

ENERGY & THE ENVIRONMENT

AT THE ALBERTA SCHOOL OF BUSINESS

Pipelines, netbacks and trade - the value of
pipelines to the oil sands

Andrew Leach

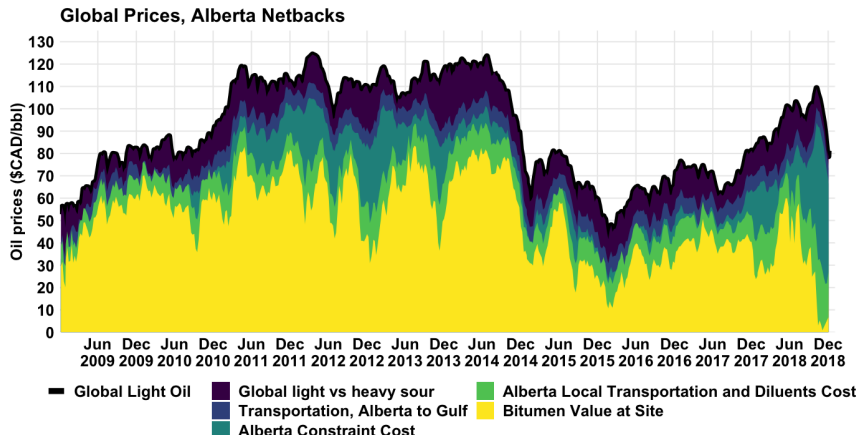
Alberta School of Business, University of Alberta

December 7, 2018

Key Points

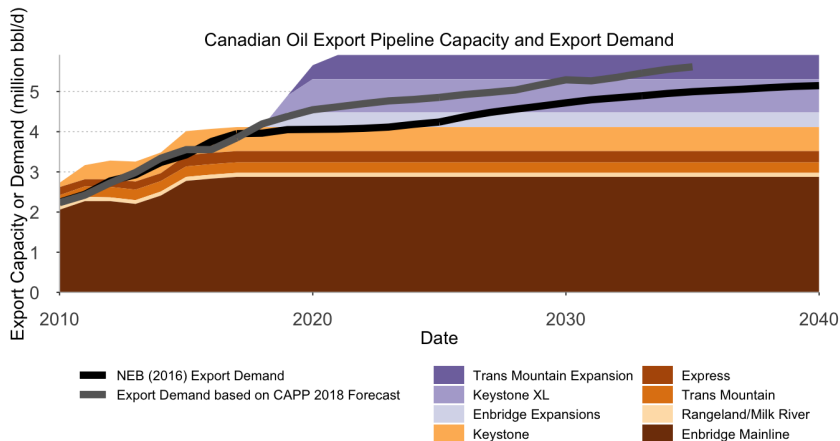
- Infrastructure is crucial for future oil sands viability, especially under low(er) prices;
- Infrastructure demands in Canada have changed, as have prices and potential netbacks - the prize is not as big as it once was;
- Policy changes (C-69, etc.) are not asking for the impossible on climate change tests - in fact, they're not really asking for much at all;

What do we mean when we talk about netbacks?



Data via Bloomberg, graph by Andrew Leach

Why is Alberta oil fetching low prices? Not enough pipeline capacity to meet demand

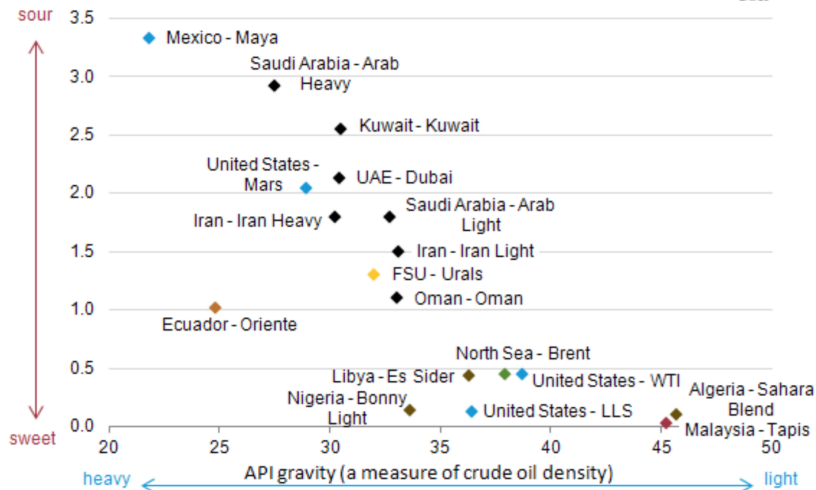


Source: NEB Data, graph by Andrew Leach.

