



## 4.3.22 Utility Interruption

A utility interruption could include power failure, potable water service outage, telecommunications infrastructure failure, natural gas infrastructure failure, or sewer infrastructure failure. For the purpose of this plan, utility interruption focuses on power failure, because it is the major cause of utility failure and has had widespread impacts on the county.

A power failure is defined as any interruption or loss of electrical service from disruption of power transmission caused by accident, sabotage, natural hazards, or equipment failure. A significant power failure is defined as any incident of a long duration that would require the involvement of the local or state emergency management organizations to coordinate provision of food, water, heating, cooling, and shelter. Interruptions in other basic utilities (such as data/telecommunications, water, natural gas, or sewer) can have a detrimental impact on Westmoreland County. Utilities that employ aboveground wiring (power and data/telecommunications) are vulnerable to the effects of other hazards such as high wind, heavy snow, ice, rain, and vehicular accidents.

This section describes the location and extent, range of magnitude, past occurrence, future occurrence, and vulnerability assessment for the utility interruption hazard for Westmoreland County.

### 4.3.22.1 Location and Extent

Utility interruptions occur throughout Westmoreland County, but are usually of small scale and short duration. Utility interruptions in Westmoreland County include disruptions in water, fuel, electric, and telecommunications capabilities. These interruptions are often a secondary impact of another hazard event. For example, severe thunderstorms or winter storms could bring down power lines and cause widespread disruptions in electricity service. Strong heat waves may result in rolling blackouts causing loss of power for an extended period. Local outages may be caused by traffic accidents or wind damage. Further information on hazards that can lead to utility interruptions are described in Sections 4.3.2 (Drought), 4.3.4 (Extreme Temperature), 4.3.6 (Hailstorm), 4.3.7 (Hurricane and Tropical Storm), 4.3.9 (Lightning), 4.3.12 (Tornado and Wind), and 4.3.14 (Winter Storm).

Local companies that provide electricity to Westmoreland County, such as PPL or West Penn Power Company, are capable of handling minor interruptions (Section 2 of this plan describes other utilities in the county). Interruptions are possible anywhere utility service has been installed. Some utility facilities are especially vulnerable. For instance, potable water interruption is possible when water intakes and many water control facilities are in the 1-percent annual chance floodplain, a flood of this magnitude may seriously impair water service. Section 4.3.5 provides more detail on possible flood impacts.

### 4.3.22.2 Range of Magnitude

Generally speaking, the most severe utility interruptions are regional power outages. Regional loss of power affects lighting; heating, ventilation, and air conditioning (HVAC) and other support equipment; communications; fire and security systems; and refrigerators, which can in turn cause loss of water and sewer service, and food spoilage. These effects are especially severe for individuals with access and functional needs and the elderly.

At a minimum, utility outages can cause short-term disruption of the orderly functioning of businesses, government operations, and private citizen functions and activities. Examples of everyday functions that would be affected by power outages include traffic signals, elevators, and retail sales. A worst-case scenario for utility interruption in Westmoreland County would be a countywide power outage during winter months, forcing the evacuation of vulnerable populations.



Sabotage also plays a role in some utility outages. Sabotage may be the direct result of a malicious attack against utilities, or may be the secondary effect of the theft of copper wiring. In a report published in October 2010 titled “An Updated Assessment of Copper Wire Theft from Electric Utilities,” the U.S. Department of Energy’s (DOE) Office of Electricity Delivery and Energy Reliability reported that United States-based utilities suffer copper thefts costing several million dollars annually (DOE 2010). The estimated minutes of outages experienced by utilities nationwide as a result of copper theft were 456,000 or about 7,600 hours (American Public Power Association [APPA] 2012).

### 4.3.22.3 Past Occurrence

Every year, Westmoreland County is susceptible to minor utility interruptions either through technological failure or as the result of inclement weather. Table 4.3.22-1 shows major utility interruptions in the county from 2015 to February 2019.

Table 4.3.22-1. Utility Interruptions from 2015 – February 2019

Utility Type	2015	2016	2017	2018	2019	Utility Total
Boil Water Advisory	0	1	0	0	1	2
Communications Outage	4	24	16	13	0	57
Natural Gas Outage	4	1	2	0	0	7
Power Outage	25	21	14	25	1	86
Water Outage	29	19	18	7	1	74
<b>Annual Total</b>	<b>62</b>	<b>66</b>	<b>50</b>	<b>45</b>	<b>3</b>	<b>226</b>

Sources: Westmoreland County 2019; Knowledge Center 2019; West Penn Power Company 2019

### 4.3.22.4 Future Occurrence

Minor utility failure (in other words, short outage events) may occur several times a year for any given area in the county, while major events (long, widespread outage events) occur once every few years. Utility failures often occur during severe weather; therefore, they should be expected during those events. Based on the assumption that the county will experience severe weather annually, in addition to outages from other causes, the future occurrence of utility interruptions in Westmoreland County should be considered *highly likely* as defined by the Risk Factor Methodology probability criteria.

