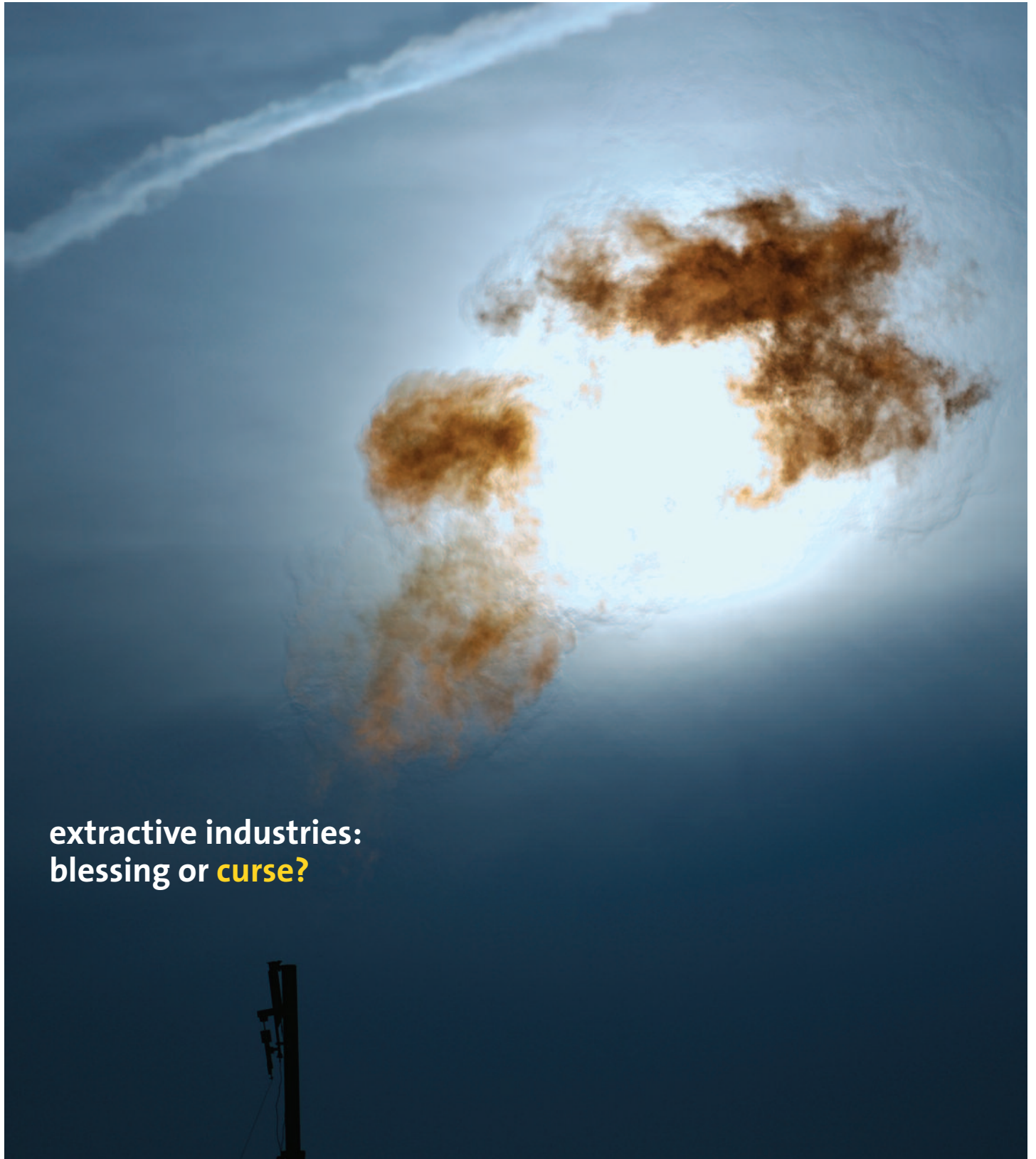


# Shell's Big Dirty Secret

Insight into the world's most carbon intensive oil company  
and the legacy of CEO Jeroen van der Veer



extractive industries:  
blessing or **curse?**

# Shell's Big Dirty Secret

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## executive summary



Shell barrels in Nigeria.  
© Elaine Gilligan, FOE EwNI

**Royal Dutch Shell plc, commonly known simply as Shell, is a multinational petroleum company. It is the second largest private sector energy corporation in the world. The company's headquarters are in The Hague, Netherlands, and London, UK. Its largest subsidiary is in the United States.**

It is the largest oil operator in Nigeria, and holds more acreage in Canada's oil sands than any other corporation. Because of these facts, and several others, Shell is also the most carbon intensive oil company in the world. In short, for every barrel of oil it produces in the future, Shell will contribute more to global warming than any other oil company.

This report documents Shell's record investment in dirty forms of energy, and it illuminates the corporate strategy and lobbying for regulations that indicate it intends to profit from that position for a long time to come.

Our key conclusions are:

- Shell holds more carbon in its resources, per barrel of future oil equivalent, than any other major international oil company. Shell is therefore the world's most carbon intensive oil company;
- The average carbon intensity of each barrel of oil and gas Shell produces is set to rise dramatically, increasing 85 per cent on today's figure;
- This sharp increase is caused by Shell's move into oil sands, its reliance on liquefied natural gas (LNG) and its continued gas flaring in Nigeria;
- Shell continues to expand investments in oil sands and oil shale, relying on the dirtiest technologies to establish itself as a leader in the industry;
- Shell has stopped its investments in renewables, except for biofuels, which pose a whole new set of environmental problems;
- Internal documents obtained in the discovery process of *Wiwa v. Shell* reveal that although Shell could have ended gas flaring in the early '90's, it decided it was more profitable not to;
- Shell continues to flare gas in Nigeria at levels which, according to its own figures, are only 12% less than those of 1999 after accounting for the reductions due to community unrest;
- Because of all of the above, Shell is more vulnerable to carbon pricing and subject to greater carbon risk than its peers.
- Therefore, Shell is leading industry lobby efforts in Washington, Brussels, and the United Nations Framework Convention on Climate Change to weaken and neuter legislation and regulation to tackle climate change;

## executive summary

This systematic approach reflects what Shell's one overriding priority is – profit and the maximization of value to its shareholders. This is not a crime. Far from it, this is the essence of management's fiduciary duty.

But a strict interpretation of profit maximization can lead to massive and costly mistakes, as has happened in Nigeria with gas flaring – and as is happening now globally with climate change.

Shell Nigeria's 1991 Performance Appraisal, revealed in this report for the first time, discussed the need for Shell to make "a reasonable return on investment to put out the flares rather than it being a cost to the oil sector". And because the community unrest, the deaths, and the local and global pollution caused by that flaring could not easily be quantified, Shell continued to flare gas in Nigeria, just as it does today.

Today, eighteen years later, if one were to quantify the financial, let alone the human, and environmental costs of that decision, there would be little question that gas flaring should have ended in 1991, and that it would have been worth the price for Shell to pay.

In those eighteen years, Shell has gone on a long and circuitous journey, much of it navigated by Shell's outgoing Chief Executive, Jeroen van der Veer, who joined the Shell Group's Board in 1997. Seeking to recover from the public relations disasters of 1995 (Brent Spar and Ken Saro-Wiwa), Shell crafted itself an image as a model of corporate social responsibility.

In the minds of many, that image still persists today. But the reality that is described in this report, and thus the legacy that van der Veer leaves, is of a cynical, short-sighted, and deceptive corporate strategy, particularly in regards to climate change.

***"If we continue burning fossil fuels as we do, we will have exhausted the carbon budget in merely 20 years and global warming will go well beyond two degrees."***

**Malte Meinshausen of the Potsdam Institute, April 30th, 2009.<sup>1</sup>**

On June 8, 2009 in a United States District court room in Manhattan, Royal Dutch Shell agreed to pay \$15.5 million to settle a case in which it had been charged with crimes against humanity surrounding its role in the execution by hanging of author and activist Ken Saro-Wiwa.

Shell said it settled the case as a "humanitarian gesture" to the Ogoni. But after more than a decade fighting to keep that case out of court, this is an absurd explanation on its face. The truth is that Shell settled because the company was scared, knowing the evidence against it was overwhelming.

Shell publicly expresses regret over the hanging of Ken Saro-Wiwa, but maintains its innocence despite mountains of evidence to the contrary. One wonders if years from now, after a decade or more of profiting from the world's most carbon intensive oil and gas production and undermining national and international efforts to slow climate change, Shell will similarly profess concern, but innocence, for the state of the world's climate.



Shell agm 2005.  
© balthazar serreau, foe ewni

# Shell's greenwashing campaign

**Climate change is an increasing threat to our planet. Experts have said that global greenhouse gas emissions need to peak by 2015 and come down to 80 percent of 1990 levels by 2050 to prevent runaway climate change.<sup>2</sup> Using ever greater quantities of energy to produce billions of barrels of otherwise inaccessible oil, therefore, appears to be a strategy for mutually assured destruction.**

Shell's public statements appear to agree with the idea that we need to tackle climate change, but this report will show that in fact Shell is continuing to invest in the most energy intensive oil sources, like oil sands and oil shale, and refuses to stop gas flaring in Nigeria. Further, in spite of a massive greenwashing campaign, the company is actually undermining action to address climate change in both Europe and the United States.

In July 2002, a committee of Shell's directors gathered at a highly confidential meeting to work out a framework for greenhouse gas emission targets for Shell. The committee noted that the world was "decarbonating" and that "it was not unreasonable to expect that the Group could pursue decarbonisation as a good business sense."<sup>3</sup>

In 2004, Shell was forced to admit it that it had over-booked its proven oil reserves by a staggering 4.47 billion barrels.<sup>4</sup> As the company's share price plunged, Shell was left staring at the unpalatable truth that its reserves portfolio was now looking seriously depleted compared to its main rivals. Jeroen van der Veer, now Shell's departing CEO, wrote at the time: "I know that those deeply regrettable events mean we have much to do to restore our reputation with our stakeholders." One of the projects he highlighted to get Shell out of the mess was the oil sands in Canada<sup>5</sup> - one of the most climate-damaging ways to produce oil.

Several years later, Shell continues to greenwash its image, portraying itself as an environmentally conscious company taking the necessary steps to tackle climate change. But in reality, the company continues to invest in the most carbon intensive oil production and works to weaken climate initiatives.

For example, in spring 2007 Shell launched its "Don't throw anything away, there is no away" advertisement in various European newspapers and magazines. The advertisement showed a classic refinery outline but with flowers rather than smoke flowing from the chimneys. It gave the impression that Shell's refineries are clean, while suggesting that Shell's products and services have a minimal impact on the environment. In the advert Shell claimed: "We use our waste [carbon dioxide] to grow flowers".