Why is Alberta oil fetching low prices? Lower value crude

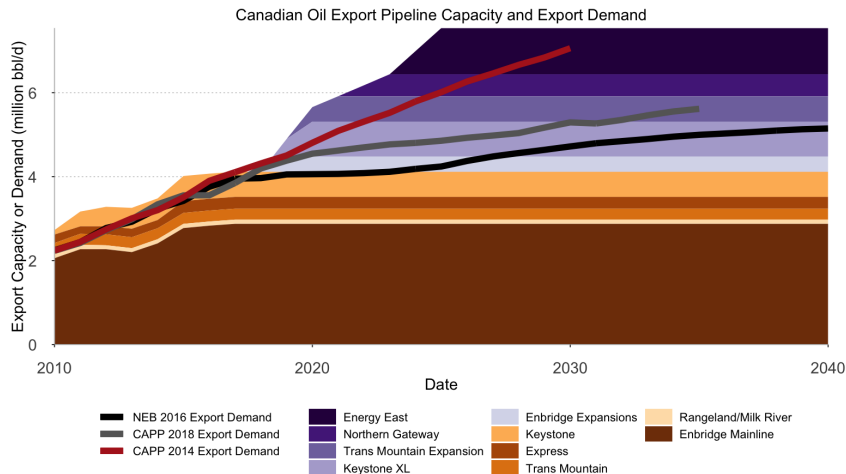
Density and sulfur content of selected crude oils

sulfur content (percentage)



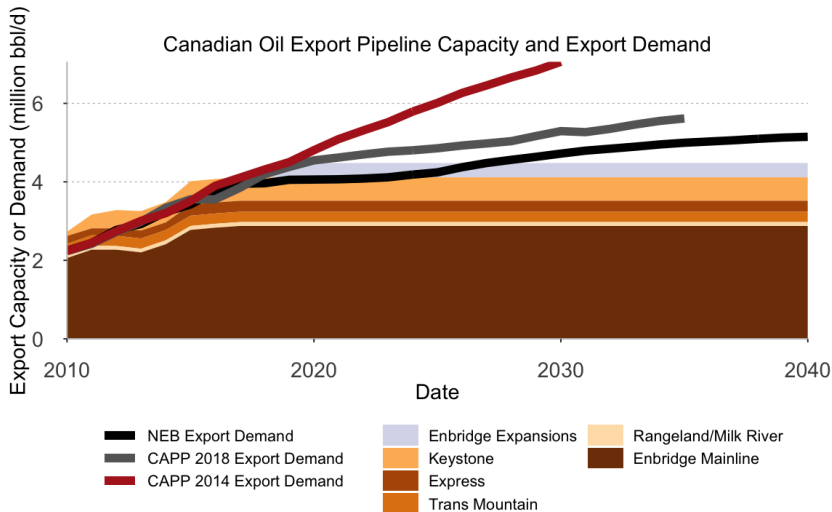
Source: U.S. Energy Information Administration, based on Energy Intelligence Group—International Crude Oil Market Handbook.

The market has changed since 2014 in many ways



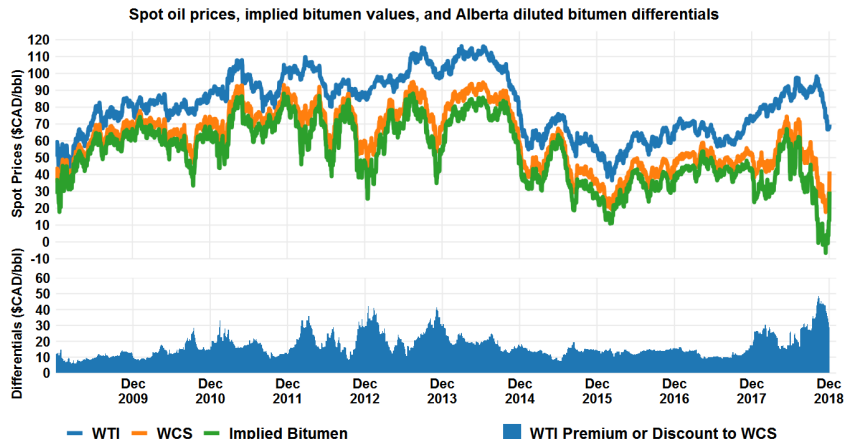
Source: NEB Data, graph by Andrew Leach.

We are short pipe capacity



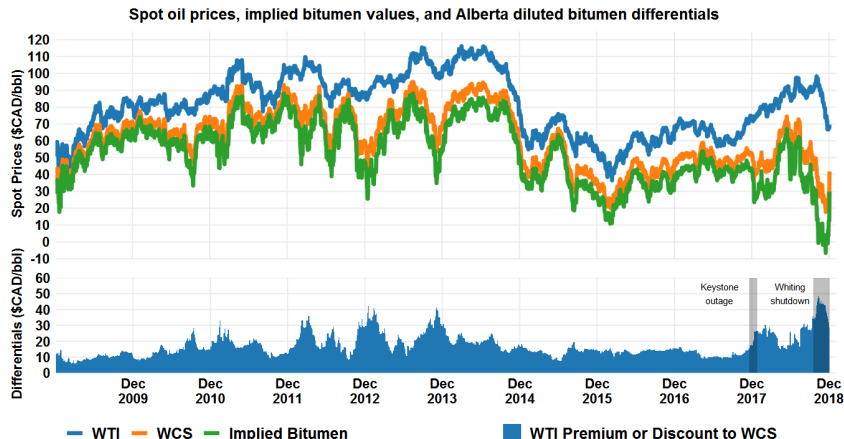
Source: NEB Data, graph by Andrew Leach.

