



The importance of industrial emissions and carbon capture in the global climate challenge

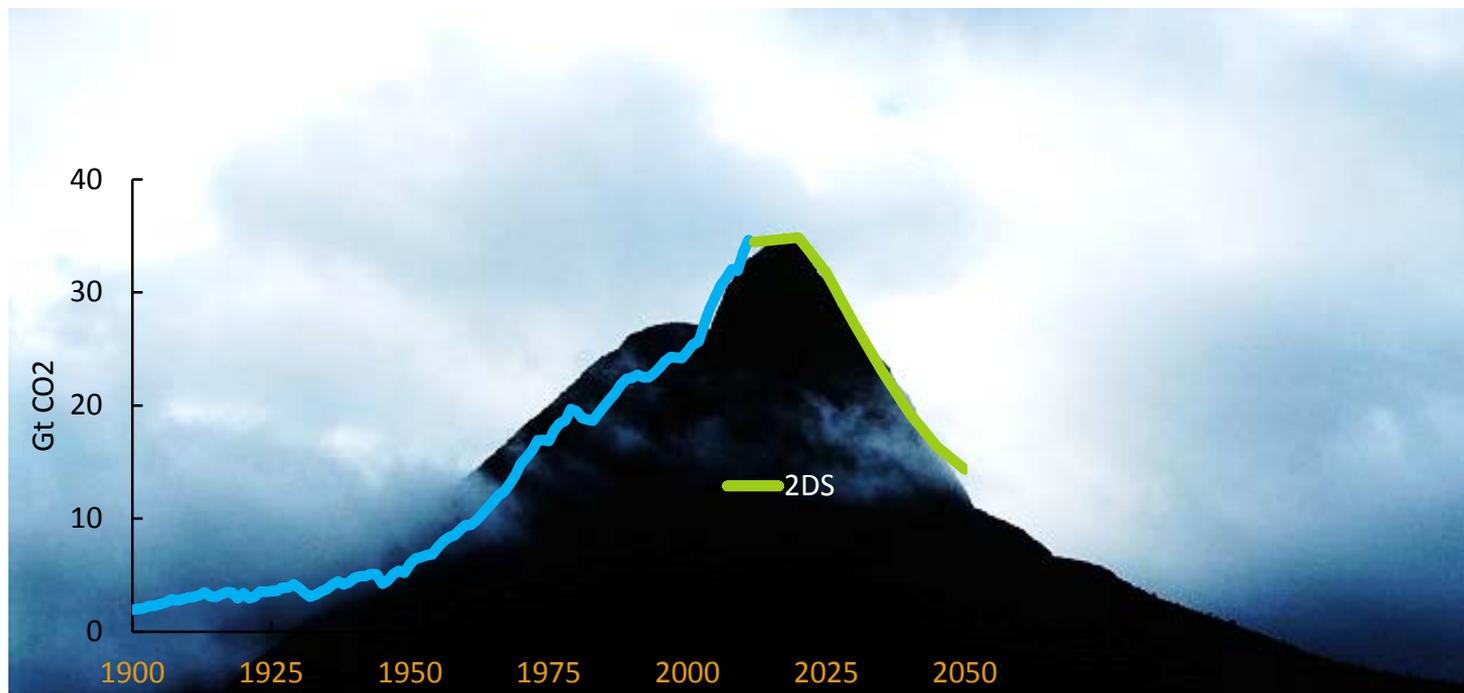
Liège, 7 February 2018

Simon Bennett, Economics and Investment Unit, International Energy Agency





Where do we need to go?



