Market Development Advisory Group (MDAG) Workplan Proposed Market Development Project Valuation Assessment

Purpose:

The completion of this assessment is required to support proposed market development projects for consideration by the IESO and MDAG for prioritization. The information in this assessment will help determine whether the project submitted is aligned with the goals and objectives of the MDAG, including: system reliability, regulatory needs, and/or meaningful market efficiency benefits.

Instructions:

Please complete this form in full to identify potential market development projects that will be considered by the IESO and MDAG for prioritization.

Stakeholders are asked to complete this project valuation assessment and return the form to engagement@ieso.ca by August 20, 2019 and will be offered the opportunity to present at the August 29 MDAG meeting.

Please note that potential market development projects submitted must, at a minimum, satisfy the criteria in section 1 - "Alignment with MDAG vision" - to be considered further. The IESO will review answers in section 1 of this assessment to verify whether the project submitted is aligned with IESO Markets goals and objectives.

Disclaimer:

Receipt of a potential market development project through this assessment for consideration and prioritization in the MDAG Workplan does not constitute a commitment by the IESO to support the proposed project, nor does it create a business relationship between the stakeholder, its partners, affiliates, or related parties, and the IESO.

All information submitted in the proposed market development project will be treated as non-confidential unless clearly labelled as confidential by the applicant. The IESO reserves the right to make public the names of applicants, the title and a description of their proposed project.

A. Key Information

Project title:	Energy Storage Integration
Organization:	Power Advisory (on behalf of Consortium of renewable generators, energy storage, and associations)
Organization representative and title:	Jason Chee-Aloy, Managing Director, Power Advisory
Mailing address:	[redacted]
Phone:	[redacted]
Email:	[redacted]
Date:	August 20, 2019

B. Project Description

Use the area below to explain the concept and objectives of this project.

- Energy storage (e.g., battery) uptake outpacing other resources in development and integration – distribution systems, transmission networks, wholesale electricity markets
    - See https://www.energy-storage.news/news/bnef-predicts-305gwh-of-energy- storage-worldwide-by-2030)
- Energy storage uptake exponentially increasing due to
    - Technological improvements and rapidly declining costs
    - Flexible application 'behind-the-meter' or 'front-of-the-meter'
    - Operational attributes enable fastest 'ramp up' and 'ramp down'
    - Meeting increasing power system flexibility and operability needs
    - Balancing energy supply from variable (i.e., wind and solar) generators (VGs)
- Precedence to integrate energy storage within wholesale electricity markets set with U.S. Federal Regulatory Commission (FERC) Order 841 (2018)
    - New York Independent System Operator (NYISO), ISO New England (ISO-NE), PJM, Midcontinent ISO (MISO), Southwest PowerPool (SPP), California ISO (CAISO) complied with Order 841 by filing plans (December 2018) to evolve their wholesale electricity market designs, rules, and systems to integrate energy storage

      See https://www.utilitydive.com/news/grid-operators-file-plans-with-ferc- on-integrating-storage-into-wholesale-m/543560/ and https://infocastinc.com/market-insights/power/compliance-with-ferc-order- 841/
- Uptake of 'hybrid' projects rapidly increasing, U.S. examples
    - Los Angeles Department of Water and Power – 25-year contract for storage (1.3¢/kWh) + solar (1.997¢/KWh) ($US)) (cheaper than 'peaking' gas-fired generation)
    - NextEra Energy – storage + solar project in Florida (409 MW), storage + solar + wind project in Oregon (380 MW)
    - Storage + solar projects beginning to replace gas-fired generators in California
- Considering volume of Ontario VGs, 'hybrid' projects at existing sites likely to increase
- Integrating storage, including 'hybrid' projects, provides multiple benefits
- Meets specific power system needs (e.g., flexibility, resource adequacy)
- Potential to re-purpose existing VG facilities (especially as contracts expire)

- Creates additional supply sources from distribution systems creating stronger linkages to the IESO-Administered Markets (IAM)

Recommendation *– as defined through IESO initiatives (e.g., Energy Storage Advisory Group, Innovation Roadmap, etc.), IESO should undertake clearer commitments and timelines to change systems, market design, rules, protocols to integrate multiple energy storage technologies, including 'hybrid' projects, into IAM.*

1. Alignment with MDAG vision

All proposed market development projects must demonstrate that they are required for system reliability, meet regulatory need, and/or deliver meaningful market efficiency benefits (deliver system cost savings). Proposed projects that meet these criteria will be further assessed according to information provided in sections 2-5. Projects that do not meet these criteria in section 1 will not be evaluated further.

A. Can the proposed market development project demonstrate that it will maintain system reliability, meet a regulatory standard or decision in Ontario, or deliver cost savings?

i. Will the proposed market development project contribute to system reliability?

☒ **Yes** ☐ **No**

Explain:

- In addition to the points described in the Project Description, IESO identified need for increased power system flexibility in their *2016 IESO Operability Assessment - Summary Review of the Operability of the IESO-Controlled Grid to 2020*, where energy storage and 'hybrid' projects are technically well suited to meet these flexibility needs
- The recommendation to integrate energy storage and 'hybrid' projects in IAM is consistent with, and complements, the Ancillary Services (A/S) proposed market development project assessment submitted by Power Advisory, where multiple resources should be able to provide multiple A/S and IESO should create new A/S (e.g., ramp) to help meet Ontario's power system flexibility needs (which are directionally consistent with changes IESO has made to expansion of operating reserve (OR) and regulation).

ii. Is the proposed market development project required to meet a regulatory requirement in Ontario?

