

# **Greener Under Pressure: Global Energy Corporations and the Environmental Squeeze**

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Exhaustion of raw materials and general degradation of the environment have become serious impediments to the continued expansion of global capitalism and, indeed, of humankind. Energy companies, which focus primarily on fossil fuels, play a major part in this environmental “squeeze.” The companies pollute directly through the petroleum production process. They make other pollution possible indirectly by supplying the fuels that contribute to global warming and climate change. As measured by gross revenue for 2005, the largest companies in order, with country of headquarters in brackets, were ExxonMobil (USA), Shell (Netherlands-UK), BP (UK), Chevron (USA), ConocoPhillips (USA), and Total (France).<sup>1</sup> Ranked by profit, the order is the same except that Total jumps to fourth place. All the ‘majors’ are vertically integrated companies involved in the full commodity process from exploration to final sales. What explains their environmental politics? How similar are the strategies of the largest companies? These are the questions to be addressed.

This paper suggests that energy companies are adjusting their strategies in the face of increasing environmental problems, which have long-run consequences for profit levels, and also under pressure from the environmental movement. Public acceptance that global warming is linked to fossil fuel consumption and

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<sup>1</sup> Forbes Global 500, 2006. <http://www.finfacts.ie/Private/currency/fortune.htm>. Accessed 31 July 2006.

persistent claims by independent critics that these fuels are approaching maximum production at the world level combine to increase the appeal of alternative and renewable energy sources. Rising demand and increasing difficulty in replacing reserves have pushed all but ExxonMobil to invest part of their enormous profits in various forms of alternative, renewable energy. Earlier corporate opposition to the view that global warming is taking place primarily as a result of burning of fossil fuels has eroded - even on the part of ExxonMobil. In symbolic statements and to some degree through their actions, energy companies now claim to mitigate damage to the environment while assuring that they can meet the world's energy needs. This paper documents the strategies of the energy companies and explains their actions with reference to the social and environmental pressures that they have encountered in recent years and to which they have contributed through their own activities.

### ***Perspective***

This work looks at a particular moment in the history of complex networks of social life and the interface of humankind with the material or natural world. Hence, the explanation of corporate actions must be sought crucially at the level of the driving forces that structure the network. The concept of network is more appropriate than the more common system, because the former is less open to reducing explanation to determination by structures. Networks are like systems in so far as they have parts that interconnect and affect each other. The nodes of the network, however, are not designed and have not evolved in order to meet network needs. Thus, it is equally plausible to consider nodes of action as responsible for changing network relations as much as for maintaining them. Indeed, it is more sensible to consider networks as *temporary* structures subject to negotiation among components and externally imposed conditioning.

Capitalism is a complex network of constantly emergent properties based on the dynamic force of profit accumulation. Capitalists (whether individual entrepreneurs or part-owners of corporations) own or borrow means of production and hire the labour of others as cheaply as possible to produce goods and services with the objective of selling them at a profit. They may reinvest all or part of any profit with the objective of increasing wealth. This process depends on free (unrestrained) markets in goods and labour to operate most successfully. Capitalism functions on the related assumptions that perpetual growth is possible at the aggregate level and that sufficient material resources will always be available.

According to Marxist theory, capitalism eventually will collapse as a result of increasing internal contradictions. Periods of overproduction relative to the capacity of the market to absorb goods and services at a profit lead to (1) concentration of means of production among those best equipped to survive economic depression, (2) technological innovation that reduces costs (and the need for labour), and (3) the development of new markets where possible. A

subsequent round of expansion and then partial collapse follows. Finally, the extreme inequalities between owners and labour break the system in a revolutionary process.

History has not been kind to this Marxian model, which anticipates revolutionary change in the most developed capitalist centres. This has not happened. However, in the present period of global or mature capitalism, the limits to extraction from nature and the scale of environmental degradation generated by human production and consumption threaten the way of life built around this dominant global capitalism. This constitutes the second contradiction, one evident in the relatively neglected writing of Marx on nature, but see such notable exceptions as Burkett (1999), Foster (2000; 2002) and O'Conner (1998).<sup>2</sup>

What happens as the capitalist network unfolds depends on the relative powers of various participants and on the interpretations of those who have the capacity to define situations, at least for the time being. No person can speak for or control the complete network,<sup>3</sup> include states, firms, labour and consumer organizations, inter-state organizations and various non-governmental organizations. Increasingly, environmental pressure groups that work at corporate, national, international, and even global scales are key components of the overall network. Information based on primary interviews with key individuals would strengthen the argument of this paper, but resources permit only secondary analysis of available statements.

