Name and address of organization:
Environment and Climate Change Canada (ECCC)
10th Floor, Fontaine Building,
200 Boulevard Sacré-Cœur,
Gatineau, Québec,
K1A 0H3

Supervisors:
Manager: Alexandre Dumas (alexandre.dumas@canada.ca; phone: 873-469-1417)
Economist: Matthew Lewis (matthew.lewis@canada.ca; phone: 873-469-1460)

Project Description:
ECCC uses the E3MC model to produce energy, greenhouse gas (GHG) and air pollutant emission projections for all sectors of the economy and under various scenarios. These projections help Canada respond to regulatory needs, international reporting requirements and to track progress on its commitments under the Paris Agreement on climate change.

One means by which GHG emissions can be reduced is through expanding public transit, which can reduce automobile use, foster urban densification and alleviate road congestion. However, the modeling framework lacks sufficient data by which to estimate the full impacts of public transit spending on transportation-related energy demand and GHG emissions. The project aims to remedy this deficiency by using existing studies to develop provincial-level estimates of the energy use and GHG emissions mitigation potential of new transit expenditures.

Benefits to Participating Student:
The student will gain experience conducting research on economic-related data sets, in addition to using econometric skills to determine relationships between variables for improving Canada's GHG and air pollutant emission projections.

Commitments, Tasks and Deliverables of Student:
Drawing on data from Statistics Canada\(^1\), the Canadian Urban Transit Association (CUTA)\(^2\), the American Public Transportation Association (APTA)\(^3\) and other relevant data sources, the student will be asked to:

1) Determine the relationship between incremental government public transit investments and energy savings and GHG emissions reductions from:
   a. Increased ridership\(^4\) and extent of mode switching from personal vehicles to public transit (in vehicle-km travelled)
   b. Reduced congestion/idling
   c. More fuel efficient public transit (e.g. buses become more fuel efficient);
   d. Fuel switching in public transit (e.g. from operating buses on diesel to light rail operating on electricity)

Notes:

\(^1\) [https://www150.statcan.gc.ca/n1/en/type/data?subject_levels=23%2C2304%2C230403&HPA=1&count=100](https://www150.statcan.gc.ca/n1/en/type/data?subject_levels=23%2C2304%2C230403&HPA=1&count=100)

\(^2\) [https://cutaactu.ca/en/resources/statistical-reports](https://cutaactu.ca/en/resources/statistical-reports)

\(^3\) [https://www.apta.com/research-technical-resources/transit-statistics/](https://www.apta.com/research-technical-resources/transit-statistics/)

i. In this analysis we would not include benefits from densification such as reduced land use; we would not consider other economic benefits such as health benefits.

ii. It would be important to include population as one of the independent variables in the regression analysis, because the ridership could increase just purely because of increased population, and not due to incremental public transit investments. Changes in transit fares might also be included as an independent variable.

iii. Consider what other independent variables could be included in this analysis.

2) Calculate appropriately weighted provincial GHG mitigation potential per dollar new public transit expenditures using demographic data coupled with the findings from the analysis in 1).

Specific Student Qualifications:
Strong research and quantitative skills and ability to work independently.

Operational Language:
English and French