

Good afternoon ladies and gentlemen. Thank you for hosting me at your Intertanko Hellenic Mediterranean Panel meeting. This is my first trip to Greece and I look forward to spending some time with you and then, later, my family will be joining me for our spring holiday. I can think of no better place to visit in these interesting times than to the country that is the “cradle of democracy”. I am very excited to experience the tradition and history of this wonderful country.

Before I begin, I'd like to share a little about myself. I'm a fairly new face to shipping, having served as BP's Vice President of Chartering and Commercial Operations for a little over two and a half years. I am responsible for managing all of the chartering and voyage related commercial activities for the BP Group. If we transport hydrocarbons on water, my teams around the world have a vital role in ensuring that they are moved effectively.

While I may be new to shipping, I'm not new to the energy business. I have worked in this industry for over 22 years serving in various business-facing finance related roles and for a short while supporting one of our Executive Vice Presidents in BP's executive office. I have had the privilege of working with some of BP's biggest projects and

transactions in our Upstream, Downstream, Alternative Energy and Supply and Trading businesses.

Shipping is vital to enabling us to do what we do as an international oil company. We seek to deliver heat, light and mobility to the world. Thinking about the purpose of that - how it enables people to live, learn and work - is very exciting. As tanker owners, you are a vital part of the energy industry. Thank you for what you do.

When I think of the energy industry, what is as true today as it was 100 years ago and may be 100 years from now is that the energy business is dynamic. That's what makes it exciting. Just when we think we find a "new normal", the new normal changes on us.

I would like for us to take some time out this afternoon to explore the dynamics that are going on in energy delivery, not just today, but in the future. It is these sets of dynamics that have direct impact on the evolution of the tanker shipping industry. Seeking understanding and having a dialogue may open up new ideas, thoughts and opportunities.

The global energy landscape is changing, probably faster than at any other time in its history. Traditional centres of demand are being overtaken by fast-growing emerging markets. The energy mix is

shifting, driven by technological improvements and environmental concerns. More than ever, the energy industry and all of the industries which support energy exploration, production and delivery, must adapt to meet those changing energy needs.

Today there are more producible resources in the ground than at any time in our history - despite all the energy that has been consumed. And the demand keeps on coming – more recently, its concentrating in emerging economies. While demand continues to grow, it's a buyer's market. There is more than enough supply to meet demand. Instead of consumers competing to access supply, producers are competing to meet demand.

Energy is transitioning as the drive for a lower carbon economy accelerates. This is to be welcomed for the sake of the environment. But we also need to understand what it means for our businesses. The costs associated with renewables are falling fast. For example, solar costs are down 80% in just five years. Onshore wind costs have come down by half in the same time. The growth of carbon emissions is slowing dramatically - from 2.1% a year over the last 20 years to 0.6% a year over the next 20, we anticipate. However, that is not enough to

meet the ambition set out in Paris in December 2014 to keep the global temperature rise below 2°C. Meeting that ambition means emissions falling by 2035.

Will that happen? We cannot tell. We will see different governments in different places with different approaches. But policy is not the only lever for change. Technology is also advancing rapidly on its own. The outcome is that we are going to see a changing mix.

Even with significant growth in renewables, oil and gas are still expected to provide around half of the energy mix by 2035. However, oil will be used much more efficiently. We estimate there will be around 100 million electric vehicles on the road worldwide by 2035, up from 1 million today. But for perspective, that's out of a global fleet of 1.8 billion.

By 2035, the main source of demand growth for oil will not come from cars and trucks and planes, but from petrochemical plants making plastics and fabrics. Quite a turnaround for the fuel that powered everything from the Model T to the Apollo rockets.

What does that mean for us as producers? It means oil is a value play, not a volume one. But it's still long-term. The winners will be those

who get to market with their product most economically, year after year, for decades to come.

