



5.4.12 Utility Failure

The following sections provide 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 Genesee 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 caused by 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 often 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 plenty of 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, chemical accidents, 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 such as 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 Genesee County are usually localized and are typically the result of a natural hazard event involving high winds or ice storms. The primary electricity utility in Genesee County is National Grid. National Fuel provides natural gas service to most of the County, along with Rochester Gas & Electric (in the Town of Byron, Town of LeRoy, and Town of Pavilion) and New York State Gas and Electric Corporation (NYSEG) (in the Town of Elba). 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.

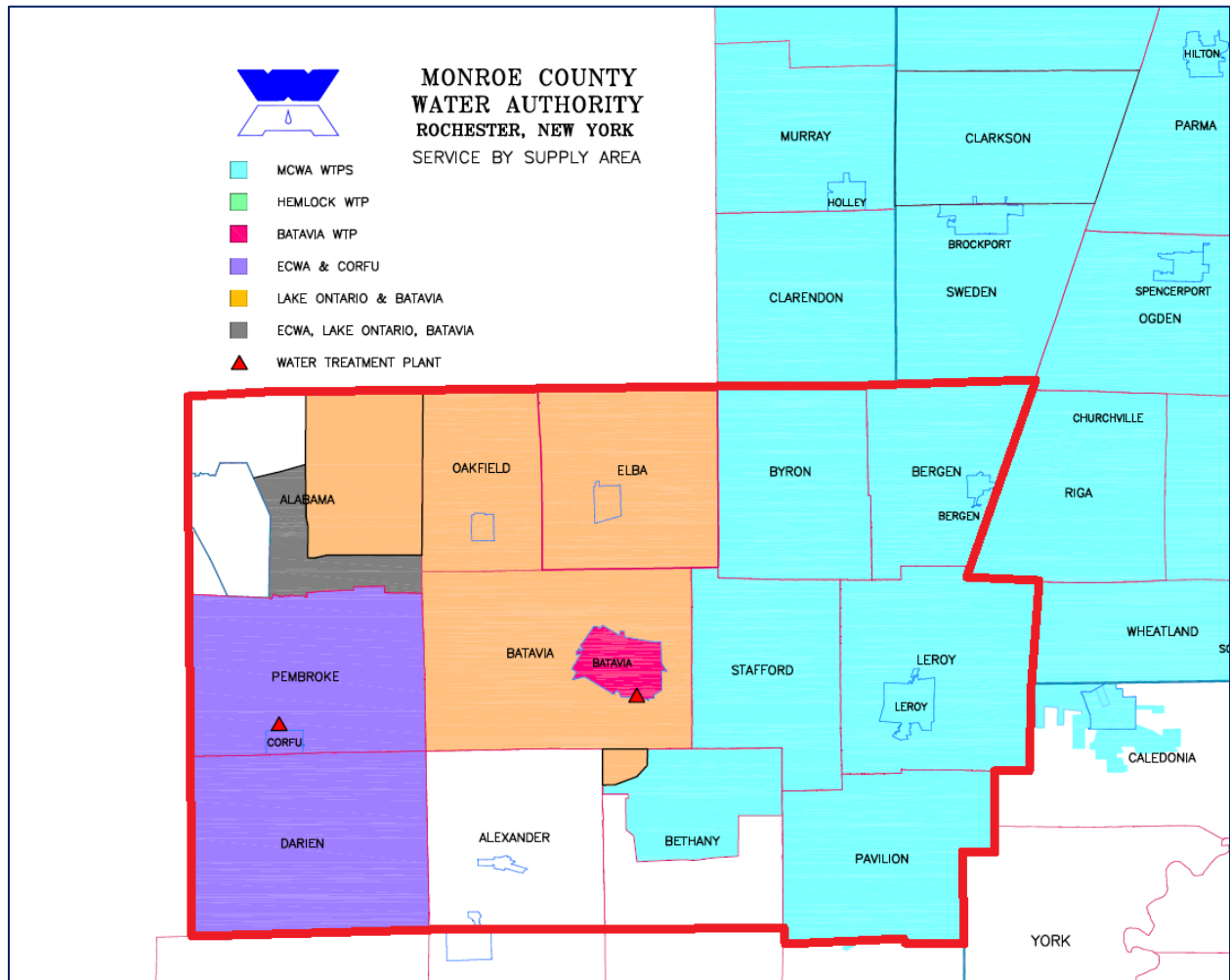
Potable water in Genesee County is provided by private wells; systems maintained by the Village of Attica, City of Batavia, and Village of Elba, the Tonawanda Creek and associated aquifer; and the Monroe County Water Authority (MCWA), which draws water from Lake Ontario and Hemlock Lake. MCWA serves the following towns (T) and villages (V) in Genesee County:

