

**Annex 2**

**Lake Erie Connector**  
**Market Assessment Report**



---



# Lake Erie Connector Market Assessment Report

---

PREPARED FOR

ITC Lake Erie Connector LLC

PREPARED BY

Judy Chang


Johannes Pfeifenberger

J. Michael Hagerty

Akarsh Sheilendranath

May 2015

---



This report was prepared for ITC Lake Erie Connector LLC. All results and any errors are the responsibility of the authors and do not represent the opinion of The Brattle Group, Inc. or its clients.

Copyright © 2015 The Brattle Group, Inc.

---

## Table of Content

Executive Summary .....	2
I. Purpose and Scope of Market Assessment Report.....	4
II. Background on the IESO and PJM Markets and Merchant Transmission Development .....	4
A. IESO and PJM Markets and the Lake Erie Connector .....	4
1. Ontario Electric Power System and its Interties.....	6
2. PJM Electric Power System and its Interties.....	10
B. Merchant Transmission Project Development.....	12
1. Merchant Transmission Development in North America.....	13
2. Merchant Development of the Lake Erie Connector .....	15
3. Operating the Bi-Directional HVDC Lake Erie Connector.....	16
III. Sources of Value for the Lake Erie Connector.....	17
A. Value Through Energy Trades .....	17
1. Historical Wholesale Energy Price Patterns .....	18
2. Current Energy Trades Between Ontario and PJM and Associated Transaction Costs.....	20
B. Potential Capacity Market Value .....	22
1. Ontario Capacity Market Fundamentals and Potential Future Development ....	23
2. PJM Capacity Market .....	26
C. Renewable Energy Credits and Clean Energy .....	28
D. Carbon Pricing in Ontario and the U.S. Clean Power Plan.....	30
IV. Open Solicitation Process .....	31

## Executive Summary

The Lake Erie Connector (or the “Project”) is a 1,000 MW, bi-directional high-voltage direct current (“HVDC”) submarine transmission line proposed to be built between Nanticoke, Ontario and Erie, Pennsylvania by ITC Lake Erie Connector LLC (“ITC Lake Erie”). The Project will be the first direct connection between the wholesale electricity markets operated by the Independent Electricity System Operator (“IESO”) in Ontario and the PJM Interconnection LLC (“PJM”), which is one of the world’s largest power markets with a U.S. footprint spanning from Virginia and New Jersey in the east reaching west to include Ohio and Illinois.

ITC Lake Erie is developing the Project on a merchant basis, which means that ITC Lake Erie will bear the full costs and risks of the Project. ITC Lake Erie will need to attract sufficient interest from transmission customers (“transmission customers”) to contract for capacity on the line before initiating construction of the Project.

This Market Assessment Report provides an assessment of the market fundamentals of the Ontario and PJM wholesale electricity markets, the sources of “merchant value” of the Project and some of the future drivers likely to influence the value of the Project. The revenues that ITC Lake Erie can expect from selling transmission capacity on the Project will be determined through the open solicitation process expected to commence in 2015.

Based on our market assessment, we come to the following conclusions:

- Since the Project is being developed on a merchant basis, ratepayers in Ontario will not bear the costs of the Project through regulated transmission rates. Other merchant transmission projects, including the Montana Alberta Tie-Line between Canada and the U.S., have delivered value to customers and increased efficient trading between markets. Just like other merchant transmission projects, potential transmission customers will offer to reserve transmission capacity at prices based on the value they ascribe to the Project. The transmission customers will be selected via an open solicitation to enter into transmission service contracts that will provide the necessary revenues for ITC Lake Erie to build and finance the Project.
- Electricity trade between Ontario’s IESO-operated wholesale electricity market and U.S. markets is currently constrained by limits of the existing transmission capability. The Project, being the first direct connection between the IESO and PJM wholesale electricity markets, will increase the import and export capability between Ontario and the U.S. and thereby increase the magnitude and efficiency of trades that benefit market participants on both sides of the border.
- Currently, electricity trade between Ontario and PJM is limited by significant transactional costs imposed on transmission customers due to lack of a direct connection between the two markets and limited transmission capability on alternate paths. The ITC

Lake Erie Connector would provide a direct path for trade between Ontario and PJM and would avoid some of the transmission, administrative, congestion, and loss charges associated with existing paths.

- Based on the differences in market fundamentals in Ontario and PJM, particularly the resource diversity across the two markets, the Project provides opportunities to trade energy (including ancillary services), capacity, and clean energy products across the two markets with lower administrative and congestion charges.
- Historically, the IESO and PJM markets have exhibited significant energy price differentials. These price differentials are a source of market value to transmission customers and the basis for energy (and ancillary services) trades that will benefit both markets. While these price differential patterns could change in the future as market conditions change, electricity consumers would continue to benefit from the Project as it will facilitate a more competitive and efficient use of supply resources in both markets.
- Ontario's recent initiatives to allow trading of firm generating "capacity" (in addition to energy on an as available basis) across its interties could provide transmission customers with another significant source of value. Exporting excess generation capacity that may exist in one market to the other offers long-term cost reductions to both markets. Furthermore, Ontario's nuclear facilities are scheduled for refurbishments or retirement between 2017 and 2030, creating a potential capacity shortfall in Ontario. Ontario could benefit from transmission customers exporting lower-cost generating capacity from PJM to meet Ontario's capacity needs. The Project, by providing a direct connection, will enable firm generating capacity to be traded between the two markets.
- Renewable Portfolio Standards ("RPS") of various PJM states, environmental regulation of greenhouse gases (GHG) in the U.S., and the emergence of carbon pricing policies in Ontario, offer a potential additional source of value for transmission customers and ITC Lake Erie. Clean energy sources can capture market value above and beyond what can be realized through energy and capacity markets. The Project may enable sales of renewable generation attributes, known as renewable energy credits ("RECs"), to the PJM market to fulfill PJM states' incremental RPS requirements; and, may likewise enable the sale of renewable energy products into Ontario.

ITC Lake Erie is currently preparing to initiate the open solicitation process to invite potential transmission customers to express their interest in contracting for transmission capacity on the Project. The open solicitation will provide an initial level of interest and ITC Lake Erie will then engage in negotiations with potential transmission customers.

## I. Purpose and Scope of Market Assessment Report

ITC Lake Erie is pursuing the Project on a merchant basis. ITC Lake Erie will bear the costs and risks of the Project and must attract sufficient interest from transmission customers to contract for capacity on the line before initiating construction of the Project. This approach differs from the process for approving and building regulated transmission, for which costs are recovered from ratepayers based on regulated transmission rates.

The specific magnitude of the revenues that ITC Lake Erie can expect from selling the capacity on the Project will be determined by the results of the open solicitation and the ensuing negotiations with potential transmission customers.

The scope of this Market Assessment Report includes:

- Explanation of how a merchant transmission project differs from regulated transmission investments and examples of recent HVDC merchant transmission lines built or under development in North America;
- Description of the current IESO and PJM market fundamentals;
- Identification of the sources of value in increasing trade between the two markets and some of the most significant drivers of future value; and,
- Outline of the next steps in the open solicitation process for engaging with parties interested in contracting for transmission capacity on the Project.

## II. Background on the IESO and PJM Markets and Merchant Transmission Development

The proposed Project will be the first direct connection between the IESO and PJM wholesale electricity markets as well as the first merchant transmission line to interconnect Ontario with an adjacent system. In this section, we provide a description of the fundamentals of the Ontario and the PJM wholesale electricity markets, focusing on the relevant features of these markets that may drive the value of the Project.

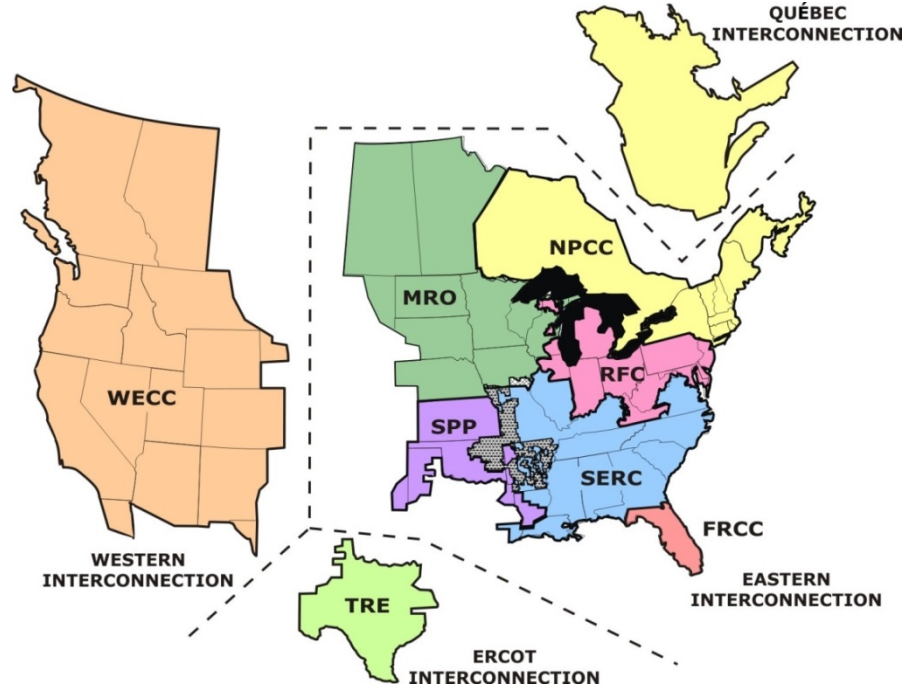
### A. IESO AND PJM MARKETS AND THE LAKE ERIE CONNECTOR

North America's electricity transmission system is made up of four interconnections with all of the electric utilities within each interconnection electrically tied together during normal system conditions and operated at a synchronized frequency. Figure 1 shows that the Eastern Interconnection covers the majority of the area east of the Rocky Mountains (excluding most of Texas and all of Québec), including Ontario (within Northeast Power Coordinating Council or "NPCC") and PJM (which coincides roughly with the "RFC" area which stands for ReliabilityFirst Corporation). Figure 2 below shows the geographic coverage of the various



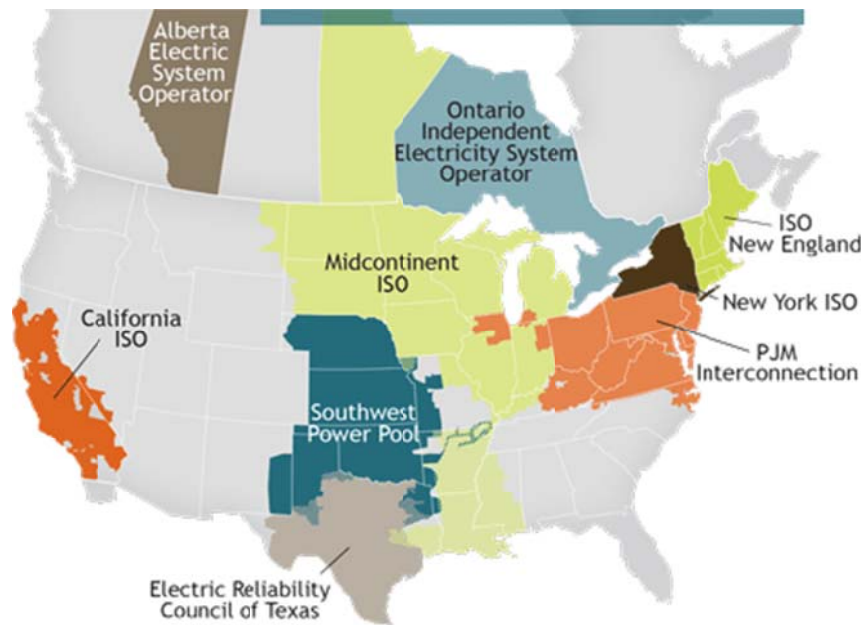
organized regional electric system and associated wholesale markets operated by independent system operators.

