

EUROPEAN ENERGY SECURITY [IN A WORLD LIVING DANGEROUSLY]

**Paper to the Conference on Energy Security – Polish,
European and Global Perspectives**

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Energy policy has risen up all the agendas that count in recent years. The purpose of this paper is to focus on one key aspect, namely security of supply, but it is important to recognise a wider context. There are a myriad of issues. Indeed we meet in the wake of the BP Gulf of Mexico disaster, the Fukushima nuclear reactors' crisis in Japan, and when oil is again more than \$100 a barrel. Moreover, numerous technologies, from nuclear to renewable to Carbon Capture and Storage (CCS), jostle for our attention, each with their own vociferous supporters and detractors. I wish, however, to take a few steps back from immediate agendas. I would argue that there are four major concerns that set the context for our debates and discussions - internationally, across Europe, and within our own nations.

1. Economics and affordability

Energy is increasing in cost. It has become, and will increasingly become, a significant component of business and domestic household budgets. Costs, as we have seen recently, can fluctuate widely, but the overall trend is upwards. Price fluctuations, however, can seriously impact on economic performance. The price of a barrel of oil rose to \$147 in July 2008 and then fell back rapidly to below \$40 by the end of that year. More recently the price, which was around \$70 last summer, then rose to \$126 in early April, and at the time of writing it is still over \$110. The significance to the economy is shown by an estimate from Oxford Economics that high oil prices in 2008 cost the global economy about \$150 billions. Although the global economic recession has since taken prominence, it is salutary to remember that before the banking and financial crisis it was the high price of oil that was commanding much political attention. Hence the emergency conference in Riyadh, followed by the London Summit called by Gordon Brown. Exactly how fluctuating and high energy costs relate to the economic recession is arguably a still unwritten chapter in the recent economic drama.

2. Climate science and global warming

This is easily the most significant question that has focussed global attention on energy. So much research has been undertaken, and so much has been written about this phenomenon, that it is only necessary here to remind readers of some salient facts. The earth has warmed by 0.7° Celsius over the last 100 years. Around 0.4° Celsius of this warming has occurred quite recently – since the 1970s. The Intergovernmental Panel on Climate Change estimates that mean global temperatures are likely to rise between 1.1° and 6.4° Celsius above 1990 levels by the end of this century, depending on the scale of emissions. The result of any failure to constrain emissions, in terms of rising sea levels, melting ice caps and the intensification of tropical cyclones, has become part of common currency and, of course, common controversy. The relative failure of the Copenhagen Conference represents a new challenge for the world community and

the actions that are required will impinge hugely on energy sources and on both demand and supply.

3. Social justice

This aspect of the energy question is the least discussed and needs more attention. Let us recognise the paradox. At a time when the western world has grown increasingly concerned about the phenomenon known as global warming, an estimated 1.4 billion citizens across the world, about one-fifth of the world's population, do not have access to electricity. Indeed, even in energy-rich nations, such as Nigeria and Iraq, many citizens cannot take regular supplies of electricity for granted. The International Energy Agency [IEA] also estimates that 2.7 billion people, some 40% of the world's population, rely on traditional biomass (wood etc) for cooking. The consequence is a major development challenge for the planet. How do we start to reduce the international demand for energy, given our carbon targets, while at the same time increasing the supply of energy or supplying modern energy for the first time to communities that currently are energy poor?

The social justice dimension is not solely one for so-called developing nations, but is a problem in Europe and certainly my own country, the UK. This last British winter of 2010/2011 has reminded us that many elderly people, and other vulnerable households, suffer from 'fuel poverty'. This is compounded by rising electricity and gas bills. Excess winter mortality, that is the number of people dying in the winter as opposed to the summer months, is significant. A public policy challenge therefore, both domestically and internationally, is how to bring about a fairer share of the world's energy resources.

