

After the Blackout:

Implementation of Mandatory Electric Reliability Standards
in Canada

Energy and Mines Ministers' Conference

Halifax, Nova Scotia
July 2015



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Summary

Since the August 14, 2003 northeast blackout, Canadian and American authorities have worked collaboratively and diligently to implement a harmonized continental approach to mandatory reliability standards. Nearly 12 years on, significant progress has been made in standards development, adoption and enforcement in Canada. This achievement is a tangible outcome of active federal/provincial/territorial collaboration under the auspices of the Energy and Mines Ministers' Conference (EMMC). Figure 1 presents a timeline of the major developments toward mandatory standards.

Going forward, emerging and complex issues such as changing resource mixes, resource planning, extreme physical events and cybersecurity will require focused attention by all those involved in electric reliability. Therefore, Canadian and American policy-makers, regulators, enforcement authorities and industry should continue to work closely together as the system evolves and to address emerging challenges both within and outside the standards process.

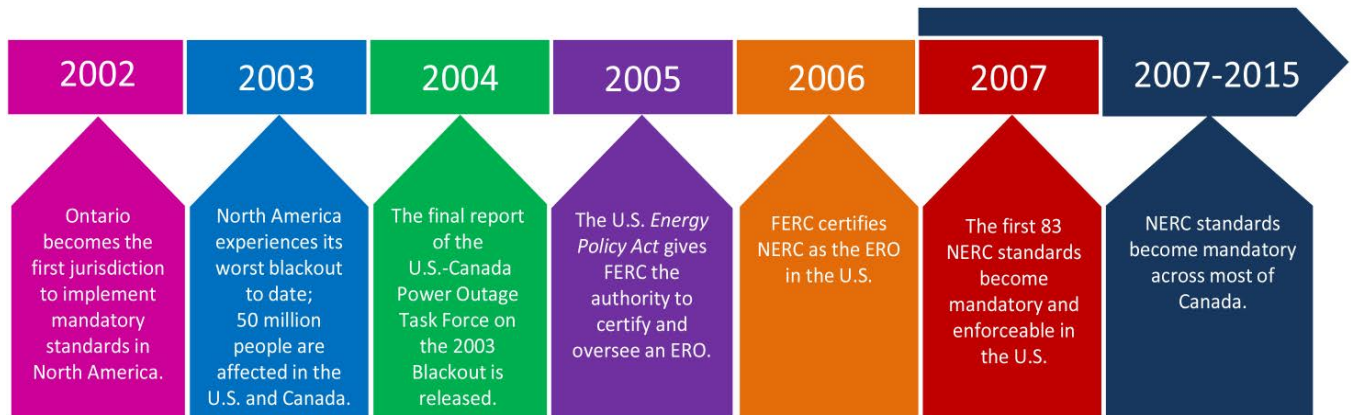


Figure 1. Timeline of major developments toward mandatory standards

Introduction

On August 14, 2003, the largest blackout in North American history occurred when 61,800 megawatts of electric power was lost in Ontario, Ohio, Michigan, Pennsylvania, New York, Vermont, Massachusetts, Connecticut and New Jersey, affecting an estimated 50 million people and causing an estimated \$4 billion to \$10 billion (U.S.\$)ⁱ in economic losses. The impacts of the event demonstrated how critical electric grid reliability is to our modern society.

Following an extensive bi-national investigation, the joint U.S.-Canada Power System Outage Task Force recommended that appropriate branches of governments in the United States (U.S.) and Canada make reliability standards mandatory and enforceable.

This paper describes the circumstances, process and key milestones toward the implementation of standards in Canada and a look ahead at top priority risks to reliability that could inform future activity.

Overview of the North American bulk electric system

Canada and the U.S. share a highly integrated electrical transmission network. Adding the Baja California region of Mexico, which also has interconnections with the U.S., we have what is referred to as the North American bulk electric system (BES).¹ This immense system of 340,000 kilometres of high-voltage transmission linesⁱⁱ connecting thousands of power generating stations has been referred to as the largest machine ever built. It is the backbone of our modern society, bringing the necessary power to keep our homes, businesses, schools, hospitals and transportation systems running. Without this infrastructure, our standard of living would simply not be possible.

