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Differing perspectives of major oil firms on future energy developments: An illustrative framework

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Abstract

This study develops a framework to analyse the perspectives of major oil firms in terms of their perceptions of current energy developments and projections of future energy potentials, and illustrates their views on the possibility of a paradigm shift in fuel use. The three A's themes—availability of resource (AV), applicability of technology (AP) and acceptability by society (AC)—make up the analytical framework. Divergence in oil firms' behaviour and perspectives are captured by the 3-A triangle that illustrates how the four largest oil firms in the world balance their stakes among the three A's. ExxonMobil's position is markedly skewed towards the theme of AV, whilst BP has the most balanced approach among the four. Shell and Total both share a similarly shaped 3-A triangle with more stakes placed on the theme of AP. The results would imply that a paradigm shift in resource use or a full-scale transition to a backstop technology is unlikely in the coming decades.

Keywords: Backstop technology; Paradigm shift; Oil industry

1. Introduction

Energy has become an integral part of our everyday life, resulting in an inextricable relationship between energy demand and economic progress. Driven by the twin forces of population growth and the spread of economic prosperity, global energy demand will continue to soar as society is bent on pursuing higher standards of living. However, conventional fossil fuels such as oil, natural gas and coal, which have, so far, provided an economical and convenient source of energy supply, are finite. Inevitably, a fundamental economic question arises: how do oil firms, as a main supplier of energy resource needed in the economy, perceive the paradox of supplying unlimited needs with limited resources?

Renewable energy resources, like solar, wind power and biofuels, which can deliver the promise of environmental benignity, inexhaustibility and self-reliance, may hold the key to the global energy challenge of growing fossil fuel scarcity. Nonetheless, the assumption of a smooth and rapid transition to a backstop technology, which is one based on super-abundant energy supplies, when fossil fuels deplete proves to be too idealistic (Nordhaus, 1979). Barriers to entry into the energy market, in the form of higher initial capital expenditure, stiff competition from incumbent fossil fuels and a lack of social acceptance amongst others, render renewable energy technologies economically unviable at current development. Notwithstanding all these, the recent spike in oil prices coupled with surging energy demand from burgeoning economies like China and India has rekindled the likelihood of renewable energy resources achieving economic viability at an earlier stage. The world's attention is on this transitional progress.

This study examines the possibility of a resource switch in the near future through the lens of privately owned multinational oil firms, namely ExxonMobil, BP, Shell and Total. These oil firms possess substantial technological expertise, financial resources and have an extensive global presence, particularly in terms of their control over reserves worldwide. As such major stakeholders, they could well

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have the significant influence to impinge on future development of the energy regime via their investment plans, which likely stem from their current and future perspectives of the energy scene. This study, therefore, seeks to develop an analytical framework to examine the perspectives of four major oil firms: ExxonMobil, BP, Shell and Total, based on their perceptions of the current energy development trends as well as projections of future energy potentials.

Utilizing the economic principles of the exploitation of energy resources and a paradigm shift in the resource use, three A's themes—availability of resources (AV), applicability of technology (AP) and acceptability by society (AC)—are employed to make up the bare bones of the analytical framework. Quantifiable measures, which are elicited based on criteria proposed in accordance with each of the three A's themes, reveal where individual oil firms place their stakes on the three A's. A 3-A triangle is also introduced to illustrate the asymmetries that exist amongst the four oil giants' positions. With an in-depth understanding of the oil firms' positions on current and future energy development as well as the impact of fuel use on the economy, the environment and the society, this study proceeds to establish how the oil giants perceive the palpability of a resource substitution with the aid of Nordhaus' theory on backstop technology.

The novel features of combining the three A's themes into a single framework and developing a 3-A triangle to illustrate the oil giants' perspectives on energy signify a new dimension in examining the future of energy use. This study introduces the novel feature for the analysis by combining the three A's into a single framework with AC as a new addition; the other 2 A's concepts have been utilised previously (Cassedy and Grossman, 1998). Furthermore, the perceptions of major oil firms on the future of fossil fuels and alternative fuels represent a very important viewpoint, which has often been understated in existing literature.

This study is structured as follows. Section 2 provides an overview of the existing literature on the comparative studies on multinational oil firms. It presents evidence to show the significance of privately owned multinational oil firms in the analysis of future energy development. It also establishes the links between energy potentials projected by oil firms and the future of the energy regime. Section 3 presents the economic principles of the analytical framework and the criteria based on the three A's themes to examine which aspects oil firms perceive as more important. It represents the first application of an analytical framework to the energy potentials projected by the major oil firms and their perspectives on the developments of the energy regime, after which it introduces a 3-A triangle that is employed to illustrate the oil firms' perceptions. Section 4 presents the perspectives of ExxonMobil, BP, Shell and Total on energy, economy and society using the 3-A triangle as well as on the feasibility of a resource switch in the near term by establishing the link between the results obtained and the economic principles backing up the framework. Section 5 concludes this study.

Table 1
The World's largest corporations in 2005 (based on 2004 revenues)

Rank	Company	Revenues ($ millions)	Profits ($ millions)
1	Wal-Mart Stores	287,989.0	10,267.0
2	BP	285,059.0	15,371.0
3	ExxonMobil	270,772.0	25,330.0
4	Royal Dutch Shell Group	268,690.0	18,183.0
5	General Motors	193,517.0	2,805.0
6	DaimlerChrysler	176,687.5	3,067.1
7	Toyota Motor	172,616.3	10,898.2
8	Ford Motor	172,233.0	3487.0
9	General Electric	152,866.0	16,819.0
10	Total	152,609.5	11,955.0

Source: Fortune Global 500 (July 15, 2005 issue), http://money.cnn.com/magazines/fortune/global500/.

2. Multinational oil firms and energy potentials

Key players in the oil industry are amongst the world's largest economic entities as shown in Table 1, which suggests that they could well have the significant influence to impinge on the development of any future energy scene. The fact that oil firms occupy four out of the ten positions of the world's largest corporations according to their 2004 revenues, coupled with the fact that three of them are in the top four positions, is definitely indicative of the enormous economic power the oil industry wields globally. With strong financial backing, technological know-how and even political influence,[1] privately owned multinational oil firms can initiate and greatly contribute to the future development of the energy market. Known as "prime movers", oil firms can also help to promote new technologies within the energy market by performing four important tasks: raising awareness, undertaking investments, provide legitimacy and diffusing new technology.[2]

Owing to their strong global presence, substantial financial clout and a robustly linked relationship with the energy market itself, privately owned multinational oil firms' investment behaviour is imperative in helping to predict and determine the direction in which the energy market will head.

Interesting divergences in oil majors' positions have been identified in systematic comparative studies.[3] BP and Shell have adopted a more proactive stance towards the global climate change issue by announcing measures to combat the carbon problem, whereas ExxonMobil has assumed a more reactive stance towards the same issue by explicitly opposing the Kyoto Protocol (Rowlands, 2000; Skjaerseth and Skodin, 2001; Kolk and Levy, 2001; van den Hove et al., 2002). In particular, Shell and BP identify a need to move towards a more sustainable energy supply mix; with a

[1]From 1990 to 2000, the oil industry contributed more than US$122 million in political donations (Van Den Hove et al., 2002).

[2]For a more detailed discussion on the role of "prime movers" in the diffusion of renewable energy technology, refer to Jacobsson and Johnson (2000).

[3]Oil majors refer to the major multinational oil firms.