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Pollution Probe: The Pathways Initiative Workshop

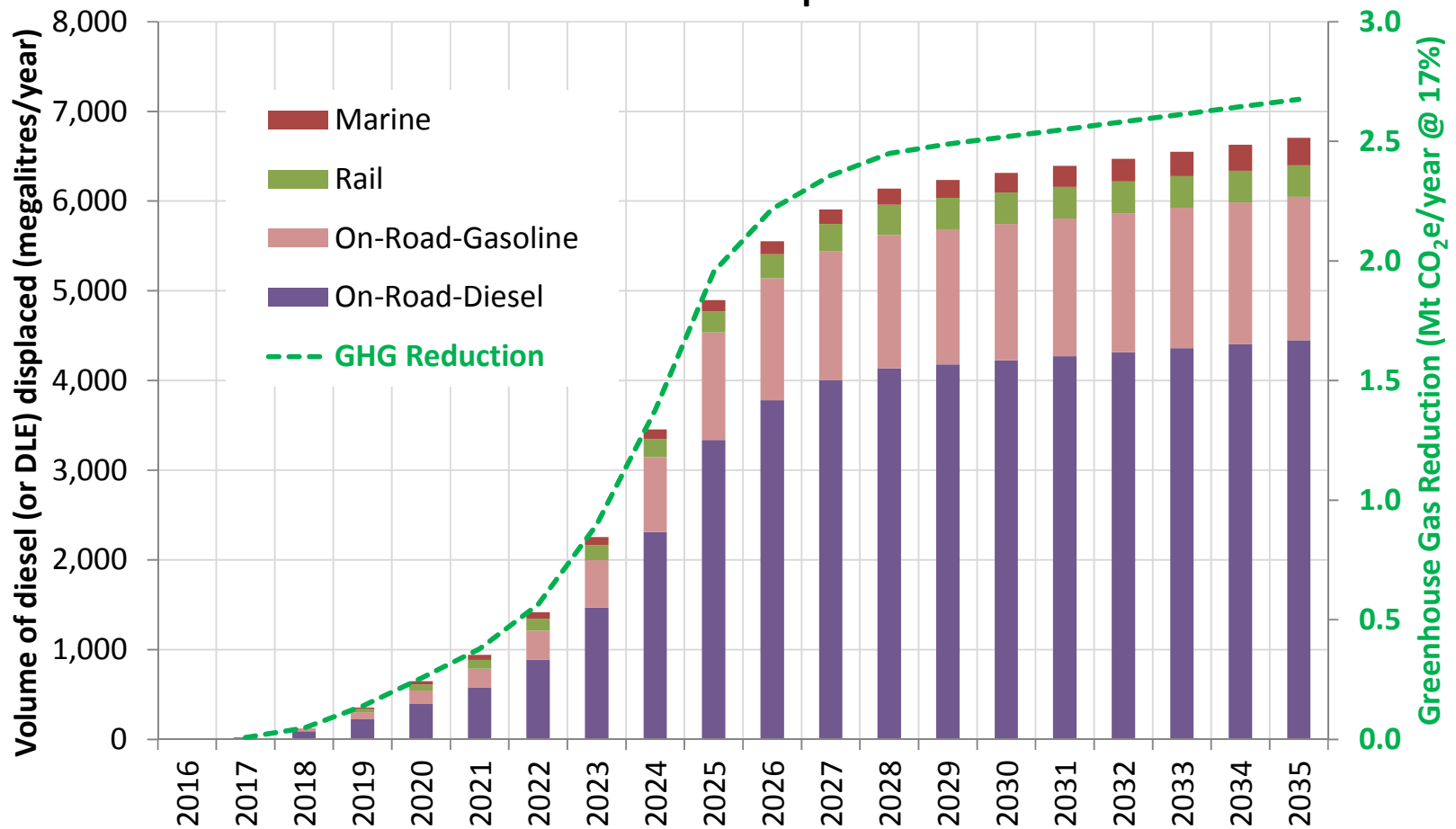
Natural gas – a tool to economically decarbonize transportation in Ontario