Shell's own data shows that in 2007 it produced almost 100 million tonnes of greenhouse gas emissions.<sup>6</sup> Only at one refinery – Pernis in the Netherlands – does Shell recycle carbon dioxide for growing plants. According to Shell, this saves 350,000 tonnes of carbon dioxide each year,<sup>7</sup> about 0.35 percent of Shell's total direct emissions. When Friends of the Earth complained against the advertisement, both the UK and Dutch Advertising Standard Authorities ruled that the company had misled the public on Shell's environmental performance.<sup>8</sup>

In 2008 Shell launched another advertisement in the UK claiming that its oil sands in Canada were a "sustainable energy source". This time World Wildlife Fund complained and once again the UK Advertising Standard Authority (ASA) upheld the complaint. The ASA concluded that because sustainable was "an ambiguous term", and as it had not seen data showing how Shell was "managing carbon emissions from its oil sands projects in order to limit climate change, we concluded that on this point the ad was misleading."<sup>9</sup>



Fire at Shell SAPREF refinery in South Africa.  
© the south durban community environmental alliance (SDCEA)

## Shell's greenwashing campaign

Further, Shell's website reads:

*We were one of the first energy companies to acknowledge the threat of climate change; to call for action by governments, our industry and energy users; and to take action ourselves. We have stepped up our appeals to government for urgent and wide-ranging policies, and our own efforts to develop the technologies needed to reduce [carbon dioxide] emissions from our operations and products.<sup>10</sup>*

In the United States, Shell is part of the US Climate Action Partnership, "an expanding alliance of major businesses and leading climate and environmental groups that have come together to call on the federal government to enact legislation requiring significant reductions of greenhouse gas emissions."<sup>11</sup> This partnership is committed to "a pathway that will slow, stop and reverse the growth of U.S. emissions."

But Shell has in fact used its position within that partnership to weaken the climate legislation under discussion in the U.S. Congress. Shell was instrumental in removing the only provisions in the American Clean Energy Security Act that would have stopped increased U.S. imports of dirty oil sands oil from Canada.



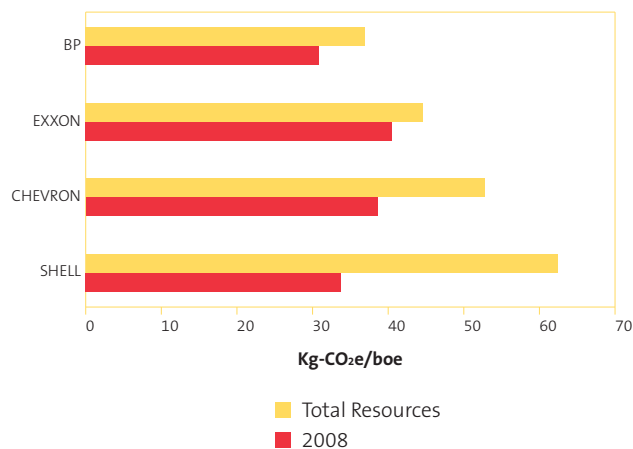
Albian Sands Muskeg River Mine, Alberta, Canada.  
© j. rezac / wwf - uk

# Shell: The world's most carbon intensive oil company

This section<sup>12</sup> summarizes our analysis of the carbon intensity of the top international oil companies. It reveals that Shell has become the most carbon intensive oil company in the world based on its total resources.

When Shell's total resources are taken into account, the amount of greenhouse gases emitted per barrel of oil equivalent produced will outstrip those of its nearest competitors. The data shows that in the age of carbon reduction, Shell is fast heading in the opposite direction, massively increasing the carbon intensity of its production of oil and gas. This presents real risks for Shell, for investors, and for the climate.

figure 1 Carbon intensity of oil & gas production by company



## The carbon intensity of major oil companies

Not every barrel of oil has the same carbon footprint. When a barrel of oil is produced, the amount of carbon emitted during its production varies significantly. This depends on factors, such as the depth and pressure of the reservoir, as well as the attributes of the oil, like its viscosity and gravity. In addition, oil is often extracted with gas, known as 'associated gas'. If this gas is flared, as is common in Nigeria, the amount of greenhouse gases emitted radically increases.

Big oil companies, like Shell, have a growing problem of finding sources of conventional oil. Much of the "easy oil" has already been produced or is controlled and exploited by countries such as Saudi Arabia. The decline of oil fields in the Middle East, North Sea, North America and elsewhere, as well as the resource sovereignty exercised by governments all over the world, means that access to oil reserves for Shell has declined sharply. In the 1970s international oil companies controlled around 70 per cent of reserves. Today that figure is close to 10 per cent.<sup>13</sup>

The oil industry has to look beyond conventional resources of oil to maintain supplies. In its 2008 Sustainability Report, Shell concedes that "Conventional sources of oil alone will struggle to meet growing demand".<sup>14</sup>

## Shell: The world's most carbon intensive oil company

In order to maintain the production of oil and gas, companies have developed technology to access reserves that were previously inaccessible. Deepwater, tight gas, shale gas, liquefied natural gas, enhanced oil recovery and oil sands production are all examples of how the industry has developed technology to access more oil and gas from the decreasing pool of hydrocarbon reservoirs they have access to.

There is a fundamental problem for the industry though: all of these forms of production are to different degrees more energy intensive than traditional methods.

For example, injecting steam into an oil sands reservoir in order to get the tar to flow to a production well can emit up to 135 kg of carbon dioxide per barrel of oil produced.<sup>15</sup> Extracting conventional oil in Saudi Arabia on average emits only 13.6 kg of carbon dioxide per barrel.<sup>16</sup>

In fact, gas flaring in the production of oil in Nigeria and the energy-intensive extraction of oil sands are two of the most carbon intensive forms of oil production (see Figure 2). The liquefaction and re-gasification processes involved in producing liquefied natural gas (LNG) which enables it to be transported by tanker, are also very energy intensive and therefore constitute a very carbon intensive way to produce and deliver natural gas.<sup>17</sup> Shell is a leading producer of both oil sands and LNG, and is the largest oil operator in Nigeria.

### Greater vulnerability to carbon pricing

As concerns over climate change have risen up the political agenda – with many countries now enacting legislation to regulate carbon emissions – the investment community has started to analyse what risks a carbon-constrained world could pose to oil and gas companies.

Shell admits it has a problem in its latest Sustainability report, saying “Our upstream energy intensity has risen by around 27% since 2000 as fields age and more heavy and harder-to-reach oil is produced.”<sup>18</sup>

In September 2008 the Global Research Department of HSBC produced a report called Oil and Carbon, in which it analysed the top European oil companies’ potential exposure to legislation on carbon and carbon pricing. The report notes Shell’s increasing move into carbon intensive oil sands and increasing LNG production. It concludes that Shell’s “above average exposure to carbon intensive projects leaves Shell more vulnerable to carbon pricing than its peers”.<sup>19</sup>

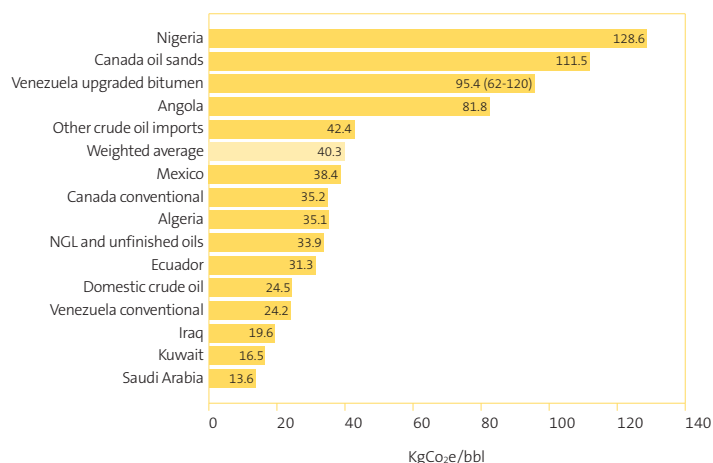
### Total resources analysis

According to HSBC: “[t]he most commonly used measure of reserves, proven and probable, is a probability-weighted assessment of a company’s reserves. This (...) understates the level of a company’s potential reserve base. ...it does not capture some companies’ unconventional reserves as many have only potentially become commercial in the past 12 months as the oil price has risen...An alternative measure, ‘resources’... is a much wider assessment and is an estimate of the total potential reserves for a company. This measure will capture a higher proportion of unconventional energy sources including oil sands, heavy oil and tight gas.”<sup>20</sup>

We agree with HSBC that a total resources measure is more indicative of a company’s total carbon profile, and therefore we have used that measure in our analysis.

In March 2009 the National Energy Technology Laboratory, part of the United States Department of Energy, reported on the huge range in carbon intensities for oil production, depending on location and extraction method.<sup>21</sup> Figure 2 (below) shows that oil from Nigeria and Canada’s oil sands top the list for the carbon intensity of crude oils processed in US refineries.

**figure 2 GHG emissions profiles for refinery feedstock extraction and pre-processing by source**



Source: US Department of Energy, National Energy Technology Laboratory, March 2009.



## Our analysis

Company disclosure of total resources from annual reports and strategy presentations were analysed using the NETL carbon intensity figures in Figure 2 along with intensity estimates for other forms of oil and gas production drawn from the HSBC report.<sup>22</sup> We applied these carbon intensity averages to the relevant percentages of the resource base disclosed by each company and derived a weighted average.<sup>23</sup>

The 2008 figure we used for comparison with current production is drawn from a carbon intensity analysis conducted by the environmental research organisation, Trucost, in April 2009.<sup>24</sup>

Table 1 reveals that - based on reported total resources - Shell's production of oil and gas will become the most carbon intense of its peers. It will rise by 85 per cent from today's figure - an increase markedly greater than its competitors. This sharp rise is due to Shell's total resources being dominated by unconventional and heavy oil (34.7 per cent) and LNG (16.9 per cent), as well as Shell's ongoing reliance on Nigerian crude with its associated gas flaring.

Shell's future dependence on carbon intensive, unconventional oil is illustrated succinctly in its disclosure of total resources from its 2008 Strategy Update.<sup>25</sup> Of the 66 billion boe represented in the chart below, 22.9 billion is Heavy Oil and EOR. We know that 20 billion barrels of that is oil sands<sup>26</sup>, which therefore constitutes the biggest single portion of Shell's resources, a full 30 per cent of its future oil and gas production. No other oil company has staked so much of its future on the dirtiest forms of oil production.

Shell also has major research and development in oil shale extraction, which does not yet factor into these resource estimates. Shell's oil shale extraction technology emits between 176 and 292 kg carbon dioxide equivalent per barrel.<sup>27</sup> Shell is also aggressively seeking oil shale and oil sands production opportunities in Russia and Jordan.<sup>28</sup>

Shell's Sustainability Report claims that its oil sands operations are more efficient than its competitors. It also claims that as the company produces increasing amounts of natural gas its production base is becoming cleaner. The truth is the dominance of oil sands resources in its resource base will render Shell's oil and gas production more carbon intensive per unit of production than any of its peers.

**table 1. Carbon intensity of oil & gas production by company**  
Estimated Average Intensity kgCO<sub>2</sub>-e/boe

Company	2008	Total resources	Percentage increase
Shell	33.8	62.6	85
Chevron	38.8	52.8	36
ExxonMobil	40.6	44.7	10
BP	31.0	36.9	19

**figure 3 Shell total resources from its 2008 Strategy Update**





## “Leadership” in unconventional oil

# 3

**Not only is Shell investing in oil sands and other highly carbon intensive sources of oil production; the company is actively touting its development of the dirtiest oil extraction technologies as demonstrative of its leadership in the industry.**

### **Unconventional oil: What is it and why you should be worried**

The oil industry’s move into unconventional oil is significant because it marks a ‘recarbonisation’ of energy sources precisely when the world needs to decarbonise to prevent runaway climate change. Shell is at the forefront of this movement.

