CCUS in the IPCC 1.5°C scenario

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Before we start…#ClimateStrike

Photos – ABC News – Andie Noonen

#COP24 Katowice

- The ‘Paris Rulebook’
  - Common Timeframes
  - Reporting and accounting methodologies
  - Transparency framework
- Country ambitions
  - Nationally determined contributions (NDCs)
  - 2020 deadline
- Financing
  - Green climate fund
  - $100 billion per year by 2025

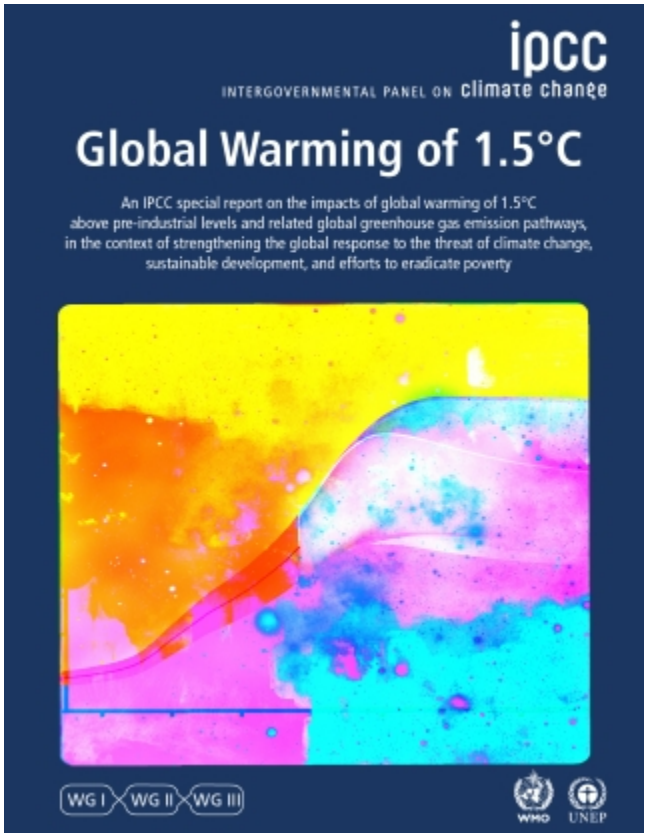
COP24·KATOWICE 2018
UNITED NATIONS CLIMATE CHANGE CONFERENCE

…meanwhile in Paris

Photos – Getty

IPCC Special Report 1.5°C

- Intergovernmental Panel on Climate Change – 1988
- Requested in the Paris Agreement
- What are the impacts of 1.5°C? - Pathways to get there by 2100
- 91 authors, 40 countries, 6000 scientific references
- Outcomes to feed into COP24



