



**CO₂ EMISSIONS FROM
ENERGY INTENSIVE INDUSTRIES**

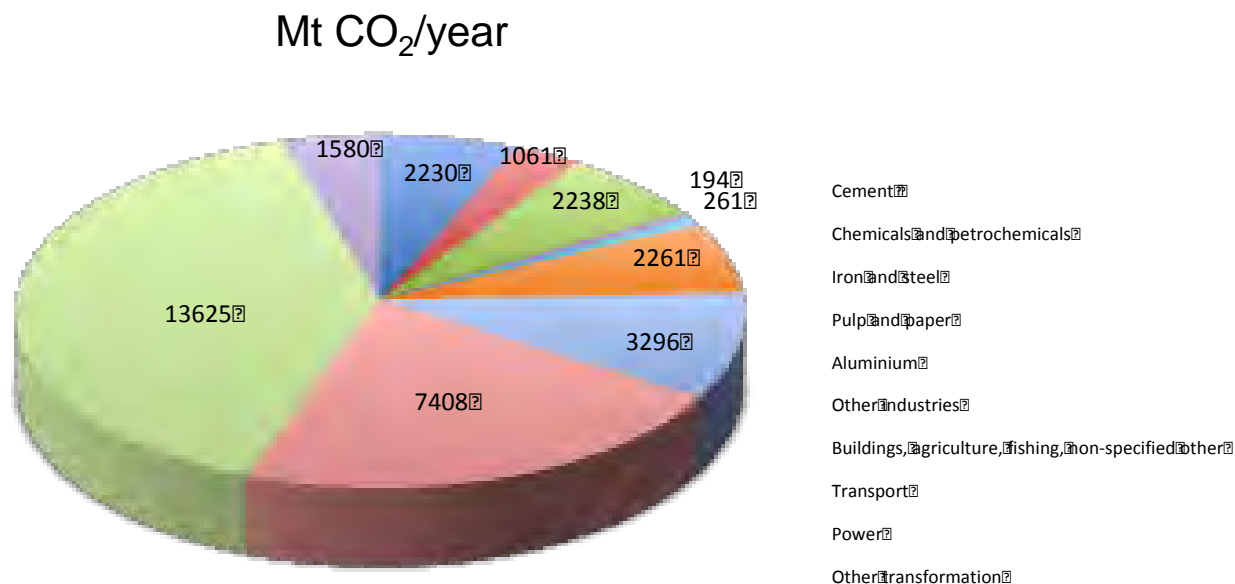
Lars Ingolf Eide
Research Council of Norway

Workshop on CCUS and Energy Intensive Industries (EII)
Paris November 7, 2019



Global CO₂ emissions by sector

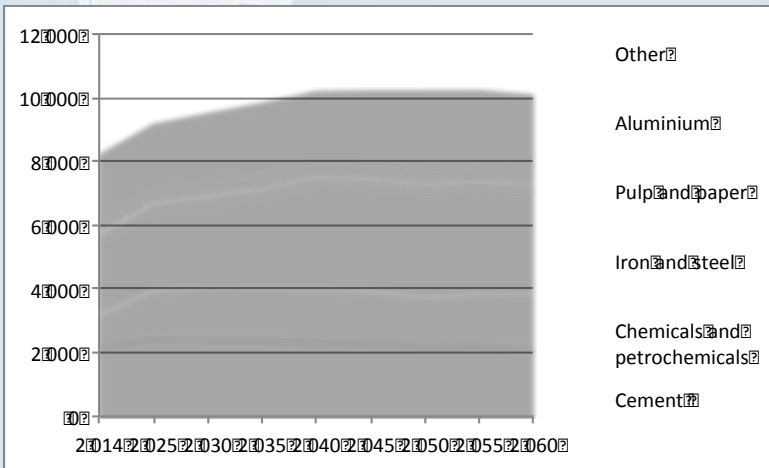
Industry direct emissions: 24 % of total global emissions (2014, IEA Technology Perspective 2017)



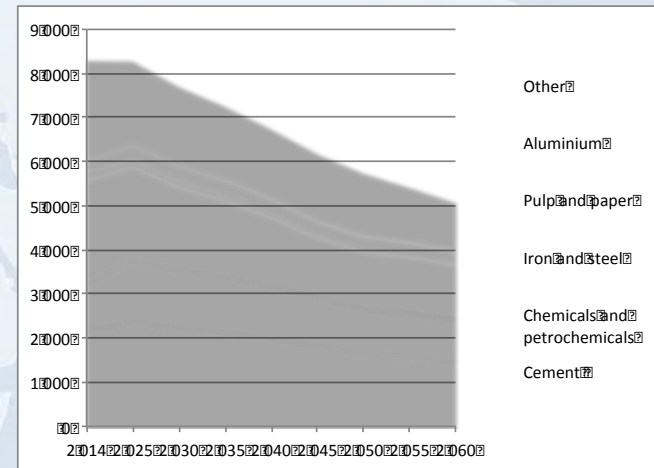
Industry: 40% of CO₂ emissions if indirect also included: 40% of total final energy consumption; >90% of industry direct GHG emissions CO₂