- Alabama (T)
- Alexander (T)
- Batavia (T)
- Bergen (T)
- Bergen (V)
- Byron (T)
- Corfu (V)
- Darien (T)
- Elba (T)
- LeRoy (T)
- LeRoy (V)
- Oakfield (T)
- Oakfield (V)
- Pavilion (T)
- Pembroke (T)
- Stafford (T)

The Town of Alexander, Town of Batavia, Town of Elba, and Town and Village of Oakfield are served from the City of Batavia’s water plant. Parts of the Town of Alabama, Town of Darien, and Town of Pembroke are served through the MCWA with ECWA source water. The Corfu Water Plant, operated by the MCWA, supplies the Village of Corfu and parts of the Town of Darien and Town of Pembroke. Figure 5.4.12-1 shows the sources of water for Genesee County’s municipalities that purchase water from the MCWA. The Village of Elba will be switching to the MCWA as its water supplier in 2019. Small parts of the Town of Alabama and Town of Darien are served by the Village of Akron Water System. The Village of Alexander and parts of the Town of Alexander are also serviced by the Village of Attica’s water supply.



Figure 5.4.12-1. Genesee County MCWA Service Area by Supply



Source: MCWA 2019

Note: ECWA: Erie County Water Authority

Genesee County is indicated with the red outline. Villages within serviced towns also draw their water from the same place.

Previous Occurrences and Losses

Between 1954 and 2015, the Federal Emergency Management Agency (FEMA) included New York State in one emergency declaration (EM-3186 in 2003) classified 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, Genesee County was included in this declaration (FEMA 2017).

For this 2019 Hazard Mitigation Plan (HMP) Update, known utility failure events that have impacted Genesee County between 2008 and 2017 are identified in Table 5.4.12-1. 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 5.4.12-1 may not include all events that have occurred in the County.



Table 5.4.12-1. Utility Failure Events in Genesee County, 2008 to 2017

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts
March 8, 2017	High Wind	N/A	N/A	Severe windstorms with gusts in excess of 70 mph caused numerous wires to down and poles to break throughout the County, which resulted in widespread power outages. National Grid brought in crews from unaffected areas of the region to help with the restoration efforts. Estimates indicated about 164,000 customers in western New York were without power with Niagara, Orleans, and western Genesee Counties being the hardest hit. Power poles were snapped.
October 24, 2016	Utility Failure	N/A	N/A	About 2,400 National Grid customers were affected by a power outage in Batavia that extended from an area north of East Main Street from Bank Street to just east of Clinton Street and stretching north in a triangle with the tip on Bank Street Road in East Elba. Power was restored through some switching, while the problem was diagnosed and corrected. It was believed to have been a fuse problem in the station that caused the outage.
September 17, 2016	Thunderstorm Wind	N/A	N/A	Thunderstorms developed during the evening hours in a warm, moist, and unstable atmosphere. A few of these storms produced damaging winds that downed some trees and power lines.
August 13, 2016	Thunderstorm Wind	N/A	N/A	Thunderstorms developed across the region in a moist unstable air mass. Numerous thunderstorms developed on outflow and lake breeze boundaries. The thunderstorms downed trees and wires throughout the region.
July 19, 2015	Unknown	N/A	N/A	A power outage extended in the Byron-Bergen area from LeRoy to the south and almost as north and east as Bergen. Additionally, a smaller outage affected 44 customers in Alexander near the county line. A reader of The Batavian reported a downed tree.
June 23, 2015	Thunderstorm Winds	N/A	N/A	An area of showers and thunderstorms moved across the lower Great Lakes region during the overnight and very early-morning hours. The thunderstorms produced strong winds that downed trees and power lines. Several of the downed trees damage structures and cars. Some roads were temporarily blocked by debris.
May 11, 2015	Thunderstorm Winds	N/A	N/A	A line of thunderstorms moved across the Niagara Frontier during the late evening hours. The thunderstorms produced strong wind gusts estimated to near 60 mph. Trees and power lines were downed in East Aurora, Darien, and Pembroke.
December 24, 2014	Thunderstorm Winds	N/A	N/A	Thunderstorm winds downed trees and power lines in Orleans and Genesee Counties. Damage was reported near Oakfield.
September 8, 2014	Power Line Down	N/A	N/A	A live wire down near 110 S. Swan Street in Batavia caused localized power outages to the area. City fire department was dispatched to deal with the sparking wire.
June 17, 2014	Thunderstorm Wind	N/A	N/A	Scattered showers and thunderstorms developed in a warm, humid air mass during the afternoon hours. These were followed by a large area of showers and thunderstorms associated with low pressure moving across the Great Lakes into southern Ontario and