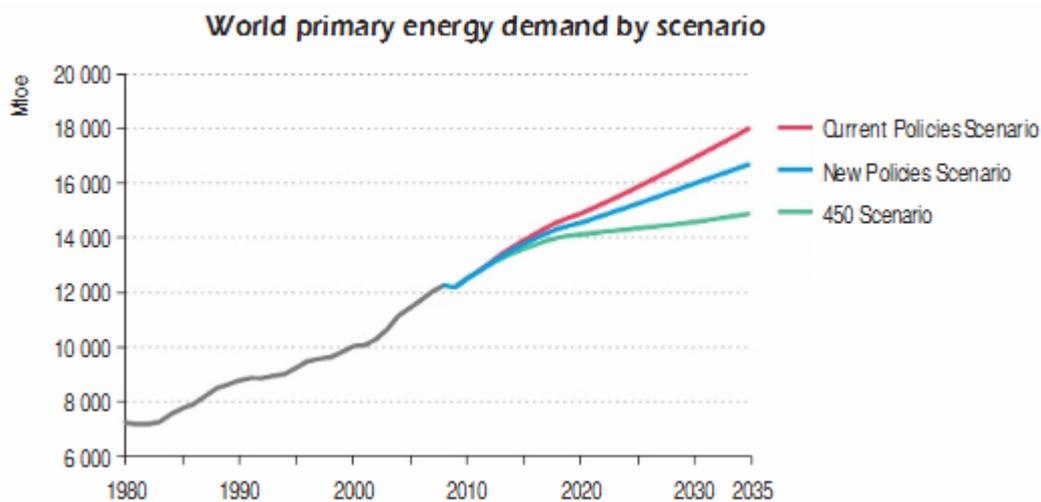
4. Energy security

The fourth question on the energy agenda and the focus of this paper is the question of supply itself and therefore energy security. This was always a key priority during my two periods as UK Minister of State for Energy, and was the particular focus of my work for Prime Minister Gordon Brown during my time as his Special Representative on International Energy Issues. It is the subject of my report *Energy Security: a national challenge in a changing world, Department of Energy and Climate Change, 2009*.

This might seem a curious time to be talking about worries regarding energy supply given that for the first time in almost three decades global energy use declined in 2009. [The last time was 1981.] This short-term decrease, the result of economic recession, should not disguise the overall trend, however, which is firmly upwards, and very significantly so. The best source is the World Energy Outlook, published annually by the IEA.

The IEA’s authoritative World Energy Outlook for 2010 presents projections for three scenarios. “The Scenarios differ with respect to what is assumed about future government policies related to the energy sector”. The **Current Policies Scenario** assumes that only policies already adopted and implemented are taken into account. The **New Policies Scenario** assumes, more ambitiously, that new measures will be introduced to implement policy commitments that have been announced. These include national pledges to reduce greenhouse gas emissions and, for certain countries, plans to phase out fossil energy subsidies. The **450 Scenario**, far more ambitiously, sets out “an energy pathway consistent with the goal of limiting the global increase in average temperature to 2°C. This Scenario is so called because it requires the concentration of greenhouse gases in the atmosphere to be limited to around 450 parts per million of carbon dioxide equivalent”.

Table 1



[Source: World Energy Outlook, IEA, Chapter 2, Figure 2.1]

Let us focus on the middle Scenario, that is the one that assumes the implementation of New Policies. By 2035 global primary energy demand continues to grow substantially – 36% higher by 2035 than in 2008.

Table 2

World primary energy demand by fuel in the New Policies Scenario (Mtoe)

	1980	2008	2015	2020	2030	2035	2008-2035*
Coal	1 792	3 315	3 892	3 966	3 984	3 934	0.6%
Oil	3 107	4 059	4 252	4 346	4 550	4 662	0.5%
Gas	1 234	2 596	2 919	3 132	3 550	3 748	1.4%
Nuclear	186	712	818	968	1 178	1 273	2.2%
Hydro	148	276	331	376	450	476	2.0%
Biomass and waste**	749	1 225	1 385	1 501	1 780	1 957	1.7%
Other renewables	12	89	178	268	521	699	7.9%
Total	7 229	12 271	13 776	14 556	16 014	16 748	1.2%

*Compound average annual growth rate. ** Includes traditional and modern uses.

[Source: World Energy Outlook 2010, IEA, Chapter 2, Table 2.2]

In all three Scenarios, most of the extra demand for energy up to 2035 is met by fossil fuels: coal, gas and oil, but varying from 62% in the 450 Scenario to 79% in the Current Policies Scenario. It is also notable that most of the extra demand comes from the emerging and developing economies. Indeed, among OECD nations, demand is fairly flat up to 2035, up by just 3% based on the New Policies Scenario. By contrast, for non-OECD countries, driven largely by China and India, demand increases by 64%. There have been many indicators presented [see the table below] to illustrate this increasing demand in such countries. Let me merely cite one here. In 2005 there were 23 million vehicles in use in China. By 2030 it is likely that this will increase tenfold to 230 million.

