LEVELING THE PLAYING FIELD –

How to Support Energy Efficiency Competing with Traditional "Wires" Solutions to Meet Regional System Needs

Bronwen Smith, Sr. Advisor Market Strategy, IESO

Presented at the 2019 ACEEE National Conference on Energy as a Resource

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IESO: Who We Are and What We Do

Reliably operate Ontario's province-wide system 24/7

Support innovation

Create electricity market efficiencies

Work closely with communities to explore sustainable options

Plan for Ontario's future energy needs

Enable province-wide energy efficiency

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Province-wide Energy Efficiency Achievements

Between 2011 and 2018 ->

10.3 TWh
of electricity saved*

Energy Saved equivalent to powering over
1 million homes
for one year**

75 Million
Energy Efficient Products Purchased

116,996
Small Business Lighting Projects Completed

1,659,997
Low income homes installed energy efficient measures

79,614
Retrofit Projects Completed in Ontario Businesses

16.5 TWh of energy savings since 2006*
5,000 MW of demand savings since 2006

*Persisting yearly energy savings at 2017
**Based on avg Ontario household uses about 9,500 kWh of electricity per year.
https://energyrates.ca/residential-electricity-natural-gas/

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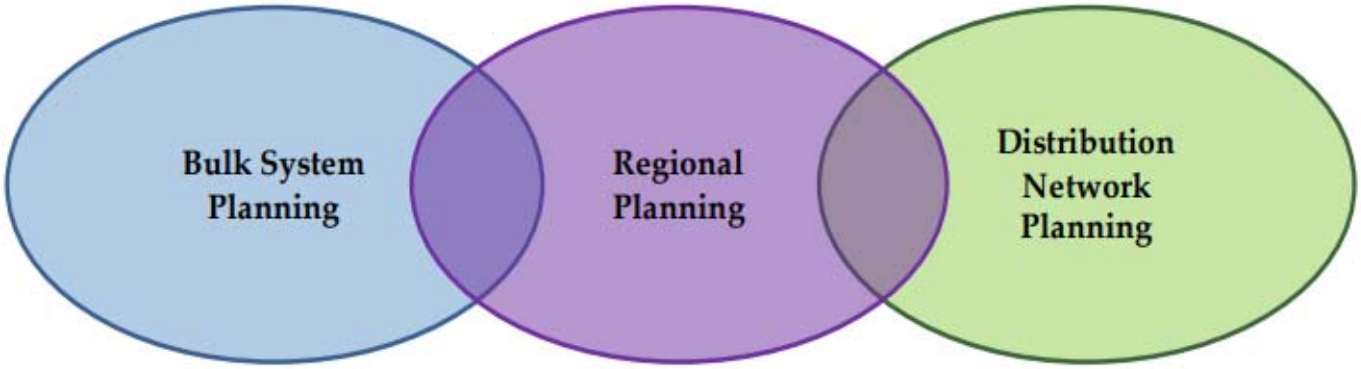
Presentation Overview

1. Ontario regional planning context and overview
2. Considering energy efficiency as a local resource
   - Required actions
   - Key Ontario initiatives

Types of Electricity Planning in Ontario



Addresses provincial electricity system needs and policy directions

- Ministry of Energy
- IESO
- Transmitters

Integrates local electricity priorities with provincial policy directions & system needs

