

Generation Contracts Review Directive

Presented by: Independent Electricity System
Operator (IESO) and Charles River Associates
(CRA)

September 16, 2020

Background

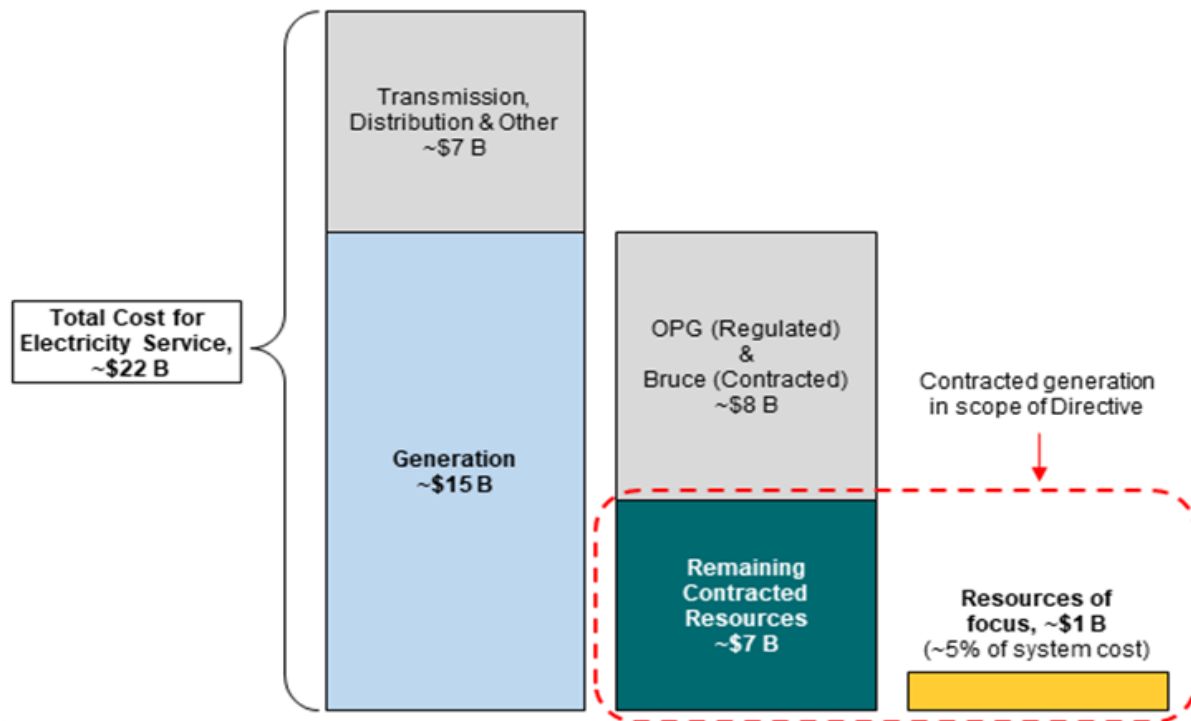
- On November 6, 2019, the Minister of Energy, Northern Development and Mines issued a directive to the IESO to retain a third party to undertake a targeted review of existing generation contracts for viable cost-lowering opportunities
- The directive placed a particular focus on larger gas, wind and solar contracts expiring in the next 10 years
- The IESO retained Charles River Associates to conduct the review
- The third-party's report along with IESO's assessment of the findings was provided to the Ministry in February of 2020
- The third-party report and other supporting information are available on IESO's website

Purpose of this Webinar

- Provide context and related information from IESO's summary report
- Provide an overview on the approach and findings of the third-party report, prepared by Charles River Associates (CRA)
- Answer any technical questions that contract holders may have for CRA or the IESO