**Figure 1**  
**North America Electric Reliability Corporation Interconnections and Regional Entities**



**Source:** NERC, Key Players, accessed September 25, 2014, online at <http://www.nerc.com/AboutNERC/keyplayers/Pages/default.aspx>

**Figure 2**  
**Organized Regional Electricity Systems**



**Source:** ISO/RTC Council accessed May 18, 2015 online at <http://www.isorto.org/About/default>

The extent to which each system within an interconnection can utilize resources located in neighboring systems depends on the strength of the interties between those systems.<sup>1</sup> Despite being geographically located near each other (on opposite sides of Lake Erie), the Ontario and PJM electric power systems currently do not have any direct connections between them to allow for the markets to benefit from the resources available in the other to improve reliability and economic efficiency.

In this section, we provide an overview of the Ontario and PJM markets, their existing interties with neighboring systems, and how the Project will facilitate increased trade between Ontario, PJM, and other neighboring markets.

### **1. Ontario Electric Power System and its Interties**

The Ontario electric power system in 2014 had a system peak load of 22,800 MW.<sup>2</sup> As of end of 2014, the total generation capacity in Ontario was 34,367 MW and the supply resource mix consisted of nuclear (38%), natural gas (29%), hydro (25%) and an increasing amount of wind

---

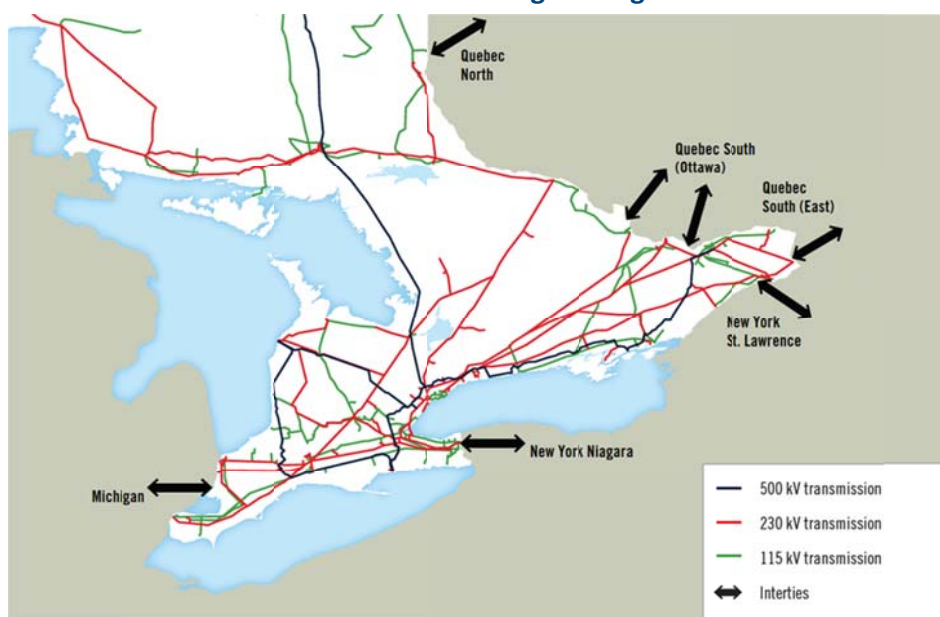
<sup>1</sup> Interties are single tie lines or groups of tie lines that together provide combined capacity for transferring energy between two electric power systems.

<sup>2</sup> IESO, Historical Hourly Ontario and Market Demands, 2002-2014, online at <http://www.ieso.ca/Pages/Power-Data/Demand.aspx>, accessed March 30, 2015.

generating capacity (7%); although wind resources typically do not provide their full energy output during peak periods.<sup>3</sup> The total energy generated in Ontario was 153,900 GWh in 2014.<sup>4</sup>

The IESO operates and administers Ontario's bulk electric power system, wholesale electricity markets, and inter-jurisdictional transactions on Ontario's 9 interties, which comprise 26 tie lines with neighboring markets. The directly connected neighboring systems include the Midcontinent ISO ("MISO"), the New York ISO ("NYISO"), and Québec. Except for a single HVDC transmission tie line with Québec, all the other interties are alternating current ("AC") lines that either provide transfer capability to neighboring markets or are radial lines directly connected to Québec which allows generation facilities in Ontario or Québec to be isolated on the other system. The existing interties that connect southern Ontario to its neighboring systems are shown in Figure 3.<sup>5</sup>

**Figure 3**  
**Ontario Interties with Neighboring Markets**



**Source:** IESO and OPA, Review of Ontario Interties, Prepared for the Minister of Energy by the IESO and the Ontario Power Authority, October 14, 2014, p. 3. The figure has been modified to show the southern portion of Ontario. Two additional 230 kV interties are located in northwest Ontario with Manitoba and Minnesota.

<sup>3</sup> IESO, Ontario's Supply Mix, accessed on March 23, 2015, online at:

<http://www.ieso.ca/Pages/Ontario%27s-Power-System/Supply-Mix/default.aspx>

<sup>4</sup> IESO, Monthly Energy Output by Fuel Type (Grid-Connected), accessed on March 23, 2015, online at:

<http://www.ieso.ca/Documents/marketReports/download/Monthly-Energy-Output-by-Fuel-Type-2014.csv>

<sup>5</sup> IESO and OPA, Review of Ontario Interties, Prepared for the Minister of Energy by the Independent Electricity System Operator and the Ontario Power Authority, October 14, 2014, p. 9.

The IESO also operates a real-time wholesale electricity market for energy and operating reserve. The IESO wholesale energy market clears at a uniform, province-wide market price to settle all internal generation and loads. The hourly province-wide energy price is termed the “Hourly Ontario Energy Price” (“HOEP”).

In 2014, Ontario was a net exporter of energy, with net exports totaling 14,200 GWh, which is 9% of total in-province generation.<sup>6</sup> Table 1 below provides a summary of the annual export transaction volumes scheduled from Ontario to Michigan (MISO), New York (NYISO), and PJM between 2011 and 2014. Export transactions from Ontario to MISO and NYISO have increased by 60% and 80% respectively since 2011, and the total exports out of Ontario to U.S. electricity markets increased by 60%, indicating that suppliers in Ontario have been increasingly pursuing opportunities to sell their energy into U.S. markets.

Also as shown below, exports from Ontario to PJM have been significantly lower than those to Michigan or New York.<sup>7</sup> Typical transaction costs for scheduling exports to PJM include export charges, intertie congestion charges, marginal system losses, and congestion cost charges. The sum of all these costs accounts for a significant portion of the energy price differential between Ontario and PJM. Therefore while the historical price differential should have attracted significant trading between Ontario and PJM, the existing charges and transmission constraints over existing transmission paths have limited the trade volumes.

**Table 1**  
**Ontario’s Annual Exports to U.S. Markets (MWh)**

Year	Michigan	New York	PJM	Total
2011	4,217,075	4,276,497	927,821	10,784,286
2012	4,388,472	5,871,785	2,188,394	13,627,812
2013	5,925,478	7,507,792	1,404,613	16,259,536
2014	6,766,992	7,693,839	815,188	17,219,177

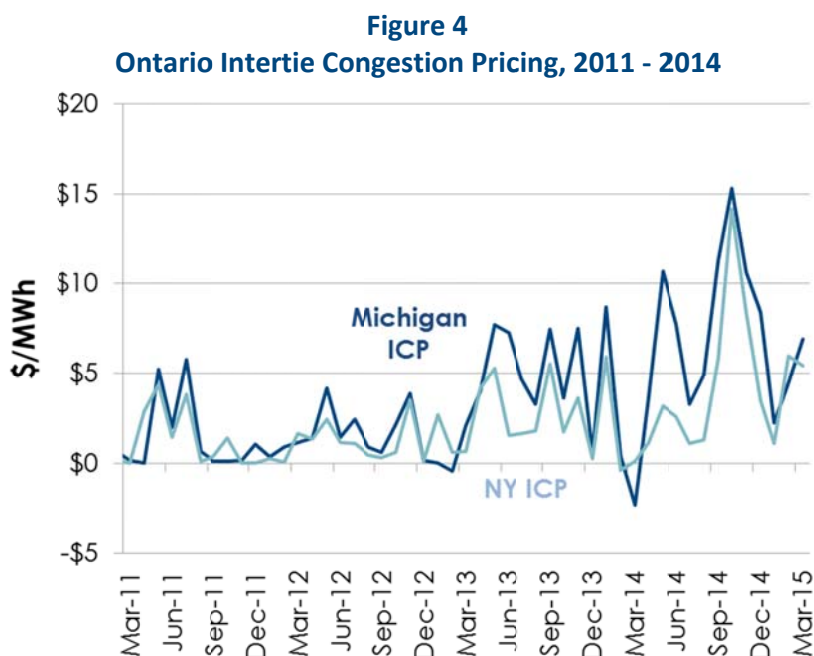
**Source and notes:** IESO, Ontario’s Supply Mix, accessed on March 23, 2015, online at: <http://www.ieso.ca/Pages/Ontario%27s-Power-System/Supply-Mix/default.aspx>. Michigan,

<sup>6</sup> IESO, Ontario’s Supply Mix, accessed on March 23, 2015, online at: <http://www.ieso.ca/Pages/Ontario%27s-Power-System/Supply-Mix/default.aspx> Net exports refer to total exports minus total imports.

<sup>7</sup> During the same period the energy price difference between PJM and Ontario has been either greater than or equal to the price difference between MISO and Ontario, or NYISO and Ontario. This indicates that export transactions from Ontario to PJM would have been just as, or more lucrative than transactions to MISO/NYISO, before accounting for transaction costs. Due to the lack of a direct interconnection between Ontario and PJM, transaction costs imposed on transmission customers wheeling energy to PJM (through MISO or NYISO transmission systems) significantly offset potential revenues from sales of energy to PJM. As a result, transactions to PJM historically have only averaged around 20-25% of those to NYISO and MISO.

