

Slower production growth and declining GHG intensity limited oil sands absolute emissions growth in 2023

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Kevin Birn, Global Head, Center of Emissions Excellence, kevin.birn@spglobal.com

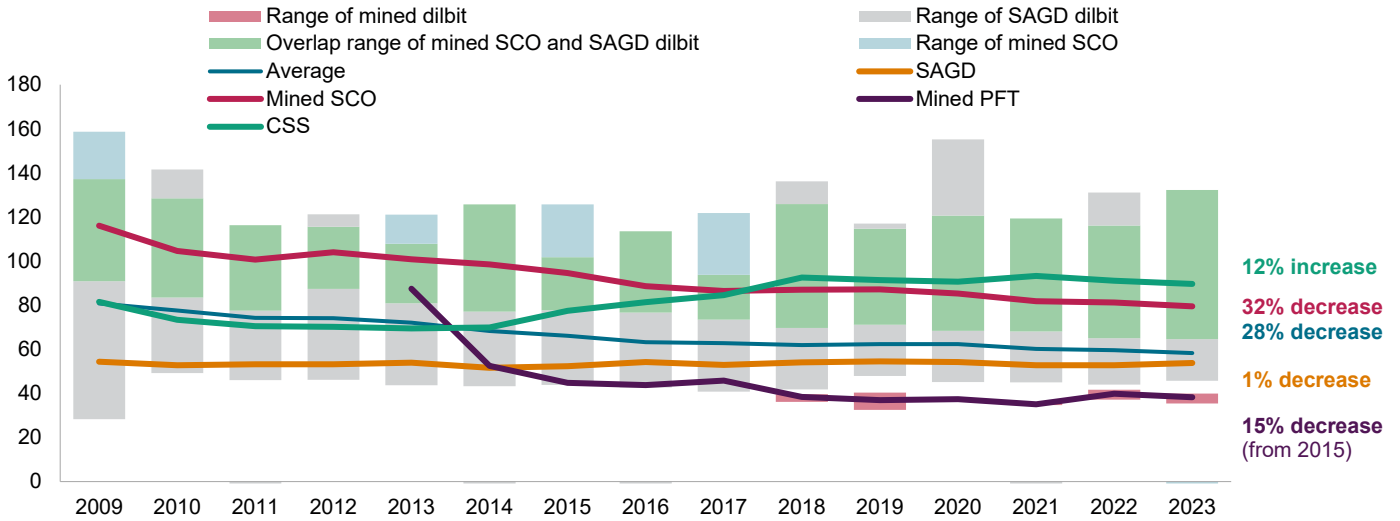
Since 2019, the pace of oil sands emissions growth has slowed, rising 3 MMtCO₂e (3%) while production increased over 250,000 b/d (9%)

The greenhouse gas intensity of the Canadian oil sands continued to decline in 2023. Since 2009, S&P Global Commodity Insights estimates that the annual average GHG intensity of the Canadian oil sands declined 28%, or nearly 23 kilograms of CO₂ equivalent per barrel (kgCO₂e/b) of marketable product (synthetic crude oil [SCO] or diluted bitumen [dilbit]).

In 2023, the average GHG intensity of oil sands product was 58 kgCO₂e/b, but in a system of over 30 facilities, performance was not consistent. Production of steam-assisted gravity drainage (SAGD) dilbit saw a modest increase in GHG intensity, which was more than offset by rising output from less GHG intensive mining operations.

Figure 1

Range and average of GHG intensity of oil sands extraction by year and by technology (2009 to 2023 in kgCO₂e/b of marketed product)