The consequences of too little pipeline capacity are now clear



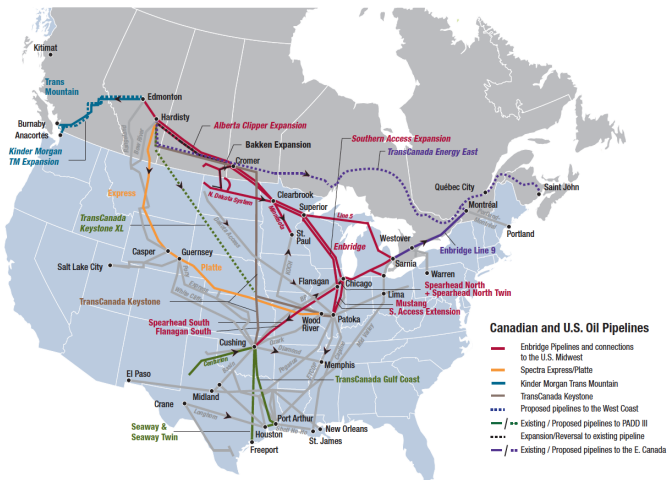
Source: Data via Bloomberg, graph by Andrew Leach

The consequences of too little pipeline capacity are now clear



Source: Data via Bloomberg, graph by Andrew Leach

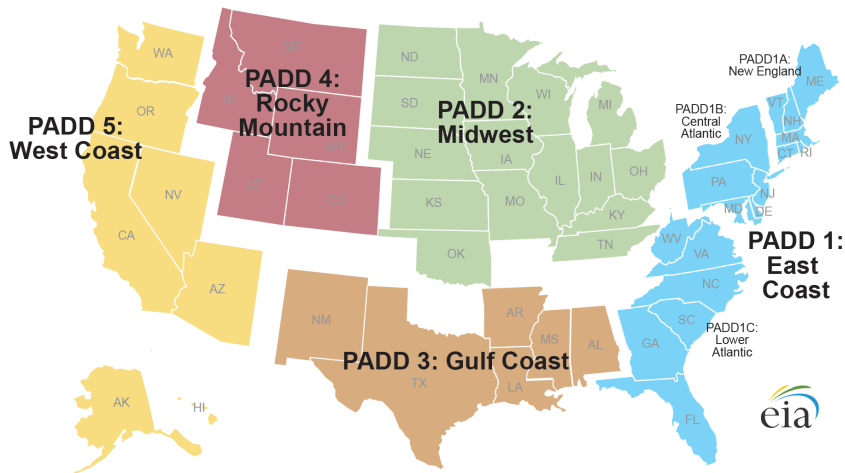
But it's not just capacity that matters



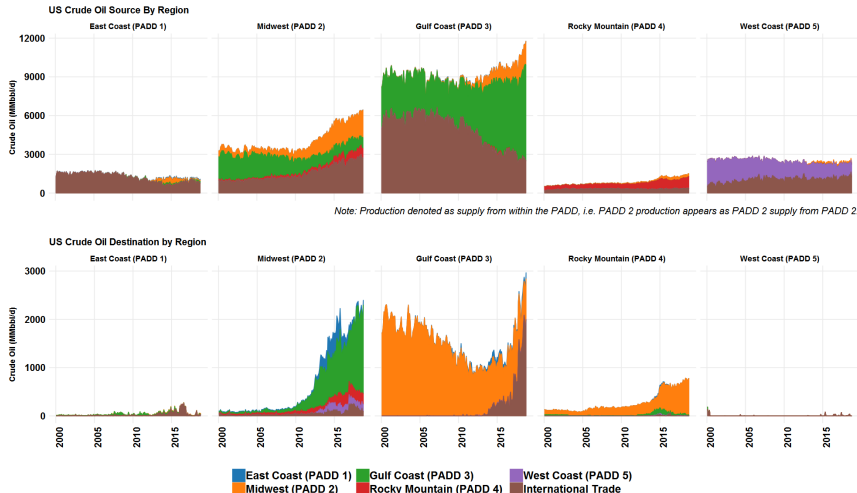
Source: CAPP

A Digression on PADDs

Petroleum Administration for Defense Districts



Let's not just focus on capacity as markets matter too

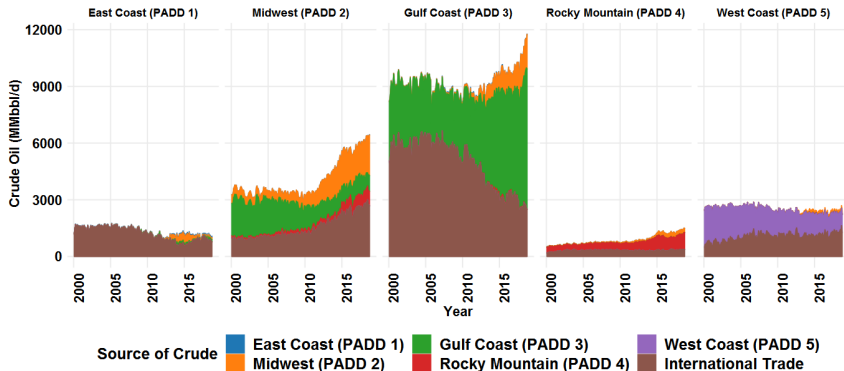


Source: Data via EIA, graph by Andrew Leach

US is producing more, importing less

