

## **The case against BP and its tar sands plans**

*Greenpeace UK, May 2010*

### **Introduction**

Within the next year, BP will decide whether to invest billions of pounds in a highly controversial oil project in Canada. The venture, called Sunrise, will exploit the vast tar sands reserves that lie under the pristine wilderness of Alberta in the west of the country.

The exploitation of tar sands oil is already one of the largest industrial projects on the planet and has created disfiguring scars and toxic lakes that can be seen from space. As well as the environmental destruction on the ground, the production methods involved require vast amounts of energy, making tar sands oil one of the dirtiest, most carbon intensive sources of oil on the planet. In addition, many indigenous First Nations communities are taking legal action against oil developers in Alberta, and there remain significant uncertainties around the long term profitability of the tar sands business model itself.

The potential for increasing development of the tar sands raises fundamental questions about our relationship with oil and energy and our willingness to overcome global challenges like climate change. If the tar sands are fully exploited our chances of stopping catastrophic global warming will be significantly, perhaps fatally, undermined.

### **What are tar sands and how big are Canada's reserves?**

Tar sands are deposits of sand and clay saturated with bitumen that, through highly energy intensive methods, can be extracted and refined to make petroleum products. The world's most significant tar sands deposits are found in Alberta, which contain the equivalent of 173 billion barrels of oil, a reserve second only in size to that of Saudi Arabia.<sup>1</sup> In 2009, tar sands production reached 1.3 million barrels per day (b/d).<sup>2</sup>

### **How is the oil extracted?**

Because tar sands oil is actually bitumen, a solid or semi-solid form of oil, and is mixed with sand and clay, producing a barrel of oil from it is highly energy intensive emitting on average three times more greenhouse gases than the extraction of a barrel of conventional oil.<sup>3</sup>

There are two methods of extraction: mining and in situ. Where the bitumen is close to the surface, generally at depths of less than 100 metres, the reserves are mined. This involves excavating the bitumen out of the ground in an open cast mine. The land is cleared and the bitumen soaked earth is dug out with giant mechanical shovels and loaded into trucks to be taken to a separation plant. It takes on average two tonnes of mined tar sands to extract a barrel of bitumen. Only about 20% of the ultimately recoverable tar sands are in deposits shallow enough to be mined.

More deeply buried bitumen requires drilling wells to pump it out, using steam to liquefy the bitumen. This is called in situ production and the two main methods are cyclic steam stimulation (CSS) and steam assisted gravity drainage (SAGD). These use steam to fluidise the bitumen and therefore require steam generating plants, a large number of wells, often spread out in groups known as pads, and an extensive network of roads and pipelines.

Once the bitumen has been extracted (and separated from the sand and clay in the case of mining) it needs to be diluted with solvents or lighter oils in order to be piped to an upgrader. Upgrading is the process of converting bitumen into synthetic crude oil, or syncrude, which can then be refined into petroleum products.

All bitumen produced from tar sands needs to be upgraded before it can be refined into traditional petroleum products. This has primarily been carried out in dedicated upgraders in Alberta with the resultant syncrude piped to refineries to be further processed into petroleum products. However, increasing quantities of diluted bitumen (dilbit) are being shipped to complex refineries in the US, where it is upgraded and refined in the same plant. This is currently BP's preferred method as it

has invested billions of dollars re-fitting its Whiting refinery in Indiana to handle dilbit and other heavy sour blends, and it is planning a similar re-fit at its Toledo, Ohio refinery (see below).

Whether it is upgraded and refined in a two-step or one-step process, the process of converting bitumen into petroleum products is significantly more energy intensive than the refining of lighter conventional oils.<sup>4</sup>

### **What is BP?**

BP is one of the world's biggest oil and gas companies, employing over 80,000 people in more than 80 countries.<sup>5</sup> In 2009 it enjoyed pre-tax profits of more than \$26 billion, produced nearly 4 million barrels of oil and gas per day and maintained proven reserves of more than 18 billion barrels of oil and gas.<sup>6</sup> BP's size, global reach and high profile afford it significant influence on energy policy, particularly in Europe and North America.

### **What is BP's current involvement with the Canadian tar sands?**

BP is currently the only major international oil company without an active tar sands project. However in 2007, the company announced a joint venture with the Canadian oil company Husky to develop the Sunrise SAGD project.<sup>7</sup> This development marks a u-turn from the company's previous policy to steer clear of tar sands production.<sup>8</sup> The companies are expected to make a final investment decision on Sunrise in the second half of 2010.

In early 2010, BP made two new separate deals to develop more tar sands projects. It is now clear that BP regards tar sands production as a major part of its future.

### **What is BP planning in Alberta?**

BP has plans for three tar sands projects in Alberta and over the next few years could spend billions of dollars creating the infrastructure needed to extract and process the bitumen. The three planned projects all expect to utilise SAGD technology. They are:

#### *1) Sunrise*

Sunrise is a 23,000 hectare site 60km northeast of Fort McMurray in Alberta with probable reserves of 3.7 billion barrels.<sup>9</sup> In 2007, BP did a deal with Husky energy to exchange a 50% stake in its Toledo refinery in Ohio for a 50% stake in Sunrise.<sup>10</sup> The Toledo refinery will upgrade and refine Sunrise production. BP chief executive, Tony Hayward, described the deal as *'an opportunity to build a strategic, material position and the huge potential of Sunrise is the ideal entry point for BP into Canadian oil sands'*.<sup>11</sup>

Sunrise is currently scheduled to start production in 2014 with an initial capacity of 60,000 b/d increasing to 200,000 b/d as the site is developed.<sup>12</sup> A final investment decision is expected in the second half of 2010.