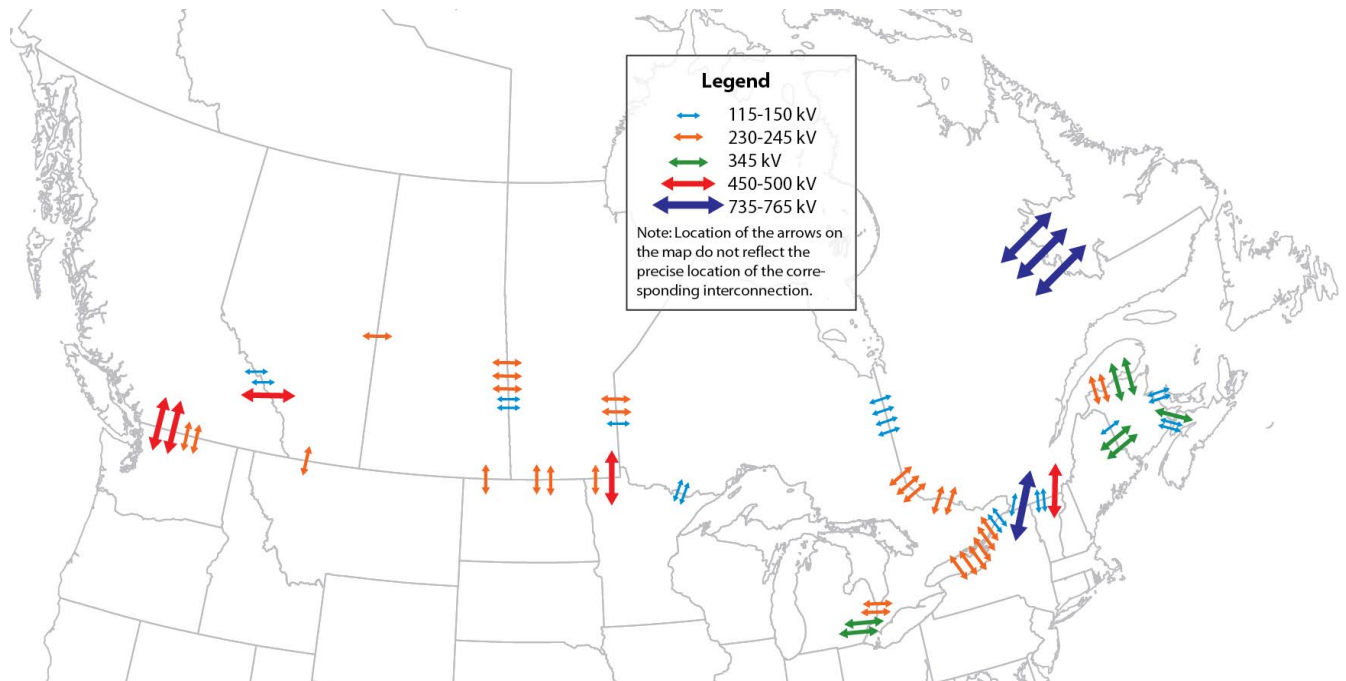


Figure 2. Transmission interconnections in Canada (2015)

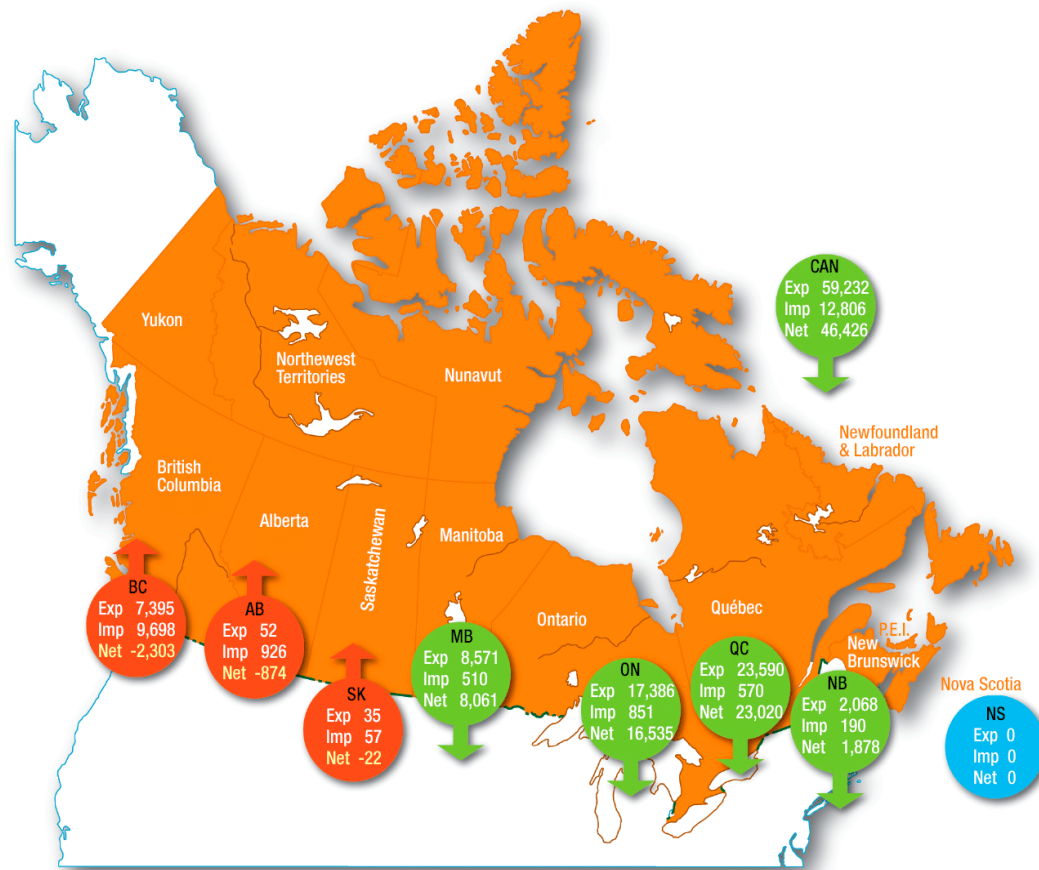
Despite the highly interconnected nature of the BES, regulatory systems are distinct for each jurisdiction. In Canada, regulatory oversight of electric reliability rests primarily within the jurisdiction of the provinces. Federal jurisdiction is limited to the permitting of international exports and the construction and operation of international power lines and designated interprovincial power lines.² In

¹ It is important to note that this paper focuses on the bulk electric system (i.e., 100 to 765 kV transmission), not local distribution systems.

² Currently, no such designation exists on any interprovincial power lines.

the U.S., the Federal Energy Regulatory Commission (FERC) has authority over electric reliability of the U.S. portion of the BES.

Utility system operators constantly balance electricity supply and demand in real time for the needs of their system. Interconnected transmission networks provide economic benefits by allowing electric utility companies to buy and sell power from each other. It also provides them with alternative power paths in emergencies (such as during extreme temperatures and/or when generating capacity is reduced for planned or unplanned maintenance), enabling reliability of the grid to be maintained despite localized outages.



