

---

**APRIL 6, 2022**

# **Barrie/Innisfil**

## **Integrated Regional Resource Plan (IRRP)**

### **Engagement Webinar #3**

# Agenda

1. IRRP Status Update
2. Demand Forecast and Transmission System Needs
3. Options Analysis and Draft Recommendations
4. Engagement and Next Steps

# Objectives of Today's Engagement Webinar

- To provide an update on the electricity planning underway in the Barrie/Innisfil sub-region
- To provide an overview of the options analysis and seek input on draft recommendations
- To outline next steps

# Seeking Input

As you listen today, please consider the following questions to guide your feedback on the draft recommended plan for the Barrie/Innisfil sub-region:

- What information needs to be considered in these recommendations?
- Please provide your feedback to the proposed recommendations.
- How can the Barrie/Innisfil Technical Working Group continue to engage with communities as these recommendations are implemented, or to help prepare for the next planning cycle?

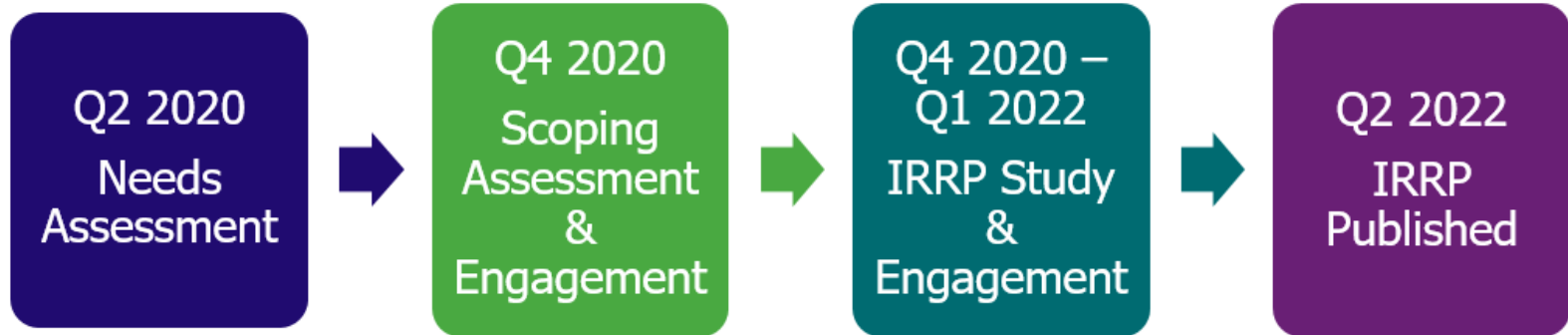
**Please submit your written comments by **May 3**  
using the feedback form by email to [engagement@ieso.ca](mailto:engagement@ieso.ca)**



# Long-term Electricity Plan Status Update

# Barrie/Innisfil IRRP Status Update

- IRRP study work began in Q4 2020, and is on track for completion in Q2 2022
  - Electricity demand forecast and needs have been determined, potential options identified and evaluated, and draft recommendations developed
  - The next step is to focus on finalizing recommendations



# Recap: Engagement Activities to Date

- Engagement launched on South Georgian Bay-Muskoka Scoping Assessment – May 2020
  - Draft Scoping Assessment posted for public comment – October 8, 2020
  - Webinar held – October 14, 2020
  - Final report posted with IESO responses to comments received – November 30, 2020
- IRRP engagement launched – December 1, 2020
  - Meeting with Town of Innisfil – December 7, 2020
  - Meeting with City of Barrie – May 31, 2020
  - Meeting with Township of Adjala-Tosorontio – December 14, 2020
- Public webinar #1 to seek input on draft electricity demand forecast – September 9, 2021
- Public webinar #2 To seek feedback on the defined electricity needs for the region and potential options – December 9, 2021



