

The 2013 Energy Outlook Forum Publication

الأمانة العامة للتخطيط التنموي
General Secretariat for Development Planning



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A Long-Term View

FOR MORE THAN 50 YEARS, ExxonMobil has looked to the future of energy to help guide our business strategies and investments for meeting global demand. More recently, we have shared it beyond our Board Room to public audiences around the world to broaden understanding of the energy challenges and opportunities all of us face in the years ahead.

In the Outlook, we view the types of energy the world will need based on how that energy is going to be used, as well as the availability of affordable and reliable supplies.

This year’s findings reveal some interesting things about how we use energy, how much we will need in the future and what types of fuels will meet demand. For example, worldwide demand for energy continues to grow, with the vast majority of demand growth over the next 30 years occurring in the developing world.

Our view of the energy future forms the foundation for ExxonMobil’s strategies and investments. Our decision more than two decades ago to invest with Qatar Petroleum to develop their natural gas reserves was grounded in our view that global demand for gas would rise significantly.

The Outlook also helps us direct our research and development efforts into new technologies that are likely to provide value in meeting people’s energy needs. Over the next five years, we plan to invest about \$185 billion in energy projects. Given the magnitude of our investments, it’s important that we get it right.

By looking ahead to develop an informed view of what the energy future will look like to 2040, we hope to contribute to creating the value inherent in these opportunities for people around the world. Our goal is to provide energy that helps underpin growing economies and improve living standards around the world. Ultimately, how much, what types of fuel and how energy will be used will depend on actions by companies, consumers and policymakers – people like you.

We hope that by sharing this Outlook, we can all help contribute to making informed decisions about our energy future.

Bart Cahir
President and General Manager, ExxonMobil Qatar Inc.

The Outlook for Energy: A View to 2040

THE OUTLOOK FOR ENERGY is ExxonMobil's long-term view of our shared energy future. The company develops the Outlook annually to assess future trends in energy supply, demand and technology to help guide the long-term investments that underpin our business strategy.

This year's Outlook reveals a number of key findings. For example:

Efficiency will continue to play a key role in solving our energy challenges. Energy-saving practices and technologies, such as hybrid vehicles and high-efficiency natural gas power plants, will help countries in the Organization for Economic Cooperation and Development (OECD) – including those in North America and Europe – keep energy use essentially flat even as OECD economic output grows 80 percent.

Energy demand in developing nations (Non OECD) will rise 65 percent by 2040 compared to 2010, reflecting growing prosperity and expanding economies. Overall, global energy demand will grow 35 percent, even with significant efficiency gains, as the world's population expands from about 7 billion people today to nearly 9 billion people by 2040, led by growth in Africa and India.

With this growth comes a greater demand for electricity. Today, and over the next few decades, electricity generation represents the largest driver of demand for energy. Through 2040, it will account for more than half of the increase in global energy demand.

Growth in transportation sector demand will be led by expanding commercial activity

as our economies grow. However, energy consumed by personal vehicles will gradually peak and then begin to fall as cars, sports utility vehicles (SUVs) and small pickup trucks become much more fuel-efficient.

Technology is enabling the safe development of once hard-to-produce energy resources, significantly expanding available supplies to meet the world's changing energy needs.

Oil will remain the No. 1 global fuel, while natural gas will overtake coal for the No. 2 spot. Use of nuclear power and renewable energy will grow, while demand for coal peaks and then begins a gradual decline.

Evolving demand and supply patterns will open the door for increased global trade opportunities. Around 2030, the nations of North America will likely transition from a net importer to a net exporter of oil and oil-based products. The changing energy landscape and the resulting trade opportunities it affords will continue to provide consumers with more choices, more value, more wealth and more good jobs.

The evolution of energy, technology and the human progress it enables will continue. Ultimately, what types of fuel and how energy will be used will depend on actions taken by consumers, suppliers and policy makers. Being informed enables all of us to make better decisions about our energy future.



Strategic Planning is Crucial Guide for Future Energy Investments

By Alistair Routledge, Vice President, ExxonMobil Qatar Inc.

IN QATAR we are reminded of what we can achieve when visionary leaders of government establish sound policies and enable international partners to work, invest, and innovate together. In just over two decades, Qatar has risen to become the world's leading supplier of liquefied natural gas.

