The Energy Storage Roadmap sets out a coherent plan to reduce barriers and deliver greater ratepayer value for Ontario consumers and businesses at the transmission level, distribution level, and behind-the-meter in commercial, industrial, and residential settings.

With multiple regulatory, market and policy engagements underway in Ontario (See Appendix A), energy storage needs a cohesive approach, with single accountability across government and agencies, to capture its full value and benefits for electricity consumers in Ontario.
THE CASE FOR ACTION

• **STORAGE IS A SYSTEM RESOURCE THAT ENSURES BETTER VALUE FROM EXISTING ASSETS AND DELIVERS RATEPAYER VALUE:** Ontario has invested billions of ratepayer dollars to build electricity supply capabilities including nuclear, hydropower, renewable energy (wind, solar and biomass), and the natural gas fleet. But these assets are often curtailed and underutilized. Energy storage can reduce costs for customers by increasing the utilization of existing assets allowing for deferment of future investment in transmission, distribution and generation. Distribution and transmission asset owners can use energy storage to adapt their networks to meet a customer needs and manage outages, both planned and unplanned.

• **STORAGE AVOIDS ELECTRICITY WASTE, ADDITIONAL COST, AND HELPS CONSUMERS MANAGE ELECTRICITY USAGE.** Ontario’s commercial and industrial electricity consumers are actively looking at ways to better manage their electricity usage to reduce costs, remain competitive and create and keep jobs in the province. Energy storage can provide multiple services in one asset and can quickly and economically adapt to changing system needs.

• **ONTARIO HAS THE EXPERTISE AND TECHNOLOGY** to get more value from existing generation assets, improve grid resiliency, hedge against uncertain demand forecasts and empower end consumers to reduce their direct electricity costs. Ontario has been a leader in energy storage innovation and has potential to create jobs and contribute to economic development.

• **DIVIDED ACCOUNTABILITY IS PREVENTING ONTARIO FROM GETTING FULL VALUE FROM STORAGE.** Energy Storage Canada has worked with government and agencies for more than 6 years to unlock the full value of storage. While some progress has been made, the main issue is the absence of a single point of accountability to address obstacles.

• **STORAGE REQUIRES A LEVEL PLAYING FIELD.** Energy storage was never part of the FIT program in Ontario nor received any subsidies. Removing barriers and creating a conducive environment for energy storage will allow for the implementation of solutions that can provide significant value to Ontario’s electricity consumers and power system at the transmission level, distribution level and behind the meter in commercial, industrial and residential settings.

• **STORAGE REQUIRES ADEQUATE COMPENSATION TO REFLECT ITS FULL VALUE AND BENEFITS.** Other jurisdictions, especially in the U.S., understand the value of energy storage and have developed processes and rules to incorporate storage technologies and services into their regulatory and market frameworks. This value can be unlocked through fair and reasonable compensation that achieves grid-level and customer savings.

• **THE IESO, MINISTRY AND OEB RECOGNIZE THAT THE BARRIERS TO ENERGY STORAGE NEED TO BE ADDRESSED.** There remains a lot of work to do and to address the barriers in a timely way and much more effective coordination is required between agencies since no one agency alone can address all of the barriers.
Ratepayer cost benefits of energy storage are driven by **REDUCED PEAK DEMAND**, deferred transmission and distribution investments, reduced GHG emissions (lower compliance cost), reduced cost of renewables integration, deferred new capacity investments, and **INCREASED GRID FLEXIBILITY, RELIABILITY AND RESILIENCY**.

THE IESO HAS IDENTIFIED **35 OBSTACLES** TO ENERGY STORAGE IN ONTARIO

The IESO’s Energy Storage Advisory Group (ESAG) convened in 2018, identified 35 obstacles to the fair competition of storage in Ontario’s electricity system (See Appendix B.). The challenges range from specific issues within market rules and operation to broader themes. In ESC’s opinion, the 35 obstacles identified by the ESAG represent a comprehensive list of barriers to tackle. However, the sheer number of changes required to remove barriers is impeding the ability of decision makers, agencies and stakeholders to devise consistent and comprehensive solutions that would unlock the full value of storage. The biggest challenge remains that no single agency has jurisdiction over the complete list of obstacles.

Accountability for the various obstacles is spread over several agencies each of whom have different priorities/mandates with respect to energy storage. ESC counts over 20 engagements and consultations through various entities (e.g., IESO, OEB, Ministry of Energy, Northern Development and Mines) that are attempting to tackle the challenges facing energy storage. A lack of overarching coordination and engagement integration across the agencies is creating further difficulties for both energy storage providers and the well intended agencies trying to enable storage participation in the Ontario electricity sector.

