

ENERGY & THE ENVIRONMENT

AT THE ALBERTA SCHOOL OF BUSINESS

WILL ACTION ON CLIMATE CHANGE STRAND THE OIL SANDS?

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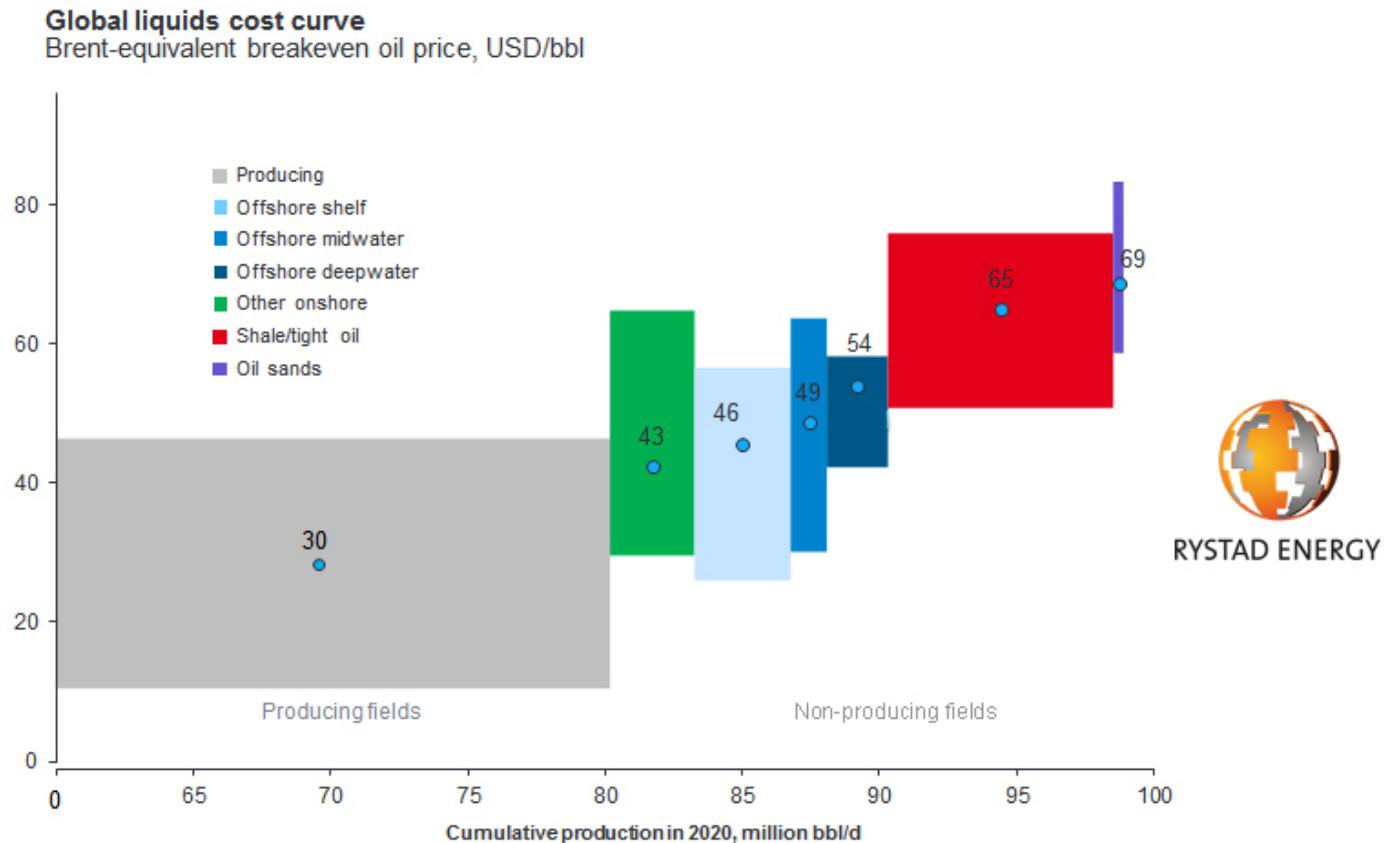
Research questions

- Is action on climate change (domestic and global) likely to strand oil sands assets?
- How might that happen?
- What are the most significant risks?

Four pillars of stranded asset risk in the oil sands

1. Global climate change policies and induced technological and market changes
2. Domestic climate change policy
3. Proxy battles on issues such as market access – will opponents succeed in blocking pipelines?
4. Global access to capital and perceived risk of long term oil sands investments

Setting the stage: Oil sands are marginal barrels



Producing fields are the cheapest supply source, as opposed to the most expensive – non producing oil sands – with 69 USD/bbl. The producing fields' low breakeven price is due to past capex that we consider as sunk, cheap Middle East and shale production. Non-producing shale and oil sands are the marginal sources of supply in 2020, with high drilling/completion costs for the former and high capex/opex for the latter.

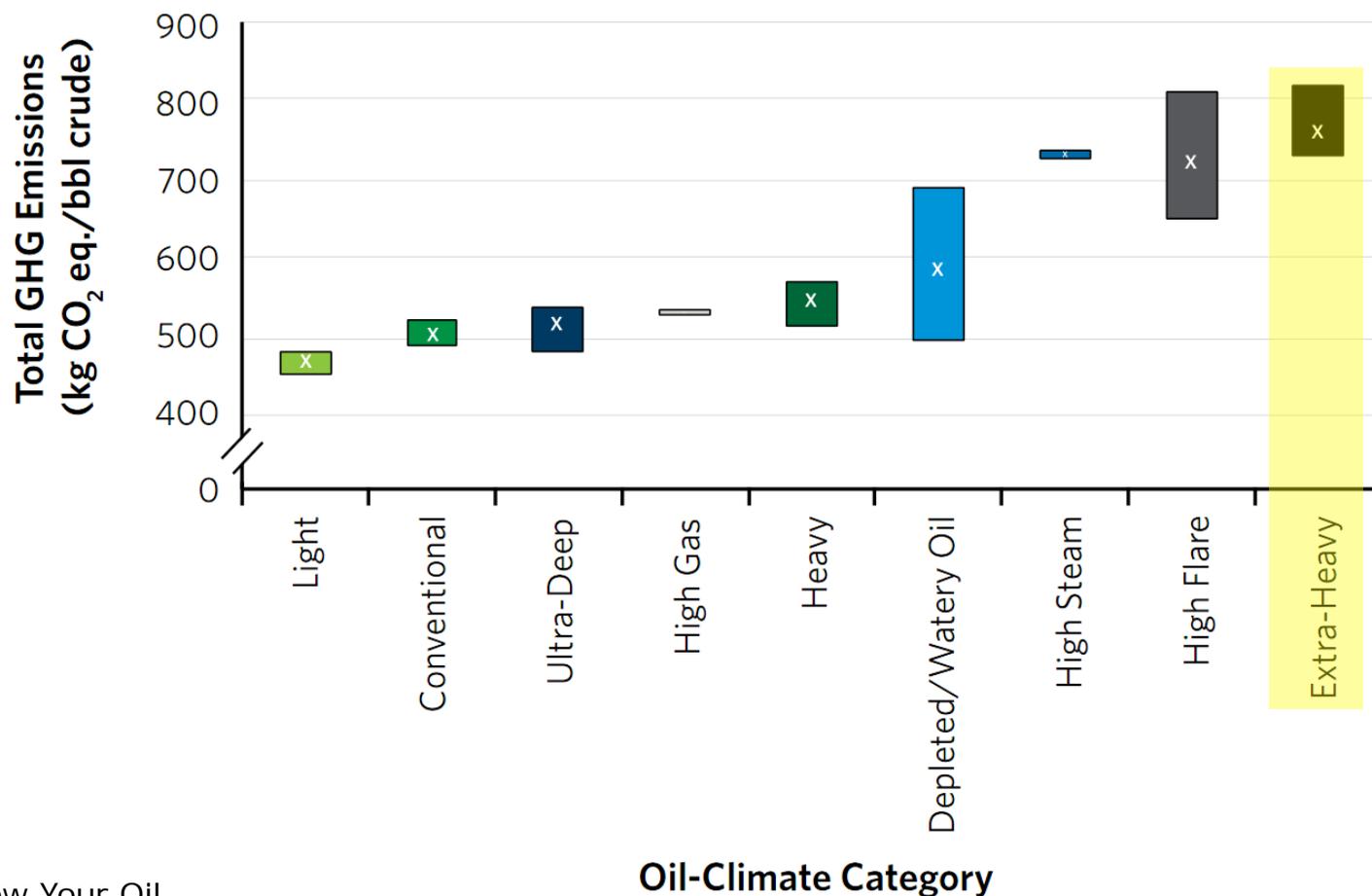
Rystad Energy's liquids cost curve is made up of nearly 20,000 unique assets by considering each asset's breakeven oil price and potential production in 2020. The breakeven price is the Brent oil price at which NPV equals zero, considering all future cash flows using a real discount rate of 7.5%.