☐ **Yes** ☒ **No**

Explain:

- There is no statute that specifically dictates how energy storage and 'hybrid' projects could be integrated within IAM, along with electricity services/products they can supply
- Therefore, by way of authority empowered by the Electricity Act, IESO has ability to make design changes and rule amendments to integrate energy storage and 'hybrid' projects within IAM
- Because there is a 'load' component to all energy storage resulting from withdrawal of energy to store, there needs to be reviews and solutions to create fairness and a 'level playing field' for energy storage and 'hybrid' projects, therefore review and solutions regarding all types of demand charges will be required and should be led by IESO and the Ontario Energy Board (OEB).

iii. Is the proposed market development project expected to deliver system cost savings?

☒ **Yes** ☐ **No**

Explain:

- See explanation under 1.A.i.
- Enabling energy storage and 'hybrid' projects that can compete to supply energy, capacity, and A/S increases competition and should result in lower prices, in turn decreases costs to customers.

B. Will the proposed market development project require design changes to the IESO Administered Markets?

☒ **Yes** ☐ **No**

Explain:

- See Project Description and explanation under 1.A.i.
- System changes, market design changes, and rule amendments will be required regarding, but not limited to, modeling energy storage and 'hybrid' projects regarding their capability to provide energy, capacity, and A/S, their energy withdrawals (including treatment of demand charges), and technical capabilities to 'cycle' energy withdrawals/injections, integration of scheduling/dispatching supply of energy and A/S, etc.

C. Is the proposed market development project aligned with IESO's market development principles of competition, transparency, efficiency, certainty, and implementability?

i. Does the proposed market development project align with the market development principle of competition?

☒ **Yes** ☐ **No**

Explain:

See Project Description and explanation under 1.A.i. and 1.A.iii.

ii. Does the proposed market development project align with the market development principle of transparency?

☒ **Yes** ☐ **No**

Explain:

- See Project Description and explanation under 1.A.i.
- Integration of 'behind-the-meter' or distribution-connected energy storage projects into IAM will increase transparency of these resources that have typically not been registered as IAM market participants, therefore increasing 'visibility' regarding their operations in accordance with IAM and Ontario's power system

iii. Does the proposed market development project align with the market development principle of efficiency?

☒ **Yes** ☐ **No**

Explain:

- See Project Description and explanations under 1.A.i., 1.A.iii., and 1.C.ii.

iv. Does the proposed market development project align with the market development principle of certainty?

☒ **Yes** ☐ **No**

Explain:

- See explanations in above sections
- Integration of energy storage and 'hybrid' projects able to supply energy, capacity, and A/S creates greater certainty regarding operations within IAM and reliability of Ontario's power system

v. Does the proposed market development project align with the market development principle of implementability?

☒ **Yes** ☐ **No**

Explain:

- See Project Description and explanations under 1.A.i. and 1.A.ii.
- U.S. wholesale electricity markets falling under FERC's jurisdictions (i.e., CAISO, SPP, MISO, PJM, NYISO, ISO-NE) have filed responses and action plans in compliance with FERC Order 841, and these ISOs are presently in the process of changing design, systems, and rules to increase integration of energy storage within their wholesale electricity markets – these actions clearly show implementability of integrating energy storage and 'hybrid' projects

2. Reliability Impacts

The purpose of this section is to understand the impact of the proposed market development project on system reliability

A. Provide a high level overview of how the proposed market development project impacts reliability.

Explain:

See Project Description and explanations above.

B. Will the proposed market development project help reduce the risk of loss of load events?

☒ Yes ☐ No

Explain:

- See Project Description and explanations above
- Storing energy and using this energy supply during times when Ontario's power system is most stressed will reduce risks of loss of load events
- Additionally, risks of loss of load events will decrease by increasing supply of A/S from energy storage and 'hybrid' projects through permitting greater participation from multiple resources in supply of A/S, including new A/S.

C. Will the proposed market development project help alleviate constraints on the system?

☒ Yes ☐ No

Explain:

- By integrating energy storage and 'hybrid' projects and expanding the number of resources that can provide A/S, including new A/S, could increase supply of energy, capacity, and A/S within constrained zones within the IESO-Controlled Grid (ICG) and also some distribution systems, and could address 'local' or zonal reliability issues if these constrained zones and sub-zones have limited energy, capacity, and/or A/S supply options
- Same for constrained zones that may have greater power system flexibility needs, relative to other zones with less flexibility needs.

D. If “Yes” was answered to either 2B, or 2C, expand whether reliability impacts are expected to be local, zonal or system wide?

☒ Local ☒ Zonal ☒ System wide

See explanation 2.C

3. Market Efficiency Impacts

The purpose of this section is to understand potential market efficiency impacts of the proposed market development project across various components of the IESO Administered Markets over the short term and long term.

A. How will this proposed project improve the efficiency of Ontario's wholesale energy market in the short term (1-2 years)?

Any information on the materiality of the impact will be helpful, in addition to clarification on which component of the wholesale market design this proposed market development project will impact, e.g., OR, RT, DR etc.

See Project Description and explanations provided above.

B. How will this proposed market development project impact the efficiency of the wholesale energy market post Market Renewal implementation?

Any information on the materiality of the impact will be helpful, in addition to clarification on which component of the wholesale market design this proposed market development project will impact, e.g., OR, RT, DR etc.?

See Project Description and explanations provided above.

C. What impacts will the proposed market development project have on system flexibility?

Explain:

See Project Description and explanations provided above.

D. How will the proposed market development project enable greater wholesale market participation?

Explain:

See Project Description and explanations provided above.

E. Overall, how will this proposed market development project increase the competitiveness of the Ontario wholesale market?

Explain:

See Project Description and explanations provided above.

4. Risk Assessment

The purpose of this section is to identify risks that may impact the value proposition of the market development project, and to understand how these risks might change over the short term and long term.

