### BP in India...





BP - committed to	o India
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With an investment of ₹40,000 crores and employing over 8,500 people in the oil, gas, lubricants and petrochemicals businesses, BP today has the largest international energy company presence in India. But our commitment goes beyond figures.

### Gas value chain: building a material presence

- In a historic partnership with Reliance Industries Ltd (RIL) in 2011, BP took a 30% stake in 21 oil and gas production sharing contracts in India, including the producing KG-D6 block and the formation of a 50:50 joint venture to source and market gas in India – India Gas Solutions Limited.

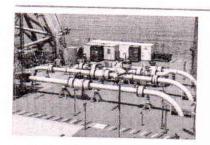
### Market leadership in lubricants and growing value through petrochemicals

- BP's association with India goes back to 1909 with Castrol. The Castrol brand has established itself as the market and technology leader in the Indian lubricant industry.
- Castrol India Ltd. is a public limited company with a gross turn over of over \$735 million in 2011. Its products and services are available in over 70,000 outlets across India and span applications across automotive, marine, industrial, power generation sectors and offshore drilling.
- BP has licensed its proprietary petrochemicals technology to two Indian companies. It continues to explore options to bring its world class technology to the Indian petrochemicals market, to help the industry expand and compete globally.

### Investing in technology and talent development

- We have made a point of transferring technologies, knowledge and expertise from our mature operations to new developments for the benefit of resource holders with whom we work.
- In support of BP's agenda of simplification, standardization and corporate efficiency, BP continues to invest significantly in India by outsourcing activities for its global information technology, finance and procurement functions.

### Behind the headlines: there is energy in this partnership



Top deck trunk gas line manifold unit on the control and riser platform at KG-D6, east coast of India

Gas value chain: building a material presence

- In India our new strategic alliance with RIL has provided BP with a 30% share in the east coast Krishna-Godavari, Cauvery and Mahanadi basins and also includes a 50/50 gas marketing joint venture. This positions BP as the only international energy company present across the full gas value chain in one of the fastest growing markets in the world.
- 12-months on, our technical assessments continue to support strong resource potential to BP. D6, 'the golden block' produced an average of 1.2 billion cubic feet per day gross for the first half of 2012. In addition to the already producing fields - D1, D3 and D26 there are ten other discoveries within KG-D6.
- In 2013 we expect to sanction and begin developing the Satellites and R-Series, with NEC 25 project beyond that, subject to regulatory approvals.
- We also expect to restart the exploration programme in 2013 and are examining various options to import LNG into India.



Coordinator, Liquid Engineering Lab, Samreen Rizwani at the Castrol R&D centre, Wadala, Mumbai

Market leadership through Castrol

 Castrol India Limited has a number of firsts to its credit, including the launch of multi grade engine oils, motorcycle oils and new generation truck engine oils including synthetic oils. Castrol has also built a best in class distribution infrastructure and pioneered the development of new channels to cater to changing customer needs.

Growing value through petrochemicals

- Two decade old co-operation in aviation fuels marketing with Indian Oil Corporation (IOC).
- Exploring an option to set up a world scale Acetic Acid plant with IOC.



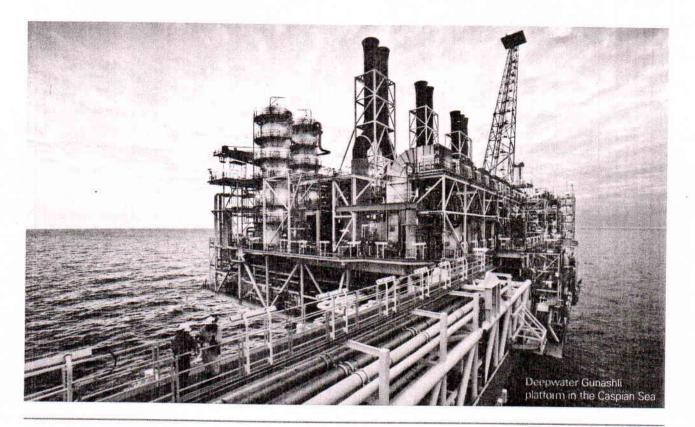
Deck officer keeping radar watch in English Channel

