



# Global and regional issues: The energy challenges for the future

By Christoph Frei,  
Secretary General, World Energy Council

As the population of the world continues to grow past the 7 billion mark, the demand for energy is becoming an ever more critical challenge for the world's energy leaders. Governments are looking for sustainable solutions that provide the most competitive energy supplies from secure sources, whilst at the same time trying to balance the long-term, and in some cases, short-term needs of the environment. Companies and state enterprises are seeking the most efficient solutions to meet the needs of shareholders and the national treasury to support growth. Innovators are looking at the latest trends that will enable them to capitalise on developing markets and the public simply want access to energy so that they can go about their business and prosper. These are the challenges that the World Energy Council addresses every day.

I am in the fortunate position of being able to assess the world's energy priorities and to call upon the support of its most extensive and influential network of energy leaders. This privileged position enables me to better understand the challenges that face all facets of our community as they seek to meet the demands of what we identify as the "energy trilemma". Building on the combined knowledge of our network and the insight captured in our annual *World Energy Issues Monitor*, we have now been able to develop this work to better understand the critical uncertainties affecting the energy sector on a regional basis. This is an important development in our process to better serve the WEC membership whilst also providing a unique insight for policy-makers and industry alike.

Looking at this global assessment over the past three years of our survey, the one item that has remained a constant is concern over climate framework. This statement can sometimes lead us to think that the world shares the same priorities. This is not the case; different regions have different priorities.

It is therefore important to develop our methodology so that we can conduct more detailed analyses of our different regions. Through the outstanding support that we have received from our members we are now able to offer this unique insight into what keeps energy leaders awake at night. This work not only guides the WEC work programme, to ensure that the organisation correctly responds to the needs of our community, but also provides a valuable insight for policymakers and strategists.

## So what are the differing challenges?

While climate framework continues to be of high importance for Asia, Europe, Latin America and the Caribbean, and North America, it is seen more as a source of uncertainty in Africa where energy prices are seen as having the highest impact.

### Africa

In Africa, energy poverty is more prominent than in any other regions due to the high level of social poverty and the low access to modern energy. About 70 per cent of Sub-Saharan Africa's (SSA) population (and 58 per cent of Africa's population) lack access to electricity, while some 80 per cent of SSA's population without access to electricity live in rural areas. Among all the regions Africa shows the highest interest in the energy-water nexus. There is an expressed concern that if dry cooling is not implemented at power plants, then there will not be enough water to sustain the current population plus cooling for the region's power plant.

Conversely, large-scale hydro is seen as an important asset for Africa and holds great potential for development, but its further development and exploitation requires huge amount of investment, suitable social and environmental framework, political stability and bold economic reforms. It could take time to address all these challenges and to make development happen in a sustainable way. Solar is also viewed with great interest as the prices of photovoltaics continue to fall.

### Asia

Asian countries, especially emerging economies, have experienced increasing demand for electricity as a result of rapid economic growth. To meet the increasing demand, Asian economies are relying heavily upon coal and nuclear as their main energy sources.

Understandably, the impact of the events in Japan following the accident at the Fukushima Daiichi nuclear power plant, while having affected the world, are probably more directly felt in Asia. The fact that Japan has seen the equivalent of a 72 per cent decrease in nuclear power generation, taking into account installed nuclear capacity, has led to other issues. To replace this supply, Japan has raised liquefied natural gas (LNG) imports, spending an estimated US\$6bn on increased additional gas imports in 2011. LNG imports to Japan were up 28.2 per cent year

on year in January 2012 and, according to the Institute of Energy Economics of Japan and the Japanese Ministry of Finance, Japanese LNG imports in 2011 were 12 per cent higher than in 2010. This understandably brings the issue of energy security to the front for Asia.

### Europe

In Europe, climate framework is clearly an important issue, but it has also become clear that Europe is globally in a rather isolated position and it will be very difficult to convince other regions to follow a similar climate agenda. Weaker economic activity has led to dramatically lower greenhouse gas emissions, driving down carbon prices for emissions trading, and our survey suggests that carbon prices will continue to decrease. Indeed, new EU data suggests that emissions fell 2.6 per cent last year, prompting carbon prices to fall to a record low of just over €6 a tonne, in line with our analysis.

Energy infrastructure, including regional interconnection, is an important agenda for Europe. However, progress in areas such as large-scale, high-voltage transmission projects have been delayed by a lack of regulatory coherence. Transmission bottleneck issues could become more serious in future. The lack of an effective carbon market and a stagnating economy raise uncertainty regarding the future of technologies. In order to reach higher shares of green electricity there is a need for proper integration of renewables. So this strong need for new infrastructure is up against an economic situation that is currently a stress to investment.

