A CanESS Overview of a Business-As-Usual Future For Residential Energy Use in Canada

whatIf? CanESS

CESAR CANADIAN ENERGY SYSTEMS ANALYSIS RESEARCH

Introduction

The Canadian Energy Systems Simulator (CanESS) is an integrated multi-sector, technology-rich, 'Stock and Flow' model that provides detailed accounting for the:

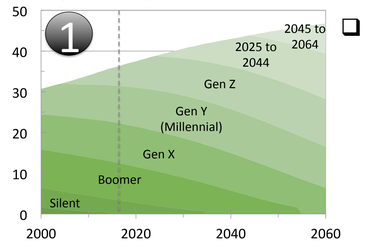
- ❑ Sources and uses of fuels and electricity,
- ❑ Key energy producing and using infrastructure, and
- ❑ The resulting greenhouse gas (GHG) emissions,

by province and for all of Canada.

Built on over 30 years of calibrated, coherent historical data, CanESS is a simulation model that allows researchers to explore an unlimited number of possible energy futures based on changes in technology, infrastructure or human behaviour.

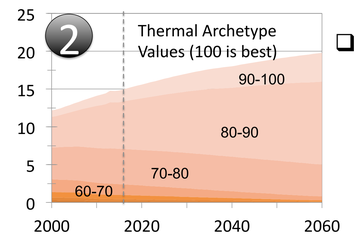
This poster offers a glimpse into CanESS's Residential component to illustrate the 'levers' that researchers can choose to adjust to explore energy futures. Values for all Canada are plotted assuming a 'Business-as-Usual' future.

Population by Generation (Millions)



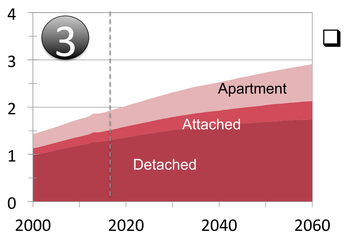
❑ Very soon the millennial and later generations become the majority decision makers

Insulation (Millions Dwellings)



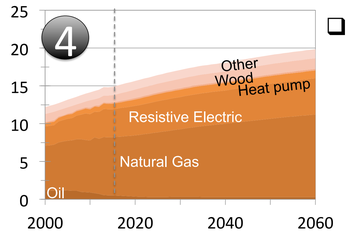
❑ Insulation naturally improves as older dwellings are replaced

Floor Space (Billions m²)



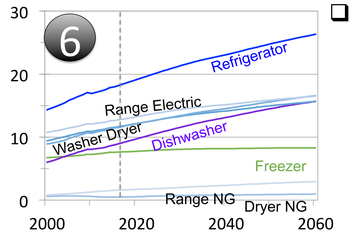
❑ Strongest growth is expected to occur for apartments, but detached homes are likely to dominate stock.

Heat Systems (Millions)



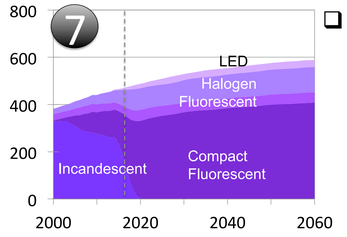
❑ Natural Gas heating dominates the residential sector. This must change if we are to meet our GHG targets.

Appliances (Million Units)



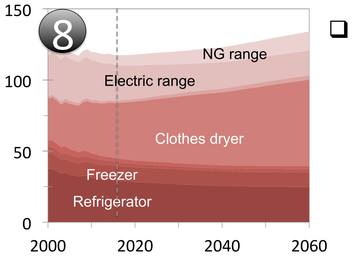
❑ Dishwashers are becoming more commonplace, approaching almost one per dwelling by 2060.

Light bulbs (Million units)

