



Power Generation Advisory Panel Meeting 11

May 3, 2021

9:30 am



**Climate Action
Council**

PowerGenPanel@dps.ny.gov

Agenda

- > Public Input Received
- > Changes to Draft Recommendations (since being presented as draft at February – April Panel meetings)
- > Next Steps

Public Input Received

Public Input Received

- > Approximately 150 unique commenters
- > Over a dozen repeat commenters
- > Generally broad support for renewables, energy efficiency, and energy storage.
 - Though some concern with the pace of renewable build-out
 - Some calls for earlier engagement with locals in planning for renewable energy projects
- > Other Key Topics:
 - Nuclear energy
 - Gas infrastructure

Public Input Received

> Nuclear comments

- Most frequent topic of comments (and repeat commenters)
- Commentors relatively evenly split between pro- and anti-nuclear
- Pro- comments point to benefits of emissions-free baseload generation, contribution to system reliability and affordability, and it being a preferred alternative to building out natural gas generation facilities which would increase carbon emissions.
- Anti- comments point to health and safety concerns associated with radiation and storage of spent fuels and the preference to support renewables instead.

> Gas Infrastructure comments

- Commenters call for preventing continued gas infrastructure build out, with specific mention for electric generation facilities.
- Many also calling for a plan to phase out existing gas generation facilities and to prioritize the closure of peaking facilities, particularly those downstate.
- Commenters point to the inconsistency of gas expansion with the goal to reduce emissions, the disproportionate impact these facilities' emissions have on communities and the need for equity, and the preference to invest in renewable energy, energy storage, and transmission to replace the need for gas generation.

Public Input Received

> City of New York

- The State's just transition should prioritize reducing New York City's reliance on dirty power plants within the five boroughs.
- Closing power plants within NYC requires a build-out of transmission and energy storage.
 - Strongly supports efforts to site renewable power in city, sees small-scale rooftop solar and community solar projects as particularly promising.
 - Calls for:
 - Expeditiously building transmission lines that can deliver clean power from offshore and upstate sources directly into NYC
 - Rapid development of energy storage resources strategically placed throughout the city.
 - NYISO and PSC to adopt market signals, rate structures, and utility programs that incentivize investments in energy storage.
- The costs of the clean energy transition must be distributed equitably and not exacerbate energy cost burdens.
- The clean energy system must be reliable and resilient to the impacts of climate change.

Public Input Received

> Environmental, EJ, and Clean Energy Industry Groups

- Focus on retiring fossil generation facilities and redirecting nuclear subsidies to accelerate deployment of energy efficiency, renewables, and storage.
- Address environmental justice and affordability issues and partner with communities and local municipalities to ensure that impacted communities benefit from the transition
- Most oppose use of alternative fuels such as renewable natural gas and hydrogen, particularly within this sector (some suggesting if it is used at all, it should be reserved for the most challenging to decarbonize sectors such as transportation).
- Specific calls for:
 - Prioritizing the closure of peaking generation facilities
 - No new or repowered fossil generation facilities
 - Preventing gas system infrastructure expansions
 - A phase out plan for fossil generation that includes a binding schedule of facility closures by year

Public Input Received

> Utility Consultation Group

- Support for the State's energy and climate goals
- Stress the need for reliable and resilient delivery of energy
 - Particularly as the State decarbonizes and any failure of electric delivery would then impact customers more deeply
 - Sees energy storage as playing a key role to support reliability and resiliency with increasing amounts of non-dispatchable renewables
- Supports efforts to increase renewable supply and reduce methane leakage
 - Strongly supports proactive and iterative planning process at the bulk transmission, local transmission, and distribution levels to identify infrastructure needs to interconnect and deliver renewable energy
 - Suggests establishing a 'regulated renewables' path where investor-owned utilities can own some amount of renewable generation
 - Calls for expediting approval of local transmission projects to create interconnection points and address system constraints necessary to integrate renewables
 - Suggests the State should accelerate methane leakage treatment by authorizing and approving earnings incentives to reduce emissions from their operations
- Cost effectiveness
 - Stresses importance of mitigating cost impacts to consumers and maximizing economic benefits of the State's decarbonization efforts, particular for the most vulnerable customers
- Don't take option off the table
 - Strongly agree with need for increased R&D to support deployment of emissions-free technology at scale by 2040, including consideration of alternative fuels
 - Strongly disagrees with the immediate moratorium on new and repowered fossil-fueled generation facilities

Changes to Draft Recommendations

New Enabling initiative – Demand Side

Description:	Analyze and appropriately model responsive demand as part of future generation and energy supply. Consider those modeled impacts on costs and timelines of power generation by decade and incorporate into system planning. It is imperative that flexible, responsive loads are analyzed and modeled appropriately to optimize for the lowest system cost and the most expeditious deployment of both clean supply and demand solutions.	
Action type:	Executive, Regulatory	
Cost and funding considerations:	\$; The potential costs must be thoroughly analyzed and evaluated through the lens of avoided grid upgrade costs as well as health and economic benefits, especially for disadvantaged communities. Funding sources could come from NYSERDA, expanded federal Weatherization Assistance Programs and clean energy programs.	
Ease of implementation:	Medium	
Example case studies:		
Risks / Barriers to success		Possible mitigants
<ul style="list-style-type: none"> Successful implementation will require a vision, commitment and directive from the state to structure a broad and long-term collective effort from all parties, adequate funding, transparency and education. 		

New Enabling initiative – Components of the strategy

Components required for delivery	Implementation lead	Time to implement	Other key stakeholders
Complete a study on avoiding or reducing grid upgrade costs with such things as demand response and the use of geothermal, including district thermal systems, especially downstate, with a focus on low and moderate income individuals and disadvantaged communities.	DPS, Utilities, NYSERDA	Ongoing	PSC/DPS, NYSERDA, NYISO, local governments, contractors and community-based organizations especially those that provide Weatherization Assistance Programs.
Identify and make available key pieces of data needed for markets to facilitate the clean energy transition is real-time marginal, average emissions, and/or zonal resource/fuel mix data, as needed from NYISO and as defined by NYC and pert. State Agencies (a number of assumptions including for imports and exports from other RTO/ISOs must be determined) to facilitate cost-effective implementation of the CLCPA, LL97, and to improve VDER values and demand response programs.	PSC/DPS, NYISO, NYSERDA	ASAP	
Prioritize state and federal appliance standards. Adopt State equipment standards (or advocate for the federal government to adopt standards) that require a universal, standardized communication protocol in electric and heat pump water heaters, as well as in space heating heat pumps, EVs, and in-home batteries.	NYSERDA	Ongoing	
Develop standards to enable “opt out” programs rather than “opt in”. Make demand flexibility programs opt-out, not opt-in as long as standards are developed to ensure that customers would reap savings on their bills and service delivery is not reduced.	PSC/DPS	Ongoing	

New Enabling initiative – Components of the strategy

Components required for delivery	Implementation lead	Time to implement	Other key stakeholders
Rethink cost-benefit tests. In order to accurately assess the true value of EE and demand response while complying with the CLCPA, the PSC should reopen the generic BCA proceeding to update costs and benefits, including CLCPA compliance costs (carbon and other environmental impacts), important non-energy benefits (localized health impacts, equity, etc.), and inclusion (or lack thereof) of customer cost contributions.	PSC/DPS	ASAP	PSC/DPS, NYSERDA, DEC, NYISO, local governments, contractors and community-based organizations especially those that provide Weatherization Assistance Programs.
Ensure that energy storage does not face double rules and unfair charges. NYS should consolidate its permitting rules for energy storage so they can be evaluated in one process. Utility commissions should reexamine their tariffs on energy storage resources and ensure they are applied fairly.	PSC/DPS	ASAP	
<p>Prioritize under-resourced communities.</p> <ul style="list-style-type: none"> - Utilities should engage the community and partner with CBOs to learn about communities and identify needs and shared objectives. - New funding should be directed toward low-income and disadvantaged communities and existing funds should be made more accessible. - In planning for a sustainable future, NYS should work with communities to ensure appropriate metrics to track program success and partner with local governments to establish appropriate consumer protections. 	PSC/DPS, Utilities, NYSERDA	ASAP	

New Enabling initiative – Benefits and impacts

Anticipated Benefits and Impacts

Disadvantaged communities

The concentration of the dirtiest peaking plants in zones J and K, sited in disadvantaged communities, provides an opportunity to back down that generation in the near term through efficiency and load responsiveness, while transmission and large-scale renewables get built to serve downstate. Targeting EE and DR in disadvantaged communities is an opportunity to provide these communities with ownership of clean energy solutions that will provide benefits at the household, utility, and community level. Greater investment should be paired with tracking and transparency around spending and benefits for disadvantaged communities. EE, DERs, and load flexibility are effective avenues for EJ communities to own clean energy solutions that provide benefits at the household, utility, and community levels.

Health and other co-benefits

Reducing demand through efficiency, and creating demand flexibility, especially downstate, will yield large GHG and criteria pollutant reductions/health benefits in the near term due to the current grid mix.

Just transition: businesses and industries, workers

Scaling up investments in dynamic load management and energy efficiency will create jobs in the part of the clean energy sector with the most growth potential. Energy efficiency and load management implementation will help businesses reduce energy costs.

There will be power sector benefits from investing in demand reduction in fossil fuels through increased building efficiency (through weatherization), to reduce gas supply pressures in winter, and avoid dual-fueled peakers switching to oil during gas peaks.

Other

Changes to Draft Recommendations

> Technology Solutions

- Incorporated advanced fuels and nuclear considerations as presented at 3/10/21 Panel meeting
- Made distinction of green hydrogen from combustion of hydrogen
- Recommended a study on exploring untapped renewable energy and storage potential

> Market Solutions

- Strengthened statement regarding buyer-side mitigation to say that NY should ensure that BSM will not be applied to CLCPA resources
- Included additional components on:
 - Proactive advocacy at the NYISO and FERC to align markets and planning processes with CLCPA goals
 - EAMs to review and evaluate their effectiveness and any need for modifications related to decarbonization and social equity goals of the CLCPA

> Distributed Generation/Distributed Energy Resources

- Fleshed out to ensure buildout of DG/DER benefit local communities and disadvantaged communities, including addition of:
 - Resources and education component to create or expand on regional discussion forums, between NYS, local communities, and projects to connect communities with resources, information, and address local concerns
 - Component encouraging aggregations of distributed resources will provide additional value for grid management

Changes to Draft Recommendations (cont'd)

> Methane Leakage

- Renamed 'Gas Infrastructure, Transmission & Methane Leakage'
- Incorporated new component (consistent with Energy Efficiency & Housing Advisory Panel) recognizing the need to phase out gas infrastructure/pipelines over time and decommission them with a managed, phased, and just transition to the maximum extent possible and as quickly as possible.

> Retirement of Fossil Fuel-Fired Facilities

- Moratorium on new and repowered gas generation facilities incorporated as a component of the recommendation (most panel members voicing opinion were in support) but making distinction as a non-consensus recommendation.

> Clean Energy Siting & Community Acceptance

- Added a component for Public education and outreach to increase general awareness, participation, and acceptance.

Changes to Draft Recommendations (cont'd)

- > No significant changes made to:
 - Existing Storage Technology
 - Long Duration Storage Technology
 - Workforce Development
 - Access and Affordability for All
 - Growth of Large-Scale Renewable Energy Generation
 - Reliability of the Future Grid
 - Energy Delivery & Hosting Capacity

Next Steps

Next Steps

- > Panel members requested to remain available for further potential collaboration and recommendation refinement
- > Panel will shift to meeting on an as-needed basis
- > Climate Action Council meeting May 10th @ 9 am (<https://climate.ny.gov/>) to review recommendations from:
 - Energy Efficiency & Housing
 - Land Use & Local Government
 - Power Generation
 - Transportation

THANK YOU!

Appendix – Full set of Recommendations to the Climate Action Council



Power Generation Advisory Panel Recommendations

May 3, 2021



**Climate Action
Council**

PowerGenPanel@dps.ny.gov

Power Generation Panel Members

Sarah Osgood,
Acting Chair
Director, Policy
Implementation:
Department of Public Service

William Acker
Executive Director:
New York Battery and
Energy Storage
Consortium

Cecilio Aponte
Senior Analyst,
Origination: at The
AES Corporation

**Elizabeth (Betta)
Broad**
Director: New Yorkers
for Clean Power

Rory Christian
President:
Concentric
Consulting, LLC

Lisa Dix
Sr. NY Representative:
Beyond Coal
Campaign, Sierra Club

Annel Hernandez
Associate Director:
New York City
Environmental Justice
Alliance

Kit Kennedy
Senior Director of
Climate & Clean Energy
Program: NRDC

Shyam Mehta
Executive
Director: NYSEIA

Emilie Nelson
Executive Vice
President: NYISO

John Reese
Senior Vice President:
Eastern Generation

**Stephan
Roundtree, Jr.**
Northeast Director:
Vote Solar

Jennifer Schneider
Intl. Representative &
Legislative & Political
Coordinator for NY:
IBEW

James Shillitto
President: Utilities
Workers Union of
America Local 1-2

Darren Suarez
Manager of Public and
Government Affairs:
Boralex Inc.