# Re-Cap of Barrie/Innisfil Needs



# Summary of Barrie/Innisfil Needs

No.	Location	Type of Need	Approximate Timing	Description
1	Alliston TS	Station Capacity	2037	Alliston TS is approaching its summer 10-day LTR
2	Barrie TS	Station Capacity	2027	Barrie TS is approaching its summer 10-day LTR and there is a supply capacity constraint at the 44 kV feeder level in 2025
3	Everett TS	Station Capacity	2025	Everett TS is approaching its summer 10-day LTR

# Summary of Barrie/Innisfil Needs (cont'd)

No.	Location	Type of Need	Approximate Timing	Description
4	Midhurst TS	Station Capacity	2035	Midhurst TS is approaching its summer 10-day LTR
5	M6E/M7E (Essa TS x Midhurst TS)	System Capacity	2034	Thermal capacity need on MxE circuit on loss of another MxE circuit
6	E8V/E9V	End-of-Life	2027	To refurbish 56 km of 230 kV transmission circuit from Orangeville TS to Essa TS
7	Essa TS	Bulk System Supply	Today	Essa autotransformer overloaded for loss of other Essa autotransformer

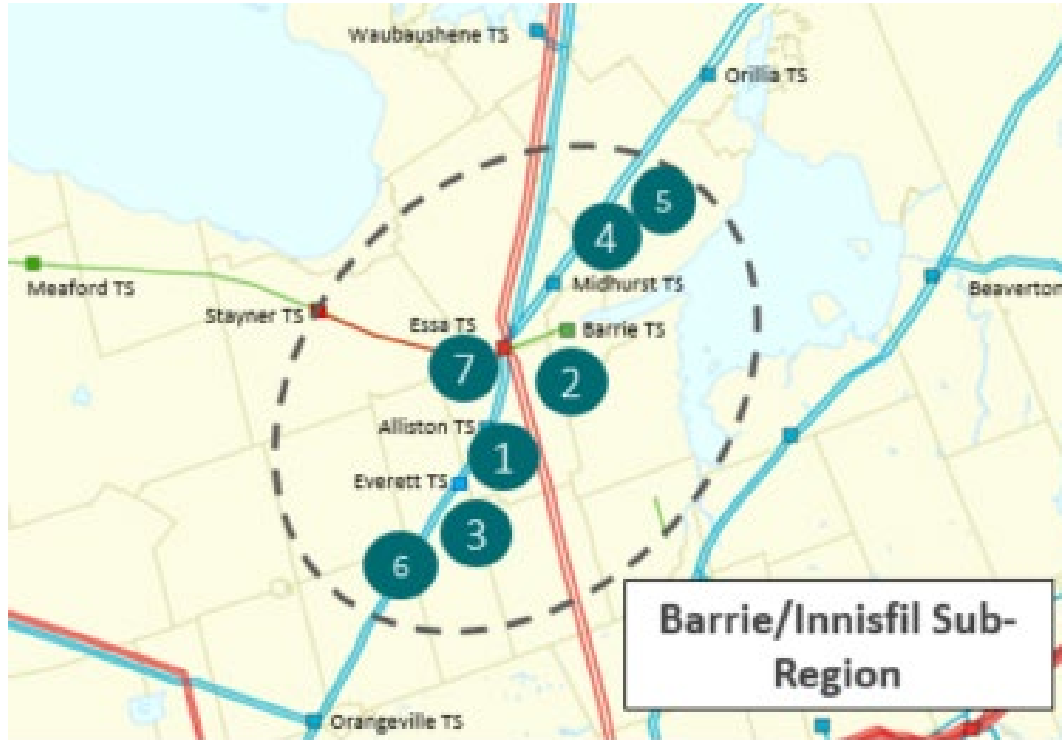
# Overall Approach to Addressing Needs

- The Barrie/Innisfil IRRP will make firm recommendations for addressing near/mid term timeframe needs
  - Near/mid term needs occur approximately in the first 7-10 years of the planning horizon
  - An options analysis, including non-wires options where feasible, has been conducted for these needs
- The Barrie/Innisfil IRRP will describe longer-term (post 2035) needs but will not provide firm recommendations to address them
  - Longer-term needs occur beyond 7-10 years in the planning horizon
  - An options analysis has generally not been conducted for these needs as the options, and performance of these options, could change in the future
- Bulk system needs will be considered as part of the IESO's Bulk Planning Process

