

ExxonMobil
Speaker Coalition
100515

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Hi everyone.

Thank you for being here, and taking the time to learn more about ExxonMobil, the oil and gas industry, and energy issues facing society.

My name is _____, and I am a _____ at ExxonMobil

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For past generations, energy was simply a miracle that made modern life possible. When people flipped a light switch, or started a car, they didn't think too much about where that energy was coming from. Today, we know it's not that simple. Today, we know that questions about energy – how much we use, which kinds we use – are really important to the future – of our lives, our economy and our environment.

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At ExxonMobil, we are trying to help answer these questions. The more people know about energy, the better we can all work together to find positive, practical solutions.

I look forward to talking with you today.

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Let's start with a quiz. How many people in the world today do not have access to electricity?

- a. 100 million
- b. 500 million
- c. 1 billion
- d. 1.3 billion

I'll give you a minute.

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The correct answer is 1.3 billion – that's one out of every five people in the world living without electricity.

There are also 2.7 billion people who don't have access to modern fuels like oil

and gas to heat their homes and cook their food. Instead, they burn things like wood and animal dung.

These fuels are inconvenient, inefficient and dangerous. Even today, exposure to smoke from traditional biomass fuels kills more than 4 million people a year, most of them women and children.

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Lack of modern energy also is a barrier to economic and social progress. As the UN has said, each one of its Millennium Development Goals – from reducing extreme poverty, to improving health and education – depends on expanding access to modern energy

Why? The answers are so obvious, we might overlook them:

When communities have access to electricity and modern energy, students are more likely to attend school...schools are more likely to have qualified teachers...sick people can visit hospitals with life-saving equipment and refrigeration for vaccines...and everyone is more likely to have access to the internet.

In fact, studies have shown that when rural communities gain access to electricity, incomes can rise by as much as 30 percent.

The link between energy and living standards is shown on this chart. As you can see, countries that score high on the UN's Human Development Index also tend to have higher levels of energy use, and vice versa. A good example is Nigeria, It scores among the lowest on the Human Development Index, in part because its access to energy is so limited. But consider this fact: The population of Nigeria is 175 million people, more than double the population of Germany.

It's important to keep in mind that even in areas where modern energy is available, many people don't earn enough money to afford things like cars, temperature-controlled homes and appliances.

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Fortunately, global living standards are on the rise.

According to the Brookings Institution, the number of people earning enough to be considered "middle class" will more than double over the next 15 years, rising from about 2 billion today to more than 4.5 billion by 2030.

Rising incomes will create new demands for energy -- in China, in India, and many other developing nations including Brazil, Nigeria and Indonesia.

At the same time, global population is growing rapidly. By 2040, there will be about 9 billion people on Earth, up from about 7.2 billion today. Each one of these people will want to use energy to sustain or improve their quality of life.

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So how much energy is the world going to need?

ExxonMobil sees global energy demand rising by more than 25 percent from 2014 to 2040. That's a big increase -- it's equal to the total energy used today in North and South America combined.

How will we meet this demand?

And how will we create solutions that protect the environment without undermining global economic growth?

One option is to use cleaner fuels, such as natural gas, nuclear and renewable fuels such as wind and solar. Another is to use energy more efficiently. We also can develop new energy technologies.

The good news is that we're already doing all three. I will discuss each in more detail. But first, let's step back and look at how we got to where we are today.

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Humans have always used energy to make life better -- safer, more productive, and more enjoyable. People generally used whichever fuels were available -- and affordable -- at the time. At first, that was mostly wood, then coal. Then came oil, natural gas, nuclear and renewable fuels.

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In the 20th century, population, economies and living standards grew rapidly -- and so did energy use. New technologies, like offshore drilling, opened up new supplies of energy. At the same time, new consumer technologies -- like cars, air-conditioning and cell phones -- created new demands for energy.

Sometimes, these changes happened fast. Smartphones were only introduced around 2000, and today there are more than 2.5 billion of them worldwide!

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Cell phones actually are a great example of how energy powers our lives, often in ways we don't appreciate....