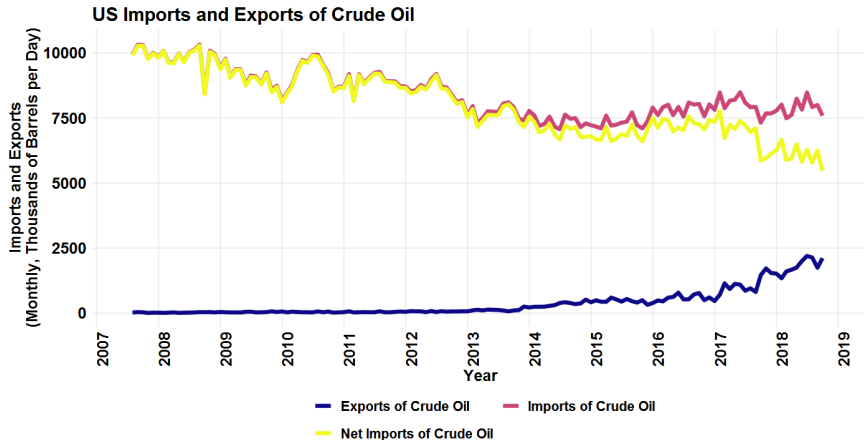
US Crude Oil Source By Region

Production appears as sourced from within a PADD, so PADD 2 production is oil from PADD 2 in PADD 2



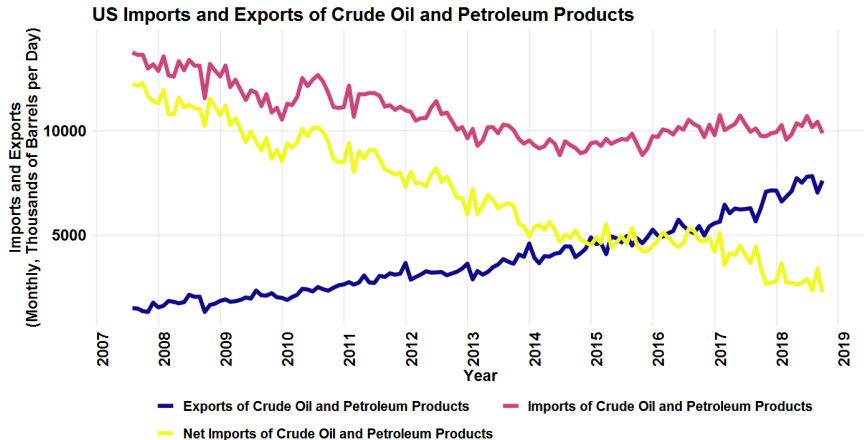
Source: EIA API, graph by Andrew Leach.

US is producing more, importing less



Source: EIA API, graph by Andrew Leach.

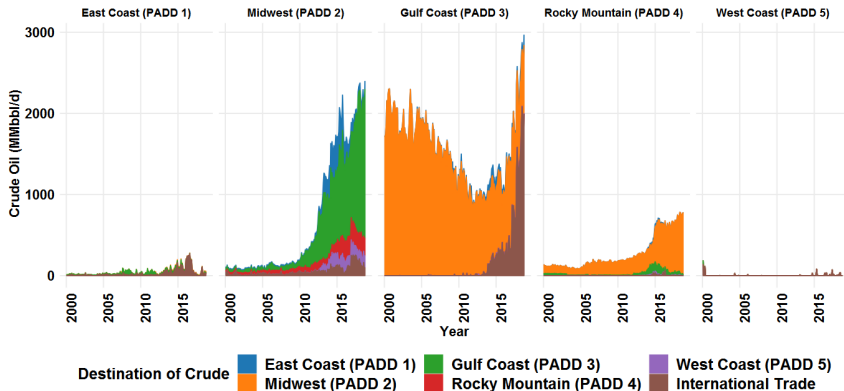
US is producing more, importing less



Source: EIA API, graph by Andrew Leach.

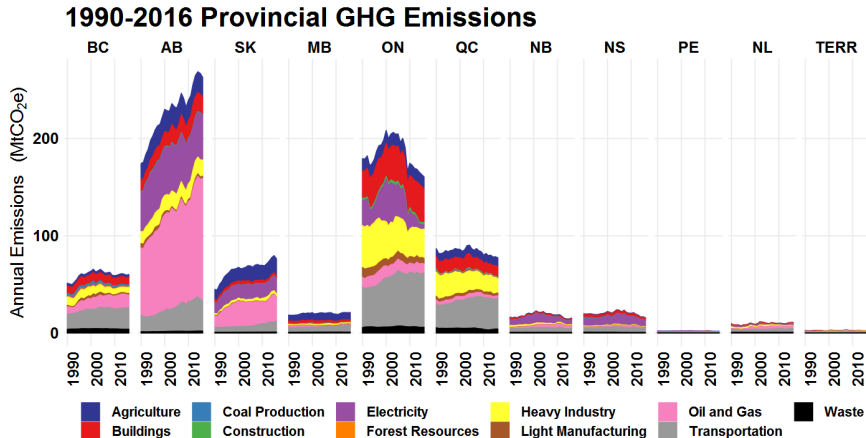
Crude flow in the US has shifted: used to be in and north, now it's south and out

US Crude Oil Destination by Region



Source: EIA API, graph by Andrew Leach.

