



The Energy Renaissance

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The Imperative of Affordable Energy

Thank you very much. I appreciate the introduction and the invitation of the Peterson Institute to be with you this afternoon.

This is one of those places in our nation's capital where serious minds turn to serious matters. The spirit of the Institute is to take the long view, to look past election cycles to the fundamentals of good policy, in this country and beyond. That's an attitude that serves us well in any place and time, and certainly right now, in this fourth year of low economic growth, high unemployment and many other challenges.

This room is filled with people who spend a lot of time analyzing these problems, and advocating policy prescriptions to deal with them. And few policy issues are more contentious than energy. There's a reason for that.

When it comes to energy policy today, we're talking past one another. We all want a secure source that minimizes adverse environmental impacts. But we're failing to be clear about what our central priority ought to be among our energy objectives.

Today, I'd like to share what I believe that priority should be. I submit to you that affordable energy is the priority that should underpin all of our actions. Every policy objective should be viewed through the lens of affordability.

To make the case, think back over the last 150 years. We've seen the greatest advancements in living standards in recorded history because we have developed abundant, affordable energy. Light, heat and mobility have been made available to billions of people. Agriculture has been mechanized, freeing populations to spend time developing other industries and toiling less for the very basics of life.

The evolution of energy supply over that time period has been just as stunning. As late as 1910, about a quarter of all U.S. farmland was still devoted to feeding horses used for transportation. Today, we use half as much land for all of our roads and highways, oil pipelines, refineries and wells combined.

Since Edison switched on his first generators in 1882, the average price of a kilowatt hour of electricity has fallen almost without interruption. Markets have driven a diverse portfolio of affordable energy

sources that is anchored by oil, natural gas and coal, but also includes nuclear, hydropower and other renewables.

And we're using our energy more efficiently. It takes 60 percent less energy today to produce a dollar of GDP than it did in 1949.

Affordable energy supports the very foundation of American life. Americans love their mobility, whether for business or pleasure. The population has roughly doubled since 1950, but gasoline consumption has quadrupled, even as gas mileage has improved. And we're flying more. U.S. airlines use about 80 percent more fuel today than when I was in college, even as they have become more fuel efficient.

Affordable energy has been a primary driver of economic expansion, from manufacturing in the 20th century, to technology in the 21st century. The most recent innovation in technology – cloud computing – is enabled by huge data centers that consume enormous amounts of energy. California companies like Google and Facebook are placing new data centers in North Carolina – in part because of the availability of reliable, affordable power supplied by coal, nuclear and natural gas.

Affordable energy is even more critical to industries like transportation. For companies like United Airlines, FedEx and Burlington Northern, fuel costs are a significant part of their operating expense to transport people and goods. By supporting business expansion and strong economies, affordable energy creates broader benefits that fund spending on social priorities such as national security, education and environmental protection.

It's no coincidence that the wealthiest economies have the highest environmental standards. Air quality in the United States, for example, has continued to improve over the past 40 years, even as the economy and energy consumption continued to grow. Just over the past two decades, common air pollutants such as sulfur dioxide and lead have decreased by an average of nearly 70 percent. And a 2009 study in the *New England Journal of Medicine* showed that improved air quality in major American cities has made significant and measurable contributions to life expectancy.

On the other hand, some of the world's worst environmental problems, such as air and water quality, are most prevalent in poor and developing nations. In my travels around the world, many leaders I speak with understand the link between affordable energy, wealth creation and ultimate living standards. They know that access to abundant, affordable energy drives development. And in a world where 6 billion people aspire to the same quality of life we enjoy, demand will only continue to go in one direction – and that's up. In fact, global demand for energy will grow as much as 40 percent over the next 25 years.

I believe the United States has an opportunity – in fact, a great responsibility – to create an energy policy with affordability at its core. We need a refreshed policy approach that recognizes the value of fossil fuels and allows a market-driven transition to affordable substitutes over time. And I would suggest that only an energy policy with affordability as its central goal has the potential to deliver long-term economic, energy and environmental security.

Policy Moving in the Wrong Direction

So if affordability should underpin our energy policy, how are we doing?

In many respects, our energy policy is moving in the opposite direction. Instead of promoting abundant and affordable energy, our policies are creating a framework that risks making energy more scarce and expensive. Let me explain how.

When we examine the global energy system today, there is a reason why fossil fuels – oil, natural gas and coal – will continue to supply the overwhelming majority of the world’s energy demand for the next several decades and beyond. They’re reliable. They’re energy-dense. They can be stored. They provide high-value products beyond power and fuel – goods like consumer electronics, medicines and clothing. And over a century, we’ve built a global infrastructure for the production of fossil fuels that represents an aggregate investment in the trillions of dollars.

