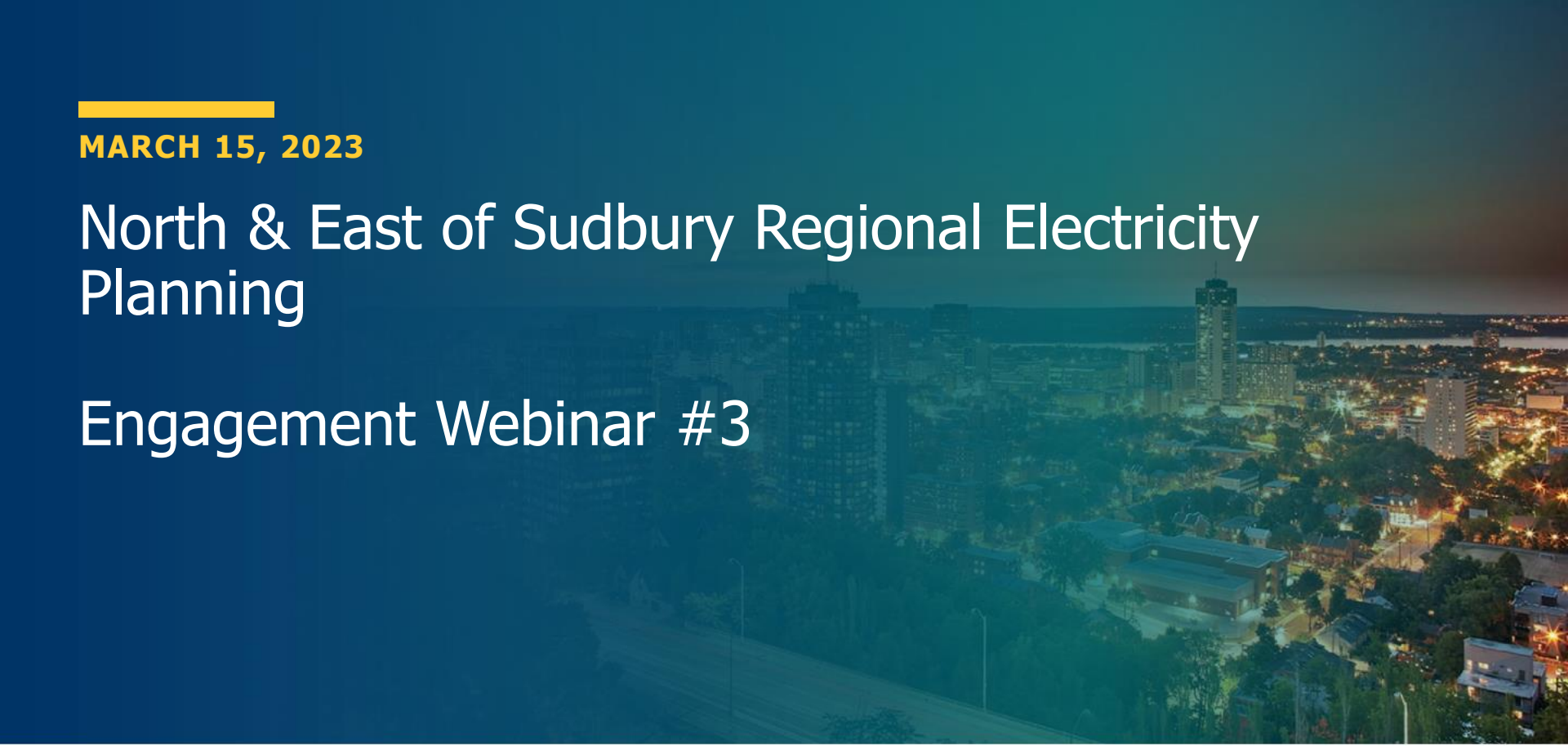


MARCH 15, 2023

North & East of Sudbury Regional Electricity Planning

Engagement Webinar #3

ieso
Connecting Today. Powering Tomorrow.