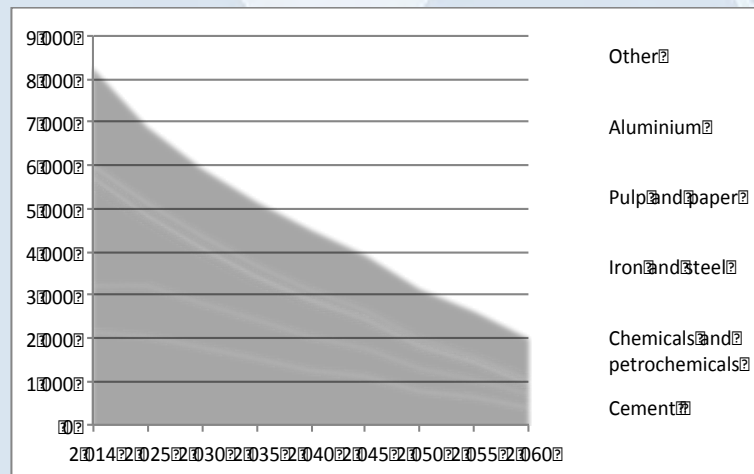
Industry direct CO₂ emissions (In Gt CO₂/year; IEA Technology Perspective 2017)



Reference Technology Scenario, RTS



2 Degree Scenario, 2DS



Beyond 2 Degree Scenario, B2DS

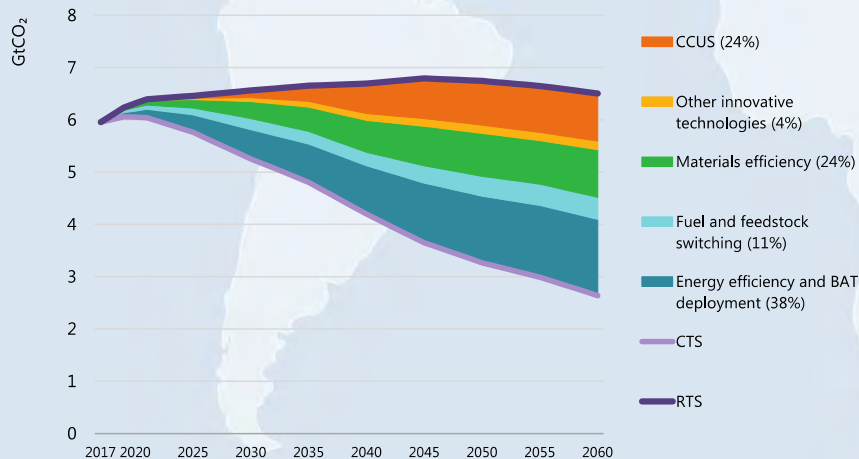
Carbon Sequestration Leadership Forum

www.cslforum.org



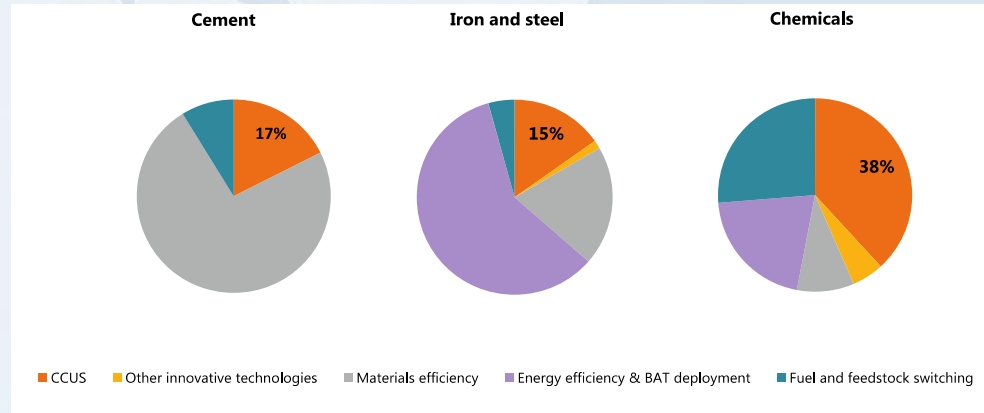
CCUS is the third-largest decarbonisation mechanism in the iron and steel subsector under the Clean Technology Scenario (CTS), accounting for 15% of accumulated emissions reductions, and the most important lever in chemical production

Figure 7. Emissions reductions for key industry subsectors (cement, iron and steel, chemicals) by mitigation strategy, CTS compared with RTS, 2017-60



Note: BAT = best available technology.
Source: IEA (2019). All rights reserved.

