET THEIR MOUNT LAUREL AFFORDABLE HOUSING QUOTA



Bridge construction work by International Union of Painters and Allied Trades (IUPAT) DC21. (Credit: IUPAT DC21.)

### COSTS

RSMeans construction cost data and estimation software was utilized to create various models of an electrified multifamily apartment building.[51] The following building types (Type I and Type II construction) were considered: brick veneer/reinforced concrete, brick veneer/rigid steel, and precast concrete/reinforced concrete. A 4-story, 60,000 GSF, 51 unit, multifamily apartment building heated/cooled entirely with air-source heat pumps (ASHPs) was modeled for each construction topology. The cost estimator provided individual building assembly costs and a square foot cost for the entire building, but the specific areas of the 51 apartment units were not detailed. To obtain a unit cost, it was assumed that 80% of the total building area (48,000 GSF) consists of rentable units, and the remaining 20% (12,000 GSF) is common space. Additionally, the model assumed 25% contractor fees, and 7% architectural fees. Costs are inclusive of equipment and labor costs (specifically, union labor costs associated with the Trenton, NJ area).

The square-foot and unit costs for each building model were then averaged, and used to estimate what it would cost New Jersey to build an additional 1,300 affordable housing units per year.

### JOBS

IMPLAN industry 53 - "Construction of new multifamily residential structures" was used to model the economic impact of this recommendation. The yearly cost of the recommendation was used as the input for the model.

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