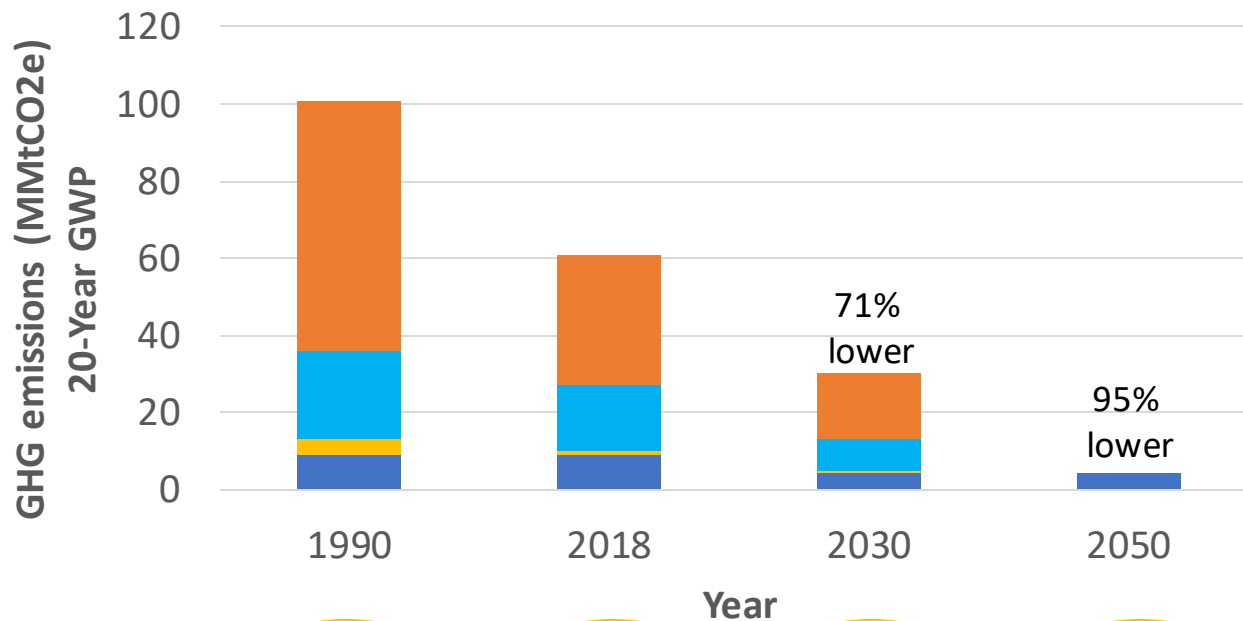
Laurie Wheelock
Litigation and Policy
Counsel: Public Utility
Law Project

Description of Recommendation Types

- > **Mitigation strategies:** actions that directly reduce emissions and contribute to the achievement of the greenhouse gas emission limits or carbon sequestration needed to achieve net zero, where applicable. Consider how the collective estimated emissions impact of these strategies amount to the Pathways reduction target for the panel (if applicable) and support attaining the greenhouse gas limits.
- > **Enabling initiatives:** actions without direct emissions benefit that enable or magnify the mitigation strategies, enhance climate justice, or just transition
 - Examples of such initiatives include outreach, education, and increasing awareness; capacity building; workforce development; and research and development.

Aggregate GHG emissions impact of Power Generation panel recommendations

Estimated GHG emissions
Power Generation



% of total
NY emissions

Electricity Sector

Emissions (2018 Subtotal)

- Fuel Combustion (34mmt)
- Imported Fossil Fuels (17mmt)

Panel Goals:

- 2030: 70% RE is equivalent to 50% emission reduction from 2018 levels above
- 2050: Align with 100% Zero Emission by 2040

Other Sectors

- NYS Oil and Gas Methane Leakage
 - Recommendations reduce leakage 50% from 2018 levels (9mmt to 4mmt)
- Additional actions by other Panels not included
- Electricity T&D
 - Phase-Out SF6 by 2050 (<1mmt to 0mmt)

Power Generation Advisory Panel Considerations

Electrifying buildings and transportation is crucial to meeting CLCPA goals.

Principles

- > Reliability
- > Equity
- > Affordability
- > Zero-emission
- > Timely

Approach to Electrification Must...

- > Minimize the system costs of electrification and balance the behind-the-meter costs with grid-side costs, with both bulk and local solutions
- > Optimize the deployment and operation of resources – locationally and for flexibility – through storage, managed load, and clean dispatchable generation
- > Look to utilities, DER providers, and bulk providers for this – as makes most sense and with steady and improvement and rules
- > Provide for improved holistic planning of the electric system and across energy systems to accommodate significant changes in characteristics of generation and significant changes in load due to electrification
- > Pay heightened attention to resilience and reliability as the energy system becomes more electric
- > Support solutions in technologies, regulation, markets, and systems management and oversight

Mitigation & Enabling Strategy Summary

Initiative #	Description	Action type	Ease of implementation	Cost
1	Growth of Large-Scale Renewable Energy Generation	Procurement, Regulatory	Medium	\$
2	Clean Energy Siting & Community Acceptance	Executive, Regulatory	Medium - Hard	\$\$
3	Distributed Generation / Distributed Energy Resources	Procurement, Regulatory	Medium	\$\$
4	Existing Storage Technology	Legislative, Regulatory, Executive	Medium	\$\$
5	Demand Side	Executive, Regulatory	Medium	\$
6	Reliability for the future grid	Executive, Regulatory	Easy	\$

Mitigation & Enabling Strategy Summary

Initiative #	Description	Action type	Ease of implementation	Cost
7	Access and Affordability for All	Executive, Regulatory	Medium	\$\$
8	Workforce Development	Executive	Easy	\$\$
9	Market Solutions	Regulatory, Executive	Medium	\$
10	Technology Solutions	Research & Development	Medium	\$\$\$
11	Long Duration Storage Technology	Executive, Regulatory, Research & Development	Hard	\$\$- \$\$\$
12	Energy Delivery & Hosting Capacity	Executive, Regulatory	Hard	\$\$\$
13	Gas Infrastructure, Transmission & Methane Leakage	Executive, Regulatory	Easy - Medium	\$\$
14	Retirement of Fossil Fuel-Fired Facilities	Regulatory	Hard	\$

Enabling initiative – Initiative #1: Growth of Large-Scale Renewable Energy Generation

Description:	Accelerate deployment of renewable energy systems including solar, land-based wind, and offshore wind in alignment with the Clean Energy Standard.	
Action type:	Procurement, Regulatory	
Cost and funding considerations:	\$; NYSERDA's existing Tier 1, Tier 4, and OSW programs.	
Ease of implementation:	Medium (acceleration of current actions)	
Example case studies:		
Risks / Barriers to success		Possible mitigants
<ul style="list-style-type: none">Ensuring efficient processes for installing renewable generation (procurement, siting, interconnection, construction) and for constructing and upgrading the transmission and distribution networks is necessary to effectively deploy renewables within the time needed.		<ul style="list-style-type: none">The Power Generation Advisory Panel's recommendations on siting, interconnection, and energy delivery to address these barriers.NYSERDA should continue to evaluate its procurement programs for effectiveness to ensure continual, swift, progress is being made.

Enabling initiative – Initiative #1: Components of the strategy

Components required for delivery	Implementation lead	Time to implement	Other key stakeholders
Continue to evaluate and adjust policies and procurement targets as necessary in order to achieve the CLCPA targets.	DPS/NYSERDA	Ongoing	PSC, DEC, Utilities, Renewable Energy Developers, siting communities
Continue to support successful programs and regulatory changes, such as Build Ready and The Accelerated Renewable Energy Growth and Community Benefit Act through funding and hiring adequate staff in the Office of Renewable Energy Siting and other relevant State Agencies (NYSERDA, DPS, DEC, etc.)	DOB	Ongoing	DPS, DEC, NYSEERDA, ORES, Utilities, Renewable Energy Developers
Identify key transmission and distribution upgrades, improvements, and new line construction needed to deliver renewable energy from where it is built, to where it is needed.	DPS/NYSERDA	ASAP	PSC, DEC, NYISO, Utilities, Transmission Developers, renewable developers, innovation companies
Establish a non-binding metric/goal for the Office of Renewable Energy Siting (ORES) with respect to megawatts of renewable energy which should be permitted each year, based on what is required to reach 70% renewables by 2030.	ORES	ASAP	

Enabling initiative – Initiative #1:

Benefits and impacts

Anticipated Benefits and Impacts

Disadvantaged communities

Ensuring the delivery of community benefits from siting of renewable generation (See Community Benefits Recommendation) and closing of fossil fuel plants in disadvantaged communities will alleviate undue burdens on disadvantaged communities. In addition, electrification will cause significant load growth between now and 2040. Without sufficient buildout of large-scale renewables, continued reliance on fossil fuel-fired facilities will be needed and emissions will not decrease.

Health and other co-benefits

Aggressive deployment of renewable technologies and upgrades and construction of transmission and distribution systems will make it possible to close fossil fuel generation facilities, improving air quality and decreasing emissions. In 2016, in-state fossil fuel combustion accounted for 163.47 MMtCO₂e (80% of all state emissions).

Just transition: businesses and industries, workers

Increases in jobs available in renewable energy system and transmission construction, as well as operation and maintenance of these systems.

Other

Enabling initiative – Initiative #2: Clean Energy Siting & Community Acceptance

Description:	Support the development and use of information and resources for local communities to make beneficial decisions about renewable energy projects in their community.
Action type:	Executive, Regulatory
Cost and funding considerations:	\$\$; NYSERDA's Clean Energy Communities program could be leveraged for some activities, but the State should also seek federal funding from the administration's stimulus and infrastructure bills. Community credit subsidies.
Ease of implementation:	Medium - Hard
Example case studies:	Scenic Hudson's Roadmap to a Clean Energy Future, Long Island Solar Roadmap, Tompkins County, NYS Geographic Information System, NY Solar Map, WindExchange.Energy.gov, NYC Community Energy Planning Tool, Temiscouata and Apuiat Wind Farms, NYCHA and Brooklyn Army Terminal RFP's

Risks / Barriers to success	Possible mitigants
<ul style="list-style-type: none"> Efficient processes for installing renewable energy projects and for upgrading the local transmission and distribution networks will be necessary to effectively deploy renewables. Local community opposition for projects if benefits are not realized locally. 	<ul style="list-style-type: none"> Strong community communication, engagement, and public outreach will be important for these projects to be possible.

