

The European Commission's science and knowledge service

Joint Research Centre



Overview of advanced coal technology solutions and state of play

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European landscape

- Coal represents approximately 80% of EU reserves of fossil fuels
- EU-28 coal consumption decreased by $\sim 50\%$ from 1990
- Further decline in production and consumption of coal in the EU is expected
- EU Reference Scenario 2016 expects 60% drop in production by 2050 and 70% drop in consumption
- Member states and regions will need to face the challenge of transitioning

Advanced coal technologies - Areas

- Power Generation
- Emission Reduction Technologies
- Industry
- Heating and Cooling

Advanced coal technologies

Power Generation – key technologies

- Combustion in ultra-supercritical (USCPC) steam cycles
- Integrated gasification combined cycle (IGCC) technology
- Fluidised bed combustion

Advanced coal technologies – Power generation

USC

- ✓ 17% of current EU coal plant fleet*
- ✓ Germany held the 2016 world record for a power plant efficiency

IGCC

- ✓ Very few IGCC plants throughout the world
- ✓ None in the regions of interest

Fluidised bed

- ✓ Operating and under construction in upper Silesia

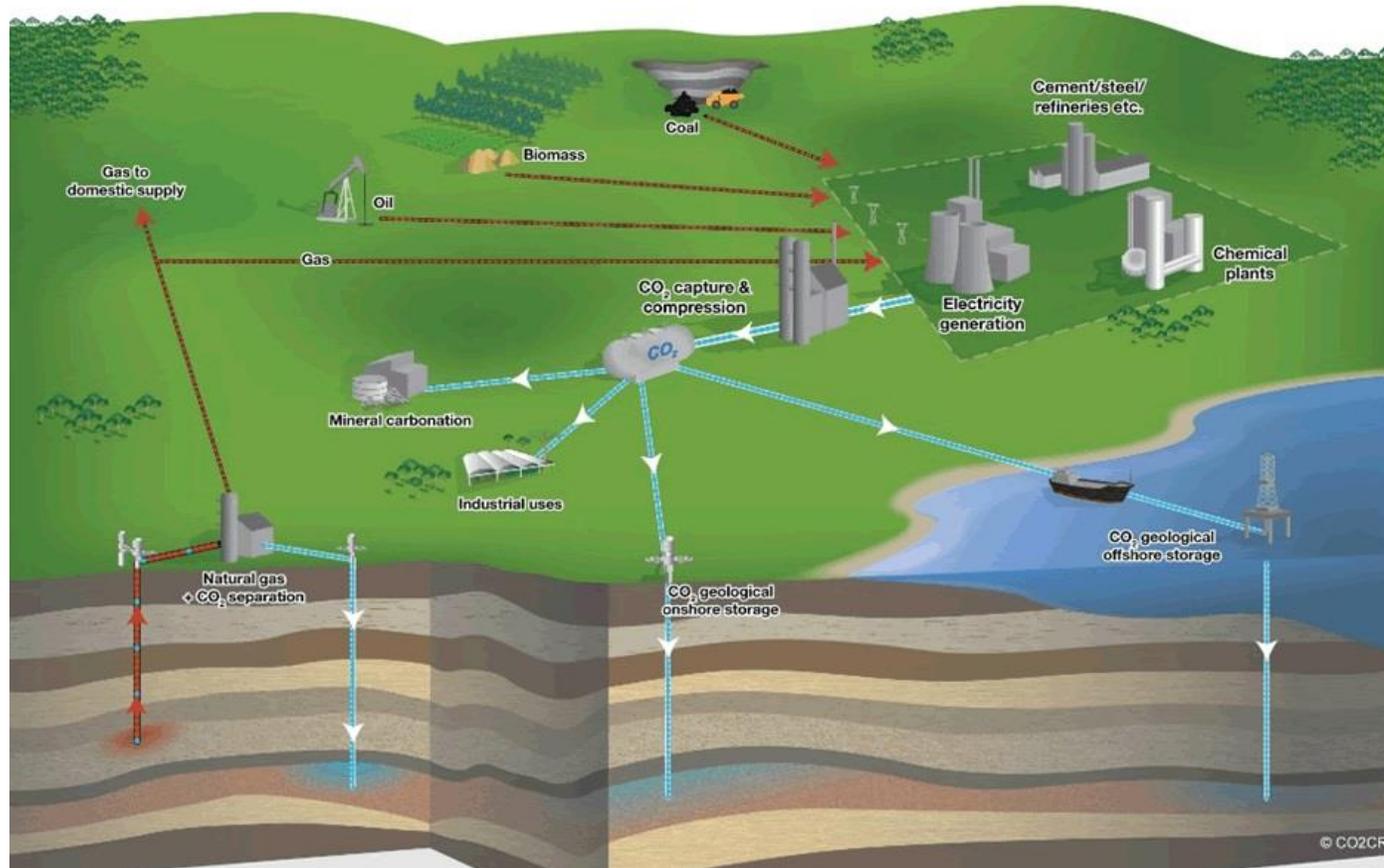
*Source: IEA, 2016

Advanced coal technologies

Emission Reduction Technologies

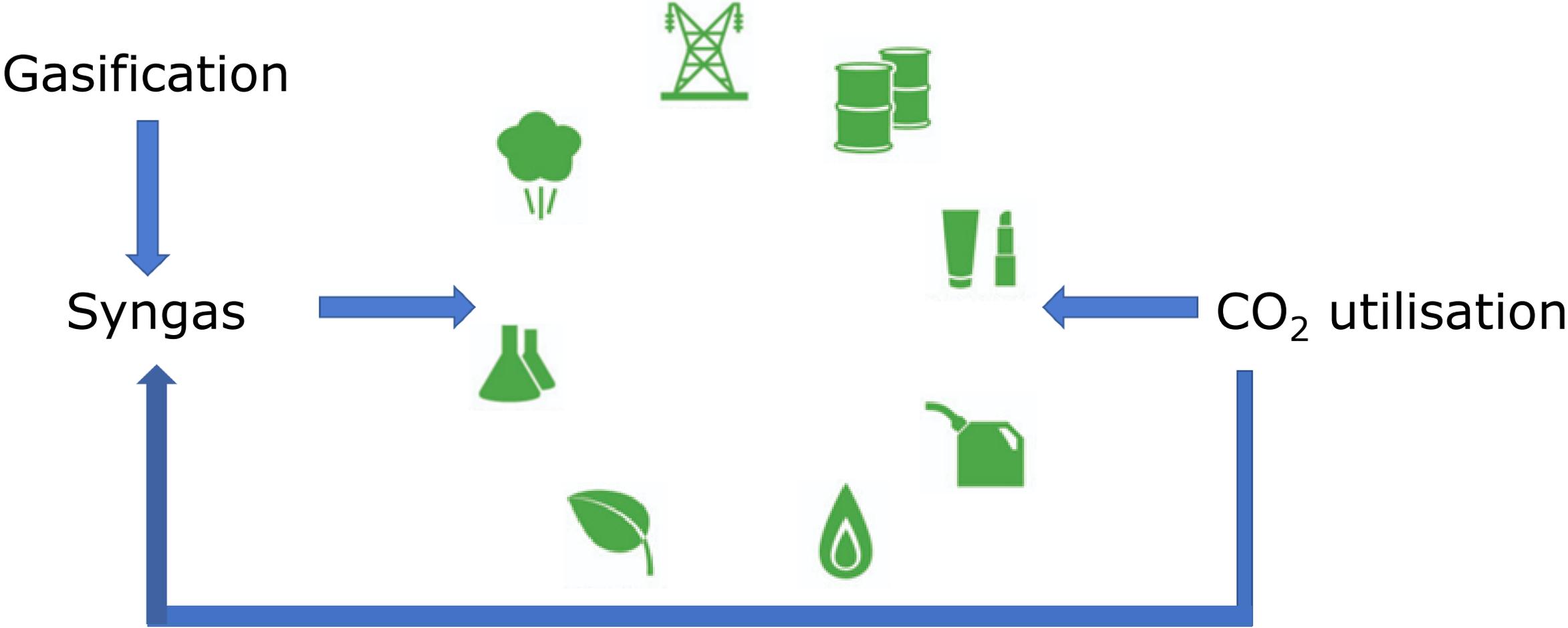
- Low Nitrogen Oxide (NOx) Burners
- Electrostatic Precipitators
- Flue Gas Desulfurization (FGD)
- Selective Catalytic Reduction (SCR)
- Carbon Capture, Utilisation and Storage (CCS/U)

Advanced coal technologies – CCS/U



Approximations apply, not in scale
Source: CO2CRC, 2017

Advanced coal technologies – Industry



Advanced coal technologies - Industry

Some European examples

... in Saxony, Germany:

