New York State Climate Action Council Draft Scoping Plan

OVERVIEW & STATUS

In 2019, NYS passed the **Climate Leadership and Community Protection Act** (Climate Act). Its intent is to empower every New Yorker to fight climate change at home, at work, and in their communities.

New York's Nation-Leading Climate Targets

85% Reduction in GHG Emissions by 2050
100% Zero-emission Electricity by 2040
70% Renewable Energy by 2030
9,000 MW of Offshore Wind by 2035
3,000 MW of Energy Storage by 2030
6,000 MW of Solar by 2025
22 Million Tons of Carbon Reduction through Energy Efficiency and Electrification

The New York State Climate Action Council is a **22-member committee** that prepared the Scoping Plan to achieve the State's clean energy and climate agenda. The Council oversees the establishment of sector-specific Advisory Panels and working groups (Agriculture and Forestry, Energy Efficiency and Housing, Energy-Intensive and Trade-Exposed Industries, Land Use and Local Government, Power Generation, Transportation, Waste Advisory Panel) and works in consultation with the *Climate Justice Working Group* and the *Environmental Justice Advisory Group*.

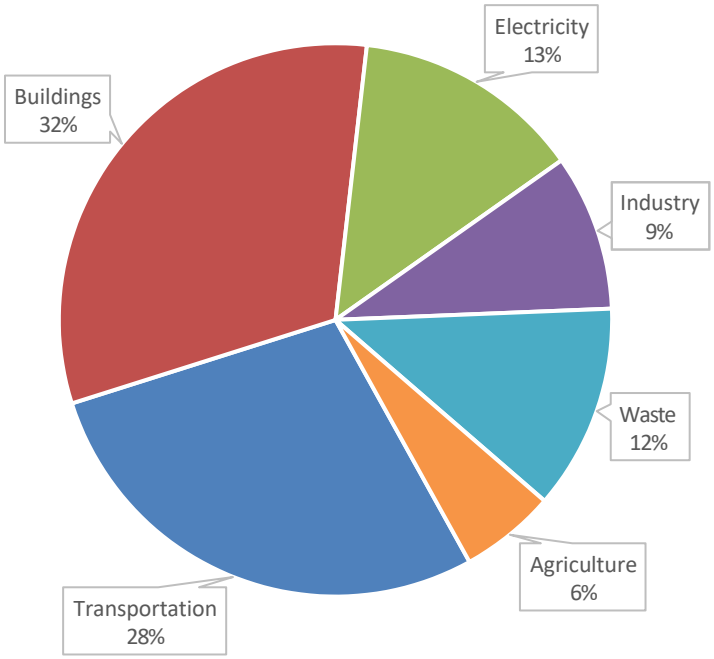
The Advisory Panels presented their recommendations to the NYS Climate Action Council in April, May and June 2021 and the Council released their Draft Scoping Plans on Monday, December 10, 2021. The General Public will now have 120 days to submit written comments.

Below are some of the details of the Scoping Plan that affect the construction industry.

QUICK FACT: More than half of current carbon emissions in New York come from Buildings and Transportation (approximately 60%). These sources include the direct use of fossil fuels, "upstream" emissions from the fuel system, and hydrofluorocarbons.

Contents: Green House Gas Industry Overview, Transportation Review, Building Review, Industry Review, Economy Wide Strategies.

2019 New York State Green House Gas Emissions by Sector



Overview

Transportation

The transportation sector was responsible for approximately 28% of the State's emissions in 2019, which includes on-road transportation (59%), non-road such as aviation (12%), emissions from imported fuels (26%), and HFCs used in vehicle air-conditioning and refrigeration (3%). Transportation sector emissions are about 16% higher today than they were in 1990. The transportation sector today is largely dependent on petroleum-based fuels such as gasoline, diesel, and jet fuel, but the State has made strong progress in transitioning from petroleum-based fuels to zero-emission technologies.

Buildings

The buildings sector was the largest source of emissions in 2019 and responsible for 32% of emissions, which includes the combustion of fossil fuels in residential (34%) and commercial buildings (19%), emissions from imported fuels (33%), and HFCs released from building equipment and foam insulation (14%). The fuels used in buildings today include natural gas, distillate fuel (heating fuel oil #2), wood, propane, kerosene, and residual fuel oil.

Industry

Industrial emissions made up 9% of emissions in 2019, this includes the processes in Mining and Quarries and Manufacturing.

Electricity Demands

Across all pathways, clean electricity is a central pillar of New York's strategies to meet the Climate Act requirements and targets, with electricity powering the large majority (68% to 76%) of the New York State economy by 2050. Driven by the electrification of other sectors of the economy, electricity demand is projected to double−with peak loads also nearly doubling−by 2050, even with aggressively managed loads. As building heating needs are electrified, both the magnitude and timing of electricity loads will change rapidly, and New York will transition to a winter-peaking system by 2035.

Gas Demands

As New York's economy becomes more electrified, end-use gas demand will decline significantly, by approximately 83% to 95% by 2050. The small remaining gas demand can be met with RNG and hydrogen across all scenarios by 2050.

Minimize Carbon Leakage Risk and Anti-Competitiveness Impact

In its transition to a net zero emission economy, the State must also consider the issue of GHG emissions "**leakage.**" Under the Climate Act, leakage is defined as, "a reduction in emissions of greenhouse gases within the state that is offset by an increase in emissions of greenhouse gases outside of the state." The concept of leakage is important given the fact that climate change is a global problem, whereas the State's policy authority is confined to activities within its borders.

New policies that increase the cost of energy, reduce the reliability of energy, or increase the cost of emitting GHGs could cause businesses to shift their production outside of New York State, or avoid the State altogether, and instead invest in out-of-State locations with lower energy cost and/or less stringent environmental and GHG emission reduction policies.

Mitigating leakage risk is of interest to the State for both climate and economic reasons, which is further demonstrated by the Climate Act requirements related to mitigating anti-competitive impacts and for the emission reduction regulations ultimately adopted by DEC to incorporate measures to minimize emissions leakage.

The following are potential measures to mitigate the risk of leakage:

- **Recognize Early Action:** The State should credit emitters for early investments to reduce their GHG emissions. The absence of early action credit could discourage short-term emission reductions by firms as they await the onset of a new system and the establishment of their baseline.

- **Set Industry-Specific Benchmarks:** If assigning emission reduction targets to individual emitters, the State should apply benchmarks for the emissions intensity of their production, taking into account current technology and types of emissions and adjusting them over time to reduce the risk of leakage caused by the imposition of infeasible reduction requirements.

