Why did Canada’s GDP and Energy Use Diverge after 1995?

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- INTRODUCTION -

Growth in the national economies (measured as Gross Domestic Product, GDP) are often correlated with increases in both fuel and electrical energy use (E) and greenhouse gas (GHG) emissions. This was the case in Canada between 1983-1995 (Fig. 1). However, uncoupling GDP from E and GHG emissions can make an important contribution to climate change mitigation.

Since 1995, government data on Canada’s energy systems has shown a divergence in GDP and E (Fig 1B). We want to know Why did Canada’s GDP and energy use (E) diverge between 1995 & 2010?

- METHODS -

Most data for these analyses were obtained from the Canadian Energy Systems Simulator (CanESS) model [1] which integrates large amounts of government database resources. Energy use was separated into the sectors (i) associated with the productive economy (E/P) and the household economy (E/H). The household economy (E/H) was separated into the productive economy (E/H,P) and the structural factor (the share of GDP generated by sector i) and E/H,P and is the intensity factor (the energy use per dollar of value added) in sector i).

The decomposition analysis was conducted using the Logarithmic Mean Divisia Index (LMDI) method [2] which uses the above equations to produce the following four factors that sum to the total change in energy intensity (DE/GDP) over the study period (T=1995 and T=2010).

- RESULTS -

1. Richer Canadians spend less of new $ on energy

2. Loss in manufacturing more than compensated for by an increase in the Commercial & Institutional (C&I) sectors.

3. A net decrease in energy intensity (increase in energy efficiency) of Canada’s productive and household economies.

- DISCUSSION / CONCLUSION -

Structural Changes in the Canadian economy (i.e. an increase role for Commercial & Institutional sectors that use little energy per GDP) accounted for 46% of the economy’s observed decrease in the energy intensity (MJ/2002$) between 1995 and 2010. An addition 24% of the observed decrease in energy intensity was attributed to an increase in the wealth of Canadians who don’t spend their additional resources on energy services, at least in Canada.

The remaining 30% of the energy intensity change was attributed to a net improvement in energy efficiency in Canada’s productive and household economies. We deconstructed the components of energy use and economic change between 1995 & 2010 and found that some trends increased and some decreased ΔE/GDP as shown in Fig. 12.

- ACKNOWLEDGEMENTS -

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- REFERENCES -

[1] CanESS v6 from whatif? Technologies Inc, Ottawa, ON

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