Assessment of Ontario's DER Compensation Mechanisms and Recommendations

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Background and Scope

- Distributed energy resource (DER) compensation mechanisms play a key role in determining the feasibility and operation of DERs, influencing both individual investments and the ability to meet system-wide electricity needs
- This study is part of a larger effort by the Ontario Energy Board (OEB) and the Independent Electricity System Operator (IESO) to understand and improve efficiency and alignment of DER compensation mechanisms

Objectives:

1. Understand how DER compensation mechanisms in Ontario and select jurisdictions function collectively to ensure that different incentives are achieving the most efficient outcomes
2. Develop an assessment framework for DER compensation mechanisms and apply this framework to Ontario's DERs
3. Identify recommendations to improve effectiveness of DER compensation mechanisms for efficient deployment and participation of DERs in Ontario's electricity system

MAJOR STUDY TASKS

DER Compensation Mechanism Types

We group the DER compensation mechanisms into three categories

DER COMPENSATION MECHANISM TYPES

Price-Based Mechanisms	Procurement and Wholesale Market Mechanisms	Programmatic Mechanisms
Include all price signals experienced by customers in a given rate class, such as rates designed for the recovery of energy, Global Adjustment (GA), transmission, and distribution costs	Include bulk system mechanisms that are used to ensure resource adequacy and reliability across different timeframes These mechanisms include: i) resource acquisition through request for proposal (RFP) processes, standard offer contracts, and capacity auctions and ii) the energy and operating reserve markets (including day-ahead and real-time market processes)	Include programs that involve upfront and/or ongoing financial incentives that are tied to customers' DER adoption, participation, and/or performance

Note: DERs include technologies and practices used to meet energy needs, either hosted by customers (e.g., rooftop solar) or directly connected to the distribution system (e.g., battery facilities). This definition includes load flexibility capabilities that are not associated with any particular technology, such as load shaving and load shifting.

Ontario's DER Compensation Mechanism

Ontario has an array of compensation mechanisms in place today that are available to different DERs and participant types

DER COMPENSATION MECHANISMS IN ONTARIO

Price-Based Mechanisms	Procurement and Wholesale Market Mechanisms	Programmatic Mechanisms
• Industrial Conservation Initiative (ICI) • Interruptible Rate Pilot (IRP) • HOEP Pricing • Regulated Price Plans (RPP) and Non-RPP for Class B Customers • Net metering • Distribution charges • Transmission charges • IESO uplifts (recovery of Capacity Auction and ancillary services)	• Energy market (bid/offer participants) • Expedited, medium, and long-term resource acquisitions and contracts (≥ 1 MW) • Capacity Auction • Ancillary services (e.g., operating reserves, frequency regulation) • Small Hydro Program	• Demand-Side Management (DSM) programs offer energy efficiency measures, residential demand response (DR), and targeted behind-the-meter (BTM) solar and storage incentives

Jurisdictions and DER Mechanisms Reviewed (1/3)

Jurisdiction	Price-Based Mechanisms	Procurement and Wholesale Market Mechanisms	Programmatic Mechanisms
New York	• Value of DER program has been continually reviewed and revised to improve customer acceptance and predictability • Standby rates and residential demand charges send accurate price signals, but have seen very limited adoption	• DR mechanisms provide compensation for both capacity and energy • DR primarily participates as capacity resources; very limited participation/activation of DR in the energy market	• EV SmartCharge incentivizes off-peak charging without necessitating that customers adopt new rates • Strong customer participation in targeted demand response (DR) programs at capacity-constrained distribution nodes
Hawaii	• Residential time-of-use (TOU) rates incentivize higher mid-day consumption when there is excess solar generation • NEM successors have driven the adoption of distributed storage paired with solar	N/A	• "Battery Bonus" program and demand-side management programs provide additional incentives for grid-friendly operation of DERs

Jurisdictions and DER Mechanisms Reviewed (2/3)

