Integrated Assessment of Environmental Footprints for Energy Scenarios: Assessment of Future Energy Systems

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SHORT-TERM OBJECTIVES

- Development of WEAP model for Canada
- Development of an integrated LEAP-WEAP model for the industrial sector in Canada
- Identification of energy scenarios for assessment of Large Canadian industries

LONG-TERM OBJECTIVES

- Assessment of GHG mitigation and water footprints for energy scenarios in large industrial sector of Canada
- Assessment of costs associated with GHG mitigation and water savings (if any) for various energy scenarios
- Development of integrated GHG footprint, water savings and cost curves for various energy scenarios

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PROJECT OVERVIEW

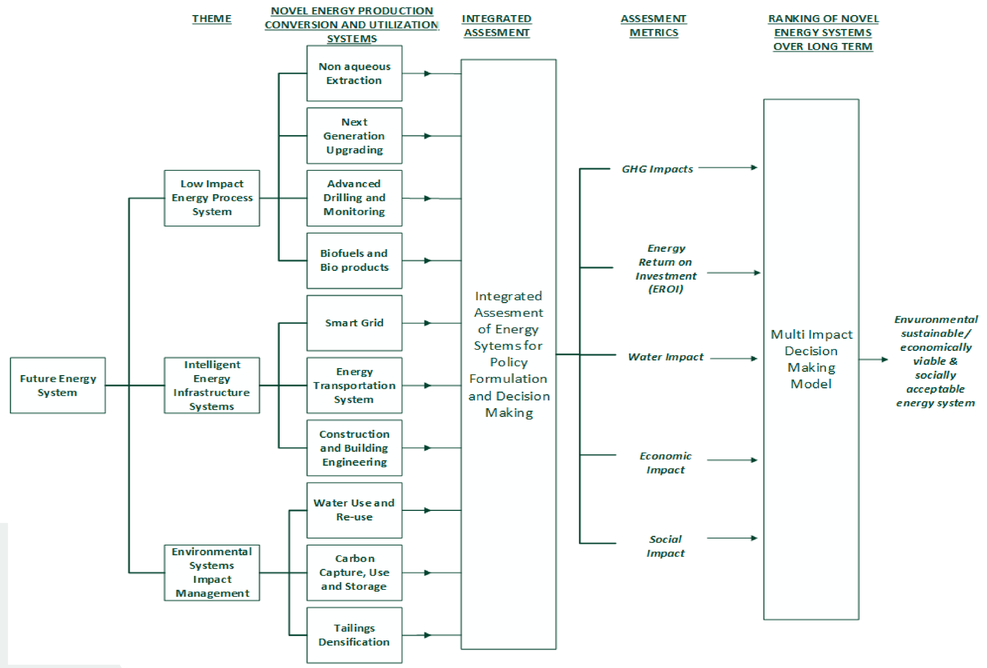
INTEGRATED ASSESSMENT OF ENVIRONMENTAL FOOTPRINTS FOR ENERGY SCENARIOS

The overall objective of this project is to understand the nexus between water demand and greenhouse gas (GHG) emissions for different energy pathways. There is a trade-off between GHG mitigation and water consumption for energy scenarios. This project is aimed at investigating this trade-off. This will be done through integration of Long-range energy alternative planning systems model (LEAP) which is focused on estimation of GHG emissions and Water Evaluation And Planning System (WEAP) which is focused on estimation of water demand for energy scenarios. Both these models are bottom up technology driven models and includes detail characteristics of energy demand and supply sectors. LEAP model for Canada and WEAP model for Alberta has been developed for assessment of energy sectors. The focus of the research would be on large Canadian industrial sectors.

THEME OVERVIEW

SYSTEM-WIDE

Understanding energy systems at a system-wide level means recognizing the countless ways that they integrate into our daily lives. From the instant when an energy source is first captured, to the moment you access it by flipping a light switch or starting your engine, it has traveled through a system to reach you. Systems modeling allows us to identify and quantify each step along the way, to simulate the impact of alternative systems, and to predict the potential consequences of change. System-wide analysis and modeling will never provide a guaranteed forecast of the future, but it can identify possible benefits and disadvantages to change, highlight areas requiring additional study, and help us to consider the viability of an entirely new energy future.



EXPECTED OUTCOMES

This project will develop information for decision makers in industry and government investment decisions and policy formulation. This will help decision making based on overall environmental impacts rather than just on single impacts.

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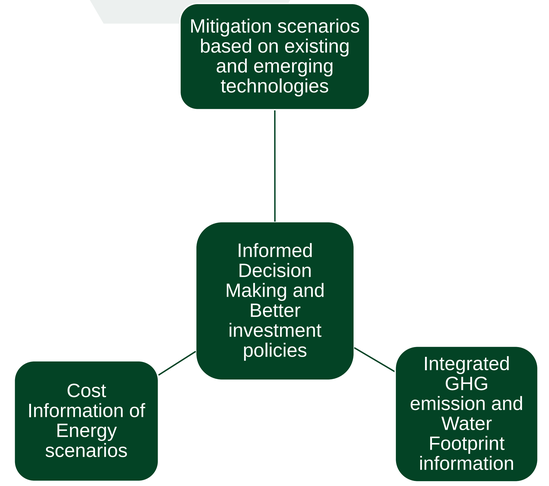

EXTERNAL PARTNERS

This project will be complementary to NSERC/Cenovus/Alberta Innovates Associate Industrial Research Chair Program in Energy and Environmental Systems Engineering (IRC) and Cenovus Energy Endowed Chair in Environmental Engineering (Endowed Chair). These programs have contributed significantly to the system level research on energy processes.

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