Working together to build a lower carbon, higher energy future

Center on Global Energy Policy
Columbia University, New York City, USA

Ben van Beurden

CEO, Royal Dutch Shell plc
September 2, 2014

Ben van Beurden became Chief Executive Officer (CEO) on January 1, 2014.

He joined Shell in 1983, after graduating with a Master's Degree in Chemical Engineering from Delft University of Technology in the Netherlands.

Ben's career in Shell spans both Upstream and Downstream activities. He has held a number of operational and commercial roles, including some 10 years in the LNG business, and a variety of positions in Downstream.

In January 2005, he became Vice President, Manufacturing Excellence, based in Houston, USA. In this role he was responsible for standards in operational excellence and high performance initiatives in refining and chemicals manufacturing.

In December 2006, he was appointed Executive Vice President, Chemicals, based in London, UK. During his tenure in the role, Ben was appointed to the boards of a number of leading industry associations including the International Council of Chemicals Associations and the European Chemical Industry Council.

From January to September 2013, he was Downstream Director and had regional responsibility for Europe and Turkey. He has been a member of the Executive Committee since January 2013.

Ben, a Dutch citizen, is married and has three daughters and a son.

Meeting the rising global demand for energy while tackling climate change is a huge challenge. In this keynote speech to the Center on Global Energy Policy at Columbia University, Ben van Beurden outlines a series of measures society will need to take to address that challenge. He urges policymakers to embrace cleaner-burning natural gas as a fuel for power generation; to increase their support for the potentially game-changing technology of carbon capture and storage; and to widen the use of carbon pricing systems. An urgent rebooting of the debate around energy and climate change is needed, he says, to pave the way for a new pragmatic and collaborative approach to building the lower carbon, higher energy future the world needs.

Thank you for your welcome. It's a privilege to be here this afternoon – and a privilege to be able to address those of you associated with the Center on Global Energy Policy.

Even in its short life the Center has made an important contribution to energy research, as well as being a hub for much-needed discussion and debate. And I want to congratulate Jason and his colleagues on their endeavours.

I also want to thank Dan Yergin for the work he has done explaining where our energy system has come from, and where it is going. Dan, I very much look forward to our conversation.

Finally, a thank you to those of you who are here simply because you're interested in the future of energy. Energy is fundamental to our civilisation. It powers, shapes and sustains our lives: the way we work, the way we travel, the way we communicate.

That's why we need as many people as possible to engage in the critical debate over how we produce and use energy. To me, the fact that so many of you are here today proves that debate is urgent and alive, just as it needs to be.

Building a sustainable energy future

Today I want to contribute to that debate by asking – and attempting to answer – two questions: "How do we build a sustainable energy future?" and "What can an energy company like Shell contribute to that future?"

Over the next twenty five minutes or so, I'll do a number of things.

Firstly, I'll briefly describe some of the key forces I see shaping the global energy system. Secondly, I'll outline a few of the ways I believe policymakers could act to build a sustainable energy system – one that limits the potential impact of climate change. Finally, I'll describe how we at Shell are contributing to the lower carbon, higher energy future the world needs – and explore some of the steps we need to take together to make it possible.

Where we are going

What are some of the factors shaping that future?

For one thing, global energy demand is rising – and will continue to rise.

There are already more than twice as many people on the planet as when I was born. The world's population is expected to grow from roughly 7 billion today to 9 billion by the middle of the century. By which time an increasing number of us – three in four – will be living in cities.

As the number of people grows so will their desire for electricity, a TV set, a fridge, and the chance to travel. And that's particularly the case in emerging economies like India and China.

The International Energy Agency, or IEA, believes demand for energy could double by 2050 from its baseline just a few years ago.

"Energy is fundamental to our civilisation. It powers, shapes and sustains our lives: the way we work, the way we travel, the way we communicate. That's why we need as many people as possible to engage in the critical debate over how we produce and use energy."

