Transportation Electrification

Presentation to Pickering Community Advisory Council

Andrea Brown
Sr. Manager Strategic Environmental Initiatives

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ONTARIO POWER GENERATION

OPG's is a Leader in Clean Energy Investments

POWER WITH PURPOSE: Providing low cost power in a safe, clean, reliable and sustainable manner for the benefit of our customers and shareholder.

- OPG produces approximately 50% of the power for the province, and it's over 99% free of GHG emissions

- OPG is a leader in clean energy investment:
  - Completed Ontario's coal phase out in 2014
  - Converted two former coal generating stations in the Northwest to biomass
  - Significant waterpower investments:
    - New Peter Sutherland Sr. GS, built in partnership with Coral Rapids Power
    - Upper & Lower Mattagami River redevelopments
    - Niagara Tunnel Project
  - Executing Darlington Refurbishment
  - Developing Nanticoke Solar on former coal generation site
  - Investing in Pickering Nuclear GS to continue operations to 2024
  - Developing Gull Bay microgrid project

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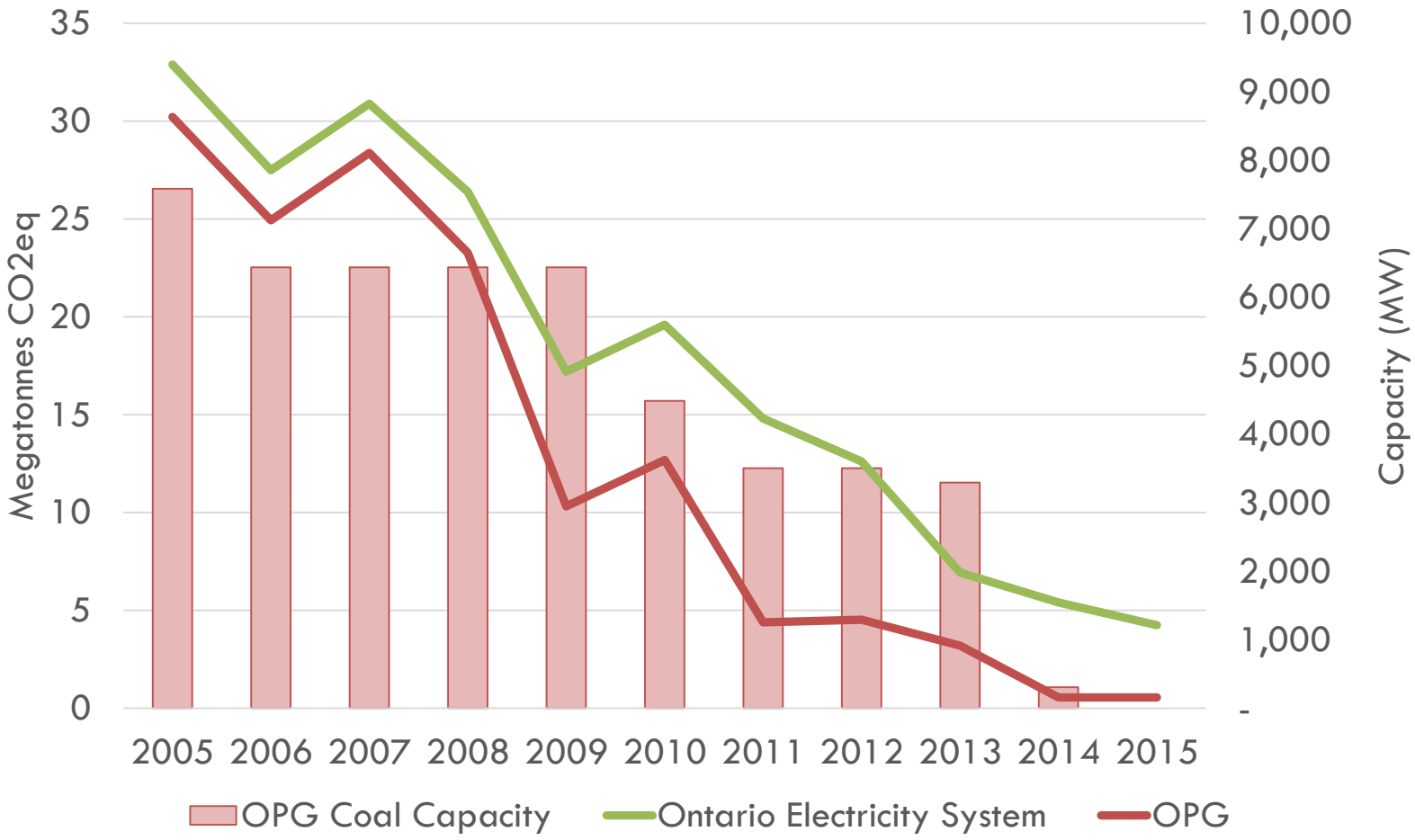
Ontario's Electricity Sector Emissions Have Fallen Drastically…