Source: Rystad Energy research and analysis; UCube March 2016

Setting the stage: oil sands are high GHG barrels

FIGURE 1

GHG Emission Ranges for 30 Phase 1 OCI Test Oils, by Category



Source: Know Your Oil

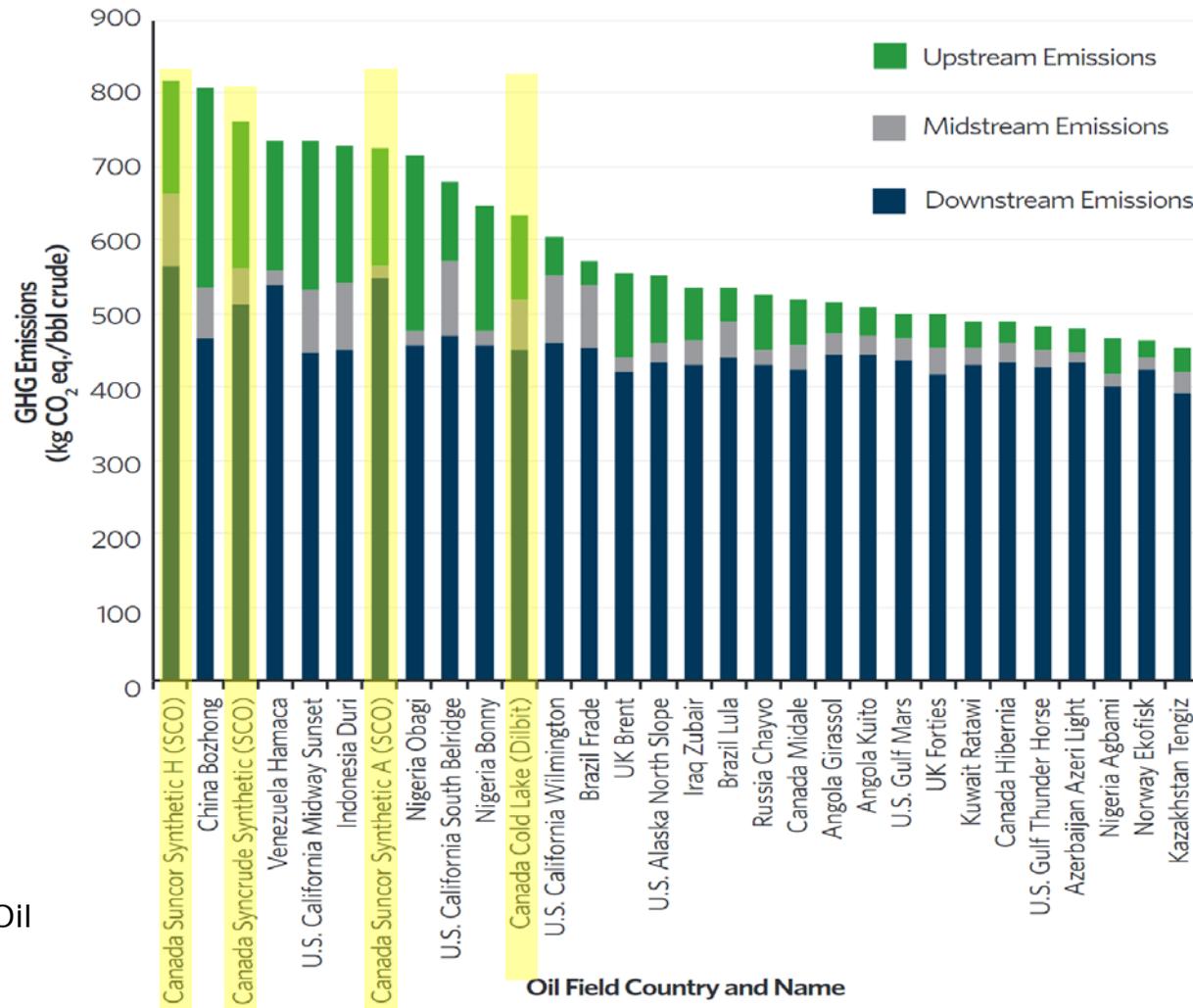
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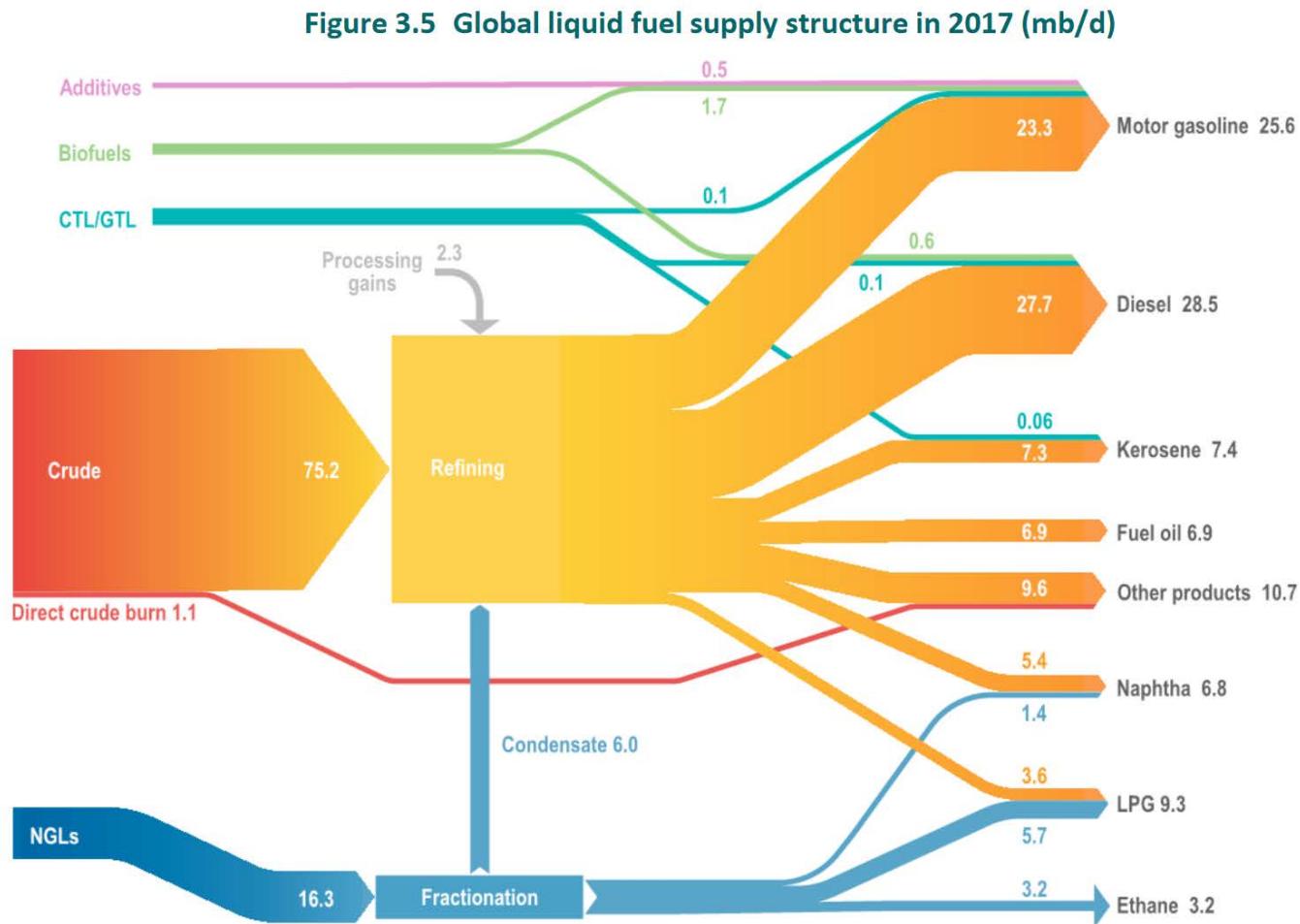
Setting the stage: oil sands are high GHG barrels

