ENERGY & THE ENVIRONMENT
AT THE ALBERTA SCHOOL OF BUSINESS

Pipelines and Climate Change

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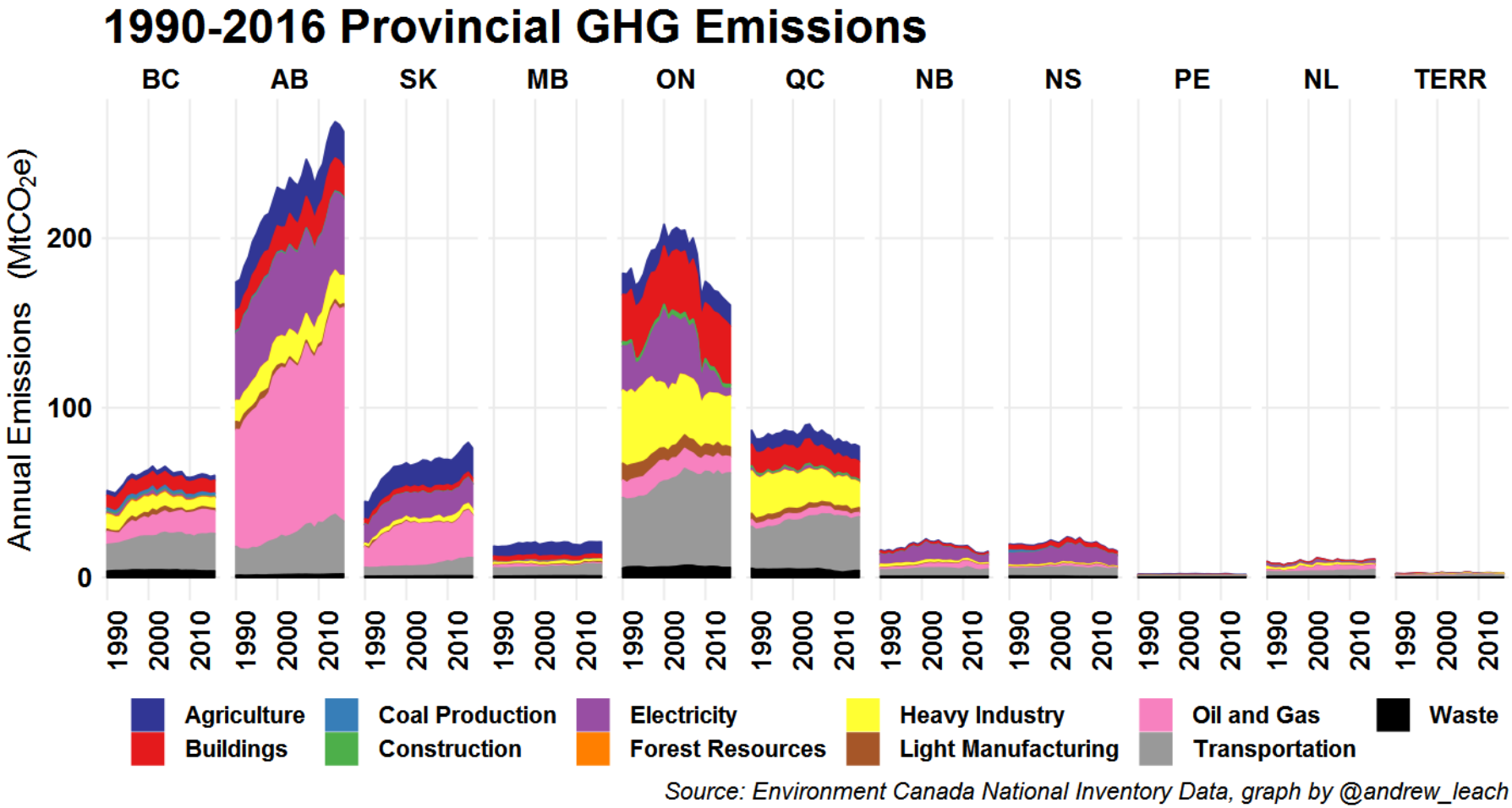
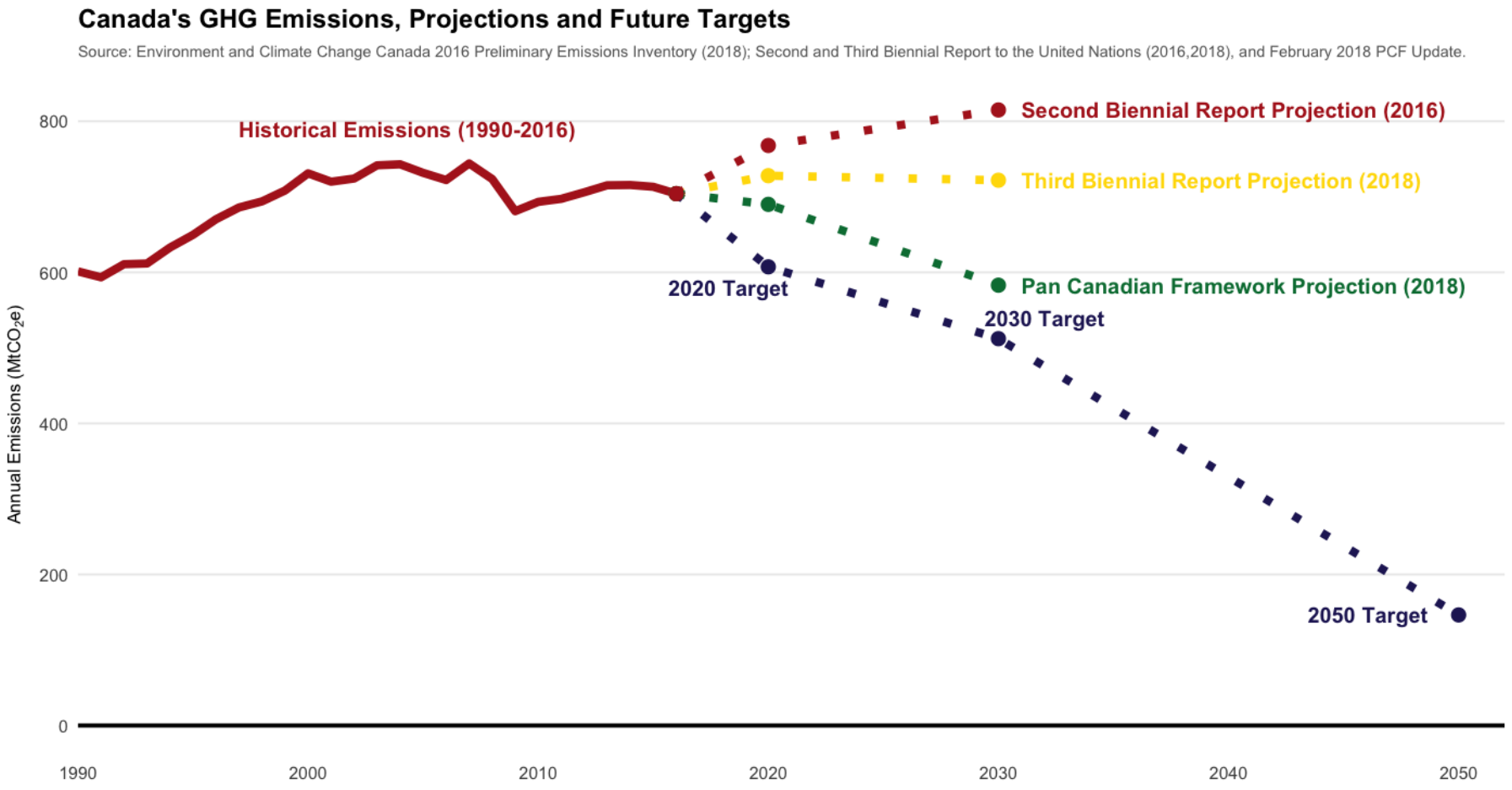
Key Points

- The climate change challenges faced by Canada and the world are daunting;
- 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;
- Climate change policy risk is very much like other market risks that pipelines face – and it should be treated as such;
- Credible climate change policy and impact assessment are necessary, if not sufficient for pipeline construction
- Alberta, and Canada, face a much larger challenge from global action on climate change than from domestic action

