REGIONAL PLANNING PROCESS REVIEW STRAW MAN DESIGN

February 28, 2020

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EXECUTIVE SUMMARY

Scope of Review and Purpose of Straw Man

- Launched as a part of continuous improvement efforts and in response to a 2017 Ontario government directive, the regional planning process review focuses primarily on three key areas:
  - Identifying opportunities to improve process efficiency and flexibility
  - Better aligning transmission facility end-of-life needs with regional planning
  - Making recommendations to address potential barriers to implementing non-wires alternatives (NWAs) in regional planning
- As part of the Regional Planning Process Review stakeholder engagement, the IESO:
  - Formed the Regional Planning Review Advisory Group to assist in conducting the review
  - Gathered feedback from key stakeholders and industry participants on opportunities to improve and enhance the process
- This Straw Man highlights key draft recommendations and potential process changes identified through this engagement

Overview of Regional Planning

- Regional planning involves identifying customer supply needs, assessing the adequacy and reliability of electricity supply in a particular geographic area, developing options, and recommending cost-effective solutions
- Although regional planning has been conducted on an as-needed basis in Ontario for many years, the process was formalized and endorsed by the Ontario Energy Board in 2013
- Under this structure, the IESO, transmitter (in most cases, Hydro One), and distributors have conducted different stages of the regional planning process
- Indigenous communities, municipalities, and public stakeholders across Ontario's 21 planning regions have also participated in and supported the process
- As of 2020, the first cycle of regional planning for all 21 regions was complete, and the second cycle is already well underway

Draft Recommendations at a Glance

Process Efficiency and Flexibility

- Streamline and standardize load forecast development
- Size the Integrated Regional Resources Plan (IRRP) according to complexity of needs
- Simplify the IRRP and Regional Infrastructure Plan (RIP) stages of the regional planning process
- Better integrate and coordinate regional planning with related processes
- Enhance engagement and transparency during planning
- Better consider cost allocation during development of a plan
- Plan with a long-term outlook
- Enhance activities occurring between planning cycles
- Clarify process stages and products

End-of-Life Asset Replacement

- Incorporate a process where transmission asset owners develop a long list of facilities with expected service life
- Include a short list of end-of-life needs as an input to regional planning

Barriers to Non-Wires Alternatives

- Develop the tools and methodologies to support need characterization and option development during IRRPs
- Formalize the stages of the planning process during which NWAs are developed and evaluated
- Explore non-wires participation in market mechanisms
- Explore requirements for the operationalization of NWAs
- Investigate mechanisms for locally targeted energy efficiency
- Continue testing NWAs and capacity building through Grid Innovation Fund projects

Next Steps and Implementation

- The IESO is seeking stakeholder feedback on the Regional Planning Process Review Straw Man Design by March 27, 2020
- The Regional Planning Process Review Final Report, to be released later in 2020, will incorporate this feedback
- Regional planning is an evolving process; therefore, recommendations resulting from this review are primarily minor modifications which will be implemented in stages, even after this review is completed
- Not all proposed actions will or can be directly implemented by the IESO; some would be best addressed through the OEB's Regional Planning Process Advisory Group, as transmitters, distributors, and other industry participants may all have a role in implementation

TABLE OF CONTENTS

Table of Contents

PURPOSE OF THE INITIATIVE

Purpose of Regional Planning Review

Through the Regional Planning Process, the IESO works with distributors and transmitters to assess Ontario's regional electricity needs and considers cost-effective conservation, generation, distributed energy resources, transmission, and other distribution options to meet those needs.

- While taking into account lessons learned, the IESO is seeking to review the regional planning process and explore opportunities to:
  - Streamline and find efficiencies in the regional planning process
  - Identify barriers to implementing cost-effective non-wires alternatives (NWAs)
  - Improve coordination with transmission equipment replacements at end of life
  - Better integrate regional planning with related planning processes
- As the process evolves to better adapt to the changing planning context, an important aspect of the review is seeking feedback from stakeholders and communities on lessons learned during the first cycle of regional planning
- These continuous improvement efforts lead to recommendations that are primarily minor modifications (small adjustments and clarifications), rather than significant structural changes
- Implementation of these recommendations will also occur in stages even after this review is completed

History of Regional Planning in Ontario

In Ontario, the IESO holds legislative responsibility, in accordance with the Electricity Act 6(1)(e,j,l), for establishing and enforcing reliability standards, engaging in activities to ensure an adequate, reliable and secure electricity system, and conducting independent planning of the power system

- In 2012, as part of the "Renewed Regulatory Framework for Electricity: A Performance-based Approach," the Ontario Energy Board (OEB) convened the Planning Process Working Group* to develop a more structured, transparent, and systematic regional planning process
- The Planning Process Working Group released its report on the new regional planning process in May 2013 to the OEB, identifying 21 electricity planning regions and outlining a schedule for the process
- The OEB subsequently endorsed the report and formalized the process timelines through changes to the Transmission System Code and Distribution System Code in August 2013

** Composed of industry stakeholders (such as electricity agencies and utilities)*

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Process Review: Background and Directive

- To continuously monitor and improve the process, the OEB created the Regional Planning Process Advisory Group in 2014 to further advance the work of the Planning Process Working Group, focusing primarily on enhancements to the Regional Infrastructure Plan (RIP) and wires-only planning process
- In 2016, the OEB broadened the mandate of the Advisory Group to include a review of Integrated Regional Resource Plan (IRRP) reports, though this did not involve a detailed review of the IRRP process
- Also by the end of 2016, the first cycle of the regional planning process was completed for all 21 regions, providing an opportunity to reflect on lessons learned and continually improve
- In 2017, the IESO received direction from the Ontario government to, in part:
  - "Review and report on the regional planning process, taking into account lessons learned, and provide options and recommendations"

Objectives of this Initiative

- Identify barriers to the implementation of cost effective non-wires solutions, such as conservation and demand management, and distributed energy resources (DERs), and provide options to address any such barriers, including potential legislative or regulatory changes, as well as options to address distributor capacity
- Propose approaches for improving the integration of regional planning with bulk system, distribution and community energy planning, and approaches to ensure alignment with market-based approaches
- Consider improved planning for replacement of transmission assets reaching end of life
- Propose approaches for streamlining the regional planning process

Scope of the Review

- These objectives led to the **Regional Planning Process Review** stakeholder engagement, which includes:
  - Examining process improvements for greater efficiency and flexibility (involving review of inputs, outputs, activities, timelines, engagements, and roles and responsibilities associated with each process stage)
  - Considering process coordination and integration with related processes (e.g., bulk system planning, regulatory filings, community energy planning)
  - Evaluating how the process might evolve to better adapt to a changing planning context (including growing interest in non-wires solutions, aging existing transmission assets, and shifts to market-based solutions)
- This review also considered the **End-of-Life Asset Replacement Information Process**, specifically focused on improving and formalizing the input of asset replacement information to the planning processes, and the **Barriers to Non-Wires Alternatives** work, which concentrates on addressing obstacles to NWAs

Purpose of the Straw Man Design

- This Straw Man Design provides draft recommendations resulting from the process review, including an overview of the needs or areas for improvement and proposed actions to address them
- The IESO is requesting stakeholder feedback on the draft recommendations and proposed actions. Please provide feedback to engagement@ieso.ca by March 27, 2020 using the feedback form on the engagement webpage
- The Regional Planning Process Review Final Report, to be released later in 2020, will incorporate this feedback

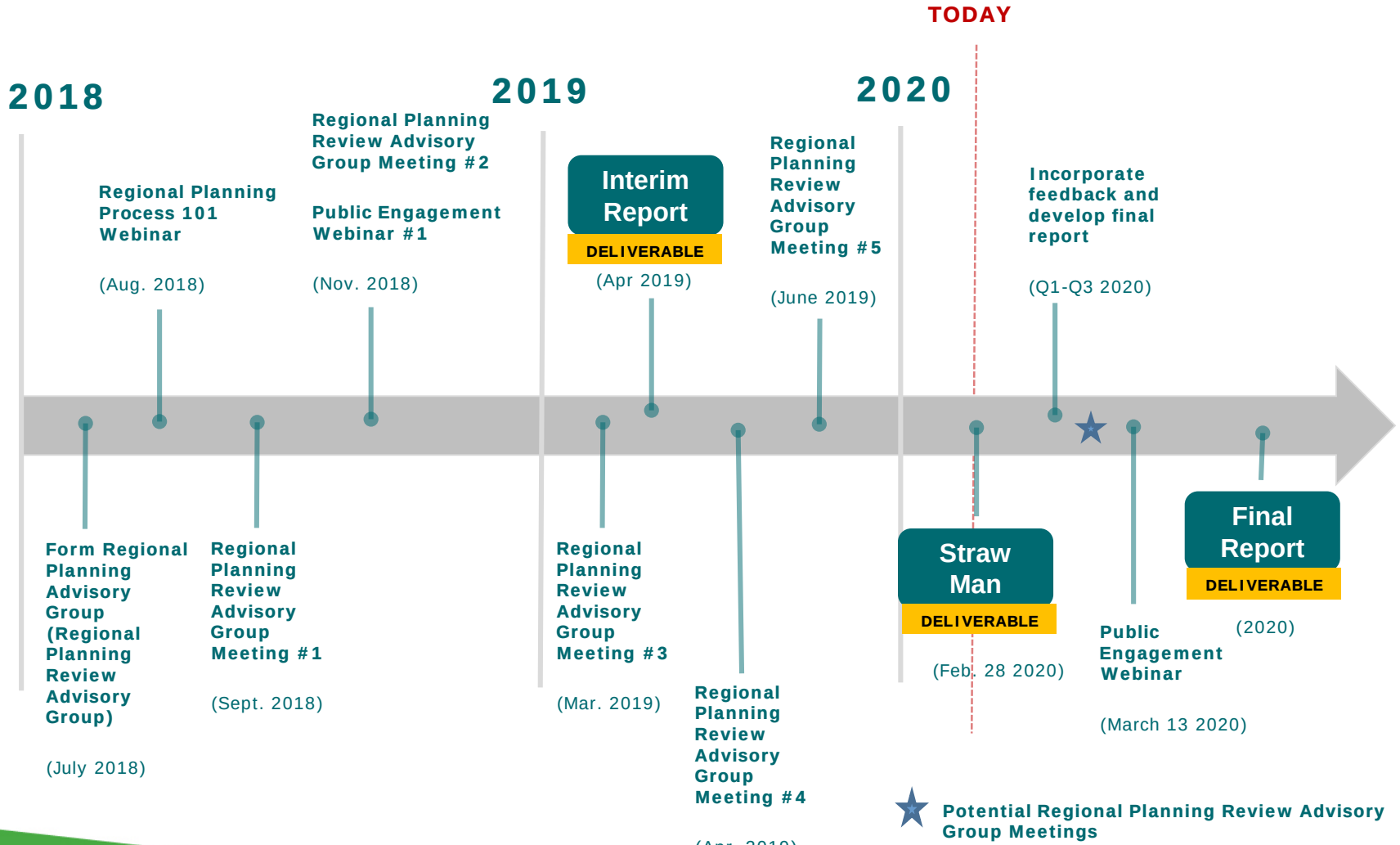
Activities Completed to Date

- To inform the needs and draft recommendations identified through the review, the IESO undertook numerous data-gathering activities over the past year, including consultation through:
  - A review of the existing regional planning process and recommendations from OEB's Regional Planning Process Advisory Group
  - Research via questionnaires and in-person interviews with the IESO staff, as well as with distributors and transmitters
  - In-person interviews with industry stakeholders
  - Establishment of the Regional Planning Review Advisory Group with five meetings held to date
  - The launch of an engagement initiative in Q4 2018 to inform the broader public through webinars and seek feedback
  - Completion of a jurisdictional scan
  - Publication of the Interim Report to identify and recommend key areas of focus

Regional Planning Review Advisory Group

- The IESO established the Regional Planning Review Advisory Group in Q3 2018 to support its work on the Regional Planning Process Review
- The advisory group's diverse membership includes transmitters, distributors, mining associations, renewable energy associations, municipalities, the Métis Nation of Ontario, and the private sector
- The advisory group provides important feedback on:
  - Potential barriers to implementing NWAs
  - Development of a coordinated, cost-effective, long-term approach to replacing transmission assets at end of life
  - Opportunities for better coordination between regional planning, bulk planning, distribution planning, and community energy planning
  - Recommendations for process changes and enhancements

