IFP Commencement Address

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Good afternoon, and congratulations.

Ladies and gentlemen, you represent the future of energy, in all of its diversity – from exploration and engineering, to economics and global markets. All of you here have chosen to study and work in a sector that is of critical importance. This is not an exaggeration. The strength and sustainability of the energy sector is key to ensuring the long term economic and environmental sustainability of our nations, and indeed the world.

This has been true since the very beginnings of our civilisations. The forests of Europe supplied fuel to the Roman Empire. The industrial revolution was built on the strength of coal. And today, despite the significant and welcome promise of renewable energy, the global economy runs on oil. It is fundamental to our economies, and will continue to play a critical role for years to come. The IEA’s World Energy Outlook central scenario sees oil still providing one-quarter of the global energy mix by 2040. This critical importance underpins the very reason for the existence of the International Energy Agency.
Changing Energy Landscape

The IEA was formed by importing countries in response to disruptions in oil supply. But that was 1974, and the world has changed dramatically since then.

New players are providing energy supplies, evolving technologies are allowing a more diverse fuel mix, and while IEA members once accounted for around three-quarters of global demand, they now account for less than half. For every single barrel of oil that is saved in OECD countries due to energy efficiency measures, two barrels are consumed in the developing world.

Underlying this shift in energy demand to emerging economies is perhaps an even more fundamental change. We live in a time where almost all decisions on energy must now be viewed through the lens of the environment.

There is no longer any doubt that our energy system is contributing to climate change. And what goes around comes around: the changes in climate resulting in part from our dependence on fossil fuels will in turn cause hardship for the global energy system in the decades ahead. We have been painfully reminded of this fact too often in the past few years with major weather events that, in addition to leading to tragic loss of life, have caused major damage to critical energy infrastructure.

And now, in the midst of growing concern over this overarching threat to our environment, economies, and expected standard of living, our global energy system is going through its own period of adjustment. This was a headline energy story of 2014, with oil prices plunging to five-year lows. This drop has led many to question the changing dynamics of the market. How will this affect energy security? How will it impact our efforts to meet collective climate targets?
How will this affect my career?

For all of you in this room, the more central question will be, how will this affect my career?

Indeed you may have watched the dramatic fall in oil prices and thought, what comes next? Is there a future for oil and gas? You have all seen the headlines. “Falling oil prices threaten electric cars and biofuels”, “Uncertain economic fortunes in a world of cheap oil”, “Cheaper oil, fatter wallets and a national opportunity”, and very succinctly “Cheaper oil: many winners, a few bad losers.”

However let us not be dismayed by headlines. While there are winners and losers in the medium term, on the horizon of ten, twenty, or thirty years there is reason to expect oil, and fossil fuels in general, to remain a driving force of the global economy.

Oil market rebalancing

Indeed what we are seeing now is not a decline, but rather a rebalancing.

Both demand and supply patterns have shifted from what we have been used to. Technological innovation has unlocked light, tight oil in the United States – a vast resource that long seemed off-limits. As such the US has changed the rules of the game, effectively becoming a new swing producer. This is one of the main factors leading to oil supply from outside of OPEC becoming far more price elastic than in the past.

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At the same time, for now demand is weak. This should come as no surprise. For one thing, the world economy itself remains relatively weak. This is part of the reason prices fell in the first place, and makes it less likely that lower prices will in and of themselves fuel a large increase in demand. This is not to say that demand growth will not gain momentum as the global economy slowly improves. But it will do so more slowly than had been expected, in line with the IMF forecast of underlying economic growth.

In the meantime, there are of course a number of economic benefits to be expected from lower prices. This includes higher household disposable income and lower industry production costs. However these benefits may be partly offset by deflation in some of the largest OECD economies. Outside of the OECD, weakening currencies mean that lower prices in US dollars will not necessarily seem that much lower to end users in domestic currencies. This will be compounded by the fact that many governments are rightfully seizing the opportunity of lower prices to dismantle their costly and ineffective subsidy programs.

Rightfully, because low oil prices represent an opportunity make smart decisions on subsidies, specifically those that result in prices paid by end users being reduced to below international benchmarks. For example, in Saudi Arabia, gasoline prices at the pump are an eighth what they are in London. These are known as fossil-fuel consumption subsidies, and are an extremely inefficient means of achieving their stated objective, which is typically to help the poor.

In 2013, governments around the world spent 550 billion US dollars on such fossil-fuel consumption subsidies. This is more than five times the level of support that went to renewable energy. It is also twice as much as actual investment into renewables in 2014.

Ten countries account for almost three-quarters of this 550 billion, and five of them are in the Middle East and North Africa. In fact, more than one-third of electricity in the Middle East is generated using subsidised oil. In the absence of these subsidies, almost all renewable energy technologies, including nuclear, would be competitive with oil-fired power plants.

