Discussion Paper

Policy Case: Recommendations for an Ontario Load-Serving Entity Model

Prepared for:

Ontario Energy Association

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EXECUTIVE SUMMARY

The Ontario Energy Association (OEA), recognizing the changing role of Ontario's Local Distribution Companies (LDCs) and the challenges for power system planning and resource procurement, engaged Power Advisory LLC (Power Advisory) and Aird & Berlis LLP (A&B) to develop this discussion paper to explore the policy case for an Ontario Load-Serving Entity (LSE) model. Power Advisory and A&B worked together with OEA staff and members of an OEA Steering Committee to review:

- Core functions of LSEs;
- Potential options for Ontario LSEs considering Ontario's unique characteristics;
- Benefits and risks associated with LDCs assuming functions of an LSE, and,
- Options for implementation.

This paper is, therefore, presented as a discussion document with the goal of engaging a wider audience with respect to the role that LSEs could provide in Ontario's electricity market.

At the most basic level, an LSE is an entity that is responsible for securing electricity resources to meet the supply needs of the customers it serves. In other words, it ensures that the reliability and resource adequacy requirements of its customers are met through acquiring generation or other resources, such as conservation and demand management (CDM), distributed energy resources (DERs), etc. While a wide range of potential models were considered with the OEA staff and the OEA Steering Committee, Power Advisory and A&B have proposed the following framework:

> Ontario LDCs, meeting Ontario Energy Board's (OEB's) eligibility requirements established by an LSE Code, will have the option to voluntarily apply for an LSE Licence, and will assume the obligation to serve their load customers through planning and procurement of incremental supply resources.

Considering the above, the proposed Ontario LSE model has the following characteristics:

1) Voluntary – Ontario LDCs will have the option to take on new responsibilities of an LSE in addition to their existing obligations as electricity distributors;
2) LSE Code/LSE Licence – the OEB establishes a new LSE Code to define obligations, roles, and responsibilities of LDCs who choose to take on responsibilities of LSEs and establishes a new LSE Licence;
3) Incremental Supply – LDCs who choose to transition to LSEs, must work with the Independent Electricity System Operator (IESO) to develop Integrated Resource Plans (IRPs) that will identify incremental resource needs for their respective service territories; and,

4) Competitive Procurement – LSEs will develop procurement plans, in accordance with the LSE Code, to competitively secure incremental resources as identified by respective IRPs.

LDCs choosing to take on the new role of an LSE will therefore need to make changes to their organization and structure. These changes will include increasing power system planning requirements, developing procurement plans, implementing procurements and managing contracts. These new responsibilities will require an increase in regulatory, planning, procurement, legal, and risk management functions within the currently structured LDCs.

There will be a number of benefits to Ontario's electricity customers should LDCs adopt new functions of an LSE. These benefits are primarily driven through efficiencies with respect to planning and resource procurements. The model proposed will also improve regulatory oversight, with the OEB playing a key role in the review and approval of IRPs and procurement plans. Therefore, needs and costs to Ontario's electricity customers will impact decisions made by the OEB regarding LSEs' IRPs and procurement plans.

As demonstrated in this paper, it is logical that an LSE will be the most equipped to perform integrated planning that balances multiple objectives, from customer preferences to resource adequacy. This integrated framework ties together distribution planning and resource planning, and therefore leads to more efficient outcomes and cost savings.

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A&B	Aird & Berlis LLP
AESO	Alberta Electricity System Operator
ARC	Affiliate Relationship Code
CAISO	California ISO
CDM	Conservation and Demand Management
CPUC	California Public Utilties Commission
DER	Distributed Energy Resource
DR	Demand-Response
DSC	Distribution System Code
DSO	Distribution System Operator
DSP	Distribution System Plan
EDA	Electricity Distributors Association
EDC	Electric Distribution Company
ERCOT	Electric Reliability Council of Texas
FCM	Forward Capacity Market
FINO	Fully Integrated Network Orchestrator
GA	Global Adjustment
GTA	Greater Toronto Area
HOEP	Hourly Ontario Electricity Price
IAM	IESO-Administered Markets
ICA	Incremental Capacity Auction
ICAP	Installed Capacity
IESO	Independent Electricity System Operator
IO	Infrastructure Ontario
IPP	Independent Power Producer
IRP	Integrated Resource Plan
IRRP	Integrated Regional Resource Plan
ISO	Independent System Operator
ISO-NE	ISO-New England
LDC	Local Distribution Company
LMP	Locational Marginal Price
LSE	Load-Serving Entity
LTEP	Long-Term Energy Plan

MISO	Midcontinent ISO
MRP	Market Renewal Program
MW	Megawatt
NERC	North American Electric Reliability Corporation
NJBPU	New Jersey Board of Public Utilities
NPCC	Northeast Power Coordinating Council
NYISO	New York ISO
OEA	Ontario Energy Assocation
OEB	Ontario Energy Board
OEFC	Ontario Electricity Financial Corporation
OPA	Ontario Power Authority
OPG	Ontario Power Generation
OPO	Ontario Planning Outlook
PJM	Pennsylvania-New Jersey-Maryland Interconnection
RFP	Request for Proposals
RPM	Reliability Pricing Model
RPP	Regulated Price Plan
RPS	Renewable Portflio Standard
RTO	Regional Transmission Organization
SPP	Southwest Power Pool
SSS	Standard Supply Service
SW GTA	South West GTA
TOU	Time-of-Use
TS	Transformer Station

1. INTRODUCTION

The business of electricity distribution is evolving as customers adopt new technologies and become more active in managing their electricity usage. Ontario's Local Distribution Companies (LDCs) are adapting to these new conditions. They are taking on new responsibilities with respect to connection, planning, and management of distributed energy resources (DERs), such as solar generation, energy storage, combined heat and power generation, and electric vehicles. In addition, many LDCs have diversified with new business models and affiliate relationships.

The adoption of DERs and changing consumer behavior also marks challenges for Ontario's Independent Electricity System Operator (IESO). The IESO is the organization responsible for the administration of Ontario's wholesale electricity market, ensuring the reliability of the bulk power system, power system planning (e.g., Ontario Planning Outlook (OPO), Integrated Regional Resource Plans (IRRPs)), and procurement of resources, amongst other activities. Increasing DER uptake means greater variation with respect to demand forecasting and adds complexity that needs to be accommodated by power system planners and operators. In Ontario's current framework, the IESO carries responsibility for meeting Ontario's resource adequacy requirements, and effectively, acts as the de facto Load-Serving Entity (LSE) for Ontario.

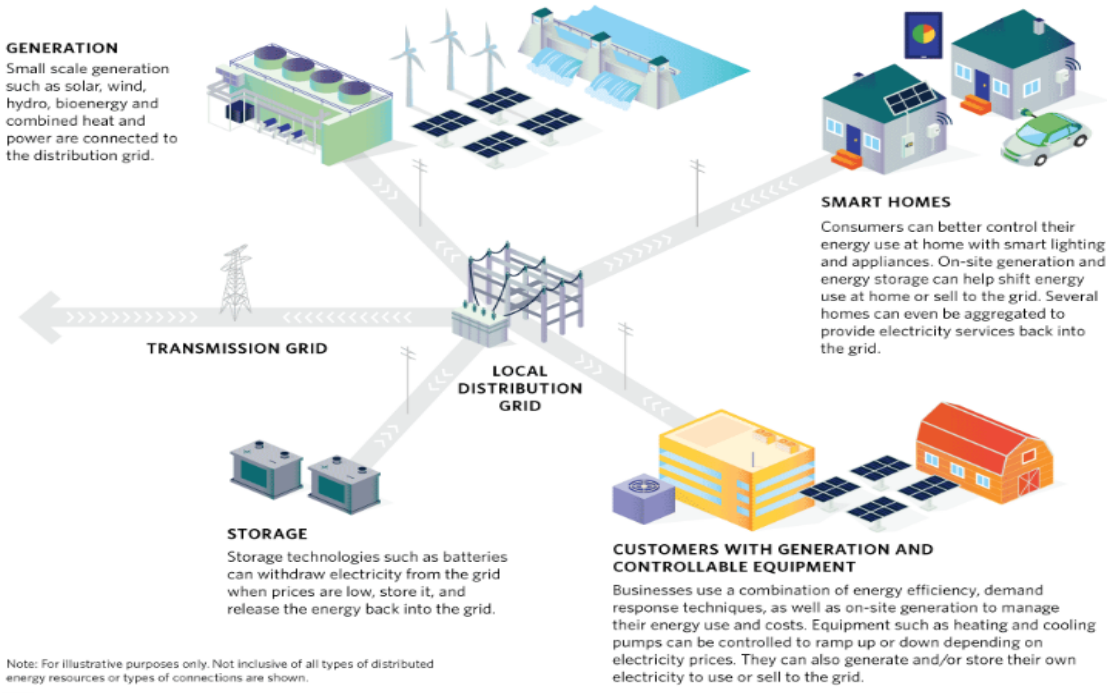


Figure 1. Evolution of distribution grid (Source: IESO)

The OEA, recognizing both the changing role of Ontario's LDCs and the challenges for power system planning and resource procurements, engaged Power Advisory and A&B to develop this discussion paper to explore the policy case for an Ontario LSE model. While LSEs are common within other wholesale electricity markets, the OEA has rightly recognized that an LSE model must reflect the unique characteristics of Ontario's 'hybrid' electricity market, considering the existing fleet of rate-regulated and contracted assets, structure of LDCs, along with planned wholesale market changes defined by the IESO's Market Renewal Program (MRP).

What is an LSE?

At the most basic level, an LSE is an entity that is responsible for securing electricity resources to meet the needs of the customers it serves. In other words, it ensures that the reliability and resource adequacy requirements of its customers are met through acquiring generation or other resources, such as conservation demand management (CDM), DERs, etc. Every jurisdiction has rules with respect to how LSEs acquire resources; for example, some LSEs are permitted to own generation assets for the purpose of meeting resource adequacy requirements, while others have been mandated to divest all generation resources and must competitively procure supply via contracts.

