

Toward a Clean Energy Future:

A Strategic Outlook

2022

THROUGH



NYSDERDA

2025



Both within the borders of the Empire State and more broadly in the global climate movement, we have reached and continue to reach key milestones in our respective journeys toward a clean energy future

To our colleagues, partners, and fellow New Yorkers:

As we turn the calendar over to 2022, many of us here in New York State and across the nation feel a strange, dissonant truth: a dual-sense of fragile, tentative optimism on the one hand, with a more protective, expect-the-unexpected cautiousness on the other. Entering the third calendar year of the pandemic, with continued twists and turns and tragic impacts on our neighbors and our institutions, the light at the end of the tunnel originally sparked by widely available vaccinations and boosters has remained frustratingly dim and distant — at least in the midst of our second winter surge and latest COVID variant. Though we've all learned to adapt in our own ways to the new way of life this period has brought, it is still worth acknowledging this prolonged period of challenge and uncertainty that we continue to navigate as individuals, as families, and as a collective society.

And yet, as I reflect on the year that has been and look out to the prospects of the years ahead, I am left with the sense that **optimism will prevail over pessimism**. And this is especially true when I survey the landscape of the climate and clean energy work that underpins our work here at NYSERDA. Both within the borders of the Empire State and more broadly in the global climate movement, we have reached and continue to reach key milestones in our respective journeys toward a clean energy future, ones that were unthinkable a few short years ago. So, even as we collectively try to will a brighter future into existence in 2022, it is also the case that we have so much to be proud of as we look back on 2021 and all that we experienced and accomplished.

On the global stage, I had the privilege to witness firsthand at COP26 in Glasgow, Scotland, just how this climate moment is manifesting itself for different nations and communities across the world. This, the most urgent United Nations climate summit in history, ended with notable progress toward addressing the climate crisis, but it arguably fell short where it counts most: on phasing out fossil fuels, establishing concrete targets to limit temperature rise to 1.5-degree Celsius goal, and ensuring financial support for the hardest-hit developing nations. As a representative of New York's Governor Kathy Hochul, I was fortunate to attend the summit and stand with other sub-national governments taking up the mantle of climate action. I heard loudly the calls from climate justice, Black, Indigenous, People of Color, and youth communities for a seat at the table in those international discussions, and like every official returning home, I left with the indelible impression that **their voices must be elevated and included in the future**.

Back home on the State front, New Yorkers saw just this month a new platform unveiled by Governor Hochul during her inaugural State of the State address. This heralded the arrival of a **'New Era for New York,'** an apt description writ large but also for the climate and clean energy platform, which saw perhaps its strongest, most comprehensive State of the State in recent memory. We saw not only major announcements in some of the categories we've gotten used to, such as **investments in offshore wind and renewable energy**, but also key new initiatives in the **buildings and transportation** sector, putting forward nation-leading new policies for **efficient and electric building construction** and **electric school buses**, among many others. This dawn of the New Era for New York bodes well for our State's climate action in the years ahead, and NYSERDA is fortunate to have been in a position to help craft and shape — and now to implement — this impressive new agenda.

And it comes at a critical time for New York State and for NYSERDA. **New York's Climate Action Council**, empaneled after the passage of the **Climate Leadership and Community Protection Act** (Climate Act), recently voted unanimously to issue for the Draft Scoping Plan to guide the achievement of our Climate Act emission reduction goals. The **Climate Justice Working Group** has also finalized for release the proposed final definition of **Disadvantaged Communities** and the framework for measuring progress on clean energy benefits and investments to those communities. Also recently released were the **Disadvantaged Communities Barriers Report**, the **Climate Jobs Study**, and DEC's updated **GHG emissions inventory**. While these momentous reports underline significant work that we need to do collectively, they also collectively present a thoroughly exciting — if not somewhat daunting — future that lies ahead for New York's energy transition and climate journey.

Simply put, acting on climate will cost far less than the cost of inaction, and it will deliver immense net benefits to the residents, businesses, and communities of New York through a cleaner energy system, reduced pollution, healthier buildings and neighborhoods, significant new job creation, and so much more.

NYSERDA is fortunate to have been in a position to help craft, shape, and now implement New York State's impressive new clean energy agenda

We will continue to lead, build on our efforts to date, and drive toward a better, cleaner, more resilient future, where New York's people can flourish.

In this context, I'm proud to present a **Strategic Outlook for 2022-2025** that seeks to harness this global and local momentum and strive for **deeper impact** in our activities here at NYSERDA, all while **keeping people at the heart of our work**. As we help drive Governor Hochul's nation-leading climate agenda and implement the Climate Act, we largely know what we need to do.

In fact, after undertaking deep-dive examinations of new strategic focus areas last year, we realized that these priorities — all revolving around **improving the lives for New York residents** — still ring true. Therefore, we present updates and refinements to the same four strategic focus areas that readers will recognize, which will continue to guide the lion's share of our activities in the years ahead:

- Building an inclusive clean energy economy
- Supporting clean energy jobs and New York's economic recovery
- Accelerating the transition from fossil gas to a low-carbon future
- Fostering healthy and resilient communities

Accordingly, all these areas reflect existing activities and work already underway at NYSERDA, which we will continue to refine and bolster as new market and policy needs emerge. In these areas and beyond, NYSERDA remains at the heart of New York's efforts to double-down on progress toward the State's unprecedented clean energy, carbon reduction, and climate equity mandates. Despite the long-term nature of many of these transitions, we are laser-focused on **near-term action** given the continued imperative of **building back better** from the coronavirus pandemic.

I'm immensely proud to work at NYSERDA serving the people of New York State. Thanks to the dedicated work and excellence of our teams across the Authority, the opportunities for us to increase our impact will only continue to grow. I hope all our partners and stakeholders find this Strategic Outlook valuable in highlighting our efforts.



**Doreen M. Harris,
President and CEO,
NYSERDA**

This forward-looking document reflects State policy and NYSERDA's plans as of January 2022. Because New York's energy policy objectives continue to develop in response to the evidence that aggressive action is needed to combat climate change — and greater ambition is possible — updates to particular targets will be noted on the Strategic Outlook webpage: nyserdera.ny.gov/Strategic-Outlook.

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NYSERDA and Its Context



NYSERDA'S EVOLVING CHARGE

In 2020, NYSERDA updated its mission and vision statements to better incorporate themes of climate change, equity and inclusivity, jobs and economic opportunity, public health, and resilient communities — all of which are central to our mission and vision going forward.

As we look out to 2022 and beyond, these themes continue to resonate strongly throughout all our work and focus areas. Indeed, just as these mission and vision statements continue to ring true, so too do the strategic focus areas captured in this and last year's Strategic Outlook.

These topics — an inclusive clean energy economy, supporting clean energy jobs, accelerating the transition from fossil gas, and fostering healthy and resilient communities — will unfold over many years and will require our constant and dedicated focus.

NYSERDA'S MISSION AND VISION STATEMENTS GUIDE THE ORGANIZATION'S CURRENT AND FUTURE INITIATIVES.

Our Vision:

New York is a global climate leader building a healthier future with thriving communities; homes and businesses powered by clean energy; and economic opportunities accessible to all New Yorkers.

Our Mission:

Advance clean energy innovation and investments to combat climate change, improving the health, resiliency, and prosperity of New Yorkers and delivering benefits equitably to all.

Our Promise:

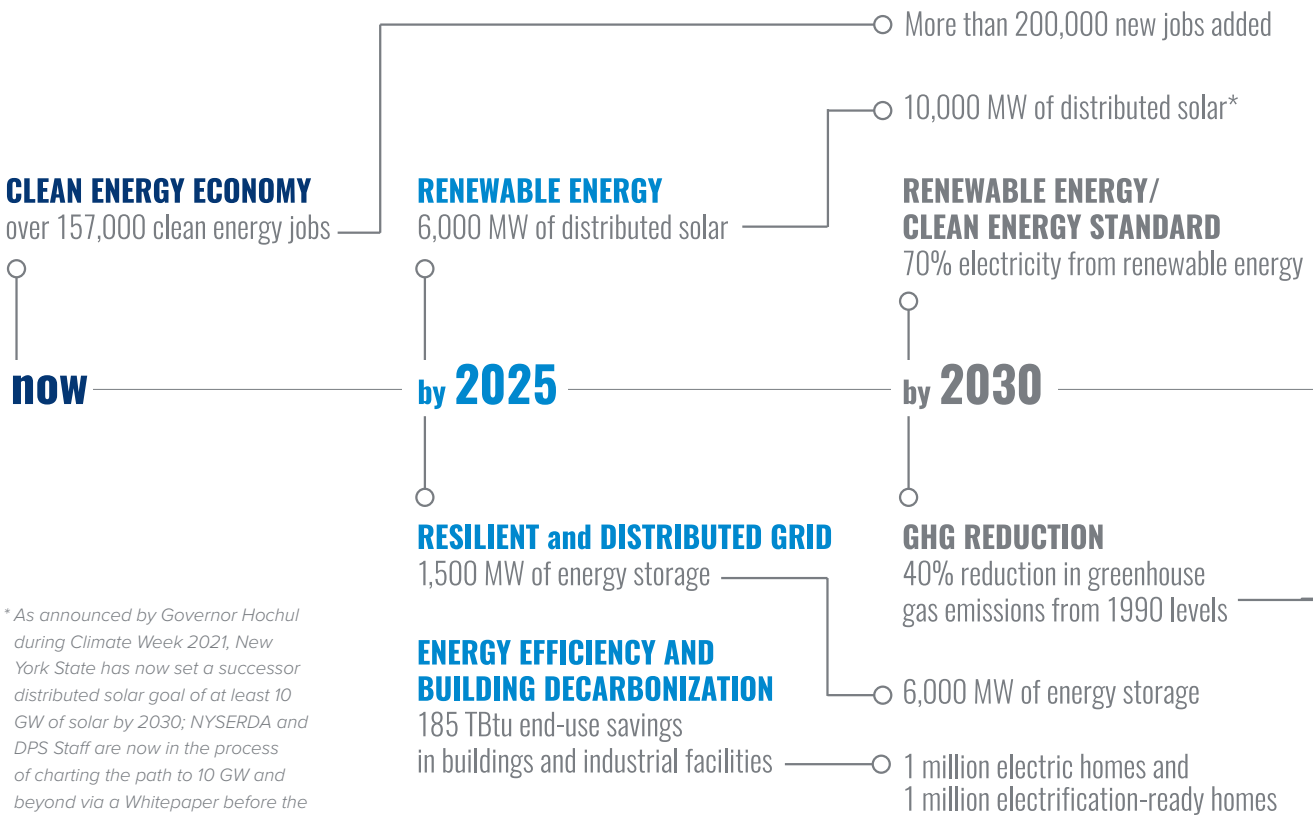
NYSERDA provides resources, expertise, and objective information so New Yorkers can make confident, informed energy decisions.



STATE POLICIES AND COMMITMENTS THAT STEER NYSERDA'S WORK

Under the Climate Leadership and Community Protection Act (Climate Act), Governor Kathy Hochul is driving the most aggressive climate and clean energy agenda in the nation, setting New York on a path for a just transition to carbon neutrality, spurring the growth of the green economy while prioritizing the needs of Disadvantaged Communities across the State. New York State — a founding member of organizations like the Regional Greenhouse Gas Initiative (RGGI) and the U.S. Climate Alliance—aims to meet the energy-related challenges posed by climate change head on, while creating economic opportunities.

As co-chair of the State's Climate Action Council, NYSERDA plays a critical role in charting the direction of New York's energy and climate policies.



NYSERDA'S ROLE

As New York State's clean energy and climate innovation agency, NYSERDA plays a key role in implementing the State's nation-leading policies, programs, planning, and actions, all to deliver a cleaner, healthier, and more prosperous future for all New Yorkers.

NYSERDA is on the front lines of a global energy transition, bringing energy expertise and public service to the challenges of fighting climate change and accelerating the pace of the move to a green energy future.

NYSERDA works to foster the adoption of clean energy technologies and the innovations needed to fight climate change and improve our quality of life, helping families and businesses access clean energy, energy efficiency, all-electric homes and vehicles, and measures for resilience — while encouraging the competition and innovation that delivers value to consumers. In so doing, NYSERDA uses a data-driven approach to guide program design and provide for high levels of accountability and transparency, stewarding public funds toward prudent investments in a wide variety of green infrastructure. NYSERDA focuses on:

- Enabling communities, residents, and businesses to take local action on clean energy, climate, and resilience.
- Instilling confidence in markets and consumers through information, credible analysis, and education.
- Leveraging program investments to support job creation in the clean energy economy and expanded access to economic opportunities for Disadvantaged Communities.
- Providing targeted financial support where costs present a persistent barrier, such as for low- to moderate-income (LMI) consumers and Disadvantaged Communities.
- Increasing customers' access to capital by creating attractive precedents and standardizing approaches that capital providers can readily replicate and scale up.
- Reducing hard and soft costs of clean energy development by driving demand and focusing the efforts of key stakeholders, as well as by supporting and focusing technological and process innovation.
- De-risking energy transitions and deployment from technological and business model innovation, to demonstration projects, to broad commercialization.
- Designing and administering novel programs and pilots to meet the needs of emerging policy priorities and deep decarbonization pathways.
- Investigating and designing ambitious energy and climate strategies and policies for the long-term.

RENEWABLE ENERGY

9,000 MW of offshore wind



by **2035**

CLEAN TRANSPORTATION

100% light duty zero-emission vehicle sales

CLEAN ELECTRICITY

100% zero-emission electricity



by **2040**

GHG REDUCTION

85% reduction in greenhouse gas emissions from 1990



by **2050**

In a dynamic world filled with constantly changing external conditions, NYSERDA aims to be a beacon of certainty and reliability for stakeholders and partners in New York State, exhibiting the steadfast and focused attention that will be needed to combat the climate crisis in the decades ahead. **Despite the ongoing challenges posed by a global pandemic and economic uncertainty, NYSERDA continues to leverage its programs within the flourishing clean energy market to assist in building back better and greener toward the State’s ambitious long-term climate mandates.**

POLICY FRAMEWORK

The landscape and policy framework surrounding NYSERDA’s work has seen significant progress over the past year. Key drivers of change include:

- Implementation of New York’s Climate Leadership and Community Protection Act (Climate Act). The nation-leading Climate Act dramatically raises the bar for the level of ambition that New York State needs to achieve and for other jurisdictions to follow, and is proven in the Climate Action Council modeling to date.
- Increased focus on key priority areas stemming from the Climate Act
 - ▶ Increasing access to (and benefits from) clean energy for Disadvantaged Communities and low-income consumers.
 - ▶ Creating quality jobs in the green economy and ensuring a just transition for all New York workers as we transition to a carbon-neutral economy.
 - ▶ Identifying sectors of the economy that require deeper decarbonization (e.g., transportation, buildings, waste, HFCs).
- Action at the local level ranging from implementation of New York City’s Climate Mobilization Act to adoption of voluntary stretch codes in nearly two dozen localities.
 - ▶ New York City’s all-electric new buildings law phases fossil fuels out of new construction starting in 2024.
- Bold action driven at the federal level, which will require unprecedented coordination between the State and federal government to focus investments for maximal impact.
- Enactment of major legislation requiring the phaseout of internal combustion vehicle sales by 2035, as signed by Governor Hochul.
- Following last year’s approval of the 70% renewable by 2030 Clean Energy Standard (CES), 2021 saw major renewable electricity developments furthering the state’s progress to the 2030 goal, including the selection of two Tier 4 transmission projects and the filing of a white paper supporting a new distributed solar goal.
- DPS and NYSERDA published the Initial Power Grid Study (released in January 2021), which demonstrated that additional grid transmission capability will be needed to achieve the full ambition of the Climate Act. In response, in March, the Public Service Commission identified a public policy transmission need for Long Island (to deliver renewable power to and from the island).

The Climate Mobilization Act, 2019

The Climate Mobilization Act is the largest climate solution put forth by any city in the world and consists of a slate of climate laws designed to dramatically cut carbon in New York City including a landmark law to regulate greenhouse gas emissions from buildings (Local Law 97).

- Increased attention and need to map the transition from fossil gas to clean energy in light of both long-term Climate Act requirements and updated methodologies for inventorying New York State’s greenhouse gas emissions footprint.
- The ongoing imperative to align NYSERDA and utility roles for market enablement and program delivery, given that utility investment in energy efficiency and building electrification measures will increase substantially over the next few years — coupled with short timelines for achieving targets.
- The need to build on recent policy developments (Public Service Commission EV Make Ready Order; multi-state Medium- and Heavy-Duty Vehicles MOU; adoption of Advanced Clean Trucks regulations; clean transportation funding in federal Infrastructure Act) to make deep in-roads in reducing emissions from transportation, which alongside buildings is the largest contributor of emissions in the State.
- Extreme weather events, which are increasing in frequency and severity and placing rapidly increasing strain on our infrastructure and communities, necessitating the need to place resiliency at the heart of clean energy and climate solutions.

These new and evolving drivers of change build upon ongoing challenges and priorities that must continue as core areas of focus.

- The need to ensure energy affordability for all New Yorkers as the energy system undergoes transformation
- The importance of leveraging market activity and private capital to achieve aggressive policy goals
- The imperative to continue building public support for complex systemic changes such as expanding support for large-scale projects and changing of consumer behaviors and purchasing decisions

As this critical inflection point for our climate and energy systems unfolds, NYSERDA has been and will continue to align policy and program offerings to reflect these new and significant drivers of change, including prioritization of the key strategies and policies outlined on the next two pages.

Climate Leadership and Community Protection Act

(Climate Act)

Lays the groundwork for achievement of New York's nation leading climate targets, while calling for an orderly and just transition to clean energy that creates jobs and continues growing a green economy. A minimum of 35% — with a goal of 40% — of benefits of clean energy investments will benefit Disadvantaged Communities.

This year – 2022 – marks a major milestone in the implementation of the Climate Act, as the Climate Action Council's draft Scoping Plan will be deliberated, discussed, and refined over the year, culminating in the issuance of a final Scoping Plan by the end of the year. It will be a truly formative year for the trajectory of New York's energy and climate journey under the Climate Act.

