



SABER PROJECT- GHG IMPLICATIONS

INTRODUCTION

Bitumen from Alberta's oil sands is going to be produced and processed for decades to come. The pertinent question is: should that raw resource be processed to add value, high quality jobs, tax base and other direct and indirect benefits in Canada? In Ontario? Or, should it be exported with the value added advantages going to non-Canadian jurisdictions?

Another question is how can greenhouse gas (GHG) emissions be controlled in a responsible manner? Emissions are not contained by borders. As such, SABER must be evaluated in a global context. A new state of the art refinery would result in new emissions. However, by offsetting emissions from older refineries elsewhere, a new refinery in Ontario, a province with world class environmental standards and carbon reduction strategies, would result in responsible industrial technology development and possibly a net reduction in global GHG emissions.

SABER AND REFINED PETROLEUM MARKETS

SABER will not create new demand for fossil fuels. Rather, it will interact with the north eastern North American market as a competing supply to meet demand that is in place and stable, if not in decline. Much of that demand is supplied by old and inefficient refineries. This results in fuels with a higher GHG burden than fuels produced in a new energy efficient refinery.

A new refinery would use state of the art process furnaces, advanced heat integration between process units, advanced process control and better insulation as well as take advantage of innovations in conversion unit efficiencies. This would contribute to a net reduction in GHG emissions per barrel of crude oil processed compared to an older facility processing the same crude oil. SABER, deploying state of the art technology, would score very well in industry benchmarking for energy and GHG intensity¹. Products supplied by SABER into a fixed or declining product demand market should mean that less efficient refiners would either have to reduce production and therefore emissions, or find other export markets. This is analogous to new natural gas fired electricity generation displacing coal in many markets today.

New, and likely more efficient, refineries have been built in Asia and other parts of the world to supply increasing product demands in those markets. Efficient cost advantaged Texas and

¹ Validating this hypothesis needs to wait until a final refinery configuration is developed and could be part of an impact assessment



Louisiana refineries have recently displaced over 4 million barrels per day of older inefficient capacity in the Atlantic basin, representing over 2% of global refining. This suggests, consistent with recent history² in the US and Canada, SABER would displace high carbon burdened product supply with reduced carbon burdened product causing inefficient refineries to lower production.

ALTERNATIVE TRANSPORTATION FUELS

Transportation fuels contribute about one third of Ontario's GHG emissions as illustrated in Figure 1. Reducing these emissions will be challenging as there is currently no alternative energy supply that can compete with conventional fuels on price, energy density, convenience and installed delivery infrastructure. These advantages took over 100 years to build and the embedded infrastructure is huge. Replacing this system will take time and is already underway³. In parallel with advancing fuel and infrastructure development, vehicles are safer and more efficient than ever. Some cars on the market today use as little as 5L/100km and are designed to run on a wide range of alternative fuels.

Alternatives to gasoline and distillates will become available over time and will likely cause older and inefficient refineries to reduce production. However, Ontario is expecting demand for fossil fuels to continue into the 2nd half of this century⁴. Fossil fuels for transportation will continue to be used for a long time, perhaps beyond the economic life of SABER.

MANUFACTURING SECTOR IN ONTARIO

Petroleum refineries are a subset of the industry sector. Ontario industries contribute about 30% of Ontario's GHG emissions. Ontario refineries contribute less than 10 % of industry emissions in the Province, or about 2 to 3% of Ontario's total GHG emissions which, in turn, translates into about 0.5% of Canada's emissions⁵. A new refinery, as would be the case for any new industrial facility added in Ontario, would increase the Province's emissions. Incremental

² USA REFINERY HISTORY EIA Data In 1982 there were 254 refineries with an average capacity of ~63,000 barrels/day were operating in the US. By 2014 115 old and inefficient refineries were shutdown leaving 139 operating facilities with an average capacity of about 128,000 barrels/day. http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=8_NA_800_NUS_C&f=A

³ Sarnia-Lambton is pursuing alternative fuels and other sources of transportation fuels and is home to the largest ethanol plant in Canada (Suncor), a biodiesel plant (Methes) and has supported projects relating to hydrogen and fuel cells, with a center of excellence located at Lambton College.

⁴ The MOECC has committed to reduce emissions by 80% relative to 2005 by 2050. *Ontario's Climate Change Discussion Paper 2015*. This may be interpreted to mean that 20% of 2005 emissions will continue at that time, some of which will come from fossil fuels.