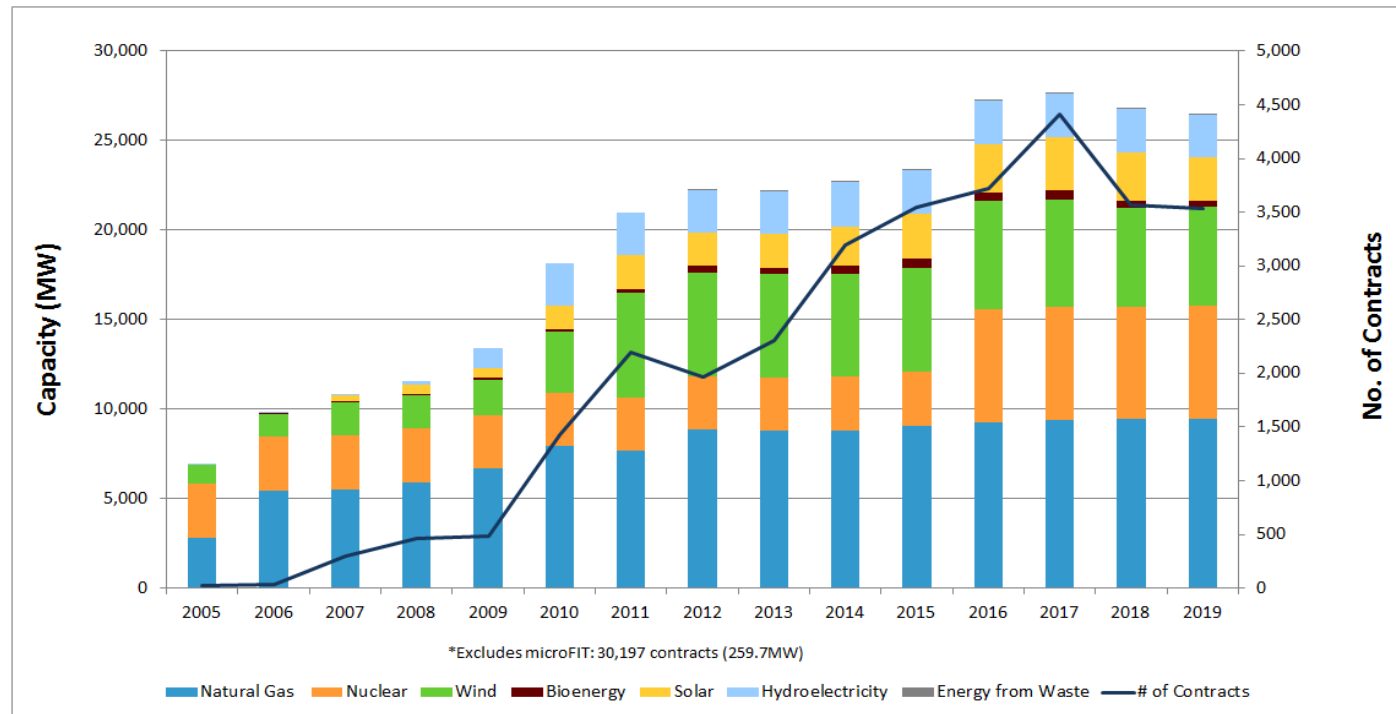
System Costs Overview

- Estimated 2020 cost breakdown of the Ontario electricity system (in 2020\$)
- Scope of Directive - \$7B
- Focus of Directive (contracts expiring in next 10 years) - \$1B



Contracts Overview

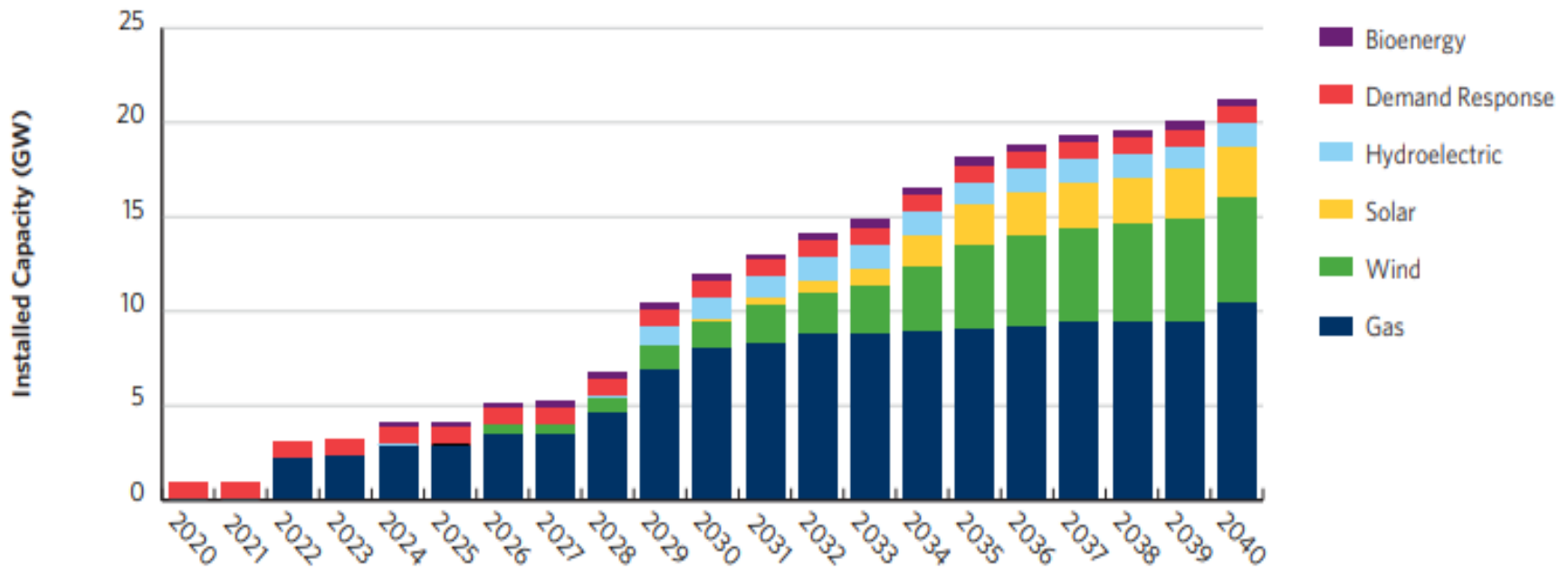
- Over time, the number of contracts and contracted capacity has grown
 - Majority of capacity is represented by larger projects (>150 MW)
 - Majority of contracts are represented by smaller scale projects (<5 MW)