In the process, the nation has unleashed its own economic growth, supported innovation, spurred job creation and strengthened the energy diversity that allows free markets to maximize the value of national resources for producers and consumers.

With the clear direction set forth by His Highness the Father Emir in the Qatar National Vision 2030 and the strategic understanding that the National Development Strategy offers in moving toward that vision, Qatar has become an example for growing nations around the world.

This foresight, the understanding of the critical role that planning should play in one's long-term strategy, is also a concept deeply rooted in ExxonMobil's culture. All of ExxonMobil's major investments have their roots in the Outlook for Energy.

For example, our decision more than two decades ago to invest with Qatar Petroleum to help develop its natural gas reserves was grounded in our view that global demand for gas would rise significantly, as was our multi-billion dollar purchase of United States-based XTO Energy in 2010. In total, we invested more than \$160 billion in energy projects over the past five years.

As big as those investments are, the International Energy Agency estimates that to meet energy demand, global energy infrastructure investment will need to average

approximately \$1.6 trillion per year through 2035, with half of that amount related to oil and natural gas.

The Outlook for Energy tells us that the world's energy supplies will continue to grow more diverse, and our investments reflect those forecasts.

In addition to our continued investments in conventional oil and gas production, we are making significant investments in oil sands, deepwater and Arctic operations, and the development of oil and natural gas supplies found in shale and other tight rock formations.

Demand for reliable, affordable energy exists every day in every community.

Successfully meeting this demand requires foresight and effective long-term planning, followed by huge investments and years of work to build the infrastructure required to produce and deliver energy. It also requires the ability to understand and manage an evolving set of technical, financial, geopolitical and environmental risks in a dynamic world.

At its heart, the Outlook for Energy is an essential tool to help us provide the energy needed for continuing human progress. The world's energy future will be shaped by decisions made not just by companies like ExxonMobil, but also by policymakers and consumers, and we hope that our continued dialogue will encourage a broader understanding of energy issues that affect us all.



Expect the Unexpected When Looking to the Future

By **HE Abdullah Bin Hamad Al-Attiyah, President of the Administrative Control and Transparency Authority, Qatar**

ENERGY PRODUCERS AND CONSUMERS,

government planners, oil companies, market investors and all those who are affected directly or indirectly by the impact of the energy market, have a vital need for accurate energy data, analysis and projection -- all are essential for energy policy development and investment planning.

To make the right investment decisions today we need to rely on quality analysis and plausible forecast of future energy supply and demand directions, and consumption patterns. Rapid developments in oil and gas production combined with population and economic growth, environmental objectives, geo-political factors and government policies are having a profound effect on domestic, regional and international energy markets.

The global energy landscape is changing rapidly, and those changes will recast our expectations about the role of different countries, regions and fuels over the coming decades. We are living in a time of game-changers across the fuel spectrum and these will present both new opportunities and new challenges.

However, please allow me to briefly share with you in a very frank and direct manner what history has taught me over the last 35 years that I spent in the energy industry.

Forecasts conducted after the first oil shock in 1973 did not predict the ability of the Western economies to adopt more energy-efficient technologies and practices which led to the oil price collapse of the 1980s. Similarly, energy forecasters did not see the growing importance of the non-OPEC production and the oil glut that followed in the early 1990s.

More recently, long-term energy forecasts and projections made during the last decade did not see the rapid emergence of the shale gas phenomenon in the United States and its huge impact potential on the global energy markets.

I think we learned from our experience from the last many years, that technology can give you a solution for a lot of difficult answers.

Although most long-term forecasts are not perfect, in some respect we must acknowledge that they remain essential to investment decisions. Also producing them and sharing them with others are always worth the effort as we learn through the process of knowledge exchange how events may develop in the future.



Formulating an Energy Outlook is a Challenging and Necessary Pursuit

By HE Dr. Mohammed Bin Saleh Al-Sada, Minister of Energy and Industry, Chairman & Managing Director, Qatar Petroleum

IT IS CHALLENGING because the future outlook, by its nature, is uncertain and unpredictable. It is necessary because energy is essential to development, progress, and prosperity for all. Over the next 30 years, we see the world's population reaching nearly 9 billion people by 2040.

Qatar is no exception and we are already witnessing an equally impressive increase in population. This translates into growing mobility requirements, rising electricity needs for homes and other buildings, and increasing energy supplies to power industry.

