Energy Technology Perspectives for the Global Cement Industry

<u>EBRD side-event</u>: Material Impact of Low Carbon Pathways, Deep Decarbonisation Technologies and Policy Dialogue

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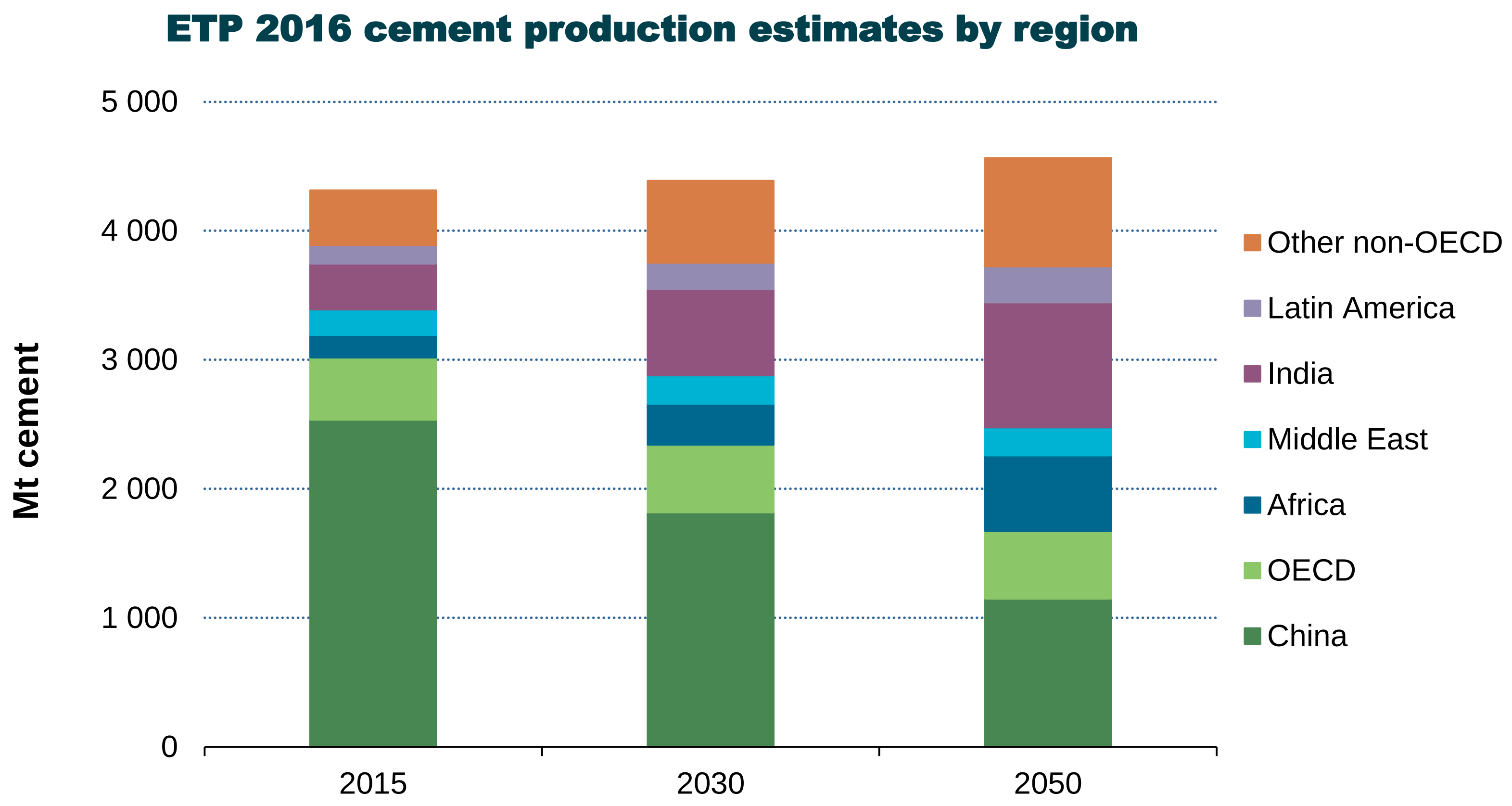
As production expands in emerging and developing economies…



While global cement demand flattens, production capacity shifts to India, Africa, and other non-OECD economies