# Summary of Needs to be Addressed by the IRRP

No.	Location	Type of Need	Approximate Timing	Description
2	Barrie TS	Station Capacity	2027	Barrie TS is approaching its summer 10-day LTR and there is a supply capacity constraint at the 44 kV feeder level in 2025
3	Everett TS	Station Capacity	2025	Everett TS is approaching its summer 10-day LTR
6	E8V/E9V	End-of-Life	2027	To refurbish 56 km of 230 kV transmission circuit from Orangeville TS to Essa TS

# Location of the Needs





# Options Analysis Methodology for Needs to be Addressed by the IRRPs

# Option Categories

Generally speaking, the IRRP may recommend “wires” options, “non-wires” options, or a combination of both

Option Type	Description
Wires	Traditional transmission assets such as switching stations, transformer stations, or transmission lines; may also include protection schemes and control and operational actions such as load rejection
Non-wires	Local load modifying solutions such as distributed energy resources (including distributed generation/storage and demand response) or energy efficiency measures - and/or - Large utility-scale generation facilities located to alleviate a local reliability need

# Identifying Wires Options

- Wires options are typically based on forecast annual peak demand beyond the load meeting capability (LMC) of the transmission system in a given local area
- Suitable wires options depends on the:
  - Type of need (capacity, load security/restoration, facilities reaching end-of-life)
  - Limiting phenomenon (thermal, voltage)

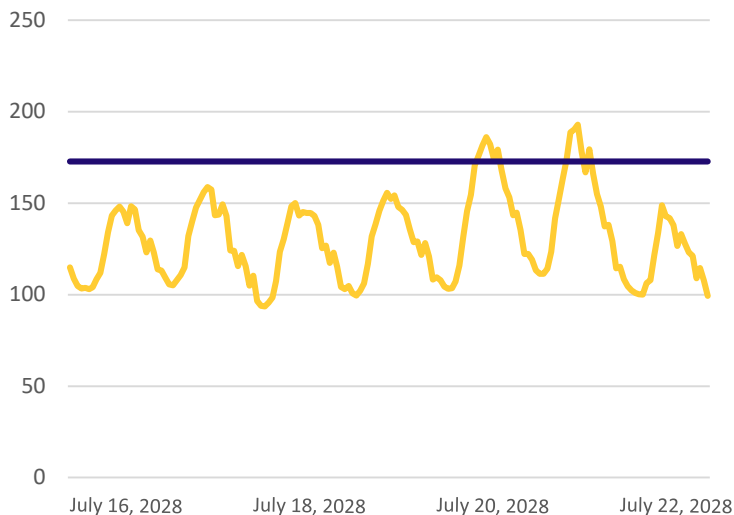


# Identifying Non-wires Options

- Identifying non-wires options require a more granular approach to understand the hourly characteristics of the need including magnitude, duration, and frequency
- This is accomplished by simulating hourly demand profiles and examining the hours when demand exceeds the LMC
- Non-wires options are selected and sized according to both the capacity and energy requirements
- This enables development of a high-level cost estimate for non-wires options

