GLOBAL OUTLOOK: KEY FINDINGS FROM RECENTLY-LAUNCHED HELE COAL ROADMAP

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Cleaner and more efficient coal technologies in Russia: Experts meeting 10 December 2012
Technology roadmaps status

2009

2010

2011

2012

2012 / 2013

- HELE Coal (for power)
- Chemical catalysis
- Hydropower
- Energy efficient building envelopes
Fossil fuels dominate energy demand

Efficiency improvement reduces specific fuel consumption and also reduces specific pollutant emissions.
Non-fossil power generation

Share of non-fossil generation has failed to keep pace with the growth in generation from fossil fuels, particularly coal.
Coal is abundant and widely available

Sufficient coal reserves exist for an 150 years of generation at current consumption rates.
What are HELE technologies?

HELE

- *Efficiency improvement*
- Reduce non-GHG emissions

CCS

- Reduce CO₂ emissions

Efficiency improvement reduces specific fuel consumption and also reduces specific pollutant emissions.
The size of the challenge is clear

Near-term projections are not consistent with a low-carbon scenario
Age distribution of existing power plants

Ageing infrastructure is the challenge in many OECD countries. Emerging economies have a growing demand for electricity.
Improve efficiency, then deploy CCS

Three processes essential to achieve a low-carbon scenario

- Decrease generation from subcritical plants
- Increase generation from high-efficiency technology (SC or better)
- Install CCS* on plants over supercritical

*CCS (Post-combustion, Oxyfuel, Pre-combustion CO₂ capture)

* CCS fitted to SC (or better) units.
Technology improvement coupled with targeted policy and regulation are essential to realise the 2DS target in 2050.
Best practice technology to be adopted

Potential for capacity growth in coal-fired power generation is seen mostly in non-OECD countries such as China and India.
Advanced technology is essential

Ultra-supercritical plants are currently operating in various countries, particularly in China.
The challenge of advanced USC

Nickel-based super-alloys will enable plant components to withstand temperatures of 700°C and beyond.
Moisture reduction important

Advanced lignite pre-drying in pulverised coal combustion

The steam cycle is optimised for maximum efficiency.
Impact of efficiency improvement on CO$_2$ abatement

Raising efficiency significantly reduces the CO$_2$/kWh emitted.
The majority of CO$_2$ is captured from power generation globally, but in some regions CO$_2$ captured from industrial applications dominates.
Recommended actions for the near term

- By 2020, CO₂ emissions from coal-fired power generation must already have peaked to be consistent with the 2DS.
- Greater efficiencies must be achieved in the power generation sector.
  - Deploying supercritical and ultra-supercritical technologies, both available now, will be important.
  - Even higher efficiencies will be achieved as A-USC and more advanced IGCC become available.
- Power generation from low-grade coals, such as lignite, can be much more efficient.
- CCS must be developed and demonstrated rapidly if it is to be deployed at a scale sufficient to achieve the 2DS.
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