Regionally, the Middle East is the world's largest oil producer and has the largest concentration of reserves -- almost 48 percent of the world's known oil reserves are situated here, and nearly 33 percent of total world oil supply is from this region.

According to the International Energy Agency (IEA), oil demand in this region grew by around 60 percent during the past decade, a yearly average of 225 thousand barrels per day, outstripping every region except China.

The IEA also forecast that global demand for natural gas will rise to 5 trillion cubic meters (TCM) in 2035 compared with 3.4 TCM today.

With this in mind, it is imperative that we adopt a multi-dimensional approach in the development of a future energy outlook. To do so, let us carefully examine interconnected issues, such as the impact of government policies, limiting carbon emissions, the present and future role of OPEC, the expanding

use of technology, continuing attempts for improving energy efficiency, the growing role of renewable and energy security concerns, to name just a few.

Such complexities are incremental in nature, going beyond the traditional norms of supply and demand, and have certainly added to the task of mapping the future. Hence the requirement for an innovative approach that can address all these fundamentals and non-fundamentals, considering their due weighting commensurate with their importance, to come out with a future outlook.

Framing tomorrow's energy strategy today also requires answers to pressing questions surrounding conventional and non-conventional gas.

How will shale gas affect the energy outlook for the United States and the rest of the world?

Will the positioning of Australia as a prospective leading future LNG player alter the future outlook?

What roles will countries surrounding the Caspian region, together with Russia, play in the future, and will they ultimately affect current gas market conditions?

Insight and careful attention to these key questions will help the world plan better for the 'difficult to predict' future.

I am optimistic about the future, and my confidence is the reflection of the journey we have undertaken. The successful path of our country has been guided by the powerful vision of His Highness Sheikh Hamad Bin Khalifa Al-Thani, Father Emir of the State



of Qatar. His vision has become a reality as we continue to retain the title of the world's leading and reliable LNG producer. Our presence is felt across all corners of the world.

We designed and built 14 LNG trains, including the first mega trains which can process more than twice the amount of natural gas than our own earlier world-scale trains, making them the largest operating LNG liquefaction facilities in the world.

Together with our partners we have drilled and completed the largest wellbores ever drilled offshore to produce natural gas; built two new classes of LNG carriers – a revolution

in the LNG shipping industry that allows us to ship 80 percent more cargo with 40 percent less energy per unit than conventional LNG carriers.

To sustain this phenomenal growth and prosperity, we need greater accuracy to understand what is happening at present, in order to determine how it will affect the future. We need an energy outlook that reflects present and future realities, now, more than any other time.

Possessing a clear outlook determines a bright future and it is my sincere hope that this forum will help in achieving this purpose.



A Note from...

**Dr. Saleh bin Mohammad Al Nabit,
Minister of Development Planning and Statistics**

THE GENERAL SECRETARIAT for Development Planning, GSDP is immensely pleased to have had the opportunity to engage with our colleagues in ExxonMobil on exploring the relevance of the 2013 Energy Outlook Forum for Qatar.

The GSDP is Qatar's strategic development planning agency. The GSDP has taken a lead in mapping Qatar's Vision and in formulating its first National Development Strategy for 2011-2016. Implementation of the National Development Strategy is now well under way and I am confident that in the years ahead we will witness substantial progress in the human, natural resource, environmental, as well as economic dimensions of our development.

Both the Vision and the National Development Strategy emphasize the critical importance of prudent natural resource management as an integral component in support of sustainable economic growth in the country. Naturally, sustaining prosperity over the medium and longer-term requires careful management of exhaustible resources to ensure

that future generations inherit ample means to meet their aspirations.

I am pleased to see that the *2013 Outlook for Energy* highlights a number of important themes that are of relevance and importance for Qatar. For instance, the efficient and effective usage of energy and other resources is high on Qatar's agenda.

Likewise, Qatar is looking at the potential of renewables as it endeavors to diversify its economy and promote sustainable wealth creation. These are issues that GSDP will be considering more closely in its upcoming mid-term review of Qatar's National Development Strategy and beyond, as the nation strives to increase its energy efficiency and reduce its carbon footprint.

Finally, we believe that the findings and recommendations in *The Outlook* should provide Qatar with a sound basis on how to guide future investment and production decisions in the hydrocarbons sector.

Thank you.