In 2005 emissions from the production of oil and gas totalled 2.9 billion tonnes of carbon dioxide equivalent (CO<sub>2</sub>e) or 6 per cent of global emissions.<sup>29</sup> This figure does not include the actual consumption of the fuel, which for road vehicles alone amounted to 4.4 billion tonnes.<sup>30</sup> While governments, vehicle manufacturers and consumers are increasingly looking to improve the efficiency with which oil is consumed, the production of unconventional oil is significantly less efficient than that of conventional production, undermining the savings made by these initiatives.

Unconventional oil in the form of oil sands or oil shale requires much more energy to extract from the ground than conventional oil. In most cases it also requires further energy-intensive processing to upgrade it into a substance that can be refined into products.

For oil sands, greenhouse gas emissions per barrel of oil produced are significantly higher than most forms of conventional production. Only the shamefully wasteful practise of gas flaring associated with production primarily in Nigeria causes more greenhouse gas emissions than oil sands extraction.

The carbon intensity of oil shale also varies depending on methods of extraction, although little commercial extraction has yet been established. However, the method that Shell is developing is set to take the carbon intensity of oil production to new heights.

#### *Oil sands*

Oil sands are deposits of sand and clay saturated with bitumen. Bitumen is oil in a solid or semi-solid state. Because it is in this less fluid state, the bitumen requires unconventional methods to get it to flow to the surface.

*Mining:* Where oil sands are close to the surface the bitumen is excavated from the ground in an open cast mine. The land is stripped and the bitumen soaked sand is dug out with mechanical shovels and loaded into trucks to be taken to a separation plant. Separation involves scrubbing out the bitumen with hot water and chemicals creating vast amounts of toxic effluent and consuming large amounts water.

Only about 18 percent of ultimately recoverable oil sands resources are in deposits shallow enough to be mined. The rest requires in situ production.

*In situ production:* More deeply buried bitumen requires the drilling of wells to pump it out, somewhat like conventional oil production. However, unlike conventional production, getting the bitumen to flow like oil generally requires injecting heat (usually steam) or solvents into the reservoir. In situ production requires power and steam generating plants, a large number of wells, often spread out in groups, and extensive roads, pipelines and product collection tanks installed across a large area.



Oil spill in Nigeria.  
© Elaine Gilligan, Foe Ewni



Near the Athabasca Oil Sands Project, Canada.  
© J. Rezac / WWF - UK



Shell Albian Sands, Canada.  
© J. Rezac / WWF - UK

While some in situ production of oil sands works much like conventional heavy oil production, most involves injecting steam into the reservoir to heat the bitumen to enable it to flow towards the production well. There are a number of different technologies for doing this, some more efficient than others, but all of these methods are extremely energy intensive and therefore generate significant greenhouse gas emissions.

*Upgrading:* The process of converting bitumen into synthetic crude oil, or syncrude, is called upgrading. Syncrude can then be refined into petroleum products. All bitumen produced from oil sands needs to be upgraded before it can be refined into traditional petroleum products. There are a number of methods for this, all of them energy intensive. Shell runs something called a hydrogen-addition upgrader that adds hydrogen to the bitumen to break it down into a substance more like conventional crude oil. Upgrading adds around 45kg of carbon dioxide equivalent per barrel of oil produced (CO<sub>2</sub>e/bl).

### Oil shale

Oil shale is a sedimentary rock containing kerogen, a substance in the early geological stage of becoming oil. Oil shale requires substantial processing to be made into oil.

Shell's research and development of oil shale resources has led it to develop a process it calls in situ conversion. The process involves heating the reservoir with electricity for periods of up to two years, which causes the oil shale to convert into a mixture of light oil and gas. This can then be pumped out using traditional methods.

To stop the oil and gas migrating horizontally from the production zone, a barrier envelope of frozen rock is created around the zone requiring yet more energy. It is very energy intensive, but results in a product that does not need upgrading. Current analysis of the carbon intensity of the process gives a range from 176.8 kg CO<sub>2</sub>e/bl to 292.2 kg CO<sub>2</sub>e/bl.<sup>34</sup> Producing oil this way makes a mockery of efforts to reduce carbon in the rest of the energy lifecycle.

### Resources

If unconventional oil was a marginal resource that could only supply a tiny fraction of global oil demand, its carbon intensity would have little impact on the fight to prevent runaway climate change. Unfortunately, this is not the case. Extractable oil sands resources in Canada – at 173 billion barrels – are second only to the conventional oil reserves of Saudi Arabia.<sup>35</sup> There are also significant oil sands resources in Venezuela and potentially significant quantities in Russia, Congo-Brazzaville, Trinidad and Madagascar.<sup>36</sup>

There is an estimated 3.7 trillion barrels of oil shale globally, about two thirds of which lie in the USA.<sup>37</sup> Other countries with significant oil shale resources include Australia, China, Estonia, Israel, Jordan, Russia and Serbia.

Estimated emissions from extracting, processing and burning all the Canadian oil sands and all the USA's oil shale amount to 980 billion tonnes of carbon dioxide equivalent.<sup>38</sup> This is equivalent to 20 years of global emissions at 2004 levels.<sup>39</sup>

**table 2. The CO<sub>2</sub>e intensity of various forms of oil production<sup>31</sup>**

Crude oil Production	Greenhouse gas intensity (kg CO <sub>2</sub> e/barrel)
Conventional Saudi Arabia	13.6
Conventional USA	24.5
Conventional Nigeria	128.6
Weighted average of oil processed in the USA	40.3
Oil Sands Mining (inc. upgrading)	80
Oil Sands in situ SAGD <sup>32</sup> (inc. upgrading)	100
Oil Sands in situ CSS <sup>33</sup> (inc. upgrading)	135
Shell's In Situ Conversion of Oil Shale	176.8-292.2

## “Leadership” in unconventional oil

### Relying on oil sands to restore Shell’s tarnished reputation

Shell’s interest in unconventional oil goes back 70 years, having first explored Alberta, Canada in the 1940s and bought its first oil shale lease in Colorado, USA in the early 1950s. The land upon which Shell’s main oil sands mine operates today was purchased by Shell Canada in 1956.<sup>40</sup> However, there was little commercial activity on either site for decades as extracting a usable product was both technically challenging and too expensive to be commercial under the prevailing oil prices.

The 1970s oil crisis inspired renewed interest and in 1979 Shell started its first oil sands pilot project at Peace River in Alberta, experimenting with methods to steam the bitumen out of the ground. The project started commercial production of around 10,000 barrels per day (b/d) in 1986 using an energy intensive process known as Cyclic Steam Stimulation (CSS).

From those humble beginnings, Shell’s ambition for unconventional oil production has grown to become a cornerstone of the company’s strategy. Since the late 1990s Shell has sought to position itself among the top oil sands producers. Today it is one of the largest leaseholders of oil sands land in the business.

When Shell’s Athabasca Oil Sands Project (AOSP) began construction in 1999, it was Alberta’s first major new oil sands project for 25 years. The project came fully on stream in 2003. Meanwhile, Shell acquired new leases adjacent to the mine and pressed forward with expansion plans that could one day see production of 770,000 b/d at the three mine sites associated with the AOSP.<sup>42</sup>

In 2006-07, in the wake of the reserves fiasco, Shell aggressively increased its position in Canada’s oil sands industry through three major strategic moves. Throughout 2006 the Shell Group began buying out the minority shareholders in Shell Canada. The deal, concluded in March 2007, at a cost of \$7.4 billion, put Shell in full control of the group’s most significant oil resource.

In July 2007, Shell completed a CAN \$2.4 billion purchase of Blackrock Ventures, which held significant leases in three regions of Alberta where oil sands lie too deep to mine and therefore require in situ production. This acquisition added 18 billion barrels of oil in place to Shell Canada’s portfolio.<sup>42, 43</sup>

### “Eye-popping” acquisitions make Shell the oil sands leader

Shell rocked the oil sands industry in March 2006 when it purchased some of the most expensive and risky leases in the industry’s history.<sup>44</sup> It paid over US \$400 million for 219,000 acres in western Athabasca’s Grosmont carbonate formations. The oil in these formations is contained in limestone rather than sand, and no company has yet perfected a method to extract it. The purchase was described as “eye popping” by the Wall Street Journal and made Shell the biggest land holder in Alberta.<sup>45</sup>

Shell then spent a further US \$100 million purchasing additional adjacent leases, raising its total commitment to half a billion dollars US for the leases alone. Shell stated at the time that total oil in place in these holdings could amount to 30 billion barrels.<sup>46</sup> Shell is experimenting with the same technology it has tested on oil shale in Colorado to extract oil from the limestone rocks.<sup>47</sup>

Following these acquisitions, Shell began to use new language to describe its oil sands strategy. The 2007 Annual Review stated for the first time that the strategic goal had become “to be the leading oil sands operator”.<sup>48</sup> With land holdings in every oil sands basin, Shell is indeed poised to claim that dubious title. Under its current plans, which do not yet include plans for production of the Grosmont carbonates, Shell could expand its Canadian oil sands production to over 600,000 barrels per day in the coming decade.<sup>49</sup>


In 2006 Shell stated that by 2015, up to 15 per cent of its production could come from unconventional sources.<sup>50</sup> Fast forward another decade, unconventional oil production could be double that, constituting the largest category of Shell’s production.

### Oil shale: Shell at the cutting edge of the world’s dirtiest oil

Shell is a leading developer of technology for extracting oil out of oil shale deposits. These deposits, which are said to potentially hold over a trillion barrels of oil in the western USA alone,<sup>51</sup> contain kerogen. This is a solid oil-like substance that would normally require millions of years of geological development to form into liquid oil but Shell’s process dramatically brings the clock forward, essentially by cooking the oil.

It is hugely energy intensive, using massive amounts of electricity to heat the reservoir for up to two years. Shell has tested this technology in Colorado and also in a number of experiments in its Albertan oil sands properties.

In November 2007 Shell’s vice president for unconventional production, John Barry said oil shale is “the biggest piece of the company’s R&D budget.”<sup>52</sup> Harold Vinegar, Shell’s



leading scientist involved in developing Shell's oil shale extraction technology added: "I'm convinced unconventional resources such as [oil] sands and oil shale will play a key role in our energy future. This is long-term thinking."<sup>53</sup>

Indeed, for Shell unlocking unconventional oil is key to its long-term future. Building on the experience it has developed with oil sands production in Canada and its ongoing oil shale research in Colorado, Shell is aggressively seeking unconventional oil opportunities beyond North America.

In 2005 Shell signed a deal with Jilin Guangzheng Mineral Development Company to explore for oil shale in China's Jilin Province.<sup>54</sup> The project folded after three years having failed to find deposits thick enough to be developed with Shell's technology.<sup>55</sup>

Shell has also been in negotiation with Russian oil company Tatneft over oil sands projects in Russia. Initially, an agreement was signed in 2007 to develop bitumen in Tatarstan.<sup>56</sup> This deal appeared to fall through in September 2008,<sup>57</sup> to be followed in December by news that the two companies were looking at bitumen deals outside of Tatarstan.<sup>58</sup>

Then in March 2009 Shell signed an agreement with the Government of Jordan to explore for oil shale, with permission to survey nearly a quarter of the country.<sup>59</sup> Malcolm Brinded, head of exploration and production, said that the project fitted "fully" with the group's corporate strategy.<sup>60</sup>

Today Shell's share of production of unconventional oil is less than 100,000 barrels per day, all of it from Canada's oil sands. But if it succeeds in pushing forward massive expansions in Canada and its exploration and research and development projects in Jordan, Russia and the United States come to fruition, that figure could be multiplied more than ten times.

