

ENABLING SYSTEM FLEXIBILITY

Stakeholder Engagement

Meeting #3

January 27, 2017

Agenda

- Engagement update
- Responses to stakeholder feedback
- Enabling flexibility for the near term
- Characteristics of flexible resources
- Next steps

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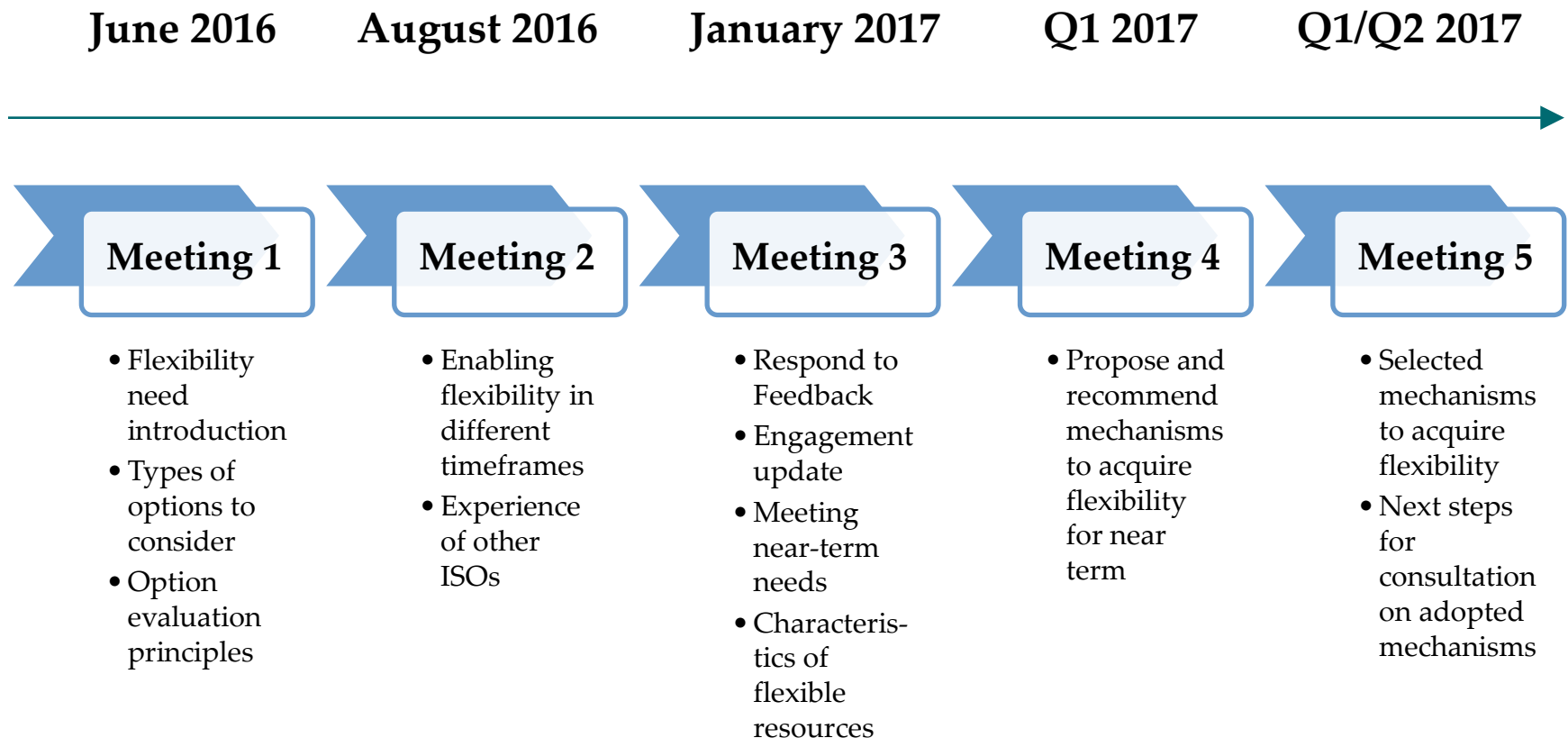
Stakeholder Engagement Update