- **Utilize Market Forces:** The State should consider measures to financially incentivize emission reductions while also providing emitters with compliance methods intended to mitigate leakage, increasing the cost-effectiveness of reducing emissions, such as through a cap-and-trade program.

Transportation Sector Review

Advanced Clean Trucks Regulation - New York State proposed a new rule on September 7 to adopt California's Advance Clean Truck (ACT) Rule which will mandate the offer for sale of increasing percentages of medium- and heavy-duty Zero-Emission Vehicle trucks beginning with model year 2025 through 2035 and beyond. This does not cover off-road equipment.

There is a proposed ZEV Sales Percentage Schedule beginning in 2025 with a 7% goal for Class 2b-3 trucks, 11% with Class 4-8 trucks and 7% for Class 7-8 Tractors. It will gradually increase every year into 2035 and subsequent years at 55%, 75% and 40% respectively.

The proposed rule would also establish a one-time reporting requirement for large fleet operations. A large entity is defined as any of the following:
- Any entity with annual revenue greater than $50 million in the U.S. and does business in New York including all subsidiaries, subdivisions, or branches.
- Any entity that owns more than 50 vehicles with a GVWR greater than 8,500 lbs. and operated at least one of those vehicles in New York in 2019.
- Any entity that dispatched more than 50 vehicles with a GVWR greater than 8,500 lbs. in New York in 2019.
- Any New York government entity, including all state agencies and authorities and local municipalities.
- Any Federal government agency operating in New York.

2030 Goals

Based on the CLCPA Goals, by 2030 nearly 100% of **Ligh Duty Vehicles** (LDV) sales and 40% or more of **Medium and Heavy Duty** (MHD) vehicle sales must be **Zero Emission Vehicles** (ZEVs).

The recommended policies are expected to result in as many as three million ZEVs (about 30% of LDVs and 10% of MHD vehicles) on the road by 2030. Electric non-road equipment, such as those used in lawncare, **construction**, and farming, are expected to gain market share, especially in subsectors that are most conducive to electrification.

Hydrogen fuel cell vehicles are expected to begin to emerge into the market by 2030, primarily for some trucking and non-road applications less suited to electrification.

Renewable Diesel (Advanced Biodiesel): Because a large portion of vehicles on the road are expected to still use internal combustion engines in 2030, particularly in the MHD vehicle classes, one path to achieving 2030 emissions reduction targets would include strategies to make

limited use of renewable diesel and other lower-carbon fuels to replace diesel in existing internal combustion engine vehicles until the transition to zero emission vehicles is complete.

2050 Goals

LDVs and a large majority of MHD vehicles will be ZEVs. Some segments of hard to-electrify subsectors are expected to rely on green hydrogen and renewable biofuels to fully replace fossil fuel combustion if zero emission applications are not feasible.

CAC recommendations:

Providing enhanced ZEV purchase incentives: ZEV trucks, buses, and non-road vehicles are significantly more expensive than diesel equivalents today. While the cost of ownership is becoming more cost-competitive, targeted incentives will be needed to facilitate the transition to emerging ZEV technologies. The State should fund direct incentives supporting the purchase of ZEV trucks and buses, with a focus on fleets operating in Low and Middle Income (LMI) and overburdened communities, small fleets, and school buses, as well as non-road vehicles and equipment such as airport ground support equipment, port cargo handling equipment, construction

State fleet: Procurement targets, with appropriate funding allocated, should be established to operationalize the State's commitment to a zero-emission State fleet of medium and heavy-duty vehicles, where technically feasible, by 2040.

Require ZEV equipment use for State contractors and at targeted facilities: To further encourage ZEV adoption, New York should enact legislation that establishes procurement and contracting rules to increase the percentage of zero-emission equipment and vehicles used for State-funded projects to be ZEVs (including contractors and subcontractors), based on production and availability, to align with New York's November 2021 commitment to converting 100% of public medium- and heavy-duty fleet (where technically feasible) to ZEVs by 2040.

Invest in ZEV charging or fueling infrastructure: Similar to LDV infrastructure, the State should provide rebates or direct investment in EV charging stations and hydrogen filling stations, where market support is needed. The development of workplace charging infrastructure is also critical to reducing the peak impacts of EV charging, because if drivers are able to plug in their vehicles while at work, then they may not need to charge for as long (or at all) when they get home each evening, even before accounting for time-of-use incentives to shift charging away from peak times.

New Technology Integration

- **Support intelligent transportation systems and AVs that save energy**: NYSERDA should invest in RD&D and demonstrations of emerging intelligent transportation systems, connected vehicles and AVs, and fund the broader adoption of technologies that prove effective in improving transportation system efficiency, such as smart parking systems, adaptive traffic lights, IoT-enabled streetlights. New York should enact policies

discouraging "empty" AV miles traveled and requiring AVs used as for-hire vehicles to be ZEVs.

- **Make data accessible and secure**: DOT, New York State Thruway, and the New York State Office of Technology Services (ITS) should support the adoption of open-source technologies and standard data collection protocols for transportation data and connected infrastructure. ITS should convene an interagency group to develop strategies to combat cybersecurity risks associated with new transportation technologies, such as AVs and EV charging.

- **Enable user-friendly apps through data sharing with transit operators**: MTA and other transit operators should facilitate the development of electronic mobility platforms offering seamless multi-modal trip planning and payment options to make public transportation more attractive, accessible, and user-friendly.

Market-Based Policies

Market-based policies focused solely on the transportation sector can provide the dual benefits of discouraging more costly carbon-intensive behavior and providing a revenue source for investment in other strategies.

- **Variable Pricing/Parking Policies**: Similar to congestion pricing, these policies discourage driving into and parking in central cities through a system of fees, the collection of which can be used to support alternatives to driving such as public transportation and cycling infrastructure. Pricing policies could include variable fees that discourage parking at peak times or demand parking policies, which limit parking to certain users or vehicles, including ZEVs. Generally, these policies would be adopted by municipalities, but the State can play a supportive role through, for example, development of model code language.

- **Vehicle Registration Fees:** The State should enact legislation establishing a system of registration fees that would discourage the purchase and continued use of more-carbon intensive vehicles. These fees would vary based on emissions or attributes related to emissions such as a vehicle's weight and/or drive train. If accompanied by incentives for lower-emitting vehicles, this approach would resemble the feebate program discussed above under the ZEV strategies.

