



NATURAL RESOURCES CANADA - INVENTIVE BY NATURE

National experiences in end-use data collection and its use in policy

Presented to the Energy End-Use Data and Energy Efficiency Metrics Initiative - IEA/ADEME

John Appleby
Office of Energy Efficiency
Natural Resources Canada

December 12, 2016

Paris, France



Natural Resources
Canada

Ressources naturelles
Canada

Canada

Canada has been collecting and analyzing end-use data and creating energy efficiency metrics since the mid-1990s for the purpose of:

- Tracking energy efficiency performance & reporting progress to Parliament of Canada
- Providing a comprehensive source of energy-use and energy efficiency data to the people of Canada
- Informing Policy Analysts and Decision Makers

Policy Sphere

- Regulations under the Energy Efficiency Act
- Building code development, guides and labels, retrofits
- Behavioral and information products
- Alternative fuels

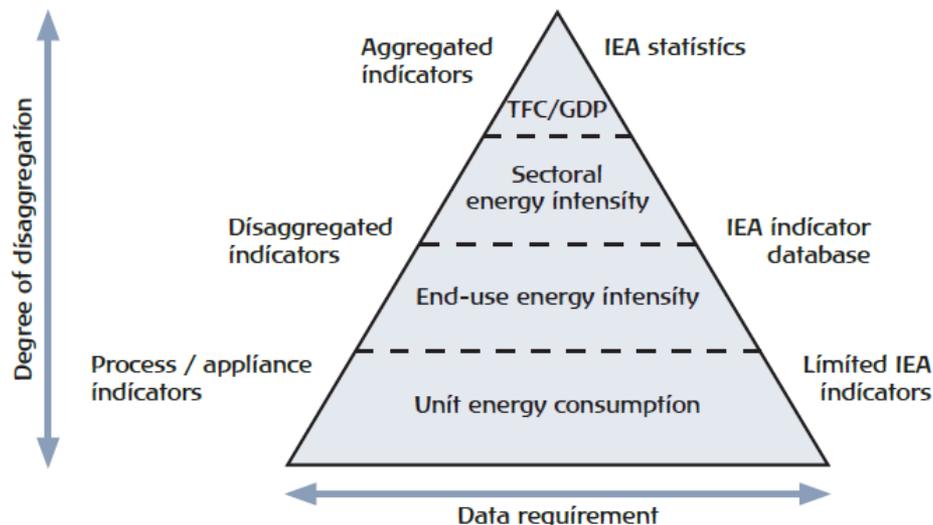


Canada has unique endowments reflected in high level of energy use per capita and masks policy progress in intensity and efficiency

- Cold weather, long distances, low population densities, rugged geography
- Comparative advantage in resource industries, energy-intensive industries

Reflected in Canada's energy use per capita masks substantial policy progress

Figure 2.1 • The IEA energy indicators pyramid



Using the IEA Indicators pyramid, policy progress in the residential sector can be illustrated.

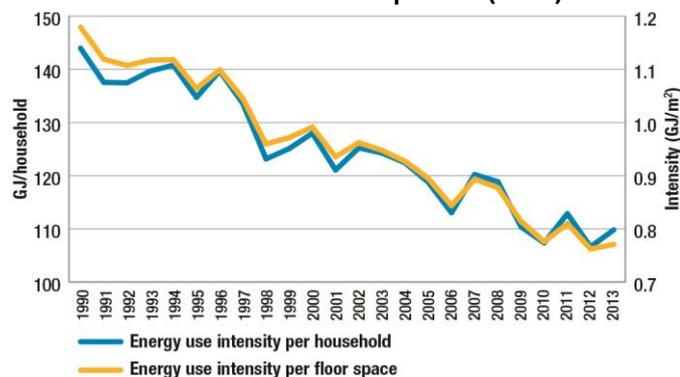
Notes: unless otherwise indicated, all tables and figures in this publication are derived from IEA data and analysis. TFC = total final consumption.

Source: Energy Efficiency Indicators: Essentials of Policy Making IEA, 2014

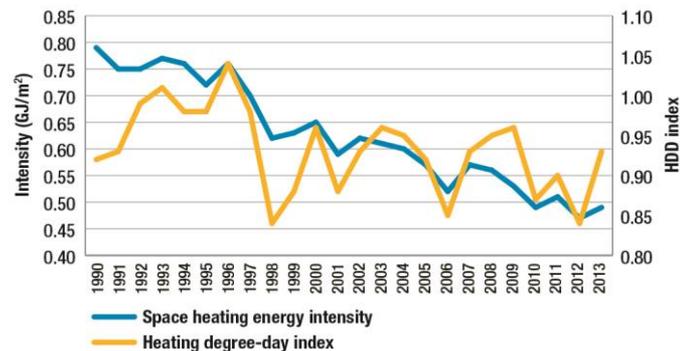


Metrics and Policy (Residential example)

Residential Energy Intensity per Household/and
Floor Space (m²)