### ***Placing the energy companies***

The first task of the analysis is to locate the energy companies in the capitalist network. All major private and public energy companies find, produce and process oil and natural gas to generate profit for states or shareholders, depending on their ownership. They are participants in extracting a non-renewable (and thus shrinking) resource, and play a significant role in environmental degradation, directly as part of the production process and indirectly through polluting impacts of the fuels they sell.<sup>4</sup>

As actors in the global economy, energy companies are positioned in a network of other actors (figure 1). In this simplified model, the corporate headquarters is

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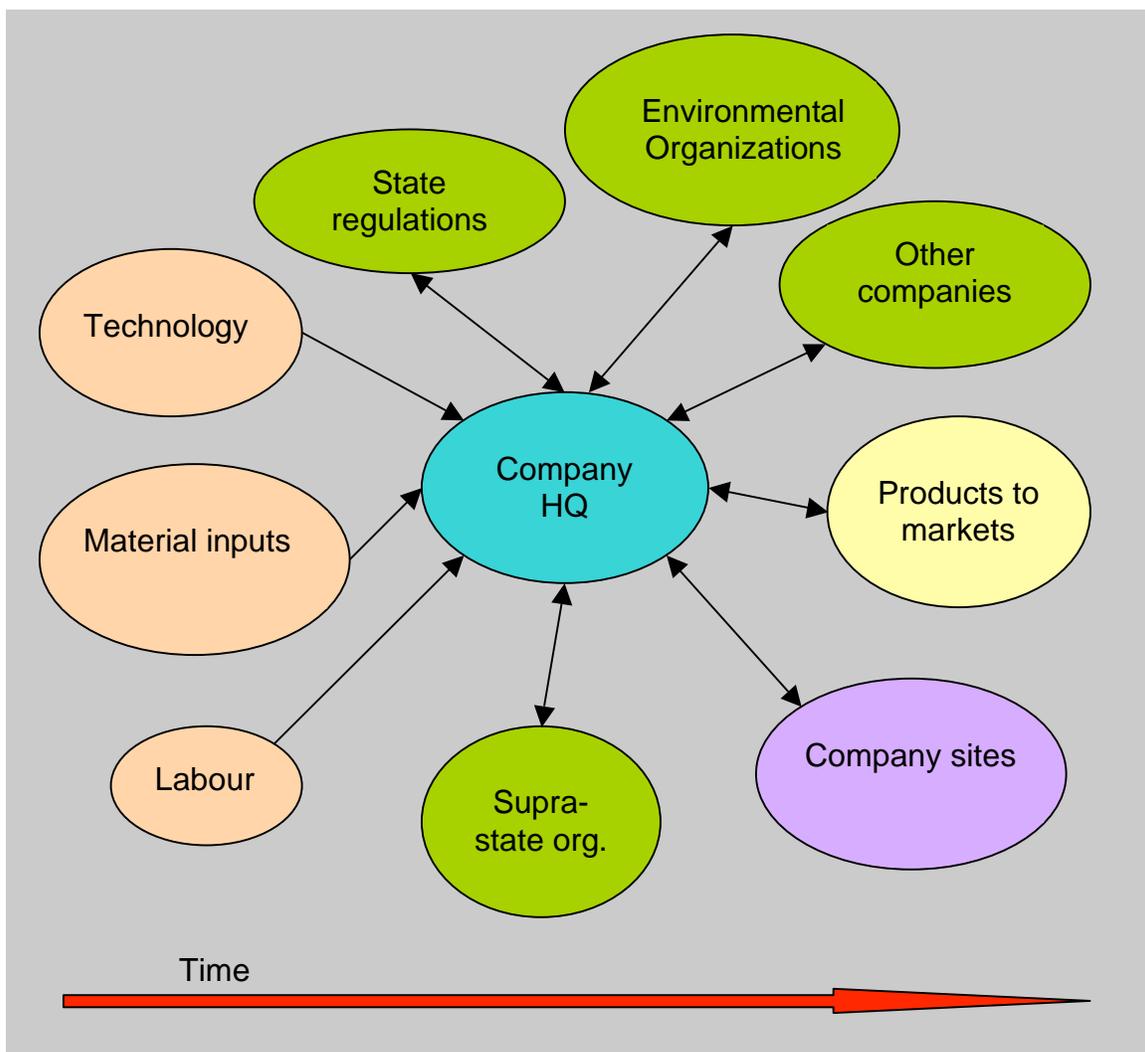
<sup>2</sup> See also Wallerstein (2004) who provides a helpful neo-Marxist summary except that he offers only passing commentary on the environmental source of crisis. Parsons (1977) presents selections by Marx and Engels on ecology.

<sup>3</sup> Actor-network theory could be helpful in a more comprehensive investigation because it insists on the interconnection of human and non-human components of action nodes, while also inviting an analysis of power to explain conduct (e.g., Latour 1987; Law 1999; Murdoch 2001).

<sup>4</sup> Space does not permit a review of the history of the petroleum industry leading to the contemporary situation dominated by the majors, but see Davis (2006), Falola (2005), and Parra (2004) for recent overviews.

intended to include the board of directors, senior managerial employees, and the administrative departments. Members of the board when acting in their managerial capacity are included as managers. Various network relations generate pressure for senior managers. These include the actions of *competitors* with whom, at times, agreements and alliances on matters of common interest, such as lobbying governments or sharing the costs and risks of expensive exploration, make sense. At the retail level in any given area, price leaders effectively control changes to which others normally respond almost immediately. Thus, consumers see no difference at the pumps most of the time. Competition for market share is usually limited to advertising that promotes brand loyalty or special services such as bonus programs.

