



## 5.4.12 Utility Failure

This section provides the hazard profile (hazard description, extent, location, previous occurrences and losses, probability of future events, and climate change impacts) and vulnerability assessment for the utility failure hazard in Livingston County.

### 5.4.12.1 Hazard Profile

#### Description

A utility failure, or power failure, is defined as any interruption or loss of electrical service caused by disruption of power transmission from an accident, sabotage, natural hazards, or equipment failure (also referred to as a loss of power or power outage). A significant power failure is defined as any incident of a long duration that would require involvement of local and/or state emergency management organizations to coordinate provision of food, water, heating, cooling, and shelter.

Widespread power outages can occur without warning or as a result of a natural disaster. Generally, warning times will be short in the case of technological failure, such as a fire at a sub-station, traffic accident, human error, or terrorist attack. In cases where a power failure is caused by natural hazards, greater warning time is possible. For example, high-wind events such as tornados and hurricanes often cause widespread power failure and are frequently forecasted before they affect a community. Additionally, severe winter weather conditions, such as ice storms, blizzards, and snowstorms, often cause power failure. In most cases, incidents such as these afford ample warning time, allowing power response crews to stage resources in preparation for power failure.

Power failures can cause secondary hazards that affect health of residents. One potential secondary hazard includes chemical accidents, which occur after restoration of power to industrial facilities. Power interruptions at chemical handling plants are of particular concern because of the potential for a chemical spill during restart (U.S. Environmental Protection Agency [EPA] 2001). Chemical spills can exert significant health and environmental impacts.

Another secondary hazard that can result from power failure is loss of communications capability by first responders, which may in turn negatively affect public safety. Backup systems, such as amateur radio operators, may be required during a disaster to augment communications capabilities. Power outages can also lead to instances of civil disturbance, such as looting.

Wastewater and potable water utility interruption may occur as a result of a power failure. These critical utilities are essential to community continuity and recovery. Interruption of service may result in cascading economic and environmental impacts.

Power failure can significantly affect health of the community. During periods of extreme heat or extreme cold, vulnerable populations, such as the elderly and medically frail, can suffer during power failures and are susceptible to hypothermia or heat stroke. Additionally, power failure can lead to food spoilage, which also negatively impacts public health.

Power failure may also lead to an increase in traffic accidents because of lack of functioning traffic control devices such as stoplights and railroad crossing advisory signals. Power outages of long duration will force law enforcement officials to man traffic control points to prevent accidents, which may delay or prevent those officers from responding to other emergency incidents.



**Extent**

The extent and severity of a power outage depends on the cause, location, duration, and time of year. An incident can range from a small, localized event to a countywide power outage. Impacts from an outage can be significant to the county and its residents. Power outages typically occur because of, or in combination with, other emergency or disaster incidents, such as severe weather and flooding, and can exacerbate such emergencies. Severity of an incident will also depend on the electrical distribution system affected.

Power failures lead to inability to use electric-powered equipment, such as lighting; heating, ventilation, and air conditioning (HVAC) units and necessary equipment; communication equipment (telephones, computers, etc.); fire and security systems; small appliances (refrigerators and sterilizers); and medical equipment. Interruption of service for any of these types of equipment can lead to a number of issues including food spoilage, loss of heating and cooling, basement flooding due to sump pump failure, and loss of water due to well pump failure.

**Location**

Utility failures in Livingston County are usually localized and are typically the result of a natural hazard event involving high winds or ice storms. The primary electricity and gas utility providers in Livingston County are National Grid and NYSEG. Table 5.4.12-1 provides the electric and gas utility providers serving the towns and villages in Livingston County.

