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Stakeholder Symposium

Distribution System Operator Capabilities Consultation

June 2025

Overview

- A DSO is an entity with **advanced capabilities to integrate, manage, and optimize DERs** for distribution and wholesale electricity market services. These capabilities and activities are incremental to those currently performed by electricity distributors in Ontario.
- The DSO capabilities consultation aims to **develop a regulatory policy framework** to maximize DER value and opportunities and align implementation with consumer interests and system needs.
- DSO models are defined by **three main design features**:
    1. DSO role in facilitating DER/A participation in the wholesale electricity market.
    2. Distribution activation mechanism, i.e., how DER/A are compensated for activation/curtailment.
    3. Degree to which DSO functions are separated from conventional distributor functions.
- The **current legislative framework in Ontario** allows for various DSO models and DER procurement mechanisms. Some models may require or benefit from legislative amendments.
- Ontario can take **low-regret steps** to support evolving DSO models as DERs increase.
- The OEB is proposing a **3-step graduated approach** that emphasizes need, cost-effectiveness, customer benefit, flexibility, practicality, and adaptability.

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Consultation Purpose

Objectives – Developing a DSO capabilities regulatory policy framework that can:

- Maximize value and opportunities of DERs.
- Align implementation with consumer interests and system needs.

Outputs – Providing policy guidance on:

- Any legislative and regulatory changes that may be required or beneficial.
- Expectations of distributor with regards to different activities.
- Criteria for reviewing distributors' investment proposals.
- Updates to participants' rules of conduct and requirements.
- Implications of introducing DSOs for existing processes and requirements (e.g., regional planning).

Outcomes – Advancing priorities related to:

- Cost-effective grid modernization.
- Increased confidence in DERs as Non-Wires Solutions (NWSs).
- Encourage DER investment where it provides greatest value.
- Reduction of duplication and inefficiency through a consistent design approach.
- Greater customer choice.

DSO Definition and Drivers

What is a DSO?

An entity with **advanced capabilities to integrate, manage and optimize DERs for distribution and wholesale market services**. DSOs actively manage distribution systems, with sophistication of capabilities evolving as system needs or DER levels increase.

Why Consider DSO Capabilities?

1. Further **Facilitate DERs as NWSs** to better meet system needs.
2. **Increase DER Hosting Capacity** to accommodate more DERs.
3. **Expand DER Compensation Mechanisms** and better reflect full value from DERs.

Background

Government Policy

- 2023 Letter of Direction (LOD) and government reports highlight DER opportunities through DSO development.
- 2024 LOD asked the OEB to explore DER opportunities and assess the regulatory landscape for future utility business models.
- 2025 Integrated Energy Plan (IEP) seeks to define a roadmap for the potential development and implementation of DSO capabilities.

OEB Policy Day

- 2023: Stakeholders asked for clarity on DSOs, emphasizing value, fairness, and consistency.
- 2024: Stakeholders prioritized clear definitions, tailored funding, fair investment pacing, and scalable grid modernization.

Further Research

- Early 2024: OEB examined regulatory considerations for DSO capabilities and commissioned a study on DSO models.
- OEB engaged with industry and the Independent Electricity System Operator (IESO) Transmission-Distribution Coordination Working Group (TDWG).

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DER-Related Initiatives

The DSO Capabilities Consultation will build on recent and ongoing DER-related initiatives.

Setting Requirements for Electricity Distributors

- Framework for Energy Innovation
- Benefit-Cost Analysis Framework
- NWS Guidelines

Facilitating DER Participaction and Integration

- DER Connections Review
- System Capacity Information Map

Incentivizing DER Participation and Integration

- OEB-IESO DER Incentives Study
- Performance Incentive Mechanisms

Understanding DSOs

- OEB-IESO's Joint Targeted Call, OEB's Innovation Sandbox Challenge

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DSO Functions

1 Distribution Network Planning & Development	This includes identifying system needs, forecasting DER penetration, identifying required investments, assessing conventional investments and NWSs, and building out the distribution system according to plans.
2 Distribution Network Operations	This includes operation of the distribution system, including, in more advanced permutations, monitoring of real-time power flows, real-time assessment of DER operating limits, and active management of the distribution system.
3 Distribution Connections Provision	This includes the framework and requirements to offer flexible and firm connections.
4 Distribution Program & Market Development	This includes putting in place the framework, infrastructure and processes for DER/As to participate in programs and distribution-level markets (as applicable).
5 Distribution Procurement & Market Operation	This includes the administration of programs or operation of markets to procure services for the distribution system and enable DER/A participation in the wholesale electricity market (as applicable).