Figure 1: The Energy Company Network



Generally, *shareholders* expect boards of directors and senior managers to act in the interests of the company as their top priority. In most cases, managers are shareholders themselves, but the largest shareholders are institutional pension funds and investment houses. In the past, such shareholders have usually been passive owners, who would express dissatisfaction by selling their stock rather than by challenging management, but recent problems of corporate governance and dissatisfaction of holders of mutual funds have contributed to more active participation. Shareholders are not likely to be difficult for managers as long as the business is profitable and company value is increasing. However, some critical individuals and organizations may try to exert pressure as shareholders on other matters. Minorities in both ExxonMobil and BP attempted unsuccessfully to change policies on issues of social and environmental justice at annual meetings in recent years (Associated Press 2006; SaveTheArctic.com 2004).

Links with various *political actors* are almost constant factors in the decisions of senior managers. The concept of political encompasses a range of relationships from local governments or informally organized groups to states, assemblages of states such as the European Union, and other supra-national organizations including the United Nations and the World Trade Organization (Mommer 2002; Mtsiva 2003). State regulation and planning, both the content of laws and their enforcement, are relevant to all stages of production and distribution. Oil companies may also be the objects of various political pressures to act in national interests as states attempt to secure energy supplies. The Kyoto Accord to reduce the production of greenhouse gases that are major contributors to climate change is the most critical international agreement to which the companies must adapt when they operate in countries that have ratified the agreement.

The *environmental movement* in several organizational variants has been critical of the oil and gas industry in general and of particular practices or incidents, such as Shell's attempt to sink the unwanted debris from its Brent Spar field (Jordan 2001) and the wreck of the Exxon Valdez close to Alaska's coast in 1989 (Keeble 1999). More recently, the environmental movement pushed strongly for compliance with the Kyoto Accord against corporate positions that denied the problem or insist on voluntary actions. The movement cannot be ignored because it appears strong enough to affect many consumers' views on energy, climate change, pollution, and transportation issues. Indeed, it probably played a role in new corporate positions discussed below, and the relationship has even evolved to one of partnership in some cases (Greenpeace International 2002). Such arrangements are promoted by acceptance of the tenets of ecological modernization, essentially the belief that capitalism is compatible with environmental sustainability.

Network relationships are sources of constraint on managers, when they limit what actions are possible, and also of opportunity, when they provide resources,

such as useful partners, favourable access to potential oil fields, and protection from opponents. Relationships contribute to actors' knowledge of relevant conditions and techniques, but this knowledge also draws on experience with past decisions, information from colleagues and media, and general education. Internal aspects of company organization, including flows of information, financial resources, labour relations, and the abilities of lower level personnel, influence what managers do. Finally, and not least, managers contribute to, but are also shaped by a capitalist ethos, or 'cultural schema' in Sewell's (1992) terms, which serves to limit vision and legitimate courses of action.

The implication of this set of influences is not that senior managers are powerless. These managers hold elite positions in geographically extended networks. Their constrained decisions affect the extent to which existing social processes and resource extraction practices are maintained or transformed.

### ***Responses to Environmental and Resource Problems***

In the early years of the twenty-first century, the issues of global warming and energy supply are prominent and closely linked (e.g., Houghton 2004). Burning fossil fuels is the prime source of increased carbon dioxide in the atmosphere and of the associated changes in climate. At the same time, some argue that oil and to a lesser extent natural gas are at or close to maximum levels of production (Heinberg 2005; Deffeyes 2005). Overall, the world's major energy companies, with the exception of ExxonMobil, offer similar interpretations of energy problems and behave in a similar fashion. The corporate responses are best understood as adjustments or defenses in which the companies try to defuse any opposition to their practices by pointing to their increasing control of emissions from their own operations and their encouragement of fuel conservation. In most cases, they also stress their commitment to alternative energy sources, preferably clean and renewable, to replace petroleum in due course.

### ***Global warming***

Does the petroleum industry contribute in a major way to global warming? After years of arguing and lobbying against the theory that human action was the most important factor in recent global warming, by the start of the current century BP, Shell, Total and Chevron all changed their positions and suggested that they were taking major steps to rectify the situation. This change has been awkward for the companies to acknowledge and also paradoxical because they all try to expand their oil production, often by drilling in environmentally sensitive areas, or lobbying to do so, as in the case of the Arctic National Wildlife Refuge.

BP states clearly that fossil fuels and global warming are linked. Moreover, this company accepts its responsibility to work towards a solution:

There is an emerging consensus that climate change is, at least in part, linked to the production and consumption of carbon based fuels. As a

major supplier of these fuels it's only right that we play a part in finding and implementing solutions to one of the greatest challenges of this century (BP 2006).