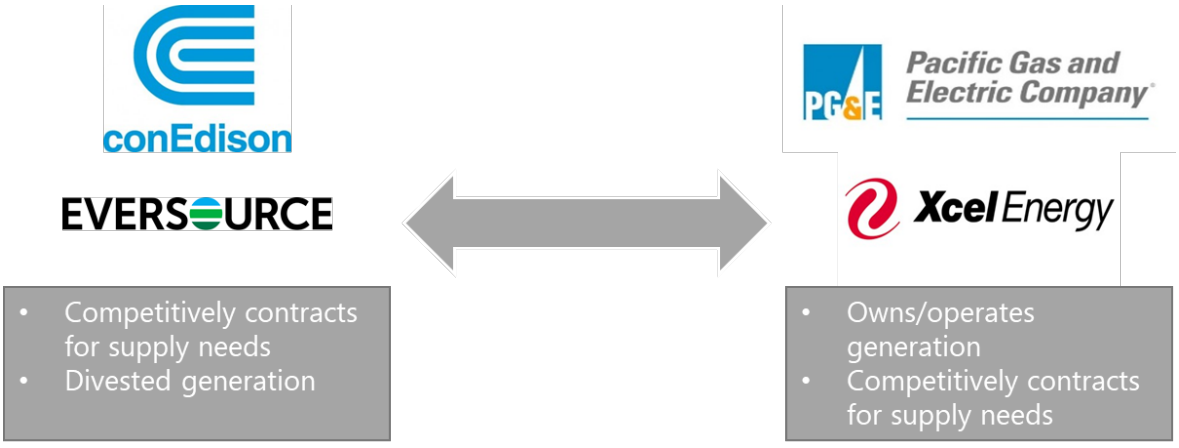


Figure 2. Range of LSE functions from other jurisdictions

The obligation to serve load is typically in addition to other responsibilities of LSEs. Like Ontario's LDCs, LSEs are distributors of electricity and carry out traditional services of connecting and billing customers, as well as maintaining distribution networks. With increasing adoption of DERs within their service territories, LDCs are also evolving by taking on new responsibilities as Distribution

System Operators (DSOs), also known as a Fully Integrated Network Orchestrators (FINOs). The Electricity Distributors Association (EDA) has recently outlined its vision, *The Power to Connect: A Roadmap to a Brighter Ontario*, for the evolution of LDCs to FINOs recognizing the benefits of enabling customer DERs, integrating DERs, and controlling and operating DERs.

LSEs are different from FINOs. While a FINO may own DERs and may play a much greater role enabling and efficiently operating DERs, a FINO does not have an obligation to maintain resource adequacy and ensuing reliability of electricity supply. Furthermore, an LSE may procure resources that are connected at the transmission system level. That said, the functions of a FINO are complementary with LSEs regarding increased planning requirements, procurements, and contract management.

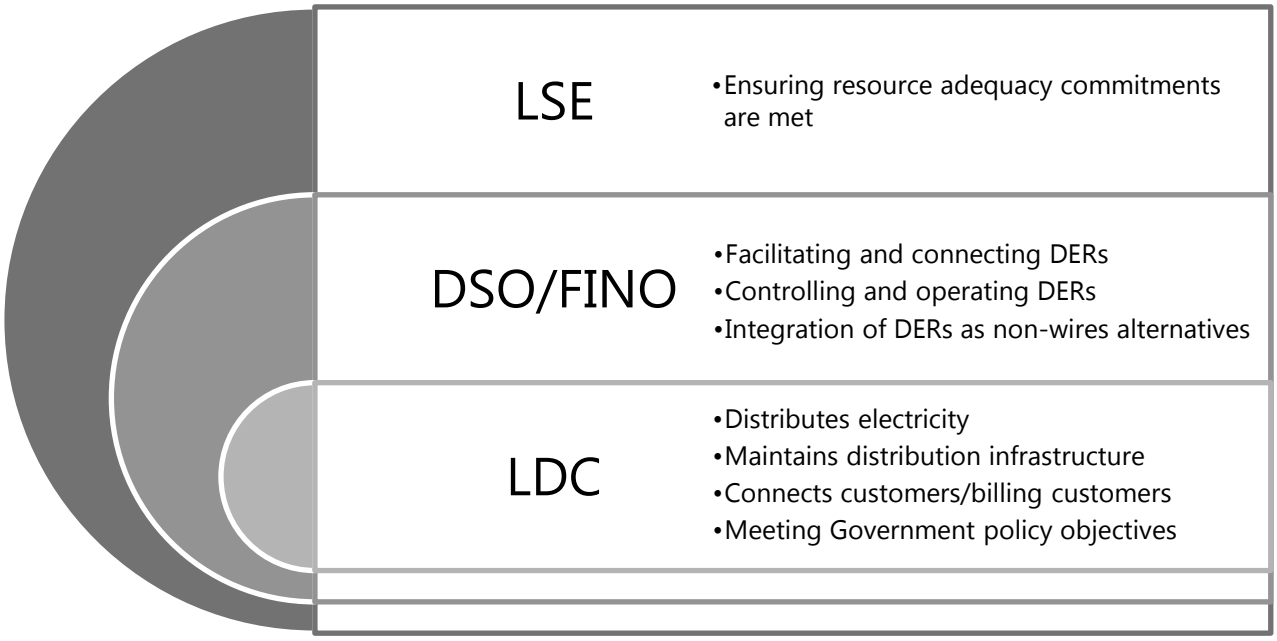


Figure 3. Roles and Responsibilities of LDCs, DSOs/FINOs, and LSEs

For reference, a summary of a jurisdictional review is contained in **Appendix A** of this paper. This summary compares different approaches LSEs use to secure[1] resource adequacy requirements.

Why does Ontario not have LSEs?

Prior to restructuring Ontario's electricity sector in the late 1990s, the vertically integrated Ontario Hydro monopoly had the obligation to serve Ontario's electricity customers. With the break-up of Ontario Hydro, the wholesale and retail markets were opened in May 2002 without any entities having specific and direct obligations to serve customers. As recommended by the Ontario's Government's Market Design Committee (MDC), and endorsed by stakeholder members of the MDC, market signals (e.g., wholesale prices) and retail choice were theorized to ensure customers would be served by the market itself. Market price signals were supposed to provide generators, retailers, and other resource providers, such as demand-response (DR), with incentives to support investments through maintenance of existing facilities and development of new projects.

Within that framework, the Ontario Energy Board's (OEB's) Standard Supply Service (SSS) Code established electricity commodity rates for applicable customers:

- 'Spot price pass-through' (or fixed price with regular true-up) methodology used, directly subjected customers to wholesale energy prices; and,
- Spot price pass-through avoided the need for LDCs to have any electricity supply obligations.

At that time, there were over 300 LDCs in Ontario, each with varying capabilities. Requiring these LDCs to assemble electricity supply portfolios or to develop procurement capabilities and mechanisms would have been a major challenge. The exposure to wholesale energy prices in part drove retail choice decisions (e.g., 35% switch rate to retail contracts from spot price pass-through default supply rates, during first six months from May 2002 market opening).

The volatile and high wholesale prices prompted the Ontario Government to freeze default supply rates in November 2002, shaking the confidence of the new market which was already struggling to attract new supply investment and needed project development. Tight supply conditions, frozen default supply rates which resulted in lessening of retail competition, and no entities with the obligation to serve customers, exacerbated Ontario's resource adequacy and reliability problems. For example, Ontario was at times importing up to 4,000 MW during the summers of 2002 to 2007.

[1] Throughout this paper "procure" and "secure" are synonymous regarding LSEs contracting for resources to meet the resource adequacy needs of their customers

Since the wholesale and retail markets did not ensure resource adequacy, the Ontario Government began to contract for needed generation from 2003 to 2005 through Ministry of Energy Request for Proposals (RFPs). The Ontario Power Authority (OPA), was established in 2004 and then operational in 2005 to produce power system plans and procure resources to ensure Ontario's resource adequacy by way of executing and managing contracts for resources. Therefore, OPA acted as Ontario's de facto LSE.

In 2016, Bill 135 shifted greater electricity planning authority and decision-making to the Ontario Government along with broader Ministerial Directive authorities over the IESO and the OEB regarding procurement initiatives. Today, the Ontario Government and the IESO plan Ontario's electricity system and make procurement decisions to meet resource adequacy needs and LDCs largely remain 'poles and wires' companies. The IESO has become Ontario's de facto LSE following the merger of the IESO and the OPA.

No other North American Independent System Operator (ISO) or Regional Transmission Organization (RTO)[2] has such a broad planning and procurement mandate as the IESO.

1.1 Need for an Ontario LSE Model

There are two underlying reasons for considering the implementation of an Ontario LSE model in Ontario. First, LSEs will help to address the evolution of electricity distribution and related implications for electricity customers. Second, the modification of planning and procurement roles delivers more opportunities for the development of integrated, cost-effective, and customer-focused solutions.

Ontario's LDCs are responding to changes with respect to increased customer participation in the electricity system through demand management and self supply, which has led to greater customer choices to manage their own needs and costs. LDCs must manage these dynamics while making decisions with respect to distribution system investments within the presently defined regulatory framework. With increased technological advancements and lowering costs for customer participation, these challenges will persist within the evolving regulatory framework.

The evolution of the electricity system means that LDCs require more tools to adapt. An option to transition to an LSE-model will provide LDCs with more options to address specific needs of their local distribution systems and respond to their customers' preferences, while helping to meet

[2] The other North American ISOs/RTOs are: Alberta Electricity System Operator (AESO); ISO-New England (ISO-NE); New York ISO (NYISO); PJM (i.e., 13 states plus District of Columbia); Midcontinent ISO (MISO); ERCOT (i.e., Texas); Southwest Power Pool (SPP); and California ISO (CAISO).

the needs of Ontario's bulk power system. An LSE could effectively integrate investment decisions by considering multiple needs in parallel, including:

- Obligations to procure incremental resources to meet supply needs of their customers;
- Needed investments in distribution resources; and,
- Customer needs and preferences.

Since an LSE will have more optionality to provide integrated solutions, it will be better equipped to adapt to the changing demands of electricity distribution, such as increased adoption of DERs. Investment decisions within this context would be optimized and would provide cost savings to electricity customers relative to today's framework.

The introduction of LSEs within Ontario will modify roles and responsibilities pertaining to power system planning and procurement of incremental resources. An LSE should have a greater role in working with the IESO to develop Integrated Resource Plans (IRPs) that meets the needs of customers within their service territory and more effectively aligns with their Distribution System Plans (DSPs) submitted to the OEB through rate applications. Likewise, an LSE should be able to competitively secure resources through contracts from third-party providers towards meeting incremental supply needs. This framework will improve decision-making and regulatory oversight with respect to the selection and development of resources.

Therefore, by way of developing integrated solutions for meeting multiple needs, an LSE will be able to provide cost savings to customers relative to Ontario's current procurement and planning framework.

An Ontario LSE model will need to be developed within the context of the evolving Ontario wholesale electricity market (e.g., IESO's MRP) and be adaptable to potential future changes in the regulatory framework that might result from the Ontario Government's OEB Modernization Review Panel or the OEB's Advisory Committee on Innovation. Any procurement process that is run by an LSE must be coordinated with the IESO's planned Incremental Capacity Auctions (ICAs) to ensure that resources are not double-counted or over-procured.

Case study:

Former decisions to not proceed with a relatively cost-effective transmission solution to address reliability issues in southwest Greater Toronto Area (SW GTA) resulted in OPA contracts for gas-fired generation projects located in Mississauga and Oakville. Due to community opposition of these projects they were subsequently cancelled and re-located to areas within Ontario not experiencing reliability issues. However, SW GTA reliability issues persist and still need to be addressed. Per the 2017 Long-Term Energy Plan (LTEP), a transmission solution is now once again identified to meet specific reliability needs.

It is clear from this example that the current planning and procurement framework has resulted in significant cost increases to Ontario's electricity customers. Arguably, an LSE with obligations to ensure incremental supply to customers in SW GTA, with relative closeness and familiarity with these customers, may have been able to identify and respond to multiple needs of their service territory by providing a cost effective and integrated solution with appropriate cost allocation.

