



IEA sees peak oil on horizon

The IEA strikes a sombre note in its latest World Energy Outlook. It warns of an oil crunch, a gas shortage and a climate crisis.

| by Alex Forbes

The International Energy Agency (IEA)'s annual flagship publication, the World Energy Outlook, this time focuses on the state of the world's oil reserves (see also the interview with Chief Economist Fatih Birol on page 18). The outcome of this oil study is surprisingly pessimistic. The IEA foresees an oil crunch in a decade or so. There are four key drivers behind the looming oil shortage. Firstly, production decline rates at existing fields are higher than expected. Secondly, oil demand is projected to grow over the long term. Thirdly, four-fifths of future oil production will need to come from national oil companies (NOCs) rather than international oil companies (IOCs). And finally, the economic slow-down and credit squeeze are likely to have a dampening effect on investment in new production.

Of these, the most significant new finding is the first. The IEA claims to have made the most comprehensive field-by-field study ever of historical oil production trends. This 'unprecedented analysis' covered the world's 800 largest oil fields. The IEA concludes that production rates at existing oil fields are not only falling faster than many expected but are also expected to accelerate. Decline rates for fields past their production peak currently average 6.7% per year and that the rate is likely to rise to 8.6% per year by 2030. The implications of this are far-reaching. Announcing these findings in London at the launch of the WEO last November, the agency's executive director, Nobuo Tanaka, said: 'Despite all the attention that is given to demand growth, decline rates are actually a far more important determinant of investment needs. Even if

oil demand were to remain flat to 2030, 45 million barrels per day (mbd) of gross capacity – roughly four times the current capacity of Saudi Arabia – would need to be built by 2030 just to offset the effect of oil field decline.'

Moreover, when projected demand growth over the period is taken into account, the investment need rises to 64 mbd by 2030, equivalent to six new Saudi Arabias. Many see this as well-nigh impossible, implying not just a supply crunch but prices even higher than we saw during 2008 – a rollercoaster year for oil prices. Peak-oil theorists are having a field day.

The IEA also highlights in the WEO that a fundamental shift is taking place in the oil and gas industry, with the ascendancy of the NOCs who between them control



by far the majority of the world's proved oil reserves. This means that four-fifths of new supply will need to come from NOCs raising questions about whether the necessary investment is likely to be forthcoming. NOCs might not be able to finance multi-billion-dollar development projects. Moreover, they have very different priorities than IOCs.

Gas concerns |

With global demand for natural gas projected to rise more quickly than overall primary energy demand – at a rate of 1.8% per year rather than the 1.6% projected for primary energy – it is reassuring to hear that discoveries of natural gas continue to exceed the amount being produced. And yet, as EER has reported in recent issues, the IEA remains concerned about the future gas demand-supply balance, particularly in the case of liquefied natural gas (LNG).

One of the most surprising conclusions is that the agency expects renewable energy to overtake gas as the second-largest source of electricity between 2010 and 2015. However, it concludes that this will not be enough to allay worries over potential gas shortages. It warns that: 'Investment in upstream facilities, LNG chains and long-distance pipelines, in the medium term, may fall short of what is needed to meet growing demand, especially if power generators opt to build more gas-fired capacity than the high levels already projected.'

As is the case with oil, the agency worries about the uncertainty over the investment needed to develop and transport gas from resource-rich countries to centres of demand. Another issue is that gas

consumption in several gas-producing regions is growing rapidly, limiting the production they are likely to make available for export.

Climate scenarios |

In the absence of new policies to abate emissions of carbon dioxide, the IEA projects in the business as usual scenario of its World Energy Outlook (WEO) that humankind is on a trajectory that will eventually lead to a 6°C rise in global temperatures – a chilling vision of global warming that would result in 'potentially catastrophic and irreversible climate change'. The IEA therefore calls for 'strong, urgent action to curb the growth in greenhouse gas emissions' and stresses that 'The post-2012 climate-change policy regime that is expected to be established at the UN conference on climate change in Copenhagen in 2009 will provide the international framework for that action.'

What kind of action? To help answer that question the IEA has formulated two detailed scenarios. In one, the global temperature rise is restricted to 3°C, implying stabilisation of atmospheric greenhouse gas concentrations at 550 parts per million (ppm) of CO₂-equivalent. The other, more ambitious scenario, aims for 2°C – a level widely regarded as an acceptable upper limit – implying concentrations of 450 ppm.

In the reference (business as usual) scenario, the IEA projects that rising global consumption of fossil fuels will lead to a 45% increase in global energy-related CO₂ emissions, from 28 Giga tonnes (Gt) in 2006 to 41 Gt by 2030. The 2030 figure is just 1 Gt below what was projected in

last year's World Energy Outlook, despite assumptions of slower economic growth and higher energy prices. The main culprit is coal, consumption of which is projected to grow faster than any other fuel in absolute terms, accounting for over a third of the increase in energy use.

The 550-ppm scenario requires emissions to rise to no more than 33 Gt by 2030 and to fall thereafter. The share of low-carbon energy in the world's primary energy mix would need to expand from 19% in 2006 to 26% in 2030. The IEA defines low-carbon energy as: hydropower, nuclear, biomass, other renewables, and fossil-fuel plants equipped with carbon capture and storage (CCS). The 450-ppm scenario is even more challenging.

The IEA goes on to look at what policies would be needed to achieve the 450-ppm and 550-ppm scenarios, taking a hybrid approach that comprises 'a combination of cap-and-trade systems, sectoral agreements and national measures.' It concludes that: 'Securing energy supplies and speeding up the transition to a low-carbon energy system both call for radical action by governments. Households, businesses and motorists will have to change the way they use energy, while suppliers will need to invest in developing and commercialising low-carbon technologies. Governments have to put in place appropriate financial incentives and regulatory frameworks that support both energy-security and climate-policy goals in an integrated way.'

In a reprise of a line from the Led Zeppelin song Stairway to Heaven, the IEA assures us that: 'There's still time to change the road we're on.' But the change will not be easy – and time is running out. ■