Enabling initiative – Initiative #2: Components of the strategy

Components required for delivery	Implement- ation lead	Time to implement	Other key stakeholders
Clean Energy Development			ORES, NYSERDA, DPS, DEC, DOS, AGM, Utilities, NYISO, Renewable Energy Developers, Transmission and Distribution System Operators, municipalities and local communities
Research and incentive viability agrivoltaics to integrate into the agricultural community and provide habitat improvement for threatened and endangered species.	NYSERDA	ASAP	
Develop a Clean Energy Development Mapping tool to help municipal representatives and local communities make informed land use decisions, and communicate local wants to developers.	NYSERDA	ASAP	
Offer NYS support and funding for Regional Planning Associations to assist municipalities in planning for renewable energy development.	NYSERDA	ASAP	
Refine NYSERDA process/evaluation and incentivize for "buildable projects".	NYSERDA	ASAP	
Study and advise communities how to best implement options for decommissioning of community owned projects at the end of their production life.	NYSERDA	ASAP	
Public Education and Outreach			
NYS should launch a statewide public education campaign to inform New Yorkers about the climate crisis and the benefits of shifting to a clean energy economy.	NYSERDA	ASAP	
Equity & Local Community Benefits			
Ensure community benefits and avoided costs are tracked in dollars.			
Allow all NYPA customers to benefit from electric utility value stack NYS-wide.	PSC/DPS	ASAP	
Determine who needs benefits and then create municipal/cooperative structures in disadvantaged communities. Examine laws regarding cooperatively owned enterprises and establish consumer protections in this new market.		ASAP	

Enabling initiative – Initiative #2: Components of the strategy

Components required for delivery	Implement- ation lead	Time to implement	Other key stakeholders
Equity & Local Community Benefits (cont'd)			
Make host community benefits more robust and targeted (ex. NYSERDA's Host Community Billing Program)	NYSERDA	ASAP	NYSERDA, DPS, DEC, DOS, Utilities, NYISO, Renewable Energy Developers, Transmission and Distribution System Operators, municipalities and local communities
Empower local governments to take a leadership role in educating the community in clean energy.	NYSERDA/DOS	ASAP	
Provide funding for non-profits and community-based organizations to do education and outreach about clean energy benefits.	NYSERDA/DPS	ASAP	
Expand and streamline incentives for energy efficiency, including funding for customers based on utility payment history instead of credit scores.	NYSERDA/DPS/ Utilities	ASAP	
Invest in local weatherization assistance and energy efficiency programs. Enable host towns to speed up rural broadband expansion.		Ongoing	
Incentivize local "climate resilience hubs", a central location that has solar + storage and becomes a location the community gather during power outages.		ASAP	
Improve NYC DCAS for more renewable energy projects. - loan loss reserve program - LMI community subscriber benefits program	NYSERDA	ASAP	
Commercial Rooftop & Parking Lot Solar			
Conduct further analysis that looks for ways to build economic/incentive structures to increase development of commercial rooftop and parking lot solar installations paired with storage.	NYSERDA	Ongoing	

Enabling initiative – Initiative #2:

Benefits and impacts

Anticipated Benefits and Impacts

Disadvantaged communities	These will provide municipalities, local communities, and disadvantaged communities valuable information and resources to make beneficial decisions about renewable energy projects in their communities. Municipalities, local communities, and disadvantaged communities will also have more control over local land use and development. Local renewable energy projects could provide utility cost savings, local infrastructure development, and job opportunities.
Health and other co-benefits	Aggressive deployment of renewable technologies and upgrades and construction of transmission and distribution systems will make it possible to close fossil fuel generation facilities, improving air quality and decreasing emissions.
Just transition: businesses and industries, workers	Local renewable energy projects could provide utility cost savings for businesses, local infrastructure development opportunities, and job opportunities for local workers.
Other	

Enabling initiative – Initiative #3: Distributed Generation / Distributed Energy Resources

Description:	By generating smaller amounts of clean electricity closer to end-users, we can increase energy efficiency, reduce carbon pollution, improve grid resiliency, and potentially curtail the need for costly transmission investments.
Action type:	Procurement, Regulatory
Cost and funding considerations:	\$\$
Ease of implementation:	Medium
Example case studies:	

Risks / Barriers to success	Possible mitigants
<ul style="list-style-type: none">• An efficient process for installing DG/DERs (procurement, siting, interconnection, construction) and for constructing and upgrading the delivery system is necessary.• Local community opposition for projects if benefits are not realized locally.	<ul style="list-style-type: none">• Focus on “high benefit” projects and programs that serve local communities, including dual-use solar/ag, affordable multifamily housing, and landfills/brownfields, and continue to invest in energy delivery.• Regional discussion forum(s) between local communities and those involved in the projects to have dialogue and understand everyone’s perspective.

Enabling initiative – Initiative #3: Components of the strategy

Components required for delivery	Implementation lead	Time to implement	Other key stakeholders
Hosting Capacity: Proactive and timely investments in local transmission and distribution infrastructure, and associated cost-sharing/allocation associated with the utilities in these upgrades. Accelerate adoption of innovative technologies and programs that increase hosting capacity such as flexible interconnection, hybrid systems and coupling with energy storage or controlled load, smart inverters, and solutions that enable maximum back feeding at substation level from distribution to transmission as part of local transmission and distribution planning process.	PSC/DPS, NYSERDA	ASAP	NYISO, NYSERDA, developers, transmission & distribution operators, communities, DEC, DOH, DOT
Interconnection: Address pace of processing interconnection applications and need for right-sizing human resources at utilities to mitigate delays in application processing.		Ongoing	
Rate Design: Consider need for dynamic underlying electric rate structures and programs(e.g., dynamic load management) that provide appropriate price signals to customers to incentivize DER deployment and usage.		Ongoing	
Compensation: Address improvements to VDER stack to more accurately reflect value provided by DERs incorporating the social cost of carbon calculation and avoided transmission costs.		Ongoing	

Enabling initiative – Initiative #3:

Components of the strategy

Components required for delivery	Implementation lead	Time to implement	Other key stakeholders
Incentives: Target incentives to stimulate high-benefit DER projects (dual-use solar/ag, multifamily housing, heat pumps/geothermal, collective solar projects) and paired with electrification serving LMI and EJ communities. Expand NYSERDA's Solar Energy Equity Framework programs; Low Income Community Solar Concept and Adder for Inclusive Community Solar Projects.	PSC/DPS, NYSERDA	Ongoing	NYISO, developers, transmission & distribution operators, communities, DEC, DOH, DOT
Ground-Mounted Siting: Address resistance and concerns to siting of ground-mounted projects, particularly upstate and western NY.	NYSERDA	Ongoing	
Rooftop and Parking Lot Solar Permitting: Need for streamlined permitting process across authorities having jurisdiction that reduces processing times and soft costs.	DOS/NYSERDA	Ongoing	
Codes: Provide model zoning ordinances to municipalities for residential/commercial properties to require new construction be designed as "solar-ready".	DOS/NYSERDA	Ongoing	
Resources & Education: Create or expand on regional discussion forums, between NYS, local communities, and projects to connect communities with resources, information, and address local concerns.	NYSERDA	Ongoing	
Aggregations: Encouraging aggregations of distributed resources will provide additional value for grid management	PSC/DPS, NYSERDA	ASAP	

Enabling initiative – Initiative #3:

Benefits and impacts

Anticipated Benefits and Impacts

Disadvantaged communities

DG/DER is a primary way (alongside energy efficiency) to meet the social equity requirements of the CLCPA. Renewable energy from DG/DERs sources can help addressing reliability needs and air quality issues from the closing of fossil fuel facilities in EJ communities. If properly developed, clean DG/DER projects can also allow communities to participate in the process, provide economic development and workforce development opportunities, and bolster resiliency.

Health and other co-benefits

Deployment of clean DG/DERs and upgrades to energy delivery systems will make it possible to close fossil fuel generation facilities, improving air quality and decreasing emissions.

Just transition: businesses and industries, workers

Development and jobs for renewable energy systems, transmission construction, and operation and maintenance of these systems.

Other

Enabling initiative – Initiative #4: Existing Storage Technology

Description:	The State developed a 3GW goal for energy storage in the 2018 energy storage roadmap based on a 50% renewable target for 2030. 70% renewables and the transition to a carbon-free grid requires higher levels of energy storage as exemplified in the recent Power Grid Study identifying a need for >15GW.	
Action type:	Legislative, Regulatory, Executive	
Cost and funding considerations:	\$\$; Potential to expand NYSERDA's existing Market Acceleration Bridge Incentive program.	
Ease of implementation:	Medium (rapid deployment and scaling)	
Risks / Barriers to success		Possible mitigants
<ul style="list-style-type: none"> • Deployment needs are greater than initially envisioned and existing program are likely insufficient to meet expanding need. • Buyer-side mitigation (BSM) rules in NYISO Capacity Market • NYISO and Utility interconnection study methods • Limitations in the NYISO and Utility interconnection study methods 		<ul style="list-style-type: none"> • Eliminate BSM for CLCPA resources. • Future programs considered should be harmonized with BSM and how it might change in the future such that access to the capacity market for these resources is maximized. • Public outreach, community engagement, and addressing host community concerns will be important for success of these projects.

Enabling initiative – Initiative #4:

Components of the strategy

Components required for delivery	Implementation lead	Time to implement	Other key stakeholders
Update State's Energy Storage Roadmap, as soon as practicable, to update and revise storage deployment goals recognizing the substantially higher requirements identified in the Power Grid Study.	NYSERDA	ASAP	DPS, developers, NYISO
Provide increased funding for energy storage deployment. The State should initiate a new docket that establishes new binding targets and creates a dedicated funding mechanism similar to the clean energy standard for storage as soon as practicable and no later than the end of 2022.	PSC	ASAP	DPS, NYSERDA, developers
Expand CES to better integrate storage.	NYSERDA	ASAP	DPS, developers, utilities
Incorporate energy storage into energy delivery and transmission planning	NYSERDA/DPS	ASAP	NYISO, utilities
Further refined modeling of the future grid is needed to evaluate the potential system reliability needs anticipated for the future grid. The modeling should identify the need for storage resources with longer durations that may develop with technology innovation, to show the true breakdown of potential storage vs. fully dispatchable generation needs.	NYSERDA	Ongoing	DPS, NYISO, utilities, developers
Incentives for companies that provide systems sufficiently tested for the higher safety standards required in urban environments such as NYC.	NYSERDA	ASAP	DPS, developers, utilities
Continued work with NYISO on market enhancements that facilitate the resource transition, support investment, minimize costs to consumers, eliminate BSM for CLCPA resources, and meet reliability. Future programs should be harmonized with BSM and how it might change in the future such that access to the capacity market for these resources is maximized	NYSERDA/DPS	Ongoing	NYISO, utilities, developers

Enabling initiative – Initiative #4:

Benefits and impacts

Anticipated Benefits and Impacts

Disadvantaged communities	Increased energy storage deployment can reduce peaker plant usage and decrease health impacts on disadvantaged communities.
Health and other co-benefits	Aggressive deployment of these technologies will it make possible to reduce peaker plant dependence and close fossil fuel generation facilities, thereby improving air quality and decreasing emissions.
Just transition: businesses and industries, workers	Growth and career paths for new workers who want to enter this new field and incumbent energy workers who are looking to transition. Development and jobs for renewable energy systems, transmission construction, and operation and maintenance of these systems.
Other	Will need large scale testing and demonstration ensure these new assets work properly on the existing grid.

Enabling initiative – Initiative #5: Demand Side

Description:	Analyze and appropriately model responsive demand as part of future generation and energy supply. Consider those modeled impacts on costs and timelines of power generation by decade and incorporate into system planning. It is imperative that flexible, responsive loads are analyzed and modeled appropriately to optimize for the lowest system cost and the most expeditious deployment of both clean supply and demand solutions.	
Action type:	Executive, Regulatory	
Cost and funding considerations:	\$; The potential costs must be thoroughly analyzed and evaluated through the lens of avoided grid upgrade costs as well as health and economic benefits, especially for disadvantaged communities. Funding sources could come from NYSERDA, expanded federal Weatherization Assistance Programs and clean energy programs.	
Ease of implementation:	Medium	
Risks / Barriers to success		Possible mitigants
<ul style="list-style-type: none">Successful implementation will require a vision, commitment and directive from the state to structure a broad and long-term collective effort from all parties, adequate funding, transparency and education.		

