CAN COAL CONTRIBUTE TO SUSTAINABLE DEVELOPMENT?

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The World Needs Energy

Energy demand

Million tonnes oil equivalent (Mtoe)

World
OECD
Developing countries

Source: IEA, 2019

1971  2000  2010  2020  2030
The strong gains of recent years mean that global coal consumption has risen by an average 1.7% per annum over the last 10 years. The fastest growth has been in Asia Pacific (3.7% p.a.). 2003 was the first year on record that North America consumed more coal than it produced.
Economic Development
Coal Contributes to Economic Development

Coal drives much of global economic development

- Main fuel for electricity generation in US, Germany, China, India, South Africa, Australia, much of Central Europe etc

- 23% of world’s primary energy; 39% of electricity; 70% of steel

- Demand continues to grow steadily - projected to be up 50% in 25 years
Social Development
Access to electricity

China
- 700 million in 2 decades
- 98% electrification
- 84% coal

South Africa
- Doubled electrification rate in a decade
- 90% coal
Environmental Improvement
Environmental improvement through Technology

- Deploy best practice
- Develop and implement advanced technology
- Enhance synergies with renewables
- Ultra low emissions future
Where are we now?

- SOx, NOx and Particulates - achieved / achievable
- Increasing thermal efficiency: ongoing
- Elimination of CO₂ emissions: the challenge
Best practice means lower emissions

- Thermal efficiency up eightfold last century

- US - $\text{SO}_x$ and $\text{NO}_x$ down 60%; coal up 70% since 1980

- Germany - $\text{NO}_x$ and particulates down 80%
Power Generation –
Benefits of efficiency

- World average - c 30%
- European average - c 36%
- BAT - c 43% (15%+ CO₂ reduction)
- 2010 - c 50% (25%+ CO₂ reduction)
Clean coal technology (CCT)
The pathway to near-zero emissions

- CO₂ Capture – e.g. chemical scrubbing
- ‘Zero Emissions’ Trajectory
- ‘Increased Efficiency’ Trajectory
- e.g. IGCC (45%) to IGCC (+55%) & H₂ production

Near-term | Mid-term | Long-term
Geological Storage Options
FutureGen

- $1bn public/private venture
- 275MW plant: operating before 2010
- 90%+ CO₂ sequestered

Goals: by 2020

- electricity at less than 10% cost premium
- hydrogen at $4.00/mmbtu (c 30p gallon)
Synergy with Renewables

- **Renewables weaknesses**: inflexibility, intermittency, unpredictability

- **Coal strengths**: flexibility, easy to store, transport and supply

Examples:
- Dual Fuel plant at Belle Vue, Mauritius enables bagasse (by-product of sugar production) to be used effectively
- Co-firing of biomass & coal in the UK
- Integration of coal and solar thermal
Conclusions

- Coal is needed for sustainable development
- Coal is compatible with sustainable development
- The coal industry can deliver sustainable development