Water, energy and the resource consumption puzzle: it's time for solutions

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Peter Voser

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Peter Voser became Chief Executive Officer on July 1, 2009. Before his appointment as CEO, Peter had been Chief Financial Officer (CFO) and an Executive Director of Royal Dutch Shell since 2004. He was CFO of the Royal Dutch/Shell Group of Companies from October 2004 to July 2005.

Peter was CFO and an Executive Committee Member of the Asea Brown Boveri (ABB) Group of Companies, based in Switzerland, from March 2002 until September 2004.

Peter joined Shell in 1982 after graduating in business administration from the University of Applied Sciences, Zürich. He went on to work in a number of finance and business roles in Switzerland, the United Kingdom, Argentina and Chile.

After moving back to London from Chile in early 1997, Peter became the Group Chief Internal Auditor. In 1999 he was appointed CFO of Shell Europe Oil Products.
He became CFO of the Global Oil Products Business in early 2001 and a member of the Oil Products Executive Committee.

From 2004 until April 2006, Peter was a member of the Supervisory Board of Aegon N.V.. He served on the Board of Directors of UBS AG from April 2005 to April 2010. He was a member of the Swiss Federal Auditor Oversight Authority from 2006 until December 2010.

Since April 2010 he has been a director of Catalyst, a non-profit organisation that works to build inclusive environments and expand opportunities for women and business. In March 2011, he was appointed to the Board of Directors of Roche. In July 2011, His Majesty the Sultan of Brunei awarded him the title of Dato Seri Laila Jasa in recognition of his services to the state of Brunei.

Peter is also active in a number of international and bilateral organisations, including the European Round Table of Industrialists and The Business Council.

A Swiss citizen, Peter was born in 1958. He is married to Daniela and they have three children.

The world faces a resource consumption puzzle. Supplies of water, energy and food are coming under pressure from an expanding global population. But tackling this problem is made all the more difficult by the powerful connections between these different resources: rising energy consumption puts added strain on the world's water stocks and vice versa. In these remarks to the 6th World Water Forum in Marseille, Peter Voser describes how Shell's recent work to quantify water use in the energy industry can support the development of a more co-ordinated approach to energy and water policy – a longstanding aspiration of many in government and industry that has hitherto been frustrated, in part, by a lack of data.

I should begin by thanking the World Water Forum for its invitation to speak today. It's a great honour for me to appear alongside such distinguished panellists. And it's heartening to see such recognition of the need for a truly co-ordinated approach to easing the pressure on the world's water, energy and food resources.

After all, demand for all three will rise in concert thanks to a surging global population, and growth in the developing economies. And there are powerful linkages between these resources. For my own industry, water is an especially important issue. Energy providers are among the largest industrial consumers of freshwater – even if our consumption pales in comparison to the agricultural sector.

We need water for drilling, flooding wells, refining crude and producing biofuels. And we need it for power generation and transportation. At the same time, energy is required for the supply, purification, distribution and treatment of water and wastewater. In some Gulf countries the energy needed to desalinate water accounts for around two-thirds of domestic oil use.

Now, it's all very well recognizing that these connections exist. But the toughest challenge still remains: what to do about it. For years, policymakers have spoken of the need for a more integrated approach to tackling the world's environmental challenges. But delivering concrete progress has proved notoriously difficult. And the overwhelming tendency is still to consider each issue in isolation.

Shell's work on water

One obstacle has been a lack of hard data - especially about freshwater use. That's hardly surprising when you consider there's not even a standard method for accounting for water use in industrial settings. As a consequence, little work has been done to examine the water intensity of different energy pathways or of the energy system as whole. And we've lacked a proper overview of where the energy system is putting the world's water resources under the most strain.

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At Shell, over the past year, we've been working with the World Business Council for Sustainable Development and the University of Utrecht to put this right. In simple terms, we've developed a methodology for measuring water use in the industrial sector as a whole. And we've applied it to the energy industry.

Now, I'm at risk of making it all sound too easy. But it means we can now estimate with greater accuracy the amount of water needed to generate energy from different sources – including oil, gas, coal, nuclear and biofuels – using different technologies and in different locations. We have published our findings in a peer reviewed article in a scientific journal.[1] We are also sharing our data with the wider business sector and the International Energy Agency.