A. Identify potential risks that could impact the value proposition of the project. Note that risks identified in 4A will be used to complete the risk assessment in section 4B, C and D.

Identify potential risks to the project:

- To alleviate risks, IESO should work with energy storage and 'hybrid' project owners/operators towards successful integration within IAM, including other stakeholders within these consultations
- Regarding the 'load' component of energy storage and 'hybrid' projects, all categories of demand charges must be reviewed through IESO and OEB stakeholder consultation processes towards fair and reasonable solutions.

Risk over time

B. Are the risks identified in section 4A expected to change over the next 1-2 years?

☒ remain unchanged ☐ decrease ☐ increase

Explain:

See explanation provided in 4.A.

Impact on project

C. Are the risks identified in section 4A expected to change post Market Renewal implementation?

☒ remain unchanged ☐ decrease ☐ increase

Explain:

See explanation provided in 4.A.

D. Are there ways that risks identified in section 4A could be mitigated cost effectively?

Explain:

See explanation provided in 4.A.

5. Implementability [This section is to be completed by the IESO]

The purpose of this section is to determine whether the proposed market development project submitted is feasible and practical for the IESO to undertake.

A. What are the IESO internal constraints in terms of capital and personnel to deliver on the proposed market development project?

B. How long does the IESO estimate the proposed market development project will take to implement?

☐ < 1 year ☐ 1 to 3 years ☐ > 3 years

Explain:

C. Is the proposed market development project feasible and practical for the IESO to begin implementing in the short, medium, or long term?

☐ < 2 years ☐ 2 to 5 years ☐ > 5 years

Explain:

D. **Are there linkages to other potential or ongoing projects**?

☐ Yes ☐ No

Explain:

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Market Development Advisory Group (MDAG) Workplan Proposed Market Development Project Valuation Assessment

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A. Key Information

Project title:	Expansion of Ancillary Services
Organization:	Power Advisory (on behalf of Consortium of renewable generators, energy storage, and associations)
Organization representative and title:	Jason Chee-Aloy, Managing Director, Power Advisory
Mailing address:	[redacted]
Phone:	[redacted]
Email:	[redacted]
Date:	August 20, 2019

B. Project Description

Use the area below to explain the concept and objectives of this project.

- Non-traditional resources (e.g., variable (i.e., wind and solar) generators (VGs), energy storage, etc.) have technical capabilities to supply operating reserve (OR) and other ancillary services (A/S) (e.g., regulation, reactive support and voltage control (RSVC), etc.)
- For example, following jurisdictions/utilities permit some VGs to supply OR, regulation, and/or RSVC
    - California ISO (CAISO) – some wind generators provide regulation
    - Southwest Power Pool (SPP) – some wind generators provide regulation
    - Xcel Energy Public Service of Colorado (PSCo) – some wind generators provide regulation
    - Germany – some wind generators provide OR
    - Ireland – some wind generators provide OR and RSVC

Recommendation – broader number of resources should be able to supply A/S within the IESO-Administered Markets (IAM), and IESO should create new A/S to meet specific power system needs (e.g., flexibility)

- Due to increasing flexibility power system needs, driven by changing supply/demand balance and resource mix, some jurisdictions have created or exploring new A/S
    - CAISO – implemented ramp A/S
    - Midcontinent MISO (MISO) – implemented ramp A/S
    - SPP – continues to explore potential implementation of ramp A/S
- IESO identified need for increased power system flexibility (2016 IESO Operability Assessment – Summary Review of the Operability of the IESO-Controlled Grid to 2020), expanding supply of multiple A/S and creation of new A/S provides multiple benefits
    - Increased supply from multiple resources (traditional and non-traditional)
    - Better ensures power system needs will be met
    - Increased competition
    - Increased competition can lead to lower A/S prices, lowering costs to customers

1. Alignment with MDAG vision

All proposed market development projects must demonstrate that they are required for system reliability, meet regulatory need, and/or deliver meaningful market efficiency benefits (deliver system cost savings). Proposed projects that meet these criteria will be further assessed according to information provided in sections 2-5. Projects that do not meet these criteria in section 1 will not be evaluated further.

A. Can the proposed market development project demonstrate that it will maintain system reliability, meet a regulatory standard or decision in Ontario, or deliver cost savings?

i. Will the proposed market development project contribute to system reliability?

☒ **Yes** ☐ **No**

Explain:

- As described in the Project Description, IESO identified need for increased power system flexibility in their *2016 IESO Operability Assessment - Summary Review of the Operability of the IESO-Controlled Grid to 2020*
- Expansion of resources that can provide multiple A/S and creation of needed A/S (e.g., ramp) are directionally consistent with changes IESO has made to expansion of OR and regulation

ii. Is the proposed market development project required to meet a regulatory requirement in Ontario?

☐ **Yes** ☒ **No**

Explain:

- There is no statute that specifically dictates A/S within IAM
- Therefore, by way of authority empowered by the Electricity Act, the IESO has the ability to make design changes and rule amendments relating to A/S
- IESO is Ontario's reliability 'agent', as IESO is a member of North American electricity reliability authorities (i.e., Northeast Power Coordinating Council (NPCC), North American Electricity Reliability Corporation (NERC)), and therefore has regulatory authority to maintain reliability of Ontario's power system and more specifically the IESO-Controlled Grid (ICG), therefore IESO has additional authority and ability to reform A/S within IAM.

iii. Is the proposed market development project expected to deliver system cost savings?

☒ **Yes** ☐ **No**

Explain:

- See explanation under Project Description and 1.A.i.
- Expanding the number of resources that can compete to supply A/S increases competition and should result in lower A/S prices, in turn decreases costs to customers.