Regional Planning Process Review Timeline



OVERVIEW OF REGIONAL PLANNING

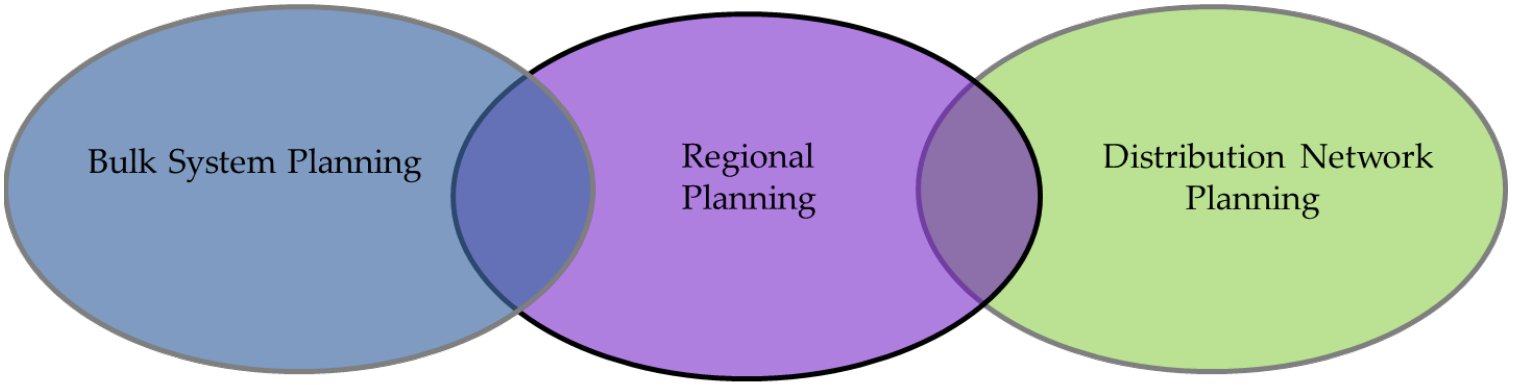
Purpose of Regional Planning

One of three categories of interrelated electricity system planning, regional planning* assesses the adequacy and reliability of electricity supply to customers in a local area and develops a 20-year plan that:

- Summarizes the electricity needs and recommends infrastructure investments or near-term actions (e.g., monitoring, initiating pilot) to maintain reliability of supply for a local area
- Supports regulatory (e.g., distribution and transmission rate filing) and any related acquisition processes (e.g., generation or distributed energy resources procurement), if applicable

** The Regional Planning Process is documented in the Planning Process Working Group Report to the Board*

Regional Planning: At a Glance

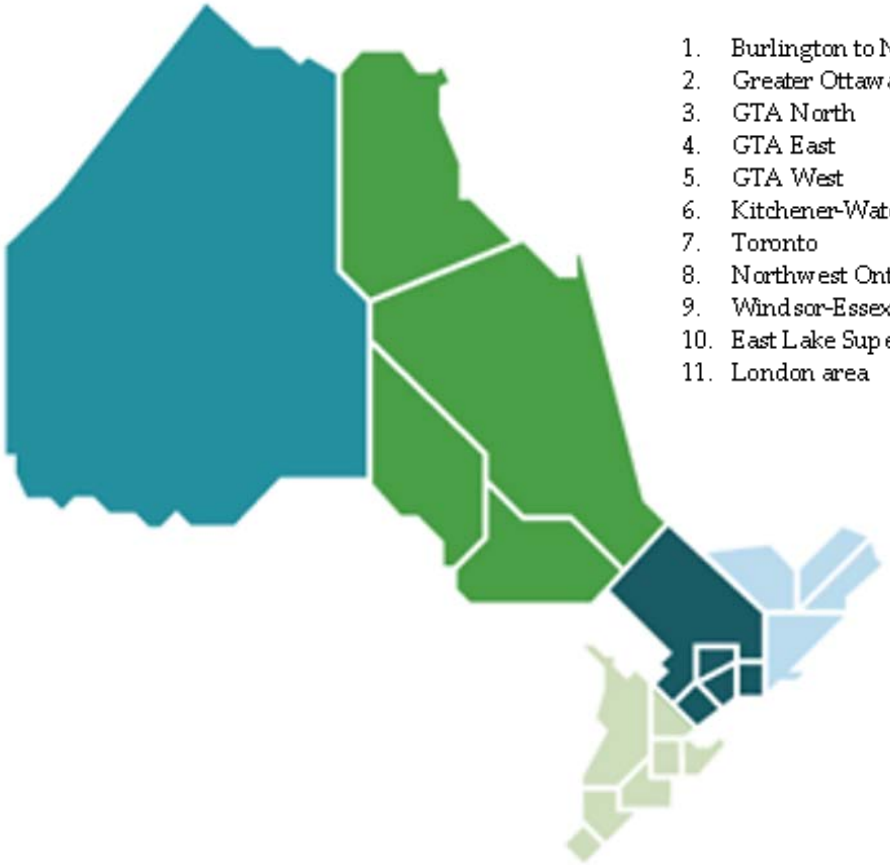


- 500 kV & 230 kV transmission
- Interconnections
- Inter-area network transfer capability
- System reliability (security and adequacy) to meet NERC, NPCC, ORTAC
- Resource needs
- Congestion and system efficiency
- System supply and demand forecasts
- Incorporation of large generation
- Typically medium- and long-term focused

- 230 kV & 115 kV transmission
- 115/230 kV autotransformers and associated switchyard facilities
- Customer connections
- Load supply stations
- Regional reliability (security and adequacy) to meet NERC, NPCC, & ORTAC
- ORTAC local area reliability criteria
- Regional/local area generation & CDM resources
- Typically near- & medium-term focused

- Transformer stations to connect to the transmission system
- Distribution network planning (e.g. new & modified Dx facilities)
- Distribution system reliability (capacity & security)
- Distribution connected generation & demand side resources/efficiency
- LDC demand forecasts
- Near- & medium-term focused

Ontario's 21 Planning Regions



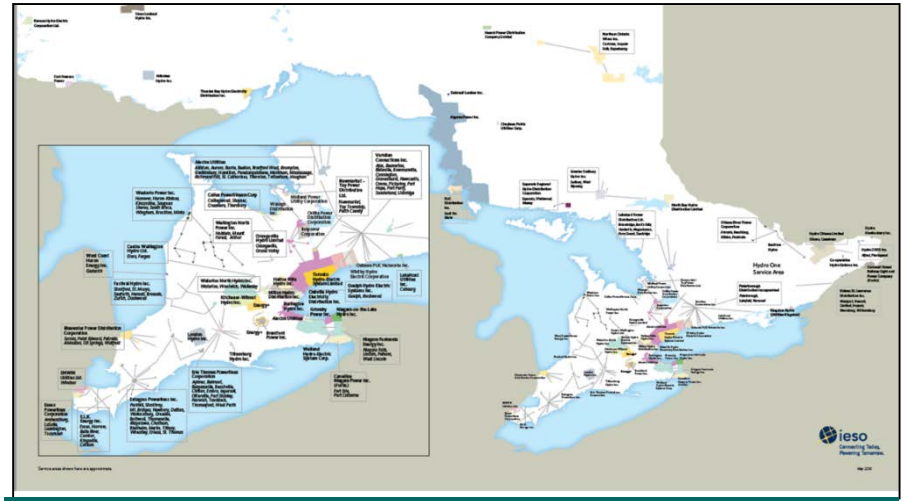
1. Burlington to Nanticoke
2. Greater Ottawa
3. GTA North
4. GTA East
5. GTA West
6. Kitchener-Waterloo-Cambridge-Guelph
7. Toronto
8. Northwest Ontario
9. Windsor-Essex
10. East Lake Superior
11. London area
12. Peterborough to Kingston
13. South Georgian Bay/Muskoka
14. Sudbury/Algoma
15. Chatham/Lambton/Sarnia
16. Greater Bruce/Huron
17. Niagara
18. North of Moosonee
19. North/East of Sudbury
20. Renfrew
21. St. Lawrence

There are 21 electricity planning regions in Ontario, defined by electrical boundaries. The OEB requires regional planning be conducted at a minimum of every five years for each of the planning regions.

Process Participants

System Operator

Transmitters



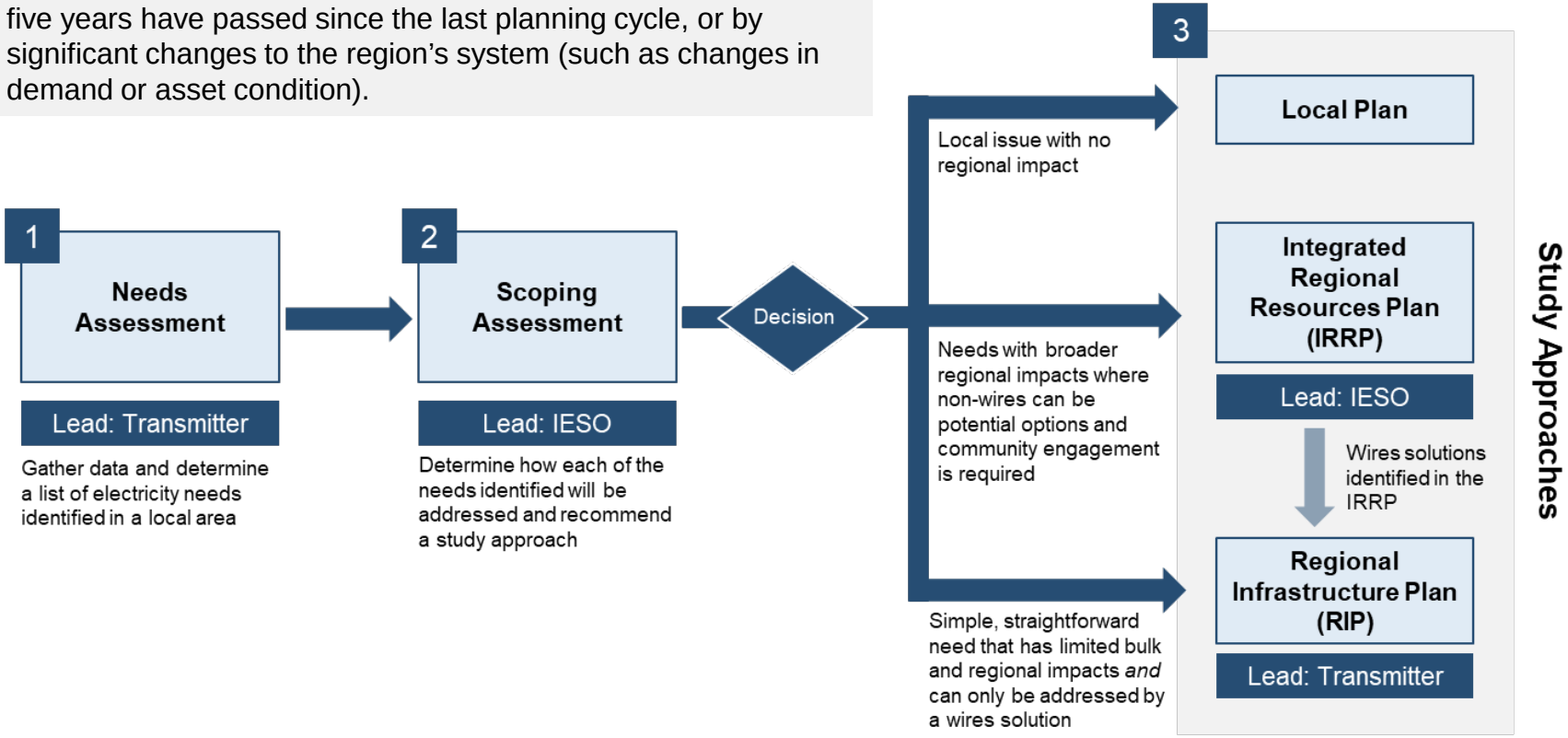
Distributors

The IESO, transmitters, and distributors form the Technical Working Group, are mandated by the OEB to carry out the Regional Planning Process in Ontario.

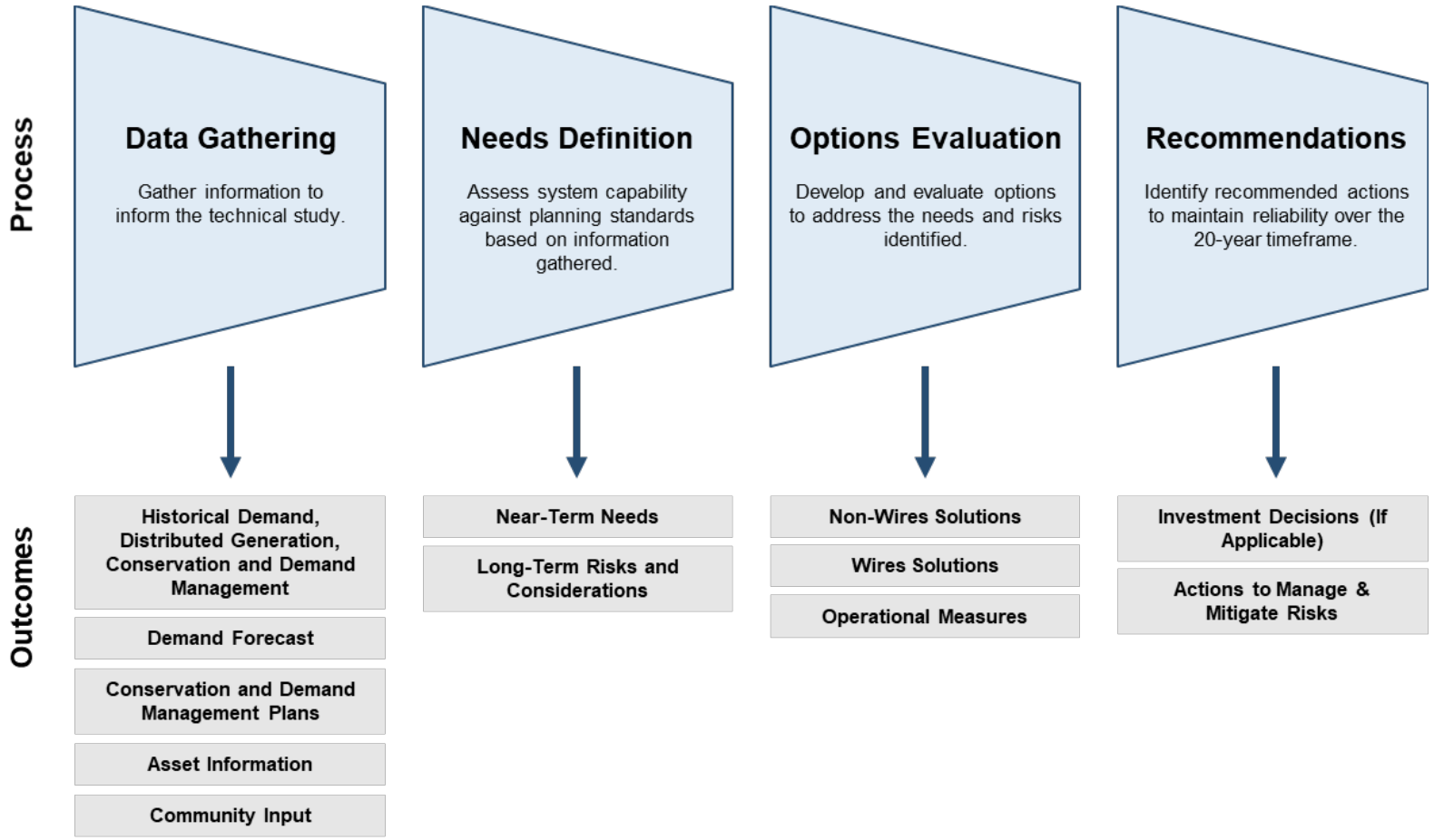
Public stakeholders (e.g., municipal and Indigenous communities, members of local advisory committees) are also engaged at different stages throughout the process.

