7. Energy Security Planning and Emergency Preparedness

Draft New York State Energy Plan

July 2025

Key Findings

- **New York is well positioned and prepared to respond to energy emergencies.** Energy emergency preparations and responses are outlined in the State Energy Emergency Plan. This plan is integrated into and coordinated with the state's larger Comprehensive Emergency Management Plan (CEMP). The State Energy Emergency plan identifies the state and federal energy management emergency structures, energy market intelligence, detailed response actions, information sources and recovery plans for energy emergencies.
- **Risk-based energy system analysis is broadly utilized to prepare and secure the energy systems in New York.** The State's energy profile, risk, threats and vulnerabilities assessments, energy security and emergency response authorities, energy security plans and preparedness, energy emergency responses and resilience resources and hazard mitigation efforts are all evaluated and used to inform and direct preparations for and prioritize responses to energy emergencies. The State's major critical energy infrastructure components are evaluated for threat probability, vulnerability, and consequences for all hazards. The resulting risk scores are used to prioritize energy emergency responses, planning, and mitigation efforts in the state.
- **New York State is involved in multi-level and multi-agency energy preparedness, response, and mitigation efforts in coordination with industry**. State and federal partners, as well as private sector gas and electric utilities, pipeline owners, fuel terminal owners, energy stake holders and trade associations all collaborate to prepare for and respond to energy emergencies in the state, region, and country. From major winter storms to extreme heat, flooding, other severe weather, and additional man-made events, New York's energy systems have been resilient to major disruptions or impacts. With potential support from the federal government and coordination with the industry, New York agencies should continue to act to support the preparedness, response and mitigation of the hazards and risks faced by New York's energy system.
- **New York continues to monitor and evaluate the changing risks as they appear in the evolving energy systems across the state**. Risks/hazards to the energy system are consistently monitored and analyzed. Historical and emerging risk as a consequence of both natural caused hazards from weather and climate change such as flooding, severe storms, hurricanes, extreme heat and cold as well as human caused hazards from policy and threat environment changes are consistently evaluated. Increased electrification, the intermittency of renewable energy sources, and the need for clean firm and backup power are all energy transition issues that are being monitored, evaluated, and addressed.
- **Energy infrastructure owners continue to invest in the energy infrastructure in the state in response to the changing risks to the energy systems**. Hardening energy assets from physical, natural, and cyber hazards is widespread in all energy systems in the state. Investment in the state's energy generation, transmission, distribution and supply chain assets in the electric, natural gas, liquid fuels and renewables sectors must continue.

- **New York State must continue to prioritize energy emergency preparedness.** This includes continued risk evaluation and response planning and continued support for collaboration among the various stakeholders in the current and evolving future energy systems in the State.

Key Terms

- **Emergency:** A serious, unexpected, and often dangerous situation requiring immediate action.
- **Energy Security Planning and Emergency Preparedness:** Plans and actions that ensures a reliable and resilient supply of energy that protects public health, safety, and welfare while minimizing economic disruption. Energy Security Planning identifies, assesses, and mitigates risks to energy infrastructure, and plans for, responds to, and recovers from events that disrupt energy supply. New York State Energy Emergency Preparedness includes energy emergency planning and response as well as energy security risk and mitigation planning through the New York State Energy Emergency Plan and the New York State Energy Security Plan.
- **Risk:** The potential for the loss or degradation of energy supply or services, and the associated indirect impacts of those losses on society, resulting from the exposure of energy infrastructure to a threat.
- **Threat:** Anything that can damage, destroy, or disrupt energy systems, including natural, technological, human/physical, and cybersecurity events.
- **Vulnerability:** The susceptibility of an energy infrastructure system to damage, loss, or degradation caused by a threat due to weaknesses within the system or due to the system's dependence on critical supporting systems or material, technical, or workforce resources affected by the threat.
- **Consequence:** The effect of the loss or degradation of an energy infrastructure asset on energy supply or service, and the associated indirect impacts of those losses on society.
- **Resilience:** The capacity to withstand or to recover quickly from negative events such as natural disasters, climate change, and other threats/hazards.
- **Community Lifelines:** The most fundamental services in the community that, when stabilized, enable all other aspects of society to function; they include Safety and Security; Health and Medical; Energy; Communications; Transportation; Food, Hydration, Shelter; Hazardous Materials and Water Systems.
- **Cross-Sector Interdependency:** One energy sector (Electric, Gas or Liquid Fuel) relying on another energy sector; for example, the electric sector has a cross-sector interdependency with the natural gas sector.
- **Intra-Sector Interdependency:** One part of an energy sector (Electric, Gas or Liquid Fuel) relying on or controlled by another part of the energy system within the same sector; for example, the liquid fuel inventory in NY has an intra-dependency with refinery production and pipeline operations in the Gulf states.
- **Mitigation:** The action of reducing the severity, seriousness, or painfulness of a risk.
- **Risk Mitigation Strategy:** A proactive approach to enhance the State's energy reliability and end-use resilience through which Risk Mitigation Measures are identified, evaluated, and may be prioritized for implementation.
- **New York State Energy Emergency Plan:** An emergency response plan outlining State activities and responsibilities in response to an energy emergency. The scope includes emergency response planning and coordination with Federal and industry partners, it does not identify the major risks to the current energy system or include longer term resilience or mitigation activities. It is an annex to the State's Comprehensive Emergency Management Plan.
- **New York State Energy Security Plan:** A plan focused on identifying and protecting the state energy systems by providing a detailed, comprehensive risk assessment of critical energy infrastructure and cross-sector interdependencies and providing a framework for evaluating risk mitigation approaches to enhance reliability and end-use resilience.

1. Overview

New York State is well-positioned and well-prepared to respond to energy emergencies, with extensive interconnected energy and emergency plans to insure a reliable and resilient energy supply for all New Yorkers. New Yorkers power their homes and businesses through robust, interconnected networks that draw from a wide range of energy sources. As fuel supplies continue to transition away from fossil-based to clean energy sources, this shift will introduce new challenges, with impacts to emergency preparedness plans, responses, and mitigation strategies that must adapt to ensure a reliable energy supply to all New Yorkers.

The New York State Energy Emergency Plan[1] outlines energy emergency preparations and responses (see Figure 1 and Table 1). The objectives of the Energy Emergency Plan are to protect public health, safety, and welfare; enhance the resiliency of services while minimizing economic disruption; and direct scarce energy supplies in an equitable manner among competing essential purposes. The Energy Emergency Plan is an integrated resource plan specifying actions in the event of an energy or fuel supply emergency and is part of and coordinated with the State's larger Comprehensive Emergency Management Plan (CEMP)[2] and other emergency response documents, such as the Emergency Support Function #12 Energy Annex guiding coordinated response actions for this sector.

The Energy Emergency Plan provides flexibility to meet a broad range of supply disruptions, incorporate private sector emergency planning efforts, relies on voluntary rather than mandatory strategies, includes detailed options to respond to a broad range of information needs, and helps develop New York State's emergency response options considering federal strategies and energy industry practices. The Energy Emergency Plan provides advance notice of available emergency response strategies and options to energy suppliers, energy users, and all levels of government to allow necessary preparations before an actual emergency occurs. It minimizes delays in establishing response mechanisms during energy emergencies, promotes consumer and supplier cooperation during periods of emergency, and coordinates State, federal, and private sector actions for maximum effectiveness during an energy emergency.

The New York State Energy Security Plan provides State and federal governments, as well as other stakeholders, with an up-to-date, comprehensive assessment of the State's energy supply chain, energy risk profile, and energy emergency mitigation and response measures. Since all critical infrastructure sectors depend on energy, a change in energy infrastructure can ripple across the security and resilience of the sectors, creating threats to public safety, the economy, and national security. Energy security planning ensures a reliable and resilient supply of energy by identifying, assessing, and mitigating risks to energy infrastructure, and plans for their response and recovery from energy supply disruptions. The Energy Security Plan details how the State, working with energy stakeholders, can secure its energy infrastructure against all physical and cybersecurity threats, mitigate the risk of energy supply disruptions, enhance the response to, and recovery from, those disruptions, and ensure that the State has a secure, reliable, and resilient energy infrastructure.

[1] New York State 2024 Energy Emergency Plan: An Integrated Resource Plan Specifying Actions in the Event of an Energy or Fuel Supply Emergency. January 2025. https://www.nyserda.ny.gov/About/Publications/Energy-Analysis-Reports-and-Studies/New-York-State-Energy-Emergency-Plan.

[2] New York State Comprehensive Emergency Management Plan. Hazard Mitigation, Response, Long-Term Recovery. March 2025. https://www.dhses.ny.gov/nys-comprehensive-emergency-management-plan-cemp

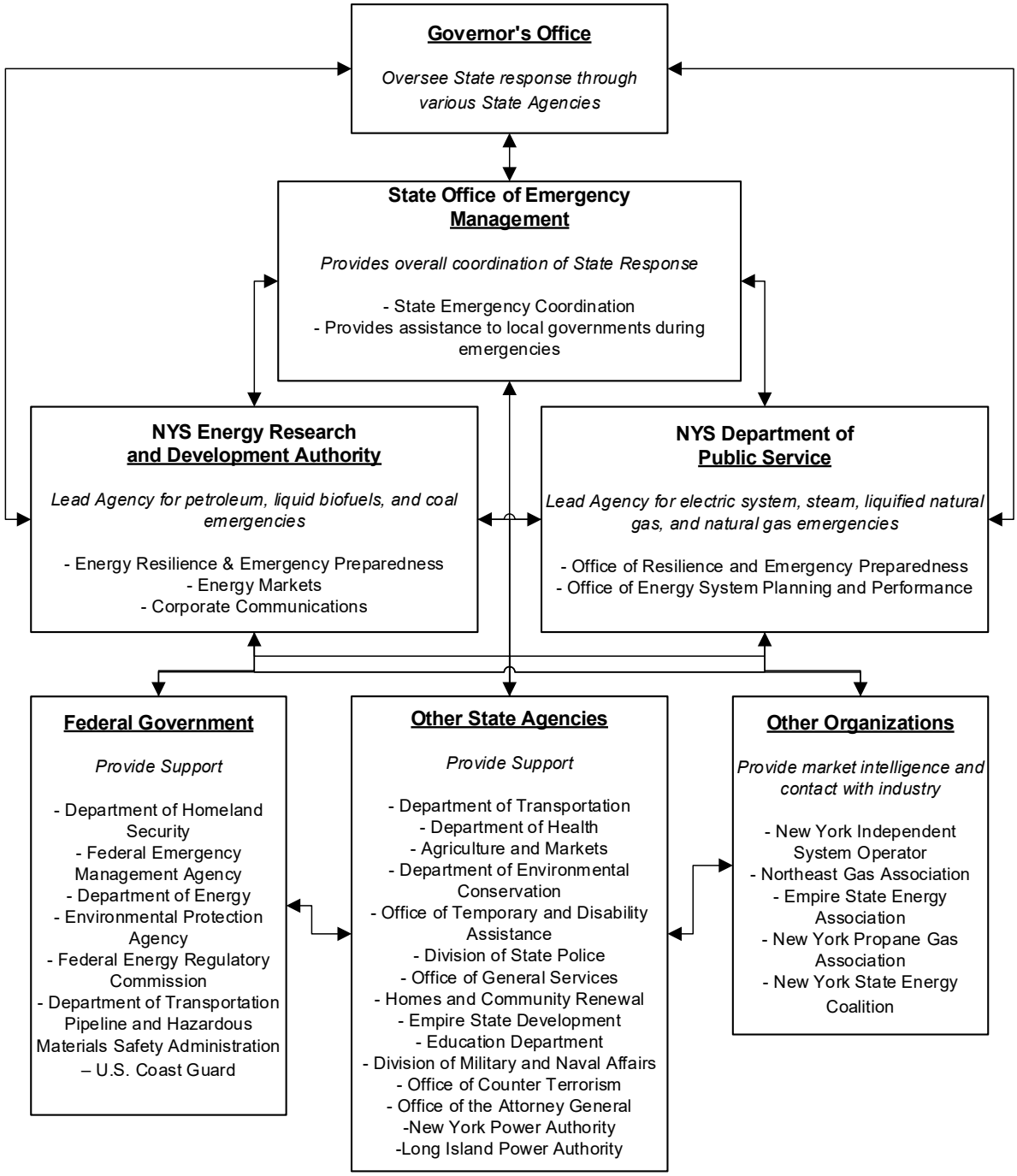

Figure 1: Network of Organizations Involved in State Energy Emergency Planning and Response Activities[3]

[3] New York State 2024 Energy Emergency Plan: An Integrated Resource Plan Specifying Actions in the Event of an Energy or Fuel Supply Emergency. January 2025. https://www.nyserda.ny.gov/About/Publications/Energy-Analysis-Reports-and-Studies/New-York-State-Energy-Emergency-Plan.

