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A New Era of Energy Innovation

(Acknowledgements.)

I appreciate the opportunity to speak today about the role technology plays in meeting the world's growing energy needs.

The theme of this year's seminar, "OPEC in a New Energy Era," speaks to the new challenges and opportunities in the years ahead, from expanding production capacity… to stabilizing markets… to meeting environmental expectations… to supporting development.

ExxonMobil is proud to participate in the energy sectors of many OPEC member nations, acting as a partner in meeting these challenges and advancing opportunities.

However, when it comes to the development of petroleum technologies, I would suggest that OPEC and the world energy community as a whole are <u>not</u> entering a new era.

With all due respect to many who have said otherwise, the era of "easy oil" is not over.

Why? Because there never has been an era of "easy oil." Our industry has constantly operated at the technological frontier. Oil only seems easy after it has been discovered, developed and produced.

Understanding this fundamental fact is essential to creating and sustaining the conditions for future technological progress.

As has been noted by other speakers, by 2030, the world's energy needs will be 50 percent greater than they are today. Growing populations, especially in developing countries, will require more energy to attain higher standards of living, to address social pressures, and to achieve greater security.

OPEC is destined to play an important and growing role in meeting this future demand. Within the next decade, crude production from non-OPEC sources is expected to plateau, while world oil demand continues to increase. The result will be a call on OPEC of nearly 50 million barrels a day by 2030 - an increase of over 50 percent above OPEC's current levels.

To reach the needed levels of production worldwide, we must continue to innovate. And fostering innovation will require free trade and investment, open access, and international partnerships. Oil producers need consumers, and oil consumers need producers.

Under these conditions of energy interdependence, industry can continue to develop, transfer and apply the energy technologies needed to support economic growth and social progress in OPEC's member countries and beyond.

The history of our industry shows when these conditions are consistently met, energy technology advances, and it advances in some truly remarkable ways.

The question whether petroleum technologies in the future will be evolutionary or revolutionary can be answered "yes."

Technological progress in our industry is never an overnight phenomenon, however, and it rarely makes headlines. It results from an incremental process involving consistent investment and the application of scientific, engineering and managerial expertise over sustained periods of time. And in the end, this evolutionary process can have revolutionary results that dramatically improve our energy future.

ExxonMobil is proud to be a technology leader. It is reflected in our consistent R&D investment, over $700 million in 2005 alone… our ongoing technical training, representing 25,000 employee training days last year… our integrated functional organizations and associated research departments that enable us to rapidly and globally apply technology… and our many Technology Assistance Agreements with host governments, including several OPEC countries.

To make my point, I would like to highlight several revolutionary technologies spanning the supply chain that have evolved over time, before turning to the conditions required to sustain such innovation in the future.

Let me begin with advances in the area of reservoir simulation, which have been instrumental in improving reservoir management and recovery worldwide.

Nearly fifty years ago, Exxon engineers applied a new mathematical technique for solving multiphase flow equations using the latest computer technology to simulate reservoir behavior.

Working with our Saudi and other venture partners, we first applied this technology on a full-field scale to the Abqaiq field in Saudi Arabia with success.

That revolutionary technology has been built upon, capitalizing on new modeling techniques and computing advances to better understand the full physics of multiphase fluid flow. It has been an evolutionary process in which ExxonMobil has dedicated more than 900 work years over the past 30 years.

And it has had revolutionary results. Our latest generation and industry leading reservoir simulator – EMpower – is currently being applied to over 150 reservoirs in 20 countries worldwide, including 8 OPEC partner countries.

Application of Empower to two major developments in Nigeria underpinned $5 billion of investments resulting in new production supply this year that will reach 350,000 barrels per day.

Advances in deepwater production provide other examples of evolutionary technologies. Since building our first steel pile platform in the Gulf of Mexico 50 years ago, we have upgraded our capabilities through the application of a succession of new technologies.

From fixed platforms we have graduated to tension leg platforms, subsea completions and most recently to floating production, storage and offloading vessels, enabling us to reach water depths of over 1,800 meters.

We recently deployed these deepwater technologies in the Erha fields, where we are partnering with the Nigerian National Petroleum Corporation to produce at water depths of over 1,200 meters.

Innovations in liquefied natural gas shipping have similar benefits. Working with our partner Qatar Petroleum, we will soon begin safely transporting clean-burning natural gas in liquefied form on vessels with 80 percent more capacity than conventional LNG ships. Such gains in shipping capacity will have a dramatic impact in connecting the world energy map.

