



# Ontario Electricity Market Update

**sussex**

June 2017



## ONTARIO POLITICAL UPDATE

*Chris Benedetti, Principal, Sussex Strategy Group*

The next provincial election is scheduled for June 7, 2018 and not unlike previous elections in recent memory, the Liberal Government is trailing its opponents, both in overall popularity of the party and that of its leader. Opposition parties have been using electricity as a wedge issue. Be it related to rising electricity prices or the privatization of Hydro One, opinion polls in the past year have indicated that energy-related issues are amongst the top areas of concern that will affect voting behaviour.

This is not new. While the specifics of the issues may change – cost overruns, local reliability, blackouts, NIMBYism, public versus private ownership – a constant theme is accusations of ineptitude and mismanagement. Ask any politician that has served in the Ontario energy portfolio and they will easily state that balancing the physics of the system, while moving the yardstick on modernization, resiliency, and balancing social, environmental, and economic imperatives, is a near impossible task. And yet, this is the expectation the media have set for Kathleen Wynne, Patrick Brown, and Andrea Horwath.

The Liberals will put forward their energy policy in the Long-Term Energy Plan (LTEP) later this summer. Politically, the focus will be on addressing affordability while maintaining a clean and reliable system. In reality, the Liberal policy release process has been underway for several months – the suspension of large scale renewable energy procurements, the release of the Fair Hydro Plan (FHP) and the ongoing Market Renewal Program (MRP). Demonstrating restraint and an appreciation

for affordability issues, while not sacrificing progress made to improve the environment and human health, will likely be fundamental themes.

The Progressive Conservatives (PCs) have their policy convention set for November, where they will hone positions that have been formulated through research and consultation by the PC Policy Advisory Committee. Reducing costs in the system and showing credibility on the file will be critical. The energy sector today is an alphabet soup of support programs for industrial customers, and governance structures that are at times difficult to decipher. We will see if the PCs pledge a wholesale renewal not just of how the system functions or how resources will be procured in the future, but also of the underlying governance, roles and responsibilities of Government and its agencies.

The New Democratic Party (NDP) are a wildcard at the moment. Beyond opposing the sale of Hydro One and embedded statements in the familiar camp of “public power”, it remains to be seen how the NDP will sell their vision on energy.

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A big question of course is if energy will even be a ballot box issue. Despite repeated attempts by the PCs in the last election to draw attention to the costs of cancelled gas plants and link those decisions to overall allegations of mismanagement, the electorate never went there. It supports the old adage that “campaigns matter”, and reinforces that predicting election results 12 months out is a mug’s game.

**IESO STAKEHOLDER  
ENGAGEMENT**

**IESO Market Renewal Program**

*Jason Chee-Aloy, Managing Director, Power Advisory*  
*Alison Cumming, Manager of Markets, Power Advisory*

IESO continues to pursue fundamental changes to restructure Ontario’s wholesale electricity market, in order to improve the market’s ability to respond to future technological changes and to address growing concerns about systemic inefficiencies over the past decade. The objective of the IESO’s MRP is to increase efficiency, stability, transparency, implementability, and cost-effectiveness. The final system design has yet to be determined, however the IESO is likely to pull components from other wholesale electricity markets meaning that the final design could be very similar to American-style wholesale markets such as PJM, NYISO and ISO-NE. IESO’s three key areas of focus are energy, capacity, and operability, with design changes anticipated under each of these work streams.

The IESO will collect feedback from Market Renewal Stakeholder Engagement Meetings throughout this process to improve coordination, integration, and issue resolution. This process will involve members of the Market Renewal Working Group (MRWG), CEO Roundtable, Stakeholder Advisory Committee (SAC), Technical Panel (TP), as well as technical sub-committees and public stakeholders.

Using data from these Stakeholder Engagements (SEs), the IESO projects that it will begin the high-

level design (HLD) process for the MRP by the first quarter of 2018. The IESO acknowledges that with the anticipated market changes, some provisions within contracts may require review in approximately three years.

***Single-Schedule Market***

As part of the MRP, the IESO plans to create a Single-Schedule Market (SSM) to replace the current two-schedule energy and congestion pricing system, in order to improve how market signals reflect system conditions and reduce uncertainty for investors. The most recent SE meeting to discuss the SSM HLD fundamentals took place on June 2, with the purpose being to introduce stakeholders to fundamentals of single schedule market designs. The following five topics were reviewed and discussed: energy pricing, reserve pricing, pricing constraint violations, multi-interval optimization, and, pricing, including pricing operating restrictions and operator actions.