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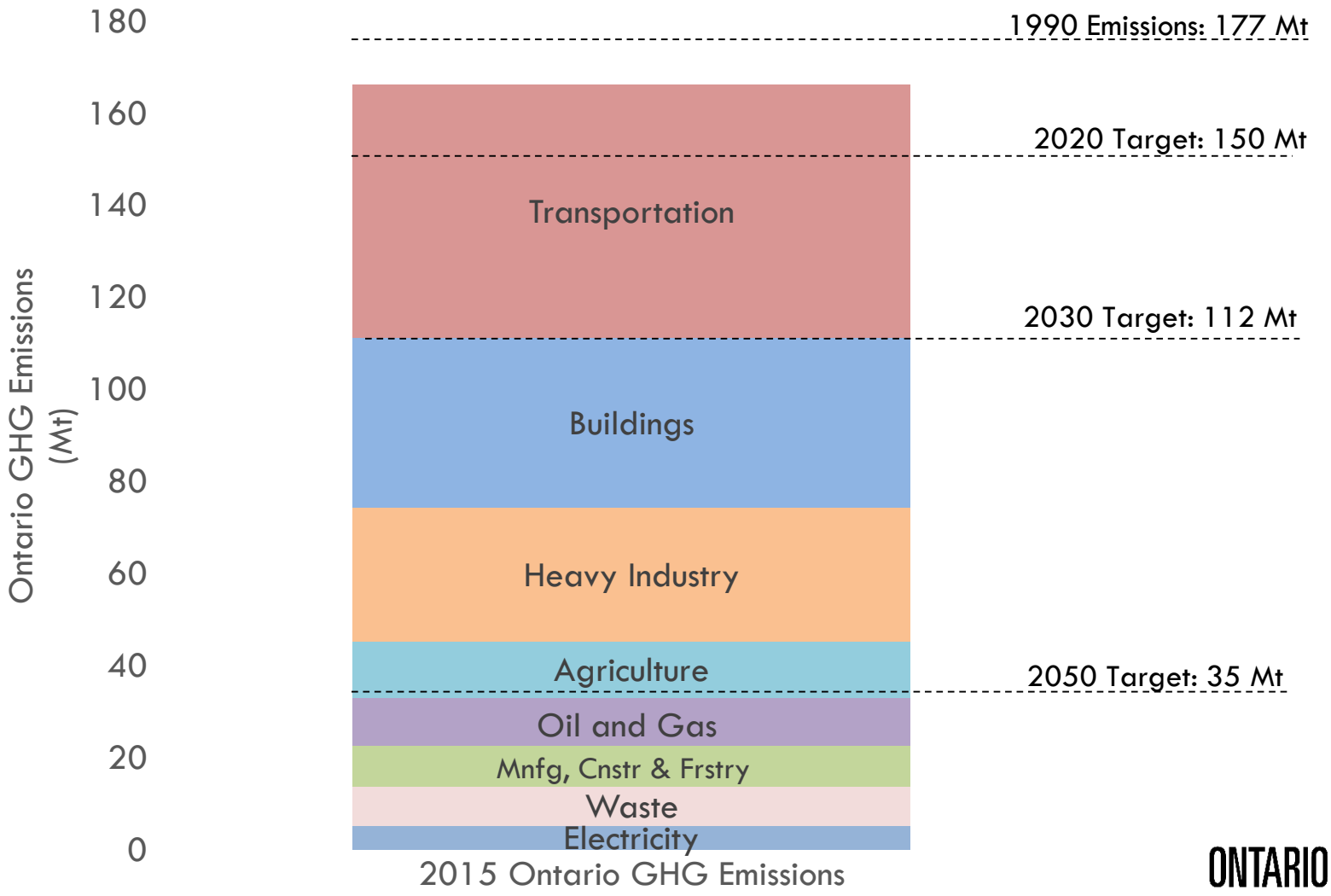
Transportation is the Largest Emitting Major Sector in Ontario



