

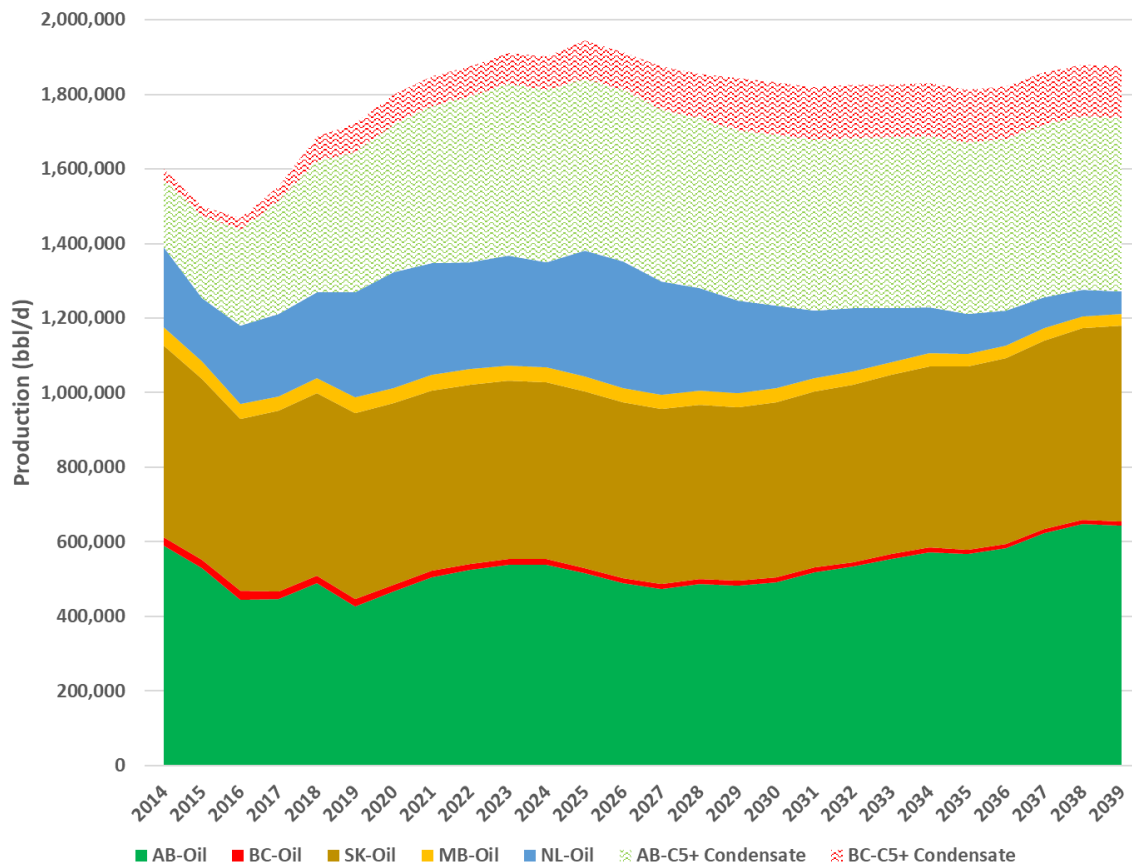
Executive Summary

This study examines Canada’s conventional crude oil and natural gas industries, including production forecasts and supply costs, over the next 20 years. The study covers onshore and offshore conventional oil, including shale and tight oil activity, conventional natural gas, coalbed methane, tight and shale gas, and the associated natural gas liquids (pentanes plus and condensate only). It does not include oil sands.

In this study, the overall oil outlook is shaped based on several factors: the dynamics of the US crude imports (declining before 2030 and growing afterwards), relatively stable demand from domestic refineries, the pentanes plus and condensate’s growth underpinned by the demand from oil sands, the additional pipeline exports to Central Canada to displace foreign oil, and additional exports via the Trans Mountain Pipeline. The outlook for gas is formed based on the expectations of additional domestic natural gas consumption, declining net exports to the US, and the additional demand for gas from LNG developments.

Figure E.1 shows historical and forecasted oil production between 2014 and 2039.