Data displayed are in gigawatt-hours.
 Numbers may not sum due to rounding.
 Source: Canadian Electricity Association (CEA) using data from NEB

Figure 3. Electricity exports and imports between Canada and the U.S. (2014)

Canada exports and imports electricity to and from the U.S. across 34 active international transmission lines. In addition, there are 32 interprovincial lines facilitating trade between provinces.

However, interconnections can, in limited circumstances, facilitate increased vulnerability to cascading blackouts if entities³ do not operate according to a common set of operating protocols. Such protocols are essential when unplanned events occur on the interconnected system and jurisdictions rapidly draw power from neighbouring jurisdictions that, in turn, draw power from the next jurisdiction in attempts to maintain the supply-demand balance. This was the case in August 2003.

Electric reliability

A reliable bulk electric system is a system able to meet the electricity needs of end-use customers even when unexpected equipment failures or other factors reduce the amount of available electricity.

North American Electric Reliability Corporation

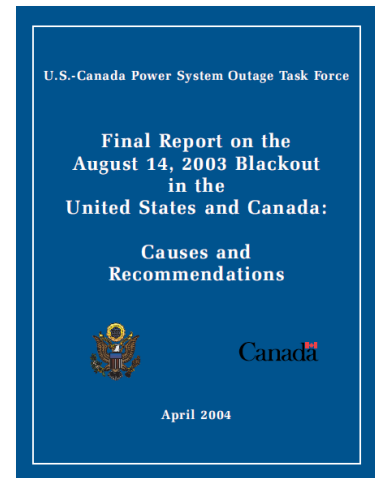
Overview of the 2003 blackout report

In response to the blackout, the U.S. and Canada established a joint U.S.-Canada Power System Outage Task Force to investigate the causes of the blackout and to recommend ways to reduce the possibility of a recurrence.

The final report, *Final Report on the August 14, 2003 Blackout in the United States and Canada: Causes and Recommendations*,ⁱⁱⁱ published in April 2004, concluded that the outage originated in Ohio and quickly cascaded over a large area. The primary identified causes of the outage are referred to as the “3 Ts”: trees, tools and training. That is, overgrown trees contacted multiple high-voltage transmission lines, tripping them out of service and increasing the load on remaining lines. This load resulted in increased line sagging and contact with additional overgrown trees. The area control centre did not have the tools that might have shown the location of significant line and facility outages within the control area. Finally, training of system operators was inadequate to respond to the emergency situation.

In addition, the report suggested that the system of voluntary reliability standards that had been in place since 1968 was no longer adequate to meet current needs. Changes in the electricity industry, such as restructuring to more competitive markets, had altered many of the traditional mechanisms, incentives and responsibilities of the entities involved in ensuring reliability.

The report also found that many of the problems arose not because the North American Electric Reliability Council⁴ (NERC) – in place at the time of the blackout – was an inadequate or ineffective



³ Entity is a common term used in the electric sector to describe industry participants.

⁴ This council is now named the North American Electric Corporation.

organization, but rather because it had no structural independence from the industry it represented and had no authority to develop strong reliability standards and enforce compliance. The report included 46 recommendations – the most important being that appropriate branches of government in the U.S. and Canada make reliability standards mandatory and enforceable and provide appropriate penalties for noncompliance.

Designing a collaborative approach

Shortly after the blackout, at the 2003 Council of Energy Ministers meeting,⁵ ministers established a senior-level (Assistant Deputy Minister) Federal-Provincial-Territorial Electricity Working Group (FPT EWG) “to exchange information and views on the circumstances and implications of the failure of the power system on August 14, 2003, and on possible new United States’ initiatives to implement mandatory electric reliability standards.”⁶

The group, in turn, formed the Bilateral Electric Reliability Oversight Group (BEROG) with the U.S. to harmonize the implementation of mandatory reliability standards developed by an electric reliability organization (ERO). The BEROG was composed of members of the FPT EWG (which by then also included Canadian regulators), as well as officials from the U.S. Department of Energy (DOE) and FERC.⁷

In 2005, the BEROG developed principles for a reliability organization that can function on an international basis. The concept of an ERO was to have a single entity to develop and enforce reliability standards. Principal tenets of the ERO are that it be independent from industry, backstopped by legislation and a single entity responsible for the entire interconnected North American electric grid. Recognition was given that the ERO would have to be a “NERC-like” organization, given its expertise and large network of industry volunteers.



Figure 4. NERC functions

⁵ This meeting is now called the Energy and Mines Ministers’ Conference.

⁶ Other assigned objectives of the group included examining ways to accelerate the permitting of electricity generation and transmission projects; monitoring emerging interprovincial/international electricity issues; and promoting renewable and cleaner energy sources.

⁷ With the addition of Mexican authorities, the group is now referred to the Trilateral Electric Reliability Oversight Group.

In the U.S., the *Energy Policy Act* of 2005 gave FERC new authority to approve and oversee an ERO responsible for reliability of the BES in the U.S. In 2006, FERC certified NERC as the ERO for the U.S. In 2007, compliance with the first 83 NERC reliability standards became mandatory for BES owners, operators and users in the U.S.

NERC governance model

NERC was created in 1968⁸ by representatives of the electric utility industry in response to a large 1965 blackout as a voluntary council to develop and promote voluntary compliance with rules and protocols for the reliable operation of the BES in North America.