B. Will the proposed market development project require design changes to the IESO Administered Markets?

☒ **Yes** ☐ **No**

Explain:

- See Project Description explanation under 1.A.i.
- System changes, market design changes, and rule amendments will be required regarding, but not limited to, modeling capability of resources to provide A/S, integration of scheduling/dispatching supply of A/S from more resources, adding new A/S, etc.

C. Is the proposed market development project aligned with IESO's market development principles of competition, transparency, efficiency, certainty, and implementability?

i. Does the proposed market development project align with the market development principle of competition?

☒ **Yes** ☐ **No**

Explain:

See Project Description and explanation under 1.A.i. and 1.A.iii.

ii. Does the proposed market development project align with the market development principle of transparency?

☒ **Yes** ☐ **No**

Explain:

- See Project Description and explanation under 1.A.i.
- By increasing the number of resources able to supply A/S, including new A/S, IESO may be able to abandon contracting some A/S (e.g., regulation) and could develop more transparency by integrating these A/S directly into the scheduling/dispatch/price-setting mechanics within IAM

iii. Does the proposed market development project align with the market development principle of efficiency?

☒ **Yes** ☐ **No**

Explain:

- See Project Description and explanations under 1.A.i., 1.A.iii., and 1.C.ii.

iv. Does the proposed market development project align with the market development principle of certainty?

☒ **Yes** ☐ **No**

Explain:

- See explanations in above sections
- Increasing the number of resources able to supply A/S and creation of needed A/S creates greater certainty regarding operations within IAM and reliability of ICG, in addition to increased revenue opportunities for a greater number of resources

v. Does the proposed market development project align with the market development principle of Implementability?

☒ **Yes** ☐ **No**

Explain:

- See Project Description and explanations under 1.A.i. and 1.A.ii.
- Other wholesale electricity markets (e.g., CAISO, MISO, SPP, etc.) successfully permitted a greater number of resources to supply A/S and have implemented new A/S

2. Reliability Impacts

The purpose of this section is to understand the impact of the proposed market development project on system reliability

A. Provide a high level overview of how the proposed market development project impacts reliability.

Explain:

See Project Description and explanations above.

B. Will the proposed market development project help reduce the risk of loss of load events?

☒ Yes ☐ No

Explain:

- See Project Description and explanations above
- Risks of loss of load events will decrease by increasing supply of A/S through permitting greater participation from multiple resources in supply of A/S including new A/S.

C. Will the proposed market development project help alleviate constraints on the system?

☒ Yes ☐ No

Explain:

- Expanding the number of resources that can provide A/S could increase supply of A/S within constrained zones within ICG, and could address 'local' or zonal reliability issues if these constrained zones have limited A/S supply options as of today
- Same for constrained zones that may have greater power system flexibility needs, relative to other zones with less flexibility needs – creation of new A/S combined with enabling supply of these A/S from multiple resources could address 'local' or zonal power system flexibility/operability need.

D. If “Yes” was answered to either 2B, or 2C, expand whether reliability impacts are expected to be local, zonal or system wide?

☒ Local ☒ Zonal ☒ System wide

See explanation 2.C

3. Market Efficiency Impacts

The purpose of this section is to understand potential market efficiency impacts of the proposed market development project across various components of the IESO Administered Markets over the short term and long term.

A. How will this proposed project improve the efficiency of Ontario's wholesale energy market in the short term (1-2 years)?

Any information on the materiality of the impact will be helpful, in addition to clarification on which component of the wholesale market design this proposed market development project will impact, e.g., OR, RT, DR etc.

See Project Description and explanations provided above.

B. How will this proposed market development project impact the efficiency of the wholesale energy market post Market Renewal implementation?

Any information on the materiality of the impact will be helpful, in addition to clarification on which component of the wholesale market design this proposed market development project will impact, e.g., OR, RT, DR etc.?

See Project Description and explanations provided above.

C. What impacts will the proposed market development project have on system flexibility?

Explain:

See Project Description and explanations provided above.

D. How will the proposed market development project enable greater wholesale market participation?

Explain:

See Project Description and explanations provided above.

E. Overall, how will this proposed market development project increase the competitiveness of the Ontario wholesale market?

Explain:
See Project Description and explanations provided above.

4. Risk Assessment

The purpose of this section is to identify risks that may impact the value proposition of the market development project, and to understand how these risks might change over the short term and long term.

A. Identify potential risks that could impact the value proposition of the project. Note that risks identified in 4A will be used to complete the risk assessment in section 4B, C and D.

Identify potential risks to the project:

- To alleviate risks, IESO should work with prospective suppliers of A/S (existing and new) and other stakeholders to ensure that all qualified resources have needed technical capabilities to supply applicable A/S.

Risk over time

B. Are the risks identified in section 4A expected to change over the next 1-2 years?

☒ remain unchanged ☐ decrease ☐ increase

Explain:

See explanation provided in 4.A.

Impact on project

C. Are the risks identified in section 4A expected to change post Market Renewal implementation?

☒ remain unchanged ☐ decrease ☐ increase

Explain:

See explanation provided in 4.A.

D. Are there ways that risks identified in section 4A could be mitigated cost effectively?

Explain:

See explanation provided in 4.A.

5. Implementability [This section is to be completed by the IESO]

The purpose of this section is to determine whether the proposed market development project submitted is feasible and practical for the IESO to undertake.

A. What are the IESO internal constraints in terms of capital and personnel to deliver on the proposed market development project?

B. How long does the IESO estimate the proposed market development project will take to implement?

☐ < 1 year ☐ 1 to 3 years ☐ > 3 years

Explain:

C. Is the proposed market development project feasible and practical for the IESO to begin implementing in the short, medium, or long term?

