Coal in the global energy mix

Current role and future perspectives

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Contents

1. The World Coal Association
2. Coal’s role in the global energy mix
3. Key demand drivers and forecasts
4. Reconciling with sustainable development objectives
World Coal Association

WCA provides the global voice for coal

“The World Coal Association will play a leading role in the debate about how we can meet the world’s future energy demands, combat energy poverty and contribute to global efforts to reduce emissions of CO₂. By working together as an industry, we can provide a strong voice for coal as an essential part of the global Energy mix and demonstrate leadership in minimising environmental impacts”.

Harry Kenyon-Slaney, Chairman, World Coal Association, Chief Executive, Rio Tinto Energy

WCA Corporate Members represent:

- 25% of global hard coal production
- 35% of global coal exports
- 7 out of 10 largest coal producers in the world

PT Adaro Indonesia
Alpha Natural Resources
Anglo American
Arch Coal
BHP Billiton Energy Coal SA
Bowie Resources
Caterpillar Global Mining
China Coal
GE Mining
Glencore
Joy Global
Karakan Invest
Mitsubishi Development
Orica Limited
Peabody Energy
Rio Tinto Limited
Shenhua Group
LLC Vostsibugol
Whitehaven Coal
XCoal

- Assocarboni (Italy)
- Associacao Brasileira do Carvao Mineral
- Association of UK Coal Importers
- Camara Asomineros
- Coal Association of Canada
- Coal Association of New Zealand
- German Hard Coal Association
- Indonesian Coal Mining Association
- Iranian Mines and Mining Industries
- Japan Coal Energy Center
- Minerals Council of Australia
- National Mining Association (USA)
- Shaanxi Coal Industry Bureau
- Svenska Kolinstituten
- UK Association of British Mining Companies
- EURACOAL
- Global CCS Institute
- UCG Association
- VGB PowerTech
Coal’s role in the global energy mix
Coal is widely available and abundant...

- Today coal is found in 70 countries and actively mined in 50
- At current rates of consumption, the IEA forecasts that coal will last 142 years, compared to 61 years for gas and only 54 years for oil.

**Location of the world’s main fossil fuel reserves (billion tonnes of oil equivalent)**

Source: World Coal Association 2013
...and it is also cost competitive in comparison to other energy fuels and technologies.

Costs of generating electricity from various energy fuels and technologies (data for China and India)

- For many countries, including the emerging economies in Asia, coal is the most abundant and the most affordable energy fuel.

- In China and India, electricity from coal comes at a cost which is roughly 50% of the cost of electricity produced by wind turbines or from natural gas.

The 21st century energy supply has been substantially built on coal.

Between 2000 and 2010 coal accounted for nearly half of the increase in global energy use, with the bulk of the growth coming from the power sector in emerging economies.

Today coal provides

- 30% of world primary energy
- 41% of world electricity
- 70% of world steel

**Incremental world primary energy demand by fuel, 2000 - 2010**

Coal provides for basic energy needs of modern economies.

- Coal is an essential raw material for steel production and the key energy fuel used in the production of cement, aluminium, glass and in other highly energy intensive industry sectors which are key to building modern economies and urban infrastructure.

- As an indispensable ingredient for building modern infrastructure coal is therefore a critical enabler for economic development.

Source: World Coal Association 2013
Coal is the backbone of electricity generation.

- Coal is the backbone of electricity generation worldwide.

- It is a key energy fuel for electricity generation in a number of developed countries including USA, Germany, Australia, United Kingdom and Japan.

- It is also the preferred source of energy for a growing number of developing countries, such as China, India, Indonesia and South Africa.

Source: World Coal Association 2013
Key demand drivers and forecasts
20% of the world population has no access to modern energy services.

- 1.3 billion people in the world who live without access to electricity
- 2.6 billion who rely on traditional fuels for cooking.

People without access to modern energy services by region

Coal is a key energy resource in the on-going global fight to address energy poverty.

- As the world’s most abundant and affordable energy fuel, coal has a role to play in delivering universal energy access.
- China provides an excellent example of an electrification strategy based on coal, with a 400% increase in China’s coal consumption and 660 million people lifted out of poverty since 1980s.

Additional on-grid electricity generation (Energy for All Case compared with the New Policies Scenario, 2030).

As the world population grows, coal will continue playing an essential role in global energy supply.

- World population is set to rise from 7 billion in 2011 to 8.7 billion in 2035.
- The IEA forecasts that by 2035 global primary energy demand will grow by 33% to 43%, driven mainly by population growth.
- As a result of higher energy demand coal consumption is set to increase by up to 44% over the next two decades.

