



E3/NS Power Electrification Study

Electrification Study Roadmap

Key Findings

E3 and NS Power developed an Electrification Study and Roadmap to summarize key findings and recommendations on programming to support beneficial electrification in both the transportation and building sectors.

Based on the results of both the jurisdictional scan, the report identifies the following key findings:

- Electrification of end uses reduces total, economy-wide emissions in Nova Scotia
- Most transportation electrification investments produce benefits that exceed costs for drivers, ratepayers and society
- Policy changes may be required to encourage adoption of the most efficient equipment to support building electrification and avoid potential adverse impacts to ratepayers

Electrification Study Roadmap

Key Findings

Utility actions through time of use rates and programs to avoid “rebound peaks” at the beginning of off-peak hours to manage transportation loads will be crucial to minimizing costs and achieving ratepayer benefits

Encouraging adoption of advanced building technology (high performance heat pumps and hybrid heat pumps as well as building shell energy efficiency measures) will be essential to mitigate peak load impacts

NS Power has provided the E3 report to stakeholders as part of the Evergreen IRP process to advance its electrification strategy on the path to 2030

Electrification Study Recommendations

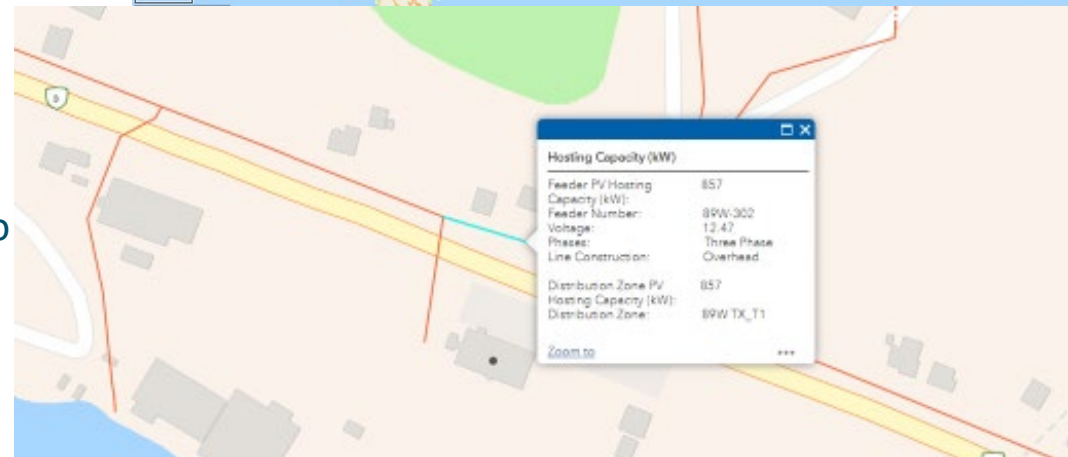
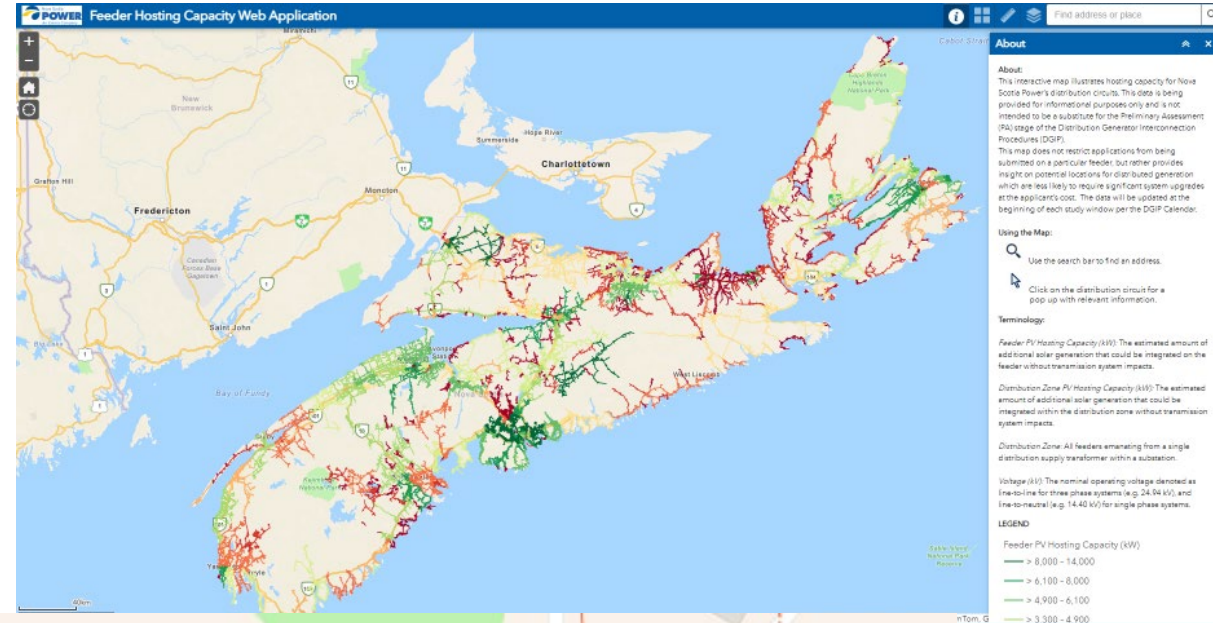
- Design and promote new rate structures that encourage adoption and minimize costs, including expanding current time-of-use rates to the full year and gradually moving to rates that reflect the marginal cost to serve load.
 - NS Power has started pilots to examine the benefits of time of use and critical peak pricing, the Company will continue to update the UARB and stakeholders on the results of these pilots.
- Work with E1 to provide rebates to help customers overcome high up-front costs of electrification, with the utility focused on technologies that provide ratepayer benefits.
 - NS Power is actively engaged with E1 and the DSMAG on electrification initiatives and DR pilot projects to promote electrification under the current DSM Supply Agreement and the 2026 to 2030 DSM Plan.