Moving along the supply chain, technology has contributed to our ability to efficiently increase our refining capacity and develop ever cleaner fuels. Nanotechnology has enabled us to tailor our refining catalysts to accelerate reactions, increase product volumes, and remove impurities. Such "nanocatalysis" is an important part of our molecule management systems that have enabled ExxonMobil to increase refining capacity at a rate equivalent to building a new grassroots refinery every three years worldwide.

Further downstream, new technologies promise to improve fuel and engine system performance. ExxonMobil is working with Toyota and Caterpillar in separate programs to design high-efficiency, low-emission engine systems.

We are applying scientific learnings from this research to the fields of homogenous charge compression ignition systems and other advanced power train systems. HCCI has the potential to deliver the higher fuel efficiency of diesel at significantly lower emissions levels, and therefore improve vehicle fuel economy by approximately 30 percent.

The point is, evolutionary development of technologies can have revolutionary impacts on consumption just as they have proven to have on production. If new vehicle fuel economy could be improved by 3 percent per year, over ten years this would save almost

4 billion barrels of oil on a global basis. To put this in perspective, it is equivalent to all of the crude oil the United States imported last year.

Reservoir management, deepwater drilling, LNG shipping, nanocatalysis and HCCI are just a few examples of evolutionary technologies with revolutionary results, enabling us to overcome the constant challenges we face in meeting the world's energy needs.

Perhaps the greatest measure of this technology revolution is the significant increase in the world's estimated recoverable petroleum resource base.

In 1950, the U.S. Geological Survey estimated that the world's conventional recoverable resource base was about 1 trillion barrels. Fifty years later, that estimate had tripled to 3 trillion barrels.

Why? Because someone in 1950 underestimated the role of technology and concluded that the "era of easy oil" was over.

Advances in technology have led us to consistently increase our estimates of recoverable resources over time. By increasing recovery of known resources, as well as transforming unconventional resources to conventional ones, technology has essentially grown the world's energy supply.

The enormous base of oil, along with natural gas and coal, ensures that fossil fuels will remain the predominant means of meeting the world's growing energy needs for the foreseeable future.

That is not to say that research and development in alternative energy technologies should not continue. It should. ExxonMobil is sponsoring such R&D though the Global Climate and Energy Project, a Stanford-based effort which engages some of the world's best scientific and engineering minds in finding ways to make internal combustion engines dramatically more efficient, and hydrogen, solar, biofuels and other alternatives more effective, competitive and safe.

However, given the predominance of oil and natural gas, continuing to develop petroleum technologies remains vital. Further innovation in fossil fuel production, refining and delivery is essential if we are to meet the growing energy needs of the future.

How do we ensure continued technological progress? It does not occur in a vacuum, or in an instant. Certain economic and political conditions conducive to innovation must be sustained across business cycles if progress is to continue.

One such condition is investment. The International Energy Agency estimates that over $200 billion per year of investment is needed to produce the oil and gas the world requires. ExxonMobil invested more than $17 billion in capital expenditures last year.

Attracting such investment requires stable fiscal terms and regulatory frameworks. It also requires open trade channels. The free flow of goods, services and investment across borders is critical to sustaining economic progress today, as well as the competition of ideas that leads to innovation tomorrow. When nations threaten to slow or stop this flow, it undermines future technological, economic and social progress worldwide.

Opening access to acreage for development is also important to sustaining technological progress. Oil and gas resources must be made available to allow technology and know-how to be brought to bear.

Because technological development is an evolutionary process, these conditions must apply over the long-term, regardless of prevailing prices.

The projects our industry undertakes span decades, require massive investments, and utilize cutting-edge technologies that evolve throughout project lifecycles. Under these circumstances, long-term planning is critical – planning which looks beyond the current business cycle and which relies on stable frameworks.

When prices are high, passions can run high. Oil importing nations can feel the pressure to assert their independence, as can oil exporting nations. On both sides, economic nationalism may gain in popularity, at the expense of international market progress.

It is precisely at times such as these that we must strive to strengthen our energy <u>inter</u>dependence by fortifying our partnerships, freeing market forces, expanding access, and sustaining investment. Unless we do, future technological progress and, ultimately, the energy supplies that fuel economic progress are jeopardized.

The new era we face, like all of its previous ones, is not an era of "easy oil." Nor will it be an era of easy answers. The supply and demand challenges we face are significant.

But, as has been this industry's history, it can be an era of continued technological advancement if we commit to the investment and interdependence essential to innovation. And if we do so, in the distant future those who come after us might look back and refer to ours as the "era of easy oil."

Thank you.