**Table 5.4.12-1. Electric and Gas Utility Providers in Livingston County**

Jurisdiction	Rochester Gas & Electric	New York State Gas and Electric Corporation	National Grid
Avon (T)			X
Avon (V)			X
Caledonia (T)			X
Caledonia (V)			X
Conesus (T)			X
Dansville (V)		X	
Geneseo (T)	X		X
Geneseo (V)	X		X
Groveland (T)			X
Leicester (T)	X	X	
Leicester (V)		X	
Lima (T)			X
Lima (V)			X
Livonia (T)			X
Livonia (V)			X
Mount Morris (T)	X	X	
Mount Morris (V)	X		
North Dansville (T)		X	
Nunda (T)	X		
Nunda (V)	X		
Ossian (T)		X	
Portage (T)	X		
Sparta (T)		X	
Springwater (T)		X	

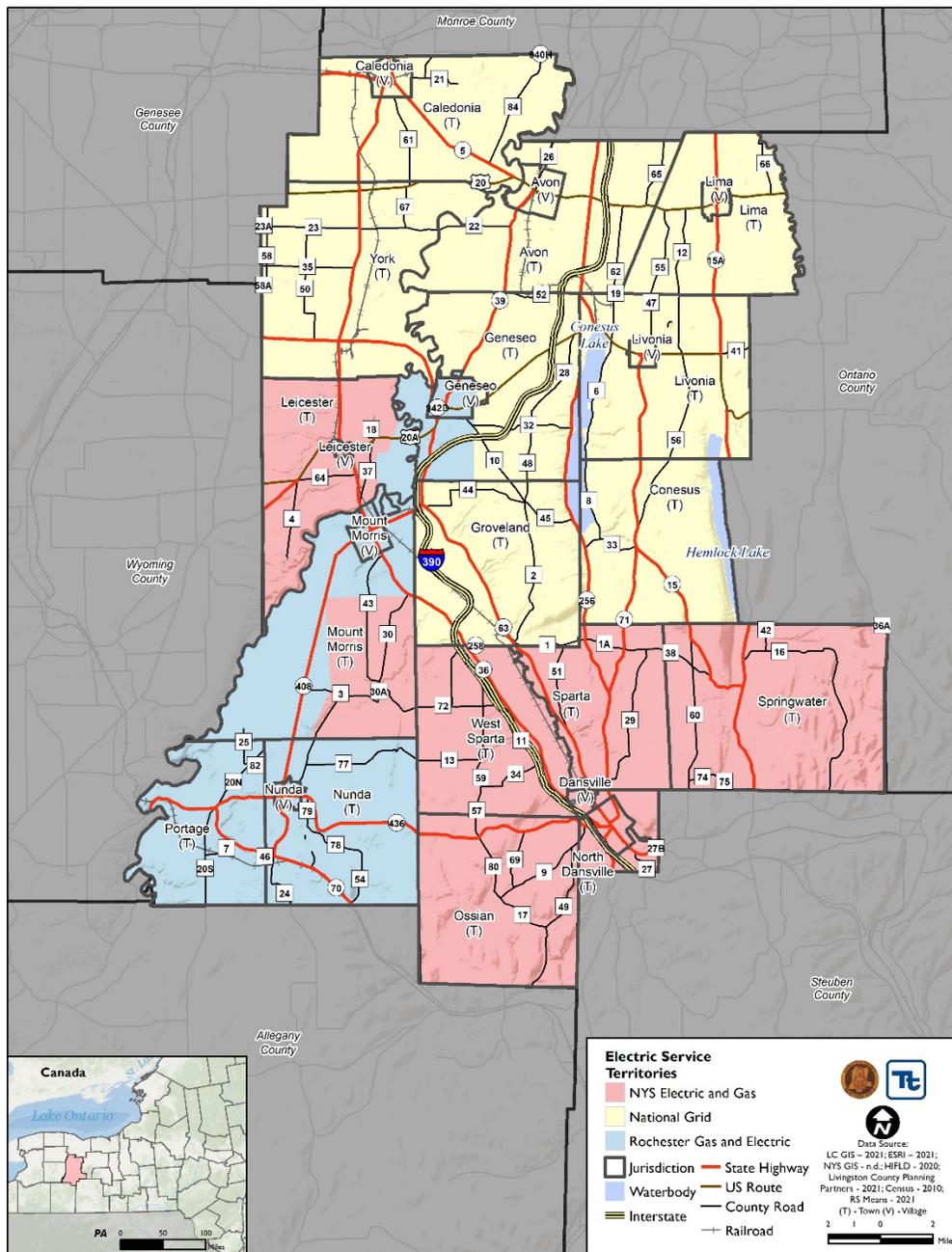


Jurisdiction	Rochester Gas & Electric	New York State Gas and Electric Corporation	National Grid
West Sparta (T)		X	
York (T)			X

Source: Livingston County GIS 2021; NYSERDA 2019; Middlebury n.d.; Warsaw n.d.