Distinguishing DSO Functions and Ontario Distributors' Roles

DSO capabilities are incremental to those required of today's electricity distributors in Ontario.

How do these functions differ from those performed by electricity distributors in Ontario?

DSO Function	Distribution Network Operator (DNO)	Today's Electricity Distributors	DSO
Distribution Network Planning & Development	Conventional infrastructure	Consider NWSs	Significant NWSs role
Distribution Network Operations	One-way power flow	Integrate DER	Advanced control
Distribution Connections Provision	Firm only	Firm & flexible	Firm & flexible
Distribution Program & Market Development	None	Consider NWSs	Advanced
Distribution Procurement & Market Operation	None	Consider NWSs	Advanced

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DSO Model Design Development

DSO models can be defined using three primary design features.

1 DER/A Participation in the Wholesale Electricity Market

Options include:

- **Dual participation**: no DSO role beyond technical assessments to preserve reliability.
- **Market Facilitator**: DSO facilitates DER/A participation in wholesale market by relaying DER/A offers to IESO.
- **Total DSO**: DSO participates in wholesale market by aggregating DER/A & making offers to IESO.

2 Distribution Activation Mechanism

Options include:

- **Rule-based**: Dynamic operating limits sent to DER.
- **Program-based**: DER/A are compensated using pre-determined approaches or values.
- **Market-based**: DER/A are compensated through local flexibility markets.

3 DNO-DSO Degree of Separation

Options include:

- **No separation**: DSO functions integrated within distributors.
- **Functional separation**: separate departments in one entity.
- **Legal separation**: DSO and conventional functions housed in separate legal entities.
- **Ownership separation**: DSO and distributor do not share a common owner.

Regulatory Considerations – Framework of Analysis

Approach	To identify legislative amendments that may be required to facilitate DSO capability adoption, the OEB: • Reviewed how **novel activities were interpreted** in the past. • **Applied the framework** used to assess activities that distributors can perform under existing legislation to analytical models built from DSO model design features.
Takeaways	• The **permissibility of activities** that distributors can perform depends on **intended purpose.** • The **existing legislative framework provides flexibility** for several DSO models and DER procurement mechanisms, including the use of local flexibility markets. • The implementation of **some DSO models would require or benefit from legislative amendments**. • The need for legislative change **does not preclude** the consideration of a design option in this consultation.

Regulatory Considerations – Summary of Key Findings

Design Feature	Design Option	OEB Staff's View on Permissibility Under the OEB Act
DER/A Wholesale Market Participation Pathway	Dual Participation	No new role for distributor; enabled under current legislative framework (**status quo**).
	Market Facilitator	Permissible distribution activity, provided **facilitation activity is incidental to a primary distribution purpose**. Additional clarity via **legislative change may be beneficial**.
	Total DSO	Requires **legislative change** to enable a distributor to actively participate in wholesale market.
Distributor – DSO Degree of Separation	No Separation	Permissible, but some regulatory tools may be advisable to mitigate risk of potential planning biases on the part of distributors (e.g. standardized cost-benefit analysis).
	Functional Separation	Permissible. Regulatory tools may be advisable (see above).
	Legal Separation	Likely requires **legislative change** and **new licensing regime** for an independent DSO; **Affiliate Relationships Code** applies.
	Ownership Separation	Likely requires **legislative change** and **new licensing regime** for an independent DSO.
Distribution Activation Mechanism	Rule-Based	Permissible distribution activity.
	Program-Based	Permissible distribution activity.
	Market-Based	Permissible distribution activity. Would require market rules, development, review & oversight processes.

External Advice – DNV Energy Insights

Insights

The market-based approach in Europe, while still in its infancy, has not been consistently effective, mainly because of **low customer interest/participation**.

As the distribution system conditions change, **so do the costs and benefits of a DSO**. It is critical to **monitor key system indicators**: (1) the emergence of DSO use cases, (2) the (timely) development of DSO capabilities and functionality, and (3) the design and establishment of reliable, liquid markets (if warranted) for flexibility services.

Setting long-term goals, remaining flexible in the pursuit of those goals, testing strategies within the existing framework, and **investing in low regret activities that support several potential futures** can all balance the duelling needs of DSO development: preparation and patience.