The energy pricing section detailed IESO efforts to shift from the current market platform, which requires out-of-market payments such as Congestion Management Settlement Credits (CMSC), to one that is based off of Local Marginal Pricing (LMP). In the reserve pricing section, the IESO noted that Operating Reserve (OR) will no longer be priced off of the unconstrained schedule, giving market pricing incentives that are more consistent with physical dispatch of OR at each location. The IESO also stressed the need for an effective pricing constraint violation strategy to prepare for circumstances in which market prices do not reflect power system needs, which would otherwise pose a challenge for system management. For multi-interval optimization (MIO) and pricing, the IESO will use a new algorithm to minimize costs over all future dispatch intervals, instead of only optimizing for the next 5 to 10-minute dispatch period, which was less efficient in the long-term. Finally, the IESO identified that because some generation facilities have physical or regulatory restrictions regarding their output, that the new

system must be able to respond to these limitations effectively.

The next MR SSM Meeting will be held on June 29.

### ***Incremental Capacity Auction***

The IESO has initiated SE meetings for its proposed Incremental Capacity Auction (ICA), the mechanism through which the Ontario energy market is expected to acquire additional capacity, beyond what it receives through contracts and regulations. The IESO has identified 19 elements for the ICA design.

The latest SE meeting for discussing the foundation of the ICA's purpose, structure, and objectives was held on June 15. IESO projects that it will begin the HLD process for the ICA beginning in the second quarter of 2018, and that the first auction will take place in the spring of 2020.

### **Political Imperatives of IESO's MRP**

*Sarah Simmons, Senior Associate, Sussex Strategy Group*

With the FHP now enacted and providing near-term rate relief for many of Ontario's electricity customers, there is now renewed focus by the Liberal Government on identifying longer-term electricity savings throughout the electricity sector. To that end, the 2017 Ontario Budget cited that "[t]he IESO's Market Renewal initiative is estimated to save up to \$5.2 billion over a 10-year period, starting in 2021." Those that have heard Energy Minister Glenn Thibeault speak at recent industry events would know that he has underscored the benefits – ratepayer savings – of MRP on many occasions.

It is clear that MRP will be a cornerstone of the upcoming LTEP, as the Liberal Government moves away from a narrative of centralized supply mix planning with defined procurements, to one of a competitive and "technology agnostic" auction to meet capacity needs of the system. From a messaging perspective the concept of "getting out the weeds of specific procurements" is compelling,

although how this is achieved while balancing other policy priorities remains to be seen. For example, will the Government accept an outcome that permits diesel generation or an increase in the emissions intensity of electricity supply?

The focus on MRP has left open other questions, such as the ongoing commitment to procure emission-free electricity supply from waterpower, wind, and solar. That said, it is without question that the Liberal Government remains committed to limiting the use of natural gas-fired generation given the recently announced Electricity Trade Agreement between Québec and Ontario. Furthermore, how future auctions or procurements deliver on community engagement imperatives for new electricity generation has yet to be defined. The pressure on the IESO to deliver on these competing objectives – rate reduction, emissions reduction, reliability, community engagement – is mounting.

### **IESO SAC Meeting**

*Alison Cumming, Manager of Markets, Power Advisory*

The IESO held its most recent SAC meeting on May 10. The objective of this meeting was to collect feedback from SAC members and other public stakeholders on IESO initiatives and to keep the sector engaged in discussion about the future of the electricity market in Ontario. The agenda of this meeting was to update stakeholders on recent developments with the IESO's Business Plan, present a mid-term review for the Conservation Framework, as well as to discuss MR plans, grid-local distribution company (LDC) inoperability, and the Third Party Access Implementation Plan for smart-metering.

The next SAC meeting is scheduled for August 23. The schedule for future SAC meetings, as well as presentations and feedback on previous meetings can be found [here](#).

## IESO Business Plan Priorities

*Alison Cumming, Manager of Markets, Power Advisory*

On May 3, the IESO responded to feedback on its 2018-2020 Business Plan from the February 1 SAC meeting. In that meeting, SAC identified seven key themes for the IESO to improve upon: conservation; education; planning; reliability; MRP, SEs, and the Climate Change Action Plan (CCAP).

The SAC advocated for the long-term continuation of province-wide conservation offerings. The IESO responded by ensuring that it will create province-wide conservation programs to affect areas where LDCs have not developed such programs, and voiced its intention to convert local initiatives to province-wide programs when appropriate.

With regard to education, SAC highlighted the need for more clarification about how the projected market changes may impact smaller, non-wholesale consumers. Though the IESO confirmed that it will seek opportunities to educate and engage with the community, it emphasized that its business plan will not focus on small-volume consumers.

The meeting also featured concerns about general confusion surrounding conservation mandate for the IESO, LDCs, and new Green Bank in the CCAP. The IESO indicated that it will partner with the Ministry of Environment and Climate Change to create a new website, provide customer relationship management, and foster implementation of new programs.