Regional Planning Process Diagram

Need Assessments can be triggered by government directives, if five years have passed since the last planning cycle, or by significant changes to the region's system (such as changes in demand or asset condition).



Carrying Out an IRRP



PART 1 – PROCESS EFFICIENCY AND FLEXIBILITY

Improving Efficiency and Flexibility

- The regional planning process will continually evolve, but completion of the first cycle provided an opportunity to identify areas for improvement
- Ideally, the process should be flexible enough to accommodate the unique needs of each region, while still providing a transparent, consistent framework for collaborative and comprehensive planning
- The Regional Planning Process Review considers how consistency and flexibility can be balanced by examining current timelines, roles, accountabilities, and objectives for each process stage
- The review also aims to improve the process on numerous fronts, aspiring to clarify expectations, avoid duplication of work, promote seamless collaboration, and facilitate effective communication

Summary of Recommendations

Part 1.1 Streamlining Load Forecast Development	Part 1.2 Accelerating and Sizing the IRRP	Part 1.3 Streamlining the IRRP and RIP
Part 1.4 Better Integrating and Coordinating with Related Processes	Part 1.5 Enhancing Regional Planning Engagements and Transparency	Part 1.6 Better Consideration of Cost Allocation
Part 1.7 Improving Long-Term Planning	Part 1.8 Enhancing Activities Between Planning Cycles	Part 1.9 Clarifying Process Stages and Final Products

1.1: Streamlining Load Forecast Development

Context and Rationale

- The prediction of future electricity demand is integral to regional planning
- As development of a load forecast is a key step of the process, and occurs during the needs assessment, IRRP, and RIP, significant time and collaboration is required of the Technical Working Group
- During the needs assessment, the transmitter uses a load forecasting methodology that involves:
  - Assembling historical net peak loads from distributors
  - Gathering 10-year forecast gross loads from distributors
  - Obtaining high-level 10-year distributed generation, as well as conservation and demand management forecasts from the IESO
  - Correcting from median to extreme weather conditions using Hydro One correction factors

1.1: Streamlining Load Forecast Development

(cont'd)

- During the IESO-led IRRP, the load forecasting methodology:
  - Extends to a 20-year outlook, with regional coincidence applied
  - Involves more detailed energy efficiency and distributed generation estimates
  - Includes alternate normalization for extreme weather
  - Contains a survey to better understand other distributor forecast assumptions (e.g., power factors, load transfers, seasonality, embedded distributers, customer segmentation, new developments, drivers of growth)
  - Considers different electricity demand outlook scenarios
- In the IRRP and RIP, the 20-year forecast is used to assess the adequacy and reliability of supply, identifying when the regional peak demand cannot be met in the near-, mid-, and long-term (typically 5-year, 5 to 10-year, and 10 to 20-year time horizons, respectively)
- As different types of loads and new resource types connect, the system is becoming more complex, making load forecasting increasingly difficult
- Forecasting methodologies should adapt in response to these trends, taking into account changing peaks and load behaviour

1.1: Streamlining Load Forecast Development

(cont'd)

- Inefficiencies and lack of clarity during the time-intensive load forecasting stage slow the overall process, and lead to misunderstood or mischaracterized needs
- Through this process review and discussions with distributors and Hydro One, areas of improvement for load forecast development were identified:
  - Base assumptions and methodologies should be consistent between distributors within a region
  - Multiple iterations of a load forecast for a region can cause delays and unnecessary redundant work
  - Forecasts beyond the mid-term time horizon are significantly less certain than predictions for the next five years
  - Members of the Technical Working Group have varying insight into transmission-connected industrial loads when applicable, as well as visibility of energy efficiency, demand response, distributed generation, and other DERs

1.1: Streamlining Load Forecast Development

Recommendation

Reduce the redundancy and time requirements of forecasting activities using clearer and more consistent methodologies. There are multiple options to achieve this.

Recommendation Details

OPTION A

To enable more clarity and consistency while accommodating the uniqueness of customers across different regions and LDCs, **base assumptions and methodologies for load forecasting should be specified** by all Technical Working Group members at the start of the regional planning process, enabled by using agreed-upon templates

- Approach to forecasting to be informed primarily by distributors, who have the best information on customer and regional growth expectations and the most direct involvement with customers
- The transmitter is expected to have more visibility into future transmission-connected industrial loads
- Any adjustments to base assumptions and methodologies would have to be clearly explained and justified by the relevant entity

The IESO is well-positioned to forecast the impact of energy efficiency and distributed generation, as well as aggregate and further examine the load forecasts. As such, the IESO should formally adopt its approach for quantifying gross and net loads (both historical and forecast).

1.1: Streamlining Load Forecast Development *(cont'd)*

OPTION B

To avoid load forecasting *three times* (during the needs assessment, IRRP and RIP) in a single planning cycle, two options are for load forecasting to…

i. **Occur once**, with the same single, comprehensive forecast used throughout each stage of the planning cycle, or

ii. **Occur twice**, with…

- A 10-year preliminary forecast for the needs assessment (primarily to identify significant changes in growth rates at delivery points and more broadly at the regional level)
- A 20-year detailed, comprehensive forecast for the IRRP and RIP (to evaluate options to solve identified needs)
- Updates to the RIP forecast only in the event of significant changes

OPTION C

Forecasts can also be **monitored and formally reviewed annually** by the Technical Working Group to reflect on accuracy and alignment with new regional developments or community energy plans, ensure that new planning cycles are triggered in a timely fashion, and minimize the forecast development work required for subsequent cycles

1.2: Accelerating and Sizing the IRRP

Context and Rationale

- Per Section 21.2 of the IESO licence, an IRRP must be completed within 18 months of determining it is required (through the scoping assessment)
- The existing process can accommodate urgent needs through hand-off letters issued by the IESO to advance IRRP recommendations, notifying the lead transmitter and participating distributors of any facilities deemed necessary to meet near-term needs
- The regional planning process can still be time-intensive – from needs assessment to completion of the IRRP can take more than two years

1.2: Accelerating and Sizing the IRRP *(cont'd)*

Recommendation

Tailor the type of IRRP and the scope of work required to better accommodate the needs of the regions and sub-regions in a timely manner.

Recommendation Details

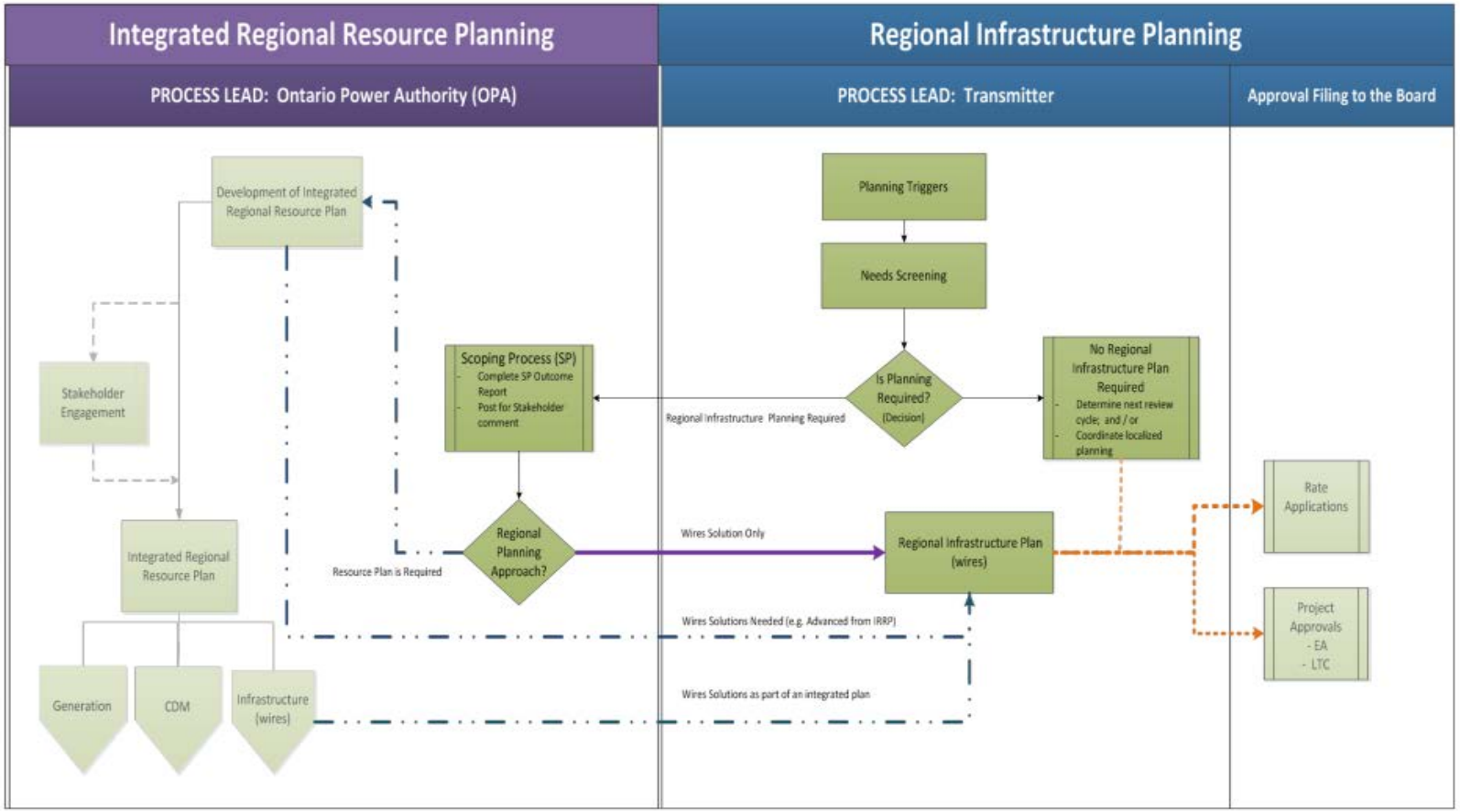
- IRRPs could be conducted more efficiently by **introducing three categories:**
  - Small IRRP
  - Medium IRRP
  - Large IRRP
- The type of IRRP should reflect the complexity and needs of the region
- Where needs are smaller and less urgent, it is anticipated that: the extent of engagement required is lesser, the amount of information gathering should be more straightforward, and a full 18-month IRRP may not be required
- "Large" IRRPs may be reserved for regions where the maximum 18-month time allowance is required for comprehensive planning
- The recommended type of IRRP could be chosen during the scoping assessment

1.3: Streamlining the IRRP and RIP

Context and Rationale

- During the scoping assessment, the Technical Working Group (with public stakeholder input) recommends a regional planning approach
- Straightforward needs without broader bulk impacts and that can likely only be solved by a wires solution do not require engagement and can be addressed through regional infrastructure planning
- Otherwise, integrated regional resource planning is conducted to facilitate public engagement and to ensure that integrated solutions that consider all options (generation, NWAs, wires) are considered, and near-term actions to address the identified needs are recommended
- The IRRP is subsequently followed by the RIP, which further examines and describes wires-only options