Under the Climate Act, the Climate Justice Working Group is charged with developing a definition/criteria for defining Disadvantaged Communities, which will guide the delivery of benefits of investments to these communities.

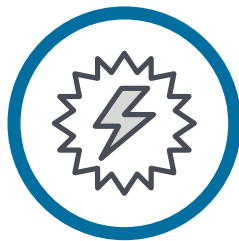
BUILDING BLOCKS OF NEW YORK'S CLEAN ENERGY AGENDA



Transportation



Buildings



Electricity



Economy Wide



Regional



Climate Act Scoping Plan

Policies and scenarios to achieve **85% GHG reduction by 2050**, targeting carbon neutrality



Clean Energy Fund

\$6B fund for four key program portfolios:

- > Market Development
- > NY Green Bank
- > NY-Sun
- > Innovation & Research



Clean Energy Standard



Designed to transform the generation of electricity to **70% renewable by 2030** and **100% zero-emission by 2040**



Zero-Emission Vehicles (ZEV) Action

Transportation emissions reductions through build-out of electric vehicles market and infrastructure, support for electrification of fleets and trucks



New Efficiency: New York

Comprehensive set of strategies for delivering energy efficiency savings and emissions reductions



NYS Clean Heat

Replacing onsite fuel combustion for heating and cooling with efficient, electric heat pumps (air, ground)



Regional Greenhouse Gas Initiative (RGGI)



Growing cooperative effort among northeast/mid-Atlantic states to cap and reduce CO₂ emissions from power plants



Multi-State and Federal Action

Building on State-level leadership through the U.S. Climate Alliance, federal infrastructure investments are now poised to drive action and impact on energy, resilience, and climate

FEDERAL INFRASTRUCTURE AND CLIMATE INVESTMENTS:
PRIORITIES FOR NYSERDA AND NEW YORK



Electric Vehicle Charging Infrastructure



Offshore Wind Port Infrastructure



**Energy Efficiency, Electrification,
and Weatherization**



Affordable Housing Investments



Zero-emission Buses and Heavy-duty Trucks



Transmission Upgrades



Green Hydrogen Hubs



Workforce Development and Training



Domestic Manufacturing and Supply Chain



Direct Air Capture Hubs

NYSERDA hopes to leverage federal funding to enhance our most critical efforts and topline mission outcomes.

Mission Outcomes and Strategic Focus Areas for 2022–2025

NYSERDA's primary mission outcomes are presented in the following pages. For each outcome, NYSERDA strategies over the planning horizon are presented along with a summary of NYSERDA's unique role in delivering on the critical outcome. Indicators of progress are also presented to ensure that movement in the market and progress toward these goals can be tracked.

The mission outcomes that NYSERDA seeks to advance to support the energy transition in New York State include:



**GREENHOUSE GAS
EMISSIONS REDUCTION**



**RENEWABLE
ENERGY**



**ENERGY EFFICIENCY AND
BUILDING DECARBONIZATION**



**CLEAN ENERGY
ECONOMY**



**RESILIENT AND DISTRIBUTED
ENERGY SYSTEM**

Over the planning horizon, NYSERDA will continue to concentrate on the following strategic focus areas to drive progress under each mission outcomes and the requirements of the Climate Act. These strategies are critical to achieving our long-term energy and greenhouse gas emission reduction goals:



**BUILDING AN
INCLUSIVE CLEAN
ENERGY ECONOMY**



**SUPPORTING CLEAN
ENERGY JOBS AND
NEW YORK STATE'S
ECONOMIC RECOVERY**



**ACCELERATING THE
TRANSITION FROM
FOSSIL GAS TO A
LOW-CARBON FUTURE**



**FOSTERING HEALTHY
AND RESILIENT
COMMUNITIES**

For each of these strategic focus areas, statewide priorities are presented along with key NYSERDA actions for 2022–2025. As characterized last year, these strategic focus areas embody a common theme of centering around people — the residents and communities across New York State who utilize the energy system every day and have the potential to benefit from NYSERDA's programs and policies.

These strategies will be crucial for achieving our ambitious and necessary climate objectives. Critical focus will be on helping historically marginalized New Yorkers access the growing green energy economy and clean energy job opportunities; supporting families to learn about and choose cleaner home appliances; and empowering neighbors, communities, and businesses to drive climate action and public health wins.

Many efforts will begin producing tangible outcomes in the near term, while others represent an acceleration in focus for a transition that will take many decades to unfold.

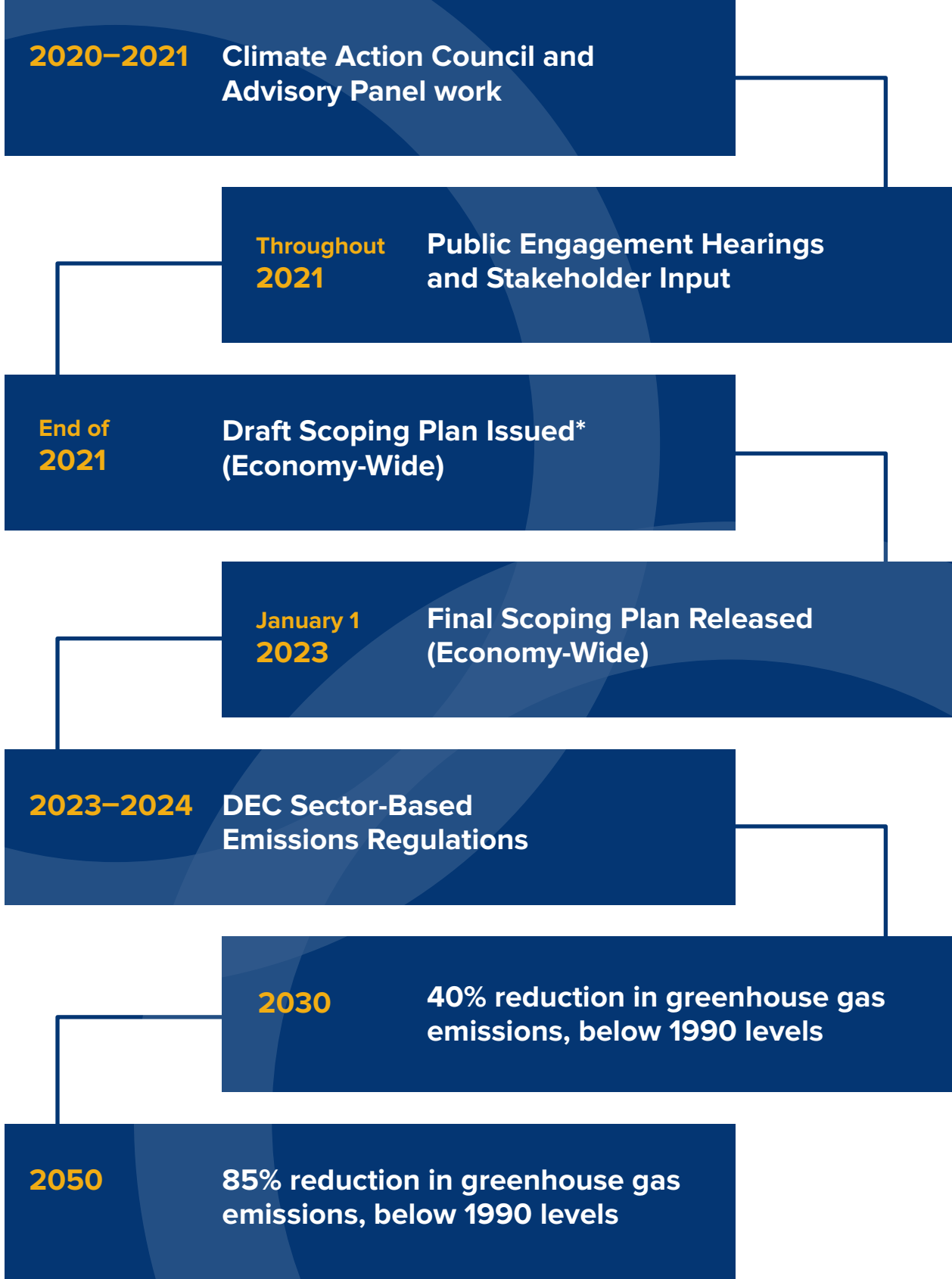


Greenhouse Gas Emissions Reduction

STATE POLICY GOAL
FOR GREENHOUSE GAS (GHG) EMISSIONS REDUCTION

The Climate Act sets a greenhouse gas reduction target of 40% by 2030 and 85% by 2050, each below 1990 levels.

Hitting these targets will enable the State to advance economy-wide carbon neutrality. In other words, it would mean that New York State is doing its part to reduce carbon pollution and the causes of climate change, while establishing a model for other jurisdictions to follow. The Climate Act also sets in motion a process to develop an updated GHG accounting methodology, which the Department of Environmental Conservation (DEC) is now implementing. Due to these methodological changes reflecting the latest scientific findings — accounting for New York’s in-state and upstream emissions footprint under a 20-year horizon for global warming potential — achieving a 40% reduction in GHG emissions by 2030 and 85% by 2050 have become significantly more difficult, requiring swifter, more transformative changes to our energy systems and economy.



* View the Draft Scoping Plan at climate.ny.gov/Draft-Scoping-Plan



NYSERDA'S ROLE

Co-Chair the Climate Action Council to craft a roadmap of policies needed to achieve the Climate Act's goals, including through leadership of the Scoping Plan development as well as support of integration and jobs study analyses.

Guide and facilitate State Energy Plan development and shape energy policies throughout New York State, by catalyzing market transformation and through development/ implementation of mandates and Executive Orders.

Identify and implement strategies for energy, buildings, and transportation sector emissions reductions and other GHG mitigation strategies.

Develop and track statewide greenhouse gas inventory, supporting DEC in updated emissions methodology rulemaking and implementation.

Facilitate State agencies' efforts to Lead-by-Example and drive toward carbon-neutral operations.



INDICATORS OF PROGRESS

- Levels and trends in GHG emissions from sources statewide and within priority sectors under updated emissions methodology

STRATEGIES FOR 2022–2025

- Support policy development and planning, including finalization of Climate Act Scoping Plan, Carbon Neutral Buildings Roadmap, Building Electrification Roadmap, Clean Transportation Roadmap, 10 GW distributed solar white paper, Hydrogen Roadmap, and more.
- Develop communications strategies that support individual/local understanding of the Scoping Plan and translate the plan to facilitate individual “what can I do, what should I do?” action.
- Advance solutions to drive emissions reductions in all areas of New York's economy—through a foundation of energy efficiency, decarbonizing electricity supply, and beneficial electrification of buildings, transportation, and industrial applications.
- Spur development of innovative, next-generation solutions driving emissions reductions in hard-to-reach sectors and hard-to-electrify applications, from hardware, software, and materials to natural carbon solutions.
- Refocus efforts to market segments needing attention, such as medium- and heavy-duty, and off-road vehicles, as indications of market-based movement in light-duty vehicles grow.
- Help spearhead regional GHG program reviews alongside other states, including notably the periodic RGGI program review beginning fall 2021 and expected to conclude early 2023.
- Support communities across the State in implementing their own sustainability and clean energy goals, including localized clean heating and cooling campaigns, and widespread adoption of new stretch energy/building codes.
- Formalize approach to inter-agency engagement, providing support for agency shifts with data, policy options, lead-by-example exemplars, strategic planning, and budgetary engagement.
- Conduct analysis and program development to better spotlight and target the co-benefits of GHG reductions, especially the public health benefits that can be delivered to Disadvantaged Communities via reduction of co-pollutants, as seen in the Clean Energy Standard Tier 4 petition/filing.
- Collaborate with other public entities on tough to decarbonize sub-sectors such as medium- and heavy-duty transportation, including work with DPS to expand the EV make-ready program for trucks and buses and engagement with transit agencies in developing tools and resources to support 100% zero-emissions bus transit.
- Enact and implement new legislation to require that, by 2027, all new school bus purchases will be zero-emissions, and by 2035, all school buses on the road will be zero-emissions — as announced by Governor Hochul in January 2022.



TRANSFORMATION 2030

2030 target: 40% reduction from 1990 emissions baseline

New York — at all levels of government — has re-oriented its policies and programs to drive low-carbon solutions and equity into decision-making from Buffalo to the Capital, to New York City, and all the town halls across the State.

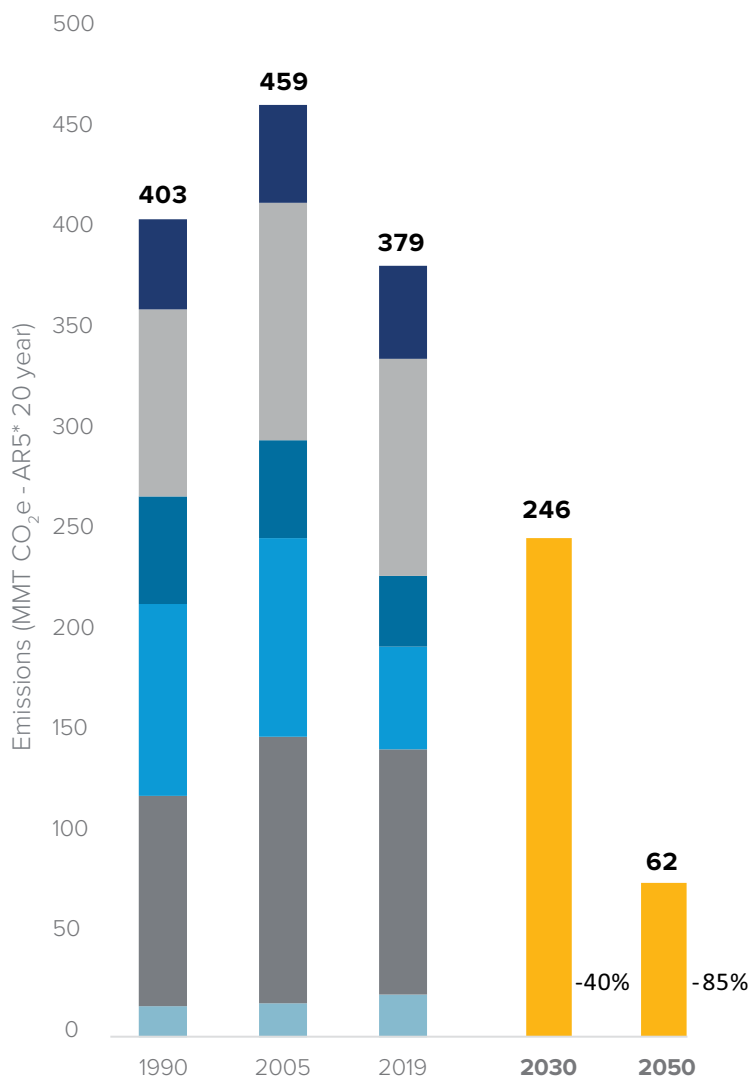
- The power industry is building new power plants fueled by wind, water, and sun, with 20,000 MW to reflect share of offshore wind by 2030.
- Infrastructure improvements are making public transit viable for even more New Yorkers and the industry is well on its way to a new generation of transport, with EVs comprising over 90% of new cars sales in 2030.
- Modern and efficient heat pumps are the preferred option for customers.
- Businesses across the State are embracing ESG goals (environmental, social and governance) and showing that sustainability can be aligned with their bottom line.
- This transformation has driven a thriving clean energy industry with nearly a half a million people employed in the sector and has improved local air quality for all New Yorkers.

2050 target: 85% reduction from 1990 emissions baseline

NOTE: all emissions inventory numbers were updated at the end of 2021 following DEC rulemaking on emissions accounting methodology to align with the Climate Act. The new inventory numbers put New York's baseline of emissions at roughly 70% higher than pre-Climate Act accounting, due to the changes in accounting for upstream emissions, global warming potential, and other updates to more properly gauge the near-term impact of our emissions.

- Waste
- Transportation
- Industry
- Electricity
- Buildings
- Agriculture
- Goal

Due to methodological updates included in DEC's GHG Emissions Report, the 1990 baseline differs slightly from the 1990 baseline incorporated into DEC's Statewide Greenhouse Gas Emission Limits regulation (Part 496) that informed the establishment of the 2030 and 2050 values. The 2030 and 2050 values shown here are based on regulation, while the 1990 value shown here is based on the latest information developed for the annual GHG Emissions Report.

