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Economic and Environmental Solutions in the Global Energy System

Thank you. It is a pleasure to be here.

My company is proud to provide the Dutch and Europeans with energy and jobs through our many operations here in the Netherlands, including our natural gas production facilities in the Groningen field… our refinery, chemical plants and blending plant here in Rotterdam… our chemicals plants in Amsterdam and Kerkrade… and our 350 Esso-branded service stations nationwide.

I have been asked today to provide an industry perspective on the impact of shifts in the global energy sector.

In doing so, let me begin by recalling the words of this university's namesake. Erasmus once wrote:

"There are some people who live in a dream world, and there are some who face reality. And then there are those who turn one into the other."

Today I would like to speak to the dreams, or goals, we all share… to the realities we all face… and to the means of turning our goals into realities through market-based advances in the energy industry.

The Goals We Share

It begins with a vision. What are the goals we, as current and future leaders of the global economy, seek to achieve?

First, we share the goal of achieving human and economic progress. In major industrialized countries, this means a higher quality of life, more secure lifestyles, better jobs, greater wealth, and a wider choice of goods and services at competitive prices.

In many developing nations, human and economic progress means something more basic. It means not just bettering lives, but preserving them.

According to the International Energy Agency, about 1.6 billion people around the world lack electricity, and about 2.4 billion still rely on basic fuels such as wood and waste.

Limited access to clean, safe and reliable energy limits access to critical social services, including food and water supplies, sanitation, health care, and education. In the hierarchy of modern needs, energy ranks high.

Indeed, energy use correlates directly with human and economic development. Expanding the availability of clean, reliable, affordable energy is critical to alleviating poverty, lifting living standards, and promoting prosperity worldwide.

A second goal we share is protecting the environment. Limiting the impact of necessary human activity on the world's ecosystems is a priority.

As fellow inhabitants of this Earth, we all share a self interest in protecting it.

We in the energy industry have an added interest because the commodity we produce is itself a product of nature. The oil and natural gas industry is literally grounded in the environment.

Ask any geoscientist or production manager in our industry and they will tell you that poor environmental performance leads to poor operational performance, which in turn leads to poor business performance. A commitment to the environment is, quite simply, a business imperative.

The Realities We Face

Achieving these goals, however, demands that we face certain realities.

The first of these realities is the inevitable rise in demand for energy worldwide. This will have a profound impact on us all.

By 2030 – less than twenty five years from now – the world's energy needs will be almost 50 percent greater than they were last year. That is a startling statistic, especially when you consider that 80 percent of that growth will come from one subset – developing countries.

Developing countries in Asia alone will see energy demand increase by over 150 percent in the period from 2000 to 2030. This growing demand for energy reflects a growing demand worldwide a higher standard of living.

Meeting it will require massive investment, access to resources, and a continued focus on technology.

A second reality with a global impact is the expected substantial increase in greenhouse gas emissions.

We know that since the 19th century, carbon dioxide concentrations in the atmosphere have increased roughly 30 percent. As fossil fuel use increases to meet growing energy demand, particularly in the developing world, carbon dioxide emissions will increase, too.

We also know that, since the mid-1800's, average global surface temperatures have risen by about 6 tenths of one degree Celsius. Other changes, too, have been observed, and have fueled concern about the potential consequences of climate change.

Scientific research continues on the reasons for these recent changes and the role played by greenhouse gas emissions and other factors - as well as the interplay of the climate's natural variability. However, at ExxonMobil we recognize that the risk to society posed by greenhouse gas emissions may prove significant.

And therefore, action is justified now.

Much of the current debate concerning the choice of action is about the economic, social and environmental consequences of these potential action steps given the uncertainties that remain and the long-term nature of climate change.

At ExxonMobil we are taking action – by extending efficiencies, helping develop advanced fuel and engine systems, and investing in breakthrough, emissions-reducing technologies. I will speak in more detail on these areas later.

A third reality we face is the fact that making meaningful, broad-based, sustainable change in energy supply is difficult.

The global energy system is enormous, and as such, it obeys what I call the law of large numbers.

For example, the average European consumes energy equivalent to about 11 liters of oil every day. But in the aggregate, Europeans will have consumed over 26 million liters of oil in the short time it takes me to deliver these remarks.

At the same time, individual market participants generally have very limited influence on price in the global context. Consider this: ExxonMobil is the world's largest publicly-traded energy company, with operations in 200 countries and territories worldwide. Nevertheless, we account for less than 2 percent of total energy production.

These facts have important implications for policymakers. In the vast marketplace for energy, national or regional energy policies often have a limited positive impact in a global context. In fact, often such policies have negative consequences for those local consumers who must secure their energy needs. Past efforts to counteract forces of a well-functioning market have proven not just ineffective, but counterproductive.

The scale of the global energy system also has important implications for alternative energy sources and technologies. To penetrate global markets in a meaningful way, alternatives must be competitive, economic and ultimately affordable for most consumers.

While much attention is given today to wind, solar and of late, biofuels, because of the enormity of global energy demand, none of these offer meaningful solutions to the bigger issues surrounding energy supply and consumption. A more fundamental breakthrough is required.

So the difficult question facing all of us and policymakers today is: What do we want to do between now and the time technology can deliver those meaningful solutions?

Turning Goals into Realities

First, we should recognize the importance of the discipline to which many of the students and faculty here today are devoted – economics.

Energy solutions that are broadly-applicable, technically-feasible, consistently-available, and commercially-viable – in a word, economic – offer the best hope of balancing economic progress and environmental preservation, given the current realities we face.