This has been the company's position since 1997, when it was the first major to leave the Global Climate Coalition, which fought against the idea that human action was mainly responsible for global warming and against the Kyoto Protocol, the proposed multinational regulations to reduce this impact. BP's decision to leave the anti-climate change lobby may have helped others follow in order to share the positive public image that might be anticipated.

In 2006, Shell's chief executive appeared strongly committed to dealing with the impact of fuels on the environment: "No discussion of future energy can take place without a focus on the effect of future energy use on the environment. It is an issue of concern to all to energy producers, to energy consumers and to governments" (van der Meer 2006:3). However, he also anticipated that future oil production would generate even more damaging impacts, and thus carbon sequestration and development of cleaner fuels would be vital. Indeed, these strategies are common to all companies. Thus, Total is claiming leadership in power generation with sequestration and appears committed to the Kyoto process (Total S.A. 2006). By 2005, ConocoPhillips was also among those accepting some responsibility and promising to take action to reduce emissions. The company supported sustainable energy development through voluntary action (ConocoPhillips 2005a).

In some ways, Chevron's position is the most encouraging for opponents of global warming by making public estimates of the final environmental impact of its products:

ChevronTexaco ... in the wake of a resolution requesting further investment in renewables last year, has become a quiet industry leader on climate change. The company has become the first (and only) oil company to disclose its entire greenhouse gas footprint, including the emissions associated with the use of its end product (e.g. emissions from cars that consume its gasoline). The company has taken the fundamental step of assuming a cost for carbon (of \$5-\$20/ton) whenever it considers a new capital investment, and is considering a major investment in renewable energy (Ceres 2004, para 2).<sup>5</sup>

ExxonMobil clung longest to the position of denial. After a period of strident opposition to the theory that global climate is changing and especially to the view that burning of fossil fuels is the most important factor in global warming, ExxonMobil's position softened in 2006. The company then accepted that fossil

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<sup>5</sup> See also BBC News (2006) for a statement of commitment by Chevron's vice-chairman.

fuels, among other factors, were contributing to the process. However, ExxonMobil stressed that uncertainty remains about the future due to the many factors related to the volume of greenhouse gas emissions. Also, in 2006, the prestigious British Royal Society sent an open letter from member scientists to the company requesting that it finally stop all funding of groups opposing the view that human actions are generating global warming. In 2005, the Society reported that ExxonMobil contributed \$2.9 million to 39 groups that it claimed misrepresented the work of climate change scientists (Adam 2006).

ExxonMobil's stance is now ambiguous. Although it acknowledged that certain assumptions do point to serious future consequences, it also noted one scenario to the effect that the warming trend could decline without intervention (ExxonMobil 2006a:22-23). This position brings comfort to climate optimists, but ExxonMobil does advocate precautionary action. "Even with many uncertainties, the risk that greenhouse gas emissions may have serious impacts justifies taking action" (23). Nevertheless, the company continued its opposition to the Kyoto Protocol on the grounds that it will be ineffective because it does not place demands on the developing countries, which will account for the largest share of increased energy use in the coming years. At the same time, ExxonMobil complained about the costs incurred by developed countries (23). Elsewhere, ExxonMobil demonstrates its faith in technological improvements as the prime means to control greenhouse gas emissions, but also acknowledges that "Worldwide carbon emissions are expected to grow rapidly over the next century, even with significant technology advances" (ExxonMobil 2006b:9).

### ***Running out of oil?***

Petroleum-based carbon emissions may gradually reduce within a few years simply because oil becomes scarce, although global warming concerns will only be alleviated if oil is replaced by less harmful sources of energy. Of course, the idea of running out of oil creates alarm because the world is heavily dependent on oil, which supplies roughly 40 percent of total energy, to meet the demand for transportation, electricity and home heating (Klare 2004:2). Worldwide, transportation uses approximately 55 percent of oil produced and in the USA it accounts for 65 percent of consumption (Hirsch et al. 2005). Somewhat separate to the issue of global supply is the regional distribution of supply relative to consumption. As indicated in Figure 2, the USA and Asia are both seriously dependent on external supplies of crude oil.