GSDP: Communication, Advocacy and Engagement

GSDP'S RELEVANCE TO Qatar's national development hinges on its ability to consult, involve, convene and influence a whole range of stakeholders and to initiate and guide dialogue on important issues. GSDP is therefore committed to communicating with and engaging stakeholders in order to keep them abreast of development progress and strengthen its partnerships with them, while building understanding of the purpose of the national development strategy and how it will bring tangible benefits for the people of Qatar. This entails:

Committing to transparency and communication:

- Keep stakeholders informed about progress and significant developments linked to the

National Development Strategy and other aspects of GSDP's mission

- Disseminate knowledge and knowledge products through a variety of channels, including publications, the popular media, web materials, workshops, conferences and other events

Undertaking advocacy efforts for the National Development Strategy:

- Tell the story of how the strategy will help turn aspirations of QNV 2030 into reality
- Explain the purpose of the National Development Strategy to stakeholders in lay terms and identify significance and tangible benefits for the citizens and people of Qatar

- Create champions for the National Development Strategy and its implementation within government, the private sector and civil society

Engaging with stakeholders:

- Strengthen strategic partnerships and relationships with stakeholders across government, the private sector and civil society to foster strong support for the National Development Strategy and its implementation and for GSDP's mission
- Consult with stakeholders to exchange information and knowledge faster and more accurately
- Poll stakeholders' views as part of strategy monitoring and evaluation and, subsequently, project design

Technology, Improved Living Standards and Policies Have Dramatic Impact on Future Fuel Choices

By Rob Gardner, Economics & Energy Manager, Corporate Strategic Planning, Exxon Mobil Corporation

EXXONMOBIL TAKES A LOOK down the road every year to assess how policies, trends and other features are going to shape the energy future for this world and for our investments and activities.

Many important factors will impact the future energy mix. Technology advances will impact both energy use and production, higher standards of living will shape the types of energy that people will use, and the policies that governments employ will also affect the amount and type of energy used.

Technology advances have always been important in the energy sector. The development of the liquefied natural gas processes have allowed natural gas to be used in countries that did not have access to adequate domestic gas supplies. We have seen advances in drilling techniques expand economic resources in both oil and natural gas. Technology is also working to reduce the cost of renewable energy supplies such as wind and solar so that they can better participate in the energy supply mix. Growing economies and vehicle technology improvements are shaping a very different need for transportation fuels in the future; the growth is in commercial transportation fuels which mean different product slates are needed from the world's refineries.

By 2040, global economic output will more than double with the Non OECD economies expanding by almost four times the level in 2010. An increase in standard of living manifests itself in many ways but one significant area is the greater use of electricity. Today, OECD and

Non OECD countries consume approximately the same levels of electricity, but that relationship will change significantly as Non OECD electricity demand surges by 150 percent by 2040. This demand is growing in use within the home but also within industry to support jobs and expanded development. Electricity generation allows a variety of fuels to be used. These include hydroelectric supplies, fossil fuels, nuclear, and modern renewables of wind and solar. The final choice depends on a number of factors including economics and public policies. We believe that natural gas will play an increasing role in power generation supplies because of its many advantages, clean burning, reliable, and it has one of the highest operating efficiencies when used in combined cycle power plant.

Policies around greenhouse gas emissions and CO₂ from energy sources will also impact future energy use. These policies are likely to have a direct and significant impact on the fuel choices made by individual countries, including a shift away from coal as CO₂ related policies are adopted especially when you bear in mind the massive leap in power consumption. The introduction of these policies will have a variety of impacts on the economy and energy use in every sector and region within any given country. Therefore, the exact nature and the pace of GHG policy initiatives will likely be affected by their impact on the economy, economic competitiveness, energy security and the ability of individuals to pay the related higher costs. Greenhouse gas emissions as related to energy use are projected to plateau by 2030 due

to efficiency gains and a gradual transition to less carbon-intensive energy supplies.

Globally, from 2010 to 2040, the rate of increase of CO₂ emissions will be about half that of energy demand growth. Two factors impact this: the wise and efficient use of energy and a shift to less carbon-intensive fuels. Of these factors, the most important relates to improving efficiency of energy use as people continue to improve their living standards.