#### *2) Terre de Grace*

This 74,000 hectare site northwest of Fort McMurray could contain up to 1 billion barrels of oil.<sup>13</sup> In March 2010, BP purchased a 75% stake in the field from Value Creation for \$900 million.<sup>14</sup>

#### *3) Kirby*

Kirby is a 90,000 acre site in southern Athabasca that has been in BP's portfolio since the 1990s. In March 2010, BP sold a 50% stake in Kirby to Devon Energy for \$500m, a move that has brought the development of the site into play.<sup>15</sup> Devon has a SAGD project up and running on a neighbouring site and BP regards it as *'an experienced operator in the Canadian oil sands with a proven track record of in situ development and production'*.<sup>16</sup>

Production from the Kirby project is likely to be upgraded and refined at BP's Whiting, Indiana refinery.<sup>17</sup> BP is investing \$3.8 billion in re-fitting Whiting to handle tar sands crude. The project started in 2008 and is scheduled to complete in 2012.<sup>18</sup> Law suits and protests have accompanied the re-fit, with the Indiana regulators accused of a lax approach to the company's projected increases in both air and water pollution.<sup>19</sup> A senior attorney for the Natural Resources

Defense Council told the Chicago Tribune in October 2009, "*BP has been playing games with the numbers (...) but the jig is up.*"<sup>20</sup>

### **Why is BP targeting tar sands oil now?**

In recent years, international oil companies (IOCs) such as BP have seen their access to conventional oil reserves decline. This is the result of the exhaustion of oil fields in areas such as the North Sea and the USA as well as the continued protectionism of oil producing countries such as Russia, Venezuela and those in the Middle East. With new reserves of conventional oil hard to come by, the appeal of unconventional oil, like tar sands, has been growing. While tar sands production is a very energy and capital intensive source of oil, it appeals to IOCs because ground access is relatively straightforward and the Canadian national and regional governments provide a safe regulatory environment in which to work.

BP claims tar sands production represents a sound investment which it can not avoid if it is to maintain the company's position as a leading oil producer. Yet the inevitability of tar sands production is far from clear. While Shell has nearly a third of its total resources in the tar sands, partly as a result of purchases made three to four years ago, it has recently expressed greater caution about developing these resources. Shell Chief Executive Peter Voser, recently told the Financial Times that the company's development of tar sands will be '*very much slower*' than in recent years and that it had '*clearly scaled down*' its earlier plans.<sup>21</sup> Voser cited rising infrastructure costs and the existence of better opportunities elsewhere as justification for his new found caution over tar sands.<sup>22</sup>

Yet, in the last year, BP has been increasingly bullish about the prospects of tar sands.<sup>23</sup> Greenpeace recently met with senior BP executives who claimed to be able to make tar sands oil profitable at \$45 a barrel, with well-to-wheel CO<sub>2</sub> emissions only 5-15% higher than that from conventional oil production – claims which are at odds with the views of the rest of oil industry<sup>24</sup>, most industry analysts<sup>25</sup> – who look for prices at least \$20 per barrel higher – and the peer reviewed scientific literature, which cites much higher emissions.<sup>26</sup>

BP is going out on a limb on tar sands, gearing up for a big expansion at precisely the moment its competitors are having second thoughts. More recently, ConocoPhillips sold off a major stake in its Canadian tar sands project for \$4.7bn because, according to analysts, '*oil sands is just not a big part of the company right now*'.<sup>27</sup>

### **But isn't BP 'beyond petroleum' these days?**

It would like to have us believe it is. In fact, BP is all about oil and gas and wants to develop one of the dirtiest, most carbon intensive sources of oil available. It is also behind one of the most hypocritical marketing ploys of modern times. In 2000 the company spent millions rebranding itself, moving from British Petroleum to 'Beyond Petroleum' in one fell swoop.<sup>28</sup> Since then it has spent a huge amount of money marketing itself as a clean energy company and upstanding corporate citizen.<sup>29</sup> Yet ten years on, BP's overriding interest remains in carbon intensive oil.

Today clean energy accounts for only 1% of BP's revenues while less than 5% of its capital spending goes on renewable technologies.<sup>30</sup> Why is this? Because BP believes it '*cannot pretend that fossil fuels can be switched off...or that renewable energy will suddenly snowball like the internet did a decade ago*'.<sup>31</sup> As one former executive said, '*oil and gas are in the company's DNA*'.<sup>32</sup> The company's investments in renewable and other clean technologies have fallen from \$1.4bn when Hayward took over in 2007, to less than \$1bn in 2010<sup>33</sup> and it intends '*to play a central role in meeting the world's continued need for hydrocarbons*'.<sup>34</sup> Hayward recently summed up BP's take on clean energy when he told a group of Business students at Stanford University that when he took over the company there were '*too many people (in BP) that were working to save the world*'.<sup>35</sup>

### **BP says tar sands are not that carbon intensive. What's the problem?**

BP claims that the well-to-wheel emissions from the gasoline produced at its Sunrise project may only be 5-15% higher than the average consumed in the US.<sup>36</sup> But the reality is that emissions from the project will be much higher than that from average conventional crude oil production. Pressure from BP's shareholders over Sunrise<sup>37</sup> has perhaps caused the company to turn to

unreliable data for its claims about the project's emissions. These claims run counter to the independent peer reviewed literature on tar sands emissions as well as assessments made by the Canadian and US governments.

