



A brief look at the Future of Energy

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Energy Institute
London, 13 October 2009



Peter Voser was born on August 29, 1958. A Swiss national, he was appointed Chief Executive Officer of Royal Dutch Shell with effect from July 2009.

Prior to his appointment as CEO, he was Chief Financial Officer since October 2004 and up to July 2005 was Chief Financial Officer of the Royal Dutch/Shell Group of Companies. In 2002 he joined the Asea Brown Boveri (ABB) Group of Companies, based in Switzerland as Chief Financial Officer and Member of the ABB Group Executive Committee.

He first joined Shell in 1982 and held a variety of finance and business roles in Switzerland, the UK, Argentina and Chile, including Chief Financial Officer of Oil Products. He was a member of the Supervisory Board of Aegon N.V. from 2004 until April, 2006. He is a member of the Supervisory Board of UBS AG and a member of the Swiss Federal Auditor Oversight Authority.

It is clear that alternative sources of energy will not by themselves deliver a secure, affordable and sustainable energy supply by mid-century. Cleaner fossil fuels will have to shoulder a large part of the burden. By the middle of the century, renewable energy could supply a maximum of 30% of world energy demand. Even that would, by historic standards, represent spectacular growth. To get there will require many years of hard work by scientists, engineers and policy makers. And, even then, nuclear and fossil energy will make up the remaining 70%. That in turn means that the world must strive to reduce carbon emissions from fossil fuels, most notably coal-fired power. Applying carbon capture and storage to power stations is one way of doing that. Another solution would be to increase our use of natural gas, the cleanest burning fossil fuel. As domestic natural gas production in the UK declines, Liquefied Natural Gas and gas from Norway will fill the gap. Indeed, the UK could develop into the first port of call for many of the world's ships carrying Liquefied Natural Gas to Europe.

Intro

Good afternoon.

I will only dip briefly into the future of energy – rather than trying to tell you the complete story.

There are two points I wish to highlight:

- First, renewables – while important – by themselves cannot carry the energy transition. Cleaner coal, oil and gas will also have to shoulder part of the burden.
- Second, addressing emissions from coal-fired power must have priority. We can apply carbon capture and storage and increase our use of natural gas, the cleanest burning fossil fuel.

Renewables in the energy transition

The world is faced with rising energy demand and growing environmental stress. The current energy system is not capable of dealing with these challenges adequately.

We need to build a better energy system – people need energy to power their lives and a clean environment to sustain their lives in the long term. Our generation must pass on to future generations as many energy options as we enjoy today.

Some of our critics say this: “If Shell were sincere, they would quit the oil and gas business and switch to renewable energy immediately.”

For me this a hasty judgment, rooted in emotions, not facts. Let's do a reality check.

At various stages in its history, Shell has invested in other segments of the energy market than most of you will associate us with. For instance, we've had serious involvement in solar, forestry, nuclear power and coal mining.

Today Shell is a market leader in the biofuels space; we distribute more biofuels than any other company.

We're working hard to develop advanced biofuels that can also use non-food feedstocks like straw or even algae.

In the meantime, we are working with the Roundtable on Sustainable Biofuels and many other international actors to develop an international certification scheme. Such a scheme would provide assurances on the greenhouse gas footprint and other environmental and social aspects of biofuels and their feedstocks.

Shell is also a sizeable player in wind.

What we've learned from decades of experience is this. It takes at least 25 years for any new energy type to gain 1% of the global market. That's been true for liquefied natural gas, or LNG, in the past. Biofuels are reaching that mark about now. Wind could do so sometime in the next decade, 25 years after the first big wind farms were built in the United States and Denmark.

So: 25 years between break-through in the lab to 1% of the market.

To scale up renewables, the world must also overcome resource constraints and environmental challenges.

For instance, the New York Times recently carried a story about two large planned solar farms in Nevada, USA. These became controversial when the local population realised that cooling would consume 20% of their desert valley's available water.

It's not just about water, it's also about metals.

Take lithium, a crucial component of the lithium-ion batteries that will power tomorrow's electric cars. It can be easily produced in large quantities in only a few places on earth. And current production methods put pressure on the environment. Making a big shift to electric vehicles would require an expansion in the world's capacity to mine and recycle lithium, and its ability to do it sustainably and responsibly.

This reality check shows why we have to make responsible use of *all* of the Earth's precious natural resources – including the ones used in renewable energy technologies. All of us as consumers will have to show leadership in this regard.

The reality check also shows why we have to think from cradle-to-cradle. I am told this is an old Chinese concept, but it also makes sense to me as a Swiss person. As resources get scarcer and more costly, we will have to pay more attention to recycling.

It also serves as a reminder that countries are well-advised to spread their energy risks by increasing the diversity of their energy supplies.

Finally, it explains why we cannot address climate change through renewable energy alone. We simply don't have the time.

Our scenario team has calculated that by the middle of the century, renewable energy could make up around 30% of the global energy mix. Make no mistake: it will take huge effort by scientists, engineers and policy makers to get there.

So, in order to reduce greenhouse gas emissions, we need to exploit the full range of climate mitigation options, including energy efficiency, renewable energy, protecting forests and wetlands, and a clear pathway for the deployment of technology to capture and store CO₂.

Addressing emissions from coal

In the energy sector, the priority area should be tackling emissions from coal-fired power – because it's at the heart of the problem, and we know what needs to be done.

According to the International Energy Agency, coal-fired power is responsible for the fastest growth in CO₂ emissions worldwide.

What does it take to address coal-fired power? A question most relevant also for the UK.