New York, and PJM account for approximately 90% of exports to U.S. electricity markets. ISO-NE receives 8 – 10% of the exports.

Due to the recent increase of energy exports out of Ontario, the volume of the potential transactions across IESO interties often exceeds the existing available intertie capability. Currently, the IESO calculates an Intertie Congestion Price (“ICP”) to help manage the energy imports to and exports from the Ontario wholesale energy market. For example, the ICP effectively increases the cost of exporting energy relative to the internal Ontario energy prices when the desired export transactions exceed the amount of transfer capability available. Conversely, when the demand for energy imports is greater than the import capability, the imported energy will receive a price that is lower than the internal Ontario price. Historically, the annual average value of ICP ranged between \$2–7/MWh, depending on the market conditions.<sup>8</sup> Figure 4 below shows that these charges are relatively volatile over time with an upward trend since 2011.



**Sources and Notes:**

- [1] Calculated based on data compiled by Ventyx, the Velocity Suite, and IESO’s daily ICP data.
- [2] Ontario prices are converted to US\$ based on the daily exchange rates provided by SNL.

The increasing value of the ICP reflects additional hours of congestion on Ontario’s interties and increasing interest in economic trade activities between parties transacting in Ontario and the neighboring markets. Going forward, as we discuss in more detail in Section III.B below,

<sup>8</sup> Historical daily ICP data for 2011-2014 was provided by the IESO upon request by the Brattle Group. Historical daily ICP data for the first quarter of 2015 were accessed from IESO’s Net Interchange Scheduling Limit Reports published monthly at: <http://reports.ieso.ca/public/NISLShadowPrices/>

anticipated changes in the generation resource mix in the Ontario market, such as nuclear generation facility refurbishments scheduled to begin 2016, could, for at least a period of time, reverse the direction of the transactions toward increasing energy imports from the U.S. markets into Ontario.

## 2. PJM Electric Power System and its Interties

The PJM electric power system covers all or part of 13 states and the District of Columbia in the U.S. and has a system peak load of 141,395 MW and total energy generation of 808,300 GWh in 2014.<sup>9,10</sup> As of 2014, PJM's resource mix includes 183,724 MW of generation capacity, which is made up of coal (40%), natural gas (31%), nuclear (18%), and a small amount of renewable energy resources.<sup>11</sup>

PJM operates a two-settlement (day-ahead and real-time) energy market with locational marginal prices ("LMPs") at each of its over 11,000 pricing node. The prices for load are settled at the load zone prices. Figure 5 below shows the PJM footprint and load zones.

---

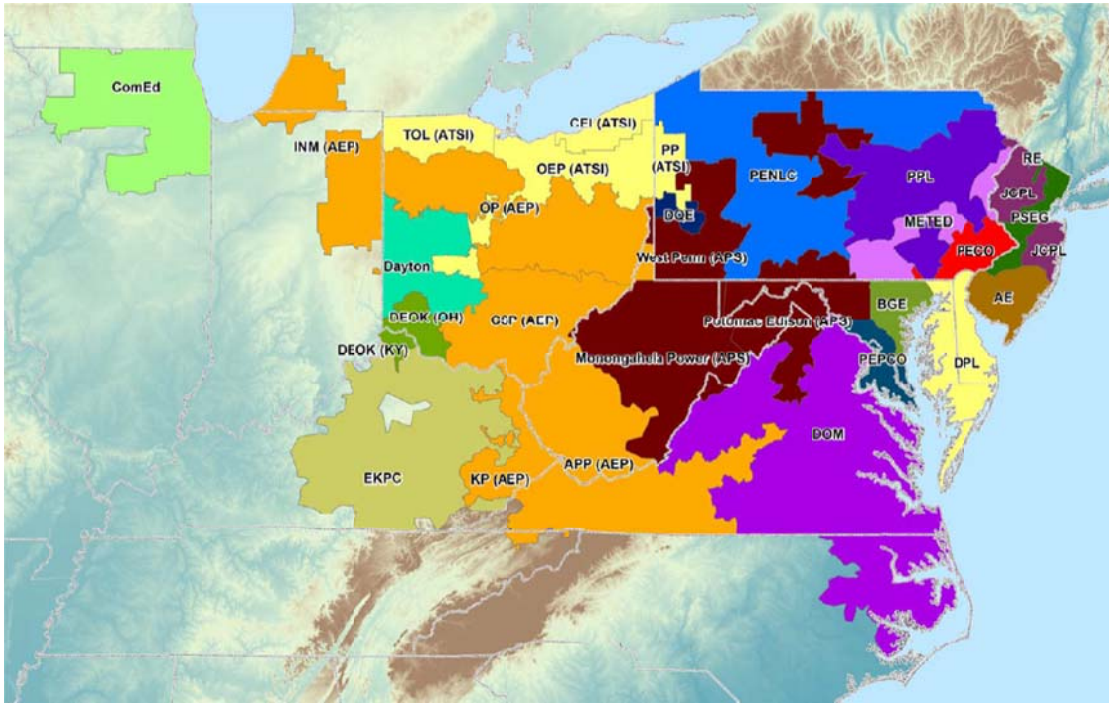
<sup>9</sup> PJM Interconnection LLC, PJM Load Forecast Report, prepared by PJM Resource Adequacy Planning Department, January 2015. Available at: <http://www.pjm.com/~media/documents/reports/2015-load-forecast-report.ashx>

<sup>10</sup> Monitoring Analytics, PJM State of the Market – 2014, Section 3, p. 77. Available at: [http://www.monitoringanalytics.com/reports/PJM\\_State\\_of\\_the\\_Market/2014.shtml](http://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2014.shtml)

<sup>11</sup> Monitoring Analytics, PJM State of the Market – 2014, Section 5, p. 186. Available at: [http://www.monitoringanalytics.com/reports/PJM\\_State\\_of\\_the\\_Market/2014.shtml](http://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2014.shtml)



**Figure 5**  
**PJM Footprint and Load Zones**



Source: PJM Load Forecast Report, January 2014.

Figure 6 below shows a snapshot of the PJM market and trading conditions across the 11 interties between PJM and its neighboring systems. The trades include those across four interties with NYISO to the northeast and one with MISO. The figure shows the locational marginal prices at PJM’s border with neighboring markets and the associated scheduled and actual power flows (as a snapshot in time).

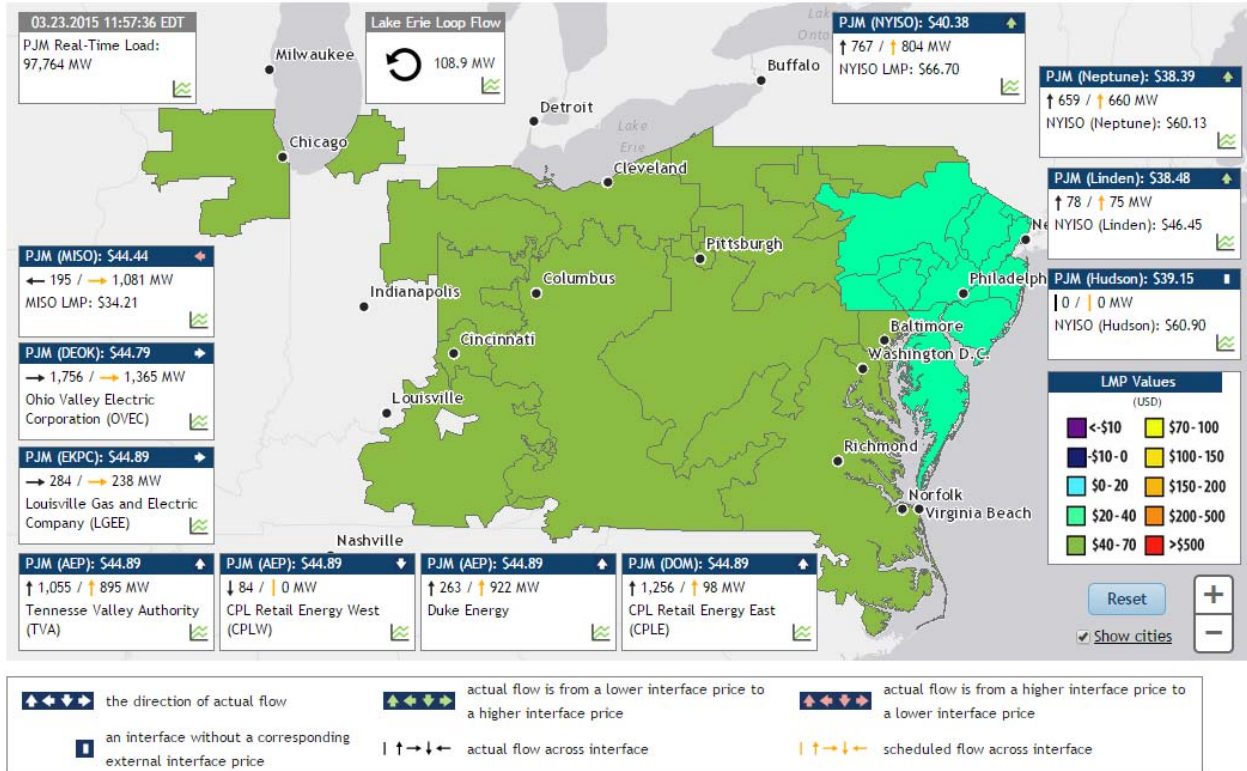
Flows across the interties can vary significantly with season. In 2014, PJM was a net importer during summer and winter and net exporter in the spring and fall.<sup>12</sup> In total, PJM exported 47,800 GWh and imported 47,400 GWh of energy in 2014.<sup>13</sup> Transactions with MISO and NYISO account for 58% of PJM’s imports and 79% of its exports. The PJM interties with NYISO include three existing merchant transmission interties (Neptune, Hudson, and Linden) that provide transmission capacity between PJM and the constrained New York City and Long Island

<sup>12</sup> “In 2014, PJM was a monthly net importer of energy in the Real-Time Energy Market in January, May, June, July, August, November and December, and a net exporter of energy in the remaining five months.” Monitoring Analytics, PJM State of the Market – 2014, Section 9, pp. 289-290. Available at: [http://www.monitoringanalytics.com/reports/PJM\\_State\\_of\\_the\\_Market/2014.shtml](http://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2014.shtml)

<sup>13</sup> *Id.*, pp. 292-293.

systems. In 2014, PJM exported 5,500 GWh of energy, or over 10% of total exports was across those merchant lines.<sup>14</sup>

**Figure 6**  
**PJM Interties with Neighboring Markets**



Source: PJM, Interregional Data Map, accessed on March 23, 2015, online at <http://www.pjm.com/markets-and-operations/interregional-map.aspx>.

