

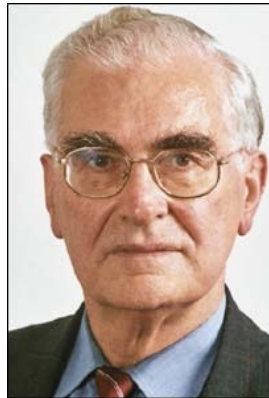


## The ASPO Conference - Second Morning

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Topic: [Supply/Production](#)

Tags: [aspo](#), [electric car](#), [ireland](#), [jatropa](#), [mali](#), [nuclear power](#), [shell](#), [wind power](#)  
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*Lord Ron Oxburgh, former non-executive chairman, Shell UK; chairman, House of Lords select committee on science and technology; honorary professor, Cambridge University*

The morning began with a Keynote address by [Lord Oxburgh](#) former non-executive chairman of Shell, who spoke on “Out of Oil, into Hot Water.” He began by noting the economic difficulties that are coming as demand continues to exceed supply. We are not, after all, making oil any more. (Ed comment – well let’s not forget biofuels – and it turned out he did not). Because these problems will arise around the time of peaking they will likely be precursors to it, and these economic consequences will come sooner than expected.

The problems, however, are not that we are running out of oil, rather it is that we are running out of cheap oil. When oil fields are abandoned there may be 60% of the original oil (OOIP) that is left in the rock. At present this is just too expensive to extract, but it leaves us with a problem since most transportation requires a liquid fuel. To work effectively the vehicle must have a small, relatively light engine, together with a storage reservoir full of fuel, that must in turn, be as light, yet energy dense, as possible. The Internal Combustion Engine (ICE) has filled that need for the past century or so. The fuels that power it are among the most energy dense of those commonly available. That alone, however, is not the problem.

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The problem arises as populations grow, and expect to achieve the standards of more developed countries, with free access to cars and transportation. This has led to a growing fleet of vehicles to meet that need, and in contrast to the [Hirsch Report \(pdf\)](#) he felt that it would likely take over 40 years to change to an alternate method of propulsion. In this change oil prices above \$70/bbl changes the paradigm. We have reached the end of an era, and need to start to change Now!

The challenge is so urgent that all potential alternates should be explored, including those that will not be considered appropriate for the long term. We need the breathing space, and thus should establish more nuclear and coal-fired power stations. But while this may solve some issues it does not really address vehicles and their need for liquids. To meet this need there should be two strategies, the first to find alternate sources of liquid fuel, and the second to find an alternative to the ICE. There is, however, no substitute for ICE on a plane, and for now that will remain a problem.

By gasifying coal, processing natural gas, or gasifying biomass we can sequentially process these into a liquid fuel to meet the need. However if this were done on a global scale the Greenhouse gasses (GHG) produced by the first two would be at a disastrous level. Biomass, however, provides three routes to a fuel, gasification, crushing the seeds, and fermentation. However, if food sources are used, then this will lead to issues and conflict. It is better to use land that is not currently used for food. He showed a chart that broke land use down so that there are 42 million sq km of forest; 45 mill of deserts, crops occupy 16 million km and savannah 23 million sq km. To meet needs we would have to take a third of the cropland for ethanol, and a third for biodiesel, and this is not acceptable. We must, therefore look to crops that are not a threat to food production. He mentioned corn residue, elephant grass and [Jatropha curcus](#) as potential fuel stock, noting the benefits of cellulosic ethanol (Shell is partnered with [Iogen in Canada](#) to exploit this opportunity). Jatropha yields a seed that can be processed to yield oil, and again Lord Oxburgh is associated with [D1 Oils](#) in establishing plantations for the jatropha as a collaborative venture with BP.

However he felt that the largest untapped source was in urban waste noting that the waste in the US if tapped (by burning largely) could generate equivalent power to that needed to power the US fleet of vehicles. (Ed note Cork has a waste processing plant in town that produces energy that the town uses).

Changing the ICE has many potential benefits. Electric cars do not have to cost [\\$100,000](#). He showed a slide of the UK version, it is a mere [\\$300,000](#) but has the advantage that the battery can be recharged in 10 minutes and so, with an initial range of 200 miles, it has some advantages over its American cousin.

He did not think much of the economics of using hydrogen as a fuel source for a car. However he did think that making vehicles much lighter, such as the [Loremo diesel](#) that is being introduced in Europe in 2009, may be the way to go. Fueled by biodiesel which, if produced responsibly, can cost \$90 - \$100/bbl it provides, an apparent alternative that gets high mileage.

In regard to existing fossil fuels, they will be used, since we need that breathing space, and for China and India it is the only large fuel stock that they currently have. However this will include carbon capture and sequestration (CCS) with costs going up 30% for the capture, and 10% for transportation. With such costs the process will only be used under government pressure.

Closing with the reminder that we will need every source that we can get, and that while it will take decades to reach optimal solutions we don't have that time, but must make do expeditiously with what we have.

The first panel then began to assemble, but the delegate from Cuba [Dr Alfredo Curbelo](#) could not make it, so the session chair [Jeremy Leggett](#) took the time to discourse on Climate Change. He pointed out the magazines that had put it on their front cover, including Vanity Fair, and noted that Peak Oil had not been so successful in getting the public attention. Nor perhaps the private

support, since the IEA target of producing 116 mbdoe by 2030 requires an investment of \$4 trillion, and that is not a done deal. And in the meantime it remains a controversial subject, given, for example the Exxon Mobil messages about there being no problem.