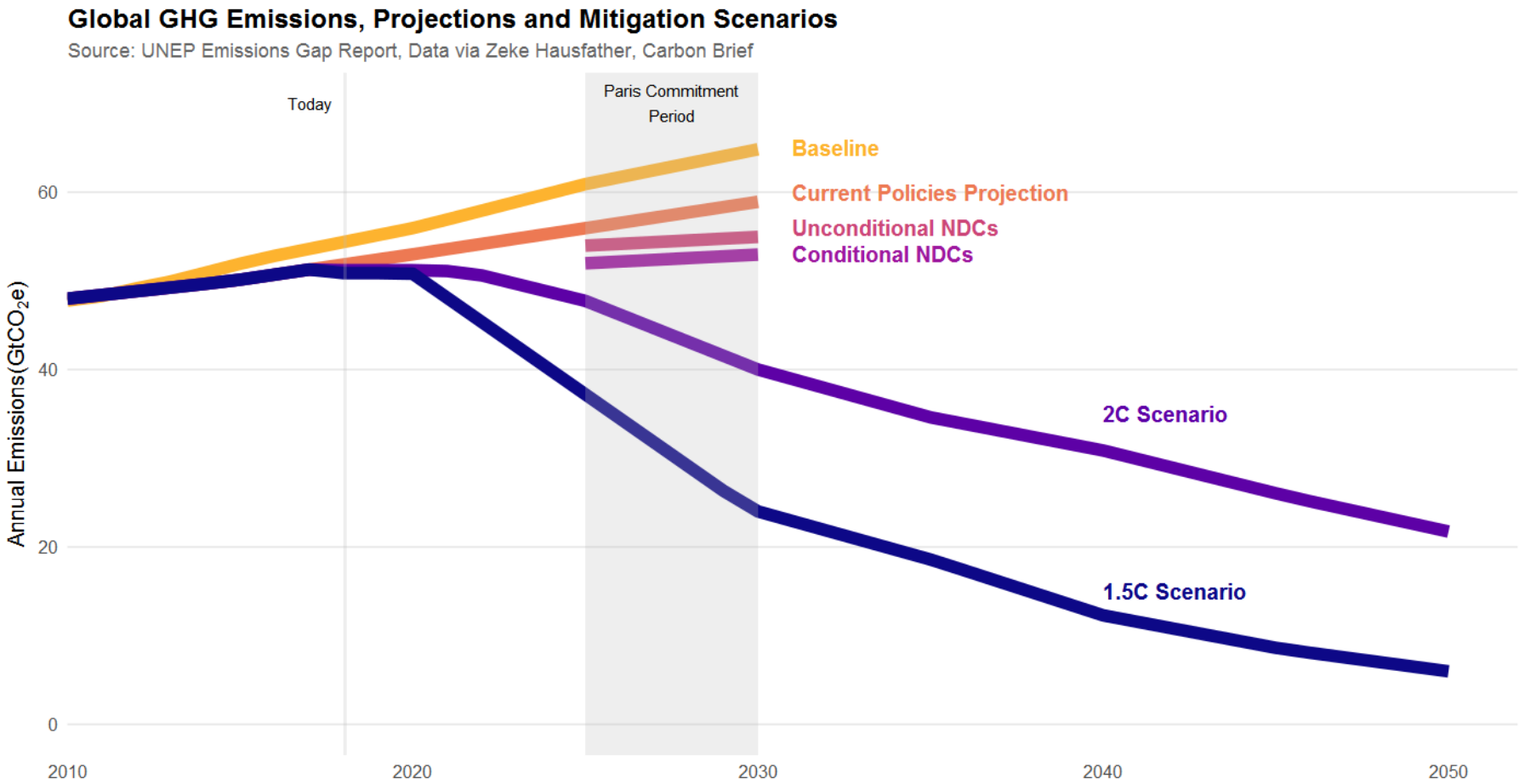
Emissions across the economy



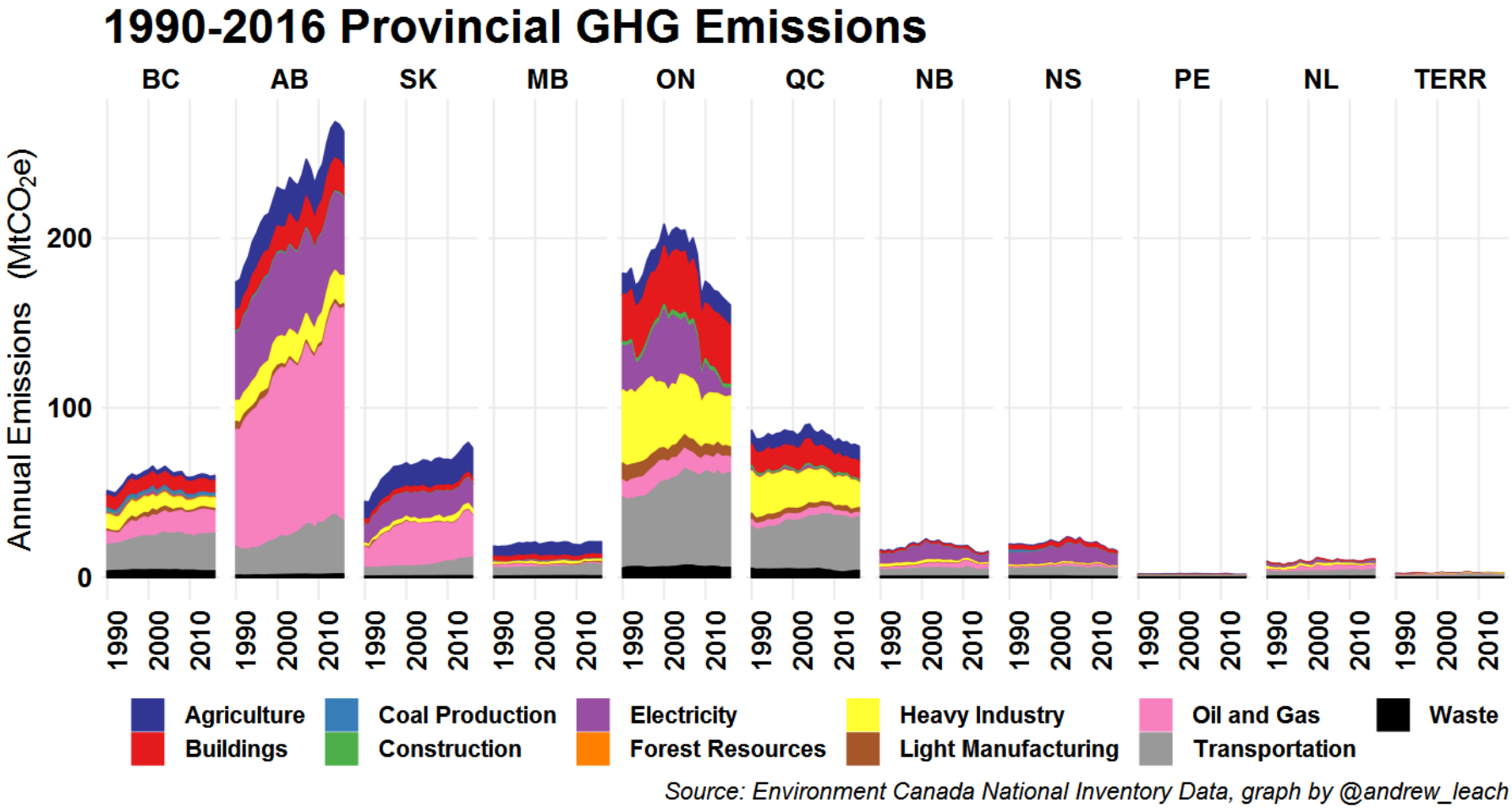
Targets, not policies



The Global Challenge is Steep



The Challenge Ahead for Oil Sands



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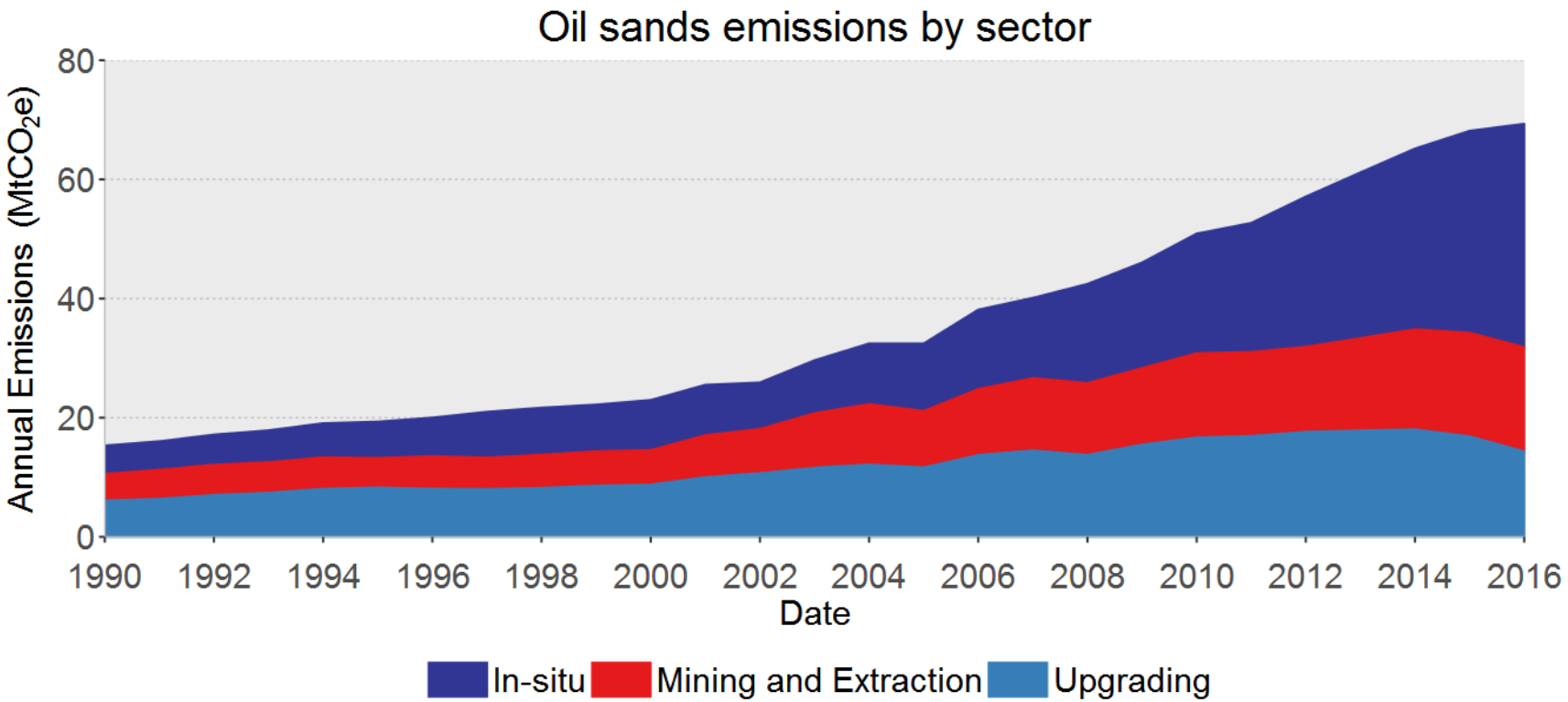
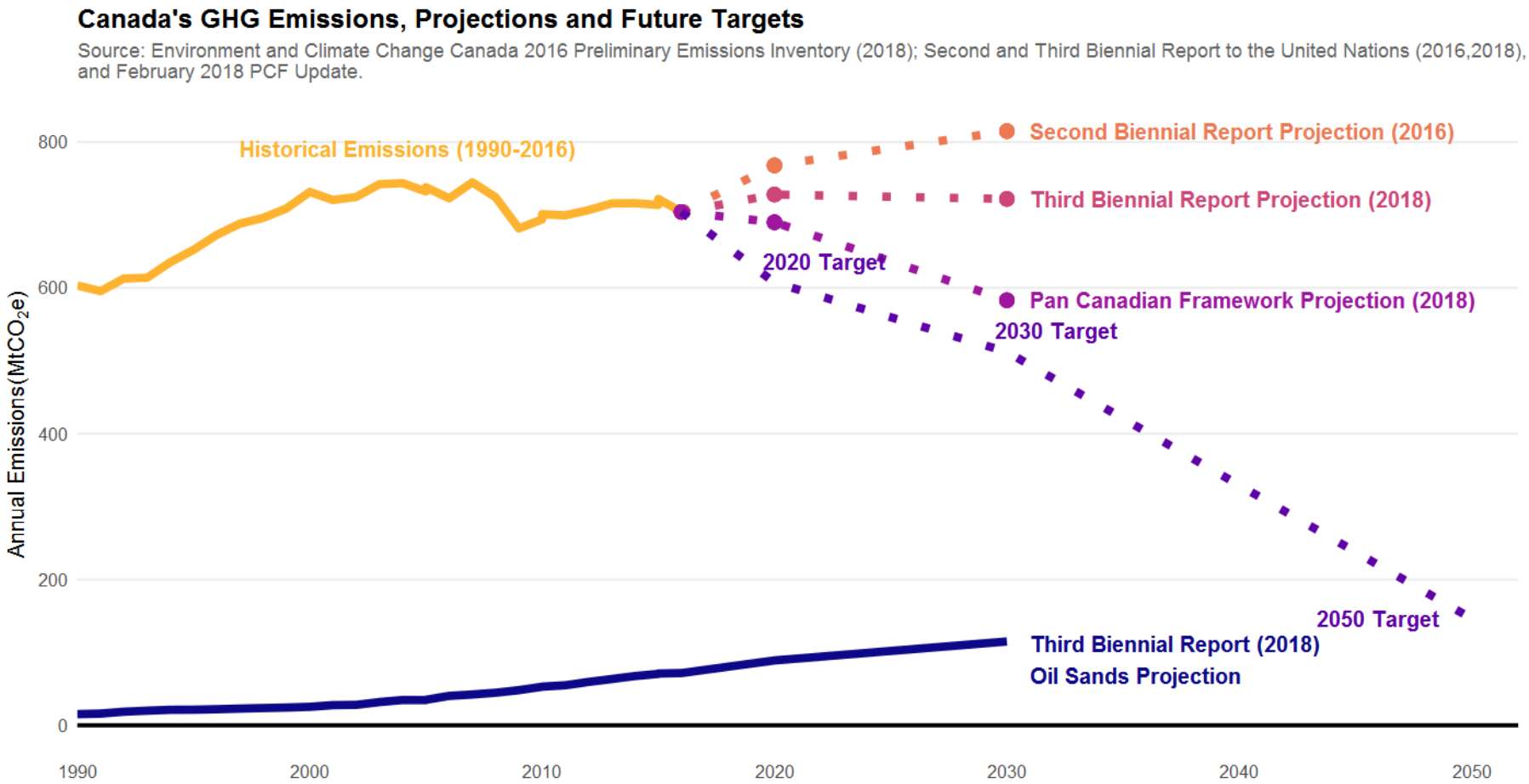
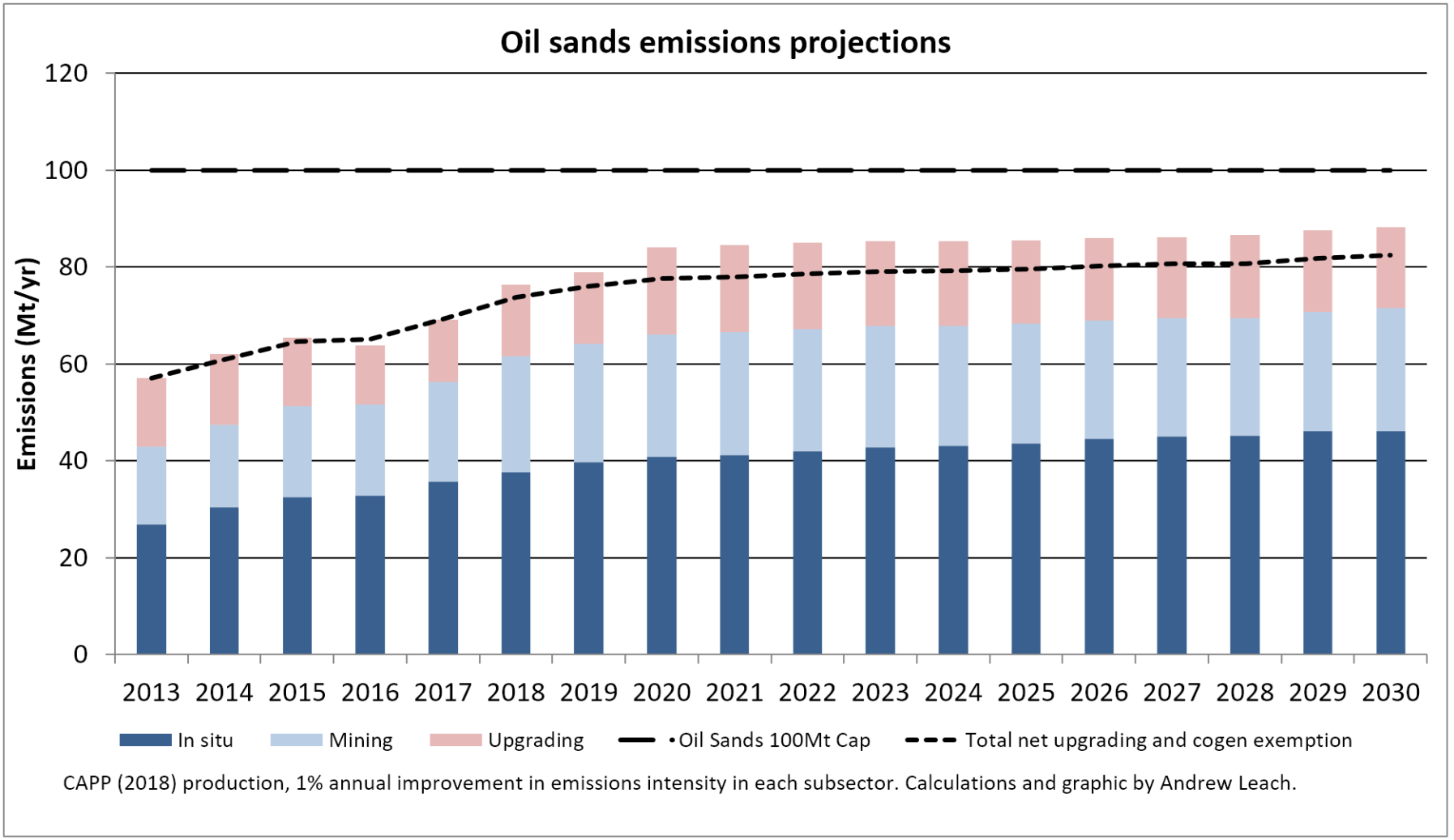


Source: Environment Canada Inventory Data, graph by Andrew Leach.