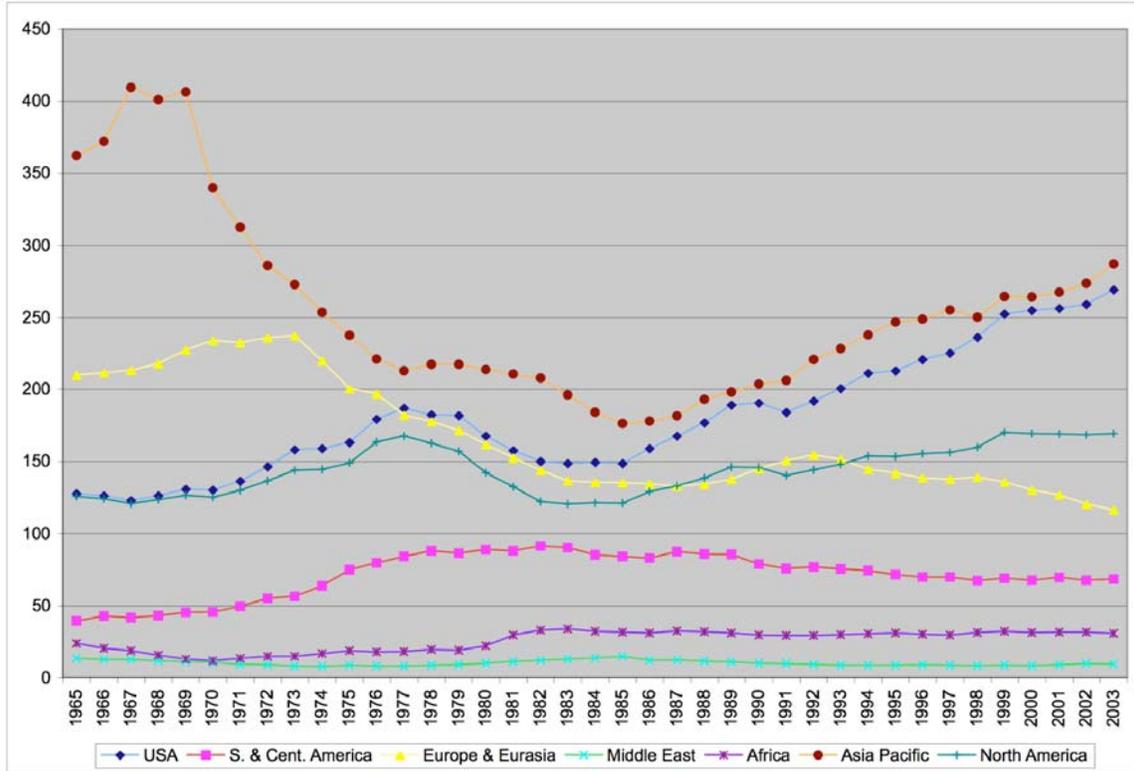


Figure 2: Oil Production as Percent of Total Consumption, 1965-2003  
 Source: BP Statistical Review of World Energy 2006 (my calculations)

There is no quick, economical substitute for this oil, and past disruptions of supply have had serious economic (and social) effects, although events such as the OPEC crisis of 1973-74 were short-lived and did not imply that long-term supply was in danger. Even a gradual decline of global oil supply will have far-reaching effects because modern economies and lifestyles are energy dependent. Massive social disruption and wars over access to remaining oilfields are not out of the question unless effective planning and quick actions are taken to reduce dramatically the consumption of oil products. This might lead to greater reliance on coal (with serious consequences for global warming) and nuclear power (with potential problems of radiation and long-term waste disposal) as well as renewable energy sources.

Because oil is so central to the provision of current energy, any theory that points to long-term supply problems will be troubling to producers and consumers. This is what peak oil analysis claims, based on the work of Hubbert (ASPO no date; Deffeyes 2005; Heinberg 2005; Hirsch et al. 2005). In 1956, Hubbert estimated that oil production in the mainland USA would peak around 1970, which indeed it did. He observed that discovery and production of oil followed a bell-shaped

curve, with production about 20 years behind discovery.<sup>6</sup> Thus knowledge of the rate of discovery allows reasonably accurate prediction of future extraction; and discoveries are hypothesized to decrease as a function of the total amount of oil that remains to be discovered.<sup>7</sup> Building on this pioneering work, Hubbert and others (quite often geologists formerly employed by oil companies) turned to calculating the future of global oil production. Although there is disagreement about how to count reserves and technological advances have made it possible to extract more oil from a given field than in the past, peak oil proponents note that production is exceeding new discoveries. Despite great investment in exploration, no giant fields have been discovered since 1968 (Hirsch et al. 2005:11). Thus, they expect that total world production will necessarily reach a maximum based on what can be taken from known sources operating at full capacity, probably around 2010. The uncertainty arises because the total amount of recoverable oil cannot be stated exactly and future demand must be estimated. Optimists on oil supply suggest that high prices will generate a successful round of new exploration and development of sites that were previously too expensive. Skeptics point out that this will simply deplete the world's admittedly unknown supply even faster.

In 2005, the BBC reported widespread interest in peak oil analysis, which received powerful support from a French government investigation that predicted the peak in 2013. A cautiously worded report sponsored by the US government (Hirsch et al. 2005) favours 2016 as the likely peak rather than the more optimistic assessment of the US Geological Survey, which selected 1936 (Deffeyes 2005:4); and late in 2005, the Swedish government was the first formally to accept the validity of the theory (Olofsson 2005).

How do energy company managers cope with the prediction that oil production will peak in the next few years? No spokesperson of any major company acknowledges that global production of oil and gas will begin to decline by 2015. Officials of Total (about 2020) and Chevron are the most pessimistic, but the positions of others are unclear.<sup>8</sup>

ExxonMobil does not suggest that oil is unlimited, but the company's web magazine rejects peak oil theory, claiming that reserves are ample for many decades and new technologies will permit sufficient recovery to meet growing demand for decades (Anonymous 2006; also ExxonMobil 2006c). ExxonMobil estimates that by 2005 less than one-third of the world's total supply of oil had been consumed. In such statements, there is no attempt to address the point that

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<sup>6</sup> For a clear description of Hubbert's method, see Deffeyes (2005:35-51).

