



## Meeting energy needs: The unique role of oil and gas

### THE PARIS PUZZLE Meeting Energy Needs

This document is one piece of the Paris Puzzle – a series of papers intended to address what we see as key components of efforts to address climate change, and demonstrate our commitment to meeting the challenge. Find the other pieces at [www.ipieca.org](http://www.ipieca.org)



#### ENERGY IS ESSENTIAL FOR SOCIETAL DEVELOPMENT

Energy helps meet the most basic human needs and is a key driver of the global economy, from power generation and manufacturing to transportation. Electricity and heat account for more than a fifth of world energy use, and transportation for about a quarter. Agriculture and food processing account for 17% of global energy consumption.

Energy demand is anticipated to grow by 37% through 2040<sup>1</sup>, despite continued declines in the energy intensity of the global economy. This trend is strongly linked to the aspirations of billions of people to improve their standard of living, along with growth of the global population - predicted to increase by 1.7 billion by 2040 and by up to 5.1 billion by 2100<sup>2</sup>.

#### THE ROLE OF OIL AND GAS IN PROVIDING ENERGY FOR DEVELOPMENT

As energy consumption in the developed world nears a plateau, developing countries will account for most future energy demand growth. While China's economy may slow, India, the rest of Asia, and portions of Africa are at, or near, an inflection point similar to China's thirty years ago.

In the next 25 years, hundreds of millions of people in these countries will buy their first refrigerators, air conditioners and vehicles. Regardless of the energy source these will use, producing them will require new factories, power plants and infrastructure, and expanded global supply chains. This entails energy for construction, manufacturing and processing, transport of heavy goods, and delivery to consumers. As evidenced by China's example, and despite a clear and increasing role for renewables, much of this energy is predicted to come from oil and gas.

Since 1990, China has added as many passenger cars<sup>3</sup> as the combined fleets of France, Germany, Italy and the UK. Appliance manufacturing has soared, with refrigerator production increasing nearly twentyfold, pushing cumulative sales over 600 million. Overall, the country's industrial output<sup>4</sup> increased by more than the current GDP of US manufacturing, and its electricity generating capacity grew from the size of Spain's to exceed that of the EU-27. China now leads the world<sup>5</sup> in energy demand, consuming 12% of the world's oil and 5% of its natural gas.

#### KEY MESSAGES

- Energy is essential for societal development.
- Oil and gas play an instrumental role in providing energy.
- All energy sources will be needed to meet growing demand, including renewables and oil and gas.

#### Footnotes

<sup>1</sup> International Energy Agency (2014) *World Energy Outlook 2014*, p. 23.

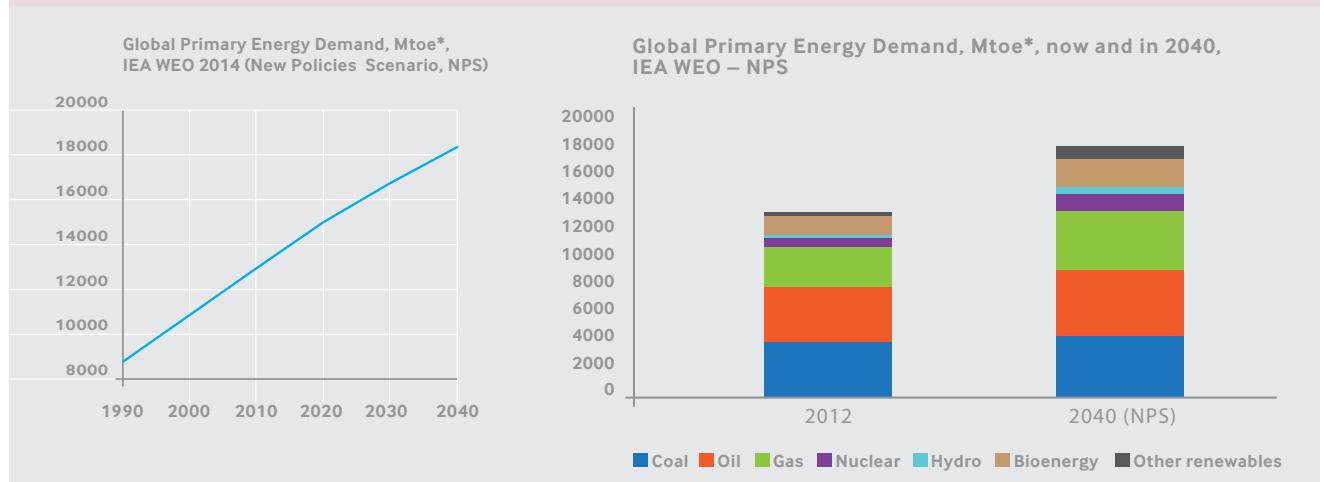
<sup>2</sup> Gerland, P. et al. (2014) World Population Stabilization Unlikely This Century. *Science*, 346 (6202), 234-237.