The IEA also says that meeting that demand will require an average annual spend of more than $2 trillion between now and 2035. That's investment in the extraction, transport and refining of oil and gas; in power generation; and in energy efficiency. That means investing roughly 3 times the entire US military annual budget – or 120 times the annual budget of NASA. Every year for the next 20 years.

Meeting energy demand is a massive challenge. But so too is the need to tackle the real and growing threat that climate change poses.

As things stand, according to both the IEA and the UN Intergovernmental Panel on Climate Change, we will have to work very hard to limit warming to two degrees.

Rising demand for energy and concerns over climate change are clearly the two most powerful influences shaping our energy system. But what are some of the other factors at work?

New oil and gas from shale rock have important implications, of course, not just for North America but for the global energy system as a whole. Oil production in the Bakken oil field in North Dakota, for example, recently reached the billion barrel mark.

The opening up of new resources not just here but in places like Latin America and the Arctic will influence where and how energy is traded and transported for decades to come.

Geopolitics will also play as crucial a part as ever, with the potential to impact supply. Witness what's going on in places like Ukraine, Iraq and the South China Sea.

And we'll see the continuing influence of new technologies on the way we access and produce energy. The efficiency of oil and gas production will continue to improve. And renewables like wind, solar, hydrogen and bio-energy will continue to increase their share of the energy mix as they become more advanced and more cost-effective.

Mountains and Oceans

Rising demand for cleaner, more affordable energy. The "Shale Revolution". More renewable energy. Geopolitical strife. And of course, climate change. Just a few of the forces shaping our energy system.

But what's the collective long-term impact of all those different forces on the way we'll produce and consume energy?

Shell's Scenarios team last year published a report mapping out two hypothetical energy futures called Mountains and Oceans. These aren't predictions but plausible scenarios based on detailed modeling, and are of enormous use in decision-making.

"Meeting energy demand is a massive challenge. But so too is the need to tackle the real and growing threat that climate change poses."

One scenario, Mountains, imagines power remaining concentrated in the hands of economic and political elites. Top-down policymaking results in progress on renewables, on hydrogen, and the steady replacement of coal by cleaner-burning natural gas – with gas becoming the backbone of the global energy system by the 2030s. There's also quick progress on carbon capture and storage or CCS, the technology that can capture carbon emissions at power stations and other large plants and store them safely deep underground.

In the world of Oceans, by contrast, power becomes increasingly devolved away from governments and elites. This spurs innovation and economic growth, but also slows consensus-building in other areas. We see slower development of natural gas infrastructure, and a greater and more sustained role for coal. We also see a late shift to energy efficient infrastructures and CCS, and the late reduction of greenhouse gas emissions.

For today's purposes two key observations emerge from the Mountains and Oceans scenarios.

The first is that governments alone are unlikely to be able to manage the shift to a sustainable energy system. That essential task will require close, cross-sector collaboration – between governments, business and civil society. Collaboration will be essential both to get the job done, and to ensure that collective action is comprehensive and balanced.

The second observation is equally simple. Despite the significant advances on emissions imagined in the Mountains and the Oceans scenarios – and in line with IEA and IPCC predictions – unless there is a major shift in how we produce and consume energy, there is only a small chance of the world limiting warming associated with climate change to two degrees Celsius.

What policymakers can do

Both observations pose very significant challenges. So what can we do?

Shell has long made the case for natural gas as a versatile, abundant and cleaner-burning fuel. When burnt to generate power it produces half the CO_2 coal does.

The Environmental Protection Agency, for example, is right to recognise gas as a key means of complying with their emissions reductions targets. According to EPA figures a partial shift from coal to natural gas between 2005 and 2012 helped reduce the US power sector's greenhouse gas emissions by 15%.

At Shell we believe that natural gas also has a long-term role as a flexible back-up to intermittent energy sources like solar and wind. A gas-fired plant can start up or stand down much more rapidly than a coal-fired plant.

