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The scenario approach to possible futures for oil and natural gas ☆

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HIGHLIGHTS

- Shell has used scenarios to deepen its strategic thinking for 40 years.
- Shell scenarios cover a broader set of drivers than traditional energy outlooks.
- Shell's *New Lens Scenarios* were published in February 2013.
- They look at trends in the economy, politics and energy over the 21st century.
- Coordinated policies are essential to meeting the world's rising energy needs.

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ABSTRACT

Shell has been using scenario planning for 40 years to help deepen its strategic thinking. Developing and applying scenarios is part of an ongoing process in Shell that encourages decision-makers to explore the features, uncertainties, and boundaries of the future landscape, and engage with alternative points of view.

Shell scenarios go beyond conventional energy outlooks and consider long-term trends in economics, energy supply and demand, geopolitical shifts and social change. They are based on plausible assumptions and quantification, and include the impact of different patterns of individual and collective choices.

Shell's latest scenario publication, the *New Lens Scenarios*, published in 2013, provides an in-depth analysis of how economic, social and political forces might play out over the 21st century, as well as their consequences for the global energy system and environment. Its 'Mountains' and 'Oceans' scenarios set out two distinct paths the world might take in the decades ahead. They reinforce the urgency and complexity of addressing the world's resource and environmental stresses, and highlight the need for business, government and society to find new ways to collaborate, fostering policies that promote the development and use of cleaner energy, and improve energy efficiency.

1. Introduction

From blackouts around the globe to the boiling tensions in the Middle East, recent events have thrown up many uncertainties about how the world will meet its growing future energy needs. While these dramatic events have grabbed the headlines, they come on top of several relentless trends that have been shaping our global energy future.

The worldwide financial crisis ushered in an era of macro-economic volatility and accelerated the shift in influence from West to East. As wealth levels rise in the emerging economies, hundreds of millions of people are emerging from poverty. And the global population, which is growing by more than 200,000 people every day, is projected to reach over 9 billion by 2050[1]. That is like adding one more China and India to the world, with basic needs for food, water, and energy that will have to be met.

At the same time, many countries are making the journey from rural to urban societies. According to one projection, the world will build the equivalent of one new city of 1.3 million people every week for the next 40 years[2].

The upshot of these trends? Surging energy demand and growing environmental stress. If we continue to use energy in the same ways we do today, global energy needs could triple in the first half of this century. At the same time, many scientists agree

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[1] Based on UN data.
[2] Based on UN data.

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that CO_2 emissions must be halved by mid-century if we are to avoid dangerous changes to the global climate.

Of course, over the coming decades we will surely find creative ways to improve the energy efficiency of our cars, homes, and factories. And technology will help us unlock additional sources of energy. But those gains may still not be enough to keep up with the pace of underlying demand growth.

Closing this gap in energy supply/demand will require a dramatic ramp-up in energy production or a drastic moderation in energy use—or, more likely, some mix of both. But just how this might be achieved remains unclear, giving rise to a 'zone of uncertainty'[3]. This could turn out to be a zone of extraordinary misery or extraordinary opportunity, depending on how the world responds.

For over four decades, Shell has developed and applied scenarios as part of its strategic thinking to help grapple with such uncertainties. Most companies monitor changes in their business environment, but Shell is one of the few that routinely employs alternative outlooks as a core strategic tool. Given the long lifetimes of investments in the energy industry, decisions made today have consequences for decades. Long-term scenario considerations are helpful in shaping those decisions.

The success of the scenarios is not just their ability to provide strategic insights, but their approach to developing and sharing these insights. They enable the company's decision-makers to think about the possible wider and longer-reaching implications of unfolding trends and potential discontinuities. They stretch and clarify thinking, helping to improve the company's prospects, not only through enriching the context for decision-making, but also by developing a leadership cadre that is more sensitive to changes in the external environment.

2. Scenarios in Shell

From the outset of the practice in the company, scenario developers embraced intuition, uncertainty, and engagement. They did not shy away from talking about what could be considered 'unimaginable'. Producing neither rigid predictions nor wild fantasies, scenario building is a craft that holds real commercial value for Shell.