Hok Ng

Engagement Recap

- The objective of this engagement is to determine potential solutions that can enable and achieve flexibility to meet the evolving needs of the system
- Meetings held to discuss
 - The nature of the flexibility need
 - Brief survey of solutions from other ISOs
 - Principles to evaluate potential solutions
- Summary of Operability Study posted in December 2016

Updated Engagement Timeline



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Responses to Stakeholder Feedback

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Stakeholder Feedback

The IESO received feedback related to:

- *Potential improvements to enable flexibility*
- *Types of resources capable of providing flexibility*

Stakeholder Feedback – Enabling Flexibility

- *Improvements could be made to the IESOs VG forecasting and dispatch scheduling. More frequent intertie scheduling should be considered as part of the solution.*
- **IESO:** *Improvements to the VG forecast are being pursued. The improvements may be incremental, but the magnitude of flexibility need remains. More frequent intertie scheduling is within the scope of Market Renewal.*

Stakeholder Feedback – Flexible Resources

- *Suggestion pertaining to considering only certain types of resources for flexibility. Among these were quicker responding resources and resources with zero emissions.*
- **IESO:** *At this stage of the process, the IESO is taking a technology neutral approach so that we can consider all possible solutions. To inform of the type of response needed for flexibility, the characteristics of flexible resources will be described in this presentation. The Ontario Cap and Trade regulation in place will value the cost of emissions – this would be considered when evaluating the overall costs of potential solutions.*

Stakeholder Feedback – Flexible Resources

- *Question regarding how energy storage will be evaluated given that it can provide multiple services. Stacking of benefits should be looked at holistically as part of Market Renewal.*
- **IESO:** *The IESO acknowledges the cross over attributes that energy storage can provide between flexibility and regulation. Furthermore, we also recognize that the activities of this engagement, as well as other initiatives, including Market Renewal are interrelated. As such, we are open to further discussion with stakeholders on this aspect. The goal of Market Renewal is to put in place a platform that would allow participants choice to participate in and receive revenue from multiple market products.*

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Enabling Flexibility for the Near Term

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Enabling System Flexibility Solutions

To meet flexibility needs, other ISOs have implemented a variety of solutions to:

- Acquire flexible capacity
 - Capacity markets
 - Flexible capacity procurement
- Signal the need for and dispatch flexibility
 - Ramp capability product
 - More frequent intertie scheduling

Observations From Other ISO Solutions

- No one common solution set for all ISOs
 - Different supply mix and market features in place require different solutions
- Some solutions require foundational market elements
 - Locational pricing
 - Optimized resource commitment programs
- Solutions took multiple years to implement
 - Stakeholdering, design and implementation

Enduring Solution for Ontario

Market Renewal will put in place the necessary market features for an enduring solution for flexibility through 3 streams:

1. Energy – Single schedule pricing, optimized commitment
2. Capacity – Acquiring the ‘right’ incremental capacity for system needs
3. Operability – Mechanisms to signal and dispatch flexibility

Near Term Needs

- Up to 1000 MW of flexibility needed in 2017/18
 - Amounts to be revised given LRP II suspension and amended FIT targets
- Market Renewal will work towards an enduring solution for flexibility
- This engagement will therefore focus on options to meet the near term flexibility requirements
 - How to get needed flexible capacity
 - How to better signal and dispatch flexible capacity

Options to Meet 2017/2018 Flexibility Needs

- Flexible capacity could be acquired through various approaches
 - Preference for open, fair and competitive approaches, such as RFP, auction, or other mechanisms that can be implemented in the 2017/2018 timeframe
- Signaling and dispatching flexibility
 - Investigating adjustments to Multi-Interval Optimization (MIO) – increase the number of intervals to look ahead for dispatch
 - New reporting to project flexibility need and availability of energy offers

Meeting 2017/2018 Flexibility Needs

- The Enabling Flexibility Stakeholder Engagement is one part of a suite of IESO initiatives that are interrelated
- Must maintain awareness of linkages between initiatives to understand impacts and ensure conflicts are avoided
- The IESO welcomes further stakeholder perspectives on this matter