## B. MERCHANT TRANSMISSION PROJECT DEVELOPMENT

ITC Lake Erie is developing the Project as a merchant transmission project. Several merchant transmission projects have been developed in North America over the past two decades. In the U.S., the Federal Energy Regulatory Commission (“FERC”) has recognized that merchant transmission can provide value to electricity customers by expanding the competitive generation market. Unlike traditional utilities which recover their transmission costs through regulated rates from captive wholesale customers,<sup>15</sup> investors in merchant transmission projects assume the

<sup>14</sup> *Id.*

<sup>15</sup> The traditional approach requires identifying new transmission facilities that are necessary to maintain a highly reliable power system and meet reliability standards set by the North American Electric Reliability Corporation (“NERC”) and its regional entities. Once identified, the new facilities are, most often, developed, constructed, and owned by the local transmission company, primarily



full market risks associated with the project. The economic foundation for merchant projects is based on the value that the transmission customers can directly capture via contractual commitments with the project developer for the use of the transmission capacity. Such contractual commitments typically provide transmission developers adequate certainty to assist in the financing of the transmission projects.

For the transmission contracts to be attractive to potential transmission customers, the transmission customers must be able to monetize sufficient value in delivering electric energy (or other products such as ancillary services, firm capacity, or RECs) between markets that are interconnected by the lines. The markets in which merchant lines have been most active have been organized wholesale electricity markets where the costs and prices of wholesale products are transparent, or regions where certain types of generation can be built at a much lower cost compared to where the generation is desired or needed (e.g., renewable or other low-emitting generation from certain low-cost areas to be delivered to markets where the resources can be sold at higher prices). The value of the transmission capacity on the merchant line, in turn, is captured through the trading of energy (including ancillary services), capacity, and RECs between market participants across the interconnected markets. The greater the price differentials are for the various traded products, the greater the value of trade, and the greater the value that transmission customers attribute to the line.

ITC Lake Erie identified an opportunity to facilitate and increase trade between the IESO and PJM markets and the proposed Project addresses this opportunity. The precise value that transmission customers will attribute to the Project and are willing to pay for transmission capacity will be determined through the open solicitation process and contractual negotiations between the transmission customers and ITC Lake Erie. In Section III, we analyze the potential value of such trades based on historical prices of various products. Prior to presenting the economic rationale for the project, we first describe the history of merchant transmission projects in North America.

## 1. Merchant Transmission Development in North America

Over the last decade, interest in developing transmission lines on a merchant basis in North America has increased. Table 2 provides a summary of a sample of merchant transmission

---

Continued from previous page

Hydro One in Ontario, and included in the rate base that is used to calculate ratepayers' bills. Recently, the Ontario Energy Board granted the rights for developing a major transmission upgrades across Ontario, known as the East-West Intertie, to Upper Canada Transmission Inc. through a competitive process. Although the line will be built by a different entity, the costs will still be covered by the Ontario ratepayers. Source: Ontario Energy Board, East-West Tie Line Designation: Phase 2 Decision and Order, EB-2011-0140, August 7, 2013. Available at: [http://www.ontarioenergyboard.ca/oeb/Documents/EB-2011-0140/Dec\\_Order\\_Phase2\\_East-WestTie\\_20130807.pdf](http://www.ontarioenergyboard.ca/oeb/Documents/EB-2011-0140/Dec_Order_Phase2_East-WestTie_20130807.pdf)

projects recently developed or currently being proposed. Several of these merchant projects have been driven by factors that are common to all merchant transmission projects, such as increased trade opportunities and sharing resources to maintain reliability. For instance, lines between PJM into New York City and Long Island, including the Hudson and Neptune lines, provide a link with significant potential for trade between two markets that are geographically adjacent, but are separated by a body of water which is too costly to cross with conventional overhead transmission facilities. The Cross Sound Cable that interconnects the Independent System Operator (ISO) New England system in Connecticut to the NYISO system on Long Island, New York is another example.

**Table 2**  
**Examples of Recently Constructed and Proposed Merchant Transmission Lines**

Facility Name (and Type)	Location	Capacity	Status	Date of Initial Operation
<b>Cross-Sound Cable</b> (submarine cable)	ISO-New England to NYISO	330 MW HVDC	Operating	2003
<b>Neptune</b> (submarine cable)	PJM to NYISO	660 MW HVDC	Operating	2007
<b>Hudson</b> (submarine cable)	PJM to NYISO	660 MW HVDC	Operating	2013
<b>Montana –Alberta Tie Line</b> (overhead line)	Montana to Alberta	300 MW AC	Operating	2014
<b>Southern Cross</b> (overhead line)	ERCOT to Southeast Utilities	3,000 MW Bidirectional HVDC	Proposed	<i>2016+</i>
<b>Champlain Hudson Express</b> (submarine cable)	Québec to NYISO	1,000 MW HVDC	Proposed	<i>2017</i>
<b>Grain Belt Express</b> (overhead line)	SPP to PJM	3,500 MW HVDC	Proposed	<i>2019</i>

Merchant transmission lines are also being developed to deliver energy and other products from regions in Canada or the U.S. that have or are developing hydro or other renewable generation facilities. For example, the proposed Champlain Hudson Power Express will provide increased access for Canadian hydro generation to markets in southeastern New York and New York City. In the U.S., the Grain Belt Express and Southern Cross lines are both being developed to capture the value associated with providing direct market access to high quality renewable energy resources from remote areas. Many of these available resources would otherwise not be able to reach markets in an economically efficient manner.

## 2. Merchant Development of the Lake Erie Connector

Due to the differences in cost recovery between merchant and regulated transmission, the process for developing merchant HVDC lines differs from traditional, regulated transmission facilities. ITC Lake Erie will aim to sell the transmission capacity to transmission customers who are willing to enter into contracts at the greatest value to help finance the project. The resulting transmission service contracts can be short- or long-term and are effectively “take-or-pay” contracts for the transmission capacity on the Project. Thus, regardless of the actual usage or the amount of energy flow over the line, the committed transmission customers will pay for the contracted transmission capacity. ITC Lake Erie plans to enter into negotiated contracts with transmission customers, following an open solicitation. A brief description of the open solicitation process is described in more detail in Section III.D below.

ITC Lake Erie received in September 2014 “negotiated rate authority” from FERC which allows it to enter into contracts based on negotiated rates with potential customers.<sup>16</sup> FERC’s approval is conditional on ITC Lake Erie adequately completing the open solicitation process and associated contracting processes outlined in FERC’s 2012 Policy Statement for identifying subscribers on merchant transmission facilities.<sup>17</sup> These same requirements were reiterated by FERC when granting ITC Lake Erie’s application for negotiated rate authority. The requirements include:<sup>18</sup>

1. Issuing broad notice of the Project in a manner that ensures that all potential and interested customers are informed of the proposed Project, such as by placing notice in trade magazines or regional energy publications.<sup>19</sup> The notice must inform interested customers of the nature of the project and the criteria ITC Lake Erie plans to use to select transmission customers.

---

<sup>16</sup> FERC, Order Conditionally Authorizing Negotiated Rate Authority and Granting Waivers, Docket No. ER14-2640-000, 148 FERC ¶ 61,236, Issued September 26, 2014.

<sup>17</sup> FERC, Allocation of Capacity on New Merchant Transmission Projects and New Cost-Based, Participant-Funded Transmission Projects: Priority Rights to New Participant-Funded Transmission, Docket Nos. AD12-9-000 and AD11-11-000, 142 FERC ¶ 61,038, Issued January 17, 2013.

<sup>18</sup> FERC, Order Conditionally Authorizing Negotiated Rate Authority and Granting Waivers, Docket No. ER14-2640-000, 148 FERC ¶ 61,236, Issued September 26, 2014.

<sup>19</sup> “Such notice should include developer points of contact, pertinent project dates, and sufficient technical specifications and contract information to inform interested customers of the nature of the project, including: (1) project size/capacity; (2) end points of the line; (3) projected construction and/or in-service dates; (4) type of line; (5) precedent agreement (if developed); and (6) other capacity allocation arrangements (including how the developer will address potential oversubscription of capacity)...Finally, the Policy Statement states that the Commission expects the developer to update its notice if there are any material changes to the nature of the project or the status of the capacity allocation process, in particular to ensure that interested entities are informed of any remaining available capacity.”

2. Disclosing the results of the capacity allocation process to demonstrate that the processes that led to the identification of transmission customers and the execution of the relevant contractual arrangements are consistent with FERC's Policy Statement and FERC's open access principles, including the criteria used to select transmission customers, pricing terms on the proposed contracts, and any risk-sharing terms and conditions.

Based on FERC's requirements,<sup>20</sup> ITC Lake Erie is planning to conduct the open solicitation process to solicit interest from potential transmission customers to purchase the rights to use the merchant transmission line. As explained earlier, the open solicitation process will efficiently allocate the transmission capacity and those transmission customers who enter into transmission contracts will have the rights to use the line to move energy and other products between the Ontario and PJM markets.

### 3. Operating the Bi-Directional HVDC Lake Erie Connector

As a merchant transmission line, the protocols for scheduling and delivering energy across the Project must recognize transmission customers' rights to reserve firm capacity and to direct flow between markets as necessary. While PJM has extensive experience with the scheduling and operations of merchant lines, it is anticipated that the IESO will develop the needed protocols. In fact, the IESO already agreed that, as a merchant transmission line, certain general principles should guide the development of new scheduling protocols. In its letter to ITC Lake Erie, the IESO expressed the following principles to guide the development of IESO's market protocols for the operations of the Project:<sup>21</sup>

- IESO recognizes that transmission customers who make significant financial commitments to subscribe for capacity on the merchant transmission line must have access to their subscribed transmission capacity.
- IESO agrees that appropriate protocols should ensure that export bids and import offers over the Project have reservations of transmission capacity on the line similar to the treatment of merchant transmission interties between other North American power markets.
- IESO expects that only limited modifications to existing market rule and manual protocols (for non-merchant interties) will be needed to screen for transmission reservations for imports and exports over the Project.

---

<sup>20</sup> ITC has also agreed to maintain accounts with FERC, which will be independently audited, and ITC will turn over control of the U.S. components of line to PJM once built.

<sup>21</sup> Letter to Terry S. Harvill, Ph.D., Re: Lake Erie Connector Project, January 29, 2015.

- IESO acknowledges that scheduling protocols will also have to be jointly developed between PJM and the IESO.
- IESO agrees that appropriate scheduling protocols should accommodate the release, sale, or reassignment of unused transmission capacity on the Project in a manner that is consistent with the approach taken in power markets subject to FERC regulation and applicable FERC orders.

### III. Sources of Value for the Lake Erie Connector

For the Project to be financially viable as a merchant transmission line, it must deliver tangible value to the marketplace that can be monetized. Table 3 below provides a general summary of the sources of merchant value for subscribing for capacity on the Project.

