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***America’s Role in Building a Sustainable Global Energy Future: An Opportunity for Greatness***

***Marvin Odum, Shell Upstream Americas Director***

**Introduction**

Thank you, and good afternoon.

I’m Marvin Odum, the President of Shell Oil and the Director of Upstream Americas—that’s the part of Shell that explores and produces energy. One of my major responsibilities is establishing and advocating innovative, industry-leading solutions to the challenge of securing safe, secure and **sustainable** energy sources. In this capacity, I serve on the executive committee of the World Business Council for Sustainable Development.

For that reason, because of my advocacy of sustainable energy, I’ve been asked to address a big topic: America’s role in building a sustainable global energy future.

The stakes in this issue are enormous—they’re nothing less than the fate of our future.

I assume that most of you have heard of the science fiction film classic *The Road Warrior*—about a ruined future world where civilization has collapsed because mankind has lost access to energy.

Imagine that one day, people around the world turn on their faucets and there is no more hot water. That’s the stark future that all of us have to work together to prevent.

If we let prevailing forces continue and current events drift, that could well be our future—a future marked by energy scarcity because of poor planning and careless mismanagement, or worse yet, devastating conflict between nations and groups of people for ownership of this most valuable resource.

But I’m not here to scare you—I’m here to offer hope.

Because we hold our future in our hands now, and we can secure a future of energy abundance and equality if we marshal our current resources and plan wisely. But such an effort will require a partnership between the peoples of the world, their governments, and leading businesses—and this is where America, as arguably the most powerful and influential nation in the world, can play a decisive role.

Before I launch into the nuts and bolts of specific policy recommendations—I **am** an engineer by profession, after all—I’d like to create some context around this issue. First, I’d like to discuss the nature of sustainable energy, and second, the exploding energy needs of the future that America will need to address. Then we’ll get around to what America can do.

**What Is Sustainable Energy?**

What is sustainable energy?Strictly speaking, sustainable energy is defined as the sustainable providing of sustainable energy development that meets the needs of the present—without compromising the ability of future generations to meet their needs.

Sustainable energy includes renewable energy sources, such as hydroelectricity, solar energy, wind energy, wave power, geothermal energy, bioenergy, tidal power, and also technologies designed to improve energy efficiency.

For 40 years, Shell has been creating what we call New Lens Scenarios, designed to help understand how the future might unfold and to improve our understanding of global developments and their potential impact on our energy system. While these scenarios can’t predict the future, they can give us the tools to anticipate what could happen, and they deepen our strategic thinking.

Shell’s scenarios team estimates that by 2035, the world’s renewable energy sources could grow by at least 60% or even **double**. By 2060, renewable energy could supply up to **four times** more energy than today, which would be a staggering rate of expansion.

In 2013, one of our New Lens Scenarios proposed that photovoltaic panels will be the world’s main power source by 2070. A second scenario envisioned natural gas as the main fuel by 2030.

Even so, fossil fuels will continue to supply the majority of energy demand for decades to come due to the sheer scale of that demand.

In the future I envision, solar, nuclear, geothermal and tidal power will all be part of the world’s energy future as well. We’ll need them all. But if we are to replace any meaningful portion of today’s fossil fuel system with alternatives, it will require major technological breakthroughs, investments, infrastructure changes, public education and intelligent policy frameworks.

Most current projections show that by 2050, approximately 30 percent of our energy will derive from alternatives to oil and gas.

According to a 2013 study by the Breakthrough Institute, it is unlikely that wind and solar will contribute significantly to the decarbonization of the electricity sector in the next decade, despite the fact that they’re poised to supply increasing amounts of power to the grid. For wind and solar to be effectively integrated into the grid, they rely on additional backup and spinning reserve capacity.

