

## Nova Scotia and its critical *energy* infrastructure

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Infrastructure is essential to the functioning of any country. According to the OECD, certain infrastructure in some countries is considered to be “critical” because its “disruption or destruction would seriously undermine public safety, social order, and the fulfilment of key government responsibilities”. Public and private sector organizations often use risk management techniques to determine how best to protect this infrastructure through resilience and adaptation.

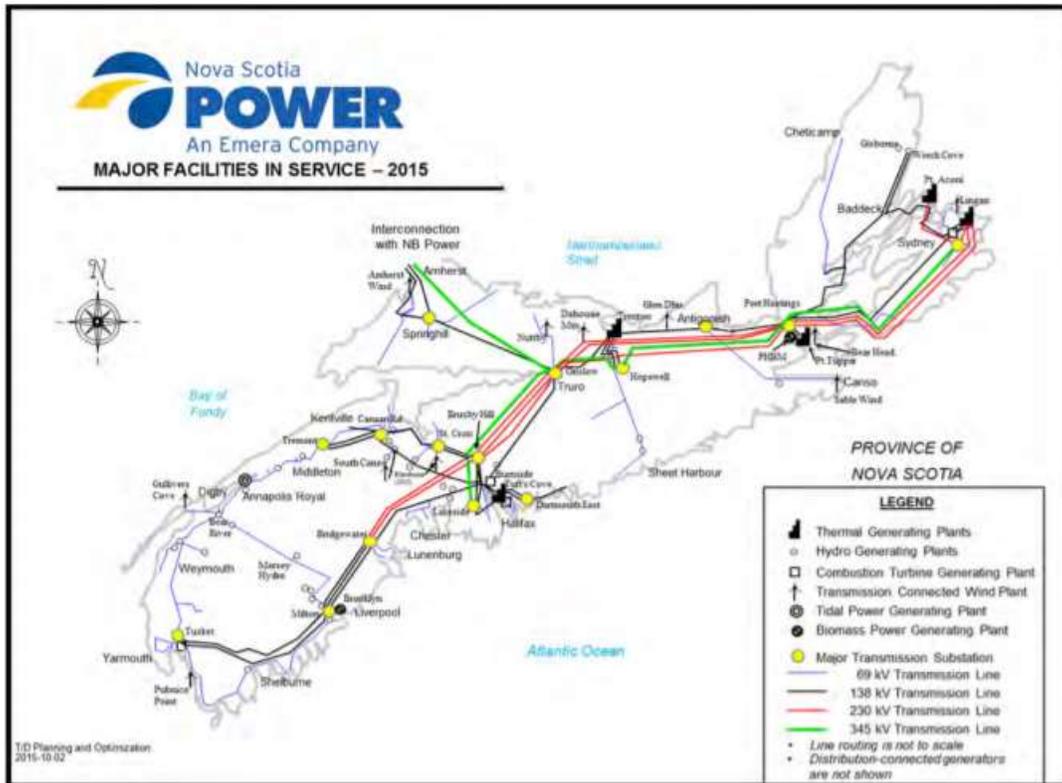
The Canadian government defines critical infrastructure as those “processes, systems, facilities, technologies, networks, assets and services essential to the health, safety, security or economic well-being of Canadians and the effective functioning of government”. Protecting critical infrastructure is considered important because disruptions to it “could result in catastrophic loss of life, adverse economic effects and significant harm to public confidence”.

In Canada, one of the ten sectors defined as critical infrastructure is energy and (electrical) utilities.

Nova Scotia’s electrical system, consisting of Nova Scotia Power’s grid (transmission and distribution) and generating facilities, is an example of critical infrastructure. Nova Scotia Power’s response to last week’s storm was an example of how it protects its critical infrastructure.

In the lead-up to the storm, Nova Scotia Power positioned its line-crews around the province to repair storm-related damage to the distribution grid.

Nova Scotia Power’s transmission grid is also designed to be resilient. The resilience can be explained by looking at Nova Scotia Power’s resource map. Power generated at the Lingan, Point Aconi, and Point Tupper thermal plants is transmitted to the mainland on a number of different circuits. The grid is designed to be redundant; if one circuit fails, the load can be met by the remaining circuits while the first is being repaired.



This type of redundancy is commonplace in modern electrical networks and is intended to reduce the risk to the system and its customers.

However, getting the power off Cape Breton Island is another matter. All of these independent circuits share a number of cables strung between a pair of transmission towers on either side of the Strait of Canso.

Last week's storm caused snow and ice to accumulate on one of the transmission cables, threatening the remaining three cables. When the winds caused this cable to touch one of the other cables, the system responded by disconnecting mainland Nova Scotia from Cape Breton Island.

This protected the critical infrastructure (i.e., about half of Nova Scotia Power's thermal generating assets on Cape Breton Island) from possible damage; however, this action, coupled with the other storm-related events, resulted in about half of Nova Scotia Power's customers losing power.

By the government of Canada's definition, Nova Scotia Power's electrical system is resilient, since the critical infrastructure that was damaged is being repaired and the generating infrastructure was protected.

But, as the government also notes, disruptions to critical infrastructure, such as Nova Scotia Power's electrical system could result in "significant harm to public confidence".

In fact, this, and previous disruptions, have already harmed public confidence in Nova Scotia Power. And if that wasn't already apparent, many Nova Scotians and both opposition party leaders made this clear during the storm.

Nova Scotians who can no longer tolerate disruptions to their electrical supply have adapted to them by purchasing generators to run essential equipment, including refrigerators, freezers, and lighting.

If the likelihood of this type storm is increasing, Nova Scotia Power will also need to adapt. For example, by reducing the vulnerability of the transmission grid when crossing the Strait of Canso.

This shouldn't be too difficult. Last August, an additional circuit intended to carry power from Muskrat Falls was installed 45 metres south of the existing crossing.

In the United States, energy is seen as an enabling function, allowing other sectors of the economy to achieve their objectives. Reducing the risk on the national energy system is therefore seen as essential.

Nova Scotia should take note.

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