Table 5.4.12-1. Utility Failure Events in Genesee County, 2008 to 2017

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts
				then Quebec. Several of the thunderstorms produced strong, damaging winds. Damage was mainly reported as downed trees and wires; however, there were some reports of structural and other damage.
December 11, 2013	Car Accident	N/A	N/A	A vehicle slid off the road and hit a meter box on Route 77 at Route 20. The meter box maintained power, but National Grid had to turn off power to the area for DOT to fix the stop lights.
July 19, 2013	Thunderstorm Wind	N/A	N/A	Strong winds downed trees and powers lines. Power outages, while scattered throughout, were reported from a large portion of the area.
January 17, 2012	Thunderstorm Wind	N/A	N/A	Strong winds downed trees and power lines and poles. Power outages were scattered throughout the region with utilities reporting several thousand customers without power at its worst.
August 25, 2011	Thunderstorm Wind, Lightning	N/A	N/A	Thunderstorm winds gusting to 60 mph downed trees and power lines.
May 4, 2011	Utility Failure	N/A	N/A	Issues with a power line that stretches under the Thruway caused a power outage that affected over 500 National Grid customers along the Route 98 corridor from Batavia to Elba. Power was restored that day, but the outage resulted in one person being stuck in a Hampton Inn elevator, which was corrected by back-up generators.
September 7, 2010	Thunderstorm Wind	N/A	N/A	Winds downed trees and wires in Alabama, Pembroke, and Darien.
August 16, 2010	Thunderstorm Wind	N/A	N/A	Strong winds downed trees and power lines. Power outages were reported.
July 21, 2010	Thunderstorm Wind	N/A	N/A	Thunderstorms developed ahead of an approaching cold front. Utility companies reported thousands without power.
September 28, 2009	Thunderstorm Wind	N/A	N/A	Winds downed trees and power lines throughout the region with utilities reporting tens of thousands of customers without service.
July 25, 2009	Tornado	N/A	N/A	A tornado crossed the town of Darien and village of Corfu in Genesee County. Twenty power poles were snapped.
February 13, 2009	Utility Failure	N/A	N/A	A power outage occurred at United Memorial Medical Center as a result of difficulties with the electrical power redundancy system at the North Campus, where 90 patients were located. The fault in the system occurred where a transfer switch that allows 75% of the hospital’s needs to move to generator power failed. The hospital was without power for 15 minutes to diagnose the problem around noon and by about 5 pm, the hospital was back to full operations after cancelling operations.



Table 5.4.12-1. Utility Failure Events in Genesee County, 2008 to 2017

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts
November 13, 2008	Transformer Fire	N/A	N/A	A transformer fire near Williams Park was believed to be responsible for the loss of power to about 2,000 residences in the City of Batavia and Towns of Batavia and Pembroke.
September 14, 2008	Thunderstorm Wind	N/A	N/A	Winds downed trees and power lines throughout the area.
June 17, 2008	Utility Failure	N/A	N/A	A failure at the Batavia substation on Franklin Street left 5,800 residents in Batavia and about 1,000 others in Alexander, Pembroke, and Elba without power. Power was restored after midnight.
June 7, 2008	Utility Maintenance	N/A	N/A	Parts of Alexander and Dodgeson Roads in the Town of Batavia experienced power outages. At the time of the outage, National Grid was working on Route 98 at the city line.
January 8, 2008	Thunderstorm Wind	N/A	N/A	Trees and power lines were downed by strong winds. Utility companies reported tens of thousands of customers without power in locations scattered throughout region. Crews from Ohio, Connecticut, and sections of eastern New York traveled to the area to help with power restoration which, in some cases, took several days.

