

Submission to:

House of Commons - Trade and Industry Select Committee
Enquiry into Security of UK Energy Supplies

by

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1. Introduction

1.1 The current resource-limited peak in UK oil production, and near-term resource-limited peak in UK gas production, are not isolated events. They are a reflection of the *global decline* in conventional hydrocarbon discoveries in *new fields* that has been a fact of petroleum exploration for over 30 years. ¹

1.2 Because of this long-term decline in discoveries, many other countries and regions of the World are also past, or near, their resource-limited peak levels of conventional oil or gas production. For example:

- The US production peak for oil was in 1971, and its output has been in decline since, despite large finds in Alaska, and more recently in the deepwater Gulf of Mexico. The US has now consumed about three-quarters of its original endowment of conventional oil. The peak in US gas production is estimated to be about now. ²
- The EU is now essentially at its resource-limited peak for both oil and gas. ³
- Though China's oil peak is a few years away, it is now a net importer, with imports growing rapidly; India is at or past its oil peak, and also has imports that are growing rapidly. The Asia-Pacific region, as a whole, is at or near its oil production peak.
- Russia is past its oil production peak, although this fact is not well known, as it is obscured by the production fall from that country's economic slowdown.

1.3 Overall, much of the World finds itself in the same position as the UK, in terms of oil, and to a lesser extent gas, resource-limited production.

2. Implications of the current situation

2.1 Because of this situation, the World faces almost certain near-term hydrocarbon shortages, as follows:

- (a). Global oil supply is currently at *political risk*. This is because the sum of conventional oil production from all countries in the world, *except* the five main Middle-East suppliers, is more-or-less at the maximum set by physical resource limits.

- (b). World oil supply will soon be at *physical* risk. This is because the Middle-East countries have themselves little spare operational capacity, and this will be increasingly called upon as oil production declines elsewhere.
- (c). Large investments in Middle-East production, if they occur, could raise output, but only to a limited extent. The main exception is Iraq, but even here there would be significant delays before prospects are confirmed, and infrastructure put in place.
- (d). In any event, global output of conventional oil will soon decline. The date of the peak depends on the size of Middle East reserves, which are poorly known, and unreliably reported. Best estimates put the global conventional oil peak between five and ten years away.
- (e). The world contains large quantities of *non-conventional oil* and various *oil substitutes*, but the rapid decline in the output of conventional oil makes it unlikely, in our view, that non-conventional sources could come on-stream fast enough to compensate.
- (f). For *conventional gas*, the world's original endowment is probably about the same, in energy terms, as its endowment of conventional oil. Since less gas has been used so far compared to oil, the world will turn increasingly to gas as oil declines. But the global peak in conventional gas production is already in sight, in perhaps 20 years, and hence the global peak of *all-hydrocarbons* (oil plus gas) is likely to be in about 10 or so years.

3. Documentation

3.1 The above views are amplified in our Submission to the Cabinet Office's *Energy Review Team*. This is available at:

<http://www.cabinet-office.gov.uk/innovation/2001/energy/submissions/ODAC.pdf>.

The Select Committee may also wish to consider other sources of information, for example, those listed in the References.

4. Research background

4.1 It is recognised that many who have knowledge of the hydrocarbon industry are not aware of the findings presented here, and that there is also a small number of analysts who dispute these finding. The reaction of these groups is usually:

- There have been many false hydrocarbon predictions before.
- Advancing technology will access more hydrocarbons.
- Increased price will access more hydrocarbons.

There is an element of truth in these assertions, but such analysts need to address the known facts of US, UK and European hydrocarbon peaking, and identify the *extent* that technology and price can change the resource-limited realities.

4.2 This Submission is based on the findings of a Research Group at the University of Reading that has been studying the question of global hydrocarbon supplies for some years.² This Group has seven members (including the author of this submission), and contains petroleum geologists, engineers and physicists. Their research has included extensive discussions with oil companies, the UK government, the IEA, the EU and the US Geological Survey. In addition, the Group has had sight of the main oil industry resource data set.

4.3 The conclusion of the Group is that the report by Campbell and Laherrère⁴ represents the best calculations to-date on the future of global hydrocarbon supplies. The calculations of the latter lead to the conclusions summarized above.

4.4 It is worth stressing that these calculations are based on:

- the authors' extensive geological knowledge;
- full access to the standard industry oil and gas resource database;
- detailed analyses of current hydrocarbon reserves (where, particularly for oil, neither FSU nor Middle East reserves can be taken at face value);
- a range of *statistical* approaches to assessing the yet-to-find;
- the use of models of future hydrocarbon production rates that the Group at Reading has assessed as adequately accurate and robust.

4.5 Campbell and Laherrère are not the only investigators to come to these conclusions. Since the 1970's similar conclusions have been reported by the UK Dept. of Energy, ESSO, Shell and the World Bank; ⁵ while more recent work has been reported by Howell et al., ⁶ Ivanhoe, ⁷ Hatfield, ⁸ The International Energy Agency, ⁹ and Deffeyes. ¹⁰

In the light of these findings, the Select Committee needs to set the decline in UK indigenous oil and gas production against almost certain hydrocarbon supply difficulties across the World.

5. References:

- [1]. F. Harper. *Ultimate Hydrocarbon Resources in the 21st Century*. Presentation at the American Assoc. of Petroleum Geologists conference: 'Oil & Gas in the 21st Century', Sept. 12-15th 1999, Birmingham, UK.
- [2]. R.W. Bentley, R.H. Booth, J.D. Burton, M.L. Coleman, B.W. Sellwood, G.R. Whitfield. *Perspectives on the Future of Oil*. Energy Exploration and Exploitation, Vol. 18, Nos. 2 & 3, pp 147-206, Multi-Science Ltd., 2000.
- [3] The European Commission. Green Paper: Towards a European strategy for the security of energy supply. COM(2000) 769, Final; ISBN 92-894-0319-5. (Figures on pp 19 and 40.)
- [4] C.J. Campbell and J.H. Laherrère. *The World's Supply of Oil, 1930 – 2050*. Report from Petroconsultants S.A., Geneva, 1995. See also: C.J. Campbell & J.H. Laherrère, *The End of Cheap Oil*, Scientific American, March 1998, pp59-65.
- [5] R.W. Bentley. *Were those past oil forecasts really so wrong ?* Published by OneOffshore Ltd., part of the PetroData Group, in the industry newsletter: *To-morrow's Oil*, November, 2000.
- [6] D.G. Howell, K.J. Bird and D.L. Gautier. *Oil: When will we run out?* Earth, March 1993, pp 26-33.
- [7] L.F. Ivanhoe. *Updated Hubbert Curves Analyze World Oil Supply*. World Oil, Vol. 217, No. 11, November, 1996, pp 91-94.
- [8] C.B. Hatfield. *Oil back on the Global Agenda*. Nature, Vol. 387, p121, May 8, 1997.
- [9] The International Energy Agency *World Energy Outlook*; published Nov. 1998; ISBN 92-64-16185-6.
- [10] K.S. Deffeyes. *'Hubbert's Peak'*. Princeton University Press, 2001; ISBN 0-691-09086-6.

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