Fossil fuels are also abundant. Over the past 30 years, while some people have been promoting the theory of peak oil, we’ve seen the world’s proved reserves of oil and natural gas increase roughly 130 percent, to 2.5 trillion barrels. Our resource base keeps expanding because our technology keeps improving. The industry has been relentless in exploring for new resources. In just the last several years, we’ve developed deepwater and shale resources that we couldn’t have imagined 10 years ago. And we’re continuing to make major new discoveries.

Because of the utility and abundance of fossil fuels, you’d think that our country would have a set of clear and long-term policies to encourage their responsible development and affordability.

That is not the case today. Our energy policy is rife with contradictions.

In the United States, for instance, conservative estimates put the size of recoverable oil and natural gas resources in the waters around our country at roughly 150 billion barrels. That’s the equivalent of more than 40 years of Saudi Arabia’s production. But even as we talk about stubbornly high oil prices and the need to decrease U.S. reliance on foreign oil, up to 85 percent of the Outer Continental Shelf in the United States has been declared off limits to development. And we’re confronting barriers to onshore access as well due to reduced leasing, excessive litigation, inconsistent regulatory guidelines and other factors.

We are seeing some positive signs on access. But, by and large, U.S. policy approaches access to resources by exception, not by rule. Is there something we know that countries like Australia, Canada, Norway and Brazil do not?

All of these countries – and many others – develop their resources responsibly, creating more affordable energy supplies and widespread economic benefits in the process. No matter where you look in the world – China and developing Asia, the Middle East, Latin America or Africa – the development of affordable fossil fuels is at the top of the policy agenda. Recognizing the role of affordable energy in economic development, the rest of the world is competing vigorously to find and secure long-term supplies of energy – in all forms. So should we.

Without a change in U.S. policy, we will continue to be marginalized in the global competition for energy and find ourselves in even less control of our energy destiny than we already are. We need a fundamental

reorientation of energy policy that puts economic objectives and economic security at its core. We need policy that moves from limiting energy development – which is largely our approach today – to enabling it.

Enabling energy development does not mean abdicating regulatory oversight. On the contrary, our industry is working diligently with the federal and state governments to enhance the regulatory oversight in deepwater and shale gas development.

Enabling energy development will require a more balanced and efficient approach to regulation so investments can be made on an economic and timely basis. Let me give you an example of inefficient regulation in our home state of California.

We applied for permits more than five years ago to make a capital investment of nearly \$1 billion to modernize our Richmond refinery, just across the bay from San Francisco. That investment would create 1,000 jobs, enhance local tax revenues, create more production flexibility and decrease emissions. After a review process that took more than four years, involving every stakeholder, the permits were granted and construction was started. But then the project was stopped by a lawsuit claiming the very thorough environmental review wasn't quite thorough enough, and the 1,000 workers were sent home. We're now re-filing for the permits and restarting the review process, still with no clear end in sight.

This is not an isolated incident. Throughout the U.S. oil and gas industry, we've seen examples of regulatory overreach that creates significant delays and cost increases. I would suggest this is not a good model for enabling the development of affordable energy.

Nor is imposing punitive and selective tax increases on the oil and gas industry – which is being proposed by the administration and some members of Congress. Let's look at the facts about taxes.

In 2010, Chevron paid an effective global tax rate of more than 40 percent. Between 2005 and 2009, our industry paid the U.S. government a total of \$158 billion in taxes, royalties and fees – or about \$86 million every day. Yet here in Washington, we continue to hear talk about taking away so called “tax breaks” and “loopholes” given to big oil.

These tax breaks are the same, or similar, provisions available to other companies in other industries. For example, one proposed takeaway is a provision of the U.S. tax code called Section 199, also known as the manufacturer's tax credit. It was adopted as part of the American Jobs Creation Act of 2004 and applies to a broad range of companies involved in manufacturing and production, from Intel to Dow Chemical – even The New York Times.

The manufacturer's tax credit was enacted specifically to stimulate job creation. So it's ironic, at best, that the government is proposing elimination of the tax provision for an industry that already supports more than 9 million American jobs, with the potential to create many more.

In another example, the administration wants to introduce double taxation on foreign incomes for international oil companies, denying them the same foreign tax credits that are available to all other industries. This “dual capacity” provision would reduce competitiveness of U.S. oil companies operating overseas relative to Chinese, Russian, and Indian firms – which are all competing with U.S. companies

for oil and gas resources. It would also diminish our ability to invest, and effectively reduce supplies in world markets.

This is short-sighted policy, to be sure. All told, the administration is proposing changes to the U.S. tax code that would effectively increase the tax call on our industry by nearly \$90 billion over 10 years.