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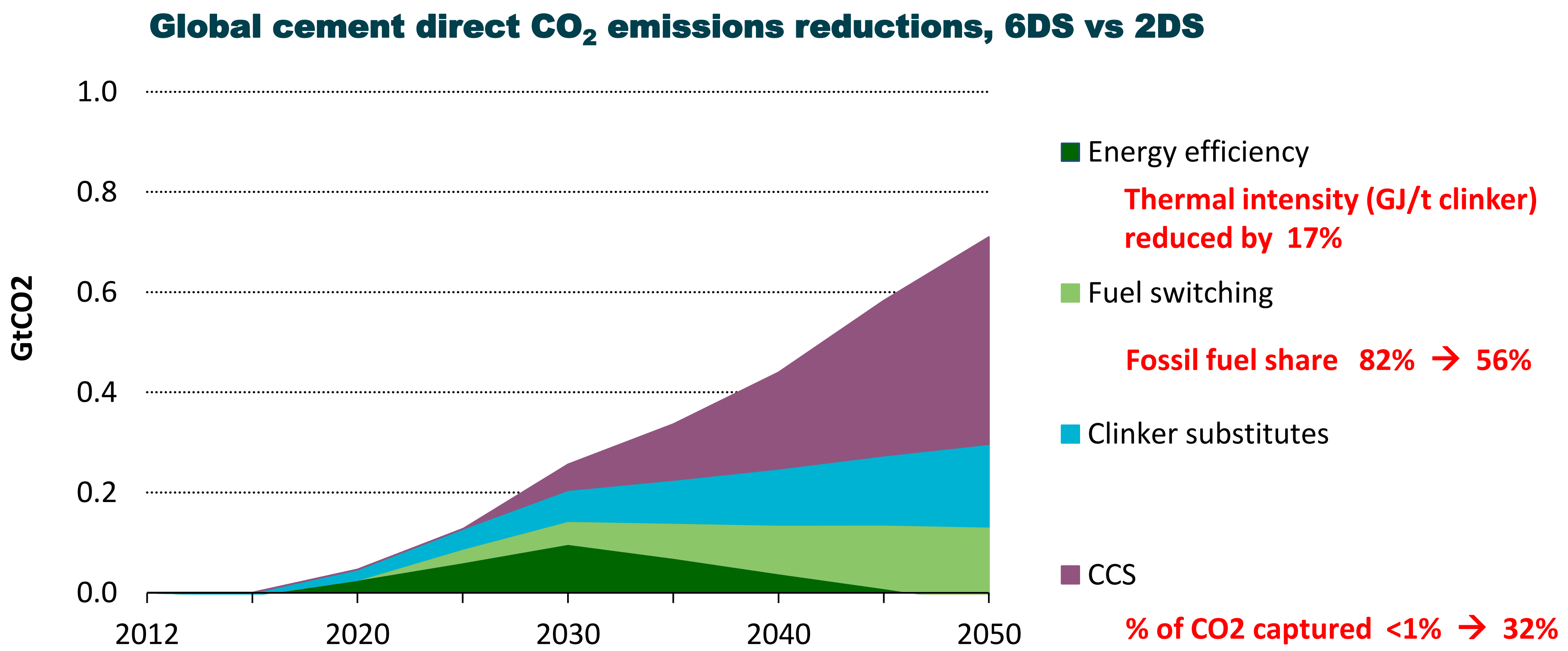
… adoption of BATs and innovative processes can achieve the 2DS …



The 2DS requires a mix of technologies, and significant decoupling of CO2 emissions from energy use