Enabling initiative – Initiative #5:

Components of the strategy

Components required for delivery	Implementation lead	Time to implement	Other key stakeholders
Complete a study on avoiding or reducing grid upgrade costs with such things as demand response and the use of geothermal, including district thermal systems, especially downstate, with a focus on low and moderate income individuals and disadvantaged communities.	DPS, Utilities, NYSERDA	Ongoing	PSC/DPS, NYSERDA, NYISO, local governments, contractors and community-based organizations especially those that provide Weatherization Assistance Programs.
Identify and make available key pieces of data needed for markets to facilitate the clean energy transition is real-time marginal, average emissions, and/or zonal resource/fuel mix data, as needed from NYISO and as defined by NYC and pert. State Agencies (a number of assumptions including for imports and exports from other RTO/ISOs must be determined) to facilitate cost-effective implementation of the CLCPA, LL97, and to improve VDER values and demand response programs.	PSC/DPS, NYISO, NYSERDA	ASAP	
Prioritize state and federal appliance standards. Adopt State equipment standards (or advocate for the federal government to adopt standards) that require a universal, standardized communication protocol in electric and heat pump water heaters, as well as in space heating heat pumps, EVs, and in-home batteries.	NYSERDA	Ongoing	
Develop standards to enable “opt out” programs rather than “opt in”. Make demand flexibility programs opt-out, not opt-in as long as standards are developed to ensure that customers would reap savings on their bills and service delivery is not reduced.	PSC/DPS	Ongoing	

Enabling initiative – Initiative #5: Components of the strategy

Components required for delivery	Implementation lead	Time to implement	Other key stakeholders
Rethink cost-benefit tests. In order to accurately assess the true value of EE and demand response while complying with the CLCPA, the PSC should reopen the generic BCA proceeding to update costs and benefits, including CLCPA compliance costs (carbon and other environmental impacts), important non-energy benefits (localized health impacts, equity, etc.), and inclusion (or lack thereof) of customer cost contributions.	PSC/DPS	ASAP	PSC/DPS, NYSERDA, DEC, NYISO, local governments, contractors and community-based organizations especially those that provide Weatherization Assistance Programs.
Ensure that energy storage does not face double rules and unfair charges. NYS should consolidate its permitting rules for energy storage so they can be evaluated in one process. Utility commissions should reexamine their tariffs on energy storage resources and ensure they are applied fairly.	PSC/DPS	ASAP	
<p>Prioritize under-resourced communities.</p> <ul style="list-style-type: none"> - Utilities should engage the community and partner with CBOs to learn about communities and identify needs and shared objectives. - New funding should be directed toward low-income and disadvantaged communities and existing funds should be made more accessible. - In planning for a sustainable future, NYS should work with communities to ensure appropriate metrics to track program success and partner with local governments to establish appropriate consumer protections. 	PSC/DPS, Utilities, NYSERDA	ASAP	

Enabling initiative – Initiative #5:

Benefits and impacts

Anticipated Benefits and Impacts

Disadvantaged communities

The concentration of the dirtiest peaking plants in zones J and K, sited in disadvantaged communities, provides an opportunity to back down that generation in the near term through efficiency and load responsiveness, while transmission and large-scale renewables get built to serve downstate. Targeting EE and DR in disadvantaged communities is an opportunity to provide these communities with ownership of clean energy solutions that will provide benefits at the household, utility, and community level. Greater investment should be paired with tracking and transparency around spending and benefits for disadvantaged communities. EE, DERs, and load flexibility are effective avenues for EJ communities to own clean energy solutions that provide benefits at the household, utility, and community levels.

Health and other co-benefits

Reducing demand through efficiency, and creating demand flexibility, especially downstate, will yield large GHG and criteria pollutant reductions/health benefits in the near term due to the current grid mix.

Just transition: businesses and industries, workers

Scaling up investments in dynamic load management and energy efficiency will create jobs in the part of the clean energy sector with the most growth potential. Energy efficiency and load management implementation will help businesses reduce energy costs.

There will be power sector benefits from investing in demand reduction in fossil fuels through increased building efficiency (through weatherization), to reduce gas supply pressures in winter, and avoid dual-fueled peakers switching to oil during gas peaks.

Other

Enabling initiative – Initiative #6: Reliability for the future grid

Description:	Generation resources combined with the transmission and distribution systems, control centers, and wholesale markets provide a continuously operating, reliable system to service New York's electric needs. All of these elements will need to transition and come together effectively to manage the transitioning grid to provide continuity of a reliable power system, while implementing the CLCPA. The recommendations to implement and achieve the CLCPA must support the high reliability standards in place in NY by implementing improvements and enhancements where needed and sustaining the practices that provide high quality electric service. If properly integrated the additional clean distributed generation, storage and large-scale renewables which the CLCPA will provide will help to build a more flexible and resilient grid to address and mitigate the impacts of climate change.	
Action type:	Executive, Regulatory	
Cost and funding considerations:	\$; The costs of establishing an effective process to complete the necessary reliability reviews are minimal. Funding sources for investment include recovery through electric rates, wholesale market revenues, state and federal infrastructure funding.	
Ease of implementation:	Easy – The process for ensuring reliability is well established	
Risks / Barriers to success		Possible mitigants
<ul style="list-style-type: none">Achievement of the CLCPA mandates must progress with a continued eye on reliability and as issues arise, solutions must be identified and implemented timely to ensure that both reliability needs and CLCPA mandates are met.Transmission constraints limit the flexibility of the grid and will make it more challenging to integrate new resources. Constraints between upstate and downstate (particularly zone J) is a current barrier to reliability which needs to be addressed.Solving the reliability issues will be a challenging but necessary part of a successful transition.		<ul style="list-style-type: none">Effective communication processes across the multitude of agencies and organizations that support reliability.Enhancing market rules so that all resources can participate in the market, based on their attributes, to provide the products and services needed for reliability.Increased transmission is needed in order to mitigate the scope and scale of reliability challenges; helping to address the need for peakers and lowering the downstate local capacity requirements.

Enabling initiative – Initiative #6: Components of the strategy

Components required for delivery	Implement- ation lead	Time to implement	Other key stakeholders
Established biennial checkpoints should be conducted to assess the state of bulk power system reliability in consultation with the federally designated electric bulk system operator (NYISO) and the state and federally jurisdictional entity the New York State Reliability Council (NYSRC). These checkpoints will ascertain if any program adjustments are needed to ensure continued safe and adequate electric service and will be informed by the review of NY power system performance in conformance with established operations requirements and by relevant studies including the NYISO's Reliability Needs Assessment.	PSC/DPS	Ongoing	PSC, DPS, NYISO, Utilities, NYSRC, FERC, Generators, Transmission Developers, NYSERDA (Climate Assessment)
Power system studies and planning should consider analyses to integrate climate change impacts as needed for reliability and resiliency. Studies will need to reflect that risks and reliability challenges will change through time due to the impacts of climate change and the changes to the power system.	PSC/DPS	Ongoing	
To the extent any changes are proposed within the Scoping Plan that could alter the current regulatory structure and statutory approach to meeting reliability in NY, input and review must be solicited by the DPS, the NYISO, the NYSRC, and the Utilities	PSC/DPS	ASAP	
Actions needed to ensure reliability while working to achieve CLCPA will additionally be reflected in the State Energy Plan.	PSC/DPS/ NYSERDA	Ongoing	
Continued efforts to improve reliability and resiliency to extreme weather events, which will be exacerbated by climate change, should occur. This work should include continued infrastructure investment such as: storm hardening, elevating equipment and substations, and moving lines underground. Additionally, design criteria must change through time and reflect the impacts of climate change as needed. Given the impacts of storms on communities, investment in community outreach to provide effective communication and support from the time of storm preparation through restoration must be made.	Utilities	Ongoing	
The market products, requirements and technology standards needed to maintain reliability should be updated through time so that all resources can participate in the market, based on their attributes, to provide the products and services needed for reliability. Undue costs should not be imposed which would impair meeting CLCPA goals, including creating barriers to renewables. Reliability needs and risks will change through time and the markets should reflect these changes as well.	NYISO	Ongoing	

Enabling initiative – Initiative #6:

Benefits and impacts

Anticipated Benefits and Impacts

Disadvantaged communities

Affordability is a real concern for disadvantaged communities. However, power outages have a disproportionate impact on disadvantaged communities because they are less able to afford measures to mitigate the human safety and health risks or recover from the potential loss of property. Now and continuing into the future, disadvantaged communities should be prioritized in terms of restoration of service.

Health and other co-benefits

Prevention of the high costs and consequences of electric service interruptions in New York, including exposure to extreme cold or heat and loss of property.

Just transition: businesses and industries, workers

Prudent steps to ensure a reliable power system are necessary to support businesses, industry and workers. New York cannot afford a decrease in the reliability of the electric grid, which is already challenged under current conditions. Additionally, poor power quality can negatively impact industrial processes. The clean distributed generation investments required by the CLCPA (e.g., rooftop solar, community solar, EE/DG and storage) can also provide much needed clean generation for, reduced energy costs and investments in disadvantaged communities.

Other

Enabling initiative – Initiative #7:

Access and Affordability for All

Description:	Prioritize helping low-income utility customers and disadvantaged communities, while also assuring that these communities will be able to afford and fully benefit from the State's transition to electrification	
Action type:	Executive, Regulatory	
Cost and funding considerations:	\$\$; Federal Relief funds should be first, directed to equity related costs to help with the implementation associated with these recommendations	
Ease of implementation:	Medium (there are fiscal/unknown costs that must be accounted for)	
Example case studies:	DPS' Low-Income Affordability Program (Case: 15-M-0565), NYC's Energy Cost Savings Program for small businesses	
Risks / Barriers to success		Possible mitigants
<ul style="list-style-type: none"> Expanding the PSC's Low-Income Affordability Program could result in higher rates for non-eligible customers. The State's ability to project how much financial support will be adequate while assuring that low-income customers will not surpass the 6% energy burden during the transition to electrification. With regards to efforts to modify financial assistance programs, such as HEAP, there is a concern that tenants will be unable to achieve certain benefits associated with changes to these programs, if their landlord does not prioritize making such technology upgrades and renters usually do not have control over their fuel source. State budget pressures could make it difficult to create new positions. 		<ul style="list-style-type: none"> Examine and monitor whether existing utility financial assistance programs are reaching all eligible customers who need help affording their energy bills, while also modifying such programs to adequately support the electrification and energy efficiency. Complete a study on avoided grid upgrade costs with energy efficiency, demand response, and the use of geothermal downstate, with a focus on low-moderate income individuals. Re-assigning existing State staff roles and duties could ameliorate the need to hire a new position & Agency coordination.

Enabling initiative – Initiative #7: Components of the strategy

Components required for delivery	Implementation lead	Time to implement	Other key stakeholders
Continually examine and monitor PSC's Low Income Affordability Program and ensure that all low-income utility customers are identified and utility discounts are reflective of low-income utility customers' actual income levels.	DPS	Ongoing	
Improved coordination of State agencies and expansion of pilots and programs to assist small businesses with the transition to electrification	NYSERDA, OTDA	Ongoing	ESD, DAM, DPS, DOH
Modify the Home Energy Assistance Program (HEAP) to help encourage electrification, energy efficiency, and reduce continued use of fossil fuels for both tenants and homeowners	OTDA, NYSERDA	ASAP	
Increase access to energy efficiency and low-income customer support programs	OTDA, NYSERDA	Ongoing	DOH, HCR
Consider studying alternative rate structures as a means of protecting low-income, disadvantaged communities and small businesses from large cost shifts	PSC/DPS	ASAP	
Increase consideration of equity and environmental justice in PSC decision-making by appointing a lead at DPS specifically for Equity and Environmental Justice and providing intervenor funding for nonprofits and CBOs. This position should also interact with existing equity and environmental justice programs at other State agencies.	PSC/DPS	ASAP	
Study how to avoid grid upgrade costs with energy efficiency and investment in downstate NY, with a focus on geothermal and Long Island	NYSERDA/DPS	ASAP	
Coordination across State Agencies is essential.	OTDA	Ongoing	NYSERDA, DOH, ESD, DAM, DPS

Enabling initiative – Initiative #7: Components of the strategy

Components required for delivery	Implementation lead	Time to implement	Other key stakeholders
The New York State Department of Public Service should be open to alternative rate structures as a means of protecting low-income, disadvantaged communities and small businesses from large cost shifts.	DPS	Ongoing	NYSERDA
Appoint a lead at the New York State Department of Public Service specifically for Equity and Environmental Justice to better incorporate environmental justice and equity concerns into the Commission’s decision-making process by creating a new senior position to coordinate that work.	DPS	ASAP	
Implement intervenor funding for nonprofits and community-based organizations (“CBOs”) who work on DPS, NYSERDA, NYISO cases, matters and proceedings. Intervenor funds will help support the nonprofits and CBOs who are actively advocating on behalf of low-income individuals and disadvantaged communities, providing an important balance in such proceedings and programs.	DPS, NYSERDA	Ongoing	OTDA, DOH, HCR
Develop a comprehensive and publicly available accounting system to track the spending and the actual benefits of state spending pursuant to CLCPA. Definition of benefits should cover positive outcomes associated with costs and spending, and include benefits to businesses, investors, and other market actors as well as those flowing to ratepayers and disadvantaged communities. To the extent possible, accounting should distinguish between funding designed to help accrue benefit members of disadvantaged communities, and the actual benefit realized by members of these communities.	DEC, NYSERDA	ASAP	ESD, DPS, OTDA, DOH, HCR
Publish yearly reports on allocation of benefits, both in terms of program scale and actual implemented benefit and establish remediation plans for non-attainment of 40% minimum allocation of benefits.	DEC, NYSERDA	ASAP	ESD, DPS

Enabling initiative – Initiative #7:

Benefits and impacts

Anticipated Benefits and Impacts	
Disadvantaged communities	<p>Provides economical support to low-income customers so they can afford the transition to electrification</p> <ul style="list-style-type: none">• The benefits of energy efficiency is also a central element that when paired with direct assistance, will be tremendously helpful for low-income individuals to control their energy costs.• The State’s work will continue to include prioritizing building electrification with a focus on the low-income and disadvantaged communities.
Health and other co-benefits	<p>Emissions reductions from implementation of the CLCPA will be seen on an aggregate statewide basis, but it will be important to triage implementation to assist Clean Air Act non-attainment areas and emissions Environmental Justice areas first and most deeply.</p> <p>Efforts to support low-income communities so that they can afford full electrification will result in positive health benefits.</p>
Just transition: businesses and industries, workers	<p>If not instituted carefully, the cost of energy for businesses may become uncompetitive and prove economically difficult for high energy-using industries to afford.</p>
Other	<p>Access and affordability to clean energy programs, energy efficiency, and other assistance programs improves living and housing conditions.</p>

Enabling initiative – Initiative #8: Workforce Development

Description:	Make it a priority to provide education and career opportunities for individuals with a focus on disadvantaged communities to enter the clean energy industry. Ensure a just transition for people currently employed in fossil industries so their needs are met.	
Action type:	Executive	
Cost and funding considerations:	<ul style="list-style-type: none"> • \$\$; HS/College technical training is approx. \$6-10K/student based on past program data. • Federal Relief funds should be first, directed to equity related costs. • Expand the NYS Fossil Fuel Plant Closure fund and specifically target funds for worker transitions and supporting lost taxes in communities. 	
Ease of implementation:	Easy	
Risks / Barriers to success		Possible mitigants
<ul style="list-style-type: none"> • Campaigns work best when they originate in the communities themselves and interest tends to be reduced when programs try to bridge income classes. • This type of recruitment and job training for private solar companies is a year-round commitment and a significant investment to get a person ready. • Will need to engage with companies that may be potentially put out of business and convince them to allow their workforce to be retrained in other skills. 		