Table 1: New York State Energy Emergency Response Agency Responsibilities[4]

Agency	Responsibility
NYS Energy Research and Development Authority (NYSERDA)	• Serves as lead agency for petroleum, liquid biofuels, and coal emergency response and the Fuel NY Strategic Fuel Reserve Initiative. Assists in implementing petroleum and coal emergency procedures. • Monitors international and national energy markets and the effect on the overall fuel price, supply, and demand in New York State. Discusses potential corrective actions with major energy suppliers. • Issues emergency orders and directives as necessary and appropriate. • Operates a public relations center and maintains liaison with the media and local governments for liquid fuels.
NYS Department of Public Service (DPS)	• Serves as lead agency for electric system, natural gas, steam, and Liquified Natural Gas emergency response. Assists in implementing electric and natural gas emergency procedures. • Serves as the coordinating agency for Emergency Support Function #12 (Energy). • Monitors status of interruptible industrial and commercial natural gas users and users with dual fuel capability. • Maintains liaison with the electric, natural gas, and steam dispatch centers of New York State's investor-owned local distribution companies, electric generators, energy service companies and marketers, wholesale suppliers, and key State agencies. • Maintains liaison with the New York State Independent System Operator (NYISO) and Northeast Gas Association. • Maintains communication with the New York State Office of Emergency Management (OEM). • Maintains liaison and communication with the large electric and natural gas utilities, the New York Power Authority (NYPA), OEM, New York State Intelligence Center (NYSIC), Office of Information Technology Services, and NYISO for cyber and/or physical security incidents that result in a severe or extended energy emergency. • Investigates and enforces regulated entities' compliance with emergency response plan obligations under Public Service Law and regulations as necessary.
NYS Office of Emergency Management (OEM)	• Provides overall coordination of New York State emergency response. • Manages or co-manages major staging areas during emergencies that could require on-site fueling depots. • Runs the Joint Information Center; manages Emergency Support Functions and ad hoc taskforces under the State's Comprehensive Emergency Management Plan (CEMP).
New York Power Authority (NYPA)	• Owns and operates seventeen (17) generating facilities with more than 1,550 miles of high-voltage transmission lines across the state. • A Non-Disaster Preparedness Committee Support Member for Emergency Support Function #12.
Long Island Power Authority (LIPA)	• Non-Disaster Preparedness Committee Support Member for Emergency Support Function #12.
NYS Agriculture and Markets (AGM)	• Maintains liaison with farm and agriculture-related associations. • Obtains status of fuel requirements for seasonal agricultural production. • Enforces compliance with the Fuel NY Initiative as it relates to Article 16 § 192-h of the NYS Agriculture and Markets Law for alternative power sources at retail gasoline outlets.
NYS Empire State Development (ESD)	• Maintains information on status of industry and commercial closings due to energy shortages. • Provides information on energy supply circumstances affecting specific industries. • Maintains liaison with regional tourism centers, businesses, trade groups, and utility companies.
NYS Education Department (State Ed)	• Maintains liaison with all school districts. • Coordinates with school administrators to identify needed energy supplies.
NYS Division of Military and Naval Affairs (DMNA)	• Identifies fuel shortages affecting military operations. • Prepares inventory of available heavy equipment and supplies. • Assists with fueling missions supporting convoy escorts, security, traffic control, and staging area operations.

[4] New York State 2024 Energy Emergency Plan: An Integrated Resource Plan Specifying Actions in the Event of an Energy or Fuel Supply Emergency. January 2025. https://www.nyserda.ny.gov/About/Publications/Energy-Analysis-Reports-and-Studies/New-York-State-Energy-Emergency-Plan.

Agency	Responsibility
NYS Department of Transportation (DOT)	• Assists in preparations to expedite energy resource deliveries when necessary. • Coordinates with federal agencies for any necessary waivers (e.g., weight restrictions, driver's hours of operation, geographical area limitations) to expedite fuel distribution. Conducts maintenance operations such as snowplowing, sanding, and traffic signals. • Coordinates with the Port of Albany and the U.S. Coast Guard for ice-breaking operations on the Hudson River to facilitate winter fuel deliveries. • Maintains liaison with appropriate federal agencies, such as the U.S. Department of Transportation and local transit authorities.
NYS Office of General Services (OGS)	• Manages the operation of approximately 55 New-York-State-owned facilities statewide. Solely responsible for supporting and managing the energy needs of numerous NYS agencies that occupy these facilities. • Collaborates in the design, oversight, policy development, and administration of the centralized electricity procurement for all large NYSOGS facilities and large facilities of other NYS agencies. • Receives emergency resources or assistance requests from OEM or the SEOC when activated as a support member of Emergency Support Function #7 (Logistics). • Maintains contact with all institutions supplied under NYS fuel contracts, including gasoline and E85 (flex fuel), diesel engine fuel, heating fuel oil, LP gas (propane), and natural gas.
NYS Office of Temporary and Disability Assistance (OTDA)	• Oversees and supervises local districts in administering the Home Energy Assistance Program (HEAP) to assist eligible households in meeting home energy costs. Program components include regular, emergency, heating equipment repair/replacement, cleaning and tuning, and cooling. • Provides funding to New York State Homes and Community Renewal (HCR) for the Weatherization Assistance Program (WAP) and to NYSERDA for energy efficiency services. • Coordinates with DPS, HCR, NYSERDA, and the State Office for the Aging on HEAP energy-related matters for low-income families. • Manages relationships with over 3,000 energy vendors, including large electric and natural gas utilities, municipal utilities, vendors of deliverable fuels such as oil, kerosene, propane, wood, and wood products, as well as vendors that perform heating and air conditioning services. Activities include negotiating vendor agreements, certifying participating vendors, and maintaining a central vendor database.
NYS Homes and Community Renewal (HCR)	• Determines status of State-assisted housing fuel and energy requirements and maintains liaison with housing owners and statewide associations. • Coordinates WAP network response to decrease energy use in low-income housing units. • Issues energy conservation recommendations to all HCR-regulated property owners.
NYS Division of State Police (State Police)	• Assists in emergency energy resource deliveries to critical or sensitive locations through vehicle escorts and traffic control and enforces other emergency response measures as required by statute.
NYS Office of Counter Terrorism (OCT)	• Oversees and coordinates State agencies' homeland security resources. • Recommends and communicates changes to National Terrorism Advisory System threat alert level. • Reviews and assesses measures taken to protect energy-related critical infrastructure by State agencies and others. • Prescribes protective measures commensurate with current terrorist threat. • Chairs the Critical Facilities and Infrastructure Branch as well as the Fuel Taskforce and Pump and Generator Taskforce. • Takes the lead for cybersecurity issues.
NYS Department of Environmental Conservation (DEC)	• Issues waivers of environmental restrictions (e.g., sulfur in fuel content standards). • Maintains liaison with the U.S. Environmental Protection Agency.
NYS Department of Health (DOH)	• Maintains liaison with the New York City Department of Health and Mental Hygiene, hospitals, and other health-related agencies and facilities. • Acts as the State's lead agency for nuclear and radiological emergencies.
NYS Office of the Attorney General (AG)	• Supports enforcement actions as necessary.
New York State Intelligence Center (NYSIC)	• Collects, evaluates, analyzes, and disseminates information and intelligence data regarding criminal and terrorist activity relevant to New York State, including energy infrastructure.

Agency	Responsibility
Joint Security Operations Center (JSOC)	• Operates as a statewide cyber command center, providing insight into the cyber threat landscape across the State and enhancing collaboration as a hub for information sharing, response efforts, and cyber coordination across New York State, New York City, Albany, Syracuse, Buffalo, Rochester, Yonkers, local and regional governments, critical infrastructure, and federal partners.

New York State must continue to prioritize energy emergency preparedness. This includes ongoing risk evaluation and response planning in addition to support for collaboration among both current and future energy system stakeholders. These emergency preparedness efforts strengthen not only the energy sector but increase the resiliency of New York State and its population.

2. Energy Emergency Planning and Response-Related Roles and Responsibilities for State Agencies

2.1. Energy Emergency Management Structure for Energy Emergency Planning and Response

Lead energy agency responsibility in the event of a severe or extended energy emergency is assumed by either NYSERDA or DPS, depending on the type of energy involved. NYSERDA assumes lead agency status for petroleum, liquid biofuels, or coal supply emergencies. DPS assumes lead agency status for electric systems, natural gas, steam, and liquefied natural gas (LNG) emergencies. The State Office of Emergency Management (OEM) assumes responsibility for coordinating the overall State response, including the activation and operation of the State Emergency Operations Center, as necessary. DPS serves as the coordinating agency, and NYSERDA serves as a supporting agency for Emergency Support Function #12 (Energy). NYSERDA and DPS also receive support from other State agencies, federal government partners, and other key stakeholders including local distribution companies. Figure 1, above, provides a high-level overview of the network and interactions between NYSERDA, DPS, OEM, Governor's Office, and other State, federal, and private partners involved in the State's energy emergency planning and response activities.

2.2. Multistate and Regional Collaboration

2.2.1. Federal Government State Energy Emergency Assurance Coordinators Program, Emergency Management Assistance Compact

NYSERDA and other New York State agencies routinely engage in multistate and regional collaboration energy assurance planning and response. This collaboration occurs regularly throughout the year and increases during potential disruptions to energy delivery, including ahead of major storms or other conditions which could affect energy markets in New York State and neighboring states.

The Energy Emergency Assurance Coordinators Program (EEAC) is a cooperative effort between the U.S. Department of Energy Office of Cybersecurity, Energy Security and Emergency Response (CESER), the National Association of State Energy Officials (NASEO), the National Association of Regulatory Utility Commissioners (NARUC), the National Governors Association (NGA), and the National Emergency Management Association (NEMA). The EEAC Program provides a network for states to share and receive information with other states and CESER prior to and during energy emergencies. EEACs include representatives from State Energy Offices, Public Service Commissions, and other State agencies.

The Emergency Management Assistance Compact (EMAC) Program is a national disaster-relief compact that New York State can leverage when it needs assistance from another state during governor-declared states of emergency or disaster. EMAC is implemented through the State Office of Emergency Management on behalf of the Governor. Every state in the U.S. has signed onto this compact.

3. Role of Local Government in Energy Security Planning and Emergency Preparedness

OEM and other stakeholders consult with local governments to determine the existence of unusual energy conditions or events that should be addressed. The following circumstances could require special attention:

- Local laws, regulations, and ordinances that might impede the success of emergency response programs.
- Local policies regarding traffic flow, routes, and transit service that have the potential for improving the effectiveness of energy emergency response measures initiated at the State level.
- Energy usage patterns that deviate from historic trends.
- Fuel requirements for essential municipal services and supporting alternative operational patterns during an emergency.

In the event of these circumstances, local governments have numerous resources and procedures with which to respond.

3.1. County Emergency Managers

County Emergency Managers coordinate emergency response activities for the county executive or chief elected official and advise on the need for declaring a local state of emergency based on the severity of the situation and the necessity to use additional executive power to formulate an effective response. County Emergency Managers perform County Emergency Preparedness Assessments (CEPA) with local governments and with input from the Division of Homeland Security and Emergency Services (DHSES).

3.2. Mutual Aid, Local Hazard Mitigation Planning

DPS works closely with electric utilities to ensure they have sufficient staff and are prepared for emergencies. Utilities draw on intrastate mutual aid, when available, and also secure interstate support through external contracts and agreements. In addition, utilities work with DHSES to coordinate with crews entering the United States from Canada, who can assist with restoration efforts.

3.3. City and County Energy Coordinators

Local municipal officials may appoint staff to serve as energy coordinators to support emergency fuel inquiries,[5] conduct fuel-related surveys, submit reports, and identify energy issues in communities

[5] In response to the Organization of the Petroleum Exporting Countries (OPEC) oil embargo, the Emergency Fuel Office (predecessor to the State Energy Office) established a network of city and county Energy Coordinators in 1974 to provide local-level energy information.

across the state. The network of city and county energy coordinators is a vital link between consumers and the State government. OEM maintains a list of local energy coordinators and facilitates periodic training.

4. Industry's Role in Energy Security Planning and Emergency Preparedness

The energy industry in New York collaborates closely with the State to prepare for, respond to, and mitigate energy emergencies, and interacts with all relevant agencies tasked with coordinating a response. The natural gas and electric industries collaborate primarily with DPS and DHSES on energy emergency issues, while the liquid petroleum industry interacts closely with NYSERDA and DHSES. Stakeholders managing critical energy infrastructure are equipped to address a wide range of risks. In anticipation of and during emergencies, various industry associations provide State agencies regular updates on critical infrastructure, emergency responses, and planning efforts.

5. New York State Energy Sector Threats and Vulnerabilities

5.1. Risk-Based Energy System Analysis

New York State employs an all-hazards approach to emergency planning, using risk-based analysis to strengthen and safeguard its energy systems. The State regularly assesses its energy profile, potential threats and vulnerabilities, and its energy security and emergency response capabilities to guide preparedness efforts and prioritize response strategies during energy emergencies. This includes the current portfolio of energy emergency preparedness plans: the Energy Emergency Plan, the CEMP, the Energy Security Plan, and the Emergency Support Function #12 Energy Annex. Resilience and hazard mitigation efforts also use this risk-based data analysis to prioritize and address hazards most likely to occur and create consequences that impact the State and at-risk populations in the energy sector (i.e., groups such as disadvantaged communities [DACs] as well as particularly vulnerable groups, including senior citizens).