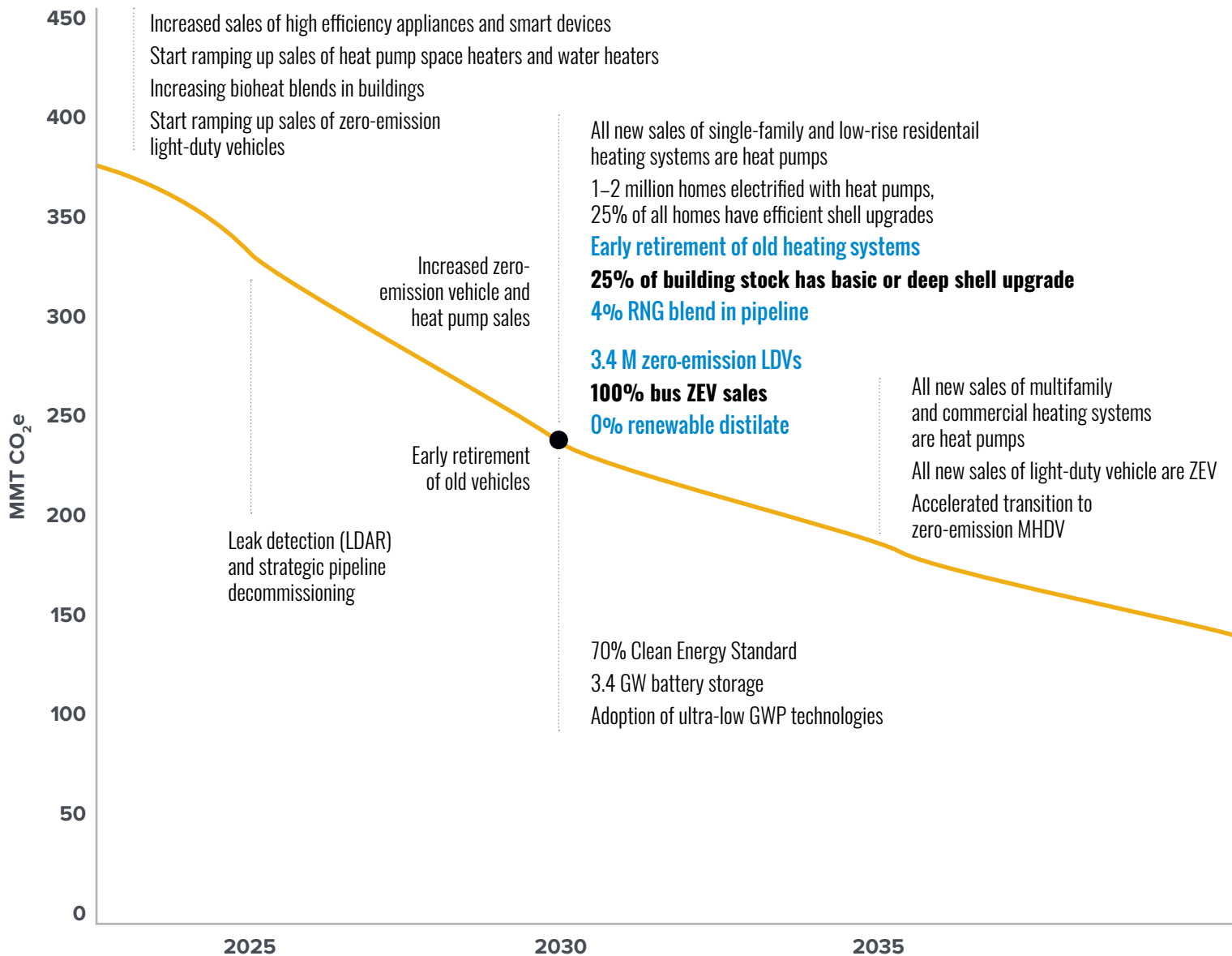


* AR5 – Fifth Assessment Report of the IPCC



CLIMATE ACTION SNAPSHOT: NEW YORK'S DRAFT SCOPING PLAN

Highlights from the draft Scoping Plan issued by the Climate Action Council in December 2021



— Draft Scoping Plan Scenario 3: Accelerated transition away from combustion

● Climate Act gross emissions limits

Blue text indicates additional action beyond CAC Advisory Panel recommendations

Blue text indicates differences vs. Draft Scoping Plan Scenario 2: Strategic Use of Low-Carbon Fuels

HIGHLIGHTED PROGRAMS AND INITIATIVES

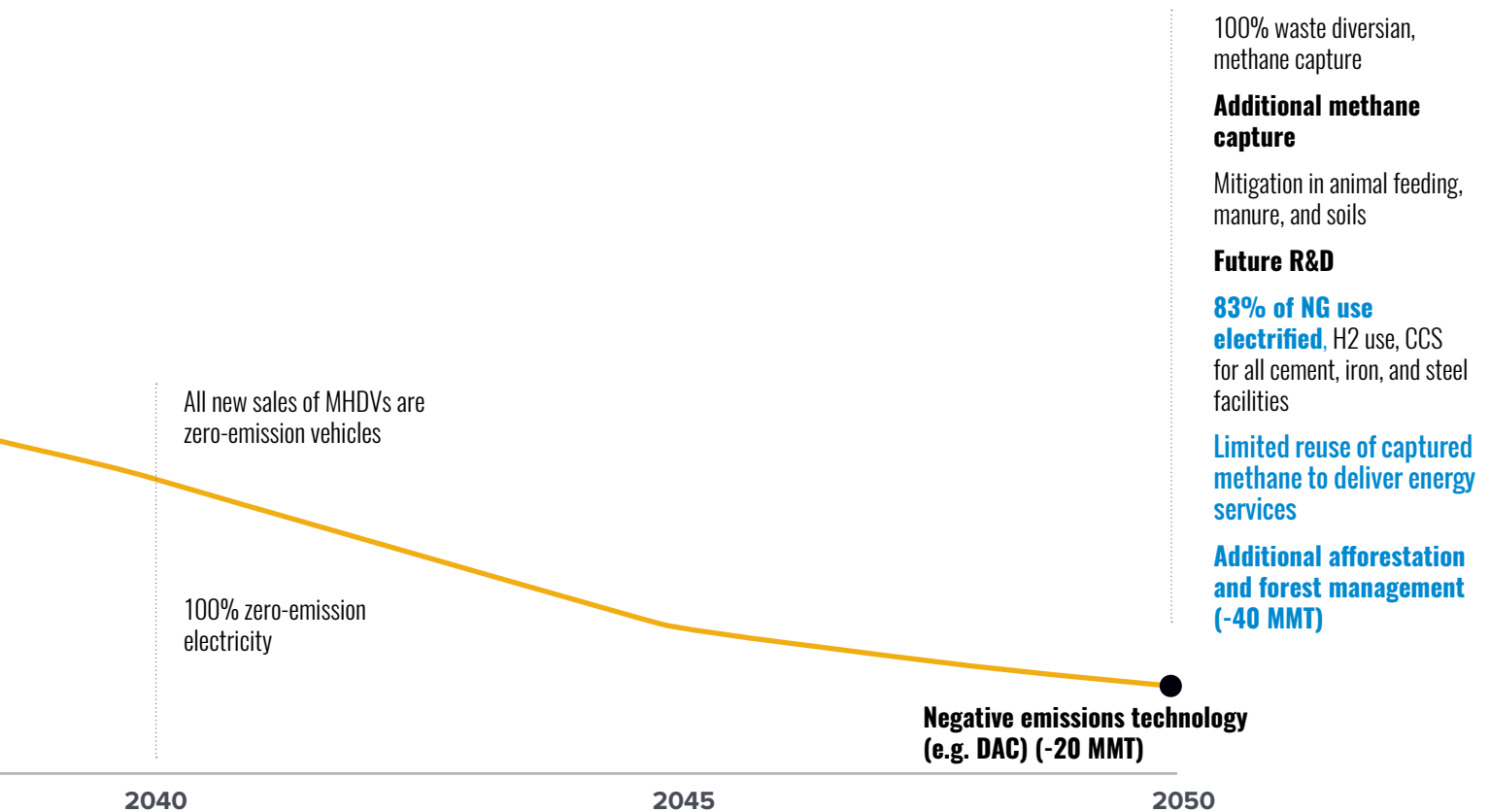
Clean Energy Fund accelerates the deployment of clean energy solutions while driving economic development.

Clean Energy Standard provides the framework for achieving 70% renewable electricity by 2030 via the build-out of large-scale renewable resources for New York State. Achievement supported by complementary actions initiated in 2020 legislation (Build Ready, Office of Renewable Energy Siting [ORES], Power Grid Study) and 2021 budget provisions (Prevailing Wage/Project Labor Agreements, MWBE/SDVOB requirements; Buy America preferences, renewable taxation model).

Energy Storage deployment and other **renewable energy integration measures** to get more renewables on the grid, minimize and avoid delivery impacts, bolster system flexibility, and support resiliency.

CLIMATE ACTION SNAPSHOT: NEW YORK'S DRAFT SCOPING PLAN

Highlights from the draft Scoping Plan issued by the Climate Action Council in December 2021



HIGHLIGHTED PROGRAMS AND INITIATIVES

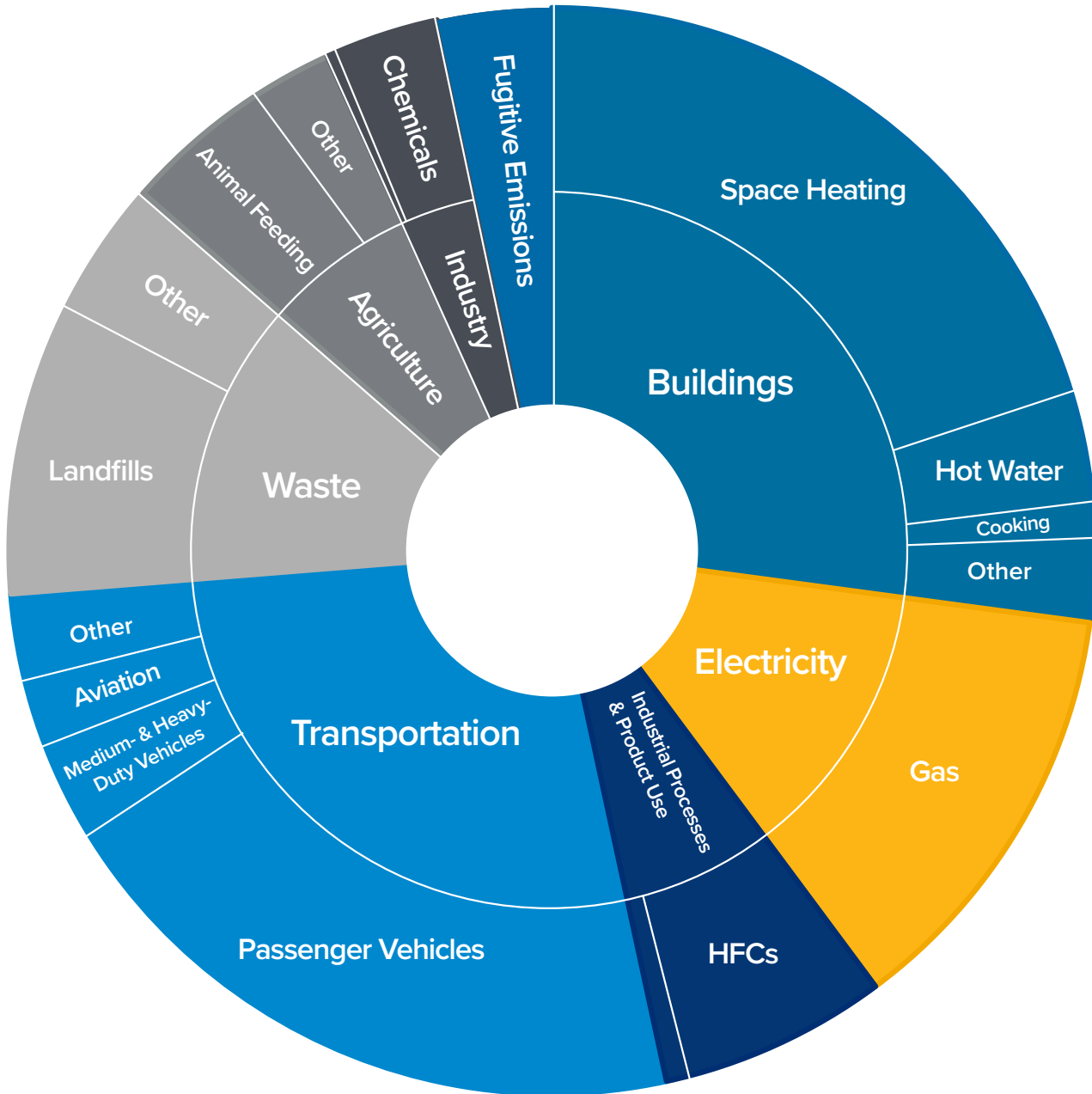
Regional Greenhouse Gas Initiative (RGGI) assigns a price to power plant emissions and directs revenue to clean energy initiatives.

EV Make Ready Order and Clean Transportation Prizes represent an important expansion in the State's commitment and investment to zero-emission vehicle adoption, with funding for grid infrastructure to support electric vehicles and NYSERDA-run prizes around environmental justice, advanced mobility, and medium- and heavy-duty vehicle innovation.

Clean Energy Communities recognizes and rewards communities for implementing clean energy actions that save taxpayer dollars, create jobs, and improve the environment.



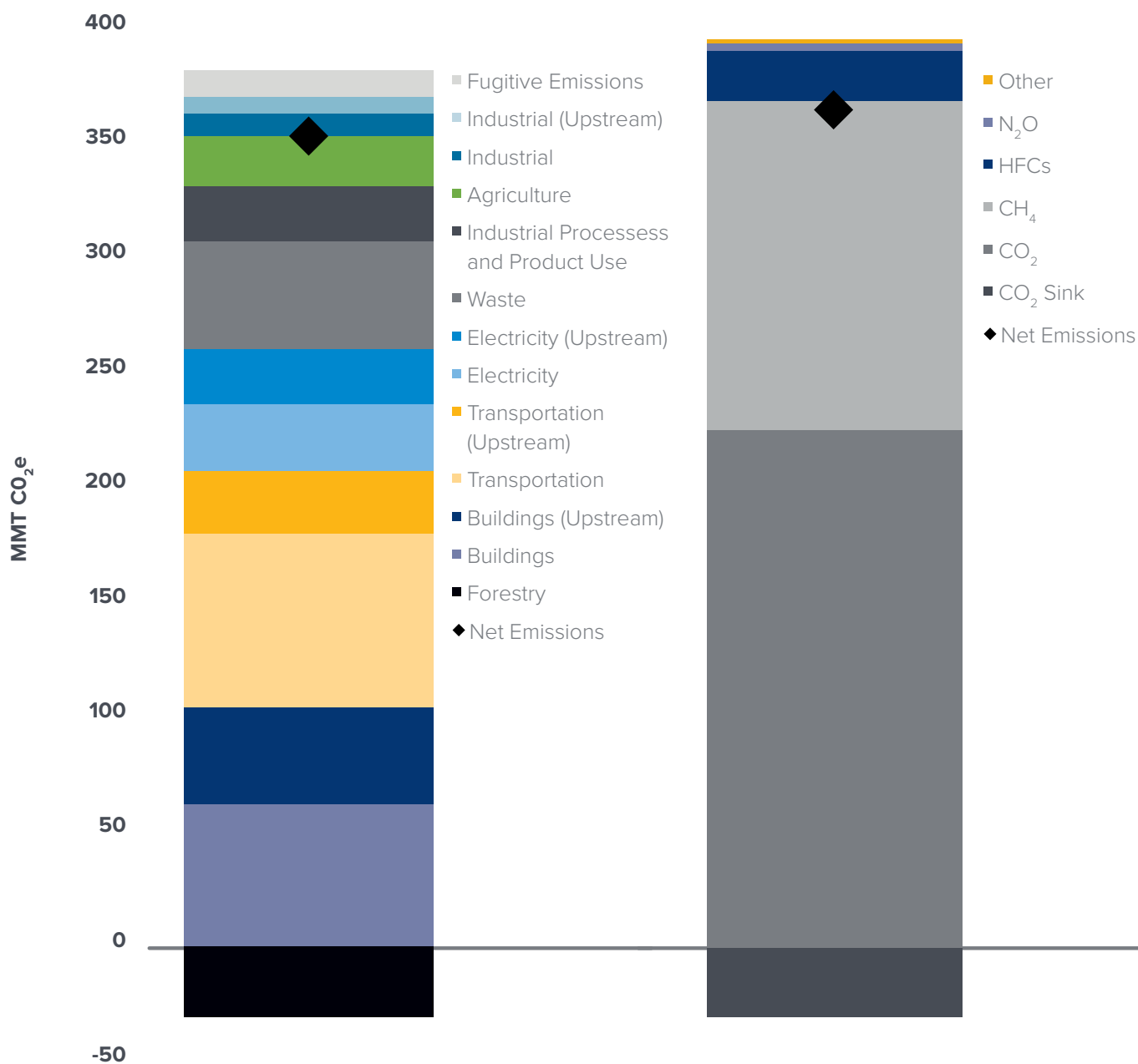
CURRENT ESTIMATED 2020 GREENHOUSE GAS EMISSIONS BY SECTOR*



*Draft 2020 results in line with DEC Climate Act accounting including upstream emission factors, 20-year Global Warming Potential (GWP), and estimates from NY PATHWAYS analysis. Sub-sector figures not yet re-benchmarked to DEC's updated GHG Inventory Report issued December 2021.



CURRENT ESTIMATED 2020 GREENHOUSE GAS EMISSIONS BY SECTOR*





Renewable Energy

STATE POLICY GOAL
FOR RENEWABLE ENERGY

The Climate Act mandates that at least 70% of New York’s electricity come from renewable energy sources such as wind and solar by 2030 (70x30).

As a companion to the Climate Act, the Accelerated Renewable Energy Growth and Community Benefit Act followed in the Spring of 2020 to address the urgency of our climate transition. The intent is to integrate the acceleration of permitting timelines, seeking regulatory efficiencies, mandating careful study of our electricity grid and the identification of priority upgrades, and deepening community engagement. Armed with the nation’s most aggressive climate goals and expedited processes to match, achievement of the 70 x 30 mandate will move the State closer to delivering just, equitable climate action to New Yorkers, including improving air quality, buttressing a more resilient grid, and spurring a clean economy through supply chain investments, workforce development, and job creation.

In the 21st century, the future is electric and NYSERDA is working tirelessly to remove barriers and deliver our State’s goals and benefits to New Yorkers — including more than \$17 billion in net benefits estimated over the lifetime of Tier 1 and offshore wind procurements under the Clean Energy Standard (not yet inclusive of the benefits from the Tier 4 awards announced in 2021).



NYSERDA'S ROLE

Facilitate continued ramp-up of steady, predictable procurements for renewable generation, offering market confidence and supply chain stability.

Support smart siting policies to maximize co-benefits between industries, cultivate infrastructure ecologies, and build community engagement.

Support climate equity through the prioritization of benefits and workforce development delivered to Disadvantaged Communities across the State.

Drive supply chain localization, local port and manufacturing investments, and job creation and training, including through new \$500 million State investment to support offshore wind ports and manufacturing.

Reduce costs by delivering economies of scale, removing barriers to deployment, and supporting innovation.

Participate actively in transmission analysis needed to cost-effectively accommodate 25+ GW of Tier 1 and Offshore Wind renewable projects anticipated for State goals.

Develop a blueprint to guide the retirement and redevelopment of New York's oldest and most-polluting fossil facilities by 2030, working with DEC and DPS – as announced in January 2022.