SAC also suggested that the IESO re-evaluate how to manage new technologies and distributed energy resources (DERs) in the future, which could prove challenging with the IESO's centralized planning structure. The IESO shared that it aims to partner with many LDCs to evaluate the prospects of future DERs, and recently established the Grid-LDC Interoperability Standing Committee to facilitate these operations. The IESO also led the development of the [Emerging Technologies Report](#) to evaluate the implications of potential technological changes in the future.

Feedback from the SAC meeting also confirmed that reliability remains a concern, particularly with respect to cyber-security investments and preparation for operations staff turnover. The IESO confirmed that employee training is a priority, especially for Control Room Operators, so as to improve the transition process between staff. It has also developed a strategy and roadmap for future developments in its cyber-security program.

Participants from the SAC meeting asked the IESO to establish an effective communication channel to increase the transparency of the MRP. In addition, they recommended that the IESO coordinate with the government to limit out-of-market transactions, such as the Hydro-Québec deal, to help maintain investors' confidence in the industry. The IESO aims to create a better method to coordinate with stakeholders, particularly now as it begins the MRP design phase.

Finally, the SAC advocated for more transparency for early-stage engagement initiatives and more attention given to managing stakeholder expectations. The IESO responded by recognizing that it could be more effective at weighing stakeholder expectations and emphasized the importance of the SAC for stakeholder engagement.

Further information on the 2018-2020 Business Plan is available [here](#).

## IESO Stakeholder Summit

*Alison Cumming, Manager of Markets, Power Advisory*

The IESO held its 2017 Stakeholder Summit on June 12 at the Beanfield Centre in Toronto. This full-day event featured experts from across North America, discussing how energy markets have been adapted and how the experience of other jurisdictions can help shape the future of the Ontario electricity system. The Summit covered two main themes: the decarbonization of electricity markets; and, the expansion of the electrical grid. The agenda from the Summit is available [here](#).

Additional stakeholder sessions will take place this fall, focusing on province-wide, regional, and local energy issues. They will be held in Thunder Bay, Sudbury, London, and Ottawa, with further logistical details provided when they are available.

## GOVERNMENT POLICY DEVELOPMENT

### National Energy Board Modernization

*Jason Chee-Aloy, Managing Director, Power Advisory*

In an effort to modernize the National Energy Board (NEB), Minister of Natural Resources James Carr has appointed a panel of experts to analyze the board. According to a Canadian Broadcasting Corporation survey commissioned in February 2017, over half of the Canadians polled showed little to no confidence in the NEB, with the lowest support in British Columbia and Quebec and highest in Alberta, Saskatchewan, and Manitoba. To address these public concerns and calls for modernization within the government, Natural Resources Canada’s (NRCAN) review will span the NEB’s structure, role, and mandate. So far the NEB review has focused primarily on the following:

- Governance and structure;
- Mandate and future opportunities;
- Decision-making roles, including for major projects;
- Compliance, enforcement, and ongoing monitoring;
- Engagement with Indigenous peoples; and
- Public Participation.

On May 15 the [NEB Modernization Expert Panel Report](#) was released, offering 26 recommendations to improve the NEB. The comment period for this report closed on June 14, with a summary of feedback expected to be forthcoming.

The Minister of Environment and Climate Change, Catherine McKenna, is also conducting a separate review of the environmental assessment processes.

In the interim, the Government of Canada has adopted a set of guiding principles and measures for major resource projects to better reflect feedback from the public and greenhouse gas emission (GHG) assessments. These interim guidelines will remain in place during the NRCAN and Ministry of Environment and Climate Change reviews.

## ONTARIO ENERGY BOARD REGULATORY UPDATES

### Winter Connection Ban Lifted

*Travis Lusney, Director, Power Advisory*

The OEB lifted its ban on winter disconnections on May 1. There are still several rules in place that LDCs must follow when disconnecting users from the grid, including a required 10-day notice before cutting off access to electricity. LDCs must also offer payment options to customers, and are expected to reconnect customers within two business days of coming to a payment agreement or receiving payment.

### Changes to the Ontario Energy Support Program

*Travis Lusney, Director, Power Advisory*

As of May 1, the Ontario Energy Support Program (OESP) was updated to provide 50% more support for low-income energy consumers. In addition, more people will now be eligible for this support. The OEB estimates that these changes will lead to \$180-300 in annual savings on electricity bills for approved households, depending on house size and annual income. Families that have already been approved or that have recently applied to the OESP program do not need to file another application; the credit allocation will increase automatically. New applicants are able to enroll in the program [here](#).

### Time-Of-Use Price Drops

*Travis Lusney, Director, Power Advisory*

Beginning May 1, electricity prices decreased for households and small businesses that purchase electricity from local utilities, which will affect more than 90% of electricity customers in Ontario. These changes lower time-of-use (TOU) rates by 1 cent per kWh during off-peak, 1.9 cents/kWh during mid-peak, and 2.3 cents/kWh during on-peak hours.