- **Mileage-Based User Fees:** The State should enact legislation to establish a per mile fee system to fund investment in transportation infrastructure. This system would reduce emissions by discouraging driving, although consumers are generally quite price insensitive to such systems. Thus, although mileage-based users fees could effectively replace declining gas tax revenues, they may not have a significant impact on incentivizing ZEVs or lowering emissions.

- **Tax Increment Financing/Special Assessment Districts:** Municipally adopted special assessment districts provide a mechanism to finance public transportation investments. For example, New York City funded investment in the extension of the 7-Line with assessments on properties in the Hudson Yards redevelopment project.

Financing for Electric Vehicles

Several financial strategies can be utilized to reduce the obstacles posed by the higher initial cost:

- **Establish a First Loss Protection product based on existing financial market instruments and practice:** The purchase of ZEVs can be facilitated by increasing the availability of low-cost capital/bank loans to fund the higher upfront costs of commercial ZEVs. One area of uncertainty that inhibits banks and other financial institutions from financing the purchase of ZEVs, however, is uncertainty about the residual value of the vehicles being purchased. New York should identify a state agency or authority to guarantee at least a portion of the residual value of the ZEVs being financed at the end of the loan term (such as First Loss Protection). Providing that certainty will help unlock the lowest cost private financing needed, further reducing upfront costs to enable the purchase of ZEVs in place of fossil fuel-powered vehicles.

- **Offer fleet feasibility studies**: NYSERDA and the electric utilities should undertake feasibility studies for MHD fleets, including school districts & transit agencies, to identify benefits, costs, logistical challenges, financing options, other barriers to electrification. By bearing these soft costs, the state should provide fleet managers with the financial information necessary to make the case for investment in zero emission fleets.

- **Expand NY Green Bank's mission**: The State should enable the NY Green Bank to take on different types of investment opportunities in defined categories of electrification financing, potentially including EV charging infrastructure as well as fleets.

Lower Carbon Renewable Fuels

The Climate Justice Working Group opposed policies supporting renewable fuels on the grounds that they still release harmful air pollutants, particularly in areas overburdened with diesel emissions, and that the State should focus instead on expeditiously electrifying vehicles and the use of hydrogen fuel cells. Although the CJWG is correct that renewable fuels still emit air pollutants, some renewable fuels have lower emissions of particulate matter.

- **Clean Fuel Standard**: The State should enact enabling legislation directing DEC to adopt a clean fuel standard. A clean fuel standard would facilitate decarbonization of transportation fuels by requiring the providers of fossil fuels to reduce the carbon content of the fuels they provide by either blending lower carbon fuels or by acquiring credits from providers of lower-carbon fuels into the stream of commerce.

  Since electricity in the state is an increasingly low carbon fuel, a clean fuel standard will support decarbonization as petroleum fuel providers finance the use of electricity for transportation use.

- Clean Fuel Infrastructure: The State should fund incentives for infrastructure for cleaner fuels, such as green hydrogen, where market support is needed.

Building Sector Review

Decarbonizing building operations describes the elimination of GHG emissions from building end uses through improving the building envelope and switching from equipment and systems powered by burning gas, oil, or other fossil fuels to highly efficient equipment and systems powered by emissions-free energy sources. Specifically, electrification of space and water heating with high efficiency heat pumps is a viable, cost-effective approach to decarbonization for nearly all buildings in New York.

The *Integration Analysis* indicates that **electrifying over 90% of building space statewide by 2050 is the scale of transformation needed to meet the Climate Act requirements**. This approach depends upon 100% zero- emissions electricity by 2040 and making energy efficiency improvements in all buildings, with the emphasis on improvements to building envelopes (air sealing, insulation, and replacing poorly performing windows) to reduce energy demand by 30% to 50%.

Smart controls and **load flexibility** also are important to minimize the impact of large-scale building electrification on the State's electric grid. In addition, embodied carbon associated with building construction can be reduced through building reuse and through using lower carbon materials or carbon-sequestering products.

2030 Goals

- **Heat pumps** should become the majority of new purchases for space and water heating by the late 2020s. More than 250,000 New York homes and thousands more commercial buildings each year are expected to be retrofitted or constructed to be all-electric and energy efficient, which is more than a ten-fold increase from the roughly 20,000 homes that adopted a heat pump as the primary heating and cooling system in 2020.

- **State codes** should require new construction to be highly efficient, all electric, and resilient to the effects of climate change. State regulations should be in place to phase out fossil fuel use in existing buildings by requiring zero emissions equipment and appliances at the time of replacement and by setting energy efficiency performance standards for large existing buildings.

- Support for **job growth** and **training** in electrification and energy efficiency services provides both new and incumbent workers with opportunities in the clean energy economy, with tens of thousands of new jobs in energy efficiency and clean energy industries to retrofit millions of buildings.

2050 Goals

- By 2050, 85 percent of homes and commercial building space statewide should be electrified with energy efficient heat pumps.

- Investments in research and development have brought affordable batteries, grid-interactivity, ultra-low Global warming potential refrigerants, and advanced technical solutions for the hardest to-electrify building types to market.

Buildings Sector Key Strategies by Theme

Theme	Strategies
Adopt Zero Emissions Codes and Standards and Require Energy Benchmarking for Buildings	1. Adopt Advanced Codes for Highly Efficient, All-Electric, and Resilient New Construction 2. Adopt Standards for Zero Emissions Equipment and the Energy Performance of Existing Buildings 3. Require Energy Benchmarking and Disclosure
Scale Up Public Financial Incentives and Expand Access to Public and Private Low- Cost Financing for Building Decarbonization	1. Scale Up Public Financial Incentives 2. Expand Access to Public and Private Low-Cost Financing 3. Align Energy Price Signals with Policy Goals
Expand New York's Commitment to Market Development, Innovation, and Leading-by- Example in State Projects	1. Invest in Workforce Development 2. Scale Up Public Awareness and Consumer Education 3. Support Innovation 4. Reduce Embodied Carbon from Building Construction
Transition from Hydrofluorocarbons	1. Advance a Managed and Just Transition from Reliance on HFC Use

Adopt Zero Emissions Codes and Standards and Require Energy Benchmarking for Buildings

Electrification and efficiency improvements in existing buildings present a larger challenge of sheer scale. **DEC should adopt regulations** that will bring about the end of fossil fuel combustion in buildings by prohibiting replacement of fossil fuel equipment at end of useful life. Building performance standards also will compel efficient operation of buildings and capital investments in high-performance building envelopes and efficient HVAC systems.

