



Free Overnight Charging Proposal

July 24, 2017

ONTARIO**POWER**
GENERATION



Benefits of Free Overnight Charging

Free overnight charging program will drive EV adoption

- Despite the lower value of free overnight charging relative to EV incentives, the psychological appeal of driving for free can help drive EV sales in Ontario
- Free overnight charging could be an important part of the emotional wave currently driving interest in EVs

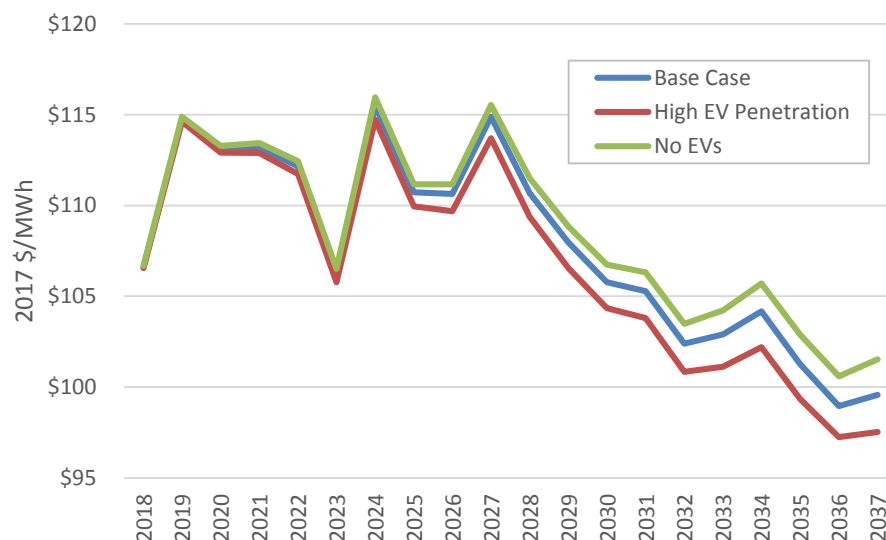
EVs will lower electricity costs

- OPG modeling shows that growth in electric vehicles will lower electricity rates in Ontario
 - High EV penetration could lead to a 4% decrease in residential electricity commodity cost by 2037, reducing the impact as ratepayers begin to repay Fair Hydro Plan debt
 - The electricity system has a large amount of fixed costs. Spreading these costs over a larger pool of electricity consumption reduces electricity rates
- EVs are expected to make up 25–50% of electricity demand growth over the next 20 years

EVs will lower Ontario GHG emissions

- The transportation sector is the largest emitter of GHGs in Ontario. Fuelling vehicles with clean baseload electricity offers a large opportunity to reduce GHG emissions in Ontario and build upon the extensive investment already made to clean up the electricity grid

Residential Pre-FHP Electricity Commodity Cost





Challenges with Implementation

■ Tight Timeline & Budget

- CCAP committed to launch a free overnight charging program in 2017 with \$15 million in funding

■ Need for New Infrastructure

- Traditional approach to separately measure EV demand would require an electrician to visit each EV owner's residence and install a sub-meter on the EV charger. This is extremely costly

■ Regulatory Issues

- In order to facilitate the inclusion of free overnight charging on LDC bills, regulatory changes would likely be required

■ LDC Billing Issues

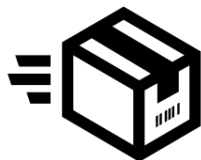
- LDCs would be required to make costly changes to their billing processes and systems



Monthly bill statement	
Account number: 000 000 000 000 000 0	The Ontario government is providing a rebate on your electricity costs equal to the provincial portion of the HST.
Meter number: 000000	
Your electricity charges	
Electricity	
488 kWh Off-peak (lowest price) @ 8.700 c/kWh	0.00
127 kWh Mid-peak (mid price) @ 13.200 c/kWh	0.00
135 kWh On-peak (highest price) @ 18.00 c/kWh	0.00
Delivery	
0.00	0.00
Regulatory charges	
0.00	0.00
Debt retirement charge	
0.00	0.00
Your total electricity charges	
H.S.T.	0.00
8% provincial rebate	(0.00)
Total amount	\$0.00