In New York State, energy risks are evaluated by both the probability of the event happening and its potential impact, as illustrated in Figure 2. The probability of a specific threat is calculated based on a given energy system's location combined with the likelihood of that event occurring on an annual basis. Natural hazards are informed by historic climate data in collaboration with the State Hazard Mitigation Plan and probabilistic models. The impact of the event is a combination of the vulnerability of an asset to the threat as well as the consequence of the energy asset being unavailable. The vulnerability is specific to each asset type by energy sector and based on the expected duration of an outage from exposure to a specific threat. The consequence of an asset being unavailable is specific to each asset and market but is primarily defined from the lost energy supply occurring during an asset outage. The resulting risk scores are used to prioritize energy emergency responses, planning, and mitigation efforts across New York State.

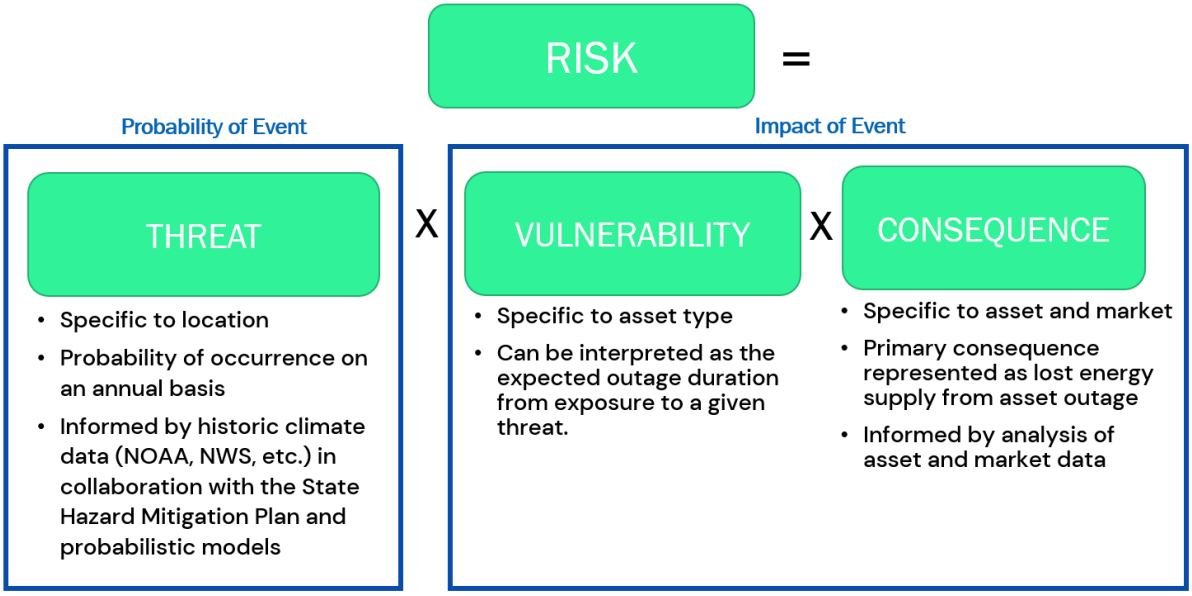

Figure 2: Risk Assessment Methodology[6]

5.2. Historic Emergency Events and Energy Disruptions

The events listed below exposed vulnerabilities in New York State's energy supply network to produce significant disruptions.

5.2.1. Hurricanes and Tropical Storms

- Power Supply
    - In October 2012, Superstorm Sandy made landfall, causing power outages that left several hundred thousand customers in downstate New York without electricity for more than two weeks.
    - In August 2011, Hurricane Irene caused significant power system damage due to widespread flooding, leading to one of the longest electrical restoration delays in State history, lasting over four months in Cornwall, New York.
- Liquid Fuel and Natural Gas System
    - Two weeks after Superstorm Sandy in 2012, only about 20 percent of retail gasoline stations in the downstate region were operational, primarily due to electrical supply disruptions.
    - Liquid fuel terminals and pipeline assets experienced wind- and storm-surge-related impacts resulting from Superstorm Sandy. Downstate liquid fuel assets experienced

[6] New York State Energy Security Plan. September 2023.

damage to equipment at terminals, marine facilities, and pipeline pump stations from the extreme winds and storm surge.

- In 2011 and 2012, widespread loss of power from Hurricanes Irene and Sandy led to a number of pipelines losing power, forcing shutoffs in liquid fuel supply systems.
- In 2011 and 2012, flooding from those storms washed out several large natural gas pipelines upstate and in the Hudson Valley.

5.2.2. Winter Weather – Polar Vortices

- **Lake Effect Snow.** Large amounts of snow regularly disrupt liquid fuel distribution, including gasoline and heating fuel, in the lake effect areas of New York State.
- **Winter Storm Elliot.** In December 2022, a period of cold temperatures led to a surge in natural gas demand. When combined with production curtailments, this resulted in critically low pressure within natural gas distribution systems in the downstate region.
- **1998 Ice Storm.** Freezing rain and heavy ice accumulation in January 1998 caused widespread power outages, leaving millions without electricity for days, and in some areas, weeks. The storm also disrupted cross-border electric energy delivery into New York State.

5.2.3. Cyberattacks and Technological Events

- **CrowdStrike.** On July 19, 2024, a CrowdStrike software update triggered a widespread IT outage, crashing millions of Windows systems. The disruption severely impacted critical services and business operations across the energy sector (see also Section 5.5.2).
- **Volt Typhoon.** On February 7, 2024, the Cybersecurity and Infrastructure Security Agency, National Security Agency, and Federal Bureau of Investigation jointly assessed with high confidence that state-sponsored cyber actors from the People's Republic of China—known as Volt Typhoon—had compromised the IT environments of multiple critical infrastructure organizations, including those in the U.S. energy sector.
- **Colonial Pipeline Shutdown.** The May 2021 shutdown of Colonial Pipeline remains one the most high-profile examples of a ransomware attack targeting an energy company. It caused significant disruption to U.S. energy delivery systems, affecting fuel supply across the East Coast, including New York State (further details are provided in Section 5.5.1).
- **Northeast Blackout of 2003.** A software error in an alarm system in an Ohio utility triggered a cascading failure across the electrical grid in August 2003, disrupting transmission and generation capacity throughout the Northeastern and Midwestern United States as well as Ontario, Canada. The blackout left approximately 55 million people without power. In New York City, the outage lasted for 29 hours (see also Section 5.5.2).

5.3. New York State Energy Sector Natural Hazards

Naturally occurring hazards that pose a threat to energy delivery in New York State include the following:

- Flooding,
- Strong Winds,
- Severe Winter Snowstorms,
- Ice Storms,
- Tornadoes,
- Coastal Hazards,
- Drought,
- Extreme Cold,
- Hurricanes,
- Severe Thunderstorms,
- Heat Waves, and
- Wildfires.

As noted in Section 5.1, New York State follows an all-hazards approach to emergency planning. This includes the development of multiple hazard-specific annexes to the State CEMP, each informed by risk-based data to address the most likely and consequential threats to the state and at-risk populations. Each annex outlines tailored response actions for both natural and human-caused hazards. The State Hazard Mitigation Plan (SHMP) identifies and assesses risks associated with natural hazards and disasters, providing a foundation for long-term risk reduction strategies. The Energy Emergency Plan incorporates SHMP data to support planning, response, and mitigation efforts specific to energy-related risks.

5.4. Climate Change and Increasing Severity and Frequency of Extreme Weather

Climate change is increasing the severity and frequency of hazardous events, posing growing risks to New York State's energy security. In the Northeastern United States, every component of the electricity supply chain, as well as fuel and gas distribution systems, is vulnerable to climate-related threats, including rising temperatures, increased precipitation, reduced water availability, sea level rise, and more frequent, intense hurricanes.

In particular, the State must be prepared for more frequent and severe tropical storms and hurricanes in the coming decades. Between 1980 and 2020, the proportion of major storms, including category 3, 4, and 5, in the North Atlantic rose from 10 percent to 40 percent of all hurricanes. According to the First Street Foundation's Wind Model, annual damages in the North Atlantic are projected to increase by 87 percent by 2053, driven by a northward shift in hurricane activity. New York State has begun mobilizing resources through local and State hazard mitigation efforts to address these evolving threats. Mitigation measures will be discussed further in Section 8.

5.5. New York State Cybersecurity and Human-Caused Threats and Vulnerabilities

Human-Caused hazards posing a threat to energy delivery in New York State include the following, and are subsequently discussed in more detail in Sections 5.5.1 through 5.5.10:

- Cyberattacks,
- Technological Hazards,
- Physical Attacks,
- Criminal Activity,
- Drones,
- Terrorism,
- Pandemics,
- Transportation Failure,
- Electromagnetic Pulses and Space Weather, and
- Energy Transition Policies.

5.5.1. Cyberattacks

Cyberattacks are increasingly prevalent both in the global energy sector and across many sectors in New York State. The examples cited below are representative of such events.

In December 2020, it was announced that updates to SolarWinds' Orion software, a network monitoring tool used by Con Edison, Orange and Rockland Utilities (O&R), and businesses in the clean energy sector, had been compromised, enabling a widespread cyberattack targeting numerous public and private sector entities. While these companies have experienced various cyber incidents, including the SolarWinds breach, none of the events to date resulted in material impacts.

The May 2021 Colonial Pipeline shutdown remains one of the most prominent examples of a ransomware attack on an energy company, causing widespread disruption to U.S. energy delivery systems. The pipeline, which transports millions of barrels of refined gasoline, diesel, and jet fuel daily from Texas to New York State, was taken offline for six days. Although Colonial paid the ransom and regained access to its systems quickly, the company kept operations suspended to assess the extent of the breach and to install security measures to detect and prevent subsequent attacks.

5.5.2. Technological Hazards

Technological hazards are human-caused events that stem from accidents, operational errors, or deficient infrastructure. Power outages are the most common consequence of such hazards. The condition of infrastructure within the electricity and transportation subsectors are of particular concern due to the advanced age of many systems across New York State's energy network. Aging infrastructure

not only undermines system resilience but also amplifies risks from other threats, including cyberattacks and other human-caused disruptions.

On July 19, 2024, a faulty CrowdStrike update triggered a widespread IT outage, crashing millions of Windows systems. Critical services and business operations were disrupted, revealing the risks of technological reliance across many sectors of the energy delivery system. Fortunately, most systems were restored within a few hours with minimal lasting effects.

Technological incidents, defined by the U.S. Pipeline and Hazardous Materials Safety Administration as events involving the unintended release of product, are the most common cause of pipeline disruptions. Between January 2016 and December 2020, New York State experienced 43 such incidents, resulting in two fatalities, six injuries, and $8.5 million in damages.

5.5.3. Physical Attacks

Intentional attacks on energy infrastructure are an increasing concern, particularly following incidents in December 2022 that targeted electricity substations in Washington State and North Carolina. Energy infrastructure is a target for a range of bad actors, including domestic and foreign terrorists, ideological activists, and disgruntled employees. In some cases, energy operators and law enforcement are unable to determine the motive behind infrastructure damage, such as distinguishing whether gunfire damage to energy equipment is intentional or incidental.

Many federal and State agencies are involved in planning for and responding to physical threats against energy infrastructure. These include the DHSES Office of Counter Terrorism Critical Infrastructure Protection Unit; NYSIC; the Department of Public Service Office of Resilience and Emergency Preparedness; the U.S. Department of Energy Office of Cybersecurity, Energy Security, and Emergency Response; the U.S. Department of Transportation Security Administration; and the U.S. Department of Homeland Security Cybersecurity and Infrastructure Security Agency.

5.5.4. Criminal Activity

Criminal activity related to utility assets and sites takes many forms, including theft, trespass, burglary, and vandalism. While individual incidents often result in minor disruptions and limited financial loss, the cumulative impact, from equipment replacement and supply loss to repair efforts and security upgrades, can be substantial. Combined with the safety and reliability risks inherent to utility infrastructure, these factors underscore the need for robust and proactive security measures.

5.5.5. Unmanned Aircraft Systems (Drones)

Unmanned aircraft systems (UAS), commonly known as drones, are becoming more widely used by the general public. As technology advances, they are becoming easier to operate and more affordable. The majority of UAS activity is conducted by recreational users who comply with Federal Aviation Administration regulations. However, there have been instances where drones have been modified for malicious purposes, including attempts to cause harm or for espionage. In response, utility companies and other critical infrastructure operators are investing in UAS detection and forensic analysis capabilities. They also coordinate with DPS Utility Security Section as well as local, State, and federal authorities to report and investigate drone activity.

5.5.6. Terrorism

Targeted attacks on the electricity subsector and pipelines worldwide have demonstrated the serious disruptions they can cause to supporting infrastructure, system reliability, and dependent systems.