1.2 Benefits of an Ontario LSE Model

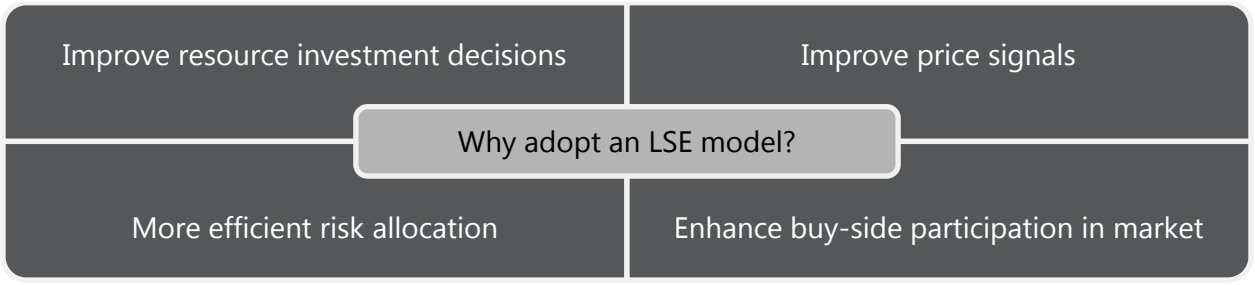


Figure 4. Benefits of an LSE Model

1.2.1 Improved Resource Investment Decisions

An LSE model will improve planning by more closely integrating DSPs and other LDC plans through integrated planning for reliability and resource adequacy, distribution system needs, and customer preferences. A stronger alignment of these planning functions will enable more efficient decision-making regarding resource mix by meeting multiple objectives and provides LSEs with flexibility to procure resources. Ultimately, the goal of such integrated planning will be to identify synergies between plans leading to cost reductions that will be passed through to customers.

Figure 5. Power System Planning Considerations

This approach will allow the Ontario Government to set policy objectives, while leaving appropriate planning and procurement decisions with LSEs, with regulatory oversight from the OEB.

An LSE model will also increase regulatory oversight regarding planning and resource procurements. Increasing rigor of regulatory review in this respect will ensure improved resource investment decision-making, reasonable costs to customers and cost effectiveness, while lessening need for Ontario Government to direct resource procurements.

1.2.2 Improved Price Signals

As LSEs will have obligations to supply their customers, wholesale electricity market prices should provide pricing benchmarks to value resources to be procured. This aligns well with the IESO's MRP which is proposing to enhance Ontario's wholesale market through planned implementation of new mechanisms such as Locational Marginal Prices (LMPs) for energy and ICAs (which are planned to have locational design elements through defined provincial capacity zones). LSEs will be able to base resource procurement decisions in part on wholesale energy and capacity prices, which will then flow through to customer rates.

Therefore, price signals to customers will remain within the LSE's service territory and will be more efficient, resulting in prudent use of CDM, deployment of DERs and other mechanisms. Revisions to default supply rate-setting, could decrease Global Adjustment (GA) and other charges.

1.2.3 More Efficient Risk Allocation

The present planning and procurement framework results in customers bearing most, if not all, of the risks. An effective LSE planning and procurement framework should result in more appropriate risk allocation between third-party resource providers, LSEs, and customers. By more appropriately allocating risk to those who can implement risk mitigation measures, an LSE model will help to ensure that efficiencies and cost reductions are realized.

Many system costs, such as generation, are socialized across the province. An LSE could reduce cost socialization, therefore reducing cross-subsidization and aligning with principles of good rate design supported by cost causality. For example, when the OEB started its rate design process, Bonbright principles[3] were highlighted as attributes of sound rate structure:

- Full cost recovery for distributors including a return on equity with appropriate risk premium;
- Fairness including cost causality, simplicity and lack of controversy; and,
- Efficiency to encourage maximum use and rational growth of the system.

1.2.4 Enhanced Buy-Side Participation

Finally, an LSE can help the IESO meet the objectives of the MRP through increased competition by developing the 'buy-side' of the market. All U.S. wholesale electricity markets are underpinned by LSE buy-side participation, which helps generators and other suppliers manage investment risks. In these markets, LSEs are essential buy-side counterparties to bilateral contracts. In addition to bilateral contract markets, Ontario LSEs over time should actively and directly participate within Ontario's wholesale electricity market.

1.3 Overview of Ontario LSE Model

While there are clear benefits for enabling LSEs, an Ontario LSE model must take into consideration the specific nature of Ontario's 'hybrid' electricity market. The remainder of this paper outlines specific recommendations with respect to a proposed Ontario LSE model, which carefully considers Ontario's organization and structure, existing statutory framework, and resource needs.

[3] See p. 5 of 2014 OEB Staff Report on Rate Design: https://www.oeb.ca/oeb/_Documents/EB-2012-0410/EB-2012-0410%20Draft%20Report%20of%20the%20Board_Rate%20Design.pdf

Figure 6. LSE Responsibilities for Incremental Resources Adequacy

It is an ideal time to consider an Ontario LSE model, given that the clear majority of Ontario's electricity needs are being met by contracted and rate regulated assets, which provide supply well into the future. The security of resources means that Ontario's LSEs need only to be responsible for incremental supply needs on a go-forward basis, thereby enabling a stable transition period.

2. ONTARIO LSE MODEL RECOMMENDATIONS

Power Advisory and A&B consulted with OEA's staff and Steering Committee in preparing recommendations for a proposed Ontario LSE model. Many factors were considered in the development of the proposed model, which reflect the unique characteristics of Ontario's electricity framework and market structure. Power Advisory and A&B also considered the capabilities and ownership structure of LDCs and endeavored to develop an approach that is both practical and implementable.

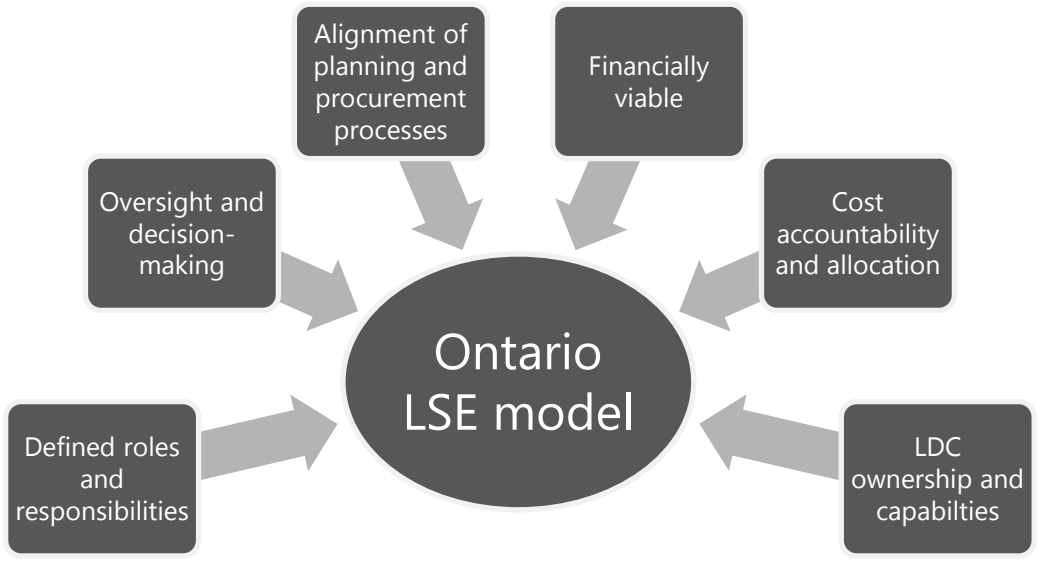


Figure 7. Considerations for Ontario LSE Model

2.1 Ontario LSE Model Characteristics

2.1.1 LSE Definition

The U.S. Department of Energy's Energy Information Administration references the North American Electric Reliability Corporation (NERC) definition for an LSE as an entity that "secures energy and transmission service (and related Interconnect Operations Services) to serve the electrical demand and energy requirements of its end-use customers." By "securing energy" the LSE ensures capacity and energy supply for its customers. This includes supply from generation, CDM, DERs, etc. An LSE is also responsible to "secure transmission service" which ensures supply can be delivered to its customers.

The authors of this paper recommend that an Ontario LSE model should adopt the NERC's definition of LSEs for Ontario or something very similar. LSEs will maintain existing obligations of LDCs with additional obligations to procure incremental resource needs to ensure supply adequacy and delivery of supply to its customers.

Therefore, in additional to new obligations to secure incremental supply to meet customer needs, LSEs' roles and responsibilities will include core responsibilities of LDCs as they are today, defined through OEB's Distribution System Code (DSC) and elsewhere (e.g., legislation, regulation, etc.), including:

- 'Take' energy from high-voltage transmission lines, 'step-down' energy to a lower voltage, distribute energy to customers (i.e., residential, commercial, industrial);
- Maintaining distribution infrastructure (e.g., lines, feeders, etc.);
- Connecting customers;
- Billing customers; and,
- Meeting Ontario Government policies and objectives.

2.1.2 Ontario LSE Obligations, Roles, Responsibilities

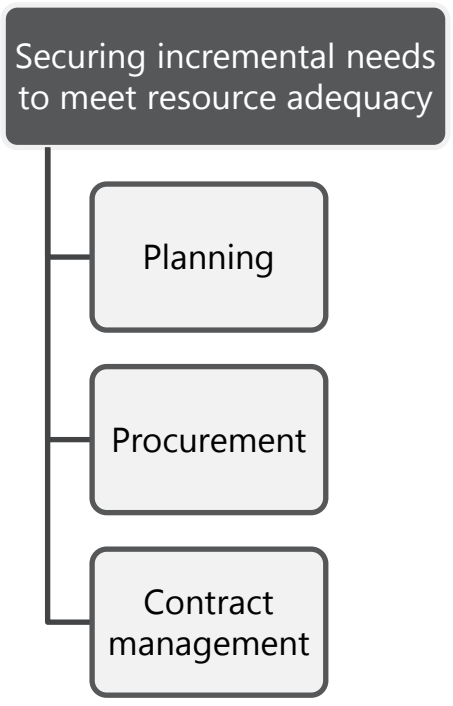


Figure 8. Additional Responsibilities for Meeting Incremental Resource Adequacy

Across other North American jurisdictions, an LSE's responsibility for securing resources can vary significantly from relatively passive to more aggressive roles in that an LSE assembles a portfolio of resources. On the passive side, an LSE procures resources from third-party providers, such as Independent Power Producers (IPPs), CDM, and DER providers, through contracts. On the more aggressive side, in addition to contracting with third-party providers, an LSE may own and operate resources to manage supply obligations, while attempting to prudently manage costs of these portfolios given risks.

Ontario LSEs will have obligations to contract for resources to meet incremental supply needs, and not the full resource portfolio requirements. Ontario's demand/supply balance projects to not require incremental resources to be procured until approximately the mid-2020s. By this time, approximately 2,000 MW will be required, and not all areas in Ontario will require additional supply. Our recommended approach is therefore incremental and prudent. It is also a relatively passive approach and enables

some LDCs to transition to LSEs given their ownership, structure, capabilities, and ability to take on incremental risks.