These regulations and complementary market support must be thoughtfully designed to drive adoption of highly efficient heat pump systems that are coupled with measures that reduce thermal energy demand, rather than uptake of inefficient alternatives such as electric furnaces or boilers.

1. Adopt Advanced Codes for Highly Efficient, All-Electric, and Resilient New Construction **-** Meeting the proposed 2024 date for low-rise construction code is predicated on New York State passing legislation by early 2022, which would direct and enable the subsequent regulatory action.

- ✓ Adopt highly efficient State Energy Code for new construction (and additions and alterations as applicable) of residential and commercial buildings.

- ✓ Adopt building resilience features into state codes to require solar wherever the opportunity exists and is feasible (with allowances for green roofs and other uses of rooftop space); grid interactive electrical appliances as feasible (such as batteries and hot water heaters); energy storage readiness; electric readiness for space conditioning, hot water, cooking, and dryers; and EV readiness where parking is provided.

- ✓ By 2024: Adopt all-electric state codes that prohibit gas/oil equipment for space conditioning, hot water, cooking, and appliances for new construction of single family and low-rise residential buildings (and additions and alterations as applicable).

- ✓ By 2027: Adopt all-electric state codes that prohibit gas/oil equipment for space conditioning, hot water, cooking, and appliances for new construction of multifamily buildings over 4 stories and commercial buildings (and additions and alterations as applicable).

2. Adopt Standards for Zero Emissions Equipment and the Energy Performance of Existing Buildings

- ***Regulations to improve energy efficiency in existing buildings***

  - ✓ As soon as possible, the State should adopt energy **efficiency standards for appliances** that are exempt from federal preemption (such as computers, monitors, fluorescent and LED light bulbs, and air purifiers).

  - ✓ 2027: Require existing properties larger than 25,000 sq. ft to upgrade to **energy efficient lighting** in all commercial spaces and common areas.

  - ✓ 2030: Adopt an **energy efficiency performance standard** for existing commercial and multifamily properties larger than 25,000 sq. ft. (with credit for building electrification). Compliance standards will be informed by statewide benchmarking data and seek alignment, where appropriate, across state and local government requirements (such as New York City local laws). A phased-in building performance standard could become effective starting in 2027.

- ***Zero emissions standards to phase out fossil fuel combustion equipment***

  - ✓ **2024:** The PSC should prohibit utilities from providing new gas service to existing buildings.

  - ✓ **2030:** Adopt zero emission standards that prohibit gas/oil replacements (at end of useful life) of heating and cooling and hot water equipment for single-family homes and low-rise residential buildings with up to 49 housing units.

  - ✓ **2035:** Adopt zero emission standards that prohibit gas/oil replacements (at end of useful life) of heating, cooling, and hot water equipment for larger multifamily buildings (4 stories and higher or 50 or more housing units) and commercial buildings.

  - ✓ **2035:** Adopt zero emission standards that prohibit gas appliance replacements (at end of useful life) for cooking and clothes drying.

  - ✓ **2035:** DEC should adopt zero emissions standards that prohibit gas/oil use in large fuel burning equipment. The standards should be enforced under a new emissions enforcement regime of large combustion equipment that typically heat buildings 50,000 sq ft or more in floor area, thereby requiring early retirement.

3. Require Energy Benchmarking and Disclosure

Require energy consumption information and disclosures:

- ✓ 2023: Commence a statewide energy benchmarking and disclosure program that requires owners of multifamily and commercial properties larger than 10,000 sq. ft. to annually report whole building energy and water consumption data to NYSERDA for public disclosure. NYSERDA should lead implementation, with support from the Department of Taxation and the Attorney General's office. Also, the PSC should require electric, gas, and water utilities to provide automatic aggregated whole building uploads of utility customer data directly to EPAs Energy Star Portfolio Manager.

- ✓ 2025: Require multifamily and commercial properties larger than 25,000 sq. ft. to undertake a comprehensive building energy assessment (audit) at least once every ten years that evaluates the building's systems and identifies opportunities to invest in energy efficiency upgrades, electrification or electrification-readiness for building systems, and resilience measures. Filing an assessment report with NYSERDA would be required on a cycle established by the State or at the time that a building permit is needed for specified work that must conform to Code, whichever comes first. NYSERDA should lead implementation, in close coordination with DOS and local code officials for development and enforcement.

- ✓ 2025: Require owners of all single-family and multifamily residential and commercial buildings to obtain and publicly disclose, as part of sale or lease listing of a building, housing unit, or commercial space, the prior-year energy consumption of the building, unit, or space (at least 12 consecutive months of energy bill data).

- ✓ 2027: Require owners of single-family buildings to obtain and disclose an energy performance rating (such as a Home Energy Rating System index) as part of sale listing.

Scale Up Public Financial Incentives and Expand Access to Public and Private Low-Cost Financing for Building Decarbonization

A substantial infusion of both public resources and private capital will be needed to pay for the building upgrades necessary to decarbonize buildings, while also expanding access to safe and healthy housing and bolstering resilience to climate impacts.

1. ***Scale Up Public Financial Incentives***

   - ✓ **Scale up incentives for building decarbonization:** Scale up direct cash incentives for energy efficiency, electrification, and electrification-readiness in residential and commercial buildings. In incentive program design, place an emphasis on ease of access to available and relevant resources for consumers and installers, particularly for LMI households and buildings in Disadvantaged Communities that may access resources from multiple programs. Design programs to support comprehensive building retrofits as well as portfolio- and community-scale solutions, where hundreds of homes and businesses are contracted for energy upgrades to more efficiently manage and deliver projects, reduce unit costs, incorporate place-based strategies, and drive scale and momentum (as compared to one-off projects). Where incentives are offered through utility companies, develop a coordinated statewide program to provide a consistent experience and incentive structure that helps installers reach more customers, with a priority to LMI households and disadvantaged communities.

   - ✓ **Align regulatory frameworks:** Identify and pursue modifications to regulatory frameworks for energy efficiency and building electrification programs to further align the programs with Climate Act goals and requirements. This includes, but is not limited to, attention to accounting holistically for the societal costs and benefits of building energy upgrades, including health impacts associated with outdoor and indoor air quality and thermal comfort.

