



United States Environmental Protection Agency Clean Power Plan Proposed Rule

Docket ID: EPA-HQ-OAR-2013-0602

Comments of the Canadian Hydropower Association

October 10, 2014

1. Introduction

The Canadian Hydropower Association appreciates the opportunity to provide its perspective on the U.S. Environmental Protection Agency's ("EPA" or "Agency") draft Clean Air Act Section 111(d) rule to establish CO₂ standards for existing power plants ("Clean Power Plan").

The Canadian Hydropower Association ("CHA" or "Association") is the national voice for the hydroelectricity industry in Canada and works to promote the technical, economic, social and environmental advantages of hydropower. In carrying out this role, the CHA works with both Canadian and American government representatives to exchange views and provide information. We also work closely with the National Hydropower Association in the United States to promote a better understanding of the important role that hydropower plays in a clean energy future for North America.

For a number of U.S. states, very low-emitting Canadian hydropower already plays a major role in their electricity planning through long-term power purchase agreements and as a resource in North American electricity markets. The Agency's Clean Power Plan appears to recognize a role for new and incremental hydropower in helping states meet their carbon reduction targets. U.S. customers, states, and independent system operators, however, require certainty that they may continue to use Canadian hydropower to cost-effectively achieve emission reductions in compliance with state and regional implementation plans.

As requested by the Agency on June 2 and November 4, 2014, the Canadian Hydropower Association is pleased to provide comments on the treatment of renewable energy generation across international boundaries within a Clean Air Act Section 111(d) plan that leverage mechanisms already in place to ensure that this generation is offsetting fossil-fuel-fired generation in the jurisdiction that would use it to meet its goal.

2. Canadian Hydropower: A Valuable Resource in an Integrated North American Electricity System

The American and the Canadian electricity markets are increasingly connected across national borders. The United States (U.S.) and Canada currently share more than 35 interconnections and 200,000 miles of high-voltage transmission lines. In fact, the North-American electricity grid is more connected North-South than East-West. In many cases, transmission connections enable American customers to access substantial hydropower resources located in Canadian provinces. Figure 1 (Transmission Map) illustrates the extent of American-Canadian electrical integration.

There are numerous advantages to this shared electricity system; higher reliability, enhanced system stability, effective fuel management, seasonal/time zone exchange opportunities and expanded access to low carbon and competitively-priced resources.

Canada plays an important role in the overall energy security of the U.S. We are each other's largest trading partners. Electricity flows both North and South between the United States and Canada. On a net annual basis, Canada exports approximately 40 TWh of electricity to the U.S. The vast majority of that power (~80%) is from hydropower. In some border states, Canadian imports play a significant role in meeting electricity needs. For example, Manitoba typically provides the Upper Midwest with about 10,000 GWh of electricity per year. This is enough to power nearly 1 million homes, and accounts for over 30% of the region's supply of renewable generation. In Vermont, the portion is even higher, with one-third of the electricity consumed in the state supplied by Québec. New York receives about 7% of its electricity from Canada.

3. Canada's Hydropower Resources

Canada is the third largest producer of hydroelectric energy in the world. Over 60% of Canadian electricity generation comes from hydropower, making Canada's electricity grid one of the cleanest and most renewable in the world. A number of new Canadian hydroelectric generating stations and cross-border transmission projects are currently in various stages of development, including the Lower Churchill Project in Newfoundland and Labrador, the Romaine Complex in Quebec and the Keeyask hydropower project in Manitoba.

As older sources of generation are retired, Canada's vast hydropower resources can play an increasing role in meeting growing electricity demand and pollution reduction objectives in both Canada and the US, but more transmission and interconnections will be needed to realize the full benefits of Canadian hydropower.

Canada's hydropower projects are developed only after thorough environmental reviews at the federal and provincial levels and with the participation of local and aboriginal communities.

4. Advantages of Hydropower Imports to the United States

Hydropower is renewable, produces no air pollution and has virtually no greenhouse gas (GHG) emissions. Hydroelectric facilities have extremely long useful lives (typically in excess of 100 years) and are very reliable. Hydropower is cost competitive and due to the absence of a variable fuel cost it contributes to the long-term stability of electricity prices, thus benefiting utilities, industry and consumers. Hydropower also offers the most economically viable technology for the large-scale storage of energy on electricity grids. To put its storage capabilities in perspective, a single hydro facility can provide more than a thousand times the storage of a compressed air energy storage facility. Drawing on hydro storage capacity, operators can increase or decrease production more rapidly from hydropower than from any other electricity source, making it the most dispatchable form of electricity generation. This key feature is of strategic importance to electricity grid operators and managers across North America in their efforts to balance electricity loads and maintain reliability and stability for consumers.

Historically, there have been many mutual benefits to integrating Canadian hydropower systems with the primarily thermal systems in the U.S.; load diversity between winter and summer peaking systems have been leveraged, system reliability improved, generation portfolios diversified, fuel used most efficiently and emissions reduced. With the challenges of integrating increasing quantities of variable generation such as wind and solar, hydropower can and does provide proven additional benefits.

