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Update: Regional & Bulk System Planning

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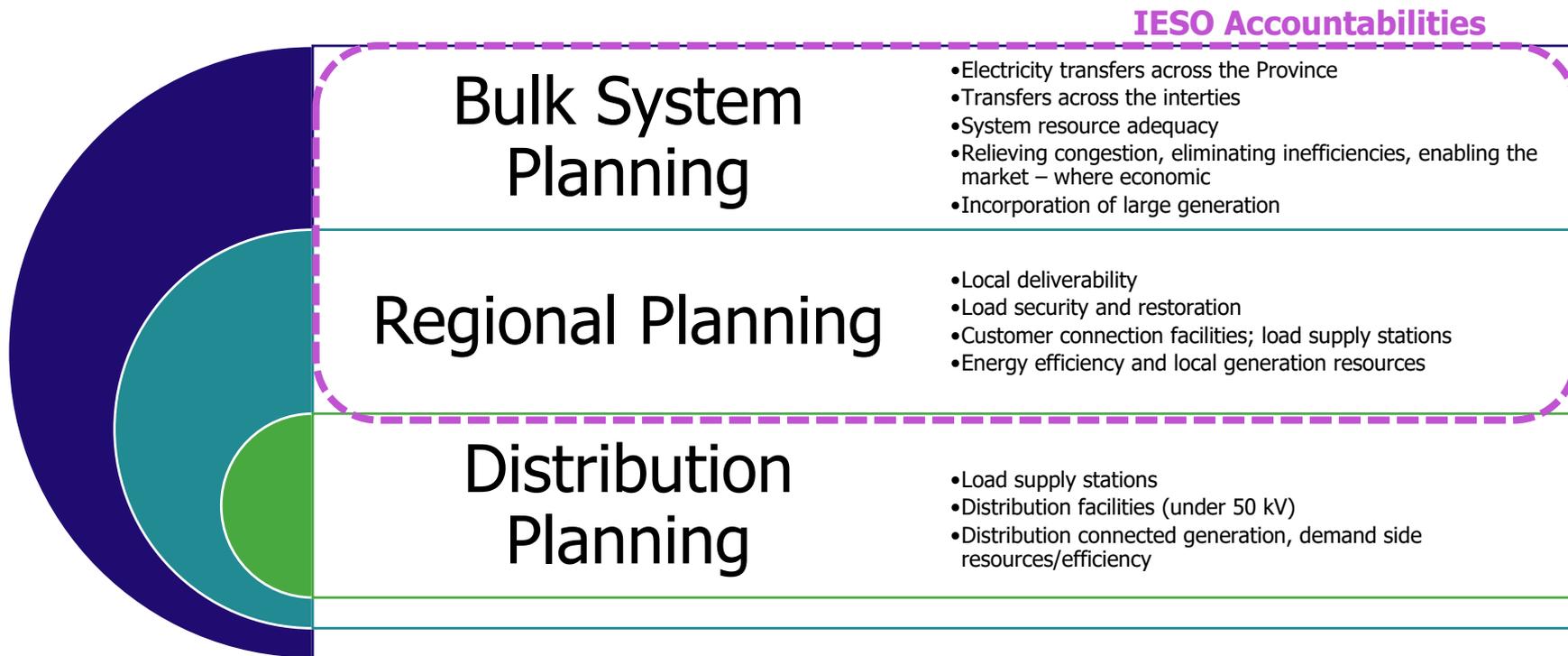
Purpose

- Inform on IESO's bulk and regional planning processes, current planning activities with a focus on those that are expected to lead to infrastructure needs and how these are being integrated into the Annual Acquisitions Report