   - ✓ **Prioritize Low and Middel Income (LMI) households, affordable housing, and disadvantaged communities:** Create dedicated direct cash incentives and financial support mechanisms for energy efficiency and electrification for LMI households, affordable housing, public housing, and disadvantaged communities. Develop new partnerships to effectively deliver programs (such as through housing agencies, community development financial institutions, and local community-based organizations) and adopt inclusive engagement processes that incorporate disadvantaged communities and LMI households in program design. Account for New

Yorks existing Energy Affordability Policy, which seeks to limit energy costs for low-income households to no more than 6% of their income, as well as a household's cumulative cost burden related to housing, energy, transportation, and healthcare when assessing affordability impacts.

- ✓ **Prioritize public housing:** Support and accelerate efficiency, electrification, and resilience in public housing, particularly in New York City Housing Authority buildings and in other Public Housing Authority developments statewide, with attention to the special needs of and jurisdictional issues that affect the state' s public housing stock. Support resiliency centers in public housing developments that provide safe temperatures, back-up power (including solar storage pilots), and community spaces to coordinate disaster relief. Leverage available federal funding and additional funding sources to support deeper retrofits and electrification.

- ✓ **Fund non-energy improvements when necessary:** Create a new "Retrofit and Electrification Readiness Fund "for LMI households, affordable housing, rent regulated housing, public housing, and residential buildings in disadvantaged communities to cover costs of non-energy building improvements that are necessary to install energy measures and broadband installation costs when funding energy projects.

- ✓ **Leverage funding for healthy homes:** Leverage healthy homes services and funding across housing, health, and energy improvements for low-income households to fund green and healthy housing retrofits. Near-term actions can expand use and coordination of both state and federal funding (such as use of Weatherization Assistance Program funds for health and safety improvements), build on the ongoing pilot to leverage New York Medicaid Value-Based Payment program for Managed Care Organizations to contribute to healthy housing services and home energy efficiency improvements, and engage with non-profit hospitals in community health needs assessments.

2. ***Expand Access to Public and Private Low-Cost Financing***

- ✓ **Integrate energy requirements and resources into affordable housing deals:** Continue to scale up energy and green requirements in affordable housing deals while ensuring that sufficient resources are available to maintain, preserve and produce housing that is clean, safe and affordable. For example, by no later than 2023, all new construction projects that receive Tax Credit funding through HCR should be required to be high-performance and all-electric buildings. Continue to streamline access to all incentives and resources for regulated affordable housing building decarbonization to go through housing agencies making projects affordable, to also make projects energy efficient, all-electric or electric-ready, and resilient.

- ✓ **Integrate energy performance into underwriting:** Provide support for lenders to underwrite to energy performance standards and applicable regulatory requirements.

- ✓ **Expand access to financing:** Provide greater access to low-cost financing products for upgrades, including for low-income homeowners and buildings located in disadvantaged communities. Explore new mechanisms to deploy public financial resources to enable low-interest financing products coupled with credit enhancement or insurance. Prioritize support for financing products made available by community development financial institutions (CDFIs) and credit unions as part of the Community Reinvestment Act regulatory compact.

- ✓ **Expand energy savings performance contracting for public sector buildings:** The State should enact enabling legislation to expand the use of energy savings performance contracting to support implementation of emissions reduction upgrades in state and municipal buildings, P-12 schools, and other public facilities. Performance contracting is a financing mechanism in which efficiency upgrades are paid for through savings from reduced utility costs. Changes to existing statute should expand the energy savings performance contracting eligible list of measures, expand the allowable payback term for deep decarbonization performance contracts, allow some fast payback measures to help fund deferred maintenance needs, and allow a state agency or authority to request to keep a portion of cost savings that result from performance contracts. A new statute should allow Design/Build and integrated project delivery methods for public sector buildings that achieve deep decarbonization performance.

- ✓ **Create a revolving loan fund:** Create a revolving loan fund for building decarbonization and the reuse of buildings and building materials. For example, the Environmental Facilities Corporation (EFC) Clean Water State Revolving Fund provides a model for enabling public mandates to be coupled with access to low-cost capital. This would be implemented through a bond-issuing government authority.

3. ***Align Energy Price Signals with Policy Goals***

- ✓ **Price GHG emissions from fossil fuels:** If an additional carbon pricing mechanism is advanced for electricity, DEC and NYSERDA should evaluate options to adopt a comparable carbon price for fossil fuels. Carbon pricing should not raise the price of electricity relative to fossil fuels as this could create unintended incentives to choose fossil fuels for heating.

- ✓ **Align electric rates:** Consider the need for dynamic underlying electric rate structures and programs (such as dynamic load management) that provide appropriate price signals to customers to incentivize deployment and usage of DERs, including heat pump systems and load flexibility measures that are designed reduce building loads that are coincident with summer and winter system peaks. For low-income households, additionally consider subsidized rates or expanded bill discounts for households that adopt heat pumps.

Expand New York's Commitment to Market Development, Innovation, and Leading-by-Example in State Projects

1. Invest in Workforce Development

- ✓ **Expand training:** Training for incumbent and new clean energy workers and adjacent industries needs to be increased dramatically, through investments in training infrastructure/delivery, career pathways, on-the-job-training, and industry partnerships. The state should support expanded or new training in the following priority areas:
  - Training and resources for the local government workforce of code officials and building inspectors.
  - Training and resources for contractors, technicians, and designers on sizing, selection, and installation of heat pumps and supporting measures.
  - Training and resources for contractors, technicians, and designers to reduce HFC emissions, addressing both leak reduction and proper disposal of HFCs already in use in building equipment and the transition to low-GWP alternatives for building equipment and spray foam insulation.
  - Continuing education on building decarbonization as part of existing or new licensing and/or registration requirements for architects, engineers, trades, contractors, building operators, and real estate professionals, such as brokers and inspectors.
  - Training and resources for building operations, maintenance, and service workers, with
  - attention to supporting retention of experienced building service workers.
  - Training and resources for planners, designers, and planning boards to understand and engage in planning processes that will support this transition.
  - Healthy homes training, to equip energy auditors and health and social workers who make home visits to identify health and safety issues and contractors to address these issues.
  - Training and industry partnership to increase the number of qualified geothermal drillers.
  - Training for workers in fossil fuel industries to transfer their skills to clean energy
  - opportunities.

- ✓ **Curricula and career services:** Require building decarbonization curricula and career services in state-funded education including K-12, technical schools, apprenticeships, and engineering and architecture programs at public universities, and encourage these curricula at private universities.