# Illustrative Example: Load Profiling & Need Visualization

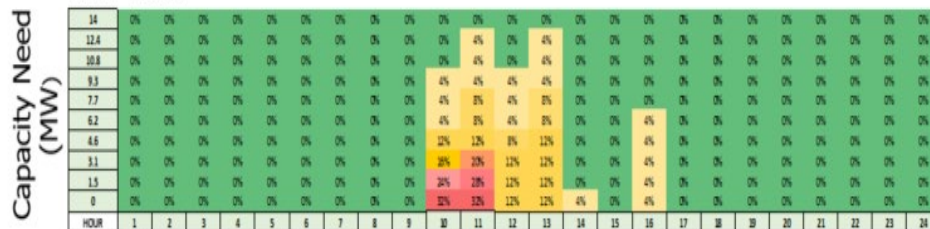
Week of July 16, 2028



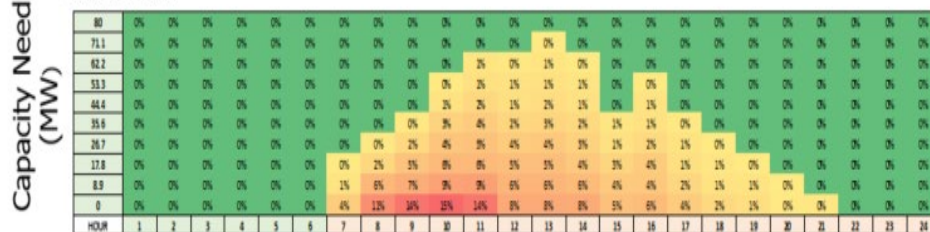
— Hourly Profile — 172.8 MW Limit

/ ~25% of the total time spent over the limit was at

2027 Need



2035 Need



# Estimating Cost of Non-wires Options

- Once suitable technologies are chosen and sized according to the characteristics of the need, the capital and operating costs of these options can be estimated based on benchmark costs for a variety of resources
- If applicable, these resources are also “credited” with the capacity value they provide the broader system

# Evaluating Options

- Once options for addressing needs have been identified and costed, recommended solutions in the plan are developed and informed by:
  - The technical ability of the option to address the need
  - The cost of the option; preference is generally given to the least cost option that meets the identified need
  - Opportunities to address multiple needs with a single solution
  - Input from community engagement



# Options Analysis and Draft Recommendations

# 1. Alliston Station Capacity Need

- Alliston TS is approaching its summer 10-day LTR by 2037
- Given that the need does not arise until late 2030s, it is prudent to monitor the load growth in the region
- Consider it in the next cycle of regional planning, anticipated to begin in 2025



## 2. Barrie Station Capacity Need

- Barrie TS is approaching its summer 10-day LTR by 2027 post BATU upgrade
  - Magnitude of the need is 7% in 2027 reaching 30% by 2035
- There is also a supply capacity constraint at the 44 kV feeder level starting in 2025 for Innpower and Hydro One distribution
- In service date for recommended solution will be driven by the earlier of the two needs

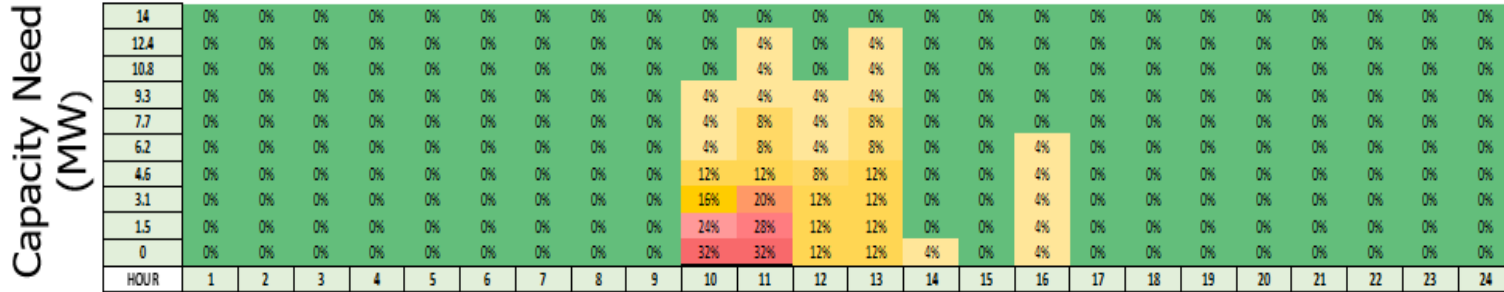
# Barrie Station Capacity Need

Key Metrics	2027	2040
Limit	172.8	172.8
Capacity Need (MW)	13.8	81
Number of Events	8	213
Maximum Energy Per Event (MWh)	53.15	592.5
Maximum Event Length (Hours)	6	15
Average Event Length (Hours)	2.8	5.1
Total Energy (MWh)	118.5	17,098