Domestic Violent Extremists and Foreign Terrorist Extremists

The U.S. Department Homeland Security recently reported that racially motivated violent extremists who support accelerationist ideologies maintain interest in attacking the power grid and other energy infrastructure. These known and evolving threats are monitored across the energy landscape and emphasize the importance of physical security to energy critical infrastructure assets. Concerns persist over the continued interest of foreign terrorist organizations and homegrown violent extremists to carry out attacks in the United States.

5.5.7. Pandemics

Pandemics can significantly disrupt energy sector operations by reducing workforce availability, both due to employee illness and public health measures such as social distancing or stay-at-home orders. These impacts are especially pronounced in roles that require highly skilled and qualified workers, such as control room operators, electric line workers, and hazmat-certified petroleum truck drivers. These skilled workforces are limited in number and cannot be easily or quickly replaced, given the extensive training, credentialing, and other qualifications required.

5.5.8. Transportation Failure

New York State's petroleum sector is vulnerable to disruptions in transportation systems, because these potential disruptions affect terminals, retail locations (i.e., gasoline stations), and end-use customers (i.e., for heating oil), all of which rely almost entirely on trucking. In addition, the sector depends heavily on rail for the transport of ethanol and gasoline additives to petroleum terminals. Beyond pipelines, marine deliveries through the States' navigable ports and waterways play a critical role. The Port of New York serves 80 million people (35 percent of the entire U.S. population) and ranks first in the nation for movement of petroleum, including aviation fuel, gasoline, and home heating oil. However, the sector's dependence on aging transportation infrastructure poses a growing risk to the reliability of the State's energy systems.

5.5.9. Electromagnetic Pulse and Solar Storms

An electromagnetic pulse (EMP) is a burst of electromagnetic radiation caused by either natural phenomena, such as solar storms (i.e., space weather), or man-made sources, such as explosions. EMPs can induce electrical surges capable of damaging or disabling electronic equipment. The electric grid's control systems and communication networks can be disrupted, leading to blackouts or outages if an EMP occurs. Solar storms, in particular, can cause geomagnetic disturbances especially in regions with electrically resistive geologic formations and may interfere with the operation of high-voltage lines.

5.5.10. Energy Transition

New York State is making significant progress in its transition away from fossil-based energy sources. This transformation is already reshaping the traditional risk profile of the State's energy systems. Understanding key policy drivers, such as the Climate Act, and their effects on energy generation,

transmission, and supply is critical to understanding the risks to maintaining system reliability, providing adequate energy supply, and securing affordable energy.

The primary challenges of the energy transition include shifts in fuel sources, resource adequacy, transmission capacity, generation retirements, new intermittent generation sources, and increasingly variable energy demand. These challenges are actively being analyzed and mitigated through New York's energy planning processes. Current energy policy designs include temporary off-ramp provisions intended to preserve system reliability and resilience while pursuing aggressive decarbonization targets in the Climate Act. New York continues to monitor and evaluate emerging risks and incorporates findings into ongoing response and mitigation planning processes.

In the electrical sector, the energy transition is expected to introduce significant risks. These risks include electrical generators being retired at a faster pace than the construction of new resources to replace them, and associated siting and supply chain concerns. Additionally, output from new renewable resources is intermittent and of limited duration. While battery storage is the primary solution to fill the voids, there are associated challenges, as extended high-demand periods rapidly deplete current storage capabilities. Concern about fire risks associated with the current energy storage technology has received attention. The growth of electric demand is likely to continue due to electrification, requiring more generation and/or transmission infrastructure to reliably meet this rising customer demand.

The transition also affects New York's liquid petroleum and natural gas systems, which are currently well-established and generally resilient. These sectors are expected to undergo significant changes. The liquid fuels and the natural gas sectors face the challenge of continuing to provide safe, reliable, and affordable energy supply amid potentially declining long-term demand. As this sector responds to the energy transition, industry focus is shifting toward innovation and the integration of cleaner products, such as liquid biofuels, renewable natural gas, and hydrogen. However, these newer products often rely on less-established supply chains and emerging technologies, which may introduce additional vulnerabilities. Regulatory uncertainty further complicates the landscape, contributing to reduced capital investment in infrastructure. The energy transition is discussed in more detail below, in Section 8.

Table 2 summarizes major risks to New York State's three energy sectors: Electric Power, Natural Gas, and Liquid Fuels.

Table 2: Major Risks of Energy System Sectors[7]

Hazard	Electric Power	Natural Gas	Liquid Fuels
Flood (Riverine, Coastal, Lakeshore, Sea-Level Rise, Flash Flood)	Flooding may damage equipment exposed to water and flood-related debris.		
	Examples: power generation and storage equipment, substations, control center buildings, underground transmission lines.	Examples: underground pipelines and storage facilities.	Examples: biofuel process units, tanks, underground pipelines, on-site electrical equipment at terminals.
	Flooding on roads can create access issues for damage assessment and restoration activities.		
Wind	High winds can damage transmission and distribution infrastructure directly, including transmission towers, power lines, and transformers, or indirectly, if debris and fallen tree limbs impact power lines. Damage to power generators from high winds can reduce the total amount of electricity available and, in extreme causes, create grid instability.	Power outages may impact select electric compressors operations.	Debris from high winds can cause road closures and create access issues for fuel distributors attempting to resupply retail stations and end-users. Extended regional power outages may increase demand for fuel for backup generators. Power outages may also shut down operations at terminals, pump stations, retail stations, and out-of-state refineries. Terminal equipment could be damaged by high winds, inhibiting the ability to receive fuel at the port or distribute fuel over the truck rack.
Tornado	High winds can cause damage to power lines and power generation facilities.	High winds can damage compressor stations, metering and regulating stations, and other above-ground facilities.	High winds can cause damage to power lines and power generation facilities.
	Damage and debris on roads may create access issues for crews attempting restoration.		
	Damage to communication systems may complicate restoration activities.		
Winter Storms and Extreme Cold	Ice accumulation on power lines may cause power outages. Cold temperatures may cause freezing in generation facilities' cooling towers, preventing electric generation. Other equipment within generation facilities may be inoperable or damaged in cold temperatures, reducing electricity availability. Freezing temperatures impacting rail systems may limit feedstock to power generation (e.g., coal). Coal piles stored at power plants may freeze solid and be unavailable for generation. Increased demand for heating during cold weather may strain available capacity, causing RTOs/ISOs to request voluntary electricity conservation or to implement rolling blackouts to maintain grid stability.	Freezing may impact non-weatherized equipment, which can cause production shut-ins. Increased demand for heating can strain natural gas supply and may cause dual-fuel power plants to switch to fuel oil to conserve natural gas. In extreme cases, natural gas prioritization for heating can cause power outages due to limited gas available for generation. Severe natural gas supply shortages or damage to infrastructure may force transmission pipelines and LDCs to interrupt supply to firm customers.	Non-weatherized equipment may freeze or be damaged by cold temperatures, including frozen product within piping systems, malfunctioning flow control equipment, flaring, and production shut ins. A region experiencing prolonged power outages may also see increased demand for backup generator fuels.
	Icy roads and storm-related debris may create access issues for crews attempting restoration.		
	Ice and snow accumulation and other storm-related impacts may impact communication systems, complicating restoration activities.		

[7] New York State Energy Security Plan. September 2023.

Hazard	Electric Power	Natural Gas	Liquid Fuels
Coastal Hazards (including hurricanes)	High winds associated with coastal storms can damage transmission and distribution infrastructure directly, including transmission towers, power lines, and transformers, or indirectly, if debris and fallen tree limbs impact power lines. Storm surge and flooding related to these storms may flood and disable low-lying substations. Damage to power generators from high winds or flooding can reduce the total amount of electricity available and, in extreme causes, create grid instability.	Power outages may impact select electric compressors operations.	Both debris from high winds and flooding can cause road closures and create access issues for fuel distributors attempting to resupply retail stations and end-users. This could cause localized fuel shortages. Extended regional power outages may increase the demand for fuel for backup power generation. Power outages can shut down operations at terminals, pump stations, retail stations, biofuel production facilities and out-of-state refineries. Terminal infrastructure, especially located at ports, can be impacted by flooding, with tank damage or even washed away. Other terminal equipment could be damaged by high winds, inhibiting the ability to receive fuel or distribute fuel over the truck rack. Facilities may shut down ahead of storm for personnel safety. Shoaling in ports can prevent ship and barge traffic to terminals.
	Outages of communications systems caused by high winds can complicate restoration efforts.		
	Debris and flooding on roads may create access issues for crews attempting restoration.		
Thunderstorm (Hail and Lightning)	Blown transformers and downed trees may impact power lines. High winds can cause damage to power lines and power generation facilities. Lightning strikes can damage transmission and distribution infrastructure, transformers, substations, and power generation facilities, and potentially start fires.	Power outages may impact select electric compressor operations. High winds can cause damage to processing plants, compressor stations, metering and regulating stations, and other above-ground facilities, as well as lightning strikes can potentially start fires. Natural gas is extremely combustible, and lightning-induced fires could become catastrophic if gas is ignited.	High winds can cause damage to biofuel production facilities, terminals, and other above-ground facilities or operations may be impacted by power outages. Lightning strikes can damage biofuel production facilities, terminals, and pumping stations, and potentially start fires. Liquid fuels are extremely combustible, and lightning-induced fires could become catastrophic if fuel is ignited
	Flooding and debris on roads may create access issues for crews attempting restoration.		
Drought	Reduced hydroelectric generation due to low-water levels. Reduced efficiency at thermoelectric generation facilities if there are constraints on steam or cooling.		Impacts to biofuel feedstocks from low moisture in soil. Low-water levels can prevent barge traffic on inland waterways. Low-water supply may limit biofuel production operations if alternative water supply is not available.
Extreme Heat	Increased demand for air conditioning may strain available generation capacity, causing RTOs/ISOs to operate below reserve margins. Increased risks of wildfires from power lines.	High temperatures can prompt RTOs/ISOs to call peaker plants online to meet electricity demand for cooling, potentially straining supply of natural gas.	Can reduce efficiency at biofuel production facilities.

Hazard	Electric Power	Natural Gas	Liquid Fuels
Wildfire	Damage to power lines and power generation facilities. May trip offline due to smoke. Utilities may shut off power to prevent wildfires (e.g., high temperatures and high winds).	Natural gas is extremely combustible, especially if above-ground infrastructure is exposed to fire.	Liquid fuels are extremely combustible, especially if above-ground infrastructure is exposed to fire.
	Active fire perimeters encompassing roads may limit crews' ability to conduct damage assessment and restoration.		
Dam Failure	Damage to downstream infrastructure due to flooding and debris.		
	Hydroelectric power generation may be disrupted, which may also reduce black start capabilities.	Unearthing and rupturing of pipelines.	Unearthing and rupturing of pipelines.
Human Error	Accidental car crashes into power poles may cause power outages. Human error at power generating stations and other grid infrastructure locations requiring active human involvement could damage generating equipment, transmission and distribution infrastructure, and other electric grid equipment.	Accidental strikes to underground pipelines can cause leaks. Valves can be left open accidentally, or improper adherence with safety regulations can cause leaks or explosions at facilities.	
Sabotage/Physical Attacks	Substations are a primary target for attack. Generation facilities and transmission infrastructure are also targets for physical attack.	Pipelines and compressor stations could be attacked, disrupting flow.	Pipelines and pump stations could be attacked, disrupting flow. Terminals and port infrastructure could be attacked.
Maintenance Issues/Faulty Equipment	Poorly maintained or older infrastructure is more prone to failure. Line arcing, power surges, corrosion, or moisture on equipment can cause equipment to malfunction or go offline.	Corrosion, material failure, excess pressure buildup, or controls malfunction can cause supply disruptions.	
Pandemic	Employee illness, social distancing requirements, and stay-at-home orders may impact energy sector staff availability and response activities and shift energy demand profiles. Global supply chains for energy equipment, such as transformers, may be disrupted, causing equipment shortages or delays.		
Cyberattack	Informational technology and operational technology systems can be impacted; this can include company and customer data, payment and scheduling systems, sensors, and control systems.		
Flood (Riverine, Coastal, Lakeshore, Sea-Level Rise, Flash Flood)	Flooding may damage equipment exposed to water and flood-related debris.		
	Examples: power generation and storage equipment, substations, control center buildings, underground transmission lines.	Examples: underground pipelines and storage facilities.	Examples: biofuel process units, tanks, underground pipelines, on-site electrical equipment at terminals.
	Flooding on roads can create access issues for damage assessment and restoration activities.		
Wind	High winds can damage transmission and distribution infrastructure directly, including transmission towers, power lines, and transformers, or indirectly, if debris and fallen tree limbs impact power lines. Damage to power generators from high winds can reduce the total amount of electricity available and, in extreme causes, create grid instability.	Power outages may impact select electric compressors operations.	Debris from high winds can cause road closures and create access issues for fuel distributors attempting to resupply retail stations and end-users. Extended regional power outages may increase demand for fuel for backup generators. Power outages may also shut down operations at terminals, pump stations, retail stations, and out-of-state refineries. Terminal equipment could be damaged by high winds, inhibiting the ability to receive fuel at the port or distribute fuel over the truck rack.

