

TOPIC 1: FAO \$4B number

Speaking: Deputy Minister, Minister, Ken Hartwick (OPG)

1) Q. Minister, when we were last here, the Deputy Minister was trying to provide some insight into the \$4 billion dollar interest cost estimate from the Financial Accountability Officer's report on Ontario's Fair Hydro Plan.

I was hoping the Deputy Minister could provide the answer that he was attempting to provide last Wednesday and also explain why Ontario Power Generation (OPG) is best qualified to manage the debt obligations?

First, I would like to point out that the \$4 billion figure was an estimate made by the Financial Accountability Office (FAO) based on initial Ministry of Energy forecasts of total debt and interest levels for Ontario's Fair Hydro Plan from March 2017.

Subsequent analysis conducted by the Ministry of Energy found that the debt and interest levels are now expected to be substantially lower.

Initial estimates of peak debt decreased between March 1, 2017 and August 31, 2017 from approximately \$28 billion to \$20 billion and the estimates of total interest cost decreased from approximately \$25 billion to \$18 billion.

These updated estimates reflect refinements of a number of variables, including the cost of borrowing and electricity system cost forecasts.

I would also note that a number of variables, including interest rates, electricity demand and electricity costs, will vary over the 30-year life of the program and cost estimates will continue to be revised to reflect these changing conditions.

The FAO report itself concludes by saying "the FAO's estimates are subject to many assumptions and uncertainties ... Fiscal impact may differ significantly from the FAO's estimates."

While the total cost of the program has already been revised downwards substantially to reflect revised inputs, I would like to take a moment to discuss the methodology behind the FAO's analysis. The FAO simply took an estimated cost of borrowing for the Ontario Financing Authority (OFA) and Ontario Power Generation (OPG) and applied to the difference to debt estimates based on Ministry of Energy data from March.

This analysis ignores the policy intent of Ontario's Fair Hydro Plan, which to ensure that the same group of ratepayers receive the benefit and pay the costs associated with the plan.

Based on this policy decision, it was decided that the debt obligation would be recognized as a regulatory asset that would be sold and securitized. This design appropriately aligns the costs and benefits within the group of eligible consumers.

Ontario Power Generation (OPG) has been identified as the Financial Services Manager (FSM) responsible for the financing plans and the financing entity (known as the Fair Hydro Plan Trust) that will manage the debt obligations.

OPG has the necessary financing and commercial expertise to assist with refinancing the Global Adjustment (GA) and will ensure that it is done in an efficient and cost-effective manner.

I would now like to invite Ken Hartwick from OPG to elaborate on the structure and speak to OPG's qualifications and its plan to keep costs down.

[Deputy passes of to Ken Hartwick to elaborate on the structure and speak to OPG's qualifications and plan to keep costs down]

Let me make a few remarks about OPG's qualifications as the financing manager of the Fair Hydro Plan:

OPG currently manages an \$18 billion nuclear fund and as an entity regulated by the Ontario Energy Board (OEB), OPG also has extensive experience with regulatory deferral and variance accounts.

OPG has the breadth and demonstrated track record in the financial markets including the highly successful inaugural public debt offering earlier in October, private placement of insurance linked bonds, participation in securitization programs, and the very successful project debt issuances tied to new hydroelectric developments.

These financing initiatives have been well received by investors at a reasonable cost to OPG. The innovative, cost saving and precedent setting aspects of these financing structures have resulted in international recognition.

OPG has also developed solid investor relationships and has a large investor base in the structured finance space who would be the target market for financing the Fair Hydro initiative. For example, the Lower Mattagami project financing attracted a broad investor base of about 80 institutional investors, including major investors in the Canadian power and utility bonds market.

In terms of administration, OPG is currently managing its own Corporate public debt and three project financing programs totaling more than \$2 billion, as well as two commercial paper programs.

2) Q. What is OPG's Role?

OPG will be acting as the Finance Service Manager (FSM) as prescribed under the Ontario Fair Hydro legislation, basically arranging for a variety of debt financing for the deferred costs.

We will be setting up a financing entity in the form of a "Trust", which is ring fenced from the generation activities of OPG in an effort to reflect the unique nature of this business and not co-mingle the operational activities of the two businesses.

The financing requirements are determined by the legislation and the reduction in consumers' bills and will be funded through the Trust.

OPG will arrange for third party debt, supplement this funding with the Province, and OPG will contribute additional funds through increased equity and debt of the OPG operating company that will be lent to the Trust, also at equivalent market rates.

OPG is uniquely positioned to be the financing manager of Ontario's Fair Hydro Plan as we understand the supply and demand characteristics of the market. As previously mentioned, we regularly interact with the Ontario Energy Board (OEB), the Independent Electricity System Operator (IESO) and we have experience in Treasury operations in the marketplace including relationships with credit rating agencies.

3) Q. What is the difference between the Province Borrowing Program and Fair Hydro Trust (FHT) borrowing program?

A simple comparison between direct borrowing by the Province and OPG's role in Ontario's Fair Hydro Plan is a bit of an "apples to oranges" comparison.

A conventional Provincial borrowing program would raise funds based on the credit worthiness of the Province and the Provincial Guarantee.

Under Ontario's Fair Hydro Plan, lenders will provide funds based on the underlying value of the specific asset. This value is created by the legislated framework rather than through a Provincial Guarantee.

Ontario's Fair Hydro Plan will create a series of deferred assets that will have certain cashflow payment streams going forward. The overall objective of Ontario Fair Hydro Plan is to spread the costs and benefits out. The financing has to be actually linked to the overall payment scheme going forward and aligned with the benefits.

Consequently, the financing actually lends itself toward a "securitization" structure with cash flows matched to specific benefits rather than as a conventional borrowing program.

4) Q. Why is OPG best placed to minimize the cost of the overall program?

The Ontario Power Generation (OPG) has the expertise and experience to manage this securitization program. The Ontario Financing Authority (OFA), does not, as far as I am aware, have direct experience in setting up or managing a securitization vehicle or program.

This combination and diversity of skills position OPG to ensure an effective funding arrangement is put in place that clearly defines the electricity ratepayer in context of the person receiving the initial benefit of the legislation.

As we work through the financing program for Ontario's Fair Hydro Plan, OPG is focused on ensuring that financing is optimized to minimize costs to ratepayers.

In particular, attention has been given to achieving a strong credit rating for the Trust, again, with the objective of mitigating the impact to ratepayers through effective market pricing of the funds being borrowed by the Trust.

Finally, OPG's Treasury function is well positioned given its experience in developing structured financing programs and in managing multiple existing debt platforms.

TOPIC 2: OPG and Fair Hydro Plan accounting

Speaking: Ken Hartwick (OPG)

1. OPG and Fair Hydro Plan

Question:

You have a lot of experience working in the electricity sector in other jurisdictions in North America. Could you tell us about whether you've seen this kind of arrangement elsewhere before – in which costs are deferred over a longer period of time than originally planned?

- **Programs similar in concept have been set up in the electricity sector, especially in the US. Several of these programs defer charges of one billion dollars or more.**
- **The most recent transactions that are similarly several billion in size occurred at Duke Energy and Long Island Power**
- **Florida and other states (approximately 18 in total) have passed similar securitization legislation to authorize recoveries by utilities of specified costs, such as hurricane recovery costs, environmental control costs, or costs associated with deregulation of the electricity market**
- **All of these take costs that have been incurred and spread their recovery over several years and decades through financing arrangements similar to the FHP.**

2. OPG and Fair Hydro Plan

Question:

Could you please tell us about what OPG's role is in the administration and ongoing operation of the Fair Hydro Plan?

- **OPG will be acting as the financing manager for the Fair Hydro legislation, basically arranging for a variety of debt financing.**
- **We will be setting up a financing entity (Trust), which is ring fenced from the generation activities of OPG in an effort to reflect the unique nature of this business and not co-mingle the operational activities of the two businesses.**
- **The financing requirements are determined by the legislation and the reduction consumers have on their bills and will be funded through the Trust.**
- **OPG will arrange for the third party debt, and supplement this funding with the Province, and OPG will contribute additional funds through increased equity and debt of the OPG operating company that will be lent to the Trust, also at equivalent market rates.**

3. OPG and Fair Hydro Plan

Question:

But is it unusual for an organization like yours to take on this responsibility?

Could you please explain why OPG might be the appropriate entity to play this kind of role—do you think you are adding value to the process by acting as the Financial Services Manager?

- **OPG is uniquely positioned as we understand the supply / demand characteristics of the market, we regularly interact with the OEB, IESO and we have experience in Treasury operations in the marketplace including relationships with the credit rating agencies.**
- **OPG has recently successfully project financed hydroelectric investments from public markets and has an ongoing settlement relationship with the IESO.**

- **A simple comparison between direct borrowing by the Province and OPG's role in the Fair Hydro Plan is a bit of an apples to oranges comparison.**
- **A conventional Provincial borrowing program would raise funds based on the credit worthiness of the Province and the Provincial Guarantee.**
- **Under the Fair Hydro Plan, lenders will provide funds based on the underlying value of the specific asset. This value is created by the legislated framework rather than through a Provincial Guarantee.**
- **The Fair Hydro Plan will create a series of deferred assets that will have certain cash-flow payment streams going forward. The overall objective of the Plan is to spread the costs out. The financing has to be actually linked to the overall payment scheme going forward, and aligned with the benefits. Consequently, the financing actually lends itself toward a securitization structure with cash flows matched to specific benefits rather than as a conventional borrowing program**
- **OPG has the expertise and experience to manage a securitization program. The Ontario Financing Authority, does not, as far as I am aware, have direct experience in setting up or managing a securitization vehicle or program.**
- **This combination and diversity of skills position OPG to ensure an effective funding arrangement is put in place that clearly defines the electricity rate payer in context of the person receiving the initial benefit of the legislation.**

4. OPG Accounting and Transparency

Question:

Do you think the structure that's been created to administer and operate the Fair Hydro Plan—and that OPG plays a role in—is a structure that will provide for transparency as it related to the borrowing and the accounting?

- **The structure that has been set up in fact ensures a high level of transparency.**
- **As these deferred amounts are funded through third party financing, the process by design in financial market space requires disclosure and oversight including credit rating agencies, the OEB, external audit of the Trust itself, additional OPG disclosure in its reports, oversight from lenders through Trust indenture documents**

- **Ratepayers and taxpayers will be able to clearly see the financial results of the Trust as it relates to the legislation.**
- **All of this will be reported in OPG's financial reports on a quarterly and annual basis. OPG's financial reports are filed with the Ontario Securities Commission (OSC) and subject to OSC oversight.**

5. OPG Accounting and External Experts

Question:

Could you explain what sort of external expertise you enlisted, and please explain what counsel these experts provided with respect to the structure that has been set up and the accounting that will be used?

- **There are three specific areas that we supplemented our team with external resources.**
 - **First, was legal advice to ensure there is clear alignment between the legislation and the Trust and its related requirements and obligations.**
 - **The second was financing advice directed at the capital markets again to ensure alignment with the markets focused on achieving the most cost effective financing to ensure the rate payer impact is minimized.**
 - **The third was accounting advice directed at the set up and governance of the Trust and then to achieve the transparency in reporting that is critical.**

As has been mentioned OPG has strong capabilities across these areas but felt it was prudent to ensure that all steps are taken to establish the Trust and its activities in a clear and transparent manner.

6. OPG and the Fair Hydro Trust

Question:

Can you describe what OPG has been asked to do to minimize the customer impact of implementing the FHP?

- **OPG will act as the Financial Services Manager for the FHP Trust.**
 - **There are 2 primary goals of the Financial Services Manager:**
 - **First of these, is to ensure that the activities envisioned under the FHP legislation, as they pertain to the Trust, are consistent with the electricity ratepayer both receiving the bill reduction and the corresponding collection of the costs related to the activities that have been invested in.**
 - **The second is to work on optimizing the FHP Trust financing to ensure that costs to ratepayers are minimized and reflect the benefit the ratepayer initially received.**
 - **Speaking to the second point we have been working on a financing program that includes several elements including a securitization program, provincial equity support and OPG funding. These elements are being optimized in a manner that will achieve an effective financing program for the benefit of consumers.**
 - **As we have worked through the program attention has been given to achieve a strong credit rating for the Trust again with the objective of mitigating the impact on the ratepayer through effective market pricing by the Trust of the funds being borrowed.**
 - **It is also critical to my first point that the financing program have a high level of transparency so ratepayers can understand the nature of the program and the associated costs. The Trust will file all necessary financial reports that will ensure this transparency.**
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TOPIC 3: IESO and Accounting

Speaking: Kim Marshal (IESO)

Q1. In the first session we asked if you could you talk about how the IESO's accounting policy compares to its peers. You said you were looking for trends, and you did some work in terms of how others are defining their rate-regulated assets. Can you elaborate further on this? Did you discuss this method with the other companies who are using it to determine what the overall advantages are?

- **Of course. Thanks for the opportunity to revisit this question.**

- When we started looking into changes to our accounting policies, we wanted to look at other organizations that have similar mandates to us.
- Including the IESO, **there are 9 independent system operators in North America**; seven in the U.S. and two in Canada: The IESO and Alberta's AESO.
- We had discussions with these organizations about their operations and accounting practices.
- We looked at their location, the accounting framework they follow, the type of organization they are (either not-for-profit or otherwise), whether they are subject to income tax, their capital structure, how they are governed, by which body they are regulated, and finally, whether they recognized balances of market participants and regulatory assets in their financial reporting.
- From this research, we found that **7 of the other 8 ISOs recognize the balances of the market participants**. They are:
 1. **ISO New England**
 2. **NYISO**, in New York
 3. **MISO**, Midcontinent ISO which covers Midwest United States, Manitoba, and much of Arkansas, Mississippi, and Louisiana.
 4. **PJM**, covering the eastern U.S. states: Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia.
 5. **CAISO**, in California
 6. **ERCOT**, in Texas
 7. **Southwest Power Pool**, in central US.
- When we talked to our counterparts across North America about regulatory assets, we found out that **6 of the other 8 entities recognize the economic effects of rate regulation**, they are:
 1. **AESO**, in Alberta
 2. ISO New England
 3. NYISO
 4. MISO
 5. PJM
 6. ERCOT
- I should mention that the two ISOs that do not recognize the effect of rate regulation are California ISO (CAISO) and Southwest Power Pool (SPP).

- When we talked to CAISO, we found out that **their accounting framework actually allows for the recognition of regulatory assets and liabilities**, but that it had concluded the need to recognize regulatory assets was no longer necessary.
- When we talked to Southwest Power Pool, we learned that **they simply do not have any variance accounts that would qualify as regulatory assets or liabilities**.
- So, when we looked at making the accounting change we considered that:
 1. Including **market accounts** on our financial statements would provide increased transparency into the value of transactions that flow through Ontario's \$17 billion electricity market;
 2. That **regulatory accounting** better reflected the economic substance of certain types of IESO expenses (like Smart Metering Entity expenses) which are recovered through a rate regulated by the OEB;
 3. That the change would **enhance the relevance, transparency and accountability of our financial reporting**;
 4. That this change would **bring the IESO in line with its peers** across North America; and
 5. Finally, that this accounting change would in **no way affect the IESO's costs, or have any financial impact on electricity ratepayers** – all these factors confirmed our decision to make the accounting change.

Q2. In the first session you stated that "Public Sector Accounting Standards (PSAS) are silent in terms of rate-regulated accounting," which is ultimately what led the IESO in conjunction with KPMG, to look beyond PSAS to US Generally Accepted Accounting Principles (GAAP) in terms rate regulated activities. How did the IESO come to the conclusion that it was acceptable to use GAAP instead of PSAS for rate regulated activities? Is there a clause or section of PSAS that permits the use of GAAP in a given scenario?

- The IESO follows Public Sector Accounting Standards (PSAS) for its accounting.
- PSAS neither explicitly permits, nor prohibits, the recognition, measurement, presentation or disclosure of rate-regulated activities.
- In absence of a clear position on an issue, standard accounting practice dictates that an entity is entitled to consult another accounting standard.

- If I may cite from the PSAS Handbook, Section 1150.18 and 19:

"Paragraphs PS 1150.19-.24 identify some of the other sources that a public sector reporting entity might consult to assist in selecting accounting policies and disclosures that comply with paragraph PS 1150.05. Pronouncements issued by other bodies authorized to issue accounting standards may be useful sources to consult. For example, accounting pronouncements published with the authority of the Canadian Accounting Standards Board (AcSB), International Accounting Standards Board (IASB), US Federal Accounting Standards Advisory Board (FASAB), US Governmental Accounting Standards Board (GASB), or International Public Sector Accounting Standards Board (IPSASB) are often important sources to consult on matters not covered by primary sources of GAAP or for assistance in applying a primary source of GAAP to specific circumstances."

- In this case, the IESO consulted US GAAP, the only accounting framework in North America that provides guidance on rate regulated operations. The IESO has since adopted aspects of the US GAAP accounting framework allowing the IESO to recognize a regulatory asset.
- This decision was supported by an accounting opinion from our external auditors at KPMG and as we've just discussed, aligns the IESO with six of the eight other independent system operators in North America.
- In fact, more than one of the big-four accounting firms agree with our decision on this matter.

Q3. Obviously determining a structure like this requires a lot of comprehensive insight and analysis to ensure that the best interests of Ontario ratepayers are being protected. Who was involved in the decision making process? What experts and outside companies were involved, and is the IESO certain that they left no stone unturned in ensuring the proper accounting process and standards were chosen?

- Definitely. It's a decision we made after careful consideration and extensive consultation with external experts.