Source: UN Population Division, IEA, World Energy Outlook 2013
IEA estimates coal demand will increase by up to 50% by 2035…

- Coal will remain a key energy fuel in the global energy mix in the foreseeable future.

- Today there are 1,199 coal plants proposed globally: 455 in India alone and another 363 in China.

- Under the Current Policies Scenario global coal consumption will increase by almost 50% through to 2035.

- Even under the IEA’s New Policies Scenario coal consumption in 2035 is 17% higher than today.
...driven by developing economies, such as India

- According to the IEA, India will become the second-largest coal user in the next decade, surpassing the USA.
- India is also set to overtake Japan and the European Union within a few years and China in the next decade to become the world’s largest coal importer.

**IEA estimates of coal demand by region (New Policies Scenario)**

Source: World Energy Outlook 2013
...and Southeast Asia

- Energy demand in Southeast Asia will increase by over 80% through to 2035.
- Coal demand is expected to triple, accounting for nearly 30% of global growth in coal demand.

Source: World Energy Outlook 2013
Reconciling with sustainable development objectives
The need to reconcile coal use and sustainable development objectives is recognised.

“Any serious effort to protect our kids from the worst effects of climate change must also include developing, demonstrating and deploying the technologies to use our abundant fossil fuel resources as cleanly as possible.”

- Ernest Moniz, US Secretary of Energy, 29 July 2013
Clean coal technologies have addressed SOx, NOx and particulate emissions in the past..

- Clean coal technologies, such as electrostatic precipitators, fabric filters, selective catalytic reduction systems, wet and dry scrubbers, sorbents and activated carbon injection can reduce the emissions of pollutants from coal combustion by 90% to 99.9%.

- In the USA the emissions of NOx, SOx and PM were reduced by 82 to 96% since 1970, while coal consumption increased by 146%
Efficiency improvements can significantly contribute to CO2 emission reductions...

- The most important near-term action to reduce CO2 emissions is to increase the efficiency of coal-fired power plants.

- 1% increase LHV efficiency = 2–3% points decrease in CO2 emissions.

- Moving the current average global efficiency rate of coal-fired power plants from 33 to 40% by deploying more advanced technology could cut 2 gigatonnes of CO2 emissions (equivalent of India’s annual CO2 emissions...)

Source: VGB PowerTech 2013
...followed by adoption of Carbon Capture and Storage

- In the longer term CCS technology can reduce GHG emissions from coal-fired power plants by up to 90%.

- CCS is expected to deliver 14% of cumulative GHG emissions cuts through to 2050. It is therefore a key low-carbon technology.

- The world’s first large scale integrated CCS project capturing CO2 from a coal-fired power plant – Sask Power’s Boundary Dam – has just started full scale operation at the end of September 2014.

**Contributions of different technologies to annual emissions reductions**

Source: IEA Energy Technology Perspectives 2014
The industry is investing in clean coal technologies

- COAL21 – established in 2006 to raise AU$1 billion over 10 years from a voluntary levy on coal production to support the pre-commercial demonstration of low emissions coal technologies, including carbon capture and storage.

- FutureGen - first-of-its-kind, near-zero emissions coal-fuelled power plant. In cooperation with the US Department of Energy, the FutureGen 2.0 project partners (Peabody Energy, Anglo American, Alpha Natural Resources, Joy Global and Glencore) will upgrade a power plant in Meredosia, Illinois with oxy-combustion technology to capture 1.1 million tons of CO2 each year - more than 90% of the plant’s carbon emissions.
PACE – Platform for Accelerating Coal Efficiency

- Last year during UNFCCC COP19 negotiations WCA launched the Warsaw Communiqué together with the Government of Poland. The Communiqué called for increased international action on the deployment of high-efficiency low-emissions (HELE) coal-fired power generation.

- Building on the Warsaw Communiqué, the World Coal Association proposes a Platform for Accelerating Coal Efficiency – as a coordinated action to support developing and emerging economies already choosing to use coal to do so with the lowest possible emission profile.
A life lived without energy, is a life lived in poverty.

Coal. Fuelling the future.

Coal has been, is, and will be the backbone of modern electricity and is the bedrock on which the modern world is built. According to the International Energy Agency, it is the fastest growing fuel – and has been for the last 20 years.

Coal plays a significant global role in sustainable development. It has already lifted hundreds of millions out of energy poverty. But there are still 1.3 billion people living without access to electricity. Coal will play a key role in providing more than half of the ‘on-grid’ electricity to deliver energy access for all.

www.worldcoal.org
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