Enabling initiative – Initiative #8: Components of the strategy

Components required for delivery	Implementation lead	Time to implement	Other key stakeholders
Establish continuing education, certifications, and licensing in trades and professions for current fossil fuel workers. Work with companies to help transition their workforce to building operations and maintenance, design, construction, and real estate professionals and into clean energy jobs. Partner with NYS agencies (NYSERDA, DOL, etc.) to work with unions to ensure they are aware of project bid opportunities.	NYSERDA	ASAP	NYS Energy/Labor/Social Service/Edu Agencies, K-12 schools, vocational/technical & higher education, education & workforce development non-profits, fossil fuel & energy companies, renewable energy companies, construction/repair/buildings businesses
Leverage RFPs from the public sector agencies for clean energy and workforce development. (ex. Solarize Brownsville)	NYSERDA	Ongoing	
Scale up training and workforce opportunities for new clean energy workers and in LSR siting locations with preferences in training and job placement to priority populations. Emphasize these principles within RFPs.	NYSERDA	Ongoing	
Create community-to-employment pipelines and career pathways and prioritize individuals in disadvantaged communities. Ensure a clear ladder/pathway to secure jobs and careers with family sustaining wages and labor unions, where possible.	NYSERDA	ASAP	
Scale up strategic partnerships in education/outreach efforts with an emphasis on disadvantaged communities and provide state agency coordination with various benefit programs in a "one stop shop" that prioritizes LMI communities.	NYSERDA	Ongoing	
Focus on businesses and job opportunities around not only installation, but also manufacturing and the entire supply chain. Engage with clean energy providers to evaluate current and future workforce needs. Align training with industry needs and potential jobs, including consideration of needs by geographical areas, to develop a successful pipeline.	NYSERDA	Ongoing	

Enabling initiative – Initiative #8:

Components of the strategy

Components required for delivery	Implementation lead	Time to implement	Other key stakeholders
Create opportunities for Minority and Women Owned businesses and in disadvantaged communities to gain a foothold in the industry and work up the value chain. Increase ranks of MWBEs, coops., employee-owned businesses, community projects through capacity building and business development support.	NYSERDA	ASAP	NYS Energy/Labor/ Social Service/Edu Agencies, K-12 schools, vocational/technical & higher education, education & workforce development non-profits, fossil fuel & energy companies, renewable energy companies, construction/ repair/ buildings businesses
Require labor standards such as Prevailing Wage, PLA's and use of accredited apprenticeship programs to ensure that the jobs are long lasting careers for NY residents that live in the local communities hosting renewable industries	NYSERDA	ASAP	
Enhance Climate and Clean Energy/decarbonization curricula in State-funded education in K-12, technical schools, BOCES programs, CUNY/SUNY, engineering and architecture programs at universities. Increase investment in STEM education curricula within K-12 student populations from disadvantaged communities to facilitate entry into targeted career pathways (eg. wind, solar, building decarbonization, etc.). Leverage BOCES, CUNY/SUNY education platforms and job placement opportunities in their programs. Ensure an 'all government approach' by obligating the state education department, SUNY, the Department of Labor, NYSERDA and other relevant agencies to help design, implement and resource the above-referenced efforts.	NYSERDA	Ongoing	

Enabling initiative – Initiative #8:

Benefits and impacts

Anticipated Benefits and Impacts

Disadvantaged communities

Open community career pathways/workforce development through education, skills and training in clean energy can provide much needed education, skills and training to communities and open career pathways. Develop business opportunities for MWBEs and community development.

Health and other co-benefits

Helping to ensure a strong and vibrant clean energy workforce will facilitate the opportunities to expand deployment of renewable energy technologies. This will help to more quickly shutdown fossil fuel generating facilities, improving air quality in communities that host these facilities.

Just transition: businesses and industries, workers

Provides businesses and workers increased transition opportunities to clean energy industries.

Other

Enabling initiative – Initiative #9: Market Solutions

Description:	Markets that incentivize resources with the desired attributes, provide optimal reliable grid management, and are sufficiently flexible to allow for technology innovation will help achieve the CLCPA objectives, while ensuring benefits for, and reducing impacts on, disadvantaged communities.	
Action type:	Regulatory, Executive	
Cost and funding considerations:	\$	
Ease of implementation:	Medium	
Risks / Barriers to success		Possible mitigants
<ul style="list-style-type: none">Will require several forward-looking market designs and the implementation of each design must be structured in a way that sends the correct price signal at the appropriate time		<ul style="list-style-type: none">Coordination across DPS, NYSERDA, the NYISO, and utilities.

Enabling initiative – Initiative #9: Components of the strategy

Components required for delivery	Implementation lead	Time to implement	Other key stakeholders
Expand wholesale market eligibility participation rules for new policy resources. The NYISO is in the process of implementing the first part of a Hybrid Storage Model, where hybrid resources will be allowed to participate as two separate resources located at the same site. The current expectation is for a second potentially more versatile “Aggregated” model market design in 2021. The NYISO is also working on a Distributed Energy Resources (DER) Participation Model. The NYISO is working toward but has not yet implemented a full wholesale DER market design. The NYISO should make changes consistent with FERC Order 2222 requirements.	NYISO	Ongoing	PSC, NYSERDA, Utilities, Suppliers
Continue assessing opportunities to improve accuracy and granularity of wholesale market energy price signals, including shortage pricing, congestion relief, and peak/off-peak pricing. Inclusion, and valuation, of ancillary market services will need to be evaluated in the context of integrating increasing quantities of renewable resources and other products.	NYISO	Ongoing	
Adapt current ancillary service market designs and look to add products that are needed to incent flexibility as needed to efficiently integrate renewables. The NYISO supports markets for energy, ancillary services, and capacity. The fundamental relationship among these markets will likely need to evolve. For example, more revenue will likely shift to ancillary service markets over time as system needs are reevaluated in the context of integrating increasing quantities of renewable resources. Be proactive in developing new products needed, however they should be structured properly to only reflect current system needs to not cause unnecessary costs. A balancing act is needed between developing the products and services of the future while not implementing changes before they are needed.	NYISO	Ongoing	

Enabling initiative – Initiative #9: Components of the strategy

Components required for delivery	Implementation lead	Time to implement	Other key stakeholders
<p>Expand Demand-Side Opportunities and Opportunities for Flexible Resources. It is anticipated that demand response resources will play a more critical reliability role in the future as the grid becomes more electrified and the load shape shifts. Demand Response can also supply some amount of needed system flexibility without emitting carbon which is consistent with the 2040 CLCPA policy objective. There should be a holistic evaluation of both wholesale and retail demand response programs to identify gaps and opportunities for new programs or program changes to meet the needs of a changing grid. As the grid evolves with State policy, it will become more important that incentives are adequate for the participation of flexible resources in the real-time (RT) energy market. An efficient RT market can create opportunities for resources to compete and meet rapidly changing system needs. The NYISO is evaluating prospective changes to the energy market in the context of its Grid in Transition project.</p>	NYISO/DPS	Ongoing	NYSERDA, Utilities
<p>Improve access for Distributed Resources and continue improvements to cost causation retail rate price signals. Continue to promote and improve VDER- Rate Design. Continued innovation in DSM and DER programs, with a focus on expanding utility customer enrollment and performance. Continue to promote and improve Standby rates. Increase deployment and efficient use of Distributed Energy Resources (DER) - Continue design and implementation of Distributed System Platforms (DSP) and markets for DER products and services.</p>	DPS	Ongoing	NYSERDA, Utilities, Suppliers

Enabling initiative – Initiative #9: Components of the strategy

Components required for delivery	Implementation lead	Time to implement	Other key stakeholders
Determine most effective approach to Incorporate Environmental Values in Market Pricing and/or in Policy and Investment Benefit Cost Analysis. Consider Improvements to current State Programs to incent CLCPA resources through mechanisms such as Renewable Energy Certificates, Offshore Wind Renewable Energy Certificates, and storage solicitations. Consider Changes and/or Augmentation to RGGI program to more fully reflect the cost and impact of emissions as represented in NY policy. Consider if (Electric Only) Carbon Pricing in the Wholesale Markets will help achieve the CLCPA mandates, including a more rapid increase in renewable and storage build out and a transition of the fossil fleet. If Carbon Pricing is not adopted, consider alternate mechanisms to fully enable Wholesale Markets to support the grid transition. Consider if an Economy-wide Carbon charge will help achieve the CLCPA mandates. Consider a Clean Dispatch Credit for emission-free, fully dispatchable assets that dispatch during peak load times.	DPS	Ongoing	NYSERDA, DEC, Utilities, Suppliers, NYISO
Examine all Resource Adequacy options and continue to improve resource adequacy contribution compensation. Consider alternative market structures of procuring Resource Adequacy. New York should ensure that BSM will not be applied to CLCPA resources and should advocate at FERC for alternatives to BSM that maximize access to the capacity market for public policy resources. New York and the NYISO should investigate how best to include all resources in the capacity markets, with the goal of reflecting energy efficiency and dynamic smart loads in resource adequacy. Continue to evaluate the capacity market value of all resource types so that resources are paid for capacity consistent with the value they provide to the grid. Allow fair access to the capacity market for energy limited resources and accurately reflect the value of such resources especially as the need for grid flexibility grows over time.	DPS	Ongoing	NYISO, NYSERDA, Utilities, Suppliers
Enhance/augment the availability of public information to assist developers in making informed project development decisions.	NYISO/DPS	Ongoing	NYSERDA, Renewable developers

Enabling initiative – Initiative #9: Components of the strategy

Components required for delivery	Implementation lead	Time to implement	Other key stakeholders
Proactive Advocacy. New York State should fund expansion of the existing office and team within Department of Public Service (DPS) that systematically focuses on proactive advocacy at NYISO and FERC to provide the necessary resources to DPS to ensure that wholesale markets and planning processes align with CLCPA goals and support environmental justice concerns, while maintaining reliability. The expanded office should focus on improved coordination with other essential State agencies including NYSERDA and DEC. The office should also monitor the developments of FERC's soon to be created Office of Public Participation and work with both that office and its Environmental Justice senior advisor to assist and support increased participation by low-income New Yorkers at FERC.	DPS	ASAP	NYSERDA, DEC, Utilities, Suppliers, NYISO, FERC
Earnings Adjustment Mechanisms. The PSC should initiate a generic proceeding for Earnings Adjustment Mechanisms (EAMs) to review and evaluate how existing EAMs are working, lay the groundwork and create consistency across the utilities where it makes sense to do so, and consider additional EAMs related to the decarbonization and social equity goals of the CLCPA and the process to do so. This review should be done on a periodic basis, and EAMs should be adjusted as necessary to encourage the needed outcomes.	PSC	ASAP	DPS, NYSERDA, Utilities, Suppliers

Enabling initiative – Initiative #9: Benefits and impacts

Anticipated Benefits and Impacts

Disadvantaged communities

Effective and flexible markets help to lower costs for consumers, including those in disadvantaged communities.

