

## Development of a Comprehensive Energy Model for Canada

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**Abstract :** With potentially dangerous impacts of climate change on the horizon, Canada has an opportunity to take a lead role on the international stage to demonstrate how energy use intensity and greenhouse gas emission intensity may be effectively reduced. Through bottom-up modelling of Canada's energy sector using Long-range Energy Alternative Planning (LEAP) software, it can be determined where efforts should be concentrated to produce the most positive energy management results. By analyzing a provincially integrated Canada, one can develop strategies to minimize the country's economic downfall while transitioning to lower-emission energy technologies. Canada's electricity sector plays an important role in accommodating these transitional technologies as fossil-fuel based power production is prevalent in many parts of the country and is responsible for a large portion (17%) of Canada's greenhouse gas emissions. Current findings incorporate an in-depth model of Canada's current energy supply and demand sectors, as well as a business-as-usual scenario up to the year 2035. This allows for in-depth analysis of energy flow from resource potential, to extraction, to fuel and electricity production, to energy end use and emissions in Canada's residential, transportation, commercial, institutional, industrial, and agricultural sectors. Bottom-up modelling techniques such as these are useful to critically analyze and compare the various possible scenarios of implementing sustainable energy measures. This work can aid government in creating effective energy and environmental policies, as well as guide industry to what technology or process changes would be most worthwhile to pursue.

**Keywords :** energy management, LEAP, energy end-use, GHG emissions

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