### 4.3.22.5 Vulnerability Assessment

To understand risk, a community must evaluate the assets that are exposed or vulnerable in the identified hazard area. This section discusses the potential impact of the subsidence and sinkhole hazard on Westmoreland County in the following subsections:

- Impact on (1) life, health, and safety; (2) general building stock; (3) economy; (4) environment; and (5) future growth and development
- Effect of climate change on vulnerability
- Further data collections that will assist understanding of this hazard over time



### Impact on Life, Health, and Safety

Utility interruptions most severely affect individuals with access and functional needs (such as children, the elderly, and individuals with special medical needs). Special medical equipment will not function without power. Likewise, a loss of air conditioning during periods of extreme heat or the loss of heating during extreme cold can be especially detrimental to those with medical needs, children, and the elderly. Table 4.3.22-2 shows the demographic change in children and the elderly from 2000 through 2017. The population under the age of 5, and under the age of 18 have decreased, while the population over the age of 65 has increased, as shown in Table 4.3.22-2. The population under the age of 18 has decreased by 17.7 percent. Data on individuals with special medical needs were not available.

**Table 4.3.22-2. Demographic Trends for Vulnerable Populations**

Vulnerable Population	2000 Census	2010 Census	2013-2017 ACS	2000 to 2017 Change
Children under 5 years	19,175	17,671	16,498	-2,677
Under 18 years	81,399	72,611	66,980	-14,419
65 years and over	67,781	68,877	75,289	+7,508

Source: U.S. Census Bureau 2018

### Impact on General Building Stock and Critical Facilities

All facility infrastructure considered critical are vulnerable to utility interruptions, especially the loss of power. The establishment of reliable backup power at these facilities is extremely important to continue to provide for the health, safety, and well-being of Westmoreland County’s population.

### Impact on the Economy

No data regarding economic impacts from utility interruptions in Westmoreland County are available. However, utility interruptions can cause economic impacts stemming from lost income, spoiled food and other goods, costs to the owners or operators of the utility facilities, and costs to government and community service groups. Calculation of potential impacts of utility interruptions is heavily dependent on the number of rate-paying utility connections affected. The Federal Emergency Management Agency (FEMA) Benefit-Cost Analysis (BCA) Toolkit v.5.3.0 has standard values based on the daily cost per rate-paying connection. The daily cost per value is shown in Table 4.3.22-3.

**Table 4.3.22-3. FEMA BCA Toolkit v5.3.0 Daily Standard Values of Utility Services**

Utility	Daily Value (per connection/per day)
Electric	\$148.00
Potable Water	\$105.00
Wastewater	\$49.00

Source: FEMA 2017

### Impact on the Environment

The most significant impact associated with utility interruptions is when the interruption involves a release of hazardous materials. This hazardous material may be released in a pipeline accident or when a material is in



transit. Section 4.3.16 (Environmental Hazards) includes a complete discussion on the impacts of a hazardous materials release. Pipelines carrying flammable materials also have the possibility of exploding or starting a fire (Pennsylvania Emergency Management Agency [PEMA] 2018).

A number of secondary impacts are associated with utility interruptions. First, interruptions could affect the ability of the government to function, especially if backup power generators or supply is inadequate or unavailable. Utility interruptions also can reduce the efficient and effective communication that is essential to first responders. Heating loss and severe cold can also impact the health and safety of at-risk populations like young children, the elderly, and individuals with disabilities (PEMA 2018).

### **Future Growth and Development**

Areas targeted for potential future growth and development in the next 5 to 10 years have been identified across Westmoreland County (further discussed in Section 2.4 of this HMP). Any areas of growth could be potentially impacted by the utility interruption hazard because the entire county is exposed and potentially vulnerable. An increase in development and population will increase demand for power supply and has the ability to increase the likelihood of utility interruption incidents.

### **Effect of Climate Change on Vulnerability**

According to the Fourth National Climate Assessment, two climate change scenarios were modeled, and temperature change in the northeastern United States is estimated to increase between 3.98 - 5.09°F by 2036-2065 and between 5.27 - 9.11°F by 2071-2100. The annual mean temperature change in Pennsylvania is projected to increase between 5.9 - 6.3°F by 2041 - 2070. Some areas of the world may experience greater temperature changes than others. It is important to note that frequency estimates may not be an accurate representation of future conditions due to the unknown impacts of climate change (PEMA 2018).

Increased average temperatures as a result of climate change make the occurrence of extreme heat more likely. While increased average temperatures would make the occurrence of extreme cold less likely, some climatologists have suggested that warming in the Arctic could impact the position of the jet stream, allowing for more extreme cold weather events to occur. While some research supports this concept, others do not and the impact of climate change on cold weather events is not fully understood (Climate Central 2013). Extreme heat and cold result in greater strain on utilities, increasing the likelihood of utility interruption.

Climatologists expect an increase in the number and intensity of severe weather events. This will include wind events such as hurricanes, tornadoes, and wind associated with thunderstorms, among other phenomena. More storms with higher winds will increase the chance that the utility infrastructure will be impacted by these storms. Additionally, climatologists expect an increase in precipitation, which could come in the form of heavy downpours or winter weather thus causing additional utility interruptions. Increased risk of drought may also threaten water utilities.

### **Additional Data and Next Steps**

For future plan updates, Westmoreland 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.