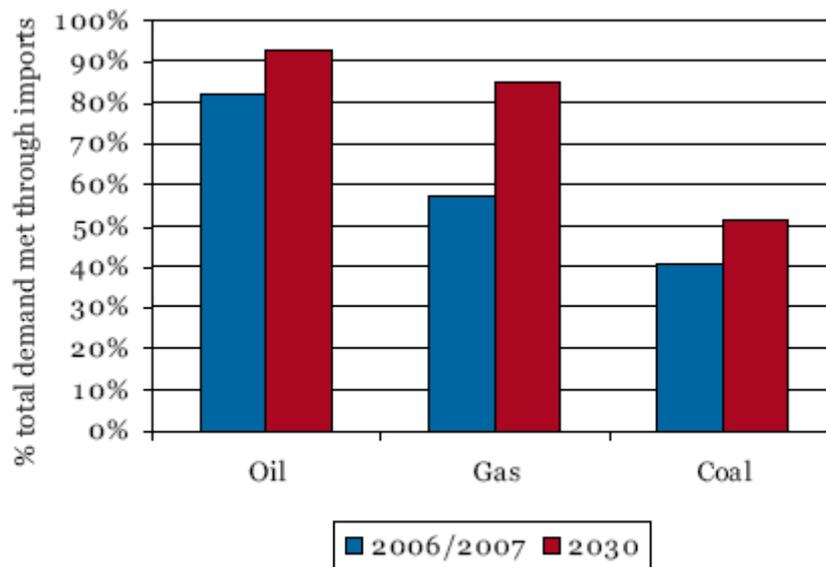
Table 3

Country	Population growth	Population		GDP growth	Vehicle use millions		Energy consumption per person	
	Per annum	2005	2030	Per annum	2005	2030	Urban (mtoe)	National (mtoe)
China	0.4%	1310m	1460m	6.1%	23m	230m	2.6	1.4
India	1.1%	1100m	1450m	6.4%	10m	125m	n/a	n/a
Middle East	1.7%	190m	300m	4.3%	18m	75m	n/a	n/a
US	0.8%	303m	370m	2.1%	160m	225m	7.6	7.6
EU	0%	489m	505m	1.8%	225m	295m	3.5	3.7

Source: WEO 2008; population figures based on UNDP

This increasing global demand for energy is occurring at a time when the European Union as a whole is experiencing a significant increase in energy import dependency. Already most energy comes from outside of the EU. This will only be enhanced in the future. Indeed, over 90% of Europe's oil will come from other countries by 2030; over 80% of its gas; and some 50% of coal [see figures below]. Parts of continental Europe are heavily dependent on Russia in particular.

Table 4



Source: IEA World Energy Outlook 2008

5. Conclusion

The geopolitics of energy insecurity will be a key theme of the 21st century. As the world comes out of global recession, the global grab for energy will return to something like its pre-recession trajectory, with demand forecast to increase substantially by 2035. Oil and gas prices can be expected to increase, perhaps very significantly. More nations will flex their muscles – economically, politically and, in extremis, militarily - in the pursuit of energy resources.

This presents new challenges. There is no exact science on this, more a question of risk assessment and judgement. But for some nations the loss of relative energy self-sufficiency takes place at a time of rapid energy change and challenge.

The European Union (EU) has not shirked from facing these challenges and indeed the EU's 20/20/20 targets are not only relevant to the most demanding challenge, that of tackling climate change. For they also, if implemented, enable the EU to enhance its energy security.

Reducing Demand

Certainly the first item on any serious energy agenda should be to reduce the European demand for energy. The EU as a whole needs to demonstrate that strong economic growth and reduced energy demand are not incompatible. Further, we should seek to demonstrate that the move towards low carbon European economies brings opportunities for new investment, science and innovation and also business opportunity, leading to the development of new 'green collar' jobs and careers.

While reducing energy demand should be a common goal for all EU nations, it must be recognised that different European nations will determine their own individual strategies for energy supply which will be influenced by their own natural resources (for example, coal reserves or hydro assets), their current energy mix, and how public opinion influences the debate.

Renewables

Given that the EU has set demanding targets for the expansion of renewable energy, we will see, however, across the Union substantial developments in a range of technologies, the exact nature of which will depend on available natural resources – onshore and offshore wind, solar power, wave and tidal marine energy, thermal etc.