Further, Ontario LSEs will help to ensure future resource adequacy and reliability are met, especially in specific locations. The approach will be consistent with IESO's MRP.

2.1.3 Establishing LSE Code and LSE Licence

Ontario's LDCs will have the option to voluntarily take on LSE responsibilities by applying to the OEB for an LSE License. The components within the LSE License should relate to, and be driven from, an OEB LSE Code.

Since the relative share of retail marketers has been shrinking in Ontario since opening the retail market in May 2002, permitting retailers to potentially transition to LSEs does not seem to be a prudent and effective option. Likewise, while other jurisdictions, such as California, have worked with specific customers towards successfully amending specific components within LSE definitions resulting in U.S. Federal Energy Regulatory Commission (FERC) approval of these customers becoming their own LSE, similar conditions do not exist in Ontario to consider permitting specific customers to be LSEs. For example, some California customers have shown levels of sophistication and capabilities to consistently meet all of their supply needs themselves.

Therefore, the authors recommend that OEB establish a new LSE Code to define the obligations, roles, and responsibilities of LSEs. An LDC who chooses to transition to an LSE can voluntarily apply to the OEB for an LSE License.

The OEB can develop an LSE Code under Section 70.1 of the *Ontario Energy Board Act* to supplement and amend the OEB's SSS Code and Distribution Service Code (DSC), and develop an LSE Licence in accordance with Section 57(e) of the *Ontario Energy Board Act*. See **Appendix B** for list of statutory changes to enable the creation of LSEs in Ontario, including changes to legislation, OEB Codes, and IESO Market Rules.

An OEB LSE Code and LSE License, will provide necessary and required regulatory oversight, therefore helping to ensure fair and reasonable outcomes relating to, but not limited to, costs to customers, prudent resource investment decisions, and power system resource adequacy and reliability requirements for LSEs' customers and service territories.

Therefore, for OEB's LSE Licence, the following components should be considered.

- Compliance with the *Electricity Act*, *Ontario Energy Board Act*, IESO Market Rules, LSE Code, other laws and regulations
- Obligation to serve customers through competitively procured incremental resource needs from third-party providers

    - Low-volume customers: LSEs will incrementally serve all default rate-regulated customers
    - Large-volume customers: LSEs will incrementally serve all large-volume default customers who must abide by regulated conditions (e.g., notice of termination, credit support, minimum/maximum consumption)
- Potential resource mix
    - Any resource qualifications/requirements could be specified (e.g., renewable portfolio standard (RPS), etc.)
    - Specifying that resources are to be secured contractually, and through competitive means where possible
- Requirement to develop, maintain, file power system plans (e.g., IRPs, DSPs)
    - Leveraging applicable IESO IRRPs, work with the IESO to determine incremental resource requirements specifically for LSEs
    - Plans will specify planned and committed resources, demand forecasts, investment needs, evaluate resource options to meet needs, identify contingencies, etc.
- Coordination and integration with the IESO and the IESO-Administered Markets (IAM) (i.e., Ontario's wholesale electricity market)
    - Coordination with the IESO regarding power system planning, resource procurements, and planned ICAs
    - Any requirements to participate within IAM, including planned ICAs

Likewise, the following components should be considered for inclusion within the OEB's LSE Code.

- Eligibility criteria for LDCs to voluntarily be licensed as LSEs
    - Completion of applicable power system plans in collaboration with the IESO, which specifies incremental resource requirements
    - Submission of procurement processes identifying how LSEs will procure incremental resources to meet obligations, including business plans and revenue requirements
    - Sufficient size/capital resources, or LDCs could work together to form a single 'buying' LSE meeting applicable requirements
    - Minimum credit rating of 'A Stable' from notable credit rating agencies (e.g., DBRS, S&P, etc.)
- Methodology for determining LSE incremental resource requirement obligations
    - Accounting for resources already contracted by the IESO or the Ontario Electricity Financial Corporation (OEFC) and Ontario Power Generation's (OPG's) rate-regulated assets (i.e., LSE resource requirements 'net' of contracted and rate-regulated resources)
- Requirements of power system plans
    - Develop IRPs specific to LSE service territory and requirements
- Procurement and contracting methodologies

- Accepted procurement methodologies (e.g., RFPs, auctions, standard offers, negotiations, etc.), and criteria for determining procurement methodology to be used to contract for resources, and use of competitive methodologies where possible
- Standard form contracts, including key terms and conditions, for example, term lengths and pricing methodologies (where applicable)
- Qualified contract counterparties
- Contract management processes
- Risk management processes (where applicable)

- Cost recovery methodology
  - Approach for rate-basing and rate-setting considering incremental cost of procurement contracts
- Conditions and circumstances where the IESO re-assumes LSE incremental resource requirement obligations

2.1.4 Planning framework

The statutory framework for power system planning and procurement of resources is mainly defined within the *Electricity Act*, as amended by the *Energy Statute Law Amendment Act* (Bill 135) in 2016. Per these requirements, the Ontario Government receives a technical report (i.e., OPO) from the IESO as input to developing the Long-Term Energy Plan (LTEP). Using this information, the Ontario Government will then develop and release an LTEP defining Ontario's energy policy and objectives. The IESO and the OEB are then directed to prepare LTEP Implementation Plans for review and approval by the Minister of Energy. The Ontario Government has further authority to issue Ministerial Directives to the IESO and the OEB to specifically undertake activities, which may include the procurement of generation, CDM, DERs, transmission, etc.

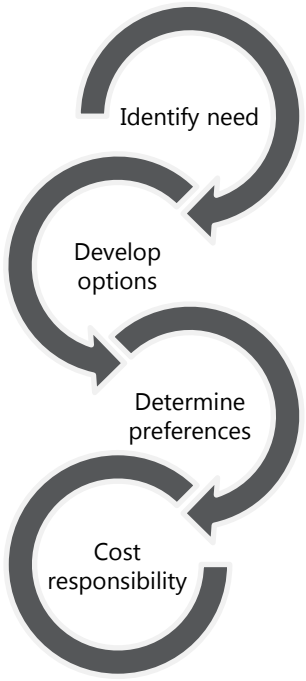


Figure 9. Resource Planning Decisions

Resulting from Ontario's present planning and procurement framework defined within Bill 135, the IESO is essentially Ontario's de facto LSE, as the IESO can procure resources to meet Ontario's resource adequacy and reliability needs to ensure supply for all Ontario's electricity customers. The procurement of generation and CDM resources have typically resulted from Ministerial

Directives to the IESO (and the OPA prior to being merged into IESO) resulting in contracts for resources and other programs. This context is important to consider as we further define roles and responsibilities of an Ontario LSE as it might relate to the Ontario Government, the IESO, and other LDCs.

The IESO's planning obligations and requirements are defined within the *Electricity Act*, along with its reliability obligations on behalf of Ontario as a member of the NERC's Northeast Power Coordinating Council (NPCC). As a result, the IESO has the mandate to maintain the reliability of Ontario's power system. To support the IESO's planning and reliability obligations, the IESO leads and produces the following power system plans:

- IESO's OPO report to meet statutory obligation of providing a technical report to Ontario Government as input to LTEP;
- IRRPs as an OEB license condition; and,
- An 18-Month Outlook, per the requirement in the IESO Market Rules.

Therefore, the IESO's reliability obligations as a member of NPCC along with its obligations under the *Electricity Act*, Market Rules, and OEB license conditions will not change relative to recommendations for an Ontario LSE model.

Any LDC who chooses to take on LSE responsibilities should develop IRPs for their own service territories and must effectively coordinate with applicable IESO power system plans. In other words, the LDC's IRP and DSP must effectively be coordinated and integrated with applicable IESO-led IRRPs, therefore applicable IRPs and IRRPs must define the resource requirements for that LSE. The LSE's service territory will be defined as the existing service territory for that respective LDC, therefore transitioning to an LSE will not change the number of customers or classes of customers.

The authors recommend that LDCs develop IRPs for their service territories and IESO continue developing IRRPs (as IRRPs cover multiple distribution service territories along with areas of Ontario's bulk transmission system). LSEs must work with the IESO to provide required technical data/information needed to be included and factored into respective IRPs and IRRPs, which will be used to determine respective LSE's resource requirements.

Under the current statutory framework, many resources have been contracted for long contract terms – typically 20-years for generation, with a range of under 10-years to approximately 40-years. These contracted resources combined with OPG's rate-regulated hydroelectric and nuclear generation are more than ensuring supply adequacy for Ontario's electricity customers. Therefore, LSEs will only need to procure incremental resources to meet their customers needs because contracted and rate-regulated resources are already providing for majority of electricity

supply to Ontario's customers. Based on the applicable IRPs and IRRPs, LSEs must work with the IESO to define incremental resource needs to be contractually procured by respective LSEs.

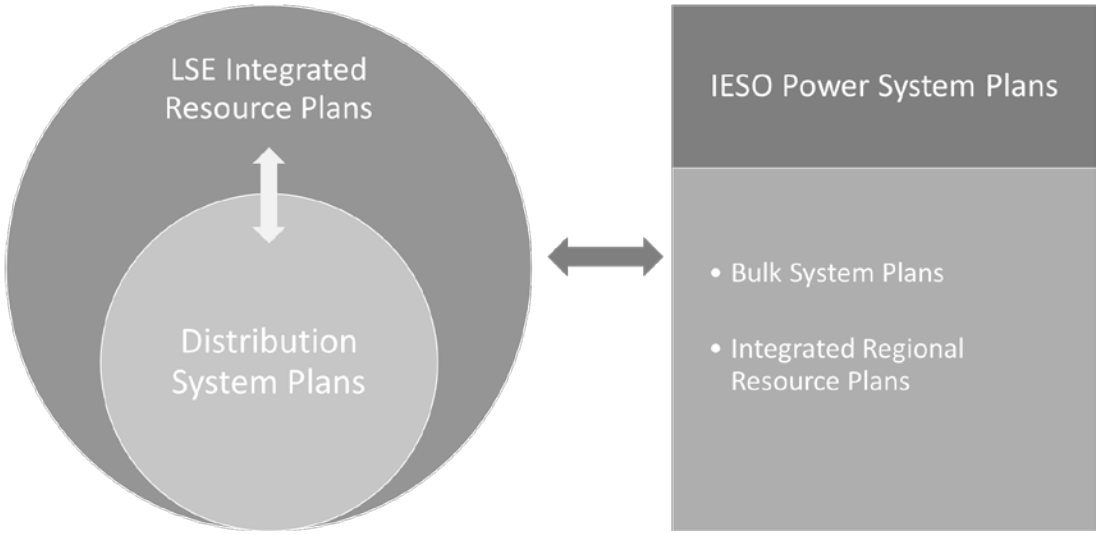


Figure 10. Relationship Between IRP, DSPs, and IESO Power System Planning

The IESO's planned ICAs must be consistent with applicable engineering and economic studies, models, and other inputs used to define 'global' (i.e., all-of-Ontario) and 'local' (i.e., areas or zones within Ontario) resource requirements to be used within ICAs. This will include any potential capacity zones (e.g., GTA, southern Ontario, northern Ontario) within ICAs. Therefore, the authors recommend these studies and models be consistent regarding development of power system plans (i.e., IRPs, IRRPs) and inputs to ICAs, including capacity zones, which will yield clear incremental resource needs to be contractually procured by respective LSEs.