In fact, in our present mode of technology, we’re having difficulty making wind and solar energy economically viable. An August 2013 news article entitled, “Europeans learning the hard truth about wind and solar energy,” reports that Germans and Danes are paying **three** times current U.S. rates for energy because of wind and solar operating costs. At present, the wind and power industries depend on subsidies and are costly in terms of performance—so much so that, unfortunately, in their **current** states, they’re not economically realistic.

At an energy conference in Berlin held on June 12, 2013, Chancellor **Angela Merkel** recommended scaling back **renewable energy subsidies** to contain spiraling costs, which reached around **$27 billion per year that year.** She remarked, “If the renewables surcharge keeps rising like it did in recent years, we will have a problem in terms of energy supply.”

I’m not saying that replacing fossil fuels with renewable, sustainable energy is a utopian dream at this point. But it’s clear that if we’re going to get from here to there, fossil fuels will have to serve as a bridge, while we catch up technologically and in terms of revamping our existing energy infrastructure.

**Exciting New Reserves of Oil and Gas**

And now for some good news. As bridge sources, oil and gas are more plentiful than formerly thought.

The International Energy Agency, or IEA—the energy voice of the U.N.—says that there are enough recoverable natural gas resources to last 250 years at current consumption levels. By 2030, we expect global demand for natural gas to increase by 60% from its 2010 level. In fact, as I mentioned earlier, our scenarios team estimates gas could become the world’s primary energy source by the 2030s.

I am certain natural gas will play a major role in establishing a cleaner and more sustainable energy system. Gas is the cleanest-burning fossil fuel; its supply is abundant and diverse.

You may remember the term “peak oil” that was coined by one of Shell’s greatest geologists, M. King Hubbert. It was a theory that the world’s petroleum resources were being permanently tapped out. Not so long ago, that theory became Holy Writ—a vast number of people believed that the world’s gas tank was half empty and shrinking rapidly.

But as the IEA noted, in its 2012 World Outlook Executive Summary, the global energy map is changing, and a new global energy landscape is emerging—because of the resurgence in oil and gas production in the United States. This is being driven by upstream technologies that are unlocking light tight oil and shale gas resources.

By around 2020, the IEA predicts, the United States is projected to become the **largest** global oil producer, overtaking Saudi Arabia until the mid-2020s. And by that time, we’ll start to see the impact of new fuel efficiency measures in transport. As a result, U.S. oil imports will continue to fall, so that North America becomes a net oil **exporter** around 2030. This will accelerate the switch in direction of international oil trade towards Asia. In this scenario, the United States, which currently imports around 20% of its total energy needs, will become all but self-sufficient in net terms—a dramatic reversal of our current trend.

In addition, a great deal of evidence suggests that massive resources of energy lie under the waters off the North Slope of Alaska. We believe that Alaska’s Chukchi and Beaufort seas are the most promising undeveloped hydrocarbon basins in the United States.

Alaska oil and gas represents a potentially enormous and vital energy resource for the world. As traditional oil and gas resources decline, we have to develop resources in new, more challenging locations to help meet rising global demand—and to enable us to bridge the gap while we transition to a permanently sustainable energy footing.

**The Energy Demands of the Future**

Now let’s talk about what the energy demands of the future are going to entail—the world that America is going to have to deal with in establishing a global sustainable energy future.

This is going to involve some cool, objective Malthusian analysis—which I’m sure is **exactly** what you were looking forward to after lunch today. [Pause for audience reaction; chuckles expected from the audience.] But nonetheless, I think that many of you will find it fascinating—and eye-opening.

When JFK took office in 1961, the population of our planet was 3 billion. It’s grown to over 7 billion today. Every day, nearly 200,000 more people are born. As they mature, they will consume more products—expect more physical and social mobility—and live in increasingly dense urban centers. By 2050, our children will share this planet with 9 billion people.

Also by 2050, three out of every four people on this planet will live in cities. That’s an increase of 50 percent from today. That’s a new city of a million people every week for the next 30 years. Most of the world’s carbon dioxide emissions already originate from cities, even though cities occupy less than 2% of the earth’s total land area.