⁵ Industry GHG emission data is available at <http://www.ec.gc.ca/ges-ghg/donnees-data/index.cfm?do=search&lang=en>



emissions due to SABER would not be high enough to meaningfully change these percentages⁶.

Institutions, businesses, individuals and industry historically have not included the cost born by society due to GHG emissions. In other words, the cost of carbon was “externalized.” That is about to change in Ontario.

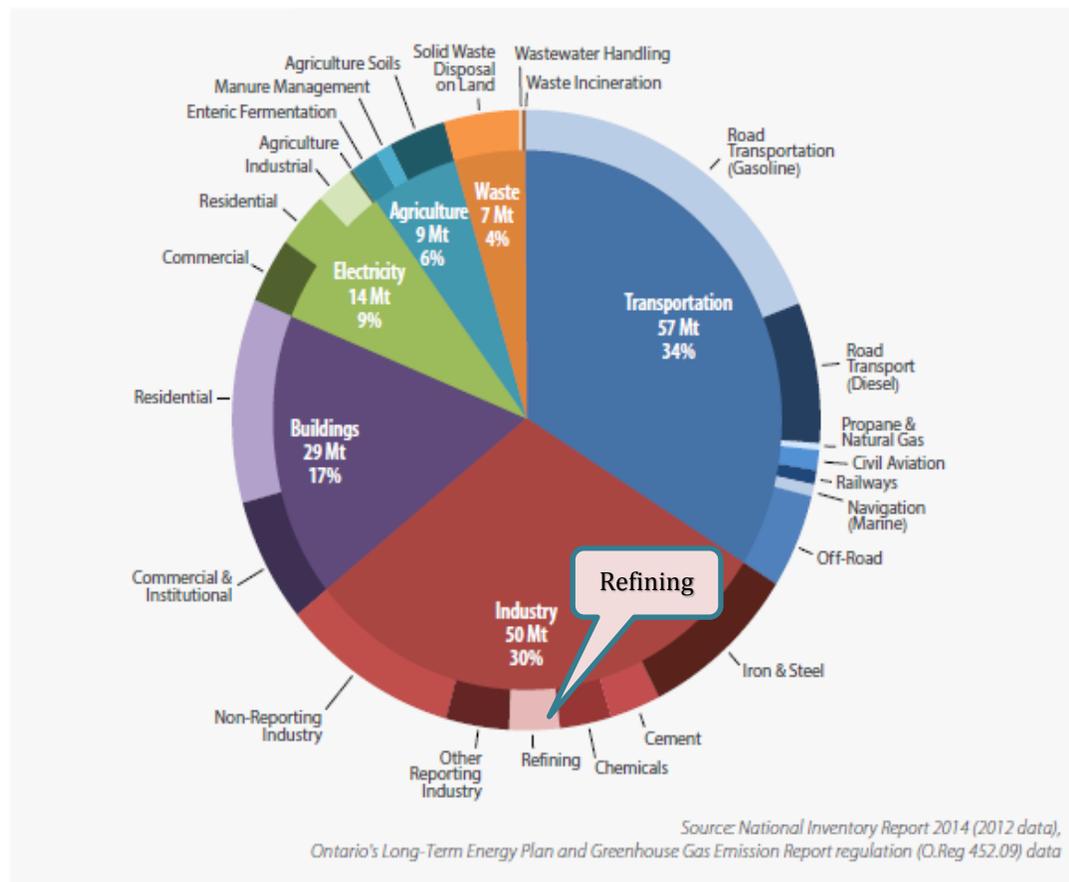
The Province is planning to implement a cap and trade program which will result in heavy industries internalizing their GHG emission costs by purchasing GHG emission permits. The number of permits made available for sale will be reduced over time; causing the price to increase.

Design for a new refinery would consider not only fuel purchase costs but also carbon costs. This will drive the proponent to design a plant that will be more efficient than would be

the case without a cap and trade program. Further, since emission costs for SABER will need to be “internalized” the future operators will be incented to maintain efficient operation and performance of efficiency enhancing equipment over the life of the Project.

Bitumen will be refined with or without SABER, we think it should be refined in Sarnia Lambton.

FIGURE 1 ONTARIO'S GHG EMISSIONS BY SECTOR
SOURCE - *ONTARIO'S CLIMATE CHANGE DISCUSSION PAPER, 2015*,
ONTARIO MINISTRY OF THE ENVIRONMENT AND CLIMATE CHANGE



⁶ SABER could emit between 0.7 and up to 1 MT of GHG_e compared to Ontario's total (2012) of about 160MT or compared to Canada's total of close to 700MTonnes).