- It takes energy to manufacture your cell phone and deliver it to the store -- or your door.

- Cell phones are charged by electricity, which is generated using natural gas or some other energy source.
- Of course, many phones connect to the Internet, which itself is a large user of electricity.
- And last but not least, parts of the phone are made from plastic, which is made from oil and gas.

Who knew that taking a selfie – or sending a text – had so much energy behind it?

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Let's go back to our history lesson.

As energy use rose through the 20th century, so did emissions. In fact, because energy was so closely tied to technology and living standards, it appeared you simply couldn't have growth and progress without higher energy demand – and emissions.

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But today, things are changing.

In the United States and other developed economies, CO2 emissions have been falling since 20xx. Today, they are at levels not seen ~~since~~ since 1990s.

~~the 1990s ("the late 80s" or "levels not seen in almost three decades — that's back when when it was Bill Clinton, not Hillary, running for the White House!~~

~~Other better, fun visual examples: Michael Dukakis and George H.W. Bush were running for president, parachute pants, Rick Astley "Never Gonna Give You Up" was on the radio (fun audio example?) (All examples from Ken's Perspectives Blog)~~

Globally, ExxonMobil sees CO2 emissions peaking around 2030, then declining. This will be a major milestone, and all the more amazing considering that global population and GDP will still continue to grow.

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There are many factors driving the shift in emissions – including cleaner fuels, better efficiency, and slowing birth rates.

But one major factor is concern about climate change.

Across the economy, you see consumers reducing their environmental impact – and making different choices about energy.

- People are doing things like biking to work, buying hybrids or smaller cars, installing solar panels, and buying food from local growers.
- Companies like Starbucks and Whole Foods are leading a drive among retailers toward the increased use of renewable energy.
- And manufacturers are reducing their energy use. Over the last decade, ExxonMobil has reduced energy usage by 10 percent in its refining and chemical facilities.

Some of these changes are voluntary. Some are driven by a desire to reduce costs. And some are the result of government mandates. Taken together, they are transforming our energy landscape.

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Let's do another quiz.

Here are the four main sectors of energy demand. Which one do you think uses the most energy?

- a. Transportation
- b. Residential/Commercial Buildings
- c. Industry (Manufacturing, Agriculture, Energy)
- d. Electricity Generation

A lot of people would choose "A." When we think about "energy," we often think about cars. That's not surprising, since there are gas stations on every street corner, and oil prices are often in the news.

But the biggest source of energy demand is actually "D" -- electricity generation. This includes utilities like Reliant and TXU, and the other companies that own the power plants that make and deliver electricity.

The generation of electricity accounts for nearly 40 percent of all the energy used in the world today -- nearly twice as much as transportation. It also is the sector that produces the most greenhouse gas emissions.

That's why rising demand for electricity, and the fuels we choose to generate that electricity, will be the single largest influence on energy and environmental trends in the coming decades.

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If you look at the fuels used to make electricity in the United States in 2010, there is quite a difference between what we used in 2010 and what is projected for 2040. You see the decline in coal -- and the growth in natural gas, nuclear, wind and solar.

Wind and solar are the fastest-growing sources, rising by more than 700 percent. By 2040, nearly 10 percent of U.S. power will come from wind and solar, up from just 2 percent in 2010. And this is great! We are going to need all forms of energy to meet demand. But renewables alone won't be enough. The other 90% will need to come from somewhere.

And a lot will come from natural gas.

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It's a major change. And ExxonMobil is changing, too!

For much of our history, we were mainly an oil company. Today we produce almost as much natural gas as we do oil.

Natural gas runs everything from hot-water heaters, to facilities that make steel and roast coffee, to the electricity that powers the servers and data centers that run the Internet.

ExxonMobil is the largest producer of natural gas in the United States.

Before we start talking about natural gas, let me digress a minute to talk about ExxonMobil.

