



A processing plant in the Athabasca oil sands of Alberta. Climate change targets could reduce demand for oil at a time when the collapse of prices has already impaired the economic viability of high cost energy sources such as the oil sands. Wikipedia photo

The Future of Canada's Oil Sands in a Decarbonizing Global Economy

Jeff Rubin

Justin Trudeau has argued that improving Canada's emission record will safeguard the development of the oil sands. But even before the Fort McMurray wildfire, Alberta's oil sands were facing an existential threat from the combination of the COP 21 worldwide emissions targets and reduced oil prices. By destroying billions of barrels of potential future oil demand, policies designed to mitigate climate change will severely impair the economic viability of the oil sands and other high cost sources of oil supply.

Both Prime Minister Justin Trudeau and Alberta's Premier Rachel Notley have worked earnestly to rehabilitate Canada's badly tarnished environmental image. For much of the last decade the Canadian government's singular economic focus on promoting the rapid growth of bitumen production from the oil sands and its resultant lack of progress in reducing national carbon emissions has isolated the country in the global environmental community.

Notley announced sweeping changes to Alberta's carbon emission policies, including the creation of a provincial carbon tax, the setting of a 100-megatonne hard cap on annual carbon emissions from the oil sands and the phase-out of all coal-fired generating plants. Trudeau has in turn promised to work with the provinces to develop a national climate change strategy that will enable the country to achieve its emission reduction targets. The Trudeau government has already announced that it considers the previous target set by the former Harper government of reducing national emissions 30 per cent below 2005 levels by 2030 a bare minimum.

Curiously, Canada's newfound commitment to improve its international image on battling carbon pollution is being pitched, at least to the country's oil patch, as an attempt to improve the oil sands marketability to increasingly emission-conscious world energy markets. Both Trudeau and Notley had even argued that the country's notoriously poor record on carbon emissions under the Conservative government had actually hurt the oil sands' long-term expansion plans that the former prime minister so famously championed. Premier Notley cited President Obama's rejection of the Keystone XL pipeline on climate change grounds as a prime example.

While that political narrative seems to be gaining traction in post-Harper Canada, it is not the domestic market that drives production growth in the oil sands. Hence it is not Alberta's emissions, nor for that matter Canada's emissions, that are relevant to the oil sands' economic future. The real threat that climate change poses to bitumen extraction from the oil sands are the actions taken by the rest of the world to mitigate global carbon pollution and the consequences those actions will have on future world oil consumption. By destroying billions of barrels of potential future oil demand, policies designed to mitigate climate change either through taxing carbon emissions or through promot-

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ing the rapid use of green energy, can only worsen the outlook for the oil sands and other high cost sources of oil supply.

It is the oil sands costs, not its carbon trail, which makes the resource so vulnerable in an emissions constrained world. Next to Arctic production, the oil sands rank as one of the most expensive sources of oil in the world, rendering it a marginal producer in the world supply chain. As such, the oil sands has stood to gain the most from triple digit oil prices which have levered huge production growth and turned what was once thought to be commercially unrecoverable oil into the world's third-largest oil reserve. But at the same time, as one of the most costly oil sources in the world, the resource is also one of the most exposed by low oil prices. That exposure could in no meaningful sense be remedied by any improvement, no matter how impressive, in either its own carbon emissions or in Canada's overall emission performance.

It is global emissions that are the sector's real nemesis. The overwhelming scientific consensus of the United Nations Intergovernmental Panel on Climate Change (IPCC) is that atmospheric carbon must not be allowed to exceed 450 parts per million (ppm) in the atmosphere—a threshold they estimate would hold the average increase in global temperatures to a two degree Celsius rise. Even that increase, as noted by many island nations attending the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change (COP 21) in Paris, would see rising sea levels at least partially inundate them. Any greater than a two degree temperature rise would unleash a spectrum of

feedback mechanisms that could overwhelm our capacity to adapt.