Much of the foreseeable growth in energy demand will arise from Asia. Approximately half of the demand increase will originate from China and India, with the majority of that from China. By 2030, Chinese demand could be more than one-and-a-half times as high as the next-largest energy consumer—the United States. By 2030, an additional 350 million Chinese will inhabit cities, and the expected urban growth in China will affect resource efficiency globally.

We can’t be fighting over energy—and the Chinese leaders know that.

In addition, let’s not forget how energy-hungry India’s teeming millions will become in future generations, as its development accelerates and its middle class grows.

The IEA believes demand for energy could **double** by 2050 from its baseline just a few years ago.

Here’s an interesting fact for you: trucks are driving a large share of oil demand growth—pun intended. [Pause for audience response if deemed necessary.] Oil consumption based on transport needs is growing in China, India and the Middle East. The transport sector already accounts for over **half** of global oil consumption, and this share is expected to increase, as the number of passenger cars doubles to 1.7 billion, and demand for road freight rises quickly.

This demand for road freight is responsible for almost **40%** of the increase in global oil demand. Oil use for trucks—predominantly diesel—increases much faster than that for passenger vehicles, in part because fuel economy standards for trucks are much less widely adopted.

The number of cars on the road is expected to triple by 2050. The world will need all the sustainable transport fuel options available to help meet this growing demand, with fewer CO2 emissions. Electric and hydrogen fuel cell vehicles will be important in the longer term. Natural gas will also be a bigger part of the mix. But most vehicles will continue to run on petrol and diesel.

This is why, in 2009, we predicted that by 2025, 80% of energy will derive from fossil fuels and 20% from alternative energy sources.

We believe that blending these fuels with sustainable biofuels offers the best, commercially viable way to reduce CO2 emissions from road transport fuels over the next 20 years. Shell was one of the first companies to invest in developing advanced biofuels.

More than one-third of the world’s CO2 emissions results from electricity generation. Natural gas produces around **half** of the greenhouse gas emissions compared to coal across its life cycle. This makes switching from coal to gas for generating power the quickest and most affordable route for many countries to achieve their CO2 reduction targets.

The IEA, in its 2014 World Energy Outlook, sees gas on the way to become the primary fuel, with the role of liquid natural gas on the rise. It foresees renewables overtaking coal to become the leading source of power by 2040, with renewables supplying half of the growth in global power demand. It predicts that wind and solar photovoltaic subsidies will decline from 2030, as costs fall and recent higher-cost commitments expire.

The study also states that because of the steady increase in hydropower and the rapid expansion of wind and solar power, renewables have become an indispensable part of the global energy mix. By 2035, the IEA sees renewables accounting for almost one-third of total electricity output.

**The Water-Energy-Food Nexus**

Here it gets even more complicated. The world’s water, energy and food systems are tightly linked. Water is needed to extract energy and generate power; energy is needed to treat and transport water; and both water and energy are needed to grow food. In the coming decades, these vital resources will come under greater pressure. We call this the energy-water-food nexus.

The world’s growing population and increased prosperity will put pressure on global demand for energy, as well as on food and water supplies in the coming decades.

By 2030, it is estimated that our world will need 30% more water, 40% more energy, and 50% more food to keep up with rising demand. And we will need to provide that additional energy, water, and food in ways that significantly reduce CO₂ emissions.

Energy, water, and food are our most vital resources, sustaining life itself and fueling our modern societies. But the challenge of ensuring sufficient supplies of water, energy, and food is magnified many times by the linkages between them. To add even more complexity, the potential effects of climate change will influence all three.

**How Can America Lead?**

So far I’ve painted you a pretty dramatic picture of the world’s energy future and the challenges we face. But what can America do to establish a sustainable global energy future?

First, let’s discuss what we mean by “America.” By “America,” I just don’t mean the Federal government with all its vast power. America is comprised of its people, its government, and the major businesses that meet their needs.