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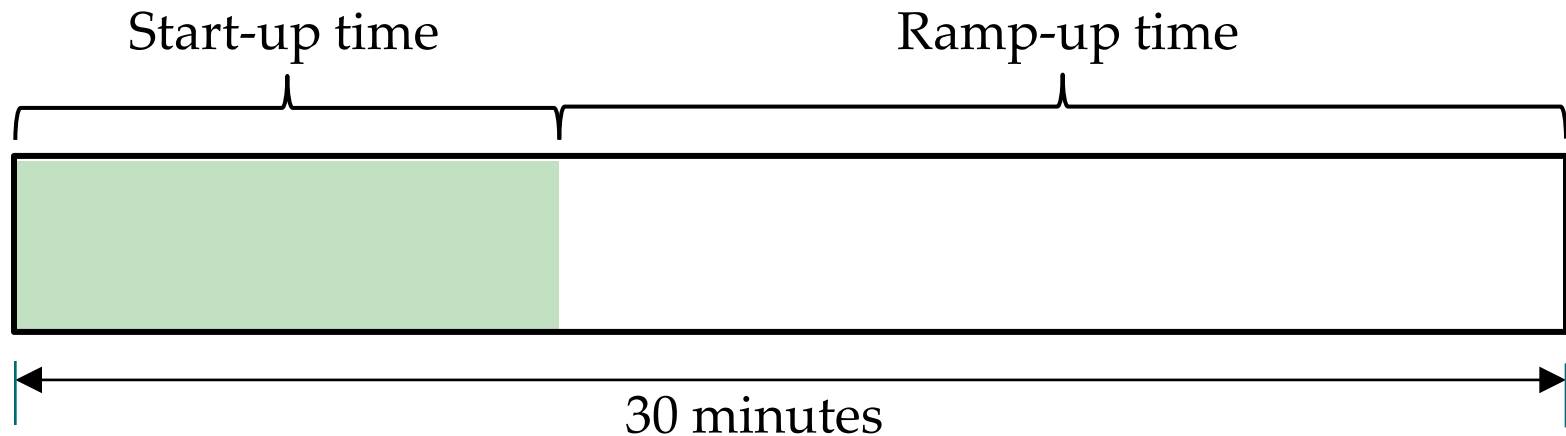
Characteristics of Flexible Resources
Ahmed Rashwan

Characteristics of Flexible Resources

- Flexible resource characteristics were informed by how the VG forecast improves significantly in the hour of dispatch
- For VG over-forecasts corrected in this time frame, real-time market processes are relied upon to dispatch available resources to compensate for the missing VG output
- Resources that are already on-line or that can synchronize and provide flexibility within ½ hour can be dispatched in real-time for this purpose

Flexibility Contribution Definition

Generation or load displacement a resource can achieve within 30 minutes – includes start-up time after receipt of a signal from the IESO



A resource with a 10 minute start-up time and a 5 MW/min ramp rate would yield a $5 \text{ MW/min} \times 20 \text{ min} = 100 \text{ MW}$ flexibility contribution

Locational Considerations

- In general, flexible resources must be located in parts of the system where their capacity is not limited by transmission constraints (e.g. Northern Ontario)
- An exception allowed is for flexible resources in areas that have a high penetration of renewables (e.g. Western Ontario)
- Assessment of capable flexible resources could be performed on a case by case basis

Operating Characteristic Guidelines

- Maximum Minimum Run Time (MRT) of about 2 hours
- Sustainability of flexibility contribution of at least 2 hours
- Capable of starting at least 2 times per day
- Minimum turnaround time of about 3 hours

Availability and Starting Reliability Considerations

- VG uncertainty exists throughout the day
- Flexible resources must be consistently available to respond to over-forecast VG
- Therefore they must maintain a high level of:
 - Availability (e.g. ~90%)
 - Starting reliability (e.g. ~95%)

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Next Steps

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For Next Meeting

- Provide further details on potential options to satisfy near term flexibility requirements
- Recommend options to
 - Acquire flexible capacity
 - Signal and dispatch flexible capacity

Stakeholder Feedback

- The feedback received has helped the IESO understand various stakeholder considerations
- We continue to welcome feedback regarding
 - The linkages of the Flexibility Stakeholder Engagement and other IESO initiatives
 - The timing of near term and enduring activities for enabling flexibility
- Please send feedback to engagement@ieso.ca by February 17th 2017