Planning and the IESO's Mandate

- The IESO is accountable for planning the integrated power system to cost-effectively maintain the reliability of the IESO-controlled grid (ICG)
 - This is accomplished through both the regional and bulk planning processes
- Regional and bulk plans produced through these processes enable new customers to connect (by ensuring the ICG can effectively deliver the required power), help protect rate-payer interests by mitigating risk (e.g. over or under supply), facilitate implementation of government policy, and improve the resilience of the power system
- The need to carry out planning follows from our objects in the Electricity Act and our license obligations

Levels of Electricity Planning



See Appendix for more information around interdependencies and need for multiple layers

Regional Planning Process

Regional planning ensures a reliable supply of electricity to Ontario's 21 electricity planning regions, by looking at the unique needs of each and developing 20-year plans that:

- Summarize electricity system needs and recommend investments or other near-term actions to maintain a reliable supply of electricity
- Support regulatory proceedings (e.g., distribution and transmission rate applications) and acquisition processes, as applicable

Ontario's 21 Planning Regions



- There are 21 electricity planning regions in Ontario
- Regions are defined by their electrical boundaries and as such differ in size
- The OEB requires this process to be conducted at a minimum of every 5 years for each region

Key Elements to Planning

- **Coordination:** Electricity planning happens at the local, regional and provincial level, coordination can result in optimal solutions that meet both local and provincial needs
- **Engagement:** Planning includes a strong commitment to public participation and involves Indigenous communities, municipalities, and stakeholders
- **Integration:** After identifying electricity needs and hearing from the communities involved, integrated solutions are developed that can include conservation, transmission, distribution, generation, and other resources (e.g., demand response, distributed energy resources)

Process Evolution

We are evolving our processes as the IESO's strategy, policy and the sector evolves.

Bulk Planning – Formalize existing processes and improve transparency, which will improve decision making, and enable better integration with markets, acquisition mechanisms and regulatory/legislative frameworks

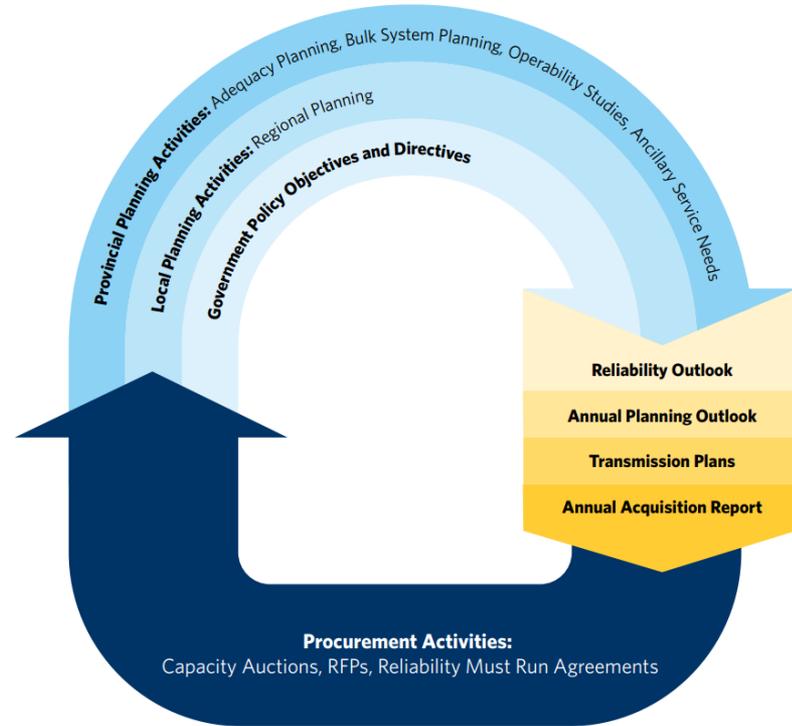
Regional Planning – Incorporate lessons learned from past regional plans, improve efficiency, and outline recommendations to improve the identification and implementation of non-wires alternatives as technology, markets, and other cost recovery mechanisms continue to evolve

Further, as a large percentage of our asset base reaches end of life (EOL), we are evolving the consideration of asset replacement decisions in both planning processes to reflect:

- How the system has changed and will continue to change over the life of any refurbished assets
- The increasing cost associated with these investments
- Opportunities to explore alternatives to like-for-like replacement

Bringing it all Together

- The IESO will leverage our planning activities and products, including the Annual Planning Outlook, to identify system needs
- The Annual Acquisition Report will identify how to acquire the resources to meet those needs
- This is an annual process that allows IESO to adjust and readjust as circumstances change



See Appendix for more detail on related products



Development of a Bulk System Planning Process

Bulk System Planning Process – Defining Success

This work is being done to achieve the following outcomes:

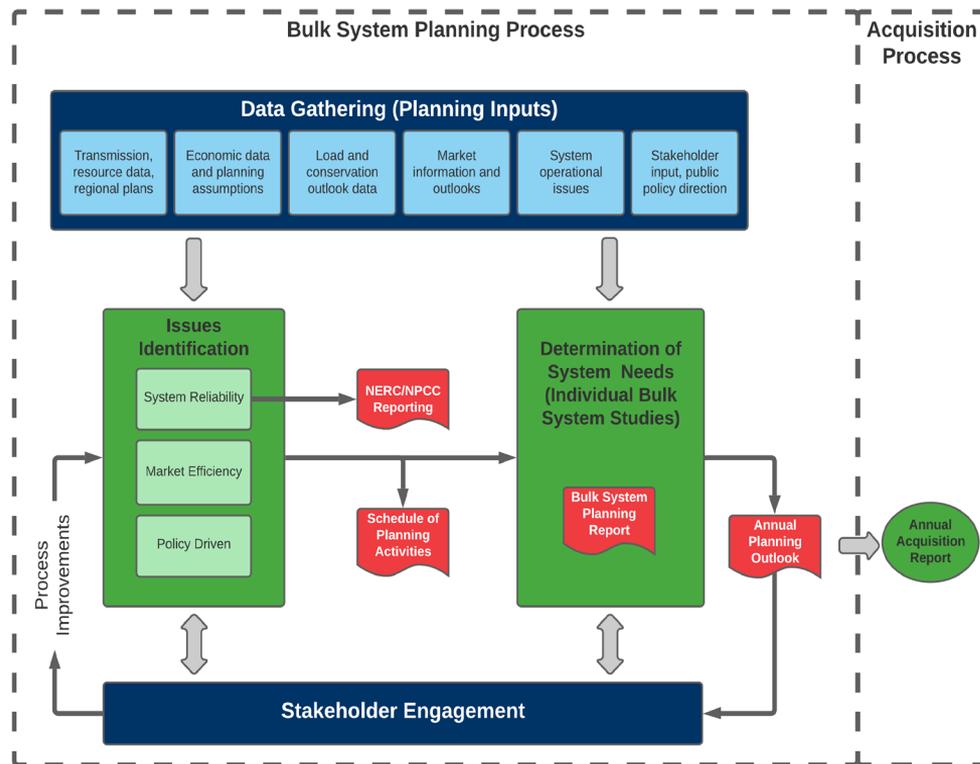
1. More accurate and timely consideration of expected changes to load and resource availability, and on operational issues, which will improve decision making and planning recommendations
 - This will be achieved through increased transparency and opportunities for engagement.
2. Better integration with downstream processes that are aimed at implementing plan recommendations (e.g. resource acquisition mechanisms, System Impact Assessments, etc.)
 - This will be achieved through regular reporting and more consistent timelines.
3. All Bulk System Planning activities (Transmission and Resource) carried out under one process.