Table 5

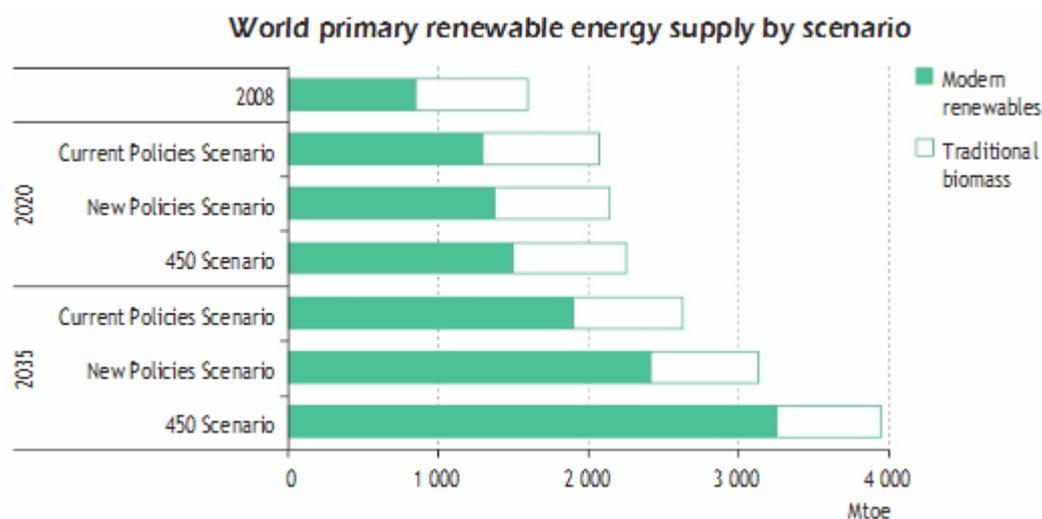
**Shares of renewable energy by sector and region
in the New Policies Scenario**

	Electricity		Heat		Biofuels			
	2008	2035	2008	2035	Road transport		Aviation	
					2008	2035	2008	2035
OECD	17%	33%	11%	23%	3%	12%	0%	3%
Europe	21%	44%	12%	25%	3%	12%	0%	0%
United States	9%	25%	10%	25%	4%	15%	0%	4%
Japan	10%	19%	3%	7%	0%	1%	0%	4%
Australia/ New Zealand	15%	31%	18%	41%	0%	2%	0%	0%
Non-OECD	21%	31%	9%	12%	2%	6%	0%	0%
China	17%	27%	1%	5%	1%	4%	0%	0%
India	16%	26%	24%	19%	0%	6%	n.a.	n.a.
Other Asia	16%	31%	11%	15%	1%	4%	0%	0%
Brazil	84%	75%	47%	50%	21%	41%	0%	3%
Other Latin America	52%	65%	13%	15%	0%	5%	0%	0%
Russia	16%	28%	5%	5%	0%	2%	0%	0%
Middle East	1%	16%	1%	3%	0%	0%	0%	0%
Africa	16%	39%	31%	37%	0%	2%	0%	0%
World	19%	32%	10%	16%	3%	8%	0%	1%
<i>European Union</i>	<i>17%</i>	<i>41%</i>	<i>13%</i>	<i>26%</i>	<i>3%</i>	<i>14%</i>	<i>0%</i>	<i>0%</i>

Note: Electricity = share of renewables in total electricity generation; heat = share of renewables for heat in total demand for heat; biofuels = share of biofuels used in road transport in total road transport and share of biofuels used in aviation in total aviation fuel.

[Source: World Energy Outlook 2010, IEA, Chapter 9, Table 9.2]

Table 6



[Source: World Energy Outlook 2010, IEA, Chapter 9, Figure 9.1]

Civil Nuclear

The role that civil nuclear might play is the best example of the fact that different European states will make individual judgements. Some states are adamant that there should be no role for new nuclear, while the UK is now embarked on a strategy to develop a new generation of nuclear reactors, policy guided by both climate change and security objectives.

Carbon Capture

Notwithstanding the increasing role in the future that will be played globally by both new nuclear and renewables, we must recognise the continuing importance of fossil fuels in global and European energy mixes. For this reason the development of new technologies to produce cleaner energy from fossil fuels must be an urgent requirement, necessitating policies and incentives to facilitate this. The importance of CCS is crucial here.

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Malcolm Wicks is the MP for Croydon North. Between 2005-6 and 2007-8 he was Minister of State for Energy in the UK Government, serving as Science Minister in the interim. In October 2008 he was appointed by Prime Minister Gordon Brown as his Special Representative on International Energy.