

Hazard Risk Analysis

Power and Water Outages

Power Outages
Water Outages

Power and Water Outages

This section discusses power and water outages. Power and water outages can be caused by both natural events and by humans.

Power Outages

Definition

Power and telecommunication outages often happen during bad weather, like heavy winds, ice or snow storms. Many communities in the country have access to electricity, and because of Canada's climate and geography electricity is useful, and sometimes necessary, for maintaining heat, cooking facilities, and providing water.

Discussion

The areas most vulnerable to power outage in Canada are: rural areas, areas of heavy concentrations of population, and areas with severe winter conditions. Outages can happen when hydroelectric poles are damaged and fail, or when electrical lines are cut because of wind, snow, or when trees and other debris land on them. Power outages can also happen during landslides, avalanches, and earthquakes, and frequently occur as a result of accidents. As well, equipment failure in a substation or a transformer or the overuse of electrical power can cause brownouts, reduced electrical capacity or power outages.

Other causes of power outages include lightning, defective equipment, and certain human activities. On average, around 75% of all customer outage incidents and 85-90% of all customer outage hours were due to distribution system problems (over a five-year period).

Many dairy farmers depend on electricity for milking cows, and other farmers depend for the survival of animals, such as pigs and chickens, during the winter months. Greenhouse farmers also depend on electricity to maintain their crops. Many commercial and industrial operations would experience economic loss if they had prolonged power outages, especially in the winter,

Most communities today are dependent on telecommunications, so any outages of high speed cable networks, wireless communication networks, or telephone service could quickly shut down businesses and affect emergency response services.

Cable faults happen when a cable (which could be underground) gets damaged, leading to a breakdown in the electrical system. Cable faults are costly to repair and difficult to locate. Underground cable systems tend to have less outages than above-ground cable systems, however, underground cable breakdowns typically take much longer to fix than above-ground systems. The time it takes to find a fault and repair it will usually take between 8–48 hours or longer.

It Happened Here...

On November 22, 2013, a State of Emergency was declared in the Attawapiskat First Nation of Ontario. A bad winter storm from Nov 18-19 had caused a power outage in the community. In the aftermath of the power outage (Nov 22), a community member lit emergency candles for light, and accidentally started a fire. The fire caused severe damage to a residential building and left 80 people without shelter.

Hazard Rating				High Risk	<input type="checkbox"/>	Low Risk	<input type="checkbox"/>	Need More Info	<input type="checkbox"/>	Not Applicable	<input type="checkbox"/>
Yes	No	Need More	Not Applicable	FACTORS							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Extreme weather events such as ice storms, windstorms and hurricanes can cause outages. Does your community experience extreme weather events (Refer to section on Atmospheric hazards)?							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Earthquakes can cause power outages. Is your community at risk for earthquakes? (Refer to section on Earthquakes)							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Trees falling on exposed power lines can cause outages, and older trees tend to fall more regularly. Are the power lines in/near your community in close proximity to trees?							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Construction equipment can make contact with above-ground power lines (known as overhead power lines) and/or uncover underground wires, which can then cause power outages. Does your community regularly have a lot of construction happening near or around it?							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Lightning can cause outages when or if it strikes power equipment. Does your community regularly experience lightning? (Refer to section on Atmospheric hazards)							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mudslides, landslides, and snow slides can cause power outages. These events occur on slopes. Is your community's power lines/equipment located on and/or near slopes such as hills or mountains?							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Flooding can damage power equipment. Is your community at risk for flooding? (Refer to section on Flooding)							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Forest, wildland, and wildland urban interface fires can damage power equipment. Is your community susceptible to forest, wildland and wildland urban interface fires? (Refer to section on Flooding)							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Heat waves can result in people using too much power, resulting in power failures and outages. Is your community at risk for heat waves? (Refer to section on Atmospheric hazards)							

Water Outages

Definition

Water outages are situations when a community loses access to water.

Discussion

Water outages can occur due to a number of causes including street work (construction), pump failures, earthquakes, and flooding. Another cause of water outages is a lack of power. Water outages can create a variety of problems including the lack of sanitary facilities, lack of firefighting capabilities, and lack of coolant in water-cooled equipment. Hospitals and health care facilities are very dependent upon water.

Approximately 74% of potable water in Canada comes from surface supply while 26% comes from groundwater. With increasing concerns regarding the long-term availability of fresh water as a result of climate change and human activity, the Prairie Provinces may face increasing risks of water outages.

It Happened Here...

On Feb 18, 2014 the water pump at the Potlotek First Nation (Cape Breton, Nova Scotia). The incident left 550 residents without water, and many people had to melt snow for keeping up basic hygiene until the pump was fixed. During the time without water, many residents became ill with the flu, largely due to a lack of adequate sanitation.

Running water was fully restored to the community of Sagkeeng First Nation, after intermittent service left hundreds of residents without water in April 2014. The thawing of the frozen ground was believed to have resulted in pipes shifting and breaking.

