The Oil Drum
DISCUSSIONS ABOUT ENERGY AND OUR FUTURE

The BP Energy Outlook to 2030 - a review

Posted by Heading Out on January 26, 2011 - 11:25am

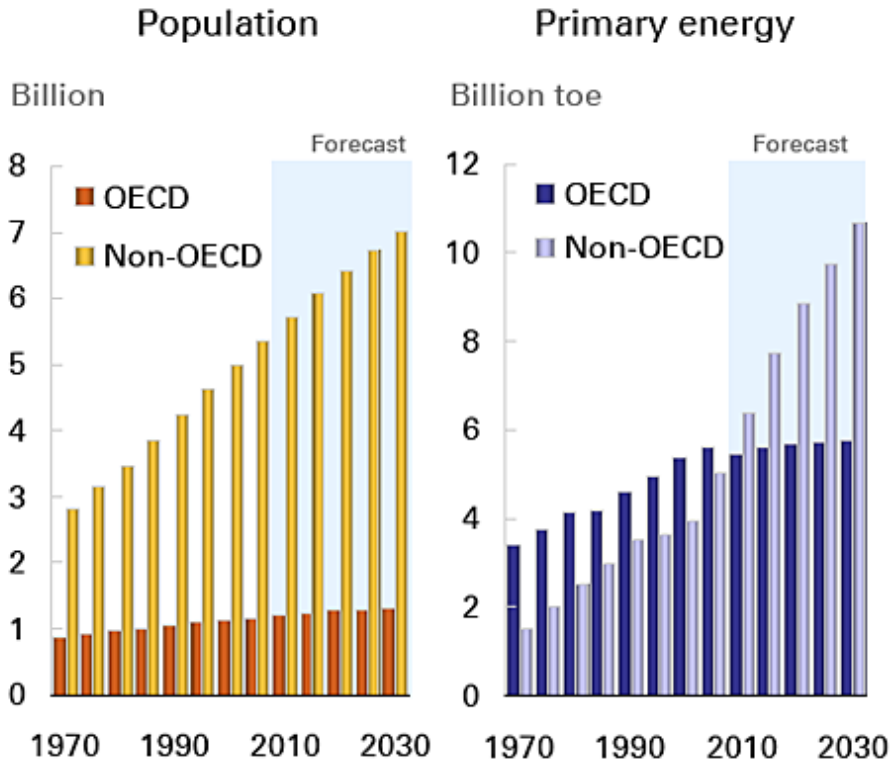
There is a significant reliance, among those who write on fossil fuels, on the statistics that BP annually compile on global energy production. For example it provides underlying information for Energy Export Databrowser, as well as many of the posts at The Oil Drum. And so when BP just released their forecast for energy for the next 20 years (Energy Outlook 2030) it is worth having a look at to see what they predict. Bear in mind that this is only one company prediction, yet nevertheless it is an influential one.

The report is very briefly summarized in the introductory speech by Bob Dudley, the Chief Executive, who chose the following highlights:

- Global energy growth will average 1.7%, but will be generated by non-OECD nations, while demand from OECD will remain relatively stable.
- Oil supply will grow at around 1% per year, with major increases in supply coming from OPEC, particularly Saudi Arabia and Iraq.
- Coal use will grow at an average of 1.2% per year, largely through demand for power from non-OECD nations.
- Natural gas will be increasingly used as a power source, with demand growing at 2.1% per year.
- Renewable energy sources will continue to be favored, with growth being at around 8% per year, and with demand for biofuels tripling over the two decades.
- Deepwater production of oil will rise from 7% of the global demand to 9% by 2020.