Electrification Study Recommendations

- Support development of infrastructure “backbone” for electric vehicle charging to improve geographic coverage and fill gaps where third parties may have less incentive to invest.
 - NS Power is working with provincial and federal governments to develop a strategy for expanding the vehicle charging network at the lowest cost to end users.
- Support cost-effective grid modernization and panel upgrades, as well as all-electric ready new construction, to ensure the utility doesn’t become a bottleneck to electrification.
 - NS Power has completed the Smart Grid Nova Scotia pilot and will use the findings from the project to determine/advance economic grid modernization projects that facilitate the path to 2030.
- Fully incorporate electrification strategy findings, including peak impacts and mitigation strategies, into utility planning models.
 - NS Power has updated its Load Forecast and IRP models to include some of the findings from the E3 electrification report and will continue to evolve these models as related electrification forecasts/approaches evolve.

Electrification Study Recommendations

- Advance public-facing distribution planning process to support electrification.
- NS Power continues to advance its distribution planning capabilities
 - AMI data has been integrated to distribution planning models to improve modeling accuracy
 - Distributed solar hosting capacity analysis has been completed and posted online
 - Interactive solar hosting capacity map will be available publicly per timelines under Commercial Net Metering
 - NS Power's Distribution Planning team has grown to accommodate increasing study requirements
- Per the report recommendations, NS Power will continue to investigate opportunities to incorporate load management modeling into its Distribution Planning models