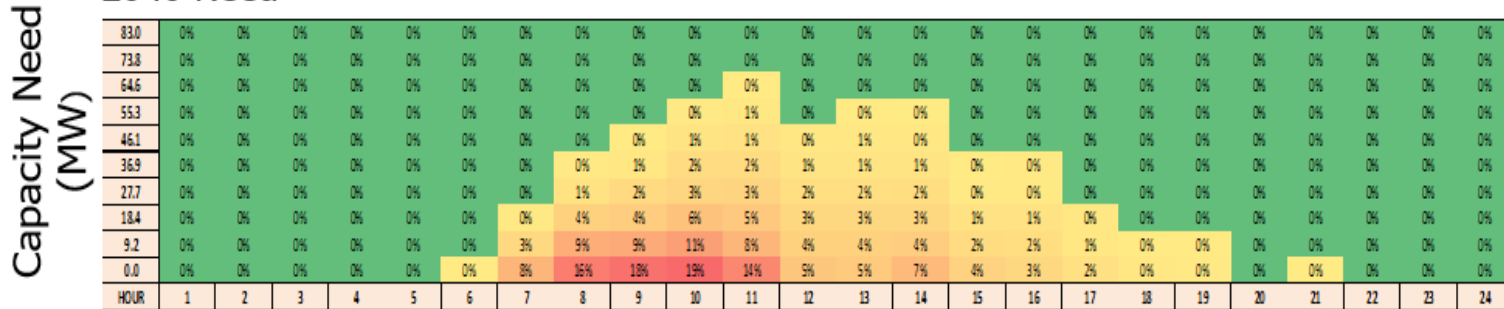


# Barrie Station Capacity Need- Heat Map

## 2027 Need



## 2040 Need

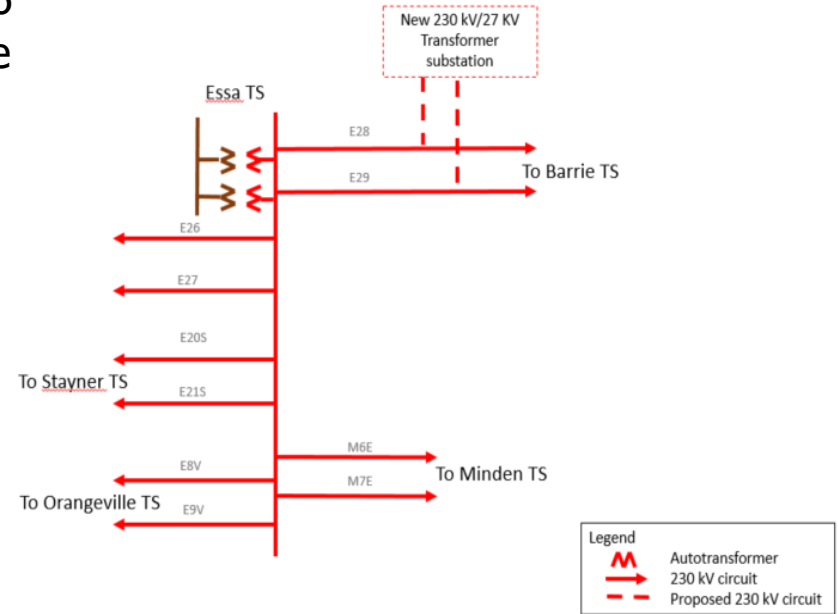


## 2. Barrie Station Capacity Need – Non Wires Options

- Non wires options include energy storage since it is least cost resource alternative
- CDM was not a good candidate due to the magnitude of the need
- Energy storage option includes a combined capacity of 81 MW for a cost of \$131M NPV to meet the need