<sup>3</sup> Bloomberg. (January 31 2013) China Vehicle Population Hits 240 Million as Smog Engulfs Cities. *Bloomberg.com*. [Online] Available from: <http://bloom.bg/1Mox67x>

<sup>4</sup> United Nations Statistics Division – National Accounts. (2014) GDP and Its Breakdown at Current Prices in US Dollars. [Online] Available from: <http://bit.ly/1MowBKr>

<sup>5</sup> BP. (2014) *BP Statistical Review of World Energy 2014*, p. 40.

THE ROLE OF RENEWABLES IN MEETING PRIMARY ENERGY DEMAND IN THE NEXT 25 YEARS



Source: International Energy Agency World Energy Outlook 2014, New Policies Scenario

\*Million Tonnes of Oil Equivalent

In future decades, the development of other countries, coupled with population growth, could increase energy demand equivalent to two or three times that of China. Growing automobile use in developing countries is expected to double the world's light-duty passenger car fleet by 2040. Plug-in electric vehicles and fuel economy improvements should save millions of barrels of fuel per day. However, oil and gas, which supply more than 90% of today's transportation energy<sup>6</sup>, are expected to be the dominant transport fuels for many years. The trends are similar for heavy goods transport, aviation and marine navigation.

As the world's economies develop, so will their non-fuel consumption of oil and natural gas. Lubricants, plastics and a vast range of advanced materials cannot be manufactured with today's technologies at the scale or cost required without oil and gas. Nitrogen fertilizers used for high-yield agriculture are based on chemical feedstock derived mainly from natural gas and other fossil fuels. Energy consultancy IHS has estimated that in 2010, hydrocarbon inputs to the global petrochemical industry were equivalent to eight million barrels per day, or 5-7% of global fossil fuel use<sup>7</sup>. That is six times the scale of today's global biofuels industry.

**ALL ENERGY SOURCES WILL BE NEEDED TO MEET THE WORLD'S GROWING DEMAND**

Under its central projection *New Policies Scenario*, the International Energy Agency (IEA) expects low-carbon energy production – consisting of hydropower, nuclear, bioenergy and other renewables – to grow by 90% between 2012 and 2040, rising from supplying 18% to over a quarter of global energy needs.

Up to a third of global electricity by 2040 may be generated from renewable sources, including wind, solar power and advanced biofuels, which are all essential for meeting growing demand while managing greenhouse gas (GHG) emissions. There is also an important role for energy efficiency – improvements in production and end-use efficiency are projected to account for an almost 15% reduction in energy demand in 2040.

Nevertheless, IEA's *New Policies Scenario* projects that oil and gas will remain the majority source of energy supply, meeting growing demand in the developing world and with gas partnering with renewables for power generation. Combined oil and natural gas demand is projected to grow globally by 30% from 2012 to 2040.

**Access to affordable, reliable energy is essential to the growth of strong economies, sustained improvements in the quality of life and the eradication of poverty. To ensure these benefits for today's and future generations alike, GHG reduction and climate change adaptation objectives must balance the need for development, economic growth, environmental protection and energy security. Oil and gas have a continuing role to play in a future of increasingly diverse energy sources, steadily improving energy efficiency and new technologies to minimize emissions.**

Footnotes

<sup>6</sup> International Energy Agency (2014) *Key World Energy Statistics*, p.35-37.

<sup>7</sup> IHS (2011) CEH: Petrochemical Industry Overview. [Online] Available at: <http://bit.ly/1EVcj1N>

.....  
IPIECA is the global oil and gas industry association for environmental and social issues. It develops, shares and promotes good practices and knowledge to help the industry improve its environmental and social performance.