- The IESO regularly reviews its accounting policies to ensure our financial reporting best represents our operations and the substance of the accounts we oversee.
- Prompted by conversation with government about the Fair Hydro Plan and recognizing the need to consider impacts of future government policy, the IESO revisited its options for reporting market accounts and recognizing regulatory assets.
- Working with its audit partner KPMG, the IESO determined that there were reporting options for market accounts and regulatory assets and that a choice was required as to whether or not to report these in the IESO financial statements.
- By analyzing the nature of the accounts, IESO's economic relationship to them, legislative requirements and market rules it was concluded that an appropriate position for either treatment was acceptable.
- Ultimately, the IESO felt the public reporting of market accounts was relevant to the needs of its financial statement users and enabled greater transparency into the market transactions it oversees, which amounted to \$17 billion last year.
- We also felt that recognizing regulatory assets would provide more transparency into the substance of the variance accounts we oversee.
- As we just covered, this change to recognize regulated assets and market accounts brings the IESO in line with accounting practices followed by other independent system operators in North America.
- I should also mention, that in the past, the Ontario Power Authority, a predecessor organization of the IESO, reported a subset of the market accounts on its financial statements – so this isn't new.
- To confirm our view that the change was appropriate, the IESO engaged independent audit firm KPMG for accounting research on the matter.
- KPMG conducted their own research into the issue.
- KPMG subsequently issued a white paper on the accounting change, supporting the IESO's decision to change its accounting policy. The changes were also reviewed with and supported by the Office of the Provincial Controller.
- The accounting change was reviewed by the IESO's Board of Directors, and approved.
- As part of our regular 2016 year-end audit, KPMG issued an accounting opinion on our financial reporting. The accounting firm issued an unqualified or "clean" accounting opinion, meaning they supported the decision.
- Finally, when publishing our 2016 financial statements, in order to communicate the change of accounting policy, the IESO added additional notes in its 2016

financial statements to explain the changes in the Summary of Significant Accounting Policies section of its 2016 annual report.

- Now, you asked a question about ensuring the best interests of Ontario rate payers were protected and this is an important point that I want to take the time to address, specifically, because it was a consideration of ours.
- **These changes in no way affect the IESO's costs, or have any financial impact on electricity ratepayers.**
- Ultimately, the IESO made these changes because it will provide the users of its financial statements greater transparency into the market transactions it oversees, which amounted to \$17 billion **last year**, and better reflects the economic substance of IESO expenses that are recovered through rate-regulation.

Q4. You say the IESO received an "unqualified opinion" from its auditor on your 2016 financial statements. What does that mean?

- It is the auditor's responsibility to express an opinion on the financial statements based on their audit.
- In our case, KPMG conducted their audit in accordance with Canadian generally accepted accounting standards.
- Those accounting standards require that the auditors comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the entity's financial statements are free from material misstatement.
- Here are some of the things an audit looks into:
- An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements.
- The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error.
- In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control.
- An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

- **On our 2016 financial statements, KPMG stated: "We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion"**
- This was followed by a statement of their **unqualified opinion**:
 - **In our opinion, the financial statements present fairly, in all material respects, the financial position of the IESO as at December 31, 2016, and its results of operations and the changes in its new debt and its cash flows for the year then ended in accordance with Canadian public sector accounting standards.**
- This is taken directly from our 2016 financial statements, which are publically available.
- So the "unqualified opinion" is basically accounting-speak to say that the audit partner undertook the thorough audit process, applied the appropriate standards and believes the financial statements follow the appropriate accounting standard and fairly and accurately represent the IESO's financial position at year-end.

Q5. So you received a clean audit on the 2016 financial statements which included regulatory accounting. Why didn't the IESO include these transactions on financial statements prior to 2016?

- The IESO regularly reviews its accounting policies.
- Prompted by a discussion with government about the Fair Hydro Plan, the IESO revisited its options for reporting market accounts and recognizing regulatory assets.
- Working with its auditor, the IESO determined that a choice was required as to whether or not to record Market Accounts and regulatory assets and liabilities in the IESO financial statements.
- By analyzing the nature of the accounts, IESO's economic relationship to them, legislative requirements and market rules it was concluded that an appropriate position for either treatment was acceptable.
- In order to confirm our decision, we asked KPMG to conduct some research on our behalf into the appropriateness of adopting regulated accounting.
- Their research agreed with our view that the recognition of regulatory assets and liabilities better reflects the economic substance of IESO's operations and enhances the relevance, transparency and accountability of its financial reporting.
- It also found that US GAAP was an appropriate accounting framework to look to for guidance on rate-regulated operations, since PSAS was silent on the issue. And that regulatory assets under ASC 980 is not an exemption from the application of US GAAP.

- Finally, KPMG found that the accounting change would bring the IESO in line with the majority of its ISO peers across North America.
- When we considered the results of KPMG's research, along with the fact that the change would have no impact on **the IESO's costs, or have any financial impact on electricity ratepayers, we went ahead and made the accounting change.**

TOPIC 4: Ministry and OFHP Support Programs

Speaking: ADMs (TBD),

Funding of Support Programs

Preamble: As part of the changes announced in the Fair Hydro Plan, your Ministry announced some changes to several support programs. You also communicated that these programs would be funded differently.

Q1: Could you please explain how the change of funding social programs works, and how it will affect people's bills?

Response

In the past, the costs of two social programs – Rural or Remote Rate Protection and the Ontario Electricity Support Program – were funded by ratepayers. The average electricity customer in Ontario contributed approximately \$2.50/month to fund these important programs.

However, in recognition of the broader social benefits of these programs, as part of Ontario's Fair Hydro Plan we have transitioned the vast majority of these costs to taxpayers – leading to real, month over month savings in the Regulatory charge of consumer's electricity bills

These programs have been subsequently expanded, to provide greater benefits to more customers, at no additional cost to the ratepayer. The new First Nations Delivery Credit is also funded through taxpayers and will not be charged to consumers.

The social programs are targeted to some of the more vulnerable consumers in Ontario – including those with low-income and in high-cost rural areas - to ensure that our electricity system recovers costs in a fair and equitable manner.

Rural or Remote Ratepayer Protection (RRRP)

Preamble: You also announced additional relief for those consumers who live in the rural and remote parts of our province. These consumers often struggle with higher delivery charges than those who live closer to our sources of generation, or live in areas in which it's harder to maintain the poles and wires.

Q2: I know that the Rural or Remote Rate Protection (RPPP) program previously helped these customers, but could you explain what actions were taken in the Fair Hydro Plan to broaden this relief?

Response

I know that the Rural or Remote Rate Protection (RPPP) program previously helped these customers, but could you explain what actions were taken in the Fair Hydro Plan to broaden this relief?

As part of the Fair Hydro Plan, the Government has introduced distribution rate protection that provides distribution rate relief for those residential customers that are served by LDCs with some of the highest distribution rates. Those LDCs are:

- Hydro One (R1 medium density & R2 low density)
- Algoma Power
- Atikokan Hydro
- Chapleau Public Utilities
- InnPower
- Lakeland Power (Parry Sound area only)
- Northern Ontario Wires
- Sioux Lookout Hydro

Eligible customers of those LDCs will not pay more for base distribution rates than \$36.43 – the maximum amount set by the OEB for 2017.

The distribution rate relief provided through RRRP and Distribution Rate Protection (DRP) will offset potential rate increases, if any, approved by the OEB, or augment any rate decreases, if any, implemented by the OEB for these eligible customers.

Support Programs for Low-Income Ontarians

Preamble: Additionally, the Minister sometimes mentions that relief for those who are low-income or live in the rural parts of our province may be as high as 40-50%.

Q3: Could you please expand on the low-income support? What programs for low-income consumers were introduced or amended in the Fair Hydro Plan, and how will this change affect the constituents in my riding?

Response

The Ontario Electricity Support Program, or the OESP, provides monthly on-bill credits for eligible low-income customers all across Ontario. The Fair Hydro Plan included enhancements to the OESP that benefit ratepayers in two important ways:

- First, the OESP program costs will no longer be funded by the rate base. It will now be a government-funded program, providing savings for ratepayers.
- Second, the program was enhanced to provide more benefits to a greater number of Ontarians.

Starting May 1, 2017, the OEB increased OESP support for low-income consumers by 50 per cent. New eligibility categories were also introduced, enabling certain household sizes in higher income brackets to become eligible for the OESP. Monthly credits now range from \$35 to \$75. This means that:

- a single customer earning under \$28,000 can now receive \$45 per month, up from \$30;
- a family of four with a combined earning under \$48,000, which was previously not eligible for the program, can now receive \$40 per month; and
- seven or more people living together who earn a total of \$39,000 or less can receive \$75 per month, up from \$50.

If an applicant uses electricity as a primary source of heating, uses certain energy-intensive medical devices, or identifies as an Indigenous person, they would be eligible for the enhanced credit. That credit ranges from \$52 to \$113 per month.

Ontario is also working to improve co-ordination across provincial programs that provide support to low-income Ontarians. This includes ensuring that anyone deemed financially eligible for Ontario Works or the Ontario Disability Support Program will automatically be eligible for the OESP.

Support for Businesses

Preamble: When the Fair Hydro Plan was introduced, the Ministry also announced that up to as many as 500,000 small businesses and farms would benefit from the 25 per cent on average reduction. You also expanded the Industrial Conservation Initiative (ICI) for larger industrial businesses.

Q4: Could you please explain what the Industrial Conservation Initiative program does, have it was expanded, and what other initiatives exist that businesses can benefit from?

Response

The government of Ontario has a number of programs in place to help businesses and industry manage their electricity costs.

In particular, the Industrial Conservation Initiative (ICI) is an important program that provides participants with the opportunity to lower their electricity costs by reducing electricity consumption during peak hours of the day.

The Industrial Conservation Initiative (ICI) works by allowing participants to pay Global Adjustment (GA) based on their contribution to the top five system peak demand hours of the year. This provides an incentive for ICI participants to reduce consumption during peak hours, benefitting them financially and benefitting the electricity system by reducing peak demand and deferring the need to build new generation.

In 2016, ICI reduced peak demand by about 1,300 Mega Watts.

As part of Ontario's Fair Hydro Plan announced in March 2017, the government has expanded ICI to include electricity consumers in the manufacturing and greenhouse sectors with an average monthly peak demand of greater than 500 kW and less than 1 MW.

This change announced in Ontario's Fair Hydro Plan builds on a previous expansion that took effect in January 1, 2017. To give more businesses the opportunity to participate in the ICI, the eligibility threshold was lowered from 3 MW to 1 MW and sector restrictions were removed.

- Prior to lowering the ICI eligibility threshold and removing sector restrictions, only electricity consumers with peak demand between 3 and 5 MW could participate in ICI.

With the expansion of ICI to 1 MW and the removal of sector restrictions, an estimated 1,300 consumers became eligible for the program. As a result of the change to ICI announced in Ontario's Fair Hydro Plan, the number of eligible consumers for the program is expected to increase further.

The government is also assisting consumers who are considering participation in Industrial Conservation Initiative (ICI) through a targeted outreach campaign delivered by the Ontario Chamber of Commerce (OCC).

In addition to the Industrial Conservation Initiative (ICI), Ontario's Fair Hydro Plan includes other measures to benefit businesses and mid- to large-sized consumers.

- All consumers are benefitting from the shifting of cost recovery for the Ontario Electricity Support Program (OESP) and the majority of Rural or Remote Rate Protection (RRRP) from electricity bills to provincial revenues.
- Small businesses and farms that are eligible for the Ontario Energy Board's (OEB) Regulated Price Plan (RPP) are also eligible to receive the benefits from refinancing of a portion of the Global Adjustment (GA), which has resulted in significant and immediate rate relief.

In addition to the measures note, Ontario also has a number of programs already in place to help industries, businesses, commercial operations and institutions lower their electricity costs and remain competitive.

These programs include:

- The Industrial Accelerator Program (IAP) – which assists eligible transmission-connected companies and their distribution-connected sites to fast-track the capital investment needed for major energy conservation projects;
- The Save on Energy for Business programs – which provide financial incentives that help distribution-connected businesses to reduce their electricity use and manage costs through energy audits, retrofits and process and system improvements; and
- The Northern Industrial Electricity Rate (NIER) Program – which provides rate rebates to Northern energy-intensive industries facing competitiveness pressures due to higher energy costs. The program also assists industrial consumers in developing and implementing energy management plans to manage their usage and reduce costs.

Finally, to further help ease the pressure on larger electricity consumers, the government is removing the Debt Retirement Charge (DRC) for all non-residential consumers on April 1, 2018 – nine months earlier than previously estimated.

Going forward the government will continue to engage with businesses and industry to explore innovative ways to reduce costs for these consumers

Effect on Ratepayer's Bills

Preamble: I think it's great that we're helping out the most vulnerable groups, such as low-income, rural, and First Nations customers, but I'm worried that this will end up costing more on my hydro bill.

Q5: Will the increases of these programs affect the electricity bills of customers who don't receive support from these programs?

Response

No – the full expansion of the social programs, as well as the vast majority of existing program costs, have been transitioned to the taxbase, leading to real, month-over-month savings in the Regulatory line of consumer invoices.

TOPIC 5: Additional Ministry of Energy questions

Speaking: ADM (TBD), Deputy Minister, Minister

Electricity costs

Preamble: The people of Ontario are currently able to benefit from a clean and reliable supply of electricity. But many of us remember that before 2003, we struggled with blackouts and brownouts, and an electricity system that was unreliable and in need of repairs.

As you've mentioned before, our government had to make significant investments to modernize and upgrade Ontario's electricity system. These were essential investments, including more than \$50 billion in electricity generation and grid infrastructure across the province. We've also been able to close Ontario's coal plants, and in doing so, were the first jurisdiction in North America to go coal-free.

But this came at a cost—one that the current generation was bearing all by themselves.

Q6: Could you please explain what measures were taken by your Ministry to reduce this burden and lower electricity costs for consumers and businesses?

Minister Response

Over the last decade the government has rebuilt our transmission and distribution grid, invested in clean generation, and closed the last coal-fired power plant. Prices have increased because our energy system is being transformed – more than \$50 billion has been invested to modernize the electricity system.

The government has heard from Ontarians across the province that the costs of these new investments have grown too quickly, which is why we are moving forward with a plan that would ensure costs are shared more evenly over the years ahead.

Ontario's Fair Hydro Plan provides new measures to lower electricity bills by 25 per cent on average for residential consumers and hold increases to the rate of inflation for the next four years, as well as initiatives to reduce costs for businesses. The plan includes the 8 per cent rebate introduced in January 2017 and builds on previously announced initiatives to deliver broad-based rate relief on all electricity bills. This rebate is available to all consumers eligible for the Regulated Price Plan (RPP) – this includes about five million residential consumers, small businesses and farms.

To relieve the current burden on ratepayers and share costs more fairly, a portion of the Global Adjustment (GA) is being refinanced. Refinancing the GA will provide significant and immediate rate relief by spreading the cost of electricity investments over the expected lifecycle of the infrastructure that has been built.

Under GA refinancing, initial analysis indicates that borrowing would occur for about 10 years. Initial analysis indicates that it is currently anticipated that loans will begin to be paid back in the mid-to-late 2020s. The exact timing will be determined by the markets and other factors as we strive to balance costs and benefits in the fairest way possible. This is a significant change that represents a fair solution to an issue that has unfairly burdened current electricity ratepayers. This does not sacrifice investments in the energy system. We're changing the way electricity costs are recovered, and moving funding for social programs off of hydro bills.

Electricity consumers that are eligible for the 8 per cent rebate are also eligible for GA refinancing, including all residential consumers, farms, most small businesses, long-term care homes and condominiums.

We are helping vulnerable electricity consumers by enhancing electricity support programs. For those most in need, the Save on Energy Home Assistance Program provides home energy efficiency upgrades at no cost to low-income electricity customers to help reduce future electricity bills.

We recognize that there are other electricity customers who are in need but do not meet the Home Assistance Program eligibility criteria. The Affordability Fund will provide energy efficiency measures to those Ontarians who are not eligible for the Home Assistance Program, and who are otherwise unable to make energy efficiency improvements without financial assistance. Energy efficiency improvements can help customers reduce future electricity bills and avoid future disconnections.

In March 2017, the Ministry of Energy entered into an agreement with an independent Trust to administer the Affordability Fund. The Trust will be responsible for distributing funds to electricity distributors across the province based on an application process and targeted eligibility criteria. The Trust's Board includes representation from three electricity distributors, two social service agencies and the Ministry of Energy (one non-voting representative).

We have expanded the Industrial Conservation Initiative (ICI), to include electricity consumers in the manufacturing and greenhouse sectors with an average monthly peak demand of greater than 500 kW and less than 1 MW, in addition to the consumers over 1 MW who are already eligible.

In June 2016, the government directed the OEB to examine and report back to the Ministry of Energy on options for First Nations rate assistance. Working with a First Nation Advisory Committee and the Chiefs of Ontario, the OEB submitted its report on First Nations rate assistance options to the ministry, including consideration for possible options, costs, funding mechanisms, and program development issues.

As a result, Ontario's Fair Hydro Plan included the elimination of the delivery charge for on-reserve First Nation customers through the First Nations On-Reserve Delivery Credit. This initiative helps address some of the unique challenges that on-reserve First Nation customers face, and recognizes First Nations' contribution to the provincial electricity system.

The FNDC provides a credit equal to 100% of the delivery charge for all on-reserve First Nations residential customers served by licensed electricity distributors (LDCs). For those First Nations residential customers served by an LDC that are charged a bundled rate and do not have a delivery charge, we are providing a credit equal to the monthly service charge. The Ontario Energy Board estimates that the First Nations Delivery Credit will provide residential customers an average monthly benefit of \$85 (or \$1,020 per year).