Proposed HLD of Bulk System Planning Process

Components of the Process:

- Data Gathering
- Issues Identification
- Determination of System Needs
- Process Improvements

Opportunities for stakeholder engagement are envisioned at each stage of the process



Bulk System Planning Process – Implementation in 2021

- Alongside engagement on the high-level design document held in February 2021, work to finalize the process is being done, with the goal to implement starting in 2022
- The remainder of the 2021 work is focused on:
 - Integrating our existing bulk system planning activities into the new process (i.e. Annual Planning Outlook, ongoing individual bulk plans, NERC/NPCC reporting)
 - Formalizing inputs and outputs from the processes (i.e. who does what by when)
 - Determining touch points and scope for engagement throughout the process
- We're also considering a framework for sharing planning data to enable stakeholders to more meaningfully participate in the planning process



Regional Planning Process Review

Regional Planning Process Review

- A review of the Regional Planning Process was completed in early 2021 that focused on:
 - Identifying opportunities to improve process efficiency and flexibility
 - Better aligning transmission facility end-of-life needs with regional and bulk planning
 - Making recommendations to address potential barriers to implementing non-wires alternatives in regional planning
- The IESO established the Regional Planning Review Advisory Group, including distributors, transmitters, municipalities, electricity customers, associations, energy providers, to support the review
- The IESO published [a final report](#) outlining a number of key recommendations
- Implementation of the recommendations are ongoing and will either be carried out by the IESO or the OEB's Regional Planning Process Advisory Group



Engagement in Planning

Key Areas for Input

Process	Outcome	Potential Questions for Input
Data Gathering	Electricity demand forecast	What major economic development or growth is expected? What other information or assumptions should be considered?
Issues Identification	Reliability concerns that must be addressed and opportunities to create value for rate payers, and timing	What additional information should be considered in the assumptions? What other areas should be studied?
Options	Potential solutions to address identified issues	What feedback is there to the potential solutions? What factors should be considered in evaluating options? What other potential options should be examined?
Action	Recommendations	What information should be considered in finalizing the recommendations?