- This does not include the ~30,000 microFIT (<10KW) contracts

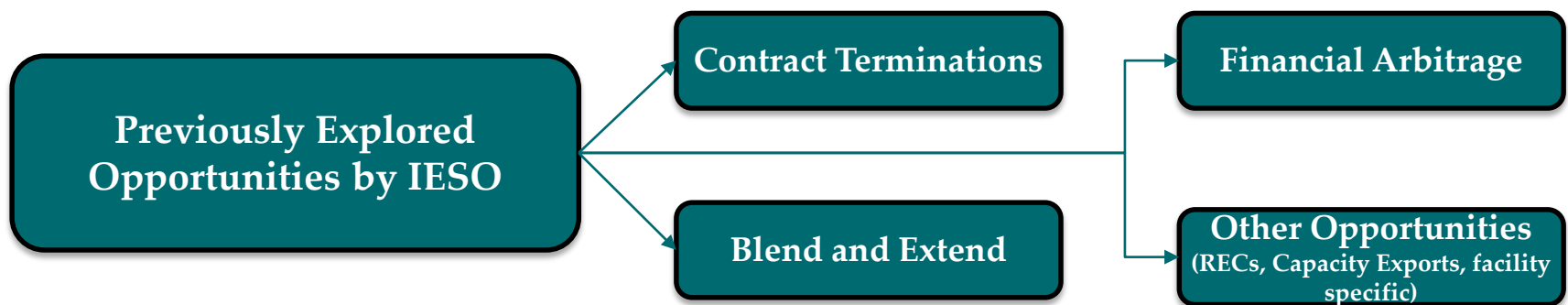
Contracts Expiring In the Future

- 10,400 MW of capacity from currently contracted resources will expire over the next ten years;
- 6,900 MW is thermal generation (predominantly gas); and
- The remaining 3,500 MWs is hydroelectric, wind, bioenergy and demand response resources.