INDICATORS OF PROGRESS

- MWh: progress toward the 70x30 and 100x40 targets
- MW and facilities (large-scale, offshore, and behind-the-meter) completed and in the pipeline: progress toward goals
- Benefits of renewable energy investments accruing for Disadvantaged Communities (%) and M/WBE engagement
- Private market investment, clean energy jobs, and costs per Renewable Energy Credit (REC)

STRATEGIES FOR 2022–2025

- Accelerate efforts to achieve the Climate Act's 70x30 renewable goal via build-out of on- and off-shore resources, as well as construction of new Tier 4 transmission line projects into Zone J/New York City.
- Continue the sprint toward and past Climate Act goals of 6,000 MW of solar by 2025, 3,000 MW of storage by 2030, 9,000 MW of offshore wind by 2035, and the delivery of benefits to Disadvantaged Communities.
- Collaborate with market participants to complete technical studies, such as New York State Cable Corridor Study announced in January 2022, and promote infrastructure investments like transmission and energy storage that will unlock system efficiencies and unbottle resources to drive progress on our goals and ensure cost savings to ratepayers.
- Collaborate with utilities and other market participants to build transparency in interconnection processes, overcome grid constraints on project capacity, and pricing/curtailment issues.
- Develop and launch new 'Offshore Wind Master Plan 2.0 – Deep Water' as planning and execution framework for at least 9,000 MW of offshore wind by 2035, featuring pursuit of next-generation floating turbine technologies and preparation for a mesh-ready offshore buildout.
- Engage in detailed sector studies of evolving resiliency design approaches and best practices to mitigate future climate risks and to deepen the carbon performance of projects through reducing embodied carbon.
- Continue working to dramatically reduce project development timelines under new 94C siting process and via interconnection efficiencies.
- Work closely with communities to inform and spur adoption of smart local siting rules/laws and cultivate welcoming renewable energy zones.
- Engage with NYS Tax and Finance to implement and refine successful model renewable energy taxation policy.

TRANSFORMATION 2030

- New York is well on its way to powering electricity with wind, water, and solar
- 70% renewable electricity statewide
- Virtually all large-scale resources procured by 2026/2027 to complete 2030 portfolio
- At least 10 GW of distributed solar, roughly 16 GW of large-scale solar, approximately 4 GW of onshore wind, and at least 6 GW of offshore wind to serve expected statewide annual load of 151,678 GWh
- Build-out of inter- and intra-regional transmission infrastructure, long-duration storage underway



The Climate Act and new, expanded goals ramp up renewable energy, including:

QUADRUPLING NEW YORK'S OFFSHORE WIND TARGET TO

9,000 MW by 2035

up from 2,400 MW by 2030

DOUBLING DOWN ON DISTRIBUTED SOLAR DEPLOYMENT TO AT LEAST

10,000 MW BY 2030

up from 6,000 MW by 2025

New York State continues to grow a strong pipeline of projects to meet the 70x30 goal.

AS OF DECEMBER 2021,
THERE WERE APPROXIMATELY:

32 GW

**OF ACTIVE RENEWABLE
ENERGY PROJECTS
IN THE NYISO
INTERCONNECTION QUEUE**

Additionally, there are currently **more than**

Additionally, there are currently more than **35 PROJECTS** in or in the process of applying for the Active Article 10 and Article 94c (ORES) queues, with nine certificates/permits granted in 2021 – indicating more of the pipeline is coming to fruition.

There have been **MORE THAN 1.2 GW OF ENERGY STORAGE** awarded statewide, with another **400+ MW OUT TO BID** as of the end of 2021 and several hundred MWs expected to be built in 2022.

In addition, there have been **MORE THAN 3.5 GW OF DISTRIBUTED SOLAR** installed statewide, with a **PIPELINE OF 2.6 GW** (high project maturity – lower than 10% attrition).

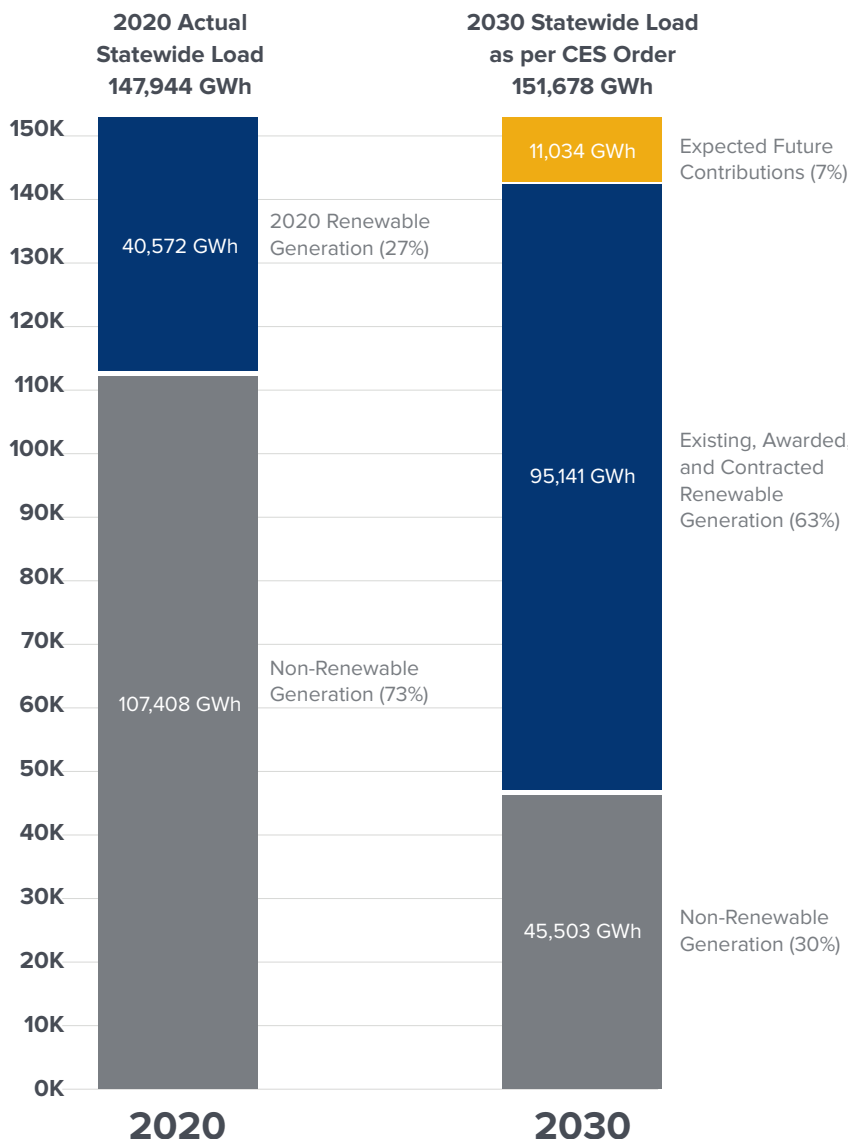


2030 Clean Energy Standard target: 70% electricity from renewable sources

PROGRESS TOWARDS 70X30 GOAL

106,174 GWh to reach goal*

*GWh required to meet goal is based on 2020 Clean Energy Standard Order load projection for 2030 and is subject to future adjustment.



HIGHLIGHTED PROGRAMS AND INITIATIVES

Large-Scale Renewables

supports the development of large-scale renewable energy projects.

Offshore Wind establishes a significant, cost effective, renewable generation source with promise of new industry in New York State.

Tier 4** is a new tier of the Clean Energy Standard helping bring forth new transmission and new renewables to serve New York City, via two major projects selected for award in 2021.

Build-Ready complements private sector development and expedites the pre-development of large-scale renewable assets with a **focus on underutilized, previously developed sites.**

Community Solar makes solar affordable and accessible for all New Yorkers.

Solar for All makes subscriptions to community solar projects available at no cost for low-income consumers.

NY-Sun and Energy Storage drive distributed solar adoption through residential/commercial rooftop and larger community solar projects, reducing costs, making solar accessible to all New Yorkers, while deploying at least 1,500 MW of energy storage by 2025 with a goal of realizing a self-sustaining market.

** Pipeline of existing, awarded, and contracted renewable generation includes 14,636 GWh of hydroelectric, land-based wind, and utility-scale solar large-scale renewables generation contracted under the Clean Energy Standard 2021 Tier 4 solicitation, T4RFP21-1, currently subject to approval by the Public Service Commission.



Energy Efficiency and Building Decarbonization

STATE POLICY GOAL FOR ENERGY EFFICIENCY AND BUILDING DECARBONIZATION

The Climate Act codifies a 2025 statewide energy efficiency target of 185 TBtu of cumulative site energy savings. Governor Hochul, in her 2022 State of the State Address, has called for two million climate friendly homes by 2030, with one million electric and efficient homes and one million electrification-ready homes.

The 2025 Climate Act energy efficiency target will deliver near-term progress toward New York's 40x30 climate goals, but it is only the beginning of a much more ambitious change needed to decarbonize New York's six million buildings consistent with Climate Act. Building energy efficiency and electrification will play a dominant role in putting the State's building sector on a course to carbon neutrality, while creating better living and working spaces for New Yorkers and economic opportunity in the form of clean energy jobs. Advances in load flexibility will minimize the grid impacts of statewide beneficial electrification of buildings. Efforts will focus on delivering benefits to Disadvantaged Communities and low- and moderate-income New Yorkers. As we look to the future, our strategy will need to go beyond building-by-building energy efficiency upgrades to decarbonization approaches that can work block-by-block and community-by-community — moving at the scale and pace needed to address the climate crisis.



NYSERDA'S ROLE

Deliver policy and strategic leadership

on energy efficiency and building electrification through Climate Action Council, Carbon Neutral Buildings Roadmap, Building Electrification Roadmap, and decarbonization partnerships with other state agencies.

Provide technical and regulatory assistance

to advance building mandates that send a clear signal to the market that New York is phasing out the use of fossil fuel in buildings and moving to cleaner, healthier options.

Develop and manage programs to eliminate barriers and increase adoption of carbon neutral building strategies, providing financial and technical assistance to solution providers and consumers, particularly low- and moderate-income consumers.

Work with HCR, DPS, and Department of State (DOS) to deliver an executable plan for the achievement of the two million climate friendly buildings goal, as charged by Governor Hochul in January 2022.

Support product innovation to deliver better solutions for the New York market and build a local clean energy industry.

Provide financing for energy efficiency and building electrification market participants.

INDICATORS OF PROGRESS

- Number of buildings that are efficient and all electric, as a percent of New York's six million buildings
- Avoided energy use: total TBtus across all fuels (natural gas, electricity, etc.)
- GHG emission reduction from the building sector (annual CO₂e)
- Investment in buildings in Disadvantaged Communities
- New York's Clean Energy Dashboard can be used to track indicators of progress, found at nyscrda.ny.gov/view-clean-energy-dashboard.

STRATEGIES FOR 2022–2025

- Leverage insights from the **Carbon Neutral Buildings Roadmap** and Building Electrification Roadmap in designing market interventions to incorporate deep efficiency, more efficient electric heating and cooling technologies, and grid-connected capability.
- Build the market for carbon neutral buildings and drive deeper levels of efficiency using a variety of strategies, including peer-based challenges and public-private demonstration partnerships; support of long-term energy planning within the capital improvement cycle; support of health-based studies; demand aggregation, supply-side engagement, community-scale systems, and other cost reduction strategies; as well as development and demonstration of new solutions to deliver higher performing buildings products and systems.
- Develop a robust portfolio of programs that create more efficient and healthier buildings for low-income families and disadvantaged communities, with a focus on schools and affordable housing, in coordination with housing agencies and utilities — including through HCR's new \$25 billion, five-year housing capital plan.
- In partnership with utilities, deliver comprehensive building electrification initiative with consumer incentives and market support, including development of workforce and supply chains, to move New York toward all-electric homes and buildings and accelerate transition away from fossil fuel.
- Build market demand by increasing consumer awareness and providing decision-quality information, tools, and playbooks on energy efficiency and building electrification opportunities for building owners and tenants — capitalizing on key points in a building life cycle (e.g., tenant turnover, major renovations, property transfer, equipment replacement).
- Support statewide building decarbonization in new construction through a combination of market demonstrations over the next three years paving the way for a mandatory low energy-use-intensity and zero on-site GHG new construction code phasing in from 2024 through 2027.
- Support statewide building decarbonization in the existing building stock with development of appliance efficiency standards, mandatory benchmarking for large buildings, home energy disclosure upon property sale, and building performance standards, consistent with the recommendations emerging from the Climate Action Council.

TRANSFORMATION 2030

To achieve New York's climate goals, by 2030 we will need to have 1–2 million buildings equipped with modern electric heating and cooling and paired with energy efficiency. This will create better living and working spaces for New Yorkers — especially low- and moderate-income New Yorkers — and will build healthier communities. Achieving this calls for a skilled workforce and will create job opportunity throughout the State and will create close to 100,000 jobs throughout the State.



ATTRIBUTES OF A CARBON NEUTRAL BUILDING

- Maximizes energy efficiency
- No fossil fuel combustion for building energy services (all-electric and uses)
- Produces or procures zero-emission electricity
- Designed with flexible loads and/or storage that can respond to grid conditions
- Features resiliency measures that protect building occupants
- Designed with attention to embodied carbon and refrigerants

nyscrda.ny.gov/Carbon-Neutral-Buildings

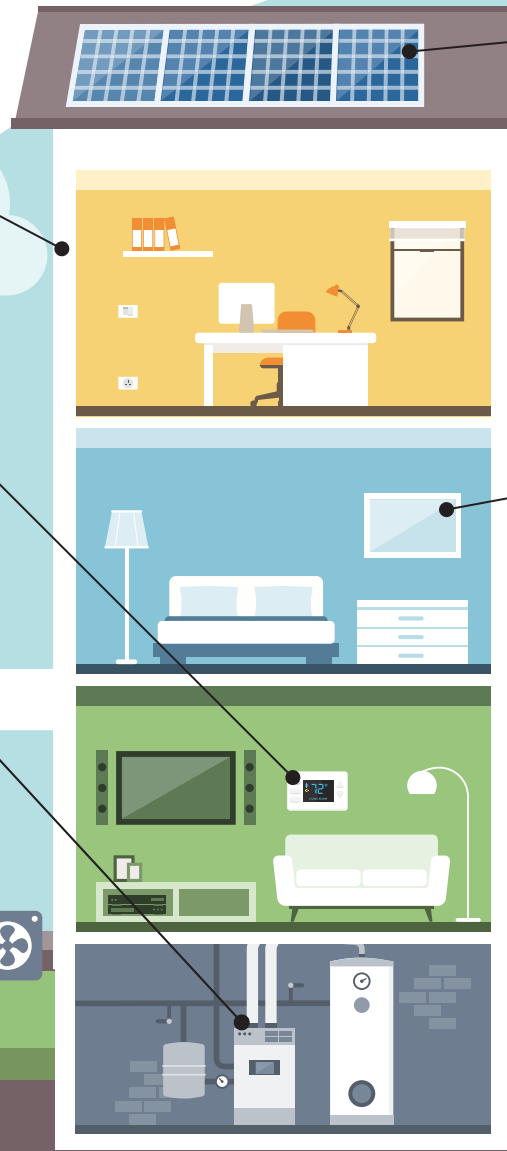
COMMUNITY WIND TURBINES

HIGH PERFORMANCE BUILDING ENVELOPE

BUILDING/HOME CONTROLS

EFFICIENT ELECTRIC WATER HEATER

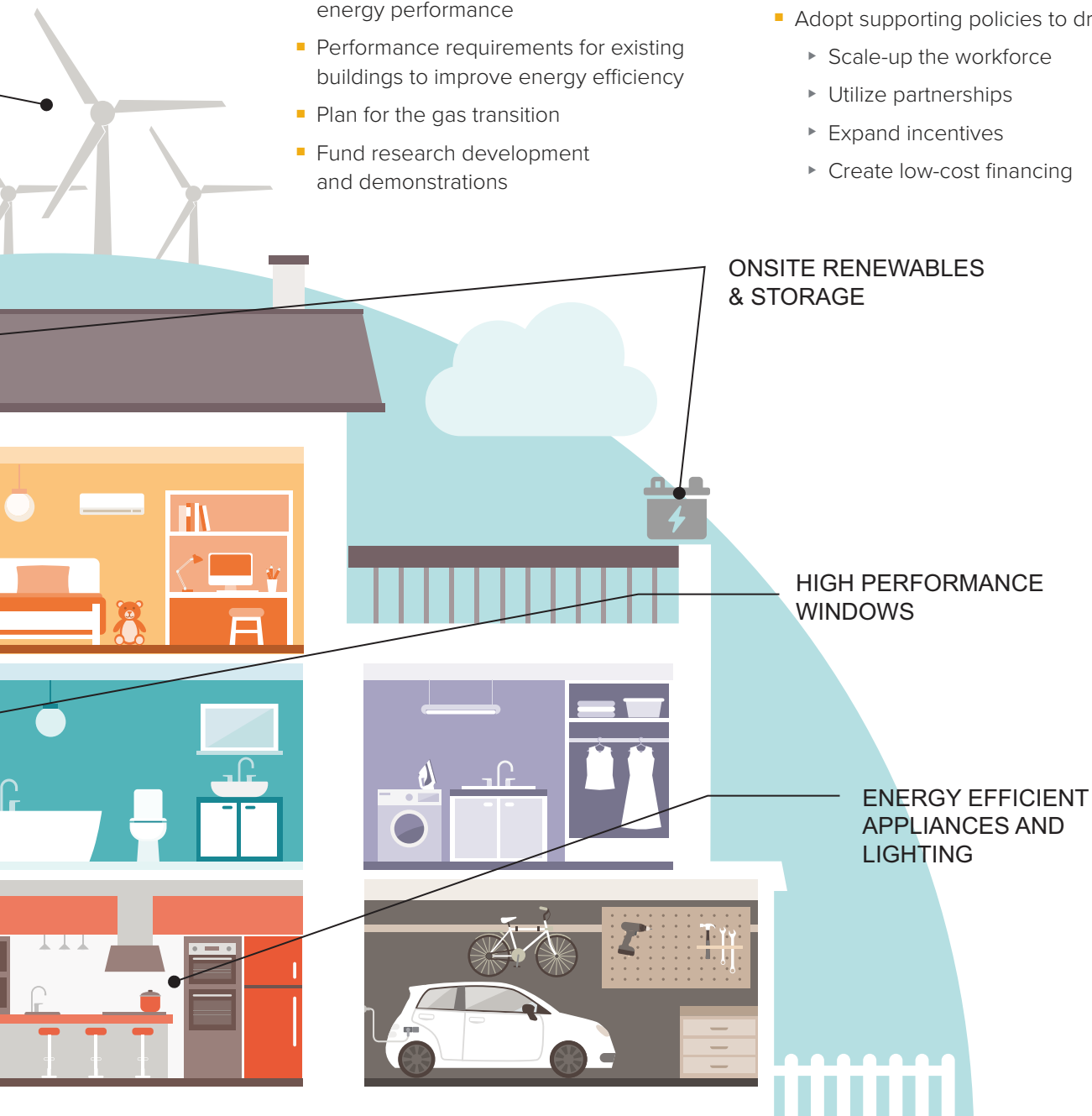
EFFICIENT HEAT PUMP HVAC





STRATEGIES NEEDED TO DRIVE PROGRESS IN CARBON NEUTRAL BUILDINGS

- Advanced codes for new construction
- Prohibit replacement of fossil-fuel heating and hot water equipment
- Benchmarking and disclosure of energy performance
- Performance requirements for existing buildings to improve energy efficiency
- Plan for the gas transition
- Fund research development and demonstrations
- Lead by example on embodied carbon
- Reduce the use of hydrofluorocarbons (HFCs)
- Prioritize low- and moderate-income residents and those in Disadvantaged Communities
- Adopt supporting policies to drive action:
 - ▶ Scale-up the workforce
 - ▶ Utilize partnerships
 - ▶ Expand incentives
 - ▶ Create low-cost financing