Today, NERC is an independent, self-regulatory, not-for-profit corporation that is governed by a Board of Trustees (3 members of the 11-member board are Canadian, including the current chair, Frederick W. Gorbet). The “ERO Enterprise” is composed of NERC and eight associated member-driven regional entities that perform various delegated reliability functions on behalf of NERC. The ERO Enterprise develops and enforces reliability standards; educates, trains, and certifies industry personnel; monitors the BES in real time; assesses reliability annually via 10-year and seasonal forecasts; and evaluates users, owners, and operators for preparedness.^{iv}

There are more than 1,900 users, owners and operators of the BES registered within the ERO Enterprise. Most major Canadian owners/operators, including the provincial utilities, are members of three of the eight regional entities: the Western Electricity Coordinating Council (WECC); the Northeast Power Coordinating Council (NPCC); and the Midwest Reliability Organization (MRO) (Figure 5).

NERC standards are designed to provide for the reliable operation of the BES. Standards are grouped into 14 categories, such as Transmission Operations; Resource and Demand Balancing; Communications; Emergency Preparedness and Operations; and Critical Infrastructure Protection. In the U.S., there are currently approximately 105 standards in force, subsets of which are also in force in Canadian jurisdictions.^v

⁸ NERC was then called the North American Electric Reliability Council.

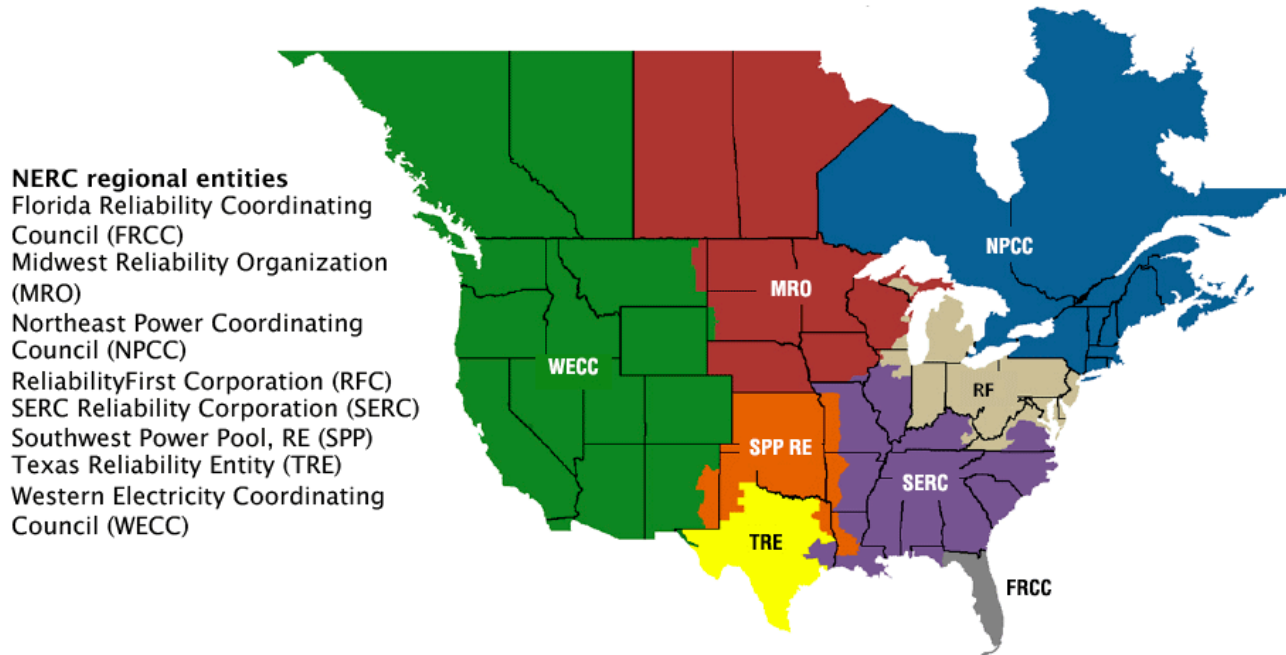


Figure 5. The eight NERC regional entities

NERC reliability standards are developed using an open and inclusive process managed by the NERC Standards Committee. Standards drafting teams are comprised of industry and other representatives from both the U.S. and Canada and are facilitated by NERC staff. Following a balloting process, standards are presented to the Board of Trustees for final approval before filing with the U.S. FERC and Canadian regulators (provincial regulators and the National Energy Board [NEB]).

The development of a standard (or modifications to an existing standard) can originate from within NERC, or NERC can be directed to develop a standard by FERC if vulnerabilities are identified.⁹ In the U.S., FERC’s authority to act on a proposed NERC standard is limited to 1) approval or 2) remand for modification. In Canada, provincial jurisdictions have differing authorities regarding the acceptance, rejection, remand or tailoring of NERC standards.

⁹ Under NERC’s rules, anyone in North America can potentially submit a standards authorization request to recommend initiation of a standard project.