And indeed in 2014 we saw significant initiatives to tackle subsidies in Jordan, Morocco and Egypt. Jordan removed fossil fuel subsidies early last year and raised electricity prices the following summer.
Morocco has been reducing subsidies progressively on both diesel and gasoline since the beginning of 2014. Egypt has raised the price of residential gas supplies, gasoline and diesel. This could reduce Egypt’s subsidy bill by about one third – that’s 5 billion US dollars.

Medium-term outlook for OPEC

These are wise and prudent measures to be taken, especially at a time when the future of oil supply in the Middle East and across OPEC is being questioned. In fact despite OPEC’s stated policy of defending market share, according to the IEA’s latest Medium-Term Oil Market Report, it is only expected to contribute roughly one third of global capacity growth to 2020. It will succeed in regaining a larger market share in terms of global supply, but only up to a point. OPEC’s share of global production will grow, but it will not revisit the higher levels reached before the financial crisis of 2008.

Of course this assumes that everything goes right with OPEC production, and this is perhaps a risky assumption. If international sanctions on Iran remain in place, nearly 90% of OPEC capacity growth through 2020 will come from a single country, Iraq. The list of challenges facing this country grew longer last year with the campaign waged by the Islamic State of Iraq and the Levant and the price collapse. But this has yet to derail its medium-term production outlook. As recently as December 2014, Iraq’s production surged to a monthly average of 3.7 million barrels per day, a 35-year high.

Iraq is a good example of how the effects of low prices can be doubled-edged. On the one hand, the price drop makes production both more difficult to finance and less profitable. On the other hand, it is an incentive to raise production volumes to make up for the loss of revenue, and to quickly resolve problems that had been holding down production.

The outlook for other OPEC countries looks dimmer. Venezuela and Nigeria will both feel the impact of low prices, leading to tighter budgets and cuts in social spending. Gulf countries may also miss their economic targets, though they have the advantage of higher buffers. Countries like Angola and Ecuador face serious difficulty.

Outside of OPEC, Russia will be hit particularly hard. Its conventional production faces a perfect storm of collapsing prices, international sanctions, and currency depreciation; the country will likely emerge as
the industry’s top loser with production set to contract by 560,000 barrels per day over the period 2014 to 2020. Unfortunately the knock-on effects from Russia’s struggles could be significant for a number of countries in the region.

The **Medium-Term Oil Market Report** also notes that the news is equally mixed for refiners.

The product market is expanding, and that’s both good news and bad news. Good news, as the industry will increasingly achieve economies of scale, become more efficient, and extend its marketing reach as the product market globalises.

But bad news for the more vulnerable components of the industry, notably some of the smaller and more antiquated refineries of Europe, and Asian OECD members, which will suffer from both diminishing demand at home and growing competition overseas.

Indeed, the hollowing out of the European refining industry amid growing competition from North America, India, China, Russia, and the Middle East will leave Europe increasingly import dependent for its middle-distillate needs. Asia buyers, on the other hand, will enjoy unprecedented buying power as crude exporters will be forced to compete more aggressively in the same Asian markets, as both North America and Europe, albeit for very different reasons, require less imports of seaborne crude.

Although growth in refining capacity will, on paper, track growth in end-user demand, in practice the refining industry will be piling up excess capacity in the next few years. That’s because up to one third of incremental product demand is expected to be met by liquids that will bypass the refining system altogether, such as biofuels, coal to liquids, or gas to liquids. As such, refinery margins are expected to remain under pressure, despite a significant improvement since the second half of 2014, when a large portion of surplus capacity was shut.

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So clearly markets are well-supplied for the time being. But short-term conditions should not blind us to the problems that may be around the corner.

The IEA’s *World Energy Outlook*, which models scenarios of how the global energy system may evolve, suggests that only a few parts of the world show significant growth in supply over the coming 25 years: the United States, Canada, Brazil and the Middle East.

Tight oil production is making the United States the largest oil producer in the world – and it stays that way until the late 2020s. After that, US production could start to fall back and by 2040 output is back to where it is today. Instead, it is the oil sands in Canada that takes over as the main source of North American supply growth.

The other major non-OPEC source of supply growth is Brazil. You can see how these suppliers do a lot to satisfy growing demand over the period to 2020. But after this, there is a large and growing gap in the market.

This is the gap that needs to be filled by the Middle East. There is no shortage of resources to meet this challenge. But, there is a real concern about a shortfall in investment. Some may argue that there is plenty of time to sort this out: extra supply from the Middle East is needed only in the early 2020s. But this would be a mistake: to produce extra barrels in the early 2020s, there needs to be investment today.