**Table 3**  
**Summary of Lake Erie Connector Sources of Merchant Value**

Value	Description
<b>Energy (and ancillary services)</b>	Hourly price differentials provide opportunities for transferring energy (or associated ancillary services) between markets, especially during extreme events. The energy transfers also help to maintain system reliability.
<b>Capacity</b>	Shifting supply and demand balances in each market have the potential to provide value for providing firm generating capacity through the Project helping to maintain reliable supply in both markets (contingent on market rule adjustments in Ontario).
<b>Renewable Energy Credits</b>	Clean energy resources (i.e., wind and hydro) in lower cost region can capture value by selling to the higher priced market.

In the following section, we identify and explain the sources of value for the merchant transmission developer and potential transmission customers. Actual value will be determined through the shipper solicitation and negotiation process and may vary by transmission customer, as some transmission customers may place different or additional strategic value on the use of the Project.

#### A. VALUE THROUGH ENERGY TRADES

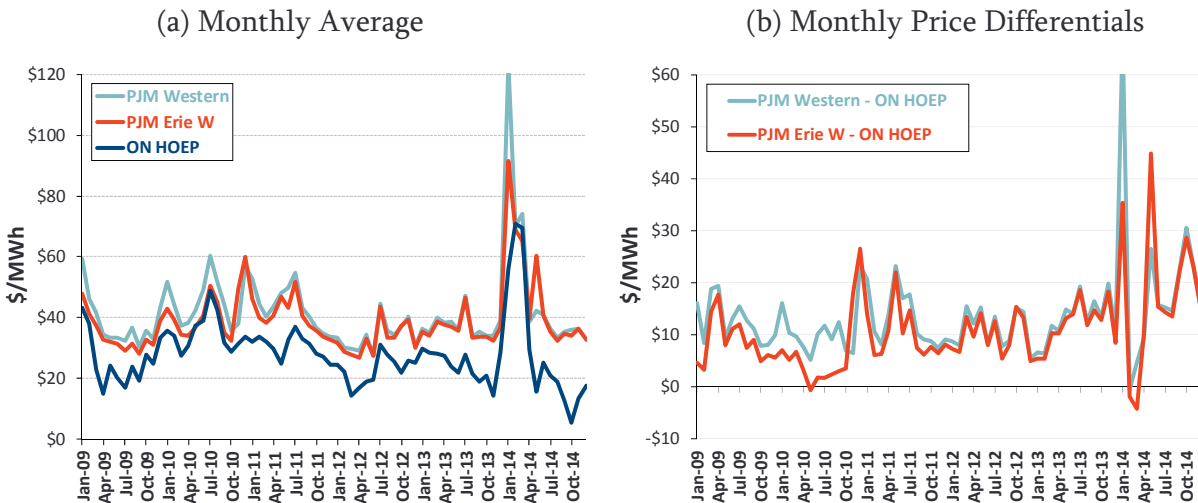
Over the past several years, differences in the generation resource mix and other important conditions in the Ontario and PJM markets have yielded significant hourly wholesale energy market price differentials between the two markets. These energy market price differences reflect the potential value that electricity suppliers can capture through selling across the markets. Each region also utilizes so-called “ancillary services,” which include operating reserves

used to balance the power system and provide supporting services under certain system contingencies. The prices for such ancillary services are closely correlated with the prices for energy that are discussed and summarized below. Looking forward, market conditions can change the trade patterns and price differentials from those observed historically.

## 1. Historical Wholesale Energy Price Patterns

Historically, the monthly average prices in PJM’s wholesale energy market have been significantly higher than those in Ontario’s wholesale market. Figure 7 below compares the Ontario real-time HOEP market prices to the real-time prices at two locations in PJM, Western Hub (which is the main trading hub in PJM) and Erie West.<sup>22</sup> These two trading points in PJM are representative of locations where the energy and other products would be imported into or exported from PJM. Figure 7(a) shows the monthly average price trends in Ontario and PJM since 2009 and Figure 7(b) shows the monthly average price differential trends between the two markets. Table 4 shows annual average prices in tabular form.<sup>23</sup> As the historical prices show, the average monthly price differentials between the PJM Western Hub / Erie West and Ontario have ranged between \$5/MWh and \$15/MWh.

**Figure 7**  
**Historical Prices in IESO and PJM Real-Time Energy Markets**



**Sources and Notes:**

[1] Calculated based on data compiled by Ventyx, the Velocity Suite.

[2] Ontario prices are converted to US\$ based on the daily exchange rates provided by SNL

<sup>22</sup> Western Hub represents the price that existing generators are likely to receive by selling over existing paths and Erie West represents the price that imports into PJM are likely to receive by selling energy across the Project.

<sup>23</sup> Note that, in addition to the HOEP, all loads in Ontario also pay a “global adjustment” charge based in their withdrawals of energy from the grid. The global adjustment charge is not applied to any exports.

**Table 4**  
**Summary of Annual Energy Prices and Price Differentials in Ontario and PJM**

Year	Ontario	PJM Western Hub		PJM Erie West	
	HOEP (\$/MWh)	Real-Time (\$/MWh)	Real-Time - HOEP (\$/MWh)	Real-Time (\$/MWh)	Real-Time - HOEP (\$/MWh)
2009	\$25.7	\$38.3	\$12.6	\$34.5	\$8.7
2010	\$35.1	\$45.9	\$10.8	\$41.7	\$6.5
2011	\$30.5	\$43.6	\$13.0	\$40.6	\$10.1
2012	\$22.8	\$33.9	\$11.1	\$32.7	\$9.9
2013	\$24.3	\$37.3	\$13.1	\$36.2	\$12.0
2014	\$29.4	\$50.0	\$20.6	\$47.6	\$18.2

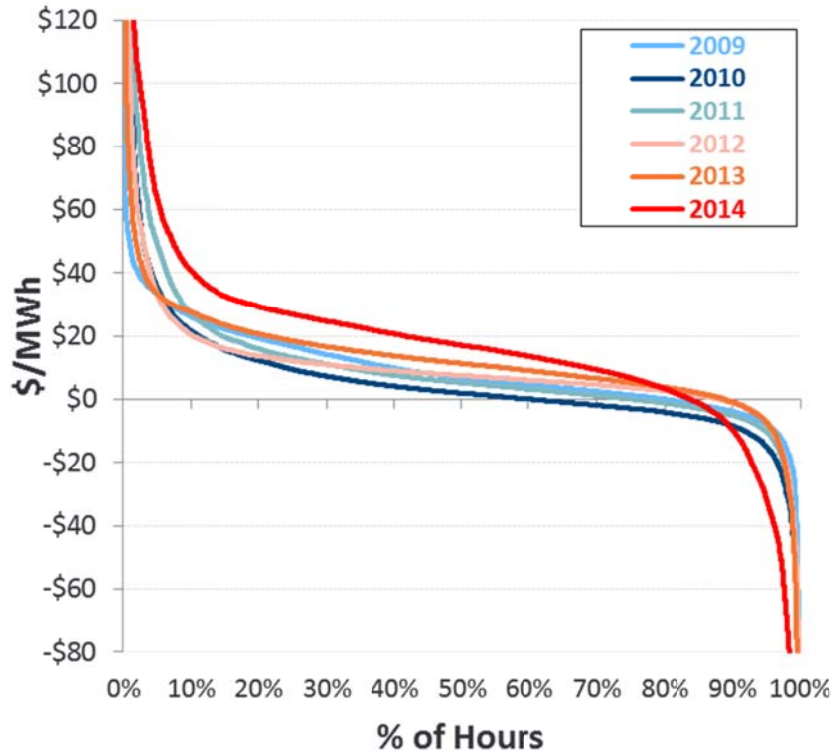
**Sources and Notes:**

[1] Calculated based on data compiled by Ventyx, the Velocity Suite.

[2] Ontario prices are converted to US\$ based on the daily exchange rates provided by SNL.

Hourly price differentials between PJM and Ontario often are significantly larger than the monthly averages shown above. Thus, the value of trades would not be the simple summation of the annual average price differentials. Instead, the value would depend on the coincident price differentials. Figure 8 below plots the coincident hourly price differentials between PJM and Ontario, sorted from most positive (when PJM's prices are greater than those in Ontario) to the most negative (when Ontario's prices are higher than those in PJM). As shown, the real-time prices in PJM have been higher than Ontario's prices during 60-90% of all hours depending on the year.

**Figure 8**  
**Hourly Energy Price Differential Duration Curves**  
(PJM Erie West Real Time Prices relative to Ontario HOEP)



**Sources and Notes:**

- [1] Calculated based on data compiled by Ventyx, the Velocity Suite.
- [2] Price difference in US dollars based on the daily exchange rates provided by SNL.

The historical hourly price differentials between Ontario and Erie West in PJM provide an indication of the revenues that transmission customers may be able to capture in the future if the Project directly interconnected those two points.

**2. Current Energy Trades Between Ontario and PJM and Associated Transaction Costs**

Opportunities for trade between Ontario and PJM are currently limited by both the available transfer capability and the costs of traversing the existing contract transmission paths through MISO and NYISO. The current transaction costs include multiple layers of transmission, congestion, and administrative charges based on the path taken. Some of these charges are likely to be avoided by transactions across the Project.

Specifically, entities transacting energy between Ontario and PJM incur the following transaction costs today:



- a. *Ontario Variable Export Charges*: These charges include Ontario’s Export Transmission Service (ETS) charge, set at approximately \$2/MWh, and uplift and administrative charges levied on export transactions scheduled from Ontario.<sup>24</sup> The uplift and administrative charges have averaged around \$3/MWh, bringing the total variable export charges to approximately \$5/MWh for entities scheduling exports out of Ontario.
- b. *Intertie Congestion Charges (ICP)*: During hours in which reservation requests exceed the available transfer capacity of the interties, the ICP represents the increased cost of importing into or exporting energy from Ontario. The average ICP for exporting to MISO over the past four years on an all-hours basis was \$3.5/MWh (ranging from \$1 – 7/MWh) and for NYISO was \$2.2/MWh (ranging from \$1 – 4/MWh).
- c. *Congestion and Marginal Loss Charges*: These charges are incurred in moving energy from Ontario across either the MISO or NYISO system as well as within PJM to the load zone in which the Project will interconnect. These charges have averaged about \$6.0/MWh for the MISO path (ranging from \$3–8/MWh) and \$3.0/MWh on the NYISO path (ranging from \$2–4/MWh) since 2011.
- d. Separately, NYISO also charges a wheel-through charge of approximately \$5/MWh for all energy transmitted across its system.