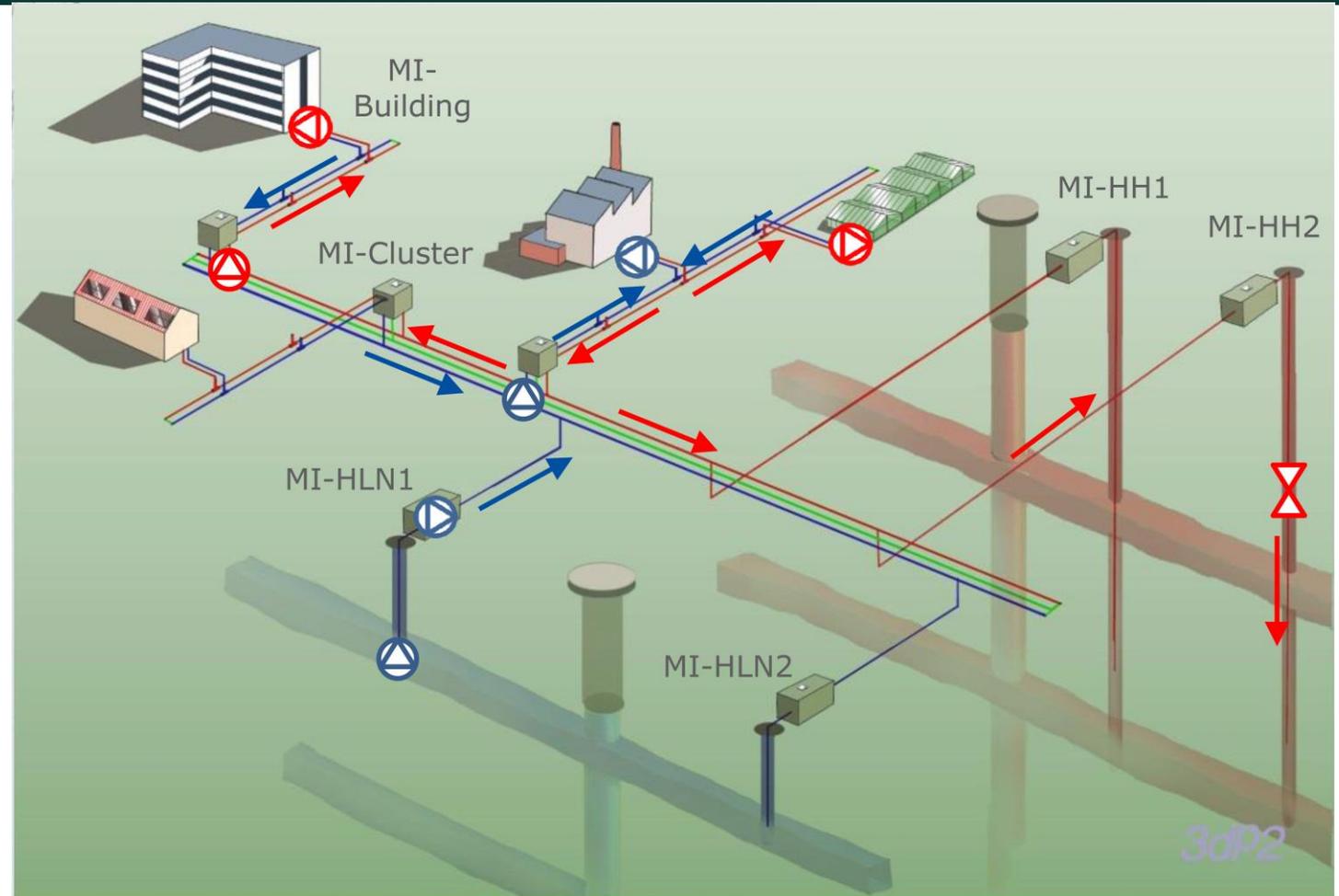
- CO₂ methanation
- CO₂ to fuels

... in Wallonia, Belgium:

- CO₂ carbonation

Advanced coal technologies – Heating and Cooling

(Another) European example



Source: Verhoeven et al., 2014

Advanced coal technologies – Summary

- A "basket" of advanced coal technology options exist
- National and regional specificities will be determining for selecting options
- Quick fixes may be possible (efficiency upgrades)
- Low hanging fruit depends on specific strategies



Any questions?

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