Some areas depend on residential propane tanks for gas service. These companies can generally handle minor interruptions of service. Interruptions are possible anywhere utility service is provided. Figure 5.4.12-1 shows the electric service territories in Livingston County.

Figure 5.4.12-1. Electric Service Territories in Livingston County





The Livingston County Water & Sewer Authority (the Authority) is a public benefit corporation that was established in 1995 by an act of the State Legislature. The Authority’s primary responsibilities are to construct, improve, maintain, develop, expand and rehabilitate water and sewerage facilities. The Authority currently operates and maintains: two wastewater treatment plants, approximately 50 miles of sanitary sewer collection and conveyance piping, and 45 sewage pump stations; approximately 75 miles of water distribution and transmission piping, 12 water storage tanks, 7 booster pump stations, and 5 re-chlorination stations. The Authority is providing water services to approximately 3558 water accounts. The Authority’s water customers are located within the Village of Livonia and portions of the Towns of Avon, Caledonia, Conesus, Geneseo, Groveland, Livonia, Mount Morris, and Sparta. The Authority is providing sewer services to approximately 3,515 sewer accounts. The Authority’s sewer customers are located within the Village of Livonia and portions of the Towns of Livonia, Conesus, Avon, Groveland, Leicester, and Sparta. The Authority is also responsible for the operation and maintenance of the flood gates in Conesus Creek at the outlet of Conesus Lake. This is accomplished through an agreement between the Authority and the Conesus Lake Compact (Towns of Conesus, Geneseo, Groveland, and Livonia)

Previous Occurrences and Losses

Between 1954 and 2021, the Federal Emergency Management Agency (FEMA) included New York State in one emergency declaration (EM-3186 in 2003 – the Great Northeast Blackout) classified solely as a power outage. Generally, utility-failure disasters have covered a wide region of the state; therefore, they may have impacted many counties. While not all New York counties were included in the disaster declaration, Livingston County was included in this declaration (FEMA 2021).

For this 2022 HMP update, known utility failure events that have impacted Livingston County between 2015 and 2021 are identified in Table 5.4.12-2. Because information regarding specific details of utility failures in the county is scarce, knowledge of previous occurrences and losses associated with these events is limited. Therefore, Table 5.4.12-2 may not include all events that have occurred in the county.

Table 5.4.12-2. Utility Failure Events in Livingston County, 2015 to 2021

Table with 5 columns: Dates of Event, Event Type, FEMA Declaration Number, County Designated?, and Losses / Impacts. It lists utility failure events such as Thunderstorm Wind and High Wind from 2019 to 2021, detailing the impact on trees, powerlines, and infrastructure.