Hydropower's rapid response times and energy storage capabilities make it a perfect partner for wind and other variable sources. When excess U.S. wind enters the market, Canadian hydropower operators can use the wind energy to serve their load, storing water in their reservoirs for future use. When less U.S. wind blows, they can release water and send clean, renewable power to the grid. In fact, this relationship is part of a long-term contract between Manitoba Hydro and Minnesota Power. The two utilities are also working together to build the proposed Great Northern Transmission Line between Manitoba and Minnesota to further enable the synergies between wind and water. This arrangement forms a strong example of positive international cooperation and energy development where different forms of clean and renewable electricity are enabling and enhancing each other across the Canada / US border.

In 2013, the Midcontinent Independent System Operator (MISO) undertook a groundbreaking Wind Synergy Study to examine the benefits of incorporating new and existing hydroelectric facilities located in Manitoba with the current and planned wind generation within the remaining MISO territory. For the first time, models were developed that simulate both the hourly, day-ahead and five-minute real-time energy and ancillary-services markets over a one-year study period. The results clearly demonstrated hydropower's ability to quickly ramp up or down to adjust to variability in wind generation. As a result, these synergies have the potential to provide weighted average load cost savings in the U.S. Midwest of \$430 million annually. This is because more wind energy is delivered to the market (reduced wind curtailments). Excess wind energy is effectively stored and delivered at periods of higher demand.

Canadian hydropower also provides US customers with very low-emitting electricity at a time when climate policies at the state and federal level in both Canada and the U.S. are increasingly striving to reduce greenhouse gas emissions. As an example, over the last five years, thanks to Hydro-Québec's net exports of electricity to neighbouring markets, the emission of over 62 million metric tons of greenhouse gas emissions was avoided in North America. In the Midwest, imports of hydropower from Manitoba to U.S. utilities from 2006 – 2012 have helped reduce GHG emissions by between 44 and 60 million tonnes.¹ While some have speculated that climate change will reduce the rainfall and runoff negatively affecting hydropower production in some regions of North America, comprehensive studies undertaken by industry and governments have found that this is not expected to be the case for most regions in Canada. In 2014, Natural Resources Canada published an extensive analysis of the impacts of climate change in Canada and concluded that "all climate projections indicate a future increase in annual runoff, so average hydroelectric generation should also increase."

Cross-border interconnections offer U.S. customers expanded access to low-carbon and competitively-priced resources. For years, clean electricity from Canada has competed with a diverse set of supply options in both bilateral and wholesale power markets across the U.S. An increasing number of U.S. utility partners and states are including Canadian hydropower in their long-term electricity supply strategies. In the Northeast, the long-term (2012-2038) contract between H.Q. Energy Services (U.S.), a subsidiary of Hydro-Québec, and Vermont's distribution utilities is a key component of Vermont's electricity strategy. In the Midwest, Manitoba Hydro maintains a number of long-standing partnerships with US utilities, exporting approximately 9.1 TWh of virtually emission-free electricity per year. Canadian hydropower producers are working with Independent System Operators to analyze how the Clean Power Plan may affect generation, reliability and resource adequacy within their regions. In the past 3 years, Vermont, Rhode Island, Connecticut, Wisconsin, Minnesota and California adopted legislation or regulations that provide for increasing use of Canadian hydropower by local utilities.

While the draft rule appears to recognize a role for new and incremental hydropower in helping states meet their carbon reduction targets, the benefits that hydropower can offer should be more fully recognized. Both new and existing hydropower, including Canadian hydropower, can assist U.S. states and regions in cost-effectively meeting their carbon reduction targets but states and utilities need certainty that this resource can be used for compliance in state and regional implementation plans.

5. Including Canadian hydropower as a compliance option for states under the Clean Power Plan

Our shared electricity system delivers many benefits to both the United States and Canada. North America's hydropower resources represent a key asset for our economies at a time when the need for reliable, clean and economically competitive energy resources is growing. In order to continue to realize these benefits, it is critical that the Clean Power Plan does not create any artificial barriers to

¹ Based on revenue quality metered data and eGRID 9th edition Version 1.0 Year 2010 GHG Annual Output Emission Rates for MRO West

electricity trade and facilitates the use of all clean resources by states in their plans. Below, the CHA offers a straightforward approach for including Canadian hydropower as a compliance option for states, facilitating access to all interconnected clean energy resources.

Hydroelectric resources have played and will continue to play a critical role in meeting North American carbon reduction goals. In its draft Clean Power Plan, EPA excluded existing hydropower generation from its target-setting under “Building Block III”, which estimated the renewable energy generation potential in each state but added that this would not preclude “states from considering incremental hydropower generation from existing facilities (or later-built facilities) as an option for compliance with state goals.”

