



Opportunity cost of tar sands development



How to better spend \$379 billion!

Summary



It has been estimated that \$379 billion (£254 billion) will be invested in expanding tar sands operations in Alberta, Canada between now and 2025¹. This is risky from both a climate change and investor perspective. It would also divert valuable investment away from meeting the key global challenges we face today:

Shifting to a low-carbon economy

\$379 billion could cover the cost of the Desertec Industrial Initiative. This would link North African solar plants into a supergrid covering Europe, North Africa and the Middle East, and supply 15% of Europe's electricity by 2050. Alternatively, \$379bn could fund a Europe-wide shift to electric vehicles.

Meeting the Millennium Development Goals

\$379 billion could: ensure every child in the world receives a primary school education; give 1.6 billion people access to improved sanitation; and avert four million child deaths, 322,000 maternal deaths, 265,000 TB deaths and 193,000 adult HIV deaths annually.

1. All figures are US Dollars unless otherwise stated. Where we have converted currencies, the ratio used is \$379bn = €282bn = £254bn

An aerial view of lake shore north of Fort McMurray, Alberta, Canada.

Canada's plans for tar sands: a \$379 billion blunder



© Jiri Rezac / WWF-UK

Tar sands production is currently around 1.3 million barrels per day (bpd). Estimates of future production range from 2.5 to 6.2 million bpd by 2020. The Canadian Energy Research Institute has estimated that **\$379bn** of investment is required by 2025 to bring production to around 4 million bpd.² This is a global business, financed and operated by companies from around the world, including Shell and BP.

With so many vital projects fighting to secure investment, can the world afford to spend \$379 billion on dirty oil?

What will an expansion of tar sands deliver?

Canada has probable reserves of 315 billion barrels. These could generate total emissions of 183 GtCO₂e, which equates

to an increase in atmospheric CO₂e of up to 12 parts per million (ppm).³ The level of CO₂e in the atmosphere is currently around 430ppm and rising.⁴ To have a decent chance of limiting the rise in global temperature to 2°C – the critical tipping point beyond which most scientists agree there will be devastating impacts on the world's ecosystems and people – atmospheric CO₂e must not pass 450 ppm.

If tar sands development proceeds at a rapid pace, by 2050 around half of the 174 billion barrels of proven reserves could have been exploited. This would mean that the tar sands would be responsible for more than 50 GtCO₂e of carbon emissions by 2050. This is 290 times the annual emissions of the UK power sector.⁵

UK oil companies and investment

Companies that make big investments in tar sands risk big future losses by focusing on a business area that is only profitable if emitting carbon is cheap, oil prices are stable at a high level, and there is a large market for the oil produced.

It has been conservatively estimated that **£35.5bn** of UK pension assets are invested in shares in UK oil and gas companies.⁶

BP plc

\$10bn is set to be invested in BP's Sunrise tar sands project.

BP also plans to spend another **\$2.5bn** converting a refinery in Toledo, Ohio, so that it can process the synthetic crude oil produced from the tar sands.

BP's capital investment was over **\$20bn** in 2009 and over **\$30bn** in 2008. By comparison, since 2005 BP has invested just **\$4bn** in alternative energy.⁷

Royal Dutch Shell plc

The **\$14bn** (£8.7bn) expansion of the Athabasca Oil Sands Project (60% owned by Shell) will raise its capacity to 255,000 bpd.

In 2008, Shell stated that tar sands made up one third of its global resources – 20bn barrels of dirty oil.⁸

Shell's annual capital investment for 2009 was **\$31bn-\$32bn**.⁹ By comparison, Shell's total investment in alternative energy in the five years to 2009 was just **\$1.7bn**.

2. *The Impacts of Canadian Oil Sands Development on the United States' Economy*, Canadian Energy Research Institute, October 2009.

3. *Unconventional Oil: Scraping the bottom of the barrel?*, Co-operative Bank, Insurance and Investments and WWF, July 2008.