**Table 5.4.12-2. Utility Failure Events in Livingston County, 2015 to 2021**

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts
January 1, 2019	High Wind	-	-	Trees and wires were reported down across the county.
September 21, 2018	Thunderstorm Wind	-	-	Multiple trees and wires were reported down.
April 14, 2018	Ice Storm	-	-	Freezing rain combined with wind caused multiple trees and power lines to fall.
April 4, 2018	High Wind	-	-	Trees and wires down throughout the county
March 1, 2018	Winter Storm	-	-	Trees and wires down throughout the county
October 15, 2017	Thunderstorm Wind	-	-	The thunderstorm winds downed trees and power lines throughout the region.
July 20, 2017	Thunderstorm Wind	-	-	Law enforcement reported trees and wires down by thunderstorm winds.
June 18, 2017	Thunderstorm Wind	-	-	Law enforcement reported trees and wires downed by thunderstorm winds on Eagle Point Road.
June 15, 2017	Thunderstorm Wind	-	-	Trees and wires down throughout the county
May 18, 2017	Thunderstorm Wind	-	-	Trees and wires down throughout the county
May 1, 2017	Thunderstorm Wind	-	-	Trees and wires down throughout the county
March 8, 2017	High Wind	-	-	Trees and power lines downed throughout the region.
March 2, 2017	High Wind	-	-	Trees and wires were downed by strong winds in Caledonia.
August 13, 2016	Thunderstorm Wind	-	-	Power outages were scattered throughout the region.
June 20, 2016	Thunderstorm Wind	-	-	Law enforcement reported trees and power lines down by thunderstorm winds.
May 29, 2016	Thunderstorm Wind	-	-	Law enforcement reported trees downed by thunderstorm winds.
September 9, 2015	Thunderstorm Wind	-	-	Trees and wires down throughout the county
June 23, 2015	Thunderstorm Wind	-	-	Trees and wires down throughout the county
June 12, 2015	Thunderstorm Wind	-	-	Law Enforcement reported trees and wires downed by thunderstorm winds on Coffee Hill Road.
June 10, 2015	Thunderstorm Wind	-	-	Law enforcement reported numerous trees and wires down from thunderstorm winds near Avon. Trees damaged several parked cars.
June 8, 2015	Thunderstorm Wind	-	-	Thunderstorm winds down large trees and limbs in the Main Street area of Hemlock.

Source: NOAA-NCEI 2021; FEMA 2021  
 mph Miles per Hour  
 NCEI National Centers for Environmental Information  
 NOAA National Oceanic and Atmospheric Administration



### Probability of Future Events

While the probability of future utility failure incidents in Livingston County is difficult to predict, the historical record indicates that previous utility failures have occurred as a result of high winds, thunderstorm winds, and winter weather. As infrastructure ages beyond its intended lifespan, it is likely to become less reliable leading to a higher likelihood of failure. Data were not readily available on the frequency of smaller utility interruptions across the County; however, it is reasonable to assume that utility failure events of shorter duration will continue to occur in the future. In addition, future changes in climate may also impact the frequency and probability of future utility failure occurrences.

Section 5.3 of this HMP lists the ranking of all identified hazards of concern for Livingston County. Probability of occurrence, or likelihood of the event, is one parameter used for hazard rankings. Based on historical records and input from the Planning Partnership, probability of occurrence of utility failures in the County is considered “frequent” (likely to occur within 25 years).

### Climate Change Impacts

Climate change is beginning to affect both people and resources in New York State, and these impacts are projected to continue and become more significant. Impacts related to increasing temperatures and sea level rise are already evident in the state. The Integrated Assessment for Effective Climate Change in New York State (ClimAID) was undertaken to provide decision makers with information on the state’s vulnerability to climate change, and to facilitate development of adaptation strategies informed by both local experience and scientific knowledge (New York State Energy Research and Development Authority [NYSERDA] 2014).

Each region in New York State, as defined by ClimAID, has attributes that will be affected by climate change. Livingston County is part of Region 1, Western New York and Great Lakes Plain. Some characteristics and issues associated with climate change in this region include relatively low rainfall, increased summer drought risk, high-value crops requiring irrigation, and projected improved condition for grapes (NYSERDA 2014). This region contains an area producing the highest agricultural revenue in the state..

Temperatures are expected to increase throughout the State by 2° F to 3.4° F by the 2020s, 4.1° F to 6.8° F by the 2050s, and 5.3° F to 10.1° F by the 2080s. The lower ends of these ranges assume lower greenhouse gas emissions scenarios, and the higher ends assume higher greenhouse gas emissions scenarios. Annual average precipitation is projected to increase by up to 1 to 8 percent by the 2020s, up to 3 to 12 percent by the 2050s, and up to 4 to 15 percent by the 2080s. By the end of the century, the greatest increases in precipitation are projected to be in the northern parts of the State. Although seasonal projections are less certain than annual results, this additional precipitation will most likely occur during the winter months, with the possibility of slightly reduced precipitation projected for the late summer and early fall. Table 5.4.12-3 lists projected precipitation changes within the Western New York Great Lakes ClimAID Region (NYSERDA 2014).

