



Delivering technology

– the key role of international energy companies

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Jeroen van der Veer is Chief Executive of Royal Dutch Shell plc. He was a Managing Director of Royal Dutch Petroleum from 1997 until the unification under Royal Dutch Shell in July 2005.

He joined Shell in 1971 and worked in manufacturing and marketing in the Netherlands, Curaçao and the United Kingdom. In 1984, he returned to Shell Nederland as manager of Corporate Planning, and then of Pernis Refinery. After an assignment in Shell International, looking after Africa and Canada, he became a managing director of Shell Nederland in 1992. Four years later he became president and chief executive of the Shell Chemical Company in the United States.

He was born in Utrecht in the Netherlands, and is married with three daughters. He has two degrees – one in mechanical engineering from Delft University and another in economics from Rotterdam University. In 2005 he was awarded an honorary doctorate from the University of Port Harcourt in Nigeria.

He is a non-executive director of Unilever, serving as a member of the Nomination and Remuneration Committees.

Concerns both about future supplies of energy and about the impact of energy on our climate are growing. The challenges should not be underestimated, but our ability to innovate and harness technology can offer solutions. The world will long depend on fossil fuels to meet expanding demand. So we need to find and recover more conventional oil and gas, develop the potential of unconventional hydrocarbons, and use coal more efficiently. At the same time, we must reduce the carbon dioxide emitted by fossil fuels, make alternative forms of energy economic, and increase energy efficiency. New technologies will have to be applied on an unprecedented scale and pace, in increasingly demanding projects. International energy companies – with their integrated capabilities, global experience and commercial drive – will have a key role in this.

People are increasingly worried about energy: “Will I get the energy I need? And, if I do, can I afford it and what happens to the environment?”

People worry that they will face a future of growing energy shortages, rising prices and international conflict for supplies. They worry that they will have to choose between rising living standards or unacceptable climate change. And they are not sure that energy companies can – or want to – offer solutions.

Nobody should underestimate the challenges.

With continued economic growth, the world’s energy needs could increase by half in about 25 years. That’s the equivalent of perhaps 100 million barrels of oil extra a day, significantly more than we added over the past quarter century.

Most will be in new markets, where infrastructure has to be developed, and much more will have to be traded internationally.

And this has to go together with cutting the carbon dioxide emissions from energy.

The scientific advice is clear. Most science academies around the world, including here in the US, agree that carbon emissions from human activities are changing our climate. They warn that urgent action is needed to reduce them.

Of course, there are still great uncertainties. But the potential risks are too great for delay.

But I don’t believe that the world is running out of energy. Or, that – taking

‘unconventional’ resources into account – we’re even close to ‘peak oil’. Or, that we must choose between economic development and action on climate.

And I do believe that energy companies have much to offer in both areas, although tackling climate change must be a challenge for all society.

I remain optimistic that the human ability to innovate and harness technology will help us to find solutions.

But this is not just a matter of making scientific advances and developing new tools. That’s only the essential first step. The challenge is – as expressed in my title – to ‘deliver technology’.

That means applying advances on the scale necessary to make real progress. It means learning from experience to use them increasingly effectively, and quickly sharing that learning around the world. It means integrating many technologies, because that’s where the real benefits come in this complex business. It means applying those technologies in increasingly demanding projects – accessing more difficult resources and creating the complex chains needed to deliver the energy people need.

The challenges we face will require us to do all this on an unprecedented scale and pace.

What do we need to do?

We need to do three things

- make the most of fossil resources,
- develop alternative forms of energy, and

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- improve energy efficiency.

Because of their efficiency and abundance, fossil fuels will remain at the heart of our energy system. We need to make the most of them, which must include dealing with their carbon emissions.

The biggest impact would come from significantly increasing the amount of oil we recover from reservoirs, little more than a third on average at present. In Shell, we see considerable scope for this, but no simple solutions. It depends on sustained investment in extending knowledge and applying technology.

Continuing advances are helping us to:

- reduce geological uncertainties,
- drill better placed, more productive and cheaper wells,
- manage reservoir processes more efficiently, and
- enhance the recovery of stranded oil.

‘Smart’ technology – enabling engineers to monitor and control reservoir processes remotely – could significantly boost recovery.

Enhanced Oil Recovery techniques – using heat, gas or chemicals to make oil flow more easily – will be increasingly important. But these projects are costly, complex and technically demanding.

All this depends on experienced people – able to understand the sub-surface possibilities, choose the right tools, and apply them effectively.

The industry is also learning how to find and develop hydrocarbons in more difficult geology and harsher environments. For example, in Shell we are using our deepwater experience from the Gulf of Mexico in places like Nigeria and Malaysia.

Consumption of liquefied natural gas could double over the next decade. But this also depends on technological, as well as commercial, innovation.

Gas to Liquids offers another way of getting gas to customers. Shell has been pursuing this for 25 years – developing our proprietary technology, gaining operational experience from our first plant in Malaysia, and building markets. Our planned 140,000 barrel a day plant

in Qatar is due to come into production around the end of the decade.

We believe that GTL will be increasingly important, providing high quality fuels to help reduce transport emissions.

Our experience illustrates three things about developing energy technologies. It takes long-term commitment. Being integrated matters. And it opens further opportunities.

Technological advance will also be important in refining, to deal with heavier and more acidic crudes, and meet demand for light and clean products.