In total, there are about 21,500 on-reserve First Nations residential customers served by LDCs. who automatically qualify.

We are also providing more support for Ontario customers that are in the greatest need of rate relief. The Ontario Electricity Support Program was launched in January 2016 to provide monthly, on-bill credits to low-income households. In May this year, we increased those monthly credits by 50% across the board, and broadened program eligibility so that more Ontarians can get access to the program. The Ministry of Community and Social Services is also playing a critical role by helping to ensure that those receiving social assistance are automatically eligible for the OESP.

We currently provide a distribution rate subsidy to support to roughly 350,000 rural or remote customers through the Rural or Remote Electricity Rate Protection (RRRP). Through the Fair Hydro Plan, we expanded distribution rate protection to provide distribution rate relief to residential customers of local distribution companies (LDCs) with some of the highest rates, including some of those that receive RRRP. The enhanced program will benefit about 800,000 customers in total. Specific rebate amounts will be LDC specific and dependent on customer usage.

Additionally, we moved the majority of the cost of RRRP to be funded by the tax base, which will reduce regulatory charges on electricity bills for all Ontario ratepayers. This will save the average residential rate payer an additional \$1.35 per month..

In addition to these changes, other assistance programs for energy costs are available through the Ontario Trillium Benefit, as well as the Low-Income Energy Assistance Program (LEAP), which provides relief for those in need of emergency assistance on their utility bills.

We are also improving sector efficiency and modernizing Ontario's electricity market, working in collaboration with the Independent Electricity System Operator and the Ontario Energy Board.

I'll pass it over to Deputy Minister Serge Imbrogno, who will discuss Ontario's rate mitigation measures in further detail.

Deputy Minister Response

On January 1, 2017, the Government introduced the Ontario Rebate for Electricity Consumers, which reduces electricity costs by 8 per cent on the amount before tax, an average savings of about \$130 annually or \$11 each month for an average residential consumer. In addition, the RRRP for low-density rural customers was increased from \$31.50 per month to \$60.50 per month. This reduced these customers' monthly distribution bills by an additional \$29 per month.

As part of the Fair Hydro Plan, starting July 1 ,2017, the Government also provided additional distribution rate protection to provide distribution cost relief to residential customers of those local distribution companies with some of the highest costs. Customers of those high-cost LDCs will have their monthly base distribution charge harmonized at an amount determined by the OEB that reflects the lowest monthly base distribution charge that is currently charged by this group of higher cost LDCs that have had a rate application for 2017 approved by the OEB. This amount is currently set at \$36.43 per month – which means that eligible customers of those LDCs will not pay more for base distribution rates than \$36.43.

First Nation leaders and Political-Territorial Organizations advocated for the review of delivery charges associated with transmission and distribution assets within the context of the potential for electricity rate relief for on-reserve customers. Acting on that, as well as the information provided by the OEB and input received during LTEP engagement sessions, the Fair Hydro Plan established the First Nations On-Reserve Delivery Credit (FNDC).

The resulting First Nations Delivery Credit, which provides a credit equal to 100% of the delivery charge for all on-reserve First Nations residential customers served by licensed electricity distributors (LDCs), is a reflection of First Nation leadership on this issue and an example of the Political Accord coming to life.

This distribution and delivery rate relief, combined with other parts of the Fair Hydro Plan, could see some customers' total electricity bills reduced by 40-50%.

I would like to build on the Minister's statements on the Ontario Electricity Support Program, or the OESP. As rates continued to rise due to much needed investments in the electricity system, we recognized the importance of providing immediate and dependable relief to those most affected. Working with the Ontario Energy Board, the province's independent energy regulator, the OESP was launched on January 1, 2016.

Since launching, we have seen considerable uptake across the province, and with the recent changes under the Fair Hydro Plan, the Ministry is working closely with all of its partners to get as many households signed up to this program as possible. This includes important advertising, communications, and marketing efforts to get the word out to people who may be eligible for the program. It also means taking steps to streamline the OESP with existing social assistance, making it easier for low-income Ontarians to access support.

Under the Fair Hydro Plan, the monthly on-bill credits for eligible households ranges from \$35 to \$75. If an applicant uses electricity as a primary source of heating, uses certain energy-intensive medical devices, or identifies as an Indigenous person, they would be eligible for the enhanced credit. That credit ranges from \$52 to \$113 per month.

Since program launch, over 350,000 applications have been received, and about 200,000 households are already receiving on-bill credits through the OESP. We are taking important steps to improve those numbers. This includes enhancements to the

program and addressing some of the barriers to apply, like making it easier for people to provide their consent so they can finish the application process. Our work with the Ministry of Community and Social Services to streamline benefits programs is another important step in this direction.

I want to add one more thing about the OESP under the Fair Hydro Plan. This program was originally paid for through rates. That charge ended on May 1 in order to shift this program to a government-funded initiative, providing more rate relief for all customers. While the charge was small, taken together with other rate relief under the Fair Hydro Plan, these changes are making a big impact on customer bills.

I'd ask Assistant Deputy Minister Steen Hume to provide further details on Ontario's Fair Hydro Plan.

ADM Response

Over the last decade the government has rebuilt our transmission and distribution grid, invested in clean generation, and closed the last coal-fired power plant. Prices have increased because our energy system is being transformed – more than \$50 billion has been invested to modernize the electricity system, including \$35 billion in electricity generation to ensure the system is clean and reliable and \$15.5 billion in transmission and distribution.

Ontario's Fair Hydro Plan is providing significant and immediate rate relief by spreading the costs of our investments in the electricity system over a longer period of time. It has done this through the refinancing of a portion of the Global Adjustment (GA).

By way of context, the GA is a mechanism that recovers costs associated with running Ontario's generation fleet, as well as the cost of conservation programs.

As Ontario invested in renewing its electricity system, the government invested in many new generating facilities, most of which operate under 20-year contracts. Some of these generators are expected to provide value to the electricity system beyond their contract lives. There is an opportunity to recognize the long-term benefit of these assets to the electricity system and "bring forward" that benefit for ratepayers today by deferring some of the current costs.

To relieve the current burden on ratepayers and share costs more fairly, a portion of the GA is being refinanced. In the early years, a portion of the costs covered by the GA is being refinanced to reduce pressure on today's electricity ratepayers. In later years, the cost of refinancing will be recovered from ratepayers.

The government has aligned eligibility for GA refinancing with the Ontario Rebate for Electricity Act, 2016 (ORECA), which provides for the 8 per cent rebate. This means that consumers who are eligible for 8 per cent rebate are also eligible for GA refinancing, including residential consumers, most small businesses, farms, condominiums, multi-unit residential complexes, long-term care homes and housing cooperatives.

All Regulated Price Plan (RPP) consumers receive GA refinancing through the Ontario Energy Board's (OEB) RPP rate setting process. Consumers not participating in RPP but who are eligible for GA refinancing include consumers that have opted out of RPP to sign contracts with electricity retailers or become wholesale consumers, and those who are eligible for ORECA but not RPP, such as long-term care homes. The OEB has determined a GA Modifier to be made to the GA charge on eligible non-RPP consumers' bills.

On May 1, 2017, new, lower RPP prices took effect, bringing the total reduction to 17 per cent. In determining the May 2017 RPP prices, the OEB made its own independent determination to partially reflect the measures that were proposed under OFHP, pending the passage of enabling legislation. As a result of the Fair Hydro Act, 2017 achieving Royal Assent on June 1st, the OEB updated RPP prices again to reflect the full benefit of GA refinancing, increasing savings from 17 to 25 per cent on average for residential consumers.

The new RPP prices will be in effect until April 30, 2018. At that time, the OEB will reset RPP prices and the GA Modifier in a way that holds increases to the rate of inflation, in accordance with the legislation.

Helping Vulnerable Consumers

Ontario's Fair Hydro Plan includes additional measures to benefit Ontarians with low incomes and those living in eligible rural or remote communities.

We recognize that there are electricity customers who are in need but do not meet the Home Assistance Program eligibility criteria. The Affordability Fund will provide energy efficiency measures to those Ontarians who are not eligible for the Home Assistance Program, and who are otherwise unable to make energy efficiency improvements without financial assistance. Energy efficiency improvements can help customers reduce future electricity bills and avoid future disconnections.

In March 2017, the Ministry of Energy entered into an agreement with an independent Trust to administer the Affordability Fund. The Trust will be responsible for distributing funds to electricity distributors across the province based on an application process and targeted eligibility criteria. The Trust's Board includes representation from three electricity distributors, two social service agencies and the Ministry of Energy (one non-voting representative).

To help reduce electricity bills for First Nations people living on reserves, we are eliminating the delivery charge for all on-reserve First Nations residential customers. We have also removed the monthly service charge for customers of licensed distributors that charge a bundled rate. The Ontario Energy Board estimates this will provide residential customers an average monthly benefit of \$85 (or \$1,020 per year)

In total, there are about 21,500 on-reserve First Nations residential customers who automatically qualify.

The Ontario Electricity Support Program (OESP) has also been expanded, which lowers electricity costs for the most vulnerable customers by providing a rebate directly on their bills. This program — which is income-tested and application-based — uses two scales: basic credits; and an enhanced credit for Indigenous people and for people who use electric heat as their primary source of energy or certain electrically intensive medical devices.

The eligibility for OESP has also been expanded so that more Ontarians can receive the credit. OESP credits also increased by 50 per cent. We are moving the OESP funded by the tax base, which will reduce regulatory charges on electricity bills for all Ontario ratepayers.

We currently provide support to roughly 350,000 rural residential customers through the Rural or Remote Electricity Rate Protection Program (RRRP). We will expand this

support to provide rate relief also to customers of local distribution companies (LDCs) with some of the highest rates.

The enhanced program will benefit about 800,000 customers total. As an example, a Hydro One low density customer on electric heat consuming 2,500kWh/month will see their distribution charge reduced by about \$75. Specific rebate amounts will be dependent on Ontario Energy Board rate-setting processes.

We are moving to have the RRRP funded by the tax base, which will reduce regulatory charges on electricity bills for all Ontario ratepayers. We project this will cost about \$500 million in the 2017–18 fiscal year.

ICI Expansion

Ontario's Fair Hydro Plan also includes measures to benefit larger consumers. We have expanded the Industrial Conservation Initiative (ICI), to include electricity consumers in the manufacturing and greenhouse sectors with an average monthly peak demand of greater than 500 kW and less than 1 MW, in addition to the consumers over 1 MW who are already eligible. ICI participants can reduce electricity costs by one third on average.

ICI lowers costs for eligible consumers that reduce consumption during the top five system peak hours of the year. This benefits businesses financially and benefits the system by deferring the need to build new peaking generation. ICI consumers can reduce their electricity costs by one third on average. In 2016, ICI is estimated to have reduced peak demand by about 1,300 MW.

ICI was also previously expanded, effective January 1, 2017. To give more businesses the incentive to participate in the ICI, the eligibility threshold was lowered from 3 MW to 1 MW and sector restrictions were removed. Prior to lowering the ICI eligibility threshold and removing sector restrictions, electricity consumers with peak demand between 3 and 5 MW could only participate in ICI if they belonged to the following

sectors: manufacturing, mining, data processing, refrigerated warehousing and greenhouses.

An estimated 300 consumers were already participating in the program. With the expansion of ICI to 1 MW and the removal of sector restrictions, an estimated 1,300 consumers are eligible to pay GA according to their share of total Ontario demand in the highest demand hours of the year. The number of participants is expected to be impacted by the further expansion of ICI to include smaller manufacturers and greenhouses between 500 kW and 1 MW.

The government is also assisting consumers who are considering participation in ICI through a targeted outreach campaign delivered by the Ontario Chamber of Commerce (OCC).

Consumers of all sizes are also benefitting from the shifting of cost recovery for OESP and the majority of RRRP from electricity bills to provincial revenues, an action that is lowering regulatory charges for everyone by approximately \$3/MWh.

Existing Programs

Additional programs that provide support to Ontario families in paying their bills, include:

- The Ontario Energy and Property Tax Credit saves qualifying individuals up to \$1,023 per year, with a maximum of \$1,165 per year for qualifying seniors.
- The Low-Income Energy Assistance Program provides emergency financial support of up to \$600 for families and individuals having trouble paying their bills.
- The Northern Ontario Energy Credit helps families and individuals in Northern Ontario by providing tax credits for low- to middle-income families and individuals living in northern Ontario. The maximum annual credit for a single person is \$148, and for a family (including single parents), is \$227.
- The saveONenergy Home Assistance Program, which was developed to help income-eligible homeowners and tenants manage their energy use and costs

by offering detailed in-home energy assessments and installing energy-saving measures at no cost. Social and assisted housing providers also qualify for assistance in making their buildings more energy efficient.

Existing programs for businesses include:

- Industrial Electricity Incentive (IEI), which offers reduced electricity rates for companies starting or expanding operations in Ontario;
- Northern Industrial Electricity Rate Program (NIERP), which provides a rebate of \$20/MWh to northern industrial consumers;
- Industrial Accelerator Program (IAP), which assists eligible transmission-connected customers to fast-track capital investment of up to \$10 million for major energy-efficiency projects, equipment retrofits, process changes and new construction;
- The SaveONenergy for Business Program, which offers financial incentives for audits, retrofits and process and systems improvements to eligible distribution connected commercial and industrial customers;
- Demand Response, through which consumers can receive payment in exchange for the commitment to reduce consumption when called upon.

Ontario's Fair Hydro Plan is lowering electricity bills for residential consumers and as many as half a million small businesses and farms are also benefitting.

Efficiencies in the Electricity Sector

Preamble: In the 2016 Mandate letter that was issued to you by the Premier, one of the key priorities was to drive efficiencies and maximize return on investment from the electricity sector. As you well know, finding these efficiencies would help drive the cost down for ratepayers, and I know our government is always looking for ways to help minimize price impacts on Ontario families and businesses.

In March, you announced the Fair Hydro Plan, which lowered bills by 25 per cent on average for all residential consumers and as many as 500,000 small businesses and farms. As part of the Fair Hydro Plan, you also recommitted to finding more efficiencies in the energy sector. Your Ministry stated that "Ontario's commitment to lowering energy costs for ratepayers would include working with the province's agencies to identify opportunities to drive efficiency and productivity improvements."

Q7: Could you please provide more detail on how the Government is moving forward with driving efficiencies in the electricity sector?

Minister response

The government has been working hard to reduce electricity ratepayer costs and will continue to look for efficiencies in the system wherever possible without compromising the reliability of our system.

We have already taken several steps to mitigate system costs, including:

- Renegotiating the Green Energy Investment Agreement (GEIA) in 2013, to reduce contract costs by \$3.7 billion.
- Reducing Feed-in Tariff (FIT) prices through annual price reviews, saving ratepayers at least \$1.9 billion.
- Introducing a competitive Large Renewable Procurement (LRP) process to drive down costs approximately \$1.5 billion lower than the 2013 LTEP forecast.
- Suspending the second round of the LRP process and the Energy-from-Waste Standard Offer Program, resulting in up to \$3.8 billion in savings, relative to the 2013 LTEP forecast.

- Limiting the Feed-In Tariff (FIT) 5 procurement target to 150 MW and suspending future FIT procurements - resulting in savings of up to \$129 million.
- Deferring the construction of two new nuclear reactors at Darlington. This was in response to the supply and demand expectations of the 2013 LTEP, avoiding an estimated \$15 billion in new construction costs.
- Maximizing the value of our existing nuclear fleet by starting Bruce refurbishments in 2020, instead of 2016, thus helping to achieve \$1.7 billion in savings relative to the 2013 LTEP forecast and by continuing to operate Pickering up to 2024, pending regulatory approvals, which could save ratepayers as much as \$600 million.

The Province's 2017 Long-Term Energy Plan will focus on continuing to take additional costs out of the system, and address affordability beyond the short and medium term. We have a robust energy supply and are in a good position to improve efficiency, increase transparency, and enhance opportunities for innovation and competition to reduce system costs. That is why Ontario's Fair Hydro Plan includes improving sector efficiency and modernizing Ontario's electricity market, building on the collaboration of the Independent Electricity System Operator (IESO) and the Ontario Energy Board (OEB).

For example, the IESO's Market Renewal initiative will result in a more efficient marketplace with competitive and transparent mechanisms that meet future system needs at the lowest cost. The project is expected to save up to \$5.2 billion over a 10-year period, and forms a key component of Ontario's plan to ensure the affordability of electricity.

DM response

The Government's agency that is responsible for regulating local electricity distribution utilities (LDCs) has a mandate to regulate the electricity distribution and transmission

sector in the public interest, ensuring the financial viability of the sector while promoting reliable service to customers at just and reasonable rates.

Since 2012, the OEB has taken action – through its Renewed Regulatory Framework for Electricity – to more closely link rate regulation with performance measures and outcomes. This includes rolling out LDC Scorecards and revising rate setting processes.

The LTEP will direct the Ontario Energy Board (OEB) to continue to enhance its efforts to improve the performance of local electricity distribution companies (LDCs) and transmitters. The OEB will make utilities more accountable to their consumers, promote efficiencies and cost reductions, encourage partnerships, and ensure regulatory processes are cost-effective and streamlined to accommodate changing utility business models.

ADM response

The OEB has tools available to it to enhance its performance-based regulatory processes. Such enhancements may incentivize LDCs to realize additional efficiencies. Potential enhancements may include:

- Increasing productivity and stretch factors to make LDCs realize more year-over-year productivity gains;
- Financial penalties for LDCs who do not meet performance expectations;
- Incentives to encourage LDC collaboration and partnerships to realize cost savings;

Opportunities also exist to modernize OEB regulatory compliance processes and streamline OEB processes to reduce regulatory costs and decrease time for regulatory decisions.