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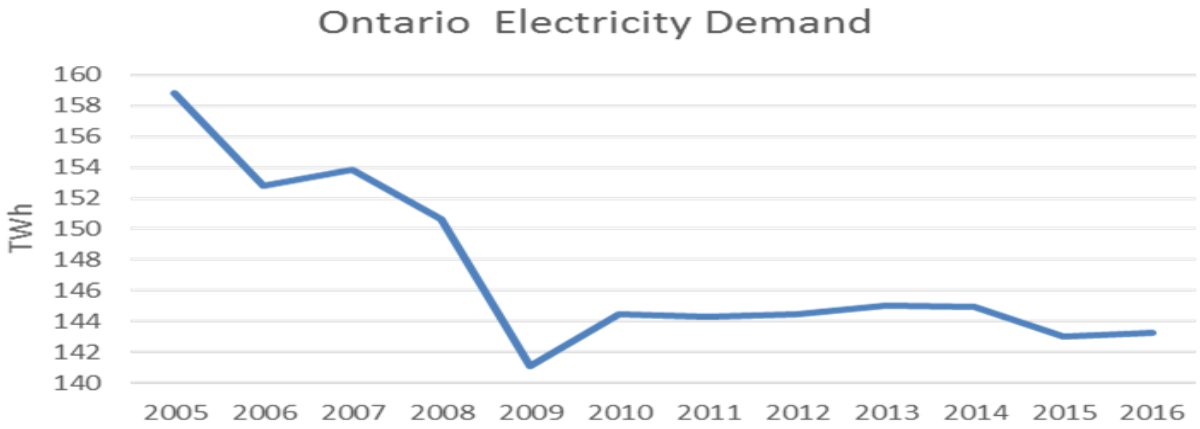
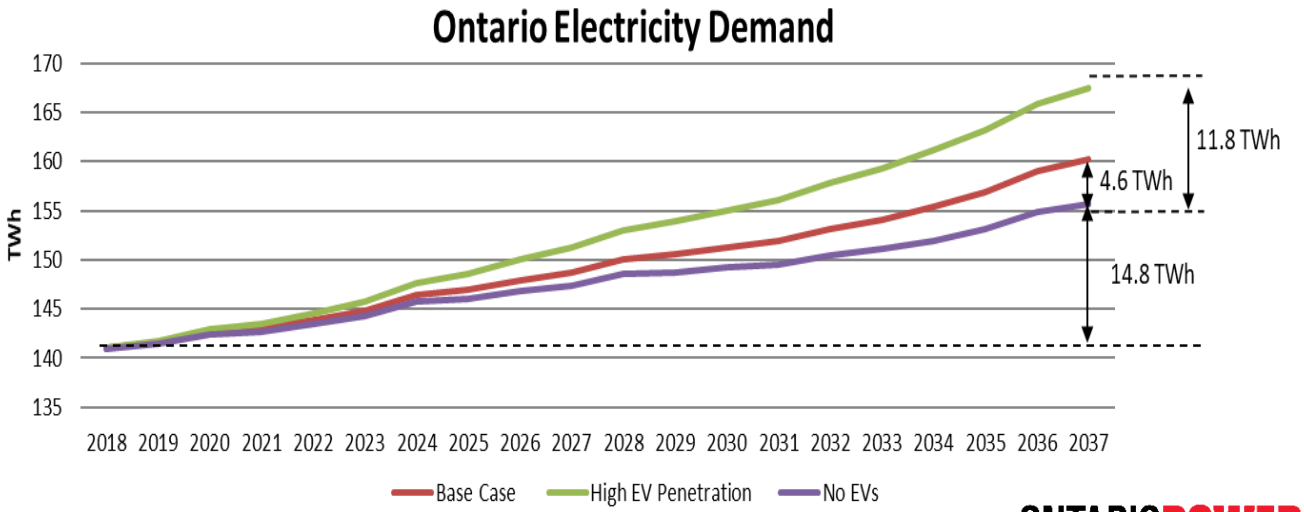
EVs can Lower Electricity Costs