And what about gas? What does the future hold? It's different, in a few ways. Demand for gas is growing faster than oil. Natural gas is the power generation feedstock of choice for many places. It's a lower-emission alternative to coal. It's a flexible baseload back-up to renewables. We still don't have a fully global gas market. Prices are typically set project by project. But the growth in LNG is increasing the accessibility of gas around the globe and leading us towards a more globally integrated gas market.

The winners won't simply be the most efficient operators. They will be the ones who can assemble large-scale, long-term projects that take gas from where it can be most efficiently produced to where it is most urgently needed. In the last decade that has classically been within the US. We are also seeing demand ramp up in China and expect to see supply rise there too as Chinese shale becomes a major play. And of course, Europe is also hungry for gas.

To explore what may happen in the future, I've structured this session in three distinct sections where I will provide some remarks and share some views and open it up to the floor for discussion.

With this backdrop in mind, let's discuss three themes:

- 1) What is the future energy outlook
- 2) What are the key themes in the near to mid-term market, from an integrated oil company perspective?
- 3) What does this mean for oil majors and trading houses moving cargoes

**I'll turn to the first – the future energy outlook.**

Often we focus on near term impacts of markets. I think there is an imperative to consider and seek understanding of the longer-term energy transition that is taking place. This helps all of us – whether shipowner, international oil company or trading house to continue to meet the energy needs of a changing world for decades to come. This first section of this discussion seeks to explore longer term changes.

Each year, Spencer Dale, BP's Chief Economist, presents the BP Energy Outlook. This presentation sets out a base case which outlines the 'most likely' path for global energy markets until 2035. It is based on assumptions and judgments about future changes in policy, technology and the economy. The Outlook also develops alternative cases to explore key uncertainties.

My first set of comments are from the Energy Outlook and are designed to give you a macro view of the landscape over the long-term so you may consider how the future of Shipping may be impacted. While we don't have time to go through the whole Energy Outlook today, I encourage you to take a look at the full presentation at BP.com.

This year, the Outlook supported a key theme of energy transition and the continued gradual decarbonisation of the fuel mix. This is being driven by:

- 1) Rapid improvements in the competitiveness of renewable energy;
- 2) Rapid growth of natural gas – especially liquefied natural gas - which is expected to grow faster than oil or coal; and
- 3) The slowing pace of increased oil demand as vehicles become more efficient and technological improvements, such as electric vehicles, autonomous driving and car sharing potential bring a mobility revolution.

The overall demand for energy looks set to expand, especially in electrification; however, this is likely to be tempered by improvements in energy efficiency as the world focuses increasing attention on sustainable use.

Turning to some numbers:

- In the base case of the Outlook, the world GDP almost doubles, driven by fast-growing emerging economies. [SLIDE 1 – pg. 10 of Energy Outlook]
- The world's population is projected to increase by 1.5 billion people (to 8.8bn). The world economy is expected to grow by c. 3.4% per annum (at Purchasing Power Parity exchange rates)
- This is driven by increases in productivity (GDP per person) with much of it driven by emerging economies with China and India, which account for around half of the increase. Africa accounts for almost half of the population increase, but only 10% of the expected increase in GDP. [SLIDE 2 – pg. 12 of Energy Outlook]
- While the world requires more energy, the increase is mitigated by falls in energy intensity (energy used by unit of GDP). This will increase as China's economy rebalances and more attention is focused on improving energy efficiency.
- The gradual change in fuel mix will continue with renewables, nuclear and hydro power accounting for half of the growth [SLIDE 3 – pg. 14 of Energy Outlook]

- Even so, oil, gas and coal will remain dominant sources – accounting for more than three-quarters of the total supplies.
- We expect to see sector demand to grow, but easing – in buildings, industry and transport. Growth in non-combusted fuel use should remain relatively robust, in part because of its limited scope for efficiency gains. [SLIDE 4 – pg. 16 of Energy Outlook]
- Power will be an increasing share of energy, accounting for nearly 2/3 of the increase in global energy consumption. This is in part because of consumer preferences towards electricity as a fuel that is clean and convenient at the point in use [SLIDE 5 – pg. 18 of Energy Outlook]
- Carbon emissions look set to continue to rise, but at a rate of less than 1/3 of that seen in the past. This reflects significant increases in the pace of decline in energy intensity and in the pace of change in the fuel mix with coal slowing sharply and gas, renewables, nuclear and hydroelectric power supplying almost 80% of the increase in energy [SLIDE 6 – pg. 20 of Energy Outlook]