Accepting that the world does not need to see a temperature rise of more than 2deg C, since this would exacerbate current droughts and floods, we need to consider the implications for fossil fuel use – how much can we burn? But the current concentrations will take us over a 1deg C rise and there are other gases that contribute, so that the CO2 limit is going to be 400 ppm. Yet, if we are to run out of oil so quickly, will this be the problem that it is made out to be? If we are to address both issues we need to bring them together, and if we are to get the message out then we have to do this through local contacts and pro-active organizations.

[Michael Dittmar](#) then talked about Nuclear Energy and some of the issues that face that industry. There are currently some 439 plants, producing 371 GWe and in 2005 this was 15% of the world electric power generation. There are currently 30 reactors under construction. The age of the reactors, however, means that soon some of this fleet must be closed down which will lead for the need for some form of action.

Breeder reactors, that were once held to be very promising, have not proven as successful as hoped. He had tried but was unable to find how long it took to double the fuel elements concerned, and there is only one breeder operating, with two under construction. He noted documentation that said that the (current) world uranium reserve will be gone in the time range between 2030 and 2040, meaning that we must anticipate developing “speculative” resources. A 7 GWe reactor needs 180 tons of uranium/year. And the 371 GWe production from 439 reactors adds up to a need for 67,000 ton/year. With a 1 – 2% growth for 20 years, this will lead to a need for between 51 and 130,000 tons of uranium. The reserve is thus going to run out in less than 50 years. In regard to those who say that uranium can be recovered from seawater, he noted that:

A reactor uses 6 gm/sec which, at seawater concentrations will require processing 10,000 cu m/sec of water. To put that in context the Rhine river flows at 2,000 cu m/sec.

He noted the flooding of the [Cigar Lake mine](#) and [subsequent setbacks](#) which was supposed to re-open in 2008 has led to the mine being set back [to possibly 2011](#), with the likelihood that this will lead to international shortages of fuel.

In looking at fusion, the current goal is to get to a prototype reactor by 2060, however this requires 56 kg of tritium/year. However, at best, the world supply of tritium in 2027 is expected to be 30 kg. This, and similar problems, leads him to state that “commercial nuclear fusion energy will always be 50 years away.”

We then took a break and came back to hear TOD's own [Nate Hagens](#) discuss how we got to where we are, through brina development, survival of the fittest, and, with the use of audiovisual examples, showed the primitive that still resides in us all. It was one of those talks that are better experienced than read (and ASPO will have the DVD out in about two weeks). His theme was sufficiently well expressed that it was quoted extensively by speakers through the rest of the conference. He noted, however that breeding for select attributes does not necessarily guarantee survival – using the example of the [Irish Elk](#). Now extinct, the antlers were used in sexual selection, with the largest racks getting to mate. This did not select for other survival skills, particularly those of changing conditions.

Thus it is not always the evident conditions that can be assumed to be optimum. Providing solar power for buildings is an example. The current trend is to retrofit solar to existing buildings, but, by adjusting the power density of new construction and the solar panel space available, a more

conformable balance can be achieved, and Germany is moving toward this model. Yet in fuel source selection it must be remembered that there are not only direct costs (fuel costs to run the tractor for eg) but also indirect costs (say the power cost to build the tractor, or the refinery) and also the environmental costs that must also be factored in. And as time goes on the Energy return on investment (EROI) will decline. For example in oil production an original return of 100:1 may move to 30:1 and then 10:1, and in biofuel generation the energy costs of the water, which may flow at 1,000 times the volume of biofuel finally generated, can not only pose costs but also show stoppers, should the plant be located in a drought zone.

In selection of the best option there is a term called the discount rate of values and Nate illustrated this, and how choices can be modified by external stimuli. This relates to the degree of foresight involved in making a selection or choice. The historic trend has been for us to select for immediate solution/gratification. One of the problems is that this leads to what (and here he quoted Dr Schlesinger) are the two prevailing stages of attitudes toward Peak Oil – complacency and panic.

The first three speakers were then joined by [Matt Dempsey](#) of the Irish Farmers Journal, [Mary Graham](#) who works in the reality of helping communities in Africa (after the celebrities go home), [Philip Walton](#) who spoke to nuclear issues, (and had some significant disagreement with Michael Dittmar, to the point that Chairman Leggett stopped taking questions (or comments) on the subject after some heated words with audience participation), and [Gerard O'Neill](#).

The discussion had by now begun to focus more on Ireland, and it was clear that the speakers thought that Ireland was in trouble. At the end of a long gas line from Russia, they must import almost all their fuel, 70% of it along this pipe, And so they have set a goal of 33% from renewable energy. Because of the problems with the intermittent nature of wind, it was suggested that the turbines would only yield 25% of faceplate power. This led into the debate about nuclear power, with emotional and rational points being brought forward.

There is a sense that folk are becoming divorced from the dirty reality of life. That jobs, such as pig farming can be exported so that no-one need get dirty. But this departure takes with it an understanding of the reality of production, and without that understanding sound judgments become more difficult. Further culture must be considered, the outsider coming in and making recommendations, or installing systems, may do so with disregard for the culture and mores of those who need to be helped. That may lead to many problems and ineffective efforts. Further solutions may need to be at a greater level than just that for Ireland, yet the people aspects are an equivalent part of this equation, whether in Mali or Mayo.

The session then broke for a lunch of Irish stew.

To be continued . . . (And Chris Skrebowski noted in the afternoon that for those of us who write these things after midnight – we get to blame Colin Campbell (grin) – hoping the links work ‘cos they do at this end.



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