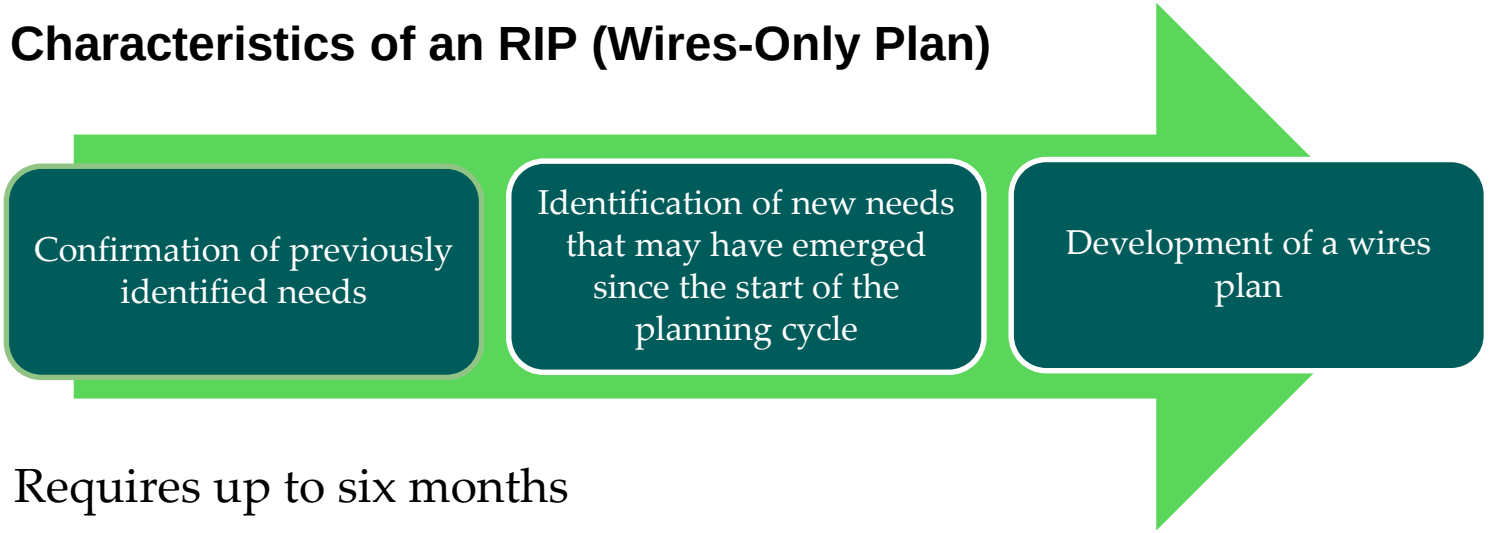
1.3: Streamlining the IRRP and RIP *(cont'd)*



Original Conceptual Flowchart for Regional Planning: Figure 1 of the Planning Process Working Group Report to the Board (May 2013)

1.3: Streamlining the IRRP and RIP *(cont'd)*

Characteristics of an RIP (Wires-Only Plan)



- Requires up to six months
- Includes many of the same components as IRRPs: data gathering, technical assessments, development of alternatives, and implementation plans
- Does not include stakeholder engagement
- Study period of 10 or 20 years
- Can be referenced in rate filing submissions or as part of distributor rate applications

1.3: Streamlining the IRRP and RIP *(cont'd)*

- The review sought to clarify differences and expectations between the IRRP and RIP, as well as identify areas for improved efficiency
- In practice, developing wires options is continuous throughout both the IRRP and RIP
- While the IRRP considers NWAs, wires options must still be evaluated to permit adequate comparison of all potential solutions
- The final wires recommendations in both planning products should ultimately align and result from collaboration (not isolated decision-making) among the same Technical Working Group
- Regional planning as a whole should be a single process with multiple supporting products that can each offer **incremental** value

1.3: Streamlining the IRRP and RIP *(cont'd)*

Recommendation

Clarify the scope of the IRRP and RIP to avoid redundancies.

Recommendation Details

Scoping assessments could recommend one of two potential approaches:

A. **Development of an RIP** for needs that have no upstream bulk system impacts, may be infeasible for non-wires options to address, *and* does not require public engagement

B. **Sequential development of the IRRP and the RIP**.

- The IRRP evaluates wires options as part of its integrated planning approach with enough detail specified to enable proper options comparison
- The RIP focuses on advancing the wires recommendations of the IRRP *without replicating work*, e.g., the RIP should use the IRRP load forecast unless significant changes are known, and wires recommendations made in the IRRP should be developed in further detail rather than reassessed
- The extent of wires solution development between the IRRP and RIP can be further outlined in the Terms of Reference at the scoping assessment stage

1.4: Coordinating with Related Processes

Context and Rationale

- Regional planning interacts with various related processes and activities, many of which have different timelines, objectives, data and reporting requirements, and stakeholders
- Examples of these processes include:
  - Bulk planning
  - End-of-life asset replacement
  - Distribution planning
  - Connection assessments
  - Community energy planning
  - Relevant regulatory proceedings (including distributor/transmitter rate filings)
  - Markets or procurement mechanisms (including transmission infrastructure or NWAs)
  - Energy efficiency program planning

1.4: Coordinating with Related Processes *(cont'd)*

- Some related processes are subject to ongoing parallel initiatives, e.g., bulk planning*
- Other processes, such as competitive procurement mechanisms for NWAs, may not yet be clearly defined and will require regional planning to evolve in the future accordingly if introduced
  - For instance, if competitive mechanisms are introduce, they may impact with whom and how IRRPs are engaged, when and what information is made public to describe a need to enable third-party solutions, and what contingency paths may be required
- Some interactions will continue to occur in much of the same manner, but improvements could be made now because the processes already exist, e.g., support for regulatory proceedings
  - While the OEB does not formally approve regional plans, it will continue to support distributors and transmitters when filing evidence in rate and leave-to-construct proceedings, ensuring that regional issues and various options have been appropriately considered before a specific investment is proposed

**This initiative seeks to update, integrate, and document the various components of bulk system planning within the context of a changing electricity system planning framework.*

1.4: Coordinating with Related Processes *(cont'd)*

Recommendation

Develop a better understanding of the scope, interdependencies, and decision-making points of processes related to regional planning to improve integration and coordination.

Recommendation Details

- To ensure effective integration and coordination with regional planning, the **following should be well-defined**:
  - **Timelines between processes**, including critical points of overlap or interaction
  - **Data and information** to be shared that is useful or necessary
  - **Common stakeholders** that require engagement
  - **Coinciding decision points** that need consensus and have regulatory or monetary ramifications
  - **Difference in roles and accountabilities** across the processes' scopes of work and objectives

1.5: Enhancing Engagement & Transparency

Context and Rationale

- Feedback received from the first planning cycle and through discussions with the Advisory Group indicated that engagement should:
  - Address expectations for input and feedback and allow stakeholders relevant and meaningful opportunities to contribute in the process
  - Help inform and evaluate options for meeting electricity needs in each region
  - Provide more education/background information, allowing stakeholders to engage earlier and more often
  - Develop and enhance relationships and provide opportunities for continuous dialogue
  - Allow the IESO to make more sustainable decisions and recommendations on behalf of the region
- To address feedback related to engagement in the regional planning process in the current planning cycle, the IESO has:
  - Integrated IESO engagement principles into the planning process
  - Broadened/enhanced engagement in the scoping assessment and IRRP
  - Created new opportunities for engagement

1.5: Enhancing Engagement & Transparency

(cont'd)

Integrating Engagement Principles

Following the first regional planning cycle, the IESO's engagement principles and processes were integrated into regional planning activities to expand transparency and improve the relevance and effectiveness of engagement. Subsequent changes in the regional planning process have resulted in:

- Engagements that define and scope the areas for local or regional input, and ensure stakeholders are invited to provide feedback on draft plans
  - Each planning region is unique and an engagement plan will reflect those unique characteristics, including methods to incorporate community-level advice on specific conditions within a broader regional plan, i.e., the formation of a local advisory committee within the public engagement framework
  - Outreach to key contributors in each engagement initiative has helped bring needed inputs into each planning process
- Dedicated web pages that host all engagement materials
- Increased transparency in the feedback loop by posting to the web pages all feedback received and the IESO response to that feedback

1.5: Enhancing Engagement & Transparency

(cont'd)

Broadening Engagement Opportunities

- Broadening and enhancing engagement opportunities during the scoping assessment and IRRP help ensure that stakeholders are provided with relevant, accurate and timely information – both early in the process and between regional planning cycles
- Stakeholders now have more context and background provided during the scoping assessment which, in turn, better prepares them for discussions in the development of an IRRP
- Enhancements in the scoping assessment process include:
  - More webinars to provide overview and background and to address stakeholder questions
  - Posting online stakeholder feedback submitted at each stage of the planning process along with IESO responses to that feedback

1.5: Enhancing Engagement & Transparency

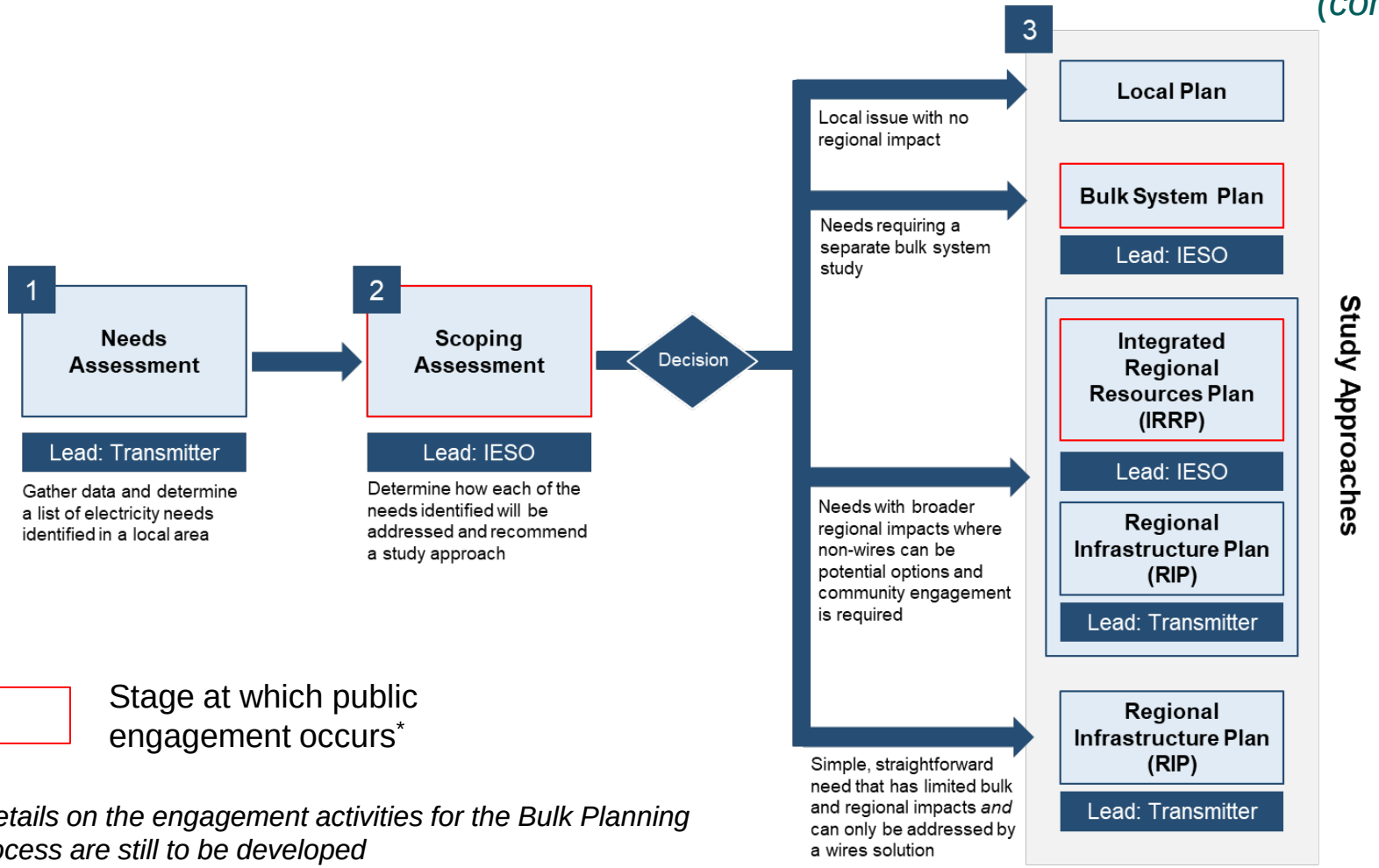
(cont'd)

New Regional Electricity Networks

- To supplement engagement activities, the IESO has established regional electricity networks
- These provide opportunities for ongoing dialogue on the latest trends and activities in regional planning, including updates on the implementation of projects recommended in past IRRPs
- Ongoing discussions from one planning cycle to another also provide the information to help all parties manage local issues as they arise
- Members of these networks will receive regular communication from the IESO, dedicated webpages with region-specific information, a newsletter, and face-to-face meetings (including an annual Regional Electricity Forum)

1.5: Enhancing Engagement & Transparency

(cont'd)



Stage at which public engagement occurs*

* *Details on the engagement activities for the Bulk Planning Process are still to be developed*

1.5: Enhancing Engagement & Transparency

(cont'd)

Recommendation

Continue to incorporate the IESO's engagement principles and processes by enhancing the stakeholder experience and guiding expectations. Continuously seek input on the engagement process for further improvement.