More specifically, let's explore oil and gas

- Growing demand in emerging economies is largely met by increased supply from low-cost producers [SLIDE 7 – pg. 24 of Energy Outlook]
- Liquids demand increases by 15 mbpd to 110 mbpd – all coming from emerging economies with China providing about half of the growth. Liquids supply increases by 13 mbpd – this will come from holders of large-scale, low cost sources – especially from the Middle East, US and Russia. OPEC will account for c. 90% of the growth (about 9 mbpd) with non-OPEC being just over 4 mbpd – US, Brazil, Russia and Canada. [SLIDE 8- pg. 26 of Energy Outlook]
- The pace of oil demand growth will be slowing. Transport accounts for c. 60% of the world's liquid fuel and almost 2/3 of the overall growth in demand with shipping, trains and planes accounting for c. 3mbpd. However, this will tail off as fuel efficiency improves and there is increasing penetration of non-oil fuels.
- The growing abundance of world oil resources is assumed to prompt a shift in the pattern of global oil supplies to holders of large-scale, low-cost resources. This means the share of global liquids supply from the Middle East OPEC, Russia and the US will

increase from 56% in 2015 to 63% in 2035. [SLIDE 9- pg. 28 of Energy Outlook]

- Growth in refinery runs will be limited and liquids supply will increase only 0.7mbpd, much slower than the 1.3mbpd over the last 20 years. The majority of this will consist of Natural Gas Liquids and biofuels. [SLIDE 10- pg. 30 of Energy Outlook]
- Gas will grow faster than both oil and coal at (1.6% per annum) between 2015-2035. Shale production accounts for c. 2/3 of the increase – especially from the US. Increases in conventional gas will be led by the Middle East, Russia and Australia. The main centres of demand growth are China, the Middle East and the US. [SLIDE 10- pg. 32 of Energy Outlook]
- While import dependence grow in both China and Europe, the increased diversity of supplies associated with a rapid expansion in LNG helps to support gas consumption. In China, growth in gas consumption outstrips domestic production. Around half of the increased imports are met by LNG with rising pipeline imports coming from Russia and other Commonwealth of Independent States (CIS). [SLIDE 11- pg. 34 of Energy Outlook]
- In Europe, domestic production is set to decline sharply as existing fields mature. As a result, the share of imported gas in

total consumption rises from around 50% in 2015 to nearly 80% by 2035.

- There are some key issues that could cause change/disruption.

They may be:

- Electric cars – the global car fleet doubles from 0.9bn in 2015 to 1.8bn in 2035 with almost all of this growth coming from emerging markets. Of this, it is estimated that approximately 100 million will be electric vehicles. Key drivers in the pace of adoption are battery life and cost; subsidies and government policies; speed of efficiency improvements in conventional vehicles; and consumer preferences. Despite this, fuel demand will increase nearly 20% to 23 mbpd. [SLIDE 12- pg. 46 of Energy Outlook]
- Recoverable reserves – there is an abundance of oil resources. We've shifted from a view of peak oil a few years ago to peak demand. Cumulative oil demand to 2035 is expected to be around 0.7trillion barrels, significantly less than the recoverable oil in the Middle East alone. Under most scenarios to 2050, cumulative oil

demand amounts to less than half of today's technically recoverable oil. [SLIDE 13- pg. 50 of Energy Outlook]

- Strong growth in LNG supplies – which will be led by the US (19 Bcf/d) and Australia (13 Bcf/d) with most of this growth occurring over the next four years as projects come on line. There is a risk that a second wave of LNG is slow to materialise. [SLIDE 14- pg. 54 of Energy Outlook]
- LNG's share in traded gas is expected to increase seven-fold to the point that it will represent half of all globally traded gas – up from 32% now. [SLIDE 15- pg. 56 of Energy Outlook]