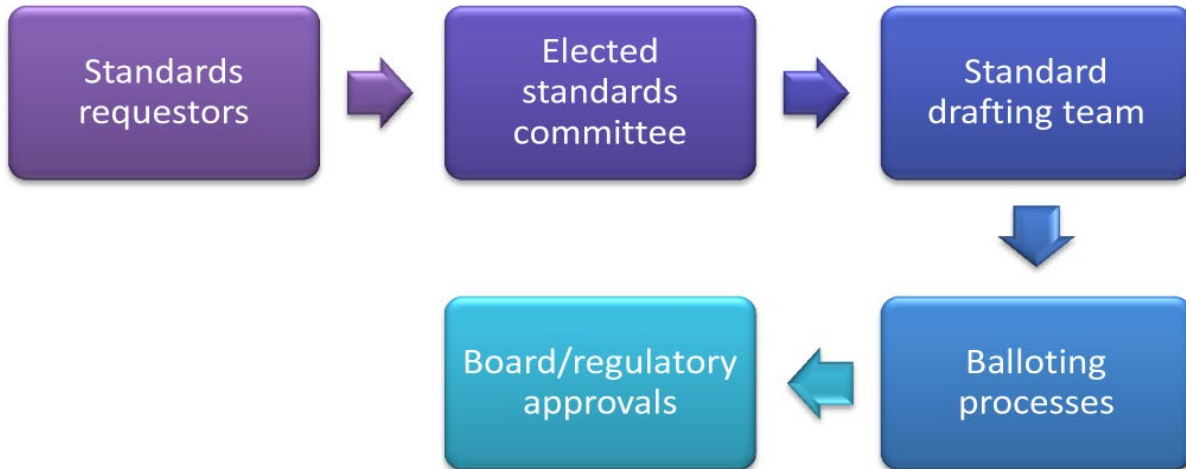


Figure 6. The overall standards-making process

NERC reliability standards in Canada

All provinces have legislation granting authority to one or more provincial authorities to be responsible for electric system reliability. At the federal level, reliability is included in NEB authorities. While not all jurisdictions have the necessary legal structures to name an ERO, the NEB and all provinces within the BES, except Newfoundland and Labrador and Prince Edward Island (P.E.I.), have recognized NERC as an electric reliability standards-setting organization and support NERC in its standards-setting and oversight role as the North American ERO.

Recognition of NERC

Recognition of NERC as the ERO by a province is done through legislation, regulation, orders in council, memoranda of understanding (MOU) or other agreements. The provinces of Ontario, Quebec, Nova Scotia, New Brunswick, Alberta, Saskatchewan as well as the NEB have such MOUs or agreements with NERC. While there are currently no MOUs in effect with British Columbia and Manitoba, both provinces have adopted NERC reliability standards as mandatory and enforceable and work closely with the ERO (see Annex B for links to jurisdictional mechanisms to recognize NERC).

Adoption of NERC standards

Each Canadian jurisdiction with mandatory reliability standards has put in place processes to consider the adoption or modifications of NERC standards. In some jurisdictions, the regulator reviews the NERC standards and modifies them as necessary for their respective jurisdiction while others post the NERC standards for a set comment period and conduct a formal review if issues are raised.

NERC standards or modified NERC standards are mandatory and enforceable or are in the process of becoming mandatory and enforceable¹⁰ in all provinces connected to the BES except P.E.I. and Newfoundland and Labrador. Likewise, NERC standards are mandatory on NEB-regulated international lines.

The two remaining provinces and the territories are unique from the other provinces with respect to their reliability regimes. P.E.I. does not have a formal agreement with NERC. Most of the electricity used in P.E.I. is generated in New Brunswick, and the New Brunswick Power Corporation (NB Power) provides load balancing and serves as the reliability coordinator for the island. Through agreements between NB Power and Maritime Electric, there is an obligation for Maritime Electric to meet certain reliability standards requirements related to the load balancing and reliability coordinator functions provided by NB Power.

While Newfoundland and Labrador has not adopted NERC standards in a formal manner to date, Newfoundland and Labrador Hydro's reliability guidelines and procedures are similar to NERC reliability standards requirements. The province is currently assessing implications of NERC and NPCC membership and standards when the Island of Newfoundland interconnects with Nova Scotia and Labrador in 2017/2018 via the two subsea high voltage direct current transmission link components of the Muskrat Falls hydroelectric project. The Labrador portion of the province is already connected to the BES via three 735-kV transmission lines into Quebec.

Finally, the three territorial systems each serve small loads via regional grids or stand-alone community generators, which are isolated from the BES.

Compliance and enforcement

Each Canadian jurisdiction with NERC standards has measures to enforce compliance. Authorities can order corrective actions, impose reporting requirements, and in some jurisdictions, impose financial penalties. Examples of three provinces in which NERC standards are mandatory and where financial penalties can be levied for non-compliance are described here. Figure 8 displays an overview for all Canadian provinces.

In Ontario, which was the first jurisdiction to implement mandatory standards in North America in 2002, the Independent Electricity System Operator's (IESO) Market Assessment and Compliance Division makes violation and sanction determinations for all Ontario entities and the IESO. Sanctions include, among other things, orders to 1) do "such things as may be necessary" to comply with the market rules; 2) cease the act, activity or practice constituting the violation; 3) impose record-keeping or reporting requirements on a market participant; 4) issue a non-compliance letter; and 5) impose financial penalties. The maximum financial penalty amount is \$1 million per occurrence for each breach at issue.

¹⁰ At the time of this writing, the Quebec regulator has adopted 43 standards and has set the effective date for 12 standards for April 1, 2015.