It could mean that the greatest proportion of Shell's production would come from energy intensive, unconventional oil. So, although in the words of the Shell's managing directors, the "world is decarbonating", Shell is now doing the opposite, recarbonating its operations despite the risks of runaway climate change.

When asked about this contradiction, van der Veer tries to shift the blame from Shell to national governments: "An energy mix -- that is, the mix between use of gas, coal, oil sands or nuclear -- is basically set by a government," he says. "So a government -- in this case, if I take the example of Canada -- they open up for oil sands. Now, if oil sands are open to our people overseas, our company is going to do that."<sup>61</sup>

In putting the blame on the Canadian government for opening up the oil sands, van der Veer has washed his hands of any corporate responsibility for Shell.

## **A flawed emission reduction strategy**

One way Shell continues to justify its involvement in oil sands is through reducing emissions from its oil sands operations. In the 2008 Sustainability Report the company highlighted how: "We have a voluntary target to halve our current operation's greenhouse gas emissions by 2010, compared to the original project design. We are on track to meet it through a combination of buying offsets and making operational improvements in the project."<sup>62</sup>

But the reality seems to be very different. In April 2009 the company was accused of abandoning "its written agreements to significantly reduce greenhouse gas pollution" at Shell's main oil sands mining sites, Jackpine Mine and Muskeg River Mine. These commitments had helped Shell receive regulatory approval from the governments of Alberta and Canada.

Marlo Reynolds, the executive director of the Pembina Institute, which works with the oil companies on the ecological impact of oil sands, said: "Shell's decision to break these binding agreements calls into question its claims of environmental leadership. Shell seems to believe it can break promises to Canadians with impunity." Without these commitments, the Pembina Institute argues that Shell's greenhouse gas pollution from these projects will increase by an estimated 900,000 tonnes.<sup>63</sup>

## **Carbon capture and storage: another flawed response**

Another way Shell is trying to square the circle of reducing emissions from oil sands is by relying on the promise of carbon capture and storage (CCS). This is a developing technology that could capture carbon dioxide emissions from large sources and bury it underground. CCS could potentially lock carbon dioxide away and prevent it from affecting the earth's climate. Shell is banking on this as-yet-unproven technology and has already proposed developing CCS at its Scotford Upgrader near Edmonton, Alberta where bitumen from the AOSP project is processed.<sup>64</sup>

But despite the industry rhetoric about the promise of such technology, the reality seems to be different. A joint Canada and Alberta task force on CCS concluded in 2008 that only a small percentage of the carbon dioxide released in mining oil sands and producing fuel from them can be captured.

Documents secured under Freedom of Information legislation in Canada marked "secret", concluded: "Oil-sands operations are very diverse (both geographically and technically) and only a small portion of the carbon dioxide streams are currently amenable for carbon capture and storage."<sup>65</sup>

## “Leadership” in unconventional oil

If CCS does not work, Shell’s decarbonisation strategy is fundamentally flawed. Moreover, senior Shell executives seem not to understand the scale of the carbon challenge. In a recent speech on energy security, one of Shell’s sustainable development directors mentioned that one of Shell’s solutions to the growing energy intensity of oil and gas production was its deployment of a handful of unmanned solar and wind monotowers at a few of its minor North Sea gas platforms.<sup>66</sup> The insignificance of this gesture in the face of the huge emissions caused by the company’s flaring in Nigeria and its move into unconventional oil betray the company’s shocking cynicism concerning its carbon dioxide burden.



Shell recent advertisement.  
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# 50 years of gas flaring in Nigeria

# 4

***“People worry about what the Mobile Police are doing, but there are a lot more deaths being caused by environmental degradation.”***  
**Ken-Saro-Wiwa<sup>67</sup>**

Shell’s future carbon intensity is set to nearly double, but one reason that the company’s existing intensity is high is due to gas flaring. For fifty years, the gas that has been produced with oil in the Niger Delta, known as “associated gas”, has been burnt off in huge roaring flares. One industry critic called it “constant night and day pollution”.<sup>68</sup> Flaring remains one of the key health, environmental and economic issues concerned with oil operations in the Delta. It has never been solved, despite years of broken promises, government regulations and court cases challenging the practice.

In the United States and Western Europe, 99 percent of associated gas is used or re-injected into the ground. But in Nigeria, despite regulations introduced more than 20 years ago to limit the practice, more than half the associated gas is flared, causing local pollution and contributing significantly to climate change. According to the Nigerian Extractive Industries Transparency Initiative (NEITI) audit, between 1999 and 2004, Shell flared the most of any company in Nigeria, burning off an average of 52 percent of gas it produced in Nigeria in gas flares.<sup>69</sup>

According to the World Bank, by 2002 flaring in Nigeria had contributed more greenhouse gases to the Earth’s atmosphere than all other sources in sub-Saharan Africa combined – and yet this gas is not being used as a fuel. Local communities living around the gas flares – and many are close to villages and agricultural land – continue to rely on wood for fuel and candles for light.

## **Economic and health costs from gas flaring**

The economic loss to Nigeria from gas flaring is immense. Figures released by Nigerian government and industry officials estimate that Nigeria is losing between \$2.5- \$3 billion US a year through flaring, or over \$70 billion US from 1970 to 2006. When the wider environmental, economic and social consequences are factored in, a ball-park figure could be in the order of \$150 billion US.<sup>70</sup>

Part of this cost has been the impact on human health. A groundbreaking study by Environmental Rights Action and the Climate Justice Programme in 2005 attempted to quantify the damage done by the toxic cocktail of pollutants, including benzene and dioxins, emitted by gas flaring. The study estimates that in Nigeria’s Bayelsa State alone, flaring is statistically likely to cause 49 premature deaths, 5,000 child respiratory illnesses, some 120,000 asthma attacks, as well as 8 additional causes of cancer each year.<sup>71</sup>

## **The struggle of Ken Saro-Wiwa and the Ogoni against gas flaring**

Communities in the Niger Delta have struggled against gas flaring pollution for more than 50 years. The Ogoni region was one of the regions where Shell was most active. Back in 1970, one Ogoni protest song went: “The flames of Shell are hell, We bask beneath their light, None for us save the blight, Of cursed neglect and cursed Shell.”<sup>72</sup>



Gas flaring in the Niger Delta.  
© Elaine Gilligan, foe ewni



Oil spill in the Niger Delta.  
© Elaine Gilligan, foe ewni

## 50 years of gas flaring in Nigeria

In the early 1990s, in response to increasing environmental pollution and social repression, Ken Saro-Wiwa and other community leaders from the Ogoni region formed the Movement for the Survival of the Ogoni People (MOSOP) and began organizing for political, economic, and environmental justice.

When he finished his book, *Genocide in Nigeria* in 1992, Ken Saro-Wiwa outlined a ten-point course of action. Number two on the list was to “prevail on Shell and Chevron to stop flaring gas in Ogoni and other producing areas”. He then wrote: “The situation is tragic. The question is, will the international community fold its arms and allow this twenty-first century genocide?”<sup>73</sup>

On January 4, 1993, 300,000 people march against Shell in what has become known as Ogoni day. Protests continued to build as Saro-Wiwa and the Ogoni dared to stand up to Shell and a repressive military regime. But their struggle met with a brutal backlash. On November 10, 1995, Ken Saro-Wiwa was hanged, with eight colleagues, in a prison yard in Port Harcourt, Nigeria, following a farce of a trial.

The struggle against gas flaring in the Niger Delta continues today. Gas flaring was first made illegal in 1984. Shell, the largest oil company in Nigeria, has pledged multiple times to stop the practice, yet never has.

### Efforts to stop gas flaring

The Nigerian government has tried to stop flaring for decades, but has failed owing to the lack of real power that it has over the oil companies. Oil is the life-blood that keeps the Nigerian political elite in power: oil accounts for roughly 80 per cent of GDP in Nigeria and nearly all of its export earnings. Shell, which operates the largest joint venture, Shell Petroleum Development Corporation (SPDC), produces 43 per cent of Nigeria’s oil.<sup>74</sup>

One of the key laws on flaring passed in 1979, the Associated Gas Re-Injection Act, ordered that: “No company engaged in the production of oil or gas shall, after 1 January 1984, flare gas produced in association with oil without the permission in writing of the Minister.”<sup>75</sup> Ever since, Nigerian government Ministers have given in to lobbying by the oil companies and allowed flaring to continue.

The situation outraged Saro-Wiwa, who wrote in 1992:

*“As a final remark of their genocidal intent and insensitivity to human suffering, Shell and Chevron refuse to obey a Nigerian law, which requires all oil companies to re-inject gas into the earth rather than flare it. Shell and Chevron think it cheaper to poison the atmosphere and the Ogoni and pay the paltry penalty imposed by the government of Nigeria than re-inject the gas as stipulated by the regulations.”<sup>76</sup>*

The pressure to resolve flaring increased dramatically after Saro-Wiwa’s murder in November 1995. As Shell was criticised over the contribution its flaring was making to climate change, its public relations executives worked out rebuttal lines, such as looking at the methane emissions from volcanoes and comparing it to Shell’s operations.<sup>77</sup> But the company knew it was “no longer acceptable to plan to continue gas flaring.”

Recently released internal documents show that SPDC was now responsible for 12 per cent of world-wide flaring. The company dropped attempting to extinguish flares by 2000 and instead proposed a “Flares Out by 2005” campaign. At the same time, it reassured influential investors that “by 2005 most of the present flares will have closed.”<sup>78</sup>

This deadline soon slipped when the Federal government set a new deadline for flares to be out by 2008.<sup>79</sup> Publicly, Shell was stating it had “set a corporate objective to end all gas flaring of gas by 2008.”<sup>80</sup> But the deadlines continued to be put back. The company’s Sustainability Report in 2003 noted: “Our goal of ending all continuous flaring by 2008 is looking increasingly challenging particularly in light of the many projects which have to be delivered for gathering associated gas in the difficult operating circumstances in Nigeria.”<sup>81</sup>

The following year, in 2004, SPDC admitted flaring would not stop until “the end of 2009”.<sup>82</sup> Other crucial discrepancies were beginning to publicly show too. Shell had originally said it was committed to retrieving some “95 per cent of all associated gas produced”.<sup>83</sup> Over time this figure has fallen to 90 per cent,<sup>84</sup> and then 85 per cent.<sup>85</sup> Once again the goal-posts had shifted and the flaring continued.