Health and other co-benefits

Effective and flexible markets enables clean technologies to come forward and displace undue burdens from fossil fuel generation on environmental justice communities.

Just transition: businesses and industries, workers

The transition away from fossil plants which will impact workers of those facilities and host communities. Complementary just transition and equity policies are needed to both transition current fossil workers to these new opportunities and ensure that workers from disadvantaged communities will benefit from new opportunities.

Other

Enabling initiative – Initiative #10: Technology Solutions

Description:	Increase research, development, and appropriately-scaled demonstration and deployment of emissions-free technology needed to reach our goals.	
Action type:	Research & Development	
Cost and funding considerations:	\$\$\$; Continued and increased support of NYSERDA's existing programs.	
Ease of implementation:	Medium (accelerating and expanding existing processes)	
Example case studies:	NYSERDA's Innovation Team	
Risks / Barriers to success		Possible mitigants
<ul style="list-style-type: none"> Significant scaling of current efforts: <ul style="list-style-type: none"> Coordination of multiple entities to scale current innovation efforts. Increasing funding and staffing of the needed programs. Rapidly developing technologies today to be deployed at scale by 2040. Current studies have identified that even after full deployment of available clean energy technologies, there is a remaining need for 15-25 GW in 2040 to meet demand and maintain reliability, although that gap may change over time. Whether the answer is new long duration battery technology, RNG, advanced green hydrogen, nuclear, overbuilding of renewable technologies or other new technologies that may emerge due to R&D efforts over the next two decades, the costs are likely to be high and aggressive action and smart planning will be challenging to make these fundamental shifts in our energy systems in two decades. And yet the health, societal, and economic benefits of the transition are also immense, and the cost of inaction or insufficient action are tremendous and would far outweigh the costs of action. 		<ul style="list-style-type: none"> Federal policy and action NYSERDA acting as a "hub" for research and development to ensure a coordinated and efficient effort. Increased funding and staffing of relevant programs needed

Enabling initiative – Initiative #10: Components of the strategy

Components required for delivery <i>(Brief description of action required)</i>	Implementation lead <i>(Entity responsible for completing)</i>	Time to implement <i>(Time required to implement)</i>	Other key stakeholders <i>(Entities that need to be engaged)</i>
Achievement of 70 by 30: Focus on Aggressively Deploying Currently-Available Solutions			
Focus on energy delivery, energy efficiency, the economics of long duration and seasonal storage, siting, and identifying technology gaps.	NYSERDA	Ongoing	NYISO, DPS, Utilities, developers.
Aggressive deployment of current renewable energy and storage technologies.	NYSERDA	Ongoing	DPS, DEC, NYISO, Utilities, siting communities
Continued build out of transmission and transmission upgrades	DPS	Ongoing	Utilities, Transmission developers, Utilities, DEC, siting communities
Supporting utility-scale demonstration projects of new technologies, including storage and transmission and distribution.	Utilities	Ongoing	Developers/researchers, Utilities, DPS, NYISO

Enabling initiative – Initiative #10: Components of the strategy

Components required for delivery	Implementation lead	Time to implement	Other key stakeholders
Achievement of 100 by 40: Focus on Identifying and Developing Needed Solutions for Dispatchable Technologies			
Identify, explore, evaluate, and develop dispatchable technologies and solutions as they emerge. Focus on solutions we know are desirable.	NYSERDA	Ongoing	Developers/Researchers
Detailed, holistic, modeling within a zero-emissions world. Modeling should include holistic integration of load, generation, and energy delivery, and be flexible in the solutions chosen. While modeling is being completed, the State should move forward with known needs.	NYSERDA	Ongoing	NYSERDA, DPS, NYISO
Support NYSERDA in its innovation efforts. NYSERDA should act as a hub for technological innovation and convene stakeholders and conduct strategic research on untapped renewables and storage projects. NYSERDA should develop of consortium of NYISO, utilities, developers, and solution providers to bring technologies to large-scale deployment faster and more cost-effectively.	NYSERDA	Ongoing	Developers/researchers, Utilities, DPS, NYISO
Supporting utility-scale demonstration projects of new technologies, including storage and transmission and distribution.	Utilities	Ongoing	Developers/researchers, Utilities, DPS, NYISO

Enabling initiative – Initiative #10: Components of the strategy

Components required for delivery	Implementation lead	Time to implement	Other key stakeholders
During planning, emissions-free resources (e.g., storage, energy efficiency, renewable energy) should be prioritized where feasible when considering end-uses, technology limitations, impacts, and costs. However, should a substitute for natural gas still be needed, advanced green hydrogen and possibly RNG could fill this gap in order to maintain reliability, if scalability, feasibility, and environmental impact and air quality issues can be addressed.	NYSERDA	Ongoing	PSC/DPS, DEC, NYISO, Utilities, Power Plant Owners/ Operators, Researchers & Developers
DPS and NY DEC should begin a process and rulemaking to define “emissions free” compliant with the CLCPA for advanced fuels	DEC/DPS	ASAP	
<p>Further analysis, technical development, and research is needed in order to determine the feasibility, climate impact, and health impacts of advanced fuels prior to infrastructure investment:</p> <ul style="list-style-type: none"> • Determine the lifecycle GHG accounting framework of RNG and advanced green hydrogen. Priority utilization should be provided for feedstocks with the lowest GHG emissions, with strong preference given to zero- or negative-emissions sources. • The potential air quality and health impacts of producing and using these fuels and best practices/end-uses to minimize these impacts. • The safety of advanced green hydrogen, storage, and pipeline operation. • Technological innovation, development, and scaled-deployment is needed in order to prove the effectiveness and economics of the technologies. 	NYSERDA	Ongoing	

Enabling initiative – Initiative #10: Components of the strategy

Components required for delivery	Implementation lead	Time to implement	Other key stakeholders
<p>The contribution of nuclear power to the 2040 resource mix and any additional policy actions needed should be evaluated prior to the cessation of the Zero Emissions Credit (ZEC) Program in 2029.</p> <ul style="list-style-type: none"> Analysis should occur prior to the ending of the ZEC program in 2029 to determine whether subsidizing any of the State’s remaining nuclear reactors will be necessary for meeting the 2040 emissions mandate and/or whether more cost effective and environmentally-friendly alternatives are available . The analysis should consider the inflexible baseload attributes of nuclear plants as well as reliability, cost, health, safety, community impact and environmental concerns of nuclear power generation. 	PSC/DPS	2029, and in alignment with NRC re-licensing	Customers, hosting communities, environmental groups, EJ, labor, NYSERDA, DEC, nuclear generating facilities, NYISO
<ul style="list-style-type: none"> Should public policy mechanisms be proposed for the continuation of nuclear power generation, effective mechanisms for input and comments by stakeholders and the public should be implemented (specifically customer, environmental, environmental justice, labor, local and indigenous communities). 	PSC/DPS	2029, and in alignment with NRC re-licensing	

Enabling initiative – Initiative #10: Benefits and impacts

Anticipated Benefits and Impacts

Disadvantaged communities	Consideration of the impacts of new technologies on environmental justice communities in relation to air quality and overall health effects.
Health and other co-benefits	Aggressive deployment of current renewable energy technologies and development of new technologies will help to more quickly shutdown fossil fuel generating facilities, improving air quality in these communities.
Just transition: businesses and industries, workers	With the right policies in place, new businesses and industries will grow in New York State centered around clean energy technologies (energy efficiency, solar, wind and offshore wind and battery storage) and the supply chain for these technologies. Becoming a "hub" for clean energy technology development will attract clean energy research and development companies to New York.
Other	Care must be taken to ensure that new technology deployment is collaborative and complimentary to other grid investments such that the lowest overall cost is incurred to achieve the CLCPA goals.

Enabling initiative – Initiative #11: Long-Duration Storage Technology

Description:	Achieving the CLCPA's high renewable energy, zero emission electricity system will require substantial amount of energy storage operating over various timescales—spanning from minutes to hours, days, weeks and even longer—to maintain grid flexibility, reliability, and resiliency.	
Action type:	Executive, Regulatory, Research & Development	
Cost and funding considerations:	\$\$-\$\$\$	
Ease of implementation:	Hard (predicting, modeling, and developing of new technologies)	
Risks / Barriers to success		Possible mitigants
<ul style="list-style-type: none"> • The specific technologies, products, and use/business cases for long-duration storage are still being developed • Scaling new technologies so they will be commercially viable in the grid • Large scale testing and demonstration needed to ensure assets work properly on the existing grid 		<ul style="list-style-type: none"> • Further R&D and the establishment of a Center of Excellence to accelerate the deployment of long-duration storage • Change formula for funding Centers of Excellence and demonstration projects

Enabling initiative – Initiative #11:

Components of the strategy, Benefits and impacts

Components required for delivery	Implementation lead	Time to implement	Other key stakeholders
Focus State programs and funding on research and demonstration projects for the development of large scale and longer duration storage	NYSERDA/DPS	Testing and commercial deployment by 2030	NYISO, utilities, developers
Develop and expand a Storage Center of Excellence so that new technologies can be matured and deployed on the grid for large scale testing	NYSERDA	ASAP	DPS, utilities, developers
Attract and engage relevant parties in collaborative efforts to address the challenges unique to long-duration storage	NYSERDA	Ongoing	DPS, utilities, developers, NYISO, ESD

Anticipated Benefits and Impacts	
Disadvantaged communities	Development and deployment of long duration storage would significantly impact our ability to reach the 2040 goal, and would allow high-emitting fossil fuel generation facilities to no longer be needed for reliability. As these facilities are often located in disadvantaged communities, it would alleviate environmental burdens in these communities.
Health and other co-benefits	Further reduce peaker plant dependence decreases emissions and improves air quality.
Just transition: businesses and industries, workers	NYS has the opportunity to be a leader in the "grid of the future", be the hub of a new clean energy field, and ensure these investments lead to new workforce development and job growth.

Enabling initiative – Initiative #12: Energy Delivery & Hosting Capacity

Description:	Pursue planning and implementation processes to facilitate necessary energy delivery options for the renewable energy buildout.	
Action type:	Executive, Regulatory	
Cost and funding considerations:	\$\$\$; There are existing mechanisms for state and FERC rate recovery. The State should also seek federal funding from the administration's stimulus and infrastructure bills.	
Ease of implementation:	Hard – Building or upgrading energy delivery system infrastructure will be difficult. It will require thorough planning and technology advancements.	
Example case studies:		
Risks / Barriers to success		Possible mitigants
<ul style="list-style-type: none"> Complex upgrades to the energy delivery system will be required. Some upgrades may be costly. Host community opposition if engagement and public outreach are not done properly. 		<ul style="list-style-type: none"> Strong community communication, engagement, and public outreach will be important for these projects and upgrades to be possible.