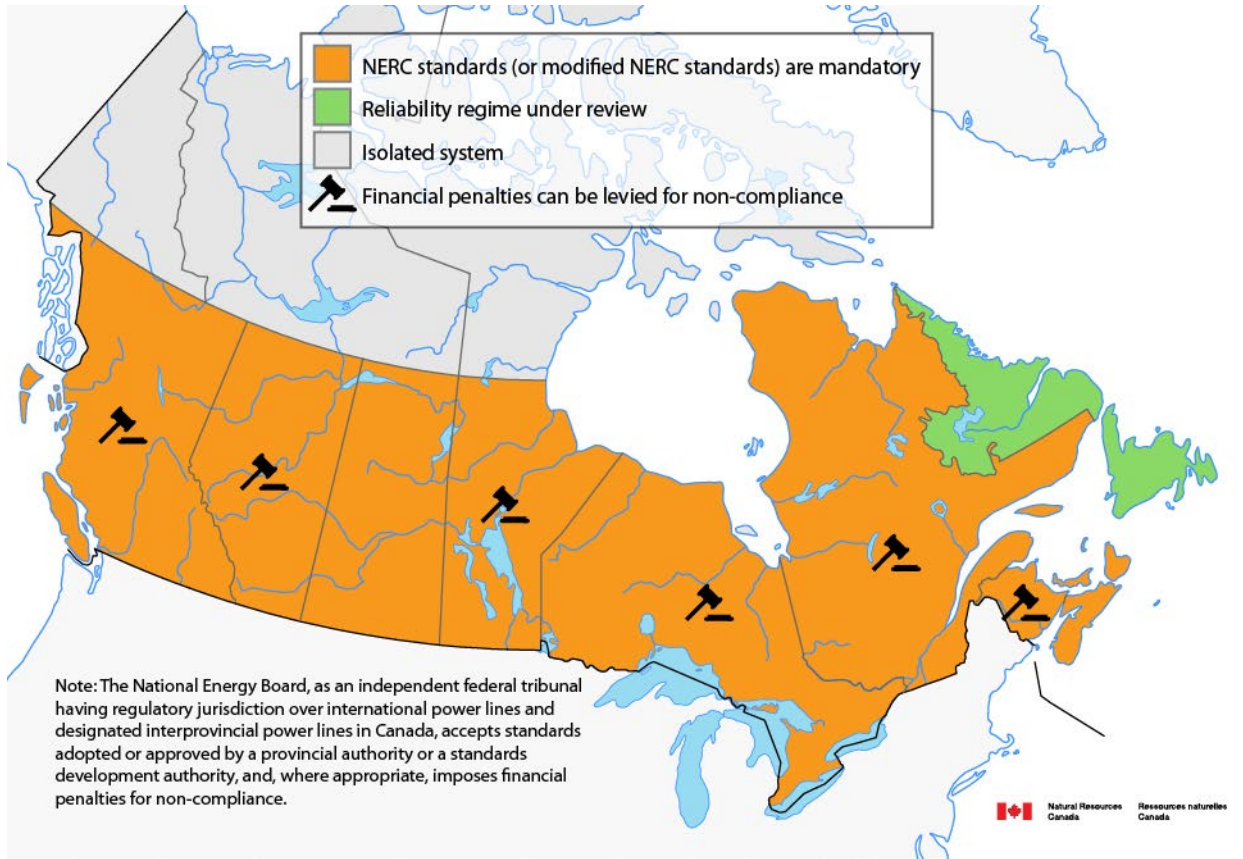


Figure 7. Electric reliability regimes in Canada (2015)

In Alberta, in accordance with Alberta Utilities Commission (AUC) rules, the Market Surveillance Administrator (MSA) may issue a notice of specified penalty for contravention of an Alberta reliability standard. Alternatively, the MSA may seek an administrative penalty before the AUC or other relief. The maximum administrative penalty amount is \$1 million per day on which the contravention occurs or continues.

In British Columbia, the provincial government has passed amendments to the *Utilities Commission Act* that enables the British Columbia Utilities Commission (BCUC) to levy the same administrative penalties as WECC for non-compliance with standards. These can be up to \$1 million per day in extreme cases. In Quebec, under its enabling legislation, the Regie de l’Energie ensures that electrical power is transmitted in accordance with its reliability standards. To that end, it can impose corrective measures, remedial plans and administrative penalties of up to \$500,000 per day on parties violating reliability standards.

More details on Canadian jurisdictional reliability regimes, including reliability standard-making and enforcement functions and U.S. comparators, can be accessed through the NERC website.^{vi}

While Ontario was a pioneer in the implementation of mandatory standards in North America, the implementation of mandatory and enforceable electric reliability standards across Canada has generally taken time primarily because of the constitutional divisions of responsibility and the unique regulatory design of each jurisdiction. It could be concluded that the specific and systemic causes of the August 2003 blackout are now largely addressed through mandatory electric reliability standards. The significant progress made in standards development, adoption and enforcement in Canada is a tangible outcome of active federal/provincial/territorial collaboration.

Maintaining oversight and coordination

The close working relationship of Canadian and American policy-makers, regulators and enforcement authorities has proven valuable in maintaining overall jurisdictional cooperation. The FPT EWG has remained active throughout the establishment of the ERO Enterprise and the implementation of reliability regimes across Canada. The group continues to confer regularly and report annually to energy ministers through the annual EMMC. It also confers regularly with the Canadian Electricity Association (CEA), NERC and FERC on reliability issues, including in two face-to-face meetings with NERC and FERC each year (Mexican authorities are also invited to participate).

In 2012, the FPT EWG established the Monitoring and Enforcement Subgroup (MESG), composed of officials from regulators and other entities responsible for compliance in Canada, to share information on monitoring and enforcement regimes and developments across Canada.

The CEA has been a very active participant in NERC since its formation. It has worked with the FTP EWG on reliability and the development of the ERO and is represented on several NERC committees. Also, Canada's Energy and Utility Regulators (CAMPUT)¹¹ is involved with NERC. Over the past two years,

NRCan-DOE MOU on enhanced energy collaboration

On September 18, 2014, Greg Rickford, Canada's Minister of Natural Resources and Dr. Ernest Moniz, United States Secretary of Energy, signed an MOU launching an agreement on enhanced energy collaboration between Natural Resources Canada (NRCan) and the U.S. DOE. The signing continues a long and productive history of Canada-U.S. collaboration on a wide range of energy issues and shared interests in greater energy security, environmental responsibility and sustainability.