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Agenda

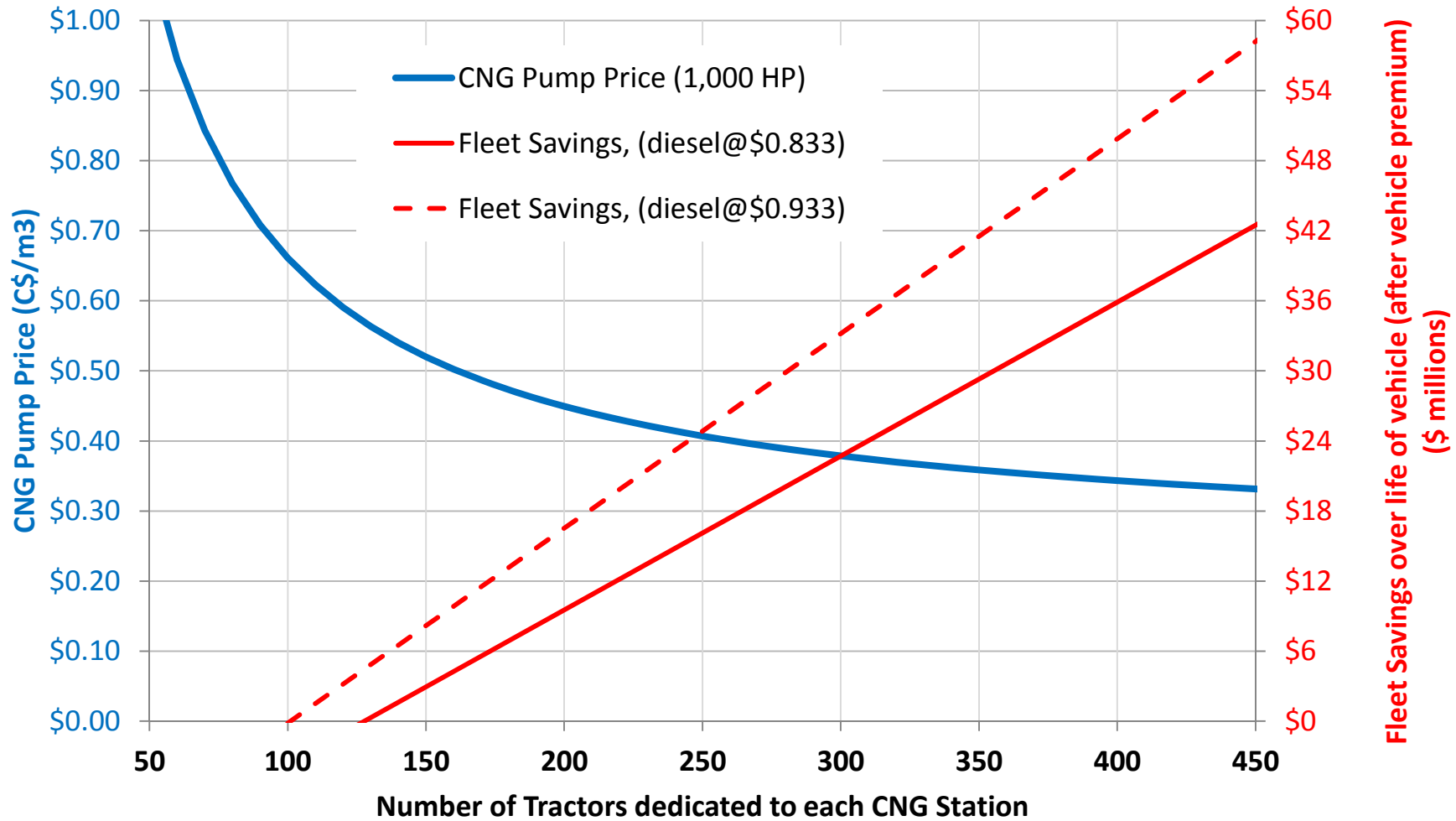
- The size of the market
- Economies of scale impacts
- The potential with Renewable Natural Gas
- Barriers and solutions
- Conclusions and Summary