Figure E.1: Canada Crude Oil Production Forecast



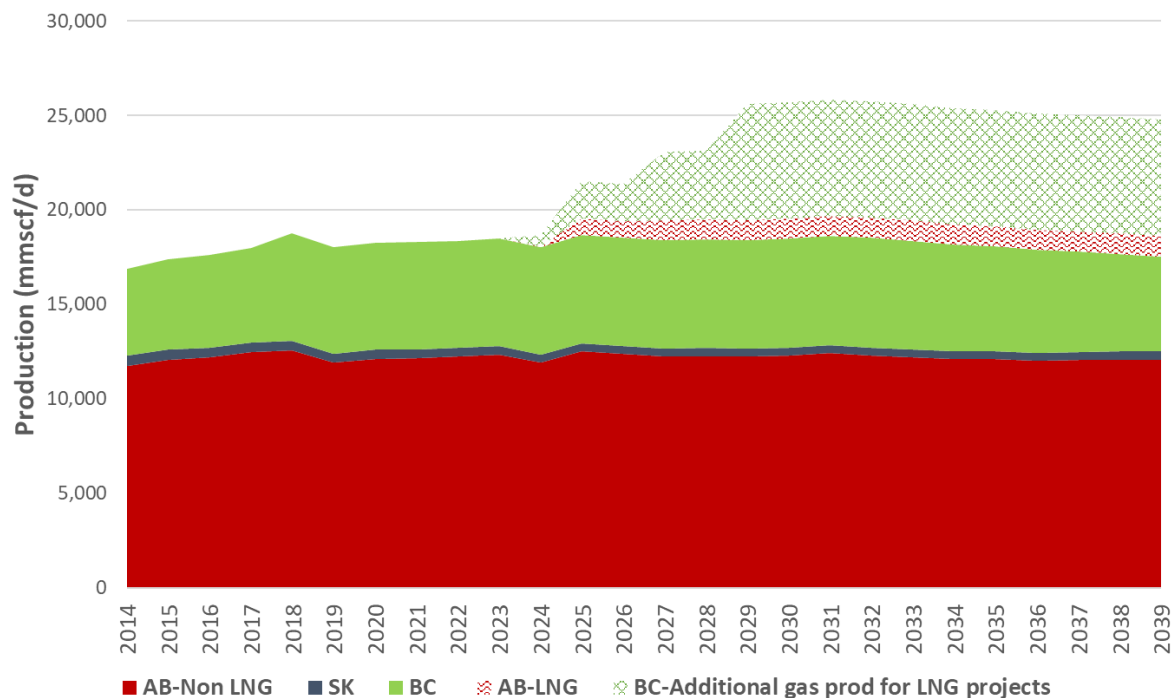
Source: CERI, BCOGC, AER, Government of SK, Government of MB, CNLOPB, PSAC, CAPP

For crude oil, the pricing environment over 2014-2018 had an impact on the industry and led to a sharp reduction in production. More than 200 Mbpd of oil production was lost from 2014 to 2016. However, from 2016 the trend reversed and is expected to do so until 2025 reaching approximately 1.4 million bpd (without pentanes plus and condensate). This is followed by a decline to 1.3 MMbpd due to falling production in Newfoundland and Labrador (Figure E.1) by the end of 2039. Growth in crude oil production will be led by Alberta followed by Saskatchewan (Figure E.1). Together with Saskatchewan, Alberta is affected most by the dwindling US imports in the coming years. After 2030 exports to the US grow due to the decline in production from their maturing shale fields.

Total pentanes plus and condensate will keep growing for the forecasted period from 418 Mbpd in 2019 to 604 Mbpd in 2039 underpinned by demand from oil sands and driven by liquids-rich natural gas drilling.

For natural gas, an incremental trend in production in recent years was caused by two factors: addition to the net exports to the US by 0.4 billion cubic feet per day (bcf/d) and an increase in domestic gas consumption. However, the net exports to the US started to decline in 2017 and are expected to continue for the foreseeable future. Growth in domestic demand by 2.5 bcf/d in the next 20 years will largely, but not completely, counterbalance this decline of net exports. The domestic incremental demand is expected to come from the electricity sector which explains 47 percent of growth, followed by industry which drives 35 percent of gas demand additions including by the oil sands sector (NEB, Energy Futures 2019).

Figure E.2: Total Canadian Natural Gas Production



Source: CERl, Government of SK, BCOGC, AER, PSAC, CAPP

LNG plants provide an opportunity to develop production capacity in western Canada and attract more growth-oriented investments into the upstream gas industry. Such a scenario will lead to a consistent increase in production until 2029 to levels slightly over 25 bcf/d. Post-2029, production will stabilize through the remainder of the study period. The gas for LNG will constitute approximately 30 percent of total Canadian production by 2039 and is expected to be supplied by British Columbia and Alberta.

This study also examines the economic impacts of the Canadian conventional oil and natural gas industry on the Canadian economy (Table E.1) as well as on the US economy. The impacts analysis is done for the period 2019-2029.

Table E.1: Total Economic Impacts from Oil and Natural Gas Development, 2019-2029*

Province	GDP (\$CAD million)	Employment (Direct and Indirect) (person-years)	Tax Revenue (including royalties) (\$CAD million)
Alberta	\$368,188	1,927,236	\$15,248
British Columbia	\$122,102	670,345	\$5,054
Manitoba	\$13,606	33,532	\$569
Newfoundland and Labrador	\$91,443	191,472	\$587
Saskatchewan	\$137,203	275,150	\$4,223
Canada	\$853,893	4,163,385	\$31,436

*The effects in each province show both direct and indirect effects of crude oil developments within that province, while the effects for Canada represents direct and indirect effects of crude oil developments in all Canadian provinces.

For the forecast period of 2019-2029, it is estimated that the total US gross state product impact (direct and indirect) will amount to almost US\$19.6 billion or CAD\$26.2 billion. The total employment impact (direct and indirect) is measured in creating or preserving 153.2 thousand full-time equivalent jobs in the 11-year period.

Another component in the study is carbon dioxide equivalent emissions from the oil and gas upstream activities. More specifically, upstream emissions encompass emissions from the following activities: drilling, production and extraction, processing in the field, and venting, flaring, and fugitive emissions.

On average, annual emissions from oil production will be 31.1 million tonnes/year during the study period or less than 1 percent below the 2017 level. Alberta and Saskatchewan will generate the highest emissions at 48 and 35 percent, respectively (Figure E.3). For the natural gas production, on the other hand, the average annual emissions will be 44.7 million tonnes/year over the 2019-2039 period, or 10 percent decrease compared to 2017 levels due to methane reduction regulation implementation. Alberta and British Columbia will generate the highest emissions at 57 and 15 percent, respectively.

Figure E.3: Emissions for Crude Oil Production (top) and Natural Gas Production (bottom)