Falling Demand and Increasing Investment Lead to Higher Electricity Prices



OPG forecasts that 25-45% of electricity demand growth over the next 20 years could come from EVs



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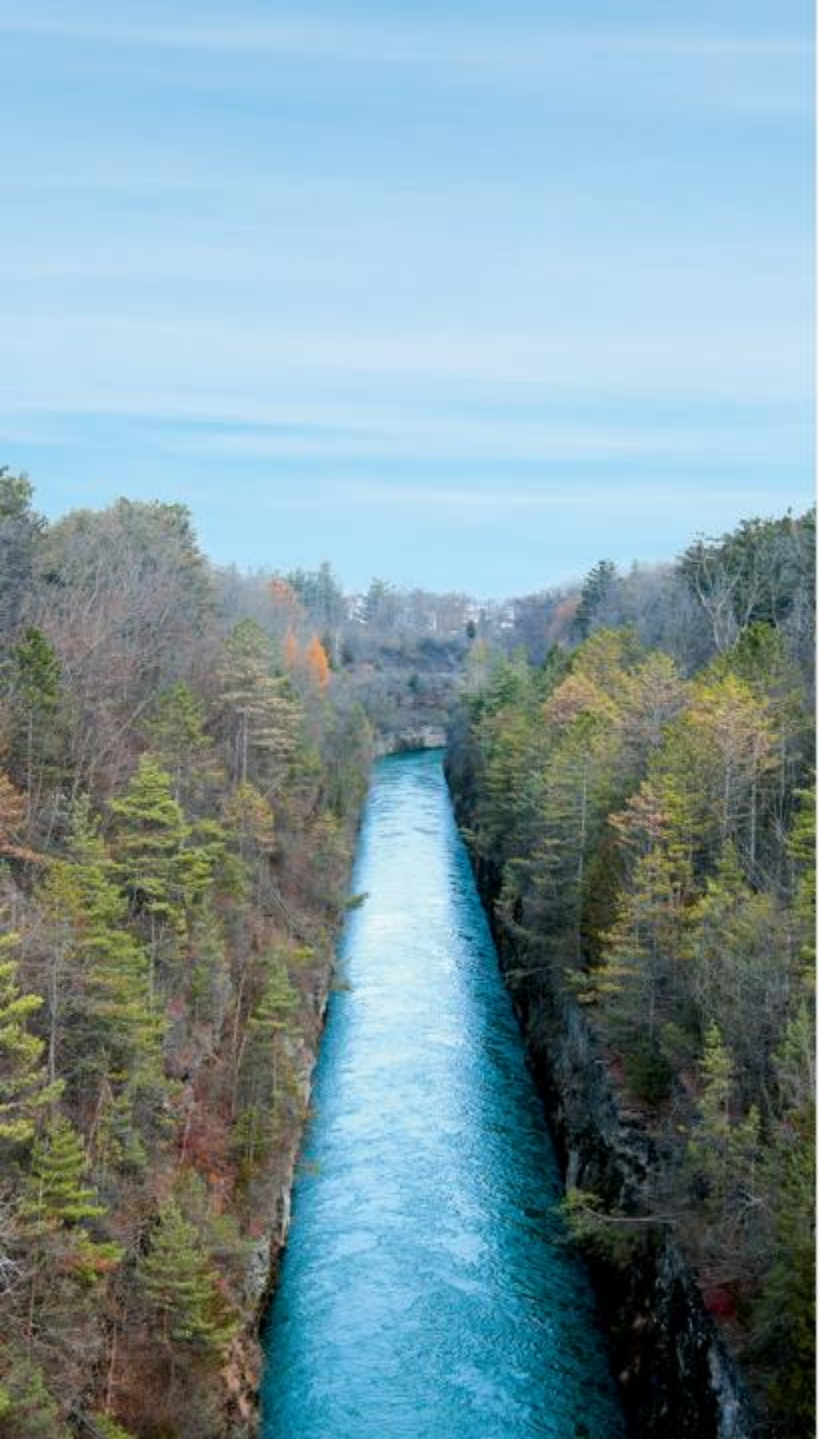