Investing in technology and talent development

- E&P: Bringing advanced deepwater, giant field and gas value chain technology and expertise to India. Seconded global experts in exploration and subsurface technologies to RIL.
- Castrol: R&D center in Mumbai for developing advanced technology for Castrol's global operations.
- Petrochemicals: Licensed state-of-the-art technology to manufacture Purified Terephthalic Acid (PTA) to JBF Petrochemicals in a planned 1.25 million tonnes per annum unit in Mangalore and Paraxylene (PX) for use by RIL for the world's largest aromatics complex in Gujarat, India. Both these technologies will provide advantaged feedstock to manufacturers.
- INFUSE: BP is a partner to the Indian Fund for Sustainable Energy (INFUSE) at the Centre for Innovation, at the Indian Institute of Management (IIM), Ahmedabad. This three way partnership between the government, industry and academia, aims to incubate new clean technologies.
- Offshoring: BP has awarded contracts for IT application development and application maintenance to strategic vendors in India. We also secure procurement and financial services through our vendors in India. Over 1200 of our global shipping staff, including Captains and Chief Engineers are Indians. We train our senior marine fleet at a training center in Lonavala.

# Innovation that delivers more





Technology at BP is the critical enabler in helping us find and recover hydrocarbons.

Our technologies are directed towards three core portfolio areas: Deepwater, Giant Fields and Gas Value Chains. It is in these areas where we believe we can deliver more impact – for the resource holders we serve, for our shareholders and for meeting society's energy needs. As reservoirs are discovered and developed in increasingly difficult geologies and geographies, technology is essential to deliver competitive advantage.

Most importantly, it supports safe, reliable, and efficient operations.

- We plan to harness technology: to go deeper into higher pressure, higher temperature environments. To make giant fields bigger. And to unlock the potential of unconventional hydrocarbon resources. Our track record of science and innovation, coupled with rapid deployment in the field, shows up right across the world. In areas that are often very difficult, geographically and geologically.

BP has selectively built leadership positions in key technologies

- Impacting industry: BP has a leadership position in technologies which have most impact on the industry, for example, Advanced Seismic Imaging and Pushing Reservoir Limits™, we call these our flagship technologies. With our technical expertise, global work practices, breakthrough research and industry leading technologies, we are better equipped to explore and develop the world's most prolific hydrocarbon basins and play a key role in meeting the world's growing demand for energy.

#### Behind the headlines: more discovery, more recovery, more efficiency.



Drilling engineer Claire Horsman carries out derrick inspection onboard the Byford Dolphin drilling rig

A major deepwater player

- We were one of the first to move from the shelf to the deepwater, with major discoveries in the Gulf of Mexico and now we are pushing the technology frontier in Angola, Australia, Brazil, Egypt and India.
- With so much of the world's deepwater resources lying under salt, our Advanced Seismic Imaging flagship pushes technological frontiers of both acquisition and processing of seismic data to see through salt to target the best reservoirs.
- With our Deepwater Facilities flagship and our latest initiative Project 20K<sup>™</sup> – we are leading the industry by developing the capabilities to explore, develop and produce from reservoirs located offshore at pressures of up to 20,000 psi.
- Established in 2003, BP's Field of the Future® Technology flagship is a long running program which has driven remote real-time monitoring and optimization of producing fields into a mainstream BP activity.



With our HIVE (highly immersive visual environment) of virtual activity we can see underground without drilling a hole

#### Giant Fields

Discovering more right under your field

- BP has considerable global experience in the development, production and regeneration of giant oil and gas fields - for example in Middle East, Russia, Alaska, Azerbaijan and North Sea.
- Over our long history, BP has influenced half of the top twenty giant fields in the world, whether through discovery, operatorship, joint venture, or technical support. Much of our reputation is built on achieving industry-leading recovery factors, through advanced water flooding techniques, enhanced oil recovery and artificial lift. Our technologies: Ocean bottom cables, 4D seismic, full waveform inversion.

Recovering more by going molecular

- The average industry recovery factor is only about 35%; some 65% of the oil known to be in the field is left in the ground.
- Enhanced Oil Recovery (EOR) can push reservoir recovery factors to new limits. BP's cost effective *Designer Water* and *Designer Gas* EOR technologies have been shown to yield substantive improvement in overall hydrocarbon recovery.
- Our Pushing Reservoir Limits<sup>™</sup> flagship applies physics and chemistry to understand the hydrocarbon recovery processes and develop new technologies to increase the recovery factor.
   Our technologies: Bright water<sup>™</sup>, LoSal<sup>®</sup> EOR, Digital Rocks.



Liquified Natural Gas Plant at Karratha, Australia

#### Gas Value Chains

- Natural gas is set to be the fastest growing fossil fuel globally to 2030. We have decades of deep technical expertise in working with countries, and indeed across entire regions, to develop gas – both conventional and unconventional – and connect it to the markets where needed.
- BP's approach has been to develop innovative high productivity 3D land based seismic acquisition techniques using simultaneous sources, which deliver high data quality, with very high productivity to identify sweet spots.