Electrification Study Recommendations

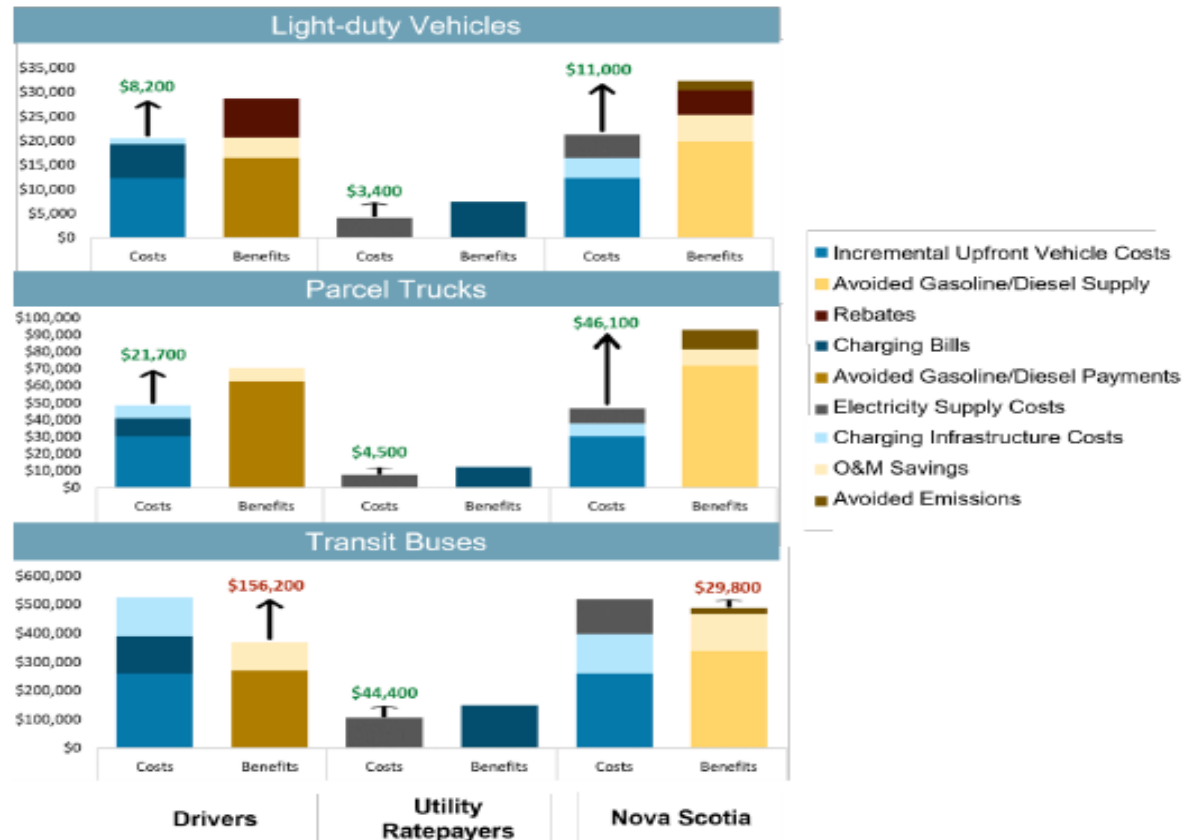
- Electrification at scale requires concerted effort and coordination across various organizations and interests with complementary expertise. Nova Scotia Power should continue to proactively build partnerships with these other key stakeholders.
 - NS Power has and will continue to work with all stakeholder groups to advance electrification in line with the provincial renewable electricity and coal phase out goals for 2030. A main avenue for this work is through this and future IRPs and/or other studies.
- Support an equitable transition through programs directly aimed at lower income or disadvantaged communities.
 - NS Power is engaged with low income and disadvantaged community advocates and supports the continuation of efficiency and electrification initiatives like those undertaken in the 2023 to 2025 DSM Supply Agreement.

Cost Benefit Analysis

- E3 and NS Power developed a cost benefit analysis tool to enable the analysis of building and transportation electrification solutions and the impacts of various programs.
 - The metrics produced as part of the cost benefit model include:
 - **Participant Cost Test:** costs and benefits to the fleet owner, vehicle driver or building owner
 - **Ratepayer Impact Measure:** the costs and benefits to all rate payers
 - **Societal Cost Test:** the costs and benefits from the perspective of the Province of Nova Scotia
 - The cost and benefit analysis includes consideration for the following:
 - Transportation: incremental upfront purchase costs of EVs, tax credits, operating and maintenance (O&M) savings, vehicle fuel savings, electricity bills and electricity supply costs for EV charging, charging infrastructure costs, and emissions savings
 - Buildings: upfront incremental cost of the appliance, incremental electricity bills, avoided fuel oil or natural gas bills, incremental electricity supply costs, avoided fuel supply costs, utility incentives, and emissions savings.