<sup>7</sup> Deffeyes (2005:39) argues that this simple explanation is robust and has not changed substantially despite new technologies, deep-water drilling, and higher prices.

<sup>8</sup> This conclusion is based on an examination of company positions as indicated on their websites in July 2006.

no giant oil fields have been discovered in recent years. The reader is left with the impression that peak oil is invalidated by the probability that much more oil remains to be extracted in the future than in the past. However, the concern of peak oil proponents is that the annual demand will soon exceed the annual supply, despite the fact that oil can be pumped for decades.

As recently as 2004, BP did not acknowledge any short or medium term problem, as indicated in this statement by Lord Browne, the company's chief executive:

At current levels of consumption, there are sufficient reserves to meet oil demand for some 40 years and to meet natural gas demand for well over 60 years. On recent trends there seems to be considerable scope for proven reserves (and production) to keep rising in Russia and elsewhere (Lord Browne in BP 2004:1).

However, this optimistic vision does not account for increasing demands, or for the geographical distribution of reserves in areas of political volatility and the implications arising from that. Another problem is that estimates of reserves are often increased above what the evidence supports. Two years later, Browne maintained his position that oil supplies were secure when interviewed by the German magazine, *Der Spiegel*. Asked whether he felt promotion of the peak oil theory was “panic-mongering,” Lord Browne replied that:

We don't have to be worried. There are still sufficient reserves out there. Technological advances enable us to pump far more oil from a field than in the past. We used to recover about 20 to 30 percent, now it's about 40 to 45 percent, and there is no good reason to assume that we shouldn't be able to achieve 50 or 60 percent.

*Spiegel*: But doesn't this make production increasingly complex and costly?

*Browne*: It may be more difficult, but that only applies to a small percentage of production volume. Most of the oil can continue to be produced by simple means (Follath and Jung 2006:2).

Browne reiterated his confidence in new technologies and new discoveries in Russia and West Africa, as well as development of the tar sands in Canada. Yet, there are others in BP who do not stand behind this reassuring commentary. For example, a BP official estimated total recoverable oil at 2.4 trillion barrels<sup>9</sup> with a peak that might be as early as 2010. This person noted that there was division in the company with economists more optimistic than geologists (Orange 2004). This statement rests on the belief that economists expect high prices to generate greater investments in exploration and technology, while the geologists are skeptical that major new discoveries are possible regardless of the motivation.

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<sup>9</sup> This is much lower than the US Geological Survey estimate of three trillion barrels.

Chevron by 2006 had still not clearly stated an opinion on the future of oil, but did promote discussion on energy issues through its interactive website ([www.willyoujoinus.com](http://www.willyoujoinus.com)), which opens with the statement: "One thing is clear: the era of easy energy is over."<sup>10</sup> The various links in this site never mention the peak oil claim and avoid strong statements, while emphasizing the need for conservation, efficient energy use and development of multiple sources. Interestingly, Chevron acknowledges that most basins in North America and Europe are in decline. Indeed, this website states that "Oil production is in decline in 33 of the 48 largest oil producing countries"; hence, probably, the willingness of Chevron to pay a high price for Unocal in 2005 in order to secure more supply in the expectation that the price of oil will continue to climb in the long-term.

Chevron has not offered a year for peak production, but Total executives have suggested since 2003 that 2020 is a reasonable estimate. In June 2006, at an Amsterdam conference, Thierry Desmarest of Total advised that "The capacity of raising (oil) production is a real challenge ... if we stay with this type of production growth our impression is that peak production could be reached around 2020" (Bergin 2006). Apparently, Total has advised European states to promote reduced consumption to help ease the situation.

Although most companies and governments are unwilling to accept, at least in public, that a serious supply problem is approaching, some major companies are already producing considerably more than they replace with reserves, and investment in exploration in recent years has failed to justify the expense (Boxell 2004). In 2004, Shell acknowledged that it had overstated its reserves by 20 percent and in 2006 was replacing only 70 to 80 percent of its production, while claiming that new fields would prevent any decline of actual production (ASPO newsletter 63, March 2006). In 2006, BP reported that it replaced only 89 percent of production with new reserves and that production was actually falling. More significant, Saudi Aramco, the state oil company of Saudi Arabia and the world's largest producer, appears to be heading for declining output as its largest fields become exhausted (ASPO newsletter 66, June 2006). As we move to consider alternative energy, it is worth noting that ExxonMobil continues to expand its production and this may contribute to its less innovative orientation.