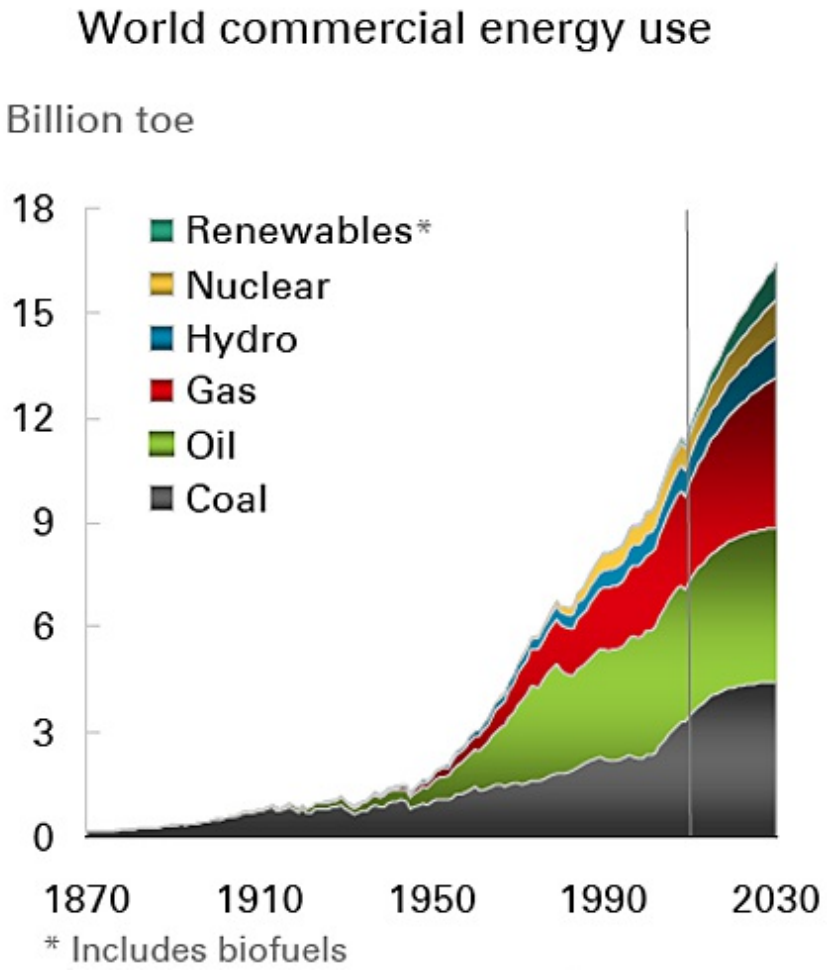
Those were the initial highlights, and there is slightly more detailed summary at the BP website. Since the booklet that summarizes the data is some 30 pages long, but uses a considerable number of graphics to show the projections, let me borrow some of these to summarize what I see as some of the critical points (and I will add a few editorial comments as I go).

The review (which is the first of its type that BP has released) recognizes that the face of energy consumption is changing. As the world population continues to grow, the shift in energy intensive industries to the developing countries has shifted the locations where demand will grow. Since industrialization also increases the energy use by their populations, there is a compounding rise in their energy use.