To summarize, the world continues to grow and has shifted from a belief of “peak oil” to a fairly common view of “peak demand”. The future centres of demand for energy are shifting to non-OECD countries. The balance of energy is shifting from heavier carbon sources of oil and coal toward lower carbon gas and renewables. Efficiency is key – in all aspects of the value chain and through the life cycle, whether it is in finding, developing or distributing the energy.

What are your views?

In this future view of the world, how do you believe shipping will be impacted in the long term?

How might shipping do to adapt to this changing environment?

**Shifting the discussion toward the near and mid-term, this next section explores key themes and challenges.**

- Moore's Law is being defied. The world is changing at a pace never seen before. As Ian Goldin, Professor and futurist from Oxford University says, "Today is the slowest day of the rest of your life".
- The world continues to face economic and political uncertainty – whether in the US with the Trump presidency or the filing for Brexit under article 50. A number of countries are the middle of political campaigns with protectionism as a theme, leaving question marks about how globalisation will continue to evolve. Global interest rates have been the lowest in decades and capital has been readily available, but, interest rates are starting to rise. There is a marked shift that has accelerated in consumer patterns moving from brick and morter retail toward online and from a consuming economy to a sharing economy. There is more data and information than ever before.

- In the energy industry, investment is starting to return. There is a shift away from complex mega-projects towards smaller, incremental and more efficient projects. Wood MacKenzie predicts capex per boe will average \$7, down from \$17bbl for 2014 projects. The number of FIDs will rise to more than 20 in 2017, compared with nine in 2016. This is still well short of the 2010-2014 average of 40 a year. Onshore US has seen a dramatic increase in efficiency, exemplified by the drillers, who are managing to complete wells up to 30% quicker. For deepwater, projects slated for FID in 2017 are largely looking good, but the longer-term deepwater pipeline is more challenged. Of the 40 larger pre-FID deepwater projects, around half fail to hit a 15% IRR at US\$60 a barrel.
- Oil and refined products production continues to shift. In the oil market, we're seeing more barrels of light crude from US Shale producers while OPEC cuts reduce the flows of the heavier grades that OPEC states mostly produce. This is currently benefitting the Atlantic basin refineries that are less sophisticated than the modern Asia and Middle Eastern plants, which can deal

with heavy and more complex grades of crude. This will benefit fuel oil in the short term. However with the new marine fuel regulations coming into effect in 2020, global demand for distillates is expected to grow faster than gasoline. As this move occurs, the impact on margins will vary by refiners depending on the configuration, access to advantaged feedstock, location and type of products produced.

- According to a Wood Mackenzie study, global bunker fuel costs could rise by up to US\$60 billion annually from 2020, in a full compliance scenario, when the International Maritime Organization's 0.5 % sulphur cap for bunker fuels kicks in. In 2016, global demand for high-sulphur fuel oil stood at almost 70% of overall bunker fuels. A combination of higher crude prices and tight availability of Marine Gas Oil could take the price of MGO up to almost four times that of fuel oil in 2016. The shipping industry will have to consider a switch to alternative fuels, such as MGO, or install scrubbers. Installing scrubbers may be an economically attractive option. Although there is an initial investment, shippers can expect a high rate of return of between 20% and 50% depending on investment cost, MGO-fuel oil spread and ships'

fuel consumption. Penetration rate for scrubbers could be limited by access to finance, scrubber manufacturing capacity, dry-dock space and technological uncertainties. We can also expect a shift in bunkering locations based on compliant fuels availability – with Singapore perhaps losing market share to China if shippers look for attractive Marine Gas Oil supply.