Win-Win Situation

↓ Reduce GHG Emissions by 9 Megatonnes

↓ Reduce Electricity Prices by 4%

↑ Increase Electricity Demand by12 TWh

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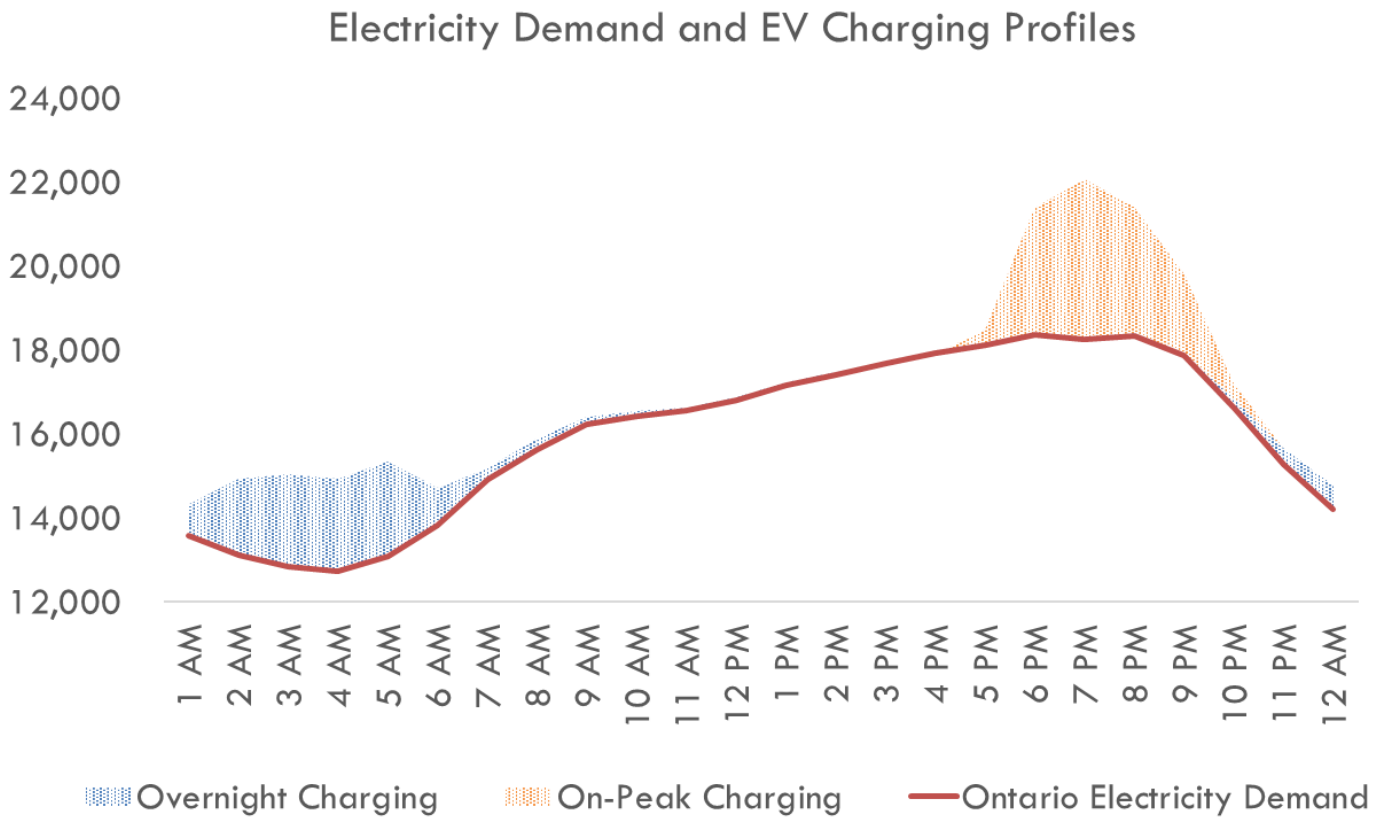
Managing Electric Vehicle Demand will be Essential