Emissions across the economy

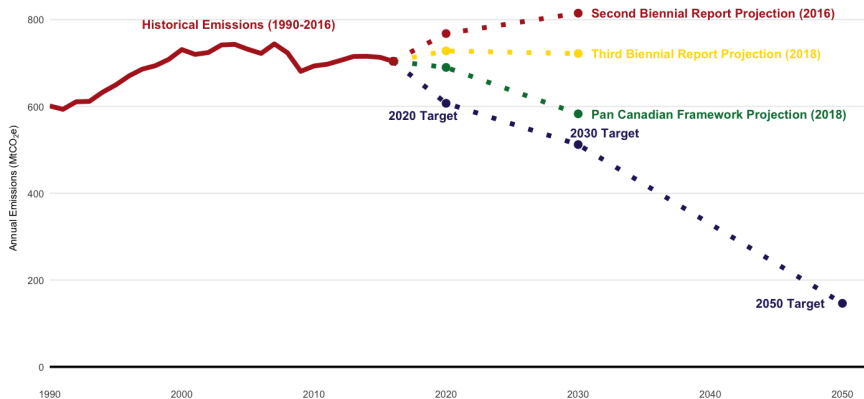


Source: Environment Canada National Inventory Data, graph by @andrew_leach

Targets, not policies

Canada's GHG Emissions, Projections and Future Targets

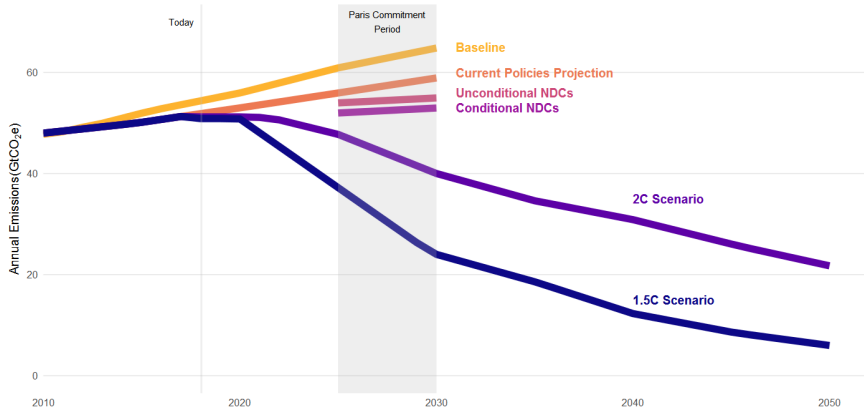
Source: Environment and Climate Change Canada 2016 Preliminary Emissions Inventory (2018); Second and Third Biennial Report to the United Nations (2016,2018), and February 2018 PCF Update.



The Global Challenge is Steep

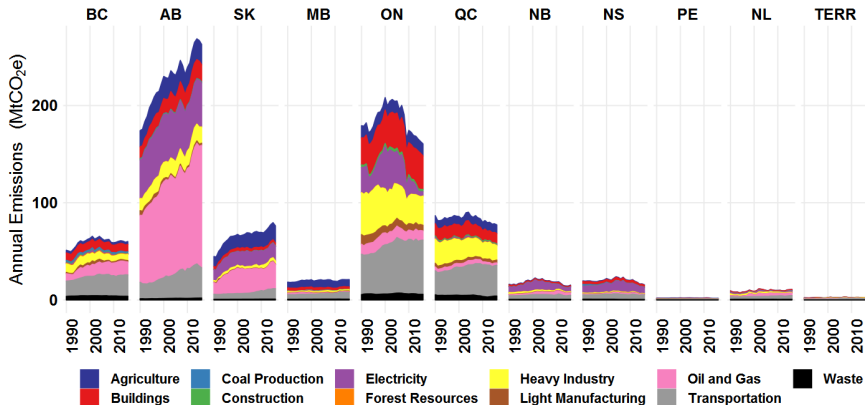
Global GHG Emissions, Projections and Mitigation Scenarios