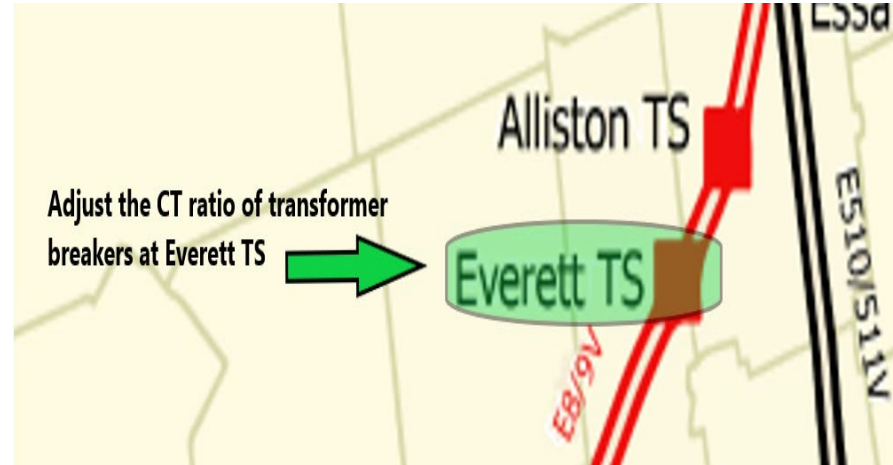
## 2. Barrie Station Capacity Need – Wires Options

- Wires option includes constructing a new 230/27.6 kV transformer substation and connecting it to the new E28B/E29B circuits at a cost of \$48M NPV
- Wires option meets both the Barrie TS and the Innpower 44 kV need beyond the end of the planning horizon and can be in service by 2025
- Variety of wires options were considered and new station is best option because of it meets the capacity requirements and allows for future load growth
- This is the recommended option and will be further defined in the RIP which will follow the IRRP



### 3. Everett Station Capacity Need

- Everett TS is approaching its summer 10-day LTR by 2025
- The most economical option is to adjust the CT ratio of transformer breakers at Everett TS at a cost of \$0.5 M NPV
- The estimated costs of non wires options were orders of magnitude larger and thus screened out from further consideration



# Everett Station Capacity Need

Key Metrics	2025	2035
Limit	86 MW	86 MW
Capacity Need (MW)	0.2	41.25
Number of Events	1	221
Maximum Energy Per Event (MWh)	0.2	320.2
Maximum Event Length (Hours)	1	14
Average Event Length (Hours)	1	4.6
Total Energy (MWh)	0.2	9,935.4

# BI 3 Everett Station Capacity Need – Heat Maps

## 2025 Need

Capacity Need  
(MW)

0	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
0	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
0	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
0	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
0	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
0	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
0	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
0	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
0	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
0	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
HOUR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

