

SCIENTISTS CALL FOR A MORATORIUM ON OIL SANDS DEVELOPMENT

Decisions about the development of the vast oil sands[†] deposits in Alberta and elsewhere in North America are among the biggest we face as Canadians and Americans. Their consequences for our national economies and shared environment will last decades to centuries. These decisions transcend the boundaries of scientific disciplines in ways that challenge accurate summary in media and debate.

We, a diverse group of natural and social scientists from both countries, began talking to each other because concerns about the oil sands reach far beyond our individual fields of research. Based on evidence raised across our many disciplines, we offer a unified voice calling for a moratorium on new oil sands projects. *No new oil sands or related infrastructure projects should proceed unless consistent with an implemented plan to rapidly reduce carbon pollution, safeguard biodiversity, protect human health, and respect treaty rights.* The following ten reasons, each grounded in science, support our call for a moratorium. We believe they should be at the center of the public debate about further development of the oil sands, a carbon-intensive source of non-renewable energy.

Ten Reasons for a Moratorium:

Reason 1. Continued expansion of oil sands and similar unconventional fuels in Canada and beyond is incompatible with limiting climate warming to a level that society can handle without widespread harm.

The latest analyses agree that the warming predicted to occur this century will substantially raise the risk of severe ecological and economic damage, widespread social upheaval, and human suffering (IPCC 2013) and that oil sands expansion is inconsistent with avoiding this outcome (Chan et al. 2010, McCollum et al. 2014, McGlade and Ekins 2014). To address the risks of climate change, Canada has committed to significantly reduce greenhouse gas emissions by 2020 and 2030. Continued investment in oil sands production and infrastructure is not consistent with these targets and undermines broader efforts to reduce CO₂ emissions and control climate warming (Office of the Auditor General of Canada 2012, Environment Canada 2014).[‡] We need a different energy path.

Reason 2. Oil sands should be one of the first fuel sources we avoid using as society moves to non-polluting forms of energy, not the next carbon-intensive source we exploit.

We need reliable energy sources while we develop a new economy around cleaner fuels. Extracting, refining, transporting, and burning oil-sands energy produces among the most

[†] Oil sands, tar sands, and bituminous sands are terms used interchangeably to describe a kind of unconventional oil deposit from which bitumen, a highly viscous form of petroleum, is mined from sand, clay, and sandstone.

[‡] Environment Canada (2014) and the Office of the Auditor General of Canada (2012) predict that Canada will miss its greenhouse gas emissions reduction target by 122 million tonnes.

greenhouse gases of any transport fuel per unit energy delivered (Brandt 2011, Gordon et al. 2015). Expansion of oil sands production will exacerbate the problem of carbon pollution and slow the transition to cleaner energy (Unruh 2000).

Reason 3. Current oil sands environmental protections and baseline data are largely lacking, and protections that exist are too seldom enforced.

In Canada, there are few controls and no uniform standards regarding pollution and other impacts from oil sands mining. Water quality monitoring by the Canadian government and industry was poor until recently, so there is little baseline knowledge to evaluate impacts on terrestrial and aquatic life (Environment Canada 2010, Royal Society of Canada 2010, Dillon et al. 2011, RAMP 2011, Jordaan 2012, Kirk et al. 2014).[§] In some cases, the enforcement of existing regulations (such as 2009 Bill 74 that would eliminate liquid tailings) is formally postponed (Energy Resources Conservation Board 2013). Actual rates of development on the ground exceed stated conservation targets (Komers and Stanojevic 2013, Government of Alberta 2012).^{**} Too often, the development of the oil sands is presented as inevitable, while protections for human health and the environment are treated as optional.

Reason 4. Contaminants from oil sands development permeate the land, water and air of the Canadian boreal landscape, and many of these impacts are difficult to mitigate.

Independent studies have demonstrated that mining and processing Albertan oil sands releases carcinogenic and toxic pollutants (e.g., heavy metals, polycyclic aromatic compounds) to the atmosphere from smoke stacks and evaporation, and to groundwater from leaching of tailings ponds. This pollution harms terrestrial and aquatic ecosystems and the species within them (Pollet and Bendell-Young 2000, Gurney et al. 2005, Nero et al. 2006, Gentes et al. 2007, Kelly et al. 2009, Kelly et al. 2010, Landis et al. 2012, Rooney et al. 2012, Kurek et al. 2013, Andrishak and Hicks 2011, Hebert et al. 2013, Galarneau et al. 2014, Parajulee and Wania 2014, Schindler 2014, Schwalb et al. 2015).

Reason 5. Less than 0.2% of the area affected by Canadian oil sands mining has been reclaimed, and none restored to its original state (Government of Alberta 2014).

