Meeting our 2050 energy objectives

By Khalid Al-Falih
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It has been three years since we met in Montreal. Now, as we gather in Daegu, the global energy industry is healthier, more dynamic, and, dare I say, more confident than ever. Indeed, those three short years have witnessed momentous change, so a chance to take stock of where we are, and where we need to go, is more welcome than ever.

To begin with, it is a tremendously exciting time to be in Korea. Korea's industrialisation, economic development, and resilience have astonished the world. Korea has become a byword for quality and innovation, admired around the globe for its cars, smartphones, and much more. And the world is embracing Korea's culture and style. The key ingredient has been the energy of the Korean people. And that provides the perfect backdrop to this Congress, where harnessing all the energy at our disposal will be fundamental to future success.

All of us in the energy industry face a historic challenge. Today, less than one-third of the world's seven billion people consume more than two-thirds of its primary energy supplies. The other five billion people have varying degrees of access to supplies of modern energy, with some trapped in extreme energy poverty. But by 2050, a total of 9 billion people will aspire to a prosperous life. Knowing this, shouldn't we ensure that ready access to clean energy will be a right for all, not a privilege for a few? That is the inspirational challenge the world faces and the test we must pass as an industry. Indeed, this is echoed in the World Energy Council's latest Trilemma report. So, today, I want to explore the path to a sustainable energy future for all and how we can rise to meet it.

Let me start with energy demand. As well as two billion additional people, the global economy will be three or hopefully even four times larger by 2050. More people and affluence mean more mobility, more urbanisation, and more demand for durable and consumable goods. That in turn will drive consumption of fuels, electricity, and chemical feedstock, and therefore energy. But it is not preordained that demand has to rise to unsustainable levels, even if we provide everyone with sufficient energy. Improved energy intensity is our low-hanging fruit and can deliver similar economic growth using considerably less energy. Setting aggressive targets on efficiency and demand management could dramatically reduce energy consumption while enabling wider access to energy, saving trillions of dollars, conserving natural resources, and improving environmental performance.

Improving efficiency in both energy conversion and widespread end-use applications is challenging, but I am pleased that many nations have already taken bold steps. In Saudi Arabia, we are not different. The government has launched major initiatives to significantly improve the efficiency of energy end-use in a range of sectors like industry, transportation, and buildings. And also in electric power generation where we are replacing inefficient power plants and increasingly moving them to gas.

But even assuming the world lowers its future energy intensity to an optimal level, future demand will be much higher than it is today. Which begs the question: how are we going to supply that demand?

To begin with, the earth is blessed with a colossal endowment of fossil energy. Take the oil industry. We have already produced about 1.3 trillion barrels, yet proven reserves have never come down. Instead, current proven reserves of 1.6 trillion barrels, which equate to a half-century of global oil production at current rates, are at their highest level ever. And these numbers will continue to rise with increased exploration and improved recovery.

At Saudi Aramco, for example, we are on track to increase the average of our conventional oil recoveries to 70 per cent, which is more than double the current world average. So resources are, in fact, abundant. I say this because, looking at the earth's total endowment of liquid fuels, we are blessed with about 14 trillion barrels of original resources in place. This is divided about equally between conventional and unconventional resources, by which I mean tight oil, extra heavy liquids, bitumen, and oil shale. When the ingenuity of our scientists and engineers is applied to this massive endowment, current proven reserves have a lot of room to grow. Such reserves will be necessary to sustain rising long-term oil demand.

In fact, demand for oil in absolute terms is likely to rise by about 20 million barrels per day (MMBD) during the next two decades. That's equal to the current production of the world's two largest oil producers, Russia and Saudi Arabia, combined. Likewise, the world's current gas reserves of more than 7,000 trillion cubic feet (tcf) have enormous room to grow, considering that the unconventional gas revolution has expanded the world's technically recoverable gas resources to the range of 30,000 tcf. If we could economically recover them, they could meet global gas demand at current rates for more than 250 years. And I am hopeful that these resources will grow even further, because I believe the US shale revolution will spread far and wide, as many other areas of the world appear to hold enormous

unconventional potential. The rush is definitely on. In fact, I'm delighted to announce here today that only two years after launching our unconventional gas programme in the frontier northern region, we are ready to commit gas for the development of a 1,000 megawatt power plant, which will feed a massive phosphate mining and manufacturing centre, and drive that region's development and prosperity.

But this is just the latest example of oil and gas powering prosperity. They are – that is, oil and gas – the most efficient, convenient, economic, and reliable energy sources the world has ever known. And they will undoubtedly continue to be the crown jewels of world energy supplies well into the future. Yet, despite their abundance, and because they are the crown jewels, we should use them prudently, efficiently, and more cleanly to secure our energy future. And we do that by leveraging them in combination with other sources like nuclear, hydro, coal, and renewables which will play an increasingly important, complementary role. Let me explain, starting with nuclear. Its prospects have unfortunately been clouded by Fukushima. However, the inevitable massive growth in demand for electricity means that nuclear will still form a significant part of the electricity generation mix in the coming decades. Naturally, legitimate concerns about nuclear safety and the issue of spent fuel disposal need to be addressed. And I believe they will be if we bring our collective ingenuity to bear.