### Ongoing Flaring & Shell’s Numbers Games

In 2005 figures from the World Resources Institute and the US Environmental Protection Agency indicated that Nigerian gas flaring was responsible for 97.4 million metric tonnes of carbon dioxide equivalent. In other words, Nigerian gas flaring in 2005 contributed the same amount to global warming as 17.8 million cars in the US did annually.<sup>86</sup>

In 2008 the best available estimates indicate that the volume of flaring in Nigeria overall has reduced to the equivalent of 9-10 million cars – although much of this reduction can be attributed to the reduction in production associated with community unrest in the Niger Delta.<sup>87</sup>

Although Shell states that it is making efforts to reduce flaring, the company continues to flare gas in Nigeria at high rates that show very little reduction from its operations in the 1990’s. In the 2007 Sustainability Report, Shell said that “the reduction in flaring in 2006 and 2007 was due to production being shut in.”<sup>88</sup>



The Shell 2008 Sustainability report states “Between 2002 and 2008, [projects to gather and use associated natural gas] had reduced associated gas flaring by more than 30%. Including the impact of reduced production due to the security situation, the joint venture’s flaring was down approximately 60%.”<sup>89</sup>

However, Shell is playing numbers games by using 2002 as their baseline year. According to the Nigerian Extractive Industries Transparency Initiative audit, between 1999 and 2004, Shell flared between 264,000 and 350,000 million standard cubic feet (MMSCF) per year in Nigeria – roughly equivalent to 52 percent of all the gas it produced.<sup>90</sup>

Shell’s flaring in 1999 was 264,000 and in 2002 was 350,000 MMSCF.<sup>91</sup> In other words, 2002 was a particularly high year for gas flaring, so claiming reductions off that year has the virtue, from Shell’s perspective, of showing a large reduction in flaring.

Based on the information in Shell’s sustainability report, this suggests that in 2008, flaring was at approximately 116,500 MMSCF, but it would be at 233,000 MMSCF if operations were continuing without security problems.

*This is only a 12% reduction from 1999 levels.* Thus using Shell’s own unverified numbers, we can see that they have barely reduced gas flaring in Nigeria in the last decade at all. Given that they have presented these figures so deceptively by claiming a reduction from the highest baseline year they could find, it is likely that an independent evaluation of flaring levels would show even poorer performance on Shell’s part.

If this closed production were to start again, flaring will increase with production. So, fifty years after the flares started – and years after Shell promised to have switched them off – the situation remains virtually as bad as ever.

Shell, which made \$31.4 billion in profit last year, still cries poverty when it comes to gas flaring. Economics still overrides ecological concerns. In 2008 it said: “We were not able to complete the installation of gas gathering equipment in 2007 because of the lack of joint venture partner funding.”<sup>92</sup>

In the mid 1990s, Shell estimated it would cost \$4-5 billion over ten years to stop flaring. It currently estimates that \$3 billion is still needed to halt the practice.<sup>93</sup>

### **Profit first: Damning internal “flaring files”**

Internal company documents released during the Wiwa v. Shell court case provide a damning, if unsurprising, explanation of Shell’s ongoing response to the issue of flaring. The documents reveal the company has systematically placed their profits before the environment or local communities when it came to putting the flares out.

“It is essential that SPDC maintains the objective of making a reasonable return on investment to put out the flares rather than it being a cost to the oil sector,” the 1991 Performance Appraisal document said.<sup>94</sup>

A confidential Chief Executives Performance Appraisal for 1991, produced in May 1992, noted that the “Environment” “represents a major challenge with many years to catch up”.<sup>95</sup>

Although Shell’s PR documents would later say the environment was “central” to its activities,<sup>96</sup> as international pressure grew against the company, the Shell Group lowered its environmental standards. One confidential Environmental Management Audit for Shell Expo, written in June 1994, noted that Shell’s “policy aim ‘To eliminate emissions, effluents and discharges that are known to have a negative effect on the environment’ has been abandoned.” Shell’s audit team said it could be “interpreted as a retrograde step”.<sup>97</sup>

By 1994 Shell privately admitted that SPDC had ageing and polluting infrastructure that was “unacceptable.” One document noted, “Key aspects of the past environmental practices of the SPDC operation also fall short of current standards and leave a significant legacy of problems to be resolved.” Top of the list of problems to be fixed was flaring of associated gas.<sup>98</sup>

Even when the government did introduce fiscal incentives to reduce flaring, Shell conceded it had not “resulted in appreciable flaring reduction due to the lack of a conducive commercial framework”. Shell’s confidential Country Business Plan for 1996, produced just months before Saro-Wiwa’s execution, even modelled extinguishing the flares by 2000.

The modelling showed that “unconstrained flaring” actually increased the value of the company, compared to switching the flares out by 2000. The company said the exercise was only “indicative”,<sup>99</sup> but the 2000 date for extinguishing flares was quietly dropped. It would be the first of many missed deadlines.

***“It is essential that SPDC maintains the objective of making a reasonable return on investment to put out the flares rather than it being a cost to the oil sector,”***

Shell Nigeria 1991 Performance Appraisal

## 50 years of gas flaring in Nigeria

### Flare out deadlines continue to slip

The 2009 flares out deadline will also not be met. Earlier this year, there were press reports that the federal government had let the flaring deadline slip to 2010, and then to 2011. Even 2011 was met with “stiff opposition” from Shell, who had proposed 2013 instead.<sup>100</sup>

Even the chances of the flares being extinguished by 2013 are looking slim. A recent in-depth analysis on flaring by Chris Cragg, a specialist energy journalist, criticised Shell’s solution to the problem. The main project being developed by Shell and the government to reduce gas flaring is a liquefied natural gas (LNG) project in the Delta, which Shell has consistently promoted as the key component of its flares-out strategy.<sup>101</sup>

Cragg argues that projects such as the LNG project “have little to do with solving the issue of flaring gas in the Delta”. He says that LNG projects need a reliable source of gas, which “overwhelmingly favours non-associated gas”. i.e gas produced on its own without oil, rather than associated gas which is produced with oil.

Back in the 1990s, the internal Shell documents said that the LNG project would “create an additional market for gas”, but would initially be supplied by non-associated gas, with associated becoming an “increasing component”. However, this latter option was “made unattractive by the lack of adequate incentives or compensation.”<sup>102</sup>

Cragg argues that the “vast majority of the gas going into the existing LNG trains appears to be non-associated.” In other words, the majority of gas would not have been flared anyway. Unless infrastructure to utilise the gas can be built locally, the flares could continue for as long as oil production does.<sup>103</sup>



Gas flaring in the Niger Delta.  
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### Timeline: Fifty Years of Flaring in Nigeria

- 1958: Oil production starts in Nigeria.
- 1960: Secretary of State for the Colonies, Lord Horne, is asked to address the issue of flaring: “There might be a wastage of energy and resources going on which one day, those giving advice to the Nigerians [i.e. The British] could be reproached”.<sup>104</sup>
- 1969: The Petroleum Regulations of 1969 state that no later than five years after commencing a project, companies have to submit plans to use the associated gas.<sup>105</sup>
- 1979: the Associated Gas Re-Injection Act calls for companies to submit detailed plans for re-injection or use the gas. But there is a get-out clause: “No company engaged in the production of oil or gas shall, after 1 January, 1984, flare gas produced in association with oil without the permission in writing of the Minister.”<sup>106</sup>
- 1993: Shell is flaring about 1,000 cubic feet (30 cubic metres) of associated gas to every barrel of oil that reaches the surface.<sup>107</sup> This equates to 1,000 million standard cubic feet of flared gas per day (28.6 million cubic metres).<sup>108</sup>
- 1995: Ken Saro-Wiwa is hanged by the Nigerian State, in part for campaigning against Shell’s gas flaring.
- 1995: The World Bank estimates that annually, flaring in Nigeria is responsible for 35 million tons of carbon dioxide, with 12 million tons of methane produced from the Rivers and Delta States alone.<sup>109</sup> The Bank approves the Nigerian Liquefied Natural Gas (NLNG) project as a means of reducing flaring, but, once commissioned, it does not stop the flaring.
- 1995: For the first time SPDC develops a “gas master plan”.<sup>110</sup>
- Shell documents concede that “reduction of gas flaring is, in strategic terms, the main environmental issue facing SPDC”.<sup>111</sup>

- 1996: A Shell memo in March notes: “From Shell’s perspective, gas flaring must cease on an accelerated timetable”. It proposes a “flares out by 2005” campaign as a “stretching vision.”<sup>112</sup>
- 1996: The federal government of Nigeria prepares a report called “Vision 2010” in which it sets 2008 as the ‘flares out’ date.<sup>113</sup>
- 1999: The Nigerian LNG project begins operation and starts to export liquefied natural gas. Shell had been involved in the various attempts to promote the project since the early 1960s as the “cornerstone” of its flares-out project.<sup>114</sup>
- 1999: Shell begins to talk publicly about its 2008 deadline, stating it has “set a corporate objective to end all gas flaring of gas by 2008.”<sup>115</sup>
- 2000: Shell continues to talk about “the phasing out of gas flaring by 2008.”<sup>116</sup>
- 2001: At a community development workshop hosted by Shell in Warri in the Delta, the company is “urged to stop flaring earlier than 2008, and in the meantime to address the effects of flaring and to promote local use of gas.”<sup>117</sup>
- 2003: The then president and CEO of Shell Canada, Linda Cook, says that the growth in demand for LNG “is helping Shell meet its gas production growth aspirations. Importantly, it is also helping Shell meet its 2008 target of eliminating all routine gas flaring in Nigeria by creating a market for previously flared associated gas.”<sup>118</sup>
- 2003: Shell’s Sustainability Report notes: “Our goal of ending all continuous flaring by 2008 is looking increasingly challenging, particularly in light of the many projects which have to be delivered for gathering associated gas in the difficult operating circumstances in Nigeria.”<sup>119</sup>
- 2004: Shell now knows the chances of meeting the 2008 deadline are unrealistic. Shell admits: “We now expect to stop continuous flaring during 2009”. However, Shell’s subsidiary in Nigeria already admits that flaring would not stop until “the end of 2009”.<sup>120</sup>
- 2005: The community of the Iwherekana, with the support of Environmental Rights Action / Friends of the Earth Nigeria, files a legal action against the Nigerian government, the Nigerian National Petroleum Corporation, as well as Shell, Exxon, Chevron, and Total / Agip to stop gas flaring.<sup>121</sup> The plaintiffs claim that flaring is in violation of their fundamental human right to life under the Nigerian Constitution and African Charter on Human Rights.<sup>122</sup>
- The Federal High Court of Nigeria in Benin orders the companies to stop flaring, as it violates constitutional rights to life and dignity. The judge also declares the Nigerian gas flaring law to be unconstitutional.<sup>123</sup>
- Shell is accused of contempt of court by refusing to switch off the flares.<sup>124</sup>
- 2006: The Nigerian High Court tells Shell it must stop flaring gas in the Iwherekana community by April 2007. Shell responds by saying it would switch off the flares by the end of 2009.<sup>125</sup>
- 2007: The court’s April deadline comes and goes. Shell continues flaring.<sup>126</sup>
- 2008: The Federal government deadline to end flaring passes on 1 January. Shell and the other oil companies are said to be “quietly” lobbying the government to extend the deadline until 2010.<sup>127</sup>
- Shell says it needs another \$6 billion US to end flaring at its 1,000 wells.<sup>128</sup>
- 2009: The press reports that the federal government has let the flaring deadline slip, first to 2010 and then to 2011. Even the date of 2011 is met with “stiff opposition” from Shell, which proposes 2013 instead.<sup>129</sup>
- 2009: In its latest Sustainability Report Shell now says another “\$3 billion or more will be needed to meet our commitment to end all remaining continuous flaring in Nigeria.”<sup>130</sup>