The size of the Ontario heavy duty market



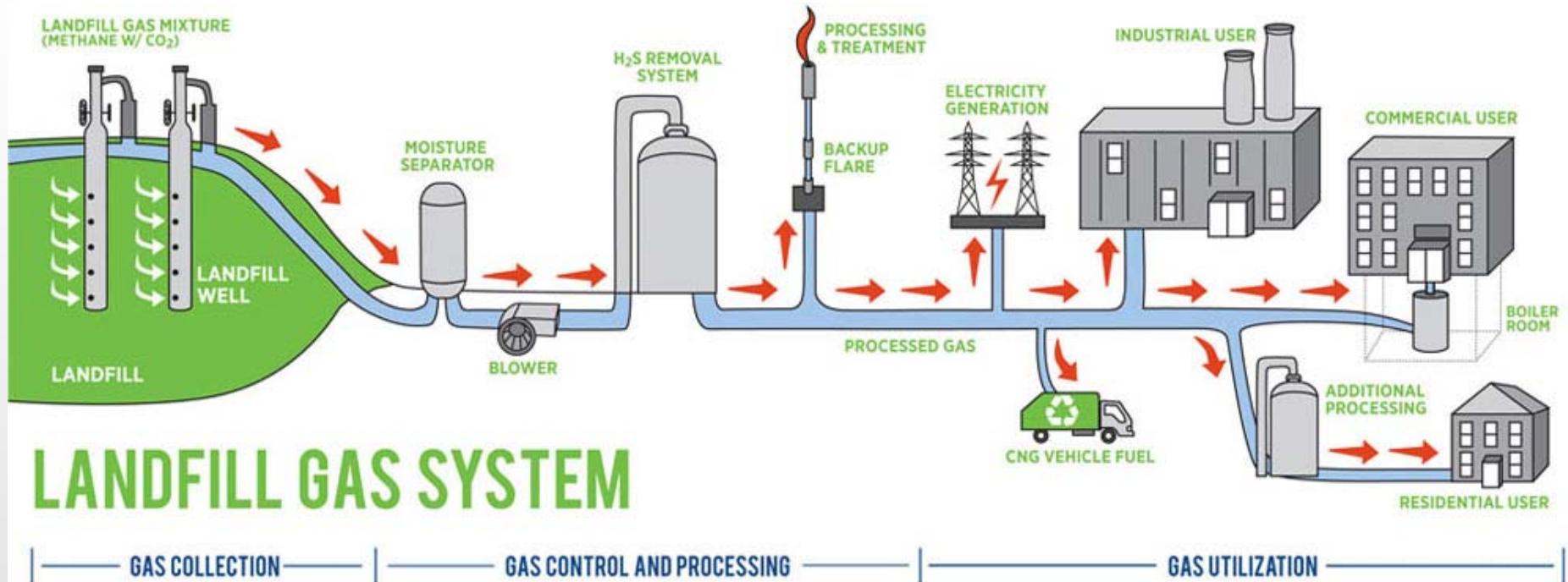
Potential: 6.7 Billion DLE + 2.7 MtCO₂e + \$3B savings/year by 2035

