TransformTO

Climate Lens Analysis
Smart Track Mitigation

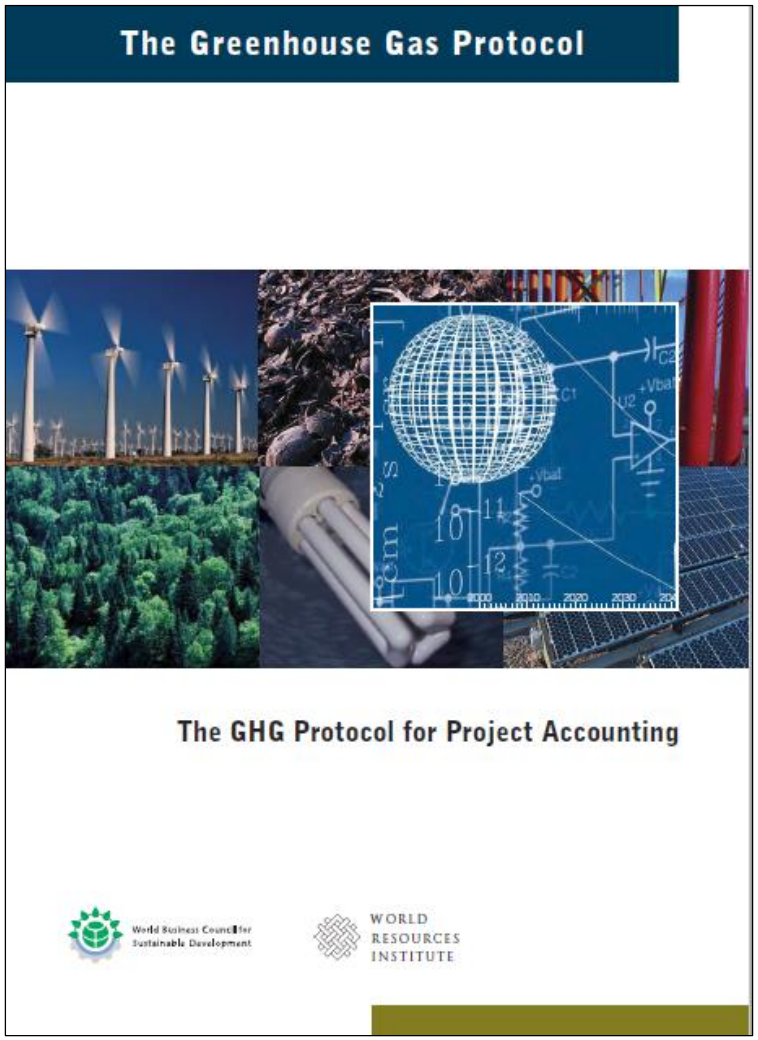
August to November (2018)

TORONTO

SmartTrack Station Program

Support an urban transit network by enhancing the existing transit network by integrating heavy rail station (GO) into system

Project Level Accounting



Accounting methods are similar with key differences:

- GHG Assessment Boundary: Primary and significant Secondary Impacts (Direct and Indirect Emissions)
- Baseline emissions (without project)
- Projected emissions (with project)

- Climate Lens:
  - Construction emissions
  - Operations emissions
  - Net increase or decrease relative to the 2030 target
  - Project cost per tonne
  - Modal share

Assessment Boundary - Spatial and Temporal

Three main impacts on GHGs will occur from:

a. Any physical work that by design facilitates modal shift away from Single Occupancy Vehicles (SOV) that cause direct reduction in Vehicles Kilometres Travelled (VKT) (+/- DIRECT)