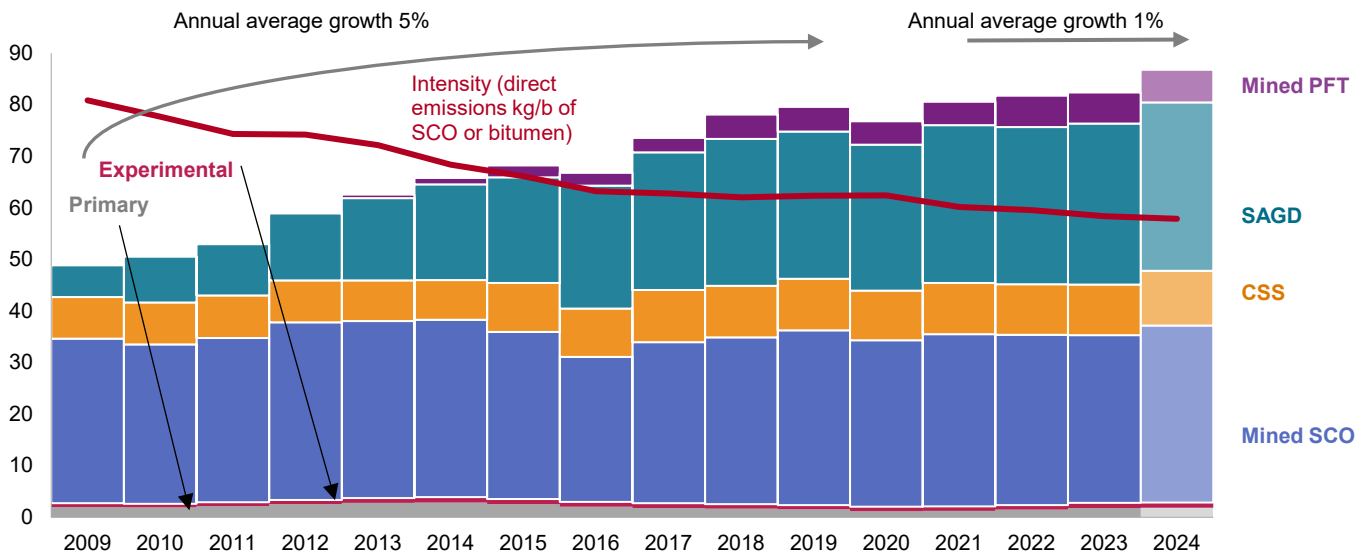


Data compiled June 4, 2024.
 PFT = paraffinic froth treatment; CSS = cyclic steam stimulation.
 Source: S&P Global Commodity Insights.
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The slower pace of absolute emissions continued in 2023, rising by less than 1 million metric tons of CO₂ equivalent (MMtCO₂e), to just over 82 MMtCO₂e. This was the third consecutive year of modest absolute emissions gains. Since 2020, absolute emissions growth from oil sands has slowed to average about 1% per year compared with 5% in the preceding decade. Slower production growth has been a factor but is not the entire story. Compared with 2019, absolute emissions were just short of 3 MMtCO₂e (3%) higher in 2023 while production was over 250,000 b/d greater (9%). This indicates that the production additions that have occurred have come at much lower emissions intensity.

Figure 2

Composition of absolute oil sands emissions vs. intensity (MMtCO₂e per year and kgCO₂e/b)



Data compiled June 2024.
 Source: S&P Global Commodity Insights.
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[Last year we wrote](#) that the lower pace of absolute emission growth may indicate emissions could peak sooner and at a lower level than previously expected. Based on 2023 operations, evidence continues to suggest this could be the case. The slower pace of emission additions could make achieving the proposed federal oil and gas emissions limit more achievable. Our current projections, however, continue to suggest anticipated production additions will outstrip near-term intensity reductions, pushing absolute emissions materially higher. Should this occur, greater decarbonization efforts from the sector will be required to meet the proposed federal oil and gas emissions limit by 2030. In this regard, time is not on the industry's side, with carbon capture and storage (CCS) taking over a half decade or more to be brought online. As we move closer to 2030, the likelihood of bringing online sufficient CCS capacity becomes more challenging.¹

1. Compared with prior oil sands GHG intensity updates by Commodity Insights, the system boundaries, or the definition of GHG intensity, has changed. Prior GHG intensity estimates included both emissions associated with diluent production, and share in blended bitumen, but also upstream natural gas extraction emissions. To align with comparisons from other basins, the emissions associated with upstream production of natural gas used in oil sands operations were not included in this most recent estimate. For comparison, if those emissions are also included the GHG intensity of Canadian oil sands in 2023, they would be 66 kgCO₂e/boe, 2% lower than 2022. Compared with 2009, the GHG intensity would have declined 26%. Absolute emissions system boundaries are not impacted as they consider only direct scope 1 emissions. It is important to note that the S&P Global oil sands absolute GHG estimate is still from Canada's National Inventory Report (NIR) by facilities included. Commodity Insights understands the NIR includes the emissions of both the Cenovus Energy Bi-Provincial Upgrader (BPU) as well as the Northwest Redwater Refinery (NWR). BPU is not included our analysis because it is not dedicated to upgrading oil sands bitumen, and it also processes non-oil-sands-derived heavy oil. The NWR facility is not included because it is designed to market refined product.

CONTACTS

Americas: +1 800 597 1344

Asia-Pacific: +60 4 296 1125

Europe, Middle East, Africa: +44 (0) 203 367 0681

www.spglobal.com/commodityinsights

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