The Challenge Ahead for Oil Sands

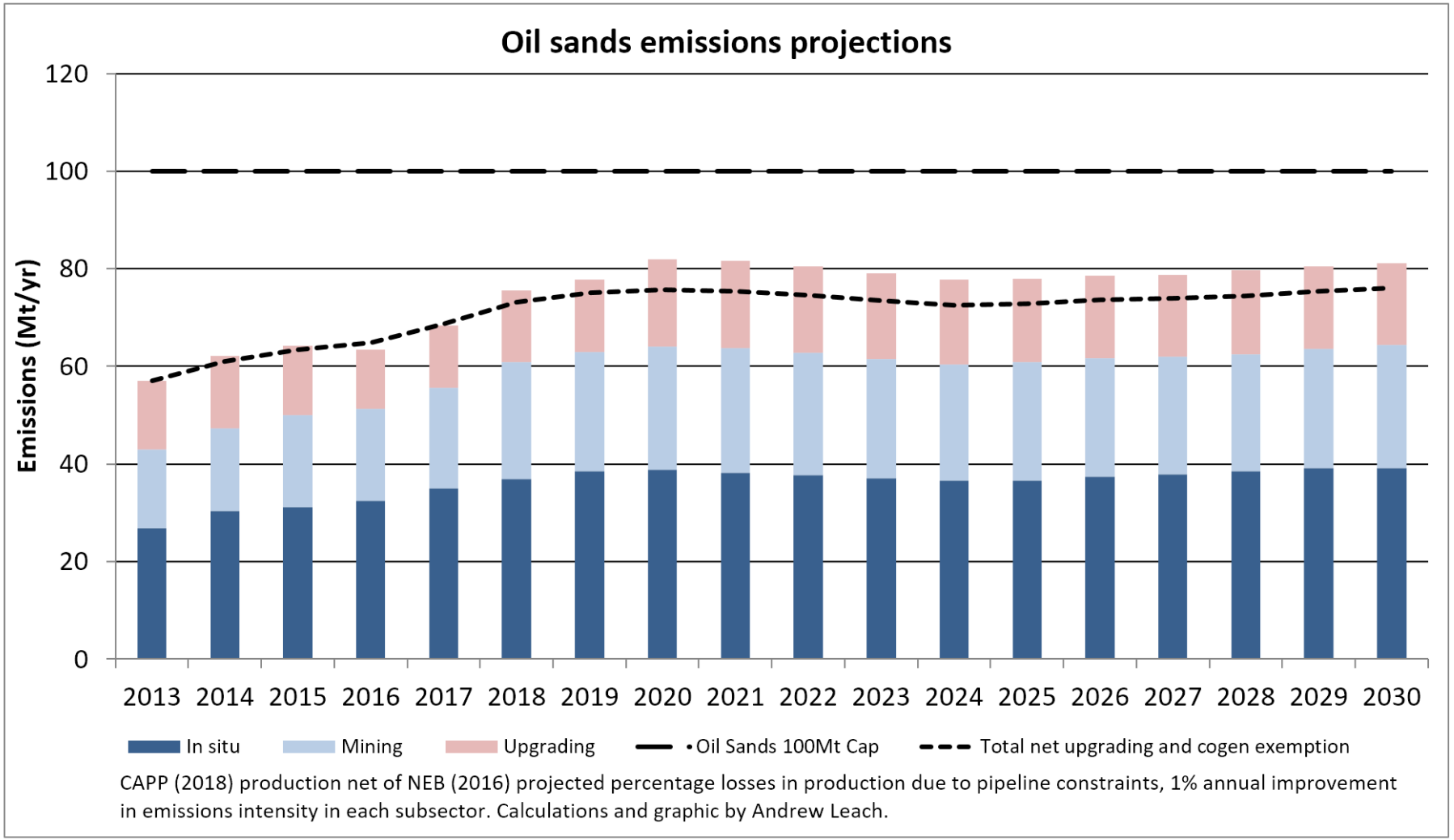


The Challenge Ahead for Oil Sands



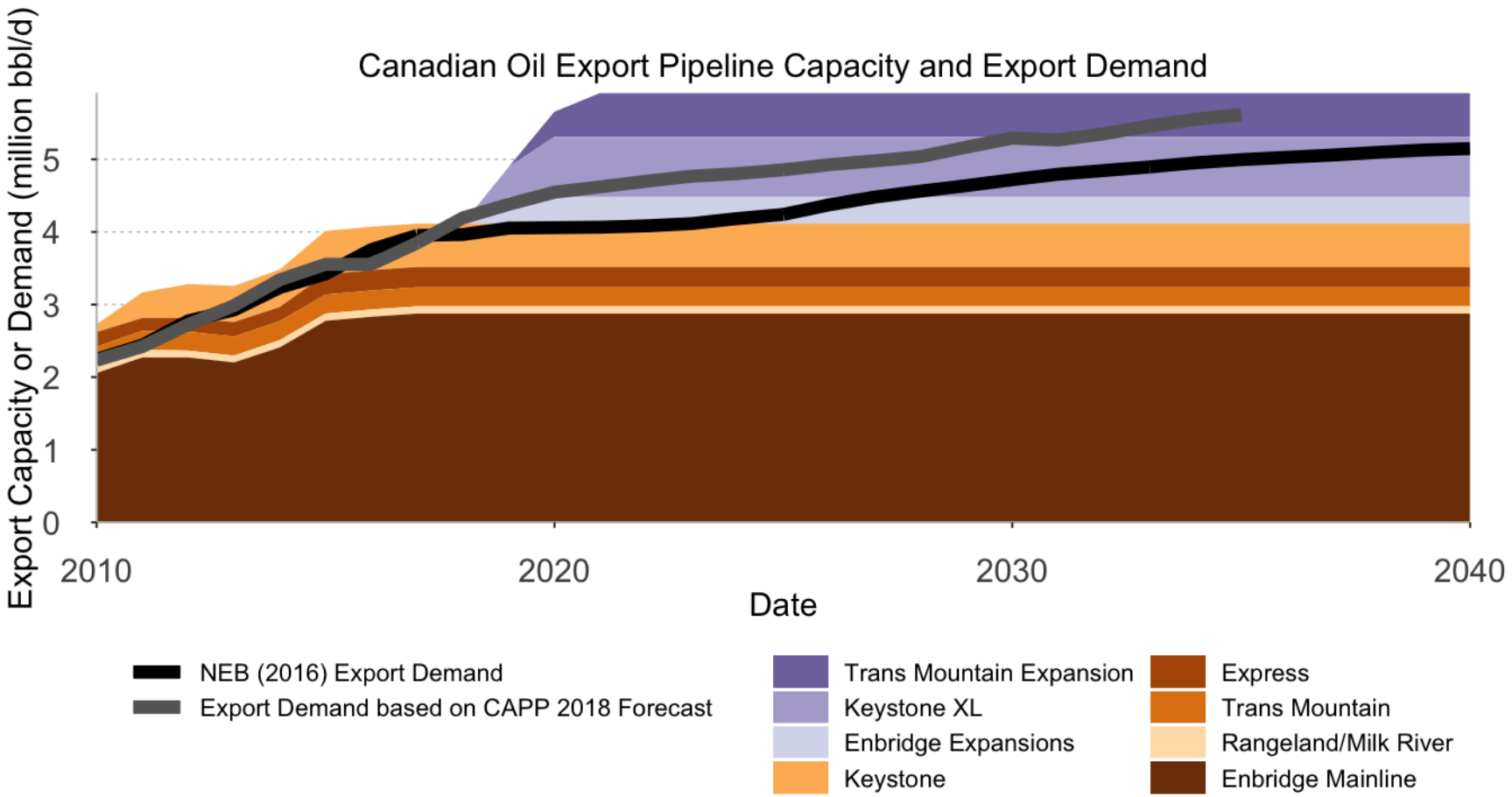
CAPP (2018) production, 1% annual improvement in emissions intensity in each subsector. Calculations and graphic by Andrew Leach.

The Challenge Ahead for Oil Sands



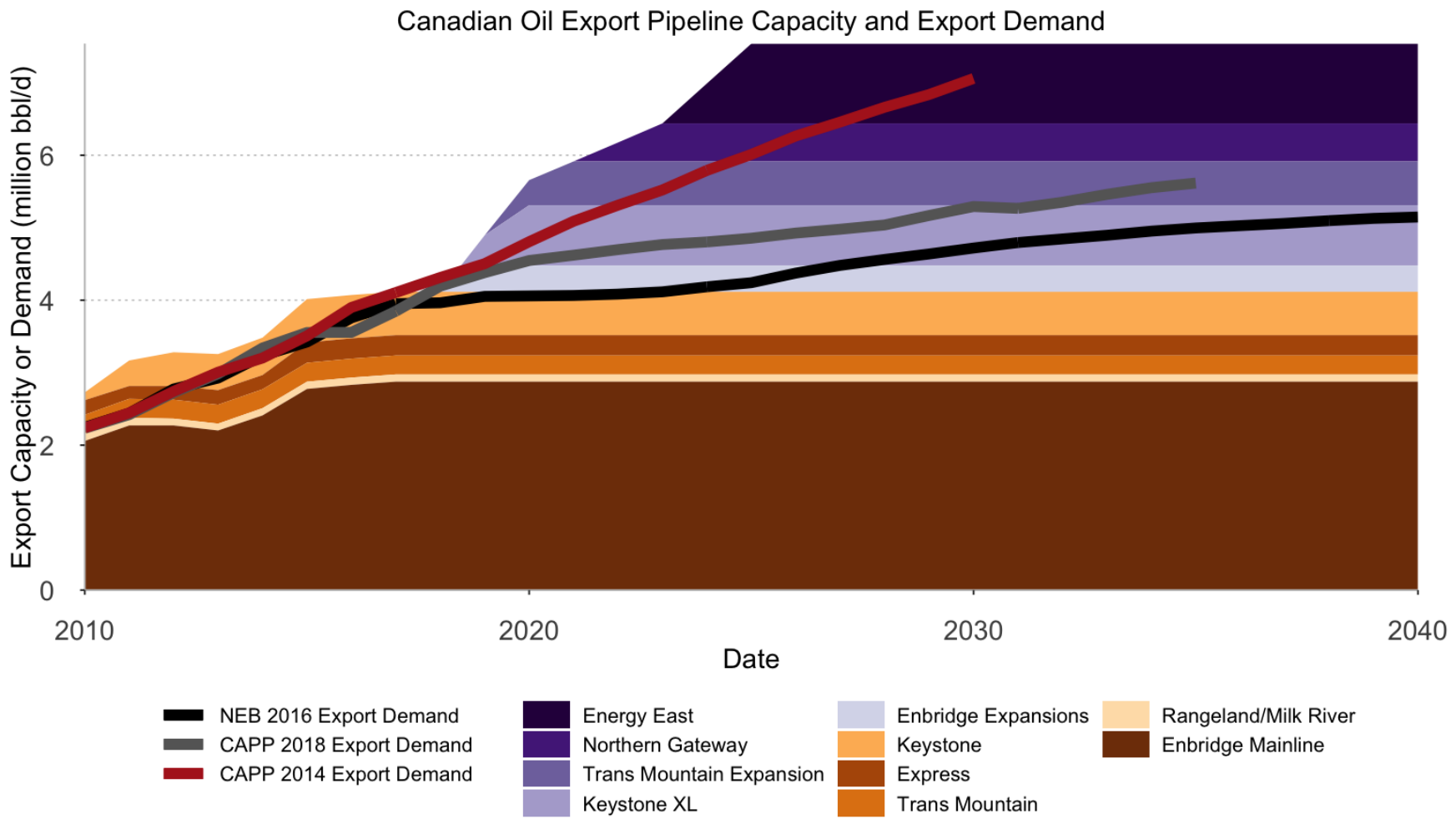
CAPP (2018) production net of NEB (2016) projected percentage losses in production due to pipeline constraints, 1% annual improvement in emissions intensity in each subsector. Calculations and graphic by Andrew Leach.

Not enough pipeline capacity to meet demand



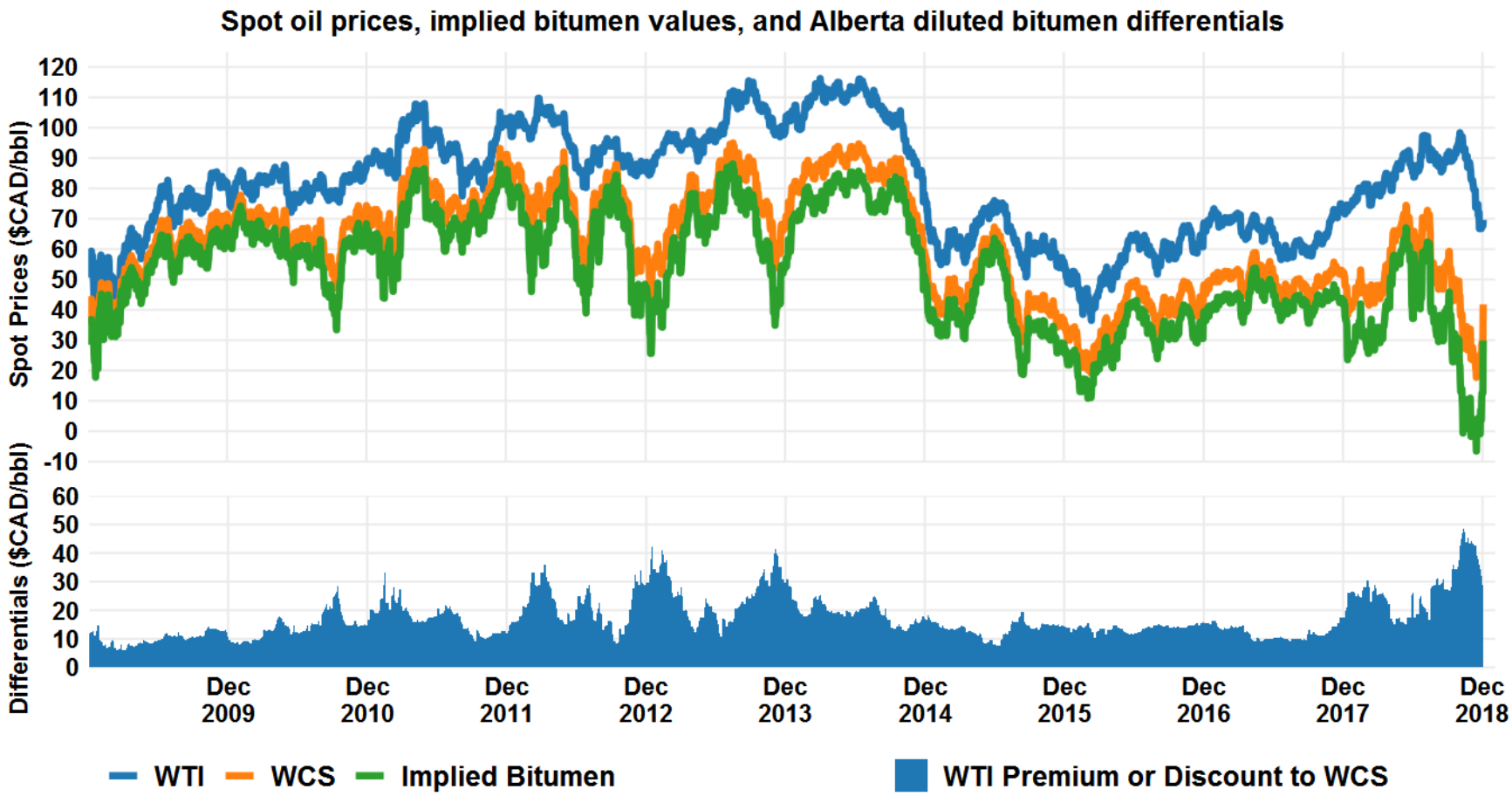
Source: NEB Data, graph by Andrew Leach.