**Table 5.4.12-3. Projected Seasonal Precipitation Change in Region 1, 2020-2100 (% change)**

Baseline (1971-2000) 34.0 inches	Low Estimate (10 <sup>th</sup> Percentile)	Middle Range (25 <sup>th</sup> to 75 <sup>th</sup> Percentile)	High Estimate (90 <sup>th</sup> Percentile)
2020s	0 percent	+ 2 to + 7 percent	+ 8 percent
2050s	+ 2 percent	+ 4 to + 10 percent	+ 12 percent
2080s	+ 1 percent	+ 4 to + 13 percent	+ 17 percent
2100	- 3 percent	+ 4 to + 19 percent	+ 24 percent

Source: *NYSERDA 2014*

Climatologists predict an increase in the number and intensity of severe weather events. More storms with higher winds will increase the chance that the power infrastructure will be impacted. Extreme temperatures are





predicted to increase as well. During the hot summer months, potential for power overload will increase as demand for power increases. Additionally, climatologists predict an increase in precipitation, which may lead to more winter weather, thus causing additional power failures.

### **5.4.12.2 Vulnerability Assessment**

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To understand risk, a community must evaluate the assets that are exposed or vulnerable within the identified hazard area. For the utility failure hazard, all of Livingston County has been identified as the hazard area. Therefore, all assets in the County (population, structures, critical facilities, and lifelines), as described in the County Profile (Section 4), are vulnerable to a utility failure.

#### **Impacts on Life, Health, and Safety**

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The entire county is vulnerable to the utility failure hazard. Loss of power can exert serious impacts on the health and welfare of residents, continuity of businesses, and ability of public safety agencies to respond to emergencies. Individuals with medical needs are vulnerable to power failures, because medical equipment (such as oxygen concentrators) requires electricity to operate. Elderly residents are also vulnerable to the effects of power failure, as power failure could expose older residents to extreme heat or extreme cold. According to the U.S. Census 2020 decennial census population estimates, there are 27,113 housing units in Livingston County (U.S. Census 2020). Most of these housing units rely on electricity to power in-home heating systems. Individuals living in these households will be exposed to significantly colder (winter months) or hotter (summer months) indoor temperatures during a utility failure. Those that use utility gas for home heating will be less vulnerable.

During power failure events, water purification systems may not function. Further, populations relying on private wells will not have access to potable water. Many power outage events are caused by storm events that can lead to flooding. Without electricity, residents would be unable to pump water from their basements, potentially causing structural and content damage to their homes. Section 5.4.3 (Flood) includes a more detailed discussion of the County’s vulnerability to the flood hazard.

Individuals with medical needs are vulnerable to power failures, because medical equipment (such as oxygen concentrators) requires electricity to operate. The elderly population is also vulnerable to the effects of power failure, as power failure could expose older residents to extreme heat or extreme cold. During power failure events, water purification systems may not function. Further, populations relying on private wells will not have access to potable water. Many power outage events are caused by storm events that can lead to flooding. Without electricity, residents would be unable to pump water from their basements, potentially causing structural and content damage to their homes.

#### **Impacts on General Building Stock**

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The entire building stock of Livingston County is exposed and is considered vulnerable to the utility failure hazard. The County Profile (Section 4 of this HMP) summarizes the building inventory of the county. Impacts sustained from utility interruption are likely to be secondary impacts. Should potable water distribution be reduced or not available, then structures could be at increased risk for structural fire since current fire suppression is dependent accessing water supply from hydrants.

#### **Impacts on Critical Facilities and Lifelines**

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During a power outage event, the County may undergo losses because of an interruption of critical services. Further, increased costs, such as providing shelters and costs related to cooling and heating centers may be incurred. Extended power outages will require officials to shelter victims who require heat and power for



activities of daily living. Power interruptions can cause economic impacts stemming from lost income and spoiled food and other goods, costs to the owners/operators of the utility facilities, and costs to government and community service groups.

Backup power is recommended for critical facilities and infrastructure. Loss of power can have serious impacts on the health and welfare of residents, continuity of business, and the ability of public safety agencies to respond to emergencies. Interruption of utility gas or water distribution could also reduce the effectiveness of critical facilities to operate at full capacity.