Source: UNEP Emissions Gap Report, Data via Zeke Hausfather, Carbon Brief



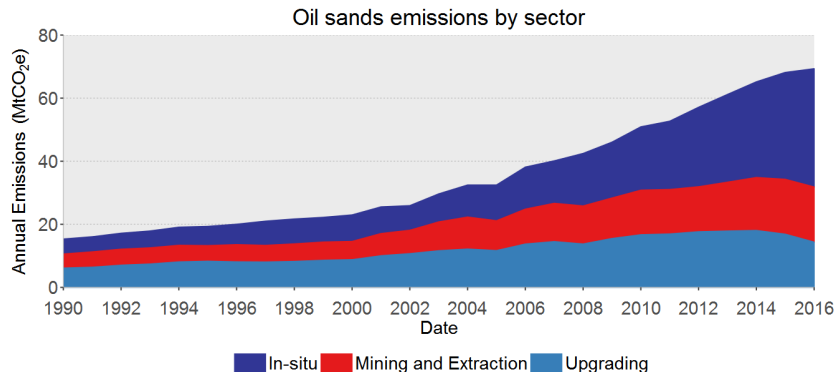
The Challenge Ahead for Oil Sands

1990-2016 Provincial GHG Emissions



Source: Environment Canada National Inventory Data, graph by @andrew_leach

The Challenge Ahead for Oil Sands

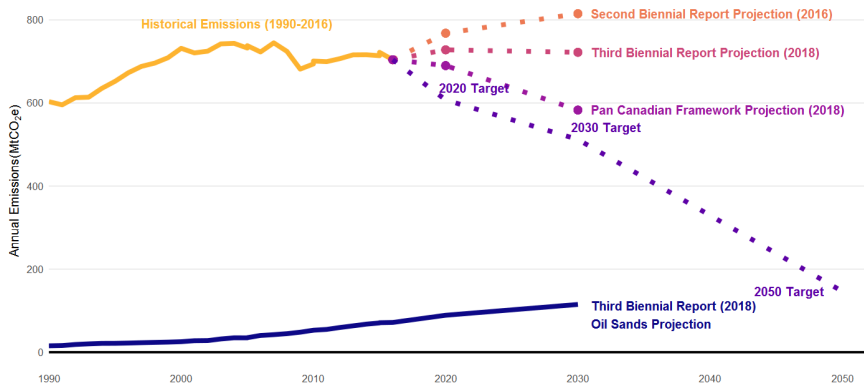


Source: Environment Canada Inventory Data, graph by Andrew Leach.

The Challenge Ahead for Oil Sands

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.



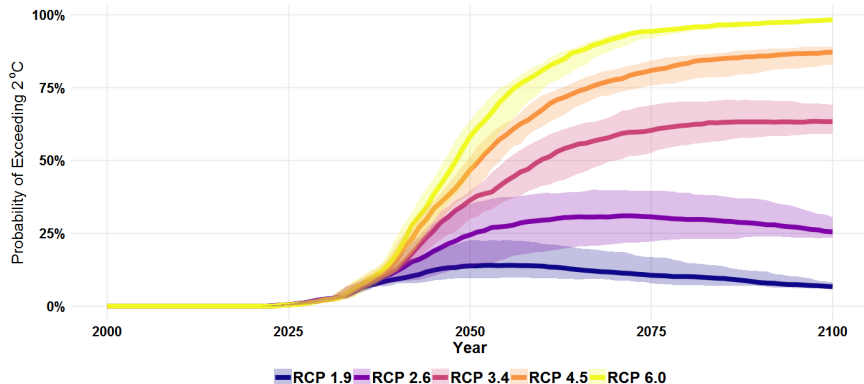
What does C-69 really do?

- Changes the rules for major projects with respect to impact assessment;
- Introduces the Canadian Energy Regulator (CER) which will replace the regulatory functions of the NEB;
- Updates both impact assessment and regulatory functions to include a climate change test;
- Makes everyone REALLY nervous.

A digression on climate change - how much insurance do you want to buy?

Probability of Exceeding 2 °C by Representative Concentration Pathway

Median model predictions and ranges, SSP2

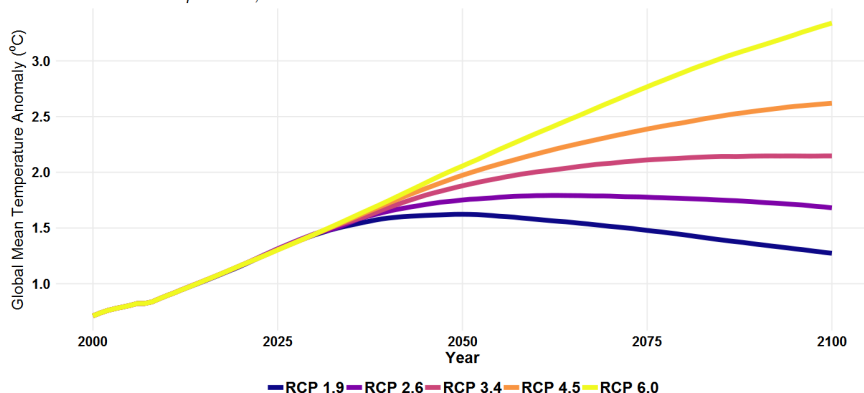


Source: Huppmann et al. IAMC 1.5°C Scenario Explorer and Data hosted by IIASA, Integrated Assessment Modeling Consortium & International Institute for Applied Systems Analysis, 2018. Release 1.0. doi: 10.22022/SR15/08-2018.15429 url: data.ene.iiasa.ac.at/iamic-1.5c-explorer Graph by Andrew Leach

RCP scenarios translate into temperature trajectories

Global Mean Temperature Anomaly, IPCC Models

Median MAGICC6 prediction, SSP2

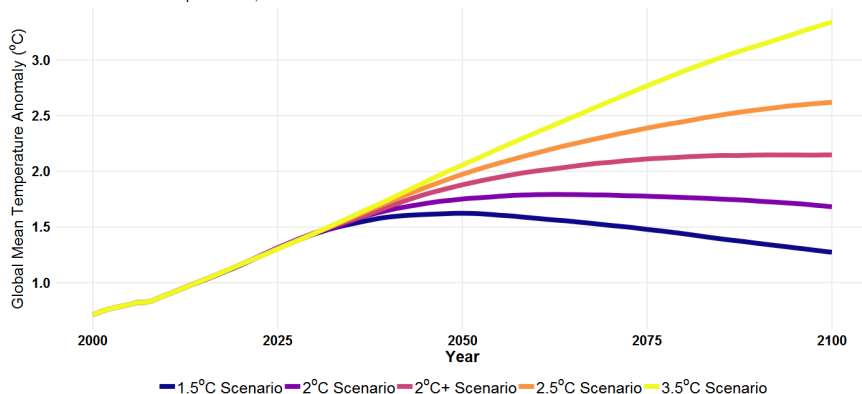


Source: Huppmann et al. IAMC 1.5°C Scenario Explorer and Data hosted by IIASA, Integrated Assessment Modeling Consortium & International Institute for Applied Systems Analysis, 2018.
Release 1.0. doi: 10.22022/SR15/08-2018.15429 url: data.ene.iiasa.ac.at/iadc-1.5c-explorer Graph by Andrew Leach