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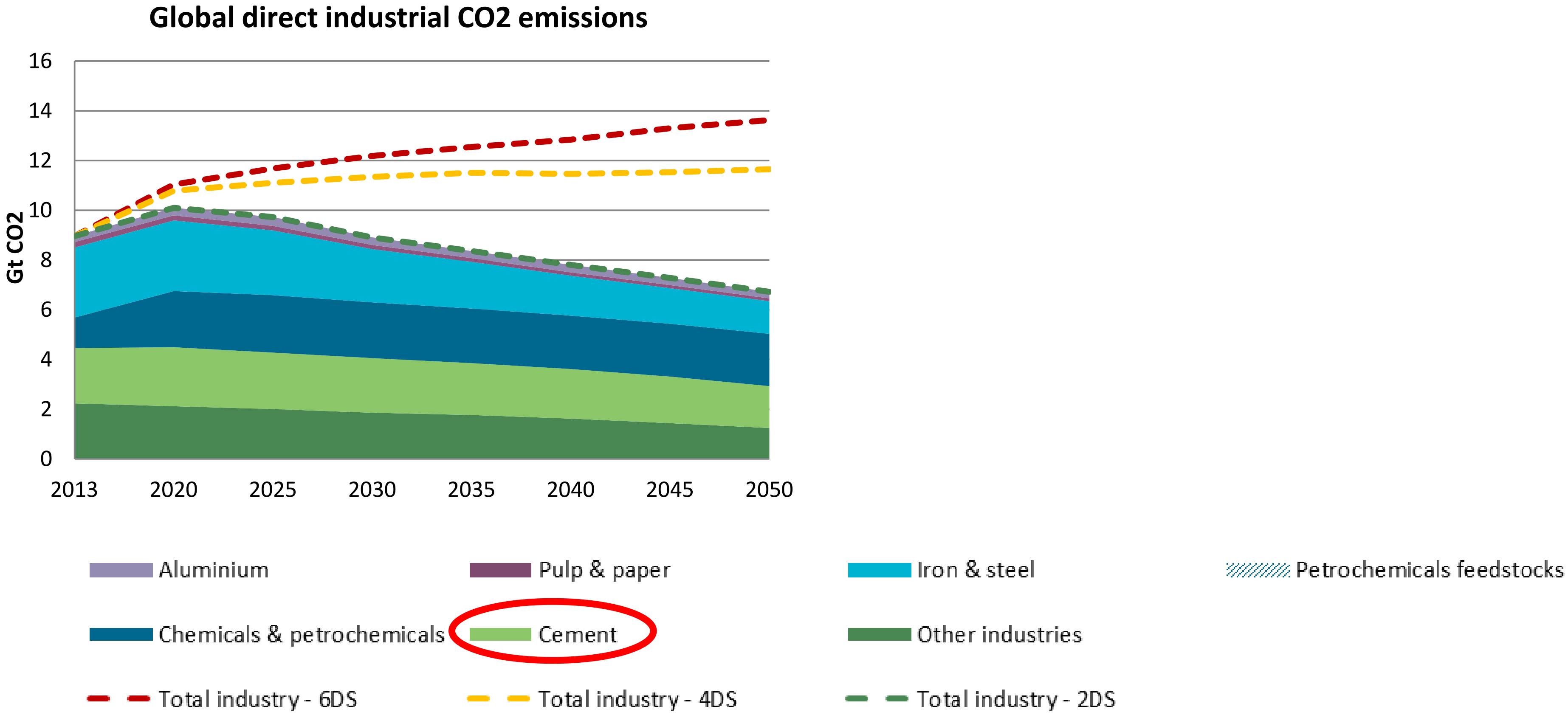
... but further decarbonisation is needed for a well-below 2DS pathway.



Decarbonizing energy-intensive industries is critical, requiring accelerated technology and policy innovation