### Latin America and the Caribbean

Transforming energy wealth into social development and reducing energy poverty is key to the region. Energy subsidies for demand side in particular are important for developing countries as they are seen to help guarantee access of energy for low-income people. Energy price concerns grow bigger as they could slow down economic development, since we expect energy demand to increase on one hand while we see the influence of MENA dynamics on the other. This region is the only region that has little doubt about the future of biofuels.

### North America

Energy issues are becoming extremely challenged in the North American region. We see that nuclear is both a source of high uncertainty and high impact. With 104 reactors operating in

the United States, accounting for 20 per cent of America's electricity output, and two new reactors having been given the go-ahead, nuclear will remain significant for the area. Middle East dynamics are an important issue to the North American region as we now see coming to the fore with the impact of oil price on the United States' political landscape.

Unconventionals are critical to the agenda in terms of their abundance and impact on energy prices. Shale gas, oil sands, fracking and tight oil have transformed North America's energy outlook. Shale gas plays an important role in the global energy market as its global production will increase to 30 per cent by 2030, and 70 per cent of this will come from the US and Canada. As for oil sands, their environmental acceptability, including pipeline construction, will be the key element for their timely development and even the creation of a new market. However, as was highlighted at our regional event in Houston last year, without agreement the Canadian government will look to new, emerging markets such as China. With the anticipated penetration of photovoltaic and wind energy into the grid and the much anticipated advent of the smart grid, the impact of electric storage may grow even bigger for the region.

### Looking to the future

It is important to note that as China becomes the world's number-one energy consumer there is a distinct shift in the energy landscape from OECD to non-OECD countries. The growth in the utilisation of nuclear power, for example, is mainly driven by non-OECD countries – the very countries that are seeing ever-rising energy demand. Of the 63 nuclear power plants currently being built worldwide, 39 are being built in non-OECD countries, including 26 in China, 10 in Russia and 7 in India. This demand shift will have a clear impact on the use of all energies in the future.

The demand growth is striking when we look at the transport sector. Our *Global Transport Scenarios 2050* report highlighted that even under the two extreme scenarios of "Freeway" (FW) and "Tollway" (TW), over the next four decades the non-OECD countries demand for transport fuels is expected to exceed that of the OECD countries by 2025 at the latest, as shown in figure 1.

Transport fuel demand in the next forty years will come mainly from developing countries such as China and India, where demand will grow by 200 per cent to 300 per cent. In contrast, the transport fuel demand for the developed countries will drop by up to 20 per cent, mainly due to

increased efficiencies. While the overall transport sector represents a quarter of total CO<sub>2</sub> emissions, our scenarios show that CO<sub>2</sub> emissions from transport could be up to 79 per cent higher in 2050. However, with clear policies that empower governments, the public and the private sector to intervene, we could limit this increase to 16 per cent. This is a clear challenge and one that will be very difficult to address.

Oil could fuel more than 80 per cent of the global transport sector for the next 40 years due to strong demand growth from the heavy duty sector, shipping and air traffic. By 2050 our report projects that global fuel demand in all transport modes could increase by 30 per cent to 82 per cent compared to 2010 levels. The impact of clear policies will have a significant effect on the projected technology mix, with the “Tollway” scenario leading to a greatly diversified landscape, as seen in our infographic on the following page.

#### Balancing the “energy trilemma”

As we look to the future the challenges are great but the rewards are equally as tangible. WEC is building partnerships

with organisations such as the United Nations, the World Water Council and others to help secure a sustainable energy future. We are creating processes anchored around our events programme that will help policy makers address the issues associated with the energy trilemma. The enduring objective of overcoming the energy trilemma provides the opportunity to have a long-term view of a balanced energy strategy within a country. From a pure investment point of view, the trilemma is increasingly being seen as a way to evaluate risks. Investors will establish a country's energy risk profile by assessing the balance between the three dimensions of the trilemma. Imbalances in the trilemma can lead to opposition in one dimension, which eventually lead to policy changes that can undermine projects. Therefore, clear and transparent energy policies that will at the same time justify the necessary short term trade-offs between the different dimensions and ensure a long- term balance between social equity, energy security and environmental impact mitigation will ultimately secure the highest degree of investor confidence. □

**Figure 1: Fuel demand for OECD and non-OECD countries**