Let's name the scenarios to make this easier

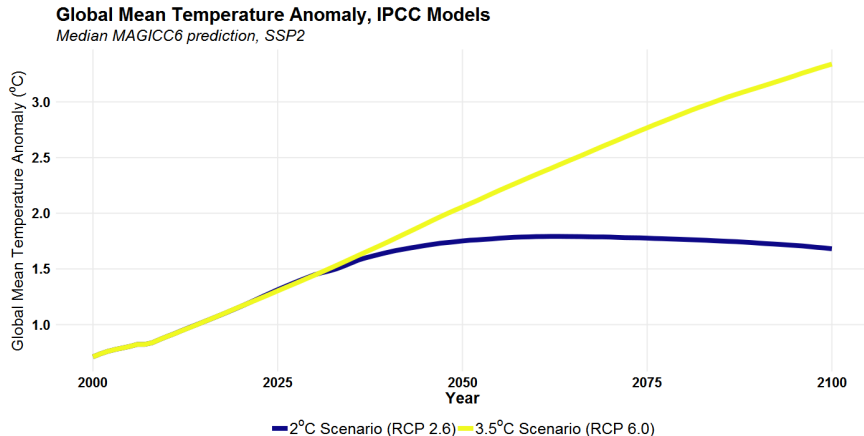
Global Mean Temperature Anomaly, IPCC Models

Median MAGICC6 prediction, SSP2



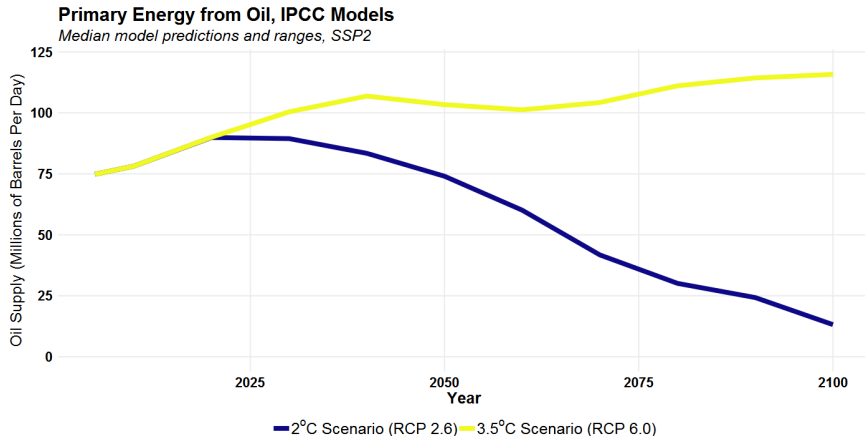
Source: Huppmann et al. IAMC 1.5°C Scenario Explorer and Data hosted by IIASA. Integrated Assessment Modeling Consortium & International Institute for Applied Systems Analysis, 2018.
Release 1.0. doi: 10.22022/SR15/08-2018.15429 url: data.ene.iiasa.ac.at/iadc-1.5c-explorer Graph by Andrew Leach

Now, let's narrow this down to a couple of scenarios.



Source: Huppmann et al. IAMC 1.5°C Scenario Explorer and Data hosted by IIASA, Integrated Assessment Modeling Consortium & International Institute for Applied Systems Analysis, 2018.
 Release 1.0. doi: 10.22022/SR15/08-2018.15429 url: data.ene.iiasa.ac.at/iadc-1.5c-explorer Graph by Andrew Leach

What do these mean for oil demand?

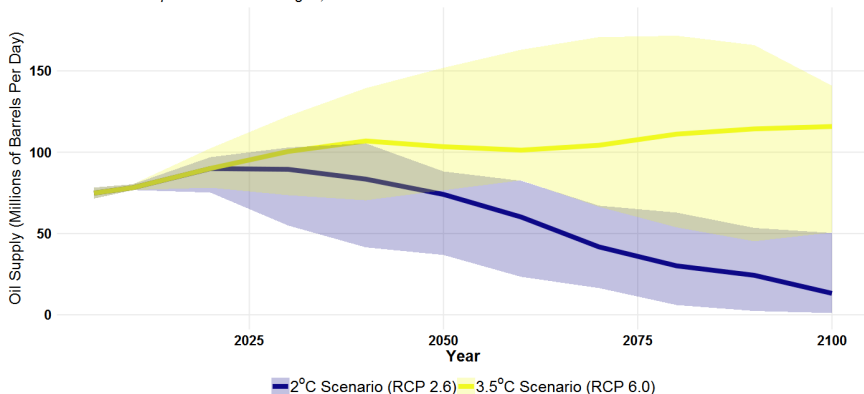


Source: Huppmann et al. IAMC 1.5°C Scenario Explorer and Data hosted by IIASA. Integrated Assessment Modeling Consortium & International Institute for Applied Systems Analysis, 2018. Release 1.0. doi: 10.22022/SR15/06-2018.15429 url: data.ene.iiasa.ac.at/iama-1.5c-explorer Graph by Andrew Leach

What do these mean for oil demand?