## BP Energy Outlook 2030 India Insights

India will become increasingly import dependent despite increased production of both renewable and nuclear energy. Here are a few reasons why:

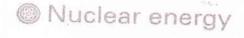
- India's energy production rises by 95%.
- © Coal remains the dominant fuel produced in India growing by 107% and accounting for 67% of total energy produced in 2030.
- Production declines in oil (-23%) are offset by gains in gas (+16%), hydro (+99%), nuclear (+342%), and renewables (+448%).
- India's energy mix remains relatively unchanged as coal's dominance drops slightly from 53% today to 50% in 2030 as oil maintains its 29% share.
- Coal will remain the leading fuel in power generation, but its share will decline marginally from 71% today to 67% in 2030.
- Despite coal's loss of market share in power generation, the fuel meets 63% of the growth while renewables contribute 14%, hydro 10%, nuclear 8%, and gas just 6%.
- India's energy consumption growth of 110% outpaces the rest of the BRIC countries with China (+72%), Brazil (+57%), and Russia (15%).
- Net energy imports increase by 135% as the country imports 42% of total energy demand in 2030, up from 37% today.

- Energy consumption grows by 110%.
- Demand for all fossil fuels expand led by oil (+108%), gas (+101%), and coal (+97%). India sees strong growth in renewables (+453%), hydro (+99%), and nuclear (+342%) as well.
- Energy consumed in power generation rises by 104%; energy demand in transport rises by 180%.
- Industry remains the largest final energy consumer of all sectors increasing by 104%, but its market share drops to 57% as transport rises.
- Oil maintains its dominance in the transport sector as its share actually increases from 94% in 2011 to 95% in 2030.
- Fossil fuels account for 88% of Indian energy consumption in 2030, down marginally from 92% in 2011. Renewables share of consumption rises from 2% to just 4% in 2030.
- Oil imports will rise by 152% as the country's production meets less than 10% of demand by 2030.
- India's CO<sub>2</sub> emissions from energy consumption double, as the country's energy intensity declines by 28% by 2030.















# BP Energy Outlook 2030 Fact Sheet

Global energy consumption in 2030 is 36% higher than 2011 with virtually all (93%) the growth in non-OECD countries and more than half coming from India and China.

- World energy demand will be about 36% higher in 2030 with India and China accounting for half the growth while inputs to power generation account for nearly 60% of the growth.
- Global energy intensity in 2030 is almost half (46%) of what it was in 1990 and 31% lower than 2011. EU energy consumption is more or less back to where it was in 1995.
- High prices and technological advances have unlocked vast unconventional resources in the US. Despite 'above ground' factors the global resource potential suggests measured growth elsewhere.
- \* Tight oil will account for 9% of global supplies while shale gas will reach 16% of the world total by 2030. North America will dominate output accounting for 72% of tight oil/shale gas supplies in 2030.
- The US will produce 99% of its energy needs by 2030, up from a low point of 70% in 2005. Around 2015 China will overtake the US to become the world's biggest energy importer.
- Russia remains the largest net exporter of energy and in 2030 its net exports meet 4.3% of world energy demand. Europe will remain the world's largest importer of natural gas.
- By 2030, 70% of emissions are coming from the non-OECD, although per capita emissions in the non-OECD are still less than half the OECD level. Total carbon emissions will increase by 26%.

- Oil and other liquids remain the slowest growing fuel in our outlook, with demand up by just 0.8% p.a., reaching 104 Mb/d (+16) by 2030. Demand is driven by non-OECD transport.
- The US, Russia, and Saudi Arabia will supply over a third of global liquids for the remainder of the outlook. The 2011 level of Call on OPEC isn't reached again until 2021.
- Natural gas will be the fastest growing fossil fuel at 2% p.a., reaching 456 Bcf/d (+144) by 2030. By volume, growth is greatest in power (+56 Bcf/d) and industry (+54 Bcf/d).
- Non-OECD accounts for 76% of the rise in gas demand and 74% of output growth. LNG supply grows twice as fast as total output and Australia overtakes Qatar as the top LNG supplier.
- Nearly all the growth in coal demand comes from just two countries, China and India, which will jointly account for 65% of total demand in 2030. India overtakes US as 2<sup>nd</sup> largest consumer.
- China overtakes the US as the biggest nuclear producer with its share of the world total rising from 3% in 2011 to 30% in 2030. Hydro's share of power generation falls slightly to 14%.
- Renewables (including biofuels) account for 6% of total demand in 2030 and grow 7.6% p.a. By 2030, 11% of world electricity is from renewable sources, up from just 4% in 2011.