Because ExxonMobil is one of the largest producers of oil and gas in the United States, many people assume ExxonMobil is one of the largest producers in the world. In fact, many people think that ExxonMobil -- plus a few other companies like Chevron, Shell, and BP -- makes up the entire oil and gas industry. That really couldn't be further from the truth. There are hundreds, if not thousands of producers and refiners all around the world.

The biggest producers are national oil companies, like Saudi Aramco and PetroChina. ExxonMobil isn't even in the top ten.

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Let's take another quiz. How much of the world's oil do you think ExxonMobil produces? Any guesses?

In fact, it's about 2 percent of the world's oil. ExxonMobil also produces about 3 percent of its natural gas.

Alright, let's go back to natural gas.

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Demand for natural gas is growing much faster than for most other major energy sources, including oil. By about 2030, natural gas will have overtaken coal as the

world's number-two fuel behind oil.

Natural gas is increasingly popular for generating electricity because it produces up to 60 percent less emissions than coal. Natural gas is flexible, powerful and affordable.

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And today, we have a lot more of it, thanks to the amazing growth in shale gas in the United States. Because of shale, U.S. gas production has risen by 40 percent just since 2005. The U.S. is now the world's #1 natural gas producer.

And because shale technologies worked equally well on tight oil, the United States also is seeing tremendous growth in oil production.

How did this happen?

For years, everyone knew there was a lot of shale gas and tight oil in states like Texas, Pennsylvania and North Dakota. But until recently no one could figure out how to extract it.

The key was not a new technology. It was the combination of two existing technologies that had been used by our industry for a long time – one called horizontal drilling and another called hydraulic fracturing, or fracking.

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The track record for the safety of shale development is exemplary. More than one million wells have been developed using hydraulic fracturing in the United States, with no proven impact on safety or groundwater.

As the Secretary of the Interior, Sally Jewell, said in an interview on NPR, "fracking has been done safely for many, many years" and bans on fracking "are the wrong way to go" because they are based on misinformation and a misunderstanding of science.

ExxonMobil is proud to be playing a role in the U.S. shale revolution. Growth in shale means more good-paying jobs -- not just engineers but also skilled trades like welders, pipefitters and instrument technicians. It also means more affordable, cleaner-burning energy for the U.S. and the world.

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We have already talked about how cleaner fuels like natural gas can reduce the environmental impact of energy use. But now let's talk about an even more powerful tool, and that is **energy efficiency**.

Our world already is far more energy-efficient than it used to be.

In 1975, the average new car in the United States got 13 miles per gallon. Today, it's more than 24 miles per gallon. ExxonMobil projects that by 2040, new cars in the U.S. will average more than 45 mpg.

A big reason is projected growth in hybrid cars. We expect that by 2040, one out of every three cars in the world will be a hybrid or other advanced vehicle. At the same time, conventional gasoline-powered vehicles will continue to grow more fuel-efficient.

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Who is responsible for all these gains in efficiency? One is ExxonMobil.

Why? Because many times, better efficiency is the result of products made from lightweight plastics and other advanced materials like the ones produced by ExxonMobil's chemical company.

The link between energy and chemicals is not something you hear a lot about. Many people don't realize that nearly 10 percent of oil and gas produced around the world is not burned for fuel. Instead, it is transformed through chemistry into high-performance materials found in everything from milk cartons to yoga pants.

In many cases, these materials help save energy and therefore emissions.

Let me give you a few examples: When we use lightweight plastic packaging on food and other products, we need less fuel needed for shipping. Insulation made from plastic reduces energy use in buildings. Plastics are even used in solar panels and wind turbines.

But the best example is probably cars. One reason today's cars are more fuel-efficient is because many of their parts are made from plastics, which are much lighter than traditional materials like steel and glass. When a car is lighter, it burns less fuel. Today, plastics account for about 40 percent of the volume of new cars, but only about 15 percent of their weight.

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But efficiency is not just found in our cars. It's everywhere – homes, commercial buildings and manufacturing facilities.

For example, ExxonMobil employs an energy-saving technology called cogeneration at 30 of our refineries and other facilities around the world. Cogen allows us to capture heat that would otherwise have been lost, and use it to help run our operations. The energy produced at these cogen facilities is equal to the energy needed to power 2.5 million U.S. homes.