Figure 8. Global cumulative direct CO₂ emissions reductions in cement, iron and steel, and chemicals in the CTS, 2017-60

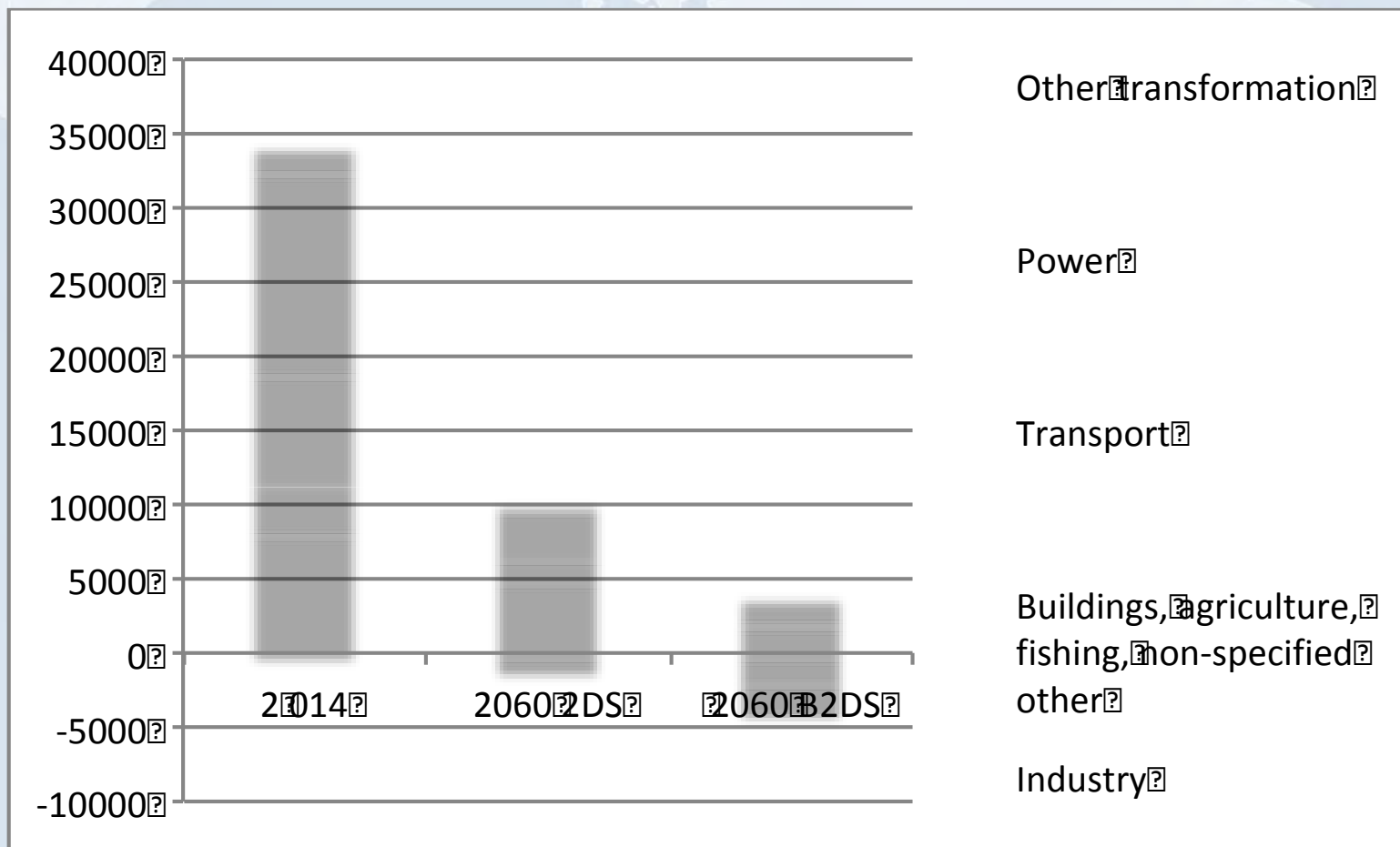


Notes: Materials efficiency includes opportunities that exist throughout value chains, such as designing for long life, lightweighting, reducing material losses during manufacturing and construction, lifetime extension, more intensive use, reuse and recycling, and in the case of cement, it notably includes reduction in the clinker-to-cement ratio; BAT = best available technology.
Source: IEA (2019). All rights reserved.