Objectives of Today's Engagement Webinar

- To provide an update on the development of the electricity plan for the North & East of Sudbury Region
- To provide an overview and seek feedback on the recommended solutions
- To outline next steps

Agenda

1. North & East of Sudbury Regional Electricity Planning Status Update
2. Recap Needs and Potential Solutions
3. Options Analysis and Draft Recommendations
4. Next Steps

Seeking Input

As you listen today, please consider the following questions to guide your feedback on the draft recommended plan for North and East of Sudbury Region:

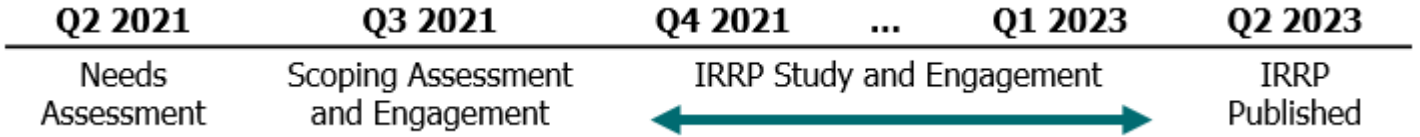
- What feedback is there to the proposed recommendations?
- What information needs to be considered in these recommendations?
- How can the IESO continue to engage with communities and stakeholders as these recommendations are implemented, or to help prepare for the next planning cycle?

Please submit your written comments by email to engagement@ieso.ca by April 5

North & East of Sudbury Regional Electricity Planning Status Update

Summary of Electricity Planning Progress to Date

- The electricity demand forecast was finalized, informed by engagement on key developments, projects, priorities, and initiatives.
- Emerging needs were identified based on the electricity demand forecast and input from IESO Control Room operators
- Potential solutions were identified, screened, and evaluated. Draft recommended solutions were developed.
- The first electricity plan – Integrated Regional Resource Plan (IRRP) – for this region is on track to be completed in April 2023.



Recap: Engagement Activities to Date

- Engagement began to inform electricity planning in the North & East of Sudbury region – June 2021
- Meetings were held with local municipalities and Indigenous communities to discuss this regional electricity planning initiative and broader electricity sector priorities and initiatives, as well as to hear about key local developments.
- Public webinar #1 held on March 31 to seek input on draft electricity demand forecast and planned engagement activities
- Public webinar #2 held on September 27 to present and seek input on high level screening of the potential options

What we've heard so far

- Pockets of industrial development expected in the City of Temiskaming Shores and Town of Iroquois Falls
- Major developments affect the whole region, and not just the host municipality – e.g. residential and commercial growth
- While several of these projects are prospective, they could move forward very quickly (i.e. within five years)
- Interest in exploring DERs and other non-wires alternatives such as energy efficiency to address regional needs and defer the need for new transmission or large-scale generation

Overarching Themes

- This is the first active electricity planning initiative and engagement for North & East of Sudbury
- The plan addresses some minor electricity needs related to reliability and operational risks, and asset replacement due to end of life.
- Demand growth and/or evolving policy direction could be drivers for further bulk and/or regional planning that would also address legacy issues in the region (e.g., reliance on RAS schemes)

Recap of Needs

Recap: Categories of Needs

Capacity Needs

- Station capacity refers to the ability to convert power from the transmission system down to distribution system voltages
- System capacity (or "load meeting capability") refers to the ability of the electricity system to supply power to customers in the area, either by generating the power locally, or bringing it in through the transmission system

End-of-Life Asset Replacement Needs

- Based on the best available asset condition information at the time
- Evaluated to decide if the facility should be replaced "like-for-like", "right-sized", or retired

