

The Coming Energy Transition: The Challenge for Canada

Outline

- The energy system and fossil fuel dependence
- Climate change and the energy revolution
- Canada's peculiar position in energy
- Policy matters

The Energy System and Fossil Fuel Dependence

- Profound fossil fuel dependence in society - most of world's energy is derived from fossil fuels
- World energy trajectory - dependence on fossil fuels relatively new; human and animal power used before industrial revolution
- Interlinked character of the energy system - generation, transmission, use, etc. all make up the complex system of energy
- Energy inequality and developing world - poorer countries are energy deprived while wealthier countries consume most of the earth's energy

Climate Change and the Energy Revolution

- Climate change and climate risks - driven by greenhouse gas pollution; greater risks as time progresses
- Magnitude of reductions required - climate change cannot be completely stopped unless all current emissions of greenhouse gases are removed from the energy system
- Decarbonisation of the energy system of developed states by mid century - energy generation, transport, industry, buildings all must be re-assessed by 2050
- The need for an 'energy revolution' (IEA) - a major change of the energy system must be made to reduce climate change and greenhouse gas content in the atmosphere
 - Changes to production and consumption of energy
 - Social and technological innovation
 - Multiple pathways and possibilities
 - Energy efficiency (all points in system)
 - Renewable energy
 - Nuclear energy
 - Carbon capture and storage (CCS)
 - All options have costs and risks - expense (installation, operation costs), less energy output, etc.
 - Main obstacles related to culture, institutions, practices and distributional conflicts, not technology - difficulty in changing established practices; path dependence

Canada's Peculiar Position

- Vast energy resources compared to other developed countries (oil, gas, wood, biomass, hydro, nuclear, etc.)
- Carbon intensive industrial structure - economy and society rely intensively on carbon emissions
- Low carbon electricity system
- Non-homogenous resources and energy supply - high oil resources in Alberta, lumber in Quebec, etc.
- Policy fragmentation
- Geographical position - borders one country and major buyer (USA)
- Climate Policy Paralysis for 15 years - talks about climate change and greenhouse gas reduction progressing
- High carbon in comparison to low carbon energy pioneer countries - Ex: Sweden and Norway

Policy Matters

- Critical framework for social and technological innovation
- Technological choices made in socio-political context
- Socio technical transitions
- Examples of climate policy initiatives
 - Carbon pricing, taxes, carbon caps, etc.
 - Feed in tariffs
 - Innovation funds - fund innovative companies and university research concerning climate change and greenhouse gas emissions
 - Regulation - laws, regulations, etc. regarding greenhouse gas emissions
 - Education
 - Strategic support - Ex: supporting electric vehicles