



Short communication

Energy realities or modelling: Which is more useful in a world of internal contradictions?



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ABSTRACT

For over forty years energy expectations have been riddled with internal contradictions, and all too often a failure to recognise complexity, the nature and scale of the challenges to be faced, and resultant uncertainty. Key elements of Shell's "World of Internal Contradictions" scenario, issued internally in October 1974, still hold good. Some other elements have since intruded, though they should not have been entirely unsuspected. The paper opens with a summary of the October 1974, risks then anticipated: another regional conflict in the Middle East; further serious threats to energy supplies; and another currency crisis and recession. Changes in social attitudes were thought likely to shift the emphasis from working for high achievement to 'takers and dreamers' having a more influential role. There were numerous internal contradictions anticipated in the evolution of this long-term scenario that have been apparent over the past forty years and seem likely to continue. Some fundamentals of the exploitation and use of energy resources were as apparent then as they are now. The future, like the past, seems likely to be riddled with internal contradictions and failure to find satisfactory resolution of important challenges for the human race. But the complexities, uncertainties and time horizons involved suggest modelling is a marginal option compared with other approaches.

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1. Introduction

Shell had won high regard for its assessment of a likely first 'oil crisis' (although the timing was a little out), and so in October 1974, "Scenarios for the 1975 Planning Cycle" was issued internally. On pages 20–21 of that 100-page book key elements of a "World of Internal Contradictions" scenario were set out. Although members of the scenario group had different views on the emphasis to be placed on key features, the outstanding ones were:

"It is thought another major regional conflict in the Middle East, further serious threats to energy supplies, or another major currency crisis and recession could well precipitate the world into this path rather than that of the alternative scenario we have called a New Belle Epoque".

"In the energy sector the supply problem is perceived as imposing a constraint on growth."

"Within most Societies expectations outstrip the achievement potential as the 'takers and dreamers have a more influential role."

Other features of this scenario included the holding back of economic growth rates and per capita incomes in countries other than those which were resource rich and able to trade "vibrantly"; a lack of incentives or rewards was likely to hold back productivity increases; and balance of payments were likely to become more problematic for countries heavily dependent upon imports. There was an expectation by some that these forces would support the rapid development of nuclear – a view which some countries took successfully on board (such as France), while others (such as Denmark) opted to go for coal to enhance supply security. For Shell the decision to enter the nuclear sector was marred by choice of partner, if nothing else. The scenario book also noted that solar energy represented a further vast energy resource, "of which the surface has been barely scratched."

Since an alternative "New Belle Epoque" scenario has been mentioned, it may be worth brief comment. There were one or two influential voices in the scenario team who had been close to Herman Kahn and the Hudson Institute for some years. It was the Hudson Institute which peddled the notion of a *Belle Epoque* or *La Deuxieme Belle Epoque* scenario, which even featured in the later Hudson Institute book: "World Economic Development: 1979 and Beyond" [1]. This was a scenario which other members of the scenario group regarded at the time (and since) as ludicrously over-optimistic – and, of course, most unfortunately timed in the case of

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the book's publication. This issue and related ones have been discussed elsewhere [2]. As far as the Hudson Institute is concerned, the publication in 1974 of its doom-laden: "The United Kingdom in 1980" and three major illusions about North Sea oil was another masterpiece of timing which overlooked the rise to power of Margaret Thatcher [3].

Shell were diffident in October 1974, about future oil prices, although a return to low prices was not anticipated unless there were to be a world depression following 'accidents' such as international monetary instability or the eventual consequences (for a time) of turbulence in the Middle East. On the supply side oil was seen to be at a disadvantage in the heating and steaming markets, and although coal supplies could expand to satisfy these markets their short-term supply elasticity was recognized to be low. Conventional oil availability was not anticipated to prove a hurdle under the World of Internal Contradictions scenario before the end of the 20th Century, but there was full awareness of 'the oil mountain'.

Although Marion King Hubbert had been a Shell Oil employee in Houston when advancing his "bell curve" hypothesis in 1956, there was no mention of a bell curve despite an awareness of Hubbert's work. Instead, there was preference for the phrase "the oil mountain" – the shape of which could vary according to demand and the availability of alternatives, whether unconventional oil or other sources accessible for the transportation sector.