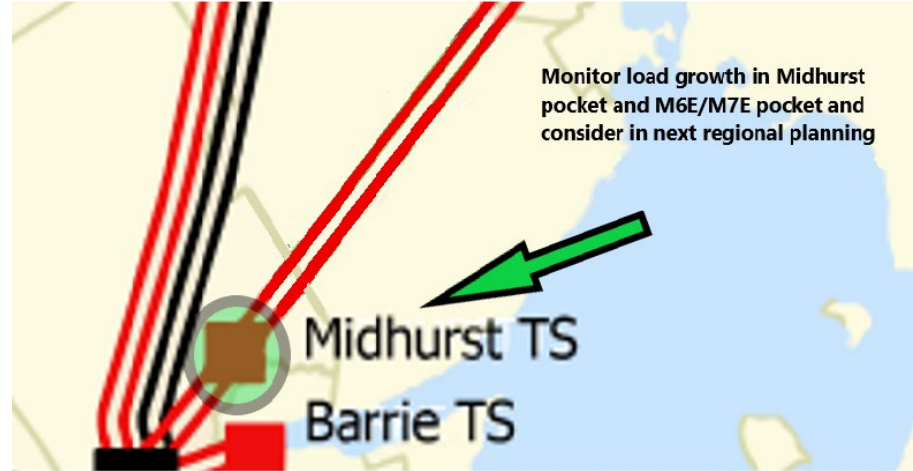
## 2035 Need

Capacity Need  
(MW)

41	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
36.4	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
31.9	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	1%	0%	0%	0%	0%	0%
27.3	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	2%	1%	1%	0%	0%	0%	0%
22.8	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	2%	2%	2%	1%	0%	0%	0%
18.2	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	2%	3%	4%	2%	0%	0%	0%
13.7	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	2%	2%	3%	1%	0%	0%
9.1	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	2%	2%	3%	4%	2%	0%	0%
4.6	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	2%	3%	4%	5%	4%	0%	0%
0	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	2%	3%	4%	5%	7%	2%	0%
HOUR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

## 4. Midhurst Station Capacity Need

- Midhurst TS is approaching its summer 10-day LTR by 2035
- Given that the need does not arise until late 2030s, it is prudent to monitor the load growth in the region and consider it in the next cycle of regional planning



## 5. MxE System Capacity Need

- There is a thermal capacity need on MxE circuit for loss of another MxE circuit starting in 2034
- While this need is a longer-term need, we did look at potential options so as to inform future plans
- This analysis shows that CDM is potentially a good candidate to defer this need, when considering the need characteristics
- While we do not need to make a firm recommendation on how to address this need now, the plan will recommend that a CDM option continue to be considered in between cycles



# MxE System Capacity Need

Key Metrics	2034	2035
Limit	581 MW	581 MW
Capacity Need (MW)	12.8	23.87
Number of Events	5	8
Maximum Energy Per Event (MWh)	20.5	47.1
Maximum Event Length (Hours)	2	3
Average Event Length (Hours)	1.6	2.1
Total Energy (MWh)	53.9	161.6

# MxE System Capacity Need – Heat Map

## 2034 Need

Capacity Need  
(MW)

13	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
11.6	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	25%	0%	0%	0%	0%	0%	
10.1	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	25%	0%	0%	0%	0%	0%	
8.7	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	25%	0%	0%	0%	0%	0%	
7.2	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	25%	0%	0%	0%	0%	0%	
5.8	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	25%	0%	0%	0%	0%	0%	
4.3	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	25%	25%	0%	0%	0%	0%	0%	
2.9	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	25%	25%	0%	0%	0%	0%	0%	
1.4	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%	25%	0%	0%	0%	0%	0%	
0	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%	50%	0%	0%	0%	0%	0%	
HOUR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