Economies of scale are critical to success



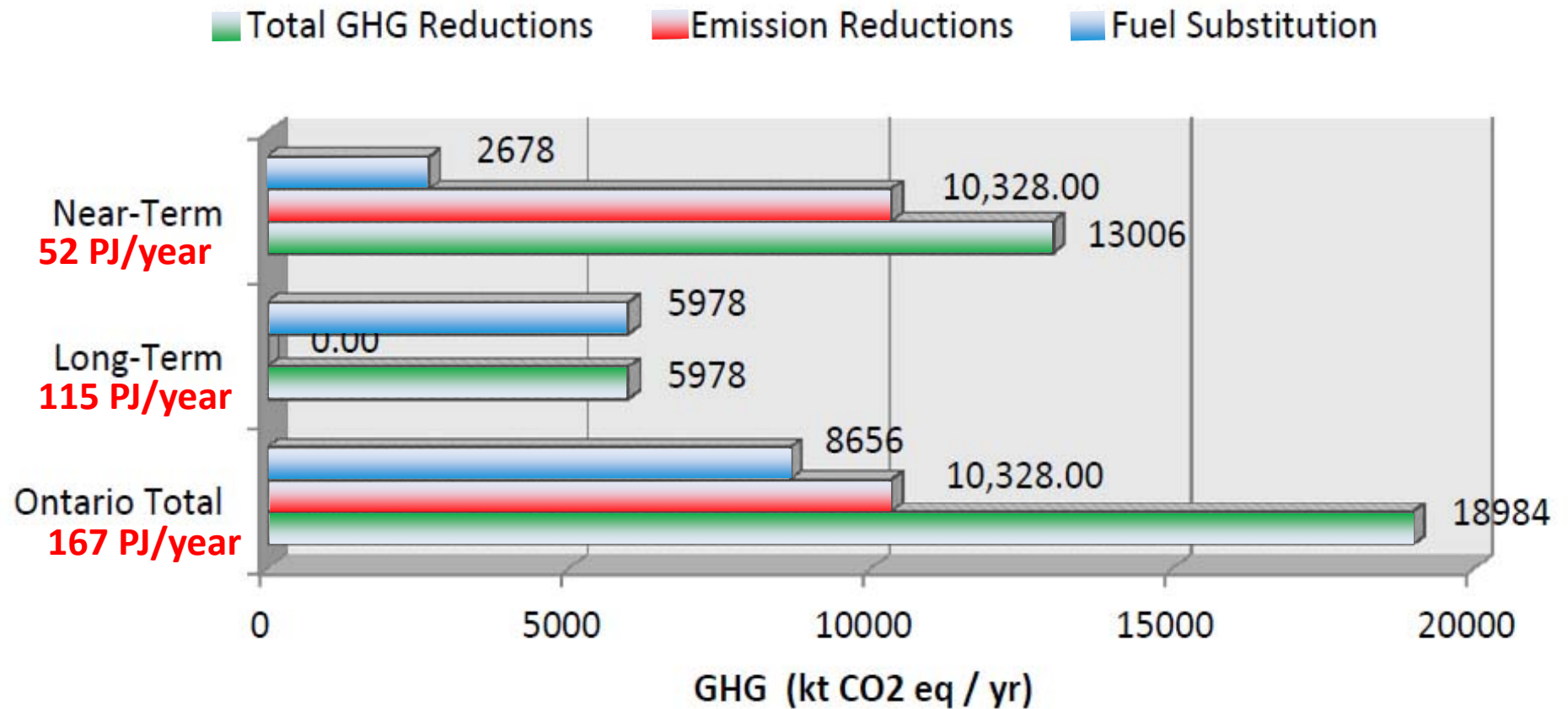
Mileage = 120,000 miles/year for 5.0 years at 6.50 MPUSG with CNG premium = \$65,000 (160 DGE tank @75% useful = 690 mile range)