Turning to coal – and considering its abundance and lower costs – I believe it will always have a role in meeting energy demand as long as we invest in far-reaching technologies that will improve efficiency and environmental performance. However, coal will face stiff competition from ever more abundant supplies of natural gas, especially when considering that coal's carbon emissions in power generation are at least twice that of gas.

On top of these core energy sources, renewables will also have a role, although technical and economic hurdles remain in the way of their rapid deployment. Furthermore, the existing global energy system is massive, and will take time to transform, even as alternatives and renewables come on stream. But progress is being made, costs are coming down, and the long-term role of alternatives and renewables is indisputable.

Let me also dispel any notion that the petroleum industry views these sources as competitors or displacers of demand. In Saudi Arabia, in fact, our vision is to turn the Kingdom into a global solar hub, and we are investing heavily in the research, development, and utilisation of solar energy. However, that doesn't mean the world can afford to provide costly subsidies on an on-going basis at the expense of economic development and fiscal imperatives. Rather, the appropriate energy mix should be left to the market and technology to determine.

So I hope everyone leaves this Congress with a united

Saudi Aramco CEO Khalid Al-Falih addresses the opening plenary session in Daegu

view to the world outside: which is that all energy sources will be required in the long-term. Yet meeting our 2050 energy goals will be easier said than done. Let me outline what I believe are the four key pre-requisites for success.

First, we need progressive, yet pragmatic and plausible, global energy policies. Since all energy sources will be required, we shouldn't prematurely pick winners and losers, selectively subsidize, set unworkable targets, or apply unrealistic regulatory and fiscal regimes. Instead, we should invest in technologies and let them mature to offer confidence in large-scale deployment and, let me stress again, allow markets to work.

Also, while the industry needs to further enhance the safety and environmental performance of energy sources, there are countless examples of well-intentioned, but poorly thought-out policies having multiple, unintended consequences. Consider the undue emphasis on transportation when the 50 dirtiest electric power plants in the United States – all coal-fired – emit roughly as much CO_2 as half of America's entire fleet of passenger vehicles. Consider also that mandates on biofuels have caused numerous ripple effects – like higher food prices – that cannot be justified, given their questionable environmental benefits on a life-cycle basis. So policies need to be more rigorous and holistic, and I believe the World Energy Council can play a significant role here.

The second pre-requisite is that adequate, timely, and long-term investments must be made in all energy sources to ensure sufficient supplies are safely and reliably produced and delivered to new consumers. In just the next two decades, total energy investment is estimated to be in the range of US$40 trillion. That's virtually the annual GDP of China, the EU, and the US combined. These investment levels are staggering and, to fund them continuously, projects will need to be profitable and bankable.

For that to happen, we need more certainty in the future direction of world energy markets, relatively healthy prices, and the pragmatic policies I discussed earlier. Market stability is also critical, and here Saudi Aramco continues to play a pivotal role. In the past two years alone, we have swung our production by more than 1.5 MMBD in order to address market supply imbalances. And we continue to make massive investments to maintain the world's largest spare oil production capacity of more than 2 MMBD.

But that's only one aspect of our broader investment across the value chain. As part of our drive to become the world's most integrated energy company, we have increased our annual capital budget tenfold from US$4 to US$40 billion in the last ten years. In addition, we have scaled up our investment in talent, R&D, and technology.

In fact, my third pre-requisite is game-changing, pace-setting R&D and technology, because, as I indicated earlier, we need to recover more fossil fuels at lower costs and make them greener, make nuclear power plants safer and better dispose of their spent fuel, and enhance the economic viability and competitiveness of alternatives and renewables to unleash their full potential. We've embraced that Saudi Aramco, our strategic goal is to become one of the world's leading creators of energy technologies by 2020. We are multiplying our funding for in-house R&D, while forming world-class strategic alliances as part of our open-network innovation model.

And to mitigate the environmental impact of fossil fuels, we're pursuing a broad-based, long-term carbon management programme, targeting both fixed and mobile sources of carbon emissions. In fact, we are working with the Korea Advanced Institute of Science and Technology (KAIST) to investigate carbon capture as well as its conversion into useful products. That will make hydrocarbon energy more sustainable for producers and consumers alike, and it's just the sort of collaborative win-win we need to see more of.

Which lead me to my last pre-requisite: collaboration. Let's not jeopardise our chance to make history by working at cross-purposes. We must avoid this at all costs. Because we need all energy sources, all industry players, all governments, all academic and research institutions, and all energy bodies working together in the global energy village. And speaking of the global energy village, if we agree that ready access to clean energy is a right for all, not a privilege for a few, then I believe this Congress should champion this goal, and ensure it becomes an integral part of the UN's future development agenda.

In conclusion, providing adequate, affordable, and acceptable energy to nine billion people will be the challenge of our lives, and of those who will follow in our footsteps. But it also presents us all with the most inspirational opportunity. So let us relish the fact that we are all in Daegu under one roof. And I have no doubt that if we, like our host country, harness all the resources at our disposal, not least the remarkable ingenuity in this room and across our industry, then we too can astonish the world by achieving a sustainable energy future. And nine billion people will have the energy they need and so rightly deserve. ❑