Conservation

Preamble: I've heard that when the Ministry plans for Ontario's electricity needs, conservation will be the first resource considered. You've said before that for every dollar invested in conservation programs, Ontarians have avoided about two dollars in costs to the electricity system.

Some of these initiatives are targeted to residential consumers and businesses, and I've heard from a few in my riding who have taken advantage of these conservation programs.

Q8: What conservation programs are available to promote affordability and give customers choices on how to increase the energy efficiency of their homes and businesses?

Minster response

Ontario has made great strides in transforming the electricity system into a clean, reliable and affordable electricity system.

Ontario's Conservation First policy and conservation programs are helping customers manage their energy bills, are offsetting system costs and are helping the Province achieve its greenhouse gas reduction targets.

Between 2005 and 2015, approximately \$3.3 billion was invested in electricity conservation and demand management programs, including programs delivered by LDCs, the Ontario Power Authority (now IESO), and the Ministry of Energy's Home Energy Saving Program.

Between 2006 and 2015, electricity conservation programs and improvements in building codes and product efficiency standards helped Ontarians save:

- 13.5 TWh of electricity in 2015 – enough to power the cities of London, Kingston, Ottawa, Peterborough and Thunder Bay in 2015.

During the same time, the conservation programs delivered by Ontario's natural gas utilities saved over 1,700 million cubic meters of natural gas, equivalent to the natural gas used by over about 800,000 homes in a year.

Conservation programs are also resulting in significant GHG emission reductions. Electricity and natural gas conservation programs through the Conservation First

Framework, the Industrial Accelerator Program and the Demand Side Management Framework are expected to result in over 3.5 Megatonnes of GHG emission reductions in 2020. This is equivalent to taking over 800,000 cars off Ontario's roads for one year.

Through collaborative efforts by the IESO and the Demand Response Working Group, Ontario's demand response resources have grown significantly above the 2013 LTEP projections, and demand response has become a mature and competitive resource.

The IESO has successfully transitioned from securing demand response through multi-year contracts to an annual competitive demand response auction. The demand response auctions held in 2015 and 2016 reduced the cost of obtaining demand response by up to 27% when compared to previous contracts.

In order to further promote affordability, as part of the Ontario Fair Hydro Plan, this year my Ministry established an Affordability Fund to provide energy efficiency measures to Ontarians who do not qualify for low income conservation programs, and are unable to make energy efficiency improvements without support.

And, to improve the availability of conservation programs for low-income customers who are most in need, in August of this year I directed the IESO to centrally deliver a low-income conservation program across LDC service territories beginning January 2018. This program is expected to enhance and expand access to the Save on Energy Home Assistance Program.

My Ministry also remains committed to encouraging collaboration of conservation efforts among electricity and natural gas utilities, and working with the Ministry of Environment and Climate Change to provide a coordinated, one-window approach to existing conservation and new low-carbon technology programs offered by the Green Ontario Fund.

A coordinated approach is convenient for customers and can provide cost-efficiencies in program delivery.

To promote efficiencies and leverage IESO's significant program delivery expertise and resources, in August of this year I also issued direction to enable the IESO to support the design and delivery of Green Ontario Fund programs.

I'll ask the Deputy Minister, Serge Imbrogno, to speak in more detail about our important conservation programs and how they are promoting affordability by supporting Ontarians in improving their energy efficiency of their homes and businesses, and helping meet our climate change goals.

DM response

Thank you Minister.

Ontario's conservation and energy efficiency programs are helping Ontarians to manage their energy use and utility bills.

Conservation is the cleanest and most cost-effective energy resource. Historically, for every \$1 invested in electricity efficiency programs, Ontarians have avoided about \$2 in costs to the electricity system.

We know that conservation requires a sustained commitment to achieve ongoing savings over the long-term.

That's why on January 1, 2015, Ontario launched a six- year electricity Conservation First Framework, which is supporting the development of new and enhanced electricity conservation programs to meet local needs and offer more choice for consumers:

The Framework is expected to achieve 7 TWh of savings in 2020 and assist the province in achieving its long-term conservation target of 30 TWh in 2032.

In addition, on December 22, 2014, the Ontario Energy Board (OEB) released the six-year natural gas Demand Side Management Framework, doubling budgets and bringing Ontario's total spending on DSM in-line with leading jurisdictions.

Both these frameworks - The Conservation First Framework and the natural gas Demand Side Management Framework – are aligned to enable greater collaboration of conservation efforts among electricity and natural gas utilities.

And we are giving Ontarians more options. Outside of the conservation first and natural gas DSM frameworks, Ontario has a number of initiatives that contribute towards a clean, reliable and flexible electricity system. These include, but are not limited to:

Time-of-Use pricing pilots

As part of its review of the Regulated Price Plan, the OEB is working with electricity distributors to test innovative Time-of-Use price structures.

The results will help guide OEB decisions on potential new price plans that could give customers greater control, be better matched to their lifestyles and help improve system efficiency.

Demand Response auctions and Demand Response pilots

Demand Response, or DR, programs are continuing to reward electricity customers for reducing their electricity use at specific times of power system need.

The IESO is holding annual DR auctions, and conducting DR pilots to learn more about the operational capabilities of DR resources, and to assess the potential for DR to provide further benefits to the electricity system.

I'll ask the Assistant Deputy Minister of the Conservation and Renewable Energy Division, Kaili Sermat-Harding, to expand on the conservation and energy efficiency programs available in Ontario, as well as how these programs are benefitting Ontarians.

ADM reponse

Thank you. I am happy to expand on the details of the suite of conservation programs that are available in Ontario.

I'd like to start by highlighting electricity and natural gas conservation programs, and province-wide multi-fuel programs enabled through the Green Investment Fund.

Residential Electricity Programs

For residential customers, local electricity and natural gas distribution are delivering a suite of conservation programs.

Under the Save on Energy brand, and with support from the IESO, customers have access to:

- The **Save on Energy HEATING AND COOLING INCENTIVE**, which provides up to \$850 in incentives for the purchase and installation of eligible central heating or cooling equipment through a participating contractor. Electrically heated homes can receive up to \$4,000 rebates for high-efficiency heat pumps. The heating and cooling system is one of the biggest investments a homeowner will make.
 - Once the installation of central heating or cooling equipment is complete, a customer can save up to \$325 a year on their electricity costs.
 - Electrically heating homes can save up to 50% on their heating costs by switching to high-efficiency heat pumps.

- In addition, contractors can help customers program their heating and cooling system for different times of the day, offering further opportunities to save.

It is helpful to describe a participant's experience in the Heating and Cooling Incentive program:

- The first step is to find a participating contractor on the Save on Energy website, which has a contractor look-up based on postal code, or by company name.
 - Step two is to install an eligible measure to make your home more comfortable and energy efficient. This could be a qualified high efficiency furnace, qualified central air conditioner, or qualified heat pump (if you have electric heating in your home).
 - The contractor will then submit an application on the participant's behalf. The contractor will send the application to the participant to confirm the application details, and so that the participant can submit proof of purchase.
 - The last step is for the participant to receive their rebate. A cheque will arrive in approximately four to eight weeks.
- **Save on Energy Instant Discounts** are available starting October 6, 2017 at participating retailers for a wide variety of energy saving measures, such as LEDs, power bars and more. This program is taking the place of Coupons, which ends September 30.
 - **Save on Energy HOME ASSISTANCE PROGRAM** was developed to help income-eligible homeowners and tenants manage their energy use and costs by offering detailed in-home energy assessments, installing energy-saving measures at no cost, and advice on steps that can be taken to save even more energy.
 - Measures can include energy-saving light bulbs (LEDs), a power bar, low-flow showerhead and faucet aerators, new energy-efficient refrigerator or window air conditioner.
 - For electrically-heated homes, residents may be eligible for a programmable thermostat, weatherstripping around doors and windows, and additional insulation in the attic and basement.

- Social and assisted housing providers also qualify for assistance through this program to make their buildings more energy efficient.
- Further, in order to improve the availability of conservation programs that help low-income customers, in August of this year I directed the IESO to centrally deliver a low-income conservation program across LDC service territories beginning January 2018. This program is expected to enhance and expand access to the Save on Energy Home Assistance Program.
- On August 4, 2017, to further improve the availability of this program, the Minister directed the IESO to centrally deliver a low-income conservation program across LDC service territories beginning January 2018.
- It is expected that IESO delivery will result in enhancements and improved access to the Save on Energy Home Assistance Program.

I will describe a participant's experience in the HAP program:

To find out if they qualify, an interested customer would contact their local electricity distributor.

Once they've been deemed eligible, an HOME ASSISTANCE expert will make an appointment to visit their home. They'll review how the customer is using energy, including:

- what light bulbs they are using
- how old their major appliances are, and
- whether drafts are coming in through their doors, windows, attic or basement.

The HOME ASSISTANCE expert will also be able to advise if their home is eligible for a new, energy-efficient refrigerator or other appliance, such as a room air conditioner, or additional insulation in your attic or basement.

Through one or two additional appointments, the HOME ASSISTANCE expert will:

- give advice on changes to save energy,
- supply and install upgrades at no charge, and

- make sure the customer knows how to use all their new energy-saving upgrades correctly.

Utilities have also been innovating to help serve their customers better. As of May 2017 there are 10 new local programs in market and 20 pilots have been completed, are in market or under development. When a pilot or local program demonstrates good results and a cost-effective program idea, it can be adopted province-wide.

For example, Hydro One Networks launched the Heat Pump Advantage pilot program in Fall 2015 to help customers with electric space or water heating to take advantage of new cold-climate heat pump technologies. Enwin Utilities launched a similar heat pumps pilot in April 2016.

Results from these pilots helped to inform a March 2017 study by the IESO: on the opportunity for residential heat pumps in Ontario. The study found that residential heat pumps can help electrically-heated homes reduce their energy use for heating by up to 60%, and that there is near-term market potential for the technology in Ontario.

As a result of the pilots and the study two new province-wide initiatives have been launched:

- In May 2017, the IESO partnered with Enbridge Gas Distribution and Union Gas to test integrating electricity saving measures into the gas utilities' home audit and retrofit programs, expanding eligibility to electrically-heated homes and providing incentives for heat pump installations.
- And in July 2017, the Save on Energy Heating and Cooling Incentive Program was re-launched and now includes incentives for installing heat pumps in electrically-heated homes.

Residential Natural Gas Programs

There are also a number of programs available to residential natural gas customers under the **Demand Side Management Framework**.

- **Enbridge and Union Gas** are providing rebates to help qualifying home owners with rebates for energy assessments and home renovations to make energy efficiency improvements, including insulation in basements, walls, and attic, as well as air sealing.

- For example, the **Home Energy Conservation Program** and **Home Reno Rebate Program** offer between \$1,600 and \$5,000 cash back for eligible energy saving upgrades.

On February 4, 2016, Ontario announced a \$100 million investment from the Green Investment Fund to enhance and expand the **Home Energy Conservation Program** and **Home Reno Rebate Program** delivered by Enbridge Gas Distribution and Union Gas. This investment enhanced the programs to be offered province-wide and to homes with primary heating by natural gas, oil, propane and wood.

This investment is expected to enable audits and retrofits of approximately 37,000 homes and save approximately 1.6 Megatonnes of cumulative lifetime greenhouse gas emissions, contributing to the province's GHG emissions reductions targets.

On May 31, 2017, the IESO launched a **Whole Home Pilot** in partnership with Enbridge Gas Distribution and Union Gas. . The pilot is testing the integration of incentives for electricity-saving measures in the home energy audit and retrofit programs funded through the DSM Framework and Ontario's Green Investment Fund, and the expansion of the program to electrically-heated homes.

The pilot is expected to be in market until December 31, 2017. The IESO will evaluate customer satisfaction, cost-effectiveness and program results to determine the future of this program enhancement.

Through these partnerships, every homeowner in Ontario can now benefit from a wide range of energy-saving rebates for the whole home. Ontarians can receive thousands of dollars in incentives through the Ontario Home Energy Conservation Incentive Program to get an energy assessment of their home and make upgrades throughout the house to use less energy – no matter how the home is heated.

The **Home Winterproofing Program** and **Home Weatherization Program** offer eligible low-income households a home energy assessment and insulation and draftproofing measures at no cost to help manage natural gas bills.

Business Electricity Programs

Now I'd like to turn our attention to the many programs we have for Ontario businesses.

The **Save on Energy for Business** electricity conservation program, made available through local distribution companies, with the support of the IESO, offers financial

incentives to help small businesses install energy-efficient equipment and improve the energy efficiency of their buildings.

There are several programs available to the commercial and institutional sector, including small businesses, municipalities, universities, schools and hospitals, through Save on Energy.

An energy audit is the first step in understanding how energy is being used in buildings. This will help to identify opportunities to reduce operating costs and improve performance.

Business customers are eligible for incentives to complete energy audits assessing the potential for energy savings through equipment replacement and operational practices.

The **AUDIT FUNDING** incentive is intended to cover up to 50% of the cost of an energy audit.

Under the **SMALL BUSINESS LIGHTING** program, qualifying businesses can get up to \$2,000 in lighting upgrades.

Further upgrades to lighting, heating, ventilating and air conditioning (HVAC), and other systems can qualify for financial incentives worth up to 50% of project costs, through the **RETROFIT PROGRAM**.

The RETROFIT PROGRAM helps businesses install and benefit from newer, more energy-efficient solutions, allowing them to operate more efficiently and improve their bottom line.

Incentives are available for high-efficiency equipment such as lighting, motors and heating, and for installing new control systems to improve the overall efficiency of buildings.

Ontario is a leading jurisdiction in North America when it comes to cost-effective funding for energy managers. Energy managers have the technical expertise to identify and install energy-saving equipment and technologies. To ensure all businesses has access to energy managers, funding is provided through LDCs and the IESO for the following:

- The **LDC ENERGY MANAGER PROGRAM** serves businesses connected to the local distribution system
- The **INDUSTRIAL ACCELERATOR PROGRAM (IAP) ENERGY MANAGER PROGRAM**, delivered by the IESO,

serves businesses connected to the provincial transmission system

- The **MULTI-SITE CUSTOMER ENERGY MANAGER PROGRAM**, delivered by the IESO, provides centralized delivery for businesses with multiple sites connected to different LDC distribution systems
- The **SECTOR-BASED ENERGY MANAGER PROGRAM**, which is presently under development by the IESO, will provide energy manager funding to associations or businesses that serve a sector of Ontario's economy. Funding will be awarded based on a competitive procurement process.

For larger more complex projects and operations – for example industrial or institutional facilities, the Save on Energy **PROCESS AND SYSTEMS** program is designed to identify, implement, and validate energy efficiency projects from start to finish.

Incentives up to \$50,000 are available for engineering studies and up to 70% of project costs for energy efficiency upgrades to reduce the payback period on large energy projects.

Home builders and renovators are encouraged to design and construct energy-efficient homes through **NEW HOME CONSTRUCTION** incentives for energy-saving measures.

And for those who own, operate, and manage buildings, **TRAINING AND SUPPORT** initiatives help provide access to the most up-to-date training, such as in building commissioning, certified measurement and verification, and how to be an energy manager.

Additionally, for those transmission-connected companies like our auto manufacturers, chemical, steel, and other large industry, the IESO's **Industrial Accelerator Program (IAP) provides** assistance to fast track capital investment in major energy conservation projects.

To enhance IAP delivery, following a December 2016 Minister's direction to the IESO, the distribution-connected sites of transmission-connected companies are now eligible to participate through the IAP program.

To summarize the IAP program offerings, the IAP is made up of four program streams:

- **RETROFIT PROGRAM**

- **PROCESS AND SYSTEMS PROGRAM**
- **HIGH PERFORMANCE NEW CONSTRUCTION**
- **MULTI-SITE CUSTOMER ENERGY MANAGER PROGRAM**

The **ENERGY PERFORMANCE PROGRAM INCENTIVES FOR MULTI-SITE BUSINESSES**, delivered by the IESO, provides centralized delivery for businesses with multiple sites connected to different LDC distribution systems.

The program encourages whole building energy performance improvements through incentives per kilowatt-hour of savings per year for up to four years.

This pay-for-performance model encourages participants who are able to make behavioural and operational changes alongside capital investment projects to achieve and grow energy savings over multiple years.

Business Natural Gas Programs

Ontario's two largest natural gas utilities, **Enbridge Gas Distribution and Union Gas**, also offer their business customers incentives to install energy-efficient equipment and improve the energy efficiency of their buildings.

They provide free services and financial incentives designed to help their customers make the most of the energy they consume. Enbridge and Union will work with their customers to design a solution that meets their customer energy needs and financial objectives

For example, Enbridge's **Energy Compass program** is a free benchmarking diagnostic service to help identify opportunities for capital and operational energy efficiency improvements in commercial buildings.

An Energy Compass report will:

- Provide recommendations for capital and operational improvements.
- Compare the energy performance of buildings in a portfolio.
- Identify buildings with higher-than-average natural gas consumption.
- Identify applicable Enbridge financial incentives that can offset the cost of making recommended energy-efficiency improvements.

Enbridge also offers its **Run It Right** program, which helps businesses to enhance existing building systems and operations to find energy efficiencies.

Unlike other incentives that require installing new equipment, the Run It Right program analyzes a building's energy performance in three simple steps to identify, implement and monitor low- and no-cost operational improvements that can lead to up to five per cent energy savings.