### Market Surveillance Panel

*Alison Cumming, Manager of Markets, Power Advisory*

The OEB’s Market Surveillance Panel (MSP), which oversees activities and behavior in IESO-administered markets, released its [semi-annual report on IESO-administered markets](#) on May 8. This report covers the period from November 2015 to April 2016. It highlighted how Ontario’s hybrid market structure limited the ability of market forces to drive more efficient production, delivery, consumption and investment, and supported market design alternatives to improve Ontario’s energy market.

The MSP also expressed concerns about the costs and effectiveness of the Real-Time Generation Cost Guarantee, determining through their analysis that the program was necessary for less than 1% of the times that it was used.

The MSP’s specific recommendations are as follows:

- Given Ontario’s current surplus capacity conditions, the IESO should reevaluate the benefit of capacity procurement from its Demand Response Auction and reassess its stated preference for lowest-cost, technology-neutral procurement;
- The IESO should stop disbursing funds from the Transmission Rights Clearing Account until it adjusts its disbursement allocation to better reflect transmission charges from the relevant accrual period;

- The IESO should do more to prevent unavailable OR from being scheduled and verify that dispatchable loads only receive compensation for their real-time OR provisions; and
- The IESO should adjust inertia failure charges so that they consider the congestion rents that inertia traders would otherwise avoid when failing a transaction for reasons within the trader’s control.

### 2018-2028 Long-Term Carbon Price Forecast

*Alison Cumming, Manager of Markets, Power Advisory*

On May 31, the OEB released its annual update for its Long Term Carbon Price Forecast (LTCPF) to help the province reach its GHG emissions reduction goals. These forecasts will be used to manage the implementation of Ontario’s Cap and Trade program and to help utilities to comply in a cost-efficient manner. The LTCPF projects that, under the new program, carbon will cost a minimum of \$17/tonne and a maximum of \$67/tonne in 2018, rising to a minimum of \$27/tonne and a maximum of \$108/tonne by 2028. The full report is available [here](#).

The Marginal Abatement Cost Curve (MACC), another component of the OEB’s carbon framework, will be released later in 2017, with updates every three years. The MACC will evaluate the cost-effectiveness of various customer and energy provider methods for reducing carbon emissions.

## OTHER REGULATORY UPDATES

### Fiscal Impact of the Fair Hydro Plan

*Travis Lusney, Director, Power Advisory*

Financial Accountability Officer of Ontario Stephen LeClair released an assessment of Ontario’s FHP on May 24. Although the plan will cut energy bills by

25% starting this month and save rate-payers roughly \$24 billion, he determined that it will cost the province \$45 billion over the next 29 years to run the program (a net \$21 billion loss). LeClair also estimated that, if the province needs to take on debt to run the FHP, that the cost of the subsidy could reach as high as \$93 billion. The FHP will cut the average monthly hydro bill from \$156 to \$123 per household in the short-term, but by 2027 rates under the FHP will rise above what they would have been if the plan had not been adopted.

LeClair’s full assessment can be found [here](#).

Energy Minister Glenn Thibeault, who is responsible for overseeing the FHP, has acknowledged that while payments in the near future will be lower spreading the costs of large electrical system improvements over a lengthier period of time will ultimately cost the province more money in the long-term. Thibeault has justified the plan by framing it as method to spread the cost of these investments more fairly over time. For the first four years of the plan, electricity rates will be held to the rate of inflation.

### Long-Term Energy Plan Review and Release

*Mark Olsheski, Senior Associate, Sussex Strategy Group*

It has been six months since Ontario concluded its public consultation process for the updating of the province’s Long-Term Energy Plan (LTEP) and though much of the discourse at Queen’s Park over that period of time has focused on electricity, the final LTEP document has yet to be released. Certainly, the resources required and imperative given to formulate and ultimately legislate the Fair Hydro Plan before the Ontario Legislature adjourned for the summer have contributed to this longer-than-expected wait, however indications point to LTEP policy discussions at the most senior levels being squarely back on track.

With the stakeholder submissions received by the Ministry of Energy in December, and taking into account assumptions made for and subsequently updated from the IESO’s Ontario Planning Outlook

(OPO), the government models the impact of numerous policy choices on future supply and demand, total cost of electricity service, as well as forecast residential and industrial bills over 20 years. Based on that modelling and with other policy objectives such as the Climate Change Action Plan (CCAP) and IESO Market Renewal overlain, choices will be made to move forward with or defer various decisions which may be materially different from the 2013 LTEP.