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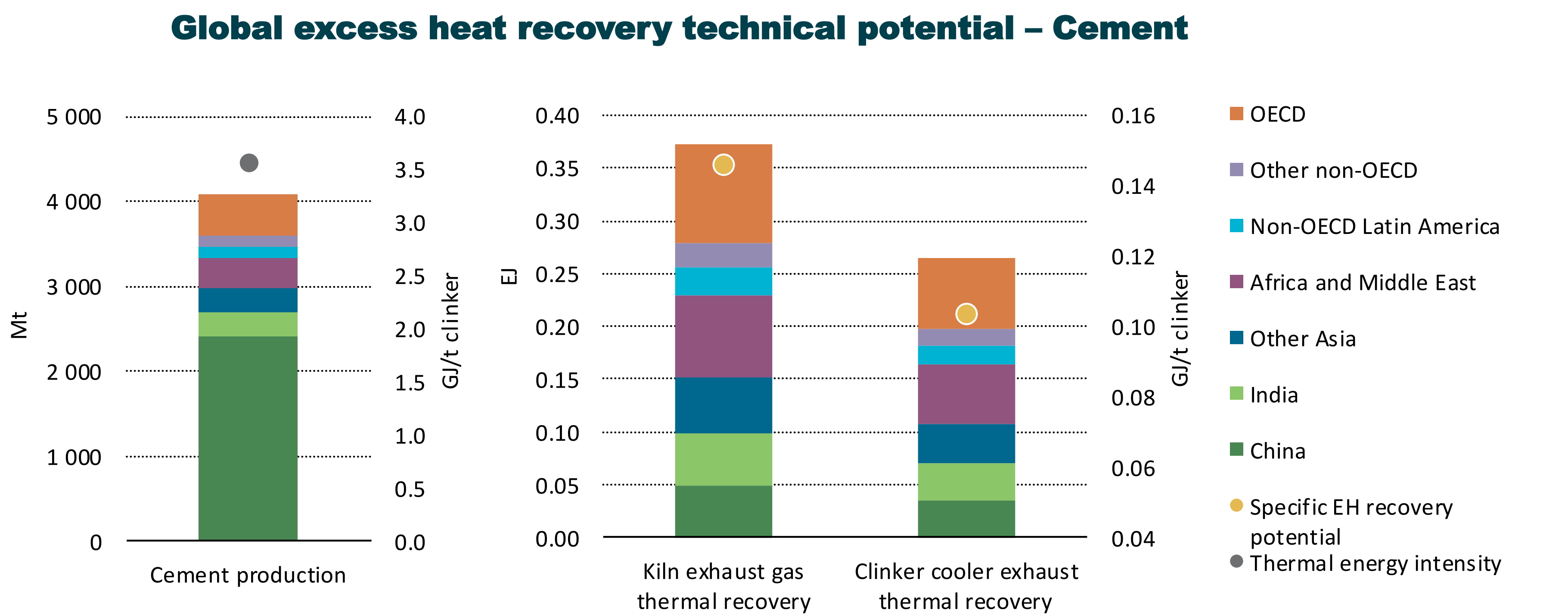
While expanding spatial boundaries can achieve greater energy savings …



NOTE: IEH technical assessment based on 2013 stock data. Specific energy savings in GJ/t cement refer to global dry- process-based clinker production. IEH estimates refer to a dry-process kiln with five-stages of pre-heater and pre-calciner and to raw materials with a moisture content of 2-6% (low-range).

Globally, 6% of the final energy use in cement making could be technically recovered

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… more innovative low-carbon technology options are crucial …

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LOW-CARBON PROCESS INNOVATION

2015 | 2030 | 2050

PILOT PHASE

INTEGRATING CCS

- POST-COMBUSTION CO2 CAPTURE
- OXY-FUEL COMBUSTION FOR CO2 CAPTURE

LOW-CARBON PRODUCT INNOVATION

LOW-CARBON CEMENTS

- AETHER
- CALIX
- CELITEMENT
- …

Note: This slide is not intended to provide an exhaustive list. Sketch is not at scale and time milestones are just illustrative.

Low-carbon cement technology RD&D is promising, but progress must be accelerated

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… and greater investment and policy support is needed to accelerate progress.