Both Enbridge and Union Gas provide custom and fixed **retrofit** incentives for efficient building equipment and systems retrofits such as space heating, water heating and food services.

Space Heating retrofit options are broad and include:

- Air Curtains
- Demand Control Ventilation
- Condensing Boilers, High-Efficiency Boilers, and High-Efficiency Boilers Energy and Heat Recovery Ventilation
- Infrared Heaters
- Condensing Make-Up Air Units

Water Heating retrofit options include ozone laundry systems, Energy Star dishwashers, condensing boilers and gas water heaters.

And retrofits for Food Services include demand control kitchen ventilation systems, and Energy Star qualified dishwashers and fryers and under-fired broiler.

Mid-Term Review of CFF and DSM Frameworks

As the Deputy Minister mentioned, the IESO and OEB are undertaking mid-term reviews of the electricity and natural gas conservation frameworks.

The IESO's Mid-Term Review of the Conservation First Framework and the Industrial Accelerator Program is focusing on conservation targets and budgets, lessons learned on LDC funding models, customer needs, conservation integration with regional planning. It will also look at alignment with Climate Change Action Plan (CCAP) initiatives and post-2020 approaches to energy efficiency.

In order to complete the review, the IESO completed an **Achievable Potential study** for electricity conservation in Ontario.

The Achievable Potential study was released on June 30, 2016 and found a potential of 7.4 TWh of savings that could be achieved by 2020 within the existing CFF budget - higher than the 7 TWh savings target currently established for 2020.

The IESO will use this study during their Mid Term Review as well as in their regional planning and long term energy planning processes.

In June 2017, the OEB initiated the mid-term review of the DSM Framework for natural gas conservation programs, which is expected to be completed by December 1, 2018. The review is looking at gas utility budgets and targets, as well as how the programs are meeting customer needs and interactions with Ontario's cap and trade program.

Demand Response

Business and residential customers may also be able to participate in demand response programs. Demand response programs reward electricity customers for reducing their electricity use at specific times of power system need. An example of demand response is a factory temporarily halting a process, or a group of residential consumers reducing their air conditioning when electricity demand is high.

IESO's second demand response auction in December 2016 procured approximately 455 MW for the summer commitment period (May 2017 to October 2017) and approximately 478 MW for the winter commitment period (November 2017 to April 2018).

Successful participants in the 2016 demand response auction include demand response aggregators (EnerNOC, Enershift/Rodan, NRG Curtailment Solutions, Ohmconnect, GC Project LP) and industrial consumers (Tembec, Resolute, Gerdau Ameristeel).

For the first time since the launch of the DR auction, a residential DR aggregator (OhmConnect) was successful in procuring DR capacity (1 MW capacity) in the 2016 DR auction. IESO is continuing to work with stakeholders to facilitate further participation of residential DR in future DR auctions.

The IESO is also running demand response pilot projects to learn more about the operational capabilities of demand response.

The next demand response auction is expected to take place in December 2017.

Affordability Fund

As the Minister and Deputy Minister mentioned, the government established the Affordability Fund as a part of the Ontario Fair Hydro Plan. The Affordability Fund will

provide energy efficiency measures to electricity residential customers who do not qualify for the Save on Energy Home Assistance Program and who are unable to undertake energy efficiency improvements without support.

The Affordability Fund is being administered by an independent Trust, which is providing oversight of funds and facilitate efficient distribution of funds to electricity distributors.

Over Summer 2017, the Trust sought input from stakeholders, including electricity distributors and representatives of low income organizations, in establishing eligibility criteria and guidance on funding allocation methodology. Program details are currently being finalized by the Trust.

The Province expects quarterly and annual reports to be prepared by the Trust to track the impact of the Province's funding. Reports are expected to include the criteria used by the distributors to distribute the funds, challenges, lessons learned, amounts distributed, and participant feedback.

It is expected that distributors will be able to start applying for funds this fall.

Green Ontario Fund

I have shared examples of the variety of conservation programs available, and ways our agency is now looking into further ensuring programs are meeting customer needs. Now I'd like to close with some words about how our Ministry is working with the Ministry of Environment and Climate Change to help further expand energy choices for Ontarians, and help the Province reach its GHG reduction targets.

The Ministry is committed to encouraging collaboration of conservation efforts among electricity and natural gas utilities, and working with the Ministry of Environment and Climate Change to provide a coordinated, one-window approach to existing conservation and new low-carbon technology programs offered by the Green Ontario Fund.

The Ministry of Energy also continues to work closely with its agencies and MOECC to support implementation of Green Ontario Fund programs.

In August 2017, the Ministry also directed the IESO to work with the MOECC and the Green Ontario Fund to support the design and delivery of Green Ontario Fund Programs. with a focus on reducing greenhouse gas emissions associated with energy usage and energy sources from Ontario residents and businesses.

IESO is offering its expertise, resources and infrastructure to support the Green Ontario Fund.

On August 30, 2017, Ontario launched the **Green Ontario Fund** and the **GreenON website**, a one-stop-shop to programs and rebates to reduce energy costs and help fight climate change.

On the same day, the Green Ontario Fund also launched the **GreenON Installations program**, which provides, for a limited time, a free home energy review and smart thermostat for eligible homes.

Coordination of Green Ontario Fund programs with existing conservation and energy efficiency programs will expand the offerings for customers and help achieve the government's energy savings and GHG emissions targets.

Closing

Ontario homes and businesses can take action to manage their energy bills by participating in Ontario's suite of conservation and energy efficiency programs.

The Ministry of Energy will continue to work with its agencies to ensure there are programs in market that are meeting the needs of Ontarians.

We will also continue to support MOECC to promote a coordinated, one-window approach to existing conservation and new Green Ontario Fund programs.

Smart Meters, Smart Grid and Grid Modernization

Preamble: Minister, you've mentioned in your lead-off that our government has had to make significant investments into our electricity system to make it more reliable. I believe that a part of these investments include smart meters and the smart grid. Several constituents in my riding have raised concerns about smart-meters, saying they don't understand why they were installed in the first place. And while I'm a little bit familiar with smart meters, and have heard that they help us conserve energy and drive costs down, I'm less clear on what the smart grid does.

Q9: Could you please explain what a smart meter does, what the smart grid is, and how they are advancing grid modernization in the province?

Ministers Response

The smart meters installed for nearly all of Ontario's residential and small business customers enable time-of-use pricing, giving Ontarians a tool to manage their electricity costs.

Smart meters are also helping electric utilities respond quickly to outages.

Smart meters, however, are only the first step in building a smart, modern grid for Ontario. The basic infrastructure delivering electricity to Ontarians has largely remained unchanged for decades.

New smart grid and grid modernizing technologies – including sensors, smart meters, and communications infrastructure – can provide the data and information needed to encourage new business models and enable customer choice.

These technologies can also benefit consumers and distribution companies through better reliability, improved asset performance, and resiliency to external events.

Grid modernization will enable Ontarians to realize the full value of emerging technologies and applications such as electric vehicles, electricity storage, and home energy automation systems.

These value propositions are enabled by our early investments in smart meters. They are a catalyst for modernizing our energy infrastructure and for providing customers with greater visibility and control of their energy use.

DM Response

Ontario has defined the smart grid as “the advanced information exchange systems and equipment that – when utilized together – improve the flexibility, security, reliability, efficiency, and safety of the integrated power system and distribution systems.”

This definition is important. The focus of any efforts to modernize our electricity system – which includes the wires, the transformer stations, and utilities – must be done in a way that improves this infrastructure and provide better service to customers.

Smart meters are the platform upon which these improvements are being built. With the old, outdated analog meters, utilities had limited information about how consumers were using electricity over time, and the pressures that this energy demand exerted on the overall system.

With smart meters now in place, utilities are now empowered with information to manage their systems more efficiently and design better programs for customers. But more importantly, customers now have a new platform to become proactive consumers.

Time-of-Use, Green Button, and intelligent thermostats – these technologies are enabled by smarter infrastructure and a modern grid.

ADM Response

A smart meter is a digital meter that measures a consumer's electricity consumption on a time-interval basis and remotely relays it back to the Local Distribution Company (LDC) for billing purposes.

The primary difference between a smart meter and an analog meter – what was used by residential and small businesses prior to the Smart Metering Initiative – is how power consumption is tracked.

With analog meters, there was no means for utilities to track energy consumption remotely. Utility service workers would periodically take meter readings, which were used to determine how much power was consumed and what to charge. Customers could also report their usage in the same way.

Smart meters changed this approach. They are able to measure usage with significant accuracy and can remotely transmit this information to utilities using information and communication technology systems, not unlike how your mobile phone works.

This provides nearly instant information to the utility, and as I will describe in a moment, can do the same for customers through initiatives like Green Button. Smart meters are also the foundation for a Smart Grid and can help identify and eliminate service interruptions.

Over 4.8 million smart meters are being used to enable time-of-use pricing – the price we pay for electricity now better reflects the cost of producing it at peak and off-peak times.

With time-of-use, customers have the ability to better manage their costs by reducing or shifting their consumption to off-peak times when electricity is less expensive to produce. Doing this reduces Ontario's overall peak demand which provides environmental benefits, and means we can defer or avoid costs to invest new generation infrastructure.

Time-of-use pricing is regulated through the OEB's Regulated Price Plan, or RPP.

On November 16, 2015, the OEB released its RPP Roadmap identifying a 5-point plan for making changes to the RPP to better respond to policy objectives, improve system efficiency, and give consumers greater control. The OEB expects to implement this plan over the next 3 to 5 years.

Among their considerations are the following:

- Updating the RPP objectives to place a greater focus on peak demand reduction, efficient system operation and long-run system costs.
- Exploring opportunities to improve time-of-use communication, launch benchmarking pilots and undertake data collection initiatives aimed at enhancing consumer understanding and ability to respond to a pricing plan.
- Designing and executing pilots to assess customer response to alternative price structures.
- Undertaking a significant data collection initiative to better understand the needs of small business consumers.
- Working with the government and IESO to reduce barriers to set optimal pricing.

The OEB is undertaking TOU pilots as a part of its review of the RPP. The pilots include both price and non-price elements to satisfy two of the objectives of the RPP Review: implementing price pilots and empowering consumers. Pilots have begun rolling out and will run for at least one calendar year. The results of the pilots will inform future OEB decisions on offering customers choice between different TOU price plans province wide.

Smart meters greater benefits than just time-of-use pricing.

Smart meters are also helping electric utilities pin-point and respond more quickly to outages. They are giving utilities the granular information they need to monitor, operate and plan the system more efficiently.

By remotely and securely transmitting hourly meter reads, smart meters allow LDCs to deliver electricity to consumers more efficiently by reducing the requirement for manual meter readings and estimated bills. Other operational benefits for LDCs include enhanced grid visibility, improved outage management and more informed system planning.

Smart meters also facilitate participation in conservation and demand response programs which are designed to help consumers better manage their usage while simultaneously helping to manage demands on the system.

Smart meters are part of and the foundation for a smart grid, which will enable Ontarians to realize the full value of emerging technologies and applications such as electric vehicles, storage, and home energy automation systems.

A 'smart grid' uses modern sensors, monitoring, communications, automation, and computer systems to improve the flexibility, reliability and efficiency of the electricity system.

It can address many of the challenges our LDCs currently face.

For instance, with some assets in place for over 50 years, there is a need to refurbish or replace with new investments as necessary to meet system growth.

As infrastructure typically incurs high capital costs, utilities can look to smart grid technology for look for opportunities to leverage solutions that continue to maximize the use of existing assets.

Smart grid technologies can help increase the resilience of the distribution grid. This will help Ontario's LDCs address extreme weather events.

In 2015, weather was the next most common reason for power outages in Toronto (after equipment failures and loss of supply from the transmission system).

On the weekend of December 21-22, 2013, a significant ice storm moved through Southern Ontario. Ice accumulation resulted in downed branches, trees and power lines, which resulted in over 500,000 customers losing power in Ontario.

There is a strong business case for continued investment in the smart grid.

According to Navigant's *Smart Grid Roadmap*, if Ontario continues to invest in smart grid through 2035, the province can realize a net present value of \$6.3B net present value by 2045.

This means building on our investment in smart meters, leveraging the infrastructure in place to build a modern grid for Ontarians.

Grid modernization involves changing from the traditional "analog" system to one that is digital, using sensors and modern communications to gather key data about how the system is working.

A modern grid can provide a number of important services for Ontarians:

- It can give customers more control of their energy use, and to interact with the system instead of just consuming power;
- It can provide much greater visibility, allowing utilities to see how their system is working in real time so they can quickly address problems and plan a more

efficient system; and

- And it can integrate new technologies – like energy storage, EVs, home energy automation systems, and renewable generation – in a way that both helps Ontarians control their energy use and optimizes the operation of our distribution grids.

Through the *Smart Grid Roadmap*, other independent studies, and feedback during our Long-Term Energy Plan engagements, we have heard that there are barriers to grid modernization. These technologies are much different than the ones made by our distribution companies over the last decades, and new to regulatory oversight.

Ontario's electricity sector faces barriers in incorporating these technologies where they make sense, including those of a cultural, technical, and regulatory nature. Moving forward, Ontario's approach to grid modernization is about exploring and addressing these barriers. In doing so, the Ministry and its agencies will aim to create the right environment for LDCs to make the best decisions for their systems and their customers. Enabling these investments will allow Ontario's LDCs to get even more value out of our smart meter deployment.

Other elements of a modern Ontario grid include the Smart Grid Fund, energy storage, meter data management, and electric vehicle integration.

The Smart Grid Fund provides financial resources to help companies, electricity utilities and organizations to demonstrate and commercialize the next generation of smart grid solutions by:

- Developing and advancing the smart grid in Ontario in the near term (improving reliability and flexibility of the electricity grid)
- Creating economic development opportunities and jobs for Ontario
- Reducing risk and uncertainty of important electricity sector investments.

There are 38 projects supported by Smart Grid Fund representing \$50M for a total sector investment of approximately \$200M.

These projects cover the following technology areas: grid automation, data management, home energy management, electric vehicles, electricity storage, microgrids and cyber security.

A third call for applications to the SGF launched on October 7, 2015. These projects are now underway.

Many of these technology focus areas were identified as high-value propositions by Navigant's *Smart Grid Roadmap*.

Meter data management is also part of the Ontario Smart Grid.

The province's Meter Data Management and Repository (MDMR) is the central system that stores and processes data for all smart meters in Ontario. The IESO, in keeping with its designation as the Smart Metering Entity (SME), is currently responsible for housing and operating the MDMR.

The MDMR receives hourly time and date-stamped meter reads from smart meters and performs a process referred to as Validating, Estimation and Editing (VEE) in order to return TOU framed data to LDCs for customer billing.

Every day, the MDMR receives between 100-120 million meter reads from residential and small business customers and processes between 200,000 – 300,000 billing requests from LDCs.

Ontario is also acting to leverage the data within the MDMR to realize the benefits to consumers from this consumption data, in particular by making non-personal information available to third parties to assist them in developing new innovative products and services that will enhance customer choice and control.

On January 26, 2016, the OEB issued an Order requiring that the SME expand the scope of data the MDMR collects.

To fulfill this mandate, the OEB has ordered the SME to begin collecting additional information, such as:

- Postal code.
- Distributer rate class.
- Commodity rate class.
- Occupant change data.

The SME started collecting this data on January 1, 2017.

This year, the SME established the Data Strategy Advisory Council to provide input in the review and development of products and processes for the implementation of third party access to MDMR data. Ministry staff are observers on the Council, which is currently focused on completing a privacy review of MDMR data, preparing several pilot projects, and establishing a framework for broad stakeholder engagement.

Throughout the design, implementation, and operation process, the SME will be guided by the Information and Privacy Commissioner's Privacy by Design principles, ensuring the anonymity of smart meter data, and security and privacy for Ontarians.

This third-party access platform is expected to launch in 2018.

The SME has also filed an application with the OEB for a reduced Smart Metering Entity Charge. This charge is included in the electricity bills of Ontario's residential and small business customers. If approved, the Smart Metering Charge will go down to \$0.59 per month, a reduction of \$0.20. The SME will continue to provide its core functionality – storing, verifying, and transforming smart meter data into time-of-use data – and implement the third party access platform, all at a reduced rate for Ontario's ratepayers.

Renewable Energy for Residential

Preamble: In the 2013 Long-Term Energy Plan (LTEP), your ministry committed to examining the potential of transitioning the microFIT program from a generation purchasing program to net metering. Net metering is different, as it allows you to send electricity generated from renewable sources to the distribution system for a credit towards your electricity costs.

I've also heard that this year the microFIT and FIT program will be winding down. However, my constituents are still interested in generating their own electricity from renewable energy.

Q10: Minister, could you please describe what opportunities homeowners and communities have to generate their own electricity from renewable energy?

Minister response

The rapid growth of Ontario's clean tech and renewable energy sectors has attracted billions of dollars in investment to Ontario and led to the creation of thousands of new jobs.

As Ontario looks towards the future, green energy will remain an important part of both our electricity supply mix and our economy, supporting jobs and growth across the province.

As the FIT and microFIT programs wind down at the end of this year, Ontario is transitioning to a net metering framework to provide opportunities for homeowners,

businesses and communities to continue to play a part in Ontario's clean energy future by generating their own electricity from renewable energy.

We engaged stakeholders and in July we updated the net metering regulation to remove the 500 kW project capacity size limit and clarify the ability to pair energy storage with renewable energy systems.

The updated regulation provides greater opportunities for larger commercial and industrial electricity customers and clarity for combining energy storage technology with renewable generation, as well as streamlining other aspects of how net metering is delivered in the province.