Renewable Natural Gas



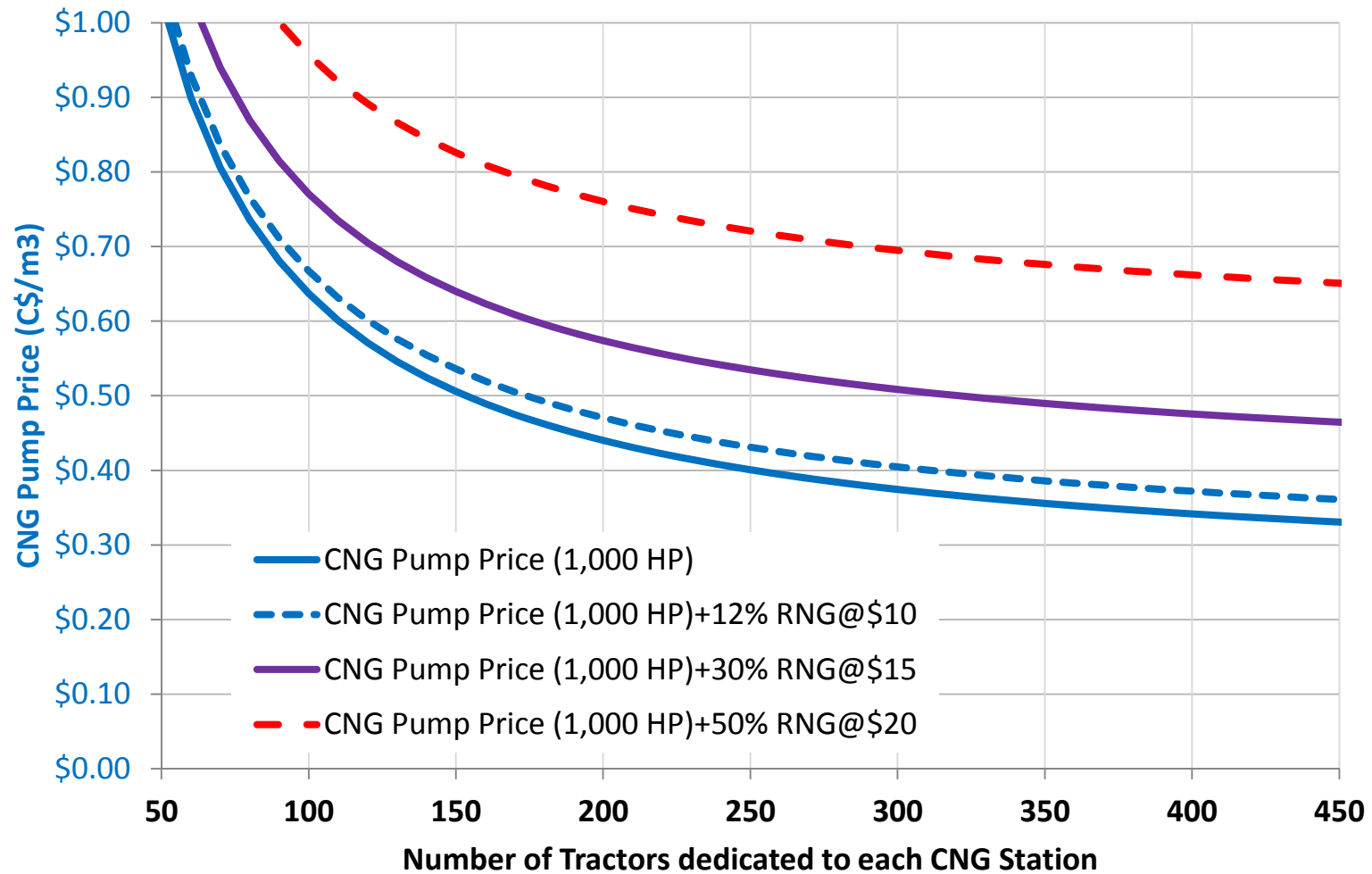
- Collect and process raw methane (50% CH₄) to pipeline quality gas
- Reduces methane leakage to the environment + displace fossil gas
- Significant GHG reduction possible – 80 to 170%

Potential GHG reductions due to RNG Production in Ontario



RNG can displace up to 16% of the conventional gas consumed in the province and provide significant GHG reduction benefits

