



Delivering Canadian Oil Sands in the United States: Energy Security at What Cost?

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Background

U.S. liquid fuel demand is expected to grow from 20 million barrel per day (MM b/d) in 2006 to 25 MM b/d in 2025. Besides seeking liquid fuel supplies to meet steady demand, the U.S. government is searching for more secure and cleaner energy sources. Recently, President Bush signed the Energy Independence and Security Act of 2007. The broad goals of the act are to increase domestic alternative fuels and fuel economy to at least 35 miles per gallon for model year 2020. While it is difficult to predict how soon other alternatives could serve our increasing demand, in the short run, the U.S. will still rely on foreign oil. For this reason, it is necessary to diversify crude oil channels to secure energy partners to minimize risk due to reliance on crude oil from unstable countries until supporting infrastructure for alternative fuels and technology are fully developed.

Canada holds the second largest oil reserves in the world if oil sands are taken into account. A large investment in oil sands from Alberta, Canada could potentially improve crude oil supply as well as help the U.S. decrease imports from unstable countries. In moving the U.S. toward a more secure and cleaner future, it is vitally important to assess the feasibility of Canadian oil sands based on costs, environmental impacts, and security enhancement.

Statement Of Work

We are comparing the life-cycle cost, energy intensity, and CO₂ emissions between Canadian oil sands and current petroleum supplies in the U.S. The life cycle boundary includes the production, transportation, and refining processes of fuels. This comparison will help to identify changes in environmental impacts, energy intensity and emissions.

Besides, energy infrastructure plays a crucial role in energy accessibility. The existing U.S. energy infrastructure was originally designed for light crude oil, while oil sands are heavy oil, deposits of bitumen. Therefore, we also estimate additional new infrastructure costs for handling Canadian oil sands in the U.S.

Results and Conclusions

Life-cycle energy and emissions of Canadian oil sands are 70-90% higher than the current U.S. crude oil status quo. If the U.S. plans to improve energy security by importing Canadian oil sands, the overall life-cycle emissions of U.S. petroleum will increase by 10-15 kg CO₂/barrel and the additional new infrastructure costs for handling Canadian oil sands will be \$10-14 billion (dollar value 2006). Increasing Canadian crude imports is arguably more secure but not the same as promoting energy independence; however, it could be a relevant backup plan since it is difficult to predict how soon other alternatives could serve our increasing demand. Imported Canadian crude oil is the best for investment because it can rely on existing facilities. On the contrary, vast additions to new pipelines, storage tanks, and refineries must be built to accommodate alternatives like coal-to-liquids (CTL) or renewable fuel projects, as well as in some cases the cost of upgrading vehicles.

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