CCS fitted to power plants, meanwhile, could be a real game-changer, removing up to 90% of carbon dioxide emissions from power generation.

Strong and stable carbon pricing is another essential step. And that's a view Shell shares with the US Federal Government, the World Bank and the OECD, among others. Indeed, we're pleased to support the World Bank's forthcoming statement on carbon pricing, to be launched at this month's UN Secretary-General's Climate Summit here in New York.

A well-implemented carbon pricing system would help to promote low-carbon technologies including CCS, encourage greater energy efficiency, and accelerate the shift to cleaner fossil fuels like natural gas. It has the added benefits of being relatively cheap to implement, and of spreading the burden fairly.

Here in the US, there are encouraging signs. Cap-and-trade mechanisms like the California emissions trading scheme and the nine-state Regional Greenhouse Gas Initiative are already empowering the market in the drive to reduce carbon.

There's a place for other forms of regulation too. The ambitious goals of initiatives like the EPA's Clean Power Plan – which aims to cut power plant-related emissions by 30% – could make a real difference. They give states clear targets while allowing them the freedom to work with industry, consumers and others on how best to achieve those targets.

I've already mentioned the rapid growth of oil production in places like North Dakota. The US is also now the world's largest producer of natural gas. Add Canada, and North America now accounts for 25% of global natural gas production.

That, as you all know, has powerful and positive implications both for the U.S. economy and for American energy security.

It's also a persuasive argument in favour of the free export of American energy. In fact I believe that policymakers here in the US should embrace a truly liberalised, diverse and global energy market. U.S. oil and gas exports would reinforce the long-term future of North American energy production, significantly improve the US balance of

"Governments alone are unlikely to be able to manage the shift to a sustainable energy system. That essential task will require collaboration – between governments, business and civil society."

trade, and help to make the global energy system more stable.

Shell will play its part

But governments cannot be expected to build our energy future on their own. Industry and civil society have vital roles to play.

At Shell we will continue to play our part.

We'll continue producing and distributing cleaner, lower-carbon natural gas. It now accounts for around half of the energy we produce – and 3% of total global natural gas production. We're one of the world's biggest suppliers of liquefied natural gas.

We'll also continue working hard to improve energy efficiency in our own operations. All of our major facilities have detailed energy management plans in place.

We'll continue our pioneering work on major CCS projects. The Peterhead power station in Scotland is expected to be the world's first gas-fired plant fitted with CCS. Next year, Shell's Quest CCS project in Alberta will start capturing and storing more than 30% of the CO_2 emissions produced when oil sands bitumen is processed into synthetic crude oil. The project is expected to store more than 1 million tonnes of CO_2 a year – the equivalent of taking 175,000 vehicles off the road. Importantly, Shell is committed to freely sharing intellectual property and data derived from the Quest CCS project.

We'll continue our development of cleaner, more advanced biofuels – and continue to look at the potential of onshore wind and hydrogen. Raizen, our biofuels joint-venture with Cosan in Brazil, already produces around 2 billion litres a year of low-carbon biofuel from sugar cane. It's also developing advanced biofuels from leaves, bark and other sugar-cane waste.

Stranded assets

And we will manage all of this as part of our global portfolio. Shell is opportunity rich and capital constrained. We are enhancing our capital efficiency; focussing on better financial performance and continued strong project delivery; and delivering value for shareholders. And we're doing all of this from a position of long-term financial health despite any talk of "stranded assets" and the so-called "carbon bubble".

This is the idea that long-term, multi-billion dollar investments in oil and gas will become redundant or "stranded" if or when governments act more aggressively to regulate emissions.

Shell knows that climate change will quite rightly continue to rise up the political and public agenda. We are preparing for increasingly robust legislation on emissions. And we understand that renewables have a huge role to play in the energy system of the future.

But in our opinion, the "stranded assets" thesis underestimates the significance of rising energy demand. It underplays the role natural gas will perform in the global energy system – especially in replacing coal power plants. And it ignores the potential of innovations like CCS.