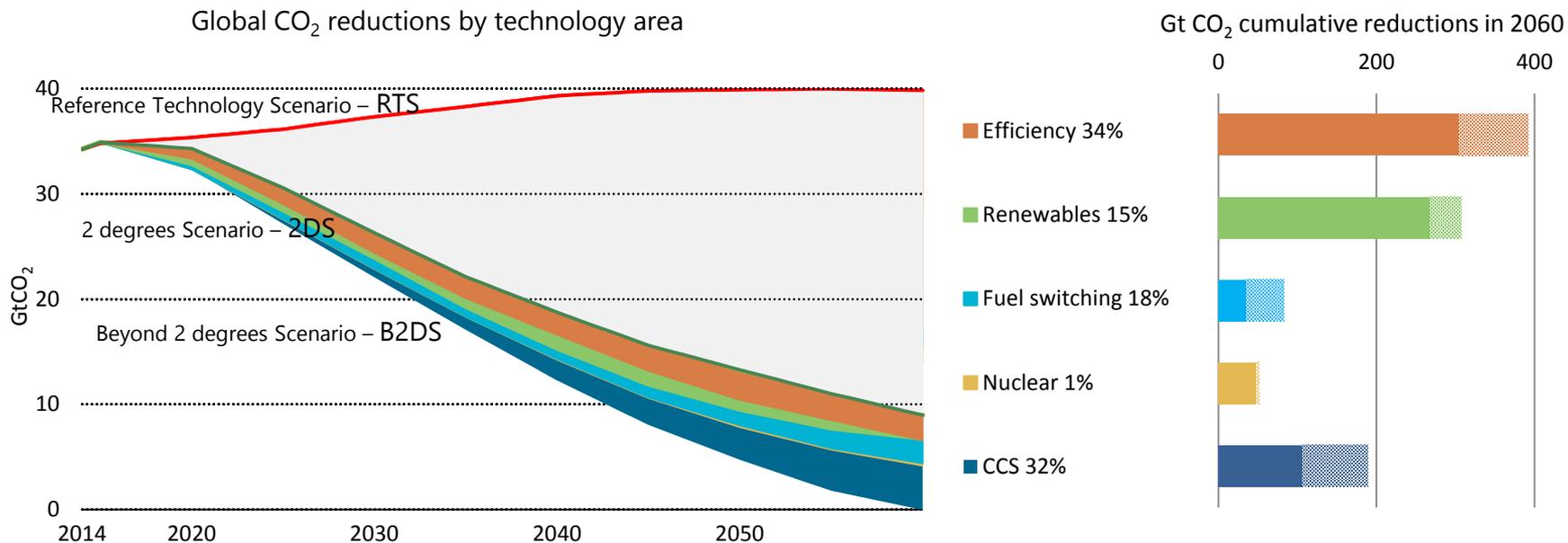
“Getting to the top is optional. Getting down is mandatory.” - Ed Viesturs



An "all of the above" technology portfolio



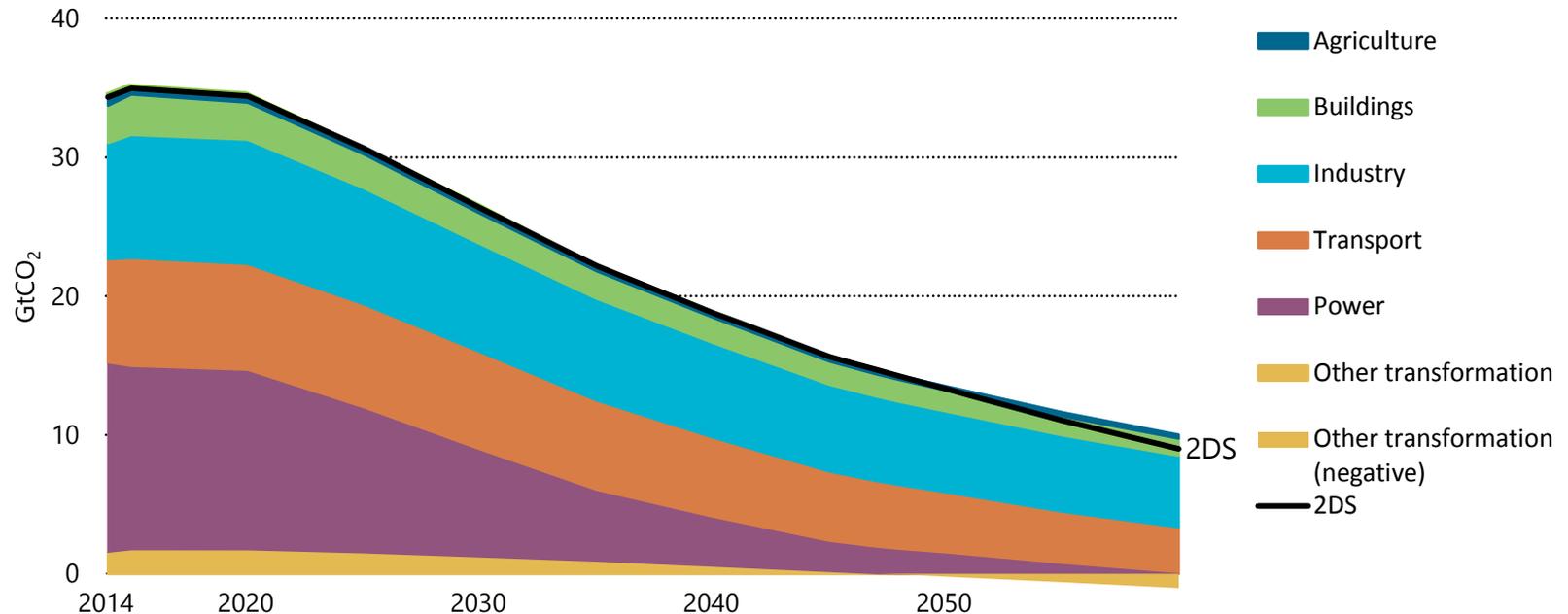
Technology area contribution to global cumulative CO₂ reductions