The market has changed since 2014 in many ways



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

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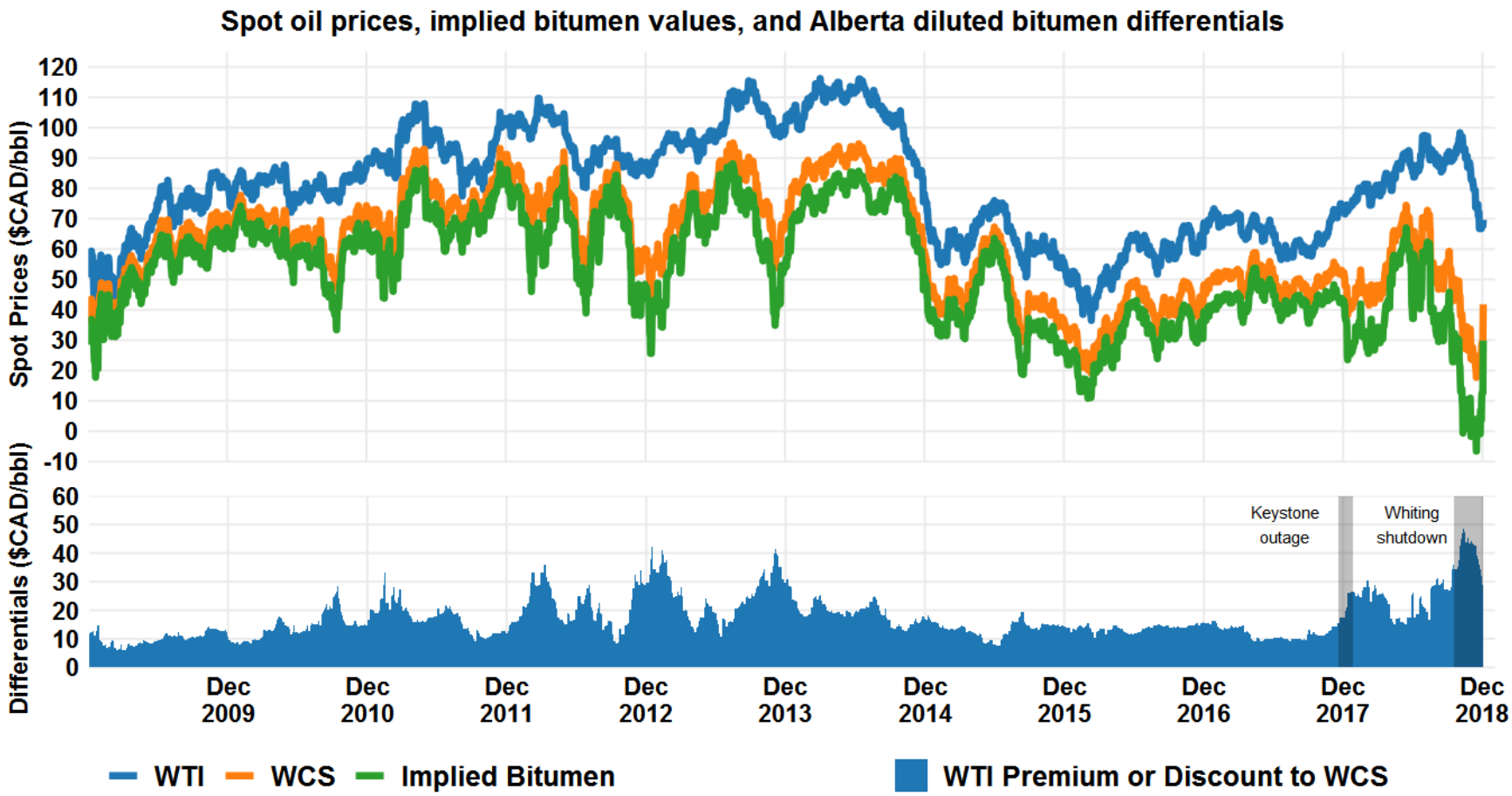
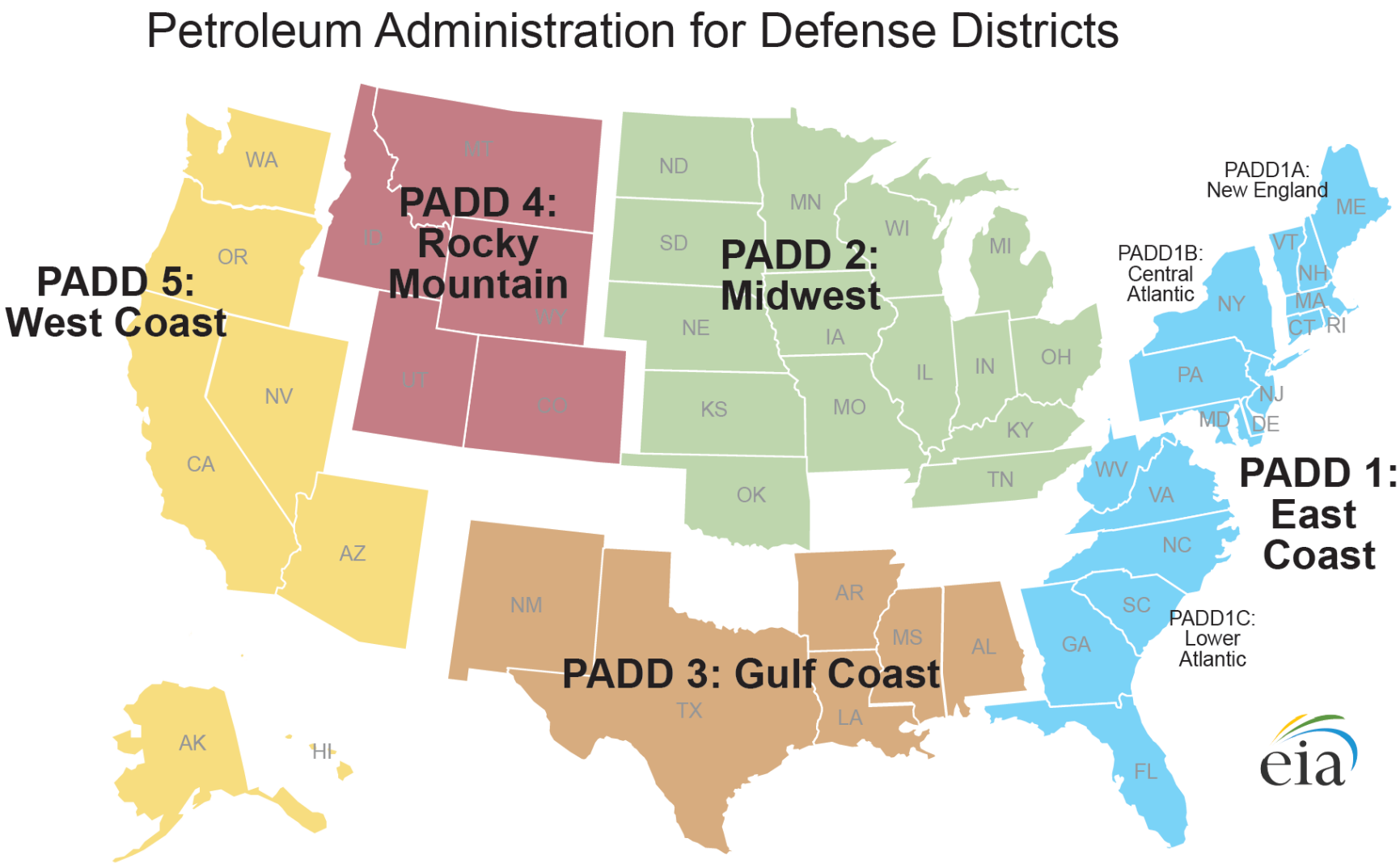
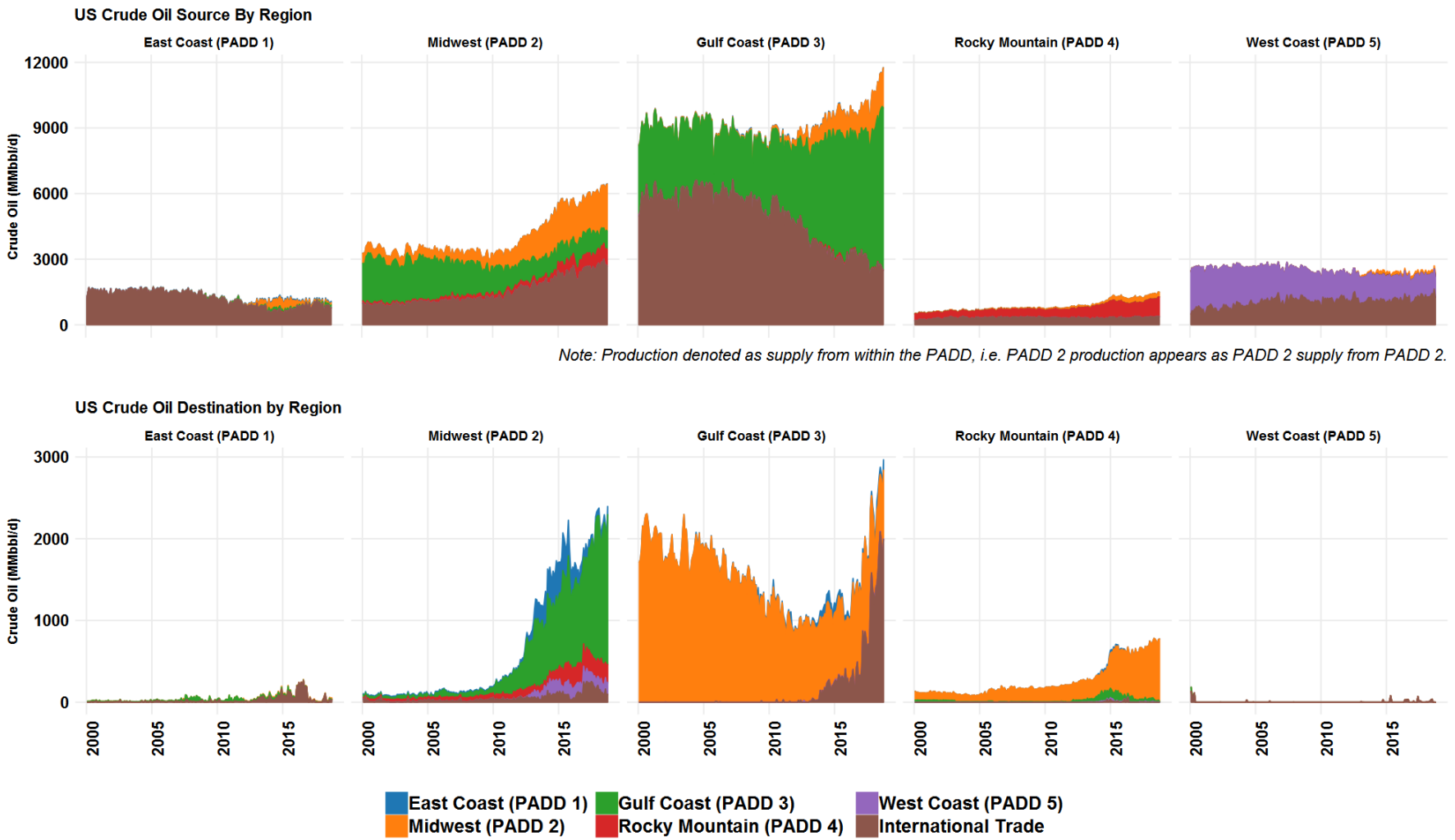


Source: Data via Bloomberg, graph by Andrew Leach

A Digression on PADDs



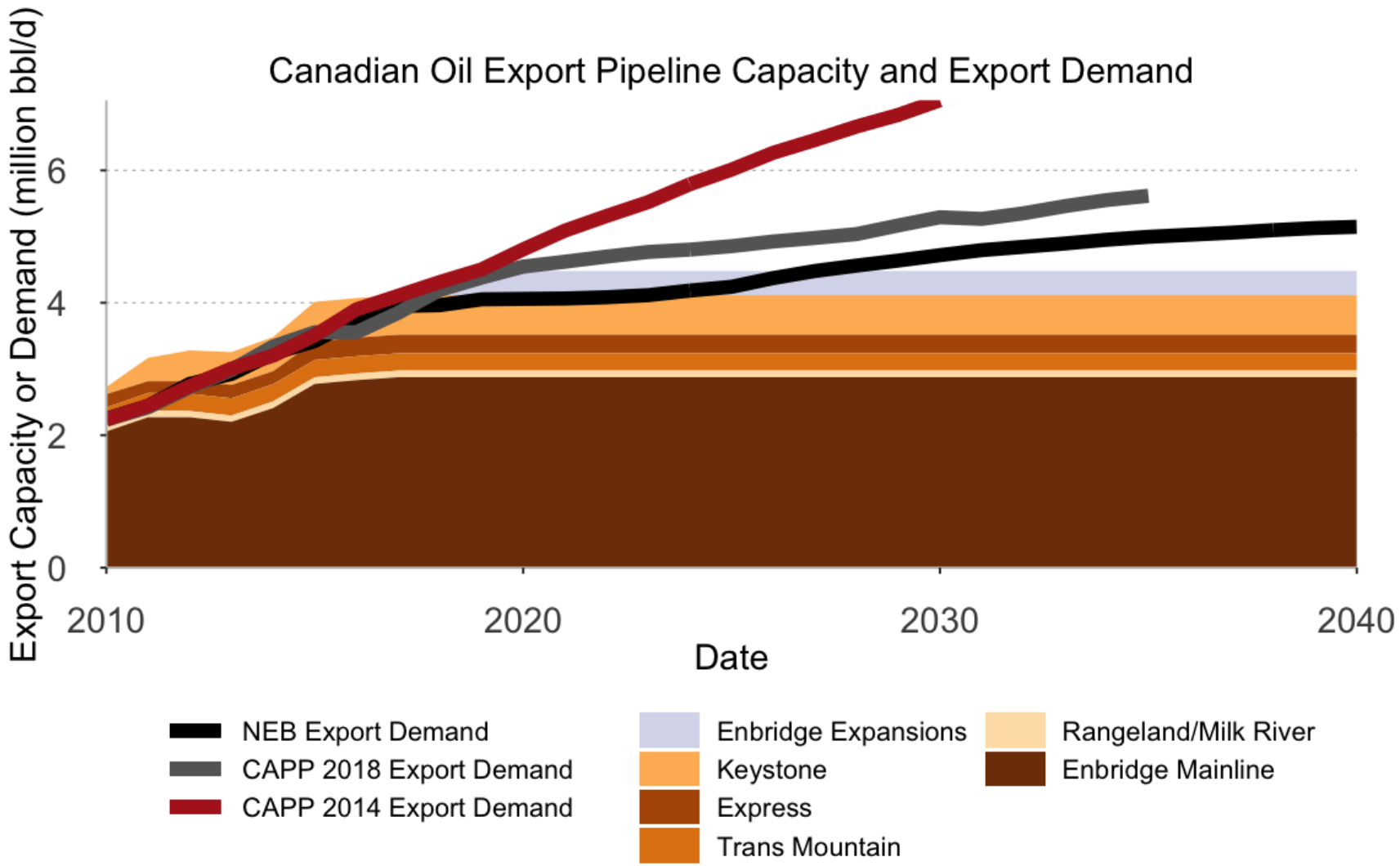
Let's not just focus on capacity as markets matter too



Note: Production denoted as supply from within the PADD, i.e. PADD 2 production appears as PADD 2 supply from PADD 2.

Source: Data via EIA, graph by Andrew Leach

Pipelines are needed to maximize oil sands' value



Source: NEB Data, graph by Andrew Leach.

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.

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**;*

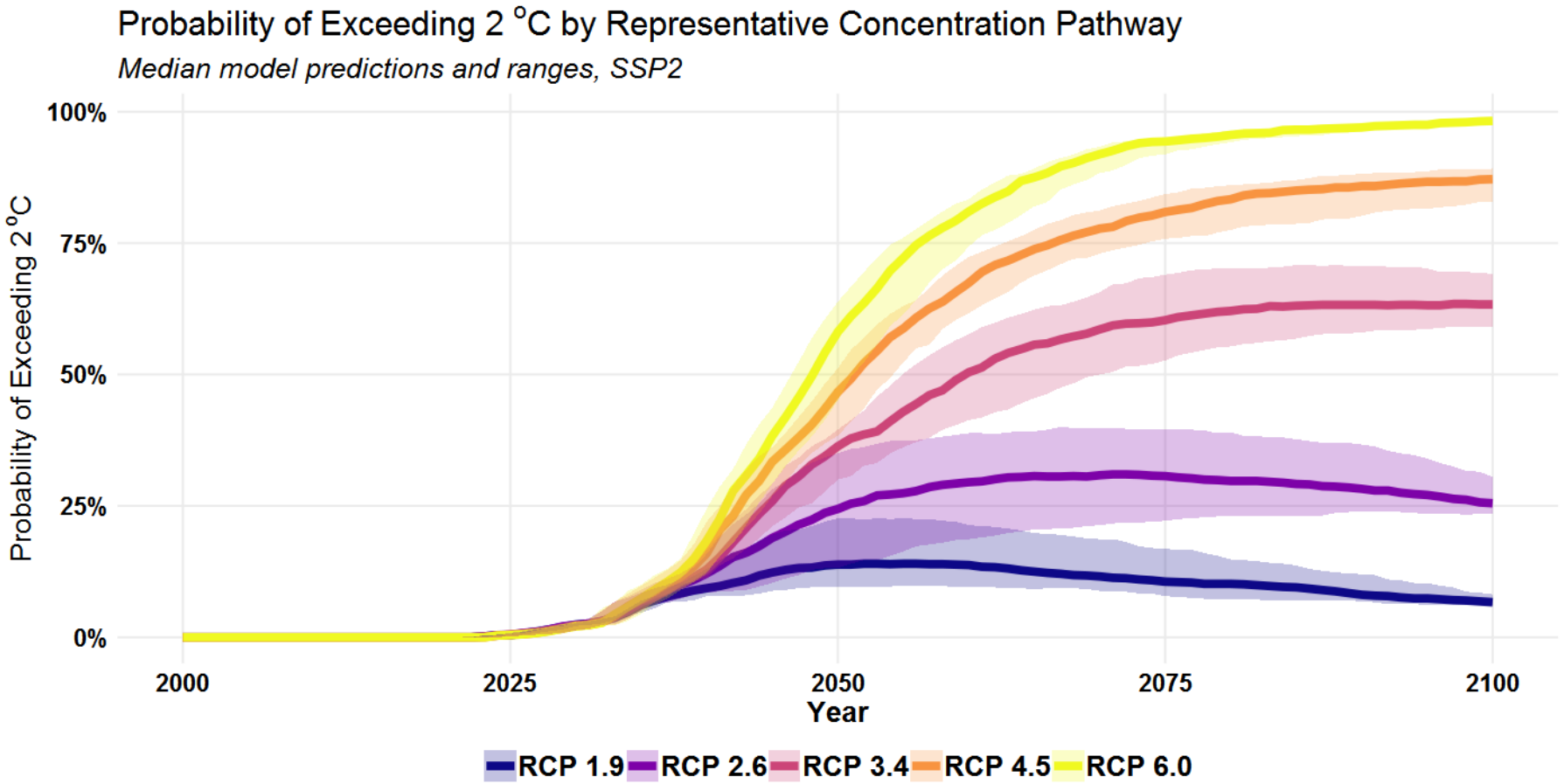
k) *any relevant assessment referred to in section 92 93 or 95 of the Impact Assessment Act; and (l) any public interest that the Commission considers may be affected by the issuance of the certificate or the dismissal of the application.*