We’re all in this together, and we’re going to have to pull together to make a strong future happen. It won’t be easy—trust in Big Government and Big Business is at an all-time low now. But the task ahead of us is so vital that it’s time for us to put our differences aside and work together for the common good.

Last year, in *The Huffington Post*, Steven Cohen, the Executive Director of Columbia University's Earth Institute, wrote a memorable essay entitled, “The Role of Government in the Transition to a Sustainable Economy.” In it, he offered a 7-point plan with some excellent suggestions how government can help build a sustainable economy. These are best practices that our government can recommend to the rest of the world, as well as institute at home. I’d like to share them with you.

1. Fund basic science needed for renewable energy and renewable resource technology.
2. Use the tax system, government purchasing power and other financial tools to steer private capital toward investment in renewable energy and other sustainability technologies and businesses.
3. Invest in sustainability infrastructure, such as smart grids, electric vehicle charging stations, mass transit, waste management facilities, water filtration systems and sewage treatment systems.
4. Regulate land use and other private modes of behavior to minimize destruction of ecosystems.
5. Work with private organizations and state and local government to ensure that the transition is well-managed in the real world.
6. Measure our society's progress toward sustainability by developing and maintaining a system of generally accepted sustainability metrics. This will hasten the integration of sustainability into our overall management of the economy. It will also help to shape our national sustainable economic policy.
7. Transfer sustainability technologies to the developing world.

He stressed the fact that government can fund the science needed to build the technological base for a sustainable economy, since America's research universities remain the best in the world.

But then Mr. Cohen went on to state something very striking, and I’ll quote him directly:

“While I am focusing here on the role of government, it is important to understand that the private sector has a **much larger** and **even more important** role to play in the transition to a sustainable economy. It is the **private sector** that produces the goods and services that modern life relies on.” Emphasis added.

As we prepare for the transition to a sustainable future, we’re going to have to replace coal with natural gas. Here is how America and its government can help the world convert.

In a 2013 study, the Breakthrough Institute noted that while the world as a whole is turning to coal, the United States is moving away from it. Between 2007 to 2012, coal’s share of electricity declined by 11 percent in the U.S, from 48.5 percent in 2007 to 37.4 in 2012. Gas deserves most of the credit for declining U.S. emissions—and coal is roughly **eight times** more lethal than natural gas.

The Breakthrough Institute recommended that in this transition period to renewable, permanently sustainable energy, cheap natural gas can accelerate the transition to zero-carbon energy sources. The study cited the U.S. shale boom as the clearest contemporary example of the potential for clean, cheap energy to simultaneously accelerate decarbonization, innovation, and the evolution of energy systems.

Overall, the Institute recommended that we accelerate the coal-to-gas shift in the United States and reduce coal consumption and coal exports.

Most importantly, the Institute advised that the United States export natural gas technologies to coal-dependent countries. With U.S. government backing, U.S. and global development institutions should promote gas exploration in other countries so that it accelerates economic development and improves local environmental quality.

In the view of the Institute, the rapid gas revolution in the United States demonstrates the power of sustained public-private technology investments—and it also provides a model of a successful energy transition to zero-carbon sources.

**Shell’s Leadership Role in Sustainability**

I’d like to add that Shell’s leadership agrees wholeheartedly with Mr. Steven Cohen’s 7-point program for how the U.S. government can foster a global sustainable energy future, and I’d like to share some insights and suggestions our leadership has offered.

Chad Holliday, the chairman-designate of Royal Dutch Shell, has devoted much of his career urging companies to pay more attention to environmental issues. He co-chaired the U.N.’s high-level group on sustainable energy for all, which in 2011 pledged to double the world’s use of renewable energy by 2030. He is a former chairman of the World Business Council for Sustainable Development, a corporate sustainability group of which I’m a member. He was also a member of the Global Commission on the Economy and Climate, which published a report calling for action to tackle the threat of global warming.