ONSITE RENEWABLES
& STORAGE

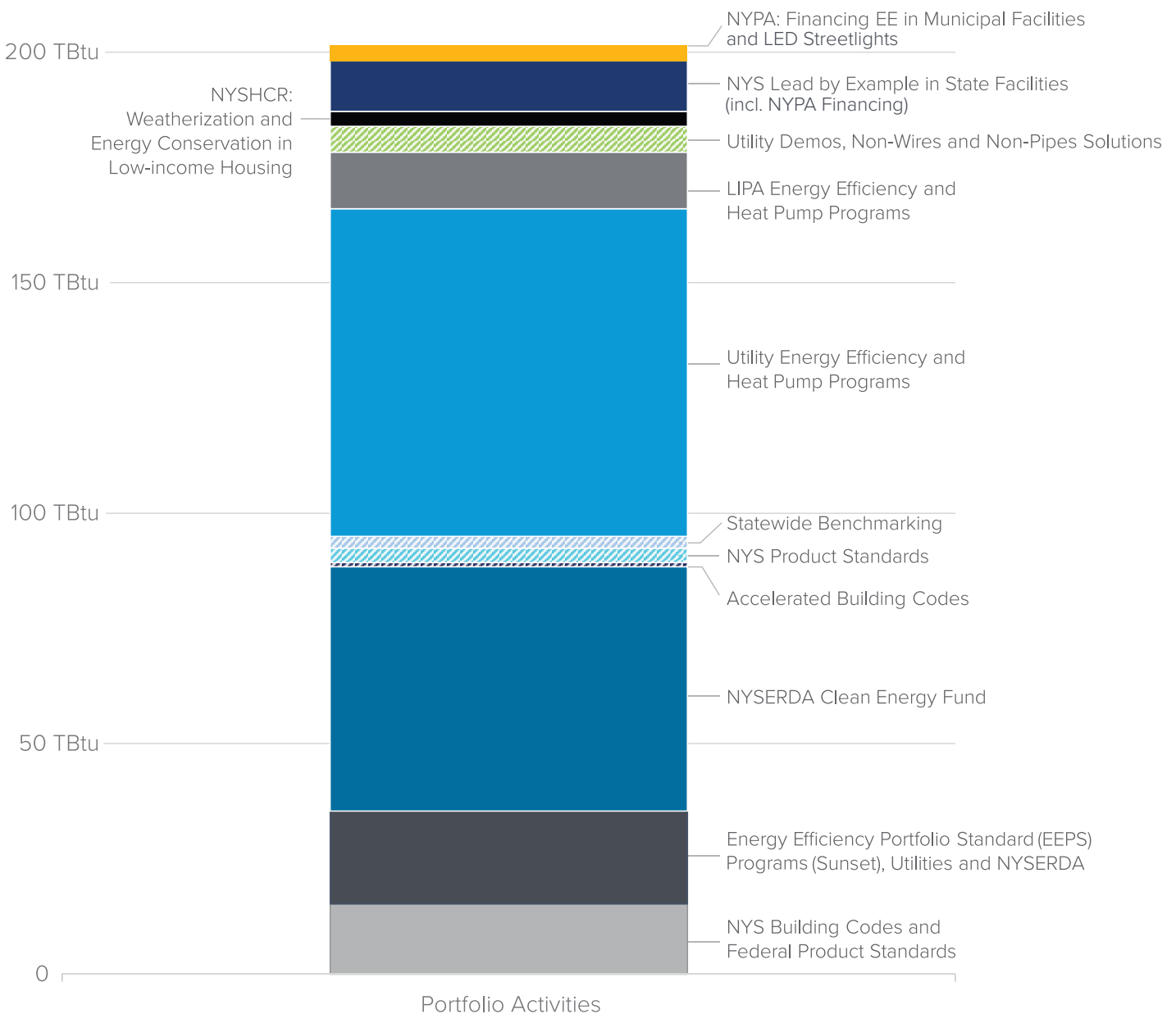
HIGH PERFORMANCE
WINDOWS

ENERGY EFFICIENT
APPLIANCES AND
LIGHTING



2025 target: 185 TBtu of onsite energy savings*

ENERGY EFFICIENCY ACTIVITIES TOTAL SITE TBTU SAVINGS
BY 2025 (CUMULATIVE ANNUAL, 2015–2025)



* Graphic does not reflect roughly 15 TBtu of overlap between policies



PROGRESS TOWARD THESE GOALS

The combined activities of NYSERDA, investor-owned utilities, and LIPA across historic and ongoing energy efficiency programs have so far achieved more than 75 TBtu of avoided energy use in the building sector — equivalent to fueling and powering more than 730,000 New York homes.

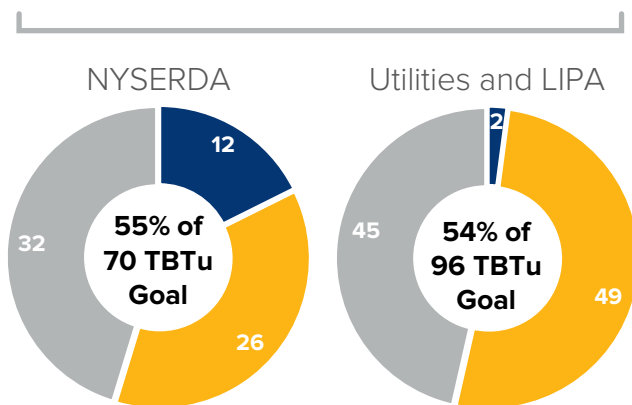
185 TBtu New Efficiency: New York Energy Goal

82
TBtu Total
Progress

- Pipeline
- Installed
- Future Contribution



37% Installed (68 TBtu) **8% Pipeline (14 TBtu)**



HIGHLIGHTED PROGRAMS AND INITIATIVES

New York State Clean Heat provides consumer incentives and develops the market for building electrification in coordination with utilities.

Empire Building Challenge demonstrates low-carbon solutions for tall buildings, in partnership with real estate industry and solution providers; the Empire Technology Prize program spurs new innovations.

Buildings of Excellence supports the design, construction, and operation of carbon neutral multifamily buildings, including affordable housing.

EMPower New York and **Assisted Home Performance** provides no- and low-cost energy efficiency solutions to income-eligible New Yorkers.

Raise the Green Roof partners with **HCR** to deliver energy efficiency and electrification right into affordable housing financing transactions.

Clean Heat For All Challenge partners with New York City Housing Authority (NYCHA) and NYPA to develop and deploy affordable window-based heat pumps in thousands of low-income apartments.

Clean Green Schools provides assistance to more than 1,000 public schools in under-resourced communities to improve environmental sustainability, create healthier learning environments, and build the clean energy talent pipeline as announced by Governor Hochul in January 2022.



Clean Energy Economy

STATE POLICY GOAL FOR
THE CLEAN ENERGY ECONOMY

With nearly 160,000 clean energy jobs across the State at the end of 2020 — and with hundreds of thousands of new jobs to be created by Climate Act investments on the near-horizon — New York’s nation-leading climate policies continue to drive investment and job-creation.

Following the setbacks in the aftermath of the early phases of the coronavirus pandemic, subsequent job rebounds have shown tremendous resilience in the sector — only 4% of New York’s clean energy workers lost their job as of the end of 2020, compared to 9% of clean energy workers nationally. The resilience of the clean energy bounce-back is also on display benchmarked against both the rest of the New York State economy, and compared to other regional clean energy industries. Nonetheless, the State needs the clean energy industry to continue to grow and thrive in the years ahead, helping drive a sustainable, equitable, and enduring economic recovery for New York.



NYSERDA'S ROLE

Unlock new job growth, leveraging marquee program investments such as offshore wind port infrastructure and competitions for deep building retrofits to bring global industries to New York.

Provide workforce development and training programs to grow the training capacity and human resources needed to build the clean energy economy, and support a just transition for historically disadvantaged populations and industries affected by the transition away from fossil fuels.

Incorporate new progressive labor and economic development provisions, including prevailing wage/project labor agreements, MWBE/SDVOB prioritization, Buy America provisions, and more.

Cultivate demand for clean energy solutions to attract clean energy companies from all ends of the global supply chain looking to serve the growing local market, supported by proactive cross-agency attraction efforts.

Foster capital attraction and support commercialization of products, services, and business models (deployment models) from clean energy startups and maturing companies.

Deliver more targeted assistance to energy startups/innovation firms, leveraging support from federal stimulus efforts and future federal incentives to advance clean energy innovation.

Establish precedent for encouraging greater private sector investment and business models through new, substantial commitments of institutional capital in the clean energy economy.

Achieving the Climate Act's nation-leading goals and building back a thriving industry sector will mean expanded deployment of existing technologies as well as substantial investment in the State's clean energy innovation economy to develop new solutions for a low-carbon future.

New York's ecosystem of start-ups will develop these technology and business-model solutions for demonstration and use in the State, as well as for export to markets across the globe. Growing new industries in our state, such as battery manufacturing and research in Binghamton, will help realize significant positive economic impacts in the form of job creation and community investment. Furthermore, to build an inclusive clean energy economy and cultivate a just transition, NYSERDA, other State agencies, and clean energy industry partners will be ramping up efforts to develop a pipeline of skilled labor and open-up economic opportunities to workers, communities, and historically disadvantaged populations who may be transitioning from fossil fuel-based economic activities.

STRATEGIES FOR 2022–2025

NY Green Bank

- Increase the size, volume, and breadth of sustainable infrastructure investment activity throughout the State, expand the base of investors focused on clean energy, and increase market participants' access to capital on commercial terms.
- Address barriers to mobilization of private capital and financing for clean energy projects: identify where barriers exist, demonstrate investment model, entice private capital, and repeat.
- Replicate and refine the transaction-model executed in 2021 with major U.S. bank to expand impact in the private financial world, boost liquidity, and deliver value for ratepayers.
- Support priority policy areas through a growing pipeline of investments in energy efficiency, energy storage, electric vehicles, affordable housing, offshore wind port infrastructure, and beyond.
- Consistent with the goals of the Climate Act, expand the impact of the new initiative to invest in projects that support and deliver benefits to Disadvantaged Communities.
- Explore and refine new financing models (e.g., energy efficiency pay-for-performance) and new technology/solution areas (e.g., microgrids).
- Continue issuing targeted RFPs and organizing convenings in strategic areas to grow the clean energy investment pipeline.
- Develop strategy for supporting full life-cycle supply chain build-out in New York, from manufacturing to recycling and reuse.



TRANSFORMATION 2030

- Nearly Half-a-Million Climate Jobs in New York by 2030
- Good-quality clean energy jobs supporting workers' families and delivering high-value to customers
- Fine-tuned matching of workforce development programs to the job creation from expected Climate Act investments
- An additional roughly \$12–\$15 billion in capital leveraged via NY Green Bank and Innovation.
- Comprehensive economic development strategy has made New York the leading market for clean energy business growth and supply chain localization
- The Southern Tier of New York has become the nation's next battery manufacturing and research hub



INDICATORS OF PROGRESS

- Statewide clean energy industry jobs, job creation driven by Climate Act investments
- Priority populations trained and employed in clean energy
- Commercialized climate solutions and launches of incubated firms, including related revenues
- Total value of capital mobilized using NY Green Bank support, and capital mobilized in Disadvantaged Communities

Innovation

- Support the development of climate technologies necessary to meet the State's Climate Act goals through funding, developing teams, customer introductions, advisory services, and the development and support of independent innovation organizations.
- Address barriers and support regulations, processes, and rulemaking that enable a robust climate innovation economy by stimulating demand and supporting private sector innovation efforts.
- Invest in the development of New York's green economy, supporting relocation of climate-tech companies to New York, the growth of existing companies already in the State, and the human capital of the innovation ecosystem across the State.
- Consistent with the goals of the Climate Act, ensure the State's innovation development system, as well as the innovations developed, deliver benefits to Disadvantaged Communities.
- Coordinate and partner with the national innovation ecosystem to align and leverage State priorities and support New York climate-tech companies' access to finance and expertise.
- Demonstrate the role of innovation in deep decarbonization, helping New York State to develop pathways to achieve the most challenging last 20% of our long-term emission reduction goals.
- Partner with existing industries to collaborate on and grow the new carbon-to-value (C2V)/carbontech hub, and to support pre-commercial deployment opportunities related to a wide-variety of applications from CO₂-products and new battery chemistries to hydrogen infrastructure/hardware.

Workforce Development

- Prioritize and scale-up our impact on the recruitment, training, job preparedness, and placement for priority populations and Disadvantaged Communities.
- Develop training infrastructure to upskill existing workers and prepare the next generation of clean energy workers in high-growth areas like high-efficiency HVAC, building electrification, energy storage, and offshore wind.
- Ensure training curricula and programmatic support respond to industry and market needs.
- Provide targeted support to reduce the time it takes to bring a new worker to full productivity and offset risks that might prevent clean energy firms from hiring or training new workers, particularly workers with additional barriers to employment.
- Boost partnership and collaboration with labor unions, community-based organizations, helping develop and place employees firmly in career pathways.



Economic Development

- Establish strategy to help organize and make State economic development resources more impactful, via greater strategic alignment and less episodic engagement on supply chain, community-center developments.

New York's clean energy industry can help drive a **sustainable recovery** for the State's economy

HIGHLIGHTED PROGRAMS AND INITIATIVES

NY Green Bank works with the private sector to increase investments into the State's clean energy markets, including through transactions related to:

- Community solar/Community distributed generation
- Affordable housing and energy efficiency
- Electric vehicles, charging infrastructure, and clean transportation
- Energy storage

Innovation supports an affordable and just transition and the achievement of New York's climate goals through investments in and advisory services to researchers and companies, including:

- Carbontech support programs with Activate and Columbia University
- Hydrogen and other solutions for deep decarbonization and a resilient energy system
- Long-duration energy storage solutions supporting a resilient, flexible, clean grid
- Natural solutions to mitigation greenhouse gases
- Building the grid of the future
- Clean heating and cooling research and development
- Tech to Market resources including accelerators like the Clean Fight and Cleantech Open Northeast; the M-Corps manufacturing scaleup program; and the Entrepreneur in Residence (EIR) mentorship program

Workforce Development supports training for new clean energy workers, driven by industry needs, and develops the clean energy sector talent pipeline:

- HVAC/Building Electrification Career Pathway Program
- Climate Justice Fellowship Program
- Building Operation and Maintenance Staff Training
- On-the-Job Training
- Clean Energy Internships
- Clean Energy Talent Pipeline Development



Through programs, partnerships, and catalytic investments, NYSERDA's innovation team is mitigating technical and commercial risk for key climate solutions to enable faster broader commercialization for the innovations New York needs to meet its ambitious climate goals.