C-69: Governor in Council Approval

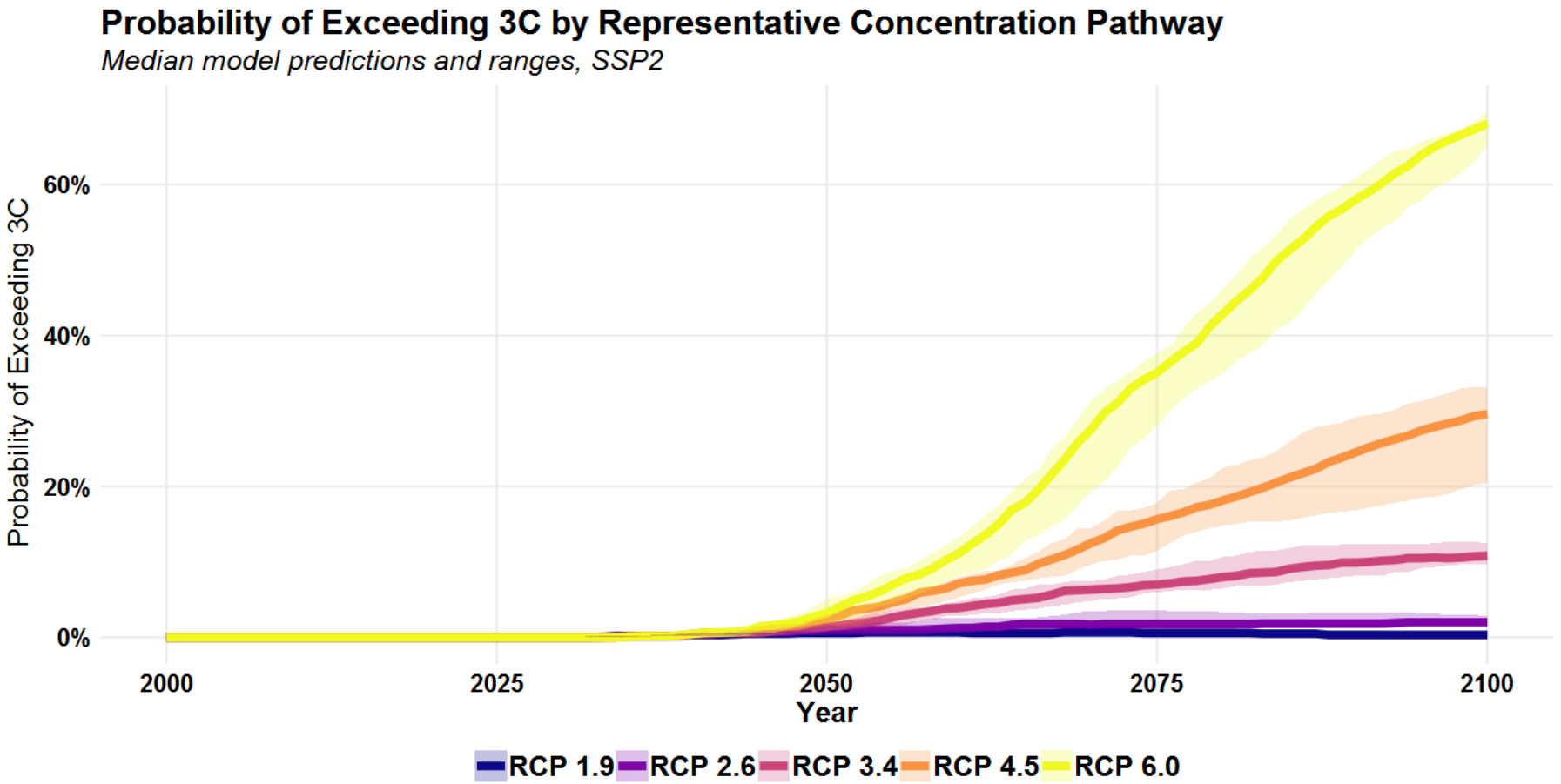
When approving an impact assessment...

> *63 The Minister's determination under paragraph 10 60(1)(a) in respect of a designated project referred to in that subsection, and the Governor in Council's determination under section 62 in respect of a designated project referred to in that subsection, must be based on the report with respect to the impact assessment and a consideration of the following factors:*
>
> a) *the extent to which the designated project contributes to sustainability;*
>
> e) ***the extent to which the effects of the designated project hinder or contribute to the Government of Canada's ability to meet its environmental obligations and its commitments in respect of climate change**.;*

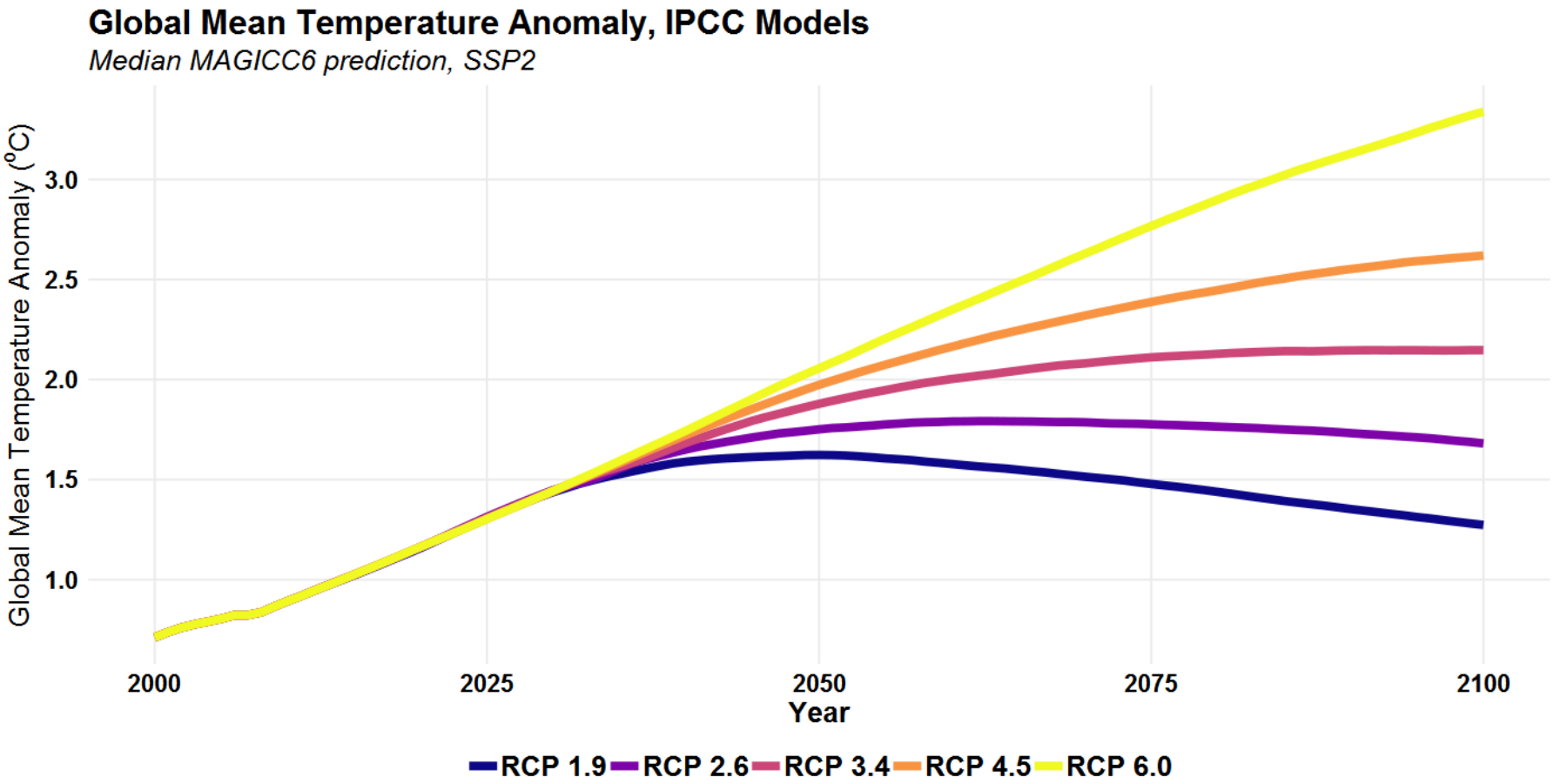
A digression on climate change - how much insurance do you want to buy?



A digression on climate change - how much risk are you willing to tolerate?

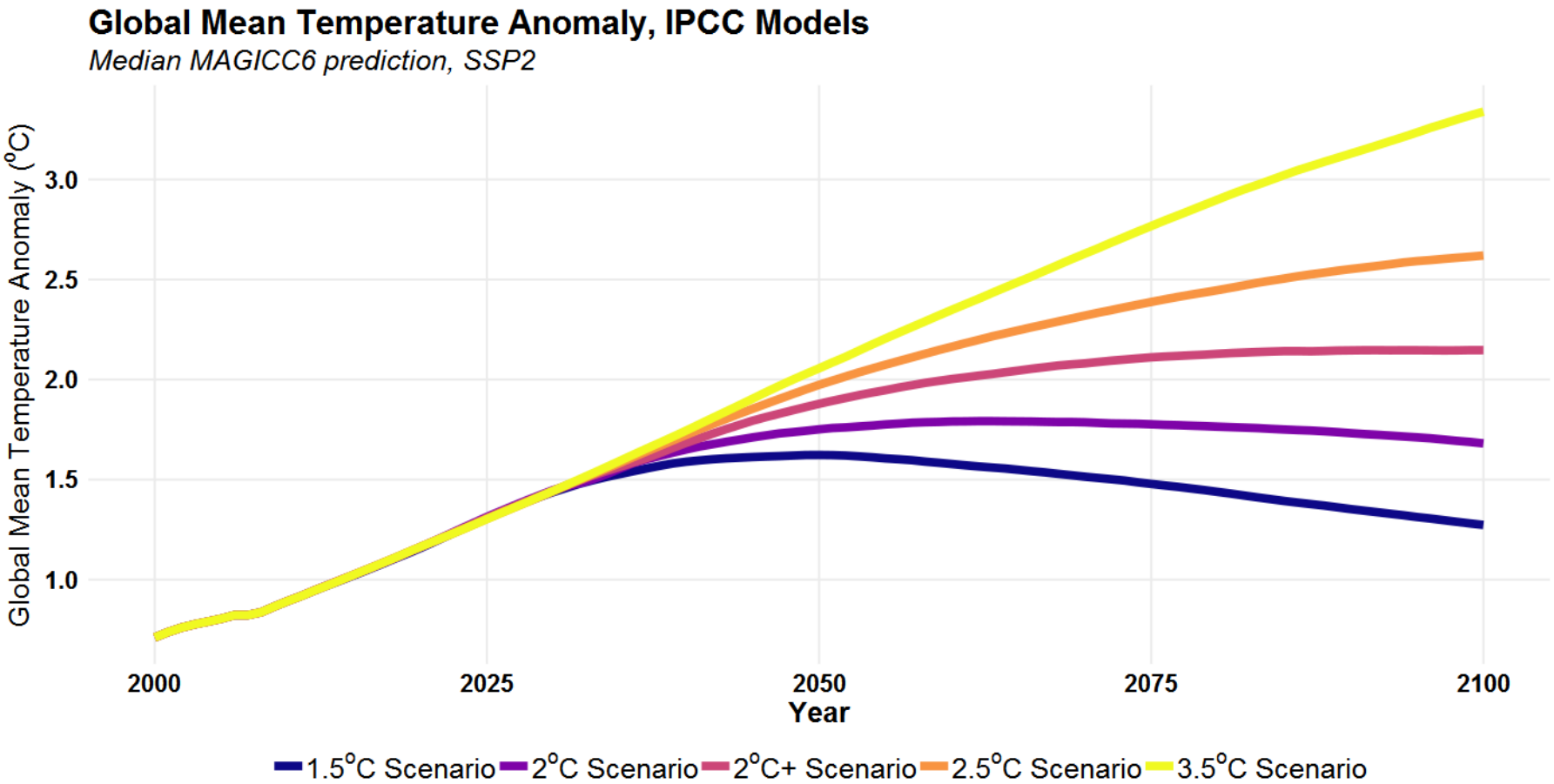


RCP scenarios translate into temperature trajectories

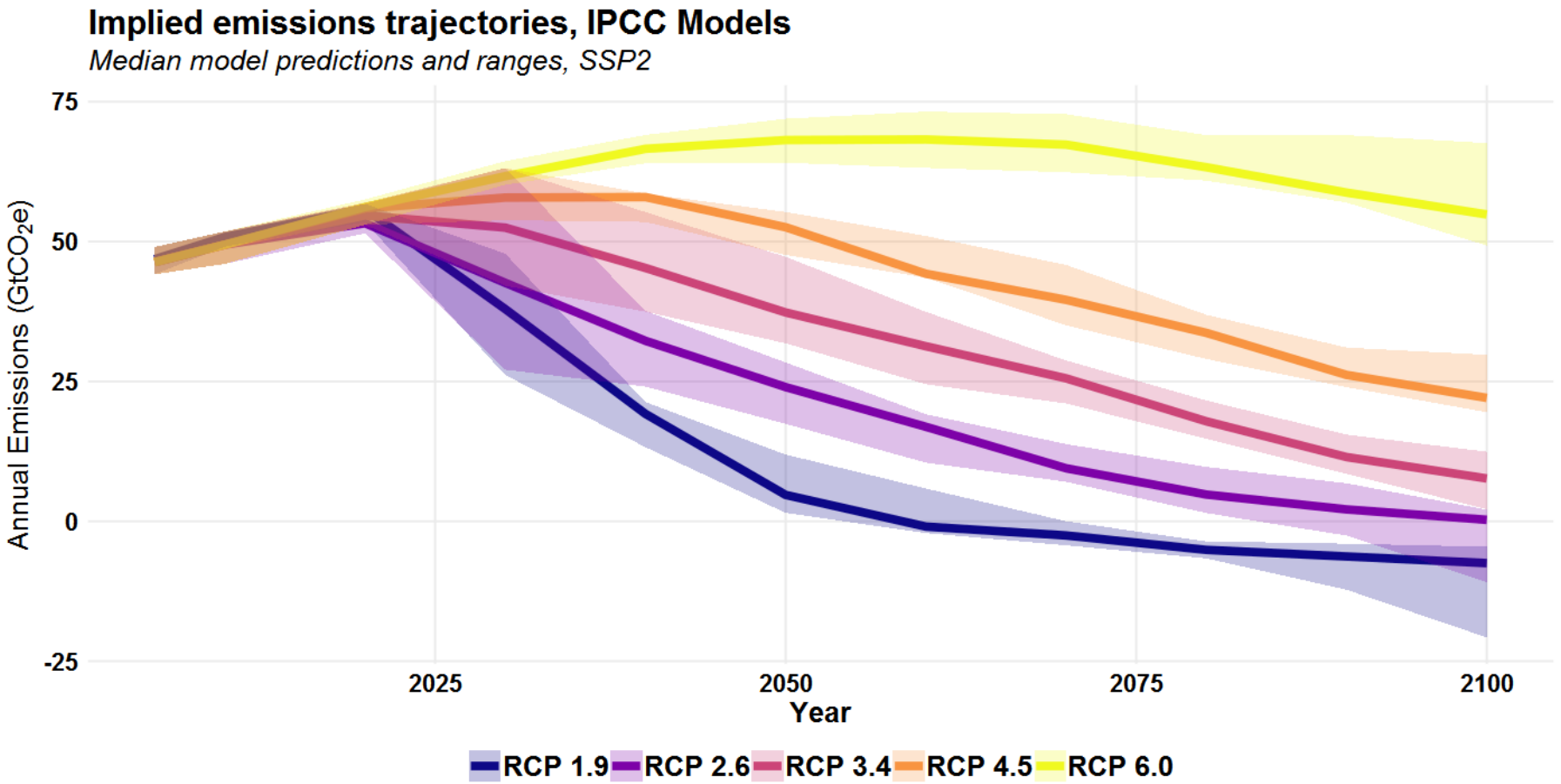


Source: Huppmann et al. IAMC 1.5°C Scenario Explorer and Data hosted by IIASA. Integrated Assessment Modeling Consortium & International Institute for Applied Systems Analysis, 2018. Release 1.0. doi: 10.22022/SR15/08-2018.15429 url: data.ene.iiasa.ac.at/iamc-1.5c-explorer Graph by Andrew Leach