FIGURE 12
Total GHG Emissions for 30 Phase 1 OCI Test Oils



Source: Know Your Oil

Setting the stage: oil is all about transportation fuel demand



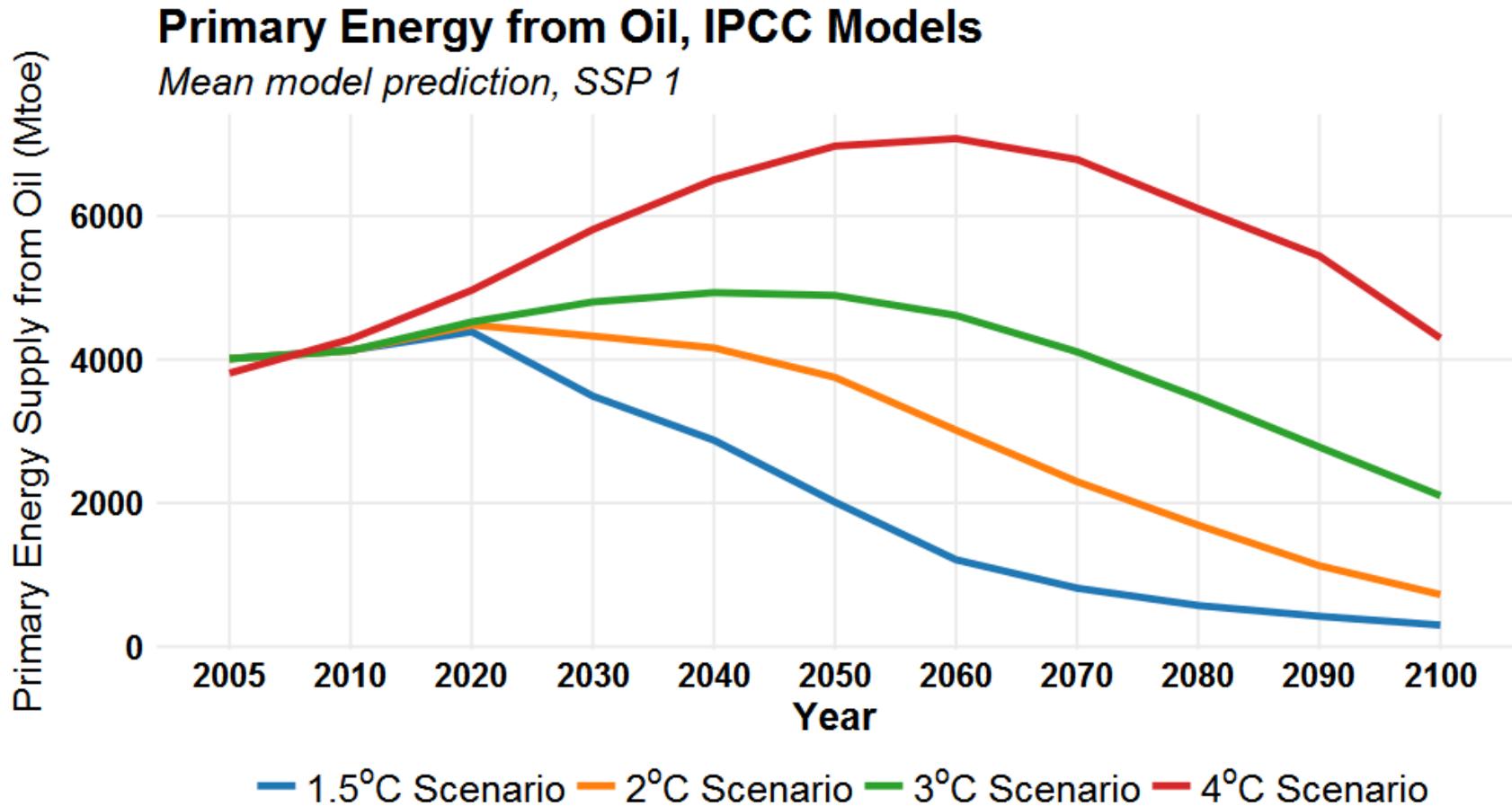
Source: IEA (2018)

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PILLAR 1 : GLOBAL CLIMATE CHANGE POLICY AND TECHNOLOGICAL CHANGE

The world is still going to use oil...but how much?