The oil sands industry's claim—widely seen in industry advertisements—that its mine sites can be restored to their former natural state is not true. Indeed, the claim is at odds with the industry's own reclamation plans filed with the Alberta government (Rooney et al. 2012). Recently published studies find that intensive disturbances associated with oil sands mining change fundamental biological processes, making it impossible to fully restore the affected wetlands, peatlands, and boreal forest, now or in the future (Foote 2012, Johnson and Miyanishi 2008). Conversion of the boreal forest alongside other disturbances from oil sands development has led to the decline of federally threatened species such as bison and woodland caribou and important subsistence food species such as moose in addition to the ecosystem-wide effects addressed in Reason 4 (Gates et al. 1992, Dyer et al. 2001, McLoughlin et al. 2003, Sorensen et

[§] Multiple independent expert review panels (Environment Canada 2010, Royal Society of Canada 2010, Dillon et al. 2011, RAMP 2011) have found that the largest monitoring program, the Regional Aquatic Monitoring Program, was unable to definitively assess oil sands industrial impacts due to poor scientific design and lack of data (Kirk et al. 2014).

^{**} For example, in 2012 the Canadian government finalized the Lower Athabasca Regional Plan, which recommended that 22% of the region be set aside for conservation. At current rates of forest disturbance, the 22% threshold will be crossed within the next 2-7 years, and 100% of the region would be disturbed by 2028 (Government of Alberta 2012, Komers and Stanojevic 2013).

al. 2008, Morgan and Powell 2009, Boutin et al. 2012, Stewart and Komers 2012). The few attempts to reclaim mined lands have produced landscapes that bear little resemblance to what was there previously and contain only a fraction of the historical biological diversity (Rooney and Bayley 2011, Rooney et al. 2012, Kovalenko et al. 2013).

Reason 6. Development and transport of oil sands is inconsistent with the title and rights of many Aboriginal Peoples of North America.

Rapid expansion of the oil sands in Canada violates or puts at risk nation-to-nation agreements with Aboriginal peoples. In Alberta, oil sands mining is contributing to the degradation and erosion of treaty and constitutionally protected rights by disrupting ecological landscapes critical to the survival of Aboriginal culture, activities, livelihoods, and lifeways (Passelac-Ross and Potes 2007, Foote 2012, ACFN). In the US, proposed infrastructure projects threaten to undermine Treaty agreements between the federal government and Native American tribes (Mufson 2012, Hart 2014). In both countries, contamination of sacred lands and waters, disruption of cultural sites, lack of consultation, and long-term effects of climate change undermine sustainable social, ecological, and economic initiatives involving Aboriginal peoples across the continent and constitute violations of Native sovereignty (Passelac-Ross and Potes 2007, Foote 2012, Mufson 2012, Hart 2014, Irvine et al. 2014, McLachlan 2014, Wohlberg 2014, Athabasca Chipewyan First Nation, Tsleil-Wautath Nation).

Reason 7. What happens in North America will set a precedent for efforts to reduce carbon pollution and address climate warming elsewhere.

The choices we make about the oil sands will reverberate globally, as other countries decide whether or how to develop their own large unconventional oil deposits (Balouga 2012). Strong North American leadership is needed now, because the impacts of current decisions will be felt for decades and centuries.

Reason 8. Controlling carbon pollution will not derail the economy.

Most leading economists now agree that limits on carbon pollution – using mechanisms such as carbon taxes, cap-and-trade systems, or regulations – can facilitate a transition over several decades to low-emission energy without a dramatic reduction in global economic growth (Global Energy Assessment 2012, IPCC 2014, Nordhaus 2014).

Reason 9. Debates about individual pipeline proposals underestimate the full social costs of the oil sands, and existing policies ignore cumulative impacts.

These are not simply business decisions. Responsible policies should address the interwoven, system-wide impacts of oil sands development, from mines and refineries, to pipelines, rail and tanker traffic, to impacts on economies and the global climate system. Current laws, regulations, and policies are not designed to assess cumulative impacts (Johnson and Miyanishi 2008, Office of the Auditor General of Canada 2011).^{††} When oil sands development is viewed as an

^{††} Land use and regulatory decisions are considered lease-by-lease with no single agency responsible for oversight, accounting of cumulative impacts, or information flow. For example, decisions regarding mineral rights are made by Alberta Energy, those for timber by Alberta Sustainable Resource Development, while Alberta Environment decides on water and air impacts, and the National Energy Board decides on pipeline and rail transport of oil sands products (Johnson and Miyanishi 2008).

integrated whole, the costs and benefits of individual decisions can be evaluated responsibly (Chan et al. 2014).

Reason 10. A majority of North Americans want their leaders to address climate change, and they are willing to pay more for energy to help make that happen.

Surveys of public opinion over the last two decades have found increasing public support for effective actions to prevent climate change. An overwhelming majority of North Americans now support government action to address climate change, even when these actions result in modest increases to energy costs (Bloomberg 2014; New York Times/Stanford University 2015).

The time is now

We believe the time has come for scientists to speak out about the magnitude and importance of the oil sands issue and to step forward as participants in an informed and international public dialogue. Working together, we can solve the energy problems before us. It is not too late, but the time to act is now.

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