Greenpeace bases its claims on tar sands carbon intensity on a 2009 peer reviewed paper that reviews 13 previously published studies comparing emissions from tar sands production and conventional production.<sup>38</sup> Using the range of figures in this paper, we calculated an average increase between conventional oil production and tar sands production of 195% (just under three times) for well-to-refinery emissions and 17% for well-to-wheel emissions.

BP's claims are based on two studies commissioned by the Albertan government published in July 2009. Based on the results of these, the government claimed that well-to-wheel emissions for tar sands derived fuels are '*comparable to other crude oils*'.<sup>39</sup> The government further claimed that '*emissions from the oil sands are generally about 10% higher than direct emissions from other crudes in the US*'.<sup>40</sup>

However the assertion that these reports are more accurate than extensive studies carried out by both the US and Canadian governments lacks credibility. These studies suggest that the well-to-wheels figure is between 13 and 27%.<sup>41</sup> The Alberta commissioned reports used a small selection of conventional crude oils for comparison, a significant proportion of which were heavy crude oils, which have higher emissions than other conventional oils. In contrast, the government studies use a larger number of different crude oils which more accurately reflect the range of crude oil consumed in the US.

While the Albertan studies were weighted towards dirtier conventional production, some of the tar sands projects studied were in fact not yet in operation. Using theoretical data from proposed projects rather than actual operations data is a tactic not used in any other study and significantly skews the results towards theoretical best practise. If we accept such tactics we could equally skew the figures the other way by discounting Nigerian oil production emissions significantly as *in theory*, the high levels of gas flaring associated with Nigerian oil production can be greatly reduced and has been proposed.<sup>42</sup> This would serve to make Nigerian emissions figures much lower and consequently the percentage increase for tar sands emissions would widen. Any comparison of theoretical best practice should surely apply to all the examples in a study.

BP should present actual project data before it makes claims suggesting its project is going to be more efficient than similar projects already in operation. While the world desperately needs to cut GHG emissions, tar sands production undeniably makes oil production dirtier. BP's efforts to trivialise this are a distasteful example of blatant self-interest.

**But BP states it will use the SAGD method and claims this is much more environmentally sound than mining.**

SAGD is an in situ method of tar sands oil extraction that involves the continuous pumping of steam into the reservoir through one pipe while pumping the fluidised bitumen to the surface via an adjacent one. While its impact on habitat is less brutal than strip mining it does still have a significant impact and its GHG intensity is in fact higher than tar sands mining.

Creating the steam for SAGD consumes huge quantities of natural gas. It is primarily the steam-to-oil ratio – the amount of steam needed to produce a unit of oil – that determines the amount of natural gas needed and the associated greenhouse gas (GHG) emissions. SAGD tar sands production is among the most GHG intensive forms of oil extraction commercially operating today.<sup>43</sup>

SAGD production also has significant impacts on habitat as a result of the large scale infrastructure required, which involves steam generating plants, a large number of wells, often spread out in groups known as pads, and extensive networks of roads and pipelines. Research by the Canadian think-tank, the Pembina Institute, found that in situ projects effectively cut the forest up into small fragments that are unable to sustain many wide ranging species.<sup>44</sup>

According to scientists from the Canadian Parks and Wilderness Society (CPAWS) and the Pembina Institute, the *'projected development of Alberta's deep (in situ) oil sands will drive many boreal wildlife species, including caribou, lynx, marten and some forest bird species to local extinction'*.<sup>45</sup> Some 35,000km<sup>2</sup> of boreal forest has already been leased for deep tar sands development, and CPAWS says that, *'it now seems clear that the only real hope for maintaining biodiversity is to place a moratorium on out of control oil sands lease sales and to implement regional land use planning that limits the pace of development and includes the designation of large wildlife reserves where industrial activities are prohibited'*.<sup>46</sup>

### **Can we develop tar sands and stop climate change?**

BP claims that its development of tar sands oil is compatible with its *'commitment to sustainability'*.<sup>47</sup> BP says that it helps *'the world meet its growing need for heat, light and mobility. (...) by producing energy that is affordable, secure and doesn't damage the environment'*.<sup>48</sup>

But these are empty claims. BP is going into the tar sands aware that if we are to tackle global climate change we will not need tar sands oil. This is because to achieve climate stability we need to reduce not increase global consumption of oil. Doing so would likely make tar sands unprofitable. With effective international action on GHG reduction tar sands production will never grow to the heights that BP's plans suggest.

When questioned by shareholders about the implications of this for the Sunrise project, BP's response was to quote energy demand projections that correspond directly with the International Energy Agency's (IEA) 2009 Reference Scenario. It is clearly this scenario that BP bases its business plan on.

Unfortunately, the IEA warns that its Reference Scenario, which is a projection of energy supply and demand under a business as usual case in terms of government action on GHG emissions, would *"almost certainly lead to massive climatic change and irreparable damage to the planet"*.<sup>49</sup> It explains that *"these Reference Scenario trends have profound implications for environmental protection, energy security and economic development. The continuation of current trends would have dire consequences for climate change. (...) taking us towards a concentration of greenhouse gases in the atmosphere in excess of 1000 parts per million (ppm) of CO<sub>2</sub>-equivalent"*.<sup>50</sup> It further warns that, *"without a change in policy, the world is on a path for a rise in global temperature of up to 6°C, with catastrophic consequences for our climate"*.<sup>51</sup>

The IEA also publishes a 450ppm scenario which it asserts would avert the worst effects of climate change. In this scenario fossil fuel consumption and its associated GHG emissions peak by 2020.<sup>52</sup> US oil demand in 2030 is predicted to be 30% less than it was in 2007<sup>53</sup> and the contraction in oil demand is expected to impact tar sands production particularly hard.<sup>54</sup>

So while BP asserts that it is simply meeting energy demand the best it can, it would appear that the level of demand it foresees will only occur in a world that fails to prevent catastrophic climate change.