Impacts of reaching 1.5°C

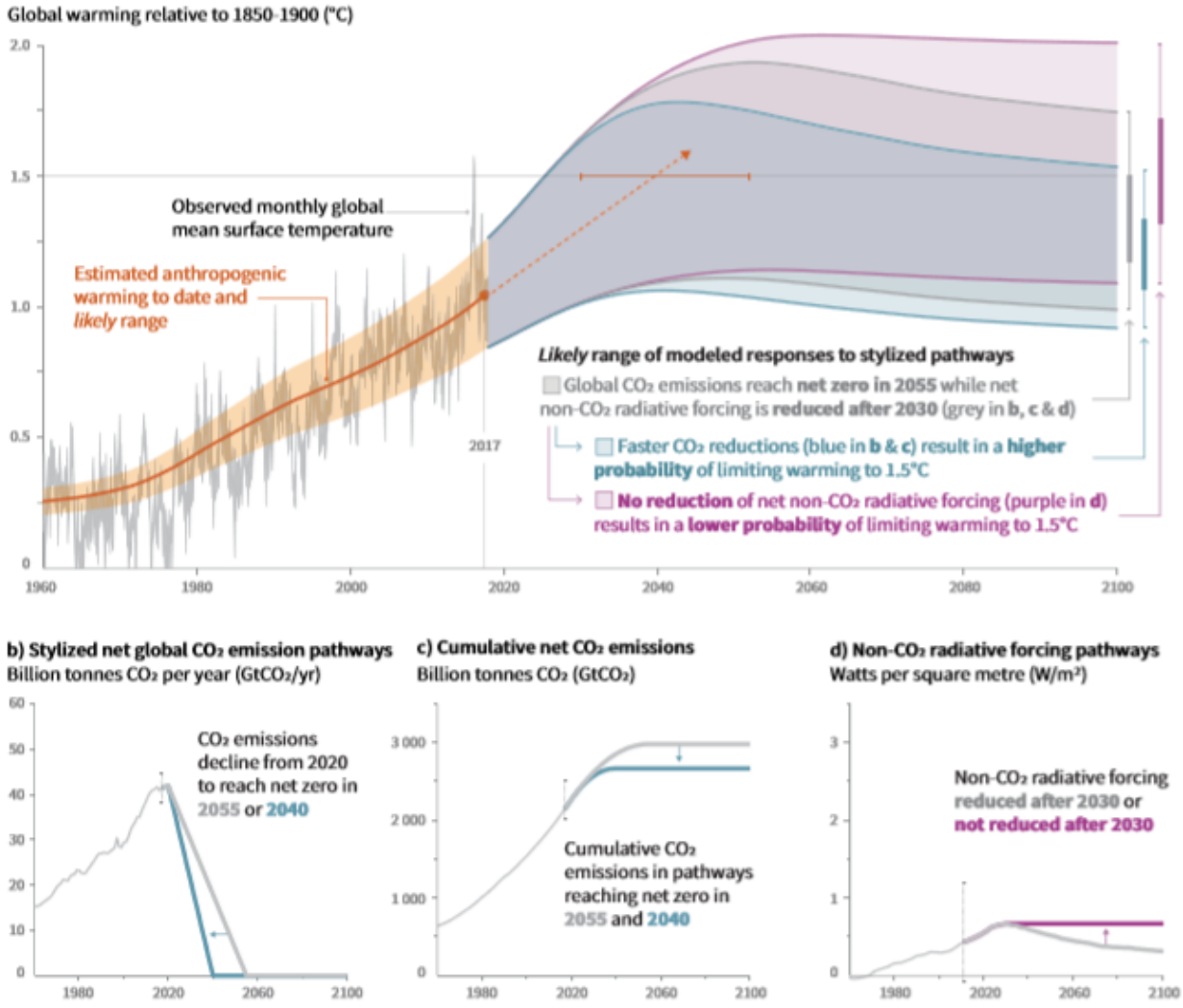
- Climate models project robust differences in regional climate characteristics between present-day and global warming of 1.5°C, and between 1.5°C and 2°C
- Extreme hot days in mid-latitudes, warm up by 3°C in 1.5 °C scenario, and 4°C in 2°C / Extreme cold nights in high latitudes warm by up to about 4.5°C at 1.5°C and about 6°C at 2°C
- Higher risks from droughts and precipitation deficit, and higher risks of heavy precipitation in 2°C
- 0.1 m less sea-level rise – 10 million people less exposed to associated risks
- Reduction in land and marine biodiversity loss

Modelled responses to 1.5°C scenario

Completed using Integrated Assessment Models (IAMs) (90 scenarios)

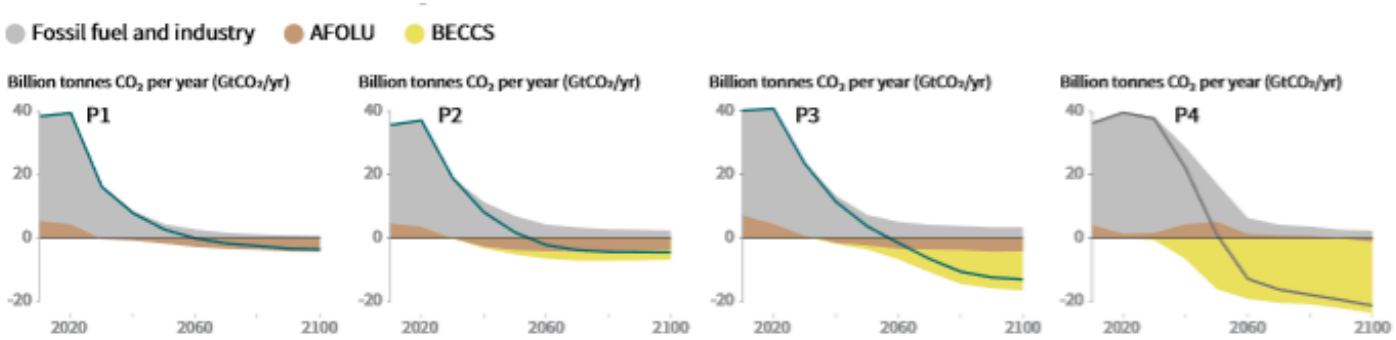
Not overshooting 1.5°C means a 45% reduction on 2010 levels by 2030 (2°C 25%), and net-zero by around 2050 (2°C – 2070)