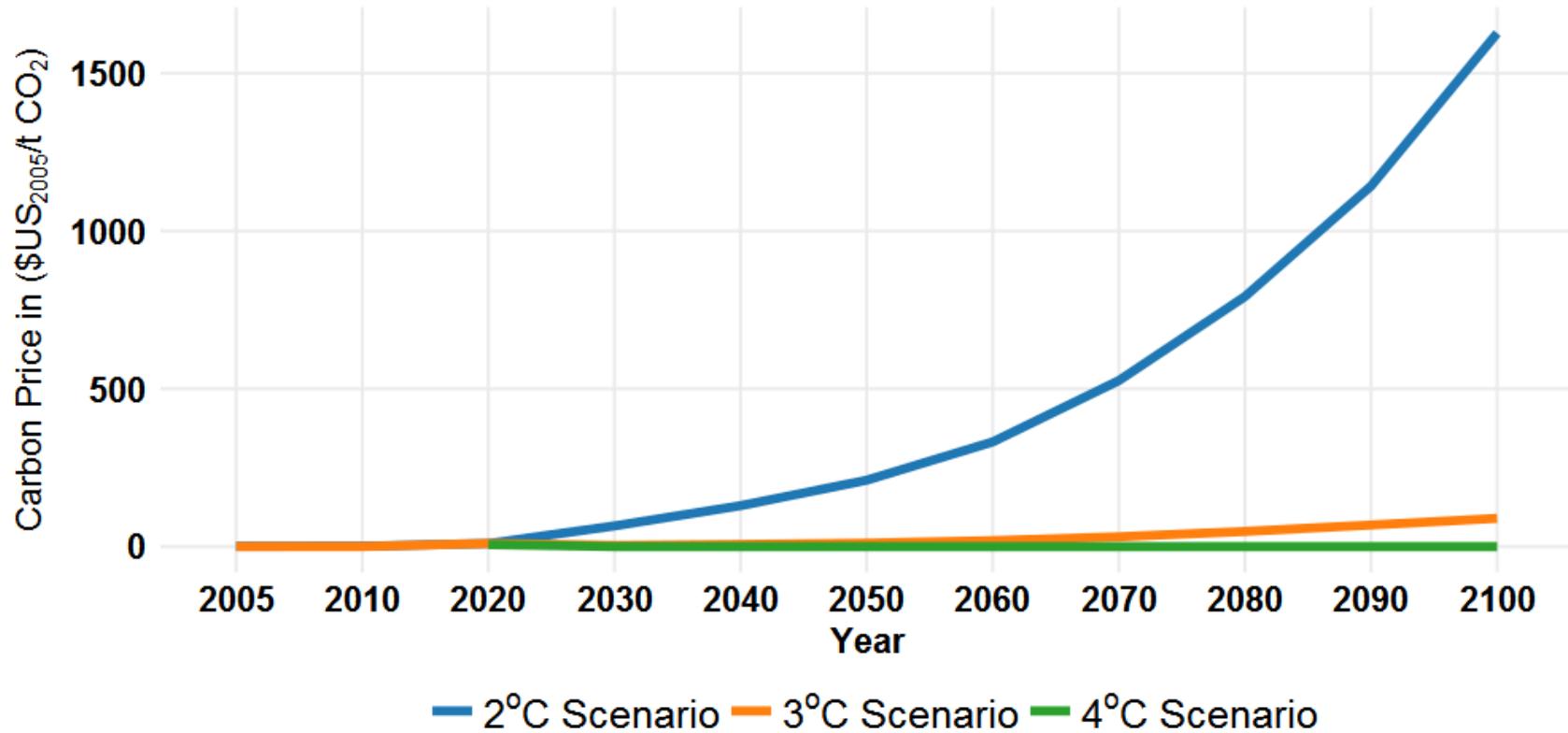
Source: IIASA SSP Database

Graph by Andrew Leach

Policy Context

Carbon Price Implied by RCP Model Scenarios

Mean model predictions

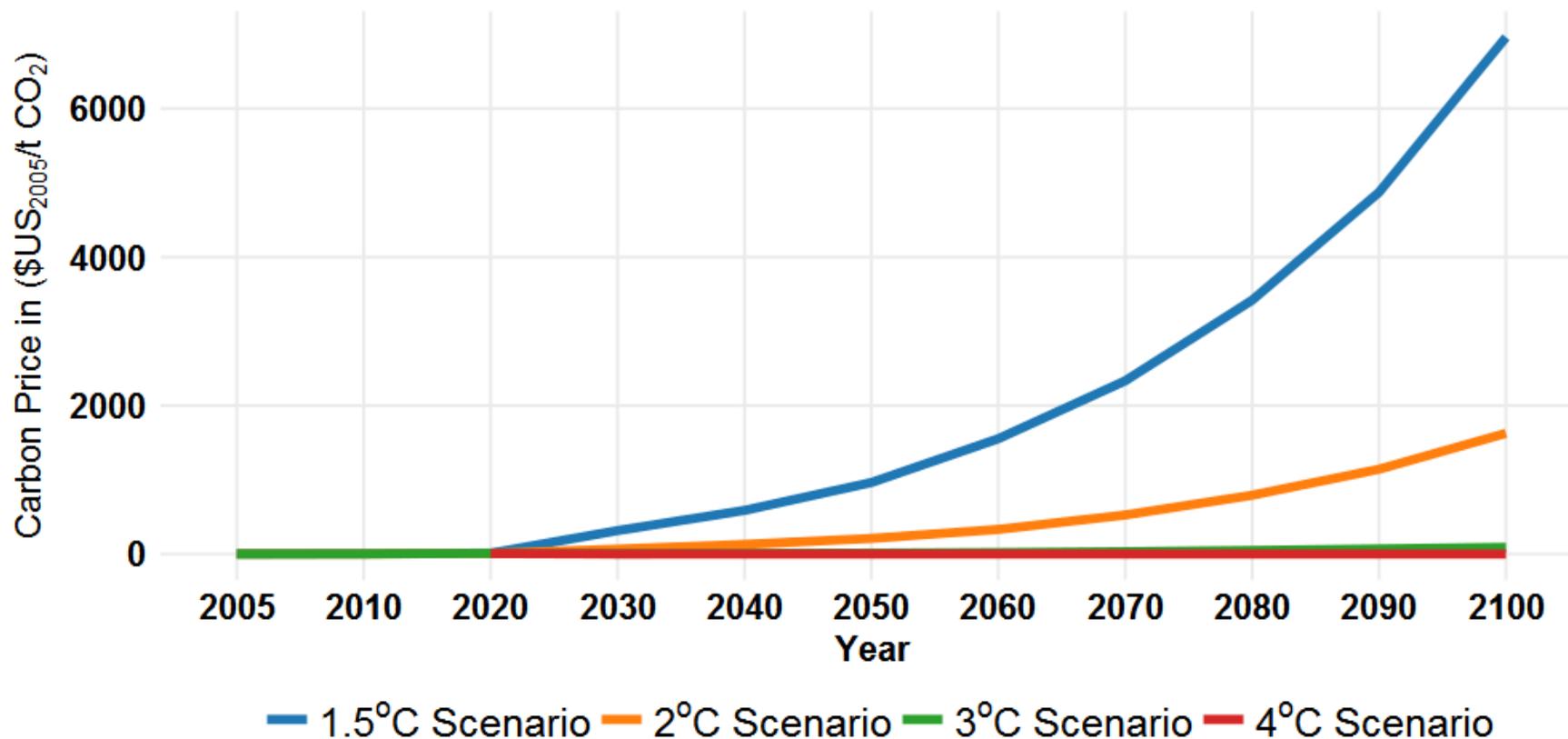


Source: IIASA SSP Database
Graph by Andrew Leach

1.5°C is much more stringent than 2°C

Carbon Price Implied by RCP Model Scenarios

Mean model predictions



Source: IIASA SSP Database

Graph by Andrew Leach

Are oil sands projects viable under more stringent GHG policies? It depends.