Let's name the scenarios to make this easier



RCP scenarios translate into emissions trajectories



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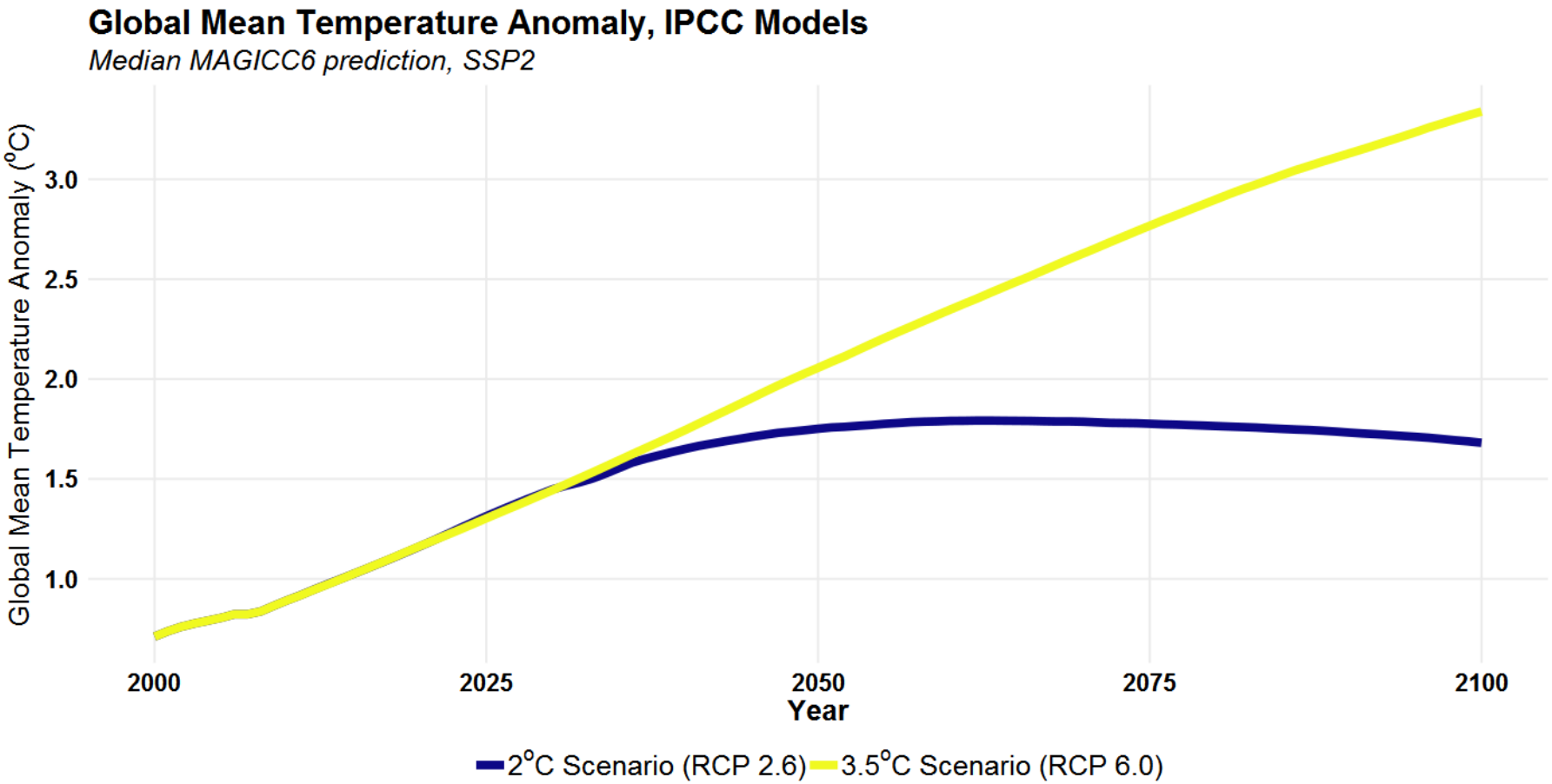
Now, let's narrow this down to a couple of scenarios.



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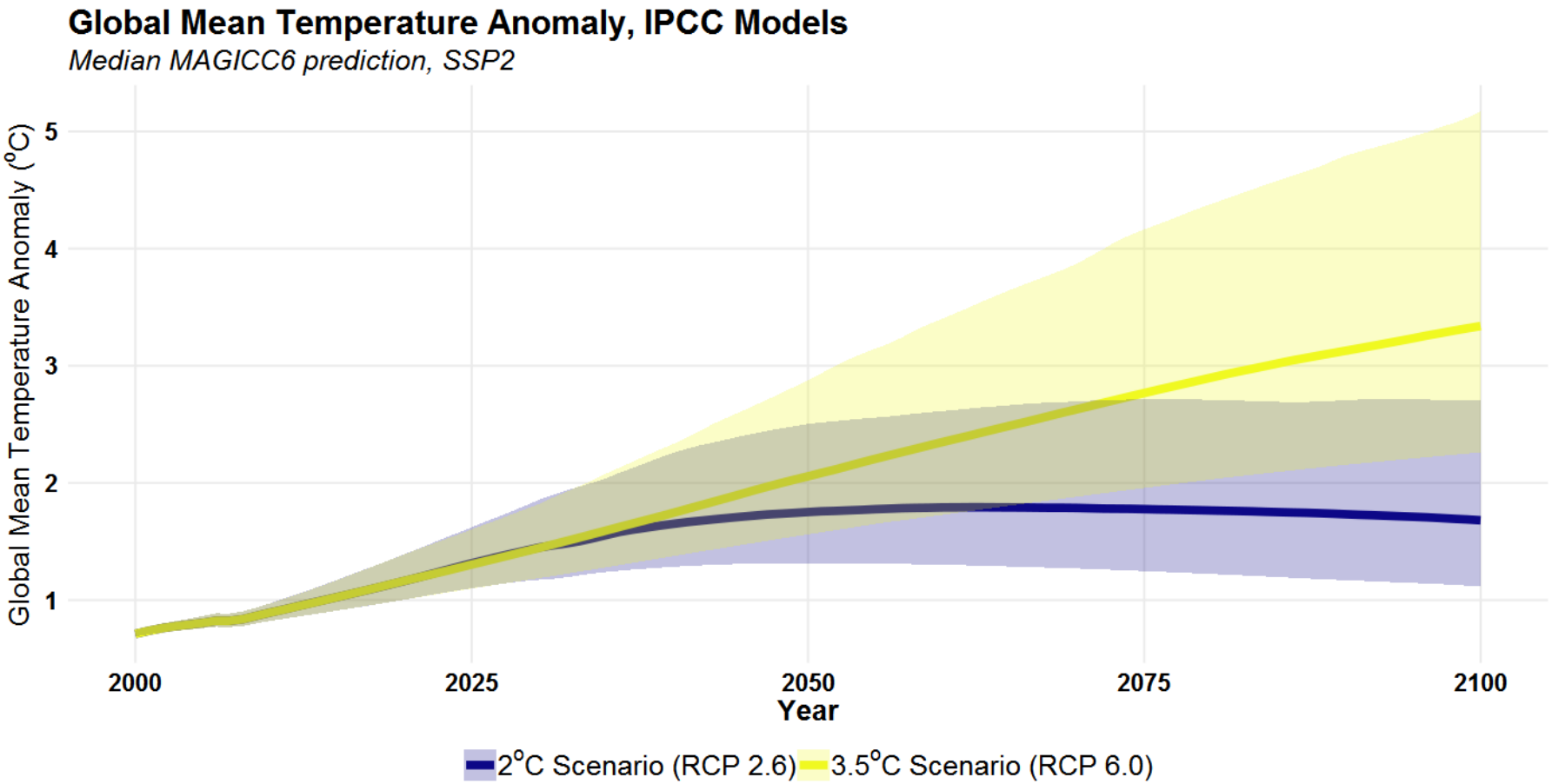
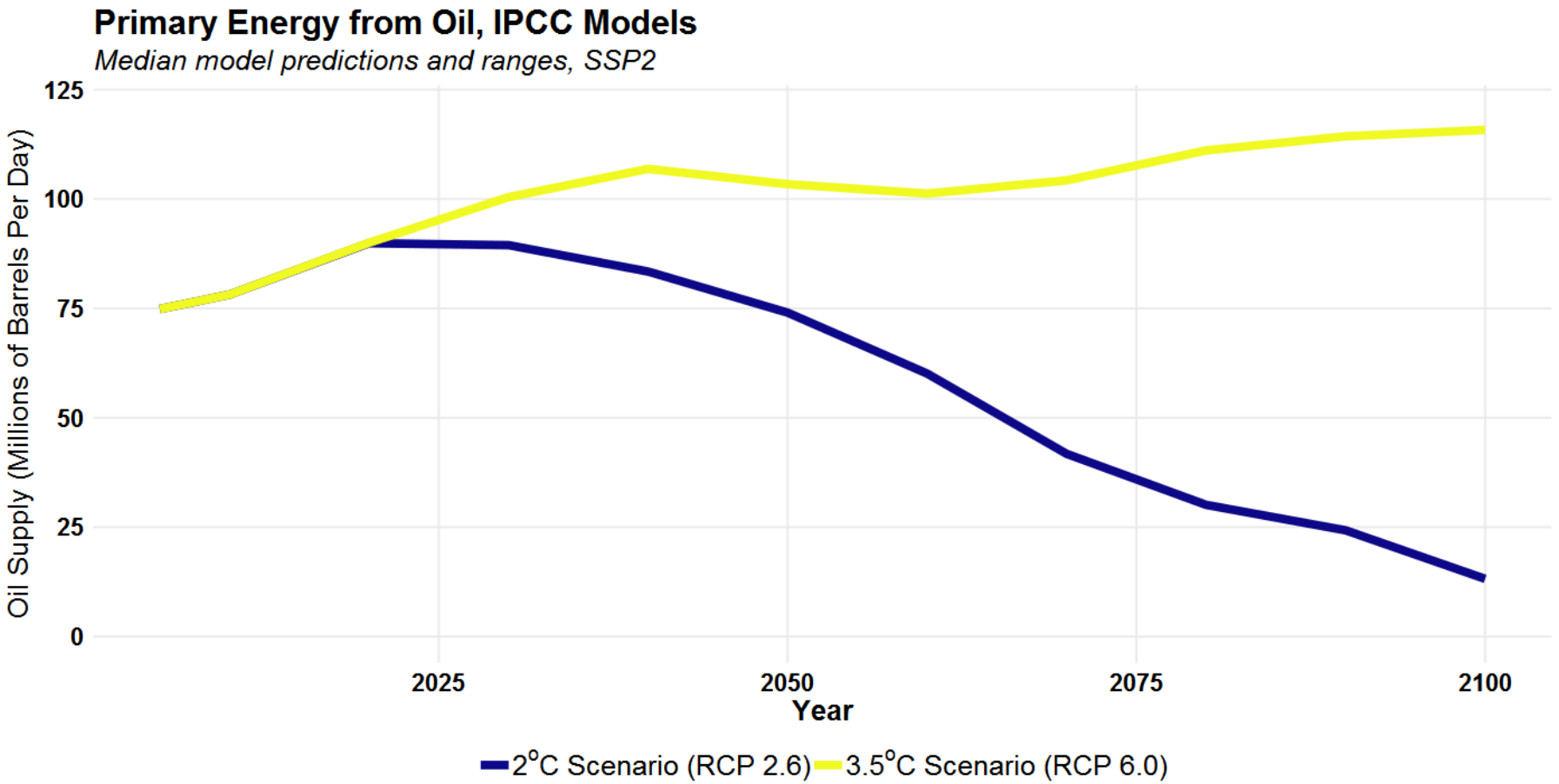


What do these mean for oil demand?



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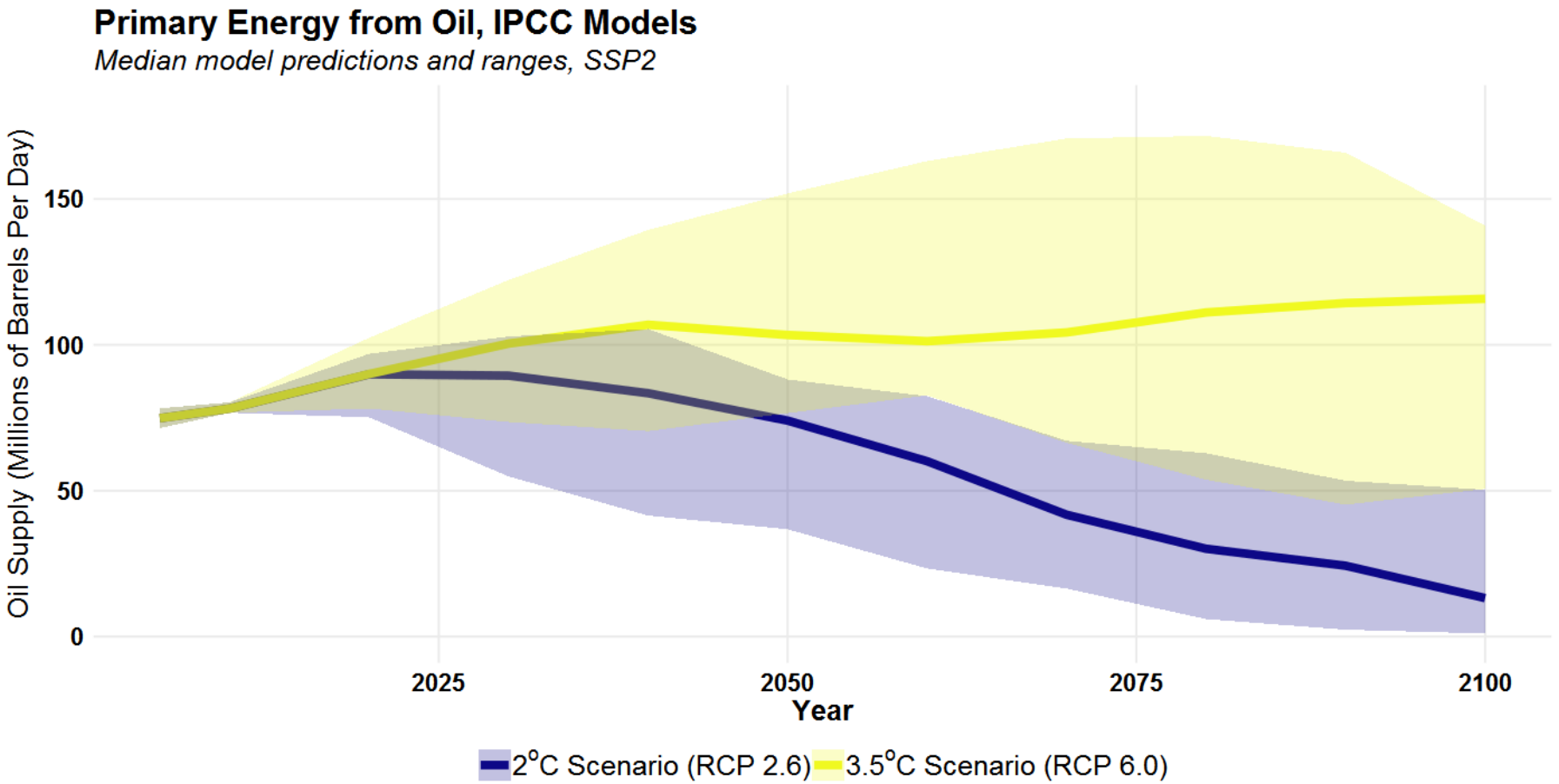