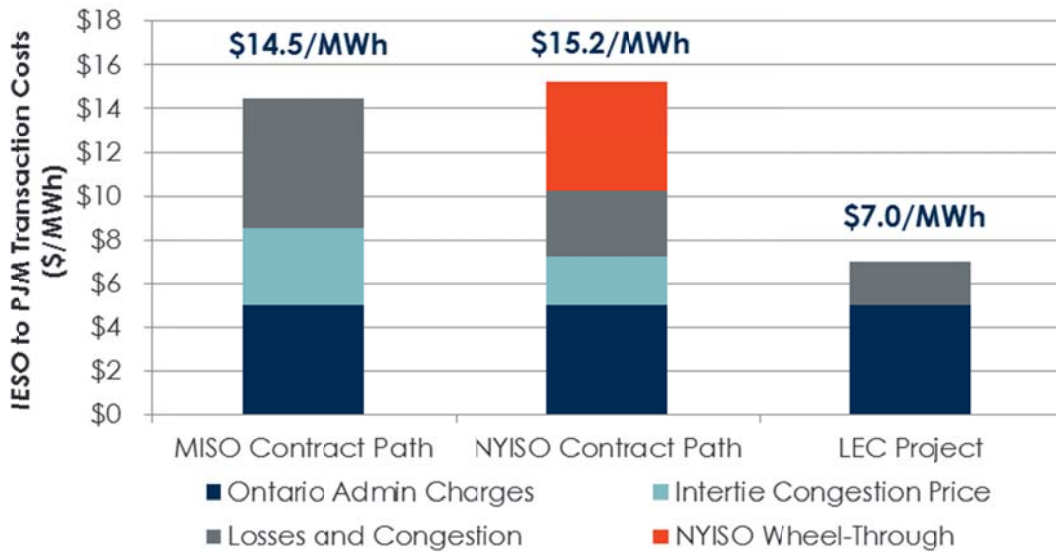
Figure 9 shows how the range of transaction costs for trading energy from IESO to PJM through the MISO and NYISO compare to the expected variable costs for transacting power across the Project. As shown, the existing transaction costs are \$14.5/MWh when transmitting through MISO and \$15.2/MWh when transmitting through NYISO.<sup>25</sup> A direct path provided by the Project would reduce those costs by over 50% to approximately \$7.0/MWh.

---

<sup>24</sup> Ontario Energy Board (OEB) directed IESO in 2010 to undertake a comprehensive study to review the ETS tariff options for Ontario. IESO engaged Charles River & Associates (“CRA”) to perform this study which was completed in May 2012. In the study, CRA analyzed the impact of various rates including: (a) status-quo at \$2/MWh, (b) complete elimination of the rate, (c) an increased rate at \$5.8/MWh, (d) a tiered rate of \$5.8/MWh on-peak and \$0.0 off-peak, (e) a tiered rate of \$3.5/MWh on-peak and \$1.0/MWh off-peak. In June 2013, OEB decided not to increase rates or create a tiered rate structures, and ordered that the rates should be kept at current levels of \$2/MWh. See details in OEB’s “Decision and Order on 2013 Export Transmission Service Rates”, EB-2012-0031, Ontario Energy Board, June 6, 2013, here: [http://www.rds.ontarioenergyboard.ca/webdrawer/webdrawer.dll/webdrawer/rec/398909/view/dec\\_order\\_Hydro%20One%20ETS%20Issue\\_20130606.PDF](http://www.rds.ontarioenergyboard.ca/webdrawer/webdrawer.dll/webdrawer/rec/398909/view/dec_order_Hydro%20One%20ETS%20Issue_20130606.PDF)

<sup>25</sup> The historical energy price difference between PJM and Ontario has averaged around \$12-\$18/MWh on an annual average basis over the last several years. A 50% reduction in transaction costs – on LEC – would translate to net revenue of \$5-11/MWh, which provides significant economic incentive for subscribers to increase economic trade between Ontario and PJM.

**Figure 9**  
**IESO to PJM Transaction Costs, 2011 – 2014**



Energy trades across the Project may be required to pay some part of the variable export charges of approximately \$5/MWh, but an updated merchant transmission line scheduling protocol currently contemplated by the IESO, would likely avoid parts of the variable charges and the incremental ICP. Just as importantly, transactions across the Project would likely also avoid the congestion costs and costs associated with losses on the existing contract transmission paths. The expected costs associated with losses across the Project is in the range of \$1.0 – 2.5/MWh.<sup>26</sup>

## B. POTENTIAL CAPACITY MARKET VALUE

Differences in the value of firm generating capacity between IESO and PJM is also a likely source of value for the Project. Currently, the magnitude of this value is contingent upon certain changes to IESO’s existing market rules related to transacting capacity over the Ontario’s interties because Ontario’s current market rules do not permit market participants to buy or sell capacity across its interties. However, Ontario is currently evaluating the future role of interties with neighboring markets to support the Province’s demand, reliability, and flexibility requirements. Based on this effort, the IESO made a number of recommendations, including to (a) modify market rules to allow Ontario generators to sell capacity that is surplus to the Province’s needs to external jurisdictions, (b) enhance the benefits of the interties to allow more frequent intertie scheduling and expanded provision of ancillary services through intertie

<sup>26</sup> Transmission losses on the Project would be 2–6% including line and convertor losses, which would translate to \$1–2.5/MWh if the market prices are at \$40/MWh (but could be proportionally higher or lower based on the price level).

transactions, and (c) allow for capacity imports and exports in developing the design of the Ontario capacity market.<sup>27</sup>

As such, Ontario is currently developing its own capacity market design proposal. If implemented, the IESO market may allow capacity to be traded between PJM and the IESO. At this time, however, IESO's proposal reflects only a high-level design for Ontario's capacity market, and therefore the definition of the capacity product, associated qualification requirements, and necessary market rule changes are still under development.

If Ontario were to allow capacity to be transacted on its interties, the capacity value provided by the Project (to both Ontario and PJM) would depend on the relative supply/demand balance between Ontario and PJM and the commitment required from the capacity resources procured.

## **1. Ontario Capacity Market Fundamentals and Potential Future Development**

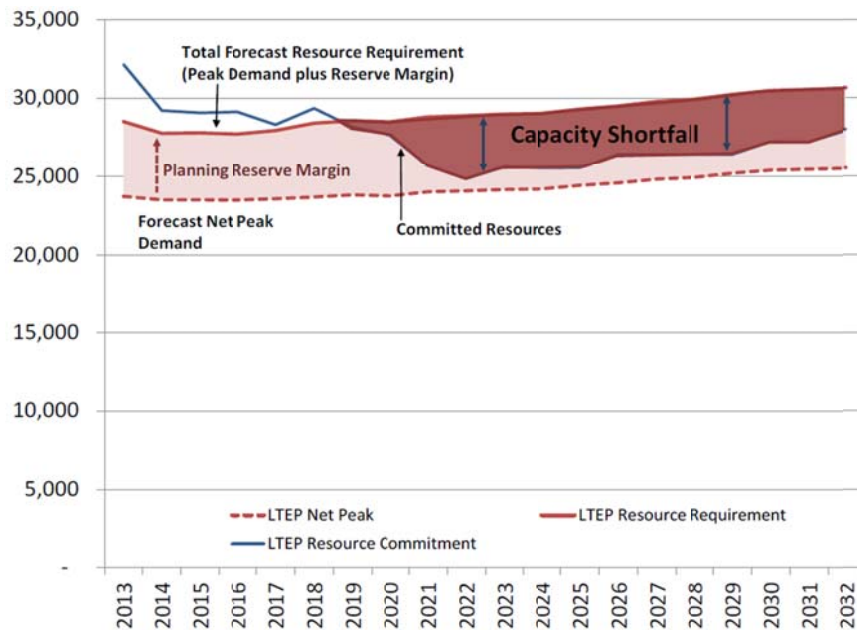
Ontario currently has a surplus of capacity resources despite the forced early retirement of its entire coal-fired generation fleet. However, the existing capacity surplus will decrease primarily as a result of the planned refurbishment and retirement of certain nuclear generation facilities. Figure 10 below compares the amount the committed generation resources (in the blue line) with the forecast peak load (low part of the purple slice) with the necessary reserve margin added (the top of the purple slice). This figure shows that the amount of Ontario's generating capacity, with the reserve margin, is projected to decrease between 2015 and 2022, falling below the required reserve margin as early as 2019. Given this forecast, Ontario is expected face some capacity shortfall starting in 2019, increasing to approximately 4,000 MW of capacity shortage by 2022.<sup>28</sup>

---

<sup>27</sup> IESO and OPA, Review of Ontario Interties, Prepared for the Minister of Energy by the Independent Electricity System Operator and the Ontario Power Authority, October 14, 2014.

<sup>28</sup> These forecasts are based on the Ministry of Energy's 2013 Long-Term Energy Plan for Ontario, updated in December 2013. The 2013 Long-Term Energy Plan does not reflect changes in expectations that may have occurred since 2013. Thus, the actual nuclear refurbishment schedules and/or expected retirements may shift from the currently available information. For example, if the schedules for nuclear refurbishment or retirement shift from the 2013 projection, the expected supply shortage will not as significant as those presented here. These and other uncertainties will affect the perspective of potential subscribers and therefore the actual value subscribers place on the Project will only be revealed through the contract agreements that LEC can obtain through its open solicitation(s).

**Figure 10**  
**Ontario's Capacity Requirements and Committed Resources**



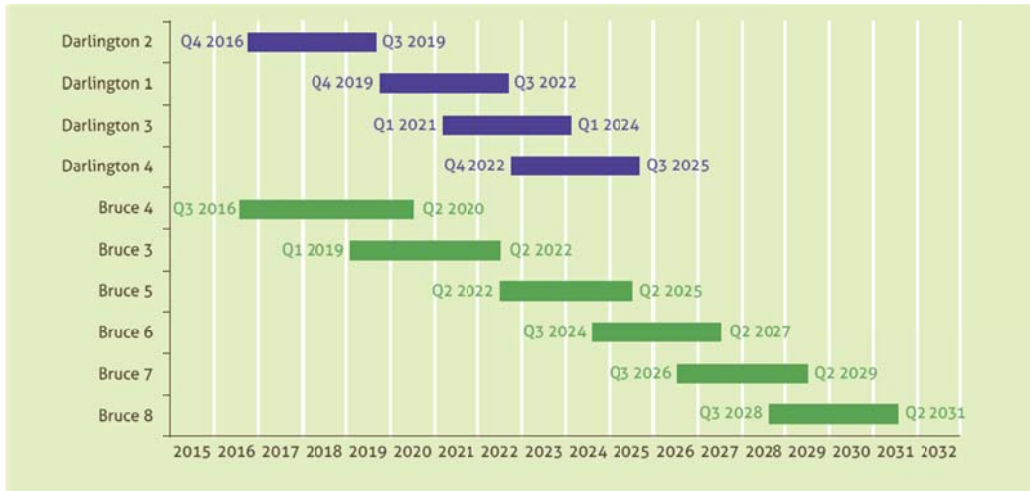
**Source:** “Ontario Capacity Auction: Assessment of Expected Benefits,” IESO, September 2014.