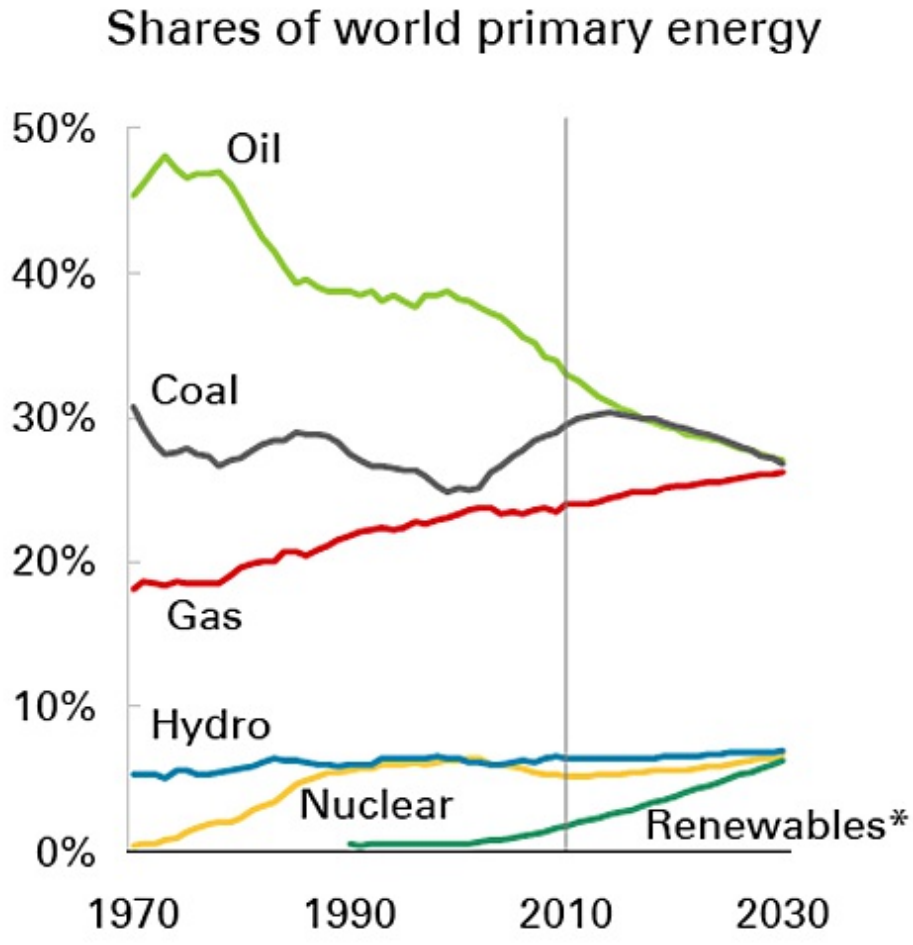
Projections of population and Energy Growth (BP Energy Outlook)

What is more interesting to me is how they see how this energy will be supplied. The overall projection is shown in this chart:



Projected future source of Energy Supplies (BP Energy Outlook)

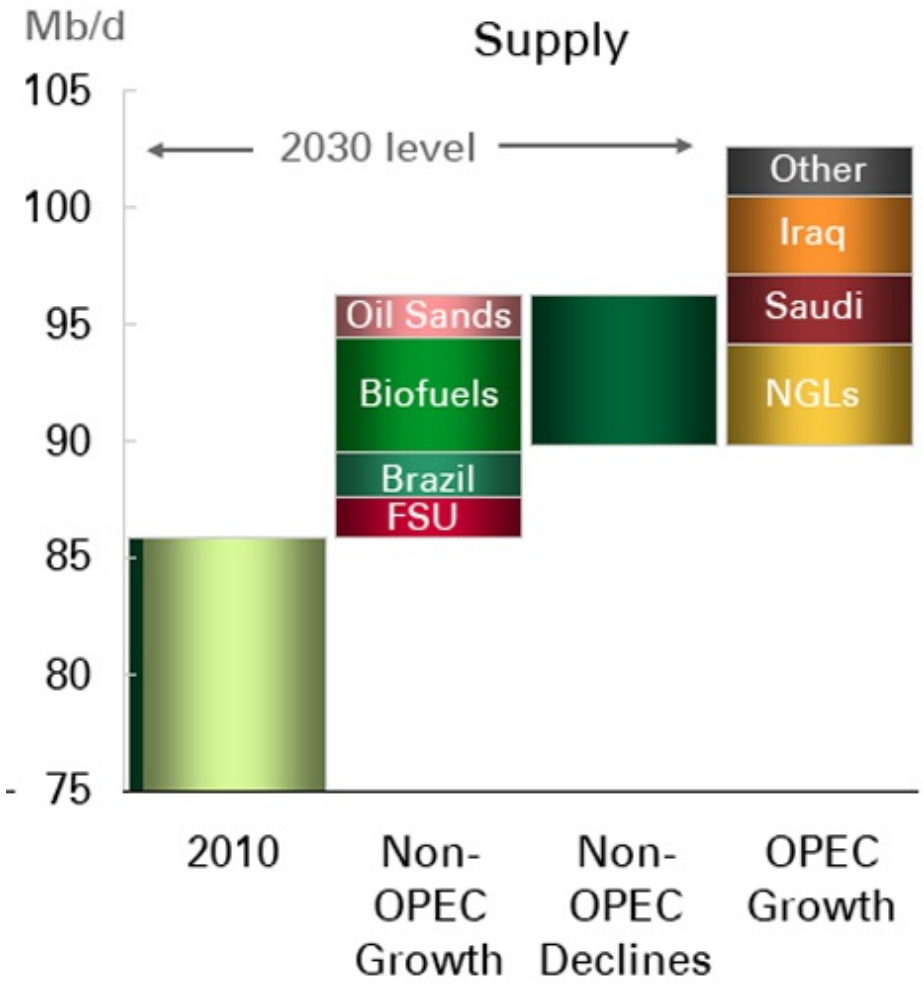
The fastest growing of these segments is that of renewables (which includes biofuels). This can be seen more explicitly in this graph from the report:



Sources of Future Energy Supply (BP Energy Outlook)

The growing impact of renewable energy production will affect both electricity generation, and transportation (the latter mainly through biofuel growth).

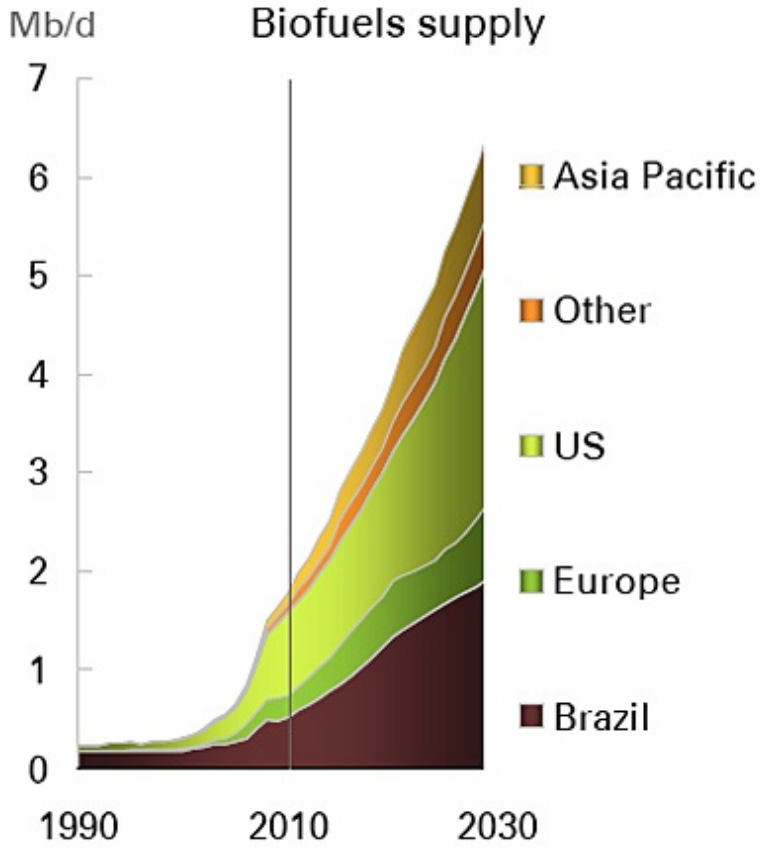
Looking specifically at the different fuel sources, the report anticipates that oil growth, will be some 16.5 mbd over 20 years, but that this will have to also compensate for about 4.5 mbd of declines in non-OPEC producers. Non-OPEC will, however, see an increase in overall production, the gains coming from about 2 mbd of increased production from oil sands (with the assumption that this is Canadian, since it is not credited to OPEC, of which Venezuela is a member), from the FSU, and from a significant increase in biofuels, only some of which is anticipated to come from the sugar-based ethanol of Brazil.



Sources of future liquid fuel supply (BP Energy Outlook)

In looking at the above chart it is important to recognize the distinction between the FSU and Russia itself, since that country may well start into a decline in production within the year. The increased production will come from places such as Azerbaijan and Kazakhstan.