Hazard	Electric Power	Natural Gas	Liquid Fuels
Tornado	High winds can cause damage to power lines and power generation facilities.	High winds can damage compressor stations, metering and regulating stations, and other above-ground facilities. Tree roots from falling trees can impact buried pipe facilities.	High winds can cause damage to equipment at biofuel production facilities, terminals, and other above-ground facilities.
	Damage and debris on roads may create access issues for crews attempting restoration.		
	Damage to communication systems may complicate restoration activities.		
Winter Storms and Extreme Cold	Ice accumulation on power lines may cause power outages. Cold temperatures may cause freezing in generation facilities' cooling towers, preventing electric generation. Other equipment within generation facilities may be inoperable or damaged in cold temperatures, reducing electricity availability. Freezing temperatures impacting rail systems may limit feedstock to power generation (e.g., coal). Coal piles stored at power plants may freeze solid and be unavailable for generation. Increased demand for heating during cold weather may strain available capacity, causing RTOs/ISOs to request voluntary electricity conservation or to implement rolling blackouts to maintain grid stability.	Freezing may impact non-weatherized equipment, which can cause production shut-ins. Increased demand for heating can strain natural gas supply and may cause dual-fuel power plants to switch to fuel oil to conserve natural gas. In extreme cases, natural gas prioritization for heating can cause power outages due to limited gas available for generation. Severe natural gas supply shortages or damage to infrastructure may force transmission pipelines and LDCs to interrupt supply to firm customers.	Non-weatherized equipment may freeze or be damaged by cold temperatures, including frozen product within piping systems, malfunctioning flow control equipment, flaring, and production shut ins. A region experiencing prolonged power outages may also see increased demand for backup generator fuels.
	Icy roads and storm-related debris may create access issues for crews attempting restoration.		
	Ice and snow accumulation and other storm-related impacts may impact communication systems, complicating restoration activities.		

6. Interdependencies in the Energy Sector

New York State's energy systems are interconnected, both directly and indirectly by design. These interdependencies typically enhance the overall robustness and resilience of the energy system. However, they can result in cascading impacts that extend beyond the initially affected sector. NYSERDA has collaborated with partners including the NYISO, DPS, DHSES, the U.S. Department of Homeland Security Cybersecurity and Infrastructure Security Agency (CISA), the U.S. Department of Energy and others to identify and document these critical energy system interdependencies.

6.1. Intra-Sector Interdependencies

New York's energy sectors are dependent on regional, national, and international systems. The electrical, natural gas, and liquid petroleum sector systems all rely on interconnected supply chains to ensure reliable and cost-effective energy for New Yorkers. The State's electric system is integrated with neighboring regional grids and Canadian Independent System Operators, enabling the import of power from outside New York. The natural gas system depends on production facilities, pipelines, and marine import terminals located across the United States and Canada. Similarly, New York's liquid petroleum

system relies on national and regional production facilities, refineries, and pipelines, marine import terminals, and both rail and road transportation networks.

6.2. Electricity Cross-Sector Interdependencies

Virtually all industries depend on electric power. As shown in Figure 3, the electricity sector has significant interdependencies with other critical infrastructure sectors. The safety and security sector relies on electricity to provide power for emergency response facilities like police stations, fire stations, and emergency operations centers. The safety and security sector is also essential for protection of electricity infrastructure and responding to emergencies that disrupt electricity. This includes law enforcement's support of electricity infrastructure security, firefighting during electrical infrastructure fires, wildfire fighting to prevent infrastructure damage, and clearing debris from roads to aid in power restoration after storms. Additionally, federal agencies, like CISA and the Federal Bureau of Investigation, support the electric sector by sharing information on physical and cyber threats and assisting with response efforts during physical and cyberattacks.

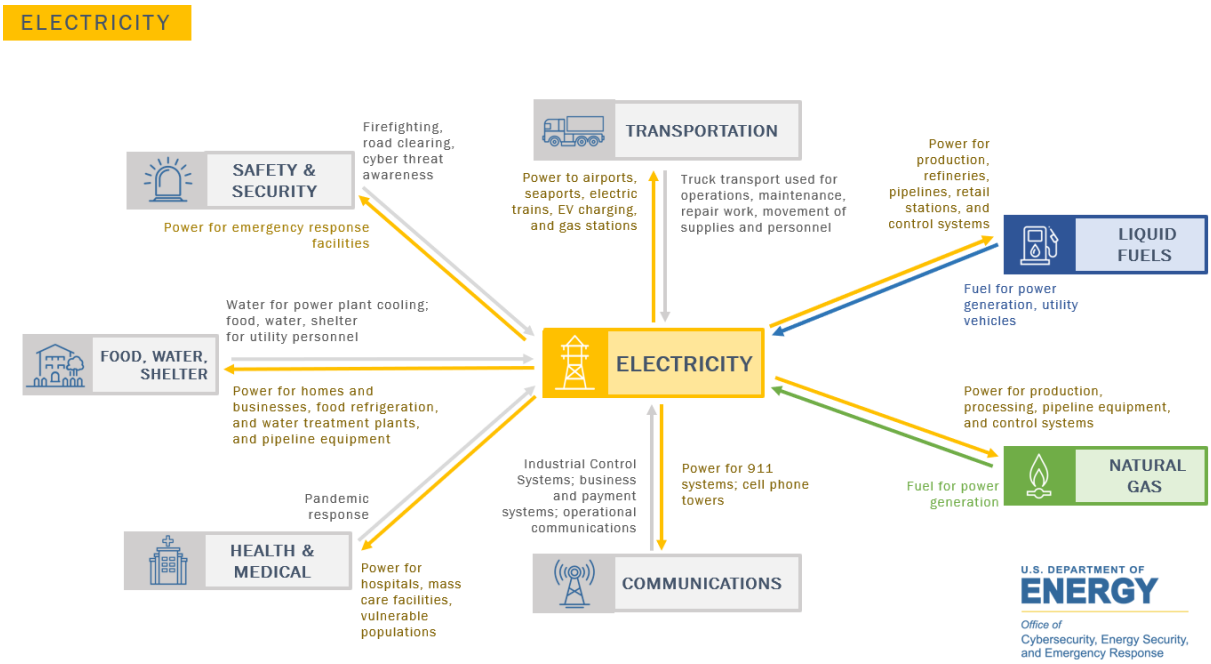

Figure 3: Electricity Cross-Sector Interdependencies[8]

Source: U.S. Department of Energy Office of Cybersecurity, Energy Security, and Emergency Response

Electricity underpins nearly every critical function across New York's essential infrastructure. It powers homes and businesses, enables food production, supports water and wastewater treatment, and fuels heating, cooking, internet access, and medical equipment. Most space heating and cooling systems,

[8] State Energy Security Plan Optional Drop-In: Cross-Sector Interdependency Diagrams. May 2022. https://www.energy.gov/sites/default/files/2022-06/DOE%20CESER%20SESP%20Drop-In_Cross-Sector%20Interdependency%20Diagrams_FINAL_508.pdf.

regardless of their primary fuel source, require electricity for operation, making outages during extreme temperatures potentially life-threatening.

These dependencies also extend in the other direction. The electricity sector relies on access to food, water, and shelter, especially for mutual aid crews during restoration efforts. Water is also essential for power plant cooling, particularly for natural gas-fired generators, which produced 45 percent of the State's utility-scale electricity in 2021. Even solar power, a growing share of the state's electricity generation, depends on water to clean photovoltaic panels and other reflective surfaces.

Hospitals, care facilities, and public health systems depend on electricity to power lifesaving medical equipment and refrigerate vaccines and medications. While many facilities have backup power generators, these are typically powered by onsite liquid fuels with only a few days of supply. The COVID-19 pandemic demonstrated the vulnerability of the energy sector to public health emergencies, such as illness and distancing requirements among utility personnel disrupted operations, reinforcing the sector's reliance on a functioning health system.

The communications sector depends heavily on electricity to power 911 systems and other emergency response communications networks, internet services, and cellular infrastructure. At the same time, energy providers rely on communications services to run industrial control systems, provide platforms for business and payment systems, and for operational communications. Communications and data collection networks are essential to monitoring grid conditions and ensuring efficient and reliable operation. Supervisory Control and Data Acquisition (SCADA) systems, which use sensors and smart devices, are vital for utilities and NYISO to maintain supply and demand balance and reliability. Many of these systems use GPS for positioning, navigation, and timing. Disruptions to GPS could impair data accuracy and hinder grid operations. Slower SCADA data or timing errors on localized measurements could cause false conclusions about grid conditions. Russian forces have regularly been interfering with the U.S. GPS as part of its war on Ukraine and could be used by an adversary as a strategy to target critical infrastructure.

Transportation infrastructure also depends on electricity. Airports rely on it for cooling, lighting, ventilation, communications, and scheduling systems. Seaports use electricity to support business operations and power cranes, forklifts, and other equipment used to lift cargo onto and off marine vessels. Seaports are critical for the delivery of replacement parts for energy infrastructure. Rail lines and trucks are essential for transporting equipment and personnel, including for storm recovery or system maintenance. Electrified transit systems, including the New York City subway and EV charging networks, further deepen this dependence.

6.3. Natural Gas Cross-Sector Interdependencies

The natural gas system has important interdependencies with other critical infrastructure sectors, as shown in Figure 4. The safety and security sector relies on the natural gas sector to heat many emergency response facilities, including police and fire stations, and emergency response operations centers. Additionally, natural gas may be used to fuel some emergency response backup generators in the event of electricity outages. In turn, the natural gas sector depends on the safety and security

services to prevent and respond to a range of potential hazards. This includes law enforcement's protection and investigation of natural gas infrastructure security, firefighting response during natural gas infrastructure fires, wildfire fighting to prevent natural gas infrastructure damage, and clearing debris from roads to aid in utility personnel in equipment restoration after storms or other events that hinder accessibility to natural gas infrastructure. Additionally, government agencies support the natural gas sector by sharing information on cyber threats and assisting in response efforts during cyberattacks.

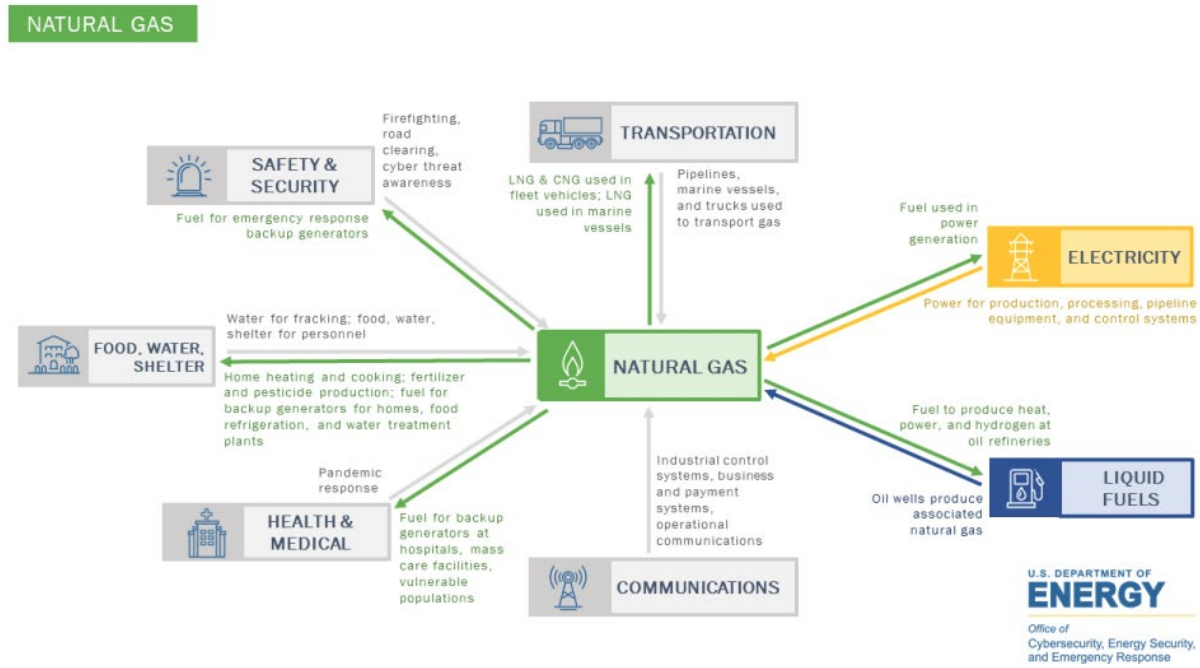

Figure 4: Natural Gas Cross-Sector Interdependencies[9]

Source: U.S. Department of Energy Office of Cybersecurity, Energy Security, and Emergency Response

The food, water, and shelter sectors may rely on natural gas for home heating and cooking, fertilizer and pesticide production, and fuel for backup generators powering homes, community emergency shelters, food refrigeration, and water treatment plants. The natural gas sector requires food, water, and shelter for utility personnel.