5.1. Clarifying the definition of hydropower

First, although there is no language that explicitly excludes Canadian hydropower as a compliance option under the Clean Power Plan, some confusion remains as to whether states can use this resource. Given the short timelines for states to develop SIPs, a clear statement that Canadian renewables can be used for compliance is necessary. As an example, several states are currently contemplating the development of new transmission to enable increased quantities of imported hydropower. Clarity that this resource can contribute to compliance is an important factor in the evaluation process for such projects.

5.2 Treatment of existing and new hydropower

Second, as states and utilities consider CO₂ emission reduction strategies, clear guidance on the definition of eligible hydropower is needed. Existing and new hydropower from Canada continues to contribute real emission reductions to the U.S. grid. Many current state policies seeking to reduce emissions in the power sector recognize the benefits of both existing and new hydropower. In contrast, if only new and incremental hydropower is allowed as a compliance option, then the earliest possible eligibility date should be considered. It can take up to 15 years to permit and build a hydropower generating station, and an earlier eligibility date would avoid penalizing U.S. regions and utilities that have arranged for purchases of Canadian hydropower and made significant transmission investments as part of their strategies to pursue cost-effective emissions management.

6. Conclusion

Our shared electricity system delivers many benefits to both the United States and Canada. North America's hydropower resources represent a key asset for our economies at a time when the need for reliable, clean and economically competitive energy resources is strong.

In order to continue to realize these benefits it is critical that the Clean Power Plan does not create any artificial barriers to electricity trade but rather facilitates access to all very low-emitting energy

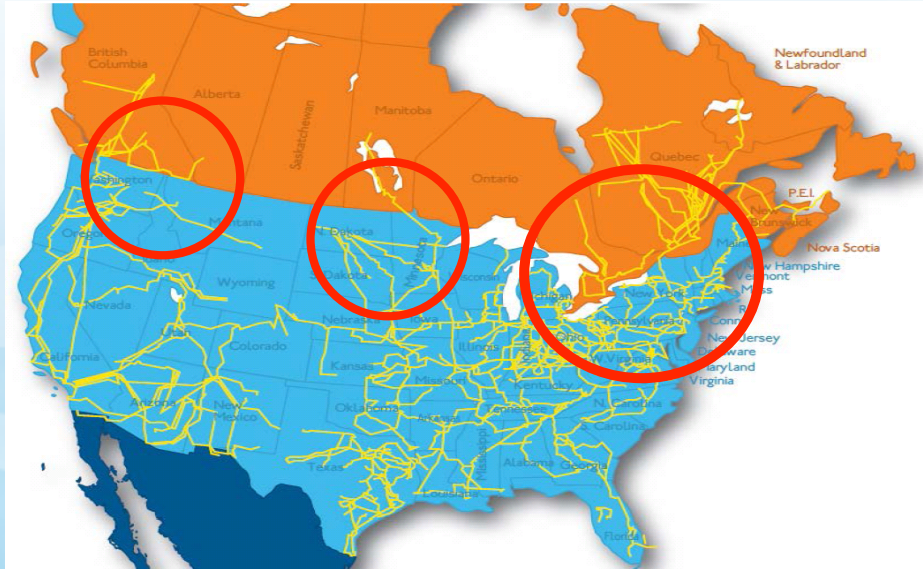
resources. The Clean Power Plan should recognize the important role that Canada's current and future hydropower resources can play in providing cost-competitive, clean and renewable electricity and energy storage, enabling the increased development of wind and solar generation in the U.S., and contributing to the stability, reliability and flexibility of North America's electricity system. Failure to allow states the flexibility to use Canadian hydropower imports could undermine the EPA's objective of cost-effectively achieving CO2 emissions reductions in the power sector. Furthermore, it would penalize U.S. regions and utilities that have arranged for purchases of Canadian hydropower and made significant transmission investments as part of their strategies to pursue cost-effective emission reductions.

While the draft Clean Power Plan appears to recognize a role for new and incremental hydropower in helping states meet their carbon reduction targets, the benefits that hydropower can offer should be more fully recognized. New and existing hydropower, including Canadian hydropower, can assist U.S. states and regions in cost-effectively meeting their carbon reduction targets but **states and utilities need certainty that Canadian hydropower can be used for compliance in state and regional implementation plans**. To build upon the ongoing relationship between Canadian and U.S. utilities, CHA advocates that EPA's final rule specifies that Canadian hydropower can serve as a compliance options under state and regional implementation plans. Should the EPA choose to limit hydropower used for compliance to generation from incremental or "later-built" facilities, an early eligibility date should be chosen so as to not adversely impact existing transmission investments and power planning efforts at the state and regional level.

The Canadian Hydropower Association appreciates EPA's leadership in taking steps to reduce emissions in the power sector. We are committed to working with the Agency in developing a rule that is transparent, enforceable, ensures environmental integrity and supports continued cross-border trade of clean electricity.

Figure 1

USA and Canada Transmission Is More North-South Than East-West



Map copyright Canadian Electricity Association (CEA)
Lines shown are 345kV and above. There are numerous interconnections between Canada and the U.S. under 345kV that do not appear on this map.

