FUNDING DETAILS

NSERC/Cenovus/Alberta Innovates Associate Industrial Research Chair in Energy and Environmental Systems Engineering

Canada is a leading energy-producing country, and its energy sector plays a critical role in the economy. The production, conversion, and use of energy, directly and indirectly, have environmental impacts. Increases in atmospheric concentrations of greenhouse gases, fresh water consumption, and disturbances in land use patterns are important environmental issues facing Canada's energy sector. While there is considerable research on the development of energy technologies, there is little systems-level research on the technologies' nexuses with the environment or detailed energy-environmental systems assessments.

Research themes include integrated energy-environmental planning and forecasting; environmental footprints and energy return on investment (EROI) of energy conversion pathways over a life cycle; and techno-economic assessments of energy conversion pathways.

RECIPIENT:
University of Alberta – Amit Kumar

PARTNERS:
NSERC, Cenovus Energy Inc., Suncor Energy Inc., Natural Resources Canada (NRCan), Environment & Climate Change Canada (ECCC), Alberta Department of Energy, Future Energy Systems – University of Alberta

PROJECT DATES:
September 2017 – August 2022

PROJECT TRL:
Start: 2
End: 3

TOTAL BUDGET:
$3M

AI FUNDING:
$0.5M

APPLICATION

The program is aimed at developing tools based on fundamental science for evaluation of energy systems. With a focus on decarbonization of energy consumption pathways and interest in low carbon fuels, decision-makers in the energy industry and government are in need of detailed fundamental science-based assessments of energy systems to make decisions that are best for Canadians in the long term.

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PROGRAM GOALS

- To develop energy-environmental modeling capacity to support policy formulation and investment decisions, and to provide the energy industry and government with the modeling tools to assess both environmental impacts and economic viability in order to compare different energy options and strategies.
- To develop cost curves through modelling to understand the cost of existing and new low carbon/decarbonized energy production and use.
- To train highly qualified personnel in energy and environmental systems engineering.
- Further details on: www.ualbertaenergysystems.ca

BENEFITS TO ALBERTA

- The program will address issues critical to our economy and help understand pathways to achieve the GHG mitigation targets set by Canada and Alberta over medium to long term planning horizon.
- The program will help in assessing low-carbon options for oil sands and help this sector in achieving the GHG emission cap in Alberta. This will also help in integration of more renewable energy and carbon capture and storage technologies in the energy sector.
- The research will have an impact not only on the energy sector but also on the agricultural and forestry sectors. It will bring together stakeholders in areas related to the energy sector and create a forum to evaluate energy systems in terms of GHG emissions, water consumption, and land use.
- The outcomes of the program will help in investment decisions and policy formulation in energy sector.

67 Publications

49 Students Trained

6 New Products/Services

CURRENT STATUS

APRIL 2020

Several projects are currently in progress under this program focused on various energy sectors. The models and cost curves developed have been published in peer-reviewed scientific journals. Currently there are 24 highly qualified personnel are working under the chair program.