Recommendation Details

With this in mind, Regional Planning should continue to ensure that:

- Targeted outreach be conducted to inform individuals within relevant communities and municipalities and enable them to contribute to the ongoing dialogue
- Information be accessible and transparent throughout the process
- Needs, options, and recommendations are clearly articulated and supplemented with educational documents (e.g., glossary of terms, FAQs, summaries of applicable codes and standards) where possible

1.6: Better Consideration of Cost Allocation

Context and Rationale

While the OEB's Transmission System Code and Distribution Code contain cost responsibility provisions for load customers, and cost allocation should align with the implementation of IRRPs and RIPs, decisions relating to cost allocation are, ultimately, part of the OEB's mandate.

- Cost allocation depends on a number of factors, including:
  - The impacted beneficiaries (incremental peak load requirements and expected load forecast from each distributor)
  - Benefit to the infrastructure's broader system and local customer connection
- While decisions relating to cost fall within the OEB's jurisdiction, cost inherently affects decision-making during the regional planning process
- IRRPs strive to recommend integrated solutions (wires, NWAs, generation) that meet local reliability needs at the **least cost to ratepayers**
- Regional planning products (IRRPs, RIPs) are then used to support related regulatory proceedings, such as distributor and transmitter rate applications

"…regional planning will seek to coordinate in a cost-effective manner the planning of transmission-level investments that can provide supply to more than one distributor but it was not meant to coordinate the breadth of distribution planning and investments among distributors."

- Planning Process Working Group Report to the Board, May 2013

1.6: Better Consideration of Cost Allocation

(cont'd)

Recommendation

Seek a clearer understanding of cost allocation during regional planning.

Recommendation Details

- In some cases, technical working groups may not fully understand the financial implications of their recommendations
- To achieve a consensus on the most appropriate and cost-effective solutions, as well as to enable informed decisions, these groups should strive for a clearer understanding of the factors that impact cost allocation through informal IRRP discussions after a solution is developed
- These include cost-recovery mechanisms for both wires and non-wires solutions

1.7: Improving Long-Term Planning

Context and Rationale

- Regional planning assesses needs based on a 20-year load forecast, but focuses on more urgent and more certain near-term needs and actions
- Typically, recommendations for needs in the 5- to 10-year range are identified but not yet committed; those beyond 10 years are monitored
- While the focus on near- and mid-term needs is important, some **participants advocated for greater consideration to the development of long-term plans that ensure near-term actions provide the flexibility to address future needs,** if and when they arise
- This is especially vital, given the length of time (often 5+ years) to replace aging transmission assets, the potential for widespread transportation electrification, the impacts of climate change, and other system-wide developments

1.7: Improving Long-Term Planning *(cont'd)*

Recommendation

Maintain a long-term outlook to ensure that regional planning is cognizant of potential future needs and does not preclude options to meet them.

Recommendation Details

- Regional plans could become more valuable and efficient if the Technical Working Group:
  - Reaffirms the number of years that constitute near-, mid-, and long-term planning time frames
  - Evaluates key long-term sensitivity scenarios unique to the region (such as significant load growth driven by local industries or electrification, local generation assumption changes, end-of-life/expected service life concerns)
  - Investigates and better communicates the implications of near-term recommendations on long-term options

1.8: Enhancing Activities Between Cycles

Context and Rationale

- As required by the OEB, regional planning is conducted for each of the 21 planning regions (defined by electrical boundaries) at least once every five years
- The full planning process (planning trigger, needs assessment, scoping assessment, IRRP, and RIP) can last more than two years, as the team gathers data, identifies needs, conducts studies, compares options, and engages stakeholders
- In practice, planning is continuous and regions evolve between official active planning cycles
- Activities between planning cycles could improve the process by ensuring the Technical Working Group is advised of new load connections and demand growth, the next planning cycle is triggered in a timely manner, and implementation plans and the status of previous recommendations are known

1. Burlington to Nanticoke
2. Greater Ottawa
3. GTA North
4. GTA East
5. GTA West
6. Kitchener-Waterloo-Cambridge-Guelph
7. Toronto
8. Northwest Ontario
9. Windsor-Essex
10. East Lake Superior
11. London area
12. Peterborough to Kingston
13. South Georgian Bay/Muskoka
14. Sudbury/Algoma
15. Chatham/Lambton/Sarnia
16. Greater Bruce/Huron
17. Niagara
18. North of Moosonee
19. North/East of Sudbury
20. Renfrew
21. St. Lawrence

1.8: Enhancing Activities Between Cycles *(cont'd)*

Recommendation

Enhance between-cycle activities to support a continuous dialogue, help maintain industry working relationships without unnecessary, time-intensive work, and further expedite subsequent planning cycles.

Recommendation Details

- To enable this, the review recommends that the Technical Working Group **meet annually** to do some or all of the following:
  - **Review the accuracy of current load forecasts** and status of local supply
  - **Report on status of previous planning recommendations** and projects
  - **Discuss/flag new or ongoing developments**, particularly as they relate to community energy plans

To maximize their value, it is recommended to align these activities with existing annual reporting mechanisms required by the OEB (such as the regional planning annual status report), and leverage the work of regional electricity networks.

1.9: Clarifying Process Stages and Products

Context and Rationale

- In 2013, the Planning Process Working Group Report to the Board* formalized the regional planning process, providing structure, timelines and a systematic approach to conducting regional planning
- While this led to the successful completion of the first cycle of regional planning, the subsequent process review identified the need for greater clarity with respect to roles and responsibilities, as well as scope and expectations

* See: https://www.oeb.ca/oeb/_Documents/EB-2011-0043/PPWG_Regional_Planning_Report_to_the_Board_App.pdf

1.9: Clarifying Process Stages and Products *(cont'd)*

Recommendation

Update the regional planning process documentation and better define the scope of process stages.

Recommendation Details

- Clarification of process steps can include, but is not limited to, hand-off points and processes for indicating agreement of the Technical Working Group participants, as well as the extent of wires planning in the IRRP vs the RIP

- Updating the documented regional planning process can clarify process steps and reflect changes subsequent to the completion of the first cycle of regional planning

Summary of Areas for Improvement

Streamlining Load Forecast Development

- Forecasting activities can be redundant and time-consuming, with unclear or inconsistent methodologies

Accelerating and Sizing the IRRP

- The full regional planning process can be lengthy (lasting over two years); the IRRP stage can be better scoped and sized according to needs and complexity

Streamlining the IRRP and RIP

- Overlapping and redundant wires planning activities lead to inefficiencies between the IRRP and RIP

Better Coordinating with Related Processes

- Poor alignment between the regional planning and other processes leads to inefficiencies

Summary of Areas for Improvement

Enhancing Regional Planning Engagements and Transparency

- Regional Planning must continue to incorporate the IESO engagement principles and process to enhance the stakeholder experience and guide expectations

Better Considering Cost Allocation

- Informed recommendations for the most cost-effective solutions can be impeded by an unclear understanding of cost implications

Improving Long-Term Planning

- Greater planning efficacy can be achieved by giving greater consideration to the 10- to 20-year time frame

Enhancing Activities Between Planning Cycles

- Regions and projects evolve significantly between planning cycles; existing between-cycle activities can be enhanced and formalized

Clarifying Process Stages and Final Products

- Process steps require additional clarity, particularly as planning has evolved following the first cycle

Implementation of Recommendations

- Recommendations in this Straw Man are not final; engagement (including with the Regional Planning Review Advisory Group) will continue to build consensus and establish more detailed proposals
- Recommendations range in complexity and accountability; the IESO can implement some, while others affect various regional planning participants
- As such, these recommendations may help inform the OEB's existing Regional Planning Process Advisory Group as it continues to monitor and seek improvements to the regional planning process

"On receipt of recommendations from the IESO regarding its review of the regional planning process… the OEB shall identify steps to implement such changes as may be appropriate to improve to utility regional planning processes."

-The OEB's Implementation Plan, February 2018

PART 2 – END-OF-LIFE ASSET REPLACEMENT INFORMATION PROCESS

Scope of the End-of-life Asset Replacement Information Process

This initiative aims to ensure bulk and regional planning processes include a coordinated, cost-effective, long-term approach to replacing transmission assets at end-of-life. This will better align investments with power system needs and market conditions, taking into account system operability and resilience, integration of DERs, and reliability

- Improving and formalizing the input of asset replacement information to the transmission planning processes will achieve three objectives:

  1. Develop a transparent, timely, and sustainable process for identifying and integrating asset replacement information into the transmission planning processes (bulk and regional)
  2. Extend the transmission asset owners' planning horizon for asset replacement needs to a 10-year horizon
  3. Develop criteria for screening identified asset replacement needs for opportunities to better align with forecast power system and market conditions through more comprehensive long-term planning

Key Terms

- **Asset End of Life**
  - The state of having a high likelihood of failure, or loss of an asset's ability to provide the intended functionality, wherein the failure or loss of functionality would cause unacceptable consequences (as determined by the asset owner's risk-based assessments considering reliability, loss of load, environmental, safety)
- **Asset Expected Service Life**
  - A general guideline to inform transmission asset owner investment decisions; the expected service life is defined as the average duration in years that an asset can be expected to operate under normal system conditions and is determined by considering manufacturer guidelines and historical asset performance, failure and retirement data

End-of-Life Replacements Needs

- Equipment is scheduled to be replaced at its end of life, which is determined by condition-based assessments that include such factors as age, performance history, failure history and test results
- Other factors, such as operating conditions (loading, switching, faults) and weather, can shorten the lifespan of equipment and result in unplanned equipment replacements, even before the equipment reaches its expected service life
- A sizeable portion of transmission assets in Ontario are operating beyond their expected service life, increasing the likelihood of need for replacement to ensure safe, secure and reliable operation

Long-Term Considerations for Asset Replacement

- The average lifespan of transmission assets varies from between 40 and 70 years, with some equipment, such as transmission line conductors and steel towers, having average lifespans of 70 to 100 years
- Over such an extended period of time, the need and/or functional requirements of the transmission system may evolve due to a number of factors, including changes to:
  - Customer needs and preferences
  - System conditions
  - Sector trends, e.g., toward increasing use of DERs and demand-side options
- End-of-life equipment replacements (like for like or alternatives) need to be better coordinated and integrated with the long-term planning process and take into consideration the shift in trends and resources, e.g., DERs, renewables, energy efficiency

Asset Replacement & Transmission Planning

Establishing a process for compiling asset replacement information offers opportunities to enhance transmission planning and can vary based on whether the need is driven by end of life, or system capability and reliability

- For asset replacement needs driven by end of life (near or medium term):
  - End-of-life need is identified based on condition assessments to maintain safe, secure and reliable supply to customers
  - From a planning perspective, a non-like-for-like replacement can offer additional benefits for customers
  - While timing of asset replacement is driven by its end of life, the scope of the replacement can be influenced by other factors (e.g., change in system conditions, forecasted load growth, impact of energy efficiency, DERs)

Asset Replacement & Transmission Planning

(cont'd)

- For system capacity- or reliability-driven needs:
  - Knowing the age of the equipment and when it will likely reach end of life will help inform the development and evaluation of options
  - The asset could be at end of life, or just greatly depreciated or close to or exceeding expected service life or accounting life
  - Replacement is driven by timing of the system need – not just the asset need
- Information on asset replacement used as an input to the planning process should allow for opportunities to be identified in both of these scenarios

CURRENT APPROACH

Existing Process: Identifying End of Life

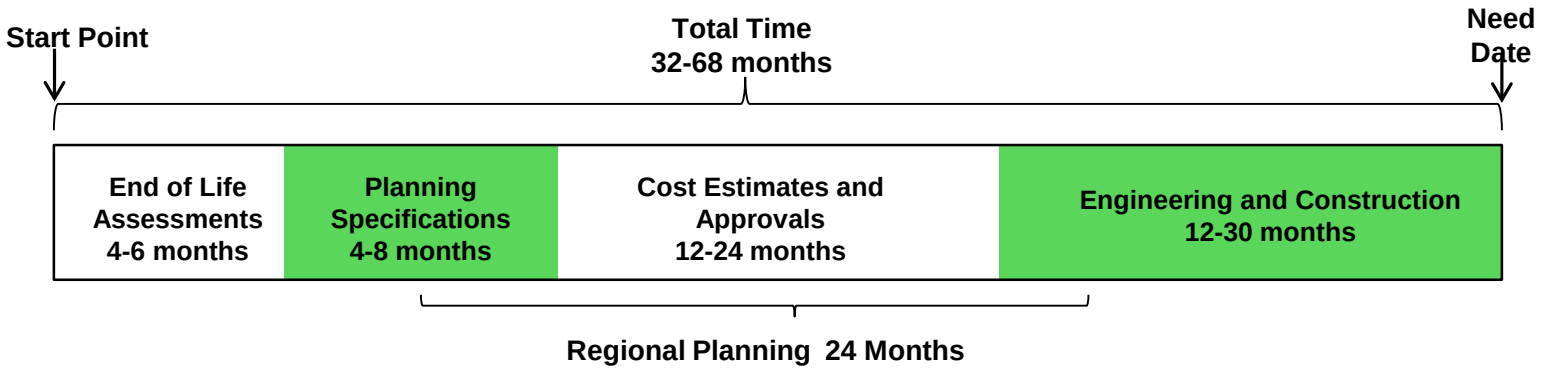
- Asset age and expected service life information is used by transmission asset owners when beginning the process of identifying potential replacement of major equipment
- When developing a list of potential end-of-life equipment for replacement, owners consider:
  - Assessments informed by asset condition information
  - Factors such as performance, criticality, economics, utilization, environmental compliance and health and safety risks, emerging issues, and capacity needs
  - Prioritization based on risk assessment using the factors described above
- Transmission asset owners are responsible for managing and ensuring the safe, secure and reliable operation of their equipment