The health and medical sectors may depend on natural gas to fuel backup generators, hot water systems, and laundry equipment for hospitals and mass care facilities. Widespread illness affecting the natural gas utility workforce can hinder operations, so the natural gas sector is also reliant on the health and medical sectors to support a healthy workforce.

[9] State Energy Security Plan Optional Drop-In: Cross-Sector Interdependency Diagrams. May 2022. https://www.energy.gov/sites/default/files/2022-06/DOE%20CESER%20SESP%20Drop-In_Cross-Sector%20Interdependency%20Diagrams_FINAL_508.pdf.

The natural gas sector uses communications services to run industrial control systems, provide platforms for business and payment systems, and facilitate operational communications. The natural gas industry often uses their own, privately owned telecommunications networks to manage day-to-day operations and coordinate emergency responses during crises. It is critical for these systems to be reliable and have minimal processing delays (also known as "low latency") to maintain smooth operations of natural gas assets. These control systems are also typically reliant on GPS systems for accurate timing information. Devices used to measure and report the status of pipeline natural gas flows are important for quickly identifying and responding to any natural gas supply disruptions.

The transportation sector is supported by the natural gas sector, mainly through liquified natural gas (LNG) and compressed natural gas (CNG). LNG and CNG are used in fleet vehicles, such as delivery trucks and buses. LNG is also used by marine vessels. Natural gas in New York is delivered via multiple pipelines and can be stored in New York State's three LNG storage facilities in Greenpoint, Holtsville, and Astoria. LNG from these storage facilities supply critical customers in the event of disruptions and during peak demand seasons when pipelines are not able to fully meet customer needs.

In addition to supporting the transportation sector, LNG serves as an efficient form of natural gas on-system, localized storage. Typically filled from pipelines during off-peak seasons LNG storage helps ensure a reliable supply during periods of peak demand or supply constraints, mitigating risks associated with upstream supply disruptions. These critical assets offer flexible and scalable solutions for meeting spikes in demand to maintain adequate system pressures providing operational security. LNG assets support peaking supply needs on the coldest days of the year to help keep customers warm including in disadvantaged communities. They provide a reliable backup supply and reduce dependency on constrained pipelines and enhance overall supply reliability and diversity.

6.4. Liquid Fuel Cross-Sector Interdependencies

Community lifelines depend on the liquid fuel system, primarily for transportation and backup power, and rely on the various critical infrastructure sectors, as summarized in Figure 5. The safety and security sectors rely on the liquid fuels sector to fuel emergency response vehicles, such as police cars, fire trucks, and ambulances, and backup generators for emergency response facilities. Meanwhile, the liquid fuels sector depends on the safety and security sectors to protect against and respond to a variety of potential hazards. This includes law enforcement's protection and investigation of liquid fuels infrastructure security, firefighting during liquid fuels infrastructure fires, wildfire fighting to prevent liquid fuels infrastructure damage, and clearing debris from roads to aid crews in equipment restoration after storms or other events that hinder accessibility to liquid fuels infrastructure. Additionally, government agencies support the liquid fuels sector by sharing information on cyber threats and assisting in response efforts during cyberattacks.

The food, water, and shelter sectors may rely on liquid fuels (i.e., diesel, propane, etc.) for home heating and cooking, fertilizer and pesticide production, and fuel for backup generators powering homes, community emergency shelters, food refrigeration, and water treatment plants. The liquid fuels sector requires food, water, and shelter for employees.

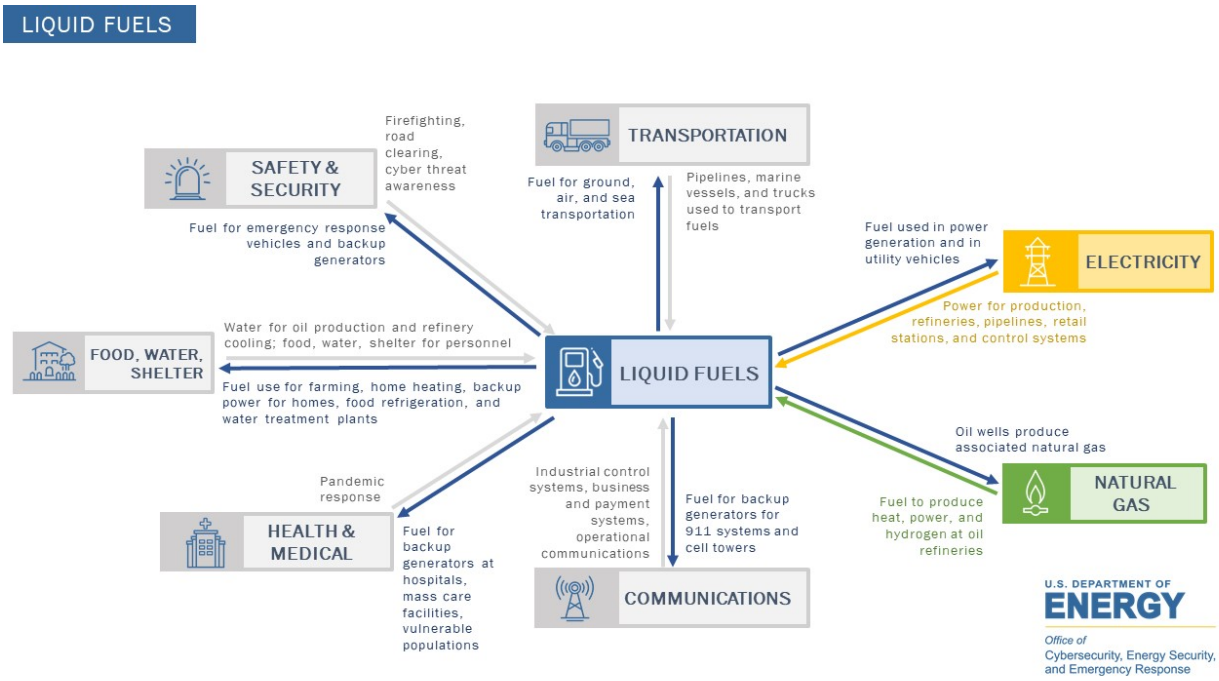

Figure 5: Liquid Fuel Cross-Sector Interdependencies[10]

Source: U.S. Department of Energy Office of Cybersecurity, Energy Security, and Emergency Response

The health and medical sectors depend on liquid fuels to fuel backup generators for hospitals, mass care facilities, and to provide services to vulnerable populations. Across the energy sectors, there is a reliance on the health and medical sectors to support a healthy workforce for continued operations.

The communications sector relies on liquid fuels to fuel backup generators for 911 systems, other emergency-response communications networks, and cell phone towers. Meanwhile, the liquid fuels sector utilizes communications services to run industrial control systems, provide platforms for business and payment systems, and for operational communications. The liquid fuels industry often uses their own, privately owned telecommunications networks to manage day-to-day operations and coordinate emergency responses during crises. It is critical for these systems to be reliable and have minimal processing delays in order to maintain smooth operations. The systems typically rely on GPS for accurate timing information which could make systems vulnerable to adversaries seeking to cause harm by disrupting GPS signals.

The transportation sector is heavily reliant on liquid fuels as fuel for ground, air, and sea transportation. The liquid fuels sector, meanwhile, is reliant on the transportation sector for the operations of its supply chain. The State receives petroleum products mainly via marine vessels and pipelines into storage terminals. Supply from the terminals is delivered to New York end users by truck. Some heating oil

[10] State Energy Security Plan Optional Drop-In: Cross-Sector Interdependency Diagrams. May 2022. https://www.energy.gov/sites/default/files/2022-06/DOE%20CESER%20SESP%20Drop-In_Cross-Sector%20Interdependency%20Diagrams_FINAL_508.pdf.

distributors store fuel at local depots that receive railcars or trucks. Heating oil is then transported on smaller trucks to end users like residential and commercial customers. Jet fuel is typically stored on site in storage tanks at airports (typically called airport fuel farms), although additional jet fuel can also be stored at nearby bulk terminals. Typically, propane is moved from fractionation facilities by pipeline, truck, rail, or barge to bulk propane terminals or directly to distributor storage depots. From distributor sites, the propane is transported by smaller trucks, known as bobtail trucks, to end users like residential and commercial customers. Ethanol typically is transported by rail, barge, or truck to either bulk petroleum terminals or terminals that are ethanol rail hubs.

6.5. Energy Systems Interdependencies and Critical Lifelines

New York's energy system is highly complex and characterized by many cross-sector interdependencies. The electricity, natural gas, and liquid fuels sectors are themselves deeply interconnected. The electricity sector relies on both natural gas and liquid fuels as fuel for power generation, as well as on liquid fuels to operate utility vehicles needed to repair and maintain the system.

Conversely, the natural gas sector relies heavily on electricity to power natural gas production and processing, as well as for the operations of natural gas pipelines, compressor stations and control systems. DPS, through its New York State Pipeline Safety Program identifies and addresses these vulnerabilities within the natural gas system.[11]

The liquid fuels sector is also directly dependent on electricity. Electric power is essential to run petroleum terminals, retail gas stations, and associated control systems. Pipelines rely on electricity to power pump stations and industrial control systems. Terminals use electric-powered technology to receive, pump, and store fuel and to load fuel onto transportation for distribution. Petroleum terminals and other liquid fuels critical infrastructure sites in the State have completed Regional Resiliency Assessment Program (RRAP) assessments that identify this electricity dependency for site specific locations. NYSERDA works with industry terminal contacts and DPS to ensure power reliability and timely power restoration to these critical energy facilities by the State's electric utilities. Retail gas stations rely on electricity to run gas pumps and payment systems. Retail gas stations that are designated under the Fuel NY law have installed either a permanent generator or a transfer switch on site to help mitigate the risk of an electricity disruption.

Petroleum plays an important role in both summer electricity peak periods and winter high-gas-demand periods. During periods of high demand for natural gas, natural-gas-interruptible customers, a group including electrical generators, may be forced to switch to petroleum fuel sources. If this happens during an extended period of high petroleum demand, when cold weather drives demand for home heating fuel, it can have a significant compounding effect on petroleum supply and availability. The stability of the petroleum system, the natural gas system, and the electrical system can all be affected. Evolving oil industry supply and distribution practices and de-emphasizing inventory buildup increases the risk that short-term cold or severe weather will sharply increase demand and disrupt deliveries. The response of

[11] NYS Pipeline Safety Program. https://dps.ny.gov/nys-pipeline-safety-program.

the related energy markets to this instability can be significant and can directly and indirectly impact the cost and availability of energy in the State.

The petroleum and biofuel supply chains in New York are interdependent. For finished gasoline, the petroleum-based gasoline blend stock is blended with ethanol, which is primarily delivered by rail from the Midwest, at liquid fuel terminals throughout the state. If ethanol supply is disrupted and terminal storage is depleted, the resulting finished blend would not meet New York State fuel specifications. Without ethanol, the finished blended gasoline would lack sufficient octane, potentially causing drivability issues and triggering a gasoline supply shortfall. Similarly, New York requires heating oil to be blended with a specified percentage of biodiesel. In the event of a biodiesel supply disruption, the State would need to issue a temporary waiver to avoid heating oil shortages and ensure continued availability for consumers.

7. Current Energy Security Planning and Emergency Preparedness Programs

A sample of New York State Energy Security Planning and Emergency Preparedness programs follows.

7.1. NYSERDA

As the lead agency for petroleum energy emergencies in New York State, NYSERDA regularly engages in market analysis and monitoring and conducts energy supply system monitoring efforts, in coordination with fuel industry and other state agency, regional, and federal partners. These efforts include seasonal preparations, such as Winter Fuels Outlook meetings and readiness meetings, to ensure adequate planning and response capabilities.

7.1.1. Regional Resiliency Assessment Program (RRAP)[12]

The RRAP uses site visitations to update and enhance the State's understanding of New York's critical liquid fuels infrastructure. These efforts identify the evolving risks to this nonregulated sector of the energy system, improve the relationship between the public and private stakeholders in this sector and is informing and improving New York's emergency response and energy resilience capabilities.

7.1.2. New York State Strategic Fuel Reserve[13]

The New York State Strategic Fuel Reserve includes an upstate and downstate fuel reserve and is designed to mitigate fuel distribution disruptions during declared emergencies by bridging gaps created by a disruption in supply until an adequate level of market deliveries can be restored. Upon declaration by New York State of an energy supply emergency, and upon the written direction of NYSERDA, fuel from the Reserve may be sold to suppliers and distributors to provide fuel for emergency responders, municipal and governmental customers, and retail outlets as determined for the emergency event.

[12] U.S. Department of Homeland Security Cybersecurity and Infrastructure Security Agency Regional Resiliency Assessment Program. https://www.cisa.gov/resources-tools/programs/regional-resiliency-assessment-program.
[13] New York State Strategic Fuel Reserve. https://www.nyserda.ny.gov/All-Programs/New-York-State-Strategic-Fuel-Reserve.