Based on available information on the outlook of Ontario’s generation capacity, one of the main drivers of the expected capacity shortage is related to the scheduled nuclear generation refurbishment and retirements.<sup>29</sup> Figure 11 below shows the schedule for refurbishments of the Bruce and Darlington nuclear units in Ontario. These refurbishments are scheduled to begin in late 2016 and are expected to continue until 2031. The current plan includes having 2-3 units on outage on a rolling basis during the 15 year period, which would reduce the region’s capacity by 2,000 to 3,000 MW in those years.

The schedule for refurbishments of the Bruce and Darlington nuclear units shown in Figure 11 was originally described in Ontario’s Long-Term Energy Plan report dated December 2013. After reviewing the applicable Ontario Power Generation’s (“OPG”) regulatory filings, and other relevant OPG and Canadian Nuclear and Safety Commission (CNSC) documents, it appears that these schedules may change, but at the time of writing of this report, the schedule in Figure 11 below is the most up to date publicly available information.

<sup>29</sup> See discussion on Ontario’s expected capacity shortfall in IESO’s September 2014 report entitled, “Ontario Capacity Auction: Assessment of Expected Benefits”, pg. 12-16. The report can be accessed at: [http://www.ieso.ca/Documents/consult/capacity-20140918-Assessment\\_of\\_Expected\\_Benefits.pdf](http://www.ieso.ca/Documents/consult/capacity-20140918-Assessment_of_Expected_Benefits.pdf)

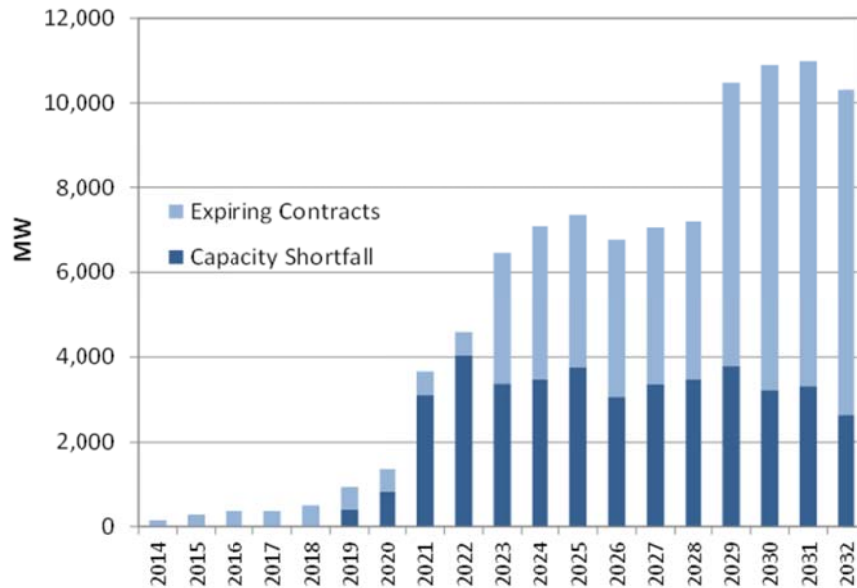
**Figure 11**  
**Ontario’s Planned Nuclear Generation Refurbishment Sequence**



**Source:** “Achieving Balance—Ontario’s Long-Term Energy Plan,” Ministry of Energy, December 2013.

Most of Ontario’s generation capacity is presently under long-term contracts. Some contracts start expiring in 2023. These expiring contracts are anticipated to increase Ontario’s future need because it is not certain whether generators will operate on a merchant basis after their contracts have expired. Figure 12 below shows the IESO’s current estimates for the amount of incremental capacity commitments needed to cover the anticipated overall capacity shortfall as well as the anticipated effects of expiring contracts. The dark blue bars show Ontario’s expected capacity shortfall, consistent with the estimated 4,000 MW capacity shortfall by the 2022 time frame. The lighter blue bars show the expiring contractual capacities. These resources would be subject to competition from new resources, and possibly from capacity purchases across the interties including via the Project.

**Figure 12**  
**Ontario’s Currently-Projected Capacity Shortfall and Expiring Long-Term Contracts**



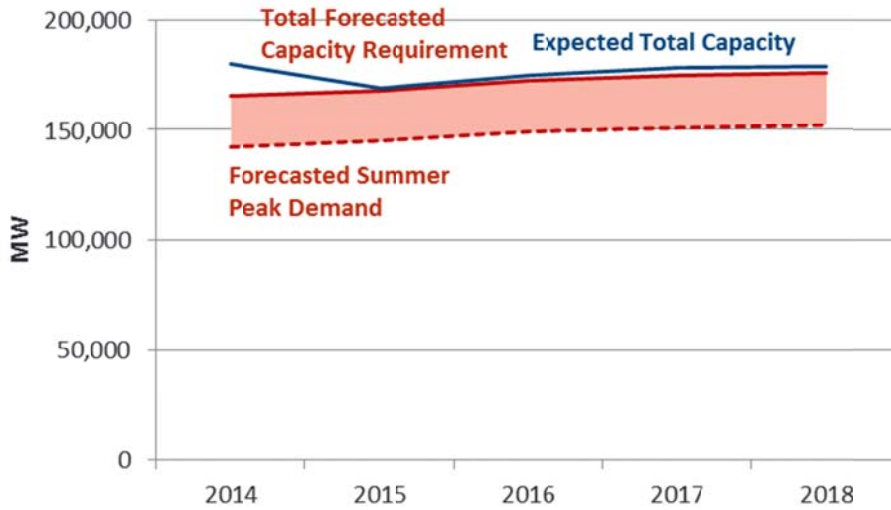
Source: “Ontario Capacity Auction: Assessment of Expected Benefits,” IESO, September 2014.

## 2. PJM Capacity Market

### a. Supply and demand balance

PJM maintains a planning reserve margin of 17-18%. Both supply and demand side resources are available in the market to meet growing load and to replace any plant retirements. A similar diagram, Figure 13 below, shows that PJM anticipates that the net effects of the generation additions and retirements in PJM will continue to maintain the same reserve margin in the future.

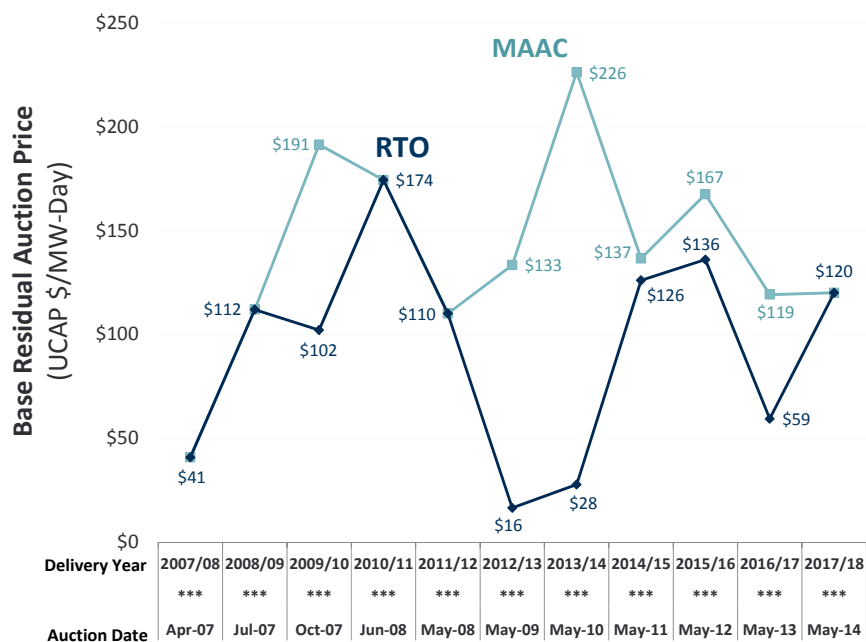
**Figure 13**  
**PJM Capacity Requirements and Expected Capacity**



***b. PJM Capacity Procurement Mechanism***

In PJM, capacity auctions set seasonal regional capacity prices through the Reliability Pricing Model (“RPM”). The RPM occurs every year, three years prior to the commitment period. Figure 14 shows that the forward capacity prices have been relatively volatile over the past five years, ranging from \$28/MW-day to \$136/MW-day in the (“Rest of RTO”) region into which the Project is expected to deliver its capacity. The average forward capacity prices over the same five years have been approximately \$94/MW-day with the most recent prices at \$120/MW-day, or approximately \$43/kW-year. These forward capacity prices in PJM are significantly below the estimated capacity payment necessary to induce new entry into the PJM market, known as the net cost of new entry. As a result, capacity imports from PJM may represent a low-cost option to address Ontario’s capacity needs during the nuclear refurbishment period.

**Figure 14**  
**PJM Base Residual Auction Clearing Prices in MAAC and Rest of RTO**  
 (Through 2017/18 Capacity Delivery Year)



Source: PJM BRA results.

### C. RENEWABLE ENERGY CREDITS AND CLEAN ENERGY

The U.S. states are currently building renewable energy resources for several reasons, including (1) to fulfill incremental renewable requirements created by RPS, (2) to meet future stringent environmental regulations, or (3) for economic purposes. Within PJM, the primary driver for renewable generation continues to be the growing demand created by RPS mandates. Each state has a slightly different definition of renewable resources in its RPS (with wind and solar resources qualifying as renewable resources in all PJM states) and some states requiring the resources to be physically located within the state or the region. Some existing requirements, can be met by resources located in Canada. Further need for clean energy due to GHG standards and other requirements may also provide additional opportunities for zero or low emissions resources from Canada. One example is the proposed Low Carbon Portfolio Standards proposed in Illinois that would create similar requirements to an RPS but include all low-carbon generation resources, including nuclear and hydro generation.<sup>30</sup>

RPS mandates in the PJM states create value (above and beyond what can be realized through the energy and capacity markets) for renewable generation in the PJM market through the

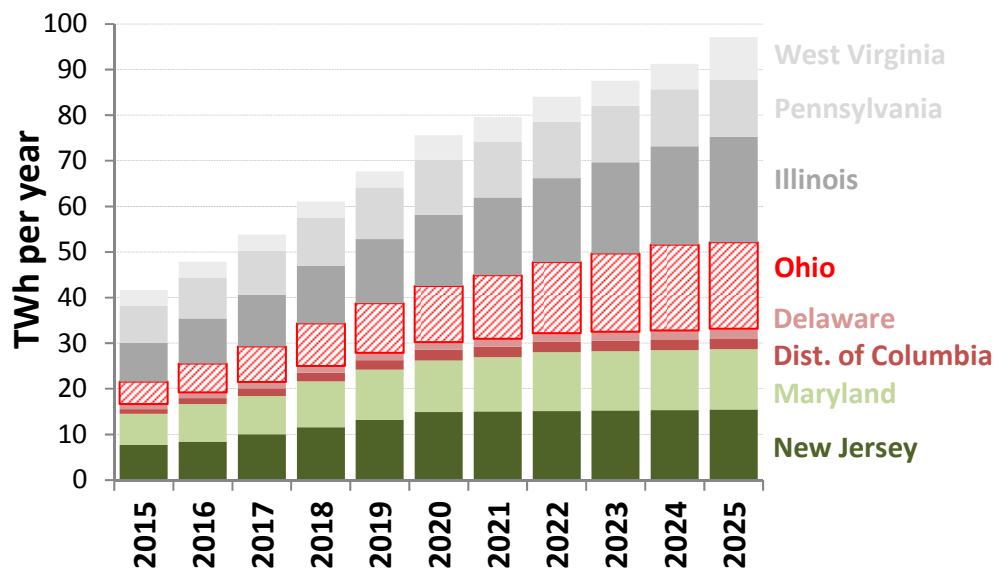
<sup>30</sup> <http://www.prnewswire.com/news-releases/broad-bipartisan-group-announces-market-based-solution-preserving-low-carbon-energy-in-illinois-300042200.html>



production and sale of RECs. Owners and developers of renewable generation in Ontario can capture some of this additional value by selling their generation over the Project into PJM and selling associated RECs to states in PJM that allow for their RPS mandates to be met by out-of-state and out-of-market resources. Currently, the PJM states whose RPS requirements would accept renewable generation imports from Ontario include Ohio, Maryland, New Jersey, and Delaware as well as the District of Columbia.