Load Restoration and Supply Security Needs

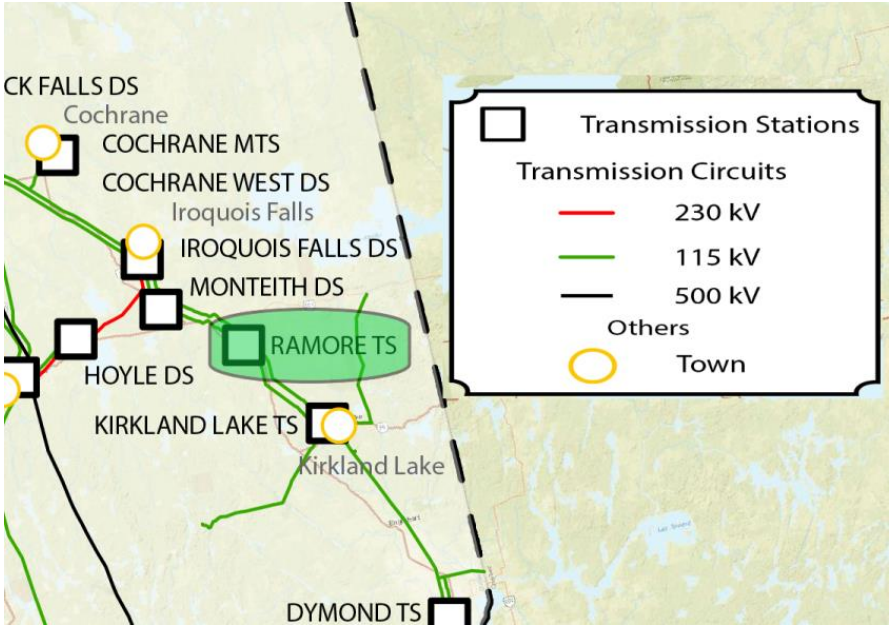
- Load restoration describes the electricity system's ability to restore power to those affected by a major transmission outage within reasonable timeframes
- Supply security describes the total amount of load interrupted following major transmission outages

Operational Considerations

- Input from IESO system operators was considered in identifying needs and in developing the recommended solutions.
- Most considerations include ensuring there is enough reactive power support to operate the grid and to explore existing reliance on operational measures such as remedial action schemes when connecting new customers and associated implications on future reliability.

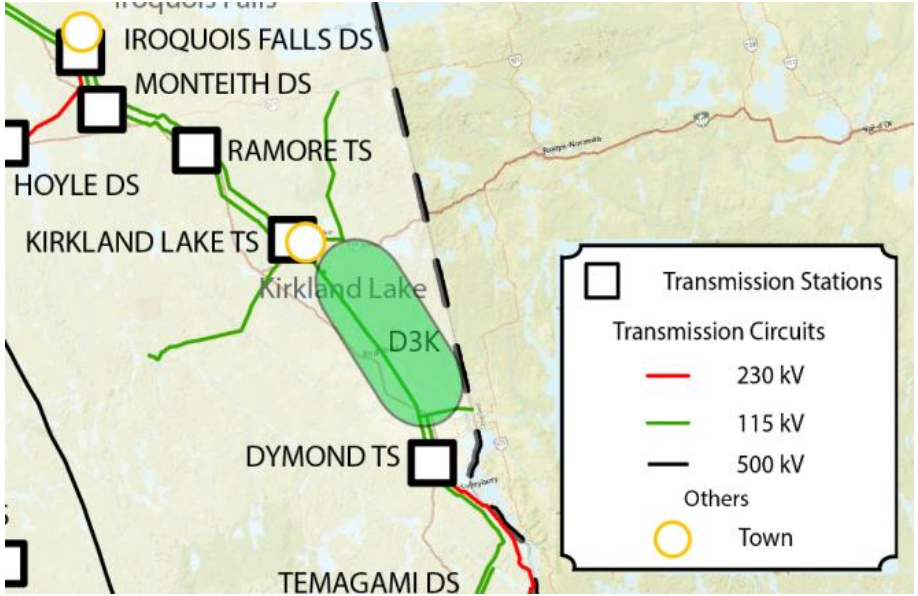
North & East of Sudbury Needs (1)

- Winter capacity needs emerging at Ramore Transformer Station (TS) near Kirkland Lake in 2033.