The Ministry has also been examining potential additional net metering updates related to third-party ownership of net-metered generation and inclusion of virtual net metering in Ontario's net metering framework.

The Ministry has engaged stakeholders and Indigenous groups on these potential updates and has incorporated their feedback as policy options are considered.

An enhanced net metering framework will provide a platform for future innovation in clean, distributed energy and put the province at the forefront of renewable energy integration in Canada.

I'll ask Deputy Minister Serge Imbrogno, to provide some additional information about this important work.

DM response

Thank you Minister.

Net metering is a billing arrangement that allows customers to generate renewable energy onsite for their own use, and to receive bill credits for extra electricity that they send to the grid.

Under a net metering arrangement, a customer, such as a homeowner or business, can generate electricity from a renewable source while still drawing electricity from the local distribution grid when needed.

On July 1, 2017 amendments to the Net Metering regulation came into force. The changes to the net metering regulation – including, for example, removing the 500 kW size limit for projects and allowing for energy storage equipment to be paired with the renewable generation technology – are significantly broadening the opportunities

available to Ontario electricity consumers to generate their own electricity from renewable sources, such as solar, wind, biomass and hydro.

By facilitating the uptake of renewable energy to offset electricity demand, net metering also supports initiatives under the Government's 2016-2020 Climate Change Action Plan, such as enabling households, institutions and businesses, to move to net zero energy homes and buildings.

And since net metering generation capacity is sited at or close to load, over time it can help reduce peak demand and the need to invest in additional generation capacity or certain grid infrastructure.

Beginning in early 2017 the Ministry initiated a series of engagement activities on different approaches to further enhancing net metering. Two themes that emerged were Third Party Ownership of net metering facilities and Virtual Net Metering.

Third party ownership would improve the ability of companies to provide renewable energy products and services to homeowners, communities or businesses that wish to net meter.

Virtual net metering would allow customers who may not be able to install their own on-site renewable energy systems to participate in renewable energy projects located off-site, for example, apartment or condo residents.

The Ministry has been examining these potential net metering enhancements while also keeping in mind potential impacts and objectives, such as ensuring value to the system and avoiding cost-shifting within the rate base.

We look forward to sharing the Province's next steps and policy direction on net metering in the upcoming Long-Term Energy Plan.

I'll now ask ADM Kaili Sermat-Harding, to outline in more detail the work we have done to improve net metering and the work that is ongoing that would further expand net metering opportunities.

ADM response

Thank you Deputy, I am pleased to have the opportunity to discuss how we continue to look for opportunities to enhance the net metering framework to improve customer access to renewable energy and enable innovative net metering business models.

Net metering is enabled through regulation (O. Reg. 541/05: Net Metering), which requires electricity distributors to offer net metering to their customers upon request. The Net Metering Regulation has been in place since 2005.

Ontario electricity consumers can participate in net metering by applying to their Local Distribution Company (LDC) to connect solar panels, or other renewable generation, to their home, business or community building to offset their electricity use and be eligible to be billed on a net-metered basis.

Ontario's 2013 LTEP committed the Ministry to "examine the potential for microFIT to transition from a generation purchasing program to a net metering program" and recognized the opportunity to expand and enhance the existing net metering framework.

Further direction on the transition of the microFIT program to net metering was outlined in the Minister of Energy's 2016 Mandate Letter, which provided that the FIT and microFIT standard offer programs would wind down, and updating and streamlining the net metering framework could reduce load on the electricity system and enable innovative technologies and customer-utility relationships.

In July 2016, after analysis and consideration of stakeholder feedback, Ministry staff presented a phased approach to updating the net metering framework for government consideration:

- The Part 1 Updates were to include near-term regulatory updates under existing regulatory authority, and;
- Part 2 Updates would involve additional potential updates to the net metering framework that would require legislative as well as regulatory amendments to implement.

Part 1 Updates

On August 19, 2016, the Ministry posted proposed amendments to the Net Metering regulation on the Environmental and Regulatory Registries for public comment.

On February 8, 2017, the approved Part 1 amendments were filed and posted on e-laws. The amendments came into force on July 1, 2017 and included:

- Removal of the 500 kilowatt (kW) project capacity size limit to allow for any sized renewable energy generation system, subject to the system being used primarily for the generator's own use;

- Allowing for the use of energy storage and its recognition for the purposes of net metering;
- Clarification that the valuation of bill credits from exported generation will remain consistent with the rate the customer is charged for electricity consumed;
- Clarification of the carryover period for bill credits at a consecutive 12 month period; and
- Allowing participants with existing net metering agreements to choose to opt into the updated terms, or to maintain their existing agreements.

The August 2016 Environmental and Regulatory posting also communicated several non-regulatory actions to be taken by the Ministry and the OEB.

Ministry actions included:

- Undertaking a cost-benefit analysis to determine whether investments in Ontario's Meter Data Management and Repository should be made to enable time-of-use (TOU) billing;
- Improving the availability of net metering program information; and
- Undertaking a cost-benefit evaluation of the program every three years, if required, coinciding with the Long-Term Energy Plan cycle.

OEB actions included:

- Developing a standardized net metering application and agreement, with consideration for streamlining processes;
- Collecting net metering information from electricity distributors at more frequent intervals to monitor implementation of the initiative; and
- Improving the availability of net metering program information.

The Ministry has taken steps to meet the non-regulatory commitments in the Environmental and Regulatory Registries posting, including:

- In June, 2017 the Ministry initiated engagement with LDCs and the IESO on a cost-benefit analysis for implementing TOU billing, and;

The Ministry has made more information on net metering available on its website and will continue to engage the OEB on improving net metering information available to LDCs and the public.

The OEB is undertaking the following steps to meet its commitments:

- On May 25, 2017, the OEB issued a Notice of Amendment to the Distribution System Code (DSC) to ensure requirements in the Code for net metering are consistent with the amended net metering regulation.

The OEB is also conducting their own Net Metering Consultations with LDCs and has formed a Net Metering Working Group. The consultations are intended to inform approaches to:

- Improving the availability of information on net metering;
- Improving process efficiency by 'standardizing' net metering applications and agreements;
- Enhancing how net metering activity is tracked via the OEB's Reporting and Record-Keeping Requirements (RRR);
- Modifying the DSC in relation to the maximum cumulative generating capacity from net metered generators; and
- Managing and recovering distributor administrative costs related to net metering.

Part 2 Updates

Third-party Ownership (TPO) and Virtual Net Metering (VNM) emerged during stakeholder consultations for Part 1 Updates as two potential areas for further enhancements to Ontario's net metering framework.

- TPO arrangements involve third parties owning and operating net-metered renewable generation systems located at electricity customer sites and selling the power generated to the customer. This could provide a property owner with an opportunity to participate in a net metering project without incurring the upfront capital cost of installing the system or the obligation to maintain the system.
- VNM involves net metering of generation that is not located at the customer site and selling power "virtually" to one or more participants, who receive a credit on their electricity bills for a power the system exports to the grid. VNM projects can enable larger scale projects with participation of many customers. VNM could expand participation in net metering to include condos, apartments, co-ops, and other shared generation arrangements, thereby providing greater consumer access to renewable energy.

In early 2017, the Ministry held specific stakeholder consultations on TPO and VNM, including a public webinar, stakeholder questionnaire, targeted meetings with stakeholders and Indigenous groups and continued engagement with our Advisory Working Group, we received input.

Stakeholder Engagement

Outcomes of the Ministry's stakeholder and Indigenous engagement have informed policy options.

On Third-Party Ownership (TPO) we heard that:

- The renewable energy industry supports TPO, citing it as important to continued activity in Ontario;
- The business models, target markets and project configurations the sector is contemplating would largely be enabled by eligibility of TPO in Ontario's net metering framework, leading to new business opportunities;

- LDCs, and LDC affiliates, support TPO, subject to appropriate consumer protection measures and clearly defined relationships between LDCs, customers and TPOs.

On Virtual Net Metering (VNM) we heard that:

- There was support from municipalities for a VNM framework that included municipal and institutional buildings.
- LDCs were supportive of VNM, depending on scoping and implementation but expressed some concerns about billing and administrative challenges to accommodate complex VNM projects;
- The renewable energy sector supports VNM as it could enable large projects (up to 10MW) that could be marketed as community net metering to large numbers of customers, and;
- Flexibility for VNM demonstration projects was suggested by some LDCs and industry proponents as an alternative to implementing a regulatory requirement for VNM;

The Ministry continues to engage with the OEB on implementation considerations and consumer protection.

Time of Use (TOU) Compensation for Net-Metered Customers

ENERGY is considering the costs and benefits of enabling TOU settlement for net-metered customers in Ontario. Net-metered customers are currently settled using tiered rates due to limitations with the province's Meter Data Management and Repository (MDM/R).

ENERGY has issued a survey to all LDCs to collect data on the costs and benefits of implementing TOU settlement and is also currently engaged with the IESO Smart Metering Entity (SME) to determine the costs of upgrades to the MDMR. The survey period has now closed and 27 responses were received.

We are aiming to complete our analysis later this year.

Conclusion

The extent of the work the Ministry is undertaking demonstrates a measured approach to enhancing the Province's net metering framework and a commitment to evidence-

based policy that considers all potential benefits and cost impacts to electricity distributors, ratepayers, and business.

It also demonstrates the level of interest in these changes from the sector, customers and LDCs alike. As customer needs and utility business models evolve, net metering will play an important role in the way we consume electricity and in the way it is supplied. Ontario is taking a leadership role in developing the policies that balance the need for clean, reliable and affordable energy now and in the future.

As the Deputy has mentioned, the upcoming LTEP scheduled to be released this fall will provide detail on the additional changes to the province's net metering framework that are being proposed at this time.

Energy Storage

Preamble: The action your Ministry has taken in eliminating coal and supporting renewable generation has been remarkable. But I have also heard that many of our renewable generation sources, such as solar and wind, are intermittent generation sources. This means that they are not always available to generate electricity. Wind Turbines for instance, generate mostly at night, while solar panels generate during the day.

But electricity storage technology can help with this. I've heard from several constituents about electricity storage solutions, such as pumped storage and batteries, and how we could harness them to increase reliability.

Q11: Could you please tell us whether the government is moving forward with Electricity Storage solutions and/or ideas?

Minister response

Energy storage technologies have the potential to revolutionize the electricity system, increasing its efficiency, lowering costs and increasing reliability for the consumer.

The IESO has completed procurement of 50MW of energy storage projects that will demonstrate the ability of energy storage to provide ancillary services to support the electricity system. The first of these projects should come into service later this year.

The IESO has published a report on the opportunities for energy storage to provide services to the Ontario electricity system. The Ministry has commissioned a further report on the opportunities for energy storage within the distribution networks. From

these reports, we learned that there are significant opportunities for energy storage to provide services to Ontario's grid in the coming decades.

Our efforts have led us to recognize that barriers remain to gain full value from energy storage and allow it to compete fairly with other technologies. Accordingly, we will move to amend government regulations to address charges that inhibit the ability of energy storage to compete fairly with other technologies, including how these facilities are charged Global Adjustment. This is just one way we continue to apply the lessons from our studies and our 50MW procurement to support energy storage in a prudent way.

DM response

Electricity production must be matched to consumption at all times, and flexible sources of generation are dispatched by the system operator to maintain this balance.

Storage changes this dynamic for the electricity sector. We're all aware of energy storage in more conventional forms – fuels like coal and gasoline – and even hydroelectric storage through reservoirs and pumped storage facilities that store water for later use.

However, old technologies like batteries are changing, and new technologies like flywheels and compressed air storage are now being tested to better understand how the work on the system.

Ontario is one of these leaders in energy storage. What works in one jurisdiction may not work in another, so in order to discover how energy storage could benefit Ontario's electricity system, the province has moved forward on several different initiatives to build this knowledge.

These steps – a targeted energy storage procurement, independent studies, innovation funding – show a prudent and balanced approach to building our knowledge of how storage can work on Ontario's grid. These learnings will instruct the path forward for energy storage in Ontario.

ADM response

I would like to step back a bit and provide some more details. Energy storage is a promising technology that has a number of different applications for Ontario's electricity system:

- It can be used to help balance electricity supply and demand on a second-by-second basis;
- It can balance the intermittency inherent in solar and wind generation, increasing the value of our renewable assets to the system;
- It can help improve system reliability;
- If appropriately located, it can defer the need to replace system assets; and,
- It can provide other technical services, such as voltage control.

In the last Long-Term Energy Plan, the government committed to including storage technologies in our procurement process, starting with 50 MW of storage.

The Independent Electricity System Operator (IESO) completed the 50 MW procurement over two phases.

In Phase 1, 33.5MW of storage was procured from 5 providers with 12 different projects. Four different types of technologies were represented in this phase: flywheel, hydrogen, thermal, and battery storage.

These technologies are expected to come online by the end of the year and provide regulation and voltage control for the IESO grid.

In Phase 2, 16.75 MW of storage was procured from 4 providers with to 9 different projects.

Three different types of technologies were represented in this phase: flow batteries, solid batteries, and compressed air energy storage.

The purpose of this second stage is to provide long-term capacity services to Ontario's grid. These projects are expected to come online in late 2018.

Ontario's procurement is unique, because of its quick implementation and its competitive framework.

This procurement was based on a real commercial process, similar to those applied to contracting for energy service for the Ontario market, with concrete commercial terms of operation and performance requirements.

Consider just four types of technology:

- An example of a Flywheel project is one in Harriston, where the company NRStor is using Temporal Power's flywheel system to provide regulation services to the Ontario grid. This is the first first grid-connected commercial flywheel facility in Canada, and has now led to Temporal Power's first export success to the island of Aruba.
- Batteries: Thanks to eCamion and Toronto Hydro, we have the first energy storage system installed directly into an urban community, at the Roding Arena and Community Centre in North York. A system like this one, which can power a community centre, a light industrial complex or small residential street, can lessen the strain on the system at times when we're experiencing peak demand.
- Underwater compressed air: This utility-scale solution promises to hold power for weeks without losing capacity. Another Ontario company, HydroStor, is leading the way on this one, collaborating with Toronto Hydro on the world's first underwater compressed air storage project, located near the Toronto Islands.
- Pumped storage: Ontario Power Generation's Adam Beck facility is the largest and most flexible energy storage facility in Canada. The reservoir will hold 20 million cubic metres of water, and can do the work of 600 MW of fossil fuel generation for up to eight hours. With its recent refurbishment, we can look forward to another 50 years of service from this facility.

The Ministry also committed in the Long-Term Energy Plan to study the value of energy storage and its many applications.

In March of this year, the IESO completed a study on the benefits of storage to the bulk system.

The IESO report found that Energy storage technologies can be used to provide some of the services needed to reliably operate the power system.

Energy storage could also help improve the utilization of existing transmission and distribution assets by deferring some costs associated with their upgrades or refurbishments, as well as improve the quality of electricity supply in certain areas of the system by controlling local voltages.

That said, energy storage needs to be considered as complimentary to our current assets that provide services to the grid. It's also important to note that location and energy storage technology types are important considerations in understanding their value for a particular service to our bulk system.

The Ministry has recently completed a study to understand the potential value of energy storage at the distribution level, which we will soon release.

This report found that beyond grid services, energy storage can be effective in helping large energy customers to reduce their electricity bills.

Both of these studies highlight that while the cost of energy storage devices are going down, they remain expensive. Further, they can provide a range of different benefits, but realizing those benefits depends a great deal on how the electricity system is structured, operated, and regulated.

The government is also committed to address barriers that limit the ability of energy storage technologies to compete in Ontario's electricity market.

For example, the OEB has created a new asset class for storage, while recent changes to Ontario's net metering framework now explicitly permit energy storage coupled with renewable energy to participate in the program.

There are other barriers that the Ministry continues to investigate. For example, our study on energy storage on distribution networks found that the way in which Global Adjustment charges are applied to energy storage is the single biggest regulatory barrier to the use of energy storage at low voltages, and that addressing the treatment of Global Adjustment for energy storage would substantially improve its competitiveness.

The Global Adjustment is just one barrier that the Ministry plans to address in the coming weeks. Some energy storage applications may be charged Global Adjustment on the energy they take from the grid, but are not reimbursed for the energy they return. Meanwhile, the end-customer who consumes the energy released by the storage facility pays Global Adjustment as well – meaning that we are collecting the fee twice. This reduces the competitiveness of energy storage, and fails to recognize the value it provides to the grid by releasing energy during times of peak demand.

The Ministry plans to move ahead to amend the regulation that governs the Global Adjustment to address this issue, and ensure that energy storage can compete on a level playing field with other technologies.

This is just one of the barriers that energy storage faces in Ontario. Ministry and agency staff will continue to work to find a clear path forward on these issues.

The Ministry is also encouraging storage technology through our Smart Grid Fund. One of the key elements of the Smart Grid Fund is to focus support on demonstrating technologies that have commercial applications domestically and abroad.

Several of the Ministry's Smart Grid Fund projects include energy storage. Here are just a few:

eCamion is developing three storage in Toronto, Sudbury, and Ottawa. Each of these projects is unique and will help eCamion to demonstrate the value of storage under different applications. In November 2016, the Minister opened the Sudbury site. This technology uses three energy sources: solar panels, a battery bank to store the power, and electricity from the Greater Sudbury Hydro's local distribution grid. This project will help Science North – Canada's second-largest science centre – reduce its dependence on the electricity grid and gain greater influence over their consumption.

Ryerson's Centre for Urban Energy is working with Toronto Hydro to test a world-first, pole-mounted storage device. Since it is mounted on a pole, this device has no footprint. The unit intelligently charges during off-peak times, and provides electricity during peak hours to support a nearby transformer.