We at Shell have long acknowledged that climate change is an issue that oil companies need to address. In a 2012 interview, Chad predicted that natural resources companies would “come under a lot of pressure” to be more sustainable.

Peter Voser, the former CEO of Royal Dutch Shell, advised a Chinese audience in 2013 of three pathways for the world to arrive at a more sustainable, cleaner energy future: the critical role of natural gas; carbon capture and storage technology; and smarter urban planning. All three can contribute to creating a more sustainable energy system. He also pointed out how partnerships between international oil companies like Shell and China’s national oil companies are helping China achieve its energy goals—a clear sign of international government-industry cooperation.

Last year at Columbia University, Ben van Beurden, the CEO of Royal Dutch Shell, recommended the free export of American energy. He believes the U.S should embrace a truly liberalized, 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 U.S. balance of trade, and help to make the global energy system more stable.

I’d also like to add that U.S. companies can invest more in biofuels overseas, just as Shell has.

**What We’re Doing at Shell**

At Shell, we’ve been at the forefront of instituting sustainability. We embed sustainability across our project development process, using specialists who work as part of the project teams.

We’ve been taking definitive steps to provide energy from cleaner sources, reduce CO2 emissions from our operations and those of our end customers, and also to help our customers use energy more efficiently.

We’re focused on ways to tackle CO2 emissions that drive climate changes—because climate change can radically affect the future availability of water supplies, agricultural patterns, and the demand for energy.

We’ve been pioneers in the field of carbon capture and storage technology, which involves capturing carbon dioxide from large industrial sources and storing it deep underground. Many see this as a key ingredient in shaping a new sustainable future.

We’re actively developing innovative new technologies for reducing the water we use in our drilling and production operations. That’s why we’re developing biofuels only in places where they don’t compete with food and water supplies, and learning ways to produce tomorrow’s biofuels from agricultural waste.

As I mentioned, Shell was one of the first companies to invest in developing advanced biofuels, using crop waste or inedible plants and new conversion processes. These can potentially produce more efficient, low-carbon biofuels for blending at higher concentrations with petrol and diesel.

Hydrogen is likely to play a role in transport in decades to come, but it continues to face challenges to achieving commercial scale. We are involved in research and have invested in a number of filling stations around the world.

We urge other major energy companies to follow our lead in creating a safer, cleaner world—and we’re happy to help them.

**What Can *I* Do?**

But up to now, I’ve been talking about the actions of huge, impersonal, faceless governmental and business entities. What about you? What can you do to help America create a more sustainable global energy future?

The answer is—everything. You people comprise the population of the world. You’re the majority. You’re our customers and our consumers. And it’s your concerted action that has awakened the world to the dangers of climate change and the need to take immediate action.

At Shell, we don’t believe that the idea of applying innovative and integrated solutions with our partners only applies to companies and government. We also believe in cultivating valuable new collaborations between producers and consumers of energy. That’s you, by the way. That’s why Shell is a firm believer in public education programs, to teach our consumers new pathways to energy efficiency and conservation.

The change begins today. As a result, I’m going to ask each of you when you walk out of this room to think of some practical step you can take **today** to do your part in creating a sustainable global energy future. Whether it’s an action you can undertake as a government, business or media leader—an initiative you can launch as a private citizen—or communicating directly with a government representative, urging them to prepare for a sustainable future. And I might add that energy conservation begins at home—and making your home energy-efficient is a great way to start.

**Conclusion**

The challenges ahead are daunting. But we hold our own future in our hands.

As I conclude here, I’d like to leave you with the inspirational words of a great American, Duke Ellington, considered by many to be the greatest American composer of the twentieth century.

He said, and I quote: “A problem is a chance for you to ***do your best***.”

Likewise, the challenges of the future should inspire **us** to do our best. Thank you.

**FINIS**