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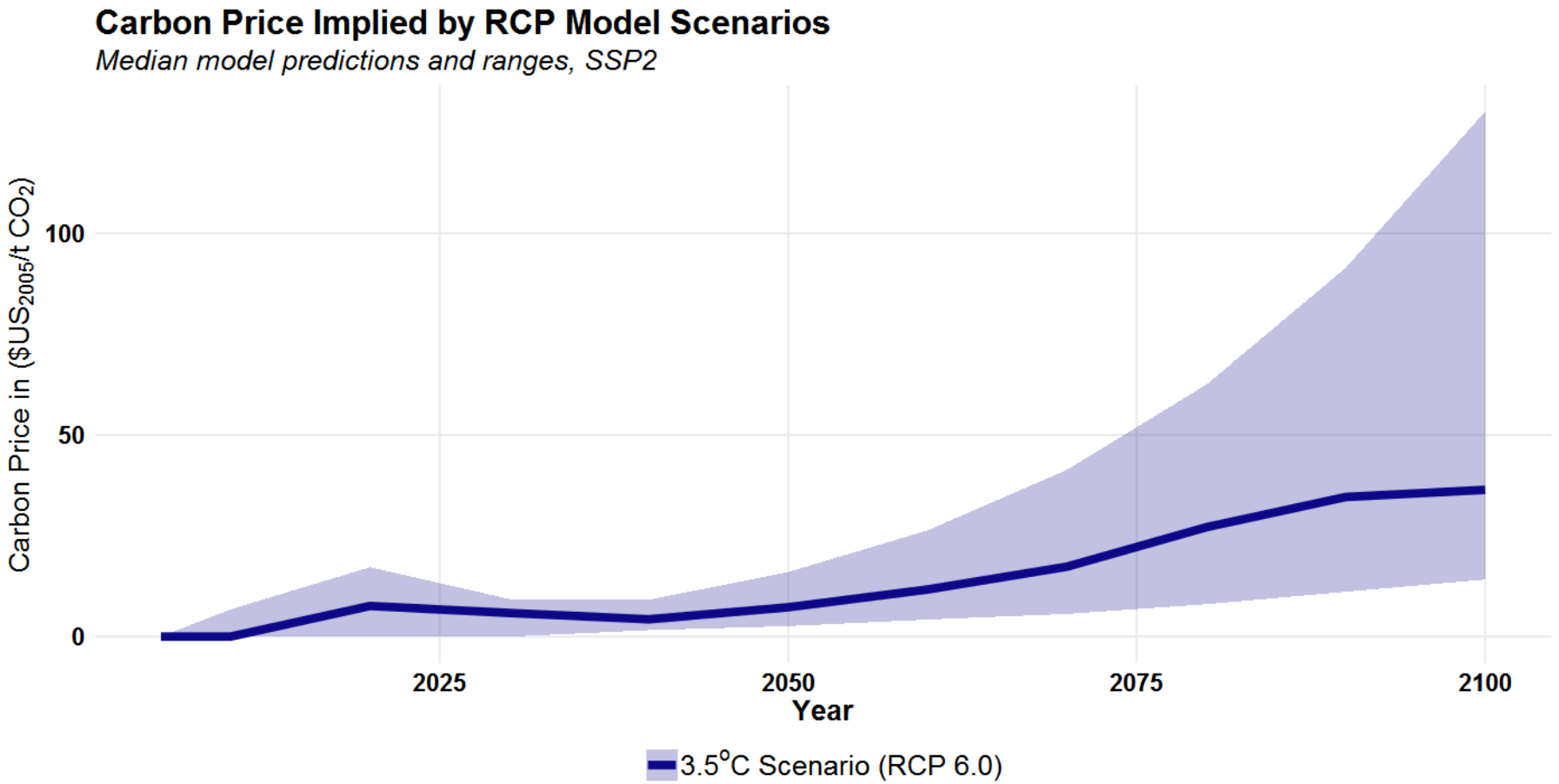
Emissions policy stringency is clearly part of the picture



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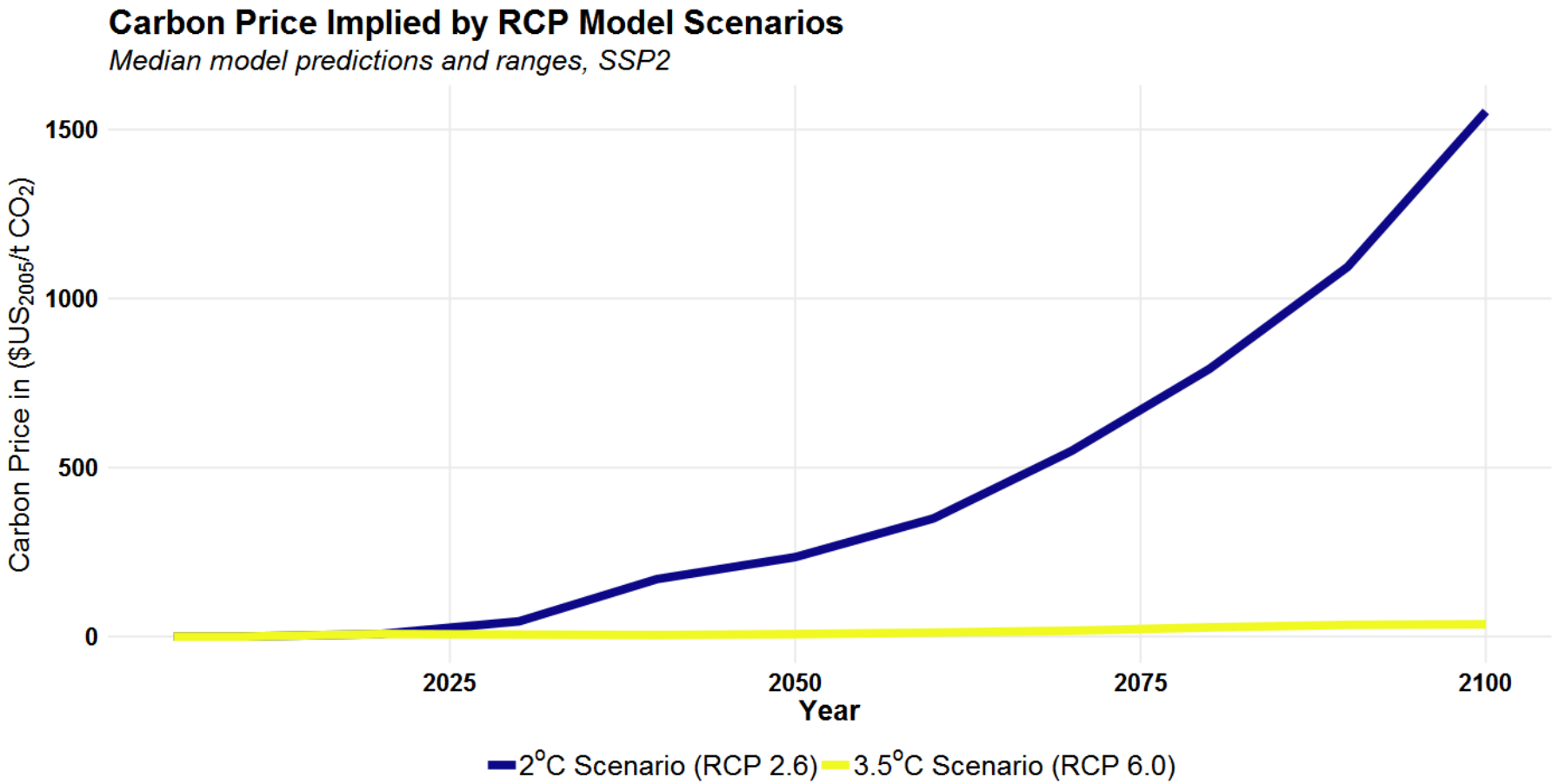
If you're arguing for limited GHG policy...



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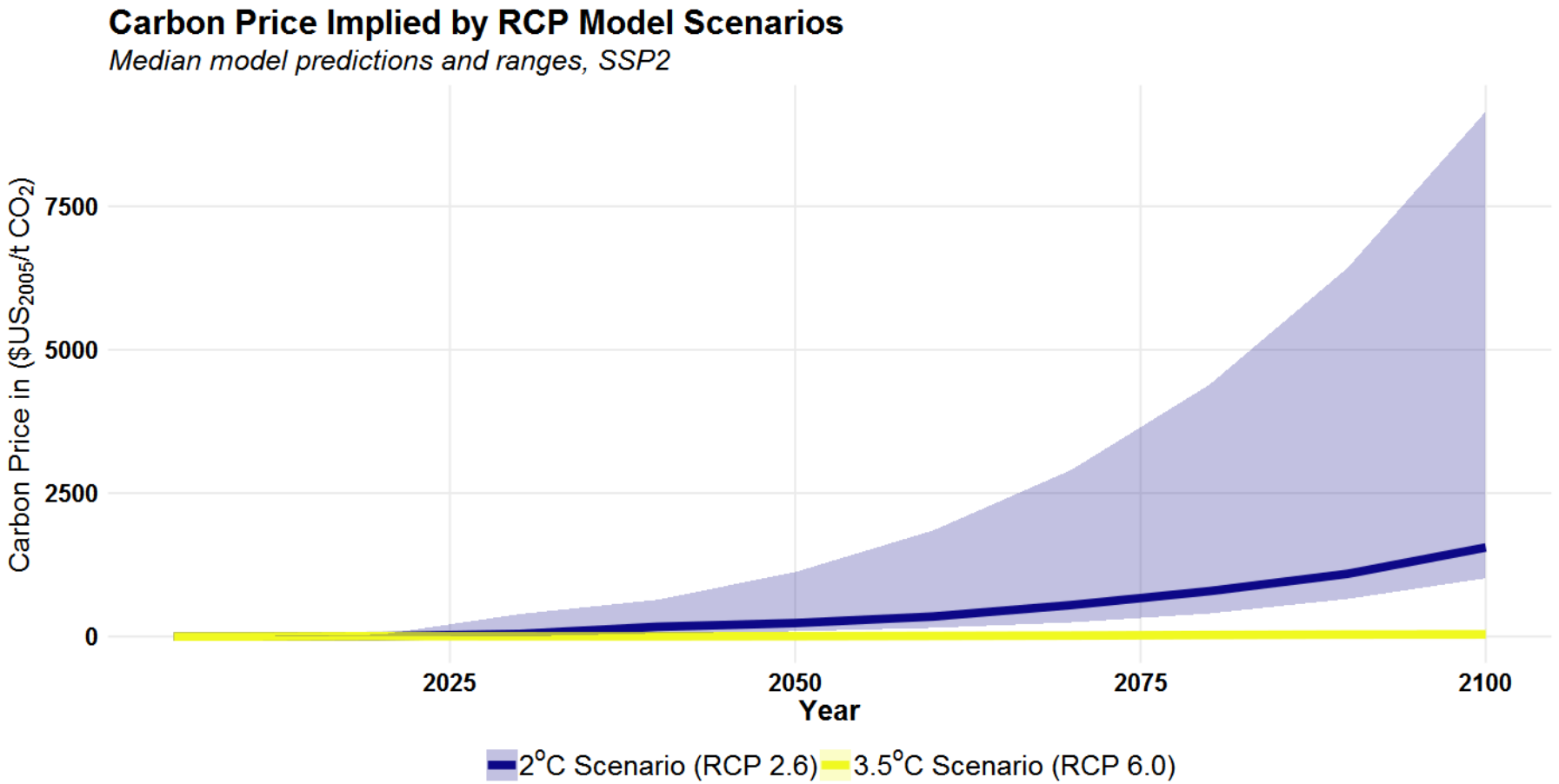

What do these tell us?

- Acting on climate change is going to mean significantly lower global oil demand;
- A 2C scenario means we already should have hit peak oil demand. A 1.5C scenario implies an even more rapid decline;
- Significant stranded asset risk will exist for long-lived assets (pipelines and oil sands production facilities) if the world acts aggressively on climate change;
- The good news: these are the risks that our oil industry is used to dealing with, as is the NEB/CER process - we just need to let it work;
- How do you integrate the potential for global action on climate change in the process? Ensure that market forecasts stipulate and are able to be challenged on their assumptions about climate change action.

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Can oil sands and pipelines pass a climate test? Maybe.

Market Prices		Current Policies	Social cost of carbon on production emissions			
			US IWG SCC (5%, average)	US IWG SCC (3%, average)	US IWG SCC (2.5%, average)	US IWG SCC (3%, 95th pctl)
Project Financial Indicators						
Internal Rate of Return	%	11.94%	11.38%	9.87%	8.80%	3.84%
Supply Cost (WTI equivalent)	$/bbl	55.14	56.24	58.75	60.61	66.65
Carbon prices ($2018/tonne)						
Average GHG cost	$/tonne	3.04	28.66	85.17	121.05	259.34
Per Barrel Revenues and Costs ($2018/bbl bitumen)						
Total Revenue	$/bbl	41.73	41.73	41.73	41.73	41.73
GHG Compliance Costs	$/bbl	0.16	1.54	4.58	6.51	13.94
Royalties	$/bbl	7.28	6.79	5.73	5.07	2.97
Taxes	$/bbl	3.26	3.02	2.49	2.16	0.77
Free Cash Flow	$/bbl	8.14	7.49	6.03	5.09	1.15

NEB (2018) Prices		Current Policies	Social cost of carbon on production emissions			
			US IWG SCC (5%, average)	US IWG SCC (3%, average)	US IWG SCC (2.5%, average)	US IWG SCC (3%, 95th pctl)
Project Financial Indicators						
Internal Rate of Return	%	16.50%	16.14%	15.09%	14.38%	11.77%
Supply Cost (WTI equivalent)	$/bbl	54.95	55.98	58.59	60.47	66.47
Carbon prices ($2018/tonne)						
Average GHG cost	$/tonne	3.04	26.83	79.77	113.41	242.88
Per Barrel Revenues and Costs ($2018/bbl bitumen)						
Total Revenue	$/bbl	58.22	58.22	58.22	58.22	58.22
GHG Compliance Costs	$/bbl	0.16	1.44	4.29	6.10	13.06
Royalties	$/bbl	13.59	13.10	12.04	11.38	8.80
Taxes	$/bbl	5.72	5.51	5.03	4.73	3.56
Free Cash Flow	$/bbl	14.84	14.26	12.95	12.11	8.90

Can oil sands and pipelines pass a climate test? Maybe.

