



## Fatih Birol Presents the IEA World Energy Outlook 2007

Posted by [Chris Vernon](#) on December 7, 2007 - 11:00am in [The Oil Drum: Europe](#)

Topic: [Supply/Production](#)

Tags: [carbon dioxide](#), [coal](#), [fatih birol](#), [growth](#), [iea](#), [oil](#) [[list all tags](#)]

On 5th December 2007 Fatih Birol, Chief Economist and Head of the Economic Analysis Division of the International Energy Agency (IEA) gave a presentation in London at the Shell Centre, hosted by the British Institute of Energy Economics (BIEE). Mike Pepler attended the meeting and took the following notes (his personal comments are in italics):

### Introduction

- We are on the eve of a new world energy order.
- On the **supply side**, we have **oil production outside the core OPEC countries reaching a peak**, which is not good news for the International Oil Companies (IOCs). The National Oil Companies (NOCs) will determine future oil supply.
- On the **demand side**, China and India are transforming global energy markets through their sheer size and rate of economic growth.
- Between now and 2030, China and India will account for 70% of new global oil demand, and 80% of new coal demand.

---

### Approach

- Chinese and Indian experts joined the IEA team to write WEO 2007, and extensive peer reviews from their countries were used.
- Three scenarios are used:
  - **Reference scenario.** All government policies and economic developments continue as they are at present. This leads to two threats: risks in security of supply for oil and gas, and climate change.
  - **Alternative scenario.** 1,500 policies currently under discussion across the world are put into practice in 2008. This scenario also includes an option to stabilise atmospheric CO<sub>2</sub> levels at 450ppm.
  - **High growth scenario.** Economic growth in China and India is the biggest unknown in these studies. The predictions have been wrong in the past, underestimating the growth. This scenario assumes an increased rate of growth for China and India.
- The analysis of China and India's impact on the global economy, environment and energy market is a key part of WEO 2007.

## Reference scenario

- The continuation of existing policy leads to a **fossil-fuel future**.
- **Coal** will see the biggest increase in use.
- **China and India are responsible for 45% of total energy demand growth from 2005 to 2030**, and 80% of coal demand growth.
- **By 2010, China will be the world's largest energy consumer**, overtaking the USA.
- Oil supply projection to 2015:
  - The supply/demand balance will remain tight.
  - By 2015, an extra 37.5 mb/d (million barrels per day) of production will be required. 13.6 mb/d of this is to meet new demand, while **23.9 mb/d is to replace declines in existing oil fields – a factor that is often overlooked**.
  - Oil producing countries have policies that should lead to an extra 25 mb/d by 2015. **A further 12.5 mb/d will be required, or a supply crunch can not be ruled out**.
  - As well as finding new production, we will also need to find ways to curb demand for oil.
  - The top 5 IOCs have had reserve replacement ratios declining steadily between 2001 and 2006. If they do not redefine their business strategies to move away from oil they will have serious difficulties.

## Vehicle sales in China

- **China will be importing 13 mb/d of oil by 2030**, as car ownership rises from 20 per thousand people to 140 per thousand.
- **Car sales in China are predicted to overtake those of the USA in 2016**.
- However, Western countries should not criticise China for this – car ownership in the EU is 680 per thousand people, and 860 per thousand in the USA.

## Coal demand in China and India

- In 2005, China exported coal, while India imported, so the net import for the two together was close to zero.
- China is now importing coal as well, and the **global coal price has doubled in the past year**.
- **By 2015, China and India will be importing 170 Mtce** (million tonnes coal equivalent), and by 2030 they will be importing 330 Mtce. (*figures are approximate, as they were read from a graph*)
- Before criticising these imports, we should remember that **in India there are 420 million people with no access to electricity**. How can we tell them not to use coal, which is the cheapest way of providing electricity?