Energy use, economic activity and environmental impacts are intertwined globally. Affecting one affects the other two, often in conflicting ways.

Restricting fossil fuel production and use, for example, will reduce emissions, but it will also retard economic growth in developed and aspiring economies, and could prevent many of the world's least advantaged from escaping poverty.

To achieve long-term sustainable progress on a global scale, we must achieve balance -- balance between the resources available, the aspirations of society, and the prices that consumers are prepared to pay.

Markets are the best means of achieving this balance because they provide the most reliable and realistic information about energy costs and benefits, and they bring practical solutions forward. Markets, allowed to function with minimal interference, are the great motivators of creativity and innovation.

As we work to strike the best balance between meeting societal needs for energy and the consequential effects, both economic and environmental, we must also work towards changing the underlying realities. This is where technology has such an important role to play.

The oil and gas industry has a history of extraordinary technological achievements. In the past, technological breakthroughs -- such as ever-cleaner fuels and products, seismic

mapping techniques and extended reach drilling -- have dramatically decreased environmental impacts and increased energy availability.

I am confident future breakthroughs will enable us to continue to meet the growing demand for energy while mitigating the impact on the environment of both producing and consuming energy. New energy technologies, when they prove competitive, have the potential to fundamentally change the global energy system -- for the better.

Energy and Environmental Solutions

It is within a market framework that our industry is finding technologically- and commercially-viable solutions to our energy challenges.

Let me highlight four.

The first is greater energy efficiency. I make the distinction between efficiency and conservation. Efficiency means continuing to carry out your necessary activities with lower energy consumption. Conservation means not continuing your activities to lower your energy consumption.

By using oil and natural gas more efficiently, we can extend the life of these resources while also reducing costs. Using electricity in our homes and offices more efficiently has the effect of saving the energy resources required to produce that electricity, often coal or natural gas.

Energy efficiency also has tangible environmental benefits. Saving energy reduces emissions.

A clear example of energy efficiency at work are the 85 cogeneration plants around the world in which ExxonMobil has interests, including one at our Rotterdam refinery.

Through the simultaneous production of steam and electricity at these facilities, we provide 3,700 megawatts of power globally, enough for about seven million average European households.

To produce that same amount of wattage, traditional power plants can emit up to twice the greenhouse gases. Cogeneration is a net loss of emissions – and a net gain for the environment. And we have taken 9 million tons of carbon dioxide out of the atmosphere.

A second solution is development of scientifically-sound standards to ensure environmental regulations are effective. Clear and workable guidelines that provide the flexibility to secure the greatest environmental benefit at the lowest economic cost offer the best chance of success.

Here I am proud to point to a local ExxonMobil success story. As Europe's Emissions Trading Scheme was taking shape, a team from our Rotterdam refinery, working closely

with Dutch government officials, developed a detailed protocol for monitoring emissions that facilitated compliance. It is currently promoted as the best practice by the EU.

A third solution is the pursuit of breakthrough clean, commercially-viable energy technologies. Emissions-free energy technologies exist, but they are not cost-free. Finding ways of making energy technologies cost-effective is the challenge – and meeting it takes significant investment in research and development.

That is the philosophy behind the Global Climate and Energy Project, an initiative based at Stanford University in California and substantially sponsored by ExxonMobil.

Through GCEP, we are researching new ways in which hydrogen and solar energy can be made economic… how carbon dioxide can be captured and stored in a cost-effective way… and how biofuels can be made more abundant.

And GCEP draws upon scientific, engineering and environmental expertise from around the world, including at ECN and TU Delft here in the Netherlands.

A fourth and truly global solution is strengthening energy interdependence. Global commodity markets are famous for their volatility and sensitivity to world events. The market for oil is no exception. To mitigate these effects and to achieve the energy security critical to economic progress, we must diversify our sources of supply.

There is no better example of this positive potential than the recent experience in the United States in the wake of Hurricanes Katrina and Rita in the Gulf of Mexico. These storms temporarily disabled fully 25 percent of U.S. refining capacity and threatened to choke off fuel supplies to millions of American consumers.

We averted this threat thanks to a free, open and competitive marketplace, which enables mutually-beneficial trade and interdependence of the United States and European markets for refined products. Responding to market signals, refiners here quickly routed additional gasoline supplies to the United States. As a result, few Americans were short of fuel.

Unfortunately, many policymakers in the United States overlook this lesson and are advocating energy independence. Such a protectionist policy offers false hope for energy security. Only by fortifying and multiplying international energy partnerships can we protect against shocks.

The important and growing role of liquefied natural gas in meeting the challenge of greater distance between producers and consumers is an excellent example of how important these international relationships will be.

I am pleased to see the European Union is steering a different course. In its recently released "Green Paper," the Commission focuses on integrating markets internally and

opening markets externally. This is an important step in the right direction – the direction of energy interdependence.

Conclusion

An economist from across the Channel once dubbed his discipline, and many of yours, the “dismal science.”

He was wrong.

Economics, I believe, is a profoundly hopeful science that can help lift standards of living, sustain the environment and strengthen international cooperation.

As an essential element of economic activity, energy holds this promise, too. Through technologically- and commercially-viable energy solutions, we can achieve the proper balance needed for progress.

And in the spirit of Erasmus, one of Europe’s great humanists, we can turn the greatest of dreams – the enhancement and elevation of the human condition – into reality.

Thank you.