# Limited renewable energy initiatives

# 5

**In the late 1990s, Shell began an initiative to invest in renewable energy as part of its core business. After a few years of investing in small amounts of wind and solar power, the company indicated in 2006 that its renewable energy focus would be on biofuels. In March 2009, Shell announced that it would pull investment from all other forms of renewable energy, except for biofuels. Far from being a universally clean or climate friendly technology, however, biofuels pose a whole new set of threats to the environment.**

## **Renewables: A vital new market**

In October 1997, Shell announced that it had established a fifth core business, Shell International Renewables. Previously, Shell had some small solar and forestry projects, but the new program was granted \$500 million in investment over five years in order to exploit the growing renewable energy market.<sup>131</sup>

Shell quickly touted its renewables investments in a major advertising campaign. Half-page advertisements appeared in the Financial Times, one of which read: “Shell is playing a major part in the move from oil and gas, and now we’re planting the seeds of renewable energy with Shell International Renewables, a new business committed to making renewable energy viable.”<sup>132</sup>

The reality was that the green investment was more of a greenwash than an actual shift in Shell’s business model. In 1998, Greenpeace released a report showing that Shell’s renewable investments were “miniscule” compared to its fossil fuel expenditure. The report noted that “despite recent shifts in company attitudes to climate change and renewables, evidence suggests that the business trajectory has not changed.”<sup>133</sup>

Although Shell heavily publicized its desire to address climate change, the move to renewables had little to do with actually addressing the ecological needs and more to do with cleaning up the company’s increasingly dirty image. Investing in a “green” image was also a clear public relations ploy to counter the blanket criticism it had received due to the murder of Ken Saro-Wiwa and the Brent Spar debacle – in 1995, in response to pressure from Greenpeace and others, Shell was forced to stop plans to dispose of the Brent Spar oil rig by sinking it in the North Atlantic. It was also a response to the growing awareness of climate change as a popular issue.<sup>134</sup>

Additionally, this new interest in renewable energy was viewed as a financially shrewd move. Shell predicted that renewables could account for half of the energy market by 2050 and sought to gain a ten percent share of the renewable market by 2005.<sup>135</sup> When Shell International Renewables was launched, Georges Dupont-Roc, then head of Shell’s Renewable Energy Business, argued the decision to develop renewables was based on sound commercial reasons.<sup>136</sup>

Shell’s real intent in investing in renewable energy became even more apparent as it justified its interest in renewable energy to its stockholders as a “win-win-win scenario”. In 1998 the then Chairman Mark Moody Stuart told shareholders: “We see renewables as a vital new market which we expect to grow quickly in coming years.” Stakeholders were pleased with this forward thinking move, and Shell claimed that it was a natural step towards new energy sources, much like the company moved from coal to oil to gas.<sup>137</sup>

## **Growing a green portfolio?**

After the millennium, Shell continued to invest in and promote their investments in renewable energy. In 2001 the company developed a series of “Global Scenarios” on how globalisation, liberalisation and advances in technology would change the world over the



Sugar cane being burned for production of biofuels.

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Deforestation due to the cultivation of soy used for biofuels in Brazil, near the Xingu park.

© jan gilhuis



Forests cleared and burnt for production of biofuels in Salta, Argentina.

© hernan giardini / greenpeace argentina

next twenty years. Shell found that, “wind becomes a competitive source of power” and that “new renewables [would] comprise 4-7 per cent of primary energy by 2020.”<sup>138</sup>

Shell also highlighted its renewable investments in its annual sustainability reports:

*2003 report:* “Almost tripled our wind-power capacity, bringing total production to 650MW ... Started producing the most efficient thinfilm solar panels available commercially.”<sup>139</sup>

*2004 report:* “We have invested around \$700 million since 2000 to build commercial businesses in wind and solar power and hydrogen.”<sup>140</sup>

*2005 report:* Shell has invested \$1 billion in renewable energy and the company has the “broadest alternative energy portfolio of any major energy company”. Shell said: “We are determined to drive down costs and overcome the other practical hurdles that prevent them becoming a significant part of the world’s energy mix.”<sup>141</sup>

In Shell’s 2005 Sustainability Report, van der Veer talked of a vision that included the “rapid growth of alternative energy in the coming decades from today’s low base.” It would be “foolish to pick the final winners, which is why we are investing in a range of the most promising technologies.”

### Coming clean on clean energy

However, only a year later and throughout 2006 a significant shift occurred within the company. Despite van der Veer’s proclamation that it would be “foolish” to invest in only one technology, Shell decided that there would be only one winner in its renewable portfolio: biofuels. Three times in its 2006 Sustainability Report, instead of promoting a mix of wind, solar and biofuels, Shell promised to develop “at least one alternative energy source.”<sup>142</sup>

At the same time, Shell’s turnaround on renewable energy became even more solidified. When asked whether Shell was an oil company, an energy company or a sustainable energy company, van der Veer said: “We are a hydrocarbons company, including petro-chemicals and clean coal technology.”<sup>143</sup> The much-hyped renewable business all but

disappeared. In 2007 Shell’s publications noted five pillars of the company business, of which renewables were missing. Under the heading “Who we are and what we do”, the main parts of the group were: exploration and production, oil sands, oil products, chemicals, and gas and power.

Officially, Shell’s wind and solar units had been moved into its gas and power division “so that they can benefit from the expertise and market knowledge of one of our mainstream businesses.” Only a decade after announcing a designated renewables division, Shell was paving the way for it to be disbanded, reflecting its new strategic goal “to be the leading oil sands operator.”<sup>144</sup>

As if to underline the speed with which it was pulling out of renewable energy - in the week that it posted record profits in March 2008, Shell also announced it was divesting from the London Array. This was set to be one of the world’s largest wind projects, aiming to have up to 341 turbines generating 1,000 megawatts (MW) in the Thames Estuary, east of London.

A year later the company finally came clean about pulling out of clean energy. In March 2009 Shell announced it would no longer invest in wind, solar or hydrogen. CEO van der Veer said: “I don’t expect them to grow much at Shell from here, due to portfolio fit and the returns outlook compared to other opportunities.” The other opportunities were, of course, oil sands and biofuels. The latter, van der Veer explained “makes the most sense” because it is “closest to our core business”.<sup>145</sup>

When Shell’s new Sustainability Report was published in May 2009, it included six “pathways” to help reduce carbon dioxide. Prominent on the list was unproven Carbon Capture and Storage (CCS). Biofuels were also mentioned, but wind and solar were conspicuous by their absence.<sup>146</sup> Shell did, however, say it had increased its wind capacity by a third to 550 MW over the past year, even though it had an identical capacity the previous year and 650 MW in 2003. The reality is that little more than one percent of Shell’s \$123 billion US total capital expenditure over the last five years has gone into renewables.<sup>147</sup>

## Limited renewable energy initiatives

### Shell's shifting statements on wind:

2003 Shell Report: "Almost tripled our wind-power capacity, bringing total production to 650MW."<sup>148</sup>

2007 Shell Sustainability Report: "Shell is also a major wind power developer, participating in projects with a capacity of over 1,100 MW (Shell share, approx 550 MW)."<sup>149</sup>

2008 Shell Sustainability Report: "In 2008 we increased our wind capacity by nearly a quarter to 550MW."<sup>150</sup>

2009 Statement: Shell announces it is getting out of wind and solar.<sup>151</sup>

### Biofuels: Not a clean energy alternative

Shell's commitment to biofuels as a clean and green alternative is misguided. Biofuels have been touted as a panacea for addressing global warming issues, and in fact companies are required to blend biofuels with oil – in Europe, the requirement is 10 percent by 2020. However, the more we learn about biofuels the less clear it is that they will achieve the goals they are lauded to accomplish. Making matter worse, the ecological impact of biofuels production and consumption could be just as bad as or worse than the impacts from oil.

As with any industrial-scale agricultural initiative, biofuels can contribute to a large-range of ecological problems. Particularly, the drive to grow more crops for biofuel production encourages the increased use of agricultural chemicals, including fertilizers and pesticides. Corn, the feedstock for the majority of biofuels grown today in the United States, requires massive amounts of fertilizer, leading to downstream pollution of our waters and adversely impacting aquatic life.<sup>152</sup> But corn is not the only culprit of these types of practices; many of the "next generation" biofuel feedstocks, including switchgrass, also utilize these types of agricultural chemicals in order to boost yields as well.<sup>153</sup>

One of the most significant concerns with increased biofuel production, however, is with land competition and conversion. There is a finite amount of land in the world, and, as biofuel production competes with other agricultural goods production for farm land, widespread conversion of ecosystem occurs. This has already been seen explicitly in Malaysia and Indonesia as rainforests are converted into palm oil plantations.<sup>154</sup> As demand for corn for ethanol has increased in the United States, farmers have taken their land out of the Conservation Reserve Program, a farm program that encourages farmers to let their fields go fallow for ecological benefits.<sup>155</sup>

On a macro level, increased biofuel production is causing shifts in agricultural markets around the world leading to ecosystem conversion in countries that are not necessarily

even producing or using biofuels in an attempt to accommodate the increased demand for agricultural land. This ecosystem conversion causes biodiversity loss, but also contributes greatly to global warming. In many cases, because of this phenomenon, today's biofuels are causing more global warming pollution than gasoline on a life-cycle basis.<sup>156</sup>

Probably even more disturbing, however, is the increased use of new genetic technologies, such as synthetic biology, to produce biofuels. Shell has partnered with several companies that specialize in the creation of synthetic biology, including Codexis, logen and Virent, in a race to become one of the first oil companies to own the next source of transportation fuel.

Synthetic biology is the engineering of entirely new life forms from scratch – someone assembling sugars in a lab in an attempt to create a new form of microbe that will accomplish a specific goal. Currently, the development of synthetic biology is completely unregulated. Microbes have the unique ability to mutate and amplify quickly, as well as find novel forms of transmission into organisms. This means that although one might be able to create a new form of microbe that produces a desired result in the lab, there is no way to control or predict how the organism will change over time and affect the other living beings in the world.

Despite their adverse ecological impact, biofuels continue to be promoted and invested in as a clean, renewable energy. But while Shell's investments in biofuels may look green, these fuels in fact have significant environmental and social impacts. Moreover, lucrative subsidies, tax credits and production and blending mandates make biofuels the most subsidized of all renewable energy sources, garnering over three-quarters of all subsidies for renewable energy.<sup>157</sup> In fact, the biofuels industry receives just as much subsidy as the oil industry itself, but for producing less than one tenth of the amount of energy.<sup>158</sup> All-in-all, Shell's commitment to biofuels aligns well with their historical investment in renewable energy: financially lucrative investments painted green.

So, Shell's journey to 'green' itself, which began after the death of Ken Saro-Wiwa, ended with the company going back to basics, just months before the *Wiwa v. Shell* case was settled in the United States. In the thirteen years it has taken to resolve this case, the company has moved its aspirations from oil and gas to renewables and then back to oil and even worse, into unconventional oil.

Seb Beloe, head of socially responsible investment at Henderson Global Investors, responded by saying he was "disappointed that Shell has moved away from a broader portfolio of renewable energies to focus just on biofuels. I definitely see that as a retrograde step."<sup>159</sup> Fred Pearce, author of the Guardian's "Greenwash" column, said simply: "Shell, I have to report, is the new Exxon."<sup>160</sup>

# Lobbying EU institutions against action on climate

# 6

**In Europe, Shell spends millions of Euros – publishing adverts in the media and circulating public statements of its executives – trying to convince EU decision makers and the general public that it is taking serious steps to reduce its energy use and to curb its greenhouse gas emissions. Privately it is doing the opposite. Behind closed doors at the European Union, the company has been fiercely lobbying against greenhouse gas reduction plans.**

Shell and other oil companies' interests are represented in Brussels by the European Petroleum Industry Association (EUROPIA), which acts for the industry in policy negotiations and the drafting of EU laws. Shell's efforts to undermine European emission reduction policies are also channelled via CONCAWE, the oil industry research association.

