

Viewpoint

The Rimini Protocol an oil depletion protocol: Heading off economic chaos and political conflict during the second half of the age of oil

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Abstract

Knowledge of petroleum geology defines the size of the World's oil and gas resources, but the reporting of reserves is grossly unreliable. Discovery has been in decline for many years, meaning that production must soon also fall. The decline of oil will have a severe impact on the modern economy which has become dependent on it. Accordingly, a Protocol to match demand against the falling supply, as imposed by Nature, is urgently needed to lessen world tensions and achieve an orderly transition.

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1. Introduction

Soaring oil prices have drawn attention to the issue of the relative supply and demand for crude oil, which is the World's premier fuel, having a central place in the modern economy.

Knowledge of petroleum geology has made great advances in recent years, such that the conditions under which this resource was formed in Nature are now well understood. In fact, it transpires that the bulk of the World's current production comes from deposits formed in two brief and exceptional epochs of extreme global warming, 90 and 150 million years ago. This fact alone tells us that oil is a finite resource, which in turn means that it is subject to depletion.

People ask: *Are we running out of oil?* The simple answer is: *Yes, we started doing that when we produced the first gallon.* But *Running Out* is not the main issue as the resource will not be finally exhausted for very many years. The much more relevant question is: *When will production reach a peak and begin to decline?*

1.1. Depletion: growth, peak and decline

Much debate and study has focused on the calculation of the date of peak, but this too misses the main point. It is not an isolated or pronounced peak but merely the highest point on a long and gentle production curve. It matters little if the actual peak came last year, if it will be passed this year, or in a few years' time. The shock is the perception of the long, remorseless and terminal decline that comes into view on the other side of peak. It can hardly fail but have a major impact on the future of Mankind.

Without quibbling over precise dates, it is now evident that the First Half of the Age of Oil draws to a close. It has lasted 150 years since the first wells were drilled for oil in Pennsylvania and on the shores of the Caspian, and saw the rapid expansion of industry, transport, trade and agriculture, allowing the World's population to expand six-fold, exactly in parallel with oil. In addition, it made possible the growth of financial capital as banks lent more money than they had on deposit, confident that *Tomorrow's Economic Expansion* offered collateral for *To-day's Debt*. Many people came to think that it was money that made the world go round, when in reality it was a cheap and abundant supply of largely oil-based energy.

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1.2. Distribution and categories of oil

The World's oil is unevenly distributed for well-understood geological reasons, and some countries are less depleted than others. In fact, five countries bordering the Persian Gulf own almost half of the *Regular Conventional Oil* that is left to produce.

This category of oil has provided most to-date and will dominate all supply far into the future. Accordingly, the onset of its decline will have the greatest impact on the World situation. The other categories, comprising the tar-sands and heavy oils of Canada and Venezuela, deepwater oil, polar oil, and liquids derived from natural gas, are important too, because they will ameliorate the rate of overall decline after peak.

1.3. Unreliable information

If reliable information on past production and reserves in known fields were freely available in the public domain, the issues of peak production and the onset of decline would be entirely self-evident. Estimating the size of an oilfield early in its life poses no particular scientific or technical challenge, such estimates being routinely made by the oil industry.

The reporting of reserves is another matter, being much influenced by political and commercial pressures. Simply stated, the oil companies reported commercial reserves under strict Stock Exchange rules that were designed to prevent fraudulent exaggeration but smiled on conservative reporting as laudable prudence. The companies, quite rightly, reported cautiously, preferring to smooth their assets and revise their reported reserves upwards over time, which gave a comforting, but very misleading, image of steady growth. It was widely, but wrongly, attributed to the remarkable technological progress that was achieved as well as to the scale of investment, when in reality it was primarily an artefact of reporting. The main impact of technology was to hold production higher for longer, which was more profitable but in fact accelerated depletion. The larger fields offered the greater scope for under-reporting, but they are aging and fewer are being found. Accordingly, the days of under-reporting are now over, leading the major companies to merge and in some cases revise their reported reserves downwards. Some begin to admit to the issue of peak oil (see Chevron www.willyou-joinus and the recent statement by Shell's Chairman).

Several major producing countries nationalised their oil industries, mainly in the 1970s, and found themselves in the uncomfortable position of having to cut production to support price, when they faced competition from growing production brought in by the international companies from new areas. In those days, there were still large new provinces to bring in, especially offshore. The Organisation of Petroleum Exporting Countries (OPEC) introduced a quota system to manage the allocation of production amongst its members. Reserve estimates became effectively

State secrets in these countries. In the 1980s, some of them announced massive overnight increases in reported reserves, although nothing particular had changed in the oilfields themselves. It transpires that some may have been reporting the total found, not the remaining reserves, which would explain why the reports have barely changed since, despite substantial production, while others simply matched their competitors.

Although the skills of a detective are called for to obtain reliable information, the general position can be determined within reasonable limits to permit and justify appropriate policy decisions and responses (see Appendix A).

1.4. You have to find it before you can produce it

That oil has to be found before it can be produced is axiomatic, meaning that production mirrors discovery after a time-lag. When a new area was opened to exploration, the first step was for the industry to secure the rights from the government concerned. The next step was to investigate the geology, examining the rocks at the surface, scanning the depths with seismic surveys and drilling exploratory boreholes, known as *wildcats*, for more information. This work proceeded until a moment-of-truth was reached when the area either delivered its first discovery, or was found to lack the essential geology, in which case it remained forever barren, no matter how much investment was applied. It was normal for the larger fields to come in first, being too large to miss (Fig. 1).

For these reasons, the production in any country tends to reach a peak close to the Midpoint of Depletion, when half the total endowment has been produced. The subsequent decline may be modelled on the general assumption that production will continue to fall at the current Depletion Rate, namely annual production as a percentage of what is left. There are of course exceptional situations that have to be assessed on their merits.

Displaying laudable frankness, a Director of the World's largest oil company has reported that the peak of world discovery, based on industry data with reserve revisions

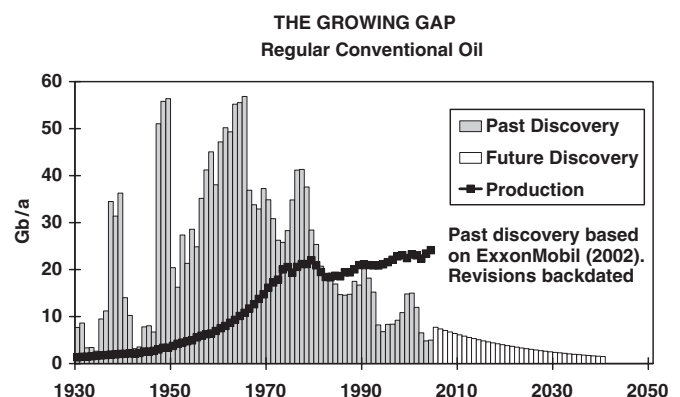


Fig. 1.

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