## CO<sub>2</sub> emissions from China and India

- It is worth looking at the **cumulative emissions** from 1900 to 2005. The USA emitted 340 Gt (Gigatonnes), the EU 240 Gt, China 90 Gt and India 25 Gt. (*figures are approximate, as they were read from a graph*)
- The projection in the reference scenario brings China's cumulative emissions close to those of the EU by 2030.
- On a per capita basis, China deserves to be allowed higher emissions, although by 2030 they could be similar to those of the EU.
- The top five CO<sub>2</sub> emitters are predicted as follows:
  - 2005: USA, China, Russia, Japan, India.
  - 2015: China, USA, Russia/India, Japan
  - 2030: China, USA, India, Russia, Japan
- By 2030, China, India and the USA will together emit more than 50% of global CO<sub>2</sub>.

## CO<sub>2</sub> from coal power plants in China and India

- **China and India will add 800 GW of electrical generation capacity between 2006 and 2015.** This is equivalent to all capacity built in Europe between 1945 and 2006. 90% of the new capacity will be coal fired.
- Coal power plants have an economic lifetime of 60 years. Once built, it is unlikely that these power plants will be closed early. We would not do this in the West, so can not ask China and India to do so either.

## Energy efficiency

- At present, **half of all new building is in China**, measured on a square meter basis. The energy efficiency standards of the new buildings are generally not good. As with the coal power plants, once these buildings are there, they will continue to be used for many years.

## Investment

- **\$22 trillion is needed between 2006 and 2030.** Half of this is in developing countries, with 17% in China and 6% in India.
- We are not running out of energy, or out of money, but we **are** running out of time.

## Alternative scenario

- Assume that 1,500 current draft policies are put into place in 2008. These include energy efficiency, building renewable energy and building nuclear power.
- The result is lower growth in net oil imports, leading to growth being reduced by 14 mb/d by 2030. (*note that this is still a rise in demand, it's just a smaller rise than in the reference*)

- In the reference scenario, CO<sub>2</sub> emissions rise by 57% by 2030, ending up at 42 Gt per year and possibly causing a global temperature rise of 6C, which would be disastrous. The alternative scenario results in emissions levelling off at 34 Gt, possibly leading to a 3C temperature rise, which could still be too much.
- The cost effectiveness of this scenario is important. For example, by 2030 China could save 170 TWh/year simply through the use of more efficient refrigerators and air conditioning, as the current standards are low. This is equivalent to twice the annual output of the Three Gorges Dam.
- **To achieve stabilisation of atmospheric CO<sub>2</sub> levels at 450 ppm**, for a 2C rise in global temperature, emissions need to drop from 27 Gt per year today, to 23 Gt by 2030. This is 19 Gt less than the reference scenario, and to achieve it requires:
  - **All power plants built after 2012 to emit no CO<sub>2</sub>.**
  - **Early retirement of coal plant in OECD countries.**
  - CCS (carbon capture and storage) to be economically viable within 10 years.
  - Improvement in efficiency (energy intensity of economies) to increase from 1.6% per year to 2.7% per year.
  - **All the countries in the world to agree on a framework and put it in place within 5 years.**

## High growth scenario

- The reference scenario has Chinese economic growth at 7.5% for the next few years, falling to 6% up to 2030.
- The high growth scenario has Chinese growth at 9.5% initially, falling to 7.5%.
- The result is more than 20% increase in oil demand by 2030.

## Summary

- The global energy system is on an **increasingly** unsustainable path.
- China and India are transforming global energy markets.
- **All** countries need to transition to a more secure, low-carbon energy system.
- New policies now being considered could have a major impact.
- **The next 10 years are critical**
  - Significant generating capacity is being built.
  - Technology lock-in means what we choose now will be there for decades.

- There will be growing tightness in oil and gas markets.
- These are global challenges, and we need global solutions.
- The OECD countries must show leadership.

## Question and answer session

Where will the projected extra 25 mb/d oil production come from?

- We know of approved projects around the world that will bring 25 mb/d by 2015 (*note that this is still less than the 37.5 mb/d actually required*). **If the supply turns out to be less than this, we are in serious trouble. If these projects do not come online, the wheels will fall off our energy system.** (*Yes, those were his exact words*)

What oil price is required to cause a reduction in demand, and how will this reduction manifest itself?