Given the internal policy decision making process a document such as the LTEP is required to go through before being published and the iterative nature of modelling options and assumptions, it is unlikely that the final LTEP will be available to be released before August or possibly September. While it is anticipated that the centrepiece of the LTEP will be the Fair Hydro Plan itself, government has expressed a desire to tackle structural issues and cost pressures in the outer years of the planning horizon and may signal policy shifts designed to achieve that objective for this particular version of the plan.

### Expanded Role for DERs

*Sarah Simmons, Senior Associate, Sussex Strategy Group*

While new generation procurement under the Feed-in Tariff (FIT) and microFIT programs will conclude in 2017, Ontarians will continue to have opportunities to benefit from on-site renewable generation. The regulatory underpinning for such projects will shift from centralized IESO contracting to distributor-led net metering, with revisions to the regulations coming into effect July 1, 2017. Responding to this transition, the OEB has begun consulting with distributors in respect of the revised regulation and other changes that would be required to the Distribution System Code, including reporting requirements.

Future financial support for DER projects are expected to be provided through the Ministry of Environment and Climate Change’s new agency, known as the Green Ontario Fund, which was established earlier this year. The new agency is

responsible for administering the Greenhouse Gas Reduction Account, which was created as part of the Cap-and-Trade program. Specific program requirements, eligibility, funding thresholds and other details are still under development. Further details are expected later this summer.

The IESO is also considering behind-the-meter solar generation as part of its Conservation First Framework mid-term review. Should the IESO expand its definition of conservation to include net-metered solar generation, LDCs would potentially have an opportunity to offer specific programs that fit the framework to contribute toward mandated conservation targets.

One factor limiting the deployment of DERs has been the implementation of the FHP. By fixing electricity rates for four years, it will limit the payback period for projects. However, distributed renewable energy generation is expected to continue to play a prominent role in the government’s climate change mitigation plans and feature prominently in the next iteration of the LTEP. Furthermore, it is anticipated that the next round of net metering regulation revisions will include a defined role for third party ownership and continue to explore virtual net metering.

Vineyard Wind (Copenhagen Infrastructure Partners and Avangrid Renewables). This will be the first procurement in response to the state’s legislated goal to reach 1,600 MW of offshore wind development by 2027.

Because at least two parties expressed interest in securing leases for two remaining Massachusetts wind energy areas (WEAs), the Bureau of Offshore Energy Management (BOEM) will hold a lease sale auction late this year or in early 2018. BOEM has yet to announce the specific auction date. These lease areas are adjacent to those that are expected to bid in the first Massachusetts RFP, though they are the furthest from shore and have the greatest average water depths. The total area to be auctioned is 140,554 acres, which can approximately support a maximum of 4,717 MW of offshore wind generation.

## OTHER JURISDICTION & ORGANIZATION UPDATES

### **Massachusetts Offshore Wind Request for Proposal**

*John Dalton, President, Power Advisory*

The Massachusetts Electric Distribution Companies submitted a draft Request for Proposal (RFP) to the Department of Public Utilities on April 28, seeking long-term contracts for 400 MW and up to 800 MW of offshore wind generation. The final RFP is expected to be formally issued by June 30. Proposals would be due December 20, 2017. This RFP is open to the three existing wind energy area leaseholders: Deepwater Wind; Bay State Wind LLC (Dong Energy and Eversource); and,