There are also very large ‘unconventional’ resources – in heavy oils, oil sands and shales, contaminated and tight gas, and coal bed methane.

And, of course, there’s lots of coal, particularly in countries like the US and China.

The distinction between ‘conventional’ and ‘unconventional’ is blurring, as we learn to develop these resources economically and responsibly.

Oil sands production in Alberta is already a robust and expanding business. Shell Canada aims to grow production from its Athabasca project to 500,000 barrels a day by sometime in the next decade.

Shell is testing an environmentally sensitive way of unlocking the very large potential of oil shale in Colorado, using electric heaters to gradually heat the rock formation and release light oil and gas.

Coal gasification offers a way of using coal more efficiently, cleanly and flexibly. The resulting syngas can fuel efficient combined cycle power plants. It could also be used – with the same technology as Gas to Liquids – to produce high quality liquid fuels.

I believe that the world will be able to rely on the efficiency and convenience of fossil energy for a long time to come.

Developing carbon solutions

How does this fit with the need to reduce carbon dioxide emissions?

I have a vision of ‘green – or greener – fossil fuels’ with much of their carbon

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dioxide captured and sequestered either underground or in inert materials.

I believe this is practical and could – certainly in the medium term – be cheaper, more convenient and more flexible than alternative energies.

A typical one-gigawatt coal fired power plant produces the same carbon emissions as one and a half million cars. China alone is building about 17 of these plants a year. That's why I think sequestration for power plants should be a priority.

I see providing carbon dioxide solutions as a commercial opportunity and have appointed a senior Shell executive – 'Mr CO2' – to ensure we pursue this vigorously.

Our coal gasification technology fits well with sequestration. We are involved in a power project to demonstrate this in Australia.

Shell Canada is also working on a project to capture carbon dioxide from its oil sands upgrader for sequestration in aging oil fields, or use in enhanced oil recovery.

Given the challenges, we need to get demonstration projects underway as quickly as possible. Governments can provide market incentives to speed development.

They can also influence the environment for commercial action. Trading schemes – such as in the EU – give companies the flexibility to plan their investment.

Giving priority to sequestration does not mean neglecting alternative energies. We need to continue working to make these competitive.

One thing we are focusing on in Shell is developing advanced biofuels – such as cellulose ethanol and bio-diesel made using the same technology as Gas to Liquids – which both produce far less carbon than present biofuels.

We are also pursuing wind, thin-film solar and hydrogen.

Finally, there is the potential for energy efficiency. I believe the world is just starting this journey – partly because it is politically painful to push forward changes that must involve all energy users.

Energy companies will play their part. We can do this by making our own operations more efficient, although this is an increasing challenge because of the additional processing to upgrade heavier oil and produce cleaner fuels. We can also provide better fuels to support improvements in engine efficiency.

Key challenges

What are the key challenges?

The first is economic – the scale of investment required to access more difficult resources and undertake long-term technology development.

The International Energy Agency estimates that meeting global energy needs will require investing \$17 thousand billion – in 2004 money – by 2030.

Oil and gas prices have risen. But so have industry costs. And developing more difficult resources will mean higher unit investment.

Given the urgent investment needs, exacting 'windfall' taxes is counterproductive, particularly in an industry with a history of volatile prices. In an increasingly uncertain world, long-term investors need predictable terms.

The second key challenge is delivering 'elephant' projects – bigger, more remote, in harsher conditions, more technologically demanding, and with greater social and environmental sensitivities.

Our Sakhalin II project in Russia is an example, perhaps the most challenging oil and LNG project yet undertaken. Construction is proceeding apace. And we're learning a lot. This is good because such projects are our future. By 2015, I think we could have 10 underway.

A wider challenge is the industry's shortage of qualified and experienced people. In North America and Europe, fewer young people pursue scientific and technical education. Here in the US, for example, the number of university students studying petroleum engineering has fallen by more than 80% since the early 1990s.

We need to convince young people that a technical career in this industry is

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both stimulating and worthwhile – meeting challenges that matter to the world.

I recently appointed some Shell experts – at the leading edge of their disciplines – as our Chief Scientists. Their primary role is to help drive our increasing business focus on technology. But I think they will also have an important external role in communicating the excitement of technology.

We are also focusing on recruiting globally – with considerable success last year – and on ensuring that all Shell people everywhere have the opportunity to make the best of their talents. So that we can do so as well.

And we emphasise the rapid transfer of technological learning across our global business.

Role of international companies

As I said at the beginning, meeting the world's expanding energy needs – while tackling carbon emissions – will require delivering technology at an unprecedented scale and pace.

I believe that major international operators will have a key role in this, because of our integrated capabilities, global experience, and 'delivery' mindset.

We bring to technology development a unique knowledge of the technical challenges and market possibilities. And we learn fast from applying new technologies in global operations, harnessing that experience wherever we work.

We can balance the risks and opportunities of investing in challenging projects, and have the capabilities to bring them to fruition.

We respond to what our customers need and society expects.

We only survive by our ability to innovate, deliver, and serve. There are always others anxious to take our business.

National and international companies have complementary strengths, and our relationship will be vital for the future.

Delivering technology

Let me end by coming back to where I started.

It is understandable that people are worried about energy. I don't underestimate the great challenges. But I have no doubt that this industry can offer solutions. They will come from our ability to 'deliver technology' – developing and applying new tools to produce the energy people need while reducing its impact on the environment we all share.

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