☐ < 2 years ☐ 2 to 5 years ☐ > 5 years

Explain:

D. **Are there linkages to other potential or ongoing projects**?

☐ Yes ☐ No

Explain:

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A. Key Information

Project title:	Valuing Clean Attributes
Organization:	Power Advisory (on behalf of Consortium of renewable generators, energy storage, and associations)
Organization representative and title:	Jason Chee-Aloy, Managing Director, Power Advisory
Mailing address:	[redacted]
Phone:	[redacted]
Email:	[redacted]
Date:	August 20, 2019

B. Project Description

Use the area below to explain the concept and objectives of this project.

- Markets exist for clean attributes (e.g., Environmental Attributes (EAs), such as Renewable Energy Certificates (RECs)) across Canada and U.S.
    - Compliance markets (state policy driven, bilateral contracts between suppliers and utilities/customers)
    - Voluntary markets (customer driven, bilateral contracts between suppliers and customers)
- Compliance and voluntary markets for EAs/RECs increasing across North America
    - Partially due to customer demand (e.g., 'corporate Power Purchase Agreements (PPAs)')
- In addition to EA/REC markets, precedence being set in New York, as New York Independent System Operator (NYISO) proposing to implement carbon pricing directly within their wholesale energy market
- For various reasons, limited ways exist for Ontario renewable generators to sell EAs/RECs (in and outside Ontario), yet demand for EAs/RECs project to continue increasing
- For nearly all contracted renewable generators, IESO retains ownership of all EAs/RECs, these EAs/RECs have never been 'monetized'
- Valuing clean attributes (e.g., EAs, RECs) provides multiple benefits
    - Sale of contracted EAs will provide revenues that could help lower electricity costs to customers
    - 'Monetizing' clean attributes should drive decision-making (i.e., suppliers and customers) to economically lower emissions within Ontario
    - Market-based solutions should result in efficient outcomes linked to electricity market

Recommendation – IESO should work with market participants/stakeholders, including the Ontario government and the Ontario Energy Board (OEB), towards determining an Ontario-specific strategy to value clean attributes within Ontario's electricity market, with considerations regarding impacts and potential mechanisms, resulting in lowering costs to customers

1. Alignment with MDAG vision

All proposed market development projects must demonstrate that they are required for system reliability, meet regulatory need, and/or deliver meaningful market efficiency benefits (deliver system cost savings). Proposed projects that meet these criteria will be further assessed according to information provided in sections 2-5. Projects that do not meet these criteria in section 1 will not be evaluated further.

A. Can the proposed market development project demonstrate that it will maintain system reliability, meet a regulatory standard or decision in Ontario, or deliver cost savings?

i. Will the proposed market development project contribute to system reliability?

☒ **Yes** ☐ **No**

Explain:

- In addition to the points described in the Project Description, EAs/RECs provide additional revenues to suppliers that can be used to ensure cost recovery of investments, which in turn supports maintenance of existing resources and development of new resources – where all resources contribute to helping maintain resource adequacy within Ontario's power system

ii. Is the proposed market development project required to meet a regulatory requirement in Ontario?

☐ **Yes** ☒ **No**

Explain:

- There is no statute that specifically dictates how EAs/RECs could be valued/integrated within IAM or within the broader Ontario electricity market
- However, for most existing renewable generators under contract with IESO, IESO retains ownership of EAs/RECs from these renewable generators, therefore if the value of EAs/RECs is to be 'unlocked' from contracts then contracts may need to be amended and/or IESO will need to find ways to 'monetize' these EAs/RECs.

iii. Is the proposed market development project expected to deliver system cost savings?

☒ **Yes** ☐ **No**

Explain:

- See explanation under Project Description and 1.A.i.
- For EAs/RECs under IESO contracts, if these EAs/RECs were 'monetized' (e.g., bilateral sales to buy-side counterparties (e.g., customers, utilities, etc.) then all or some of the revenues could be used to lower costs to customers (e.g., lower Global Adjustment (GA) costs).

B. Will the proposed market development project require design changes to the IESO Administered Markets?

☒ **Yes** ☐ **No**

Explain:

- See Project Description explanation under 1.A.i.
- System changes, market design changes, and rule amendments will not be required if EAs/RECs are not directly valued within IAM (i.e., not taking approach presently proposed by NYISO to apply a 'carbon adder' to wholesale energy prices under specific conditions).

C. Is the proposed market development project aligned with IESO's market development principles of competition, transparency, efficiency, certainty, and implementability?

i. Does the proposed market development project align with the market development principle of competition?

☒ **Yes** ☐ **No**

Explain:

- See Project Description and explanation under 1.A.i. and 1.A.iii.
- Markets for EAs/RECs continue to increase across U.S. and Canada, in part due to state policies (e.g., Renewable Portfolio Standards (RPS), etc.) and demand from customers (including corporations as evident by increasing corporate PPAs) and utilities – all enabling increased competition on both supply-side and demand-side for EAs/RECs

ii. Does the proposed market development project align with the market development principle of transparency?

☒ **Yes** ☐ **No**

Explain:

- See Project Description and explanation under 1.A.i.
- Enabling supplier and/or IESO access to EA/REC markets will provide needed transparency to value of Ontario-based EAs/RECs

iii. Does the proposed market development project align with the market development principle of efficiency?

☒ **Yes** ☐ **No**

Explain:

- See Project Description and explanations under 1.A.i., 1.A.iii., and 1.C.ii.
- Due to IESO retaining ownership of mostly all EAs/RECs from applicable contracts, inefficiencies exist by way of not realizing the monetary value of these EAs/RECs

iv. Does the proposed market development project align with the market development principle of certainty?

☒ **Yes** ☐ **No**

Explain:

- See explanations in above sections

v. Does the proposed market development project align with the market development principle of Implementability?