Consideration of Process Within Planning

- **Regional Planning:** Similar to capacity or reliability needs, end-of-life needs are identified at the needs assessment stage
  - In the first regional planning cycle, transmission asset owners identified end-of-life needs over the near term (five years)
  - In the second cycle, owners have started identifying end-of-life needs over the near and medium term (up to 10 years)
- **Bulk Planning:** Similar to regional planning, coordination of end-of-life asset replacements with long-term bulk planning is important; however, no formal bulk planning process exists.* Instead, transmission asset end-of-life needs are identified as needed during this process

*An additional initiative is underway, focused on formalizing and updating the bulk planning process

Planning and Project Timelines



- In the existing planning process, in which end-of-life needs are typically identified up to five years ahead, presents some challenges:
  - May not provide sufficient time to perform integrated long-term planning
  - Regional planning cycles happen periodically and may not align with end-of-life needs identified over the next five years
  - Future bulk planning cycles will also likely be periodic and face similar challenges

Existing Information/Input Process

- Identifying end-of-life replacement needs over the next five years in regional planning is not sufficient, and may not look out far enough to better coordinate with long-term planning
- Currently no formalized input to the bulk planning process (due in part to historical lack of a formal process)*
- Opportunity to improve and formalize how end-of-life information is provided as an input into the planning processes

*An additional initiative underway is focused on formalizing and updating the bulk planning process

RECOMMENDED PROCESS

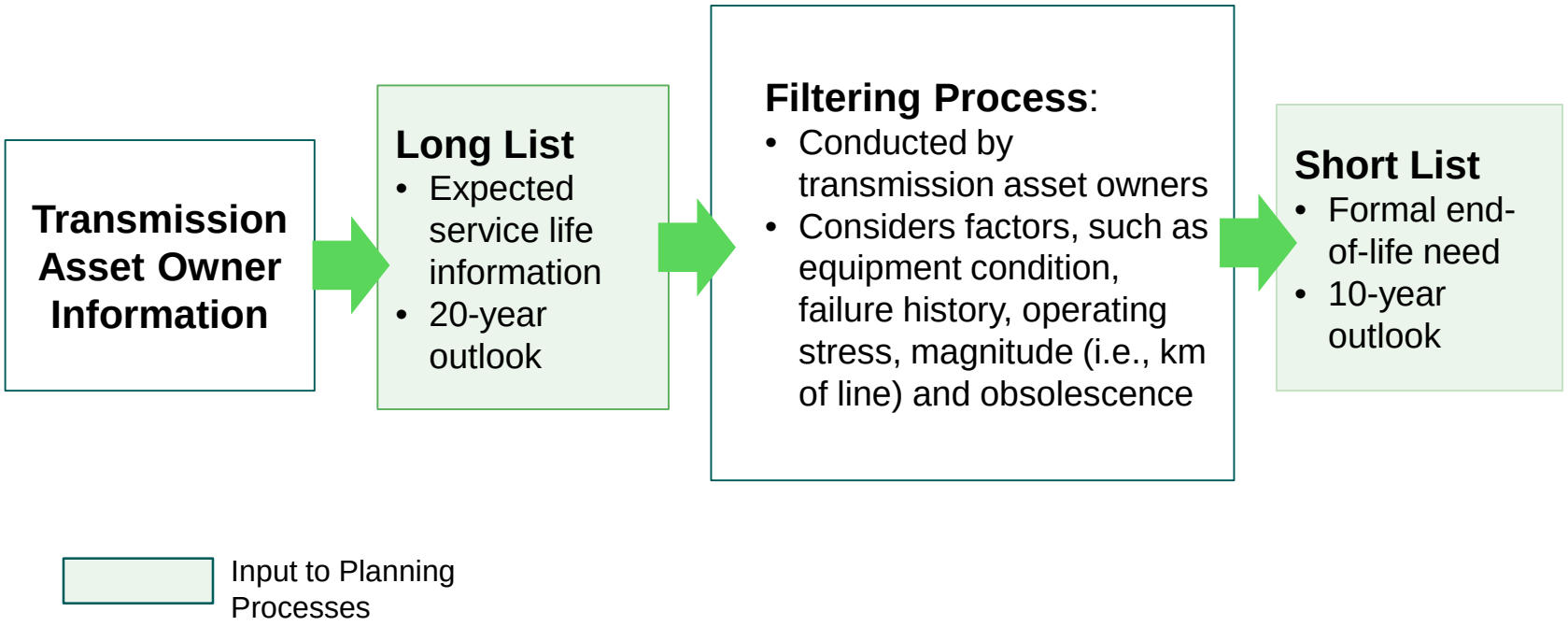
Overview of Recommended Process

- On an annual basis, transmission asset owners (including applicable distributors) will provide a "long list" of transmission assets nearing end-of-life to the IESO as an input to the transmission planning process
- This list will act as a starting point to identify the "short list" of end-of-life equipment replacement needs over the next 10 years

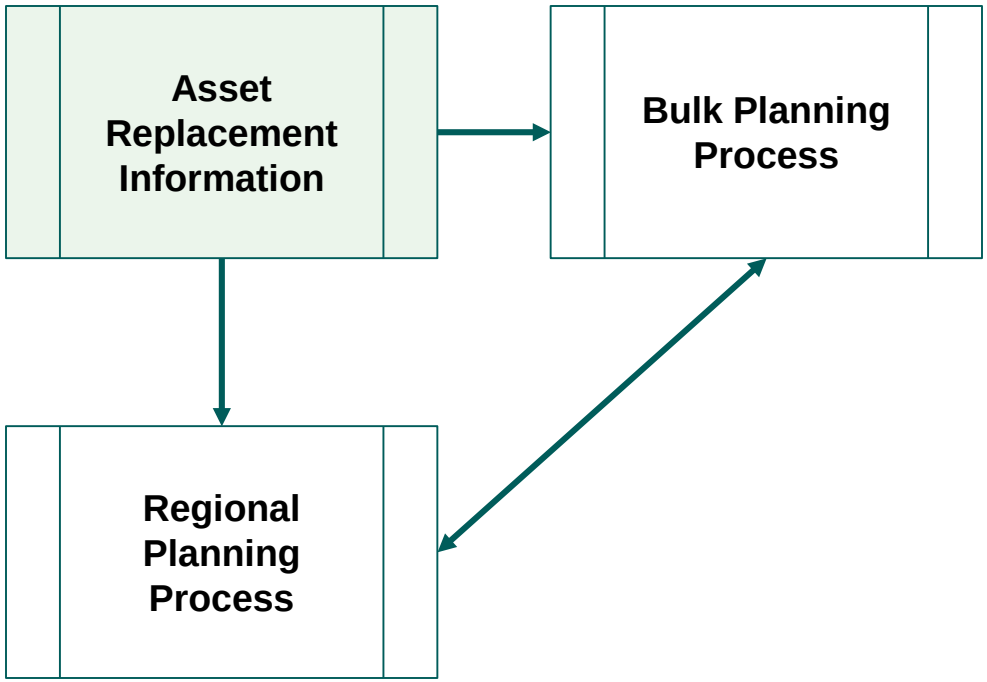
Potential Benefits and Objectives

- Formal process to provide better visibility of a region's asset demographics over the mid to long term as part of the planning processes
- Greater ability to coordinate timing of bulk and regional planning activities based on asset demographics and associated opportunities
- Longer lead time to study opportunities for non like-for-like replacements, particularly for bulk system planning

Asset Replacement Information Process



Relationship Between Processes



Development of the Long List

- Data will be provided for major categories of high-voltage equipment:
  - Transformers (autos and step-downs)
  - Breakers*
  - Transmission lines (including underground cables)
- The long list will be based on expected service life information by asset category, and will include equipment designation, age and location

In select cases, low-voltage breakers (switchgear) should be captured on the "long list" where the replacement of the switchgear is considered as an integrated replacement (e.g., replacement of indoor metalclad switchgear)

Filtering Process to Produce the Short List

- Using their knowledge, transmission asset owners will work from the "long list" to identify the "short list" of projects:
  - That are likely to reach end-of-life over the next 10 years based on available asset condition information,
  - Where typical replacement options may not be possible, and/or
  - That have imminent near-term needs that require timely planning decisions
- Similar to long list, the short list will be prepared on an annual basis
- This short list will act as another informational **input** to the regional planning process to identify reliability needs in a timely fashion

Treatment of Inputs in Planning Processes

	Bulk Planning	Regional Planning
Treatment of Short List	Each bulk item on the short list will be examined to determine whether a bulk planning study should be triggered or if the need can be included in an ongoing bulk planning activity to determine or recommend replacement option (e.g., like for like, upsizing, downsizing, reconfiguration)	The regional planning study team will review as an input to the regional planning the process and determine the planning approach for each item on the list (i.e., identify needs in the needs assessment and determine the planning approach as part of the scoping process)
Treatment of Long List	Used as a general input to ongoing bulk planning activities	Used as a general input to ongoing regional planning activities

Implementation of Process

- Final process recommendations, as developed with and agreed upon by the Working Group, will be included in the final Regional Planning Process Review report
- Any additional comments on the proposed process are welcome as part of the follow-up engagement for this straw man

PART 3 – BARRIERS TO NON-WIRES ALTERNATIVES

Changing Role and Impact of NWAs

Trends in the electrical sector continue to increase the relevance of non-wires alternatives (NWAs) and their associated impacts

- Customers have greater choices to meet their energy needs
- Community stakeholders should have a greater say in how the planning and operating needs of the grid should be met and can present solutions
- As emerging technologies and practices materialize and mature, utilities can choose more non-traditional options to meet reliability needs
- Higher uptake of DERs is resulting in greater variability in the grid while decentralized controls are increasing system complexity
- In response to NWAs and in anticipation of further proliferation, regulation is evolving to foster innovation, efficiency, competition and accountability

Barriers to Non-Wires Alternatives

"A significant shift is taking place in the electric power sector today. Regulators, policy makers, and utilities are beginning to investigate and deploy alternatives to traditional transmission and distribution assets—that is, building power plants and other traditional electric infrastructure as has been done for the past 100 years…However, the growing interest in NWAs has revealed a major gap in current knowledge…"

-Non-Wires Alternatives: Case Studies from Leading U.S. Projects, Smart Electric Power Alliance, Peak Load Management Alliance, and E4TheFuture, November 2018

The 2017 Ontario government directive regarding regional planning includes two key objectives with respect to NWAs:

1. Identify barriers to the implementation of cost-effective NWAs, including but not limited to energy efficiency and DERs
2. Provide options to address any such barriers

NWAs in the First Regional Planning Cycle

- **Energy Efficiency**
  - Peak demand savings from existing and future committed province-wide energy efficiency programs and codes and standards were considered in forecasts, reducing electricity consumption overall and typically deferring capacity needs

- **Local Generation**
  - Contracted distributed generation peak demand contributions were built into the planning forecast
  - Distributors also provided the IESO with information on any behind-the-meter generation that did not have a contract, as the IESO may lack visibility

- **Local Achievable Potential Study**
  - Recommended by a number of IRRPs to determine the potential for NWAs in a local area (e.g., for a particular transformer station service area)
  - Studies are currently underway and aim to use local load segmentation to assess what technologies can technically and economically address needs

Assessing NWA Feasibility in First Cycle

When assessing feasibility, the following was considered:

- If supply capacity, load restoration, and load security needs can **technically be solved** with energy efficiency, demand response, distributed generation or any other NWAs
- The **timing and magnitude** of incremental peak demand savings required and whether there is sufficient lead time to implement cost-effective NWAs
- **Whether and how existing** energy-efficiency programs and generation (both local and provincial, and also demand response) can be leveraged by targeting areas with regional needs
- Potential **implementation hurdles** (such as siting high-density urban areas and lack of experience in implementing NWAs targeted to a local area)

The data needed to assess these factors was not readily available during the first regional planning cycle; local achievable potential studies are being implemented to attempt to collect some of this information in the near term.