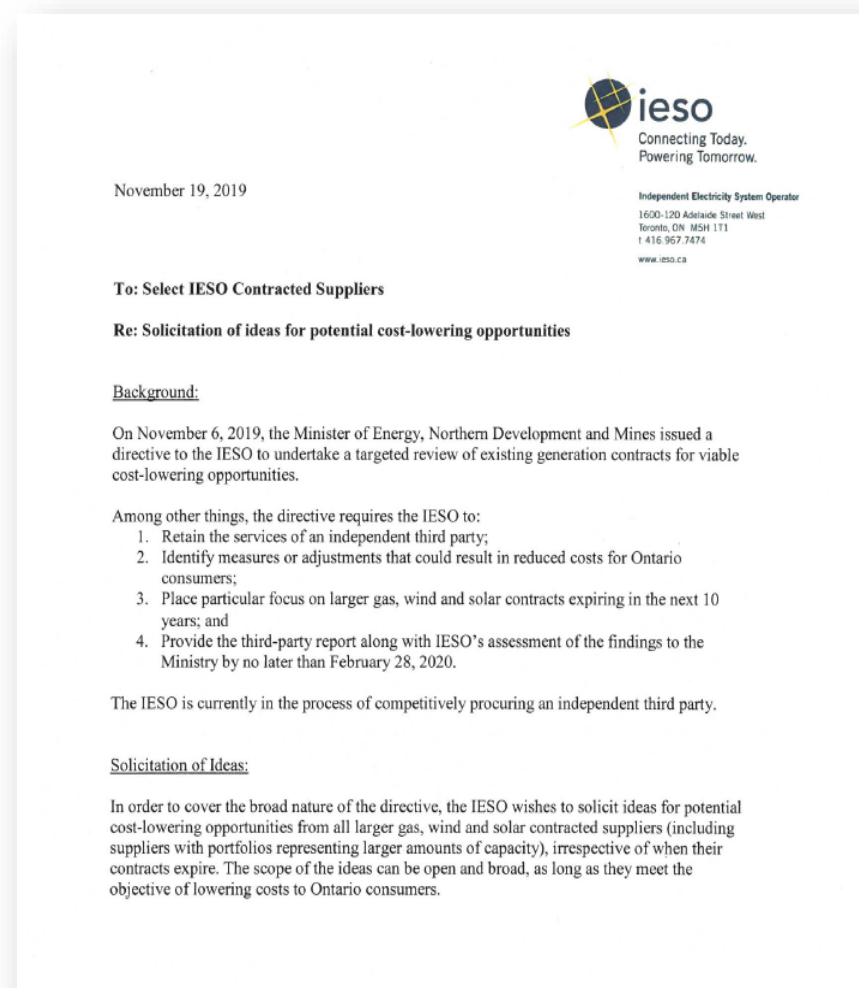
Prior IESO Analysis

- The IESO continuously looks for potential savings from contracts and has conducted various analyses in the past
 - Blend and Extend is often sited and has been extensively analyzed, but the value is often a trade between short term gains and long term additional costs
 - Various financial arbitrage opportunities have been explored in the past, but they have benefits and risks that often offset each other
 - Various specific opportunities have been explored and capitalized on where savings were possible



Contract Counterparty Engagement

- The IESO reached out to contract counterparties for their input on cost saving opportunities
- 25 submissions were received
- Blend and extend was noted most frequently



Current Status and COVID-19 Impacts

- The report was completed prior to the onset of COVID-19 pandemic in March
- Assumptions, market volatility and uncertainties caused by COVID-19 are not reflected in the report
- At this point the IESO does not have a mandate to pursue any specific mechanism noted in the third-party report

Presentation by Charles River Associates

Robert Cary

Generation Contracts Review Report Overview

September 16, 2020

CRA Charles River
Associates

Contents

- Systematic review process
- Scope of primary opportunities
- Base case modeling assumptions
- Overview of primary opportunities
- Sensitivity analysis
- Results
- Risks & uncertainties

Systematic Review (report figure 3)

Primary Opportunities	Secondary Opportunities	No Material Opportunities
<p>Contract Buyout (Termination by agreement)</p> <p>Contract buyout terminates existing contractual obligation upon agreement with supplier</p>	<p>Renewable Energy Credits</p>	<p>Contract Rights</p> <ul style="list-style-type: none"> • Pre-Commercial Operation Date • Admin • Other
<p>Contract Buydown (Financial Arbitrage)</p> <p>Contract buydown does not extend the contract term and is a partial pre-payment of residual values made to reduce contract price for the remaining contract term</p>	<p>Particular Contracts Economics</p>	<p>Market Efficiency</p>
<p>Blend & Extend (Levelization and Risk Adjustment)</p> <p>The IESO benefits from a reduction in the contract price for the balance of existing term, but commits to ongoing contract obligations for an extended period</p>		<p>Market-Contract Interaction</p>
		<p>Risk Ownership and Management</p> <ul style="list-style-type: none"> • Technical • Electricity Market • Fuel (Gas and Renewable) • Regulatory

Scope of Primary Opportunities (report table 3)

Category	Size	Options		
		Buyout	Buydown	Blend & Extend
<p>Wind</p> <p><i>Large transmission-connected facilities, 19 MW to 300 MW</i></p>	<p>45 Contracts</p> <p>4,543 MW (82.1% of total wind)</p> <p>\$ 1,696 M / yr total cost (2021)</p>	<p>Yes</p>	<p>Yes</p>	<p>Some</p> <p><i>Contracts with term past 2035 not considered eligible</i></p>
<p>Solar</p> <p><i>Large transmission-connected facilities 10 MW to 100 MW</i></p> <p><i>Potential to consider larger portfolios of smaller contracts</i></p>	<p>15 Contracts</p> <p>778 MW (32.23% of total solar)</p> <p>\$ 413 M / yr total cost (2021)</p>	<p>Yes</p>	<p>Yes</p>	<p>Some</p> <p><i>Contracts with term past 2035 not considered eligible</i></p>
<p>Gas</p> <p><i>Excludes Ontario Power Generation's 2,000 MW gas / oil fired Lennox facility (close to the end of contract term) and all distribution-connected facilities</i></p>	<p>13 Contracts</p> <p>6,620 MW (89.62% of total gas)</p> <p>\$ 1,095 M / yr total cost (2021)</p>	<p>No</p> <p><i>Would create a threat to system adequacy</i></p>	<p>Some</p> <p><i>Others have present price below our buydown floor or have term past 2035</i></p>	<p>Some</p> <p><i>Others have low present price that would be increased by blending or have term past 2035</i></p>