PJM projected that a **10-20% REDUCTION** in its frequency regulation capacity procurement could result in **$25 MILLION TO $50 MILLION SAVINGS** to consumers in its territory.
1. Establish a Coordinating Committee to oversee Ontario regulatory framework update for energy storage resources

2. Establish clear guidance on Global Adjustment (GA) cost allocation options for all customer types including energy storage resources when operating as a load for the benefit of the grid

3. IESO to summarize and inform stakeholders of in the capabilities and restrictions of the market tools for energy storage

4. IESO to identify scope for energy storage inclusion in Market Renewal Program

5. Clarify treatment of energy storage resources in Ontario’s regulatory framework

6. Establish an expedited connection process for load displacement resources

### SUMMARY OF NEAR-TERM PRIORITIES AND TIMING

<table>
<thead>
<tr>
<th>NEAR-TERM PRIORITY</th>
<th>PROJECT CHAMPION</th>
<th>START DATE</th>
<th>END DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Establish Coordinating Committee</td>
<td>MENDM</td>
<td>Q2 2019</td>
<td>Q4 2019</td>
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<tr>
<td>2. Guidance on GA cost allocation options</td>
<td>MENDM</td>
<td>Q2 2019</td>
<td>Q3 2019</td>
</tr>
<tr>
<td>3. Identify FERC Order 841 Compliance plans that are applicable to Ontario and where constraints exist</td>
<td>IESO</td>
<td>Q2 2019</td>
<td>Q3 2019</td>
</tr>
<tr>
<td>4. ESAG Recommendations in Scope for MRP</td>
<td>IESO</td>
<td>Q2 2019</td>
<td>Q3 2019</td>
</tr>
<tr>
<td>5. Clarify treatment of energy storage resources</td>
<td>OEB/IESO/MENDM</td>
<td>Q2 2019</td>
<td>Q3 2019</td>
</tr>
<tr>
<td>6. Expedited connection process for load displacement resources</td>
<td>OEB</td>
<td>Q2 2019</td>
<td>Q4 2019</td>
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### APPENDIX A:

<table>
<thead>
<tr>
<th>ORGANIZATION</th>
<th>ENGAGEMENT</th>
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<tbody>
<tr>
<td>IESO</td>
<td>Energy Storage Advisory Group (ESAG)</td>
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<tr>
<td></td>
<td>Innovation Roadmap</td>
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<td></td>
<td>Demand Response Working Group (DRWG)</td>
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<td></td>
<td>Market Renewal Program (MRP): Multiple Engagements</td>
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<td></td>
<td>2019 Ontario Planning Outlook (OPO)</td>
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<td></td>
<td>Bulk System Planning</td>
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<td></td>
<td>Grid/LDC Interoperability Committee</td>
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<td>Regional Planning</td>
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<td>Market Development Advisory Group (MDAG)</td>
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<td>OEB</td>
<td>OEB Committee on Innovation</td>
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<td></td>
<td>Innovation Sandbox</td>
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<td>Rate Design for Commercial and Industrial Customers</td>
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<td>Net Metering Consultation Responding to Distributed Energy Resources Utility Remuneration</td>
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<tr>
<td>MENDM</td>
<td>Industrial Rate Review</td>
</tr>
<tr>
<td>LDC</td>
<td>Local Distribution System Plan (DSPs)</td>
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</tbody>
</table>

Massachusetts Study State of Charge (2016) modeled the system-wide impact of deploying **1,766 MEGAWATTS OF ENERGY STORAGE** in Massachusetts by 2025, delivering more than **U.S.$2.2 BILLION** in system benefits and savings for Massachusetts ratepayers, and an additional **$250 MILLION** in regional system benefits for New England.
APPENDIX B:
35 Obstacles to Energy Storage identified by IESO Energy Storage Advisory Group (ESAG)

No. 1 - Lack of clarity in IESO market rules
No. 2 - Minimum size threshold for market participation
No. 3 - Storage participation in OR
No. 4 - Optimize regulation service for energy storage
No. 5 - IESO DSO
No. 6 - Application of global adjustment
No. 7 - Application of IESO uplifts
No. 8 - Application of IESO admin fee
No. 9 - Application of IESO capacity-based demand response charge
No. 10 - Application of transmission charges
No. 11 - Application of distribution charges
No. 12 - Application of gross revenue charges
No. 13 - Application of other regulatory charges
No. 14 - No clear role for energy storage in Ontario legislation and regulations
No. 15 - Energy storage definition in OEB act
No. 16 - Energy storage ineligible for IAP
No. 17 - Price signals for residential and small business customers
No. 18 - Lack of awareness of energy storage capabilities
No. 19 - Lack of clarity in OEB codes
No. 20 - Lock-down of bids/offers prior to real-time dispatch
No. 21 - No aggregation model for energy storage
No. 22 - Revenues from multiple services
No. 23 - Monetizing indirect benefits
No. 24 - Clearer framework for rate basing
No. 25 - Perceived inequity between charges applicable to rate-based assets vs. privately owned
No. 26 - Lack of clarity for energy storage interconnections
No. 27 - SCADA requirements for smaller scale energy storage
No. 28 - Lack of siting information available to third parties
No. 29 - Lack of clarity in safety and interconnection standards
No. 30 - LDCs ability to monitor signals from storage
No. 31 - Metering to become market participant is expensive
No. 32 - No clear procurement process for large scale storage resources
No. 33 - Policy certainty on ICI program
No. 34 - Better stakeholder engagement for policy changes
No. 35 - Lack of nodal / congestion pricing