Building new nuclear power stations could be part of the answer.

But let me focus on three other elements: cap-and-trade; carbon capture and storage, or CCS, more natural gas.

At Shell, we think carbon pricing is best achieved through cap and trade. As part of this, policy-makers should also push for rapid and large-scale deployment of CCS.

Shell is involved in a number of CCS projects under development. For instance, in Canada's oil sands region, we're making good progress with plans to build the Quest project.

Shell Quest aims to store up to 1.2 million tonnes of CO₂ per year from our Scotford upgrader. That's equivalent to taking around 200,000 American cars off the road.

At the UN Climate Conference in Copenhagen in December, countries will have an opportunity to drive progress on all these fronts. It won't be easy and a positive outcome is far from assured.

The role of the United States will be crucial. There is the perception – including here in Britain - that the oil and gas industry in the USA is 100% opposed to efforts in Congress to agree effective climate legislation.

“We have to make responsible use of all of the Earth's precious natural resources – including the ones used in renewable energy technologies.”

While other companies can address their own positions, let me say that this is not true for Shell. As a member of United States Climate Action Partnership, we are actively involved in efforts to build a fair and effective U.S. cap-and-trade programme.

The role of natural gas

Another way to quickly and cheaply reduce emissions from coal-fired power is to burn natural gas instead of coal.

On average, a natural gas-fired power plant emits half the CO₂ of a coal-burning plant to produce the same amount of electricity. It also generates significantly less local pollution.

Natural gas-fired power stations can also be switched on and off with relative ease, making them ideal allies of the intermittent power generated by wind turbines and solar panels.

While natural gas is not a silver bullet, it's difficult to see a sustainable and secure energy future without it.

Natural gas has been important for the UK – without it, the Kyoto targets would not have been achieved and the lights would have gone out long ago.

However, these days, natural gas gets a bad press. In the public debate here in the UK, natural gas is caught in an uncomfortable no man's land between clean energy from wind and secure energy from coal.

So let's do another reality check.

As you all know, many of Britain's coal-fired and nuclear power plants will soon have to be decommissioned. The Government has calculated that of around 75GW in generating capacity, 20GW will disappear by 2015.

Meanwhile, the country faces very ambitious renewable and nuclear targets. Under the EU's target, renewable energy should supply 15% of the UK's total energy demand by 2020.

That would require the equivalent of at least fifty London Arrays to be built between now and 2020. And that is assuming no increase in demand before 2020.

Clearly, the UK's energy challenge is acute. Which raises the question whether the UK can

afford to dismiss natural gas as a future source of energy.

The concerns over natural gas supplies are understandable. Natural gas supplies from Russia – coming into the European Union through Ukraine – have become politicised in recent years.

If we look at the facts, we see that the European Union has continued to receive supplies reliably from Russia.

As for the UK, in 2008 Russian gas supplied less than 5% of the country's natural gas mix. And our assessment is that this will continue to be the case in 2020.

The reason the UK will continue to need so little Russian gas is that many new sources of gas are coming on stream that will find their way to the UK.

The two most important ones are LNG and Norwegian gas.

LNG only made up 1% of the UK's mix in 2008, but this share is rising. By 2020, LNG could account for 35%.

The UK is at the end of Europe's natural gas pipelines, but it may well become the first port of call for ships that carry LNG from countries like Qatar, Nigeria, Trinidad and Algeria.

Norwegian gas will likely account for another 35% by 2020, with a big role for the Shell-operated Ormen Lange field.

More natural gas will become available in the future. There are huge unconventional gas resources to be unlocked in many countries – I'm talking about natural gas that is trapped in dense rock, coal seams, in layers of shale, or at shallow depths.

Unlocking these resources will require many technology advances and favourable economics.

If you think this is science fiction, take a look at the United States. There, new technology has opened up abundant gas resources contained in dense rock formations, increasing supplies dramatically.

Some people now even speculate that the US might convert LNG import terminals into LNG export facilities.

“In the United States, new technology has opened up abundant gas resources contained in dense rock formations, increasing supplies dramatically.”

This may never happen – public opposition in America to increasing energy exports is traditionally strong.

The United States will in any case draw less on global LNG supplies, freeing up more for the UK and other European countries.

Let me make a final point - which is this: While domestic natural gas production is expected to fall from about two-thirds of total demand today, the UK will still produce a quarter of the gas it consumes in 2020. And this assumes no new, unconventional, resources will be added to the mix.

As you can see, companies like Shell sit at the nexus of one the world's most difficult and exciting challenges: building a new energy system – capable of meeting growing energy needs at much reduced environmental cost.

At Shell, that responsibility is a source of inspiration for our people. And we work hard to make it a source of trust for our customers.

We will continue to work hard to produce energy-efficient liquid transport fuels, including sustainable biofuels.

Meanwhile, we will continue to invest in projects and technologies that help us to produce and distribute more natural gas to the world's power sector.

For instance, we're currently pioneering the development of Floating LNG technology.

This would allow us to liquefy natural gas at full sea, reducing the environmental impact on land and sparing us the cost of piping the gas to land over a long distance.

Conclusion

Summarising, when I look at the future of energy, I see a broad mix of energy types and carriers.

There will be a growing role for renewable energy and for carbon capture and storage.

Consumers will be much more efficient in their use of energy.

Recycling will be increasingly important.

Underpinning a cleaner energy system will be international cap-and-trade mechanisms.

And natural gas will be the energy type that connects all the dots.

Thank you.

“While natural gas is not a silver bullet, it's difficult to see a sustainable and secure energy future without it.”

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