

Modeling and Optimization of the CO2 Transportation Pipeline Design in Alberta

PROJECT DESCRIPTION

"Carbon Capture and Storage/Sequestration (CCS) is the separation and capture of carbon dioxide (CO₂) from the atmospheric emissions of industrial processes and its subsequent transport and permanent storage in deep underground rock formations. CCS is widely regarded as a major means to reduce carbon dioxide emissions from centralized industrial emission sources (e.g., power plants and chemical plants). CO₂ emission sources and geological formations suitable for CO₂ sequestration are generally not located in the same places. Captured CO₂ needs to be transported from the sources to the geologic sequestration sites. It has been widely recognized that pipeline transport is an ideal means for large-scale CO₂ transport over a long distance.

Alberta was the first province in Canada to develop legislation regulating greenhouse gas emissions that requires large industrial emitters to report their emissions and take actions to make mandatory reductions. The majority of Alberta's emissions come from large industrial facilities like coal-fired power plants and oil and gas facilities that are more appropriate for commercial-scale CCS. Alberta also has the ideal geology for CCS. The same rock formations which securely stored oil and gas for millions of years can now securely store liquid carbon dioxide (CO₂). In this project, we will investigate a superstructure-based modeling and optimization framework to address the design problems of CO₂ transportation pipeline networks in Alberta by considering all alternative sources, sinks, intermediate sites, and pipeline connections. The objective is to minimize the integrated costs of CCS, including capture cost, storage cost, and transportation cost, subject to the constraints of transportation capability requirements and pressure requirements."

FACULTY-DEPARTMENT

Engineering - Chemical and Materials Engineering

DESIRED FIELD OF (STUDENT) STUDY

Chemical Engineering, Industrial Engineering, Applied Mathematics

INTERNSHIP LOCATION

University of Alberta Main Campus - Edmonton

NUMBER OF INTERNSHIP POSITIONS

1

Contact: Brendan Cavanagh, Internship Coordinator (Inbound)
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INTERNSHIP START DATE

July 4

INTERNSHIP END DATE

October 4

ARE THE DATES FLEXIBLE?

Yes, I am flexible regarding the internship dates. Selected students can contact me to request a date change.