Figure 15 shows that future RPS and REC requirements in these states and the rest of PJM are projected to double from 2015 to 2022. The RPS-related demand for renewable energy is expected to reach about 100 million MWh by 2025. This would translate to more than 30,000 MW of renewables assuming a 35% capacity factor. Currently, PJM has about 7,000 MW of existing wind generation, which means approximately 25,000 MW of additional wind generation (or other clean energy resources) are still needed to meet RPS targets through 2025. This is in addition to the 5,000–7,000 MW of solar generation necessary to meet solar carve-out requirements in PJM states.

**Figure 15**  
**RPS Requirement in PJM States**



Source: Calculated based on state RPS targets in DSIRE database.  
Estimates exclude in-state solar requirements.

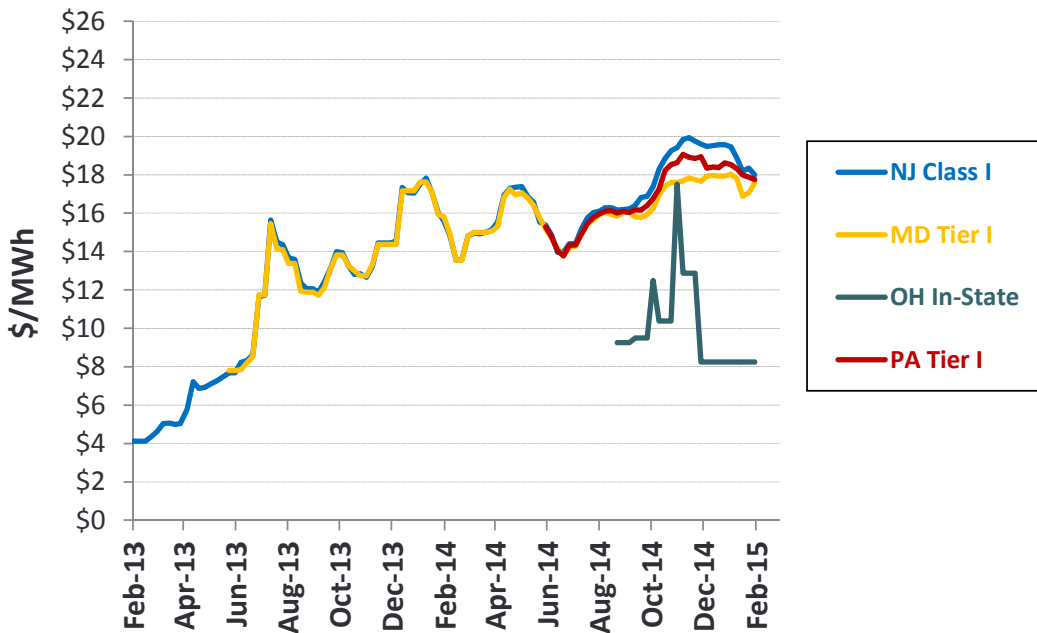
About 15,000 MW of wind generation capacity is in PJM’s generation queue.<sup>31</sup> Even if all of this were to be built, the PJM states would still need a lot more to meet their incremental RPS needs. This provides significant opportunities for imported renewable energy.

<sup>31</sup> PJM 2013 Regional Transmission Expansion Plan

Figure 16 below shows the weekly average prices for Class I RECs in selected PJM states for the 2015 compliance year. The REC prices in Maryland and New Jersey for the 2015 compliance year traded at \$14 to \$18/MWh for most of 2014 and increased to \$16 to \$19/MWh in 2015. Ohio REC prices dropped significantly in 2014 due to a legislative directive that froze the state’s renewable energy targets for 2015–2016 at the current levels of 2.5% instead of the scheduled 1% annual increase. REC prices in Ohio are expected to increase to a level similar to the other states once Ohio resumes its original schedule in 2017.

The value of trading RECs across the Project will depend on the market value of renewable energy resources in the two regions. In the future, if Ontario also institutes a renewable energy requirement or carbon emissions reduction requirement, the value of tradable RECs across the Project will be a function of the price differences in the two markets.

**Figure 16**  
**Class 1 REC Price Indices in Selected PJM States for the 2015 Compliance Year**



Source: Data compiled by SNL.

#### D. CARBON PRICING IN ONTARIO AND THE U.S. CLEAN POWER PLAN

The Ontario Ministry of the Environment and Climate Change released a discussion paper in February 2015 in which it proposed adding a price on carbon emissions as an approach for

reducing the Province's greenhouse gas emissions.<sup>32</sup> The Ministry requested public comment on its proposals and aims to release a comprehensive strategy to adapt to climate change, although the timing for doing so is currently unclear.

In April 2015, the premier of Ontario announced her intent to implement a cap-and-trade system for greenhouse gas emissions as part of the Province's strategy to combat climate change.<sup>33</sup> The cap-and-trade program may eventually link to the existing carbon program between California and Québec.<sup>34</sup> While the potential direction and impact of Ontario's policies are not yet clear, it appears that the Province is also moving toward using cleaner generation resources.

In June of 2014, the U.S. Environmental Protection Agency proposed a plan to reduce carbon emissions from existing sources of electricity generation, also known as the "Clean Power Plan." Under the proposed rule, states are expected to develop plans to reduce carbon emissions for EPA approval, either on an individual basis or as part of a region. Increased use of renewable generation is one of the four "building blocks" that EPA expects will be used by states to achieve required carbon emission reductions. This rule could further increase the value of access to clean and renewable energy supplies. A final rule is expected this summer.

#### IV. Open Solicitation Process

As noted above, ITC Lake Erie was granted negotiated rate authority by FERC in 2014, subject to carrying out an open solicitation process. ITC Lake Erie also has begun publicizing the solicitation process, including by advertising the Project in trade publications.

ITC Lake Erie will initiate an open solicitation process later in 2015 to identify potential subscribers of transmission capacity with whom to negotiate contracts for up to 1,000 MW of transmission rights. Due to the bi-directional nature of the Project, transmission rights will be available to be purchased separately in each direction.

In accordance with the requirements in FERC's order granting ITC Lake Erie negotiated rate authority, ITC Lake Erie will complete the open solicitation based on the following approach:

---

<sup>32</sup> Ontario Ministry of the Environment and Climate Change, Ontario's Climate Change Discussion Paper 2015, February 2015. Available at:

[http://www.downloads.ene.gov.on.ca/envision/env\\_reg/er/documents/2015/012-3452.pdf](http://www.downloads.ene.gov.on.ca/envision/env_reg/er/documents/2015/012-3452.pdf)

<sup>33</sup> The Globe and Mail, April 2, 2015, viewed at:

<http://www.theglobeandmail.com/news/politics/ontario-plans-cap-and-trade-on-greenhouse-gas-emissions/article23786538/>

<sup>34</sup> "Ontario joins cap-and-trade programme", The Financial Times, April 13, 2015. Available online here: <http://www.ft.com/cms/s/0/bde76192-e1fd-11e4-9995-00144feab7de.html#axzz3XOJRprBr>

1. ITC Lake Erie will initiate the open solicitation by posting information concerning the Project to relevant publications and trade press, including the selection criteria ITC Lake Erie will use to identify potential transmission customers, and requesting submittal of Expressions of Interest.
2. Based on the Expressions of Interest, ITC Lake Erie will determine which interested parties would qualify as potential transmission customers based on the following criteria:
  - a. Desired quantity of capacity on the Project;
  - b. Desired term of transmission service agreement;
  - c. Creditworthiness;
  - d. Financial strength (e.g., Tangible Net Worth); and
  - e. Desired start date of the transmission service

All Expressions of Interest will be assessed based on each of the criteria listed above, though some criteria may carry a different (proprietary) weight than others. All of the criteria will be applied in a non-discriminatory manner. ITC Lake Erie may conduct additional open solicitation processes if the transmission capacity of the Project is not fully subscribed through the initial round. ITC Lake Erie will consider negotiating only with those parties that are interested in purchasing at least 50 MW of transmission capacity on the Project. Once prospective customers have been identified, ITC Lake Erie will engage in negotiations with the interested parties, with the goal of executing one or more transmission service agreements based on mutually agreed-upon transmission rates, terms, and conditions. ITC Lake Erie also will reserve the right to offer more favorable rates, terms, and conditions to certain customers, such as first-movers or those willing to assume greater risk.

A website has been established to hold and share information related to the open solicitation and to help facilitate communication between the Independent Manager of the solicitation and interested parties.<sup>35</sup> Communications with interested parties will take place through email and the open solicitation website, and they will submit questions through the website, and the answers will be posted on the website.<sup>36</sup>

Information sessions will be held to provide further detail regarding the Project, the value proposition that it provides to potential subscribers, the details regarding the solicitation process, and the requirements related to submitting Expressions of Interest.

---

<sup>35</sup> See: <http://www.lakeerieconnector-os.com>

<sup>36</sup> The website is divided into the following sections: overview of the open solicitation process; registration form for parties interested in receiving updates regarding the open solicitation; Ask the Manager page to submit questions directly to the Independent Manager; Frequently Asked Questions (FAQs); calendar of key dates for the open solicitation process; details regarding information sessions; public and confidential documents; and a portal for document submittal and registration.

Following agreement with transmission customers, ITC Lake Erie will submit a filing to FERC disclosing the results of its capacity allocation process to demonstrate that the processes that led to the identification of transmission customers and the execution of the relevant contractual arrangements are consistent with the Policy Statement and FERC's open access principles, including the criteria used to select customers, any price terms, and any risk-sharing terms and conditions.