Jurisdiction	Price-Based Mechanisms	Procurement and Wholesale Market Mechanisms	Programmatic Mechanisms
California	• Multiple residential TOU rate options that cater to customers with different levels of flexibility have replaced tiered rates • Commercial and industrial (C&I) customers are transitioned to mandatory TOU rates	• Multiple mechanisms are available for DR to participate in wholesale markets, including market-based and emergency resources	• Incentives for distributed solar were reduced after state surpassed capacity goals and as payments to customers do not align with grid value • Pilot to allow aggregators to use customer DERs to help meet specific distribution system needs
Australia	• "Solar Sponge" rate incents higher consumption of midday solar through price signals that reflect wholesale market energy prices. • C&I rates reflect locational constraints	• Wholesale DR program was introduced in 2021, though participation is limited so far • Ongoing trials to develop an integrated DER market design reflecting local system constraints	• Several demonstration projects to test virtual power plants (through the aggregations of DERs) and explore market improvements to integrate DER assets into the marketplace

Jurisdictions and DER Mechanisms Reviewed (3/3)

Jurisdiction	Price-Based Mechanisms	Procurement and Wholesale Market Mechanisms	Programmatic Mechanisms
PJM Interconnection	N/A	• PJM has attracted a large quantity of DR due in large part to capacity auction payments • Several mechanisms/participation pathways are available to DRs, depending on their characteristics and risk profile • Market participation requirements on DR to ensure economically efficient participation is balanced against flexibility to encourage participation from all resources • Price-responsive demand serves as demand-side resource that leverages dynamic retail rates, providing a closer link between the wholesale and retail electricity markets	N/A

Key Takeaways from the Jurisdictional Scan (1/2)

1 Patchwork of mechanisms can lead to inefficient outcomes

- DER compensation mechanisms are often used to promote specific technologies and/or policy goals; the resulting patchwork of mechanisms do not efficiently incentivize all DER types
- Some jurisdictions have amended policies to create more cost-reflective and holistic mechanisms, such as New York's VDER tariff and California's Distributed Energy Resource Action Plan

2 Challenges and opportunities in rate design

- Retail rate design continues to be the biggest barrier to – and opportunity for – promoting the efficient level of DER adoption and participation
- Some jurisdictions are moving away from the recovery of fixed system costs through flat volumetric charges ($/kWh) to prevent volumetric electricity prices exceeding marginal costs and slowing the pace of electrification
- Others are moving away from time-invariant volumetric rates and towards dynamic price signals to reflect the system conditions
- Some jurisdictions (e.g., Hawaii) are moving toward changing their default rate structure to include a demand charge in part to ensure all customers pay their fair share of the system costs

Key Takeaways from the Jurisdictional Scan (2/2)

3 Reliable and certain incentives lead to high participation levels

- Approaches with simple compensation designs with low risk and high convenience for customers enjoy greater interest relative to more sophisticated designs
- However, some implementations led to distortions in compensation and cost shifts at the expense of non-participants
- Jurisdictions have evaluated and updated the structure of compensation mechanisms (including compensation levels) over time, as market conditions, technological capabilities, and policy priorities evolve

4 A portfolio of complimentary mechanisms is needed to target all DER and participant types

- Where rates alone are unable to provide efficient price signals, procurement and wholesale energy market mechanisms and programmatic mechanisms can be particularly useful to supplement the price signals
- Coordination between regulatory bodies and system planners is needed to incentivize the efficient deployment of DERs (e.g., California DER Action Plan and Australia OpEN)

Assessment Framework

PRINCIPLE 1

Economic Efficiency / Cost Effectiveness

A compensation mechanism should lead to societally beneficial outcomes in a cost-effective manner.

PRINCIPLE 2

Comparable Compensation across Mechanisms and Resource Types

Resources should receive similar compensation for similar services regardless of technology or mechanism type (after accounting for differences in important attributes across resource types).

PRINCIPLE 3

Simple and Accessible

Some participants have less sophistication and/or risk tolerance than others, and a mechanism's complexity should be appropriately calibrated to intended participant, technology, and compensation level.

