World Academy of Science, Engineering and Technology
International Journal of Energy and Environmental Engineering
Vol:10, No:05, 2016

Development of a Comprehensive Energy Model for Canada

Authors : Matthew B. Davis, Amit Kumar

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 to 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 transitionary 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
Conference Title : ICSREE 2016 : International Conference on Sustainable and Renewable Energy Engineering
Conference Location : Montreal, Canada
Conference Dates : May 16-17, 2016