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Capping atmospheric carbon at the 450 ppm level (or potentially lower if the rise in average global temperature is to be held to 1.5 degrees Celsius) implies not only a dramatic but an imminent change in the world economy's use of carbon-emitting fossil fuels. In its most recent general assessment report, the IPCC estimated that the world had a remaining carbon budget of 1000 gigatonnes (GT) of CO₂ before emissions push atmospheric carbon concentrations to the critical 450 ppm threshold. Scaled to recent annual global emissions running just over 30 GT, the global economy has only about three decades left to burn carbon fuels. That horizon could be extended by reducing annual emission, but either way the global economy must soon head toward substantive and sustained reductions in

emissions either through decarbonizing economic growth (falling emissions per unit of GDP) or, less desirably, through much lower rates of economic growth itself.

Either route implies a very different trajectory for carbon emissions, and hence global fuel consumption than the rates of growth fossil fuel producers have become accustomed to and, more critically, are counting on to continue indefinitely into the future. The carbon trail from business as usual growth in oil, coal and natural gas combustion would put carbon levels on course to hitting as high as 700 ppm by the end of the century, triggering as much as a six degree Celsius rise in average temperatures. The IPCC warns that anything close to those levels would bring with it catastrophic changes in global climate and sea levels.

Avoiding those consequences by limiting the rise in atmospheric carbon to 450 ppm level (or less) through what is commonly referred to as deep decarbonization has both significant near-term as well as profound longer term implications for the oil industry. Not only is there no room within the world's remaining carbon budget to accommodate business as usual growth in world oil demand but the looming emission reductions will necessitate substantial reductions in world oil consumption over the next several decades.

The International Energy Agency (IEA) estimated that in order to hold atmospheric carbon at the 450 ppm threshold, global oil consumption will have to fall to under 80 million bpd by 2030 and continue to decline to 74 million bpd by 2040—an over 20 per cent reduction from today's production level. World oil demand would have to peak by 2020 before beginning a terminal decline over the balance of the century. By mid-century virtually all increases in global energy demand would have to be supplied through renewable power .

The time frames for required cuts in global oil consumption are precisely those during which the Canadian Association of Petroleum Producers (CAPP) expects oil sands production to double. But instead of benefitting from another two decades of world oil demand growing at its annual trend rate of a little over one million bpd, oil sands producers would be facing a contracting global market that would shut in more than 20 mbd of current world oil production

The blueprint for that contracting global oil market is at least partially drafted through the existing emission reduction commitments of the largest oil consuming countries both in the developed and developing world. Current national pledges to reduce carbon emissions are a minimum starting point. While they already dictate significant reductions in future world oil demand, they are still inadequate from a climate change mitigation standpoint.

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Even if all pledged national emission reduction targets are met, global carbon emissions would still be on track to induce anywhere from a 2.7 -3.5 degrees Celsius warming of the planet—almost double the level which the COP21 agreement intends to hold global temperature change to. It is widely anticipated that more aggressive commitments to reduce

future emissions at the individual country level will be needed, requiring even greater reductions in fossil fuel demand.

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Whatever ultimate target for global warming is pursued, the route to keeping carbon out of the atmosphere is to keep fossil fuels in the ground. Anywhere from two-thirds to three quarters of all proven reserves of fossil fuels will not be able to be burned if we are to adhere to a carbon threshold of 450 ppm according to the IPCC. In effect that would leave the bulk of the world's oil reserves as stranded assets with no economic value. According to Moody's, half of the world's coal reserves are already uneconomic to exploit at today's price for either thermal or metallurgical coal, both of which are trading at or near decade lows.

Just as today's coal prices have already stranded coal reserves around the world, tomorrow's oil prices in an emission-constrained world will strand much of the world's proven oil reserves. All but the lowest cost reserves will be abandoned in a contracting world oil market, leaving most of the oil sands estimated 170 billion barrels of bitumen in the ground. **P**

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