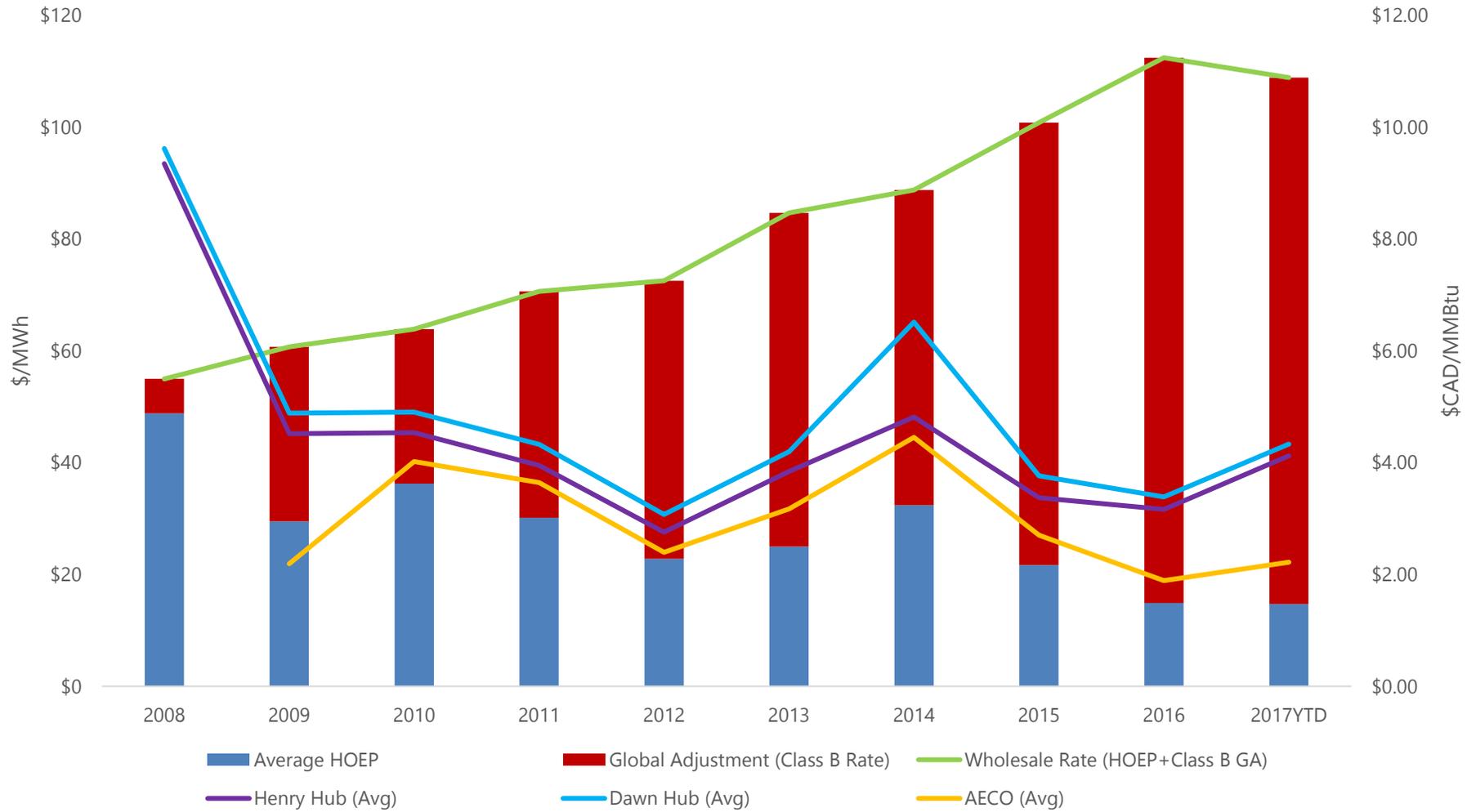
## MARKET SCORECARD

Annual Ontario Price Statistics												
	Units	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017YTD
<b>Peak HOEP</b>	\$/MWh	\$437	\$564	\$1,891	\$545	\$558	\$390	\$584	\$964	\$1,402	\$1,620	\$1,823
<b>Average HOEP</b>	\$/MWh	\$48	\$49	\$30	\$36	\$30	\$23	\$25	\$32	\$22	\$15	\$15
<b>Minimum HOEP</b>	\$/MWh	-\$0	-\$34	-\$52	-\$128	-\$139	-\$128	-\$106	-\$110	-\$22	-\$10	-\$6
<b>On-Peak Average</b>	\$/MWh	\$62	\$64	\$38	\$42	\$36	\$27	\$31	\$41	\$28	\$14	\$13
<b>Off-Peak Average</b>	\$/MWh	\$39	\$39	\$24	\$32	\$27	\$20	\$21	\$27	\$18	\$15	\$15
<b>Global Adjustment (Class B Rate)</b>	\$/MWh	\$4	\$6	\$31	\$28	\$40	\$50	\$60	\$56	\$79	\$98	\$94
<b>Wholesale Rate (HOEP+Class B GA)</b>	\$/MWh	\$52	\$55	\$61	\$64	\$71	\$73	\$85	\$89	\$101	\$112	\$109
<b>Henry Hub (Avg)</b>	\$/MMBTU	\$7.49	\$9.35	\$4.52	\$4.54	\$3.95	\$2.76	\$3.84	\$4.82	\$3.37	\$3.16	\$4.12
<b>Dawn Hub (Avg)</b>	\$/MMBTU	\$7.67	\$9.62	\$4.89	\$4.91	\$4.33	\$3.07	\$4.20	\$6.51	\$3.77	\$3.39	\$4.33
<b>AECO (Avg)</b>	\$/MMBTU			\$2.19	\$4.02	\$3.65	\$2.40	\$3.17	\$4.45	\$2.70	\$1.89	\$2.22