Other projects include Panasonic's efforts to include a battery into a larger microgrid at University of Ontario Institute of Technology to support reliability and resiliency on campus. Renewable Energy Systems is developing an energy storage system to support a local distribution company's substation. Upon completion, this project will not only improve the quality of supply for those customers connected to the substation. It will allow the LDC to defer investment that would otherwise be necessary to upgrade the substation.

These initiatives will provide a much better understanding of the value of energy storage on Ontario's electricity systems, information that is critical to determine the path forward for this technology in the province.

As you know, the Ministry will soon release the next Long-Term Energy Plan. It will build on our learnings from our prudent approach to energy storage. Like other non-wires alternatives, there are barriers that prevent Ontario's distribution companies from investing in energy storage in ways that make sense for the system and for ratepayers. As part of our LTEP process, we will work with our agencies to address these barriers

and create the right environment for utilities to modernize their grids. These efforts should create new opportunities to capture the full value of energy storage.

Climate Change Action Plan (CCAP)

Preamble: With the unusually hot weather this past September, I think we can all agree that we're feeling the effects of climate change. In June 2016, the government released its first five-year Climate Change Action Plan (CCAP). Ontario's Climate Change Action Plan will provide people and businesses with tools and incentives to accelerate the use of clean technology that exists today. Through this plan, the province is continuing to reduce greenhouse gas emissions to fight climate change.

Building on Ontario's climate change legislation, the plan ensures that proceeds from the province's recently finalized cap and trade program are invested in a transparent and accountable way back into green projects that will help households and businesses reduce greenhouse gas pollution and save on their energy costs.

Q12: How is the electricity sector contributing to the province's battle against climate change?

Minister Response

Ontario has been taking strong climate-positive actions for years, such as successfully eliminating coal as a source of electricity generation and developing a long-term energy plan that focuses on a safe, clean, reliable and affordable energy future.

The Ministry of Energy is continuing to work closely with the Ministry of Environment and Climate Change (MOECC) and its agencies to develop and implement a variety of initiatives outlined in Ontario's Climate Change Action Plan (CCAP) and have taken into consideration Ontario's greenhouse gas (GHG) emissions reduction targets in the development of the 2017 Long-term Energy Plan (LTEP).

I'd ask that my Deputy Minister Serge Imbrogno provide further details on the electricity sector's contribution to Ontario's fight against climate change.

Deputy Minister Response

Ontario has taken significant action to reduce greenhouse gas (GHG) emissions from the electricity sector through the elimination of coal-fired electricity generation and associated investments in emissions-free generation.

The elimination of coal-fired generation represents a 30 megatonne (Mt) reduction in GHG emissions since 2003. In 2016, 90 per cent of the grid-connected power generated in Ontario came from clean sources of energy such as nuclear, water and other renewables. As a result of these efforts, Ontario's electricity system is in a strong position as the province transitions to a low-carbon economy.

I'd ask that Assistant Deputy Minister Steen Hume provide further details on how Ontario's electricity sector is responding to the challenge of climate change.

ADM Response

By way of background, in April 2015, Premier Wynne announced that Ontario would be putting a limit on greenhouse gas (GHG) emission through the implementation of a cap and trade program, which is a flexible, market-based program with targets (caps) that get more stringent over time. It should be noted that Ontario's caps are set at a broader economy-wide level rather than by sector.

Ontario has recent announced that it has to joined the cap and trade program that Quebec and California have implemented and which was developed under the Western Climate Initiative (WCI).

Ontario's cap and trade program will support implementation of the Climate Change Action Plan (CCAP) and help meet it's our greenhouse gas (GHG) emission reduction targets of:

- 15% below 1990 levels by 2020;
- 37% below 1990 levels by 2030; and
- 80% below 1990 levels by 2050.

On January 1, 2017, Ontario's cap and trade program took effect. So far, Ontario has successfully administered its first three quarterly cap and trade auctions in March, June, and September 2017. All current (2017) allowances that were offered at the auctions were sold (along with a portion of the offered future vintage allowances). Total proceeds for the province were approximately \$1.5 billion.

By law, all proceeds from cap and trade will be invested into projects that support greenhouse gas (GHG) reductions. This will:

- Create good jobs in clean tech and construction;
- Generate opportunities for investment in next generation clean technologies; and
- Help Ontario decarbonize by shifting away from fossil fuels.

Decarbonisation of Ontario Electricity System

We respect to the decarbonisation of Ontario electricity system. In 2003, when Ontario committed to the phase-out of coal, coal-fired generation provided 25 per cent of Ontario's electricity and represented the largest single source of greenhouse gas (GHG) emissions in Ontario. A 2005 independent study estimated the financial and environmental impacts of coal-fired electricity had an annual cost of \$4.4 billion.

Phasing-out coal-fired electricity generation represented the single largest climate change initiative in North America. In April 2014, Ontario burned its last piece of coal for electricity generation.

The elimination of coal-fired generation has led to a 30 Mt reduction in greenhouse gas (GHG) emissions, the equivalent of taking up to 7 million cars off the road.

Ontario was the first jurisdiction in North America with a significant reliance on coal-fired electricity to eliminate it as a source of electricity production. The phase-out has also helped in meeting Ontario's greenhouse gas (GHG) emission reduction targets.

Ontario's Supply Mix

In addition, between 2005 and 2015, the share of installed renewable energy capacity in Ontario's electricity supply mix has grown from 26% to 40%. Ontario is now Canada's leading province for both installed wind energy capacity and solar photovoltaic capacity.

Currently, approximately 7,500 MW of non-hydro renewable generation (i.e., wind, solar and bioenergy) is connected to both the transmission and distribution networks in Ontario. In 2016, non-hydro renewables produced approximately 10.25 TWh of energy. By the end of 2016, there was more than 3,100 MW of embedded generation in commercial operation within local distribution systems.

According to the Independent Electricity System Operator's (IESO) 2016 Ontario Planning Outlook, greenhouse gas (GHG) emissions are expected to rise slightly following the retirement of the Pickering generation station in 2014, but will remain well below historical levels and stay relatively flat through to 2035.

Cap and trade is designed to limit GHG emissions and is a cornerstone in the province's measures to address climate change. All emissions from electricity generation are subject to a carbon price through the cost of fuel. Natural gas distributors purchase allowances to cover emissions of consumers that are not directly covered under cap and trade, including most natural gas-fired electricity generators. Natural gas-fired

electricity generators are expected to pass on the cost of carbon through increased offers into the wholesale electricity market. As a regulated entity, costs incurred by gas distributors to comply with the cap and trade program would be passed on to natural gas consumers once approved by the Ontario Energy Board (OEB).

Non-emitting electricity generation, such as wind and solar power, is not subject to a carbon price and therefore will not impact the price of electricity.

The addition of a carbon price as part of Ontario's cap and trade program to emitting electricity generators will also reduce the amount of electricity exported from natural gas-fired generators, further reducing Ontario GHG emissions.

Climate Change Action Plan

The Ministry of Energy is working closely with Ministry of Environment and Climate Change (MOECC), the Independent Electricity System Operator (IESO), the Ontario Energy Board (OEB) and other key energy sector stakeholders to implement a variety of Climate Change Action Plan actions.

The Ministry of Energy is currently supporting such Climate Change Action Plan (CCAP) items, such as:

- Energy efficiency and clean energy projects for homes, businesses and industry;
- Electrification of transportation;
- Programs to support renewable micro-grids and alternative energy projects to reduce diesel in remote First Nations; and
- Municipal programs, including community energy planning.

In closing, the Ministry of Energy has taken into consideration Ontario's greenhouse gas

(GHG) emissions reduction targets in the development of its upcoming Long-term Energy Plan (LTEP) and will continue to support the implementation of Ontario's Climate Change Action Plan (CCAP)

Nuclear Refurbishment

Preamble: Last year, your Ministry announced that it would go ahead with nuclear refurbishment projects at both the Darlington and Bruce generating stations, and continued operations at the Pickering generating station to 2024.

I've heard some concern in my riding from constituents who are questioning the need to extend the life of these nuclear facilities. On the other hand, I've heard of many benefits of the nuclear sector, including environmental and health.

Q13: Could you please provide the rationale behind the Government's decision to proceed with nuclear refurbishment? How is nuclear energy helping Ontario meet its climate change targets?

Minister Response

Our priority is to ensure that Ontarians have access to a reliable, affordable and clean supply of power where and when they need it.

To date, Ontario has taken significant action to reduce emissions from the electricity sector through the elimination of coal-fired electricity generation and associated investments in emissions-free generation, including the refurbishment and restart of 2 Bruce nuclear units.

Phasing-out coal-fired electricity generation was the single largest climate change initiative in North America and the equivalent of taking up to 7 million cars off the road.

Altogether, about 90 per cent of the power generated in Ontario during 2016 came from clean sources of energy such as water, nuclear, wind, solar, and bioenergy.

Our government is committed to nuclear power and is making important investments in nuclear generation. Nuclear power is the backbone of Ontario's electricity system.

Nuclear generation is reliable, cost-effective, GHG-free and currently provides about 60% of Ontario's energy needs.

Nuclear power plants are able to operate reliably and continuously, making them ideally suited to meet around-the-clock "baseload" energy needs (i.e., the minimum demand that is always present in the system).

In 2016, all 3 of Ontario's nuclear plants – Darlington, Bruce and Pickering – received "Satisfactory" or "Fully Satisfactory" ratings from the Canadian Nuclear Safety Commission (CNSC). In fact, Darlington has received the "Fully Satisfactory" rating for the eighth year in a row, the strongest continuous performance by any Canadian nuclear power plant.

Nuclear doesn't only power Ontario's economy, it drives it too. The nuclear industry supports tens of thousands of jobs and billions of dollars in economic activity annually.

As laid out in 2013 LTEP, Ontario is moving forward with plans to refurbish 10 nuclear units at Darlington (4 units) and Bruce (6 units) between 2016 and 2033.

The upgrade of Ontario's nuclear fleet will ensure we have safe, reliable, emissions-free energy where and when we need it and contribute to job creation and economic growth.

Furthermore, Ontario's nuclear reactors are vital for the production of medical isotopes that can diagnose and treat life-threatening diseases. These isotopes can also sterilize

medical equipment such as hospital gowns, gloves, masks, implantable devices and syringes, as well as some food products.

Our decision to refurbish our nuclear fleet will help secure the supply of these critically important, life-saving medical isotopes over the long-term.

Deputy Imbrogno will now speak in more detail about the merits of nuclear refurbishment.

Deputy Minister Response

Ontario has been safely operating nuclear power plants for over 40 years starting with the launch of Canada's first full-scale nuclear reactor, Douglas Point, back in 1968.

There are currently 18 operational reactor units in Ontario, spread across 3 sites (Darlington, Pickering and Bruce), for a combined capacity of about 13,000 MW. Another 2 units at Pickering have been shut down and undergoing decommissioning.

Ontario's nuclear reactors are designed to provide electricity generation for approximately 25 – 30 years. Refurbishment and replacement of key reactor and station components is necessary to allow for continued operation for approximately 30 additional years.

Nuclear refurbishment received strong, province-wide support during the 2013 Long-Term Energy Plan (2013 LTEP) consultation process.

The merits of proceeding with nuclear refurbishment are clear.

Refurbished nuclear is expected to be the most cost-effective and emissions-free generation available to Ontario for meeting its round-the-clock power requirements.

Existing nuclear generating stations are located in supportive communities and have access to high-voltage transmission.

The refurbishments at Bruce and Darlington will support Ontario's globally recognized nuclear supply chain, with more than 180 companies and over 60,000 jobs, including a highly-skilled workforce in plant operation and support, nuclear refurbishment and manufacturing supply chain.

Ontario's commitment to refurbish its nuclear fleet will also create a strong foundation for Ontario's nuclear suppliers to export their products and services to a global nuclear industry.

I'd ask Steen Hume, Assistant Deputy Minister of the Energy Supply Policy, to discuss in more detail the specific benefits and opportunities of the Darlington and Bruce refurbishments.

ADM Response

On December 3, 2015, the government announced that Ontario has updated its contract with Bruce Power and will proceed with the refurbishment of six nuclear units at the Tiverton-based nuclear generation station. The first Bruce refurbishment is scheduled for 2020.

Then, on January 11, 2016, the government announced its decision for OPG to proceed with the refurbishment of four units at Darlington, securing 3,500 MW of power. On October 15, 2016, OPG commenced the first unit refurbishment (i.e., Unit 2 refurbishment).

Together with the 2 Bruce units that were refurbished in 2012, these refurbishments will secure over 9,800 MW of affordable, reliable and GHG-free baseload generation capacity, and support GHG-reduction targets set by Ontario's Climate Change Action Plan.

The updated Bruce agreement secures 6,300 MW of emissions-free, baseload generating capacity from the Bruce site over the long-term. The updated agreement has achieved \$1.7 billion in savings for electricity customers when compared to the forecast in the 2013 LTEP. This means a reduction in forecast household electricity bills by about \$66 each year over the next decade.

Bruce Power is expected to invest approximately \$13 billion of its own funds and will take full risk of cost overruns on refurbishments of the six nuclear units

The Bruce site is estimated to maintain 22,000 direct and indirect jobs annually, with \$4 billion in annual Ontario economic benefits through spending on operational equipment, supplies, materials and labour income.

During the Bruce refurbishments, the Bruce site will provide an additional estimated 5,000 direct and indirect jobs annually, with \$2.3 billion in annual economic benefits.

For Darlington refurbishments, OPG's budget for the project is \$12.8 billion, about \$1.2 billion less than originally projected by OPG, and all four units are scheduled for completion by 2026.

The refurbishment of Darlington, now underway, is critical to Ontario's energy future. Darlington refurbishment will boost economic activity across Ontario, create jobs, and secure 3,500 MW of affordable, reliable and emission-free power for 30-plus years.

The Darlington refurbishment and continued operation up to 2055 will contribute \$90 billion to Ontario's GDP and increase employment by an average of 14,200 jobs annually, including over 2,600 jobs onsite at Darlington. Also, a report by an independent third party highlighted that Darlington refurbishment will help reduce Ontario's GHG emissions to the equivalent of taking two million cars off the road each year.

The average cost of power from Darlington nuclear units post-refurbishment is estimated to range between \$72/MWh and \$81 MWh, or 7 and 8 cents per kilowatt hour in 2015 dollars.

The starting price of the Bruce output under the updated refurbishment contract is \$65.73/MWh and estimated to be \$77/MWh over the life of the contract in 2015 dollars.

Both Darlington and Bruce prices are within the range assumed in the 2013 LTEP for refurbished nuclear energy and are lower than the average price of electricity generation in Ontario, which in 2015 was \$92/MWh.

Pickering, our first commercial nuclear plant facility, will not be refurbished once it reaches the end of its safe operating period. The Government approved a plan for OPG to complete confirmatory work and seek the necessary regulatory approvals from the Ontario Energy Board (OEB) and Canadian Nuclear Safety Commission (CNSC) to enable ongoing operation of the Pickering Generating Station up to 2024.

At that point, all Pickering units would be shut down and decommissioned. Operating Pickering up to 2024 would ensure that the province has a reliable, affordable and emission-free source of "round the clock" power during the Darlington and initial Bruce refurbishments.

As the Minister mentioned, in addition to powering our economy, our nuclear reactors have broader societal benefits, such as production of key medical isotopes.

Medical isotopes are currently produced in a number of Ontario's nuclear power and research reactors, including:

- Ontario nuclear power reactors: Bruce B and Pickering reactors; and
- Ontario Research reactors: National Research Universal (NRU) reactor at the federal Canadian Nuclear Laboratories (Chalk River, Ontario) and McMaster Nuclear Reactor at McMaster University (Hamilton, Ontario).

Cobalt-60 is one of the most prominent medical isotopes produced in Ontario's reactors. Cobalt-60 is primarily used in medical equipment sterilization and cancer treatments.

Ontario's power reactors (i.e., Bruce B and Pickering) currently supply 70 per cent of the world's Cobalt-60, which is used to sterilize medical equipment such as hospital gowns, gloves, masks, implantable devices and syringes. Cobalt-60 has also recently been used to sterilize mosquitoes to stop the spread of mosquito-borne viruses and illnesses such as Zika; and

A special form of Cobalt-60, known as High Specific Activity Cobalt (or HSA Cobalt) accounts for 10 million cancer therapy treatments each year around the world. Until now it has mostly been produced at the NRU.

Ontario's research reactors produce a number of other medical isotopes (e.g., Molybdenum-99, Lutetium-177, Iodine-125) that play a critical role in the diagnosis and treatment of critical diseases.

With NRU slated to be shut down by March 2018 and Pickering by 2024, Ontario's refurbishment program is helping to secure the supply of these critically important medical isotopes over the long-term.

- On November 7, 2016, OPG and Bruce Power signed a memorandum of understanding (MOU) to ensure a continued long-term stable supply of life-saving Cobalt-60. The companies will look for innovative ways to expand Cobalt-60 production to the Darlington and Bruce A facilities;

- On November 8, 2016, Nordion and Bruce Power announced a new long-term supply agreement for Cobalt-60 - including HSA Cobalt - over the life of the updated Bruce refurbishment contract (i.e., until 2064); and
- On August 8, 2017, Bruce Power and Areva signed an MOU to explore the *on-line production* of medical isotopes (i.e., a process that allows insertion and harvesting of isotopes during normal reactor operation as opposed to during maintenance outages). Such a capability would allow the production of shorter-lived medical isotopes (e.g., Molybdenum-99, Lutetium-177 and Iridium-192) which are currently only produced by research reactors such as NRU and McMaster Nuclear Reactor.