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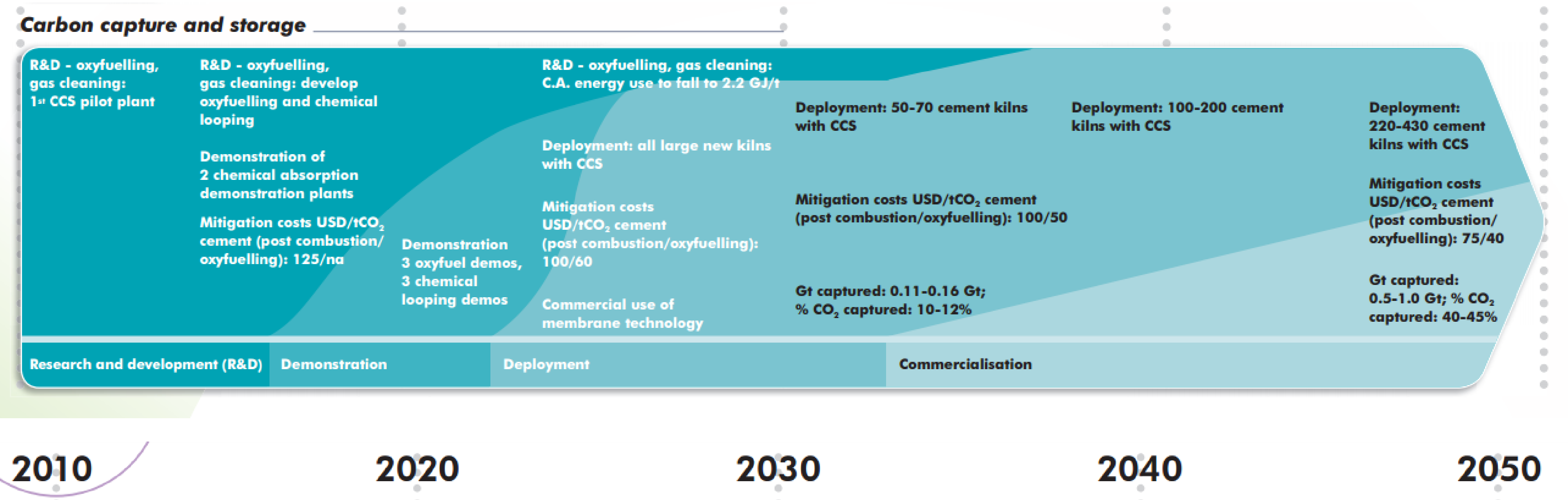
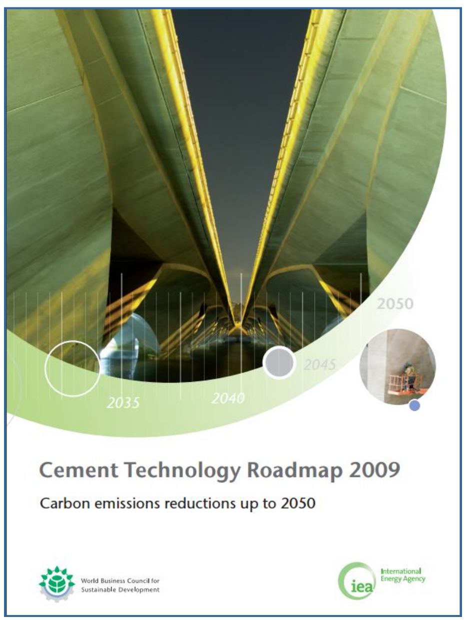
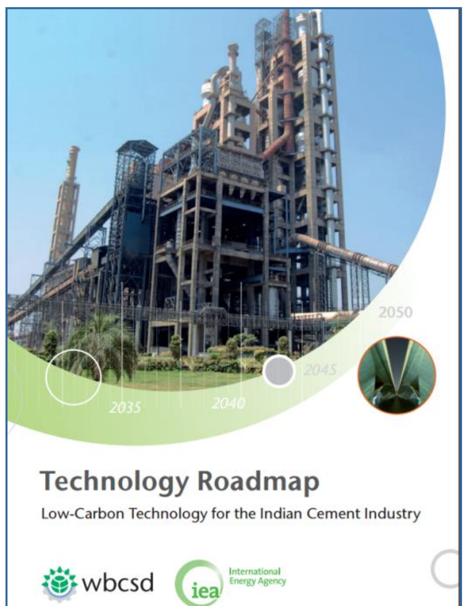


- **CCS is currently not on track to meet IEA Cement Technology Roadmap targets (2009)**
  - 3 oxy-fuel demos & 3 chemical looping demos by 2020
  - Scaling up of CCS and significant cost reductions in oxy-fuelling by 2030; widespread deployment by 2040
  - Further improvements in cost and deployment through 2050

IEA Roadmaps: action plans to accelerate industrial energy transitions

2009	2013	2015	2017
✓ Global Cement	✓ India Cement ✓ Chemical catalysis ✓ CCS	✓ Hydrogen	✓ Brazil Cement ✓ India Cement Update Tentative: • Global Cement Update • Iron and steel





- Goal to achieve
- Milestones to be met
- Gaps to be filled
- Actions to overcome gaps and barriers
- What and when things need to be achieved

Available at http://www.iea.org/roadmaps/

Priorities for the global cement industry

- **Achieving BAT performance is critical, while accelerating low-carbon innovations is essential**
  - BAT includes energy and resource efficiency (e.g., clinker ratios)
  - The pace of CCS deployment must increase
  - Low-carbon cements can be a major breakthrough
- **Biomass/waste fuels can reduce emissions, but supplies may be uncertain**
- **Expanding boundaries of influence can create new opportunities**
  - Waste heat recovery for local plants/buildings
  - Materials efficiency in end use product applications
- **Multiple aspects of strong policy support are needed:**
  - Long-term energy and climate policy signals
  - Increased support for technology RD&D
  - Low-carbon and energy efficiency labels and standards

The IEA works around the world to support an accelerated clean energy transition that is

enabled by real-world SOLUTIONS

supported by ANALYSIS

and built on DATA