☒ **Yes** ☐ **No**

Explain:

- See Project Description and explanations under 1.A.i. and 1.A.ii.
- Markets for EAs/RECs exist – compliance and voluntary, therefore 'unlocking' value of applicable contracted EAs/RECs is clearly doable

2. Reliability Impacts

The purpose of this section is to understand the impact of the proposed market development project on system reliability

A. Provide a high level overview of how the proposed market development project impacts reliability.

Explain:

- No negative impacts on reliability.

B. Will the proposed market development project help reduce the risk of loss of load events?

☒ Yes ☐ No

Explain:

- Yes – through provision of additional revenues that can contribute to availability of applicable resources that can help maintain resource adequacy within Ontario's power system.

C. Will the proposed market development project help alleviate constraints on the system?

☒ Yes ☐ No

Explain:

- Not directly applicable.

D. If "Yes" was answered to either 2B, or 2C, expand whether reliability impacts are expected to be local, zonal or system wide?

☐ Local ☐ Zonal ☐ System wide

- Not directly applicable.

3. Market Efficiency Impacts

The purpose of this section is to understand potential market efficiency impacts of the proposed market development project across various components of the IESO Administered Markets over the short term and long term.

A. How will this proposed project improve the efficiency of Ontario's wholesale energy market in the short term (1-2 years)?

Any information on the materiality of the impact will be helpful, in addition to clarification on which component of the wholesale market design this proposed market development project will impact, e.g., OR, RT, DR etc.

See Project Description and explanations provided above.

B. How will this proposed market development project impact the efficiency of the wholesale energy market post Market Renewal implementation?

Any information on the materiality of the impact will be helpful, in addition to clarification on which component of the wholesale market design this proposed market development project will impact, e.g., OR, RT, DR etc.?

See Project Description and explanations provided above.

C. What impacts will the proposed market development project have on system flexibility?

Explain:

See Project Description and explanations provided above.

D. How will the proposed market development project enable greater wholesale market participation?

Explain:

See Project Description and explanations provided above.

E. Overall, how will this proposed market development project increase the competitiveness of the Ontario wholesale market?

Explain:

See Project Description and explanations provided above.

4. Risk Assessment

The purpose of this section is to identify risks that may impact the value proposition of the market development project, and to understand how these risks might change over the short term and long term.

A. Identify potential risks that could impact the value proposition of the project. Note that risks identified in 4A will be used to complete the risk assessment in section 4B, C and D.

Identify potential risks to the project:
Not applicable.

Risk over time

B. Are the risks identified in section 4A expected to change over the next 1-2 years?

☐ remain unchanged ☐ decrease ☐ increase

Explain:
See explanation provided in 4.A.

Impact on project

C. Are the risks identified in section 4A expected to change post Market Renewal implementation?

☐ remain unchanged ☐ decrease ☐ increase

Explain:
See explanation provided in 4.A.

D. Are there ways that risks identified in section 4A could be mitigated cost effectively?

Explain:
See explanation provided in 4.A.

5. Implementability [This section is to be completed by the IESO]

The purpose of this section is to determine whether the proposed market development project submitted is feasible and practical for the IESO to undertake.

A. What are the IESO internal constraints in terms of capital and personnel to deliver on the proposed market development project?

B. How long does the IESO estimate the proposed market development project will take to implement?

☐ < 1 year ☐ 1 to 3 years ☐ > 3 years

Explain:

C. Is the proposed market development project feasible and practical for the IESO to begin implementing in the short, medium, or long term?

☐ < 2 years ☐ 2 to 5 years ☐ > 5 years

Explain:

D. **Are there linkages to other potential or ongoing projects**?

☐ Yes ☐ No

Explain:

Please submit the completed project valuation assessment to engagement@ieso.ca

Market Development Advisory Group (MDAG) Workplan Proposed Market Development Project Valuation Assessment

Purpose:

The completion of this assessment is required to support proposed market development projects for consideration by the IESO and MDAG for prioritization. The information in this assessment will help determine whether the project submitted is aligned with the goals and objectives of the MDAG, including: system reliability, regulatory needs, and/or meaningful market efficiency benefits.

Instructions:

Please complete this form in full to identify potential market development projects that will be considered by the IESO and MDAG for prioritization.

Stakeholders are asked to complete this project valuation assessment and return the form to engagement@ieso.ca by **August 20, 2019** and will be offered the opportunity to present at the August 29 MDAG meeting.

Please note that potential market development projects submitted must, at a minimum, satisfy the criteria in section 1 - "Alignment with MDAG vision" - to be considered further. The IESO will review answers in section 1 of this assessment to verify whether the project submitted is aligned with IESO Markets goals and objectives.

Disclaimer:

Receipt of a potential market development project through this assessment for consideration and prioritization in the MDAG Workplan does not constitute a commitment by the IESO to support the proposed project, nor does it create a business relationship between the stakeholder, its partners, affiliates, or related parties, and the IESO.

All information submitted in the proposed market development project will be treated as non-confidential unless clearly labelled as confidential by the applicant. The IESO reserves the right to make public the names of applicants, the title and a description of their proposed project.

A. Key Information

Project title:	Efficient Pricing
Organization:	Power Advisory (on behalf of Consortium of renewable generators, energy storage, and associations)
Organization representative and title:	Jason Chee-Aloy, Managing Director, Power Advisory
Mailing address:	[redacted]
Phone:	[redacted]
Email:	[redacted]
Date:	August 20, 2019

B. Project Description

Use the area below to explain the concept and objectives of this project.