Cumulative emissions for a 1.5°C must not exceed ~3000 $GtCO_2$ up to 2500 $GtCO_2$ has been emitted already



IPCC – SPM.1

Illustrative model pathways for 1.5°C



	Lower energy demand Downsized energy system	Sustainable development Limited acceptability BECCS	Follows historical patterns Cleaner production	Resource and energy intensive lifestyles
CO_2 emission change 2030 %*	-58	-47	-41	4
CO_2 emission change 2050 %*	-93	-95	-91	-97
Final energy demand 2030 %*	-15	-5	17	39
Final energy demand 2050 %*	-32	2	21	44
Renewable energy 2030 %*	60	58	48	25
Renewable energy 2050 %*	77	81	63	70
Cumulative CCS until 2100**	0	348	687	1218
Of which BECCS**	0	151	414	1191

* Compared to 2010 levels **$GtCO_2$

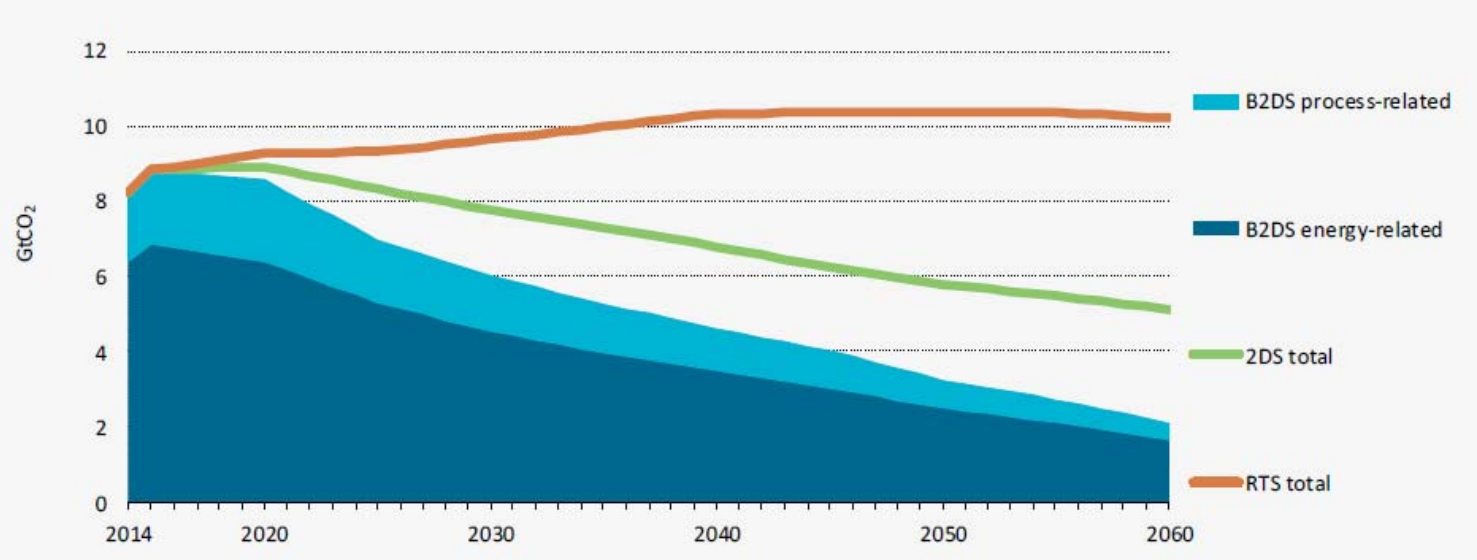
Focus on BECCS

- Carbon Dioxide Removal (CDR), is relevant for all scenarios
- CDR includes both Agriculture, Forestry and other Land-use (AFOLU), and Bio-CCS (BECCS)
- IAMs use BECCS for electricity, hydrogen production and liquid fuels
- In scenarios with less rapid near-term actions, BECCS becomes more prevalent
- Limited by biomass availability and sustainable land-use issues