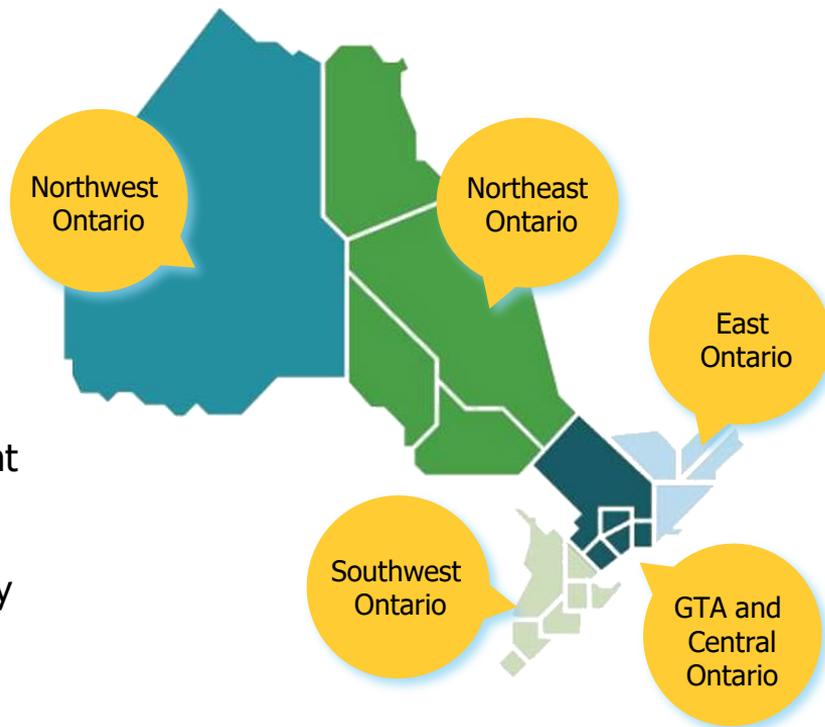
Active Planning Projects

	Planning Projects	Drivers for Input
Northern Ontario	<ul style="list-style-type: none"> Northwest regional planning Northwest bulk study Northeast bulk study 	<ul style="list-style-type: none"> Significant growth potential primarily in large industrial customers Local reliability issues
Southwest Ontario	<ul style="list-style-type: none"> West of London bulk study Windsor-Essex regional planning 	<ul style="list-style-type: none"> Agricultural growth Local solutions
East Ontario	<ul style="list-style-type: none"> Gatineau bulk study Ottawa regional planning Peterborough to Kingston regional planning 	<ul style="list-style-type: none"> Aging infrastructure Electrification Economic development
Central/ GTA	<ul style="list-style-type: none"> South Georgian Bay/Muskoka regional planning Toronto regional planning 	<ul style="list-style-type: none"> Non-wires alternatives Local and regional economic development

- All active planning initiatives are reported in the IESO's monthly Engagement Report

Regional Electricity Networks

- Promote dialogue between and among network members and the IESO
- Build understanding and awareness
- Share local priorities and perspectives
- Shape future discussions
- Provide an opportunity for meaningful engagement in IESO decision-making
- Subscribe to receive updates on regional electricity planning at www.ieso.ca/subscribe
- Join an online dialogue with Network members at www.iesoconnects.ca



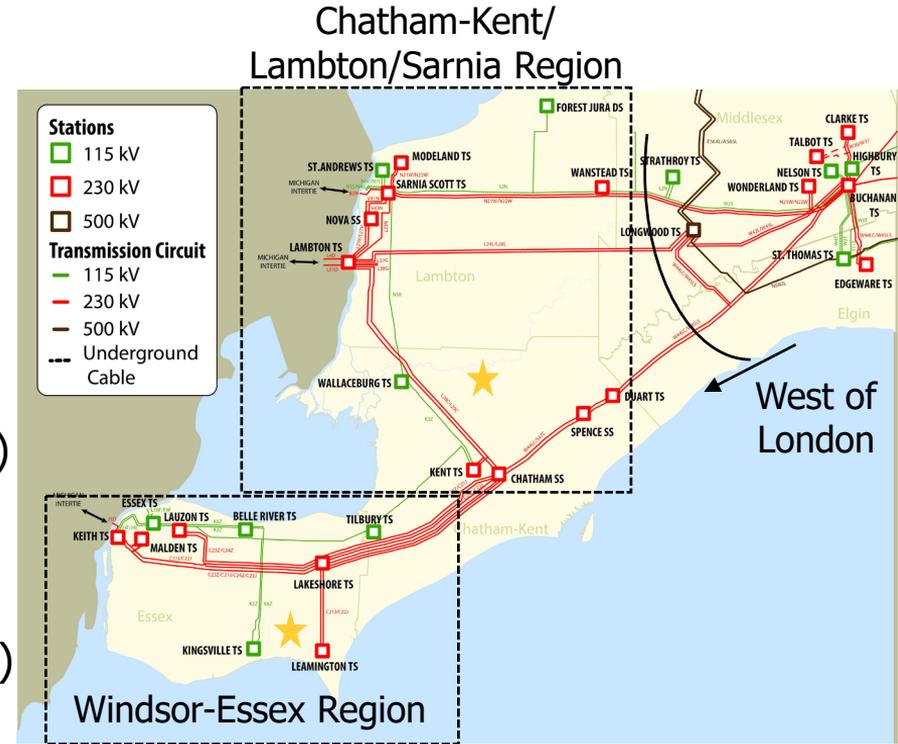


A Focus on Southwest Ontario

Background

- High electricity demand growth due to greenhouse expansions near Kingsville, Leamington, and Dresden have exceeded both regional and bulk supply capabilities
- Recommendations to date*:
 - Lakeshore switching station (in service 2022)
 - Chatham-to-Lakeshore line (in service 2026)
 - Targeted energy efficiency and indoor agriculture call for proposals (in effect 2019-)
 - Lambton-to-Chatham line (in service 2028)