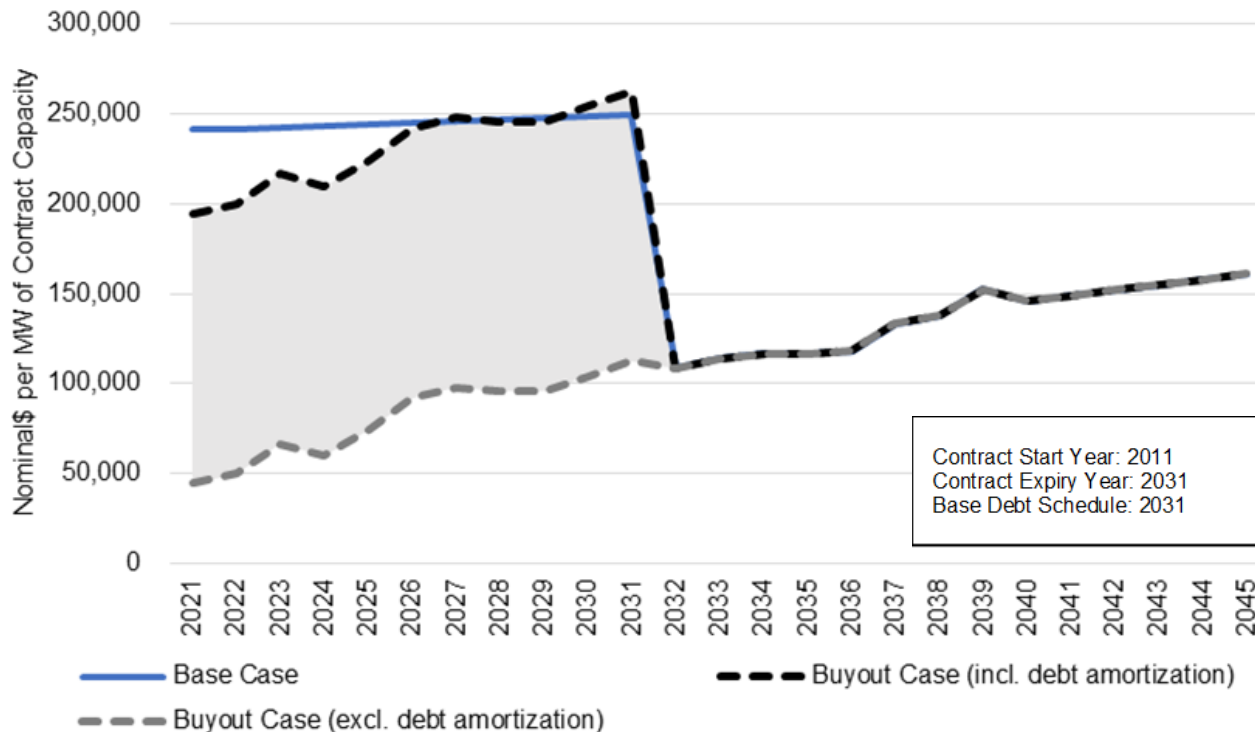
Base case modeling assumptions (report table 4)

Category	Assumptions
Implementation date	January 1, 2021
Real or Nominal	Analysis assumed nominal dollars
Inflation / Escalation Rate	2%
Supplier Cost of Capital	6%
IESO Cost of Capital / Cost of Debt	3%
Social Discount Rate	Base 6%
Effective Average Peak Capacity Contribution	Wind: 15% Solar: 35% Gas: 93%
Exchange Rate	USD/CAD = \$0.8
Renewables contract Buydown Floor	<u>Assumed</u> 1.5x – ratio of bought-down contract revenues over the sum of market energy and capacity revenue
Gas contract Buydown Price Floor	<u>Assumed</u> \$8,000-9,000/MW-month – floor of bought-down contract Net Revenue Requirement
Energy and Capacity Price	<ul style="list-style-type: none"> • IESO's Annual Planning Outlook Marginal Costs 2019, APO Reference Case, as proxy for Energy Price outlook; • IESO's Annual Planning Outlook Marginal Capacity Costs, APO 2019 Reference Case, as proxy for Capacity Price outlook
Blend & Extend Term	10 Years
Buydown / Buyout Debt Amortization Term	<ul style="list-style-type: none"> • Base Case: Remaining contract life • Sensitivity on extension: 10 years past contract term
Renewables Extrapolation	Production Capability = Annual average over 2014 (or 1st full year of operation) - 2018 Annual Curtailment = Annual average over 2014 (or 1st full year of operation) – 2018 Unpaid Curtailment = Minimum of Annual Curtailment, Annual Cap and Remaining Total Cap
Gas-fired Generation Extrapolation of Actual Net Revenue	Extrapolate Imputed Net Revenue based on the cumulative price setting outlook summarized from the Base Case Hourly IESO Annual Planning Outlook Marginal Costs analysis. Actual Net Revenue assumed equal to Imputed Net Revenue.