Looking ahead, we expect one of the most important economic solutions to meeting rising energy needs and reducing CO₂ emissions will be a shift toward natural gas. Natural gas is increasingly recognized as an abundant and reliable energy source, and its growing availability around the world will play an important role in helping improve living standards while also reducing environmental impacts associated with energy use.



GSDP ExxonMobil 2013 Energy Outlook Forum

**Panel Discussion with HE Abdullah Bin Hamad Al Attiyah,
HE Dr. Mohammed Bin Saleh Al Sada, HE Dr. Ibrahim
Ibrahim, Mr. Rob Gardner & Moderator Sean Evers**

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“Gas is the right bridge between carbonized energy and decarbonized energy and we will make use of it to support the world economy for many decades to come.”

HE Dr. AL SADA

So this issue needs to be addressed because companies, NOCs or IOCs, need to turn this forecast into a plan. Take gas into transportation, for example. The penetration of gas into transportation is huge, not only compressed natural gas but we see LNG taking a huge role in transportation. How will that affect the forecast of greater efficiency?

So while forecasts are so important to us, we cannot live without it, but we need actually to consider which factors are tangible and which factors are not tangible. What forecasts tell us should be taken with a grain of salt because a lot of important factors can suddenly get introduced and shatter all of the forecasts. For example, geopolitical factors such as unrest, revolutions, wars, economic and financial situations in the world, the pace of penetration of renewables and shale gas in countries like China, for example. They will all hugely affect the forecast.

MODERATOR: Your Excellency Al Attiyah, there is only one time in the Energy Outlook publication that I could find use of the word critical, and that was used in reference to the importance of developing unconventional and shale gas. Do you think that's warranted?

HE AL ATTIIYAH: I've been asked several times if shale gas is a threat to conventional gas, and my answer is no.

I believe that shale gas will give more trust for consumers to consume more gas. Because a few years ago all the analysts and forecasters were saying that gas reserves will not exceed 70 years. This triggered the world to panic and to go research what is the next fuel. Now, after shale gas is becoming huge, especially in the United States, we now see this calculation of reserves extended from 70 years maybe to more than 200 years. It gives more confidence to consumers to consume more gas because they fully trust that it has a long supply.

I think we will see gas exported from the United States. And there is no problem to see it happen. You know that we want the world to

consume more gas. Because I believe the gas market will change and evolve - even in the Middle East, which I believe will be the next big market. Now we are seeing Saudi Arabia, Kuwait, the Emirates, Bahrain, even in Egypt and Oman - some countries that export LNG, now they have a big shortage of gas.

The UAE is building a big LNG receiving terminal in Fujairah. Kuwait is planning to build about 7 million tons of LNG. In the future Saudi Arabia will need a lot of energy to replace crude oil in the power sectors. So gas consumption and LNG consumption, even in the Middle East, is set to soar.

MODERATOR: Dr. Al Sada, in your opinion are we witnessing a shale revolution or an evolution?

HE DR. AL SADA: Well, evolution vis-à-vis revolution. In fact, I can say that technically it has been an evolution because it was the successful combination of an already existing technology of horizontal drilling successfully combined with fracturing. So fracking came up, but that took many years to develop. So it was very incremental; smaller independent companies took the challenge because they didn't have better opportunities to indulge and so they went into development.

So in my view it has been an evolution, though the effect of that evolution was rather dramatic in the United States.

The super majors did not expect it. We did not expect it. Proof is that we went and invested with major oil companies in regasification. Majors reacted fast and started to buy these smaller companies with whom the shale technology exists. So the effect of shale gas in the United States has been, yes, dramatic.

But the United States has the infrastructure, has the technology, and they are able to make use of the shale gas. And the pace at which they developed the shale gas is fast, but they started with the rich gas. So the economics of shale gas today primarily is fully borne by the liquids. Now, the question is how much rich gas exists? Will companies go to leaner gas fields? In that case, how much can they tolerate? It's not only capital expenditures, it's also operating expenditures, because shale gas needs continuous drilling. The lifespan of shale gas will drop significantly within a year-and-a-half to two years.

There will be a lot of challenges, including technical challenges. Until now, tight oil and shale gas don't have well established reservoir modeling, which will give better prediction of the performance of these fields.

MODERATOR: Your Excellency HE Dr. Ibrahim what is your view of the 2013 Energy Outlook and in particular the expectation for greater energy efficiency?