North & East of Sudbury Needs (2)

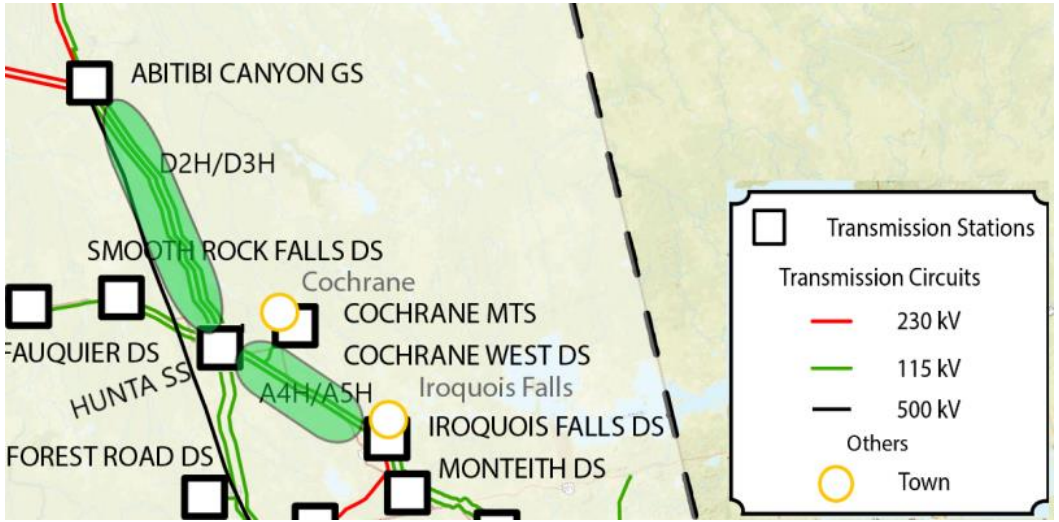
- Previously identified circuit D3K overloading for the loss of A8K and A9K, beginning in 2030. These circuits supply the Kirkland Lake area.
- In late 2022, a remedial action scheme* was introduced to the area that address this need.



*A scheme designed to detect predetermined system conditions and automatically take corrective actions that may include, but are not limited to, curtailing or tripping generation or other sources, curtailing or tripping load, or reconfiguring a system.

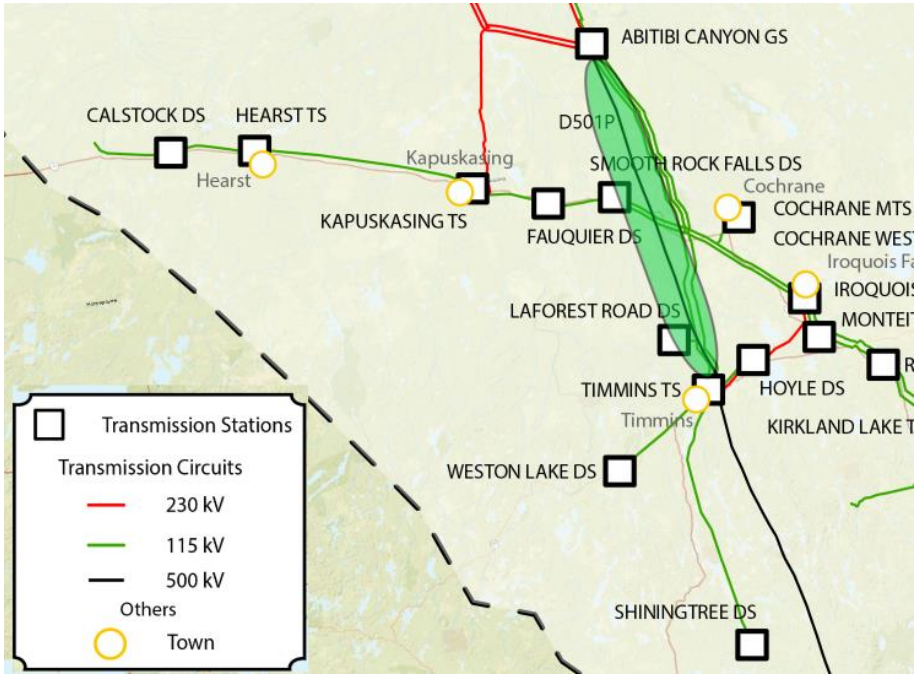
North & East of Sudbury Needs (3)

- A number of circuits in the Iroquois Falls, Cochrane and Smooth Rock Falls areas will be reaching their end-of-life:
  - D2H/D3H in 2026
  - A4H/A5H in 2027.