Q14: What are the benefits of OPG's plan for ongoing operation of the Pickering station?

Minister Response

In January 2016, the government approved a plan for OPG to complete confirmatory work and seek the necessary regulatory approvals from the Ontario Energy Board (OEB) and Canadian Nuclear Safety Commission (CNSC) to enable ongoing operation of the Pickering Generating Station up to 2024. At that point, all Pickering units would be shut down and decommissioned.

The government approval was based on promising early technical and economic assessments by OPG as well as IESO which indicated the potential for net savings for Ontario's electricity consumers as a result of operating Pickering up to 2024.

Operating Pickering up to 2024 would also ensure that the province has a reliable, affordable and emission-free source of "round the clock" power during the Darlington and initial Bruce refurbishments.

Ongoing operation of Pickering would protect 4,500 jobs across Durham region, avoid 8 million tonnes of greenhouse gas emissions, and save Ontario electricity consumers up to \$600 million.

OPG will need to satisfy the CNSC of Pickering's ability to operate safely up to 2024.

CNSC will not allow Pickering to operate to 2024 unless it is satisfied that safety of the public and the environment can be assured during this period.

OPG will seek final government approval to proceed with ongoing Pickering operating up to 2024 after receiving the necessary regulatory approvals.

Deputy Imbrogno will now expand on the role of Pickering in our electricity system.

Deputy Minister Response

Pickering plays an important role in meeting our energy needs.

Pickering Nuclear Generating Station is our first commercial nuclear power plant facility. Pickering nuclear units were put into service between 1971 and 1986. Two of the eight nuclear reactors at Pickering have since been permanently shut down and are currently undergoing decommissioning.

Pickering currently provides 3,094 megawatts of system capacity through its six operating nuclear units and plays a key role in maintaining Ontario's grid reliability.

Pickering supplies approximately 14% of Ontario's electricity, enough to serve a city of approximately 1.5 million.

2013 LTEP assumed that Pickering would operate until 2020 before being shut down. This is based on the CNSC's approval that the key reactor components (i.e., reactor pressure tubes) would be able to safely operate through that period.

Since then, OPG has undertaken technical analysis and assessments on the condition of key equipment and expressed confidence in Pickering's ability to safely operate to 2024.

Steen Hume, Assistant Deputy Minister of the Energy Supply Policy, will provide more detail about the regulatory approvals required and the benefits of ongoing operation of Pickering up to 2024.

ADM Response

Like all nuclear power plants in Canada, the Pickering Nuclear Generating Station is licensed by the CNSC, which regulates the use of nuclear energy and materials to protect health, safety, security and the environment through the Federal government's *Nuclear Safety and Control Act*.

CNSC licensing of nuclear power plants is comprehensive and covers topics such as radiation protection, emergency preparedness, environmental protection and equipment fitness for service.

CNSC continuously monitors all of Ontario's nuclear power plants, including Pickering, and ensures that they operate safely at all times. In 2016, Pickering received the highest safety rating – "Fully Satisfactory" – from the CNSC for the second year in a row.

Pickering's current operating licence expires in August 2018.

On August 28, 2017, OPG submitted its Pickering operating licence renewal application along with supporting documentation to the CNSC for a 10-year period, from

September 1, 2018 to August 31, 2028. The licence renewal application encompasses three phases of operational activities over the proposed licence term:

1. Continued commercial operation until 2024;
2. Stabilization phase (post-shutdown defueling and dewatering); and
3. Early period of a Safe Storage phase.

OPG has undertaken work in three technical assessment areas to support the Pickering licence application:

- Periodic Safety Review (PSR) is being performed to evaluate the extent to which Pickering conforms to modern codes, standards and practices. Potential safety enhancements will then be assessed to identify the alternatives that can be reasonably and practicably implemented to improve safety during the four years of additional operations.
- Fuel channels (key reactor core components) are currently assumed to be the life-limiting component of the Pickering units. Technical work on the fuel channels' fitness-for-service will continue through the Fuel Channel Life Assurance Project and ongoing inspections. The work program consists of analysis and research and development work to assess fuel channel fitness-for-service for the planned operating durations and to develop methods for assuring that each Pickering unit can meet its target service life.
- Component Condition Assessments are being performed for other major components to validate their fitness-for-service to the planned operation dates.

OPG expects to spend an additional \$307 million between 2016 and 2020, in order to enable ongoing Pickering operation up to 2024. As a rate-regulated asset, all costs to enable ongoing Pickering operation will be subject to review and approval by the OEB through a public and transparent process to ensure they are prudently incurred.

The estimated cost of the additional power from Pickering between 2020 and 2024 is \$65 per megawatt-hour (MWh), lower than the average price of electricity generation in Ontario, which in 2015 was \$92 per MWh.

The net savings of up to \$600 million to Ontario electricity ratepayers from Pickering operation up to 2024 would be achieved by:

- Reducing the need to construct and operate more expensive replacement natural gas-fired generation, as well as reducing electricity imports, during the Darlington and initial Bruce refurbishments;
- Deferring transmission grid reinforcements in the Greater Toronto Area (GTA) that would be necessary once Pickering shuts down permanently;
- Deferring costs for Pickering station closure (e.g., severance costs for 4,500 employees); and
- Deferring expenditures for Pickering station decommissioning.

In addition to providing savings for ratepayers, reducing our reliance on gas-fired generation by using emission-free Pickering generation would avoid the 8 million tonnes of greenhouse gas emissions up to 2024 as mentioned by the Minister.

Support for First Nations

Preamble: I have also heard that as part of the Fair Hydro Plan, there were measures introduced to help First Nations customers out with the cost of their delivery charges.

Q15: Could you please expand on what this program does, and how it will provide relief for First Nations who live on reserve?

Response

The FNDC provides a credit equal to 100% of the delivery charge for all on-reserve First Nations residential customers served by licensed electricity distributors (LDCs). For those First Nations residential customers served by an LDC that are charged a bundled rate and do not have a delivery charge, we are providing a credit equal to the monthly service charge. The Ontario Energy Board estimates that the First Nations Delivery Credit will provide residential customers an average monthly benefit of \$85 (or \$1,020 per year).

In total, there are about 21,500 on-reserve First Nations residential customers served by LDCs who may be eligible. The distribution rate relief provided through the First Nations Delivery Credit (FNDC) will offset potential rate increases, if any, approved by the OEB for these customers.

Natural Gas Grant Program

Preamble: We know that when people heat their homes with electricity, their bills can be significantly higher in the winter. That's why access to natural gas is so important. Yet still, I sometimes hear stories from constituents across the province that have a tough time getting connected to natural gas. For some, the cost is a significant factor.

Especially some rural and remote communities have difficulty getting connected.

Q16: Could you please expand on what the government is doing to expand natural gas access to rural and remote communities?

Minister Response

In April 2017, the government launched the new Natural Gas Grant Program to facilitate the expansion of natural gas service into areas of the province that currently do not have access to natural gas.

The Natural Gas Grant Program is a \$100 million initiative, part of the province's \$31.5 billion *Moving Ontario Forward plan*, and is led by the Ministry of Infrastructure (MOI), with support from the Ministry of Energy and the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA).

The Natural Gas Grant Program will assist communities in gaining access to natural gas and support natural gas expansion projects with economic development potential.

I'd ask that my Deputy Minister Serge Imbrogno to expand on the Natural Gas Grant Program.

Deputy Minister Response

Ontario is expanding access to natural gas for communities that do not currently have service, including those in rural and northern Ontario and First Nations communities. Natural gas is an important heating source in Ontario and can be cheaper than alternative sources such as propane, heating oil and electricity.

Ontario's Natural Gas Grant Program will support natural gas expansion projects in municipalities, First Nations and unincorporated areas. Projects to expand natural gas pipelines as well as liquefied or compressed natural gas infrastructure are eligible.

The application window for the Grant Program closed on July 31, 2017. MOI is currently reviewing all applications for funding.

Natural gas expansion in Ontario is overseen by the Ontario Energy Board (OEB) and managed by private sector natural gas distribution companies.

I will now ask my Assistant Deputy Minister to provide additional details on the Natural Gas Grant Program.

ADM Response

Ensuring affordable sources of energy are available to more rural and northern communities is a key part of Ontario's energy plan. Natural gas access can help stimulate the economy by attracting new industry to Ontario, making commercial transportation more affordable, benefiting Ontario's agricultural producers and providing consumers with more energy choices.

MOI's inter-jurisdictional analysis of the Natural Gas Grant Program shows Ontario in a unique position in terms of the size and scope of provincially administered natural gas expansion programs:

- Alberta, allocates funding to a natural gas umbrella organization, the Federation of Alberta Gas Co-ops, which oversees the expansion of natural gas service to rural communities; and
- In Saskatchewan and Manitoba, provincial energy corporations provide loan programs to promote energy-efficient upgrades, including fuel switching to natural gas.

In April 2017, the government launched the new Natural Gas Grant Program to facilitate. The Natural Gas Grant Program has two separate application streams:

- Expansion Stream: Projects that are primarily aimed at converting residential dwellings to natural gas. A total of \$70 million of funding is available for these projects.
- Economic Development Stream: Projects that will assist with connecting business to natural gas and benefit agri-businesses, rural Ontario, First Nations communities or unincorporated areas. For example, projects that will help connect farms, greenhouses, manufacturing facilities, mining operations, etc. A total of \$30 million in funding is available to support these projects.

Applications to the Grant Program must be made by the natural gas distributor or supplier and have the written support of the respective municipality, First Nation or unincorporated area. Property owners cannot apply for funding under the Natural Gas Grant Program.

MOI established a review process that utilizes set criteria to determine the projects that will benefit most from access to the grant funds, and prioritizes approvals accordingly. Approvals under the Grant program will also be conditional on the project receiving all necessary approvals from the Ontario Energy Board (OEB).

Consistent with the OEB's efforts to encourage competition, multiple applications to provide service to the same project area by different distributors or suppliers are acceptable under the Natural Gas Grant Program. Where there are competing grant applications for the same community, grant funding will only be provided to the project approved by the OEB.

The application window for the Grant Program closed on July 31, 2017.

Applications and supporting documentation are being assessed by technical reviewers from Infrastructure Ontario, MOI, OMAFRA and ENERGY. The selected projects will then require Ministerial approvals.

Natural Gas Grant Program Guidelines

All projects under the Natural Gas Grant Program must be for new connections or increased volumes of natural gas. Prospective connections to new residential or commercial developments that have yet to be built are excluded.

Prospective connections, such as for the attraction of new business and investments, may be included under the Economic Development Stream with appropriate supporting evidence showing when these connections would occur and how they would benefit the area.

The Natural Gas Grant Program funding may only be used towards:

- Capital projects to build new natural gas pipelines or compressors and other related capital works; and
- Capital projects to build liquefied or compressed natural gas infrastructure, including pipelines, compressors, liquefaction facilities, re-gasification facilities, storage facilities and other related capital works.

However, it should be noted that operational and maintenance costs and the cost of purchasing gas are not eligible for funding under the Natural Gas Grant Program.

Applications will only be considered when Municipalities and First Nations participate in the following manner:

- Make a financial contribution towards project costs. The contribution should be, at minimum, equivalent to the property tax (or other levies in the case of First Nations) that would be recovered on the new infrastructure being built for a period of 10 years. How this contribution will be made (e.g. up front or over time, through municipal loans, etc.) is up to the discretion of the municipality or the First Nation in consultation with the natural gas distributor or supplier. Alternatively, municipalities or First Nations may provide evidence either separately or as part of the application to explain why making such a contribution is not feasible.
- Provide a supporting council or band council resolution. The resolution must, at minimum indicate:
 - The municipality or First Nation is supportive of the project to provide natural gas access to their jurisdiction;
 - The municipality or First Nation are willing to make a financial contribution to the natural gas expansion project should it be approved by the Ontario

Energy Board. The contribution would be, at minimum, equivalent to the property tax that would be recovered on the new natural gas infrastructure being built for a period of 10 years beginning from the time that property taxes first become due; and

- Municipalities and First Nations are expected to estimate the amount of property taxes that would be recovered over ten years for the purposes of completing the application form but are not required to specify this amount as part of the municipal or band council resolution since the actual amounts may vary.
- Finally, for applications under the Economic Development Project Stream only, municipalities and First Nations must provide supporting evidence for economic development benefits that natural gas access will bring to the community and/or region. Municipalities and First Nations must have worked with the natural gas distributor or supplier to include this information in the application form. The natural gas distributor or supplier must enter into a contractual agreement with municipalities and First Nations that were making contributions to the natural gas expansion project.

Evaluation Criteria

There are two separate project streams in order to ensure the Natural Gas Grant Program supports both improved access to natural gas as well as economic development in communities. Each has specific evaluation criteria.

In Expansion Stream, the evaluation criteria include:

- Cost-Effective Access: Projects will be assessed based on the number of new connections that are made possible relative to the amount of grant funding requested; and
- Energy Affordability: Projects will be assessed based on how much the community is currently paying in annual heating costs.

In the Economic Development Stream the evaluation criteria include:

- **Economic Development:** The expected economic benefits to businesses (e.g., agriculture, forestry, mining, manufacturing etc.) that support rural Ontario, First Nations or unincorporated areas. This could also include benefits to registered farming businesses and/or agri-businesses including grain elevators, feed manufacturing facilities and crop input supply businesses located anywhere in Ontario; and
- **Energy Cost Savings:** Expected energy cost savings to businesses with greater consideration expected for those projects that accommodate a higher density of connections to the pipeline (e.g., clusters and collaborative ventures such as business parks or corridors).

Additional criteria that both Streams are evaluated against include:

- **Project Revenues and Customer Engagement:** The extent to which various rate options were considered and whether the proposed rate(s) reflects feedback from the community being served;
- **Greenhouse Gas Emissions:** The impact the projects will have on reducing greenhouse gas emissions; and
- **Partnerships and Innovation:** How the projects leverage partnerships and innovative approaches to make the undertakings more economical (i.e., lower project costs or improve project revenues) or provide better outcomes.
- **Geography:** Additional consideration will be given to projects that are in northern areas of the province or located within First Nations Reserves.

Regulation of Natural Gas Expansion In Ontario

The Ontario Energy Board (OEB) oversees expansion of the natural gas network in the province, which typically includes three elements:

- Municipal Franchise Agreement (MFA) and Certificate for Public Convenience and Necessity: Securing the approval to serve an area of the province;
- Leave-to-Construct Approval: Securing approval to construct facilities that meet certain size and cost criteria; and
- Rate Setting: Securing approval to charge customers for regulated services.

During a nine-day oral hearing from May 5-13, 2016, the OEB heard evidence from 28 interested parties, including customer groups, environmental organizations, municipalities, First Nations, industry associations and utility companies. The OEB also received 24 written comments from interested parties by the July 2016.

In November 2016, the Ontario Energy Board (OEB) introduced new rules for natural gas expansion in the province when it issued its decision on natural gas expansion entitled *Generic Proceeding on Community Natural*

Gas Expansion

Under the new rules, natural gas distributors may implement stand-alone rates or surcharges for expansion projects to new areas to recover costs. Previously, distributors had to charge the same rates to all customers in the same rate class. This limited the ability to expand, particularly into rural and remote areas which face higher expansion costs.

The overall intent of the community expansion proceeding was to develop a regulatory framework to support the expansion of infrastructure necessary to provide natural gas to communities that would otherwise not receive natural gas service.

The OEB's decision will also encourage competition between interested parties for the provision of lower cost natural gas service to new communities. Under the new rules,

the OEB will consider proposals from competing distributors or suppliers to service the same community. In situations where there is competition to serve a new community, the OEB will first evaluate the proponents' leave-to-construct and rate-setting plans.

The Natural Gas Grant Program is complementary to these new rules introduced by the OEB. Under the Grant Program, projects to build new natural gas infrastructure must utilize stand-alone rates or surcharges to recover capital costs to lower the net grant funding required.

Recent OEB Decisions on Natural Gas Expansion

In August 2017, the Ontario Energy Board (OEB) released its decision approving an application by Union Gas Limited seeking approval of a Community Expansion Program to the following unserved areas:

- Kettle and Stoney Point First Nation and Lambton Shores; and
- Milverton, Rostock and Wartburg.

This decision demonstrated the significance of the new regulatory framework announced in the Generic Proceeding decision. Union will use a volumetric-based "System Expansion Surcharge" (SES) applied only to those customers residing in the new expansion area. The expansions do not rely upon additional funding from the Natural Gas Grant Program.

The System Expansion Surcharge (SES) will be community-specific, for a defined period of time not to exceed 40 years towards recovery of the cost of the projects. It will be reviewed by the Ontario Energy Board (OEB) after 10 years from the start of its implementation to ensure that its forecasted costs remain on track to be appropriately recovered within the remaining timelines.

The surcharge rate for all communities will be 23 cents per cubic metre, and the approved SES term will be applied to customers attaching to any future extensions of the pipeline system. The SES will appear as an extra line item on each expansion area customer's monthly bill along with the current gas bill line items.

OEB's August 2017, decision also approved expansion to the Delaware Nation of Moraviantown First Nation conditional on receiving funding from the Natural Gas Grant Program. OEB deferred its decision on expansion to Prince Township pending negotiations between Union and Batchewana First Nation of Ojibways.

Ontario's Natural Gas Grant Program is supporting natural gas expansion projects in municipalities, First Nations and unincorporated areas.

Ontario is expanding access to natural gas for communities that do not currently have service, including those in rural and northern Ontario and First Nations communities. Natural gas is an important heating source in Ontario and can be cheaper than alternative sources such as propane, heating oil and electricity.