Pushing energy technology to achieve carbon neutrality by 2060 could meet the mid-point of the range of ambitions expressed in Paris

Getting to zero: the challenge of industry and heavy transport

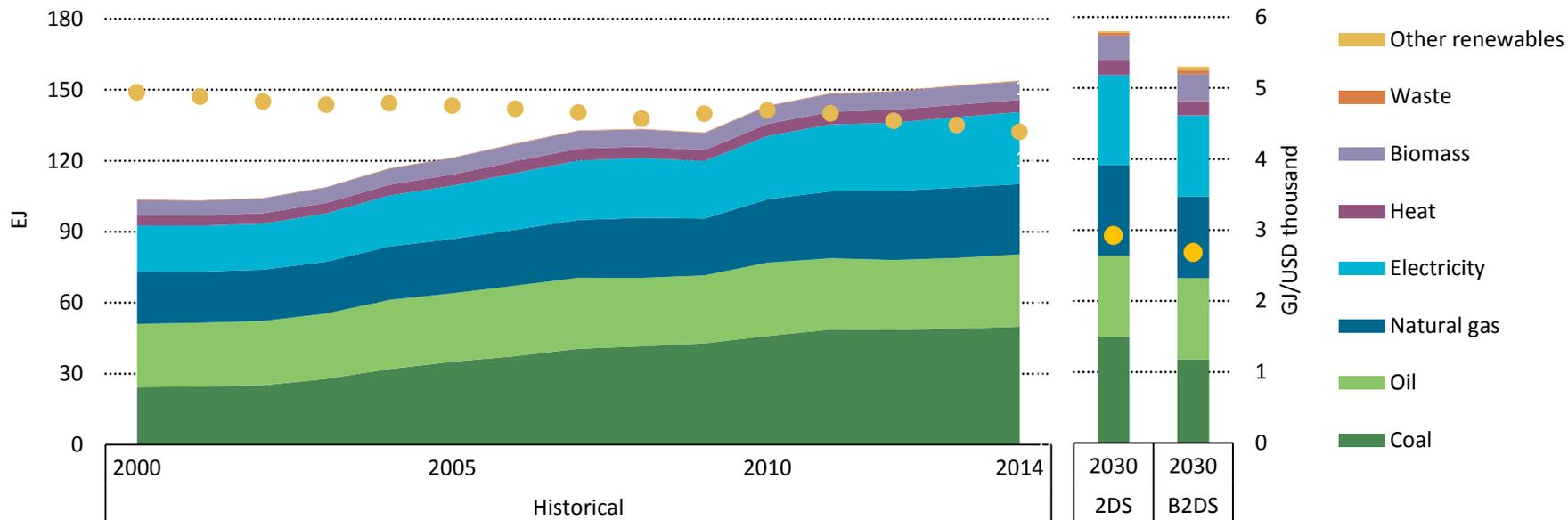
Energy- and process-related CO₂ emissions by sector in the 2DS



Industry and transport account nearly all remaining emissions in the 2DS in 2050.

Current global industrial energy trends are not on track

Global final industrial energy consumption and aggregated industrial energy intensity



Note: energy use related to blast furnaces and coke ovens is include in crude steel final energy use. Petrochemicals feedstocks energy is included in HVC final energy use.