Primary Energy from Oil, IPCC Models

Median model predictions and ranges, SSP2



Source: Huppmann et al. IAMC 1.5°C Scenario Explorer and Data hosted by IIASA. Integrated Assessment Modeling Consortium & International Institute for Applied Systems Analysis, 2018. Release 1.0. doi: 10.22022/SR15/06-2018.15429 url: data.ene.iiasa.ac.at/iamc-1.5c-explorer Graph by Andrew Leach

C-69: The Canadian Energy Regulator

When approving a pipeline...

183(2) The Commission must make its recommendation taking into account in light of among other things, any Indigenous knowledge that has been provided to the Commission and scientific information and data all considerations that appear to it to be relevant and directly related to the pipeline including:

- a) the environmental effects, including any cumulative environmental effects;*
- f) **the availability of oil, gas (...) to the pipeline;***
- g) **the existence of actual or potential markets***
- j) the extent to which the effects of the pipeline hinder or contribute to the Government of Canada's ability to meet its environmental obligations and its commitments in respect of climate change;*
- k) any relevant assessment referred to in section 92 93 or 95 of the Impact Assessment Act; and (l) any public interest that the Commission considers may be affected by the issuance of the certificate or the dismissal of the application.*

Conclusion

- Oil sands projects will definitely be more valuable with pipelines than without;
- The North American oil market has changed fundamentally, and that affects oil sands value;
- Oil sands present a GHG policy conundrum for Canada and Canadian emissions will increase with market access;
- Does that mean that global emissions will, definitely, be higher with pipelines than without? Not necessarily.;
- Serious global action on climate change will, almost assuredly, mean no further oil sands expansion and potentially (dis)orderly wind-down of the oil sands industry over decades;
- The good news, again: these are the risks that our oil industry is used to dealing with, as is the NEB/CER process. Let it work - don't tie its hands.

Contact info

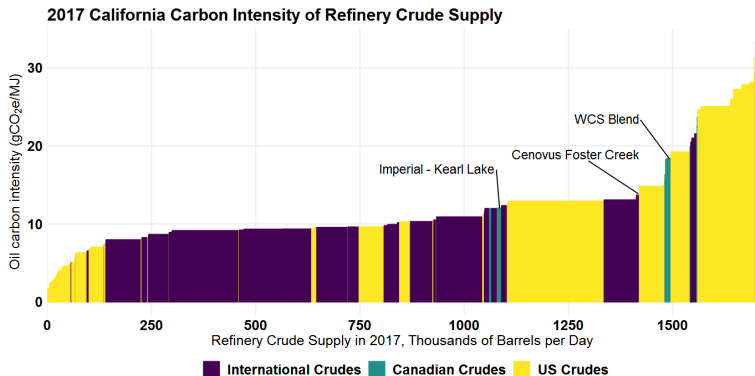
Andrew Leach

School of Business, University of Alberta

Email: andrew.leach@ualberta.ca

Twitter: [@andrew_leach](https://twitter.com/andrew_leach)

If not oil sands then what?



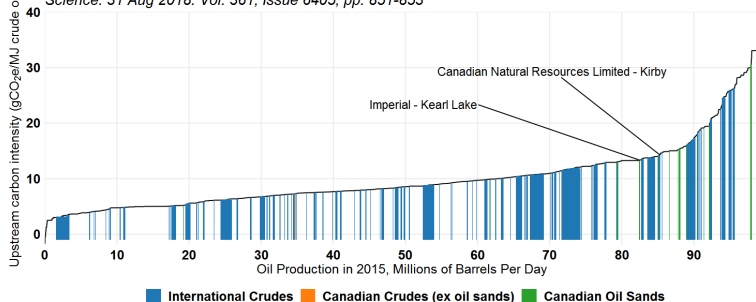
Source: CARB (2018) data at <https://www.arb.ca.gov/fuels/lcfs/crude-oil/crude-oil.htm>.

If not oil sands then what?

Global field-level upstream carbon intensity supply curve (2015)

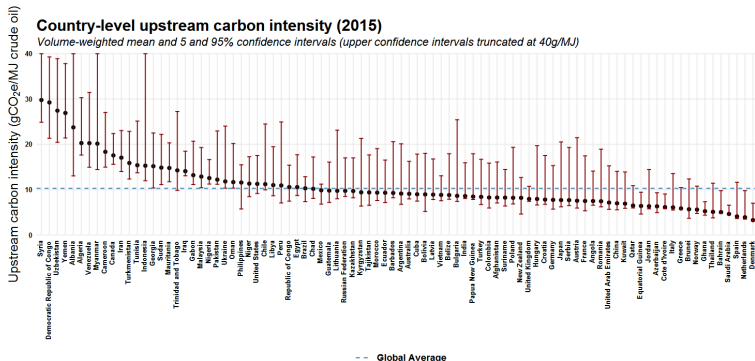
Using publicly available data from Masnadi et al. 2018. Global carbon intensity of crude oil production.

Science. 31 Aug 2018: Vol. 361, Issue 6405, pp. 851-853



Source: Global curve from Masnadi et al (2018). Field-level calculations use OPGEE 2.0c (2018) with Masnadi et al. input data.

If not oil sands then what?



Source: Masnadi et al. 2018. Global carbon intensity of crude oil production. Science. 31 Aug 2018; Vol. 361, Issue 6405, pp. 851-853.