- Wholesale energy and operating reserve (OR) prices should accurately reflect locational supply/demand balance in real-time
- Since electricity is volatile with relatively limited ability to store supply, energy and OR prices can be very volatile and rise to very high levels
- As a consequence, wholesale energy and OR prices can be overly mitigated – not reflecting actual supply/demand balance, and dampening needed revenues towards maintaining operating assets and cost recovery of investments (including needed resources to be built)
- Therefore, 'out of market' mechanisms needed to 'proxy' lost revenues from wholesale energy and OR markets, not able to reflect actual supply/demand balance
- Customers end up paying in totality – no matter which mechanisms used to provide revenues commensurate with meeting power system needs, however shortage/scarcity pricing for energy and OR will lower customer costs relative to some 'out of market' mechanisms (e.g., 'uplift' charges from wholesale electricity market)

Recommendation – implement shortage/scarcity energy and OR pricing, and consider use of OR demand curve (ORDC) to address the dynamic described above

- Governments, regulators, independent system operators (ISOs) recognizing benefits to efficient pricing through wholesale energy and OR shortage/scarcity pricing, therefore precedent setting for IESO
    - U.S. Federal Energy Regulatory Commission (FERC) issued Order 825 (2016) regarding shortage/scarcity pricing
    - New York ISO (NYISO) and Electricity Reliability Council of Texas (ERCOT) administer specific rules/protocols for shortage/scarcity pricing, ERCOT administers ORDC

      NYISO has three present initiatives focusing on shortage pricing (e.g., April FERC order (EL18-33, EL18-34) directed NYISO (and PJM) to adjust market rules to more effectively allow 'fast-start' resources to set prices)
    - On July 25, 2019, Government of Alberta directed Alberta Electricity System Operator (AESO) to explore shortage/scarcity pricing within Alberta's wholesale energy market

1. Alignment with MDAG vision

All proposed market development projects must demonstrate that they are required for system reliability, meet regulatory need, and/or deliver meaningful market efficiency benefits (deliver system cost savings). Proposed projects that meet these criteria will be further assessed according to information provided in sections 2-5. Projects that do not meet these criteria in section 1 will not be evaluated further.

A. Can the proposed market development project demonstrate that it will maintain system reliability, meet a regulatory standard or decision in Ontario, or deliver cost savings?

i. Will the proposed market development project contribute to system reliability?

☒ **Yes** ☐ **No**

Explain:

- Shortage/scarcity pricing for energy and OR, combined with ORDC, enhances MRP Energy Workstream (Single Schedule Market (SSM), Day-Ahead Market (DAM), Enhanced Real-Time Unit Commitment (ERUC)) reforms and provides multiple benefits
    - Most accurate price signals
    - Best pricing benchmark to design customer rates
    - Efficient supplier and customer responses to real-time system conditions
    - Lessens need for 'out of market' mechanisms/payments
    - Increases operational and economic efficiencies for producers and customers, therefore lower costs to customers
- The benefits listed above combine to provide accurate price signals most reflecting actual supply/demand conditions in real-time therefore signaling power system needs, as a result suppliers and customers can most efficiently and quickly respond to Ontario's power system needs resulting in efficient actions towards maintaining reliability of the IESO-Controlled Grid (ICG) and the broader Ontario power system (including distribution systems, where distributed energy resources (DERs) could respond to these price signals)

ii. Is the proposed market development project required to meet a regulatory requirement in Ontario?

☐ **Yes** ☒ **No**

Explain:

- There is no statute that specifically dictates how the IESO-Administered Markets (IAM) should formulate, calculate, or set wholesale energy and OR prices
- Therefore, by way of authority empowered by the Electricity Act, IESO has ability to make design changes and rule amendments relating to implementing efficient pricing in the form of shortage/scarcity energy and OR pricing, with consideration of ORDC
- As the case with any amendment to the Market Rules, the Ontario Energy Board (OEB) has oversight mainly through appeals to rule amendments filed by stakeholders.

iii. Is the proposed market development project expected to deliver system cost savings?

☒ **Yes** ☐ **No**

Explain:

- See Project Description and explanation under 1.A.i.
- Efficient pricing of energy and OR will result in more efficient allocation of resources through economic improvements to scheduling and dispatching resources for real-time production and consumption combined with most accurate market-clearing prices
- Therefore, resulting in overall lower energy and OR costs, while decreasing the use of 'out of market' mechanisms/payments – which reduces overall costs to all customers

B. Will the proposed market development project require design changes to the IESO Administered Markets?

☒ **Yes** ☐ **No**

Explain:

- See explanation under 1.A.i.
- System changes and rule amendments will be required regarding, but not limited to, how resources are scheduled/dispatched, which resources can set market-clearing prices, conditions to permit shortage/scarcity pricing for energy and OR, etc.

C. Is the proposed market development project aligned with IESO's market development principles of competition, transparency, efficiency, certainty, and implementability?

i. Does the proposed market development project align with the market development principle of competition?

☒ **Yes** ☐ **No**

Explain:

- See Project Description and explanation under 1.A.i.
- Efficient pricing provides most accurate economic signals permitting increased competition to supply energy and OR, or not consume energy when economic

ii. Does the proposed market development project align with the market development principle of transparency?

☒ **Yes** ☐ **No**

Explain:

- See Project Description and explanation under 1.A.i.
- Efficient pricing provides greatest transparency regarding real-time supply/demand balance (and by location with planned implementation of Locational Marginal Pricing (LMP) through SSM)

iii. Does the proposed market development project align with the market development principle of efficiency?

☒ **Yes** ☐ **No**

Explain:

- See Project Description and explanations under 1.A.i., 1.C.i., and 1.C.ii

iv. Does the proposed market development project align with the market development principle of certainty?

☒ **Yes** ☐ **No**

Explain:

- See explanation under Project Description and 1.A.i.
- Efficient pricing creates stronger linkages to IAM settlements, as settlements should best match market-clearing prices with dispatch instructions, therefore creating more certainty with lessening the need to use 'out of market' mechanisms which lessens transparency settlements do not always reflect market-clearing prices

v. Does the proposed market development project align with the market development principle of Implementability?