- ✓ **Prioritize disadvantaged communities and other priority populations:** The state should prioritize disadvantaged communities and low-income residents for training and job placement by creating community-to-employment pipelines and career pathways that are informed by an analysis of the effectiveness of current on-the-job training investments. Good wages, benefits, local and targeted training and hiring will be ensured through Community Benefits/Workforce Agreements and On the Job

Training Funding where appropriate, feasible and permitted by law. The state should leverage agencies' spending and regulatory influence to advance commitments around job access and job quality for Disadvantaged Communities. The state should increase ranks of MWBEs and SDVOBs and worker cooperatives through increased funding for workforce training, business development support, and certification assistance, so as to provide increased opportunities for MWBE and SDVOB utilization on state contracts, in accordance *with Executive Law Article 15-A and 17-B.*

2. Scale Up Public Awareness and Consumer Education

- ✓ **Scale up campaigns:** Support and scale up multilingual public and consumer education efforts through large-scale, coordinated awareness, inspiration, and education campaigns. This would include traditional and broad reaching media, digital communication, "influencer "style campaigns, user-generated campaigns, virtual tours, and mailers. Campaigns would provide specific resources and tools for installers, distributors, the home-visiting workforce, and other supply chain actors to educate consumers.

- ✓ **Create strategic partnerships:** Create strategic partnerships that can have broad impact, including with trusted community leaders, religious leaders, and community-based organizations. Partner with utilities to promote decarbonization and to sunset messaging that promotes fossil gas as a "cleaner" choice. Other partners would include cooperative extensions, business councils, industry organizations and leading companies, unions, schools and teachers, film and public venues, and state and local elected officials. This work can build on experience from Heat Smart programs.

- ✓ **Prioritize disadvantaged communities:** Ensure messages, messengers, and media reflect disadvantaged communities in marketing efforts, and prioritize education and technical assistance for disadvantaged communities. Build on NYSERDA's development of regional Clean Energy Hubs and on the commitment of NYSERDA and the state's electric and gas utilities to maintain the New York Energy Advisor website as a "one-stop shop" source of information for clean energy, electrification, and energy efficiency programs for LMI households. Fund and expand community hubs to offer education, resources, local contractors, technical assistance, and program navigator support.

- ✓ **Publicize leaders:** Publicize best practices for efficient building operations and recognize leaders and innovators in efficient operations that support building occupants. Create an incentive program/challenge to attract others or encourage others to sign a pledge to commit to neutrality.

- ✓ **Provide technical resources:** Provide technical assistance and resource toolkits for building decision-makers and residents including playbooks for low-carbon solutions in common building types, free in-home or virtual audits to homeowners, and capital planning support for large buildings. Provide information resources and tools to support tenant engagement. Demonstrate low-carbon solutions through challenges and case studies. Develop case studies showing the feasibility, performance, and costs for three

paths to transition to highly efficient and all-electric buildings: full electrification, phased electrification, and electrification readiness.

3. ***Support Innovation***

- ✓ **Leverage Federal resources:** Advocate for, and leverage, federal and national laboratory resources focused on identifying and commercializing advancements in technologies for building decarbonization and building resilience.

- ✓ **Scale up tech transfer:** Scale up resources to identify and promote technology transfer for innovative building decarbonization technologies and design approaches that are in use internationally and could be transferred to the New York market. For example, support adapting technologies for U.S. and New York standards, in-state demonstrations, market research, partnering with New York entities, and manufacturing assistance.

- ✓ **Support minority- and women-owned and socially responsible business enterprises:** Provide support and outreach for MWBEs, cooperatives, and B Corps. For example, provide dedicated access to expert advisory services; internships, fellowships, and board placement in innovative companies and access to venture capital for underrepresented women and minority entrepreneurs, via New York Ventures.

- ✓ **Support NextGen building decarbonization solutions:** Continue to support RD&D, demonstrations, and technology transfer and commercialization for next generation HVAC systems, building envelopes, and design approaches that meet technical needs, deliver high performance, and lower costs. This includes continued improvement in cold climate performance across a range of heat pump products and sizes; improved domestic hot water heat pump technologies; solutions for harder-to-electrify buildings, including those on the Con Ed steam system; community thermal loops; advanced heat recovery and ventilation; improved thermal storage for HVAC applications; innovative materials, construction approaches, and manufacturing methods that improve building envelopes; and other technologies.

- ✓ **Support NextGen grid-interactive buildings solutions:** Support RD&D, demonstrations, technology transfer and commercialization, and development of standards across manufacturers and equipment for Grid-Interactive Efficient Buildings, to deliver energy efficiency, load flexibility, and modulation capabilities that contribute to efficient grid management and grid reliability. Support the development of market signals, including revenue streams for Grid- Interactive Efficient Buildings, via analysis of opportunities to provide grid services and electric/thermal services to neighboring buildings, assessment of market mechanisms for supporting desired policy outcomes, and pilots and demonstrations to inform rulemaking and ratemaking.

- ✓ **Support RD&D for low-carbon fuels:** Assess and then support RD&D needs with respect to the potential for some use of low-carbon fuels in buildings (such as RNG, green hydrogen, wood, and/or high-percentage biodiesel blends) and bioenergy with

carbon capture and storage for harder-to-electrify buildings, which may include campuses with district energy systems.

✓ **Support RD&D for building resilience:** Assess and then support RD&D needs with respect to building resilience, as New York looks toward both widespread building electrification and more frequent extreme weather. Related RD&D investments (also discussed in Chapter 13) include the flexibility and resilience of the electrical system and long-term energy and thermal storage solutions.

4. Reduce Embodied Carbon from Building Construction

- ✓ **Lead by example in state projects:** Drive embodied carbon reductions through design and procurement in state-funded new construction projects.

- ✓ **Make embodied carbon transparent:** In design specifications, require Environmental Product Declarations for structural building materials where available, and require the use of available modeling software and design tools for calculation of the project's embodied carbon budget.

- ✓ **Follow lower-carbon specifications:** Require that state-funded projects follow lower-carbon specifications (see GreenNY) for the most carbon intensive construction materials and products (such as concrete, foam insulations, glass, and window units).

- ✓ **Set reduction targets for projects:** Subsequently, set a target embodied carbon reduction level for projects that is below the established mean embodied carbon budget, as illustrated over the previous years.