Under the MOU, Canada and the U.S. plan to cooperate on initiatives, including sharing of knowledge, technical information and research plans to improve environmental practices in conventional and unconventional oil and gas development; enhancing the reliability and security of North American energy infrastructure; supporting the advancement of an efficient and clean electric grid; enhancing coordination on energy efficiency standards; facilitating increased use of natural gas in the transportation sector; collaborating to reduce the cost of carbon capture and storage (CCS); and engaging in regional and multilateral dialogues on energy and environmental issues to advance shared priorities.

¹¹ In 2011, the CAMPUT constitution was amended to drop the name Canadian Association of Members of Public Utility Tribunals, but to continue using the acronym, since this is well recognized.

NERC has given a higher profile to the CEA and CAMPUT at their Board of Trustees and Member Representatives Committee meetings, inviting their remarks on reliability activities in Canada.

Outside of its role with the FPT EWG, NRCan also works closely with government, industry and academia partners to advance physical and cyber security research and skills transfer at its National Energy Infrastructure Test Centre.

Finally, NRCan and the U.S. DOE maintain a close relationship under the auspices of the Canada-U.S. Clean Energy Dialogue and the 2014 Memorandum of Understanding on Enhanced Energy Cooperation, which includes enhancing the reliability and security of North American energy infrastructure as a key area of focus.

Going forward, these close working relationships will continue to be of value as the system evolves and new issues arise.

Principles for Data Sharing

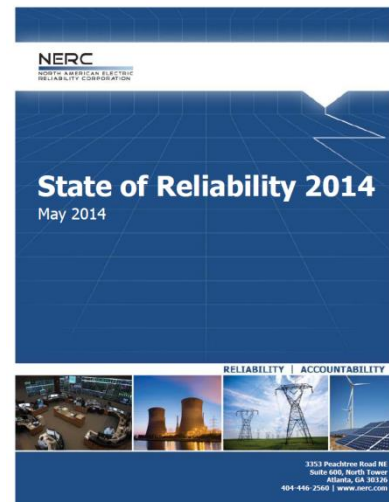
In 2012, the FPT EWG and FERC finalized the “*Principles for Data Sharing*” to aid in the event of future cross-border outages or investigations. Based on the principles, the FPT EWG, FERC and NERC further developed a Draft Protocol for Sharing Confidential Data and Other Information Related to a Cross-Border Disturbance that could be used and tailored as appropriate by each jurisdiction in the event of a cross-border incident.

Measuring results

Reliability, and by extension, the impact that the ERO Enterprise has had on the reliability of the BES is not easily measured. Balancing the supply and demand of electricity will always be a challenge given the complex, variable and instantaneous interaction of numerous generators and loads in different locations. Additionally, the unpredictable nature of external factors such as extreme weather events makes it difficult to draw conclusive trends from year-over-year comparisons.

Qualitatively, it can be said that the specific and systemic issues that contributed to the 2003 blackout have been addressed by NERC standards and are being monitored and enforced. Indeed, one measure of success is the fact that there has not been an event of similar scale on the BES since 2003.

For example, NERC included in its *State of Reliability Report 2014*, that in 2013, the BES was able to withstand the most “stressful” events of the year without significant loss of transmission, generation or load. These measures indicate the system’s ability to perform reliably over a variety of operating conditions. 2013 also saw significantly fewer high priority energy emergency alerts resulting from an imminent or initiated loss of load than previous years. This further demonstrates the ability of the BES to respond to a variety stresses (severe weather, system constraints, etc.).



Looking ahead: priority risks

Looking ahead, in its *5-year Performance Assessment* report,^{vii} NERC identifies its top-priority reliability risks for 2014–2017, which it will use to guide future project work including standards development, system analysis and information sharing. While again technical in nature, some risks may be served by focused regulatory and/or policy attention in both Canada and the U.S., such as changing resource mix, resource planning, extreme physical events and cybersecurity.

Changing resource mix: As the generation and load on the power system changes (e.g., integrated variable resources, increased dependence on natural gas, increased demand-side management, new technologies deployed), the system is being brought into states that are significantly different than those considered when the system was designed and planned, exposing new vulnerabilities not previously considered. Fundamental operating characteristics and behaviours are no longer a certainty.

Resource planning: Plant retirements (largely due to aging infrastructure; implemented environmental regulations; increased uncertainty in future resources due to other potential environmental regulations; and lower natural gas prices, which significantly affect power plant economics) are leading to cases where resources may be inadequate to ensure firm demand is served at all times.

Extreme physical events: While the probability of extreme physical events (such as physical attacks, geomagnetic disturbances or severe weather) that lead to extensive damage is low, the potential consequences are significant enough that risk avoidance (reducing the probability) is insufficient as a sole risk management strategy.

Cybersecurity: Cyberattacks against the BES could potentially cause major grid disturbances or outages. Such threats are complex and rapidly evolving, commanding the attention of NERC, owners/operators, governments and others involved in critical infrastructure protection.

Going forward, policy-makers should continue to address reliability issues as well as complement regulatory efforts where appropriate and give consideration to these priority risks for reliability. These efforts should be made in collaboration with NERC, FERC and industry participants.

Conclusions and recommendations

As described in this report, much has been done to improve North American BES reliability since the August 2003 northeast blackout. The main conclusions are summarized as follows.