Enabling initiative – Initiative #12: Components of the strategy

Components required for delivery	Implement- ation lead	Time to implement	Other key stakeholders
Expand Electricity Transmission and Distribution Systems to Support Energy Delivery			NYSERDA, DPS, DEC, Utilities, NYISO, Transmission and Distribution System Operators, municipalities and local communities where projects are sited and where energy is delivered.
Continue with strategic long-term transmission and distribution investments by NYPA and utilities for expedited projects needed in the short term (within ~5 years), by utilities for local transmission and distribution investments within a utility's footprint, and declare public policy needs in the current NYISO PPTN process through FERC Order 1000.	PSC/NYPA	Ongoing	
Focus on increasing hosting capacity with a holistic/top-down approach and to accelerate adoption, while being mindful of the tradeoffs between siting resources in high-cost areas and investments in T&D infrastructure to reach the most equitable cost option.	PSC/DPS	ASAP	
Create a database to track penetration and identify where there may be headroom for Renewable Energy Zones. Recommend process to 1) establish Renewable Energy Zones, 2) determine quantity of renewable energy targeted within each zone, and 3) develop a plan for each REZ to build sufficient transmission to ensure energy delivery within and out of the zone.	DPS/NYSERDA	ASAP	
Offshore Wind (OSW)			
Conduct further planning and pursue system upgrades on Long Island and in NYC to facilitate 9,000 MW of OSW.	DPS/NYSERDA	Ongoing	
Promote multiport infrastructure investment to support and facilitate the growth of the offshore wind industry in NY. Future offshore wind solicitations should continue to include a multi-port strategy and requirement for offshore wind generators to partner with any of the 11 prequalified NY ports to stage, construct, manufacture key components, or coordinate operations and maintenance activities.	NYSERDA	Ongoing	

Enabling initiative – Initiative #12: Components of the strategy

Components required for delivery	Implementation lead	Time to implement	Other key stakeholders
Advanced Grid Technologies & Future Studies for Planning Processes			NYSDERDA, DPS, DEC, Utilities, NYISO, Transmission and Distribution System Operators, municipalities and local communities where projects are sited and where energy is delivered.
Building on the Power Grid Study, continue R&D and rapid deployment of advanced grid technology to: <ul style="list-style-type: none"> a) alleviate transmission system bottlenecks to allow for better deliverability of renewable energy throughout the State; b) unbottle constrained resources to allow more hydro and/or wind imports and the ability to reduce system congestion; c) optimize the utilization of existing transmission capacity and right of ways; d) increase circuit load factor through dynamic ratings; e) encourage utilities to accelerate investments in their local systems that will facilitate renewables development and enhancing the electrification of transportation, but also grow safety and resiliency. 	DPS/NYSERDA	ASAP	

Enabling initiative – Initiative #12: Components of the strategy

Components required for delivery	Implementation lead	Time to implement	Other key stakeholders
Advanced Grid Technologies & Future Studies for Planning Processes (continued)			NYSERDA, DPS, DEC, Utilities, NYISO, Transmission and Distribution System Operators, municipalities and local communities where projects are sited and where energy is delivered.
Examine and, if needed, modify planning processes (timeframe of processes, forward looking, technology deployment alignment, address defaulting to regulated solutions) to encourage the incorporation of advanced technologies	DPS/NYSERDA	ASAP	
Conduct a study that looks more closely at short- and long-duration storage, clean dispatchable energy, and T&D investments to get a more precise view of the long-term needs of the grid; further informing public policy decisions and market design	DPS/NYSERDA	ASAP	
Develop and publish LT&D system information in time to support renewable developer decision making timelines.	PSC/Utilities	ASAP	
Interconnection			
Explore additional areas of openness and engagement with the NYISO and other stakeholders to improve the interconnection/Class Year process.	PSC/DPS	ASAP	
NYS can be more involved with stakeholders in planning optimal locations for clean energy projects, either through community energy studies, stakeholders' processes, or other connections, while serving as a resource for technical information and a bridge to communicate with the NYISO.	DPS/NYSERDA	Ongoing	
Further engagement, outreach, education, and support for local municipalities, communities and residents to improve acceptance of energy delivery projects.	DPS/NYSERDA	Ongoing	

Enabling initiative – Initiative #12:

Benefits and impacts

Anticipated Benefits and Impacts

Disadvantaged communities	Rapid improvements and upgrades to the energy delivery system will allow more renewable energy into the system reducing the need for fossil fuel generational facilities. Closing fossil fuel generation facilities in disadvantaged communities will improve air quality.
Health and other co-benefits	Aggressive upgrades and construction of transmission and distribution systems will make it possible to close fossil fuel generation facilities, improving air quality and decreasing emissions.
Just transition: businesses and industries, workers	Renewable energy developers will be able to site and construct projects more easily and quickly, bringing more projects to NYS and increasing renewable energy development activity.
Other	

Mitigation strategy – Initiative #13: Gas Infrastructure, Transmission & Methane Leakage

Description:	<p>This recommendation intends to address methane leakage and the infrastructure related to fossil natural gas, though it also applies to any potential future gas technologies. This recommendation aligns with what was proposed by the Energy Efficiency & Housing Panel, but includes a broader scope beyond that of the end-use gas distribution sector.</p> <p>Transition away from gas with a managed, phased, and just transition from natural gas and decommission natural gas infrastructure to the maximum extent possible and as quickly as possible.</p>		
Action type:	Executive, Regulatory		
GHG reduction by 2030:	Medium	GHG reduction by 2050:	High
Cost and funding considerations:	\$\$		
Ease of implementation:	Easy - Medium		
Risks / Barriers to success		Possible mitigants	
<ul style="list-style-type: none"> Natural gas infrastructure is an extensive statewide network, much of it underground and within buildings. Leakage detection and repair (LDAR), as well as decommissioning may be challenging in populous areas. As New York transitions away from natural gas, it will need to ensure proper system maintenance and investment, and chart a path to avoid stranded assets. The Federal Energy Regulatory Commission oversees interstate natural gas transmission and plays a significant role in approving natural gas infrastructure, which presents additional regulatory considerations for this category of facilities. 		<ul style="list-style-type: none"> Improved planning, including inventorying infrastructure components and characterizing emissions to allow for prioritization of LDAR. Coordination with local regional and federal entities. Advances in LDAR technology. 	

Mitigation strategy – Initiative #13:

Components of the strategy

Components required for delivery	Implementation lead	Time to implement	Other key stakeholders
Undertake a detailed economic analysis to determine the most equitable and cost-effective strategy for transitioning off of gas, maintaining public safety and customer reliability, and decommissioning gas systems/infrastructure. A strategic approach to decommissioning the distribution system should be considered while considering both end-use customers and growth in the power generation sector with electrification. This analysis should be completed in parallel with decommissioning power plants and the NYISO Reliability Needs Assessment.	DPS	ASAP	DPS, NYSERDA, DEC, Utilities, natural gas producers, infrastructure owners, local municipalities
Initiate a proceeding to establish emission reductions targets for transmission and gas utilities, allocating specific targets (short, medium and long term) to establish the trajectory for the gas utility sector to achieve the 2050 emissions reductions targets.	DPS/DEC	Ongoing	
Implement Legislative changes to the provisions of the public service law and transportation corporations law so as not to promote gas system expansion by creating a customer right to gas service and requiring that existing customers subsidize gas system extensions to new customers as they are currently written.	DPS	ASAP	
Deny additional gas infrastructure permits to avoid creating additional stranded assets and exacerbating GHG emissions. Furthermore, NYS should advocate to FERC for denial of gas infrastructure projects that will exacerbate GHG emissions. These actions should be taken to the extent consistent with reliability.	DPS/DEC	ASAP	

Mitigation strategy – Initiative #13:

Components of the strategy

Components required for delivery	Implementation lead	Time to implement	Other key stakeholders
Support the current DEC effort to promulgate regulations to decrease methane emissions from gas infrastructure, including upstream emissions, and in coordination with the PSC, mandate specific emission reduction targets (including interim targets) for transmission, storage and gas distribution utilities upstream of the meter. These targets are necessary to guide utility gas system planning.	DEC	Ongoing	DPS, NYSERDA, DEC, Utilities, natural gas producers, infrastructure owners, local municipalities
Support future efforts from DEC to further control, reduce, and eliminate methane emissions from gas infrastructure. This may include: Implementation of the usage of leak detection and repair enhanced technology, developing an inventory of all infrastructure and sources of methane emissions potentially subject to State regulation, and operation and maintenance requirements resulting in reduced methane emissions	DPS/DEC	ASAP	
Continued research and development of leakage detection technologies, including continuous monitoring technologies and survey (aerial or land) for the production, transmission and storage of natural gas.	DPS	Ongoing	
Develop a program to accurately characterize gas infrastructure components through information requests better estimate emissions and improve inventory reporting.	DEC	ASAP	

Mitigation strategy – Initiative #13:

Components of the strategy

Components required for delivery	Implementation lead	Time to implement	Other key stakeholders
Develop an integrated plan and coordinate efforts with utilities, gas producers, infrastructure owners, and local municipalities to decommission infrastructure by implementing non-pipes alternatives (NPAs) and detect and repair leaks in remaining gas infrastructure while maintaining affordable, safe and reliable service.	DPS	ASAP	DPS, NYSERDA, DEC, Utilities, natural gas producers, infrastructure owners, local municipalities
Identify funding sources and appropriately fund efforts to locate and cap abandoned wells.	DEC	ASAP	
Develop an online registry for submission of data to organize the data and information in a manner that informs and directs infrastructure decommissioning. The CLCPA [75-0105(4)] states that the DEC shall consider a registry but does not direct the DEC to create one. The online registry should have a transparent planning and reporting process, include emissions from the gas industry (from wells to end of distribution network pipes/burner tips) and sources of “fugitive” methane from other methane sources such as landfills, wastewater treatment etc. The information collected shall track and collect data needed for interim targets. The registry shall Account for, report, and track environmental attributes of any advanced fuel project or fugitive methane avoidance project that assures no double counting of reductions or environmental benefits. The CAC should determine the best and highest environmental attributes.	DEC	ASAP	

Mitigation strategy – Initiative #13:

Benefits and impacts

Anticipated Benefits and Impacts

Disadvantaged communities

In addition to being a greenhouse gas (GHG), methane is a precursor to ozone which impacts disadvantaged communities disproportionately. Reducing methane emissions from natural gas infrastructure improves local air quality, especially in neighborhoods that have significant and/or older infrastructure. Rebuilding gas infrastructure will increase the likelihood of stranded assets, increase rate pressures, and exacerbate equity impacts, especially for LMI customers, as customers transition off of the gas system.

Health and other co-benefits

- 2017 (20 yr GWP) emissions from the oil and natural gas sector was 8,950,000 MTCO₂e.
- LDAR at wells, compressors and storage sources may reduce GHG emissions by 375,000 MTCO₂e.
- Additional reductions can be realized with further requirements, including capping abandoned wells, regulation of operation and maintenance and other activities.
- Methane is a precursor to ozone which impacts disadvantaged communities disproportionately, the reduction of methane has the potential to also reduce ozone.

Just transition: businesses and industries, workers

As the natural gas system transitions, job availability and roles within the sector may change to: Shuttering of natural gas power plants; Decommissioning of the system; Leakage detection and repair services; and Need to understand and operate a changing system (different infrastructure needs, footprint, or equipment, and different gas compositions).

Other

Enabling initiative – Initiative #14: Retirement of Fossil Fuel-Fired Facilities

Description:	Develop a plan and implement regulations to phase out fossil fuel-fired baseload and peaking generation resources as quickly as practicable while retaining system reliability by prioritizing efforts to lower emissions of co-pollutants in disadvantaged and environmental justice communities. Leverage existing technology, innovative zero-emissions technology where feasible, transmission and distribution investment, targeted energy efficiency and demand response, market design, and policy or regulatory mechanisms.	
Action type:	Regulatory	
Cost and funding considerations:	\$; Renewable and storage resources can compete to displace fossil-fuel fired plant capacity payments. Potential revenue from regulatory compliance should be considered in all cost assessments.	
Ease of implementation:	Hard – Retiring all fossil sources on the system will be difficult, requiring thorough and innovative planning, as well as technology advancements.	
Example case studies:	DEC “Peaker Rule,” 6 NYCRR Subpart 227-3	
Risks / Barriers to success		Possible mitigants
<ul style="list-style-type: none"> Effective deployment of renewables, flexible generation or storage, and distributed resources, as well as energy efficiency and demand response solutions that can reliably replace existing fossil resources will be critical. Transmission and distribution upgrades are needed to complement the zero emissions resource build out, in order to ensure energy delivery. 		<ul style="list-style-type: none"> The recommendations from the Power Generation Advisory Panel focus on enabling strategies to assist in the transition away from fossil fuels. These include strategies to more rapidly deploy renewable technologies, including flexible resources, addressing barriers to renewables deployment, transmission and distribution upgrades, developing and deploying technology innovations, encouraging effective market structures, and ensuring a just and equitable transition.