But as always in life, challenges present opportunities.
One of those opportunities will lie with renewable energy. And let us be clear on one thing – the rise in renewables is not bad news for oil, for a number of reasons.

To begin with, oil and renewables rarely compete. Renewables are primarily used to generate electricity for utilities, businesses, and homeowners. Oil is generally destined for transport. Demand for renewables will not suddenly fall if demand for oil increases.

Some may argue that this situation is complicated to some degree by the price of gas, if it is indexed to oil. As the price of oil falls, so does gas, which of course does compete with renewables in electricity generation. But in many jurisdictions renewables are already competitive with cheap gas. For example, the recent long-term contract awarded for solar PV in Dubai is just below 60 US dollars per megawatt hour, on par with gas prices in many parts of the world.

But the most important factor for renewables is not price. It’s the stability and predictability of policy and market frameworks. This is what will ensure that renewable energy can generate the significant capital needed for long term gain. And what a gain it would be. We speak of winners and losers during oil price fluctuations, but consider an investment portfolio of renewable power that is stable, predictable, and unlimited. Renewable power that decreases pollution, contributes to global climate efforts, and provides a hedge against volatile fossil fuel prices. Renewable power that improves energy security, energy access, and the resilience of our economies. Where are the losers there?

So the risk is that lower oil prices will introduce policy uncertainty. This is once again why policy makers must be smart, patient, and prudent, and at the same time industry should take advantage of an opportunity. This is not the moment for either policy makers or industry to lose sight of the big picture.

For when we lose sight of the big picture, we make short term decisions with negative long term consequences.

Some 30 years ago there was a similar bear market for oil, with oversupply and weak demand. Back then, policy makers could have taken advantage of the plunge in prices, for example by tightening vehicle fuel-efficiency standards. This could have protected motorists from the inevitable run-up in prices. But instead they generally took a laissez-faire approach, and consumers flocked to larger, thirstier vehicles. When oil prices began rising, owners of those vehicles paid dearly at the pump.

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What a difference a protracted spell of high prices makes. With record high oil prices between 2008 and 2013, the United States raised fuel efficiency standards for new light-duty vehicles by more than 14%.

Though some in the US may be taking advantage of low oil prices and buying SUVs, standards will be tightened further in the years to come. This will reduce American dependence on oil by 2 million barrels a day by 2025, according to the US government.

Obviously this isn’t just about the United States. As you can see, the bulk of new transport in coming years will be outside of OECD countries. This is where much of the opportunity lies.

New transport demand in emerging economies, and an increasing number of vehicles, will have significant impacts on rapidly growing cities. Local air pollution and congestion will threaten to add significant costs, yet building roads to alleviate that congestion will not be able to keep pace with the adoption of personal vehicles in many emerging countries.

These represent potentially strong drivers to increase investments in more efficient modes to alleviate congestion and air pollution while also improving the efficiency of the entire transit system. This represents an opportunity not only to mitigate the effects of combustion engines on the environment, but also a tremendous market opportunity for businesses – and engineers like many of you – who are willing to take advantage.

There is another way that we can take advantage of the current low price environment, and this is an issue that should be of great interest to the economists in the room – carbon pricing. Because if the world seeks to truly encourage more efficient use of energy, boost the economic case for carbon capture and storage, and promote low-carbon energy sources including renewables and nuclear power, then there must be an effective, realistic price on carbon. A carbon price is not a means of phasing out our use of fossil fuels, it is rather an opportunity to encourage efficiency and innovation.

Low oil prices provide an opportunity here. Policy makers in major energy consuming countries can take advantage of the oil market’s collapse to introduce carbon pricing, taxes, or low-carbon mandates, or to strengthen existing schemes. You can see here that the world is making progress. Carbon taxes and emissions trading schemes are implemented or being planned in dozens of jurisdictions around the globe, from emerging economies in Asia and South America, to developed countries in Europe and
North America. We should recall that it was when oil prices were falling in the early 1990s that Finland, Sweden, and Denmark implemented some of the earliest carbon taxes.

Critics argue that carbon taxes are job killers, but this is short-sighted. If such schemes are designed properly, and put in place in an environment of lower energy prices, economic discomfort can be minimised. Indeed, many studies suggest they can yield a net economic benefit. And with smart, targeted measures aimed at low-income earners, once the price of oil does rise, the effects of a new tax can be mitigated. In addition, higher taxes on transport fuels could help to finance clean energy research, development, and deployment – this is good for us all. The long term benefits of secure and reliable access to sustainable energy and transportation are simply undeniable.