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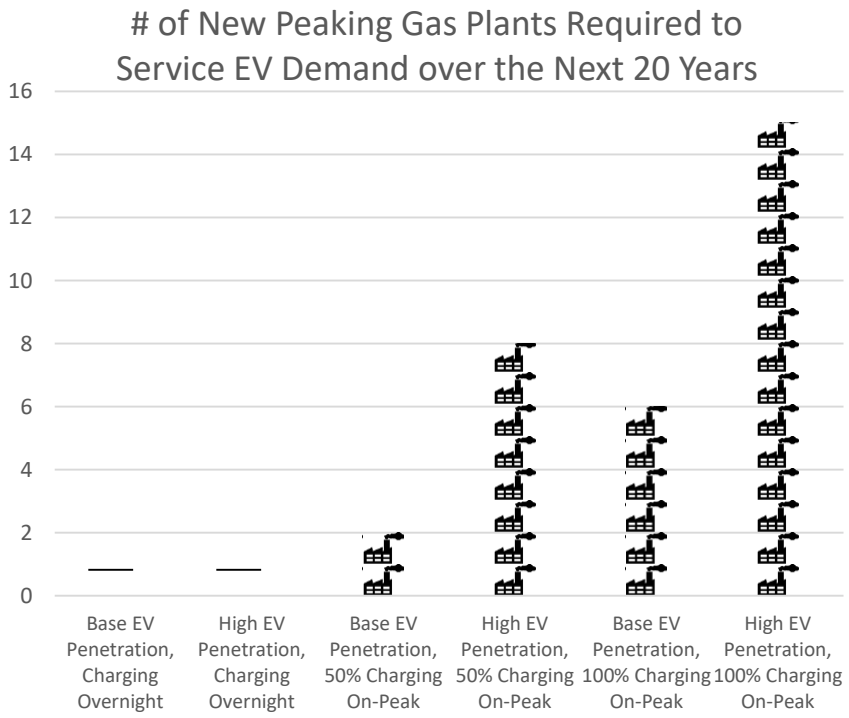
Unmanaged EV Demand Will Increase Costs and GHGs

- On-peak charging will increase electricity system GHG emissions as gas-fired generation is used to meet incremental peak demand
- As EV demand grows, up to 15 new gas-fired generators will be required to meet peak demand, increasing electricity bills for consumers above OPG's base forecast



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OPG's Transportation Electrification Strategy

Leverage **OPG's clean electricity** to support the electrification of transportation

Maximize use of **existing clean generation investments** with increased electricity demand

Create **new commercial growth** opportunities for OPG

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OPG Leadership in Transportation Electrification