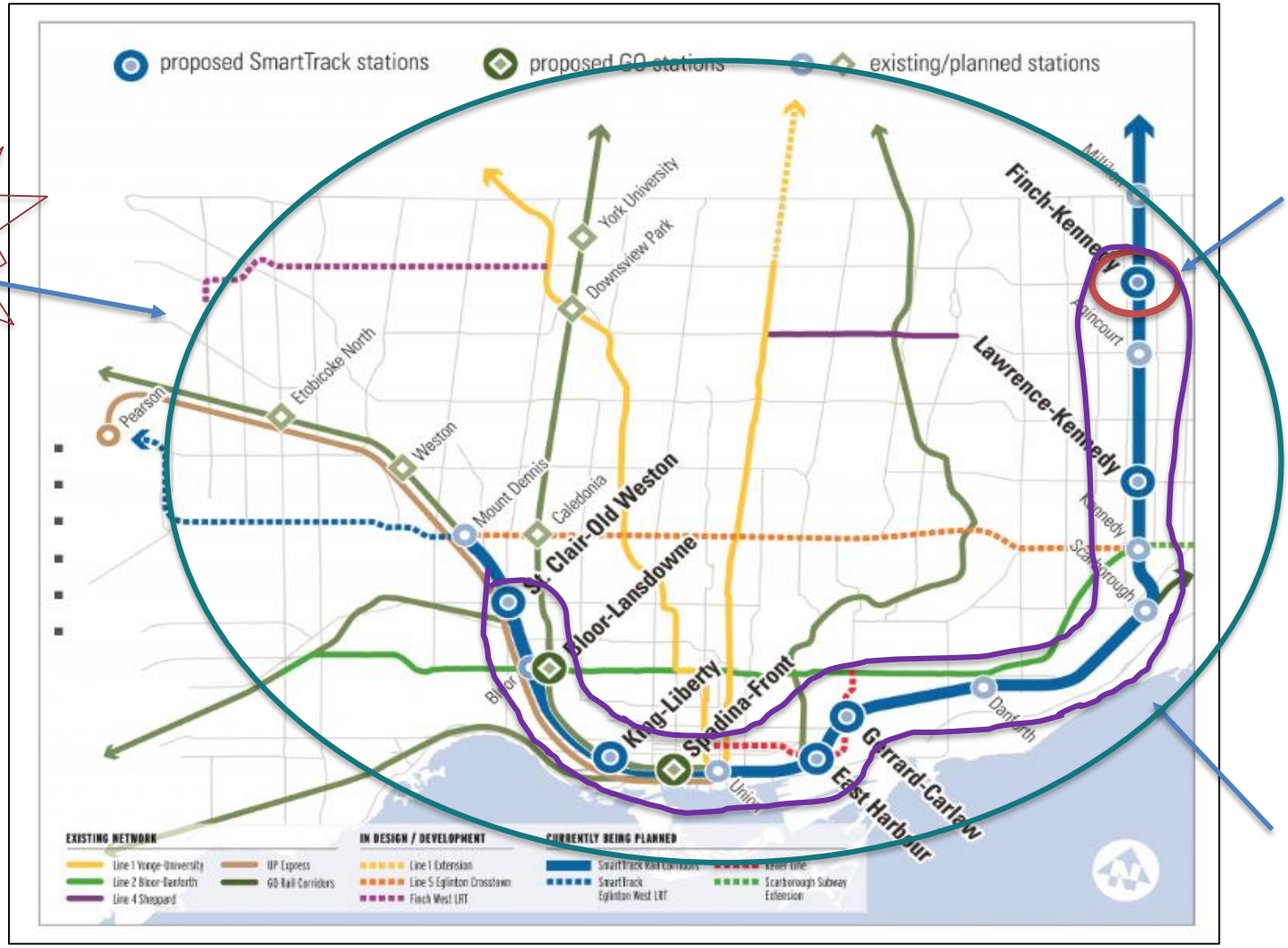
a. Future electrification of the GO Expansion lines (Ontario's EF for electricity) (DIRECT)

b. Reduction of GHGs from residential and employment densification (land use changes) (+/- INDIRECT)

Timeframes: Analysis from 2020 to 2080 (Metrolinx)
Built by 2020 and operational by 2025

Assessment Boundary – Spatial Challenges

Chosen: system network



X m around the stations

X m around each of 6 stations added together and line in between

Base Case Emissions

Future “no SmartTrack Stations” scenario, network-wide represented by:

- Year 2019 to 2080 VKT and corresponding modal share to represent passenger vehicle usage across the GTHA
- 2019 to 2050 BAP modelled energy emissions data for stationary energy sources located within a 1000 m radius from the centrepoint of each SmartTrack station
- 2019 to 2080 GO Train transition to electric trains

Estimated Future Emissions

Estimated SmartTrack Station Program scenario, network-wide represented by:

A. Construction and Maintenance Phase (2020 to 2025)

- Year 2020 to 2025 VKT and corresponding modal share to represent passenger vehicle usage across the GTHA
- Estimates from Metrolinx GO train diesel emissions
- 2019 to 2050 Low Carbon modelled energy emissions data for stationary energy sources located within a 1000 m radius from the centrepoint of each SmartTrack station
- Tailpipe emissions from primarily non-road diesel vehicles used for construction activities to install station access elements
- Maintenance emissions for access elements

Estimated Future Emissions (con't)

B. Operational Emissions (2026-2080)

- Year 2026 to 2080 VKT and corresponding modal share to represent passenger vehicle usage across the GTHA
- Estimates from Metrolinx GO train with linear decrease in diesel and increase in electricity starting in 2030
- 2019 to 2050 Low Carbon modelled energy emissions data for stationary energy sources located within a 1000 m radius from the centrepoint of each SmartTrack station

Challenges

- Identifying opportunities at a post-design stage analysis but having enough concrete info to do an analysis
- Defining an appropriate spatial scale of impacts (whole system, station by station)
- Difficulty in matching available data with overlaying spatial scales
- Literature not currently available or includes stages out of scope of Climate Lens
- Unknown transit benefits analysis – eg. Land use, reduced congestion
- No standard calculator or approach

Resources

- ✓ ISO Documents – ISO 14064-2 (training course and certification)
- ✓ Infrastructure Carbon Estimator (Construction Emissions)
- ✓ https://www.fhwa.dot.gov/environment/sustainability/energy/tools/carbon_estimator/
- ✓ S. Saxe et al., 2017. The net greenhouse gas impact of the Sheppard Subway line, Transportation Research Part D, 51, p.261-275
- ✓ Norman, J., MacLean, H. and Kennedy C. 2006. Comparing High and Low Residential Density: Life-Cycle Analysis of Energy Use and Greenhouse Gas Emissions. Journal of Urban Planning and Development, 132(1), 10-21
- ✓ Regional (or local) planning demand models
- ✓ Community Inventory (local transit authorities, MTO, VKT)
- ✓ Conceptual designs

Toronto Supports Climate Lens Thinking

- Ties community impacts directly to Canada's Nationally Determined Contributions (NDCs)

- Recognizes climate implications at every stage of the project and encourages thinking on long term causal relationships with carbon emissions
  - Construction emissions
  - Operations and maintenance emissions
  - Sources and sinks
  - Land use impacts

- Identify opportunities where emissions can be reduced during the project cycle and encourage quantifying what those reductions might be if implemented

- Builds capacity as many Divisions will need to be involved and socializes concept that producing carbon will come at some

Discussion

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