HE DR. IBRAHIM: I think energy efficiency is underestimated. When you go about forecasting one percent annual growth in energy in the coming 30 years and at the same time you have three percent increase in GDP.

The point is made: we need a lot of investment for energy in the future. So what I'm saying does not negate; actually, it supports the argument that energy demand will be more. It's going to be more. For example, let's talk about efficiency in cars. Now, many people talk about a rebound effect from greater efficiency in cars. The argument is that if it is more energy efficient, you drive more. This is the rebound effect. So, really, if you measure energy efficiency just in the efficiency of car for transportation, you are overestimating the impact of energy efficiency

because the rebound effect - which is the consumption effect - will to a certain extent make that impact much less.

MODERATOR: Your Excellency Dr. Al Sada, from an NOC point of view and as a resource owner of significant magnitude, how do you adapt to a forecast that says one-third of future energy demand will be met by greater efficiency in consumption?

HE DR. AL SADA: Qatar Petroleum has its own views on how efficiency will practically affect our business. For example, now we can see the refining industry will be affected by the efficiency because the structure of the product, the cuts, bunkering fuel is likely to decrease with time. Gasoline and diesel in particular will increase. Now, with that, the feedstock to refineries worldwide is likely to be lighter and lighter because the shale oil and condensate by nature are lighter, and they are penetrating refineries with higher percentage.

PANEL DISCUSSION

One important thing is to look at it from a Qatari perspective. Well, thank God that the biggest advantage in Qatar was the right time to develop our North Field gas. So it was developed timely with the vision of His Highness the Father Emir, led by His Excellency Abdullah Bin Hamad Al Attiyah; timely so that we have a proven record today of efficiency. The cost is a fraction of today's prospective projects. So Qatar is positioned comfortably now with LNG, and we don't have any worry about the development of gas. Now, most of the forecasts developed for supply assumed that all the projects announced will materialize timely. But if we go back just five years and look at the list of projects assumingly producing today, little of them are producing today.

AUDIENCE: What is the next big thing? And what do people think about methane hydrates as the next possible technology breakthrough?

HE DR. AL SADA: Well, reality is that fossil fuels will still represent more than 75 percent of the total energy consumed even by 2040. So the way we look at the gas, including obviously methane, is that they will still have the biggest share, while we talk about alternatives. In fact, we in Qatar, we think the world needs all sorts of energies and a little bit more to sustain a reasonable GDP growth worldwide.

On renewables, with the best case scenario they will not be able to take a share which threatens the fossil fuels because they start from a very low base.

MODERATOR: So you don't see any surprises to come, like shale?

HE DR. AL SADA: I would just like to say one thing, that though the news coverage and the emphasis is mostly on shale gas, economists can tell us that 50 percent of the incremental increase of gas will still come from conventional gas. But that is not covered duly by the news and the analysts. But this is the reality. Still conventional gas will represent half of the incremental increase from now to 2040. So I think gas is the right bridge between carbonized energy and decarbonized energy and we will make use of it to support the world economy for many decades to come.

AUDIENCE: My question is that the assumption which you have used for carbon is \$60. What factors went into assuming that?



ROB GARDNER: The CO₂ proxy cost that we used in our outlook starts escalating in this decade for the OECD economies and reaches \$60 a ton by 2030 and continues on up to about \$80 a ton by 2040.

And in the developing economies, it's a range of prices that come into effect after 2030 and reach – in the case of China – around \$20 to \$25 on average across the country.

And essentially, what drove those initial assumptions, even five years ago when we started this was we looked at power generation fuel

choices and said what price would be necessary to bring different power generation sources into the mix? And because of these assumption changes, what fuel mix shifts do we see in power generation because that's the sector impacted most by costs set by policymakers. Frankly, carbon costs at that level don't really impact transportation fuels. Transportation fuel impacts are much more heavily driven by efficiency policies and not by one type of tax or another. Now, when you introduce those costs, you do have broad-reaching impacts across the economy because you do have higher

energy cost that affects energy demand directly. As electricity costs go up, we evaluate alternative fuel choices based on their costs and use this as another method to understand and assess the impact of carbon costs on fuel demand in the future.

Ultimately policymakers are likely to need to try to balance a variety of tradeoffs in setting carbon policies including economic growth, economic competitiveness, impact on consumers from higher energy costs, energy security and environmental impacts.

