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Subject: Final Ryerson CUE white paper: GHG Emission Mitigation and Electrical Load Impact in Urban Ontario
Attachments: 1-White Paper 6 - Energy Planning.pdf

Hi,

Please find attached the latest white paper, *GHG Emission Mitigation and Electrical Load Impact in Urban Ontario*, from Bob Singh, the IESO's Integration of Urban and Electricity Planning Research Fellow at the Ryerson University Centre for Urban Energy. Please feel free to share internally.

Abstract: GHG emission mitigation efforts can pay significant dividends if urban areas are targeted as they consume disproportionately high levels of energy per capita utilizing carbon-based energy resources. The urban areas of Ontario are no exceptions; two key GHG emitters being the transportation and the buildings sectors. The government of Ontario has taken measures (e.g., subsidies for electric vehicles, carbon tax on gasoline) to promote cleaner fuel use in the transportation sector. The paper provides formulations for delivering on GHG reduction targets through initiatives and/or disincentives and their impacts on the electrical load profile, assuming electricity as the cleaner substitution fuel for Ontario. More specifically, it optimizes investments made in providing incentives for GHG reduction to light duty vehicles (LDVs) and single detached homes (SDHs), taking into consideration costs and benefits, for different levels of LDV/SDH uptakes. The impact of these uptakes on the electrical load profile are also assessed. The algorithms developed serve as a tool for policy makers to undertake scenario analyses where they can assess the interplay between variables like investments (i.e., subsidies), carbon tax, benefits due to GHG reduction, and levels of uptakes in electric vehicles and/or SDH heating in order to achieve the desired goal while optimizing investments. The electricity infrastructure planners can use this tool (a) to make timely adjustments to their short and midterm plans by assessing electrical load impact of government decisions on subsidies and/or carbon tax and (b) to undertake scenario planning studies for long-term plans. Making relevant assumptions, the paper also provides the results of scenario analyses and sensitivities assessments for

Ontario's GHG reduction targets. The paper highlights the need for comprehensive studies in the areas of GHG emission cost to the environment and health which is currently lacking.

This white paper marks the completion of the IESO-Ryerson contract for the Integration of Urban and Electricity Planning Research Fellowship.

Below is the full list of papers produced through this Research Fellowship and available to IESO staff:

6. GHG Emission Mitigation and Electrical Load Impact in Urban Ontario
5. Regulatory Challenges with Transactive Energy in Urban Communities
4. Urban Energy Efficiency and Sustainability through New & Emerging Technologies
3. Achieving Energy Sustainability in Toronto: Moving towards a low carbon future
2. Achieving Electricity Grid Resilience
1. Sustainable Integrated Urban & Energy Planning, the Evolving Electrical Grid and Urban Energy Transition

All the best,

Tom Aagaard | Senior Specialist, Policy, Engagement and Innovation

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