The second point is that relating to biofuels, where BP note that renewables currently provide 3% of liquid fuel for transport, but that this is expected to rise to 9%. (Within the next 20 years increased rail, electric, hybrid and CNG are not expected to make a material contribution, though CNG use is expected to be about 2%). The concern with biofuel production is that it is virtually all anticipated to come from ethanol. And, as we have just seen with the closure of the Range Fuels plant in Georgia this week, the commercial viability of cellulosic ethanol has yet to be established, challenging not only the BP view of the future, but also that of others. The practicality of further increase in corn ethanol production in the United States is doubtful, giving the rising cost of the raw feed stock (corn). However this is the projection, and increasingly BP expects that biofuels will meet increases in liquid fuel demand (rising to meeting 60% of the growth by 2030). There is, however, an allocation of 1 mbd for increases in refinery gains (which I have discussed earlier) and from natural gas and coal, which perhaps gives some indication of their opinion of this latter effort.

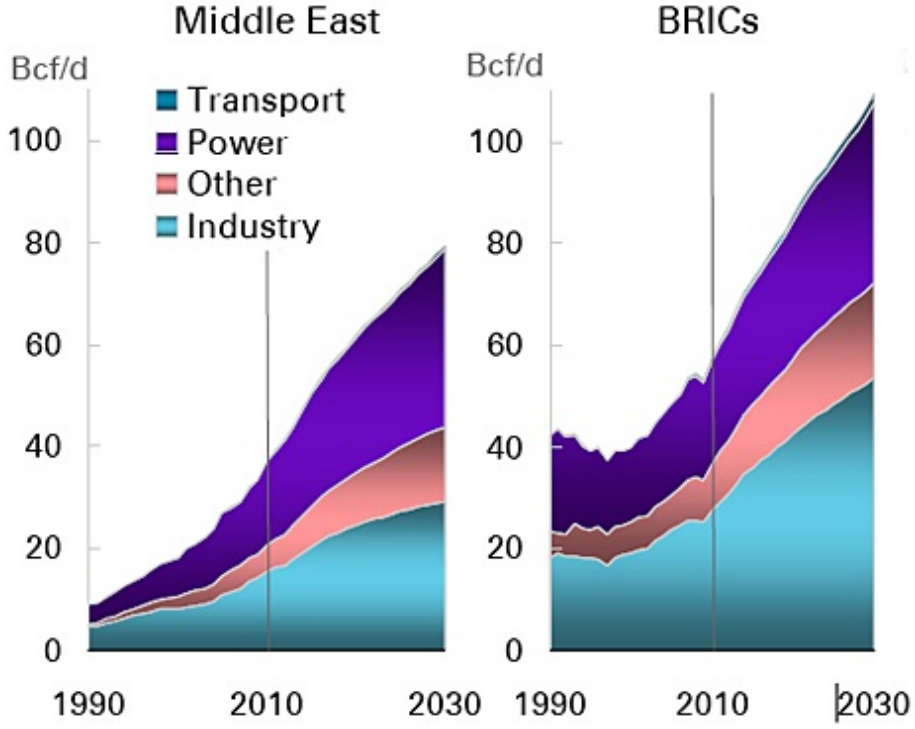


Anticipated size and source of Biofuel production (BP Energy Outlook)

It is the dramatic increase in transport demand, particularly in Asia, that will drive the increased demand for liquids, China alone is expected to pass the United States in oil consumption within this time frame. To further supply that growth, NGL increases of more than 4 mbd from OPEC, and crude oil production growth mainly from Saudi Arabia and Iraq is projected. (In this regard it should be noted that a year ago BP were anticipating that Iraq might be producing 10 mbd by 2020 – the current more realistic target is 5.5 mbd by 2030. And while Iraq has stated it may be able to reach 12.5 mbd by 2017, the condition of the infrastructure in the country, among other issues, would suggest that BP are now more likely correct). Whether Saudi Arabia will rise to the challenge of producing (and likely more critically exporting) at the levels BP projects, given the current age and production history of its main fields is a question, since recent pronouncements from that country suggest a more conservative production capacity of 12 mbd and a disinclination, perhaps, to produce at even that level. (BP assume that both Russia and Saudi Arabia will retain their market share of 12% over the two decades, which, with an assumed total of over 102 mbd would give them each an assumed production of over 12 mbd). To reach the Saudi target BP expect them to expand production capability after 2020.