Source: Electricity Market Prices – IESO, Natural Gas Price Index – SNL

**MARKET SCORECARD**

Ontario Annual Market Prices



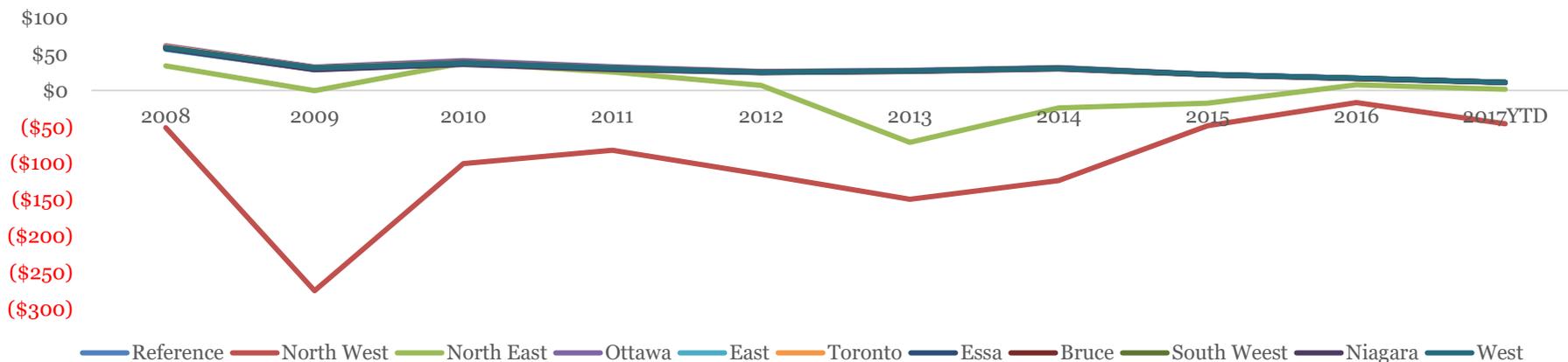
Source: Electricity Market Prices – IESO. Natural Gas Price Index - SNL

**MARKET SCORECARD**

<b>Ontario Proxy Zonal Price</b>											
	<b>Units</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017YTD</b>
<b>Reference</b>	\$/MWh	\$60	\$32	\$39	\$31	\$26	\$27	\$31	\$22	\$17	\$11
<b>North West</b>	\$/MWh	-\$51	-\$275	-\$101	-\$82	-\$115	-\$150	-\$124	-\$49	-\$17	-\$46
<b>North East</b>	\$/MWh	\$34	-\$1	\$38	\$25	\$7	-\$71	-\$24	-\$18	\$8	\$1
<b>Ottawa</b>	\$/MWh	\$61	\$32	\$41	\$32	\$26	\$28	\$31	\$22	\$17	\$11
<b>East</b>	\$/MWh	\$56	\$29	\$37	\$30	\$25	\$27	\$30	\$22	\$16	\$11
<b>Toronto</b>	\$/MWh	\$60	\$31	\$38	\$31	\$25	\$27	\$30	\$22	\$16	\$11
<b>Essa</b>	\$/MWh	\$59	\$30	\$38	\$31	\$25	\$27	\$31	\$22	\$16	\$11
<b>Bruce</b>	\$/MWh	\$59	\$31	\$36	\$30	\$24	\$26	\$30	\$21	\$16	\$11
<b>South Weest</b>	\$/MWh	\$59	\$31	\$37	\$31	\$25	\$27	\$30	\$22	\$17	\$11
<b>Niagara</b>	\$/MWh	\$57	\$28	\$36	\$29	\$24	\$26	\$30	\$22	\$17	\$11
<b>West</b>	\$/MWh	\$59	\$31	\$37	\$31	\$25	\$27	\$30	\$22	\$17	\$11

Source: IESO Market Data

Annual Ontario Average Nodel Price by Zone (Avg)



## MARKET SCORECARD

<b>Monthly Ontario Price Statistics</b>													
		<b>2016</b>							<b>2017</b>				
	<b>Units</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>
<b>Peak HOEP</b>	\$/MWh	\$1,620	\$538	\$214	\$332	\$257	\$151	\$368	\$154	\$333	\$1,823	\$1,711	\$281
<b>Average HOEP</b>	\$/MWh	\$19	\$21	\$30	\$15	\$11	\$15	\$19	\$20	\$20	\$25	\$10	\$3
<b>Minimum HOEP</b>	\$/MWh	-\$5	-\$5	-\$4	-\$5	-\$4	-\$4	-\$3	-\$3	-\$3	-\$3	-\$6	-\$6
<b>On-Peak Average</b>	\$/MWh	\$15	\$15	\$15	\$14	\$14	\$14	\$13	\$13	\$14	\$13	\$12	\$12
<b>Off-Peak Average</b>	\$/MWh	\$20	\$22	\$33	\$16	\$11	\$15	\$21	\$22	\$23	\$28	\$9	\$1
<b>Global Adjustment (Class B Rate)</b>	\$/MWh	\$95	\$83	\$71	\$95	\$112	\$111	\$87	\$82	\$86	\$71	\$108	\$123
<b>Wholesale Rate (HOEP+Class B GA)</b>	\$/MWh	\$114	\$104	\$101	\$111	\$124	\$126	\$107	\$103	\$107	\$96	\$117	\$126
<b>Henry Hub (Avg)</b>	\$CAD/MMBtu	\$3.00	\$3.08	\$3.06	\$3.47	\$3.96	\$3.34	\$4.79	\$4.43	\$3.81	\$3.83	\$4.16	\$4.30
<b>Dawn Hub (Avg)</b>	\$CAD/MMBtu	\$3.16	\$3.55	\$3.60	\$3.90	\$3.83	\$3.48	\$5.39	\$4.73	\$3.96	\$4.13	\$4.36	\$4.34
<b>AECO (Avg)</b>	\$CAD/MMBtu	\$1.61	\$1.93	\$1.66	\$2.17	\$2.46	\$2.13	\$2.73	\$2.36	\$2.08	\$2.07	\$2.21	\$2.32