The worst course of action would be complacency. We saw this 30 years ago, but back then the prospect of climate change barely registered as a policy concern. Today we know otherwise. Policy makers must look over the horizon, beyond the election cycle. They have a once-in-a-generation chance to get us back on track. If we continue with business as usual, the planet is on track to become warmer, and not by the maximum 2°C Celsius that world leaders have pledged, but by around 6°C. This coming year provides a tremendous opportunity for world leaders to show vision and initiative by bringing real, measurable and effective climate targets to COP 21 in Paris. These targets must take into account the energy system, because as I have said there is no longer any doubt that our energy system is contributing to climate change. Users and producers across the entire fuel mix, including oil, must be a part of the conversation, and the solutions that are developed must involve the entire fuel mix; calling for an immediate end to fossil-fuel use is just as shortsighted as claiming that climate change isn’t happening. Innovation, in the form of energy efficiency, advanced biofuels, or carbon capture and storage, combined with a balanced approach to the fuel mix, is the only reasonable way to meet climate targets while maintaining economic growth and providing access to energy for the hundreds of millions who currently go without.

**Climate resilience**

Yet the nexus of climate and energy does not end at emissions reductions.

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Increased air and water temperatures, decreased availability of fresh water and increasingly intensive and frequent storm events and sea level rise have disrupted and will continue to disrupt energy systems. These impacts do not exist solely in climate models or simulations. Already we have seen instances of oil and gas production being halted, power generation being curtailed and energy infrastructure destroyed by hurricanes and floods. Energy security in the coming century will be more and more concerned with resilience.

It is this combined action on both mitigation and adaptation that will be necessary to ensure sustainable, affordable, and secure energy supply for years to come. This is of concern to every country and region, whether a country is a net importer or exporter, has stagnating energy demand or rapid growth, or features vulnerable coastlines or desertification. It is clear that lessons have already been learned in this regard, for example with the US Secretary of Energy’s decision to create a one-million-barrel emergency stock of gasoline in the Northeast region of the United States following Tropical Storm Sandy.

Unfortunately this won’t be the last difficult lesson, and weather event threats to energy security may increasingly find their way into the headlines. We can hope that world leaders will take note, and make 2015 a year that is remembered not simply as the year that the United States became an oil swing producer, but as a year that the world stood up and said that action on climate change must be taken now. Whatever action is taken, energy security must be taken into account, for the energy-climate nexus is central to the sustainability of our economies and standards of living. And it is up to you, as the energy leaders of tomorrow, to take such action.

So if there’s one word I would like you to remember from today, it’s this: innovate.

It’s not a magic word. You can’t simply decide to innovate and quickly come up with an idea that will revolutionise an industry. Innovation requires patience. It requires commitment. It requires investment of both time and resources. Innovation may not lead to short term profits and rewards – though it can, if you’re lucky – but is more likely to result in long-term, sustainable success. The kind of success that isn’t here and gone tomorrow, but lasts for years or even decades.

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This is something many of us forget. Indeed, when looking back at past successes we often fail to appreciate the cost and effort required. Technological change can be an intricate, complex and long-term process.

For example it took 60 years from the first commercial production of oil before it captured 10% of the primary energy market. It was another two decades before it reached 30%. During this time, fierce competition was encountered between producers and users of oil and those with a preference for horse-drawn travel, electric trams, gas lighting, bioethanol, coal conversion and many others.

Hindsight may have a habit of making past transitions appear neat and inevitable, but they were not. The same applies to the innovations that made shale oil possible. The same will apply to the innovations ahead.

Innovation is not only about technical progress – innovation is needed from research and development, to supportive markets and regulations.

And we cannot simply pour money into research, expecting the development of technology that magically becomes mainstream. Support is needed from research and development, to demonstration, to changing market barriers. We need supportive markets that can pull innovative technologies, and the benefits they bring, into the mainstream.

Cheap oil may make us complacent, believing that today’s technology and today’s fuel will continue to be the engine of growth for tomorrow. Of course this is false. Just as the horse-drawn carriage was replaced by the internal combustion automobile, so will the diesel generator be replaced by the solar cell. There were some who kept their money in horses, assuming that the demand for horseshoes and saddles would never go away. We can imagine what happened to these investors.

Ladies and gentlemen, you have the responsibility of unlocking the next great innovation.

You are about to continue in, or newly embark upon, a career in a sector that is never static. It is always changing. Indeed I hear the phrase energy transition so often that it has almost become meaningless.

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The energy system is in a constant state of change, evolution, rebalancing, and upheaval. This can be a good thing.

It encourages us to increase efficiencies, to develop more sustainable ways of producing and using energy, and build an energy system that can support economic growth for the next generation, and the generation after that.

And above all, when we are looking toward the energy system of tomorrow, let us not be blinded by what is happening today. Short term changes are important, yes. But what matters more to our societies is what we can expect in the long term. That’s what we need to get right. That’s what will have a lasting impact.

I feel confident in leaving this responsibility in your hands.