☒ **Yes** ☐ **No**

Explain:

- See Project Description and explanations under 1.A.i. and 1.A.ii.
- Other wholesale electricity markets (e.g., ERCOT, NYISO), etc.) have successfully implemented forms of shortage/scarcity pricing, therefore clearly conveying ability for IESO to implement similar changes

2. Reliability Impacts

The purpose of this section is to understand the impact of the proposed market development project on system reliability

A. Provide a high level overview of how the proposed market development project impacts reliability.

Explain:

- See explanation under Project Description and 1.A.i.
- Efficient pricing (shortage/scarcity pricing for energy and OR) helps power system reliability through transparent and economic signals to which market participants and others (e.g., customers and suppliers not registered as IAM market participants but can react to real-time wholesale market price signals) can react accordingly to efficiently meet real-time power system reliability needs.

B. Will the proposed market development project help reduce the risk of loss of load events?

☒ Yes ☐ No

Explain:

- See explanation under 2.A.
- Efficient pricing through shortage/scarcity pricing for energy and OR provides most accurate, transparent, and real-time signals to load customers, enabling reaction to these signals, which helps to reduce risks of loss of load events – same for suppliers (e.g., generators, storage, imports, etc.) that could respond by supplying energy or OR in order to reduce risks of loss of load events.

C. Will the proposed market development project help alleviate constraints on the system?

☒ Yes ☐ No

Explain:

- See explanation under 1.A.i., 2.A., and 2.B.
- Efficient pricing through shortage/scarcity pricing for energy and OR, combined with planned implementation of LMP, will provide most accurate and transparent locational pricing signals which can help alleviate constraints in ICG

D. If "Yes" was answered to either 2B, or 2C, expand whether reliability impacts are expected to be local, zonal or system wide?

☒ Local ☒ Zonal ☒ System wide

See explanation under 1.A.i., 2.A, 2.B., and 2.C.

3. Market Efficiency Impacts

The purpose of this section is to understand potential market efficiency impacts of the proposed market development project across various components of the IESO Administered Markets over the short term and long term.

A. How will this proposed project improve the efficiency of Ontario's wholesale energy market in the short term (1-2 years)?

Any information on the materiality of the impact will be helpful, in addition to clarification on which component of the wholesale market design this proposed market development project will impact, e.g., OR, RT, DR etc.

See Project Description and explanations provided above.

B. How will this proposed market development project impact the efficiency of the wholesale energy market post Market Renewal implementation?

Any information on the materiality of the impact will be helpful, in addition to clarification on which component of the wholesale market design this proposed market development project will impact, e.g., OR, RT, DR etc.?

See Project Description and explanations provided above.

C. What impacts will the proposed market development project have on system flexibility?

Explain:

- See Project Description and all explanations provided above
- Efficient pricing through shortage/scarcity pricing for energy and OR will help address power system flexibility needs within the IAM and on the ICG, especially intra-hour where 'fast response' resources (e.g., some generators, storage, etc.) respond to accurate and transparent prices – resulting in most effectively being compensated through accurate market-clearing prices.

D. How will the proposed market development project enable greater wholesale market participation?

Explain:

See Project Description and explanations provided above.

E. Overall, how will this proposed market development project increase the competitiveness of the Ontario wholesale market?

Explain:

See Project Description and explanations provided above.

4. Risk Assessment

The purpose of this section is to identify risks that may impact the value proposition of the market development project, and to understand how these risks might change over the short term and long term.

A. Identify potential risks that could impact the value proposition of the project. Note that risks identified in 4A will be used to complete the risk assessment in section 4B, C and D.

Identify potential risks to the project:

- Efficient pricing through shortage/scarcity pricing of energy and OR must enable IAM to clear at prices that accurately reflect real-time supply/demand balance locationally (i.e., planned within SSM through LMP), therefore any market oversight must permit prices to clear at required yet reasonable levels – if not, risks to the efficacy of shortage/scarcity pricing of energy and OR will occur
- Rate design and cost allocation to all classes of customers must carefully be determined, striking a balance between appropriate prices/rates for customers that may not have total ability to respond to real-time market-clearing prices or can be unduly economically harmed by prices that reach certain levels, and permitting settlement of real-time market-clearing prices based on shortage/scarcity pricing of energy and OR to those customers that have capabilities of managing (maybe even benefiting) real-time exposure to market-clearing prices.

Risk over time

B. Are the risks identified in section 4A expected to change over the next 1-2 years?

☐ remain unchanged ☐ decrease ☐ increase

Explain:

See explanation provided above.

Impact on project

C. Are the risks identified in section 4A expected to change post Market Renewal implementation?

☐ remain unchanged ☐ decrease ☐ increase

Explain: See explanation provided in 4.A.

D. Are there ways that risks identified in section 4A could be mitigated cost effectively?

Explain: See explanation provided in 4.A. re: rate design and cost allocation to customers

5. Implementability [This section is to be completed by the IESO]

The purpose of this section is to determine whether the proposed market development project submitted is feasible and practical for the IESO to undertake.

A. What are the IESO internal constraints in terms of capital and personnel to deliver on the proposed market development project?

B. How long does the IESO estimate the proposed market development project will take to implement?

☐ < 1 year ☐ 1 to 3 years ☐ > 3 years

Explain:

C. Is the proposed market development project feasible and practical for the IESO to begin implementing in the short, medium, or long term?

☐ < 2 years ☐ 2 to 5 years ☐ > 5 years

Explain:

D. **Are there linkages to other potential or ongoing projects**?

☐ Yes ☐ No

Explain:

Please submit the completed project valuation assessment to engagement@ieso.ca