Enabling initiative – Initiative #14: Components of the strategy

Components required for delivery	Implement- ation lead	Time to implement	Other Key Stakeholders
Non-Consensus Recommendation with Majority Support: Temporary Moratorium on New or Repowered Fossil Fuel-Fired Facilities until the Full Recommendation is Adopted			
<p><u>Moratorium on New Fossil Generation</u>: A moratorium will be placed on the permitting, licensing, siting and construction of any new (including repowered, partially repowered) fossil fuel electric generating facility until, as described in the consensus recommendation, (a) the final CAC recommendations are adopted by the state; and (b) NYSDEC has completed its Assessment and Determination of Emissions reduction targets and finalized Emissions Reductions regulations setting ratcheted down emission limits and targets to zero by 2040; and (c) the New York State Planning board and the PSC have finalized the electric sector gas planning process in order to support and ensure the achievement of the emissions reductions targets and compliance with the promulgated emissions reduction regulations by DEC unless a system reliability need is certified as described in the paragraph below.</p> <p><u>System Reliability</u>: No new, repowered or partially repowered fossil fuel generation facility would be allowed unless (a) NYISO and the local transmission owner certify the existence of a reliability need that cannot otherwise be addressed through a local or bulk transmission system upgrade and that can only be addressed by the fossil generator; (b) the PSC determines based on demonstration from the local transmission distribution company, the utility, and NYISO that no combination of transmission, energy storage, emissions free electric generation, demand response and energy efficiency can address the reliability need within the relevant time frame; (c) if repowering, the fossil fuel generation facility would result in “a significant reduction in criteria and hazardous air pollution from a representative baseline 12 month period within the prior 24 months, as determined by DEC; (d) NYSDEC conducts a thorough equity analysis as mandated under the CLCPA and as required by NYSDEC Commissioner Policy 29; (e) all projects will be subject to Article 10; and (f) the license and permits or renewed permits for any such facility shall be terminated by 2040.</p>	CAC	ASAP	

Enabling initiative – Initiative #14:

Components of the strategy

Components required for delivery	Implement- ation lead	Time to implement	Other Key Stakeholders
Non-Consensus Recommendation with Majority Support: Temporary Moratorium on New or Repowered Fossil Fuel-Fired Facilities until the Full Recommendation is Adopted (cont'd)			
<u>New Fossil Generation Through 2040</u> : After the promulgation of the regulations and processes described above and fully detailed in the consensus recommendations below, new, repowered or partially repowered fossil fuel generation facilities may only be licensed or permitted if they comply with these regulations, processes and plans and if their licenses, permits and any permit renewals will terminate by 2040. In its permitting decisions and in the development of the regulations noted above, DEC is required under the CLCPA to “prioritize reductions of greenhouse gas emissions and co-pollutants in disadvantaged communities” and to ensure that a project “shall not disproportionately burden disadvantaged communities.”	CAC	ASAP	

Alternative Viewpoint on Non-Consensus Recommendation
<p>The CLCPA requires state agencies to integrate consistency with the CLCPA into their decision-making. In order to achieve the 2030 mandate it is necessary to substantially build out NY’s infrastructure; including renewable and storage resources, along with transmission and distribution to support energy delivery. This work, combined with the comprehensive planning and regulatory process to determine how to phase down fossil reliably in a fact based manner by 2040, is what is needed to achieve the CLCPA goals.</p>

Enabling Initiative – Initiative #14

Retirement of Fossil Fuel-Fired Facilities

Principles for Retiring, Repowering and New Fossil Fuel-Fired Facilities

- > Fossil-fuel fired facilities should not be permitted to operate after 2040.
- > Reducing greenhouse gas emissions and co-pollutants in disadvantaged communities is a priority, and we must ensure an equitable and affordable transition.
- > The State must move quickly and take strong action both to invest in renewable electricity, storage, energy efficiency, and transmission and distribution to phase out fossil fuel generation, all while maintaining reliability.
 - Electrification of buildings of transportation are critical to achievement of the CLCPA and will increase load on the electric grid.
 - Continued provision of safe and adequate electrical service is required as alternative solutions are implemented.
 - Not all solutions are yet known, and the transition requires innovative and holistic planning.
- > Public and stakeholder input must be considered in any such planning.
- > State agency decision-making and approvals must consider consistency with GHG emissions limits.

Enabling initiative – Initiative #14: Retirement of Fossil Fuel-Fired Facilities

> There are 3 main components to the Fossil Fuel Generation Recommendation:

1. A planning process to determine emissions reduction targets to reach zero emissions by 2040.
2. Promulgation of emissions regulations by DEC in order to reach the 2040 goal.
 - *Similar to the "Peaker Rule" (DEC 6 NYCRR Subpart 227-3), any closures designated by the emissions regulations of fossil fuel generation facilities would prompt a reliability needs analysis and identification of alternatives.*
3. An iterative planning process that builds on #1 in which the progress, the reduction targets, the regulations, and the other mechanisms being utilized are evaluated and revised as necessary in order to reach the 2040 goal.

The above components shall be enacted as soon as possible by the relevant State Agencies.

Enabling initiative – Initiative #14: Components of the strategy

Components required for delivery	Implementation lead	Time to implement	Other Key Stakeholders
A planning process to determine emissions reduction targets to reach zero emissions by 2040			
Determine the potential for greenhouse gas emission and co-pollutant reductions from fossil fuel generation by 2030 and set a corresponding timeline for emissions reduction targets. The timeline from present to 2030 for possible emission reductions shall be determined in conjunction with the renewable energy procurement and interconnection schedule and shall represent a continual decline in emissions from present to 2040 while ensuring reliability. The process shall include effective mechanisms for input and comments by stakeholders (including but not limited to: generators, utilities, and environmental, environmental justice, public health, labor, and electricity consumer advocates and organizations, as well as local communities) and the public.	New York State Energy Planning Board	As soon as possible, but no later than 2023	NYSERDA, PSC, DEC
When setting emission reduction targets, consideration should be given to the location and emissions profile from fossil generating units across the state, as well as relevant planning studies from involved organizations (e.g., the Power Grid Study, NYISO reliability analyses, etc.) in order to inform decisions to address these emissions in the most efficient and effective manner possible.	New York State Energy Planning Board	As soon as possible, but no later than 2023	NYSERDA, PSC, DEC
Disadvantaged communities shall be considered when determining the emissions reduction targets, as required by the CLCPA.	New York State Energy Planning Board	As soon as possible, but no later than 2023	NYSERDA, PSC, DEC

Enabling initiative – Initiative #14: Components of the strategy

Components required for delivery	Implementation lead	Time to implement	Other Key Stakeholders
Promulgation of emissions regulations by DEC in order to reach the 2040 goal			
Following the above analysis, DEC shall examine all potential regulatory options, including new regulations and/or permit requirements or amendment of current regulations and/or permitting requirements, to determine the most efficient, effective and enforceable format to achieve the determined emissions reduction targets and the CLCPA goals. Evaluation of emissions, benefits, reliability needs, cost, and available replacements and solutions (and their subsequent impacts) must be executed. Specific focus should also be given to reducing emissions and co-pollutants in disadvantaged and environmental justice communities. The process shall include effective mechanisms for input and comments from stakeholders prior to formal proposal under SAPA, similar to the process used in promulgating the DEC “Peaker Rule,” 6 NYCRR Subpart 227-3. Once completed DEC shall follow SAPA in promulgating the identified regulation(s). The effectiveness of the regulations shall be evaluated every two years. This evaluation should coincide with the resource planning review.	DEC	As soon as possible, but no later than 2024	NYSERDA, PSC, NYSEPB
Coordination of closures and the necessary reliability assessments should take place between State Agencies (e.g., DEC, PSC, NYSERDA) and other key stakeholders (e.g., the NYISO, utilities and fossil fuel facility owners and operators), similar to the process used in promulgating the DEC “Peaker Rule,” 6 NYCRR Subpart 227-3.	DEC	As soon as possible, but no later than 2024	NYSERDA, PSC, NYSEPB, NYISO, Utilities

Enabling initiative – Initiative #14: Components of the strategy

Components required for delivery	Implementation lead	Time to implement	Other Key Stakeholders
An iterative planning process in which the progress, the reduction targets, the regulations, and the other mechanisms being utilized are evaluated and revised as necessary in order to reach the 2040 goal.			
The New York State Energy Planning Board shall commence an iterative planning process in order to support and ensure the continued achievement of the emissions reduction targets and compliance with promulgated regulations including identification of alternatives and barriers to those alternatives, and analysis or additional mechanisms needed.	New York State Energy Planning Board	Performed every two years and timed to serve as a critical input into future Clean Energy Standard, State Energy Plan and/or Climate Action Council updates.	NYSERDA, DEC, PSC, NYISO, Utilities
Examine options to reduce or eliminate emissions from fossil fuel-fired generation facilities, including behind-the-meter fossil resources as expeditiously as practicable but not later than 2040, identifying the nature, feasibility, cost and avoided costs, risks and risk mitigants, and impacts on emissions and health as well as reliability.			
Outline the impacts on communities and workers of such options and the ability to repurpose these facilities to take advantage of their location and infrastructure to ensure reliability while meeting of the CLCPA goals.			
Examine and prioritize options to reduce greenhouse gas emissions and co-pollutants in disadvantaged communities.			
Investigate and implement market mechanisms to assist in the removal of fossil fuel-fired generating facilities from the system, including but not limited to the opportunity for carbon pricing, Clean Dispatch Credits, and valuing of environmental attributes.			

Retirement of Fossil Fuel-Fired Facilities

- > Only after alternative solutions (or combination thereof) such as storage (of any duration), zero-emissions resources, transmission upgrades or construction, energy efficiency, or demand response, are fully analyzed and determined to not be able to solve the identified grid reliability need, shall fossil fuel-fired generation facilities be considered in order to meet DEC emissions reduction regulations.
- > **Fossil fuel-fired generation facilities shall only be considered if:**
 - The NYISO and local transmission operators confirm that the fossil fuel-fired facility is required to maintain bulk or non-bulk power system reliability and that need cannot be reasonably met with any zero-emissions alternatives or combination of zero-emissions alternatives (above).
 - A fossil fuel-fired generation facility results in:
 - A fossil fuel-fired generation or low carbon facility provides needed electric system qualities necessary for the reliable operation of the electric system that the alternatives cannot provide.
 - A greater integration of zero-emissions resources
 - A reduction of fossil fuel-fired generation capacity while decreasing greenhouse gas emissions and co-pollutants
 - A significant reduction of greenhouse gases and co-pollutants (reduction requirements to be defined by DEC regulations and analysis)
 - A fossil fuel-fired generation facility addresses a specific environmental justice concern (as required by the CLCPA)
 - Public and stakeholder input must be incorporated into the decision-making process (as required by Article 10)
- > **For all scenarios, a thorough analysis of equity considerations, as required by the CLCPA, is completed by the relevant State Agency.**

Enabling initiative – Initiative #14:

Benefits and impacts

Anticipated Benefits and Impacts

Disadvantaged communities

Closure of high-emitting fossil units should be prioritized in environmental justice communities through measures such as energy efficiency, battery storage, renewables deployment, and necessary transmission and distribution upgrades. As fossil generation facilities close, the impact of the lost tax revenue must also be examined within these communities and a transition must be identified.

Health and other co-benefits

Phasing out fossil fuel-fired generating facilities, especially the largest emitters, will decrease emissions and improve air quality, particularly in the communities where fossil fuel generation is located. In 2016, in-state fossil fuel combustion accounted for 27.72 MMtCO₂e (14% of all state emissions).

Just transition: businesses and industries, workers

The closure of fossil units will impact workers. Training and support in the transition to new jobs will be important (see Workforce Development recommendation for additional information).

Other

Appendix

Category definitions (1 of 2)

Emissions impact (2018 baseline)

Low

Strategy results in <10% of the reductions needed from the sector for each target year (2030 and 2050)

OR

Less than 1.5 million metric tons (MMT) of emissions reductions in 2030 or 3 MMT 2050.

Medium

Strategy results in 10-33% of the reductions needed from the sector in at least one of the target years

OR

greater than 1.5 but less than 4 MMT of emissions reductions in 2030 or over 3 but less than 8 MMT in 2050.

High

Strategy results in >33% of the reductions needed from the sector in at least one of the target years

OR

over 4 MMT of emissions reductions in 2030 or over 8 MMT in 2050.

Ease of implementation

Easy

- Strategy has been implemented many times and/or can build off an existing NYS program
- Proven and widely available technology
- Key stakeholders are strong supporters; no strong opponents

Medium

- Strategy is new to New York State but has been successfully implemented in other comparable states/countries
- Proven technology with known GHG impact, but still small-scale
- Key stakeholders are neutral, or balanced mix of supporters and opponents

Hard

- Strategy is unproven in comparable settings
- Early-stage technology (e.g., need for pilots to prove feasibility and significant capital to scale up)
- Key stakeholders oppose the strategy

Category definitions (2 of 2)

Mitigation Strategy Cost

\$

- <\$250M total resource cost
- Most resources required for successful implementation are already on hand

\$\$

- \$250M - \$1B total resource cost
- Requires some new resources for successful implementation

\$\$\$

- Over \$1 Billion total resource cost
- Requires high degree of new resources (people, equipment, technology)
- Strategies with cost >\$10B should indicate the range of anticipated costs

Enabling Strategy Cost

\$

- <\$25M total cost
- Most resources required for successful implementation are already on hand

\$\$

- \$25M - \$100M total cost
- Requires some new resources for successful implementation

\$\$\$

- Over \$100M total cost
- Requires high degree of new resources or is a demonstration project
- Strategies with cost >\$250M should indicate the range of anticipated costs