### **But doesn't BP support action to prevent climate change?**

BP is actively campaigning against legislation that will reduce GHG emissions because it is concerned this will lead to a reduction in demand for its products. BP is a member of the American Petroleum Institute, an oil industry organisation heavily involved in undermining international action on climate change and promoting the 'astroturfing' movement in the US.<sup>55</sup> Through front groups like the Consumer Energy Alliance, BP has worked with organisations that have actively lobbied against action on clean energy, to promote grass roots support for new offshore drilling around the USA.<sup>56</sup> More recently, BP was exposed as being involved in legal action taken by the National Petrochemical & Refiners Association aimed at stopping California implementing low carbon fuel legislation that would in effect rule out the use of tar sands oil.<sup>57</sup> BP also dropped out of a coalition of business groups that had been pressing the US Congress to pass climate change laws.<sup>58</sup>

## **But the tar sands aren't a major source of GHGs**

Tar sands production is the fastest growing source of GHG emissions in Canada and is cited as a key contributor to Canada's failure to achieve its Kyoto Protocol commitments.<sup>59</sup> Canada's emissions rose by 26.2% between 1990 and 2007 and in 2007 were a full 32.2% above its Kyoto target.<sup>60</sup> Some 44% of the projected increase in Canada's GHG emissions between 2006 and 2020 is expected to derive from new tar sands projects.<sup>61</sup>

The expansion of oil production in the region is also having an impact beyond Canada's border as was seen during the Copenhagen climate summit when Canada was one of the countries blocking progress. The choice for Canada appears simple. Either constrain tar sands production or undermine international action to prevent catastrophic climate change. Canada consistently chooses the latter.

Public support for action on emissions remains strong even in Alberta, the province that has most to gain economically from the tar sands. A public opinion poll conducted by Probe Research in 2007 showed that 92% of Albertans polled felt that tar sands companies should reduce GHG emissions at all their facilities.<sup>62</sup> The same poll showed that 70% of Albertans felt that absolute reductions in GHGs were appropriate, compared with the 20% of Albertans polled who preferred targets that reduced only the intensity of GHG emissions per barrel.

## **But surely we need to develop every source of oil to meet our future energy demands?**

BP claims that world energy demand is growing so fast that tar sands are vital to help ensure fuel supplies are substantial enough to keep cars on the road. The basis for this is that, according to the IEA, *'world energy demand is projected to increase by around 40% between 2007 and 2030 with fossil fuels still satisfying as much as 80% of that demand by the end of that period'*.<sup>63</sup>

In addition, BP expects supplies of conventional oil to fall, implying that the slack will have to be taken up by unconventional oils, such as tar sands: *'meeting the increase in demand for oil and replacing supplies from mature fields will require the industry to find 60 million barrels a day of new production equivalent to almost double the level of output from the entire Middle East today'*.<sup>64</sup> So as demand for oil grows, while the supply of conventional oil falls, BP hopes the price of oil will remain consistently high enough to make tar sands viable.

The first problem with these assumptions is that they do not take into account the actions that will be necessary to prevent catastrophic climate change. As mentioned above, the IEA scenario in which world energy demand grows by 40% and fossil fuels satisfy 80% of energy demand is one which cannot be allowed to materialise. In a scenario that prevents catastrophic climate change these figures are significantly reduced and much of the tar sands will have to be left in the ground.<sup>65</sup>

The second problem lies in the market reaction to the high oil prices that tar sands are a symptom of. It would appear that high oil prices are unsustainable and lead to a decrease in demand for oil. While tar sands production is the most expensive in the world, its growth is significantly threatened by any slowdown in oil demand.

Tar sands production involves some of the highest capital and operating costs in the industry, making it the most expensive source of oil worldwide. As such, future projects can only come on stream if oil prices stay high. The minimum price of oil needed to support new tar sands projects in Canada, for example, is often cited as being between \$80 and \$90 per barrel.<sup>66</sup> One forecast has placed the long term oil price needed for production growth at more than \$120 per barrel.<sup>67</sup>

The assumption that the global economy will sustain oil prices on an inexorable upward curve appears misguided. High oil prices cause a slowdown in economic activity and thereby suppress oil demand.<sup>68</sup> High oil prices also increase the take up of new technologies that use oil more efficiently and encourage consumers to switch to alternatives and more efficient patterns of use. Compounding this is the effect that high oil prices have on the energy policies of economies that are dependent on imported oil.<sup>69</sup>

Concerned about high oil prices and energy security, countries such as China and the US are starting to tackle the issue of excessive dependence on oil. For the US in particular, this means addressing the extreme inefficiency with which oil is used in transportation in that country as well as diversifying a proportion of transportation to other sources of energy such as electricity. Some

progress has already been made in this regard and as a result projections for oil demand in the future have been significantly revised in recent years. As new technologies gain ground these forecasts could be revised further.<sup>70</sup>

There is therefore a growing consensus that oil demand in developed countries has peaked.<sup>71</sup> There is also fervent debate about how far the burgeoning growth in oil demand in developing countries will go.<sup>72</sup> So the assumption that we will need ever growing quantities of tar sands oil to meet burgeoning demand and make up for dwindling supplies makes sense neither for the climate nor for the economy. In contrast investments in efficiency and clean energy production would appear to make much better sense for a world that has to reduce its oil consumption to survive.