Market Prices		Current Policies	Social cost of carbon on life cycle emissions			
			US IWG SCC (5%, average)	US IWG SCC (3%, average)	US IWG SCC (2.5%, average)	US IWG SCC (3%, 95th pctl)
Project Financial Indicators						
Internal Rate of Return	%	11.94%	3.44%	#NUM!	#NUM!	#NUM!
Supply Cost (WTI equivalent)	$/bbl	55.23	66.02	89.34	104.70	161.74
Oil Price ($2017/bbl)						
WTI Price	$/tonne	58.64	45.15	23.37	9.74	(49.12)
Carbon prices ($2017/tonne)						
Average GHG cost	$/tonne	3.04	28.66	85.17	121.05	259.34
Per Barrel Revenues and Costs ($2017/bbl bitumen)						
Total Revenue	$/bbl	41.73	27.14	(1.35)	(19.36)	(89.55)
GHG Compliance Costs	$/bbl	0.16	1.54	4.58	6.51	13.94
Royalties	$/bbl	7.28	1.45	0.02	-	-
Taxes	$/bbl	3.26	0.57	-	-	-
Free Cash Flow	$/bbl	8.14	0.69	(28.83)	(48.75)	(126.38)

NEB (2018) Prices		Current Policies	Social cost of carbon on life cycle emissions			
			US IWG SCC (5%, average)	US IWG SCC (3%, average)	US IWG SCC (2.5%, average)	US IWG SCC (3%, 95th pctl)
Project Financial Indicators						
Internal Rate of Return	%	16.50%	12.22%	#NUM!	#NUM!	#NUM!
Supply Cost (WTI equivalent)	$/bbl	55.04	65.79	89.10	104.56	161.27
Oil Price ($2017/bbl)						
WTI Price	$/tonne	70.68	57.20	35.42	21.79	(37.07)
Carbon prices ($2017/tonne)						
Average GHG cost	$/tonne	3.04	26.83	79.77	113.41	242.88
Per Barrel Revenues and Costs ($2017/bbl bitumen)						
Total Revenue	$/bbl	58.22	44.57	17.92	1.05	(64.60)
GHG Compliance Costs	$/bbl	0.16	1.44	4.29	6.10	13.06
Royalties	$/bbl	13.59	7.37	0.46	0.03	-
Taxes	$/bbl	5.72	3.39	-	-	-
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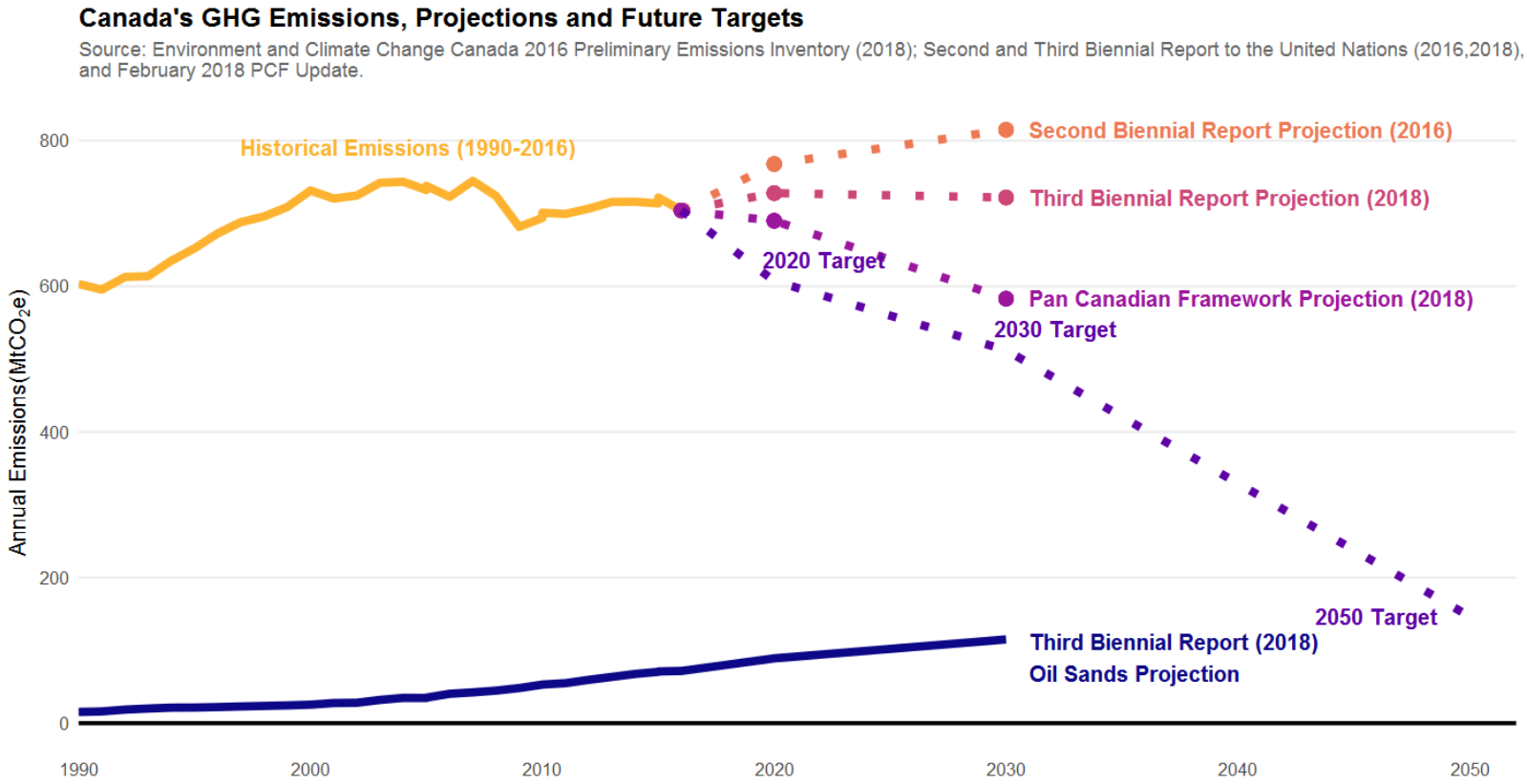
Can oil sands and pipelines pass a climate test? Maybe.



Conclusion

- The threat of climate change and the potential value of oil sands present Canada with very challenging choices;
- Oil sands projects will, definitely be higher with pipelines than without;
- Does that mean that global emissions will, definitely, be higher with pipelines than without? No.;
- Serious global action on climate change will, almost assuredly, mean no further oil sands expansion and (dis)orderly wind-down of the oil sands industry over decades;
- Global action, not domestic policies, will have the largest impacts on oil sands revenues;
- 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

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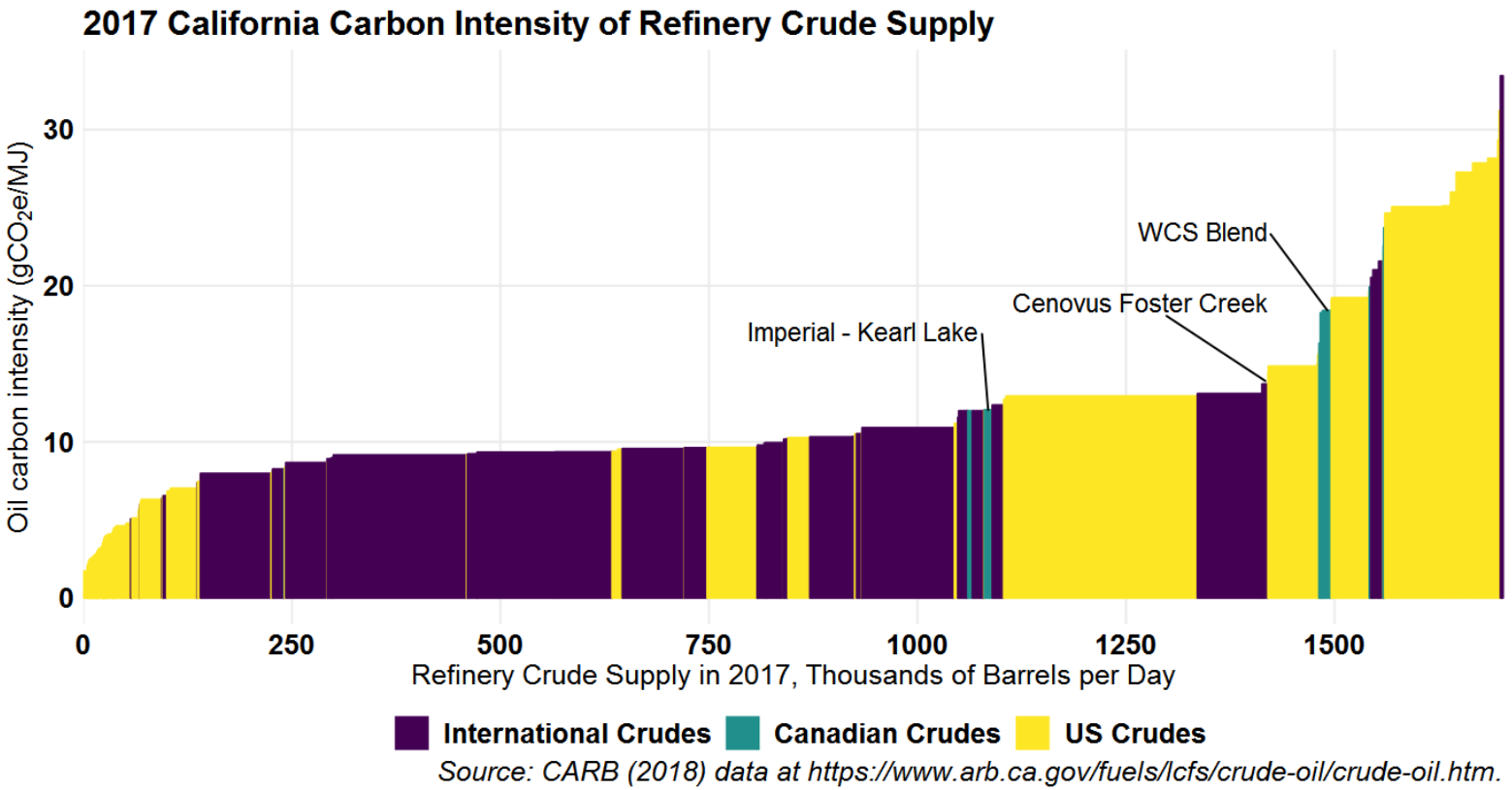
If not oil sands then what?



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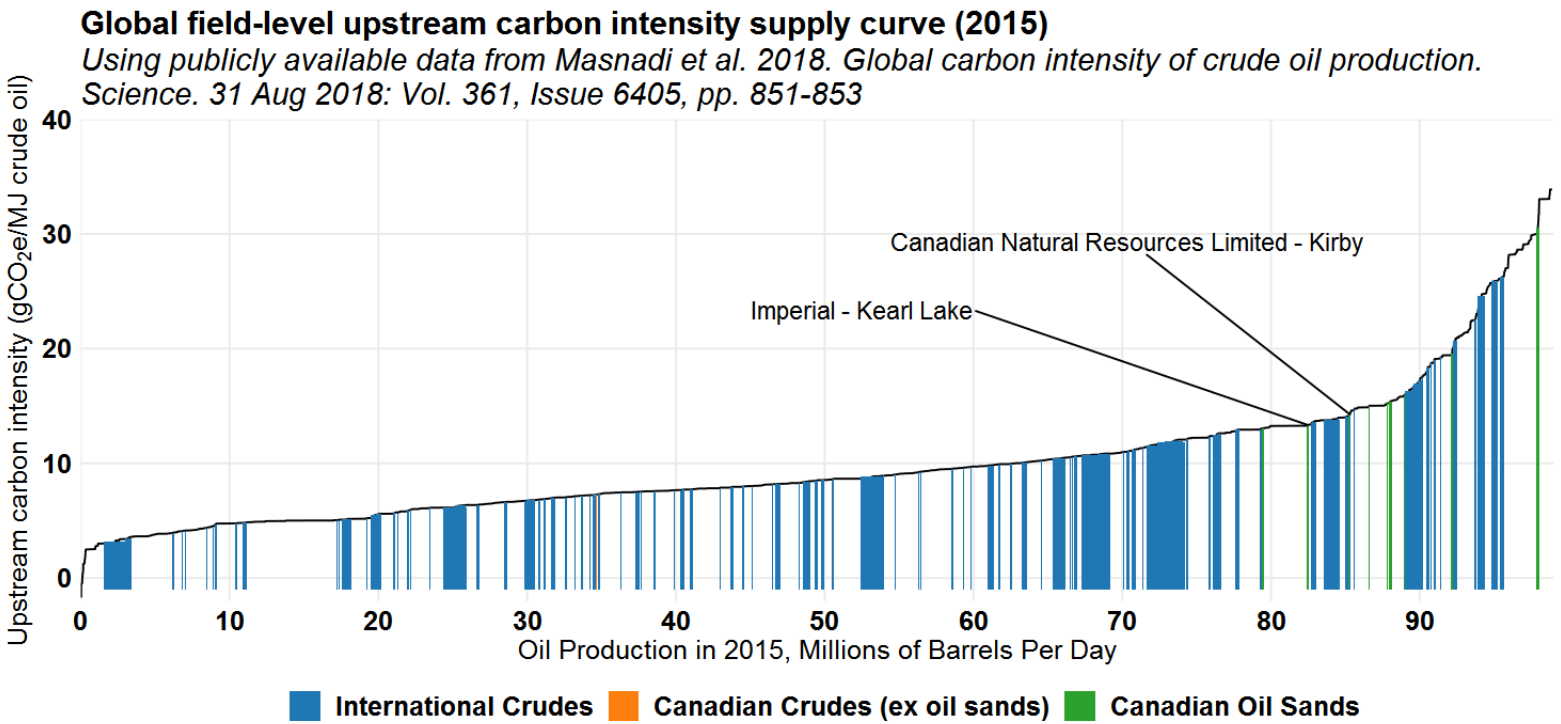

Source: Global curve from Masnadi et al (2018). Field-level calculations use OPGEE 2.0c (2018) with Masnadi et al. input data.

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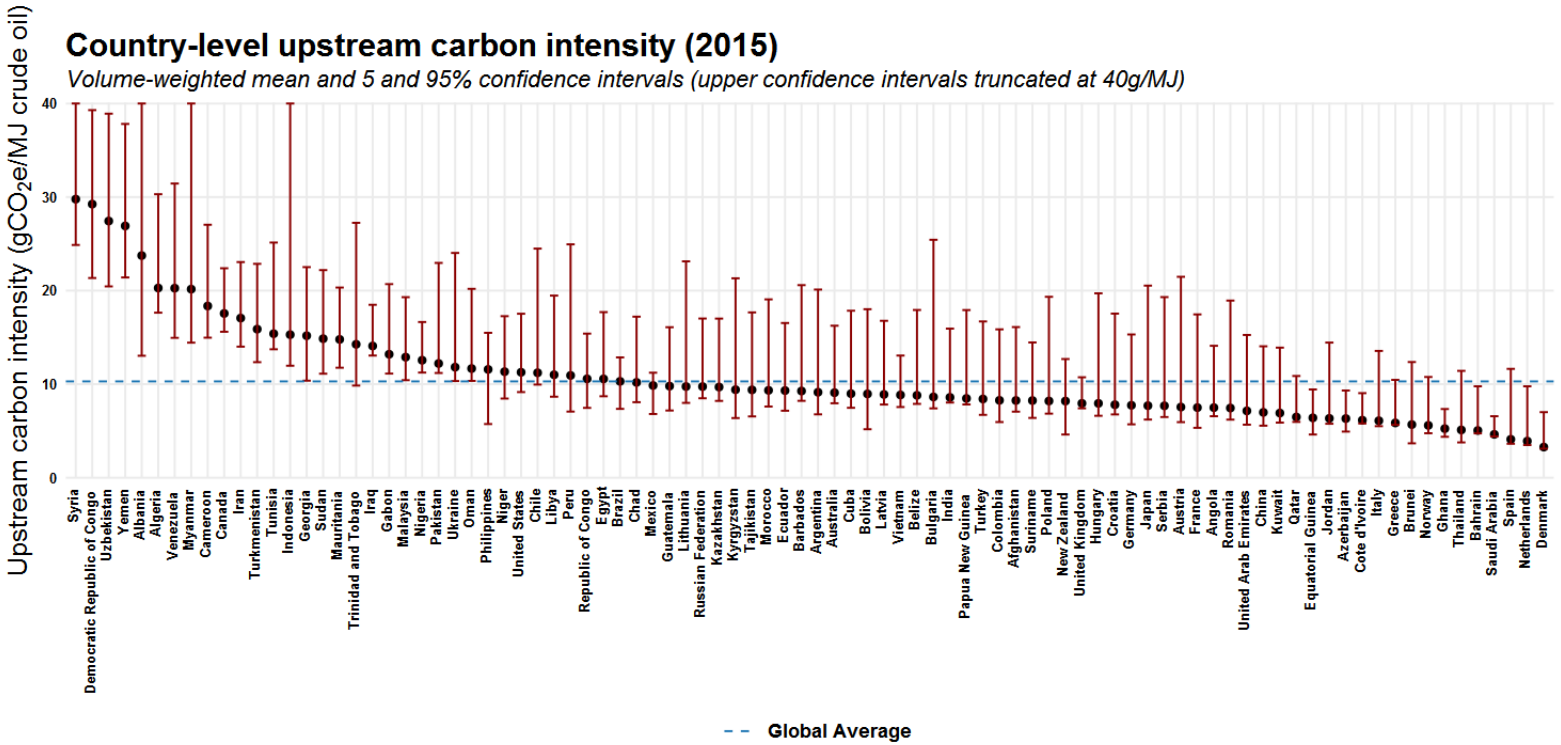

Source: Masnadi et al. 2018. Global carbon intensity of crude oil production. Science. 31 Aug 2018: Vol. 361, Issue 6405, pp. 851-853.