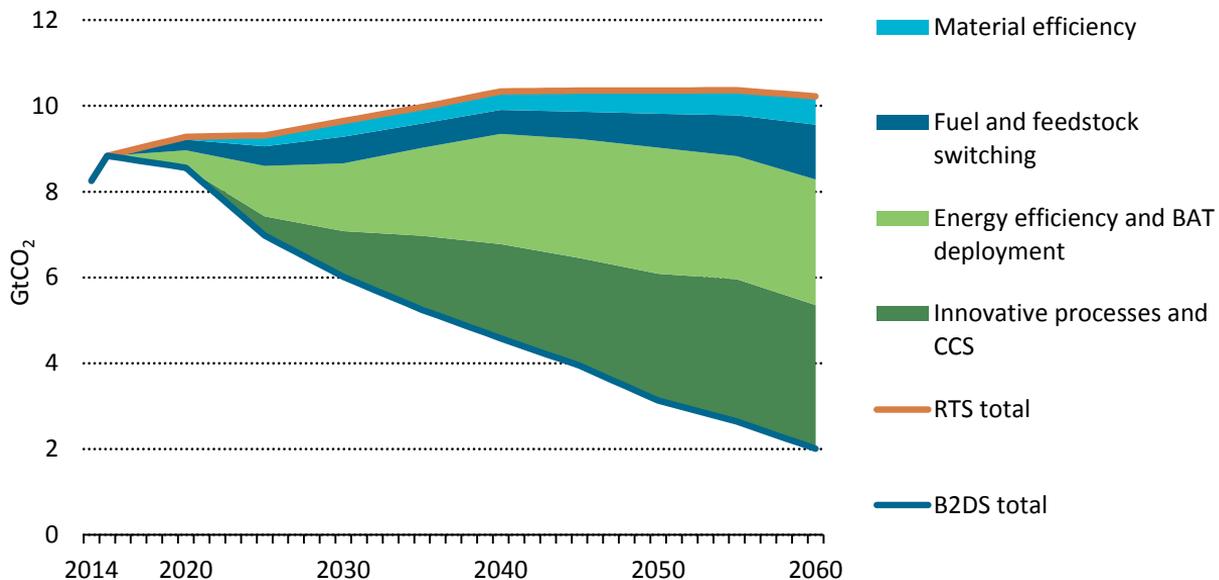
The annual pace of improvement in aggregated industrial energy intensity over the last 15 years would need to triple and almost quadruple to align with the 2DS and B2DS by 2030



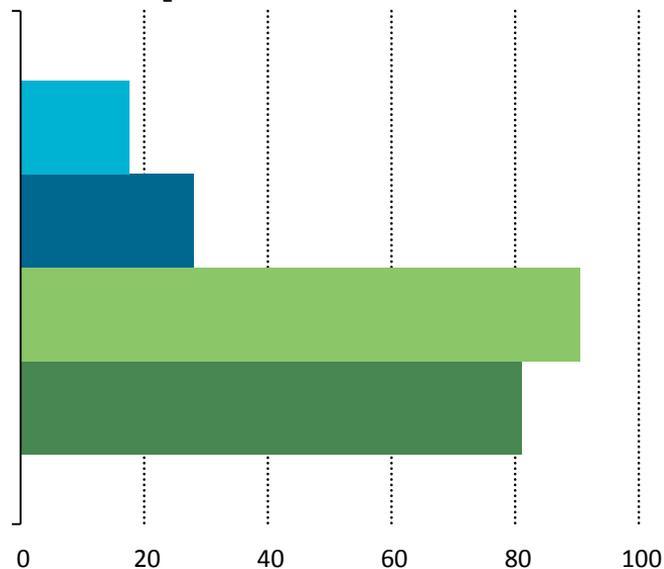
Global urbanisation adds a city the size of Shanghai every four months

How can the industrial low-carbon transition be realised?