- As I've discussed, the gas value chain will evolve. Conventional developments will continue; however, they must be able to provide a return sufficient to justify the scale, time and complexity to develop. Increasingly, we expect greenfield opportunities to grow with greater use of more flexible infrastructure such as Floating Storage & Regasification Units, single point moorings with shuttle FSRUs, regas islands and power ships. This will facilitate evolution of the market from long-term point to point contracts toward more spot and opportunistic shipments.
- We are at a crossroads in managing the environmental impacts of the last century's industrialization and rapid population growth. The quest for a more environmentally responsible world will continue to be a key issue. Last year, at COP21 in Paris, 195

nations reached an agreement to keep the global temperature rise this century below 2 degrees Celsius. The shipping industry currently emits c. 2.5% % of the world's GHGs. Our industry has a significant role to play toward building a lower carbon future. How do we decarbonise shipping? Moves to reduce shipping emissions through technology retrofits and operational efficiencies or to potentially break away from carbon-based fuels altogether will be challenging and costly. Will LNG fuelled vessels move forward at scale? What are views of other technology possibilities? How will future financing be impacted?

- We are also at the cusp of continued massive acceleration of technological change - some call it the fourth industrial revolution. This may create great opportunity. Technological advances will continue to drive efficiency into how we operate and manage in shipping. Will the change we create internally in our industry be fast enough? A lot of people don't think so. The creator of Uber did not have a transport logistics background. The creators and founders of Airbnb did not have a hotel and lodging backgrounds. The likelihood of the next disruptive technology in Shipping coming from outside of the industry is high. 3D printing, cargo

tracking, Blockchain, online auctions and driverless ships are not out of the realm of possibility for fundamentally affecting the industry. Data and intellectual property will be taking an increasing share of the rent.

- The regulatory environment continues to evolve.
- Uncertainties continue around ballast water management – the availability of approved systems and investments and countries implementing some of their own legislation will influence the pace of adoption. I understand you had a session on this earlier today.
- Trading regulations are evolving and expectations around “know your customer” have grown.
- Shipping continues to have fundamental overcapacity with deliveries outstripping scrapping. In 2016, the fleet grew by 6% for both oil and product tanker segments. BIMCO expects the crude oil tanker segment to see a net fleet growth of around 3% in 2017 (6.0% in 2016E) and estimates the supply side growth rate of the oil product tanker fleet to be around 2.5% (6.1% in

2016E). Demolition of tanker capacity is likely to reach a five-year high, but not enough to prevent the onset of a loss-making freight market. This has affected and will continue to impact trade routes and tonne miles, especially since demand growth eased off. BIMCO suggests that in coming years the end-consumption of oil will need to catch up – and bloated oil stocks must be drawn on – before the market can be rebalanced. Much of this will depend on OPEC showing discipline. So far, this appears to be holding. Vortexa says its data show seaborne oil shipments totalled 759.6m bbls of crude in transit and 52m bbls held on sea in supertankers on April 3. This is down from 899.4m bbls in transit and 78.4m bbls in floating oil storage on January 1. Tanker demand growth in 2017 is expected to come predominantly from the greater Asian region led by China and India.

What are your views of the key near to mid-term challenges in Shipping?

Are there key decisions the industry should consider to rebalance?

## **What this may mean for oil majors and trading houses moving cargoes**

Last month, BP provided its strategy update to the market. We've been coming out of two different phases after our Macondo oil spill – first, emphasizing recovery and then building resilience, particularly in the low oil price environment.

We're now focusing squarely on the future - we'll focus mostly on the immediate five years ahead but we are also looking beyond that. As I have said, and you have seen, energy remains the future, but the future of energy will be different.

We're a company that thinks long-term. Right now our industry is changing very fast, but we are used to navigating change. We have spent time studying the changing demand patterns ahead and ways to adjust our strategy in line with our view of the future trends. We believe this will be evolution not revolution. I'll briefly share some of the choices we've made.