Another of Shell's platforms for delivering policy-oriented messages is the European Round Table of Industrialists, a forum of 45 CEOs and chairmen of major European companies. The European Round Table of Industrialists is chaired by Jorma Olilla, Shell's Non-Executive Chairman, while CEO Jeroen van der Veer is the Chairman of the European Round Table of Industrialists's Energy and Climate Working Group.<sup>161</sup>

Shell has responded to the European Commission's proposal to cut carbon dioxide emissions by 20 per cent by 2020 with a vigorous lobbying and advertising campaign. Two main elements of the Commission's "Climate action and renewable energy package" were the Fuel Quality Directive and the reform of the Emissions Trading Scheme.

## Lobbying against fuel quality

The Commission's Fuel Quality Directive proposal introduced a new greenhouse gas reduction target for transport fuels, which would require producers to reduce emissions from their fuels by 10 per cent by 2020 compared with 2010 levels. The main target of the directive was the oil industry.

To reach the proposed reduction target, the Commission insisted that its proposal should drive emissions reductions throughout the entire fossil fuel chain. This meant that the oil industry would have to reduce flaring and venting; improve energy efficiency in refineries; increase usage of cogeneration, and develop CCS.<sup>162</sup>

The industry's critics argued that the 10 per cent target was easily achievable. Friends of the Earth Europe's "Extracting the Truth" report, published in 2008, outlined how the industry could reach the 10 per cent emission reduction target almost exclusively by reducing gas flaring, while further reductions could be achieved through other measures.<sup>163</sup>

However, from the beginning the oil industry lobbied against the targets and measures of the Fuel Quality Directive. EUROPIA stated that the 10 per cent reduction target "should be withdrawn from the Directive proposal".<sup>164</sup> During a stakeholder meeting in May 2007, EUROPIA and CONCAWE both argued that the oil industry could do nothing to reduce the greenhouse gas intensity of mineral oil-based fuels. They proposed instead that the target should be achieved through an increased use of biofuels. When the Commission proposed sustainability criteria for biofuels, EUROPIA tried to get them off the table.<sup>165</sup>



Friends of the Earth Europe's greenwashing banners.  
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## Lobbying EU institutions against action on climate

Shell and others also argued against proposals for further efficiency improvements of oil refineries. The contention was that since refineries were already part of the Emissions Trading Scheme, they should not be subject to a second piece of legislation. This, according to EUROPIA, would be unfair.<sup>166</sup> It didn't matter that a European Commission study showed that the Fuel Quality Directive needn't affect Emissions Trading Scheme functioning.<sup>167</sup> Or that the Emissions Trading Scheme was in fact failing to stimulate significant carbon dioxide reductions because emission permits were given for free.<sup>168</sup>

During negotiations on the possibilities for reducing greenhouse gas released through flaring and venting, the industry argued that flaring was needed for safety reasons. It also claimed that reducing flaring would require them to develop costly installations for its commercial use.<sup>169</sup> However, even industry insiders believe that gas flaring is “a so-called low hanging fruit in terms of climate change abatement because it's relatively simple. It can be done quite easily.”<sup>170</sup>

### Scaremongering at the EU over the Emissions Trading Scheme

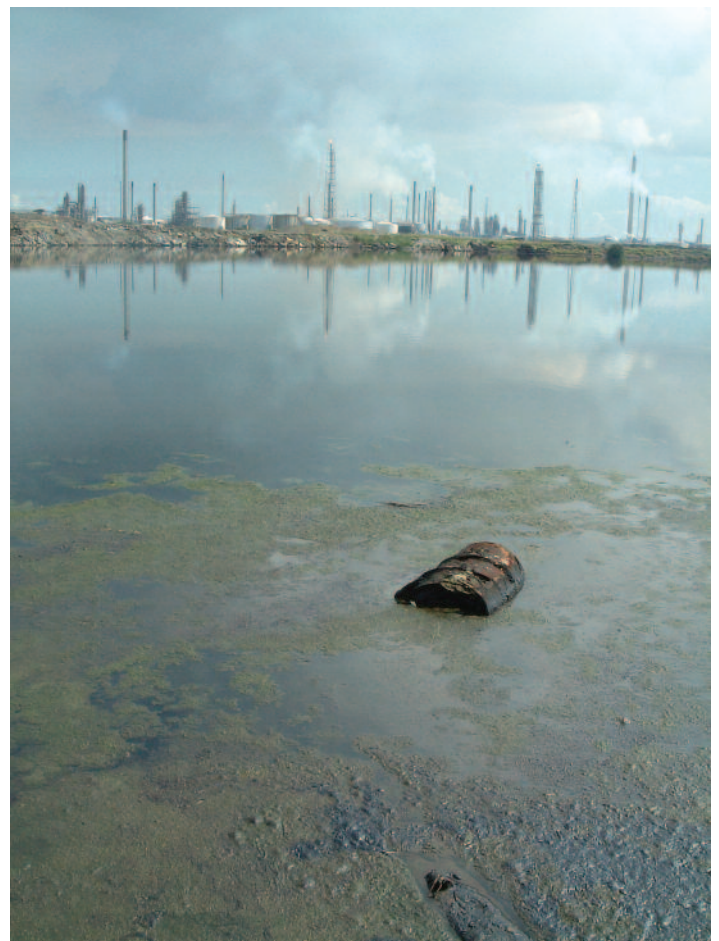
The second element of the EU's 2007 “Climate action and renewable energy package” was reform of the Emissions Trading Scheme. These include a plan to charge refineries for 20 per cent of their emission permits from 2013, rising to 100 per cent by 2020. Once again Shell and other oil companies have lobbied against the proposals.<sup>171</sup>

Shell has used the European Roundtable of Industrialists as a vehicle to lobby against this. In a letter sent in January 2008 to Gunter Verheugen, the EU Commissioner for Enterprise and Industry, the European Round Table of Industrialists “raised a number of concerns regarding the directions being taken by the Commission on the revision of the Emissions Trading Scheme.” The letter contained scaremongering, arguing that the Commission's proposals “create further uncertainty and will certainly not entice the industry to invest.” It was signed by Jeroen van der Veer.<sup>172</sup>

In a later interview for The Times, van der Veer was even more blunt. “We don't want to threaten draconian measures, we prefer to make the case in a positive way. But it's a hell of a lot of employment...”, he said, suggesting that the proposals would lead to a loss of European jobs. He warned that “you should not drive the industry away [from Europe].” Even as oil company profits hit record heights, van der Veer stated that the Commission's proposal would undermine the competitiveness of a struggling industry and threaten an exodus of refineries out of the EU.<sup>173</sup>

Van der Veer also warned in the Dutch media against “escalating percentages” for greenhouse gas reductions, referring to reduction targets of 30 and 40 per cent that were discussed by European governments.<sup>174</sup> Despite overwhelming evidence that even greater targets are necessary, van der Veer talked of “overstretched targets”. When Rotterdam – the base for Shell's biggest refineries – announced that it would halve its greenhouse gas emissions by 2025, Shell publicly distanced itself from that commitment.<sup>175</sup>

While van der Veer has been attempting to undermine the EU's greenhouse gas emission strategy, he has also been key in the internal debate within Shell on how to deal with the company's own greenhouse gas emissions. Contrary to all public statements, Shell actively undermines efforts to reduce climate impact of fossil fuels.



Asphalt lake near the former Shell refinery in Curacao, Dutch Antilles.  
© humane care foundation, curacao



# Weakening U.S. climate legislation

Shell is spending a large amount of money on lobbying in Washington and has also reportedly played a role in weakening climate efforts in U.S. climate legislation.



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## Millions spent each year on lobbying

Shell's lobbying disclosure reports say that the company spent \$800,000 in the first 3 months of 2009 on lobbying activities.<sup>176</sup> During that time, it lobbied on climate and energy related legislation such as the discussion draft of the climate legislation in the U.S. House of Representatives, which is now the American Clean Energy Security Act. Shell also lobbied on Environmental Protection Agency implementing regulations of the Renewable Fuels Standard, as well as issues "related to the commodity exchange act, derivatives market oversight, and [the Commodity Futures Trading Corporation], all of which are related to climate regulations."<sup>177</sup>

## Shell weakens climate legislation

Shell, along with ConocoPhillips, is one of 28 members of the United States Climate Action Partnership (USCAP) whose blueprint serves as the basis for the climate and energy bill that came out of the Energy and Commerce Committee in the House of Representatives.<sup>178</sup> The Energy and Commerce Committee allowed USCAP organizations to play a significant role in influencing the climate legislation, with the Committee even holding a hearing about the partnership prior to drafting climate legislation.<sup>179</sup>

The resulting American Clean Energy Security Act is particularly industry friendly. The legislation ensures that polluters can continue business as usual until 2030 or beyond without having to actually reduce their emissions.<sup>180</sup> The bill also gives over 57 percent of emissions allocations worth hundreds of billions of dollars to polluting industries, including almost 2 percent of these allocations to oil refineries. In contrast only 12 percent of allocations would go to financing renewable energy.<sup>181</sup> It is not surprising that a company that recently announced that it will no longer invest in renewable energy and is instead focusing its attention on dirty sources of energy and biofuels is trying to take U.S. policy down the same pathway.<sup>182</sup>

Shell was instrumental in removing the only provisions in the bill that would have stopped increased US imports of dirty oil sands oil from Canada. The original discussion draft of the American Clean Energy Security Act included a low carbon fuel standard that would have ensured that the carbon intensity of transportation fuels remained at 2005 levels beginning in 2014. In 2023 it would have required that the transportation pool reduce carbon intensity by 5 percent and by 10 percent in 2030. The oil companies in USCAP argued that was contrary to the USCAP blueprint because it required the carbon intensity of fuels not to rise from 2014 to 2022.<sup>183</sup> The legislation as passed out of the Energy and Commerce committee was weaker than the discussion draft and includes billions of dollars in giveaways for refineries while completely eliminating protections from high carbon fuels such as oil sands.

Just months before the legislation began to make its way through the U.S. House of Representatives, Shell executive vice president Graeme S.S. Sweeney had said, "California's low carbon fuel standard is going to set the standard for the U.S. and, I expect, the standard globally."<sup>184</sup> Yet Shell has been instrumental in eliminating provisions in legislation that would support these efforts. Shell Oil is trying to greenwash its image while at the same time using its position in USCAP to undermine effective US climate policy.



# Appendix one: Methodology for calculating the carbon intensity of oil companies

## 1. Current Intensity

The Trucost analysis of carbon intensity amongst the top five international oil companies was based on the following sources:

- Company annual reports,
- US Securities and Exchange Commission filings
- Investor presentations.

These were analysed for a breakdown of conventional / heavy oil and gas production.

### 1.1 Conventional Oil

Oil production carbon intensity was calculated according to the figures given in two recent reports from the National Energy Research Laboratory.<sup>185</sup> These provide figures for the carbon intensity per barrel for oil production in a range of countries from which the USA imports oil.