"While we can't predict the future, science-based creative thinking can give us some clues,"[4] says, Dr. Angela Wilkinson, from the Smith School of Enterprise and the Environment at Oxford University, who used to work in Shell's scenario team and has co-authored a book about the practice.

Shell's scenario analysis focuses on four main areas – economics, geopolitics and socio-cultural issues, energy, and the environment – to understand how consumers, governments, energy producers, and regulators are likely to behave and respond to change in the decades ahead.

Today's scenario builders also use complex econometric modeling and sophisticated methodologies. The scenarios development process includes a multitude of short-, medium-, and long-term portraits of global energy developments; individual country analyses; and consideration of major trends in areas like public health and urbanisation. Scenarios can take a global view or focus on specific issues in specific countries, such as the future for the emerging democracies of Libya or Iraq. They often look decades ahead, but can also have a shorter-term focus, such as the current Eurozone financial crisis.

The ultimate goal of scenarios for Shell is to encourage and equip business decision-makers to consider the factors that shape their choices right now. That is important for an industry investing billion-dollar sums in infrastructure which can operate for decades. Today scenarios continue to influence thinking across the company, from the Board and Executive Committee right across the operating businesses.

Many important strategic decisions taken over the last four decades have the fingerprints of scenario activity on them. Of course, all major choices involve multiple inputs from many people, but scenarios have explicitly highlighted specific threats and opportunities or, more frequently, implicitly informed the fundamental mind-sets underpinning decisions.

Scenarios under discussion in 1973 first established Shell's reputation for using this academic approach to inform strategic business planning. When the Yom Kippur War broke out in October of that year, the West's support for Israel angered oil-rich Arab states, triggering an oil embargo. Fuel shortages sparked a global recession and a massive stock market crash. The world reeled. But Shell's decision-makers were mentally prepared for the worst because they had already imagined such a scenario. This helped the company weather the volatility of the 1970s, bringing financial gains running into the billions of dollars thanks to the re-configuration or sale of refineries and installations, or decisions not to replace them.

The Scenarios' contribution to Shell's strategic thinking helped the company to anticipate, adapt, and respond to another oil shock in 1979, as well as to the decline and eventual collapse of the Soviet Union in the 1980s. It also prepared the company for the rise of environmental concerns linked to carbon dioxide in the 1990s and to explore the dynamics of recession and recovery in the 2000s. In the past two decades, scenarios also helped prepare the company for the impact of technology, terrorism, and globalisation in a rapidly changing world.

Long before the collapse of the Berlin wall in 1989, scenarios workshops had imagined potential new opportunities in new markets opening up behind the old Iron Curtain—not only in the Soviet Union, but also across eastern Europe. Shell not only opened refineries in Eastern Europe, it closed down or sold some in Western Europe.

In the 1990s, growing social and environmental stresses were highlighted, helping Shell develop a constructive, pro-active attitude to the threat of climate change.

In 2005, scenarios also raised the probability of a looming gap between the world's surging demand for energy and global supplies and reinforced the significance of natural gas in the company's energy mix.

A few years later they highlighted a mix of circumstances that made sustainable biofuels appear to be an attractive business opportunity. In 2011, Shell moved into the production of low-carbon bio-ethanol from Brazilian sugar cane.

In Shell's 2011 *Signals & Signposts* publication, one of the key factors raised was the impact of heightened political tension in the developing world. In early 2011, the Arab Spring took the world by surprise with popular revolts toppling rulers in Egypt and Tunisia and sowing the seeds for reform throughout the Middle East.

While Shell's scenarios cannot of course, predict the exact dates of uprisings in the Middle East and North Africa, they haved highlighted conditions that would make the rebellions increasingly likely: growing resentment, youthful populations with little opportunity for employment, economic volatility, and rising unemployment and inflation.

Shell has shared at least half a dozen far-reaching global scenarios with the wider world since the 1990s, probing the impact of profound developments like the fall of the Iron Curtain and the war in Iraq, as well as the evolution of alternative energy resources like biofuels, shale gas, and wind, solar, and other renewable energy resources. In 2013, a summary of recent work entitled *New Lens Scenarios* was published (www.shell.com/scenarios) (Charts 1–4).

[3] Shell Scenarios Team (2011). Signals & Signposts, page 10.
[4] Shell Scenarios Team (2012). 40 Years of Shell Scenarios, page 11.