Oil sands supply costs with carbon pricing

Impact of carbon prices applied upstream (production) only or over the whole life cycle on the supply costs of oil sands standardized to West Texas Intermediate prices in \$US(2018, real) per barrel

	US IWG SCC (5%, average)	US IWG SCC (3%, average)	US IWG SCC (2.5%, average)	US IWG SCC (3%, 95th pctl)	McGlade and Ekins Nature 2015 (adjusted to \$2011)	SSP1 RCP 2.5 Average from IASSA
Current Alberta policy design with specified prices	78.12	78.50	78.77	79.58	78.78	78.24
Carbon tax, upstream only	78.43	81.07	82.84	88.91	84.93	81.27
Carbon tax, life cycle emissions (full incidence on producer prices)	87.32	108.41	122.43	173.10	147.63	128.70

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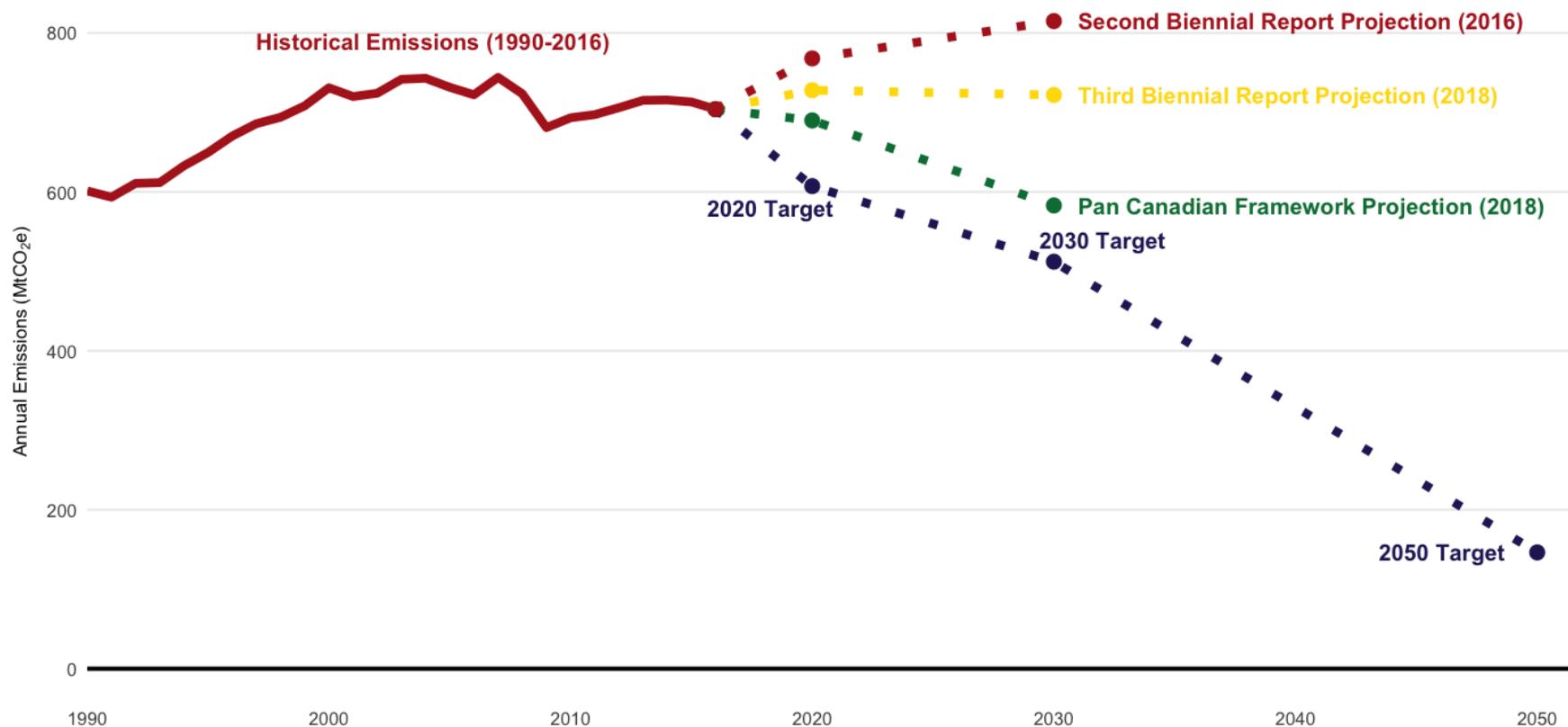
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PILLAR 2 : DOMESTIC CLIMATE CHANGE POLICY

Canada's Emissions

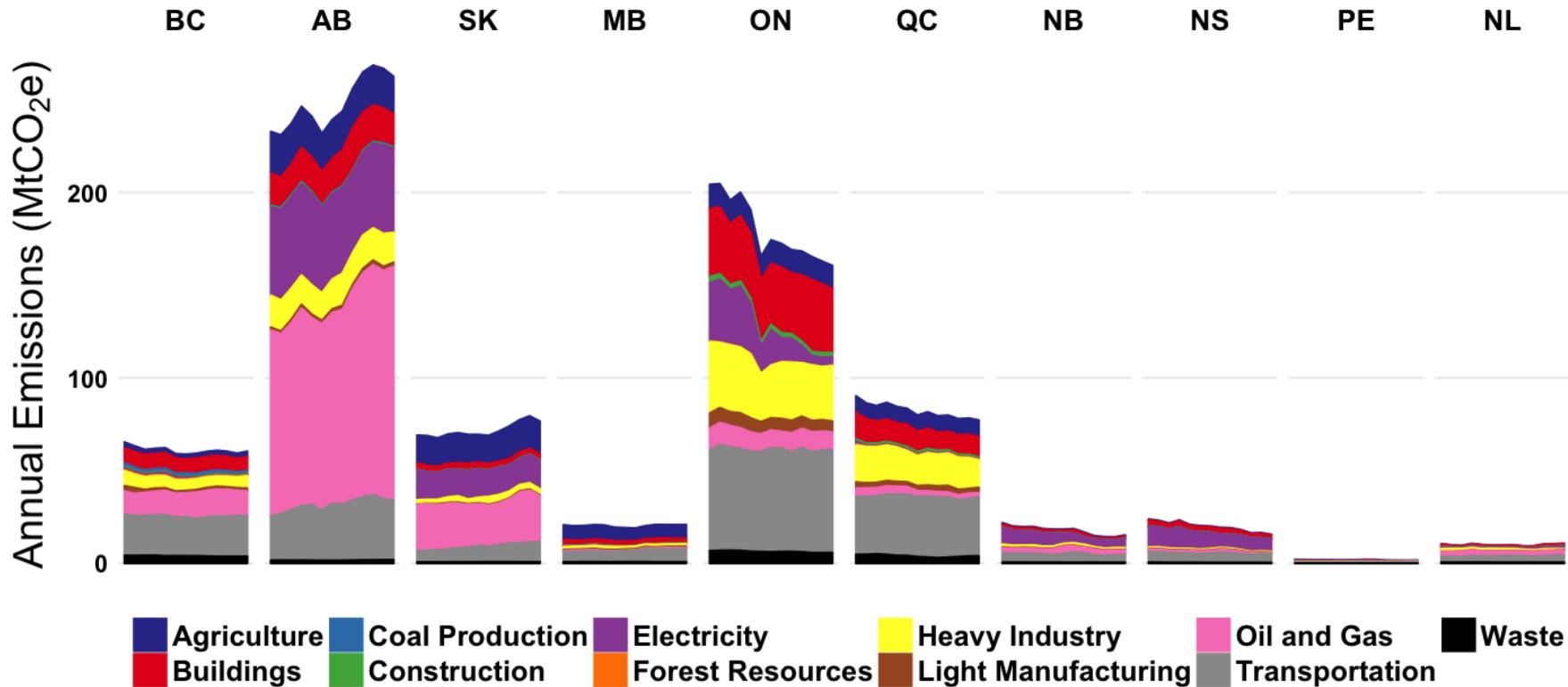
Canada's GHG Emissions, Projections and Future Targets

Source: Environment and Climate Change Canada 2016 Preliminary Emissions Inventory (2018); Second and Third Biennial Report to the United Nations (2016,2018), and February 2018 PCF Update.