- IESO
- Transmitters
- Local Distribution Companies

Examines local electricity needs and priorities at the community-level

- Local Distribution Companies

First Nations communities & Métis, municipalities and industry stakeholders

Key Participants

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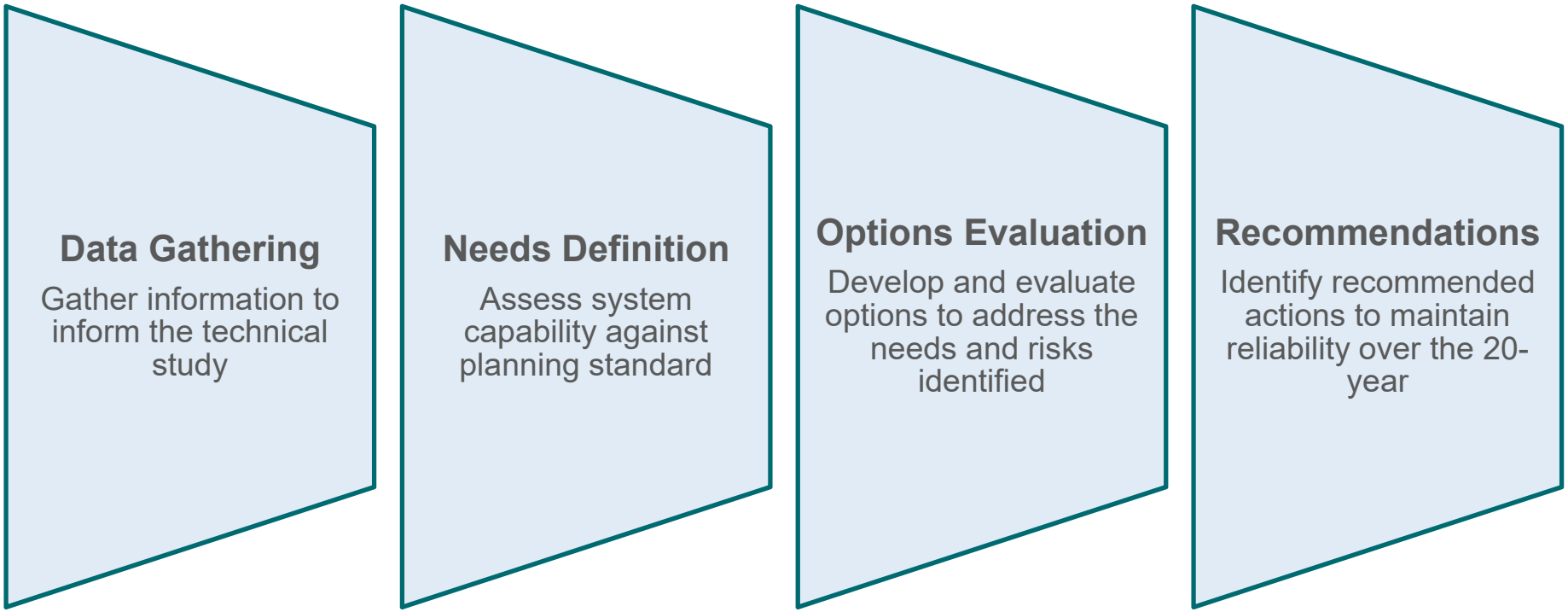
Regional Planning Overview



Considering EE as a Local Resource: Required Actions

1. Develop tools to characterize local system needs (timing, duration, magnitude)
2. Shift consideration of energy efficiency from demand forecast to supply side options
3. Develop tools to quantify local energy efficiency potential
4. Develop tools to compare energy efficiency costs and benefits to other resources
5. Targeted energy efficiency deployment to meet local needs as informed by above

Considering EE as a Local Resource: Local Achievable Potential Studies (LAPS)

- LAPS assess the feasibility of non-wires potential (including energy efficiency) to defer, offset or complement wires investments
- Conducting five LAPS focused on areas with greatest non-wires opportunity
- Studies led by distribution utility, supported by IESO and third-party consultants
- Energy efficiency potential characterized at the transformer station level
- How does energy efficiency potential align with system needs?
  → key component of studies

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Considering EE as a Local Resource: Characterizing Local Capacity Needs

- Summarizing the projected load characteristics of the Transformer Station (timing, duration, and magnitude of peaks above rated capacity)

Capacity need (MW)

50	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
45	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
40	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%
35	0%	0%	0%	0%	0%	0%	4%	0%	0%	0%	0%	0%
30	0%	0%	0%	0%	0%	1%	13%	4%	0%	0%	0%	0%
25	0%	0%	0%	0%	0%	5%	26%	10%	1%	0%	0%	0%
20	0%	0%	0%	0%	0%	15%	42%	24%	4%	0%	0%	0%
15	22%	9%	1%	0%	5%	35%	54%	46%	13%	2%	0%	6%
10	74%	69%	36%	6%	20%	59%	69%	65%	38%	16%	24%	54%
5	98%	100%	95%	77%	71%	90%	92%	94%	71%	68%	84%	94%
MNTH	1	2	3	4	5	6	7	8	9	10	11	12