We took a decision to capitalise on our incumbency in key regions to extend access to competitive oil resources. One example is the 10% interest we've been awarded in Abu Dhabi's ADCO onshore

concession. It provides us with access to world-class competitive resources out to 2055 - resources we know well from working with a long term partner. Similarly in Azerbaijan, we've signed principles of agreement to extended development of the ACG oil field out to 2050, with economics that will keep us highly competitive.

But as well as investing, being competitive also means making the choice to pull back when necessary. We took a decision not to proceed with drilling in the Great Australian Bight. This was a tough decision, but ultimately the project would not compete with other upstream opportunities in our global portfolio.

The role gas needs to play in the transition can't be overstated. Gas is a cleaner, lower carbon alternative to coal, and is abundant in supply. Gas is a growing proportion of BP's portfolio and six out of seven of our start-ups this year are gas projects. We've added to our gas position in Egypt with a 10% interest in the giant Zohr field offshore. We're working with CNPC in China to explore for shale gas. We've increased our interest in Oman. And we are very excited about the new access we have with Kosmos in Mauritania and Senegal. We think this is a basin with enormous potential to produce significant volumes of gas very competitively.

For our refined products business, we currently operate or have a stake in 11 refineries and 17 petrochemicals plants. We currently do not plan to build new refineries, but will focus on modernising existing plants while expanding our network of filling stations, such as the recent deal we struck with Woolworths in Australia.

BP has the largest operated renewables business of the super majors. We are making selective investments in new technologies by taking small equity investments in new ventures.

We also, as you may know, have a significant trading business. Our supply and trading business connects BP to the world's traded markets for oil, gas, power, refinery feedstocks and currencies. Our business employs about 1,800 people in oil trading and trades over 5 mbpd of oil and refined products. We complete some 550,000 transactions and serve more than 12,000 customers across some 140 countries in a year.

We create long-term value from our assets by managing the flow of these commodities. We bring our specialized knowledge of safe, reliable energy production and management of production assets, together with our experience of global markets, to create a single commercial face to the world's traded markets. In addition to marketing our BP production,

we will continue to seek to expand our trading activities using long-term deals on third-party oil and products.

For oil majors and trading houses, nimbleness and accessibility remain key. Gaining access to asset opportunities where there is length in production and the ability to supply areas where demand is greater. Trade flows in these areas will shift in the short to medium term, with longer-term demographic and economic changes playing into larger investment decisions. Traders will use networks of ships, storage terminals and contacts to acquire product and supply customers. Trading margins remain important. As I said earlier, oil has become a value play.

Demonstrating this are recent examples where trading houses have moved further downstream into retail facilities with a bet that supply can be done more cheaply than previous supply chains. Examples from the large traders include Vitol's acquisition of Shell's petrol stations in Australia and its pending acquisition of a large petrol station network in Turkey, Trafigura's plans for a 24% stake in Essar Oil, the Indian Oil producer and our planned acquisition of Woolworths' retail sites in Australia.

I cannot over emphasize the role big data is and will play in informing judgements.

For shipowners, I can sum it up by saying expect energy companies to follow the trail of demand growth. This is what happened 100 years ago and is what still happens today. I expect you will continue to see:

- shifts in voyage lengths;
- optionality on voyage deviations where there is not a term supply agreement;
- continued growth in STS transfers, especially where newer ports or locations may not have the deepwater berths required of the larger ships;
- a continued shift into newer geographies in Africa, Latin America and Asia; and
- seeking to access and clear ports where we may not have previously berthed.
- Safety will remain paramount and underpin what we do.

Margin competition will be the name of the game as producers compete to meet demand. When the market premium is traded away, new opportunities will be found. Being nimble is a prerequisite.

One thing is for certain, waterborne cargo carriage is inherent to enabling what we do. Water is where the market changes first. This will not change in the near future. We will continue to seek safe, reliable and efficient shipping solutions. To achieve that, it will take all of us to work together to continue to build a sustainable and successful industry. Yes, there will always be challenges, but with challenges, there are lots of opportunities. We will continue to evolve technology, our response to the environment, the markets, our people and our operations. As we say in BP, “the future is bright, but different”.