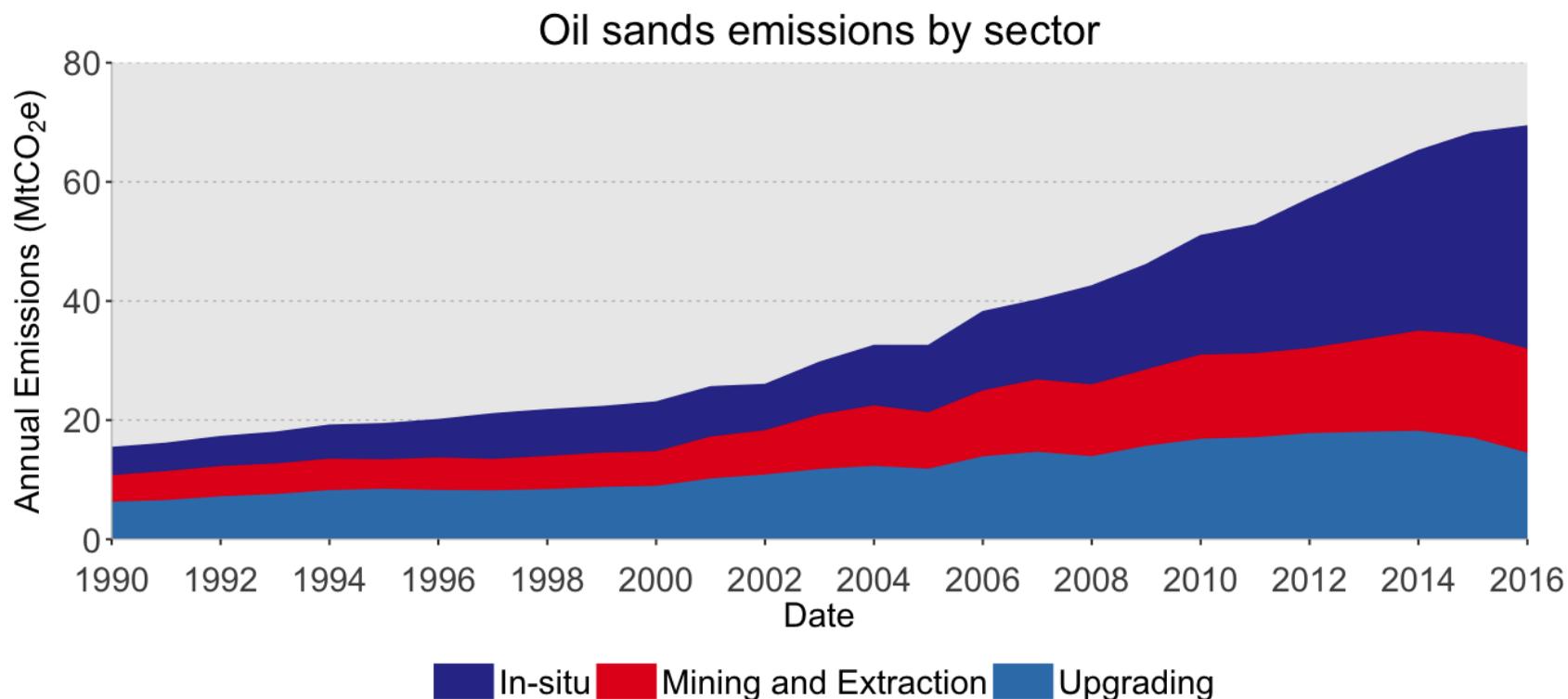
Canada's emissions – one sector stands out

2004-2016 Provincial GHG Emissions



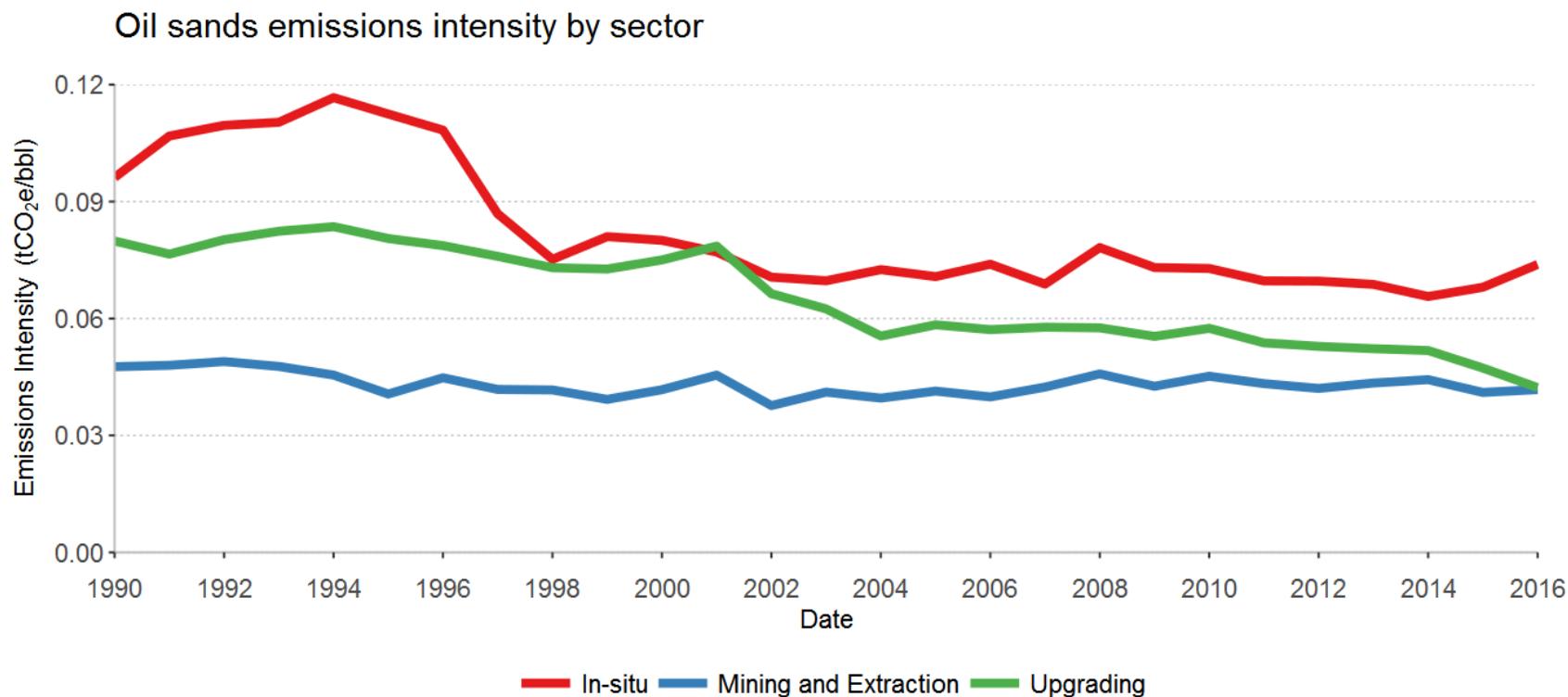
Source: Environment Canada Preliminary Data
Graph by @andrew_leach

Oil sands emissions have grown rapidly



Source: Environment Canada Inventory Data, graph by Andrew Leach.