- ✓ **Incorporate embodied carbon budgets into permitting:** Require an embodied carbon budget to be submitted as part of the permit process for all commercial and institutional new construction (and additions and alterations as applicable), immediately for state entities and no later than 2025 for local government entities. Provide state-funded training and resources for designers and for state and local permitting entities to check carbon budgets for completeness at first, and then for accuracy as the market improves in its abilities.

- ✓ **Encourage building reuse:** Identify and pursue financial incentives, changes to building codes, and other strategies to encourage building reuse, beginning in urban centers that are returning vacant buildings to use. Maintaining the existing building facade and architectural style can be an additional benefit to the embodied carbon reduction.

- ✓ **Support RD&D**: Support RD&D, demonstration projects, and technology transfer and commercialization for enhanced low embodied carbon construction, including preference for reuse of existing buildings. Showcase low embodied carbon designs and undertake industry outreach.

- ✓ **Expand in-state manufacturing for products:** Provide assistance to expand in-state manufacturing for products that are lower in embodied carbon or made of carbon sequestering materials (also known as biogenic or agriculture-based materials). The New York State Wood Products Development Council (WPDC), SUNY College of Environmental Science and Forestry (ESF), and ESD are well positioned to provide and coordinate assistance.

- ✓ **Incorporate embodied carbon specifications into incentive programs:** In the design of energy efficiency incentive programs, incorporate lower-carbon specifications for the most carbon intensive products (such as foam insulations in homes).

Transition from Hydrofluorocarbons

1. Advance a Managed and Just Transition from Reliance on Hydrofluorocarbon Use

- ✓ **Provide education and training:** The state should provide resource toolkits, programs and incentives that make low-GWP refrigerant technologies and low-GWP alternatives available and affordable, including a focus on natural refrigerants. DEC should promulgate regulations regarding proper disposal of HFCs already in use in existing equipment and such regulations should be supported by training installers and contractors on handling, equipment maintenance, and disposal protocols,. NYSERDA should support design professional and workforce training and education around low-GWP refrigerants and alternatives, including natural refrigerants, in building equipment and in building/construction spray foam.

- ✓ **Update regulations, codes, and standards:** As soon as possible, update the relevant New York codes, including the mechanical code, to allow the use of low-GWP alternatives for HFCs. DEC should promulgate regulations requiring reclamation or destruction of refrigerants from appliances at end-of-life, with verification and reporting, and require leak detection for certain commercial refrigeration. Provide education and training, technical assistance, and economic support (such as, incentives to purchase leak detection and reclamation equipment, or compensation for refrigerant reclamation) to aid local industry with this transition.

- ✓ **Phase out high-GWP HFCs:** DEC should expand the scope of 6 NYCRR Part 494, which prohibits certain HFCs in refrigerator/freezers, chillers, commercial refrigeration, and aerosols/foams/solvents end uses, including through the establishment of a GWP threshold that decreases over time as low and ultra-low GWP options become available. DEC should align New York policy with anticipated federal (EPA) policy measures to meet HFC reduction requirements as well as with other U.S. Climate Alliance states, to send a strong market signal to manufacturers and industry while mitigating costs of the transition.

- ✓ **Research health effects and environmental impacts:** Support further research into known data gaps, including an analysis of typical leak rates and charge size in heat pump technologies and research into long term health effects of exposure to new

HFC-alternative chemicals in building materials.

- ✓ **Support RD&D:** Continue to support demonstration projects for low and ultra-low GWP refrigerants in HVAC and hot-water systems, and for refrigerant leakage detection and reduction strategies. Develop case studies in refrigerant management and alternatives to HFCs, including natural refrigerants, showing the safety, performance, and cost impacts.

Industry Review

Mining and Quarrying

Mining and quarrying activities produce stationary source GHG emissions primarily from grinding equipment and diesel-powered material handling and moving equipment. There are approximately 4,000 mining and quarrying jobs in the state, most of which are concentrated in construction sand and gravel mining, and stone mining and quarrying. Only a small share of the state's GHG emissions are produced by mining and quarrying activities, some of which also occur within energy- or emission-intensive and trade-exposed industries and are thus addressed in these strategies similarly to manufacturing activities.

Low Carbon Procurement

Another strategy that has been identified to reduce emissions in the industrial sector is to create state procurement incentives so that manufacturers will produce **less emission-intensive goods** to capitalize on the increased demand for such goods.

The initial focus for this effort should be to incentivize the manufacturing of **lower carbon building materials, such as cement, steel, and aluminum.** The public sector purchases a large proportion of building materials produced in the market. This enables the state to exert significant influence on the producers of building materials to develop low-carbon options across its entire range of products. At the same time, the standards for verifying what constitute a low-carbon product are relatively well established for these types of materials.

At present, about 28% of annual emissions associated with buildings can be allocated to the use of construction materials, primarily emissions associated with the production of concrete and steel, as well as aluminum, glass, and insulation material. Demand for greener building materials from the private sector will spur manufacturers to reduce the embodied carbon in their products. However, there is an opportunity to accelerate the growth of this demand via public procurement directives, given that nearly 50% of all cement and 20% of all steel that is purchased in the U.S. is paid for with tax dollars.

There are many available pathways to offer advantages to providers of these low-carbon materials in the public procurement process. The state of California's Buy Clean program, for

example, created a system in which selected building materials−structural steel, concrete reinforcing steel, flat glass, and mineral wood board insulation−used in public projects would need to meet minimum GWP standards. Another option to enable low-carbon material procurement is to discount bid prices submitted for public work projects if the bidders are utilizing building materials with low GWP.

Both houses of New York Legislature recently passed a bill that instructs the Office of General Services (OGS) to examine available incentives, including bid discounts, to encourage the use of low embodied carbon concrete in state agency projects. The exact method of supporting procurement of low-carbon products should be established through coordinated efforts of expert government stakeholders, with the interagency GreenNY initiative, including NYSERDA, DEC, and other state agencies, leading the effort.

Given the public sector's significant share of market demand for building materials and the critical need for increased supply of low-embodied carbon building materials, the state should increase purchases of low-carbon materials to provide manufacturers with an economic incentive to increase supply.

- ✓ **Identify carbon intense materials:** First, the interagency GreenNY initiative should develop a list of the most carbon intense building materials and products eligible for incentives or preferential treatment in procurement.

- ✓ **Develop standards:** After identification of eligible products, the interagency group should work with manufacturers, trade associations, researchers, and other like-minded states or federal agencies to set standards for determining the GWP of each building material.

- ✓ **Provide policy support:** The State should implement policy mechanisms that provide advantages to projects or procurement bids utilizing products that meet or exceed GWP targets.