OPG's Simple & Cost-Effective Solution



- Telematics device that can simply be plugged into any EV's data port by the user to record its charging behaviour. Data transmitted to program manager via cellular network
- Device can be shipped directly to users who then plug-in the device by themselves
- EV drivers reimbursed for overnight charging with rewards points that can be redeemed online for gift cards at major retailers
- App to provide insight and analysis into driving and charging patterns and compare to other EV drivers
- Program avoids any regulatory or infrastructure changes making it simple, cost-effective and quick to implement



Potential Partners

- OPG has investigated potential solutions for providing free overnight charging
- OPG has only been able to find one company that offers both the technology and software platforms necessary to launch the free overnight charging program
 - FleetCarma is an Ontario-based company which has developed an EV-specific telematics device
- OPG is continuing to assess whether other potential partners exist and remains open to working with additional partners

FleetCarma

- OPG is using FleetCarma's technology to assess its own fleet to determine which vehicles are suitable and cost-effective to convert to electric
- FleetCarma has existing in-vehicle technology and a software platform that could facilitate a cost-effective free overnight charging program within the \$15 million budget
- FleetCarma manufactures its technology in Cornwall and Markham, Ontario

SmartCharge New York

- FleetCarma is operating a program called SmartCharge New York for ConEdison
- The program uses incentives to drive charging behavior that is positive for the electricity grid:
 - Customers receive \$5 in rewards points if they do not charge on-peak all month
 - Customers receive 5 cents/kWh in rewards points for all off-peak charging
- The learnings from this program could be leveraged for Ontario's Free Overnight Charging program



Potential Role of the Parties



- Work with OPG to establish goals for the program to enable optimal design and outcomes
- Provide funding from Greenhouse Gas Reduction Account
- Overall program design and management
 - Maximize the benefit to the electricity system and ratepayers based on its expertise related to the system
- Program administration and management
- Procuring contractor(s) to help execute the program
- Marketing
- Budgeting and financial management
- OPG could share EV data with LDCs to further their understanding of load in their territory

LDCs



Why OPG?

OPG can operate the program throughout the province

- OPG operates throughout the province, allowing EV owners to participate regardless of where they live and which LDC they connect to. 60+ LDC programs would add unnecessary cost and complexity
- By operating a province-wide program, OPG could leverage economies of scale to minimize program costs

OPG can act quickly and cooperate with government

- OPG is willing and prepared to execute the program quickly. OPG has existing relationships with necessary partners. OPG has capital to deploy immediately to launch the program
- OPG has a long history of operating electricity system assets to the benefit of ratepayers including Beck PGS and hydroelectric frequency regulation

OPG can maximize the value of the program for government and ratepayers

- As the largest baseload generator in the province and the industry leader in market modeling, OPG can maximize the value of the information gathered to the benefit of ratepayers
- As a profit seeking entity, OPG is well positioned to find value opportunities from the program so that it can potentially continue beyond the CCAP commitment of 4 years as a self-funding program
- The knowledge gained from operating this program is likely to lead to future business opportunities for OPG in Ontario and beyond, to the benefit of the shareholder and ratepayers

OPG has a long-history of supporting the electrification of transportation

- 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 involvement provides direct connection to the “clean fuel” that powers EVs



Communications Opportunities

Announcement Opportunity

- The launch of a single, province-wide free overnight charging program would provide an excellent announcement opportunity for the Ministry of Energy and Ministry of the Environment and Climate Change

Fueled by Clean Power

- OPG's power is more than 99 per cent free of smog and greenhouse gas emissions
- An OPG operated free overnight charging program would provide an excellent opportunity to tie the overnight power consumed by EV owners to OPG's clean, baseload generation
- EVs charged overnight would have virtually no carbon footprint

Key Messages

- Ontario is leveraging its investment to clean up the electricity system to help clean up transportation, the largest emitting sector in the province
- EVs charged overnight using OPG's clean power are virtually smog and greenhouse gas free
- OPG implemented the Province's coal phase out to clean up the electricity system, the equivalent to removing 7 million vehicles from the road. Together, we will now leverage that clean investment to fuel the next generation of vehicles with clean OPG electricity and begin to remove Ontario's 8 million fossil fuel cars from the road



Summary of OPG's Proposal



- **Quick implementation**

- OPG believes there is still time to launch the program in 2017



- **Cost-effective**

- OPG believes it can operate a province-wide program within the \$15 million budget included in the CCAP, pending Ministry confirmation of program intent



- **Seamless solution**

- OPG can manage program design, procurement and ongoing administration of the program



- **Meets government commitment**

- Provides a cost-effective solution to a challenging government commitment