Canada: Development of provincial & territorial PFA for GHG emissions

Matthew Prescott
October 4, 2018

Outline

• Physical flow accounts in Canada
• Why produce provincial and territorial GHG emission accounts for Canada?
• The process to go sub-national
• Challenges encountered
• Preliminary results
• Proposed path forward
Physical flow accounts at STC

•“Statistics Canada’s Physical Flow Accounts (PFA) record the annual flows of natural resources, products and residuals between the Canadian economy and the environment.”
•Canadian PFA currently cover energy use (terajoules), GHG emissions (kilotonnes CO2_eq), and water use (m3)
•Follow UN System of Environmental-Economic Accounting (SEEA) guidelines
•Compiled using detailed industry and commodity classifications of the Canadian supply and use tables; but disseminated at a more aggregated industry level
•Currently, estimates for each account are only published at the national level

The case for a sub-national GHG account in Canada

•Canada is BIG. Across provinces and territories, we see:
  •Different climates & various impacts
  •Different economies
  •Different policies
    •Introduction of carbon pricing
The policy push for provincial & territorial estimates

- Big increase in demand for energy and emissions data given the provincial obligations under the Pan Canadian Framework on Clean Growth and Climate Change
- P/T data can address need for consistent, coherent, and comprehensive estimates of GHG emissions at that level
- Significant advantage of PFA over NIR is its direct link to economic data, allowing for robust analysis (e.g. intensities and final demand)
- Long story, short: people are looking for this information!
What did we do?

• First, a top-down approach: spread energy use across provinces using SUT
• Determined bottom-up approach would be required to deliver quality estimates, especially where:
  • more recent reference periods not available in SUT
  • SUT are not a sufficient proxy for certain fuels (e.g. spent pulping liquor) or certain fuel use (e.g. own-account consumption)
• Little work needed on compilation methodology – the vast majority of effort involved was to update systems and working files (i.e. building an infrastructure to confidently produce 14x the number of estimates)

Challenge: Limitations of source data / collaboration with providers

• Some PFA source data are sampled to yield only national estimates
  • e.g. Industrial Consumption of Energy Survey, which provides the energy use account with detailed manufacturing fuel use data, only samples a handful of industries provincially
• Administrative data also only available at national level
  • e.g. the GHG account requires data from Environment and Climate Change Canada’s UNFCCC submission to fill in gaps in non energy-based emissions
• Improving communication and collaboration with data providers and other stakeholders is a high priority
Challenge: Confidentiality

• Critical to maintain the confidentiality of survey respondents while publishing more granular data
• Don’t want to put out more tables if they will be mostly suppressed
• The risk of a breach:
  • Loss of confidence in department to safeguard private information
  • Potential loss of future data
  • Reputation

Challenge: Confidentiality (cont.)

• Approaches taken to address confidentiality:
  • Decision tree
    • Corporate tool to interpret Statistics Act, has allowed for full, unsuppressed release of monetary supply and use tables
  • Highly integrated nature of GHG account
  • No company is reporting emissions, estimates are derived
  • SSI Classification Tool: PFA for GHG at ‘0’ on scale to 50
Preliminary results

CO₂ EMISSIONS IN CANADA, BY PROVINCE AND REGION, 2016

<table>
<thead>
<tr>
<th>Province</th>
<th>Emissions (Kilotonnes CO₂ Equivalent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TERRITORIES</td>
<td>6.15</td>
</tr>
<tr>
<td>MANITOBA</td>
<td>23,967</td>
</tr>
<tr>
<td>ATLANTIC</td>
<td>55,086</td>
</tr>
<tr>
<td>SASKATCHEWAN</td>
<td>74,933</td>
</tr>
<tr>
<td>BRITISH COLUMBIA</td>
<td>74,139</td>
</tr>
<tr>
<td>QUÉBEC</td>
<td>87,902</td>
</tr>
<tr>
<td>ONTARIO</td>
<td>164,009</td>
</tr>
<tr>
<td>ALBERTA</td>
<td>271,385</td>
</tr>
</tbody>
</table>

Preliminary results

DIRECT HOUSEHOLD GHG EMISSIONS PER CAPITA IN CANADA, PROVINCES AND REGIONS, 2016

<table>
<thead>
<tr>
<th>Region</th>
<th>Emissions (Kilotonnes of CO₂ Equivalent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATLANTIC</td>
<td>6.04</td>
</tr>
<tr>
<td>AB</td>
<td>6.47</td>
</tr>
<tr>
<td>QC</td>
<td>5.98</td>
</tr>
<tr>
<td>MB</td>
<td>5.36</td>
</tr>
<tr>
<td>SK</td>
<td>5.78</td>
</tr>
<tr>
<td>ON</td>
<td>5.06</td>
</tr>
<tr>
<td>NB</td>
<td>6.20</td>
</tr>
<tr>
<td>QC</td>
<td>5.13</td>
</tr>
<tr>
<td>TERRITORIES</td>
<td>3.06</td>
</tr>
</tbody>
</table>
Preliminary results

DIRECT EMISSIONS BY INDUSTRIES AND HOUSEHOLDS IN ONTARIO, 2009-2016

KILOTONNES OF CO2 EQUIVALENT

DIRECT INDUSTRIAL GHG EMISSIONS INTENSITY, CANADA, PROVINCES AND REGIONS, 2016

KILOTONNES PER MILLION DOLLARS OF REAL GDP
Reducing suppression - GHG account a good place to start

• Relevance: This topic has the greatest demand from stakeholders
• The GHG estimates are an aggregation of:
  • 12 fuels from the energy use account
  • 5 fuels from the non-energy account (which is not published)
  • Petrochemical feedstock, naphtha, lubricants allocated using SUT
  • “Plugins” data covering industrial process and fugitive emissions
• Energy and non-energy data get converted to GHG emissions through emission factors
• The above are summed by industry in CO2 equivalents

Proposed new approach: GHG

• Lift current confidentiality at the total GHG level since these emissions are a multi-factor combination of fuel types and emissions factors.
• Publish provincial/territorial GHG emissions (kilotonnes of CO₂ equivalents) in fall 2018.
  • Follow-suit with energy use in 2019, then water use
• For any custom tabulations requiring the reporting emissions by fuel type, determine and follow the energy use pattern.
• Pursue further analytical work on PT accounts
  • e.g. intensity and final demand measures at PT level
Thank you!

• Questions/comments?

Unit Head, Environment, Energy and Transportation Statistics Division
Statistics Canada / Government of Canada
matthew.prescott@canada.ca / Tel: 613-882-8461

Chef de sous-section, Division de la statistique de l'environnement, de l'énergie et des transports
Statistique Canada / Gouvernement du Canada
matthew.prescott@canada.ca / Tél. : 613-882-8461