Water Outage - Natural Human-caused

Hazard Rating				High Risk	<input type="checkbox"/>	Low Risk	<input type="checkbox"/>	Need More Info	<input type="checkbox"/>	Not Applicable	<input type="checkbox"/>
Yes	No	Need More	Not Applicable	FACTORS							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Most utilities are experiencing failure with pipes made out of gray cast iron due to their brittleness. Pipe failure can cause water outages. Is your community's water supplied through gray cast iron pipes?							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Old pipes fail more frequently. Are the pipes that supply your community's water old?							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pipes can freeze when the temperature stays below 0°C over several days. Does your community experience temperatures that stay below 0°C for several days at a time?							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pipes are more likely to freeze if they are located in areas that are exposed to freezing temperatures, such as outside or unheated areas indoors. Does your community use pipes throughout the year that are located outside, along exterior walls, in basements, or in garages?							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Power outages can cause water outages if pumps or other equipment cannot operate. Is your community at risk for power outages and does it rely on pumps and electrically-powered equipment to supply water (Refer to the previous section on Power Outages)?							

Historical Events – General Information

Please Note: See your Provincial/Territorial Risk and Resilience Information Guides for additional resources, including information regarding your community emergency manager, contact with Aboriginal Affairs and Northern Development Canada, and provincial or territorial Emergency Management Organization (EMO). EMO websites generally provide information specific to the hazards in your territory or province. Band websites or regional Aboriginal community websites can provide more information.

Resources
<p>The “Canadian Disasters - An Historical Survey” website by Robert L. Jones provides a great list of past disasters which have occurred since the 1500s in Canada and have resulted in at least 20 deaths.</p> <p>http://web.ncf.ca/jonesb/DisasterPaper/disasterpaper.html</p> <p>Keywords: Canadian disasters historical survey</p>
<p>The Public Safety Canada “Canadian Disaster Database” contains a list of past disasters in Canada.</p> <p>http://www.publicsafety.gc.ca/prg/em/cdd/srch-eng.aspx</p> <p>Keywords: Canada disaster database</p>
<p>Wikipedia has a list of disasters in Canada and links to various events; however, it does not have a lot of information about British Columbia.</p> <p>http://en.wikipedia.org/wiki/List_of_disasters_in_Canada</p> <p>Keywords: Canada disasters wiki</p>
<p>SOS! Canadian Disasters is supported by Library and Archives Canada, and provides some interesting stories on historical events and also has a great website on an education program (Grades 7 to 12) on understanding hazards and disasters in Canada.</p> <p>http://www.collectionscanada.gc.ca/sos/index-e.html</p> <p>Keywords: sos! Canada library archives</p>
<p>CBC Archives have a wide variety of news clips on historical and current disasters in Canada as well as educational information on hazards for teachers. On the CBC Digital Archives webpage, search for “disaster” in their own keyword search bar.</p> <p>http://www.cbc.ca/cgi-bin/MT4/mt-search.cgi?search=disaster&IncludeBlogs=777&limit=20</p> <p>Keywords: CBC archives, Disaster</p>

References

- American Red Cross. (n.d.). *Preventing & Thawing Frozen Pipes*. Retrieved from <http://www.redcross.org/prepare/disaster/winter-storm/preventing-thawing-frozen-pipes>
- Attawapiskat First Nation. (2013). *Attawapiskat declares state of emergency*. Retrieved. <http://www.attawapiskat.org/wp-content/uploads/20131123MediaStatementKapusKasingEvacuationa.pdf>
- BC Hydro (2011). *Glossary*. Retrieved from http://www.bchydro.com/outages/popup/glossary_pop.htm#underinvestigation.
- CBC News. (2014 April 12). *Frozen pipes create water woes at Sagkeeng First Nation*. Retrieved from <http://www.cbc.ca/news/canada/manitoba/frozen-pipes-create-water-woes-at-sagkeeng-first-nation-1.2608306>
- CBC News. (2014 February 19). *Potlotek First Nation without water for 2 days*. Retrieved <http://www.cbc.ca/news/canada/nova-scotia/potlotek-first-nation-without-water-for-2-days-1.2543615>
- Chang, S. E., McDaniels, T. L., Mikawoz, J., & Peterson, K. (2007). Infrastructure failure interdependencies in extreme events: Power outage consequences in the 1998 ice storm. *Natural Hazards*, 41(2), 337-358.
- Eichenberger, J.C. *IWA Water Balance in Canada – “How are we doing?”* Retrieved from <http://rash.apanela.com/tf/leakage/IWA%20Water%20Balance%20in%20Canada%20How%20are%20we%20doing.pdf>
- Makar, J.M. & Kleiner, Y. (2010). *Maintaining water pipeline integrity*. Natural Resource Council Canada. Retrieved from http://www.google.ca/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CCcQFjAA&url=http%3A%2F%2Fnparc.cisti-icist.nrc-cnrc.gc.ca%2Fnpsi%2Fctrl%3Faction%3Drtdoc%26an%3D20331196&ei=fNvnVIKmbZftoATmxoHoDg&usg=AFQjCNHGCE4InLZxJf_quph1nraYkRu-Xw&sig2=r-W5f-Lw6hpDJEJkgb5eVA&bvm=bv.86475890,d.cGU
- National Energy Council. (2004). *A compendium of electric reliability frameworks*. Retrieved from <http://publications.gc.ca/collections/Collection/NE23-114-2004E.pdf>