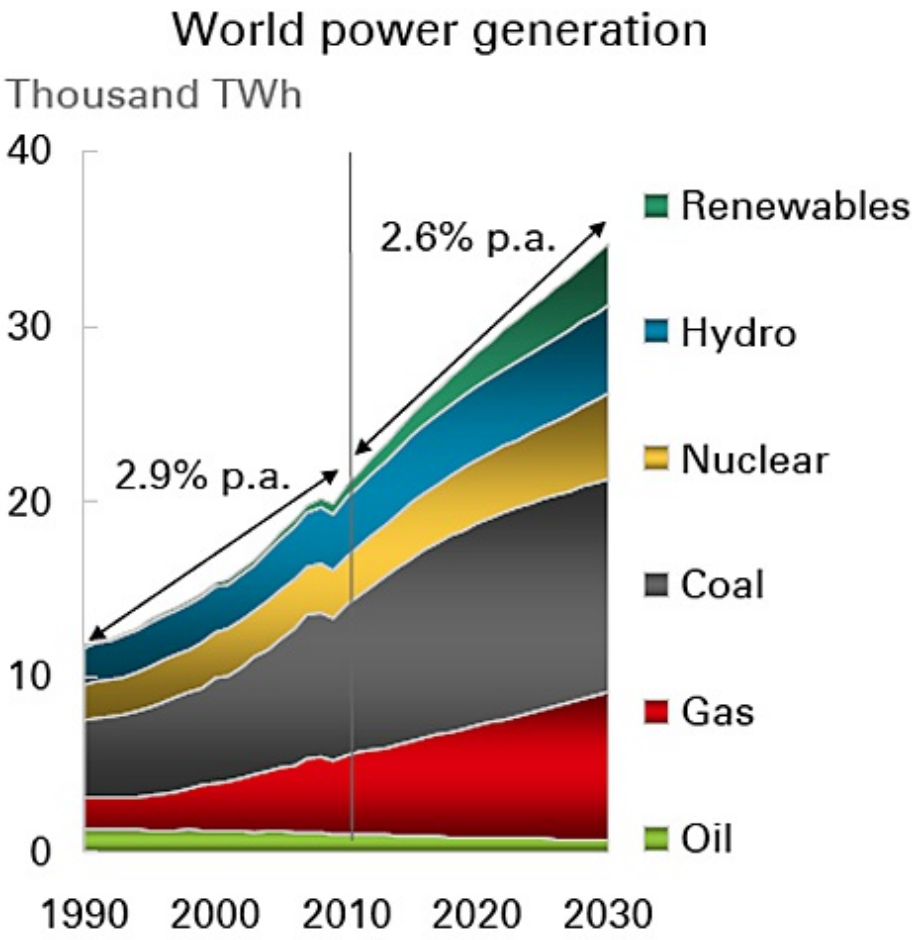
The major change in fuel use over the next two decades is expected to come in the increasing move from coal to natural gas as the primary source for electricity generation. Because of overall increases in power demand absolute demand for both fuels will increase, but increasingly the demand will shift to NG.

Thus, for example, Chinese growth in demand will rise at 7.6% pa to 43 bcf/day, though this will still only be 9% of their total energy consumption. It is the BRIC countries, which include Brazil, Russia, India and China (and now South Africa) (H/t KLR) whose overall growth in demand, with that in the Middle East, will likely prove greatest over the next two decades.