Source: Electricity Market Prices – IESO. Natural Gas Price Index - SNL

**MARKET SCORECARD**

Ontario Monthly Market Prices



Source: Electricity Market Prices – IESO. Natural Gas Price Index – SNL

## MARKET SCORECARD

### Contracted Capacity by Fuel and Contract Status (as of Q4 2016)

Contracted Generation Resources (MW)	Total Capacity	Under Development	Commercial Operation
<b>Renewables</b>			
Bio-Energy	495	7	489
Solar	2,689	462	2,227
Wind	6,055	1,284	4,772
Non-Hydro Renewables	9,239	1,753	7,488
Hydroelectric	2,427	198	2,229
<b>Renewables - Subtotal</b>	<b>11,666</b>	<b>1,951</b>	<b>9,717</b>
<b>Natural Gas, Nuclear and other Fuel Sources</b>			
Combined Heat and Power (CHP)	555	85	471
Simple Cycle and Combined Cycle (SC/CC)	8,696	1,214	7,482
Other	24	0	24
Nuclear (Bruce)	6,300	0	6,300
<b>Natural Gas, Nuclear and Other - Subtotal</b>	<b>15,575</b>	<b>1,299</b>	<b>14,277</b>
<b>Total Contract Capacity</b>	<b>27,241</b>	<b>3,250</b>	<b>23,994</b>

Source: IESO Quarterly Progress Report on Electricity Supply 2016 Q4

## MARKET SCORECARD

### Committed and Contracted Generation Resources (as of April 2017)

Project Name	Zone	Fuel Type	Estimated Effective Date	Project Status	Capacity (MW)
Niagara Region Wind Farm	Southwest	Wind		Commercial Operation	230
Greenfield South	West	Gas	2017-Q1	Commissioning	298
Windsor Solar	West	Solar	2017-Q1	Commissioning	50
South Gate Solar	Southwest	Solar	2017-Q1	Commissioning	50
Nomewaminikan Hydro	Northwest	Water	2017-Q2	Commissioning	10
Harmon Unit 2 Runner Upgrade	Northeast	Water	2017-Q2	Commissioning	10
Peter Sutherland Senior Generating Station	Northeast	Water	2017-Q2	Under Development	28
Harmon Unit 1 Runner Upgrade	Northeast	Water	2017-Q3	Under Development	10
Belle River Wind	West	Wind	2017-Q3	Under Development	100
Napanee Generating Station	East	Gas	2017-Q4	Under Development	985
North Kent Wind 1	West	Wind	2017-Q4	Under Development	100
Kapuskasing Generating Station	Northeast	Gas	2017-Q4	Expiring Contract	-60
North Bay Generating Station	Northeast	Gas	2017-Q4	Expiring Contract	-60
Amherst Island Wind	East	Wind	2018-Q2	Under Development	75
<b>Total</b>					<b>1,826</b>

Source: IESO 18-month outlook as of March 2017 for the period of April 2017 to September 2018

## MARKET SCORECARD

### Existing Installed Transmission Generation Resources (as of April 2017)

Fuel Type	Total Installed Capacity (MW)	Forecast Capability at Summer Peak (MW)	Number of Stations	Change in Installed Capacity (MW)	Change in Stations
Nuclear	12,978	10,667	5	0	0
Hydroelectric	8,451	5,845	73	0	0
Gas/Oil	9,943	8,170	30	0	0
Wind	3,983	479	35	60	1
Biofuel	495	459	9	0	0
Solar	280	28	6	0	0
<b>Total</b>	<b>36,130</b>	<b>25,648</b>	<b>158</b>	<b>60</b>	<b>1</b>

Source: IESO 18-month outlook as of March 2017 for the period of April 2017 to September 2018