4. http://assets.wwf.org.uk/downloads/tipping_point_report.pdf

5. 2008 power sector emissions were 171 MtCO₂e, *Meeting Carbon Budgets – the need for a step change*, Progress report to Parliament, Committee on Climate Change, 2009.

6. This estimate is based on an Oil and Gas sector weighting of 21.2% in the FTSE 350 on 31 December 2008, and assumes that the £169bn UK equity share of UK pension fund investments reflects the make-up of the index.

7. BP Annual Review, 2009.

8. Shell March 2008 strategy update: Investing in new heartlands for oil.

9. Shell March 2009 strategy update: building new heartlands, managing recession challenges.

How much clean energy and transport does \$379 billion buy?

© Thomas Haugersveen / WWF-Norway & Arctic



Europe

Desertec solar supergrid

\$379bn could pay for the Desertec Industrial Initiative, linking new concentrated solar plants into a supergrid covering Europe, North Africa and the Middle East. It would cost £240bn and could supply 15% of Europe's electricity by 2050, as well as providing electricity to the provider countries.¹⁰

North Sea supergrid

£26.5bn could pay for a North Sea supergrid. This money would link nine North European countries' renewable energy projects (UK wind and wave, German solar, Norwegian hydro, Belgian wave, etc) via high voltage direct current undersea cables. It could act as a giant 30GW 'battery', via measures such as pumped storage of Norway's hydropower, for Europe's clean energy. It would store electricity when demand is low and be a major step towards a continent-wide supergrid.¹¹

European electric transport

\$379bn could fund infrastructure for a Europe-wide system of electric vehicles and subsidise sales of electric vehicles. This would not only create a low-carbon personal transport system but would reduce the demand for oil. For example **£30m** will pay for 11,000 vehicle charging points.¹² With **£254bn** you could provide 93 million charging points across Europe.

European Wind Power

\$379bn would help to fund wind power investment in the EU, from now to 2025. The EU targets for wind energy are 20% of electricity demand by 2020 and 34% electricity demand by 2030.¹³ Annual investment needs to increase from **€11bn** in 2008 to **€23.5bn** in 2020, and just below €25bn annually in the decade to 2030. If the targets are met, the wind energy sector will employ 446,000 people by 2020, and annual CO₂ emissions avoided by using wind energy will increase to 113 Mt in 2010, 333 Mt in 2020 and 599 Mt in 2030 (compared to total UK power sector emissions of 171MtCO₂ in 2008).¹⁴

UK

\$379bn could transform the UK's power sector. A report from Policy Exchange states that £264bn (\$394bn) of investment in UK low-carbon energy infrastructure is needed to meet the target of 15% renewable energy by 2020.¹⁵

This includes:

- Renewables – £136bn
- Investment in networks – £65bn
- Replacement requirement – £42bn
- Energy efficiency – £21bn

The UK needs to transform its energy sector in order to meet its carbon emissions reduction targets. Paying for this transformation is a huge financial challenge. Finance needs to be made available rapidly and on a huge scale. The transformation will save 755 MtCO₂ between now and 2030 (compared to UK power sector emissions of 171 MtCO₂ in 2008) and will help create up to half a million more jobs in the UK renewable energy sector.¹⁶

As the Stern Review found, the costs of doing nothing and having to deal with runaway climate change could be as high as 20% of global GDP, far outweighing the costs of decarbonising the energy sector and wider economy.¹⁷

10. www.guardian.co.uk/environment/2010/jan/03/european-unites-renewable-energy-supergrid and www.desertec.org/en/

11. www.guardian.co.uk/environment/2010/jan/03/european-unites-renewable-energy-supergrid and <http://image.guardian.co.uk/sys-files/Environment/documents/2010/01/04/WINDFARMS20410.pdf>

12. www.edie.net/news/news_story.asp?id=17716

13. www.ewea.org/fileadmin/ewea_documents/documents/publications/reports/Pure_Power_Full_Report.pdf

14. *ibid*

15. Dieter Helm, James Wardlaw and Ben Caldecott (2009) *Delivering a 21st Century Infrastructure for Britain* (Policy Exchange).