These figures were then used to estimate emissions according to company production in a given country. The sub-total was weighted to reflect the proportion of each company's production in each country. ExxonMobil only reports production in regions, therefore a regional average was used.

### 1.2 Unconventional Oil / Oil sands

Oil sands emissions were based on actual reporting where applicable. This is derived from company reporting and/or intensity figures from the Oil Sands Review.<sup>186</sup> Where emissions were not reported, industry averages derived from the Pembina Institute's analysis were used.<sup>187</sup>

### 1.3 Natural Gas

Natural gas intensity estimates were based on information for gas production in Europe, USA and Canada using the data from the European Environment Agency, the US Environmental Protection Agency and Department of Energy.<sup>188</sup>

## 2. 1.Total Resources Analysis

The total resources analysis was undertaken by the report's authors, analysing company graphs or pie-charts given in company reports or analyst presentations. All the companies

were asked for the raw data behind the charts, but were not forthcoming, so the graphs were broken down using a protractor or ruler to calculate the proportion each segment represents. Intensity calculations were then made using the following general assumptions:

### 2.1 Traditional / Conventional production:

Apart from BP, all companies mixed oil and gas together in this category. With no way to calculate the split we assumed a 50/50 split between oil and natural gas for all companies except BP. We then used the applicable 2008 intensity figure for each company from the Trucost analysis.

### 2.2 Deepwater and Arctic oil production

We could find no published carbon intensity figures for these categories of production. We know that they are probably above the average for conventional oil, so we assumed the weighted average for US refinery feedstock in the NETL analysis. This is 40.3<sup>189</sup>

### 2.3 Tight / Sour and unconventional gas

We used the figure in HSBC's Oil & Carbon Report for Tight Gas: 33.1

### 2.4 Heavy Oil and Oil sands

Each company has reported heavy oil, Enhanced Oil Recovery (EOR) and oil sands slightly differently. To improve accuracy, we have, where possible, broken these segments down using separate company documents. Including:

- *Shell*: We asked Shell to give a numerical break down of what it calls "Heavy Oil and EOR" in its Total Resources pie-chart, but it refused.<sup>190</sup> This segment made up 34.7 per cent of its pie-chart or 22.9 billion boe out of a total of 66 billion boe. The media release accompanying the presentation, from which this chart was derived, stated: "Canadian heavy oil, where we have some 20 billion barrels of resources, is a classical new technology and integration play that Shell can do well."<sup>191</sup>

We therefore assume that of the 22.9 billion boe, 20 billion boe is oil sands. We do not know the proportion of this 20 billion boe that will be extracted using mining or in situ



Near the Athabasca Oil Sands Project, Canada.

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methods, and once again we asked Shell and they did not tell us. However, we are aware that 80 per cent of oil sands resources are only accessible through in situ methods.<sup>192</sup>

So although Shell's main planned production capacity is in mining which has a lower carbon intensity, we know that in the long term, it will be in situ production that will probably produce the most barrels of oil. We therefore took an average of the carbon intensity figures, including upgrading, for the three main methods of oil sands extraction from the Pembina Institute analysis. These are detailed below in the table. The average of the three including upgrading amounts to 105.

For the rest of the Heavy Oil and EOR segment we took an average of the figures for EOR and Water Flood Viscous & Heavy Oil from the HSBC Oil & Carbon Report. This gives 47.5.

- **ExxonMobil:** ExxonMobil's graph included a segment called Heavy Oil that accounted for about 20.5 per cent of its resource base. We were able to locate total resource figures for specific oil sands projects in Imperial Oil's (Exxon's Canadian subsidiary, 69.6 per cent owned by ExxonMobil) annual report.<sup>193</sup> We cannot be sure that these account for all of ExxonMobil's oil sands resources but, again without further information from the company, it is as close as we were able to get.

We calculated that about 35 per cent of the Heavy Oil resource could be accounted for with oil sands mining resources and about 9.4 per cent in Imperial Oil's main in situ project that uses Cyclic Steam Simulation (CSS). We therefore applied Pembina figures to the mining segment (80) and CSS segment (135) and HSBC's Heavy Oil figure (55) to the remainder. This gave us a total intensity figure for the Heavy Oil segment of 71.3.

- **Chevron:** Chevron reported Heavy Oil in a separate segment to Oil Sands. We applied the HSBC Heavy Oil figure to Heavy Oil (55) and the Pembina average of the three production methods to the oil sands (105).
- **BP:** BP reported Heavy Oil and Viscous Water Flood together. BP at present has one planned oil sands project, but it does not disclose the total resources for it. We used the HSBC Heavy Oil figure for this (55). If we had added BP's oil sands

project to the analysis, (which as a SAGD project does have high intensity) BP's figure may have changed by a point or so. This however would not make much difference to the overall comparison between companies.

**table 3. Oil sands carbon intensity figures from which we derived an average of 105<sup>194</sup>**

Activity	Greenhouse gas intensity (kg CO <sub>2</sub> e/barrel)	Greenhouse gas intensity (kg CO <sub>2</sub> e/barrel) including 45 kg CO <sub>2</sub> e/barrel for upgrading of bitumen
Mining of bitumen	35	80
SAGD extraction of bitumen (In situ)	55	100
Cyclic Steam extraction of bitumen (In situ)	90	135

### 2.5 Other general assumptions

That the Total Resources measurement and definition is the same for all companies.

We are forecasting 40+ years into the future based on 2008 data; therefore figures are highly susceptible to unforeseen events (political, economic, geographic etc), plus technological improvements to efficiency.

The development of these resources is dependent on the trajectory of crude oil prices. The higher the oil price, the more oil is available for drilling as more expensive methods become economical. In general as the oil price rises, heavier and more difficult oil, which usually requires more energy intensive production methods, is increasingly likely to be exploited.

We have no timeline for the development of these resources – the figures are an estimate of intensity based on 100 per cent of Total Resource development.



## Appendix two: Flaring calculations

### Estimates of flaring in the Niger Delta

Industry sources and World Bank research estimates vary – although the most reasonable conclusion is that current gas flaring in the Niger Delta emits from 53-60 million tons of CO<sub>2</sub> annually. This is equivalent to 9-10 million cars in the US.

Calculation and additional estimates:

**1.** According to satellite research on behalf of the World Bank, Nigeria flared 23.0 billion cubic meters of gas in 2004. This is close to current estimates from OPEC, NNPC, and CEDIGAZ, in which Nigeria flared 22 billion cubic meters of gas in 2007. According to the President of the Nigerian Gas Association however, Nigeria currently flares 33.6 billion cubic meters – while the current estimate of the World Bank is only 16.8 billion cubic meters. We have thrown out the outliers, and chosen to adopt the median estimates of 22-23 billion cubic meters of gas.

Sources:

- Report 'A twelve year record of national and global gas flaring volumes estimated using satellite data, final report to the World Bank' by US National Geophysical Data Center, May 2007, [http://www.ngdc.noaa.gov/dmsp/interest/gas\\_flares.html](http://www.ngdc.noaa.gov/dmsp/interest/gas_flares.html)
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- Recent World Bank estimates: <http://siteresources.worldbank.org/EXTGGFR/Resources/344690Sanitation0and0hygiene0at0wb.pdf?resourceurlname=344690Sanitation0and0hygiene0at0wb.pdf>

These were analysed for a breakdown of conventional / heavy oil and gas production.

**2.** A billion cubic meter translates to greenhouse gas emissions of 2,38 million tonnes CO<sub>2</sub> equivalent. Source: report 'Nigeria: Carbon Credit Development for Flare Reduction Projects, Guidebook', ICF Consulting Ltd and Triple 'E' Systems Associates Ltd., June 2006,

Source: [http://siteresources.worldbank.org/EXTGGFR/Resources/NigeriaGGFRGuidebook\\_ICF.pdf](http://siteresources.worldbank.org/EXTGGFR/Resources/NigeriaGGFRGuidebook_ICF.pdf)

**3.** Calculation from figures above: Gas flaring in Nigeria caused climate change emissions to an amount of 53-55 million tonnes CO<sub>2</sub>-equivalent. You can also calculate this differently: Over 150 billion cubic meters of natural gas were being flared and vented in 2004, of which in Nigeria 23,0 billion cubic meters. Flaring gas has a global impact on climate change by adding about 390 million tons of CO<sub>2</sub> in annual emissions. So, CO<sub>2</sub>-emissions are 60 million tons in Nigeria by gas flaring.

Source: report 'Global Gas Flaring Reduction Partnership', World Bank, December 2006, <http://siteresources.worldbank.org/INTGGFR/Resources/GGFR-IssueBrief.pdf>

**3.** Equivalency calculator by US EPA:

<http://www.epa.gov/solar/energy-resources/calculator.html>

In addition, we analyzed Shell's data in the following way:

The Shell 2008 Sustainability report states "Between 2002 and 2008, [projects to gather and use associated natural gas] had reduced associated gas flaring by more than 30%. Including the impact of reduced production due to the security situation, the joint venture's flaring was down approximately 60%." [http://sustainabilityreport.shell.com/2008/servicepages/downloads/files/entire\\_shell\\_ssr\\_08.pdf](http://sustainabilityreport.shell.com/2008/servicepages/downloads/files/entire_shell_ssr_08.pdf)



Burning oil spill in Nigeria.

© andrea scaringella

According to the Nigerian Extractive Industries Transparency Initiative audit, between 1999 and 2004, Shell flared between 264,000 and 350,000 million standard cubic feet (MMSCF) per year in Nigeria. Shell's flaring in 1999 was 264,000 and in 2002 was 350,000 MMSCF (<http://www.neiti.org.ng/FinalAuditReports-Sept07/PhysicalReports/Appendicies/AppCGasSystemBinder.pdf>). Based on the information in Shell's sustainability report, this suggests that in 2008, flaring was at approximately 116,500 MMSCF, but it would be at 233,000 MMSCF if operations were continuing without security problems, not far below 1999 levels.

According to the Nigerian Extractive Industries Transparency Initiative (NEITI) audit, between 1999 and 2004, Shell flared an average of 52 percent of gas it produced in Nigeria (<http://www.neiti.org.ng/FinalAuditReports-Sept07/PhysicalReports/Appendicies/AppCGasSystemBinder.pdf>).

Based on the information in Shell's 2008 sustainability report and the NEITI, Shell flared approximately 116,500 million standard cubic feet (MMSCF in 2008), and would have flared as much as 233,000 MMSCF if operations were continuing normally without security problems.

[http://sustainabilityreport.shell.com/2008/servicepages/downloads/files/entire\\_shell\\_ssr\\_08.pdf](http://sustainabilityreport.shell.com/2008/servicepages/downloads/files/entire_shell_ssr_08.pdf)

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51.290 + 46.166 = 97,456,000 metric tons of CO<sub>2</sub>eq.  
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*"I and my colleagues are not the only ones on trial. Shell is here on trial...The Company has indeed ducked this particular trial, but its day will surely come and the lessons learnt here may prove useful to it. For there is no doubt in my mind that the ecological war that the Company has waged in the Delta will be called to question sooner than later and the crimes of that war be duly punished. The crime of the Company's dirty wars against the Ogoni people will also be punished...Come the day."*

Ken Saro-Wiwa, before the Nigerian Military Tribunal that falsely convicted him, September 21st 1995



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