SELECT INNOVATION RESOURCES FOR CLIMATE TECH STARTUPS IN NEW YORK

Clean Tech Center Incubator
CenterState CEO

Wind Turbine Blade Test Facility
Intertek / Clarkson University

intertek **Mobile PV Test Center**
Intertek

NY BEST+ **Test & Commercialization Center**
NY-BEST

VentureFor ClimateTech **Venture For ClimateTech**
Early Stage Accelerator

eco **Emerging Cleantech Opportunity Incubator**
Launch NY

ScaleFor ClimateTech **Scale For ClimateTech**
Manufacturing Scaleup

R-I-T **Venture Creations** **Venture Creations Incubator**
Rochester Institute of Technology

Southern Tier Clean Energy Incubator
Binghamton University

THE CLEAN FIGHT **The Clean Fight**
Growth Stage Accelerator

Business Model Innovation
NYSERDA

NY Climate Progress
Investment Program

National Offshore Wind R&D Consortium
Stony Brook University

Clean Energy Business Incubator Program
Stony Brook University

C-Level Matching
Columbia Technology Ventures

ACRE Incubator
NYU Tandon School of Engineering

Entrepreneurs-In-Residence Program
Columbia Technology Ventures

Carbon to Value Initiative
Urban Future Lab

NYSERDA

NATIONAL OFFSHORE WIND
RESEARCH & DEVELOPMENT CONSORTIUM

COLUMBIA
TECHNOLOGY VENTURES

CARBON TO VALUE INITIATIVE

nysERDA.ny.gov/innovation

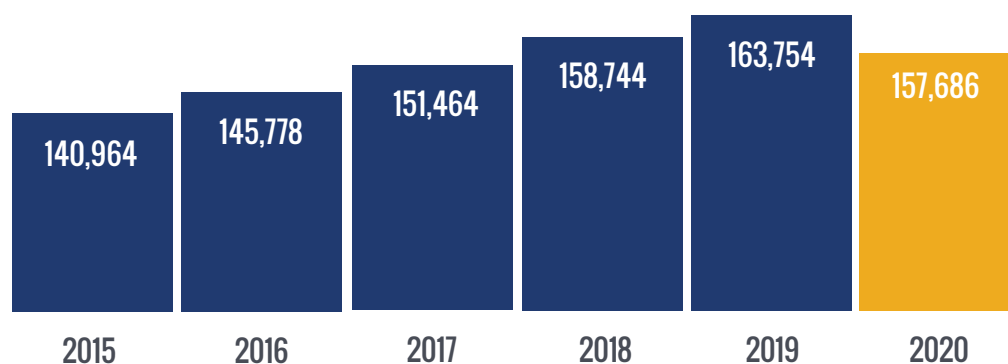
CO₂



157,000+ clean energy jobs in 2020

across New York State

ANNUAL CLEAN ENERGY EMPLOYMENT IN NEW YORK
(2015–2020 COVID-ADJUSTED)



CLEAN ENERGY EMPLOYMENT
BY TECHNOLOGY
(number of jobs, December 2020)



Energy Efficiency

121k



**Renewable Electric
Power Generation**

23k



**Clean and Alternative
Transportation**

9k



Renewable Fuels

2.6k



**Grid Modernization
and Energy Storage**

2.3k

New York lost approximately 6,000 clean energy jobs amidst the COVID-19 pandemic. This represents the first employment decline since the annual Clean Energy Industry reporting series began in 2015.

However, clean energy in New York fared better than clean energy in neighboring states and New York's economy at large.

Amid the pandemic, New York made modest employment gains in key sectors, including wind energy, clean and alternative transportation, energy storage, and grid modernization. Despite the challenges COVID-19 introduced, New York continues to advance the ambitious goals laid out by its Climate Leadership and Community Protection Act, positioning the clean energy industry to be a cornerstone for economic recovery.

nysERDA.ny.gov/Clean-Energy-Jobs



Resilient and Distributed Energy System

STATE POLICY GOAL
FOR THE ENERGY SYSTEM

Build a resilient and distributed energy system — and supportive social infrastructure — that can anticipate, absorb, adapt to, and recover quickly from a wide range of shocks and stresses, including climate, environmental, cyber, financial, aging infrastructure, and other emerging vulnerabilities.

In this period of dynamic and fast-paced change, marked by a global pandemic, wildfires, extreme storms, record-breaking heat, and cyber threats, the energy system faces a range of new risks and disruptions, even as the system moves away from a more vulnerable centralized power generation towards an increasingly balanced, diversified, and digitalized network.



As New York strives to meet its aggressive climate targets, the State will need to contend with new risks and opportunities.

With electric power enabling nearly all critical infrastructure and services, including communications, emergency systems, banking, and transportation, it is crucial that the transition to clean energy and net zero emissions also advances via a resilient and modernized grid. This includes considerations for infrastructure given changing flood zones, sea level rise, and storm surge zones as well as new solutions and designs to withstand high windspeed, hail, and higher temperatures, and advancements in flexible, responsive resources such as energy storage and building load flexibility. Measuring and valuing risk reduction and resilience can help catalyze opportunities to harness the market system in service of these important goals.

Climate impacts land disproportionately on Disadvantaged Communities — populations that often have fewer resources to respond — so it is vital that investments also address questions of equity with targeted approaches for vulnerable communities. To this end, building a resilient and distributed energy system can also generate new workforce opportunities and create avenues to strengthen social cohesion, a quality of community resilience, through citizen engagement with shared energy and infrastructure.



NYSERDA'S ROLE

Lead-by-example by factoring resilience goals in the State's clean energy infrastructure investments.

Partner with other State agencies to identify and implement best practices around climate resilience, including through the Extreme Heat Action Plan announced with DEC in January 2022.

Spearhead next generation of climate adaptation research to provide insights for infrastructure, investment, and energy system planning decisions based on new/updated climate projection data.

Spur development and integration of a wide array of smart grid technologies that support a distributed energy system and advance resilience including storage, smart demand response, and vehicle to home/grid (V2H/G) flexible charging.

Continue to administer and refine flagship distributed energy resources (DER) programs like NY-Sun, and energy storage incentive programs to boost resilience, provide grid value, and reduce costs.



INDICATORS OF PROGRESS

- Progress toward storage (6,000 MW by 2030) and distributed solar (10,000 MW by 2030) deployment goals
- Statewide grid-interactive building load
- Percentage of NYSERDA solicitations that incorporate resilience provisions
- Penetration of homes and buildings equipped with onsite generation and energy storage (stationary batteries, electric vehicles)

STRATEGIES FOR 2022–2025

- Accelerate pace of deployment for energy storage technologies to achieve updated 2030 goal of 6 GWs, as announced by Governor Hochul in January 2022.
- Incorporate resilience considerations and incentives into NYSERDA programs, including floodplain mapping, onsite generation and storage, and other means to ensure investments factor in shifts like increased electrification, future climate impacts, and other energy system disruptions.
- Explore potential mechanisms for the finance and insurance of resilient energy infrastructure, in partnership with the Department of Financial Services; support efforts to price resilience into everything touching energy, transport, and buildings, from insurance to construction codes and utility regulation.
- Spur development and integration of smart grid technologies to ensure buildings are flexible and responsive under changing conditions, with a focus on load pockets where environmental and health outcomes are critical (e.g., Disadvantaged Communities).
- Work with Public Service Commission to effectuate systemic grid operation changes, including to better make use of DER, including transportation and storage, in a way that fully integrates them and allows for greater self-healing capabilities.
- Support resiliency and grid flexibility, i.e., balance the growing intermittent renewable resources. Continue efforts to scale up energy storage to achieve statewide goals, with a focus on the Downstate region where energy storage is critically needed to replace dirty peaker plants, support grid congestion, and offshore wind procurements. Foster virtual power plant (VPP) pilots into robust, mature programs offered ubiquitously by utilities.
- Drawing from the Carbon Neutral Buildings Roadmap work, develop solutions and playbooks for resilient communities and resilient housing focusing on passive survivability, resilience solutions for all-electric buildings and facilities of refuge to withstand future disruptions to the energy system system — all recognizing that in an electrified future, efficiency is an inherent resilience measure.
- Leverage engagement with communities to catalyze county and municipal resilience strengthening, from backup for critical loads to physical spaces embodying a comprehensive vision for social cohesion and emergency resilience.
- Partner with NYS Division of Homeland Security and Emergency Services (DHSSES) to refine model local laws based on climate assessment study findings, integrate clean resilience solutions into state hazard mitigation plan program and funding for backup power, and develop local guidebooks for resilience to supplement Community Risk and Resilience Act (CRRA) plans



TRANSFORMATION 2030

- At least 10 GW of distributed solar; 6 GW of energy storage; and more.
- Ubiquitous and actionable energy data-access, allowing thousands of distributed energy assets (PV, EV, grid-interactive buildings) to communicate and participate responsively, delivering value to customers and to grid.
- Resilience considerations and investments imbedded in all energy/clean energy infrastructure and programming, with near full GHG-alignment for resilience solutions.
- Community-, neighborhood-, and household-level infrastructure investments to boost social cohesion and people-centric resilience, with physical refuges from extreme heat and weather events.

at least

10 GW
distributed solar

6 GW
energy storage

HIGHLIGHTED PROGRAMS AND INITIATIVES

The **New York State Climate Impacts Assessment**, launched in November 2021, is a multi-year study to explore how climate change affects New York State communities, ecosystems, and economy. Led and funded by NYSERDA, this collaborative climate research effort is being conducted in partnership with academic institutions, science organizations, community leaders, and industry representatives.

Innovation's Smart Grid and Technology to Market teams will launch **initiatives to support a resilient, affordable, flexible clean grid.**

New York Power Grid Study as required in April 2020 by Accelerated Renewable Energy Growth and Community Benefit Act legislation

Energy Storage engages those involved in building, installing, integrating, or researching energy storage technology, including efforts to expand opportunities to pair solar and storage statewide (continuing and expanding the strong Residential PV + Storage program on Long island through the DLM tariff).

The Extreme Heat Action Plan, announced in January 2022 as a collaboration between NYSERDA and DEC, will address the threat of extreme heat in disadvantaged communities, areas of employment, and recreational zones across the state, and will help coordinate interagency investments to ensure that priority assistance goes to disadvantaged communities on the front lines of heat exposure.

Offshore Wind, including new analysis and program measures related to resilience.

Real Time Energy Management provides the ability to shed or shift loads in response to grid needs as well as the capability to stage critical equipment to maintain building services most needed to support safety and recovery.

Carbon Neutral Buildings Roadmap places strong emphasis on resilience with a full chapter dedicated to resiliency considerations related to building decarbonization.



Building an Inclusive Clean Energy Economy

LONG-TERM VISION AND VALUE PROPOSITION

A strong and inclusive clean energy economy will lead to economic opportunities, improved health, and engagement for all New Yorkers especially those who have not benefitted in the past.

New York State's frontline communities, including environmental justice, LMI, communities of color, and otherwise Disadvantaged^{*} Communities, have disproportionately been impacted by energy costs; pollution from fossil fuel combustion; disinvestment in housing; systemic inequities in education and workforce opportunities; and limited ability to engage in and inform policy making that affects their community.

^{*} As part of the implementation of the Climate Act, the Climate Justice Working Group is charged with developing criteria for Disadvantaged Communities for prioritization and benefit through New York State investments in clean energy.



Realizing the objectives of the Climate Act will require foundational shifts in the development and implementation of clean energy policy, programs, and processes to ensure opportunities for residents and communities to participate in and benefit from the clean energy economy.

In advancement of the Climate Act objectives, the NYSERDA clean energy portfolio will focus investments to:

- Improve energy affordability.
- Reduce pollution from fossil fuel combustion across all sectors for environmental justice.
- Create new economic development opportunities for communities.
- Advance workforce development and training.

In addition, NYSERDA will focus on community capacity development and engagement to ensure the perspectives of residents are incorporated into the development and implementation of clean energy initiatives.

Improving diversity, equity, and inclusion within and across NYSERDA's teams and functions has been prioritized to ensure the operations and practices of the Authority are more representative and responsive to the diverse needs of New Yorkers.

NYSERDA is positioned to drive equity and help realize an inclusive clean energy economy through its direct investment, as well as through its work with State agencies, utility companies, and community-based organizations.



KEY CHALLENGES/ BARRIERS

- Systemic and institutional inequities have led to limited opportunities for communities of color and other frontline or Disadvantaged Communities to participate in and benefit from the clean energy economy, including access to green jobs, ownership of distributed energy resources, and informing policy and programs.
- Energy burden for lower-income households can exceed 20% of annual income, and nearly half of New York's population has annual income below 80% of the Area Median Income, especially within communities of color.
- Access to capital, misaligned incentives, and historically fragmented administration of key programs present barriers to scaling clean energy solutions within the LMI market segment and Disadvantaged Communities.
- The size of income-eligible and disadvantaged populations requires innovative approaches to achieve adoption at scale, with careful attention to program/policy designs to avoid regressive outcomes/impacts.
- Engaging with Disadvantaged Communities and bringing their voice to the table is inherently challenging given chronic lack of resources within LMI and EJ communities.

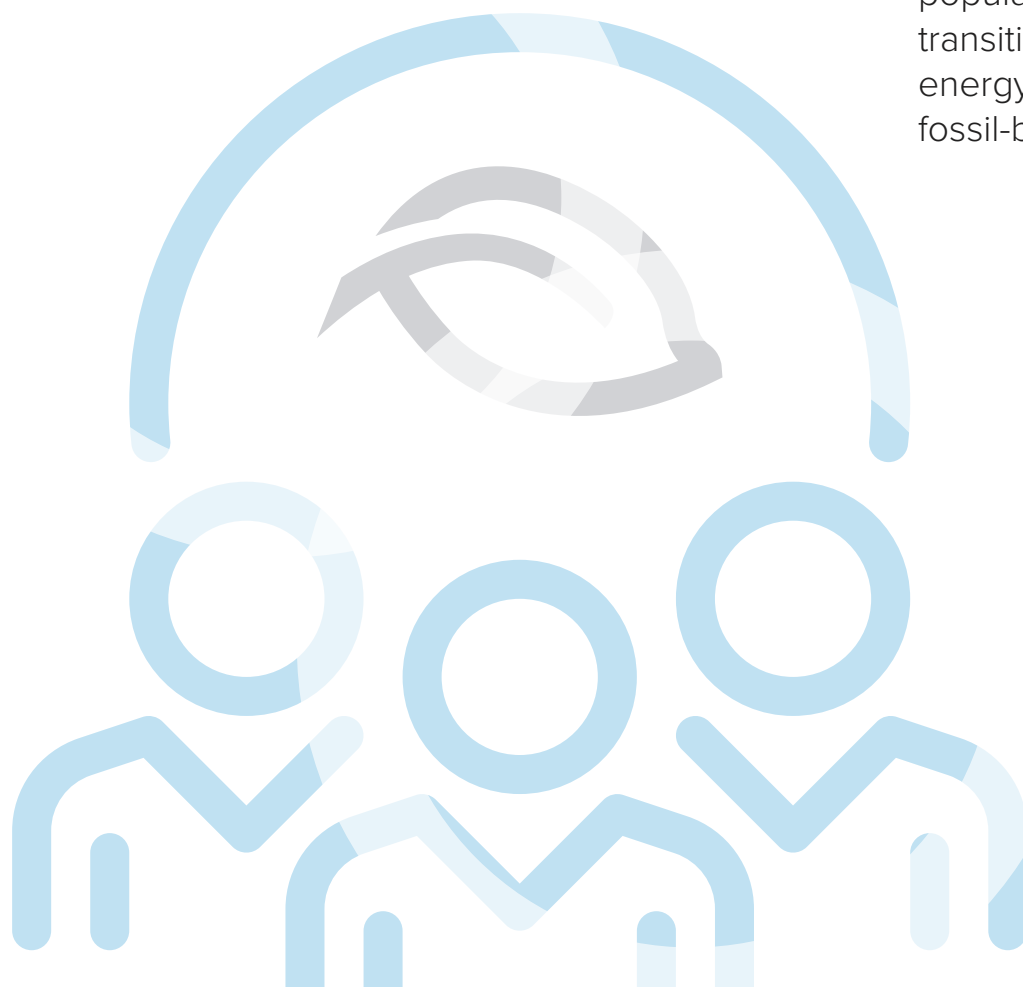
PRIORITY ACTIONS FOR NEW YORK

- Work toward a goal of driving 40% of the benefits of clean energy spending to Disadvantaged Communities.
- Increase engagement of frontline, climate-vulnerable communities in developing the clean energy economy, including ensuring community representation in decision-making and policymaking.
- Align State resources and strategy to increase impact from public investments in energy affordability and expand access to clean energy solutions for lower-income households, affordable housing, and Disadvantaged Communities.
- Leverage regulatory, policy, and financing mechanisms to increase adoption of clean energy solutions in affordable housing, including beneficial electrification.
- Facilitate a just transition to a clean energy economy by supporting unemployed or underemployed workers and priority populations, including workers in fossil-based industries, by addressing barriers to training and job opportunities for residents of Disadvantaged Communities and priority populations.
- Advance resilience to climate change and extreme weather events including within affordable housing and Disadvantaged Communities through clean energy solutions such as solar, energy storage, and passive house standards.
- Advance access to clean transportation for residents of Disadvantaged Communities and accelerate the transition to electric vehicles within EJ areas to reduce emissions and improve air quality.
- Develop solutions and models for deploying utility-scale DER, clean transportation, and energy efficiency in the built environment to reduce emissions and co-pollutants especially within Disadvantaged Communities.
- Quantify and maximize health and economic benefits from deploying clean energy solutions, especially within Disadvantaged Communities.
- Develop a path for decarbonizing affordable housing, including models that advance beneficial electrification across the LMI market segment.
- Publish, finalize, and implement findings from the Climate Act Disadvantaged Communities Barriers Report.



NYSERDA KEY ACTIONS FOR 2022–2025

- **Build community capacity** through the Clean Energy Hubs to engage residents and increase awareness of clean energy solutions, advance job opportunities and economic development, and facilitate community input in policy and program decision-making.
- **Ensure robust engagement opportunities** for local communities in program planning and design by providing a structured engagement process and financial support for stakeholders.
- **Expand workforce development** to include social service wrap-around support through partner organizations and forge effective partnerships with organized labor to expand energy- and climate-related job opportunities for all New Yorkers, especially those from Disadvantaged Communities, underserved populations, and those transitioning to the clean energy industry from a fossil-based job.
- **Develop replicable solutions** to advance beneficial electrification across the LMI market.
- **Advance models** that maximize community benefits from distributed energy resources, including ownership models.
- **Ensure that all New Yorkers have opportunities** to understand the health, economic and resiliency benefits from clean energy deployment, and have access to these solutions.
- **Implement a statewide portfolio** of energy efficiency initiatives with utilities to increase the impact and reach of LMI clean energy investments.
- **Integrate clean energy subsidies** from NYSERDA and utilities into affordable housing finance to advance the energy performance of these buildings and deliver co-benefits to tenants.