### ***Alternative sources of energy***

Global warming and upcoming limits to oil (and gas) supply both require intervention and serious consideration of alternative sources of energy. ExxonMobil and ConocoPhillips support almost no research on developing alternative energies apart from hydrogen fuel cells, while the remaining four majors are all involved in solar, wind, biological and hydrogen as potential

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<sup>10</sup> This was also part of a mass advertising campaign.

sources. In addition, Chevron is the world's largest producer of geothermal energy, while Total investigates both tidal and hydro power.

BP's website in 2006 appears with alternative energy in the main heading. Following the link we find a firm statement for the future: "We believe that solar, wind, hydrogen power and gas-fired power technologies have reached the tipping point and that we can create a profitable, high-growth, global business in the course of the next decade" ([www.bp.com](http://www.bp.com)). This may be greenwash publicity because, in the *Der Spiegel* interview, Lord Browne offered no clear opinion about the future of alternative energy. To him, beyond petroleum, the much advertised redefinition of BP, appears to mean natural gas because, "There is currently no alternative to oil and gas" (Follath and Jung 2006:3). To be fair, BP is a large investor in alternative energy, although the \$800 million to be spent annually on renewable energy projects appears less significant when set against the \$11 billion allocated to oil and gas. In response to a challenge that BP's redefinition of its logo as beyond petroleum is misleading and intended to draw attention away from the main focus of the company on petroleum, Browne argued essentially that there is no short-term substitute for fossil fuels and we should try to find an acceptable mix:

You can't say that you either want oil and gas or a clean environment. There has to be a balance between both sides. Fossil fuels will continue to be a large part of the energy mix in the future, that's the reality. It will take some time before technologies are available that reduce the importance of oil and gas. This is why the question we must ask is: Can we find an energy mix that affects the environment in a positive way while at the same time guaranteeing a reliable supply? I think we're doing a great deal to make this happen (Follath and Jung 2006:3).

Shell also claims to be environmentally responsible and is a leader in alternative energy research, having spent about \$1 billion by 2006 (much less than its spending on conventional energy). By 2005, the outgoing chairman of Shell (Lord Oxburgh) was forecasting the eventual demise of fossil fuels and recognizing that burning these fuels induced climate change. He anticipated that Shell would adjust by adopting new technologies and also suggested state intervention to promote necessary changes because markets alone would not bring this about (Reuters 2005). Moreover, in February 2006, Shell announced that it expected to bring some form of alternative energy into commercial production, although the type had yet to be determined (Shell 2006). This company, however, has a long history of environmental problems that do not encourage trust until change can be demonstrated over a period of years. These problems include the Brent Spar disposal, human rights issues in Nigeria, massive overstatement of reserves, environmental and social damage in the Peruvian Amazon, and attempts to hide problems in the Sakhalin development. Moreover, Shell has tried to silence critics like former employee Art Donovan, who maintains a website critical of Shell and other companies (<http://royaldutchshellplc.com/category/alternative-energy/>).

In 2006, Chevron announced a new business unit for ethanol and biodiesel fuels, an area that the company felt would be strategically important in the future. Similarly, BP planned a \$500 million research centre for biofuels and also a partnership with DuPont to use sugar as the key ingredient in a new fuel aimed at the British market (Alster 2006). Chevron's \$300 million per year in biofuel development anticipated rising conventional fuel costs and the eventual replacement of petroleum with alternative sources (BBC News 2006). The same company showcased in 2006 highly efficient UPS processing centres that included a power system based on a combination of solar energy and hydrogen fuel cells (Chevron 2006). Despite these environmentally friendly initiatives, Chevron was the main funder of resistance to a proposed tax in California that would have taken a share of gasoline revenue to finance development of alternative energy (UC Berkeley 2006).

ExxonMobil's position (like the more silent ConocoPhillips) stands out in contrast to the four active majors by relying on efficiency, care and technological development to delay the need for alternative sources. This company puts almost all its exploration and development resources into oil and gas (\$18 billion for 2006) insisting that these resources are the only ones profitable and that supplies will be adequate well into the future. ExxonMobil (and, indeed, all the other majors) trumpet the importance of liquifying natural gas at the source, which permits transportation by ship, but this is no solution to the problem of fuelling motors designed for gasoline, and is, of course, non-renewable like oil. Speaking for ExxonMobil, Dave Gardner stated: "We're an oil and gas company. In times past, when we tried to get into other businesses, we didn't do it well. We'd rather re-invest in what we know" (Healey 2005). The only exception, almost always brought up by ExxonMobil when challenged, is \$10 million p.a. to a Stanford University projected concerned with new technologies.

In a report on future energy requirements and probable sources, ExxonMobil does acknowledge that wind and solar energy will increase quickly (11 percent p.a.), but from such a small base in relation to the total energy demand that these sources are likely to contribute only one percent of the world's energy consumption by 2030 (ExxonMobil 2006b:4). At the same time, ExxonMobil expects that oil and gas, with liquid natural gas growing dramatically in relative importance, will supply roughly 60 percent of total consumption, about the same as in the early part of the century (Ibid.). Former Chief executive officer, Lee Raymond, raised these points in 2005, concluding that:

What all of this means, and without disparaging the importance of working on alternative energy approaches, is that for many decades the key issue in energy will be how to find and produce enough conventional energy to support global economic activity and prosperity for a growing world population (Barry 2005:3).