Overview of buyout (report figure 8 shows pro-forma wind contract buyout)

- Key elements of the transaction

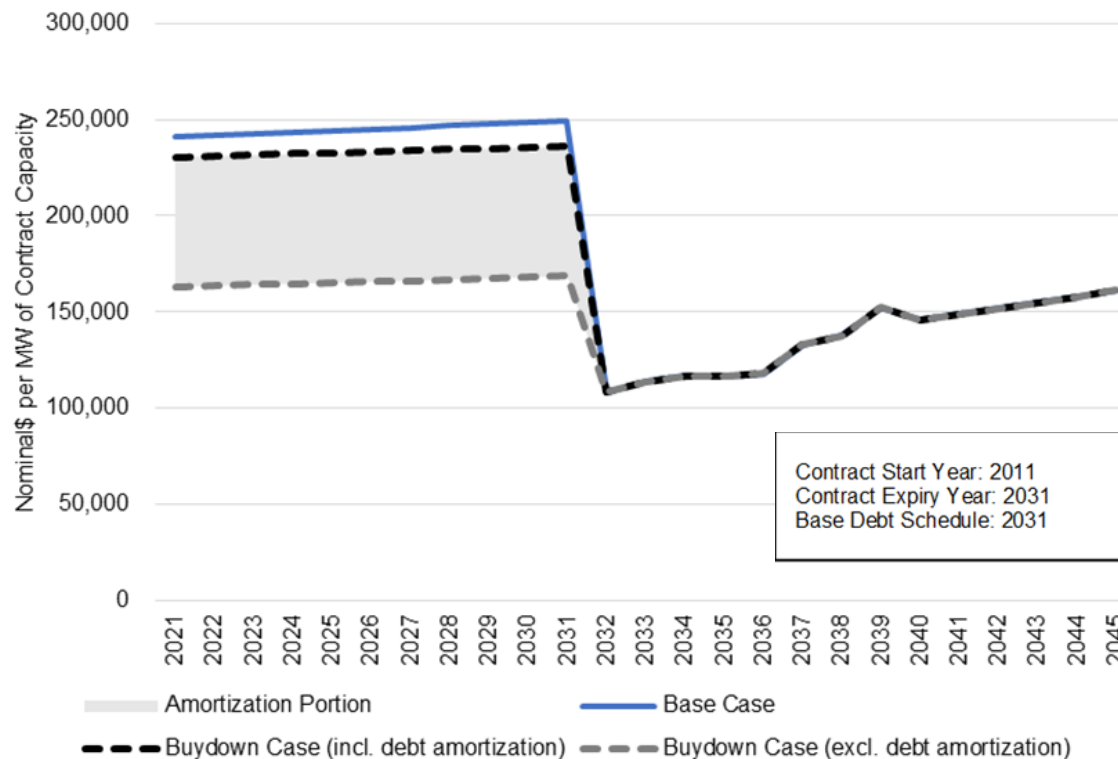
- IESO pays Supplier an agreed lump sum to terminate the contract
- Supplier then earns market revenues only, and bears all the market risk (upside and downside)
- IESO amortizes the lump sum amount @ 3% interest over the bought-out term
- Wind and solar generators only



Overview of buydown (report figure 9 shows pro-forma wind contract buydown)

- Key elements of the transaction

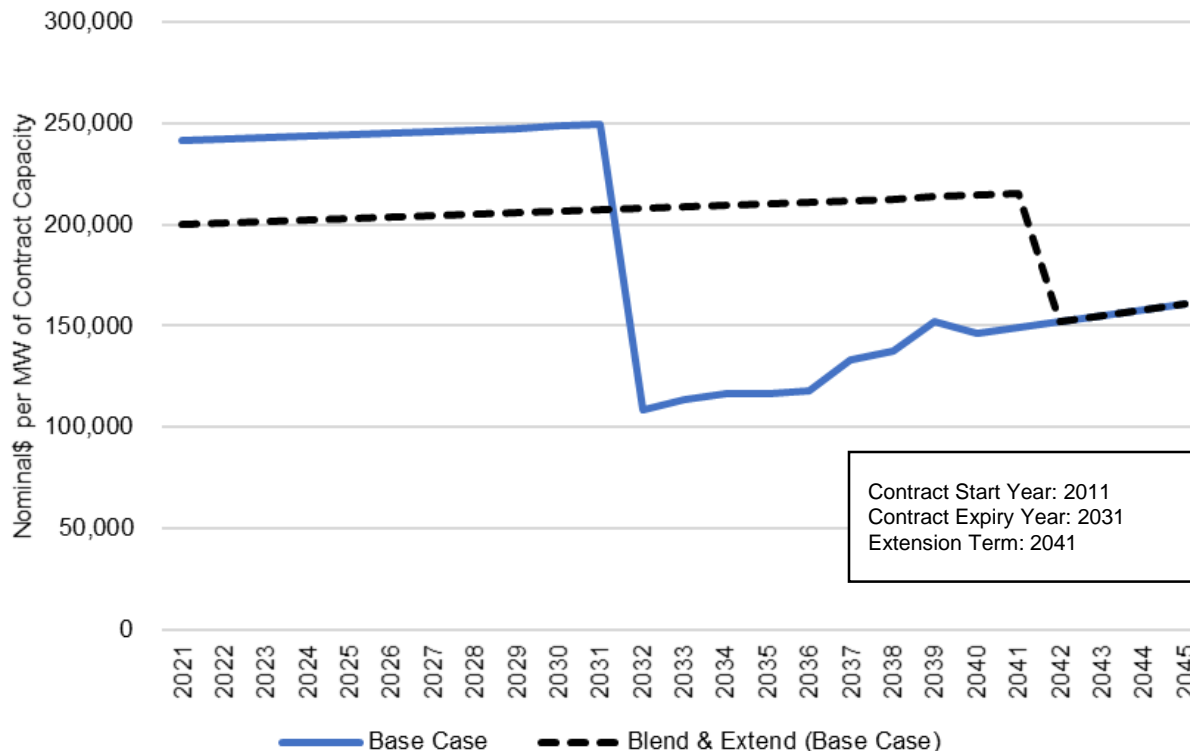
- IESO pays Supplier an agreed lump sum to reduce contract price
- Supplier receives reduced contract price (no new market risk) for remaining term
- IESO amortizes the lump sum amount @ 3% interest over the remaining contract term
- All wind and solar generators and some higher priced gas generators