Capacity need (MW)

50	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
45	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
40	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%
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30	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	3%	3%	6%	8%	9%	4%	2%	0%	0%	0%	0%	0%
25	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	3%	7%	9%	10%	12%	14%	15%	11%	5%	0%	0%	0%	0%	0%
20	0%	0%	0%	0%	0%	0%	0%	0%	1%	5%	11%	15%	16%	17%	19%	21%	22%	17%	15%	8%	4%	0%	0%	0%
15	0%	0%	0%	0%	0%	0%	1%	4%	12%	18%	21%	25%	27%	26%	28%	30%	38%	44%	39%	32%	26%	13%	2%	0%
10	5%	2%	1%	1%	2%	12%	28%	39%	49%	55%	58%	61%	63%	59%	61%	68%	84%	76%	82%	77%	66%	52%	37%	21%
5	60%	51%	46%	48%	56%	81%	87%	94%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99%	95%	79%	68%
HOUR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

Heat maps illustrate probabilistic need at each station – e.g., on 15% of days station has at least 25 MW violation in hour 17

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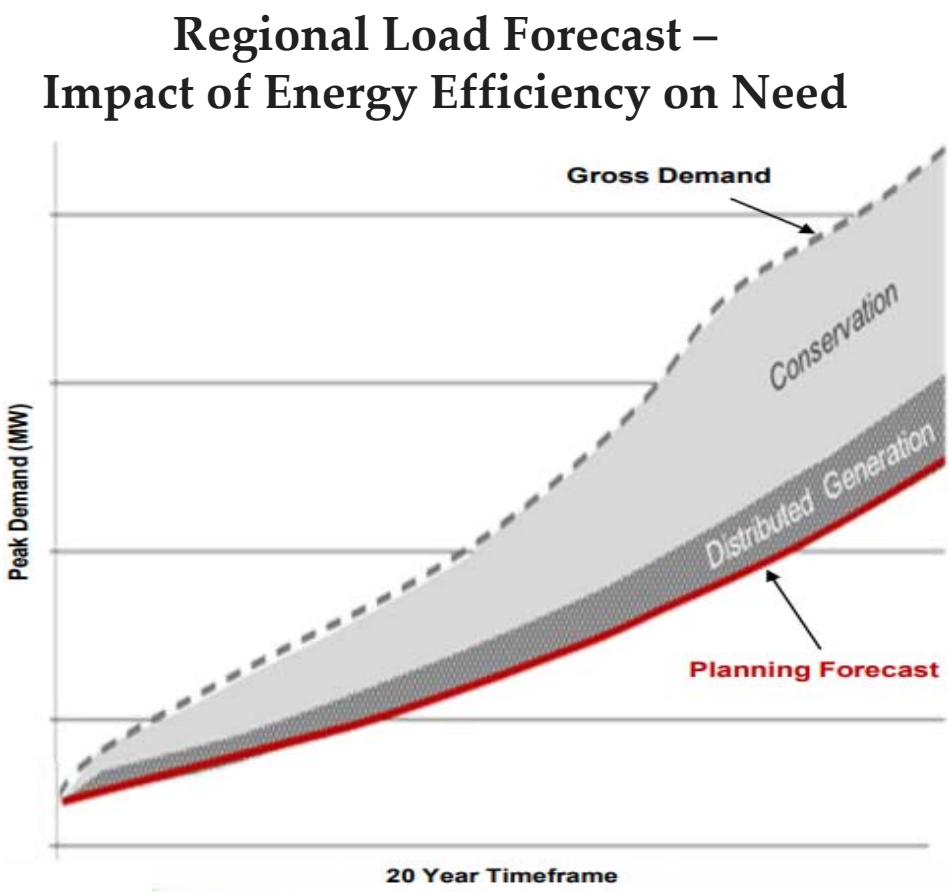
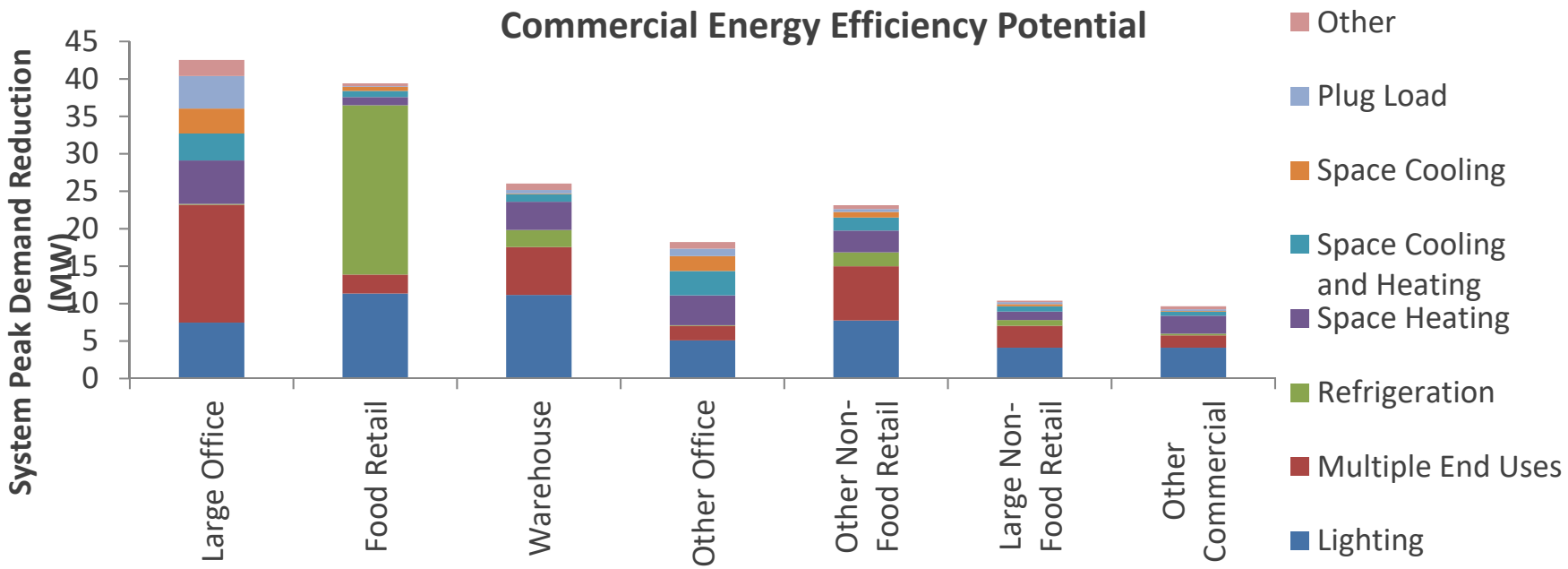
Considering EE as a Local Resource: Shifting EE From Demand to Supply Side