### **BP claims there has been full consultation with First Nations communities, so does Sunrise have local approval?**

A recent study of company practice has found that not a single company operating tar sands projects has adopted the principles of free prior and informed consent – in which local people are granted a formal role and some form of veto, with regard to decisions about local development projects – as a goal in its consultation process.<sup>73</sup>

In BP's response to shareholders concerned about the Sunrise project the company stated: '*Several local aboriginal communities have expressed interest in the project as local stakeholders. In 2003 Husky started consultation activities with stakeholders through public open houses and face-to-face meetings with interested parties.*'<sup>74</sup> Because Sunrise is a joint venture and Husky is the operator, BP will have little to do with the on-ground development. There are a number of ongoing lawsuits that seek redress for the failure of government and industry to consult, protect or provide adequate benefits for First Nations.<sup>75</sup>

### **What is happening with the BP oil spill in the Gulf of Mexico?**

On 20 April 2010 an explosion destroyed the Deepwater Horizon, an ultra-deepwater drilling rig in the Gulf of Mexico, 41 miles off the coast of Louisiana.<sup>76</sup> The rig, operated by TransOcean on behalf of BP, was drilling in 1500m of water. The explosion killed 11 workers and two days later the rig sank.<sup>77</sup> On the sea bed, the ruptured well began leaking oil and gas.

Initially BP tried to play down both the size of the leak and its culpability. CEO Hayward said, '*it wasn't our accident,*'<sup>78</sup> whilst company officials said the amount of oil seeping from the ruptured pipe was only 1000 b/d.<sup>79</sup> Several days later the US coastguard estimated the size of the leak at 5000 b/d.<sup>80</sup> By mid-May it was suggested that it could be leaking as much as 70,000 b/d.<sup>81</sup>

Despite repeated attempts, BP was still unable to stop any more than a small percentage of the flow of oil as much as a month after the initial incident.<sup>82</sup> The millions of litres of crude oil threaten to cause an environmental and human catastrophe on a massive scale. The spill could have devastating implications for the delicate marine and wetland ecosystems of Louisiana,<sup>83</sup> whilst the economic effects could impact local communities for decades.<sup>84</sup> The disaster has already cost BP \$450m<sup>85</sup> and its share price has plummeted.<sup>86</sup> It is estimated the final bill could be billions of pounds<sup>87</sup> and attention is focussing on how BP allowed the incident to occur, especially with its long track record of penny pinching and poor safety.<sup>88</sup>

### **Endnotes**

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<sup>1</sup> Canadian Association of Petroleum Producers, June 2009. *Crude Oil: Forecasts, Markets & Pipeline Expansions*

<sup>2</sup> Ibid.

<sup>3</sup> Alex D. Charpentier, Joule A. Bergerson, and Heather L. MacLean. *Understanding the Canadian oil sands industry's greenhouse gas emissions*, in *Environmental Research Letters* 1 (2009)

<sup>4</sup> See for example: Department of Energy, National Energy Technology Laboratory, 27 March 2009. *An evaluation of the extraction, transport and refining of imported crude oils and the impact on life cycle greenhouse gas emissions*. Analysis uses an average for Canadian oil sands that includes pre-upgraded and dilbit. This averaged figure is an underestimate as the upgrading step of pre-upgraded sources is not included. Even so, Canadian oil sands comes out as 38% more energy intensive to process into diesel than the average US feedstock based on 2005 figures.