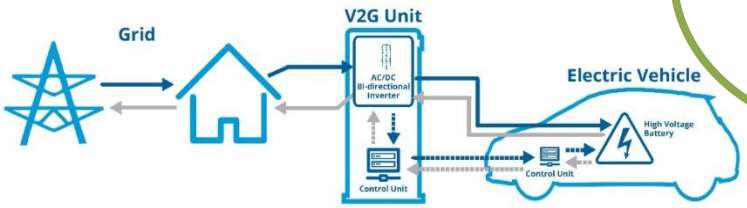
Pilot new technologies

Fleet Electrification

Increase EV adoption

Facilitate access to EV Charging

New business opportunities



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Education and Awareness

PLUG 'N DRIVE

POWERPLACE

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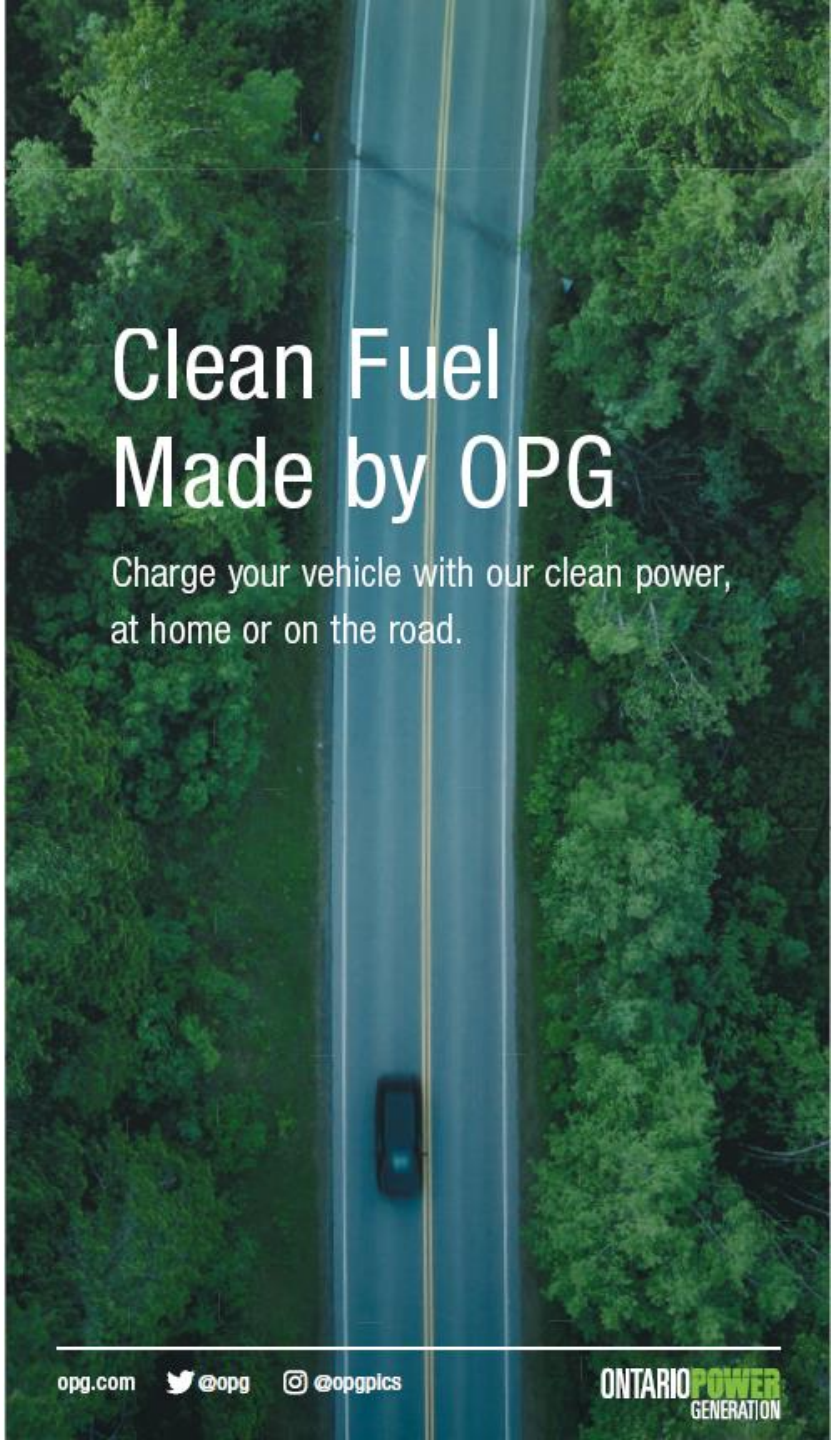
- OPG founded Plug n Drive and recently helped fund their EV Discovery Centre
- OPG partnered with GM to help launch the Volt EV in Canada
- OPG was the host sponsor of the Electric Mobility Canada conference in Ottawa in 2018



Bolt Across OPG

- Niagara to Thunder Bay
- 3000 km
- ~100 driver/riders
- 29 OPG sites
- hundreds of employees engaged

A demonstration that:

- Charging infrastructure exists across the province; making EVs a viable option even for long trips
- EV owners save money
- Electrifying transportation makes economic sense

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OPG's Electric Vehicle Chargers

Since installing the first round of 32 chargers in December 2017; OPG workplace and fleet chargers have:

- Provided more than 2,200 hours of charging at work
- Dispensed more than 12MWh of electricity, enabling more than 60,000km of GHG-free transportation
- Reduced

2018 plan is to **double** the number of charging spots available at OPG sites.