There has been a recent fashion to dismiss the 'peak oil' hypothesis as now redundant due to the onset of fracking of oil and gas. This suggests a misunderstanding about the nature of the 'peak oil' hypothesis which has been widely circulated over the past twenty years. Although the issue is out of chronological order here, it is now addressed. The hypothesis has always been about recoverable conventional oil, and there has never been any serious suggestion that non-conventional oil (or gas for that matter) did not exist or would not ultimately be developed. Although the topic was not addressed in the October 1974, Shell scenario book, Shell's "Exploratory Scenarios for the Long Term", issued in January 1977, was explicit. It was highly likely that ultimately recoverable conventional oil resources would exceed 2 trillion barrels, and a 25% chance of them exceeding 2.7 trillion barrels. There could be a further 600–700 billion barrels to be discovered "in the more speculative Deep Sea and Polar regions and in stratigraphic traps". The scenario book went on:

"Furthermore, no allowance has been made for future recovery from unconventional sources such as tar sands or oil shales, neither of which is considered to contribute significantly to the world oil availability within the remainder of this century." (p.45)

Most commentators on 'peak oil' have excluded tar sands (e.g. Athabaskan) and heavy oil (Venezuelan) from their definition of (the lighter) conventional crudes for the reason covered later here when the mid-1980s and OPEC production quotas are discussed. But there has been no denial of the existence of non-conventional oil and gas resources or of fracking (which can claim a 150-year history) although volumes and timing of exploitation have been debated [4].

Three other points may be made here before proceeding on to the implications of the World of Internal Contradictions scenario as events developed in the late 1970s. First, it has been claimed that "international political economy (IPE) of energy, a field with which scholars have only recently started to identify", was founded in the 1970s and born of the OPEC "crisis" [5]. This seems an odd claim. Numerous Shell people were familiar with issues of international political economy – not least in relation to the Middle East and North Africa. A number of Shell people had attended the Middle

East Centre for Arab Studies in Shemlan from 1947. Wahhabism, Sunni-Shia tensions, and unrest in the Arabian Gulf, were familiar territory on which Shell people talked and wrote for many years even before 1973. Ian Skeet's "Muscat & Oman: the end of an era", published in 1974, reflects this for example [6]. There was also the notion, particularly associated with Maurice Adelman, that OPEC would quickly collapse as an organization, as US Trusts had done in the past. Few seemed to be aware of the long life of numerous European cartels in the past although Shell's planners were.

This highlights the importance of having a knowledge of history – social, political, religious, economic, climatic, scientific and technical. Paul David and Mark Thomas have stated as their central contention: "economics in some quarters, and more widely should become, an historical social science" [7]. In the energy field there are related themes in the journal *Energy Research & Social Science*, edited by Benjamin Sovacool. One thinks of papers written by Richard Hirsh and Christopher Jones [8], Daniel Spreng [9], Adonis Yatchew [10], and Benjamin Sovacool himself [11,12] in that journal. *Energy Policy* has covered some of the same ground from time to time – in a Special Issue edited by Roger Fouquet and Peter Pearson in 2012, for example [13]. More recently some of the papers published in the January 2014, and November 2015, issues of *Energy Policy* also emphasized the importance of history [14]. Charles Hall and others have referred to the need to 're-integrate the natural sciences with economics' in the journal *BioScience* [15]. Benjamin Sovacool has pointed out that, for every \$1 spent in the USA on research into behavioural and demand-side energy research, \$35 is spent on energy supply and infrastructure [16]. It should be obvious that energy economists are required to have knowledge of economic and social history, including financial and debt crises and past political and religious upheavals, as well as the history of energy transitions and basic energy concepts. An ability to engage in modelling such matters may be considered of secondary importance [17].

One area where a distinct difference of view existed within Shell's scenario group emerged from the idea that under the new conditions operating in the wake of the 1973 oil 'crisis' large sections of industrialized societies would opt for "Voluntary Simplicity". Financial pressures and resource constraints would assist in promoting the idea that less materialistic lifestyles would be a worthwhile goal. This idea was being strongly promoted by the Stanford Research Institute at the time [18]. For some of the scenario group's members it seemed to reflect unrealistic perceptions of human behaviour unlikely to be shared outside a small coterie of California's residents. The opposition to the idea of "Voluntary Simplicity" was not led by "hard core economists" as some have suggested, but by an economist who was also a social and economic historian, who had researched and written extensively on human behaviour, and was aware of the past record of similar thinking and small group initiatives over more than 2500 years.

The promoters of 'Voluntary Simplicity', within Shell at least, seemed unaware that the term derived from Richard Gregg's 1936 Pendle Hill Essay: "The Value of Voluntary Simplicity", which began by "reference to such great modern leaders as Lenin" [19]. The opponents of the concept of 'Voluntary Simplicity', while acknowledging that at some future point of time there may be involuntary simplicity forced by economic, population and environmental pressures, were familiar with 'the 150-year old Jevons' paradox' (or 'rebound effect' as it is now usually referred to), considered likely to undermine hopes of achieving 'Voluntary Simplicity'.

Another debate which for some of those involved has stood the test of time is the importance of not placing too much faith in modelling. Shell's 1974 global energy model contained over 3000 simultaneous equations and took over 19 h to run. It never achieved anything useful except, perhaps, in providing a firmer basis for 'mini-modelling' to test particular issues. It was finally handed over

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