2.1.5 Voluntary Opt-In and Procurement Coordination

The key recommendation regarding the proposed Ontario LSE model is the voluntary option of LDCs transitioning to LSEs, provided LDCs receive LSE Licenses from the OEB.

As LDCs will have the option to voluntarily take on LSE responsibilities, the IESO will then be the supply provider of 'last resort' through planned ICAs. That is, the IESO will procure needed resources for all other Ontario customers not served by respective LSEs. Therefore, applicable LSE procurements for incremental resource requirements should be held prior to respective IESO ICAs, such that the IESO could effectively discount resources that have been contractually procured by

respective LSEs. These resources will not be factored into resource requirements that will need to be procured through applicable ICAs. Therefore, the IESO needs to effectively account for resources that have been contracted (or not) by LSEs, and therefore calibrate the resource adequacy requirements needed to be procured through applicable ICAs, including capacity zone targets.

Many examples exist where procurements made by LSEs towards meeting obligations to supply their customers are integrated within Capacity Markets administered by ISOs, including:

- ISO-NE Forward Capacity Market (FCM);
- NYISO Installed Capacity (ICAP) Market; and,
- PJM Reliability Pricing Model (RPM) (i.e., forward Capacity Market).

In these markets, LSEs procure resources which are integrated within Capacity Markets. This is a fundamental design component since the creation of these Capacity Markets.

2.1.6 Competitive and Financially Back-Stopped Procurements

The authors recommend that the LSE Code and the LSE License require LSEs, to the extent possible, procure resources from third-party providers through competitive mechanisms (e.g., RFPs, auctions).

In accordance with LSE Code and LSE License conditions, LSEs should be obligated to file procurement plans with the OEB for approvals, along with any form of standard contracts that will be used to procure incremental resource requirements. For example, this will include proposed procurement processes and mechanisms such as RFPs, auctions, or other programs.

Any OEB proceeding regarding an LSE's procurement plan and any form of standard contract should result in timely OEB decisions and well before the IESO administers applicable ICAs. Timing will be important to ensure that ICAs and an LSE's procurements are coordinated and integrated in meeting Ontario's resource adequacy requirements.

Further, either the IESO, the OEFC, or another Ontario Government agency, such as Infrastructure Ontario (IO), should financially 'back-stop' LSE contracts with third-party providers to ensure that needed resource investments are made and to protect customers. For example, this would protect customers from circumstances of needed investments not moving forward. Further, contracts between LSEs and third-party providers must have specific contract provisions to best incentivize and ensure that third-party providers meet their supply obligations.

2.1.7 Regulatory Oversight

In addition to having timely oversight of LSE procurement processes, the OEB should continue to have oversight regarding allocation of procurement costs to customers. Further, the OEB should have oversight with respect to the methodologies to set applicable customer rates (including default supply customers) along with final decisions regarding the level of actual customer rates to ensure rates are justified and reasonable.

Therefore, OEB oversight and decision-making regarding the following two areas are fundamental with respect to ensuring an Ontario LSE model is pragmatic, workable, and implementable:

- Rate design for default supply customers; and,
- Cost allocation resulting from contractually procured resources.

The OEB's regulatory oversight regarding LSEs' contractual procurements of required incremental resources provides greatest assurances that procurement decisions and outcomes are cost effective and are generally made within the public's and customers' best interests. All jurisdictions with LSEs have some form of state and/or federal regulatory oversight with respect to resource procurements. This level of oversight currently does not exist in the current planning and procurement framework in Ontario.

2.1.8 Rates and Cost Recovery

The main cost components of the present rate design methodology for Ontario's default supply customers (i.e., Regulated Price Plan (RPP) consumers) comprises of the wholesale energy market price (i.e., Hourly Ontario Energy Price (HOEP)) and the GA. The OEB sets RPP semi-annually based on forecasts for time-of-use (TOU) electricity commodity charges. The RPP is then applied uniformly to all default supply customers no matter their location within Ontario or service territory.

An Ontario LSE model will require changes to the existing methodology of calculating default supply rates, since LSEs will be contractually procuring incremental resources to meet multiple needs and resources contracted from different LSE service territories will be different.

Different contracting results for different LSEs will then result in the need for different default supply rates (and potentially applicable default rate-setting methodologies) from different LSE service territories. It is important to note that since it is recommended that LSEs only contractually procure for incremental resources, and incremental resource requirements are projected to be initially relatively small, then differences in default supply rates from different LSE service territories should be relatively small with very little rate discrepancy for all customers.

Different default supply rates for different LSE service territories are reasonable considering 'local' versus 'global' power system needs, resource mix and options available by location, and local demand and supply balance. Therefore, this framework can also more effectively value resources per location within Ontario and then be reflected in appropriate rates.

This is a benefit and consistent with planned changes to the IAM. The IESO is planning to implement LMP within its MRP with a proposed position to charge all non-dispatchable loads (i.e., all LDCs are non-dispatchable loads) zonal LMPs and capacity zones with zonal capacity prices through planned ICAs.

For LDCs who do not transition to LSEs and for their customers, the existing methodologies to set default supply rates for default customers through RPP can generally remain the same or evolve to whatever default supply rate-setting methodology the OEB decides to set in the future.

Rate design methodologies for customers that are not default supply customers (i.e., large commercial and industrial customers) located within LSE service territories will also need to change, but these changes will vary between service territories as the share of large commercial and industrial customers are different. Any changes to rate design for large commercial and industrial customers must necessarily account for these customers' existing capabilities to secure their own supply requirements, such as the utilization of CDM or self-supply through on-site or 'behind-the-meter' generation. On balance, large commercial and industrial customers have higher electricity costs compared to default supply customers, and therefore have developed more capabilities to manage their electricity consumption.

Overall GA costs will decrease over time as the IESO and the OEFC generation contracts expire and the costs of LSEs' procurements for incremental resources are allocated to the applicable customers through default supply rates. Declining GA costs affords opportunities to re-allocate applicable costs within the market through competitive frameworks, therefore enabling market forces and competitive outcomes. In addition to declining GA costs, an Ontario LSE model and associated changes to setting default supply rates offers justifiable reasons in time to review and unwind the existing Fair Hydro Plan.

2.2 Summary of Ontario LSE Model Recommendations

In summary, listed below are the recommendations with respect to the proposed Ontario LSE Model.

1. Ontario should adopt NERC's definition of LSEs, or something very similar.
2. Ontario's LSEs should maintain all existing obligations, roles, responsibilities of LDCs, with additional responsibilities to contractually procure resources to meet incremental needs to ensure adequate supply for their customers. As such, LSEs would make integrated

investment decisions based on multiple needs and factors, including resource adequacy and reliability, distribution system needs, customer needs and preferences, and policy objectives.

3. The OEB should establish a new LSE Code to define obligations, roles, responsibilities of LSEs, and LDCs who choose to take on the responsibilities of LSEs can voluntarily apply to the OEB for an LSE License.

4. Ontario's LDCs (who choose to transition to LSEs) will develop IRPs for their service territories and the IESO will continue to lead in developing IRRPs. These LSEs must work with the IESO to provide required technical data and other information needed to be factored into respective IRPs and IRRPs. Together, these IRPs and IRRPs will be used to determine LSEs' incremental resource requirements.

5. The IESO and LSEs should work together to model supply and delivery of capacity/energy from applicable contracted and rate-regulated resources to determine incremental resource needs to be contractually procured by respective LSEs.

6. Engineering and economic models and other studies must be consistent regarding development of power system plans (i.e., IRPs, IRRPs) and inputs to ICAs, including capacity zones, which will yield clear incremental resource needs to be contractually procured by LSEs.

7. Effective oversight and decision-making are needed within the IAM, including planned MRP market design and rule changes to help define incremental resource requirements and then help justify LSEs' procurements.

8. LSEs should have obligations to contractually procure incremental resources for their customers within their service territories, and integrate contracting for resources based on multiple needs (e.g., resource adequacy/reliability, distribution system needs, customer needs/preferences, policy objectives, etc.)

9. The IESO, the OEFC, or IO should, at least initially, financially 'back-stop' LSEs' contracts with third-party resource providers to ease transition of some LDCs to LSEs. This approach will help to ensure needed resource investments are made while protecting customers.

10. LSEs' contractual procurements for needed incremental resources must be aligned with respective IESO's ICAs, therefore enabling LSEs' contracted resources to be integrated and factored into respective IESO ICAs.

11. LSEs should contractually procure needed incremental resources prior to the applicable IESO ICAs, permitting IESO to effectively account for resources that have been contracted

(or not) by LSEs. Therefore, resource adequacy requirements are calibrated to reflect the resources that need to be procured through applicable ICAs.

12. The LSE Code and the LSE License should require that LSEs, to the extent possible, contractually procure resources through competitive mechanisms (e.g., RFPs, auctions.)

13. The OEB must have timely oversight over LSE procurement initiatives, including procurement processes and mechanisms and any standard form contracts, to ensure that LSE procurements can be effectively coordinated and integrated within applicable IESO ICAs and are cost effective.

14. The OEB should continue to have oversight and decision-making authority relating to rate design for default supply customers and allocation of costs to customers resulting from LSEs contractually procuring incremental resources to meet specific needs.

15. The OEB should maintain existing methodologies to set default supply rates for all default supply customers located with LDCs' service territories (with slight cost allocation adjustments) and therefore not within LSEs' service territories. The OEB should define new methodologies to set different default supply rates for all default supply customers located within LSEs' service territories where these rates will necessarily be different from LSE service territory to territory.