ILLUSTRATIVE INITIATIVES TO ADVANCE AN INCLUSIVE CLEAN ENERGY ECONOMY BY PORTFOLIO

MARKET DEVELOPMENT

Clean Green Schools – funding solutions for eligible P-12 schools to reduce school energy use and assist in the conversion to carbon-free fuels

EmPower New York – no-cost and discounted efficiency solutions to income-eligible New Yorkers, helping save energy and money

Technical Assistance and Predevelopment – support for housing agencies, contractors, developers, and builders for clean energy, high-performance building, and retrofits

Beneficial Electrification for LMI and Affordable Housing – replicable solutions for heat pump adoption in the LMI and affordable housing sectors, while ensuring customer protections

Raise the Green Roof – pre-development support, grants and financing for building decarbonization measures deployed in Homes and Community Renewal's (HCR) affordable housing portfolio

Community-Based Workforce Development – community-based training partnerships between clean energy businesses, training organizations, industry associations, and un/underemployed residents in Disadvantaged Communities

On-the-job training for priority populations – support for clean energy businesses to hire persons from priority populations

Career Pathways Funding and Training – solicitation to train and place new entrants to the HVAC and building electrification industry

Climate Justice Corps – funding for fellows to improve engagement of Disadvantaged Communities, identify community-based, climate justice focused projects and solutions, and build capacity of local organizations to advance climate justice

NY GREEN BANK / FINANCE

Financing for Affordable Housing and Energy Efficiency in Disadvantaged Communities – new initiative using financing to catalyze clean energy within the existing capital stack for affordable housing, aiming to invest at least \$150 million in clean energy and energy efficiency solutions that benefit the State's affordable multifamily housing market

Exploring tariff-backed and other innovative, inclusive financing models – approaches to overcome LMI/Disadvantaged Communities finance challenges, stabilize energy costs, and improve air quality in Disadvantaged Communities

Partnering with other agencies to explore innovative opportunities to put NY Green Bank capital to work, including new areas such as energy resiliency

Through Green Jobs–Green New York – providing New Yorkers with access to energy assessments, installation services, low-interest financing, and pathways to training for various green-collar careers

Cultivating diverse ecosystem of investment partners and counterparties – explore funding to cover transaction costs and/or pro bono/in-kind transaction support

NY-SUN / DISTRIBUTED ENERGY RESOURCES

Solar for All – utility bill assistance program funding solar to benefit homeowners/renters unable to access solar

Affordable Multifamily Housing Incentive – PV installations serving affordable housing properties

Technical Assistance and Predevelopment – grants to address key barriers to PV and storage projects providing benefits to LMI, Environmental Justice and Disadvantaged Communities

Community Solar, Solar paired with Storage, and Energy Efficiency – incentive adders for community PV, projects that pair PV and energy storage and provide resiliency and/or financial benefits to LMI customers and affordable housing

Peaker Reduction and Replacement – project deployments that support the potential for solar and energy storage to repower, replace, and back-down electric generating peaker units

Good-Paying Community Solar Jobs – require prevailing wage for workers on projects above 1 MW

Place-based decarbonization models – work with sister agencies to demonstrate novel partnerships surrounding place-based decarbonization with a focus on Disadvantaged Communities, such as the new interagency team we will lead with NYPA on Hunts Point in the Bronx



INNOVATION AND RESEARCH

Advanced HVAC Challenge – heating and cooling technology innovations targeting common LMI building types and needs

Innovation for Affordable Decarbonization – investments designed to reduce the cost of clean energy through optimization of the power grid, clean building technologies, and clean gas and liquid fuels

Evolving work on resilience – tools to support adaptation to climate change for all New Yorkers, including those most vulnerable

Clean Neighborhoods Challenge – scalable, community-aligned clean transportation solutions that reduce local air pollution and remove barriers to widespread electric and active transportation use in disadvantaged communities

Electric Mobility Challenge – community-informed clean transportation solutions that transform access to electric mobility options and reduce emissions in disadvantaged communities

Electric Truck & Bus Challenge – innovative demonstrations that accelerate medium- and heavy-duty vehicle electrification, expand access to cost-effective, user-friendly solutions, and reduce emissions

LARGE-SCALE RENEWABLES

RFP Design – prioritize in the evaluation of projects' economic benefits to disadvantaged communities, the role of renewables and energy storage to support the phaseout of the most polluting fossil generators downstate

Agriculture, natural resources and smart siting policies – maximize co-benefits between industries and cultivate infrastructure ecologies (e.g., supporting supplemental income diversification, promoting carbon sequestration through soil enrichment, water quality improvements)

Implement 2021 Executive Budget proposals – complete Buy American market assessment, MWBE and SDVOB assessment, and implement updated prevailing wage requirements for project construction and operation.”

Transmission planning – active participation in transmission planning to align with project development and seek important partnerships and cultivate benefits with communities, including via Tier 4

OTHER AUTHORITY-WIDE PRIORITY EFFORTS

Capacity-building and community engagement – Clean Energy Hubs to build local capacity and advance opportunities for residents within the clean energy economy; development of multilingual communication materials; providing financial support to encourage stakeholder engagement in processes; streamlining stakeholder engagement Authority-wide through equitable engagement framework

Community Ownership of Clean Energy and Distributed Energy Resources – New models for community ownership of distributed energy resources

■ **NYSERDA Diversity, Equity, and Inclusion (DE&I)** – Implementation of DEI Strategic Plan released in 2021 to promote DE&I progress Authority-wide

Grow MWBE Contracting – NYSERDA to increase utilization of MWBE contractors

■ LEARN MORE ABOUT
NYSERDA'S DE&I EFFORTS

nyserdera.ny.gov/DEI



Supporting Clean Energy Jobs and New York's Economic Recovery

LONG-TERM VISION AND VALUE PROPOSITION

New York's nation-leading climate action policies and investments have driven steady growth in the State's clean energy economy, outpacing economy-wide growth for the last three years.

However, like other sectors, the clean energy industry suffered significant job losses as a result of the pandemic. Jobs are rebounding, but continued investment is needed to address current worker dislocation in the near term, build labor capacity, and ensure that New Yorkers and New York firms reap the financial benefits that will result from delivering clean energy solutions at the scale needed to meet Climate Act goals. The State's continued leadership and investment in its clean energy workers and businesses will also create the foundation for a just transition in the decades to come, beginning with prioritizing training, job placement, and wrap-around support for individuals from Disadvantaged Communities, underserved populations, or those entering the clean energy workforce from a fossil-based job.



KEY CHALLENGES/BARRIERS

- Historically marginalized populations face greater barriers to employment.
- Strains on businesses as a result of the pandemic threaten the recruitment, retention, and training of workers.
- Public, private, and philanthropic resources are increasingly scarce, and in some cases, have constraints on how they can be used (e.g., geography, direct technical training versus wrap-around services).
- Ongoing demographic transitions and retirements require the State to entice new entrants to this energy field and ensure that training is in sync with job placement opportunities.

PRIORITY ACTIONS FOR NEW YORK

- Harness the State's clean energy investments to provide economic opportunity and quality jobs for New Yorkers, including LMI and historically disadvantaged populations.
- Support the work of the Climate Action Council and Just Transition Working Group to ensure workforce development considerations are prioritized.
- Integrate the definition of Disadvantaged Communities and guidance from the Climate Justice Working Group into workforce-related programs and offerings
- Advocate for climate/clean energy investments as part of State and federal stimulus efforts.

NYSERDA KEY ACTIONS FOR 2022–2025

- **Scale-up Career Pathways** and other successful models for clean energy apprenticeships, pre-apprenticeships, and job-readiness programs to build a talent pipeline especially from individuals within Disadvantaged Communities, priority populations, and fossil-based incumbent workers transitioning into clean energy.
- **Support build-out of OSW workforce training** supporting SUNY in advancing the Offshore Wind Training Institute (OSWTI), and coordinating industry efforts already underway.
- **Leverage NYSERDA's purchasing power** to maximize opportunities for New Yorkers and New York firms — especially MWBE and Service Disabled Veteran-Owned Businesses — installing, servicing and supplying clean energy solutions.
- **Identify and work with partners** including Empire State Development to grow key supply chains where NYS firms can have a competitive advantage.
- **Support community based economic development projects** by leveraging existing NYSERDA clean energy programs, identifying more comprehensive funding strategies, and working with State, local and utility partners.
- **Focus NYSERDA's relationship with other agencies and channel partners** on workforce development and training to develop complementary offers that increase collective impact and serve a wider base of workers.
- **Pursue funding opportunities** to complement/supplement our traditional funding sources to deliver wrap-around services (such as funding for transportation, tools, daycare, etc.) to help priority populations pursue clean energy workforce opportunities.
- **Continue to fund Climate Justice Fellows** to place individuals working in and for Disadvantaged Communities to advance local climate action priorities.
- **Explore novel community-based clean energy investments**, including Build-Ready project development to provide workforce support alongside renewable development and leveraging DOL resources where feasible.



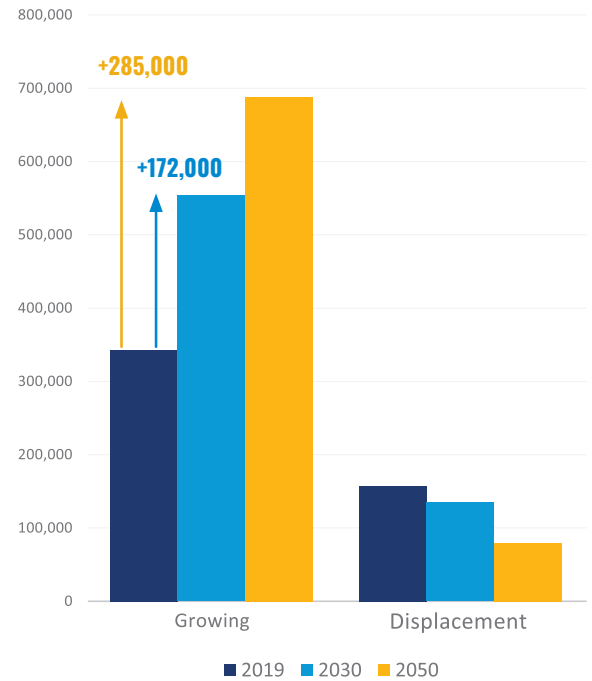
Spotlight

New York State Climate Jobs Study

Based on independent research conducted for New York's Just Transition Working Group, Climate Act Scoping Plan Investments are expected to spur hundreds of thousands of new jobs in coming decades.

Expected clean energy job growth 2X greater than 2016–2020	More than half of new jobs will tackle building decarbonization	Offshore wind will be one of the fastest growing sectors
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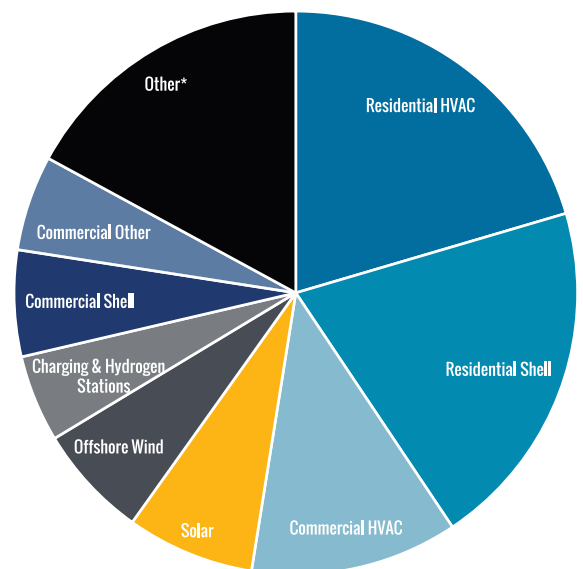
- Employment in growth sub-sectors increases by at least 172,000 jobs by 2030, a 55% increase in the workforce from 2019 to 2030
- Employment grows in these sub-sectors by at least 285,000 jobs through 2050
- In New York State, clean energy jobs, in their comparable sub-sectors, are expected to grow annually at more than twice the rate from 2021 through 2030 as the growth experienced between 2016 through 2020
- By 2050, growth sub-sectors, in New York State will reach nearly 600,000 jobs



Key Employment Findings — S2: LCF Scenario

- Sub-Sectoral Breakdown of 172,000 jobs added by 2030
- Over half of the new jobs, in the growth sub-sectors, from 2019 to 2030, will be found in the buildings sub-sectors (shaded blue)
- The next largest growth sub-sectors are solar and offshore wind electricity generation, and electric vehicle charging and hydrogen fueling stations

* Includes Transmission, Storage, Other Generation, Bioenergy, Residential Other, Hydrogen, Onshore Wind, and Vehicle Manufacturing





Founded in 1622, First Presbyterian Church in Jamaica, Queens is one of the oldest churches in New York and the nation. Now it's one of the first to replace its fossil fuel-fired heating systems with efficient heat-pump heating and cooling systems.

The church removed eight gas boilers and installed a cold-climate heat-pump system. Financed and project managed by BlocPower, this will serve as one of 35 clean-energy demonstration projects being organized by Metro IAF with support from NYSEERDA.

A crew from HVAC contractor VRF Solutions installed air handlers in the church's 96-year-old Magill Building as part of its installation of a 72-ton variable refrigerant flow (VRF) heat pump system. The project is projected to reduce the church's energy usage by 60%, saving 1,191 MMBtu's of energy per year and eliminating 51 tons/year of carbon emissions equivalents.





Accelerating the Transition from Fossil Gas to a Low-Carbon Future

LONG-TERM VISION AND VALUE PROPOSITION

In order to realize its goals of a carbon neutral economy by mid-century, New York needs to move away from its dependence on the combustion of fossil gas to heat homes and businesses and power industrial processes.

This transition away from fossil gas to lower-carbon energy sources may be one of the most challenging pieces of our decarbonization agenda.

In the near term, New York State needs to drive more uptake of demand-reducing solutions such as energy efficiency and electrification for heating. Over the longer term, the State will need to scale up these solutions and advance new alternatives to fossil gas.

In hard-to-electrify use cases, the State will need to pursue R&D to prove and deploy deep decarbonization innovations to replace fossil gas with alternatives with lower climate impact — such as green hydrogen, renewable natural gas, and carbon capture, among others.

Additionally, given the global warming potential of methane, losses/emissions of fossil gas will need to be reduced throughout the gas infrastructure for safety and environmental reasons.

KEY CHALLENGES/BARRIERS



- Significant disparity between the societal costs of fossil gas and the costs realized by consumers, resulting in a market signal that is inconsistent with New York’s public policy objectives.
- Near-term affordability of gas makes it favorable among residents for home heating and hot water, and also among businesses and particularly industrial users, where high quality heat for process applications is prized and there are few commercially available electric solutions. While most industry experts agree that retail gas prices are likely to increase significantly within the next decade, this long-term price risk is not yet considered in most consumer decisions.
- While efficient, all-electric alternatives can fulfill most/all residential applications and many commercial ones, alternatives do face several limitations, including high upfront cost, lack of awareness among consumers, lack of market infrastructure (familiar installers, marketing), and technical barriers for certain buildings.
- Given affordability barriers, fossil gas transition creates regressive outcome risks for those unable to swiftly move off.
- The existing gas distribution system is a multibillion-dollar asset that will remain in place even as consumption is reduced, and it needs investments to be maintained to keep people safe.

PRIORITY ACTIONS FOR NEW YORK

- Address near-term downstate gas supply constraints minimizing investment in infrastructure and maximizing demand-side solutions to reduce winter gas peak including energy efficiency, demand response, and electrification.
- Launch a comprehensive gas transition planning process to advance a managed, phased, and just transition from fossil gas, focusing on safety, equity, reliability, and affordability.
- Build market capacity, expand product availability, and drive cost reductions in commercially available fossil gas alternatives like electrification (through NYS Clean Heat), while developing new long-term solutions.
- Advance recommendations for building and industrial sectors via Climate Action Council, including codes and standards aimed at driving adoption of efficient, low-carbon solutions and clean alternatives for heat/industrial process.
- Level the playing field for clean energy alternatives and end the legal obligation to serve customers with fossil gas, while maintaining affordability for New York’s most vulnerable customers.

NYSERDA KEY ACTIONS FOR 2022–2025

- **Develop and publish long-term roadmaps** for advancing all-electric clean homes and buildings; and green hydrogen, as alternatives to fossil gas.
- **Phase out support for fossil gas** in all programs within three years and reorient investments around building shell improvements, electrification, and development of deep decarbonization alternatives.
- **Prove-out solution set** for LMI/Disadvantaged Communities electrification — tailored to building stock and housing energy affordability needs.
- **Focus on reducing cost of alternative clean heating/cooling through innovation** — demonstrate heat pump technologies (and other carbon-reducing solutions) in large commercial/multifamily buildings, working with property owners, and engaging manufacturers to define/deliver/tailor products to meet New York’s building needs.
- **Support cutting edge innovations** to reduce dependence on fossil gas for heating and process loads.
- **Build understanding of and momentum** for deep decarbonization technologies, including green hydrogen, carbon capture, and other forms of carbotech, leveraging federal funding opportunities — including via New York Green Hydrogen Hub efforts announced in January 2022.

Hydrogen Roadmap

A comprehensive strategy to advance green hydrogen as a solution in New York, considering technology needs and risks, infrastructure, resiliency, costs, and environmental justice. Along with several other actions announced in January 2022, including a regulatory framework and prize program, the Hydrogen Roadmap will help position New York to compete for nearly \$10 billion in federal funding for green hydrogen R&D.

Building Electrification Roadmap

A roadmap offering a deep-dive on electrification solutions and needs, charting course for progress by 2030 consistent with Climate Act milestones.



Fostering Healthy and Resilient Communities

LONG-TERM VISION AND VALUE PROPOSITION

New York's diverse communities have a critical role to play in the State's clean energy transition.

They serve as essential partners both in the rapid expansion of clean energy generation as well as the decarbonization of society — including the built environment and the transportation and industrial sectors — thereby creating healthy, livable environments and supporting larger projects with far-reaching statewide benefits.

But to succeed, we need to provide communities with the necessary tools and other resources to carry out this work. On the renewable generation side, efforts such as the Office of Renewable Energy Siting (ORES), NYSERDA's Build-Ready program, and the new host community benefits framework, are designed to reduce barriers for localities and overcome obstacles to mutually beneficial project development.