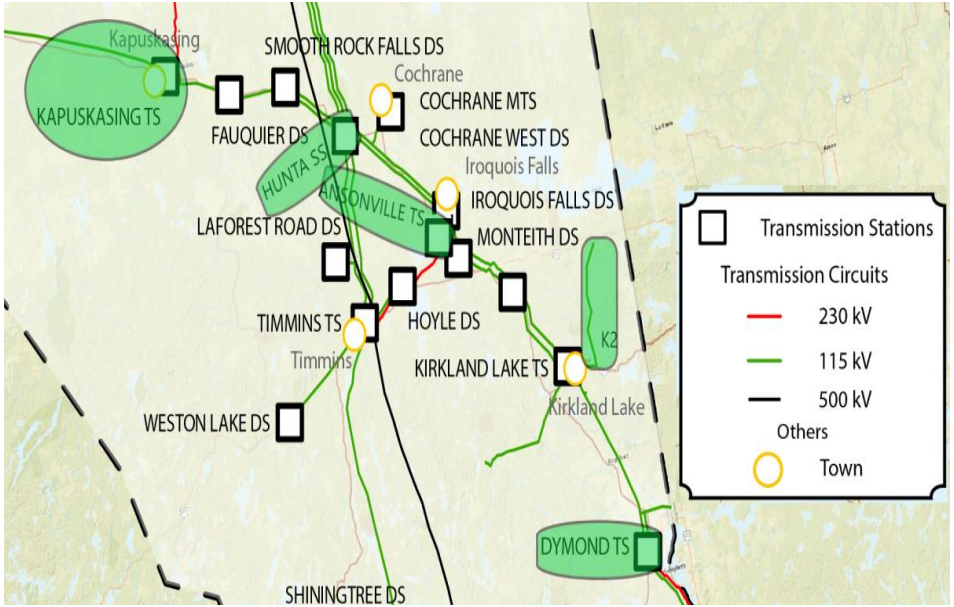
North & East of Sudbury Needs (4)

- Load security need on the 500 kV system north of Timmins. Loss of circuit D501P may result in violation of Ontario Resource and Transmission Assessment Criteria (ORTAC) loss of load criteria.
- A related issue is difficulty supplying loads in the area during planned outages to circuit D501P.



North & East of Sudbury Needs (5)

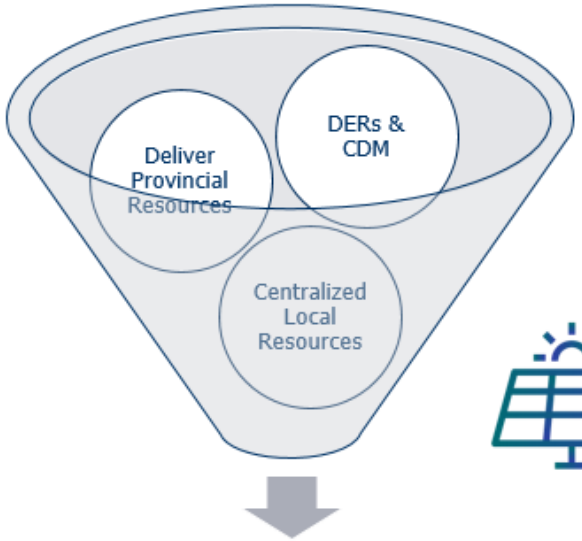
- Existing local voltage control issues due to sizing of existing capacitors at Dymond TS
  - Need to be resized due to system changes
- Existing issues at Ansonville, Hunta and Kapuskasing
- Need for additional voltage support in the Kirkland Lake area to maintain minimum voltages during outage conditions



Options Analysis and Draft Recommendations

Possible Options in Electricity Planning

Traditional "wires" option to supply the local area with system resources (may include operational actions and schemes)



Non-wires alternatives (NWAs) like distributed generation (DG) or conservation & demand management (CDM)

Strategically-sited local generation to address transmission infrastructure limitations

Non-Wires Alternatives (NWAs) Considered

Potential NWAs were identified, screened, and evaluated based on technical feasibility and cost:

- Generation – single cycle gas turbine (SCGT)
- Energy efficiency (EE) (also referred to as CDM)
- Energy storage
- A combination of generation and EE, or storage and EE

Options Analysis and Recommended Solutions (1)

Kirkland Lake area: Ramore TS station capacity need

Options	Analysis and Draft Recommended Solution
1. Keep peak loading below existing capacity, using measures such as conservation or distributed energy resources (Cost of non-wires alternatives estimated at $3 to $3.7 million). 2. Upgrade the station to enable additional capacity (conventional, or "Wires" solution - $10-15 million)	Ramore TS need arises in 2033; considering the timeframe and size of the need (1.2 MW), it is recommended to monitor load growth in between regional planning cycles.

Options Analysis and Recommended Solutions (2)

The heat map below shows possible frequency of Ramore TS winter capacity needs in 2040 by MW and hour.

MW Range	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
2.00	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1.78	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1.56	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1.33	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1.11	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0.89	0%	0%	0%	0%	0%	0%	0%	1%	1%	0%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0.67	0%	0%	0%	0%	0%	0%	0%	3%	4%	1%	1%	0%	2%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0.44	1%	0%	0%	0%	0%	0%	0%	5%	6%	3%	2%	2%	4%	6%	0%	0%	0%	0%	1%	0%	0%	0%	1%	0%
0.22	3%	3%	0%	0%	0%	0%	1%	7%	8%	6%	5%	3%	6%	8%	0%	0%	0%	0%	1%	2%	1%	1%	2%	0%
0.00	4%	3%	2%	0%	0%	0%	2%	11%	11%	9%	8%	6%	9%	10%	1%	0%	0%	1%	4%	4%	4%	3%	4%	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

The graph above illustrates the profile of the need at Ramore TS. It shows that NWA will need to provide energy for up to 9 hours with a peak demand up to 1.11 MW.

Options Analysis and Recommended Solutions (3)

Iroquois Falls, Cochrane and Smooth Rock Falls areas: Circuits reaching end of life

Need	Analysis and Draft Recommended Solutions
D2H/D3H End-of-Life Needs Like-for-standard replacement.	Replace end-of-life sections with like-for-standard replacements
A4H/A5H End-of-Life Needs Like-for-standard replacement.	Replace end-of-life sections with like-for-standard replacements. Recommend that Hydro One and the IESO co-ordinate further in the Regional Infrastructure Plan (RIP).

Options Analysis and Recommended Solutions (4)

Load security needs north of Timmins

Need	Analysis and Draft Recommended Solutions
D501P Load security need; Difficulty supplying loads during D501P planned outages Include in future bulk planning study	Study this need as part of the next bulk system plan for Northeast Ontario in combination with other drivers of system expansion as they develop (e.g., additional demand growth, decarbonisation policies, etc.)

Options Analysis and Recommended Solutions (5)

Local voltage control issues

Need	Analysis and Draft Recommended Solutions
Dymond TS Capacitors Right-Sizing	Investigate feasibility of right sizing capacitors at Dymond TS to improve operability in the RIP. Explore the feasibility of upgrading the capacitor switching scheme at Dymond TS to introduce remote switching capabilities.
Kirkland Lake TS Reactive Support	Hydro One to further study feasibility of adding capacitor(s) in the Kirkland Lake area in the RIP
Ansonville, Hunta, Kapuskasing Area Voltage Control	Kapuskasing RAS will be able to address voltage issues. Recommend IESO and Hydro One continue to coordinate in the Northern Voltage study

Next Steps

Next Steps

- Written feedback will be collected up until April 5
- Final plan to be published in April 2023
- Further discussions with local municipalities, customers, stakeholders, and communities as necessary

Seeking Input

- What feedback is there to the proposed recommendations?
- What information needs to be considered in these recommendations?
- How can the IESO continue to engage with communities and stakeholders as these recommendations are implemented, or to help prepare for the next planning cycle?