Source: NOAA-NCDC 2017; *The Batavian* 2008, 2009, 2011, 2013, 2014, 2015, 2016
 mph Miles per Hour
 NCDC National Climatic Data Center
 NOAA National Oceanic and Atmospheric Administration



Probability of Future Events

While the probability of future utility failure incidents in Genesee County is difficult to predict, the historical record indicates that previous utility failures have occurred as a result of high winds, lightning, and winter weather.

Section 5.3 of this HMP lists the ranking of all identified hazards of concern for Genesee 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] 2011).

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

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 5.4.12-2 lists projected precipitation changes within the Western New York Great Lakes ClimAID Region (NYSERDA 2014).

Table 5.4.12-2. Projected Seasonal Precipitation Change in Region 1, 2020-2100 (% change)

Baseline (1971-2000) 34.0 inches	Low Estimate (10 th Percentile)	Middle Range (25 th to 75 th Percentile)	High Estimate (90 th 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*

Annual temperatures throughout New York State have been rising since the start of the 20th century. State average temperatures have increased by approximately 0.6° F since 1970, with winter warming exceeding 1.1° F per decade. Extreme heat events are likely to increase throughout New York State, and short-duration warm season droughts will become more common.





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

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 Genesee 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 of this HMP), are vulnerable to a utility failure. This section discusses the potential impact of the utility failure hazard on the County. Specifically, this section addresses:

- Overview of vulnerability
- Data and methodology used for the evaluation
- Impacts on (1) life, health, and safety of residents; (2) general building stock; (3) critical facilities; and (4) future growth and development
- Change of vulnerability as compared to that presented in the 2011 Genesee County Hazard Mitigation Plan
- Further data collections that will increase understanding of this hazard over time.

Overview of Vulnerability

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 2011-2015 American Community Survey (U.S. Census 2016), 2,266 housing units or approximately 9.5 percent of housing units in Genesee County 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. The 13,695 housing units, or 57.2 percent of total, 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 5.4.6 (Flood) includes a more detailed discussion of the County's vulnerability to the flood hazard.

Data and Methodology

Data were collected from Genesee County and the Planning Partnership. Insufficient data were available to model long-term potential impacts of a utility failure on the County. Over time, additional data will be collected to allow better analysis of this hazard. Available information and a preliminary assessment are provided below.

Impacts on Life, Health, and Safety

For the purposes of this HMP, the entire population in Genesee County is considered vulnerable to utility failure events. Section 4 of this HMP (County Profile) includes a summary of population statistics for the County.



Utility failures pose potential health impacts including injury and death. Other issues pertaining to power outages include food safety from lack of refrigeration and carbon monoxide poisoning from misuse of generators.

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

The entire building stock of Genesee County is exposed and is considered vulnerable to the utility failure hazard. Section 4 of this HMP (County Profile) summarizes the building inventory of the County.

Impacts on Critical Facilities

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. FEMA's benefit-cost analysis (BCA) methodology measures loss of electrical service on a per-person-per-day-of-lost-service basis for the service area affected. For the electrical utility, the standard value is \$131 per person per day (FEMA 2014).

Future Growth and Development

As discussed in Sections 4 and 9 of this HMP, areas targeted for future growth and development have been identified across Genesee County. Any areas of growth could be impacted by the power outage hazard because the entire County is exposed and vulnerable. Specific areas of development are indicated in tabular form and/or on the hazard maps included in the jurisdictional annexes in Volume II, Section 9 of this plan.

Change of Vulnerability

Overall, the County's vulnerability has not changed since the HMP was developed in 2008, and the entire County will continue to be exposed and vulnerable to the utility failure hazard. Utility Failure was not a profiled hazard in the 2008 version of the HMP.

Additional Data and Next Steps

For future plan updates, Genesee County can track data on power outage events and obtain additional information on past and future events, particularly in terms of any injuries, deaths, shelter needs, pipe-freeze incidents, and other impacts. These data will help to identify any concerns or trends for which mitigation measures should be developed or refined. In time, quantitative modeling of estimated power outage events may be feasible as data are gathered and improved.