And as you might expect from a company like Shell, our investments take into account potential threats to the viability and profitability of a particular project. That's why we voluntarily impose a project screening value of $40 per tonne of carbon dioxide emitted – ensuring new projects are viable even if those projects have to pay a price, in future, for CO_2 emissions.

Broadening the frame of discussion

Let me turn to the crucial role of energy in powering progress. The potentially devastating impact of climate change, if unchecked, is a concern for all of us. But is there a danger of allowing that concern to obliterate the energy story? Have we forgotten the extraordinary benefits we derive from access to energy? The role that energy plays as the lifeblood of human existence?

"Shell knows that climate change will quite rightly continue to rise up the political and public agenda. We are preparing for increasingly robust legislation on emissions. And we understand that renewables have a huge role to play in the energy system of the future."

When it comes to discussing energy and climate change there's a temptation for companies like Shell to play it safe. To avoid the risk of a backlash. But that doesn't serve anyone's interests.

I believe that global companies like Shell have a responsibility to society to speak up. To inject pragmatism into a discussion which is too often shaped by misinformation and conjecture.

Because it sometimes feels like energy itself has become a dirty word. That we have forgotten the extraordinary benefits so many of us have enjoyed because of unprecedented access to energy.

It's too easy, it seems, to forget the essential contribution energy makes to enterprise, to communication, to quality of life.

Energy powers economies. Without it, the lights go out. Without energy, our lives would be almost unrecognisable. Yet worldwide, 3 billion people still lack access to the modern energy many of us take for granted.

According to the World Bank, more than half a billion people in Africa have no access to electricity. 10 million small and medium-sized enterprises in Africa are struggling to grow because of lack of power. The entire African continent, with a population of more than 1 billion, has total power generation capacity of about 80,000 megawatts. That's roughly the same as the combined capacity of New York State and Pennsylvania.

Access to energy isn't just about whether a household can have a television set or air-conditioning. As in Africa, in much of the world access to energy is the difference between prosperity and poverty. Sometimes between sickness and health.

I am concerned that the terms of debate around climate change have become entrenched – and that the assumptions of that debate are too simplistic, and sometimes flawed.

There has been a tendency, for example, to assume that a twin strategy of renewables and energy efficiency will be enough to meet the growing demand for energy. The US Energy Information Administration estimates that 11% of today's global energy comes from renewable energy sources like hydropower, biofuels, wind, geothermal and solar. But it also estimates that, even by 2040, that number will have increased to only 15%. Shell's Scenarios team, for its part, believes that figure could be as high as 25% by 2050. But that still leaves 75% of energy demand needing to be met by traditional sources like oil, gas and nuclear.

Optimism is welcome. We need optimism. But we also need to temper our expectations of a zero-carbon future with the understanding that there are significant technological and economic obstacles. We urgently need to broaden the frame of discussion.

The reality is that, historically, new energy sources have taken around 30 years to establish even a 1% share of the market. The scale and cost of energy infrastructure are simply too large to expect anything else. Today wind and solar combined provide less than 1% of global primary energy.

If they're to grow, if they're to deliver hundreds of millions from poverty, the world's economies can't wait. The simple truth is that for an energy system to be truly "sustainable" it doesn't just need to be lower carbon… it needs to be higher energy.

A new model of collaboration

Building that system is going to involve a lot of effort by a lot of people.

UN Secretary-General Ban-Ki Moon recently observed that "In our increasingly interconnected world, vision and ambition must be advanced by a diverse and dynamic public-private partnership. Together, we can leverage our strengths, multiply our means, and shift the global climate trajectory."

I want to add my voice to that of Secretary-

"I am concerned that the terms of debate around climate change have become entrenched – and that the assumptions of that debate are too simplistic, and sometimes flawed."

General Ban. I would like to find ways for Shell to play a greater role in a closer coalition of governments, business and civil society. One defined by better mutual understanding and dialogue.