- 1. All Canadian jurisdictions connected to the North American BES have implemented mandatory and enforceable electric reliability standards (P.E.I. and Newfoundland and Labrador exceptions explained in the footnotes).^{12, 13}**
- 2. The ERO Enterprise (NERC and the eight regional entities) provides a harmonized approach for electric reliability standards across the North American BES.**
- 3. The specific and systemic causes of the August 2003 blackout are now largely addressed through mandatory electric reliability standards.**
- 4. Significant progress has been made in the development of reliability oversight and enforcement mechanisms in Canada since the August 2003 blackout.**
- 5. The close working relationship of Canadian and U.S. policy-makers, regulators and enforcement authorities has proven valuable in maintaining overall jurisdictional cooperation throughout the implementation of mandatory electric reliability standards.**
- 6. Changing resource mix, resource planning, extreme physical events and cybersecurity will be priority risks facing the electric sector going forward.**

Going forward, the following recommendations are presented for consideration of all involved parties:

- 1. Canadian policy-makers, regulators, enforcement authorities and industry should continue to work closely with FERC and NERC on electric reliability matters.**
- 2. Canadian policy-makers should complement regulatory efforts where appropriate and give consideration to the reliability impacts of changing resource mixes, resource planning, extreme physical events and cybersecurity.**

¹² As the BES interconnection facilities between New Brunswick and P.E.I. are covered by agreements between MECL and NB Power, and there are no BES facilities on P.E.I., there are no further requirements for P.E.I. to implement mandatory standards.

¹³ Newfoundland and Labrador is currently assessing implications of NERC and NPCC membership and standards as the Island of Newfoundland interconnects with Nova Scotia and Labrador in 2017/18.

Annex A – List of acronyms

AUC: Alberta Utilities Commission

BCUC: British Columbia Utilities Commission

BES: Bulk Electric System

BEROG: Bilateral Electric Reliability Oversight Group

CAMPUT: Canada’s Energy and Utility Regulators (formerly Canadian Association of Municipal Public Utility Tribunals)

CEA: Canadian Electricity Association

ERO: Electric Reliability Organization

EMMC: Energy and Mines Ministers’ Conference

FERC: Federal Energy Regulatory Commission

FPT EWG: Federal-Provincial-Territorial Electricity Working Group

IESO: Independent Electricity System Operator

MRO: Midwest Reliability Organization

NB Power: New Brunswick Power Corporation

NEB: National Energy Board

NERC: North American Electric Reliability Corporation

NPCC: Northeast Power Coordinating Council

NRCan: Natural Resources Canada

P.E.I.: Prince Edward Island

WECC: Western Electricity Coordinating Council

Annex B – Recognition of NERC in Canada

Jurisdiction	Recognition of NERC (legislation, regulation, MOU, other)	Regulatory authority
British Columbia	NERC and WECC are recognized as standards-making bodies under the Utilities Commission Act (1996).	British Columbia Utilities Commission
Alberta	The reliability standards made by NERC and WECC apply in Alberta to the extent that those standards are adopted by the Alberta Electric System Operator under Section 19 of the Alberta Transmission Regulation (2007); authority to designate NERC as the ERO under Section 20; and NERC is formally recognized as the ERO in Ministerial Order 79/2007 (2007).	Alberta Utilities Commission
Saskatchewan	NERC and MRO are recognized as Saskatchewan’s electric reliability standards setting bodies under the SaskPower-MRO-NERC MOU (2009).	SaskPower
Manitoba	Manitoba Hydro’s membership in the MRO and its obligations to adopt reliability standards were sanctioned by the province through Order in Council No. 206 (2004). Reliability standards and enforcement are legal requirements under the Reliability Standards Regulation (2012) and the Monetary Penalty Payment Regulation (2012).	Government of Manitoba and the Manitoba Public Utilities Board
Ontario	NERC is recognized as a “standards authority” under the Ontario Electricity Act (1998). NERC is recognized as the ERO for Ontario under the OEB-NERC MOU (2006).	Ontario Energy Board
Quebec	NERC and NPCC are recognized experts in setting reliability standards and monitoring their application under the Agreement on the development of electric power transmission reliability standards and of procedures and a program for the monitoring of the application of these standards for Quebec (2009).	la Régie de l’énergie
New Brunswick	NERC is recognized as a standards-making body under the New Brunswick Reliability Standards Regulation (2013) under the New Brunswick Electricity Act (2003). NERC is recognized the New Brunswick ERO under the NB-NBSO-NERC MOU (2008).	New Brunswick Energy and Utilities Board
Prince Edward Island	Most of the electricity used in P.E.I. is generated in New Brunswick. Normally there is no conventional generation running in P.E.I. The New Brunswick Power Corporation provides load balancing and serves as the reliability coordinator for P.E.I.	Island Regulatory and Appeals Commission

Nova Scotia	NERC is recognized as a standards-making body under the NSUARB-NERC MOU (2006).	Nova Scotia Utility and Review Board
Newfoundland and Labrador	<p>While Newfoundland and Labrador has not adopted NERC standards in a formal manner to date, Newfoundland and Labrador Hydro’s reliability guidelines and procedures are very similar to many NERC reliability standard requirements.</p> <p>The province is currently assessing implications of NERC and NPCC membership and standards given the Muskrat Falls hydroelectric development and associated Maritime and Labrador Island subsea transmission links that will connect the Island of Newfoundland to Nova Scotia and to Labrador, respectively.</p>	Newfoundland and Labrador Board of Commissioners of Public Utilities
Northwest Territories	Isolated system not connected to the BES	NWT Public Utilities Board
Yukon	Isolated system not connected to the BES	Yukon Utilities Board
Nunavut	Isolated system not connected to the BES	Utility Rates Review Council of Nunavut
Federal	<p>NERC is recognized as a corporation that is to carry out its mandate as an ERO as applicable to international power lines under the NEB-NERC MOU (2006).</p> <p>NERC and regional entities are recognized as “standards development authorities” under General Order MO-036-2012 and Amending Orders for certain permitted lines (2012).</p>	National Energy Board

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