CCUS contributes 24% of the cumulative emissions reductions from the RTS to the CTS.

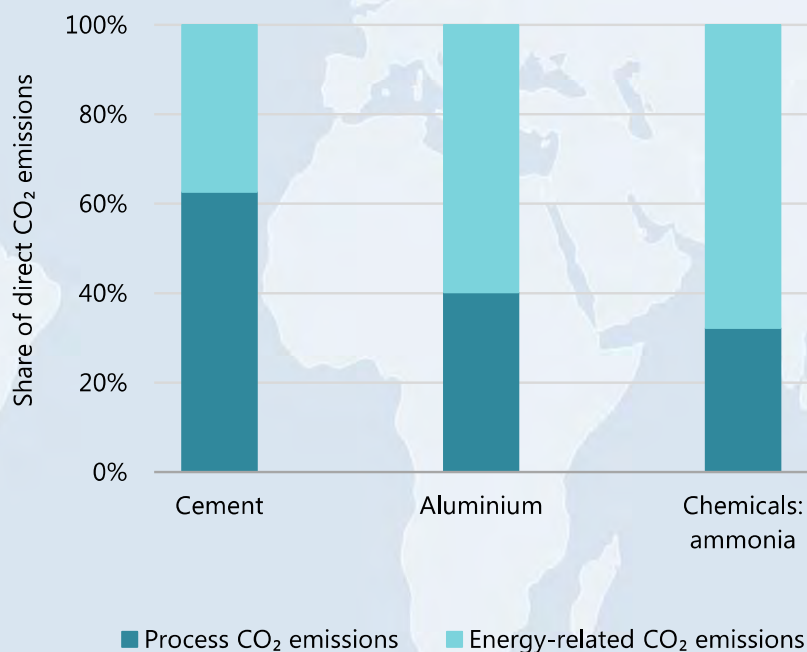


Even with CCUS industry may still be the largest emitter in 2060 in 2DS and B2DS





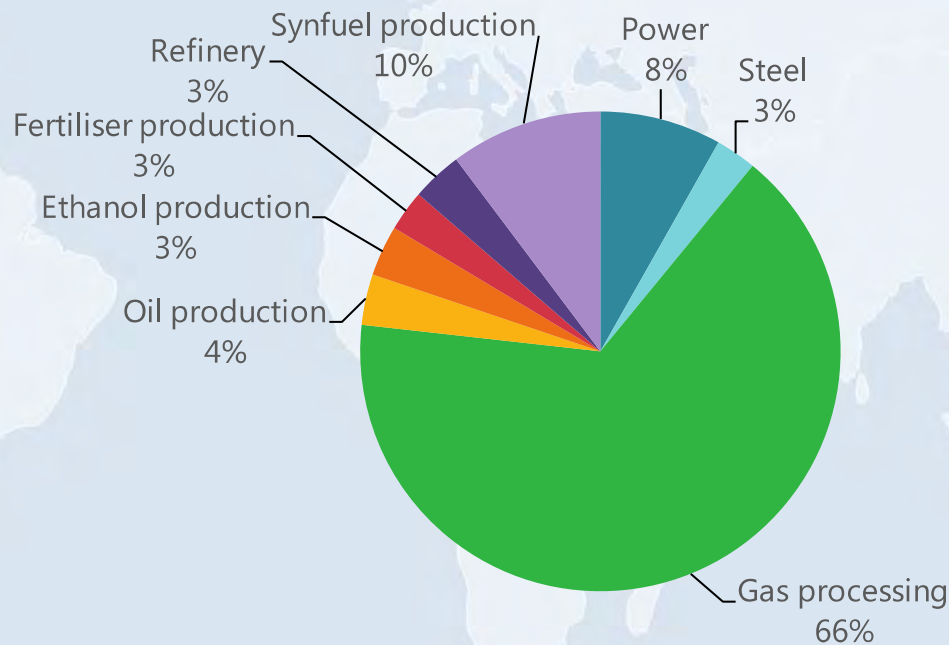
Industry emissions are among the most challenging to mitigate



Process emissions account for about two-thirds of cement and one-quarter of total industrial emissions.



CCUS is already happening in industry



Source: IEA (2019). All rights reserved.

CCUS deployment has so far been concentrated on low-cost opportunities such as gas processing

From: Transforming Industry through CCUS. IEA, 2019