Oil sands emissions trends are not encouraging



Oil sands are resistant to domestic carbon prices

Oil sands supply costs with carbon pricing

Impact of carbon prices applied upstream (production) only or over the whole life cycle on the supply costs of oil sands standardized to West Texas Intermediate prices in \$US(2018, real) per barrel

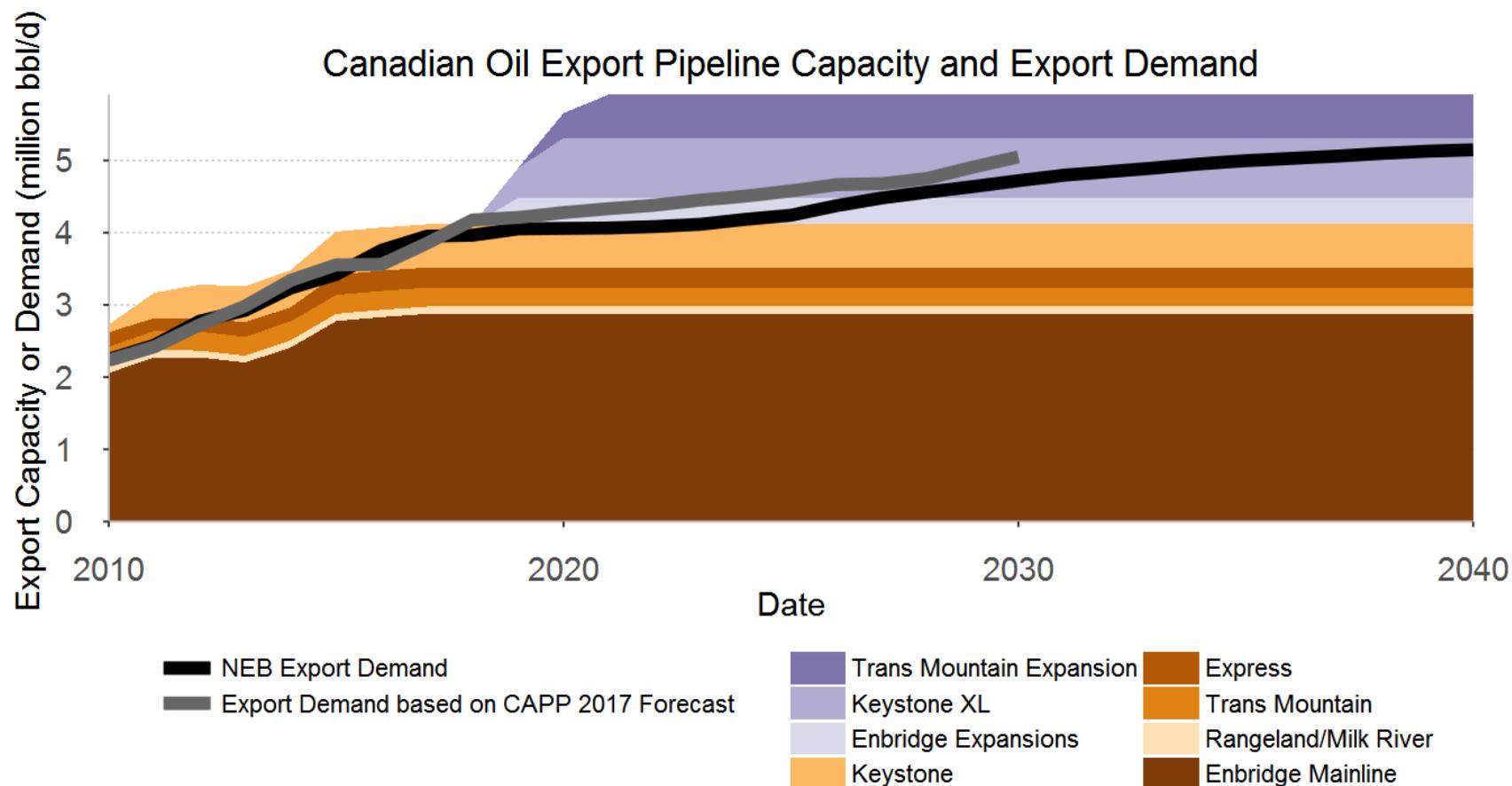
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PILLAR 3 : PROXY BATTLES AND ACCESS TO MARKETS

New infrastructure matters a lot



Source: NEB Data, graph by Andrew Leach.

Will pipelines be built?