Interruption of potable water distribution also has a considerable impact on the firefighting capabilities of many fire departments within Livingston County. Livingston County’s fire departments rely on the pressurized water system that supplies the fire hydrant connections for fire suppression. Most of the firefighting apparatus in the county relies on these fire department connections for adequate fire suppression. Should frequent or widespread water interruption occur, there will be an increased risk for structural fire and wildfire occurrence within the county.

### **Impact on Economy**

A prolonged power failure in Livingston County may impact the County’s economy. All roadway systems and supporting resources provide services locally, regionally, nationally, and internationally. Disruption in any of these services would mean that many workers, residents, and travelers would not be able to go where needed.

Power interruptions can cause economic impacts stemming from lost income, spoiled food and other goods, costs to the owners/operators of the utility facilities, and costs to government and community service groups. Interruption of utility gas or potable water distribution could also cause significant economic impacts such as additional costs for bringing in water tenders to maintain fire suppression capabilities; opening additional warming centers should electric and utility gas utility be interrupted to residential areas; and distribution of potable water for public consumption. Significant costs could be associated with reimbursing fire departments from other counties within New York to travel, staff, and maintain water tenders within Livingston County during the duration of a water outage event.

Potential modeling of economic impacts from utility interruption would be developed by calculating interruption of service costs derived from a standard value per person per day multiplied out by the number of customers served. This would help to provide an estimate of the impact of the interrupted utility service but may not be representative of the complete economic impact of a prolonged utility interruption. For example, FEMA’s benefit-cost analysis (BCA) methodology measures the loss of electrical service on a per-person-per-day-of-lost-service basis for the service area affected. The FEMA BCA Toolkit version 6.0 uses the following standard values to estimate cost of utility usage per person per day (FEMA 2020):

- Electric: \$174.00
- Potable Water: \$114.00
- Wastewater: \$58.00

### **Impact on the Environment**

At this time, there are no known impacts to the environment caused by utility failures.



### Future Changes that May Impact Vulnerability

Understanding future changes that impact vulnerability in the county can assist in planning for future development and ensuring that appropriate mitigation, planning, and preparedness measures are in place. The county considered the following factors to examine potential conditions that may affect hazard vulnerability:

- Potential or projected development
- Projected changes in population
- Other identified conditions as relevant and appropriate, including the impacts of climate change

### Projected Development

Any areas of growth could be potentially impacted by utility failures because the entire County is exposed and vulnerable. However, because of increased standards and codes, new development may be less vulnerable to utility failures compared to the aging building stock in the County. Section 4, County Profile, provides more information about the new development plans for Livingston County.

### Projected Changes in Population

According to the 2019 American Community Survey 5-year population estimates, the population of the County has decreased by approximately 3-percent since 2010. Even though the population is decreasing in Livingston County, persons that move into older properties that do not meet existing codes are at greater risk of experiencing utility failure events. Section 4, County Profile, provides additional discussion on population trends.

### Climate Change

Several implications for climate change are related to the power failure hazard. Providing projections of future climate change for a specific region is challenging. Shorter term projections are more closely tied to existing trends making longer term projections even more challenging. The further out a prediction reaches, the more subject to changing dynamics it becomes.

Climatologists predict an increase in the number and intensity of severe weather events. More storms with higher winds will increase the chance that the power infrastructure will be impacted. Extreme temperatures are predicted to increase as well. During the hot summer months, the potential for power overload will increase as demand for power increases. Additionally, climatologists predict an increase in precipitation, which may lead to more winter weather causing additional power failures and utility interruptions.

### Changes in Vulnerability Since the 2015 HMP

Since the 2014 analysis, population statistics have been updated using the 5-Year 2015-2019 American Community Survey Population Estimates (American Community Survey 2019) and the U.S. 2020 Decennial Census Data. Overall, this vulnerability assessment uses a more accurate and updated building inventory than that used in the 2015 HMP. This information provides more accurate exposure and potential loss estimates for Livingston County.