*The IESO announced in the 2021 AAR that it would pursue a bilateral arrangement with Brighton Beach to support local reliability needs



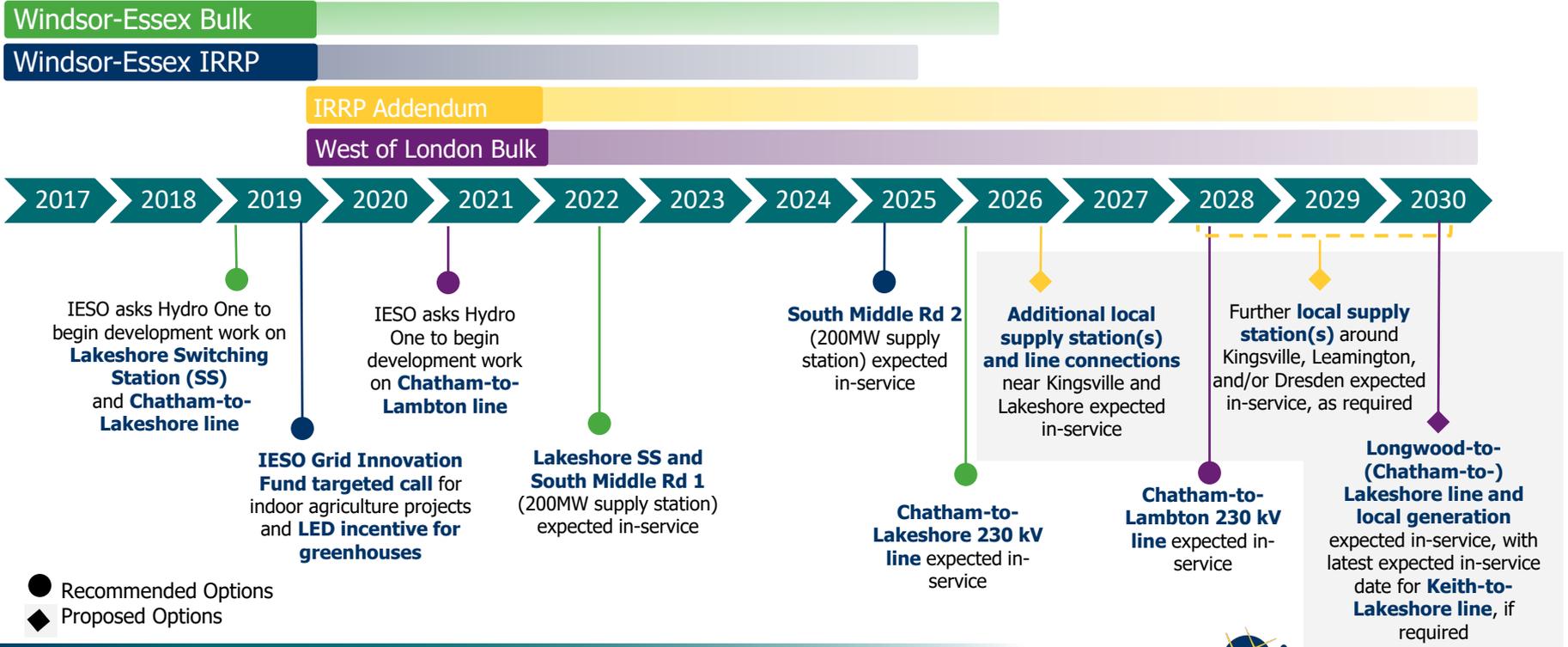
★ Concentration of greenhouse-related load growth

West of London Bulk – Long-Term Options

- To continue to enable the reference forecast beyond 2030, the preferred long-term option is:
 - a) **230-kV** double circuit line from Lakeshore-to-Chatham-to-Longwood corridor, and **400 MW** of local generation/storage; *or*
 - b) **500-kV** single circuit line from Lakeshore-to-Longwood corridor, and **550 MW** of local generation/storage;