As to exactly how this might work, it's very early days yet. I know there's a lot of work to do to make it happen.

But here's a glimpse of what such a coalition approach might look like. And you may be surprised to hear that it's not informed by things happening here or in Europe.

In recent years, Shell has worked closely with the Chinese Government's Development Research Center to help map out a sustainable energy future for China. Our two-year joint study identified the key energy challenges facing the country – and proposed detailed, pragmatic solutions: support for innovation; electricity and gas reforms; the liberalisation of energy prices; carbon trading; cleaner mobility; and more resource-efficient urban development. A new joint study is examining China's gas development strategy, including looking at supply-side measures to accelerate domestic production and demand to promote the use of gas in China.

What are some of the potential benefits of those two collaborative projects? A greater role for cleaner-burning natural gas. More resource-efficient urban planning. Improved energy efficiency.

China is, of course, a special case. But if this kind of cross-sector collaboration became the norm and not the exception, wouldn't our collective energy future look brighter?

Shell has a long track record of working in partnership with others. We have numerous energy-related joint ventures and partnerships all over the world. With governments, national oil and gas companies and many other firms. We have close ties with universities like MIT and Tsinghua in Beijing. And we have collaborative partnerships with a range of leading environmental non-governmental organisations.

Whenever we plan a new major project or extend an existing one, we work closely with NGOs to reduce the environmental impact. We also work very closely with local communities to enable them to share the benefits of our activities in terms of creating jobs and developing skills that will boost local economies.

In other words, we understand the value of building long-lasting, cross-sector partnerships.

We, along with others, have much more to learn if we're to collaborate on the unprecedented scale required. But I believe there is a constructive and credible role for Shell to play in this space. And as CEO I will lead that effort.

Conclusion

In conclusion then: the world, as we all know, is experiencing an energy transition. That transition is being driven by a range of factors including demand for cleaner energy, new resources, shifting geopolitics and technological innovation. But two major challenges dominate: the urgent need to meet rising demand for global energy. And the urgent need to reduce greenhouse gas emissions.

Those two needs are going to be very difficult to satisfy at the same time – and as things stand… we won't succeed.

There are pressing things I believe the world needs to do. It must embrace cleaner-burning natural gas. Governments should support the development of innovations like CCS. They must implement carbon pricing as a flexible, pragmatic solution to rising emissions. They need to encourage diversity of global supply.

But I also believe a reboot is needed for what has become a skewed global debate around our energy future. A debate which

"In his most recent State of the Union speech, President Obama said, 'When our children's children look us in the eye and ask if we did all we could to leave them a safer, more stable world, with new sources of energy, I want us to be able to say yes, we did.' Well, I and everyone I work with at Shell want to be able to say that too."

too often neglects the vital benefits so many derive from access to energy.

And we must explore and develop a new model of cross-sector collaboration.

In his most recent State of the Union speech, President Obama – a Columbia alumnus – said, "When our children's children look us in the eye and ask if we did all we could to leave them a safer, more stable world, with new sources of energy, I want us to be able to say yes, we did."

Well, I and everyone I work with at Shell want to be able to say that too.

None of us is under the illusion that what we need to do will be easy.

But I'm proud to be CEO of a company that is prepared to try. And proud to say that Shell will continue to seek out and apply innovative, pragmatic, long-term solutions in building the safer, more stable, energy rich future the world needs.

Thank you very much.

Recent speeches by Shell's senior leadership

- A century of ideas, *Ben van Beurden*
- Taking geoscience beyond the conventional, *Matthias Bichsel*
- Asia's energy future, *Peter Voser*
- The power of innovation in collaboration, *Matthias Bichsel*
- Keynote speech to the Royal Dutch Gas Association (KVGN), *Peter Voser*
- Investing in the future, *Peter Voser*
- Shell's recommendations for a more competitive EU energy policy by 2020, *Peter Voser*

For information about Shell, including downloadable versions of these speeches and other publications, please visit www.shell.com.