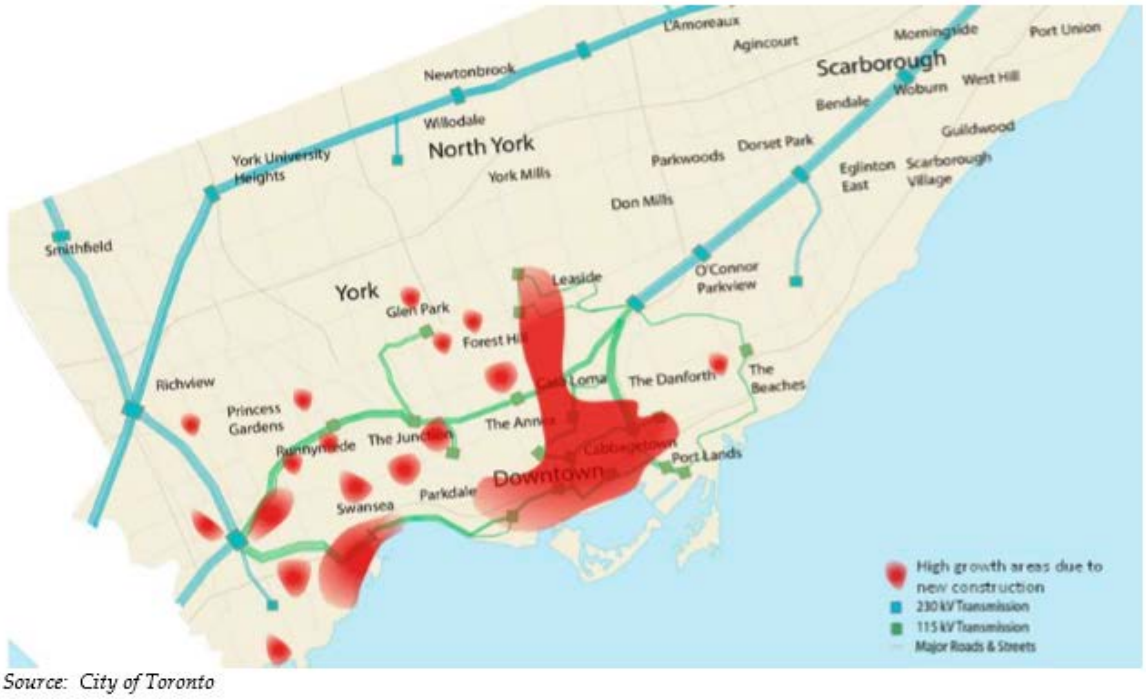
16. The OEB should review rate-setting methodologies for all non-default supply customers (e.g., large commercial and industrial customers) located within LSE service territories with considerations of these customers' actual capabilities of ensuring their own resource adequacy (partially or fully) through multiple mechanisms (e.g., CDM programs, self-supply, etc.)

17. Cost allocation across all classes of customers in Ontario needs to be reviewed and the allocation of costs needs to be revised appropriately based on relative cost shares based on LSEs' and LDCs' service territories differentiated by various components (e.g., LSE contractual procurements, share of GA costs, etc.)

2.3 Ontario LSE Model Example

A critical area within Toronto Hydro's service territory is Central Toronto. This example does not provide any numerical requirements or statistics, and it is only meant to convey concepts and recommendations relating to LSEs with acknowledgement that Toronto Hydro's customers and service territory goes beyond Central Toronto. Further, this is a stylized example of Toronto Hydro as an LSE with obligations to contractually procure incremental resource requirements for the Central Toronto area based on the framework provided in the preceding sections of this paper.

Figure 5-3: Concentrations of Growth in Central Toronto



Source: City of Toronto

Figure 11. Load Growth in Central Toronto (Source: IESO)

If Toronto Hydro were to transition to an LSE, Toronto Hydro will assume the obligations to contractually procure incremental resource requirements for the Central Toronto area.

1. Toronto Hydro works with the IESO towards completing an IRP, including incremental resource requirements
2. Key components of engineering and economic studies within the Toronto Hydro IRP include:
    - Demand forecast;
    - Reserve margin requirement;
    - Supply adequacy (i.e., energy supplied through Leaside transformer station (TS) and Manby TS, contracted generators (e.g., Portlands Energy Centre, etc.) located in Central Toronto, CDM programs/contracts and forecast expected capabilities applicable to Central Toronto, etc.); and,
    - Transmission and distribution capabilities helping to ensure supply adequacy

3. Based on the IRP supported by engineering/economic studies, any incremental resource requirements will be identified (i.e., supply adequacy plus transmission/distribution capabilities less demand forecast plus reserve margin)
4. Toronto Hydro will then be obligated to contractually procure incremental resource requirements
5. Decisions on what resources to contractually procure should result from studies used to support development of the IRP to determine integrated resource solutions and appropriate procurement processes to use
6. Toronto Hydro concludes procurements (i.e., execute contracts with third-party providers resulting from competitive procurements) of incremental resources after receiving applicable OEB approvals
7. The IESO factors in and integrates resources contractually procured by Toronto Hydro within ICAs

As shown in Figure 11, from IESO's April 2015 Central Toronto Area IRRP, the load growth in Central Toronto projects to increase faster than most other areas within Toronto Hydro's service territory. Therefore, this suggests that over time incremental resource requirements will grow faster in Central Toronto compared to other areas in and outside of Toronto Hydro's service territory. This further helps justify the potential for an LSE model in Toronto.

3. OUTCOMES OF RECOMMENDED ONTARIO LSE MODEL

Section 1 of this paper outlined the rationale and benefits for an Ontario LSE model, and section 2 provided specific recommendations and design features of the proposed Ontario LSE model.

This section articulates benefits and outcomes of the recommended Ontario LSE model, and further outlines the required changes for LDCs to transition to LSEs.

Figure 12. Benefits of Recommended Ontario LSE Model

3.1 Outcomes Providing Benefits for Implementing an Ontario LSE Model

3.1.1 Least-Regrets LSE Approach with Clear Path for Cost Reduction in Ontario

The proposed framework provides a voluntary option for LDCs to transition to LSEs with an established set of eligibility requirements and obligations for these LSEs, as defined within an LSE Code and an LSE License. As such, shareholders of Ontario's LDCs will have the ability to assess opportunities, risks, and benefits of taking on expanded obligations, roles, and responsibilities within Ontario's electricity market. This model recognizes the diversity of Ontario's LDCs while acknowledging that some Ontario LDCs may not have the desire or internal capabilities to perform functions of LSEs.

The establishment of an LSE Code will enable the OEB to 'set the bar' with respect to which LDCs may transition to LSEs. LDCs and their shareholders can assess the risks and benefits of transitioning to an LSE model, and are not obligated to transition to LSEs unless they choose to do so. For example, an LDC considering this transition will need to evaluate the strategic business case, benefits to customers, and benefits to their shareholders.

Furthermore, LSEs will only be responsible for procuring incremental supply to meet identified resource requirements. There will be a clear delineation of planning and resource procurement

responsibilities to ensure that the obligation to serve customers is met by the proposed framework. LSEs will only be obligated to procure incremental resource requirements, therefore mitigating risks during the transition from LDCs to LSEs. This approach therefore provides a reasonable amount of time for LSEs to 'scale up' the appropriate functions within their organizations to meet new obligations.

3.1.2 Improved Power System Planning and Regulatory Oversight of Procurement Decisions

The proposed Ontario LSE model necessitates increased planning and regulatory oversight from the OEB, thereby leading to greater transparency and decision-making pertaining to resource procurement decisions and costs to customers. Overall, the approach recognizes that there is a greater opportunity for LSEs to respond to local customer needs and preferences with respect to meeting resource needs compared to the current planning and procurement framework.

Ontario's LDCs do not have the authority to procure resources to meet supply needs and the IESO procurements spread supply costs province-wide to all customers. While the IESO's proposed ICAs have planned locational considerations through capacity zones (which have yet to be defined), they presently are not being planned to completely factor in distribution system needs or needs and preferences of local area customers. Improving alignment of IRRPs, IRPs, and DSPs will provide power system planners with opportunities to optimize procurements within distribution systems, as well as leverage customer-based assets to meet incremental resource requirements. For example, with increased DERs anticipated on the system, the IESO currently does not have a clear forecast of demand as demonstrated by multiple demand forecast scenarios within the OPO. Arguably LSEs will have better visibility with respect to their customers' driven demand, DERs, and other resources on their own systems.

Finally, with OEB oversight of both planning and procurement methodologies, LSEs will be required to demonstrate prudency and cost effectiveness of their choices. As a result, an LSE will need to weigh all reasonable options to determine best approaches to meet incremental resource requirements while balancing local considerations such as input from customers and communities they serve.

3.1.3 Alignment with IESO's MRP

The proposed Ontario LSE model has been developed with consideration of existing assets that are contracted by the IESO and the OEFC, and OPG's rate-regulated assets. It is also consistent with objectives of the IESO's MRP. In fact, the approach should improve the efficacy of MRP.

IESO's MRP Mission Statement: *Market Renewal will deliver a more efficient, stable marketplace with competitive and transparent mechanisms that meet system and participants needs at lowest cost.*

Ontario LSEs should improve efficiency and stability of Ontario's electricity market with increased 'buy-side' participation through bilateral contracting. Further, Ontario LSEs will also improve planning functions which provide underlining signals to the market driving investment needs and outcomes.

The procurement of new incremental resources will aim to be competitive and transparent with regulatory oversight from the OEB. LSE procurement contracts can be designed to effectively allocate risks amongst customers, LSEs, and third-party resource providers (e.g., IPPs, CDM providers (including DR), technology/service providers, etc.). Overall, improved coordination of planning and procurement functions will together help ensure that low cost resources are identified and effectively procured to meet multiple needs.

LSEs should coordinate with the IESO regarding development and administration of ICAs to ensure that only the needed amount of resources are secured through ICAs, accounting for incremental resources that are contractually procured by LSEs. The approach avoids any duplication and ensures that ICAs avoid over-procurement with increased clarity regarding distribution-side resources. As a result, ICAs should focus on meeting incremental supply requirements for the province that are not met by LSEs.

3.1.4 Achievable with Opportunity to Expand LSE Model Framework in Future

The planning functions of LDCs are already projected to increase in the future, with increased uptake of DERs and LDCs preparing DSPs that consider 'non-wires alternatives'. As a result, there is a need to evaluate alternative scenarios regarding potential integration of alternative and new resources, increasing the need for coordination with customers. In addition, customers may also be developing behind-the-meter DERs for their own purposes.

In coordination with the IESO, system planning that considers resource adequacy and reliability requirements is a logical next step for many LDCs who are already participating within IESO regional planning processes. Many LDCs and their unregulated affiliate businesses have gained valuable experience working with other resource providers and in developing, financing, owning, and operating resources themselves. Therefore, these LDCs could be candidates for potential transition to LSEs.

Furthermore, the proposed Ontario LSE model focuses on competitively contracting for incremental resources, rather than through ownership of large-scale generation assets. This initially minimizes risks to customers, LDCs who transitioned to LSEs, and LDC shareholders. Any incremental risk can be managed contractually, which is appropriate considering the shareholders of many LDCs consist of Government entities (i.e., municipal, provincial).

3.2 Required Changes for LDCs Transitioning to LSEs

The table below lists the main changes to LSEs' organization and structure relative to the present organization and structure of LDCs. Most of these changes result from the additional of LSEs administering procurement processes to contract for incremental resource requirements and the management of contracts.

Required Change	Qualitative Cost	Qualitative Benefit
System Planning • IESO and LSEs work together to determine resource requirements based on respective IRRPs and IRPs	• LSEs will require additional planning resources • Additional coordination with IESO	• Consistency of planning • Integrated resource solutions meeting multiple needs
Resource Procurement • LSEs contractually procure incremental resource requirements through competitive process • LSEs' procurements integrated with IESO procurements	• Development of procurement process, including contracts	• Increased coordination of procurement between LSEs and IESO • Contracted resources meeting multiple needs
Organization and Structure • New obligations to contractually procure incremental resources and manage contracts • Regulatory accountabilities • Potential risk management	• Administration of procurement processes and contract management • Additional regulatory proceedings scope • Potential increase in scope of risk management	• LSEs can better coordinate procurements for incremental resources with other system needs, policy objectives, customers needs/preferences • Potential to streamline/rationalize contract management

Figure 13. Qualitative Costs and Benefits

4. TRANSITIONING TO AN ONTARIO LSE MODEL

4.1 Summary of the Process to Voluntarily Take on LSE Responsibilities

The following chart summarized the proposed transition of an LDC to an LSE based on the framework that has been outlined in this paper.