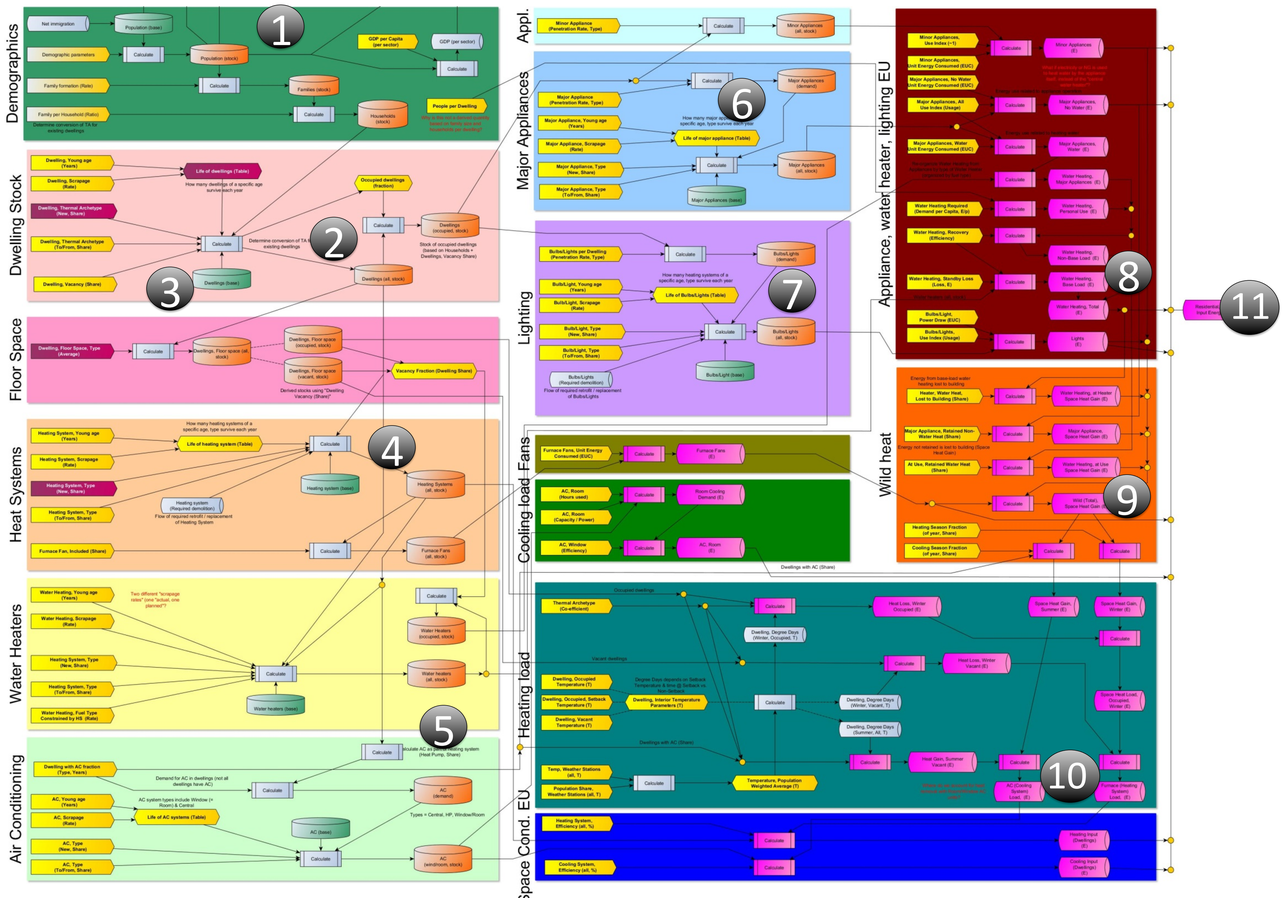


❑ Due to policy, incandescent bulb are disappearing. In this projection, LEDs only grow slowly: This is probably an underestimate.

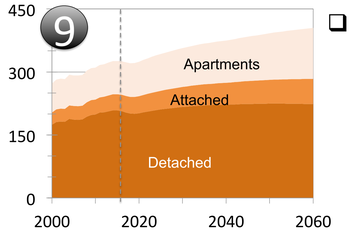
Appliance Energy use (PJ/yr)



❑ Most appliances are expected to become more fuel efficient, but clothes dryers are difficult to improve.

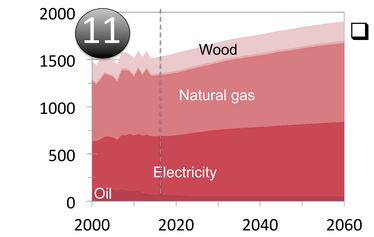


Equipment 'Wild Heat' Winter (PJ/yr)

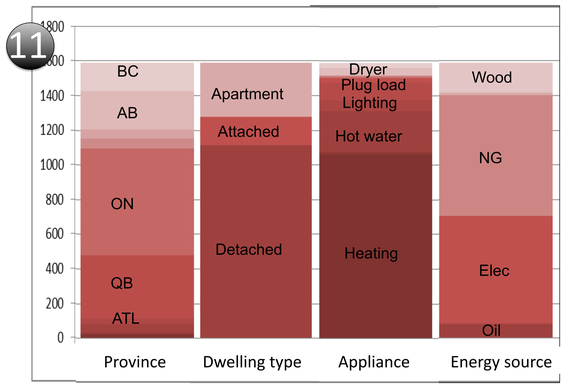


❑ Some appliances (ranges, refrigerators, dryers) provide a significant contribution to winter heat load.

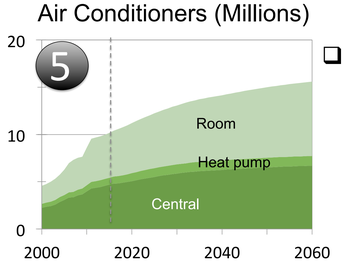
Residential Energy Use (PJ/yr)



❑ Residential energy use by fuel projects that this sector will continue to depends to have a large dependence on fossil fuels (NG).

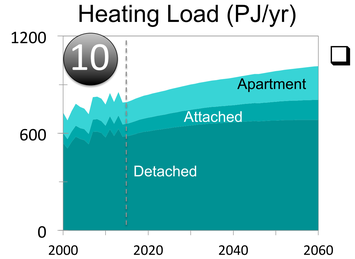


Air Conditioners (Millions)



❑ With climate change and population growth, AC stocks are expected to continue to grow

Heating Load (PJ/yr)



❑ As dwellings become better insulated, the heat load grows slower than the growth in buildings and floor space (graphs 2 and 3)

For more information:

About: CanESS : www.whatiftechnologies.com

CESAR : www.cesarnet.ca