VANCOUVER SUN,
November 28, 2014

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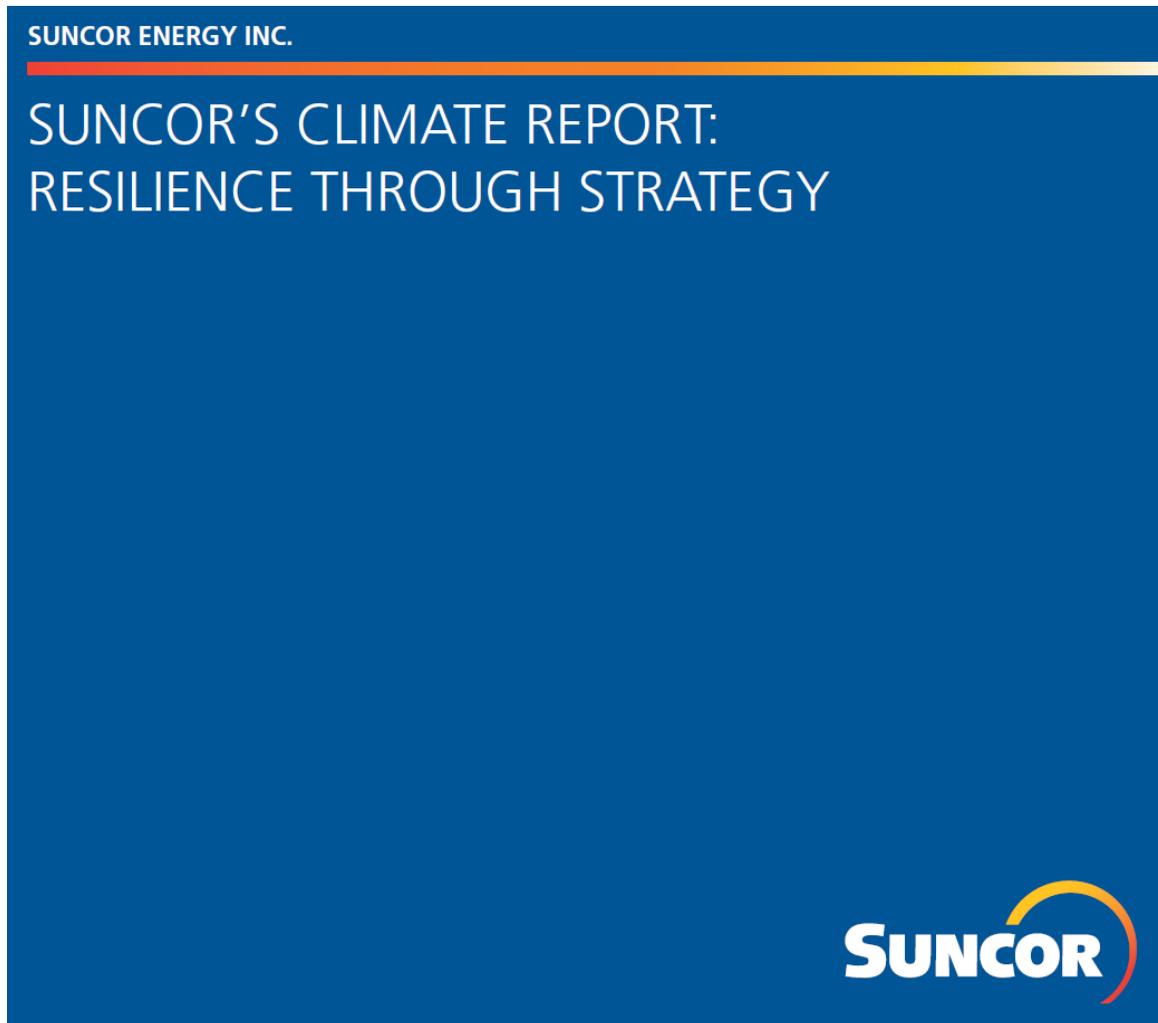
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PILLAR 4 : ACCESS TO CAPITAL

Companies under a tonne of pressure



Source: Suncor

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Companies under a tonne of pressure

Autonomy



Rapid technological and societal change transform the energy landscape.

Millennial shift – focus on sustainability and collaboration, sustainable urbanization.

Falling costs and improved reliability of clean energy allow developing countries to bypass large scale hydrocarbon-based energy infrastructure.

Natural gas is a transitional fuel for power generation, but after 2030 increasingly renewable power generation fuels a largely electrified energy system.

Break through battery technology development supports growth in electric vehicles.

Oil's role in geo-politics is substantially diminished contributing to a generally stable geo-political environment.

Stable moderately strong economy.

Carbon intensive industries face high regulatory costs and requirements.

No new export pipelines are built out of the Athabasca Oil Sands region.

Energy markets impact

Abundant and cost effective supply of energy coupled with moderation and eventual decline in demand, particularly in transportation, drives oil prices to stay low in the long term.

Oil exploration and production slows as investment moves to other sectors, reducing but not choking supply.

High cost supply falls off fast.

Oil is still required and continues to provide a significant share of the world's energy need.

Expected impact on Suncor

No existing assets are stranded.

Existing long-life assets continue to produce, funding their own sustaining capital or modest growth capital requirements for incremental production expansion.

New oil sands growth projects are challenged and unlikely to proceed.

Oil sands continues to provide a stable dividend base while growth options in other resource basins are considered.

Only the top tier refineries will remain profitable – Suncor's downstream maintains a focus on reliable, efficient and low-cost operations.

Source: Suncor

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Companies under a tonne of pressure

Shell welcomes report on climate-related transparency

Jun 29, 2017

Royal Dutch Shell plc (Shell) welcomes the final recommendations set out in a report published today by the Task Force on Climate-Related Financial Disclosures (TCFD).

The TCFD is a global initiative chaired by Michael Bloomberg to get companies across all sectors to assess more clearly and disclose more transparently both the risks and the opportunities presented by climate change. It was set up at the prompting of the G20 and the Financial Stability Board (FSB).

"I agree that companies should be clear about how they plan to be resilient in the face of climate change and energy transition," said Shell CEO Ben van Beurden. "I believe it is right that it should be transparent which companies are truly on firm foundations over the long-term. I applaud the task force for its work to achieve this aim and I have signed a letter confirming Shell's support for the initiative.

"The details matter and I look forward to Shell working with the task force on those details. Specifically, how we present forward-looking information in an uncertain world, the disclosure of commercially sensitive data and the feasibility of providing the suggested detail to the standard required of financial filings. Ultimately, however, both Shell and the task force want these disclosures to be fit for purpose."

Commenting on Shell's support for the initiative, Governor of the Bank of England and FSB Chair, Mark Carney said: "The task force's recommendations have been developed by the market for the market. They set out the disclosures that a wide range of users and preparers of corporate information have said are essential to understanding a company's climate-related risks and opportunities. Widespread adoption will provide investors, banks and insurers with that information, helping minimise the risk that market adjustments to climate change will be incomplete, late and potentially destabilising. I am delighted that Shell is supporting the recommendations and that in so doing, it will bring its considerable expertise to work with the task force to build on, and refine their recommendations over time."

Source: Shell

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ASSESSING CLIMATE RISK

We stress test our project portfolio against low carbon scenarios

Our business needs to be resilient to the multiple risks - both upsides and downsides - posed by the response to climate change. These include potential stricter climate regulations, changing demand for oil and gas, technologies that could disrupt our market, as well as physical effects on our operations caused by the direct impact of climate change.

To ensure that we take these risks into account, we stress test our project portfolio against the International Energy Agency (IEA) energy scenarios, including a range of price assumptions for oil, gas and carbon. Replacing our own planning assumptions with those used in the IEA's 450 scenario (broadly aligned with a 2°C framework) in the World Economic Outlook 2016 shows a positive impact of around 6% on net present value over the lifetime of all projects*.

Our portfolio already has a high share of conventional oil and natural gas assets that have relatively low cost and a low carbon intensity. We also have significant capex flexibility going forward. As a result of these efforts, in 2016 Statoil was ranked as the oil and gas company best prepared for a low carbon future by the CDP.

* Both our own and IEA's price assumptions may differ from actual future oil, gas and carbon prices, so there can be no assurance that the assessment is a reliable indicator of the actual impact of climate change on Statoil.

OIL AND GAS PRODUCTION*

By category, share of total (boe)

Conventional oil and gas Shale gas
Heavy oil Tight oil LNG



* Forecasted production based on equity share, including production from accessed exploration acreage.

Source: Statoil

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Companies under a tonne of pressure

Shareholders force ExxonMobil to come clean on cost of climate change

'Historic' vote by nearly two-thirds of shareholders will force annual 'stress test' to measure how regulation will affect assets



Conclusions

- Oil sands are certainly a marginal resource with the potential to be meaningfully impacted by action on climate change
- Global actions on climate policy, technology and access to capital are likely the most important risks
- Market access and domestic energy policy are important, but potentially an order of magnitude smaller than global oil market, capital, and technology impacts
- There can be a role for oil sands in a world acting on climate change but a push below 2°C scenarios would change that dramatically

Contact Information

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