7.2. DPS

The Public Service Law vests the New York State Public Service Commission (PSC) and DPS with regulatory authority concerning electric corporations' preparation for, and response to, various emergency events. See generally Public Service Law (PSL) §66(21); see also PSL §3-b(3)(c). Electric corporations must submit Utility Emergency Response Plans (ERPs) to DPS in accordance with PSL §66(21)(a), PSL §3-b(3)(c)(i), and 16 NYCRR §105.1, to ensure electric corporations are prepared for and can efficiently respond to emergencies. Utilities are further required to update and file their ERP annually, which are submitted to the Commission for approval after review by department staff. DPS, as the operational arm of the PSC, is responsible for emergency response oversight of the IOUs, which occurs in three (3) phases: storm preparedness, active tracking of utility impacts, system repair and restoration and post event analysis as necessary. The obligation to submit annual ERP updates was established after Superstorm Sandy, which caused widespread damage and prolonged service outages, prompting a review of utility preparedness and response protocols. Annual submission ensures that regulated entities' plans are current and reflective of any new risks, regulatory requirements, and technological advancements. PSL §66(21)(d) provides for the Commission to certify to DHSES that each electric corporation's ERP is sufficient, to the greatest extent feasible, to provide for the timely and safe restoration of energy services after a major event.

Like electric corporations, gas distribution utilities must also develop plans to respond to an emergency. The Department's Part 255 regulations require gas utilities to establish and implement emergency plans for the gas distribution system in their respective service territories. See generally 16 NYCRR §255.615.

In addition to utility emergency response plans, major utility corporations are required to submit a Climate Change Vulnerability Study and Climate Change Resilience Plan to the PSC. In December 2024, the PSC approved, with modifications, the Climate Change Resiliency Plans filed by New York's major utility corporations. In its decision, the Commission directed the utilities to include proposed resilience investments as part of ongoing and future rate case proceedings, provide more explicit process and design changes with respect to climate change projections, define engagement strategies for proposed resilience measures that could impact telecommunication service providers, and include implementation- and outcome-based performance benchmarks for all proposed resilience measures in future updates to the plans and upcoming progress reports.[14] Please see the Electricity and Climate Change, Adaptation, and Resiliency chapters of this Plan for more information.

The Commission approves budgets for storm hardening, resilience, climate change resilience plans, reliability, asset condition driven capital programs, and vegetation management programs in rate proceedings. These programs in conjunction with many other capital and operations and maintenance

[14] Proceeding on Motion of the Commission Concerning Electric Utility Climate Vulnerability Studies and Plans, Case Number 22-E-0222; https://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=22-E-0222

projects and programs reviewed by Department Staff in rate and other proceedings contribute to electric utility performance during emergency events.

The DPS Office of Resilience, Utility Security, Nuclear Affairs, and Emergency Preparedness (OREP) Utility Security Section (USS) has utility cybersecurity oversight responsibilities. Under the authority granted by the Public Service Law and PSC orders, OREP USS staff regularly conducts thorough inspections and audits of the physical and operational technology cybersecurity postures of regulated utility facilities, sites, and assets. OREP USS also audits annually the protection of Personally Identifiable Information at electric, gas, and water utilities. Through these inspections, examinations, and audits, OREP USS assesses the capabilities of utility companies to respond to threats. In conducting these audits, OREP USS utilizes the North American Electric Reliability Corporation Critical Infrastructure Protection (NERC-CIP) standards for gas and electric companies.

7.3. NYISO

NYISO is responsible for managing and operating New York's electric grid and its competitive wholesale electric marketplace. NYISO ensures that the electric grid in New York is reliable and plans for the future, working with power producers, utility companies, and stakeholders to provide power to meet New Yorkers' electricity needs on a daily, hourly, and minute-to-minute basis balancing the supply of power from energy producers with the demand for electricity from consumers across the state. NYISO plans the power system for the future, over one, five, and ten-year studies to maintain long term reliability, reduce congestion on the transmission system, and meet public policy needs calling for new transmission, such as lines to bring renewable resources to customers. NYISO plays a critical role in planning and encouraging investment in New York's electric infrastructure by identifying reliability needs of the power system, determining congested areas, encouraging market-based solutions, and evaluating proposed projects through numerous assessments.

One way that NYISO, DPS, DEC, NYSERDA, and DOT support energy emergency preparedness is through the State Agency and NYISO Winter Coordination Protocol, which is used when electric generation unit fuel supply may be at risk, posing a threat to electric system reliability. During the winter season, NYISO maintains contact with electric generators through its Cold Weather Fuel Survey, which assesses availability of both primary and alternate fuel supply. As a result, NYISO can coordinate with the State Agencies to assess the current information on predicted electric demand, weather forecasts, and generator fuel supplies, as well as a general assessment of any issues generators may be experiencing in securing resupply volumes or any additional fuel distribution difficulties. State agencies can take appropriate actions, including waiver requests for sulfur fuel requirements or hours-of-service for the transportation of fuels needed to operate electric generation, if needed.

7.4. NYPA

The NYPA emergency preparedness plan is designed to ensure a swift and effective response to power grid disruptions caused by natural disasters or other emergencies. The plan includes maintaining a robust system to restore power, maintaining strategic fuel reserves for critical equipment, and collaboration with other utilities and emergency responders across the state. It also includes measures to enhance infrastructure resilience and ensure operational continuity during crisis situations.

Key elements of the NYPA emergency preparedness plan include:

- **Risk assessment**
    - Identifying potential hazards like severe weather events, cyberattacks, and equipment failures to develop targeted response strategies.
- **Communication protocols**
    - Establishing clear communication channels with stakeholders including state agencies, local authorities, and customers to provide timely updates during emergencies.
- **Emergency response teams**
    - Training dedicated teams to rapidly assess damage, mobilize repair crews, and manage power restoration efforts.
- **Strategic fuel reserves**
    - Maintaining a stockpile of fuel to ensure uninterrupted operation of power restoration equipment.
- **Infrastructure resilience**
    - Implementing measures to enhance the durability of power lines, substations, and other critical infrastructure against extreme weather events.
- **Collaboration with other utilities**
    - Coordinating with other power companies in New York State to share resources and expertise during emergencies.
- **Community engagement**
    - Educating the public on emergency preparedness measures and providing updates on power restoration efforts.
- **Integration of renewable energy sources**
    - NYPA is actively incorporating renewable energy sources like battery storage to enhance grid resilience during emergencies.
- **Continuous improvement**
    - Regularly reviewing and updating the emergency preparedness plan based on lessons learned from past events.

7.5. DHSES

The New York State Mesonet[15] helps mitigate the harmful effects from high-impact weather events and helps prepare New Yorkers with greater lead times and more accurate predictions. The New York State Mesonet provides real-time data to operational forecasters from across the State with updates every five minutes and an average station spacing of about 17 miles. These data are combined with data from other surface networks, weather radar, and satellite to improve numerical weather prediction models for even greater accuracy and precision than ever before, giving forecasters much greater confidence in their warning products.

The New York State Weather Risk Communication Center provides real-time weather information to State agencies, emergency managers, and other critical stakeholders through briefs, updates, special reports, and forecasts.

The State conducts **County Emergency Preparedness Assessments (CEPA)**[16] in each of the 57 counties of New York as well as in New York City. That provides great insight as to the State's risk profile from a local-level perspective. Counties also participate in their own CEPA to help understand their local risks. Progress of the mitigation activities are captured in the Threat and Hazard Identification and Risk Assessment (THIRA), State Preparedness Report (SPR), and the State Emergency Preparedness Assessment (SEPA), which are updated every three years.

The New York State Watch Center[17] is New York State's 24/7 alert and warning point. The State Watch Center supports the mission of DHSES by maintaining situational awareness of state, national, and international incidents, sharing information with Division staff, State agencies, and other emergency officials, and notifying State agencies and counties of developing incidents. The State Watch Center is responsible for activating the State Emergency Operations Center in Albany during emergencies and maintaining dedicated communications with federal emergency response agencies and commercial nuclear power generation facilities. It also assumes daytime and off-hours responsibility for several State agency emergency hotlines and maintains the authority to mass notify the public statewide to an emergency or imminent threat.

The DHSES-OCT risk assessment program. Offers risk and vulnerability assessment services for critical infrastructure, including critical energy infrastructure, provided by the Office of Counter Terrorism's (OCT) Critical Infrastructure Unit. These services are a vital component to the Division's ability to uphold statutory obligation set forth in NYS Executive Law, Article 26 §709 (j) *to work with local, state, and federal agencies and private entities to conduct assessments of the vulnerability of critical infrastructure to terrorist attack and other natural and man-made disasters.*

[15] New York State Mesonet. https://nysmesonet.org/
[16] County Emergency Preparedness Assessment. New York State Division of Homeland Security and Emergency Services. https://www.dhses.ny.gov/county-emergency-preparedness-assessment-cepa.
[17] New York State Watch Center. New York State Division of Homeland Security and Emergency Services Office of Emergency Management. https://www.dhses.ny.gov/new-york-state-watch-center.

7.6. Department of State

The Department of State's Division of Building Standards and Codes provides various services related to the development, administration, and enforcement of the Uniform Fire Prevention and Building Code (Uniform Code) and State Energy Conservation Construction Code (Energy Code). The statutory responsibility for developing and maintaining the Uniform Code and the Energy Code is vested in the State Fire Prevention and Building Code Council (Code Council).

The Uniform Code and the Energy Code serve as key mitigation strategies by setting minimum standards for construction, ensuring structures are designed and built to withstand natural hazards, including earthquakes, hurricanes, floods, and wildfires. By promoting resilient design and construction, these codes help minimize damage and loss of life during disasters, reducing the impact of disasters on communities. They are a proactive approach to disaster preparedness by fostering development of more resilient buildings. Both codes are reviewed on a three-year cycle, along with the national model codes on which they are based, to ensure alignment with evolving construction technologies and best practices in resilient building design.

7.7. AGM Weights and Measures

"Fuel NY" law (16.192-H).[18] Fuel NY was established to maintain the availability of motor fuel during energy or fuel supply emergencies and expedite a return to normal operations. The program requires strategically located gas stations in the downstate region to be equipped with transfer switches, making them generator-ready, and to have a plan for generator deployment in the event of a declared energy emergency. The State enforces the Fuel NY law among gas stations within designated geographic areas and publishes a list of gas stations in compliance of the Fuel NY law.

7.8. DOH

The Building Resilience Against Climate Effects (BRACE) program[19] provides near-real-time surveillance for some extreme weather impacts, the Cooling Center Finder Tool, and works to put risk awareness messaging out for different types of hazards.

8. Energy Transition and Resilience

8.1. Overview

As described in the Climate Change, Adaptation, and Resiliency chapter of this Plan, decarbonizing the energy system is imperative for combating climate change. New York State has taken a leading role in this through the Climate Act, which codifies renewable energy targets. New York is making advances towards these ambitious targets, but it will require substantial changes to energy systems across the state, primarily by phasing out fossil fuel generation infrastructure, building out renewable energy, and constructing transmission systems to deliver it. The planned energy transition from fossil fuels to

[18] Fuel New York Program Resource Guide. August 2024. https://agriculture.ny.gov/fuel-new-york-program-resource-guide

[19] New York State's Building Resilience Against Climate Effects. New York State Department of Health. https://www.health.ny.gov/environmental/weather/about.htm.

renewables will bring about significant benefits for New York State, including job creation, energy security, and health benefits. Going forward, the design and location of renewables may introduce new risks to the State's current energy mix. Understanding and mitigating these risks, especially in the face of climate change, is essential for emergency preparedness as New York transitions to a clean energy future. The energy transition will substantially change the production, distribution, and consumption of energy across the state, and particularly in the downstate region. Changes to the types and locations of energy infrastructure in New York will have both short- and long-term hazard, risk, and mitigation implications for the State's energy emergency preparedness.

8.2. Energy Transition, Resilience, and Policy

New York State is advancing its ambitious decarbonization targets under the Climate Act while adhering to a core energy policy principle: balancing emissions reductions with reliability, resilience, and risk mitigation in the energy system. This approach includes temporary, tailored "off-ramp" provisions that ensure critical energy services remain uninterrupted during the transition. An example of this principle in action is the DEC Peaker Rule regulation to limit nitrogen oxide (NO_x) emissions from combustion turbines during ozone season that included built in system reliability provisions. The rule led to the retirement of 1,027 megawatts (MW) of generators by May 2023 with an additional retirement slated for 2025. NYISO projections of peak day demand under expected weather conditions, found NYC may have reliability margin deficit as much as 446 MW for 9 hours on peak day in 2026, with extreme heat exacerbating this issue. These negative resource adequacy projections led to the activation of Peaker Rule's built-in reliability provisions to avoid this system deficit.

8.3. State Energy Transition and Resilience Priorities

The State's Energy Transition and Resilience priorities, developed through the Energy Security Plan, are closely aligned to the State's Hazard Mitigation Goals and the Climate Action Council Scoping Plan Goals. These priorities will help to ensure that the energy sector in New York is strengthened, secured, made more resilient, and transitions to a clean energy future.

