

IESO Project Brief

Project ID # 376

1. Proposed Project Name:	IESO Simulator Project – Phase 2
2. Prepared by:	Tiberiu Abid
3. Sponsor(s):	Nicholas Ingman
4. Executive Summary: The IESO Simulator is an essential part of the Control Room Operator’s training to ensure we deliver superior reliability performance in a changing environment. As outlined in the original business case for the Operations Training Simulator, maintaining reliability of Ontario’s electricity system continues to be our primary focus. One of the risks we face is that junior staff with little experience may not have the capability nor the confidence to respond appropriately when a significant contingency occurs or when we need to execute a material system restoration. Thus, there is a need for operators to gain the necessary experience through a more effective training experience supported by a power system simulator. Since the introduction of the Operations Training Simulator in 2014 our operators have benefitted significantly from being able to respond to both routine and extreme system events in a safe environment. With the simulator, in one week we can expose a team of control room operators to a variety of training scenarios that they might not see in five years on-shift. The initial delivery of the IESO Simulator Project in December 2014 did not include the IESO’s custom EMS security applications. During the closure of this project it was agreed that these security applications would be delivered as part of the EMS Replacement project. The EMS Replacement project was completed in 2016 and upgraded the existing IESO Simulator to the latest EMS platform (NM6.4) and introduced the EMS security applications. Although the security applications are part of the latest Simulator delivery we are unable to utilize them for training to provide a sufficiently realistic training experience for IESO Control Room Operators and achieve the objectives stated in the original business case. In conclusion, the new IESO Simulator Project – Phase 2 initiative will address the outstanding items above and allow us to fully integrate the EMS security applications into the Simulation environment. Challenges that need to be addressed if we are to continue to meet the original business objective for the Operations Training Simulator: • About two-thirds of the existing control room staff have less than 10 years of experience. On an ongoing basis we expect to hire 2 to 3 new control room staff each year to replace staff who are retiring or are leaving to take jobs outside the control room. With low levels of experience, we have fewer control room staff who have been exposed to significant system contingency events and system restoration. • With shifting demographics in the electricity sector, the number of control room staff that we can hire from outside the IESO with industry experience has diminished significantly. In its place, the primary hiring pool is new college or university graduates. As a result, most new control room staff have little work experience and hands-on power system operations experience.	

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- Due to the relatively low frequency of significant contingency events on the power system, it's likely that a control room operator will experience few such contingencies during his/her tenure in the control room.

Although the security applications are part of the latest Simulator delivery we are unable to utilize them for training for the following reasons:

- The data required (thermal limits and Operating Security Limit (OSL) sets/equations) in order to make them work is only available via a static set from a flat file. There isn't an interface to an OSL tool to allow the trainer to create activation plans (OSL limit sets) when an area is out-of-scope of coverage. This means that the System Security Monitoring (SSM) application will only work for areas where all elements are in service and up to one (1) critical element out of service. This does not support most of our training scenarios;
- For the Thermal Limit Monitoring (TLM) and Security Analysis (SA) applications, the limits are static (i.e. representing the limits that Hydro One sent us when the State Estimator (SE) snapshot was taken) and represent only a specific set of weather conditions (temperature, wind speed, day/night). We do not have an interface to the TLM Manager application which houses the complete set of thermal limits (look-up tables) nor the ability to specify the limit set used during simulation based on weather conditions.
- In addition we cannot apply manual overrides to thermal limits to reflect equipment de-ratings, etc.

5. What strategic Corporate goal does this project support from the list below? *

a) Providing Public Value Deliver superior reliability performance in a changing environment – plan and manage the power system so Ontarians have power when and where they need it	☒
b) Building Corporate Resilience Strengthen the development and engagement of our employees	☒
c) Respect and Value our Stakeholders N/A	☐

6. Why is this project required?

a) Required to meet Regulatory/Government directive requirements N/A	☐
b) Meets multiple conditions (6c) and (6d) of criteria 6 This project is required to improve the effectiveness of Control Room Operator training. It has been	☒

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assessed that, without fully functioning security applications, the IESO Simulator does not allow the trainer to provide a sufficiently realistic training experience for IESO Control Room Operators.	
c) Required to sustain IESO Service (Business/IT) N/A	☐
d) Required to increase efficiency and reduce operational cost N/A	☐
7. What customers or users will receive benefits from the outcome of this project?	
a) Market Participants (External Users) + IESO N/A	☐
b) All IESO or Market Participants. N/A	☐
c) Multiple business units N/A	☐
d) Single business unit Market and System Operations – System Operations and Operations Training	☒
8. Does the project directly support the mitigation of a Corporate key risk or low/ modest tolerance event?	
a) Mitigates key risk The breadth and pace of change of Ontario's evolving energy environment challenges the IESO's ability to maintain grid reliability and efficiently integrate new entrants and technologies into the operation of the grid.	☒

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b) Mitigates low tolerance event N/A	☐
c) Mitigates modest tolerance event N/A	☐
d) Not supporting any of the Enterprise Risk/Event N/A	☐
9. Is this project part of a program? ☐ Yes ☒ No	
10) Impact Assessment: If this project is not undertaken the IESO Simulator will not allow the trainer to provide a sufficiently realistic training experience for IESO Control Room Operators and will not achieve the objectives stated in the original Operations Training Simulator Business Case.	
11. Project Attributes:	
a) Duration including contingency: ☐ 0 to 6 months ☐ 7 to 12 months ☒ greater than 12 months	
b) Total Cost (Capital & OM&A) including contingency: ☐ up to \$100k ☐ \$101k to \$500k ☒ \$501k to \$1M ☐ greater than \$1M	
c) Project Dependencies None	

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d) Key Deliverables:

Integrating the EMS security applications into the IESO Simulation environment

1. Thermal limit monitoring (TLM)/Security Analysis (SA)
2. System Security Monitoring (SSM) / Operating Security Limit (OSL)

e) Preferred project start (quarter):

Q2-2017

f) Key Project Risks:

1. Resource availability and expertise
2. Stakeholder expectations

g) Mandatory due date:

N/A

h) Key resources required:

- M&SO Operations Training – Subject Matter Expert
- M&SO Models & Data – Subject Matter Expert
- IT Business Solutions – Market Operations & Forecast Systems – Solution Analyst

i) Additional information, if any:

Reference Documentation:

None