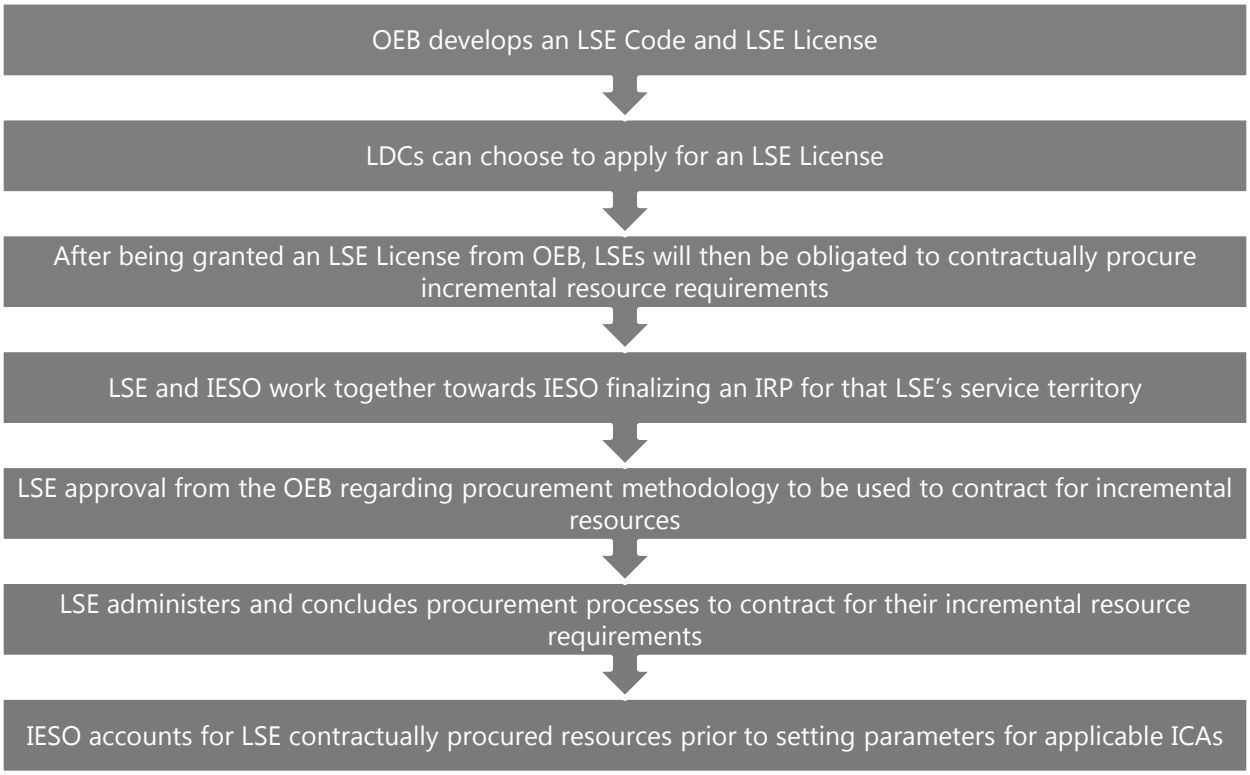


Figure 14. Taking on LSE Responsibilities

4.2 Reconciling Ontario LDC Unregulated and Regulated Businesses

The recommended Ontario LSE model only obligates LDCs that voluntarily take on the responsibilities of an LSE to procure incremental resource requirements. These LSEs will remain to be rate-regulated by the OEB, and the OEB will have oversight over the incremental resource procurements and resulting contracts. To the extent that LDCs have unregulated businesses at

the time they apply for an LSE licence, these unregulated businesses could continue to function as they have been alongside the LSEs' regulated businesses.

However, it is likely that OEB's Affiliate Relationship Code (ARC) will need to be amended. Changes to the ARC may be necessary to:

- Ensure that LSEs' regulated and unregulated businesses are governed within a manner that protects customers;
- Prevents cross-subsidization of affiliate activities;
- Ensures no preferential access to applicable services; and,
- Prevents activities resulting in business disadvantages to third-party providers.

Depending on how Ontario LSEs evolve over time, regulated and unregulated businesses will require future review. For example, if Ontario's electricity market becomes significantly more competitive, then LSEs may become less rate-regulated over time. This scenario could result from competitive market forces delivering fair, efficient, and costeffective resource procurement outcomes yielding just and reasonable customer rates. Increasing competition may result from:

- Decrease in OPG's market share by way of less rate-regulated assets through retirements or divestures;
- Less contracting through IESO or other Government agencies;
- Multiple LSEs with fewer LDCs; and,
- Successful IESO MRP implementation.

4.3 Further Transition for Ontario LSE Model

Further evolution of the recommended Ontario LSE model will likely be a function of three key factors in the future:

1. Technological advances which continue to change electricity distribution;
2. Resource requirements to meet resource adequacy, reliability, and electricity supply needs of Ontario; and,
3. Successful implementation of IESO's MRP.

Regarding the first factor, as discussed in section 1 of this paper, on-going evolution of electricity distribution is presently necessitating LDCs to evolve. Therefore, optionality to transition to LSEs will help LDCs better serve their customers' needs and preferences, address distribution system needs more effectively, and help address bulk system needs within Ontario.

Assuming the trends in technological advances continue to change electricity distribution while increasingly enabling customer choice, LSEs may be required or incentivized to broaden their capabilities and service offerings and enter new lines of businesses. For example, many LSEs

researched within the U.S. own and operate generation and other resources in addition to distributing electricity (see **Appendix A** for several examples). In fact, many U.S. LSEs also serve natural gas customers in addition to their electricity customers.

Regarding the second factor, LSEs may transition to having increased obligations, roles, and responsibilities in meeting Ontario's future supply needs as illustrated in the 2017 LTEP projected supply needs below.

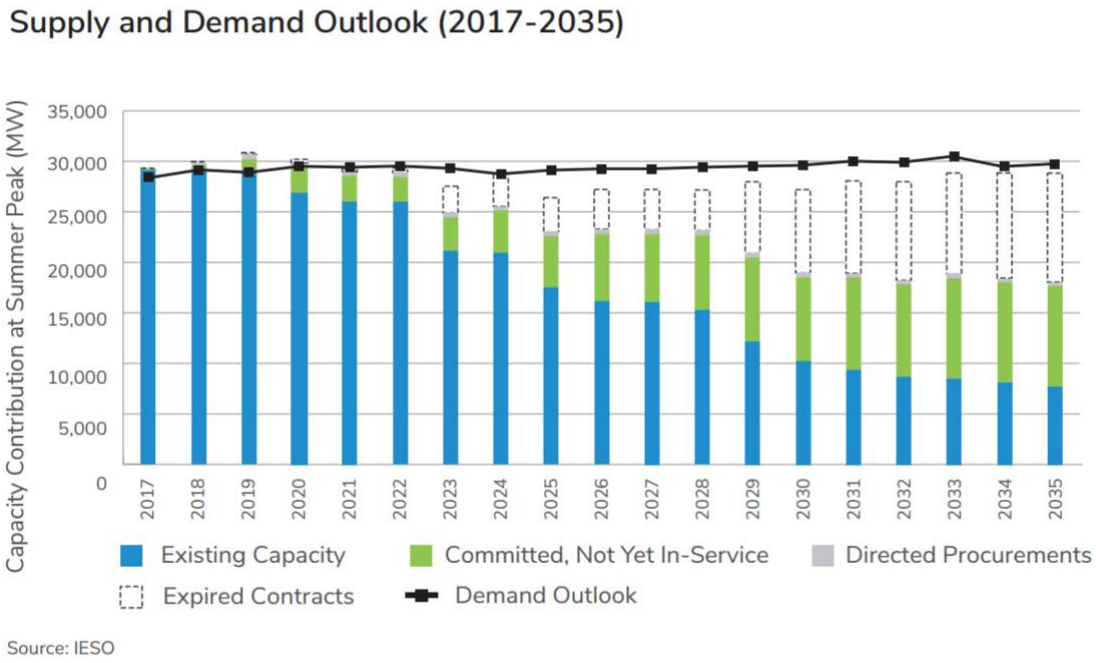


Figure 15. Outlook of Supply and Demand (Source: Ministry of Energy)

Ontario projects to need at least 2,000 MW by the mid-2020s and as much as 10,000 MW by the mid-2030s if a significant amount of generation retires at the end of their contract terms. Therefore, LSEs may necessarily be required to broaden and increase their capabilities and service offerings by contracting for additional resources or owning and operating additional resources, especially if Ontario's future supply need trends towards 10,000 MW.

Regarding the third factor, LSEs obligations, roles, and responsibilities could grow based on market opportunities by way of providing products and services directly to the IAM resulting in new revenue streams for LSEs. For example, LSEs may transition to directly participating within

the IAM by competitively offering capacity into ICAs. Therefore, LSEs could receive capacity revenues in the future.

Another similar example results from the potential for the IESO to broaden qualifications of multiple resources in providing ancillary services, which could also result in new revenue streams for LSEs. For example, DERs providing multiple ancillary services, such as regulation services, etc., will provide new sources of revenue.

On the other hand, linking to the second factor, if the IESO's MRP is unable to secure needed resources (e.g., through ICAs), LSEs will likely have direct opportunities to address Ontario's future supply needs. Therefore, LSEs could drive broader and increased capabilities and service offerings by contracting for additional resources and/or owning and operating additional resources.

LSEs taking on broader procurement responsibilities and/or owning and operating resources for purposes of maintaining resource adequacy is a common feature within most jurisdictions and wholesale electricity markets. Under the current Ontario framework, the IESO presently does not have any 'fall back' plans if ICAs are either not implemented or not effective in procuring all of Ontario's electricity supply needs.

LDCs who voluntarily transition to LSEs will have obligations to contractually procure incremental resource requirements for customers within their applicable service territories. Over time, there could be potential for these LSEs to also contractually procure incremental resource requirements for customers outside of their service territories in addition to contractually procuring incremental resource requirements for customers within their service territories. This will likely depend on results and success of contracted procurements for incremental resources required for the LSE's own service territory. Also, there could be potential for LSEs to work together to procure required incremental resources to meet the supply needs of their customers, or potentially outsource this procurement obligation.

Furthermore, over time, the IESO could assign existing contracts to applicable LSEs for their management. For example, mostly all IESO contracts with generators have assignment provisions accompanied with IESO obligations (backed by the Ontario Government) to financially 'back-stop' contract payments if needed.

Based on the three factors described above, LSEs over time may transition to new lines of businesses, including but not limited to owning and operating resources for purposes of meeting their service territory's and Ontario's resource adequacy and reliability requirements and needs.