Global direct industrial CO₂ emissions



Gt CO₂ cumulative reductions in 2060



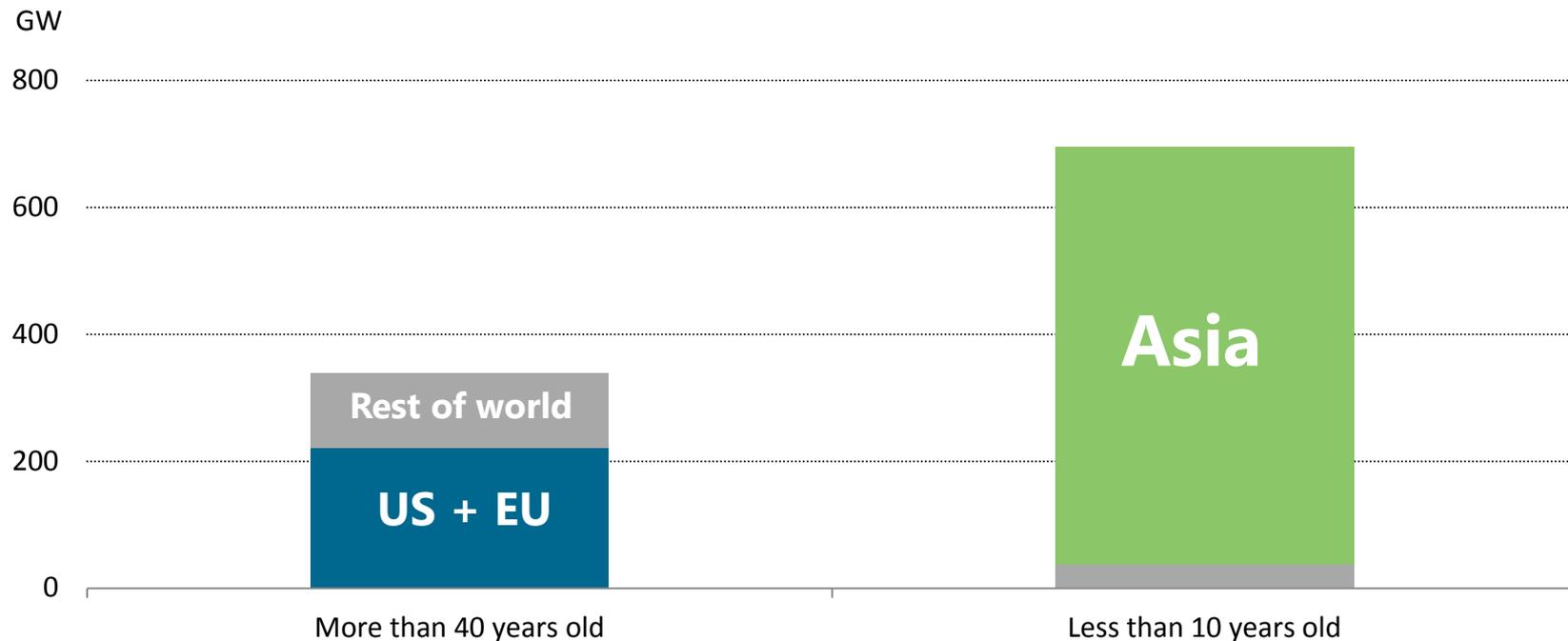
A number of strategies contribute to industrial emissions reductions – there is no silver bullet



Globally, the coal power generating fleet is youthful



Age of installed coal plant fleet by region



The age profile and efficiency of coal plants in Asia puts the political and economic challenge into perspective, and raises the value of CCS

Building coalitions and momentum



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IEA holds global summit on carbon capture with leading energy ministers and CEOs

7 November 2017



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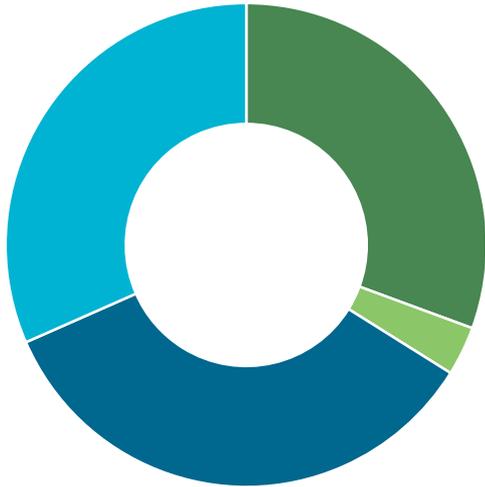