In order to decarbonize the State's building stock by mid-century, New York will have to quickly move beyond a building-by-building approach to a neighborhood-by-neighborhood approach, developing carbon neutral communities.

There are more than 6 million buildings in New York. More than 200,000 buildings per year would need to be decarbonized for the next 30 years to address the entire existing building stock by 2050. The State needs to build scale to succeed, and action at the community-level will be critical.

NYSERDA provides planning resources for community-scale decarbonization projects, and is supporting several communities as they embark on the decarbonization transition. Integrating decarbonized transportation solutions will also be paramount in providing holistic community-scale climate solutions with neighborhood-level impact.

The disparate health and air quality impacts borne by Disadvantaged Communities as a result of historical and continuing environmental injustice remain front of mind, a reality that has been underscored and exacerbated by the COVID-19 pandemic. We can begin to reverse and repair these inequitable community outcomes by providing resources to Disadvantaged Communities that ensure all New Yorkers benefit from the clean energy transition. Decarbonized communities will have improved outdoor air quality (e.g., through the elimination of peaker plants and on-site combustion of fossil fuels), safer and healthier buildings (through electrification, energy efficiency and measures to guard against airborne pathogens), job and economic opportunities, and increased economic activity, collectively fostering healthy communities.



KEY CHALLENGES/BARRIERS

- Communities lack resources to adequately address many on-the-ground challenges associated with the energy transformation — from competing interest for land use and challenging siting issues, to a diverse building stock coupled with complex and evolving building codes and aging infrastructure.
- Local resource constraints were exacerbated by COVID-19 and the associated economic challenges.
- Some communities have a negative perception of large-scale renewable projects, and are negatively disposed to development of these projects.
- Disadvantaged communities face disparate exposure to air pollution from multiple sources (vehicles, power plants, industrial facilities) and often are burdened with a building stock that does not provide healthy indoor air quality.
- Health and safety benefits that result from community decarbonization are not always well understood and can be difficult to quantify and monetize.

PRIORITY ACTIONS FOR NEW YORK

- Continue to provide and expand upon training and technical resources to help communities prepare for responsible renewable energy development, embrace decarbonization and energy efficiency, and support progressive building codes.
- Facilitate paths for community engagement on decarbonization wherever possible, including through grants and financial support, local coordinators, clear technical guidance and templates, recognition, and interagency coordination.
- Incorporate decarbonization into various existing State funding programs, like the Downtown and Upstate Revitalization Initiatives and other opportunities under the Consolidated Funding Application.
- Develop and establish a robust framework for host community benefit agreements as part of large-scale renewable projects clarifying local benefits and making benefits packages more compelling.
- Through the Office of Renewable Energy Siting, issue new uniform, standardized guidelines for responsible large-scale renewable siting to improve consistency, expedite approval of projects not located on greenfield sites, and reduce burdens for local community intervention.
- Focus on turning underutilized lands, such as brownfields, landfills, and former industrial properties, into revenue-generating clean energy projects, and advance project development on other sites that present development challenges for commercial developers.
- Facilitate passage and/or implementation of proactive community-level clean energy policies such as Community Choice Aggregation (CCA), benchmarking, and other climate-friendly codes, standards, and mandates recommended by the Climate Action Council.



NYSDERDA KEY ACTIONS FOR 2022–2025

- **Site and build renewable power and distributed clean energy projects** that provide community benefits by providing guidance on project economics, PILOTs, siting assistance to local communities, and ensuring projects deliver tangible benefits to host communities.
- **Encourage adoption of CCAs** where localities use 100% renewable energy as default supply.
- **Grow local partnerships and drive investment** in clean energy on brownfields or otherwise underutilized land, offering support like Just Transition site reuse planning grants.
- **Build local capacity** and develop programs to support community-scale decarbonization through the Clean Energy Communities Leadership Round, Clean Energy Hubs, and clean energy training opportunities for local officials.
- **Develop programs** that provide technical and financial assistance for communities to adopt comprehensive plans and local legislation aimed at full decarbonization.
- **Directly partner with municipalities, communities, and individual landowners** to promote neighbor-to-neighbor clean energy campaigns and testimonials, sharing best practices by local government champions for clean energy.
- **Partner with stakeholders and Community-Based Organizations (CBOs)** within Disadvantaged Communities to co-develop local clean energy agendas and deploy climate resilience hubs that enable residents to safely shelter in place through community-scale distributed energy resources including solar, storage, green hydrogen, and district geothermal systems.
- **Catalyze novel clean transportation and zero-emission vehicle/mobility deployments** with prize funding supporting clean vehicles, personal mobility, and medium- and heavy-duty transportation transformations that benefit environmental justice communities.
- **Help communities address the dual challenges of sustainability and COVID mitigation**, providing building science expertise and creating greener and healthier schools.
- **Leverage funds that can drive novel approaches** to realizing health and energy benefits, including the Healthy Homes pilot that is using health dollars and avoided health/insurance costs to finance electrification, energy efficiency, and clean energy upgrades.
- **Develop and implement the Extreme Heat Action Plan** in partnership with DEC, as announced in January 2022, to address the threat of extreme heat in Disadvantaged Communities, areas of employment, and recreational zones across the state and to mitigate neighborhood climate impacts associated with extreme heat via measures such as shade structures, cool roofs, cool pavements, parks, natural canopies, spray pads, and more.



Funding

FUNDING SOURCES

Several funding sources help NYSERDA advance the State’s clean energy goals and achieve the its mission. NYSERDA invests these funds in a fiscally responsible manner that maximizes benefits to New Yorkers, fills critical gaps, and addresses the needs of the market.

Clean Energy Fund

Authorized by the Public Service Commission (PSC) and derived from an assessment on retail sales of electricity by State utilities — it is comprised of four portfolios: Market Development, Innovation and Research, NY-Sun, and NY Green Bank. The CEF was reaffirmed by PSC Order in August 2021.

Clean Energy Standard

As authorized by the PSC, these funds are realized by NYSERDA through the sale of Tier 1 Renewable Energy Credits (RECs), Offshore Wind Renewable Energy Credits (ORECs), and Zero Emission Credits (ZECs) as well as receipt of Alternative Compliance Payments from New York’s Load Serving Entities (LSEs). Through PSC orders, LSEs are obligated to meet annual compliance obligations for RECs, ORECs and ZECs. As needed, utility financial backstop collections may be called on to meet funding shortfalls. These commitments are typically paid out over a 20–25 year contract term upon delivery of RECs (for Tier 1, OSW, and Tier 4; contract terms are shorter for Tier 2 RECs and ZECs).

Regional Greenhouse Gas Initiative (RGGI)

Derived from sale of carbon emission allowances as set forth in 6 NYCRR Part 242 and 21 NYCRR Part 507. The amount of revenues available is dependent on the variable auction prices for the allowances. Per requirements in 21 NYCRR 507, RGGI funds are used to advance energy efficiency, renewable energy, and carbon abatement projects in New York State.

Federal Funding

Federal funding will be leveraged to enhance NYSERDA’s most critical efforts and topline mission outcomes, including via partnership with sister State agencies. NYSERDA will be targeting, on a strategic basis, block grant and competitive funding opportunities via the Infrastructure Investment and Jobs Act (IIJA), as well as through additional spending appropriations made in 2022.

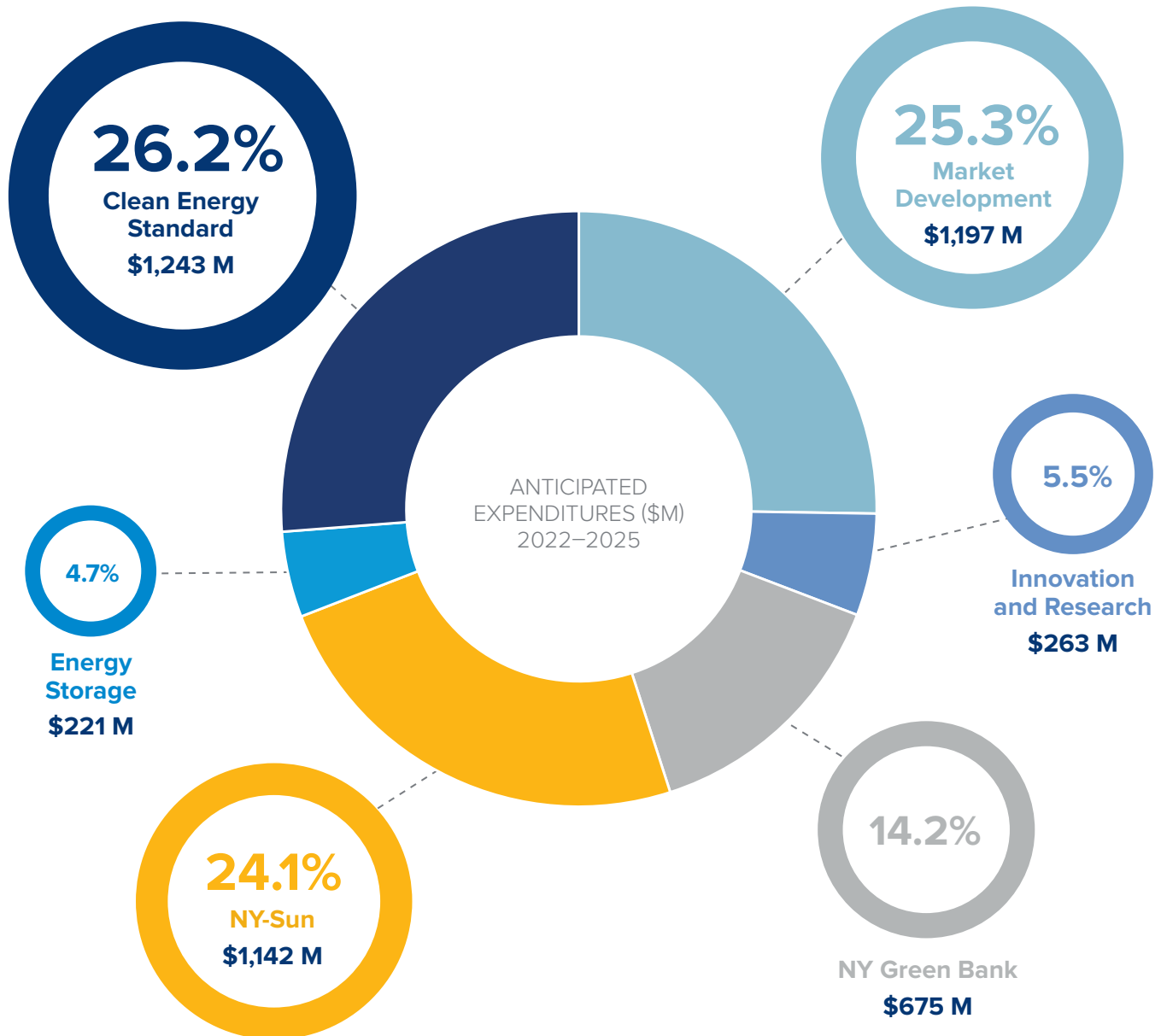
Other Funds

Includes sources provided by various sponsors used for specific purposes. Public funds are leveraged considerably with private sector funding through NYSERDA programs.

ANTICIPATED EXPENDITURES (2022-2025)

RENEWABLES
ENERGY EFFICIENCY
EMISSIONS REDUCTIONS
CLEAN ENERGY ECONOMY
DISTRIBUTED ENERGY SYSTEM

INVESTMENT AREAS AND PRIORITY INITIATIVES	ESTIMATED 3-YEAR INVESTMENT LEVEL	% OF TOTAL	NYSERDA MISSION OUTCOME(S) ICONS INDICATE RELEVANCE FOR PLANNED FUNDING				
			RENEWABLES	ENERGY EFFICIENCY	EMISSIONS REDUCTIONS	CLEAN ENERGY ECONOMY	DISTRIBUTED ENERGY SYSTEM
Clean Energy Standard ^{1, 2, 3}	\$1,243,492,396	26.2%					
Market Development	\$1,197,358,146	25.3%					
NY-Sun	\$1,141,582,806	24.1%					
NY Green Bank	\$675,000,000	14.2%					
Innovation and Research	\$262,880,535	5.5%					
Energy Storage	\$220,930,234	4.7%					
Total	\$4,741,244,117						



Appendix: NYSERDA's Structure

NYSERDA BOARD MEMBERS

Richard L. Kauffman

NYSERDA Chair

Sherburne B. Abbott

Vice President for Sustainability Initiatives and
University Professor of Sustainability Science and Policy, Syracuse University

Charles Bell

Programs Director, Consumers Union

Justin E. Driscoll

Interim President and Chief Executive Officer, EVP and General Counsel, New York Power Authority

Jay L. Koh

Managing Director and Founder, Lightsmith Group

Basil Seggos

Commissioner, New York State Department of Environmental Conservation

Marie Therese Dominguez

Commissioner, New York State Department of Transportation

Rory M. Christian

Chair and CEO, New York State Public Service Commission

Arturo Garcia-Costas

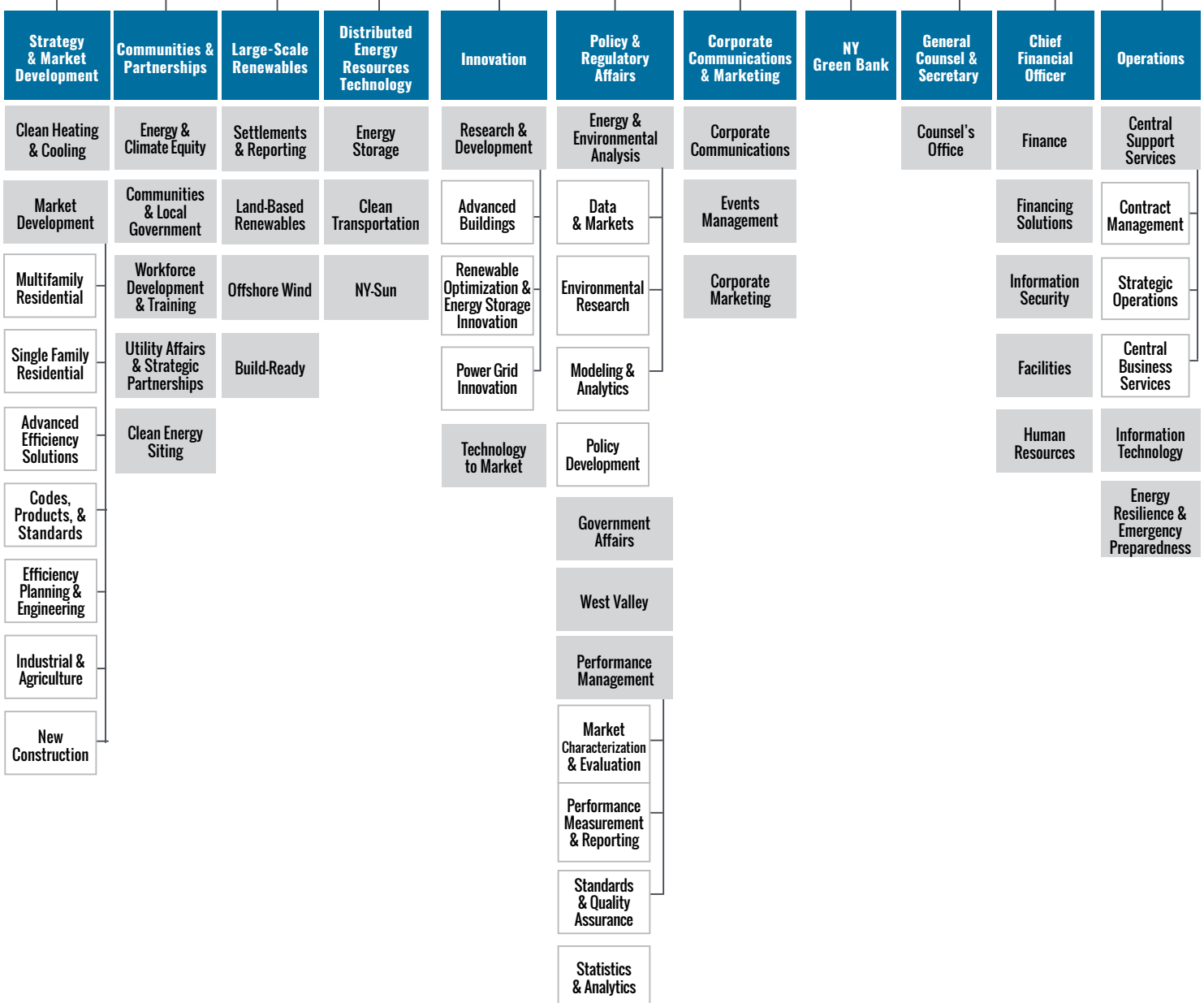
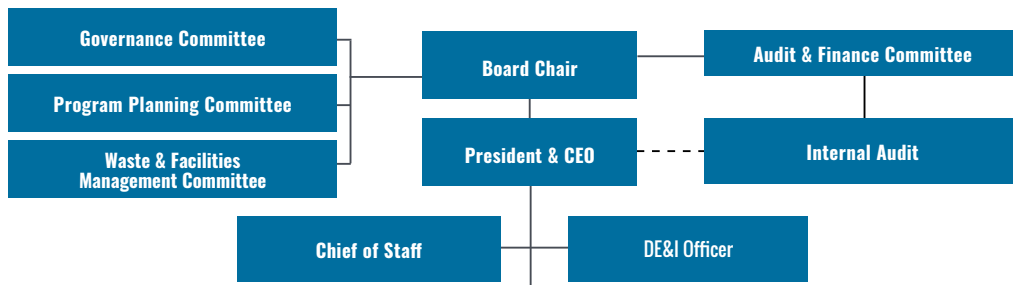
Program Officer for the Local, National and International Environment, The New York Community Trust

Frances A. Resheske

Senior Vice President, Corporate Affairs, Con Edison

Sarah Sadie McKeown

Executive Vice President, The Community Preservation Corporation



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State of New York

Kathy Hochul, Governor

New York State Energy Research and Development Authority

Richard L. Kauffman, Chair | Doreen M. Harris, President and CEO