Remember I said earlier that ExxonMobil sees global energy consumption rising by 25% through 2040? You should know that that forecast assumes large gains

in efficiency. Without improved efficiency, global energy demand would be far higher. In fact, it would rise by more than 110%.

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The idea that plastic helps promote sustainability, or that energy companies want to save energy, runs counter to the stereotype. But one thing I hope you come away with today is the idea that if we want to promote effective energy solutions, we need to move beyond such stereotypes.

Let's take a minute to watch some of a TED talk on this very topic. It's by a sustainability strategist named Leyla Acaroglu. In it, she asks the familiar question, "Paper or plastic?..."

Let's take a look...

[Play first three sections of the TED video (total run time is 1:08)]

So what do you think she learned?

[Play last section of the TED video (run time 55 seconds)]

Fascinating, right? There are many other examples of how plastic, used smartly, can help us use energy more efficiently.

Efficiency is a win-win, because it saves energy and emissions. Actually, it's a triple win, because it also saves on fuel costs.

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Cost is important when it comes to energy, because cost influences our decisions. This is particularly true in developing economies. But it's also true in developed economies. For example, as gasoline prices fell last year, so did U.S. sales of hybrid cars.

Advances in technology can help bring down costs over time, as they have with hybrids. Technology also can make alternative fuels more affordable. For example, the cost of solar panels in the United States has fallen by two-thirds in just the past five years.

Technology also can open up brand-new energy solutions, and ExxonMobil is one of the companies looking for those solutions. We have invested more than \$9 billion dollars in research and development of advanced energy technologies, including hundreds of millions of dollars on biofuels.

For example, right now we are trying to find a way to make fuel from algae and plant waste.

You may have seen the recent TV commercial that focuses on ExxonMobil's research into biofuels. We hope that someday we can use algae or alternative sources to produce clean, renewable biofuels for use in cars, airplanes and all the other places we currently use liquid fuels.

We also are researching hydrogen fuel cell technology, which can make cars 80% more fuel efficient with 45% less emissions.

We still have a long way to go, but we are working on it.

One technology we are using -- right now -- to curb emissions is called carbon capture and storage, or CCS. CCS enables us to store CO₂ underground rather than releasing it into the atmosphere. ExxonMobil captures more CO₂ emissions than anyone in the world -- an amount equivalent to taking a million cars off the road each year.

Many researchers believe CCS will expand greatly during this century, and play an integral role in reducing global emissions.

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ExxonMobil is proud to provide the world with the reliable, affordable energy it needs while also helping manage the risks of climate change.

We know that energy landscape is evolving. We also know that now more than ever, people and governments are committed to reducing greenhouse-gas emissions. That commitment was highlighted by the historic climate accord reached at the COP21 conference in Paris in December.

ExxonMobil believes the best way to meet climate goals is through a revenue-neutral carbon tax. ("Revenue neutral" means any taxes collected on carbon fuels are distributed back to taxpayers.) We have written about this frequently, including on our blog. You should check it out -- it's called ExxonMobil Perspectives. It has a lot of information on our work on climate, energy and technology.

CLIMATE COMMITMENT.

Powering the world responsibly is a big job; ExxonMobil has nearly 75,000 employees around the world, on six continents. It's also an expensive job; over the last five years, we have spent nearly \$190 billion dollars in our global oil, natural gas and chemical activities and research. We spend about \$1 billion dollars a day just to operate our company.

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Finding energy solutions will take a concerted effort by everyone -- companies, governments, and individuals -- including yourselves. And it will require us to

balance our concern for the environment with the very real energy needs of people around the world. We are optimistic this can be done.

Times will change, and ExxonMobil will continue to change with them. One hundred years ago, ExxonMobil was a very different company. And perhaps in another 100 years we will also look very different.

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But we will never waver from our commitment to safety and integrity, to the development of advanced energy technologies, and the provision of energy for the betterment of mankind.

Thank you very much.

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