Cost Benefit Analysis

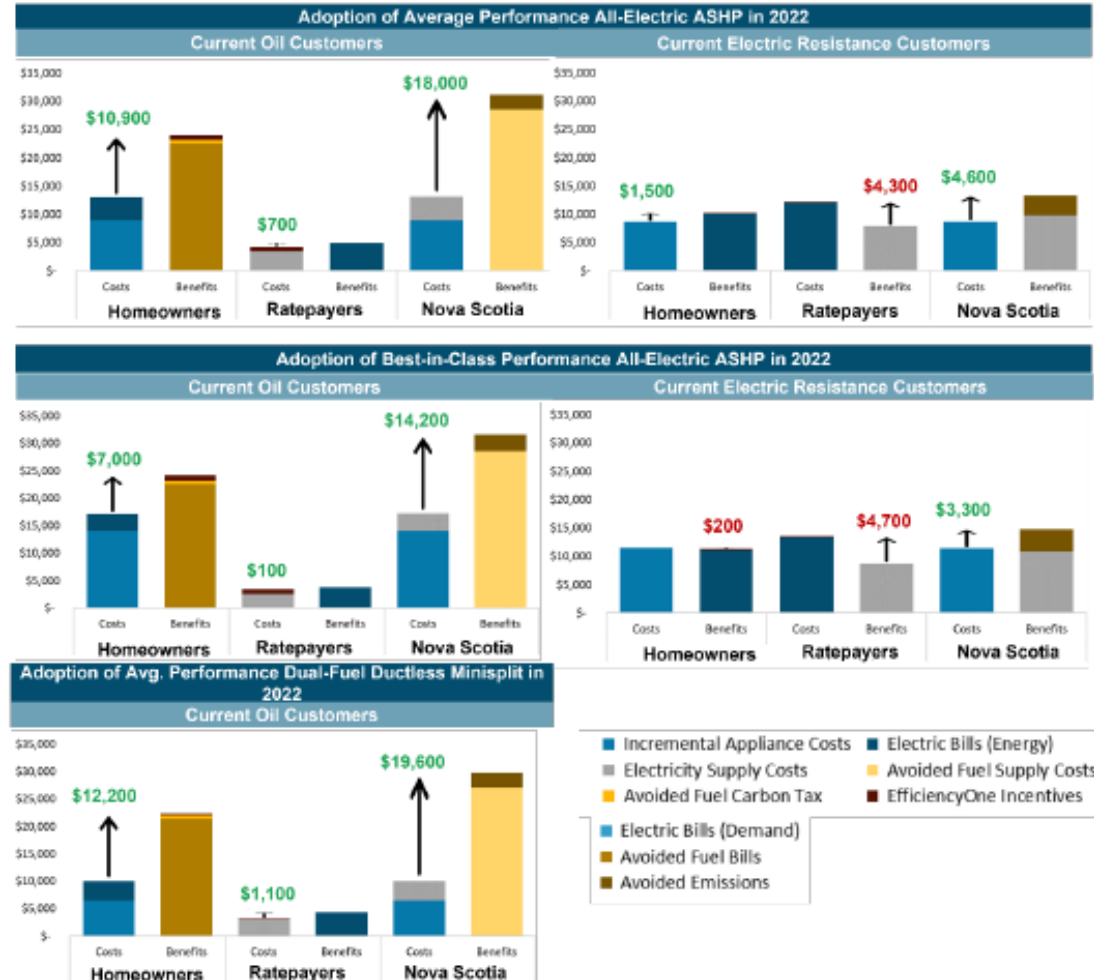
Figure ES-2. Net present value of costs and benefits of adopting light-duty vehicle in 2022, assuming managed charging with load management using vehicle-grid integration



Notes: The benefit estimates vary across scenarios based on rates, fuel costs, incentives, and marginal electricity costs. Results have been rounded to the nearest \$100. The figure above assumes (not exhaustive): managed charging with VGI to smooth loads, TOU electric rates, base gasoline and diesel prices, and a 12-year vehicle lifetime. Light-duty vehicles receive a \$3,000 provincial rebate and \$5,000 federal rebate.

Cost Benefit Analysis

Figure ES-3. Net present value of adopting heat pump technologies for selected cases



Electrification Focus in 2024

NS Power will continue to engage customers and representatives through the IRP Action Plan process and DSMAG to explore the electrification options that are most economic in the short to medium term using the E3 model and cost effectiveness analysis as a template as appropriate

- The E3 model has shown that there are "no regrets" electrification initiatives that could be implemented to accelerate the pace of electrification and hence decarbonization of end uses
- E3 has provided NS Power with a Cost Benefit Analysis tool that can be used to calculate the benefits of electrification and in collaboration with E1 NS Power will explore potential pilot projects that could be implemented during the current DSM Supply Agreement period or as stand-alone initiatives under the IRP Action Plan
- Design and prepare the launch of one or more electrification and demand response specific initiatives in collaboration with the IRP and/or DSMAG stakeholders