Expected growth in NG demand in the next 20 years (BP Energy Outlook)

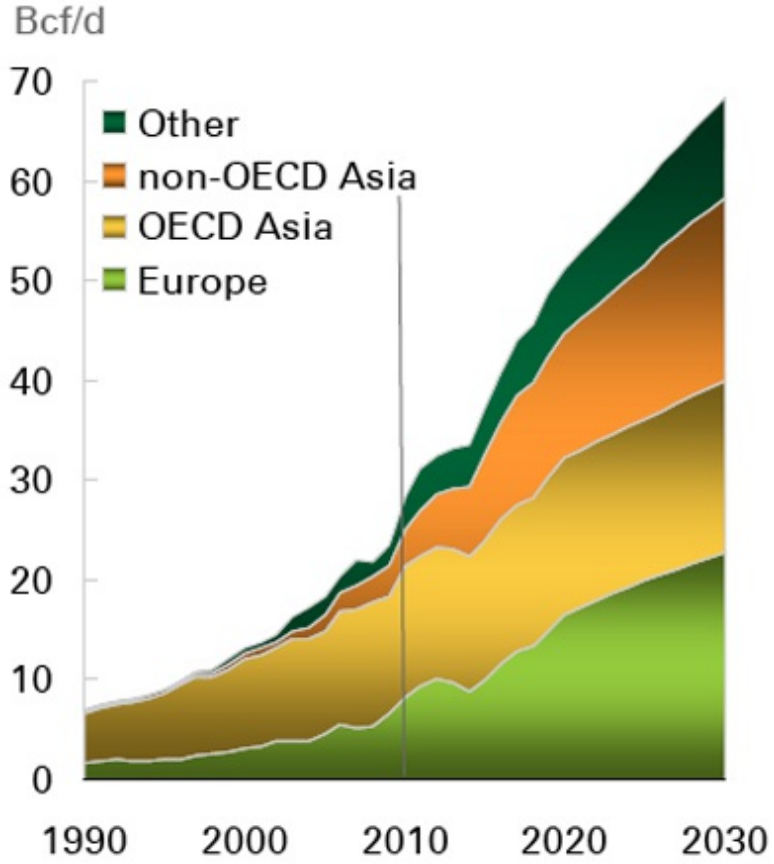
By 2030 BP project that most use of oil for power generation has been displaced, with coal and NG being the primary fossil sources. NG use will increase to about 40% of the market, outside of Europe, where it rises to 65%, given the European concern over climate change. However, in terms of the absolute market, Europe will see a much greater impact from renewable resources generating power, so that the percentage that NG provides will only rise to 24%. Over half the NG supply in North America will come from shale gas and coal bed methane (CBM), elsewhere the impact from those resources will, within this time frame, be much less. Whether or not these unconventional resources reach the 57% market supply by 2030 will likely depend on the development of at least one new technological breakthrough that lowers cost while increasing long-term yield from the wells, but that is a quite feasible assumption.



Electric Power generation by source (BP Energy Outlook)

The market for LNG is anticipated to grow significantly (4.4% pa), particularly in Europe and Asia. Supply is initially seen as coming from the Middle East, but this will be followed by production from Australia which will overtake Qatar by 2020, and then African deposits will come on line providing 41% of the supply by 2030. It is interesting to note the caveat that BP introduce into this projection.

> We assume that policy supports the continued rapid growth of non-fossil power generation – especially renewables, which attain a global share of 10% by 2030. Where gas is available at a competitive price, it continues to displace coal.



Regional demand growth for LNG (BP Energy Outlook)

It is the response that China makes in changing their primary source of power as they continue to expand production, and thus energy demand, that will decide how far, and how fast the transition from coal will occur. BP anticipate that the market overall will continue to rise until just before 2030, at which time it will flatten. But whether that happens will likely depend on availability and price, of both coal, and its potential replacements. (Hence the caveat).

BP recognize that this is only a base case projection, and that there are many different factors that will likely change the final results. That is likely to be particularly true if there is an upsurge in interest in climate change legislation and regulation. I have made some comments on how accurately I think that the models have been developed, but that should not detract from the value of this particular document which, being freely downloadable, is well worth getting and saving.