And here's the kicker. At the same time the administration is considering billions of dollars in new tax increases for the industry, another branch of our government is providing a \$2 billion credit facility to Brazil to support that country's development of deepwater oil and natural gas. The financing being provided by the U.S. Export-Import Bank is targeted at supporting contracts with U.S. oil service companies. So the intent may be a good one.

But taking away investment capital from U.S. oil and gas companies through punitive taxes – while providing credit directly to a foreign country to develop its resources – is not a policy that would make sense to most Americans.

In a political calculation about taxes, it is tempting to target our industry. We report large earnings. But, we also make large investments. In 2010, for instance, Chevron earned about \$19 billion. But this year, we're investing \$26 billion in capital expenditures worldwide, including \$7 billion in the United States, for new energy projects. And next year we'll spend even more.

To put this into perspective, another iconic California company, Apple, earns about what we earn. But Apple has profit margins two times Chevron's, and an effective tax rate one-third less, about 28 percent. Yet, we don't hear calls for tax increases on Apple or the tech sector, nor should we. In fact, we actually hear talk of tax holidays for the tech sector and others.

There is broad consensus about the need for tax reform, but it should be approached equitably and comprehensively, not by singling out specific industries or sectors.

Fossil Fuels Aren't Enough

Taking a fresh look at policies on access, regulation and taxes in ways that will enable more production of oil and gas are critical steps to make energy more affordable.

But despite an abundance of fossil fuels in the world, we realize that given the scale of demand growth, they alone won't be enough. We'll also need safe and reliable supplies of nuclear energy. Over time, we'll need renewables to play an increasing role. And we'll need to use all forms of energy as efficiently as possible.

There's little doubt that renewables will play a growing role in the energy portfolio. My company has been investing in renewables for a number of years. We're the largest producer of renewables in our industry thanks to our geothermal business. And we're committed to developing renewable energy that can be produced profitably, at commercial scale, without the use of subsidies.

But let's be clear. We're still in the early stages of that process. Getting to commercial scale remains a fundamental hurdle for most renewable energy. Both wind and solar require enormous amounts of land in order to generate the same volume of energy as fossil fuels and they require backup power.

To give you an idea of scale, a natural-gas-fired generator producing 400 megawatts of power, enough energy to power 300,000 U.S. homes, would require about 200 acres of land. A wind farm generating the same volume of power would require a land area of 53,000 acres. That's roughly 3.5 times the size of Manhattan.

Because of scale limitations and other factors, most renewables also can't compete with fossil fuels on price. On a per-unit basis, stripped of subsidies, wind, solar and biofuels are simply not cost-competitive with fossil fuels. Compared to a conventional gas-fired generator, for example, electricity produced by offshore wind is almost 4 times as expensive, while power from solar thermal is nearly 5 times higher.

For long term viability of wind and solar energy, incentives like 30 percent tax credits, roll-in tariff protections and loan guarantees are no recipe for success.

In fact, over the past year, we've seen spectacular failures of the subsidy model. The Spanish solar industry has effectively raised the cost of energy and stranded hundreds of millions of dollars in capital because the government simply couldn't afford to subsidize the losses. The United States is now coming to grips with high-cost, subsidized renewables. Just over the past several months, we've seen three startups that manufacture solar panels – and received taxpayer subsidies to do so – declare bankruptcy.

There were a number of factors that led up to these bankruptcies, including tough overseas competition. But the fundamental fact is that in a free-market economy, emerging industries that depend on the whim or capacity of government to subsidize them – indefinitely – are not sustainable.

It's critical that we continue investing in research and development of alternative energy sources. But we should be focused on those that can be cost-competitive, without subsidies, at commercial scale. Trying to replace market-based development by mandating the production and use of renewables – before the technology is ready – just adds to the cost of energy.

Here's a case in point. The government's Renewable Fuel Standards mandate production of 16 billion gallons per year of cellulosic biofuels by 2022. As part of a company that's conducting extensive biofuels research, I can tell you that the technology to meet the mandate, economically and reliably, does not exist. Yet if we don't meet those requirements, we face significant financial penalties, which will ultimately add to energy costs borne by the consumer.

Just because we create a mandate, the technology doesn't suddenly appear. Our experience has shown that it takes long time horizons and significant investment to build new commercial-scale energy technology. Trying to force it through regulation or administrative fiat just distorts markets, squanders capital and adds to costs.

If indeed the objective of energy policy is to create a class of higher-priced energy, we ought to be transparent with consumers so they can make informed choices about what kind of energy they want to use and how much they're willing to pay. Given the choice, history has shown that most consumers will opt for affordability and reliability. U.S. energy policy ought to be aligned with that.