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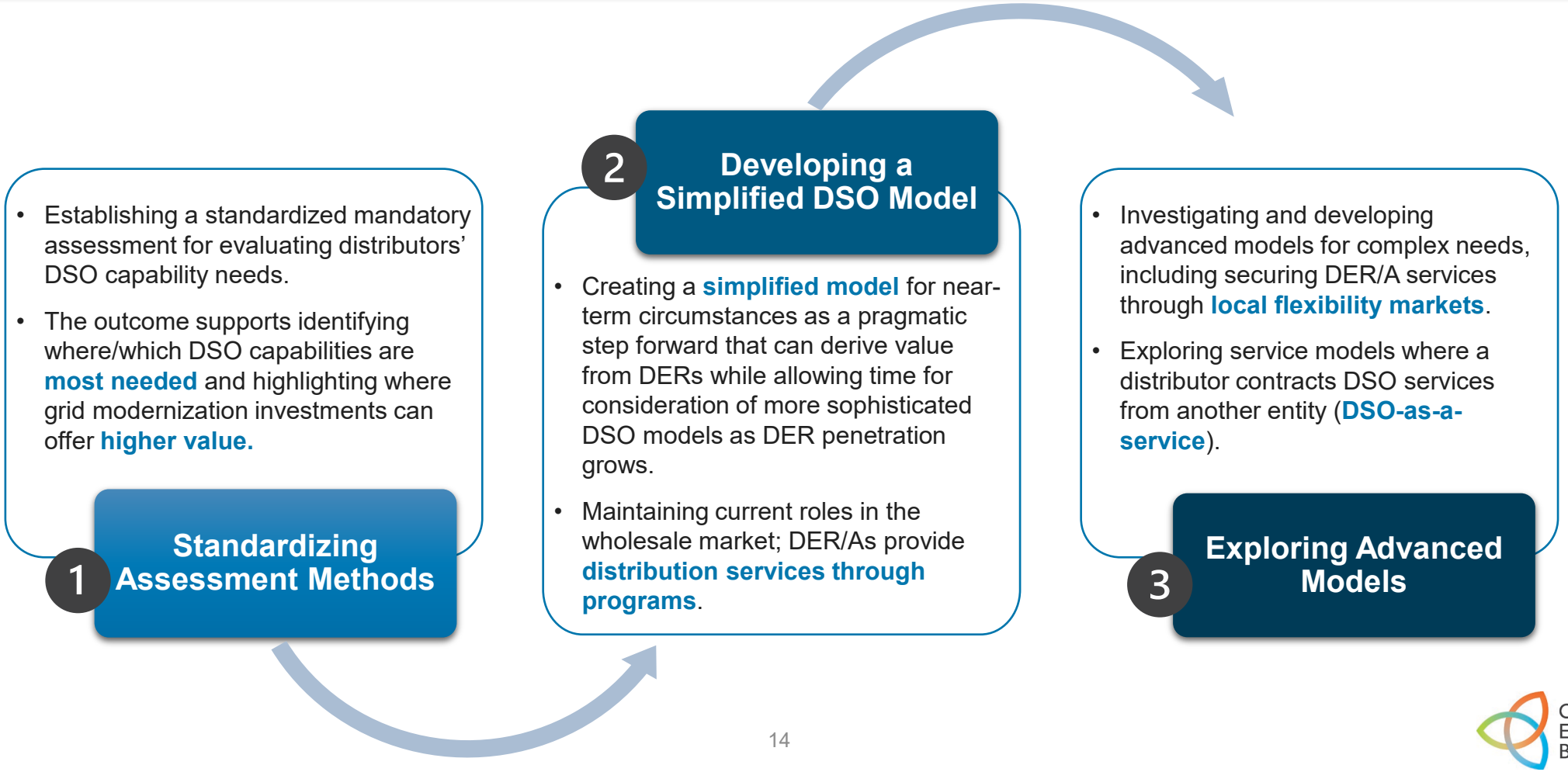
Proposed Graduated Approach to Implementing DSO Capability

Collaborating with stakeholders on a 3-step approach, guided by DNV's insights, emphasizing **need, cost-effectiveness, customer benefit, flexibility, practicality, and adaptability**.



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Discussion Questions

Defining Opportunities and Objectives

- What are your views on the opportunities and policy objectives for DSO capabilities?
- What are your views on the use cases and value of DSO capabilities for Ontario, including the importance of DSO capabilities in capturing more of the benefits DERs can provide?
- How should the OEB's objectives (set out in section 1 of the OEB Act) be balanced and reflected in the development of a DSO policy framework for Ontario?

Evaluating Proposals and Approaches

- Is an evolutionary approach to developing DSO capabilities appropriate for Ontario to pursue in order to achieve the policy objectives set out in the Staff Discussion Paper?
- What are your views on each of the three proposals presented in the Staff Discussion Paper?

Balancing Standardization and Flexibility

- How should the OEB best balance the benefits of a standard approach relative to the innovation and insights that could be gleaned from enabling greater flexibility and diversity through experimentation?