- In initial round of region plans energy efficiency was considered on the demand side of load forecasting
- Long term provincial targets shifted out need dates in regional/local areas
- Moving to now consider additional energy efficiency as a resource capable of meeting local needs to be evaluated against other wires and non wires alternatives

Considering EE as a Local Resource: Quantifying Local Potential



- Characterizing the existing and anticipated load served by the Transformer Station by customer type and end-use
- Identify energy efficiency measures capable of delivering demand reduction

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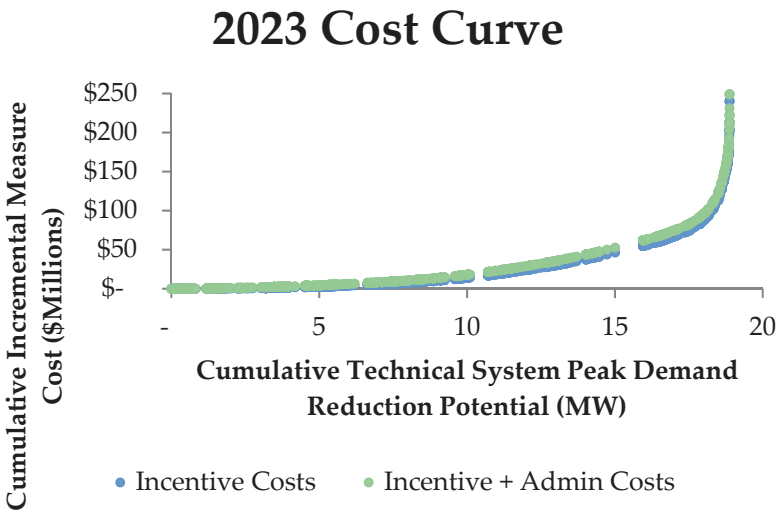
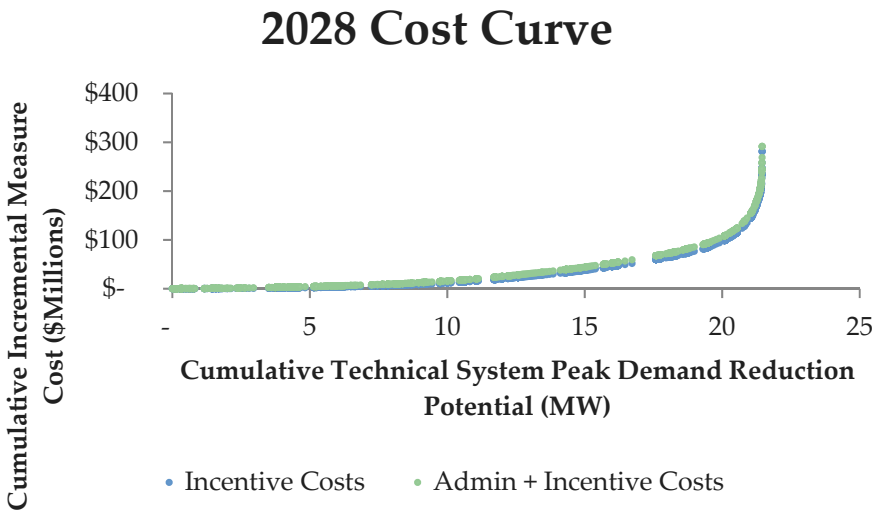
Considering EE as a Local Resource: Comparing Costs and Benefits





- Developing cost-curves to estimate the quantities of peak demand reduction the identified energy efficiency measures can provide over time
- NPV analysis used to compare energy efficiency against wires , non-wires and integrated options

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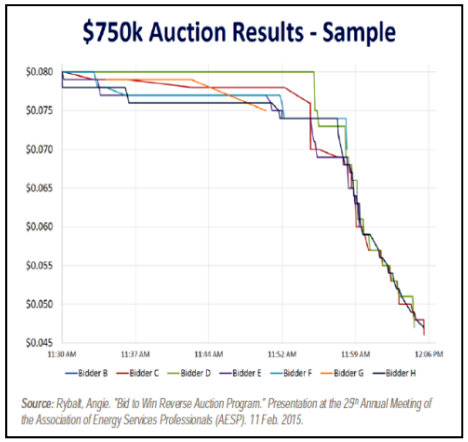
Considering EE as a Local Resource: Key Ontario Initiatives

Near-term – within current EE framework

- **Province-wide programs & a Local Program Fund for utilities:** consider opportunities to target systems needs via existing programs and prioritizing funding to new local programs that target system needs

Longer-term – evolving EE and planning frameworks

- **Post 2020 EE Framework Development:** explore options to better align EE programs with electricity system needs in the next energy efficiency framework
- **Regional Planning Process Review:** examine process improvements to reduce barriers to non-wires as part of a utility's infrastructure planning
- **Energy Efficiency Pilot Auction**: test procurement mechanism to competitively procure EE
- **York Region Non-Wires Alternative Demonstration Project:** develop and test local market design to procure resources that meet distribution-level needs and enable simultaneous bulk market participation
- **Ontario Energy Board Utility Remuneration Consultation:** explores how to remunerate utilities in ways that make them indifferent to solutions (e.g. address decreased electricity sales)



Source: Rybalt, Angie. "Bid to Win Reverse Auction Program." Presentation at the 25th Annual Meeting of the Association of Energy Services Professionals (AESP). 11 Feb. 2015.

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Bronwen Smith

Senior Advisor, Market Strategy

Independent Electricity System Operator (IESO)

Bronwen.Smith@ieso.ca

T: (416) 969 6056

Katelyn Margerm

Specialist, Conservation Planning

Independent Electricity System Operator (IESO)

Katelyn.Margerm@ieso.ca

T: (416) 969-2532