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- <sup>5</sup> BP Annual Review 2009
- <sup>6</sup> Ibid.
- <sup>7</sup> [www.huskyenergy.com/news/newsrelease.asp?ID=179](http://www.huskyenergy.com/news/newsrelease.asp?ID=179)
- <sup>8</sup> [http://business.timesonline.co.uk/tol/business/industry\\_sectors/natural\\_resources/article7018483.ece](http://business.timesonline.co.uk/tol/business/industry_sectors/natural_resources/article7018483.ece)
- <sup>9</sup> [www.huskyenergy.com/operations/upstream/oilsands/sunrise.asp](http://www.huskyenergy.com/operations/upstream/oilsands/sunrise.asp)
- <sup>10</sup> BP, 05 December 2007, *BP Enters Canadian Oil Sands with Husky Energy*.  
<http://www.bp.com/genericarticle.do?categoryId=2012968&contentId=7038865>
- <sup>11</sup> Ibid.
- <sup>12</sup> Husky Energy, 20 January 2010, Sunrise Oil Sands Project Update.  
<http://www.huskyenergy.com/news/2010/sunrise-oil-sands-project-update.asp>
- <sup>13</sup> Upstream Online, 27 April 2010, BP eyes Terre de Grace oil sands block.  
<http://www.upstreamonline.com/live/article213258.ece>
- <sup>14</sup> BP first quarter 2010 results. 27, April 2010.  
[http://www.bp.com/liveassets/bp\\_internet/globalbp/STAGING/global\\_assets/downloads/B/bp\\_first\\_quarter\\_2010\\_results.pdf](http://www.bp.com/liveassets/bp_internet/globalbp/STAGING/global_assets/downloads/B/bp_first_quarter_2010_results.pdf)
- <sup>15</sup> Calgary Herald, 11 March 2010. Devon's Kirby oilsands deal a game-changer for in situ: analysts  
[www.calgaryherald.com/business/Devon+Kirby+oilsands+deal+game+changer+situ+analysts/2671249/story.html](http://www.calgaryherald.com/business/Devon+Kirby+oilsands+deal+game+changer+situ+analysts/2671249/story.html)
- <sup>16</sup> CBC News, 11 March 2010, BP sells oilsands part interest to Devon.  
[www.cbc.ca/canada/calgary/story/2010/03/11/bp-devon-olisands.html?ref=rss](http://www.cbc.ca/canada/calgary/story/2010/03/11/bp-devon-olisands.html?ref=rss)
- <sup>17</sup> BP press release, 11 March 2010. *BP Enters Deepwater Brazil and Strengthens Core Portfolio*.  
<http://www.bp.com/genericarticle.do?categoryId=2012968&contentId=7060559>
- <sup>18</sup> BP, Whiting Refinery Modernization Project.  
[http://www.bp.com/liveassets/bp\\_internet/globalbp/STAGING/global\\_assets/bp\\_us\\_assets/downloads/a/abp\\_refineries\\_whiting\\_refinery\\_modernization\\_project.pdf](http://www.bp.com/liveassets/bp_internet/globalbp/STAGING/global_assets/bp_us_assets/downloads/a/abp_refineries_whiting_refinery_modernization_project.pdf)
- <sup>19</sup> The Chicago Tribune, 20 October, 2009, *Obama's EPA cracks down, orders more tests for BP refinery*.
- <sup>20</sup> Ibid.
- <sup>21</sup> Financial Times, 24 January 2010. Shell to look beyond tar sands.  
[www.ft.com/cms/s/0/f7283aa8-0927-11df-ba88-00144feabdc0.html?ftcamp=rss](http://www.ft.com/cms/s/0/f7283aa8-0927-11df-ba88-00144feabdc0.html?ftcamp=rss)
- <sup>22</sup> Ibid.
- <sup>23</sup> The Guardian, 04 February 2010, Tony Hayward: BP's straight-talking chief on evolution not revolution.  
[www.guardian.co.uk/business/2010/feb/04/tony-hayward-bp-interview](http://www.guardian.co.uk/business/2010/feb/04/tony-hayward-bp-interview)
- <sup>24</sup> See for example, *The Globe & Mail*, 28 April, 2010. *Shell puts oil sands expansion plans on hold*.
- <sup>25</sup> See for example, Goldman Sachs Research, November 2009, Canadian oil sands fieldtrip 2009: Key takeaways; and Deutsche Bank, Global Markets Research, October 2009, The Peak Oil Market.
- <sup>26</sup> See Charpentier et al, 2009
- <sup>27</sup> Houston Chronicle, 12 April, 2010. Oil sands sale brings more than expected.  
[www.chron.com/disp/story.mpl/business/6956022.html](http://www.chron.com/disp/story.mpl/business/6956022.html)
- <sup>28</sup> [www.bp.com/sectiongenericarticle.do?categoryId=9028308&contentId=7019491](http://www.bp.com/sectiongenericarticle.do?categoryId=9028308&contentId=7019491)
- <sup>29</sup> [www.bp.com/liveassets/bp\\_internet/globalbp/STAGING/global\\_assets/downloads/A/ALL\\_UK\\_heathrow\\_A\\_DS.pdf](http://www.bp.com/liveassets/bp_internet/globalbp/STAGING/global_assets/downloads/A/ALL_UK_heathrow_A_DS.pdf)
- <sup>30</sup> Financial Times, 08 July 2009, Back to Petroleum. [www.ft.com/cms/s/0/f5a06d86-6b57-11de-861d-00144feabdc0.html](http://www.ft.com/cms/s/0/f5a06d86-6b57-11de-861d-00144feabdc0.html)
- <sup>31</sup> [www.bp.com/genericarticle.do?categoryId=98&contentId=7057586](http://www.bp.com/genericarticle.do?categoryId=98&contentId=7057586)
- <sup>32</sup> Financial Times, 08 July 2009, Back to Petroleum  
[www.ft.com/cms/s/0/f5a06d86-6b57-11de-861d-00144feabdc0.html](http://www.ft.com/cms/s/0/f5a06d86-6b57-11de-861d-00144feabdc0.html)
- <sup>33</sup> Financial Times, 13 May, 2009. Sun sets on BP's solar hopes  
<http://www.ft.com/cms/s/0/d7b2a18e-3ff3-11de-9ced-00144feabdc0.html>
- <sup>34</sup> [www.bp.com/genericarticle.do?categoryId=98&contentId=7057586](http://www.bp.com/genericarticle.do?categoryId=98&contentId=7057586)
- <sup>35</sup> Financial Times, 08 July 2009, Back to Petroleum  
[www.ft.com/cms/s/0/f5a06d86-6b57-11de-861d-00144feabdc0.html](http://www.ft.com/cms/s/0/f5a06d86-6b57-11de-861d-00144feabdc0.html)
- <sup>36</sup> [http://www.bp.com/liveassets/bp\\_internet/globalbp/STAGING/global\\_assets/downloads/B/BP\\_Oil\\_Sands\\_Presentation\\_08022010.pdf](http://www.bp.com/liveassets/bp_internet/globalbp/STAGING/global_assets/downloads/B/BP_Oil_Sands_Presentation_08022010.pdf)
- <sup>37</sup> CBC News 15 April, 2010. BP feels oilsands heat from shareholders  
<http://www.cbc.ca/money/story/2010/04/15/bp-oilsands-shareholder-protest.html>
- <sup>38</sup> Alex D. Charpentier, Joule A. Bergerson, and Heather L. MacLean. *Understanding the Canadian oil sands industry's greenhouse gas emissions*, in Environmental Research Letters 1 (2009)
- <sup>39</sup> [www.albertainnovates.ca/media/15735/lca%20news%20release%20and%20backgrounder.pdf](http://www.albertainnovates.ca/media/15735/lca%20news%20release%20and%20backgrounder.pdf)
- <sup>40</sup> Ibid.