16. www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/renewable/res/res.aspx

17. Stern, N (2007): 'The Stern Review: Economics of Climate Change', Cambridge University Press.

Eco-upgrade for UK homes

\$379bn could pay for a £10,000 eco-upgrade for every home in the UK¹⁸ – currently 25 million homes¹⁹. This would include loft and cavity wall insulation, solid wall insulation, smart meters and micro-renewable energy generation such as heat pumps. UK homes emitted 140 MtCO₂ in 2007.²⁰

United States

For wind power to meet a target of supplying 20% of US electric power by 2030, its capacity would have to reach more than 300 GW. This is an increase of more than 290 GW within 23 years.²¹

\$379bn would meet the total construction cost for the 251GW of onshore wind power needed to meet the target.

In the decade up to 2030, the US wind industry could provide 150,000 jobs directly and support 500,000 jobs. It could also reduce power sector emissions by 825 MtCO₂ in 2030.²²

In his 2009 budget, President Obama announced \$150bn of investment (\$15bn per year for 10 years) in clean energy including wind, solar and geothermal power, and clean coal technology.²³

Canada

Emissions from tar sands production make it impossible for Canada to reach its own emissions reduction targets under the Kyoto Protocol. Investing money in renewable energy, efficient transport, and other emissions-reducing projects could create new jobs and help remove the tag of 'Climate Fossil' from Canada.²⁴

• **\$14bn** (Canadian Dollars) of investment is needed for conversion to smart grids across Canada, new transmission lines within provinces and increased transmission capacity between Québec and Ontario.²⁵

• **\$77bn** (Canadian Dollars) of investment would pay for expansion of urban transit, mostly rail, across Canada; as well as new high speed intercity train systems for Québec City–Windsor, Edmonton–Calgary and Vancouver–Seattle.²⁶

Ontario has signed a **\$7bn** (Canadian Dollars) deal with a consortium led by Samsung to develop 2,000 MW of wind power and 500 MW of solar power in the province.²⁷ The projects will triple Ontario's renewable wind and solar power, providing electricity to more than 580,000 households. Some 16,000 new green energy jobs will be created.

The wind and solar projects will displace 40 MtCO₂ over their lifetime compared to what would be emitted by equivalent gas-fired generation. This is equivalent to removing every car from the roads of Ontario for one year.²⁸



© Claire Doole / WWF-Canada



© iStockphoto

18. Warm Homes, Greener Homes: A Strategy for Household Energy Management (www.decc.gov.uk/en/content/cms/what_we_do/consumers/saving_energy/hem/hem.aspx)
 19. www.statistics.gov.uk/cci/nugget.asp?id=1866
 20. *Committee on Climate Change, Meeting carbon budgets: the need for a step change, 2009.*
 21. www.nrel.gov/docs/ty08osti/41869.pdf
 22. www.awea.org/pubs/factsheets/20percent_Wind_factsheet.pdf
 23. www.whitehouse.gov/issues/energy-and-environment www.whitehouse.gov/the_press_office/Remarks-by-the-President-in-Newton-IA/
 24. http://www.davidsuzuki.org/files/reports/Climate_Leadership_Economic_Prosperty_-_Web.pdf
 25. *ibid*
 26. *ibid*
 27. www.premier.gov.on.ca/news/event.php?ItemID=10655&Lang=En
 28. <http://news.ontario.ca/mei/en/2010/01/backgrounder-2010i121.html>

What could \$379bn pay for in terms of international development?



© Brent Stirton / Getty Images

Millennium Development Goals

The Millennium Development Goals (MDGs) are eight targets which include halving extreme poverty, halting the spread of HIV/AIDS, and providing universal education. The MDGs, which are due to be achieved by 2015, are drawn from the actions and targets contained in the Millennium Declaration that was adopted by 189 nations and signed by 147 heads of state and governments during the UN Millennium Summit in September 2000.