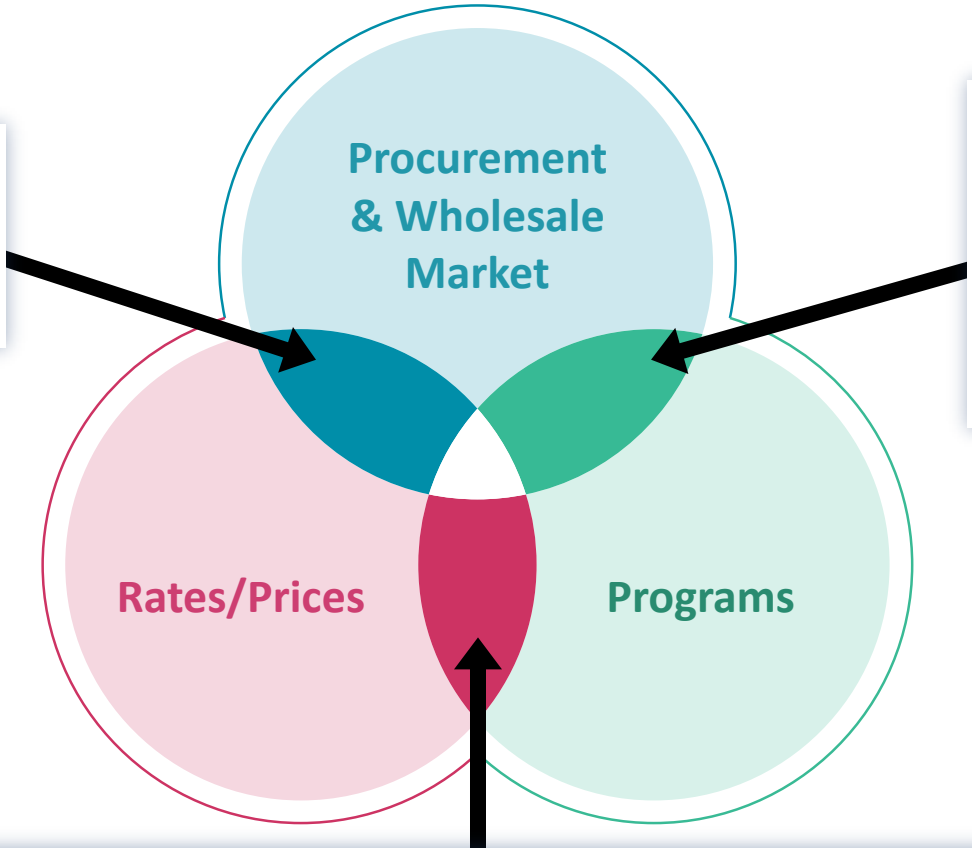
PRINCIPLE 4

Predictable and Acceptable Payoff

Participants should be able to predict payoff with reasonable accuracy, as this will result in maximal participation by cost-effective resources.

Assessment Framework: Understanding Interactions

- Need to avoid double-counting of energy/capacity incentive for load curtailment (e.g., FERC 745 implementation in PJM)



- Need to align incentives that serve similar functions (e.g., market-based DR and smart-thermostat-based DR program)
- Avoid duplicate compensation for same services from procurement/programs

- Need to maintain technology neutrality while designing rates/programs that unlock benefits from specific technologies (e.g., California EV rates, ConEd's EV SmartCharge)
- Programs should be designed to supplement—not duplicate—price signals from rates

Application of the DER Compensation Assessment Framework

Using the assessment framework, we identify several opportunities to improve economic efficiency while managing issues around comparable compensation, simplicity/accessibility, and predictable and acceptable payback

Price-Based Mechanisms	There are opportunities to allocate Global Adjustment (GA) costs to all customer types more efficiently, which will result in more appropriate price signals for DER adoption and dispatch
Procurement and Wholesale Market Mechanisms	Continued integration of DERs into existing wholesale/procurement mechanisms will improve economic efficiency by creating additional competition among energy service providers
Programmatic Mechanisms	When rates alone fall short of conveying all underlying costs—and/or where existing mechanisms have gaps due to unrecognized or underrecognized value streams or the complexity that DER participants experience—programmatic mechanisms can be used to bridge the gaps and incentivize DERs more efficiently

Efforts are already underway to implement many of these improvements, but opportunities remain

Price-Based Mechanisms

Introduce further rate improvements and rate options for RPP Class B customers

Retail rates send price signals that are not fully reflective of system costs. Ontario has taken steps to improve the cost-reflectiveness of retail rates by introducing a standard time-of-use rate and the opt-in Ultra-Low Overnight rate.