- 
- <sup>41</sup> See [http://switchboard.nrdc.org/blogs/sclefkowitz/studies\\_confirm\\_tar\\_sands\\_dirt.html](http://switchboard.nrdc.org/blogs/sclefkowitz/studies_confirm_tar_sands_dirt.html) Also, see Charpentier et al and [http://www.netl.doe.gov/energyanalyses/pubs/PetrRefGHGEmis\\_ImportSourceSpecific1.pdf](http://www.netl.doe.gov/energyanalyses/pubs/PetrRefGHGEmis_ImportSourceSpecific1.pdf)
- <sup>42</sup> All Africa.com 10 February 2010, Nigeria: FG Reiterates Commitment to End Gas Flaring. <http://allafrica.com/stories/201002110421.html>
- <sup>43</sup> See Charpentier et al.
- <sup>44</sup> The Pembina Institute, August 2006, Death by a Thousands Cuts: Impacts of in situ oil sands development on Alberta's boreal forest. <http://pubs.pembina.org/reports/1000-cuts.pdf>
- <sup>45</sup> <http://cpaws.org/news/archive/2006/08/death-by-a-thousand-cuts-impac.php>
- <sup>46</sup> Ibid.
- <sup>47</sup> [http://www.bp.com/liveassets/bp\\_internet/globalbp/STAGING/global\\_assets/downloads/B/BP\\_Oil\\_Sands\\_Presentation\\_08022010.pdf](http://www.bp.com/liveassets/bp_internet/globalbp/STAGING/global_assets/downloads/B/BP_Oil_Sands_Presentation_08022010.pdf)
- <sup>48</sup> [www.bp.com/liveassets/bp\\_internet/globalbp/STAGING/global\\_assets/downloads/W/what\\_we\\_stand\\_for.pdf](http://www.bp.com/liveassets/bp_internet/globalbp/STAGING/global_assets/downloads/W/what_we_stand_for.pdf)
- <sup>49</sup> International Energy Agency, *World Energy Outlook 2009*. p.168
- <sup>50</sup> [www.iea.org/weo/docs/weo2009/fact\\_sheets\\_WEO\\_2009.pdf](http://www.iea.org/weo/docs/weo2009/fact_sheets_WEO_2009.pdf)
- <sup>51</sup> Ibid.
- <sup>52</sup> International Energy Agency, *World Energy Outlook 2009*. p.195
- <sup>53</sup> Op Cit. P.332
- <sup>54</sup> Op Cit. P.216
- <sup>55</sup> [www.guardian.co.uk/business/2009/aug/19/oil-firms-warned-over-us-lobbying](http://www.guardian.co.uk/business/2009/aug/19/oil-firms-warned-over-us-lobbying) and [www.guardian.co.uk/environment/2009/aug/14/us-lobbying](http://www.guardian.co.uk/environment/2009/aug/14/us-lobbying)
- <sup>56</sup> <http://thinkprogress.org/wp-content/uploads/2010/05/ceapower.PPT>
- <sup>57</sup> [www.guardian.co.uk/business/2010/feb/14/oil-sands-ban-legal-challenge](http://www.guardian.co.uk/business/2010/feb/14/oil-sands-ban-legal-challenge)
- <sup>58</sup> [www.guardian.co.uk/environment/2010/feb/16/barack-obama-climate-change-laws](http://www.guardian.co.uk/environment/2010/feb/16/barack-obama-climate-change-laws)
- <sup>59</sup> [www.thestar.com/news/insight/article/729155--why-canada-failed-on-kyoto-and-how-to-make-amends](http://www.thestar.com/news/insight/article/729155--why-canada-failed-on-kyoto-and-how-to-make-amends)
- <sup>60</sup> [http://knowledge.allianz.com/en/globalissues/climate\\_change/top\\_climate\\_stories/g8\\_climatescorecards\\_2009\\_canada.pdf](http://knowledge.allianz.com/en/globalissues/climate_change/top_climate_stories/g8_climatescorecards_2009_canada.pdf)
- <sup>61</sup> Pembina Institute, March 2010. *Drilling deeper: the in situ oil sands report card*
- <sup>62</sup> <http://pubs.pembina.org/reports/OS-Undermining-Final.pdf>
- <sup>63</sup> [www.bp.com/liveassets/bp\\_internet/globalbp/globalbp\\_uk\\_english/set\\_branch/set\\_investors/STAGING/local\\_assets/downloads/pdf/IC\\_AGM\\_oil\\_sands\\_resolution.pdf](http://www.bp.com/liveassets/bp_internet/globalbp/globalbp_uk_english/set_branch/set_investors/STAGING/local_assets/downloads/pdf/IC_AGM_oil_sands_resolution.pdf)
- <sup>64</sup> Ibid.
- <sup>65</sup> International Energy Agency, *World Energy Outlook 2009*
- <sup>66</sup> Goldman Sachs Research, November 2009; and Deutsche Bank, Global Markets Research, October 2009
- <sup>67</sup> Canadian Energy Research Institute, 3 November 2009. Oil sands industry update: production outlook and supply costs 2009-2043, Media Brief
- <sup>68</sup> James Hamilton, *Causes and Consequences of the Oil Shock of 2007-8*. 'Brookings Papers on Economic Activity'. Available at: [http://www.brookings.edu/economics/bpea/~media/Files/Programs/ES/BPEA/2009\\_spring\\_bpea\\_papers/2009\\_spring\\_bpea\\_hamilton.pdf](http://www.brookings.edu/economics/bpea/~media/Files/Programs/ES/BPEA/2009_spring_bpea_papers/2009_spring_bpea_hamilton.pdf)
- <sup>69</sup> *The Beginning of the End for Oil? Peak Oil: A Demand-side Phenomenon?* Arthur D Little, February 2009. Available from [http://www.adl.com/reports.html?&no\\_cache=1&view=356](http://www.adl.com/reports.html?&no_cache=1&view=356) following free registration.
- <sup>70</sup> *Shifting Sands: how a changing economy could bury the tar sands industry*: [www.greenpeace.org.uk/files/pdfs/climate/shifting-sands-bpshell-rising-risks-update-2.pdf](http://www.greenpeace.org.uk/files/pdfs/climate/shifting-sands-bpshell-rising-risks-update-2.pdf)
- <sup>71</sup> Cambridge Energy Research Associates, 29 September 2009. *Peak oil demand in the developed world: it's here* [www.cera.com/aspx/cda/public1/news/researchHighlights/researchHighlights.aspx?CID=10635#10635](http://www.cera.com/aspx/cda/public1/news/researchHighlights/researchHighlights.aspx?CID=10635#10635)
- <sup>72</sup> Financial Times Energy Source, Kate Mackenzie, *China's fears about imported oil*. <http://blogs.ft.com/energy-source/2010/01/21/chinas-fears-about-imported-oil/>; and Arthur D Little, February 2009. *The beginning of the end for oil? Peak oil: a demand-side phenomenon?* Available from [www.adl.com/reports.html?&no\\_cache=1&view=356](http://www.adl.com/reports.html?&no_cache=1&view=356) following free registration
- <sup>73</sup> [www.ethicalfunds.com/en/Investor/ChangingTheWorld/HowWeWork/ResearchAndLobbying/Pages/LinesInTheSands.aspx](http://www.ethicalfunds.com/en/Investor/ChangingTheWorld/HowWeWork/ResearchAndLobbying/Pages/LinesInTheSands.aspx)
- <sup>74</sup> [www.bp.com/liveassets/bp\\_internet/globalbp/globalbp\\_uk\\_english/set\\_branch/set\\_investors/STAGING/local\\_assets/downloads/pdf/IC\\_AGM\\_oil\\_sands\\_resolution.pdf](http://www.bp.com/liveassets/bp_internet/globalbp/globalbp_uk_english/set_branch/set_investors/STAGING/local_assets/downloads/pdf/IC_AGM_oil_sands_resolution.pdf)
- <sup>75</sup> The Ytee, 28 April, 2008. Law Suit a Tar Sands Stopper? <http://theyee.ca/News/2008/07/28/LawSuit/>
- <sup>76</sup> BP Press Release 25 April, 2010. BP Forges Ahead With Gulf of Mexico Oil Spill Response <http://www.bp.com/genericarticle.do?categoryId=2012968&contentId=7061458>