- Priority 1—Strengthen energy sector reliability to ensure all communities, especially DACs, will benefit from continuous access to secure energy.
- Priority 2—Secure all critical energy infrastructure against human-made (i.e., physical and cybersecurity threats) and natural hazards.
- Priority 3—Enhance the response to, and recovery from, energy disruptions to improve energy supply resilience for end users.
- Priority 4—Reduce greenhouse gas emissions and achieve net-zero emissions, increase renewable energy use, and ensure all communities equitably benefit in the clean energy transition.

8.4. Resilience and Mitigation Strategies to Support Existing Energy Infrastructure

As New York transitions to a clean energy economy, all resources that may be available as part of the State's comprehensive decarbonization strategy will be explored. Supporting innovation and studying all

technologies will enable the State to remain on the cutting edge of evolving solutions that will complement existing decarbonization efforts in achieving the State's ambitious Climate Act targets while contributing to energy resilience and mitigation strategies. Despite current readiness of the energy system, investing in additional resilience and mitigation strategies to support the current energy infrastructure in transition is needed. This effort includes the role of private stakeholders as owners and/or operators of critical energy infrastructure and related systems. Examples of current private investment include the Champlain Hudson Power Express (CHPE), a major new transmission project, which will bring a dependable supply of clean electricity from existing hydroelectric facilities and other renewable facilities in Quebec, Canada directly to New York City. The route has been carefully designed to minimize its impact on the environment and burying and/or submerging the line protects it from extreme weather risks impacting other forms of electric transmission. By delivering directly into New York City's grid, CHPE bypasses mid-state electric transmission congestion.

Distributed Energy Resources (DER) are playing an increasingly important role in New York's energy landscape. These resources, including solar, energy storage, combined heat and power, anaerobic digesters, and fuel cells, generate or store electricity for use on-site (e.g., for homes and buildings) or to supply power directly to the electric grid. DERs contribute to a cleaner and more efficient grid and results in lower energy bills. DERs can improve system resilience by providing backup power during outages. Microgrids, small, localized energy systems powered by DERs, can supply electricity locally. Their ability to connect to or disconnect from the larger grid makes them a resilient solution, capable of continuing operations during hazard-induced outages affecting the larger grid system. Biogas and RNG are being used in DER systems and hydrogen blends are being evaluated, but additional research and review is needed. Generation equipment currently running on traditional fuels may be able to transition to lower-carbon fuels, including biogas, and RNG. Numerous energy storage project investments also help to ensure that intermittent renewable power is supported with sufficient energy storage to provide clean, reliable, and resilient power. DERs are critical to advance New York State's climate and clean energy goals and support a resilient energy system.

Private investment is also advancing energy resilience and decarbonization in New York's liquid petroleum sector. Petroleum terminals across the state are upgrading infrastructure, such as dedicated tanks, new pumps, piping, controls, insulation, and heat tracing, to support the State's biodiesel mandate. This mandate reduces the level of petroleum fuel used in New York, helping to further New York's clean energy goals and the upgraded and dedicated infrastructure will help ensure those fuels are readily available in all seasons to New Yorkers. Additional investments by the liquid fuels sector include the installation of new vaper recovery units at terminals that have direct environmental/air quality benefits for vulnerable populations and communities.

Another example of New York's energy resilience and mitigation strategies can be found in the Office of Renewable Energy Siting and Electric Transmission (ORES), recently integrated into DPS. ORES was established to consolidate the environmental review and permitting of major renewable energy facilities in New York State into a single forum that provides a coordinated and timely review of siting permit applications. All large-scale, renewable energy projects 25 MW or larger are required to obtain a siting permit from ORES for new construction or expansion. This process is designed to help progress towards

State's renewable energy objectives by streamlining the permitting process while ensuring the protection of the environment with consideration of all pertinent social, economic, and environmental factors (including environmental justice) while providing opportunity for local government and community participation in the permitting process.

8.5. Resilience and Mitigation Strategies to Support Clean Energy Transition and Enhance Emergency Preparedness

New York State's energy system will evolve over the coming decades and investing in solutions that increase resilience and improve mitigation is critical to support the clean energy transition. The nexus of energy-transition-driven policy, technological advancements, and evolving energy systems' risk and reliability issues make for a dynamic environment for current and future mitigation efforts.

Energy storage is one example of an evolving mitigation strategy and plays a pivotal role in delivering reliable and affordable power to New Yorkers as the State increasingly switched to renewable energy sources. Integrating residential, commercial, and bulk storage in the electric grid, especially in areas with high energy demand, will allow clean energy to be available when and where it is most needed. Energy storage can also provide backup power during power disruptions. However, increasing numbers of risks associated with energy storage and fire was reported. On July 28, 2023, Governor Kathy Hochul announced the creation of a new Inter-Agency Fire Safety Working Group to ensure the safety and security of energy storage systems across the state and to help address and mitigate the emerging fire risks associated with this developing technology. The Working Group provided the final report to the NYS Fire Prevention and Building Code Council[20] and Department of State staff. The Department of State released a Notice of Proposed Rule Making[21] in March 2025 containing proposed code language intended to reflect the recommendations of the Working Group to enhance safety standards for battery energy storage systems. This will advance the safe and reliable growth of battery storage capacity, a critical component to the clean energy transition.

These examples of private investments and public efforts all support New York's clean energy goals while providing reliable and resilient energy to all New Yorkers.

- **Existing State Hazard Mitigation Plan Strategies.** The goal of the State Hazard Mitigation Plan is that all jurisdictions develop robust mitigation plans and tangible mitigation actions that will contribute to long-term risk reduction, including the developing critical energy infrastructure necessary for the clean energy transition. Hazard mitigation is any sustained action taken to reduce or eliminate long-term risk to life and property from hazard events. It is an on-going process that occurs before, during, and after disasters and serves to break the cycle of damage and repair in hazardous areas. At a minimum, mitigation measures must be technically feasible, cost-effective, and environmentally sound. The goal is that all jurisdictions (state, county, and

[20] New York State Fire Prevention and Building Code Council. https://dos.ny.gov/state-fire-prevention-and-building-code-council.
[21] Notice of Proposed Rulemaking https://dos.ny.gov/notice-proposed-rule-making

local) develop robust mitigation plans and tangible mitigation actions that will contribute to long-term risk reduction, including existing critical energy infrastructure.

Mitigation strategies for the State's energy system are included in the State Hazard Mitigation Plan. These strategies address specific risks caused by natural, physical, or man-made hazards and vulnerabilities and are focused on specific energy asset types. These strategies are informed by and aligned with the detailed energy risk assessments found in the state's Energy Emergency and Energy Security planning documents.

Mitigation strategies are outlined in the New York State Hazard Mitigation Plan through Mitigate NY.[22] Identified mitigation measures included in the plan are found in the State Hazard Mitigation Action Database, the State Capabilities Catalogue, and the Local Hazard Mitigation Action Database.

Hazard-specific annexes are part of the State's CEMP. They outline an active approach to provide various services throughout New York State during the response and short-term recovery phases of specific hazard induced events. These annexes are developed in response to the evolving risks to the state and include responses consistent with the changing energy systems in the state. Examples of hazard-specific annexes that incorporate significant energy system components include:

- **New York State Extreme Heat Annex.**[23] This annex acknowledges that the critical infrastructure that society relies on can be severely impacted by extreme heat. Critical lifelines including energy systems are impacted by extreme heat and the impacts from extreme heat can disproportionally affect vulnerable populations and disadvantaged communities. To escape the negative effects of extreme heat, a large majority of private residences and other buildings use some sort of cooling system, whether it be central air conditioning or a simple window unit. The increased demand caused by using these systems can lead to a strain on the power grid that may lead to damage to electrical components, blackouts. The annex includes response, and mitigation action plans to manage the risk and ensure public safety for all communities during these extreme heat events. This Annex identifies the risks for the energy systems including electrical grid, nuclear power plants, and impacts to transportation. In the energy sectors, extreme heat can cause reduced efficiency for systems such as generator units and hydroelectric systems. Nuclear power plants, particularly ones built along lakes or rivers, may also be at risk of temporarily shutting down if water levels drop too low or if the water becomes too warm, not allowing it to cool the plant properly. New York State's transportation infrastructure may be impacted in various ways. Expansion joints on bridges and highways may weaken and show signs of stress creating rutting and potholes, while the warping of railroad tracks increase the likelihood of a train derailment and the buckling and melting of asphalt and tarmac on public

[22] Mitigate NY. New York State Hazard Mitigation Plan. https://mitigateny.org/.
[23] New York State Extreme Heat Annex. New York State Division of Homeland Security and Emergency Services. https://www.dhses.ny.gov/extreme-heat-annex.

roads and airports may affect traffic. Powerlines may begin to overheat and sag over roadways causing hazardous conditions and outages. The Extreme Heat annex is aligned with the overall New York State Extreme Heat Action Plan[24] that is represented in more detail in the Climate Change, Adaptation, and Resiliency chapter of this Plan.

- **New York State Blizzard and Severe Winter Weather Annex.**[25] This annex outlines New York State's strategy in preparing for, responding to, and recovering from a blizzard as well as other impactful severe winter weather events using a collaborative, multi-agency State approach. The Annex identifies critical infrastructure, such as the electrical grid, major electric generators, communications infrastructure, and transportation infrastructure, is at a major risk of being impacted during a severe winter weather event. During extreme cold particularly, the increased demand on the electrical grid can overload it and cause outages. The electrical grid is also at risk of physical damage as heavy snow, high winds, and ice can potentially damage electrical infrastructure. Severe winter weather can curtail natural gas production facilities and affect the operation of natural gas pipeline compressors. Colder temperatures will increase demand for natural gas for space heating potentially causing large industrial and electric generator or other natural gas interruptible customers to switch to alternate fuel supplies including liquid heating fuels. Severe winter weather can also impact the liquid fuels industry disrupting or delaying the transport and delivery of critical home heating and transportation fuels. Emergency services, shelters, and other community lifelines rely on liquid fuels to run their vehicles, provide heat for buildings, and fuel for generators during electrical outages. Critical infrastructure for the liquid fuels sector including petroleum terminals and pipelines is also dependent on electricity to maintain operations and can be severely curtailed by electrical outages. Severe cold winter weather increases demand for liquid heating fuels across the residential and commercial sectors. Electric generators and other natural gas users may have to rely on alternate liquid fuels if they do not have firm natural gas service. The potential for disruption of deliveries of essential home heating fuels would especially impact vulnerable consumers and disadvantaged communities.

- **New York State Coastal Storm Annex.**[26] This annex applies to any warm weather or cold weather coastal storm that warrants a collective, multi-agency state disaster response. This Annex identifies the key mechanisms in coordinating with local and federal stakeholders in response to an impending coastal storm. This Annex includes an operational timeline and operating protocols that ensures the State's response is mobilized in advance of all local or federal plans. The plan includes detailed energy system monitoring for this risk and restoration following and incident through the Emergency Support Function #12 Energy Annex.

[24] New York State Extreme Heat Action Plan. New York State Department of Environmental Conservation. https://dec.ny.gov/environmental-protection/climate-change/effects-impacts/extreme-heat.
[25] New York State Blizzard/Severe Winter Weather Annex. New York State Division of Homeland Security and Emergency Services. https://www.dhses.ny.gov/blizzardsevere-winter-weather-annex.
[26] New York State Coastal Storm Annex. New York State Division of Homeland Security and Emergency Services. https://www.dhses.ny.gov/coastal-storm-annex.

9. Themes and Recommended Actions

New York State has a robust interagency emergency preparedness and response system and is well-positioned and prepared to respond to energy emergencies. It is important to continue to build out additional energy security resilience and preparedness capabilities and actions through existing agencies and programs.

The current energy systems in New York are rapidly evolving in response to the transition to clean energy as well as local, regional and global market, technology, climate and policy changes. This evolution will continue to introduce new hazards and vulnerabilities, changing the risk profile of the energy systems in the state and will have a direct effect on the emergency preparedness plans, responses, and mitigation strategies needed in New York.

It is recommended that:

- New York State continue to prioritize multi-agency energy emergency management and test capabilities through exercises, training, and collaborations.
- New York State continue to apply risk-based assessment to monitor, evaluate, and respond to the changing risks in the evolving energy systems within the state. The changing risk landscape will introduce opportunities to test emergency preparedness strategies and improve them.
- New York State should study and analyze the effects of mitigation and sustainability efforts to inform future strategies and investments.
- New York State should continue to encourage energy infrastructure investment consistent with both State clean energy and energy security goals.
- New York State should continue to emphasize and communicate the critical role that the public will play in energy emergency preparedness throughout the clean energy transition. Response plans (including the Extreme Heat and Extreme Winter Weather annexes) should continue to include public planning and participation to help mitigate the risks posed by these evolving threats.
- Individuals should understand their evolving role in energy emergency preparedness as well: for example, securing guaranteed winter heating fuel supply contracts (Heating Oil, Propane or Kerosene) for private residences is becoming more critical as the current energy systems continue to transition.

These efforts will continue to strengthen the State's energy infrastructure, delivering a more resilient and clean energy system into the future.