IEA launches the

IEA CCUS Summit on 07 November 2017 in Paris brought together senior decision makers from the public and private sector

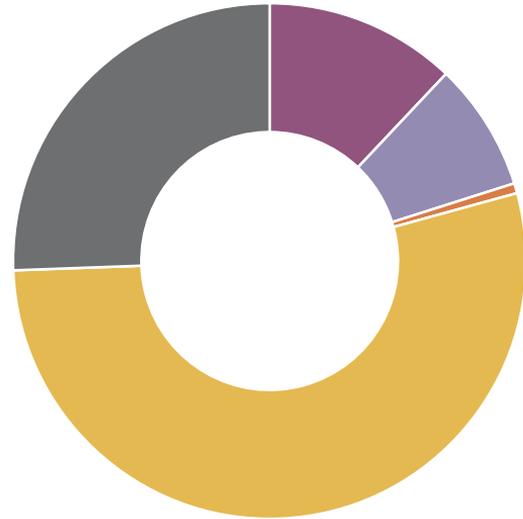
Investment in CCS, 2010-2017

Investment by source of capital



- Public grant
- Equity in SPV/JV
- Debt - off balance sheet
- Corporate balance sheet

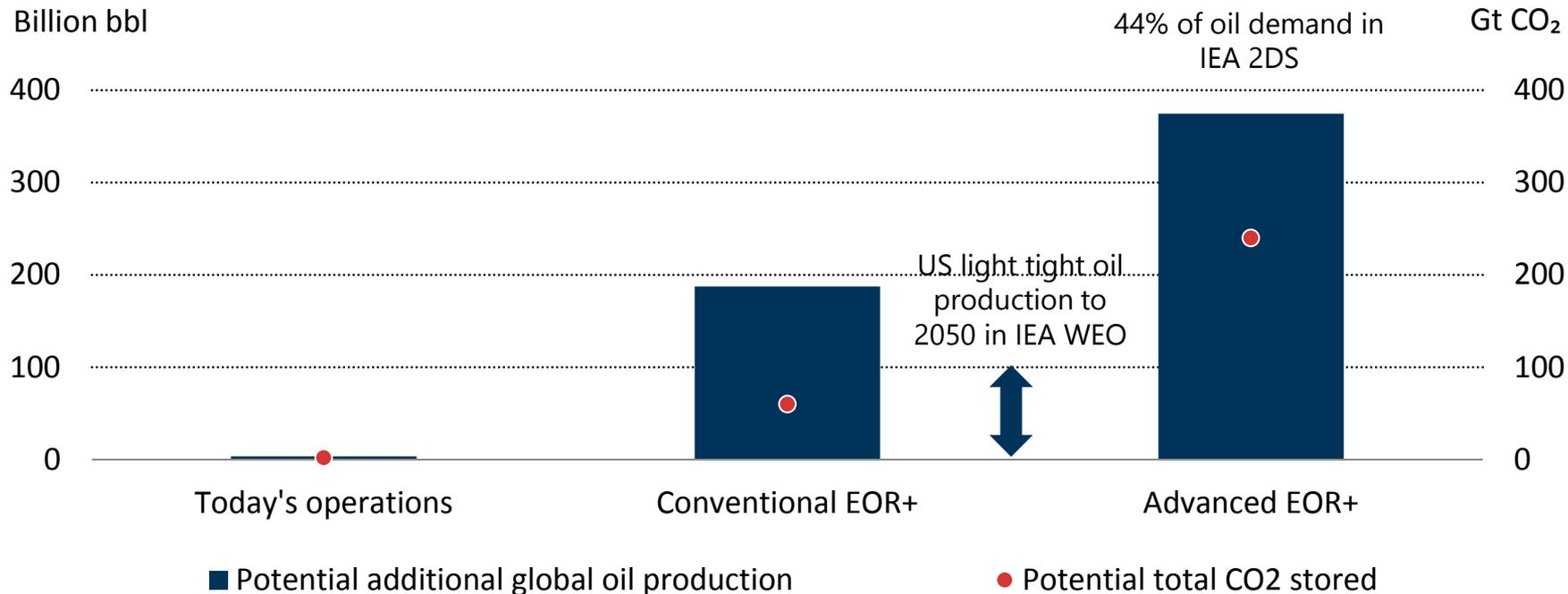
Revenue source



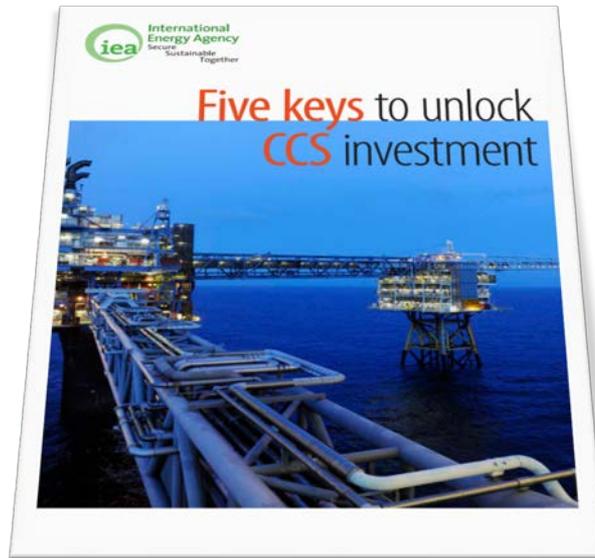
- Regulated electricity sales
- Tax credits
- Sale of CO2 for EOR
- Industrial products sales
- Oil and gas sales

Government interventions have leveraged corporate investment – future scale of CCS will need debt financing

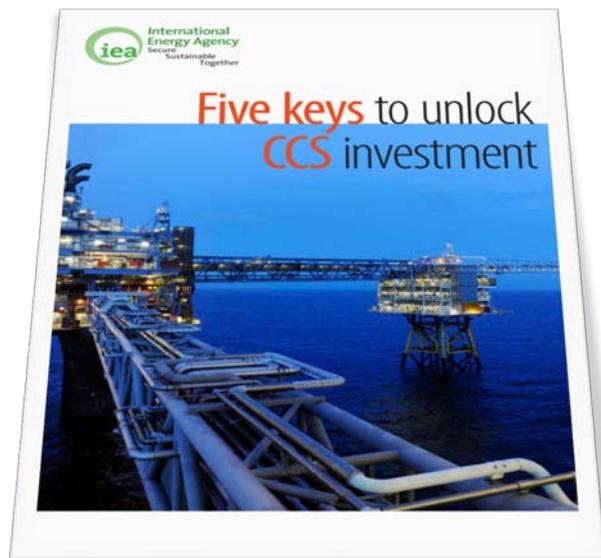
Can CCU help the chicken & egg problem for storage & capture?



Why invest in capture if a reliable storage service is unavailable? Because another CO₂ buyer may be.
(Evolutionary answer: the egg came first, laid by a bird that was not a chicken)



- 1) **Harvest low-hanging fruit** to build CCS deployment and experience from the ground up.
- 2) **Tailor policies** to shepherd CCS through the early deployment phase and to address unique integration challenges for these facilities.
- 3) **Target multiple pathways to reduce costs** from technology innovation to progressive financial mechanisms.
- 4) **Build CO₂ networks** to better support transport and storage options.
- 5) **Strengthen partnerships** and cooperation between industry and government.



- 1) **Limit project risks by matching public funds with known storage resources and known capture technologies.** Test less mature technology and industry combinations at pilot scale. Start with simple value chains and build up step-by-step.
- 2) **Ensure a steady revenue stream that can reduce finance costs for commercial projects.** Explore a range of funding mechanisms for EU support. Aim to generate a pipeline of projects over a decade. Use CO₂ pricing to help cover OPEX but don't rely on it for CAPEX investments.
- 3) **Continue to fund research into better capture and utilisation technologies, using strict selection and success criteria.** Have a plan for moving from seed funding to subsidies and then competitive tendering for capacity. Reward breakthroughs in clean production technologies according to their ability to scale-up and mitigate emissions.
- 4) **Support the construction of CO₂ transport and storage infrastructure** by reliable CO₂ off-takers. Allocate risk appropriately across the value chain in dialogue with leading infrastructure investors.
- 5) **Act multilaterally to strengthen the efforts of governments and companies around the world.** Deepen global expectations that CO₂ emissions will not be tolerated by voters, regulators or consumers in the near future.



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