Approach to NWA Barriers to Date

Consistent with the objectives of this initiative, the approach can be represented in three stages:

Process for Identifying Barriers to NWAs

- **Reviewed findings and lessons learned** from past initiatives:
  - Brant Local Demand Response Pilot
  - Grid Innovation Fund (formerly the Conservation Fund)
    - Power.House
    - Local Achievable Potential Studies
  - Toronto Hydro Local Demand Management Study
- **Gathered data** through:
  - Regional Planning Review Advisory Group
  - Internal engagement
  - Surveys of regional planning working groups
  - One-on-one conversations with stakeholders
  - Local Advisory Committees
  - Jurisdictional scans
- **Leveraged findings** from the work of the Energy Storage Advisory Group

NWA Barrier Categorization

Thirty-one barriers were identified and organized into eight categories:*

1. State of technology
2. System value
3. Resource markets
4. Process understanding and experience
5. Regulatory
6. Tools & data
7. Hand-off, acquisition, permitting and connection
8. Operationalization

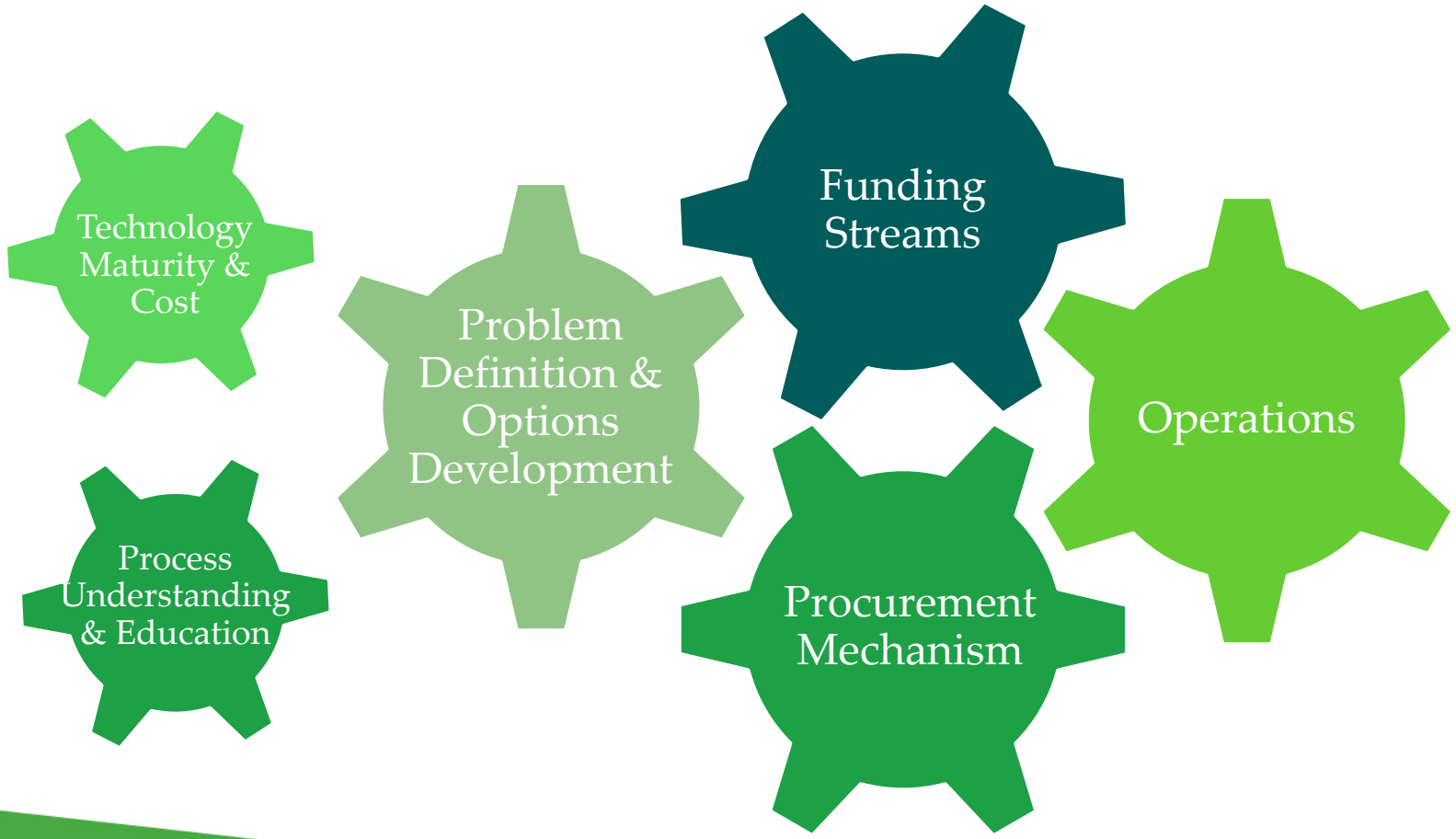
A further distinction was made between:

- **System barriers** that exist in the broader sector (categories 1 through 5)
- **Process barriers** that are part of the regional planning process and associated implementation processes (categories 6, 7 and 8)

*The original full list of barriers and their descriptions can be found in past engagement materials on the Regional Planning Process Review engagement webpage

Themes at a Glance

Barriers identified can be summarized in six interdependent themes:



Problem Definition & Options Development

The need definition in regional planning, typically characterized as the local load-meeting capability on an annual basis, caters to wires solutions, implicitly assuming that the broader system is adequate. A more comprehensive needs definition and options evaluation methodology is required to enable NWAs.

- **Granularity**: Local needs are not captured with sufficient granularity (time, location, customer type) and do not adequately describe the probabilistic nature of capacity/reliability needs
- **Scope**: Broader system capacity, energy, and ancillary services needs are not considered in conjunction with local needs
- **Options evaluation**: There is a lack of formalized methods for evaluating both the technical and economic feasibility of NWAs given their unique characteristics, capability to provide multiple services, and timing challenges (if multiple individual resources are required)

Procurement Mechanism

While there is a clear mechanism for procuring wires solutions, no corresponding mechanism exists for NWAs.

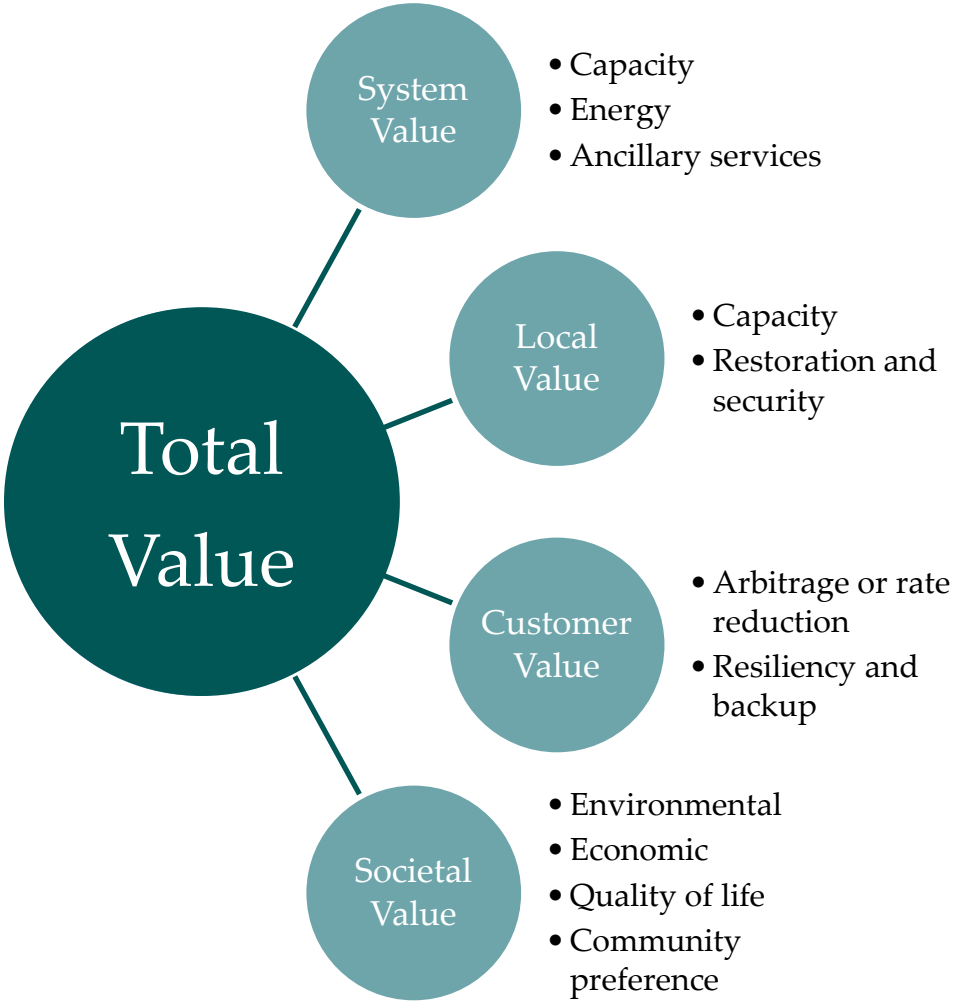
- **Roles and responsibility**: In regional planning, if a recommendation for NWAs is made, there is no clear party responsible for implementing the recommendation
- **Standardized acquisition process**: No standard process exists for procuring NWAs to address a local/regional system need
- **Access to IESO-administered markets**: The minimum size requirement, resource eligibility, and other connection/registration burdens may be prohibitive for NWAs to access IESO-administered markets

Funding Streams

Wires solutions typically have only one single funding stream: regulated rate recovery from transmission/distribution customers. NWAs must often access multiple revenue streams concurrently to be economically viable, including rate recovery, market revenues, and program funding through uplift.

- **Rules/Regulations for Value Stacking**: No process to access multiple value streams or guidelines on when and for what services value stacking is appropriate
- **Timing and Coordination of Ancillary Services**: No transparent market space for ancillary services that NWAs may provide in addition to capacity/energy, resulting in value uncertainty; also, procurement of these services may not align with capacity/energy/local reliability procurement mechanisms for NWAs
- **Cost Sharing & Recovery:** Limited mechanism for having local area beneficiaries (municipalities, customers, or market participants, in addition to LDCs) pay for NWAs and, where there are multiple beneficiaries, there are no guidelines or mechanisms for cost sharing. These is also no process to encourage funding to address local community preferences

Potential Value Streams



Potential Value Streams

NWAs can potentially provide ***system, local, customer,*** and ***societal*** value:

- **System value** is the ability of NWAs to provide services to the bulk system, typically acquired through wholesale markets, including **capacity**, **energy** and **ancillary** services
- **Local value** is the ability of NWAs to address needs in a specific area of the system, including **local capacity needs** and **restoration and security needs**
- **Customer value** is the ability of NWAs to provide services directly to the electricity customers, including **energy arbitrage or rate reduction, and resiliency and backup**
- **Societal value** is the ability of NWAs to provide benefits to the community that are not typically recovered by the ratepayer **(environmental, economic, quality of life,** or **community preference)**

Operations

There is no established procedure governing the process, timing, communications, and controls associated with operating dispatchable NWAs (mainly DERs and demand response) and verifying their performance

- **Local Dispatch Signals**: No trigger mechanism or market signal for NWAs to respond to local reliability constraints
- **Performance Visibility and Accounting**: IESO visibility of distribution-connected NWAs is limited; smaller distributor may not be able to monitor those on its system. Performance verification is required for accounting and to ensure transmission/distribution system needs can be met
- **Transmission-Distribution System Interfaces**: No robust transmission-distribution system interface (including all hardware, software and communication protocols) where NWAs must address both system needs
- **Commitment Timelines**: Long lead time associated with wires infrastructure planning/implementation may make a wires backup to NWAs infeasible if required

Process Understanding and Education

Both potential solution providers and the broader public have gaps in knowledge regarding system needs and regulations pertaining to NWAs

- **Quality, Timing, and Detail of Information from the IRRP Process**: Information from IRRP studies related to needs definition and options development is inconsistent and generally not sufficient for stakeholders to provide input on potential NWAs
- **Communication of Ongoing Work**: Stakeholder knowledge of ongoing initiatives/programs/pilots/work related to energy efficiency and DERs is inconsistent and incomplete
- **Understanding of Existing Regulations, Procurement Processes, and Value Streams**: Both industry stakeholders and the general public are unclear regarding the governance of NWAs within existing regulations and processes, as well as the full range of their potential benefits

Technology Maturity and Cost

The Technology Maturity and Cost theme refers to the barriers resulting from the state of NWAs technologies and their associated costs:

- **Technology Maturity**: Some NWA technologies lack a proven track record for reliable performance, and scalability for mass adoption and commercial deployment
- **Technology Cost**: Some NWAs technologies may not be cost competitive compared to other ancillary service products and wires infrastructure

OBJECTIVES

Scope of Objectives

The barriers identified in the previous section are not limited to IESO processes and span the utilities industry. This section identifies high-level of objectives for addressing these barriers that fall into two categories.