Please submit your written comments by email to engagement@ieso.ca by April 5

Keeping in Touch

- Subscribe to receive updates on the North & East of Sudbury regional initiatives on the IESO website – http://www.ieso.ca/subscribe > select North & East of Sudbury region
- Follow the North & East of Sudbury regional planning activities online – https://www.ieso.ca/en/Get-Involved/Regional-Planning/Northeast-Ontario/North-East-Sudbury
- Dedicated engagement webpage – https://www.ieso.ca/en/Sector-Participants/Engagement-Initiatives/Engagements/Regional-Electricity-Planning-North-East-of-Sudbury
- Regional Electricity Networks provide a platform for ongoing engagement on electricity issues – https://www.ieso.ca/en/Get-Involved/Regional-Planning/Electricity-Networks/Overview > join Northeast Network

Questions?

Do you have any questions for clarification on the material presented today?

Submit questions via the web portal on the webinar window, or by email to engagement@ieso.ca

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

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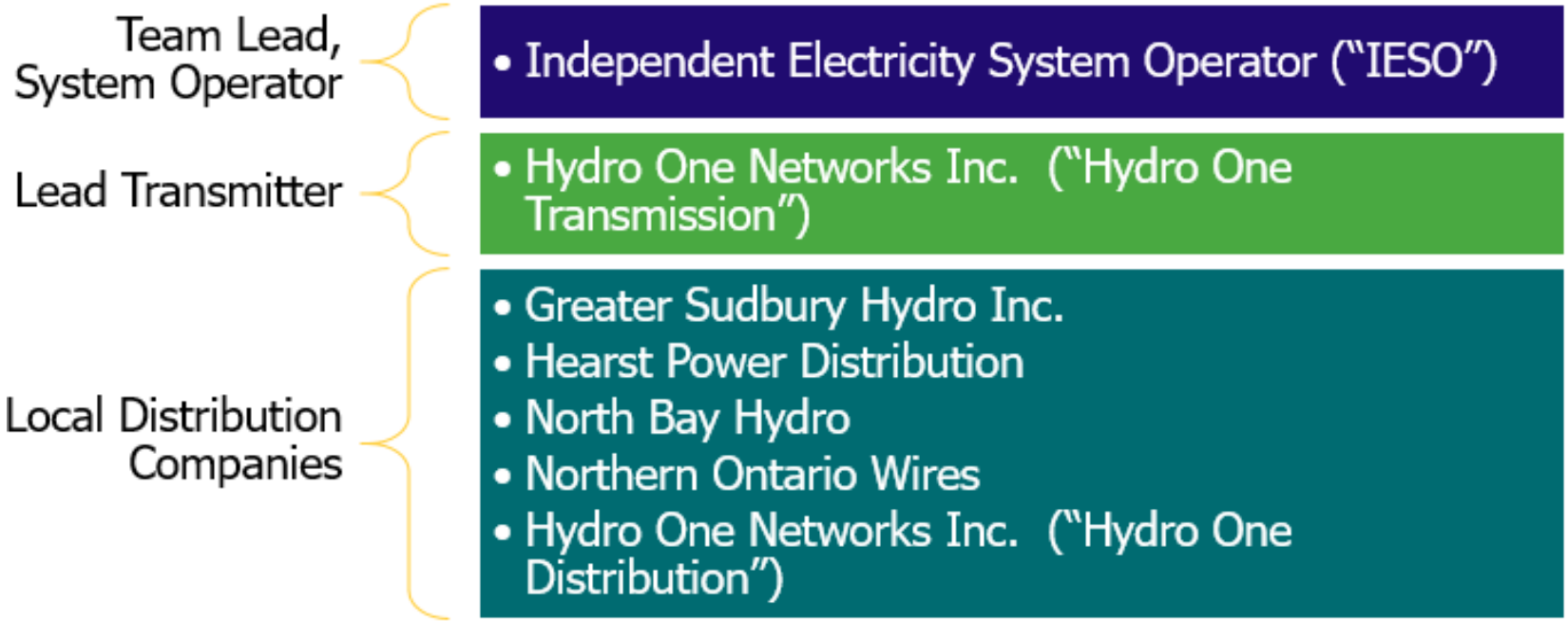
APPENDIX

IRRP Technical Working Group



Overview of North and East of Sudbury Needs