There's a final element in an affordable energy portfolio that's very important, and one that we don't talk about enough. In a portfolio of fossil fuels, nuclear and renewables, it can rightly be considered the "fourth" fuel – energy efficiency.

Energy efficiency is, effectively, the cheapest source of energy we have. Its importance can't be overstated, especially if we expect to meet the demand for energy in a world of about 9 billion people by 2050. Even in an advanced economy like ours, which has become significantly more energy efficient, the opportunity for energy savings is huge.

Lawrence Livermore National Lab estimates that about one-third of all energy used in the United States today is wasted. And McKinsey calculates the value of potential efficiency gain between now and 2020 at \$1.2 trillion. That's a big prize, and we ought to be focused on it.

At Chevron, we understand the economic value of efficiency. We've reduced energy intensity in our own operations worldwide by more than 30 percent since 1992.

Going forward, we believe the real gains in energy efficiency will be realized through the development of innovative technologies in lighting, building, transportation and other sectors. That's why Chevron is partnering with the Energy Efficiency Center at the University of California in Davis, which is focused on commercializing new technologies that consumers will accept.

Technology: The Common Denominator

Technology, in fact, is a key driver of innovation across the energy portfolio and ultimately drives affordable energy. Technological advances have expanded our resource base; allowed us to recover more of those resources, efficiently, economically, and safely; enabled us to produce cleaner-burning fuels and manage a much smaller environmental footprint.

At Chevron, we're focused on core oil and gas applications of technology like seismic imaging, enhanced oil recovery and hydraulic fracturing. And we continue to work on a variety of next-generation advancements with partners that include Los Alamos National Lab, the National Renewable Energy Lab, NASA and others.

Over the long term, technology is also our best chance of having a real impact on carbon and other greenhouse gas emissions, without disrupting the economy.

Cap-and-trade and carbon tax proposals have been widely discussed as policy approaches to reduce carbon emissions. They've been rejected to date by most governments because of the burden they place on consumers and businesses, particularly in the developing world. High prices will certainly curtail demand for carbon-based energy. But they also risk exporting jobs and slowing economic growth. And it is not at all clear that higher-priced fossil fuels will lead to competitively priced substitutes any time soon.

Gasoline taxes in Europe have raised prices above \$8 per gallon, but they have not prompted a transition to an electric fleet as a result. And when do you suppose we'll see an alternative to liquid fuels for air travel?

From our perspective, a low-carbon future, first and foremost, should include more natural gas, more energy efficiency and more investment in R&D focused on step-change carbon management technologies. The government can play a valuable role in R&D by continuing to fund grants through entities like the National Science Foundation, focusing on basic research and science, and developing tax policies that will stimulate more R&D in the private sector.

From deepwater oil to shale gas, technology has continued to open up new frontiers and new markets. Our company is committed to long-term R&D investments, and we look forward to partnering with the government to extend that R&D in promising new directions.

An Energy Renaissance

If we did the things we've discussed today – commit our country to affordable energy, broaden access to resources, create responsible and balanced tax policies, increase efficiency and investments in R&D – I believe we have the opportunity to create an energy renaissance in America.

An energy renaissance will create a wide range of economic benefits. A recent study by Wood Mackenzie concludes that if we opened up more domestic resources to production, it would create up to 1.4 million new jobs and generate more than \$800 billion in new government revenue by 2030.

We can't afford to squander this opportunity.

A stronger oil and gas industry would stimulate other sectors as well. The growth of the shale gas industry in the Northeast, for instance, has prompted a \$650 million investment in a new steel plant in Ohio that will create the seamless pipe needed for gas production. Increased natural gas supplies, in turn, create an economic incentive for the expansion of manufacturing and petrochemical industries.

But an energy renaissance would do something else as well. It will send a message to the rest of the world that the United States is serious about energy and serious about sustained economic growth. And that we are committed to both.

I would suggest, with the economy at the top of the global agenda, that's an important message for the United States to send.

Let me close with a final thought.

As the global economy continues to struggle to regain its footing, it can sometimes feel like we've run out of choices. We've had bailouts, artificial stimulus, and, soon, budget cuts. I believe we do have one clear choice left. And as Churchill noted, "Americans usually arrive at the right decision once they've exhausted all the alternatives."

The last and best choice for economic revival, here in the United States and the rest of the world, is growth. We need a growth agenda premised on creating an environment that allows the private sector to grow, to create jobs, to lift incomes, to generate more tax revenues and to regain our optimism about the future, which is our country at its best.

I'm here today to tell you the energy industry can help us do that.

At this critical moment for our economy, we can get everything else right, but still go nowhere unless we have affordable supplies of the energy that make things run. Today we stand ready to be the industry that helps make recovery possible – a strong, durable, global recovery, led by the United States.

Thank you very much.

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