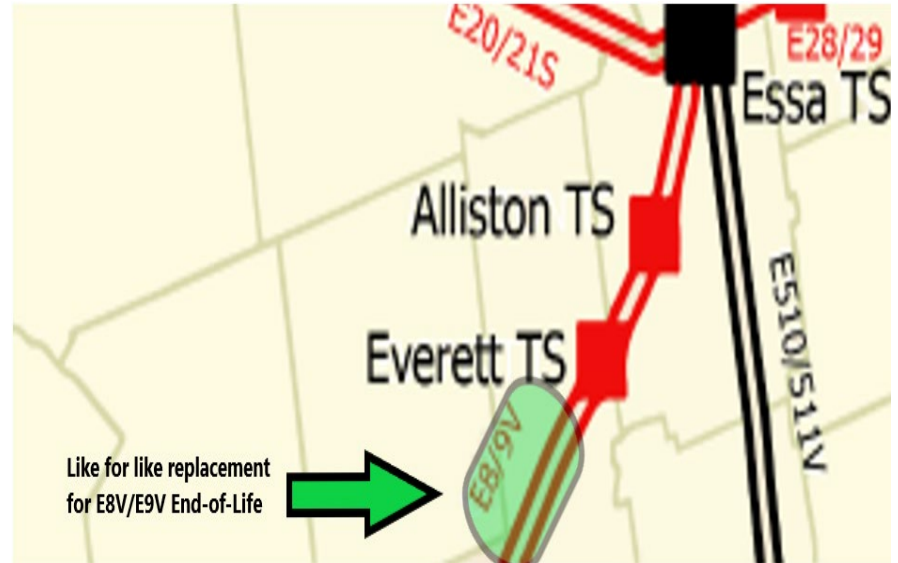
## 2035 Need

Capacity Need  
(MW)

24	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
21.3	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
18.7	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
16.0	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
13.3	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
10.7	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	25%	0%	0%	0%	0%	0%
8.0	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	25%	0%	0%	0%	0%	0%
5.3	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	25%	0%	0%	0%	0%	0%
2.7	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	25%	25%	0%	0%	0%	0%	0%
0	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%	50%	0%	0%	0%	0%	0%
HOUR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

## 6. E8V/E9V End-of-Life Need

- Sections of E8V/E9V will reach end-of-life in 2027
- No violations were identified in system studies
- Like for like replacement is appropriate



# Summary of Recommendations

1. Monitor load growth in the Alliston pocket and consider in next regional planning cycle

2. Construct new transformer substation for Barrie TS and connected to upgraded E28B/E29B

3. Adjust the CT ratio of transformer breakers at Everett TS

4. & 5. Monitor load growth in Midhurst pocket and M6E/M7E pocket and consider in next regional planning cycle. For MxE, continue to explore a CDM option given its potential

6. Like for like replacement for E8V/E9V End-of-Life

7. Study Essa autotransformer overload through IESO bulk planning process



# Next Steps

# Your Feedback is Important

As you prepare your feedback, consider the following questions to guide feedback your feedback on the draft recommended plan for the Barrie/Innisfil IRRP:

- What information needs to be considered in these recommendations?
- Please provide your feedback to the proposed recommendations.
- How can the Technical Working Group continue to engage with communities as these recommendations are implemented, or to help prepare for the next planning cycle?

**Please submit your written comments by **May 3**  
using the feedback form by email to [engagement@ieso.ca](mailto:engagement@ieso.ca)**

## Next Steps for Engagement

- **May 3:** Written feedback due on options analysis and draft recommendations
- **May 26:** Final Barrie/Innisfil IRRP to be posted with IESO responses to feedback received

## Keeping in Touch

- **Subscribe** to receive updates on the Barrie/Innisfil regional electricity planning initiatives on the IESO website *\*select South Georgian Bay/Muskoka*
- **Follow** the Barrie/Innisfil regional planning activities on the dedicated engagement webpage
- **Join** the GTA/Central Regional Electricity Network for ongoing dialogue on local developments, priorities and planning initiatives



# Seeking Input on the Webinar

- Tell us about today
  - Was the material clear? Did it cover what you expected?
  - Was there enough opportunity to ask questions?
  - Is there any way to improve these gatherings, e.g., speakers, presentations or technology?
- 
- Chat section is open for comments

---

# Thank You

[ieso.ca](http://ieso.ca)

1.888.448.7777

[customer.relations@ieso.ca](mailto:customer.relations@ieso.ca)

[engagement@ieso.ca](mailto:engagement@ieso.ca)



[@IESO\\_Tweets](https://twitter.com/IESO_Tweets)



[facebook.com/OntarioIESO](https://facebook.com/OntarioIESO)



[linkedin.com/company/IESO](https://linkedin.com/company/IESO)