Timeline with New Proposed Options



Engagement in Southwest Ontario

- November 2019 (ongoing) – one-on-one outreach/meetings with local communities and stakeholders to discuss Windsor-Essex IRRP Addendum
- April 2020 (ongoing) – one-on-one outreach/meetings with local communities and stakeholders to discuss West of London Bulk Study
- November 26, 2020 – SW Regional Electricity Network engaged to create a broader electricity dialogue and seek input on key considerations for the demand forecast, needs and potential options on both IRRP and bulk studies
- March 31, 2021 – SW Network meeting to provide an overview and answer questions re the proposed new transmission line Lambton-to-Chatham
- July 15, 2021 – SW Network meeting to seek input on the potential options and recommendations for the IRRP and bulk studies

What we've heard so far

- Significant growth continues in greenhouse and industrial development
- Concern around land use impacts from new electricity infrastructure particularly in Kingsville-Leamington-Lakeshore areas
- Potential for non-wires alternatives/distributed energy resources (DERs)
- Interest in project development from Indigenous communities
- Access to data/information is important to enable input and development of solutions
- A process and mechanism for acquiring generation solutions is needed

Thank You

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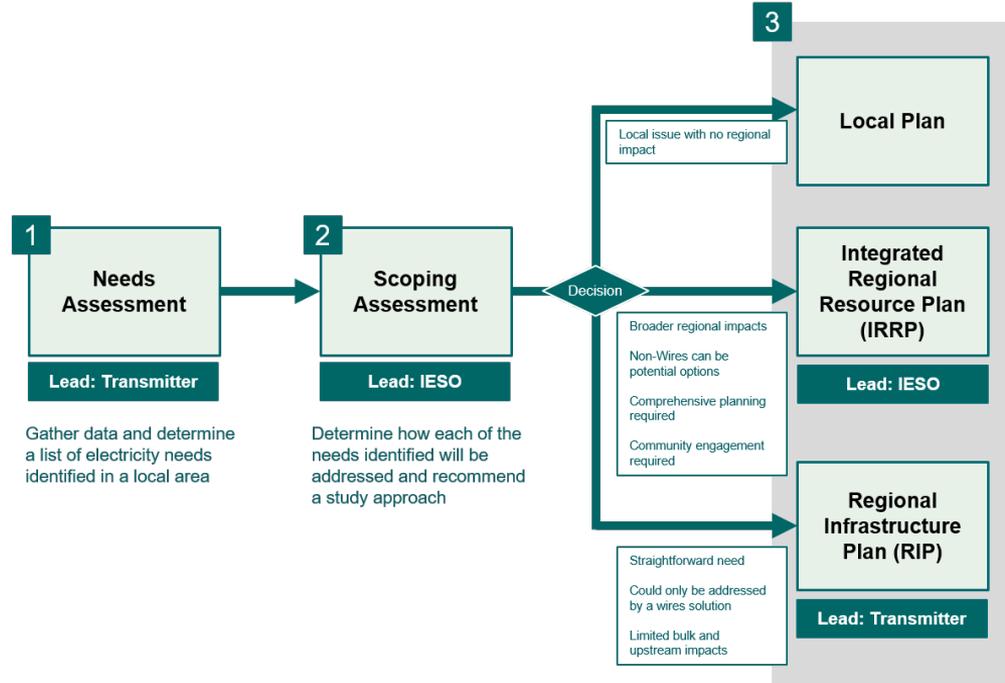