ExxonMobil is less active in alternative energy than other companies, but it is also less mired in contradiction. The others present an environmentally friendly image by touting various investments in alternatives; yet they attempt to produce as much oil as possible, even in highly sensitive areas. For example, BP seems to have resisted advice from its own employees to take precautionary action in its Alaskan operations prior to the leakages that closed down the pipeline in 2006 (Leopold 2006). All major companies foresee oil and gas as the prime sources of energy for decades. We should not interpret statements of concern about climate change and comparatively modest investments in alternative energy as a retreat from conventional sources, which will be exploited as long as they can be extracted at a price consumers will pay.

## ***Conclusion***

The world's energy companies and indeed its entire population are at a crucial conjunction in history. Capitalism as the underlying economic core of the contemporary world has defeated the state socialist alternative that seemed a major rival for much of the twentieth century. However, the freedom from rivals (and thus the emergence of capitalism as a truly global economic framework) has been replaced by problems that are the products of its success. As reviewed earlier, the dynamic of economic expansion has consumed enormous amounts of fossil fuels that contribute to global warming and climate change. At the same time, upcoming shortages of energy threaten this expansion. The world's energy companies are located at the core of this contradiction and how they act is vital to the way capitalism will unfold.

ExxonMobil partially excepted, global warming and the peak oil problem appear to have led to a set of common coping practices on the part of energy companies: environmental controls in their own activities to minimize harmful emissions; promoting public awareness of the need to conserve; funding research and technological innovation to reduce consumption of conventional energy; and increased use of natural gas aided by transportation of liquid natural gas. The majority of companies do engage in the development of alternative energy sources (solar, wind, tides, nuclear, coal, hydro, biomass fuels, and hydrogen). Some of the alternate technologies bring their own environmental problems. Yet, the prospect of reaching maximum oil production also leads managers to stress expanded exploration and the purchase of other companies that possess reserves. All the major companies act this way.

In summary, all global oil companies now acknowledge that global warming is taking place and that it is probably linked to burning fossil fuels. Nevertheless, they all anticipate that oil and gas will be the primary fuel for decades to come. Chevron and Total are more openly concerned about future supplies. Shell, Chevron, Total and BP are substantial investors in alternative sources, but put the vast majority of their resources into oil and gas. ConocoPhillips (2005b) by 2005 indicated interest in alternative energy projects, but with no specific plan, while ExxonMobil resisted substantial investing in alternative energy.

Political relations do create conditions to which companies must adjust. Thus, ExxonMobil states that it will follow Kyoto regulations when it operates in jurisdictions to which they apply (ExxonMobil UK 2005), but clearly this is unwilling compliance. Nevertheless, the companies have been adept in certain key jurisdictions in influencing policy, such as the decision of the USA not to ratify the Kyoto Protocol (Vidal 2005). Yet, even in the USA, close links with the administration of George W. Bush do not translate easily into favourable policy, of which failure to gain access to the Arctic National Wildlife Reserve is a recent example (Eilperin 2005).

Energy companies face serious pressure from transnational environmental organizations and smaller scale groups in the environmental movement to develop energy that does not contribute to global warming and other forms of pollution. Opposition may even be internal as some BP shareholders challenged that company's desire to drill in the Arctic National Wildlife Refuge (BP withdrew its plan in 2003). On the other hand, most shareholders are crucially concerned with near-term profit and the share price. ExxonMobil's stand appeals to this interest by claiming that it will generate better returns over the next 25 years by focussing on what it does best - extract, process and market oil and gas products. It is unlikely that ExxonMobil's managers actually believe that there is abundant oil and gas for all, but they may expect to use the enormous profits to be earned in the next few years to buy up the most successful independent developers of alternative energy and to take over one of the other majors.

Four of the companies promote alternative energy partly as a practical economic issue (oil will soon be scarce and fuel may become so expensive as to endanger social stability) and partly due to their acceptance of the position that fossil fuel consumption is responsible for serious environmental impacts. Such alternative energy plans and acceptance of partial responsibility for global warming may be considered as parts of a power discourse or ideology. They appear to deflect attention away from huge profits that accrue as a result of expensive oil and make the companies look responsible as guardians of energy security in the future. The companies can claim to be taking steps to cope with global warming. At the same time, all these companies invest much more in petroleum and natural gas, which means that owners are promised the financial rewards from successful oil production if companies are allowed to follow economic criteria in their decisions. This points to power based on manipulation by presenting claims to knowledge and response to problems in a partial manner that builds support and avoids unwelcome regulation. Citizens can rest comfortably and leave energy to the experts.

There are hints of progress in the changing practices of the petroleum majors and this should encourage others in the energy network to push for more effective action. Our world is delicately placed on the cusp of breakdown or

movement towards a more sustainable planet. The energy issue is a vital part of the solution.

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## Notes