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[1] Joost Schoornagel, Franke Niele, Erns Worrell, Maike Böggemann, "Water accounting for (agro) industrial operations and its application to energy pathways", Resources, Conservation & Recycling, Vol. 61, 2012, pp. 1-15

All this should bring several benefits, not least for policymakers deciding how to meet rising demand for heating, transport and electricity. They will have a clearer sense of how different energy pathways might affect their precious water resources. And industrial companies will be able to make more considered strategic and operational decisions in a world of growing water scarcity.

But this is just the beginning. At Shell, we're now taking our work a stage further. Some of you will know that for decades we have produced energy scenarios to map how the global energy system might evolve. And that we factor CO2 emissions into our work. That enables us to see how much CO2 the world would emit in different energy scenarios - and policymakers to see what needs to be done to meet emissions targets.

Thanks to our water accounting project, we will soon be able to do the same for water. We're factoring our new data on water use into our scenarios models. That will give us a better understanding of the demands the energy system will place on global water resources in the decades ahead. As such, it will be another critical step towards a more integrated approach to energy and environmental policymaking.

Initial findings

So what are some of the main themes emerging from our work?

The first is that freshwater consumption in the energy system will grow sharply. That's partly because global energy demand will double in the first half of this century. It's also because the world will draw more of its energy from water intensive sources and technologies, such as biofuels.

Nevertheless, it's the power sector that will continue to account for the majority of energy related freshwater use. It's important to realize that different technologies have a very different impact on water use in the power sector. In particular, the type of cooling system used in a power plant is a major determinant of the total quantity of water needed to generate electricity.

The energy source also matters. For example, it can be much more water intensive to generate electricity from coal and nuclear than gas. So growing the share of gas-fired power could help to reduce the overall freshwater intensity of electricity generation. And replacing coal-fired power with gas can also help to reduce CO2 emissions by around half.

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A second emerging theme is the importance of geographical location. That may sound obvious, but you only have to look at biofuels to see why this matters. Biofuels may offer the fastest route to CO2 emissions reductions in the road transport sector. But growing biofuels feedstocks in water-stressed areas could mean that their overall social and environmental impact is far from positive. That's why it's preferable to source feedstocks in countries like Brazil, where agricultural systems are fed mainly by rainwater, rather than irrigation.

A third observation is that the world must address some unexpected dilemmas, such as the tension between reducing CO2 emissions and conserving water supplies. Biofuels are just one example. Another is nuclear power, which can deliver substantial CO2 reduction benefits, while taking a heavy toll on freshwater resources in some regions.

Potential solutions

So how do we begin to solve this resource consumption puzzle?

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Innovation and technology will clearly be critical. The energy industry already employs some highly effective water technologies. And we're getting better at recovering and recycling water, including waste water from communities close to operations. For example at Shell's Groundbirch tight gas project in Canada, we are funding a water recycling plant for the nearby city of Dawson Creek. The plant will treat sewage water so that it can be re-used in our operations, and for other industrial and

municipal purposes, such as water for sports fields.

Then there's our giant new Pearl gas-to-liquids project in the Qatari desert. This converts natural gas into high value liquid fuels and chemical feed stocks. The chemical reaction that turns the gas into liquids also produces a large amount of water and heat. So at Pearl we built a system that enables us to harness these by-products to drive the plant's equipment with steam. Thus we avoid drawing on Qatar's precious water resources.

At Shell, we're also making progress on biofuels. We're investing in Brazilian sugarcane ethanol through Raizen, our joint venture with Cosan. Brazilian sugarcane needs virtually no irrigation water to grow because of high seasonal rainfall. And Raizen uses a system that recycles 90% of the water used in the industrial process.

But it will take more than technological innovation to ease the strain on the world's water and energy resources.

New forms of collaboration between the public and private spheres will also be necessary.

We need partnerships that marry the commercial expertise of the private sector with the public sector's understanding of regulatory economics. We need partnerships that remain impartial, and that don't fall under the influence of one interest group. And we need partnerships that make a tangible impact on the policy-making process, commanding the confidence of some of the world's most senior political and business leaders.

Conclusion

I could be talking about the World Water Forum.

I'll finish by affirming that at Shell we look forward to continuing to work with the Forum and its partners in the private and public sectors – not just to deepen our understanding of these daunting challenges, but to make demonstrable progress in addressing them.

Thank you.

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