Water Resource Recovery Facility Conversion

Transforming wastewater treatment plants from a waste disposal priority to WRRFs (Water Resource Recovery Facilities) that emphasize the capture of beneficial products is a key component of the circular economy. WRRFs, which represent much of the existing capacity for organics materials management in New York, present tremendous opportunity for reducing GHG emissions. However, the funding for WRRFs is tied to municipal water and sewer rates, is generally constrained, and is largely dedicated to improving water quality, making it difficult to self-fund beneficial reuse projects. Biogas and digestate products resulting from beneficial reuse can be valuable if markets are aligned with GHG emission reducing priorities, and incentivizing biogas production could reduce costly infrastructure upgrades at WRRFs.

- ✓ Beneficial use: The State should support beneficial use of biosolids and renewable biogas, recognizing that water treatment process waste generation is unavoidable.

- ✓ Optimize anerobic digestion: The State should operate co-digestion programs at anaerobic digesters with existing capacity and include difficult to compost organics such as post-consumer food scraps and fats, oils, and grease.

- ✓ Implement co-digestion: The State should support increased pre-processing and de-packaging capacity throughout the State to capture more organic waste from products that are packaged but are no longer suitable for public sale.

- ✓ Research co-pollutants: The State should evaluate the extent and impact of co-pollutants such as emerging contaminants.

Economy Wide Strategies

Pricing Green House Gas

A *carbon pricing* program establishes the price per ton of GHG emissions that regulated entities would pay.

A *cap-and-invest* program would also price emissions, but indirectly as the price is established by the market based on the available supply of and demand for emission allowances, rather than directly by the government entity.

Under a *tradeable performance standard*, each provider of liquid or gaseous fuels would be required to reduce the carbon intensity of the fuels provided over time. They can accomplish this by directly blending lower carbon renewable fuels or by acquiring credits from providers of electricity to displace the use of liquid or gaseous fuels.

Members of the Council have identified the value of a comprehensive policy that effectively prices GHG emissions. Such a policy could fulfill at least three purposes:

• It could serve as an overarching program to ensure collective statewide GHG emission reductions, as required by the Climate Act.216

• It could provide an additional source of funding to implement policies identified in this Plan, particularly policies that require State investment or State funding of incentive programs, including investments to benefit disadvantaged communities. Statewide support should be considered alongside other funding sources, including federal funding programs.

• It would provide a consistent market signal across all economic sectors to yield additional emission reductions as individuals and businesses make decisions that reduce their emissions, as well as support clean technology market development that could be fostered in the regional

economy.

In addition, a well-designed program could support economic development and innovation in New York and reduce existing disproportionate burdens of GHG and other emissions in Disadvantaged Communities.

The Draft Plan identifies three options for public input:

(1) a tax or fee establishing a carbon price, referred to as a *carbon pricing*.

(2) a program that caps emissions across the economy, or within particular sectors, and allocates emissions primarily through an auction mechanism that provide revenues for investment, known as *cap-and-invest*; and

(3) a *clean energy supply standard*, which would require providers of liquid and gaseous fuels across the economy to reduce the carbon intensity of fuels they introduce into commerce. Both carbon pricing and a cap-and-invest program would charge the entity emitting GHGs for the pollution it produces, with a primary distinction being price certainty as compared to emission certainty, as described further below.

Adaptation and Resilience

Even with strong and innovative strategies in place to curb GHG emissions, the impacts of climate change are already being felt and are only projected to accelerate. Climate change mitigation strategies alone are not sufficient to prepare for the impacts of present and future climate change. Therefore, New York State must take bold action to adapt to climate change and enhance resilience in communities, **infrastructure**, and systems.

Communities and Infrastructure

Enhancing resilience of communities and infrastructure includes strategies to assist municipalities to prepare for and react to increasingly severe climate hazards. The strategies include recommendations to expand state support for regional and local planning, assist municipalities in their efforts to incorporate future conditions into local planning and regulatory decisions, recommendations to address risks due to flooding and extreme heat, and recommendations to ensure resilience of the energy system.

Some strategies moving forward (Construction related):

- ✓ **Resilient infrastructure fund:** Create a resilient infrastructure fund through bonding.
- ✓ **Staffing:** The Governor should appoint a **Chief State Resilience Officer** (CSRO) and convene adaptation and resilience subcabinet.
- ✓ **Right-sizing infrastructure:** DEC should hire a **statewide technical assistance coordinator** to support to municipalities for right-sizing culverts and bridges to reduce flood risk and improve habitat connectivity.

- ✓ **Adaptation and resilience plan:** Prepare for development of a comprehensive state climate change adaptation and resilience plan.

- ✓ **Vulnerability assessments and adaptation plans:** DEC, with support from OGS and AECOM, should complete preliminary agency vulnerability assessments and adaptation plans, and identify and prioritize state adaptation and resilience projects.

- ✓ **Assessments and research:** NYSERDA should continue ongoing update to New York climate change assessment, and DEC or other agencies should initiate or fund additional research.

- ✓ **State infrastructure investments:** CSRO should provide recommendations to the Executive Chamber to adopt a process to ensure integration of state infrastructure investments to ensure efficient use of land and other resources, and consideration of adaptation and resilience.

- ✓ **Resilient design:** OGS and DEC should convene work group to adopt climate resilient design guidelines for state-funded projects.

- ✓ **Support dam removals:** DEC should support dam removals that reduce flood risk and improve aquatic habitat quality.

- ✓ **Amend the Smart Growth Public Infrastructure Policy Act:** Amend the Smart Growth Public Infrastructure Policy Act and similar statutes to require consideration of climate hazards; DEC should develop implementation guidance.

- ✓ **Consideration of future climate:** OGS should convene work group to establish policies and procedures to require design professionals and contractors on state-funded projects to consider future climate conditions.

- ✓ **Amend state building code:** DOS should amend state building code to account for sea-level rise and enhanced riverine flooding, and potential use of innovative structures, such as amphibious buildings.

- ✓ **Weatherization in building codes**: DOS should amend state building code to require more effective weatherization from thermal extremes.

- ✓ **Capital improvements:** NYSERDA, in consultation with DPS, DOS, and other relevant entities, should promote capital improvements in buildings to endure grid failures and to facilitate building's ability to accept power when system re-energized.

- ✓ **PV and EV-charging in building code:** DOS, in consultation with NYSERDA, should include requirements for PV and EV-charging readiness in building code.