If redirected into development, the **\$379bn** the oil industry wants to invest in tar sands could make a huge contribution to meeting the MDGs. It could:

- provide every child globally with a place in primary education between now and 2015 (MDG2)

and

- halve the proportion of people in the world living without sustainable access to both improved water supply and improved sanitation by 2015 (MDG7)

and

- rapidly move towards meeting the health-related MDGs (reduce child mortality (MDG4), improve maternal health (MDG5) and combat HIV/AIDS, malaria and other major diseases (MDG6)) in the 49 lowest-income countries.

Universal primary education (MDG 2)

According to Action Aid, universal primary education would cost \$10bn a year.²⁹ So between now and 2015, the cost of providing every child with a primary education would be **\$60bn** including those 101 million children of primary school age currently not in education.³⁰

Health MDGs (MDGs 4, 5 & 6)

The World Health Organisation (WHO) estimates the cost of achieving the health-related MDGs at **\$232bn** over six years (2010-2015)³¹ in the 49 lowest-income countries. According to the WHO report, making these additional resources available would avert four million child deaths annually, 193,000 maternal deaths, 193,000 adult HIV deaths and 265,000 tuberculosis deaths would also be averted.

Water and sanitation (MDG 7)

The WHO and Gutmacher Institute have estimated the cost of halving the proportion of people without sustainable access to both improved water supply and improved sanitation at around \$13bn annually, or **\$78bn** between 2010 and 2015. This level of investment would mean, for example, over 1.6 billion people would gain access to improved sanitation.³² Furthermore, incidences of diarrhoea would be reduced by 10%.³³

Clean Development Mechanism (CDM)

\$24bn (the combined investment in BP's Sunrise and Shell's Athabasca project) is the same as the combined value of all tradable emissions credits in the United Nations CDM in 2009.³⁴ The CDM is designed to stimulate sustainable development and emissions reductions. It enables emission reduction projects in developing countries to earn certified emission reduction credits (CERs) for each tonne of CO₂ saved. These credits can be traded and sold and are used by industrialised countries to meet some of their emissions reduction targets. It is expected to produce CERs representing 2.7bn tonnes of CO₂ equivalent between 2008 and 2012.³⁵

29. www.actionaid.org.uk/304/our_approach.html

30. www.childinfo.org/education_outofschool.php

31. WHO, Constraints to Scaling Up Health Related MDGs: Costing and Financial Gap analysis, available at www.who.int/choice/publications/d_ScalingUp_MDGs_WHO_report.pdf

32. Since 1990, the number of people in developing regions using improved sanitation facilities has increased by 1.1 billion. However, some 2.5 billion people still live without access to improved sanitation, of which 1.6 billion must gain access by 2015 in order to meet the Millennium Development Goal to halve the proportion of people without access to sanitation. UN (2008) *The Millennium Development Goals Report*.

33. WHO and Gutmacher Institute, *Costs and benefits of water and sanitation improvements at the global level: Executive summary*, available at www.who.int/water_sanitation_health/wsh0404summary/en/index.html Cost adjusted for inflation to 2010 prices using the US government converter at data.bls.gov/cgi-bin/cpicalc.pl

34. Jeff Coelho, 'Angola eyes 15 UN-backed offset projects', PointCarbon, 05 March 2009.

35. <http://cdm.unfccc.int/about/index.html>

Acknowledgements

The report was written by Robert Nash of WWF-UK, with contributions from Ben Norbury and Hannah Newcomb of The Co-operative.

The **co-operative**

www.goodwithmoney.co.uk/toxicfuels

The Co-operative

New Century House
Corporation Street
Manchester
M60 4ES
T: 0161 827 6172

The mission of WWF is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by:

- conserving the world's biological diversity
- ensuring that the use of renewable natural resources is sustainable
- reducing pollution and wasteful consumption

wwf.org.uk/what_we_do/campaigning/toxic_fuels/



for a living planet

WWF-UK

Panda House, Weyside Park
Godalming, Surrey GU7 1XR
t: +44 (0)1483 426444
f: +44 (0)1483 426409