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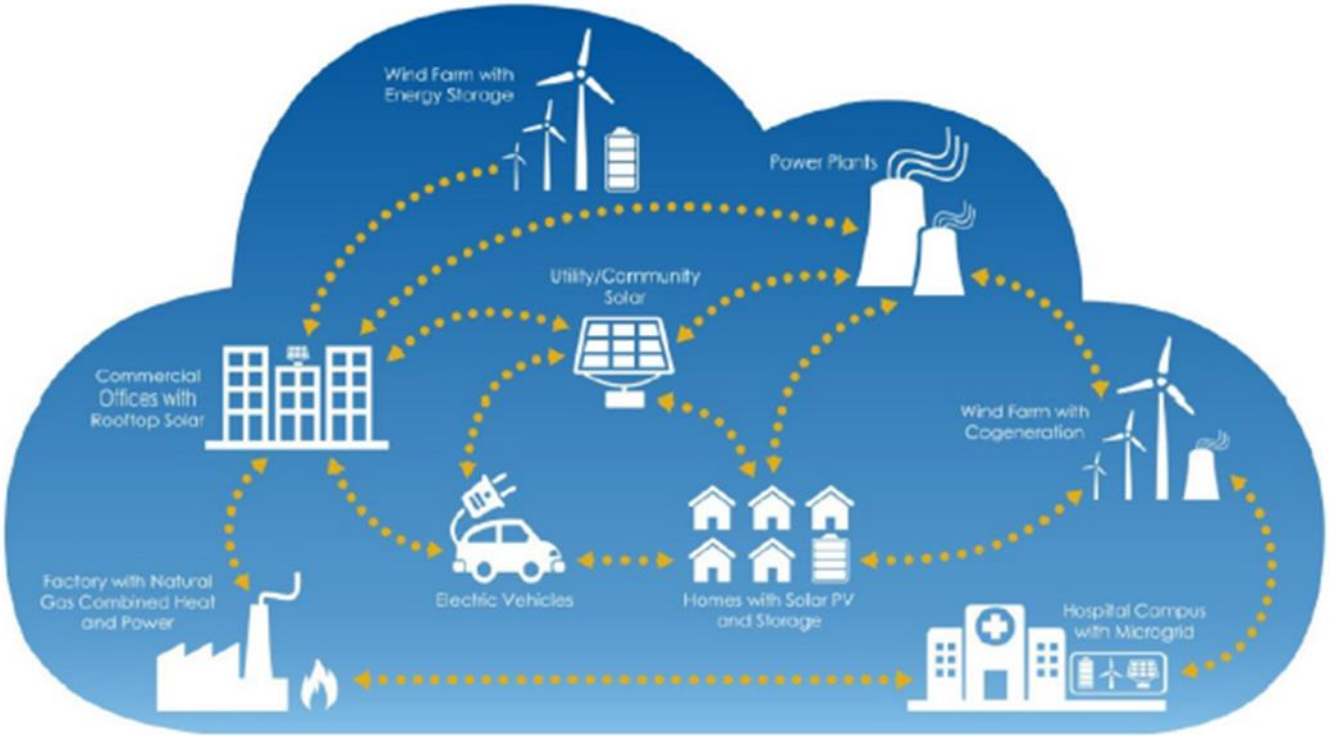
Vehicle-Grid Integration Could Mean New Opportunities…



Source: Navigant Research

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Clean Hydrogen

Benefits of H2 fuel cell vehicles

- Potential business case for use of surplus baseload to produce hydrogen
- No overhead wires required for rail
- Facilitates long haul trucking due to fueling times akin to gasoline

Challenges of clean hydrogen production

- Surplus baseload diminishing post 2025
- Regulatory uncertainty for OPG (i.e. behind the meter generation)
- Centralized vs onsite hydrogen production
- Electrolysis not cost competitive to other forms of H2 production

Hydrogen made via electrolysis using Ontario's clean energy is another form of transportation electrification. OPG is investigating potential for clean hydrogen production.

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