- The bad news is that the price elasticity of oil is declining, so that a rise in price only produces a small reduction demand. The reasons for this are:
  - **Oil use is becoming more and more focused on transport**, where there are no significant alternative fuels to substitute.
  - **The OECD is wealthier** than during the last oil price shocks, and can afford to keep buying fuel at much higher prices.
  - Much of the current **oil demand growth is coming from subsidised markets**, such as China, India and the Middle East, so oil market price rises do not impact demand.
- We currently expect WTI crude oil to be at or above \$65 a barrel in real terms, and this is not enough to reduce demand. If consumers perceive that prices above this level are here to stay, then there will be some impact on demand. However, this price mechanism will not act fast enough, and government policies are also needed to reduce demand. For example, we would like to see fuel subsidies reduced.
- Also, we do not believe that high oil prices hurt the **global** economy, which is more than just the USA and EU. Some countries may be hurt by high prices, but others benefit.
- Note that in the last few years Africa has lost 3% of GDP growth to rising oil prices, but this does not even make headline news, while slight falls in USA growth get everyone worried.

High oil prices are on the way, which will incentivise efficiency – do you anticipate any surprises?

- We expect **high prices for the next decade, and maybe even higher after that.**
- In the developing world **\$250bn in energy subsidies is paid out each year.** If subsidies were removed for energy, then the payback on efficiency measures would be extremely rapid – at present there is little incentive as energy is too cheap. However, subsidies can not be quickly removed in some cases, due to the effect on people. In practice we have found that **energy subsidies in India actually divert more money to the upper and middle classes than to poor people.**

- Regulations on efficiency are needed in developing countries.

We need a lot of investment in oil production – what constraints do you see?

- There is currently a problem in the availability of manpower. However, this can be resolved over a few years simply by increasing the pay of the engineers.
- Willingness to invest – the Middle East has the money, but is not necessarily willing to invest it in new oil production.
- Iran doesn't have the domestic capital to invest, and also has challenging geology in its oil fields, leading to production declines of up to 20% a year in some fields. However, Iran does not have access to international capital in the way that other countries do.
- The rapidly declining production in OECD countries is clearly a constraint.

CCS leads to reduced efficiency in power stations – is this included in your assessment?

- I am not strongly in favour of CCS. In normal circumstances CCS would have little impact in the next 10 years as it is expensive and not yet commercially proven. There are also regulatory issues on where the CO<sub>2</sub> is stored.
- I would look at other technologies, such as nuclear power, ahead of CCS.
- Before China and India can be expected to use CCS, the OECD will need to spend a lot of cash developing it.
- Time is an issue – China and India are building coal power plants **now**, and retro-fit of CCS will be expensive.

China plans a target of 16% renewable energy by 2020, and higher targets after that.

- It is good to have such targets, but we are not convinced they will reach them.

What do you think on the role of Russia in future?

- Russia is very energy rich, and also close to Europe.
- The government in Russia has had a strong influence on energy, both domestically and in exports.
- 50% of global proved gas reserves are in Russia and Iran, while Qatar is third.
- There is a **significant decline in gas production from several Russian fields**, and there is insufficient investment in new production – **they may not be able to honour their export commitments in future.**

Further comments from Fatih Birol on oil

- The market price of crude is now well above the actual cost of producing it in most fields.
- In many countries the tax on fuel is more than the raw material cost.
- In producing countries fuel is very cheap, but their populations often suffer from energy poverty despite this.

\* \* \* \* \*

*Mike lives in Rye, UK, and works from home for the Ashden Awards for Sustainable Energy ([www.ashdenawards.org](http://www.ashdenawards.org)). He is also one of the founding members of PowerSwitch ([www.powerswitch.org.uk](http://www.powerswitch.org.uk)), and together with his wife Tracy manages eight acres of coppice woodland near Rye.*



This work is licensed under a [Creative Commons Attribution-Share Alike 3.0 United States License](http://creativecommons.org/licenses/by-sa/3.0/).