Overview of blend & extend (report figure 10 shows wind contract blend & extend)

- Key elements of the transaction

- IESO and Supplier agree a contract price for an extension period, and then agree to blend the current end extension period prices to give equal total value at a certain discount rate
- Supplier's market risk (upside and downside) is reduced for the extension period
- Cost reductions for the existing term and expected increases for the extension period
- All wind and solar generators & higher priced gas generators, excluding with term past 2035



Implementation & sensitivity analysis (report sections 6 & 8)

• Implementation Issues

- We identify some of the possible program frameworks that the IESO could adopt, and some of the key issues that would have to be resolved in any program implementation.
- In order to model outcomes, we needed to adopt a hypothetical program
 - modeling assumes that a standard pricing discount rate is applied to individual contract parameters in order to determine a lump sum price offer likely to be accepted by a proportion of Suppliers.
 - Reduced IESO pricing discount rate increases program offer price (for buyout or buydown), increases expected take-up, increases IESO funding requirement, and reduces net savings per MW taken up.
 - Incremental gross savings come at reducing net benefit.
- Take-up rates
 - Assessment of take up rates is a challenge, and is therefore a primary sensitivity test to define the range of likely outcomes.
 - Take-up MW and total net savings proportionately (before program costs).

• Other sensitivity cases

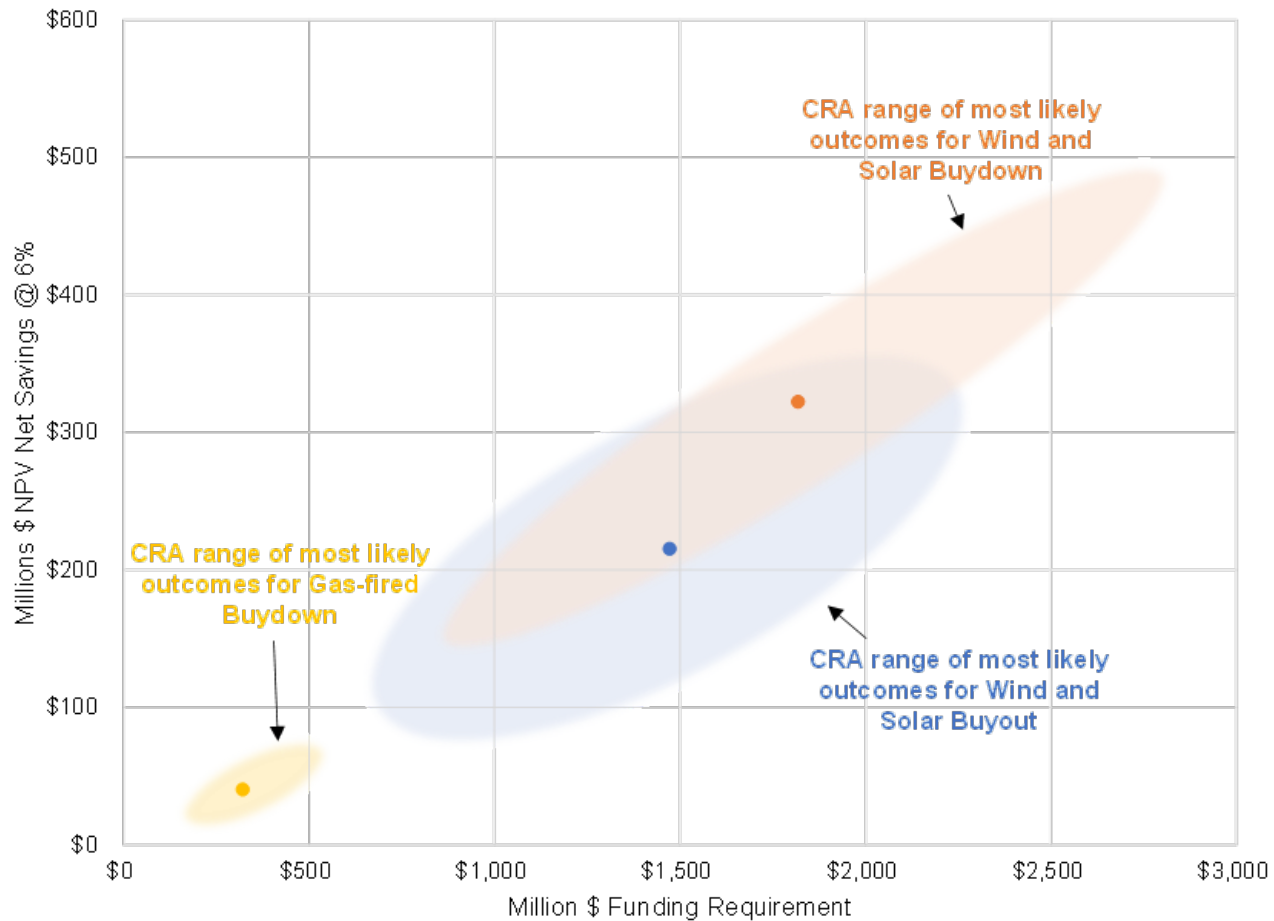
- IESO debt funding cost (buyout & buydown only)
- Changes in market costs (buyout and blend & extend only)
 - To reflect forecast changes evident before any program implementation.
 - To reflect variations that arise in the relevant term but after program implementation.
- Capacity value treatment in buyout or blend & extend
 - Relates to Suppliers' perception of market (as opposed to planning) capacity value.
- Extended IESO debt amortization (buyout & buydown only)