1. Objectives that are **directly related to the regional planning process**
2. Objectives that are **related to implementation processes downstream of regional planning**, such as the procurement, market integration, value stacking and operationalization of NWAs
    - Note that some of these objectives, in part or in whole, may fall outside the purview of the IESO

Regional Planning NWA Objectives

Understanding the Need and Data Gathering

- Quantify, in greater granularity, the temporal, locational, and end-use characteristics of the need
- Standardize methodologies for evaluating needs between regions

Enabling a Fair Comparison

- Develop an evaluation framework to capture, to the extent they can be realized, the full range of NWA benefits to ensure a fair comparison between options

Enabling Market Solutions

- Communicate relevant information in sufficient detail to enable proponents to design and propose solutions

Empowering Local Community Choice

- Build public knowledge to facilitate meaningful dialogue

Implementation Objectives

Standardizing Procurement

- Develop a clear implementation path for NWAs recommendations
- Clarify roles and responsibilities amongst the IESO, transmitters, and distributors for NWAs procurement and implementation

Creating the Framework and Infrastructure for NWAs Solutions

- Enable transmission-distribution system interoperability
- Implement means for visibility and where necessary, control of NWAs to ensure system reliability

Implementation Objectives *(cont'd)*

Streamlining Market Integration & Enabling Value Stacking

- Enable proponents to build business cases for NWAs that are economic with multiple concurrent value streams
- Facilitate monetization of NWA system, local, and customer-level services through competitive processes, to the extent they are technically qualified
  - System value streams should be accessible through wholesale market mechanisms
  - Local value streams should be identified through regional planning and monetized
  - Customer value streams should be established directly between NWA proponents and customers
  - Societal value streams, to the extent they are monetized by other entities, should be considered in the planning process
- Explore interim procurement mechanisms until enduring competitive mechanisms are established

NEAR-TERM ACTIONS

Goal of Near-Term Actions

This section identifies the IESO's near-term actions that:

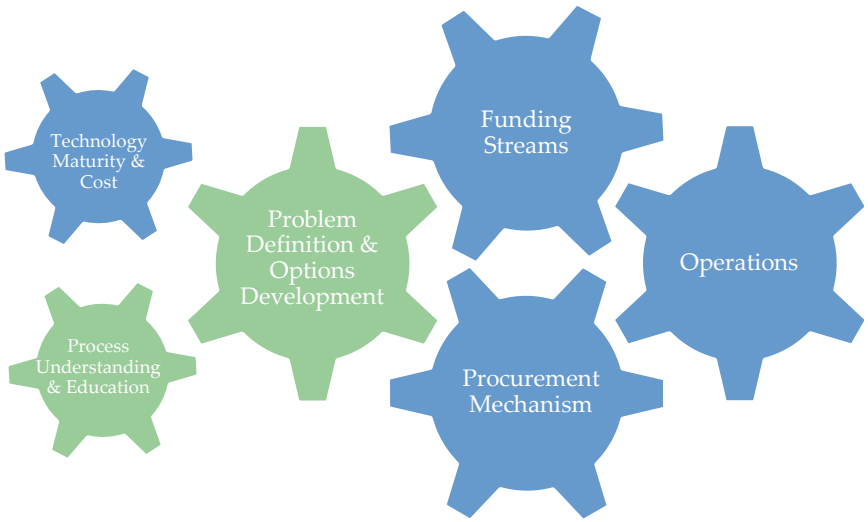
- Address objectives related to regional planning
- Provide a starting point toward achieving the objectives related to processes downstream of regional planning
  - In addition to the IESO, efforts to achieve these objectives must involve regulators, transmitters, distributors, and private proponents

IESO's Near-Term Actions at a Glance

Legend

- Directly related to the Regional Planning Process
- Related to implementation processes downstream of Regional Planning

Themes of NWA Barriers



1. Support Need Characterization
2. Support Option Development
3. Formalize NWA Development/Evaluation
4. Explore NWA Participation in Markets
5. Explore Operationalization Requirements
6. Implement Targeted Energy Efficiency
7. Continue Testing NWA Performance
8. Build Capacity through Grid Innovation Fund Projects

#1: Support Need Characterization

Develop tools and methodologies

Purpose

Provide more comprehensive and detailed data on the nature of the load and any projected growth, including but not limited to capturing the load's temporal granularity beyond annual peak demand, locational distribution, end-use applications, and customer types

Themes Supported

Problem Definition & Options Development

#1: Action Details

- Refine the methodologies used to characterize need
  - Create tools that help model system needs with more granularity than the current status quo, with emphasis on locational and temporal details
  - Specifically, this includes using a more probabilistic approach to defining needs; rather than defining need at a peak hour, consider the timing, duration, frequency, and magnitude of events during which loading exceeds system limits
  - To inform these tools, work with distributors and other local intelligence to a) develop and maintain sector-specific and station-specific load, energy efficiency, and Distributed Energy Resource databases, and b) gather information on changing customer compositions
- Leverage learnings from ongoing local Achievable Potential Studies
- Consider engaging third-party service providers and sector experts during tool and methodology development

#2: Support Option Development

Develop tools and methodologies

Purpose

Expand IESO tools and methodologies to develop, evaluate, and compare non-wires options, enabling a level playing field for both wires and non-wires solutions during regional planning. Options development requires more comprehensive and detailed information on the technical potential and associated benefits of NWAs, and community preferences

Themes Supported

Problem Definition & Options Development

#2: Action Details

- Refine the methodologies for evaluating feasibility of the cost-effective non-wires options
  - Determine the NWAs' technical capability to address the need
  - Work closely with distributors to further explore and quantify distribution system benefits
  - Estimate other system values in addition to the local value
- Leverage the learnings from ongoing Achievable Potential Studies
- Consider the opportunity to engage third-party service providers and sector experts during tool and methodology development

#3: Formalize NWA Development/Evaluation

Streamline stages of regional planning process

Purpose

Clarify the framework under which regional planning considers and evaluates non-wires options to provide additional transparency to all stakeholders and advance general process understanding

Themes Supported

- Problem Definition & Options Development
- Process Understanding & Education

#3: Action Details

- Consider the merits and criteria of a screening mechanism for non-wires options to address needs identified in regional plans
- Determine the information requirements in regional plans to enable providers to formulate non-wires alternatives
- Introduce backstop paths in the regional planning process as non-wires procurement mechanisms continue to evolve
- Accordingly, communicate any process changes to stakeholders and planning participants

#4: Explore NWA Participation in Markets

Innovation and Sector Evolution White Paper Series

Purpose

Further inform market reform to enable mechanisms for non-wires alternatives procurement through transparent and objective information – developing exploratory white papers can help overcome access-to-information barriers that can pose a challenge to participation in electricity markets

Themes Supported

- Procurement Mechanism
- Funding Streams

#4: Action Details

Year of Initiation	White Paper	Scope
2019	Non-Wires Alternative Markets	• Identify market-based approaches to procuring NWAs and to explore how an NWAs market can function in a reliable and efficient manner in concert with the wholesale market • Explore interrelated services and identify stackable services provided by a single resource • Consider how local prices for NWAs could be formed and potentially work as an extension of the IESO administered markets
2019	Distributed Energy Resources: Models for Expanded Participation in Wholesale Markets	• Explore conceptual models for Distributed Energy Resource participation in the IESO-administered markets, and identify material barriers that inhibit the participation of Distributed Energy Resources • Develop high-level options for expanded and/or aggregated Distributed Energy Resource participation and identify an evaluation framework to assess the options
2020	Distributed Energy Resources: Capability to Provide Bulk and Distributed Level Products & Services	

#5: Explore Operationalization Requirements

Purpose

Enhance IESO visibility and control of the transmission-distribution interface to advance the successful implementation of NWAs and ensure local and system needs are met

Themes Supported

Operations

#5: Action Details

- **Leverage learnings from the York Region NWAs Demonstration Project**
  - Use of DERs as an alternative to centralized generation and network infrastructure
  - Coordination between the IESO wholesale market and operations and distribution market and operations, including data exchanges needed
- **Continue work through Grid-LDC Interoperability Standing Committee**
  - Engage on coordination between IESO and LDC-controlled grid resources
  - Increase awareness of upcoming changes at grid and distribution levels to understand impact on operations
  - Evaluate future scenarios for DER development and perform relevant risk assessments*
  - Identify collaboration and data-sharing opportunities through the Grid-LDC Interoperability and Data Sharing Framework

*Risks to essential reliability services, load forecasting and operational planning, voltage and frequency ride-through capability, power flow modelling, market scheduling and coordination, system restoration, protection systems and under frequency load shedding, as well as cybersecurity

#5: Action Details *(cont'd)*

- **Finalize the Transmission-Distribution Interoperability white paper**
  - Define the functions that will need to be fulfilled in a high-DER future in order to provide a reliable and cost-effective supply of electricity
  - Provide clarity on the interfaces between entities, data exchange requirements, and IT and communication technologies needed
  - Consider the merits and drawbacks of potential models for allocating functions to various entities (e.g., the IESO, distributors, aggregators) in a high-DER future
- **Participate in relevant electricity sector working groups**
  - For example, North American Electric Reliability Corporation's System Planning Impact from Distributed Energy Resources working group

#6: Implement Targeted Energy Efficiency

Explore mechanisms

Purpose

Take specific actions to address hurdles to implementing energy efficiency measures to further level the playing field for solutions to be evaluated (whether they be wires, non-wires, or a mixture) and ultimately recommended during regional planning

Themes Supported

- Procurement Mechanism
- Funding Streams

#6: Action Details

- Test approaches for targeting energy efficiency under the Interim Framework to areas with regional needs (e.g., through the LDC Local Program Fund)
- Under a future energy efficiency framework
  - Explore allocating a portion of funding to enable energy efficiency activities where a regional need has been identified
  - Test competitive mechanisms to acquire energy efficiency aligned with peak system demand

#7: Continue Testing NWA Performance

Leverage Green Innovation Fund (GIF)* Projects

Purpose

Implement demonstration projects and programs that help the IESO and non-wires proponents validate technology performance and advance their potential for deployment

Themes Supported

- Technology Maturity and Cost
- Process Understanding and Education

*IESO's Grid Innovation Fund

#7: Action Details

Leverage the following project types eligible under the GIF:

- **Programs**: testing of concepts and programs in real-world environments, involving suitable partners and a measurement and verification component to determine cost-effectiveness
  - For example, NRStor's Local Distributed Energy Resource Integration and Rental Program Pilot, which will demonstrate a rental model for deploying behind-the-meter energy storage in an electrically-constrained urban neighbourhood
- **Emerging technology demonstrations**: testing of near-commercial technologies in real-world, appropriate operational environments, involving a measurement and verification component to determine cost-effectiveness and electricity savings potential
  - For example, Alectra's Residential Solar Storage Pilot (POWER.HOUSE), which demonstrated the technical potential of aggregated solar and storage to provide various services to customers, the local grid, and the bulk energy system

#8: Build Capacity through GIF Projects

Purpose

Support projects focused on research, tools, training, community practice, and information-sharing to help the IESO and the broader electricity sector gain familiarity with and an understanding of NWAs – these endeavours will continue to help close the knowledge gaps among solution providers and other stakeholders

Themes Supported

Process Understanding & Education

#8: Action Details

Leverage the following project types eligible under the GIF:

- **Tools**: new tools or approaches to establish feasibility and broader potential
  - For example, various distributor-led local Achievable Potential Studies, which assess the feasibility and costs of using NWAs to defer or negate the need for transmission or distribution system infrastructure and inform future IRRPs
- **Training programs**: pilots designed to close a skills gap
- **Community of practice**: self-sustaining network designed to facilitate information sharing and best practices to target groups
- **Strategic research**: studies investigating projects or program concepts, or adoption barriers and mitigation strategies for innovative energy solutions
  - For example, Toronto Hydro's Local Demand Management Pilot Study, which developed activation protocols and modelled avoided generation, transmission, and distribution costs through local demand response capability

Barriers to Non-Wires: Next Steps

- These near-term actions will help meet all regional planning related objectives in the previous section
- While they do not fully address all non-regional planning related objectives, they are a starting point for advancing the procurement mechanisms, funding streams, and operationalization of NWAs
- The IESO will continue to influence barriers outside of its direct purview through active participation in OEB initiatives, including:
  - Utility remuneration
  - Responding to DERs
  - DER connections review
  - Other future initiatives and consultations

CONCLUSION

Stakeholder Feedback

- Stakeholder feedback is requested on the recommendations identified for the three primary areas for improvement
- Recommendations for improvements to process efficiency and flexibility:
  - Are there any gaps or deficiencies in the regional planning process that these recommendations do not address?
  - Will the recommendations identified achieve the objectives of streamlining the regional planning process and improving coordination with other, related planning processes?
- Recommendations to develop a long-term approach to replacing transmission assets at end of life:
  - Will the recommendations identified achieve the objectives of establishing a coordinated, cost-effective, long-term approach to replacing transmission assets at end-of-life?
  - Will the recommendations identified provide the necessary asset replacement information for consideration in the bulk and regional transmission planning processes?
- Recommendations to identify barriers to the implementation of cost-effective non-wires alternatives and options to address barriers:
  - Will the recommendations identified adequately address barriers to consideration of cost-effective non-wires alternatives within the scope of regional planning activities that the IESO is responsible for?
  - With respect to the recommendations identified outside of regional planning that the IESO is not solely responsible for, do the recommendations provide a good starting point to address barriers to implementing non-wires alternatives?

Stakeholder Engagement *(cont'd)*

- The IESO is requesting feedback on the recommendations and actions in the Straw Man Design to develop the Regional Planning Process Review Final Report.
- Please provide feedback to engagement@ieso.ca by March 27, 2020 using the feedback form on the engagement webpage.
- A broader public webinar will also be held in Q1 2020

Engagement and Implementation: Timeline

APPENDIX: LIST OF ACRONYMS

List of Acronyms

DER	Distributed Energy Resource(s)
GIF	Grid Innovation Fund
IESO	Independent Electricity System Operator
IRRP	Integrated Regional Resources Plan
LDC	Local Distribution Company
NWA	Non-Wires Alternative(s)
OEB	Ontario Energy Board
RIP	Regional Infrastructure Plan