5. CONCLUSIONS

Enabling LDCs to take on new obligations and becoming LSEs can address several underlying challenges within Ontario's electricity sector. As DERs have become cost-effective and accessible to customers, both LDCs and the IESO must adapt to ensure that power system plans are coordinated to reduce duplication and improve efficiency of decision-making. As demonstrated throughout this paper, it is logical that an LSE will be the most equipped to perform integrated planning that balances multiple objectives, from consumer preferences to resource adequacy. The integrated framework would tie together distribution planning and resource planning and lead more efficient outcomes and cost savings.

APPENDIX A: SELECT JURISDCTIONAL REVIEW OF LSE MODELS

EVERSOURCE	• New York Stock Exchange listed, A credit rating (only North American utility with rating)
	• Service territory spans Massachusetts, Connecticut, New Hampshire
	• Wholly owned subsidiaries offer electricity and natural gas distribution services, 3.1 million customers
	• ISO-NE administers wholesale electricity market, including Forward Capacity Market (FCM)
	  o FCM ensures resource adequacy, LSEs responsible for procuring capacity based on customers' peak load and reserve requirement
	• Utilities divested generation assets with electricity restructuring in late 1990s/early 2000s
	• Eversource, like other New England electric distribution companies (EDCs), responsible for providing 'default supply' to customers that did not contract with retailers
	• Eversource responsible for procuring default supply, default suppliers responsible for managing supply portfolio
	  o Default supply obligation auctioned off as 'slices' of multiple obligations to serve customers (e.g., 10% of residential customer supply with default supplier responsible for managing risks (e.g., customer attrition, etc.))
	• Relatively limited regulatory oversight of this default supply procurement given that it is subject to a 'market test' (i.e., regulatory confidence in competition and market forces)

conEdison	• NYSE listed • New York City and Westchester County, serving 3.4 million customers • Regulatory oversight of customer rates and terms of service by New York State Public Service Commission • ConEdison's principal businesses are: Consolidated Edison Company of New York (regulated electric, natural gas, steam); Orange & Rockland Utilities (regulated electric, natural gas); Con Edison Clean Energy Businesses, Inc.; and Con Edison Transmission, Inc. • Divested generation facilities, other than those that also produce steam for specific business purposes

	o New York State Energy and Research and Development Authority recently ruled ConEdison eligible to own renewable generation • Wholesale electricity market administered by NYISO, including Installed Capacity (ICAP) market • Default supply similar to Ontario 'spot price pass-through', based on Day-Ahead Market prices • ConEdison responsible for providing default supply to customers that did not contract with retailers, and required to purchase a portion of default supply from ICAP Market based on peak load
Xcel Energy	• NASDAQ listed • Xcel Energy Inc.'s service territory includes Minnesota, Michigan, North Dakota, South Dakota, Colorado, Texas, and New Mexico • Four subsidiaries are Northern States Power Company-Minnesota, Northern States Power Company-Wisconsin, Public Service Company of Colorado, and Southwestern Public Service Company, total of 3.5 million customers • Regulatory oversite by each state's Public Utilities Commission o IRPs filed with state regulators for approvals • Retail competition only available in Michigan and Texas • NSP-M and NSP-W operate in Midcontinent ISO (MISO), SPS operates in Southwest Power Pool (SPP) o MISO and SPP administer wholesale electricity markets, without Capacity Markets • Majority of jurisdictions supplies default customers from supply portfolios based on combination of owned generation and contracts with IPPs, etc. • Leverages RFPs and resulting contracts to meet default supply needs
PG&E Pacific Gas and Electric Company	• NASDAQ listed • Located in California with 5.4 million customers • Regulatory oversight by California Public Utilities Commission (CPUC) • PG&E owns and operates generation, transmission and distribution, also enters into contracts with third-party suppliers (e.g., IPPs) to meet default supply requirements • California ISO (CAISO) administers wholesale electricity market, without a Capacity Market • Competitive retail supply choice available

	• CPUC establishes resource requirements for all LSEs • CPUC's resource adequacy program guides procurement to meet resource requirements and promotes infrastructure investment by requiring LSEs to procure capacity on behalf of their default supply customers • CPUC approves various contracts that PG&E has entered into with third-party providers (e.g., IPPs) in accordance with their CPUC-approved procurement plan to comply with resource adequacy requirements o In addition, CPUC provides oversight regarding procurements needed to meet mandatory state renewable energy targets

PSEG
We make things work for you.
	• PSEG publicly traded on NYSE
	• PSEG owns and operates a diverse fleet of generation facilities, approximately 10,600 MW
	• Located in New Jersey (central, diagonal corridor of the state)
	• 2.2 million customers
	• Regulatory oversight by New Jersey Board of Public Utilities (NJBPU)
	• PJM administers competitive wholesale electricity market, includes Forwards Capacity Market (RPM)
	  o Each organization serving PJM load must meet its resource obligations through PJM's RPM, where LSEs must pay the locational capacity price for their zone
	  o LSEs can also develop/own generation and/or develop/own DR and energy efficiency resources with optionality to offer these resources into PJM's RPM, and/or develop/own transmission
	• Since 2002, four New Jersey EDCs have procured resources to serve their Basic Generation Service customers through a state-wide auction process held each February
	  o Process was proposed by New Jersey EDCs and approved by NJBPU
	  o NJBPU oversees the auction process, competitive auctions are conducted using a 'reverse-clock' methodology

Key Findings Resulting from Review of LSE Models:

- Each LSE enters into contracts with generators (e.g., IPPs), other providers (e.g., CDM, etc.), and/or traders/marketers for resource supply towards meeting default supply resource adequacy requirements, but with reliance on these contracts with varying roles and responsibilities
- Not all LSEs are permitted to own generation (e.g., Eversource Energy and ConEdison were required to divest generation in accordance with electricity restructuring and mandated to contractually procure default supply to meet resource adequacy requirements on behalf of their default supply customers)
- Not all jurisdictions offer competitive retail electricity supply options to customers (e.g., North Dakota, South Dakota, Wisconsin, Colorado, New Mexico have no competitive electricity supplier choice)
- Fully competitive wholesale electricity markets essential, where LSEs rely more heavily on third parties for provision of resource supply to default supply customers
- Degree of regulatory oversight regarding LSEs' obligations, roles, responsibilities, functions varies significantly across the U.S., depending on risks LSEs required to manage with limited oversight when limited risk
- Purview of regulatory oversight with respect to LSE obligations, roles, responsibilities, functions varies, but may consist of
    - Review and approval of IRPs
    - Determination of LSE resource adequacy requirements
    - Review and approval of procurement processes
    - Review and approval of contracts
- Resources are typically procured through competitive processes (e.g., RFPs, auctions, etc.)
- Contracts may also shift risks to resource providers, and may be for shorter terms
- For example, in ISO-NE, LSE contracts with resource providers are for a percentage of the overall supply obligation (however the overall supply obligation may not be specified)
- Shorter term contracts typically are less than two or three years
- Where Capacity Markets exist, some form of LSE participation is required and/or incentivized

- LSEs coordinate with ISOs to ensure that only required incremental resources are procured
- For example, NYISO allocates cost responsibility for ICAP Market based on LSEs' net obligations (e.g., total obligation minus amount that was certified (e.g., owned/contracted) and amount that was secured during forward auctions)

APPENDIX B: STATUTORY CHANGES TO ENABLE LSES IN ONTARIO

- OEB can develop an LSE Code under Section 70.1 of the *Ontario Energy Board Act* to supplement and revise/amend the OEB's SSS Code, and develop an LSE Licence in accordance with Section 57(e) of the *Ontario Energy Board Act*
- *Ontario Energy Board Act*, Section 71(1) – amend to allow LDCs to transition to LSEs
    - "…a transmitter or distributor shall not, except through one or more affiliates, carry on any business activity other than transmitting or distributing electricity."
        - 71(2): permitted to provide services that would assist the Government of Ontario in achieving its goals in electricity conservation, including services related to the promotion of electricity conservation and the efficient use of electricity, electricity load management, or the promotion of cleaner energy sources
- *Ontario Energy Board Act*, Section 71(4)
    - "Despite subsection (1) the Board may, if in its opinion special circumstances of a particular case so require, authorize a transmitter or distributor to carry on a business activity other than transmitting or distributing electricity other than through one or more affiliates, in accordance with an order of the Board."
- *Ontario Energy Board Act*, Section 78(3) – amend to provide LSE rate orders
    - "The Board may make orders approving or fixing just and reasonable rates for the transmitting or distributing of electricity or such other activity as may be prescribed and for the retailing of electricity in order to meet a distributor's obligations under section 29 of the Electricity Act, 1998."
- *Ontario Energy Board Act*, Section 78(3) – amend to provide LSE rate orders
    - "The Board may make orders approving or fixing just and reasonable rates for the transmitting or distributing of electricity or such other activity as may be prescribed and for the retailing of electricity in order to meet a distributor's obligations under section 29 of the *Electricity Act, 1998."*
- *Ontario Energy Board Act*, Section 80
    - "No transmitter or distributor or affiliate of a transmitter or distributor shall acquire an interest in a generation facility in Ontario, construct a generation facility in Ontario or purchase shares of a corporation that owns a generation facility in

Ontario unless it has first given notice of its proposal to do so to the Board and the Board,

- (a) has not issued a notice of review of the proposal within 60 days of the filing of the notice; or
- (b) has approved the proposal under section 82."

- No need for amendment – distinction between LDCs investing in generation assets and entering into contracts with resource providers (e.g., generators, etc.)

- SSS Code, Section 2.2.2 – amend to allow LDCs as LSEs to contractually procure resource directly
  - "A distributor shall obtain the electricity required to fulfill its standard supply service obligation through the IESO-administered markets, from an embedded retail generator (as defined in the Retail Settlement Code) located within the distributor's licensed service area in accordance with the Retail Settlement Code or, in the case of an embedded distributor (as defined in the Retail Settlement Code), from the embedded distributor's host distributor (as defined in the Retail Settlement Code). "
- *Electricity Act*, Part II.2 (sections 25.29-25.33)
  - Restrictions on ability of IESO to procure resources, requirements regarding power system plans, Implementation Plans, pricing
  - Reconcile with resource procurements by LSEs
- *Electricity Act*, Sections 26(1)
  - "A transmitter or distributor shall provide generators, retailers, market participants and consumers with non-discriminatory access to its transmission or distribution systems in Ontario in accordance with its licence."
  - Provide LSEs with open access rights
- *Electricity Act*, Sections 29(1)
  - "A distributor shall sell electricity to every person connected to the distributor's distribution system, except a person who advises the distributor in writing that the person does not wish to purchase electricity from the distributor."

  - Shift applicable default supply obligation from LDCs to LSEs, but changes may not be needed because applicable LDCs will transition to LSEs

- IESO Market Rules
  - IESO has sole decision-making authority regarding amendments to Market Rules (Section 32 of *Electricity Act*)
  - Add LSE classification as registered IESO market participants along with applicable obligations

- In addition to the essential statutory amendments listed within the previous slides regarding the *Ontario Energy Board Act*, SSS Code, *Electricity Act*, and IESO Market Rules, other amendments will be needed

- In addition to amendments to the *Ontario Energy Board Act*, SSS Code, *Electricity Act*, and IESO Market Rules, amendments will likely also be needed within the DSC, Retail Settlement Code (RSC), ARC, etc.