Overview of results (report figure 1)

	Renewable (Wind & Solar)		Gas-fired	
Buyout				
Take-up MW	243 - 730	MW		
Take-up MW as %	5 - 14	%		
Year 1 savings - gross	86 - 258	\$ Million		
% of total system costs (gross)	0.4 - 1.2	%		
Year 1 savings - net	19 - 56	\$ Million		
% of total system costs (net)	0.1 - 0.3	%		
NPV net savings (@ 6% discount rate)	108 - 323	\$ Million		
Buydown				
Take-up MW	426 - 1,279	MW	434 - 1,303	MW
Take-up MW as %	8 - 24	%	7 - 20	%
Year 1 savings - gross	99 - 297	\$ Million	25 - 76	\$ Million
% of total system costs (gross)	0.4 - 1.3	%	0.1 - 0.3	%
Year 1 savings - net	16 - 48	\$ Million	3 - 8	\$ Million
% of total system costs (net)	0.07 - 0.2	%	0.01 - 0.04	%
NPV net savings (@ 6% discount rate)	161 - 483	\$ Million	20 - 60	\$ Million
Blend & Extend				
Take-up MW	481 - 1,443	MW	803 - 2,408	MW
Take-up MW as %	9 - 27	%	12 - 36	%
Year 1 savings - gross	N/A	\$ Million	N/A	\$ Million
% of total system costs (gross)	N/A	%	N/A	%
Year 1 savings - net	39 - 118	\$ Million	25 - 74	\$ Million
% of total system costs (net)	0.2 - 0.5	%	0.1 - 0.3	%
NPV net savings (@ 6% discount rate)	0	\$ Million	1 - 2	\$ Million

Values presented in the table above represent potential savings before recognition of program or transaction costs.

Results Graphic (report figure 2)



Blend & Extend opportunities do not have initial funding requirements, and are centered on zero NPV of benefits, so do not lend themselves to this representation.

Risk and uncertainty (report sections 10.1 & 10.2)

- **Reliability**
 - CRA's analysis excludes the possibility of gas-fired plant buyout due to the potential reliability risk.
 - CRA has not identified reliability risk associated other opportunities analysed.
 - Reliability risk would need to be subject to full technical assessment within any implementation process.
- **System planning considerations**
 - Blend & extend increases the IESO's contractual commitments in the period 2029 to 2045.
 - This reduces IESO flexibility to respond to reduction of expected system requirements.
- **Financial considerations**
 - Buyout increases Supplier market price risk and regulatory risk, limiting expected take-up.
 - Buydown represents no transfer of market or regulatory risk.
 - Blend & extend represents a major mitigation of Suppliers' market and regulatory risk for the extension period.
- **Major uncertainties**
 - Supplier perception of any program and of the economics required to stimulate take-up may vary from the assumptions of the analysis.
 - The large solar and gas fleets are very granular, with 15 and 13 members respectively, and with diversity of facility size. Results can vary widely from the statistical averages calculated in the analysis.
- **COVID-19**
 - CRA's analysis was completed in December 2019 and January 2020, based on 2019 planning data.
 - The report was completed in February 2020 and thus pre-dates the economic impacts of COVID-19.

QUESTIONS