The OEB could continue to explore more dynamic opt-in rates and periodically review TOU periods to ensure that they accurately incentivize customers to respond to system conditions.

Introduce further rate improvements and rate options for Non-RPP Class B customers

Non-RPP Class B customers currently pay for GA through a flat volumetric charge that varies on a monthly basis, which is not cost-reflective. The OEB is developing a report with recommendations to the Minister on dynamic pricing options for cost-reflective GA collection for this group of customers.

The OEB should continue to explore options that send more efficient price signals to Non-RPP Class B customers.

Examine alternative transmission and distribution cost recovery methods that align with system needs

Transmission and distribution costs are largely fixed and/or driven by peak demand, but are sometimes recovered from customers volumetrically.

The OEB should continue to evaluate how more cost-reflective billing determinants for recovery of transmission and distribution costs could encourage participants to shape their loads in grid-beneficial ways.

Procurement and Wholesale Market Mechanisms

Provide opportunities for DERs to participate in procurement processes where they are capable of meeting service requirements

DERs that can provide the desired services should be able to compete with traditional resources on a level playing field, providing that DERs meet important and clearly defined participation and performance criteria.

The IESO has indicated its openness to including standalone and aggregated resources of less than 1 MW in future procurements - a step toward leveraging more DERs to meet system needs.

Provide a pathway for small customers with DERs to participate in and be appropriately compensated in the wholesale energy markets

The dynamic price signals in the wholesale energy market generally provide efficient incentives for DERs, and changes under the Market Renewal Program will sharpen those price signals.

The IESO should continue to work with stakeholders to develop wholesale market participation models to enable participation of aggregated residential and small commercial customers.

Account for DER attributes consistently across DER incentives

Attributes such as visibility, availability and performance, and flexibility can enhance the value of DERs to the system. All else being equal, DERs with more desirable attributes should receive high compensation.

As a longer-term goal, Ontario should aspire to ensure that these attributes are clearly defined, communicated, and applied consistently across all compensation mechanisms. This may require a full study and valuation of DER attributes.

Programmatic Mechanisms

Leverage DER programs to unlock DER value streams and to provide important grid services

A DER program can bridge gaps within existing mechanisms and can enable market participants or DERs that currently do not fit neatly into existing mechanisms.

Coordination across the IESO, OEB, LDCs, and other key stakeholders could help to improve efficiency and the participant experience. Efforts should focus on high-priority, high-impact programs.

Continue to incorporate non-wires solutions (NWS) in distribution system planning

NWS utilize DERs to defer or avoid more expensive infrastructure costs. The OEB has taken steps to facilitate the integration of cost-effective NWS into distribution planning to meet system needs (e.g., Benefit-Cost Evaluation Framework, NWS Guidelines).

The OEB should continue its work to support LDCs' consideration of cost-effective NWS as they become a core part of distribution system planning.

Continue to incorporate NWS in regional transmission planning

The IESO has established a structured process for identifying NWS for transmission needs through the Integrated Regional Resource Planning process.

When transmission NWS options are viable, the IESO should continue to explore how existing or new mechanisms can be appropriately utilized to enroll transmission NWS participants.

Conclusion

In this study, we review Ontario's DER compensation mechanisms, develop a DER assessment framework, and provide recommendations for how Ontario can improve mechanisms to leverage cost-effective DERs to meet system needs

It is critical that the DER compensation mechanisms are economically efficient, designed to promote flexibility, and adaptable to evolving market conditions and technological advancements. This would help ensure that the best technologies and business models succeed and help mitigate the pace of future system cost increases

Many of the potential changes to the compensation mechanisms are already under development or in initial deployment stages in the Province

Enhancements to Ontario's existing mechanisms, along with the introduction of new ones where needed, can lead to a higher level of cost-effective DER participation in Ontario's electricity system, including participation from the next generation of DER technologies