CNG Potential Pump Price with RNG

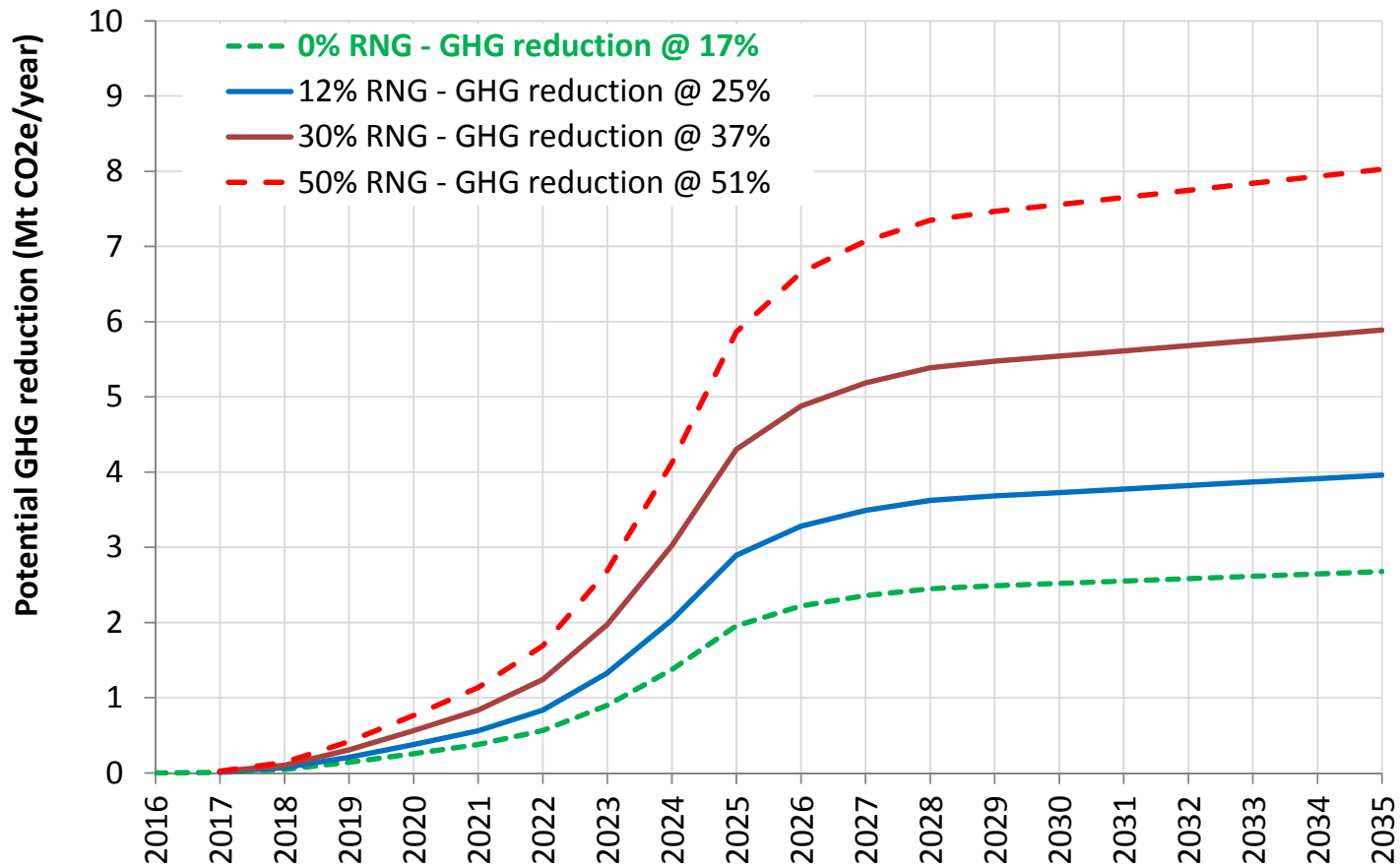


Mileage = 120,000 miles/year for 5.0 years at 6.50 MPUSG

GHG Reduction Potential in Ontario with RNG Blending



GHG Reduction Potential in Ontario Medium and Heavy Duty Transportation with RNG blending



Barriers and solutions

- CNG/LNG Vehicle premium & station infrastructure
 - Ontario support for 50% of vehicle premiums and public access stations
- CNG tank technology and costs
 - promote made in Ontario and target development of adsorbed CNG
- Current ~15% inefficiency of Spark Ignited vs. diesel engines
 - R&D to reduce or eliminate
- RNG Supply & Cost
 - Utilities pay market rates for portion of portfolio and blend in to CNG
- Fuel price uncertainty
 - excise tax exemption on natural gas
- **Getting to scale – all of the above to the “tipping point”**

Conclusions & Summary

- Cap and Trade is a “once in a lifetime” opportunity
- Natural gas can lower GHG emissions in Ontario's heavy duty transport sector **AND** save Ontario billions of dollars / year
- Renewable Natural Gas decarbonizes the natural gas system and the transportation sector
- Funding from the Greenhouse Gas Reduction Account is required to mitigate barriers
- As the market develops, the economic & GHG savings will become compelling - transforming the transportation sector



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Q&A



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