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Appendix

Regional planning process



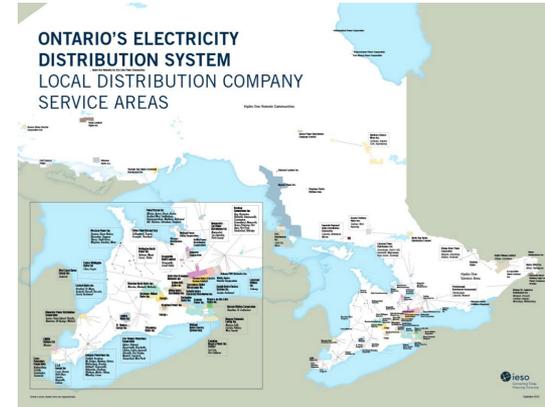
Regional Planning Study Team Participants



Independent
Electricity System
Operator



Lead Transmitter



Local Distributors

Levels of Electricity Planning - Interdependence

- There are three levels of electricity planning:
 - Bulk system planning
 - Regional planning
 - Distribution planning
- These three levels of planning are interdependent and can not be completed in isolation
 - E.g. there may be solutions that cost-effectively meet needs at multiple levels, planning decisions made at one level may impact planning at other levels or information obtained through planning at one level may be useful in the other levels of planning
- As the sector evolves and trends towards more decentralized solutions the interactions between the three levels of planning will need to evolve and increase to ensure optimal use of resources throughout the system

Need for Planning Processes and Why Multiple Layers

Planning processes help maintain reliability in accordance with accepted standards and protect consumers by minimizing unwarranted or risky investments.

When properly designed and carried out, Planning Processes:

- Provide accurate and timely data on expected future changes to load, resource availability and policy
- Mitigate future reliability or enterprise risks, balanced with minimizing rate-payer costs
- Help mitigate risks associated with implementation, by engaging impacted parties at the appropriate time in solution development

There are benefits to having two separate processes – one that is Regionally focused and one that is Provincially focused:

- The nature of the system issues are different (resource adequacy vs. local deliverability)
- There are different stakeholders – allows for collaboration with the parties who will pay for solutions, and development of relationships that ultimately improve inputs to and outcomes of the planning process
- The nature of the solutions are different

It is important to note that regional and bulk planning are interdependent. While there are benefits in having two processes, this needs to be reflected in process design.

Outcome of Power System Planning

- The outcome of planning is typically a planning report that contains recommendations for investments in generation and/or transmission
 - In situations where implementation must occur before the completion of a plan (or if the scope/cost of a recommendation doesn't merit a comprehensive planning report), an alternate tool, such as a hand-off or urge letter, can be used to communicate recommendations to the responsible party and serve as evidentiary support of need.
 - In some cases, the outcome of Planning is advice to Government.
- Completed bulk and regional plans (or hand-off letters) act as instruments for the responsible parties to implement the IESO's or Working Group's recommendations
- They are used as evidentiary support of project need in regulatory forums (e.g. distributors and transmitter file applicable regional plans in their rate applications)
- Plans can also inform targets for markets, scopes of other competitive resource or transmission acquisitions, or government directives



Related Products

Annual Planning Outlook

- The Annual Planning Outlook is the primary reporting vehicle of the bulk system planning process, providing a snapshot and summary of the outlook for demand, system issues that are forecasted to arise, resource, transmission, and other needs required to maintain system reliability and improve market efficiency and respond to public policy drivers/constraints.

Resource Adequacy Framework

- The Resource Adequacy Framework will enable different competitive mechanisms to meet Ontario's resource adequacy needs; e.g. capacity auctions for addressing short-term needs, and other acquisition tools for mid to long resource commitments
- Outputs from the Bulk System Planning Process (e.g. Annual Planning Outlook) will inform the acquisition targets and mechanisms moving forward, and the Annual Acquisition Report
- Transparency throughout Bulk System Planning will provide the market with information and foresight into issues and when solutions will need to be in place to better enable their participation

Annual Acquisition Report

- Translates the needs from the most recent Annual Planning Outlook to acquisition quantities
- Allocates the acquisition quantities between acquisition mechanisms across three acquisition time horizons (Short term, Medium term, Long term along with transitional actions)
- Identifies targets and specifications for the ensuing acquisitions