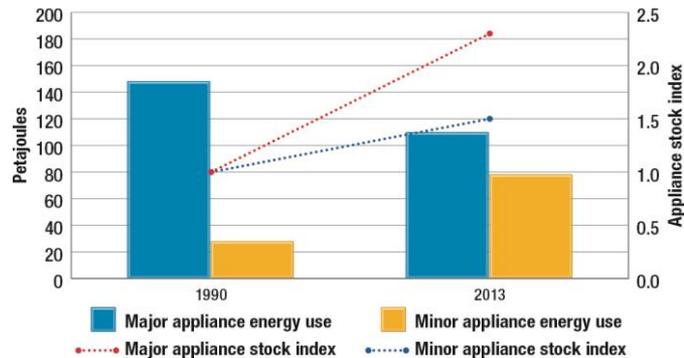
Space Heating Energy Intensity
GJ/m²



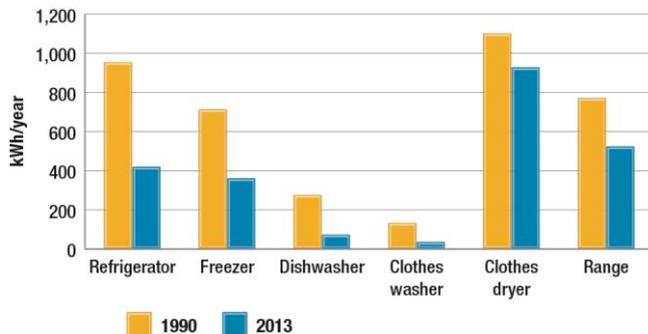
A significant reduction in intensity:

- Overall residential energy intensity declined 24% since 1990. Measurement requires Canada's Energy Balances (feeder surveys), Labour Force Survey, Housing stock estimates and building permit data as well as Household Energy Use Surveys.
- At the end-use level we can see that space heating (63% of energy use) intensity declined as consumers shifted toward more improved building shells and more efficient furnaces. **Policy instrument includes regulation of furnace efficiency standards, building codes, retrofit programs.**

Energy Use and appliance Stock Index, 1990 and 2013



Unit Energy Consumption for new major electric appliances 1990 and 2013

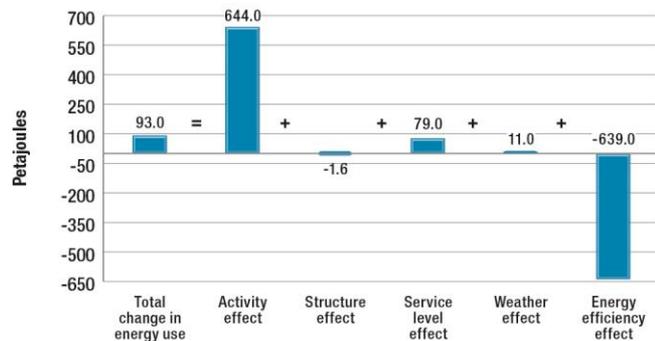


- At a more detailed level we can breakout other policy influences
 - Major appliances - large drop in energy use coinciding with regulations and minimum efficiency standards adopted in the 1990s
 - Minor appliances – In contrast due to growth in TVs , VCRs, DVDs, VGCs and PCs energy use has more than doubled (187%) since 1990.
 - Need to regulate standby power (2011).

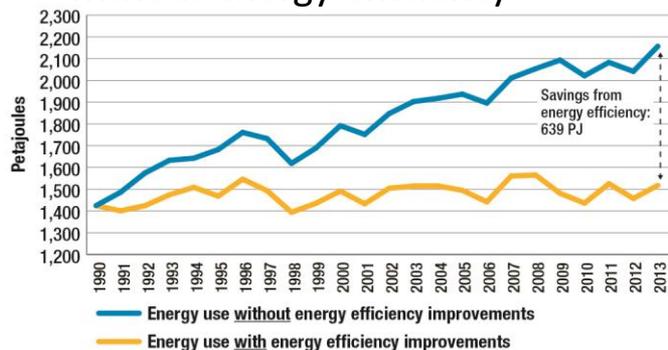
Data Source: Association of Home Appliance Manufacturers, National End-Use Models, Energy Efficiency Trends in Canada 1990-2013

Overall the residential sector has been a Canadian success story

Energy Efficiency more than offset increases by activity 1990-2013



Residential energy use with and without energy efficiency



- Factorization isolates the impact of energy efficiency which improved by 45% since 1990 achieving:
 - Overall savings of 639 PJ or 27 MT of avoided GHG
 - Savings of \$12 billion for the sector OR
 - \$869 per household in 2013.

Source: National End-Use Models, Energy Efficiency Trends In Canada, 1990-2013



Challenges in end-use analysis

Grey Areas in Measurement

- Changing business models – secondary distribution of petroleum products, electricity.
- Measuring domestic and international energy use for air and marine transport.
- How to separate out the role of light trucks in commercial businesses.
- Comparing estimates internationally if definitions, year ranges or methodology varies.
- More work is needed across countries to standardize measurement, more open source methodology, fewer black boxes.

Impact on Policy Formation

- Concepts can be difficult to convey to policy analysts generally – need to simplify, find new ways to express intensity, energy efficiency, benefits.





NATURAL RESOURCES CANADA - INVENTIVE BY NATURE

Thank You

For more information on energy end-use and energy efficiency in Canada please visit our web site

<http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/home.cfm>



Natural Resources
Canada

Ressources naturelles
Canada

Canada