- 
- <sup>77</sup> Reuters, 04 May, 2010. Factbox: Chronology of Gulf of Mexico oil spill.  
<http://www.reuters.com/article/idUSTRE6425MV20100504>
- <sup>78</sup> MSNBC News, 03 May 2010. Fire booms neglected in oil cleanup?  
[http://www.msnbc.msn.com/id/36912754/ns/us\\_news-environment/](http://www.msnbc.msn.com/id/36912754/ns/us_news-environment/)
- <sup>79</sup> Bloomberg, 24 April, 2010. BP says, 1,000 barrels of oil leaking daily from Gulf rig.  
<http://www.bloomberg.com/apps/news?sid=aLZRZdZg5TVo&pid=20601087>
- <sup>80</sup> BBC News, 29 April, 2010. US oil leak 'five times bigger'.  
<http://news.bbc.co.uk/1/hi/world/americas/8650728.stm>
- <sup>81</sup> NPR, 14 May, 2010. Gulf Oil Spill Far Exceeds Official Estimates.  
<http://www.npr.org/templates/story/story.php?storyId=126809525>
- <sup>82</sup> BP press release, Update on Gulf of Mexico Oil Spill Response, 18 May 2010.  
<http://www.bp.com/genericarticle.do?categoryId=2012968&contentId=7062184>
- <sup>83</sup> BBC News, 30 April, 2010. Oil slick threatens 'frightening' impacts  
[http://news.bbc.co.uk/1/hi/science\\_and\\_environment/10093904.stm](http://news.bbc.co.uk/1/hi/science_and_environment/10093904.stm)
- <sup>84</sup> <http://edition.cnn.com/2010/US/05/01/louisiana.oil.spill/index.html>
- <sup>85</sup> [http://www.google.com/hostednews/ap/article/ALeqM5iGgVQq-uQHlrMhFKLy\\_V0Hz\\_7XNwD9FM08MO0](http://www.google.com/hostednews/ap/article/ALeqM5iGgVQq-uQHlrMhFKLy_V0Hz_7XNwD9FM08MO0)
- <sup>86</sup> <http://www.guardian.co.uk/business/marketforceslive/2010/may/04/deepwater-horizon-oil-spill-bp-cleanup-costs-rising>
- <sup>87</sup> <http://www.dailymail.co.uk/news/worldnews/article-1278002/Gulf-Mexico-oil-spill-Obama-hit-BP-10bn-clean-bill.html>
- <sup>88</sup> <http://online.wsj.com/article/SB10001424052748703871904575216620922595624.html>