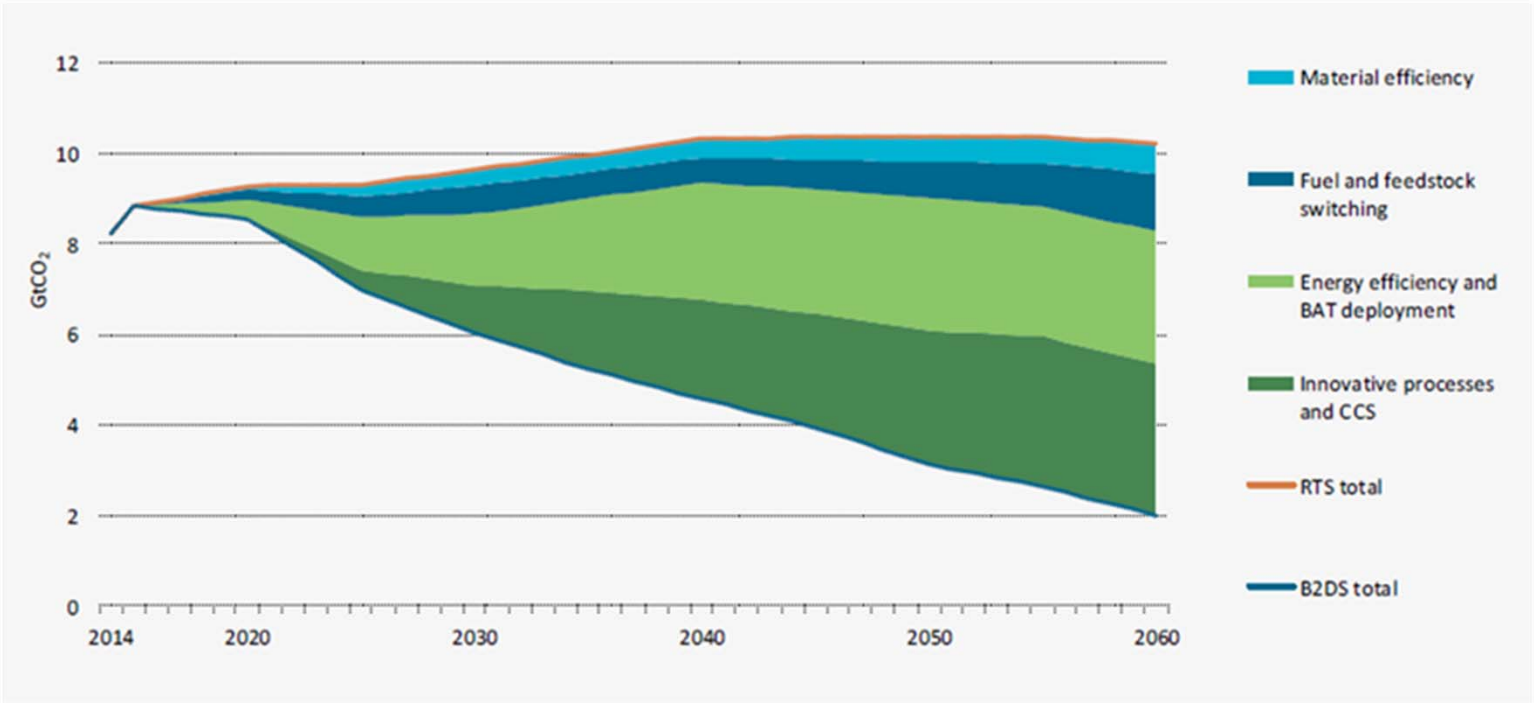
Focus on Industry

- Carbon emissions reduced by 65-90% in a 1.5°C scenario
- Energy efficiency, electrification, reducing carbon content of non-electric fuels, innovative process and CCS
- IEA B2DS can be used to illustrate efforts to reach 1.5°C (well nearly)

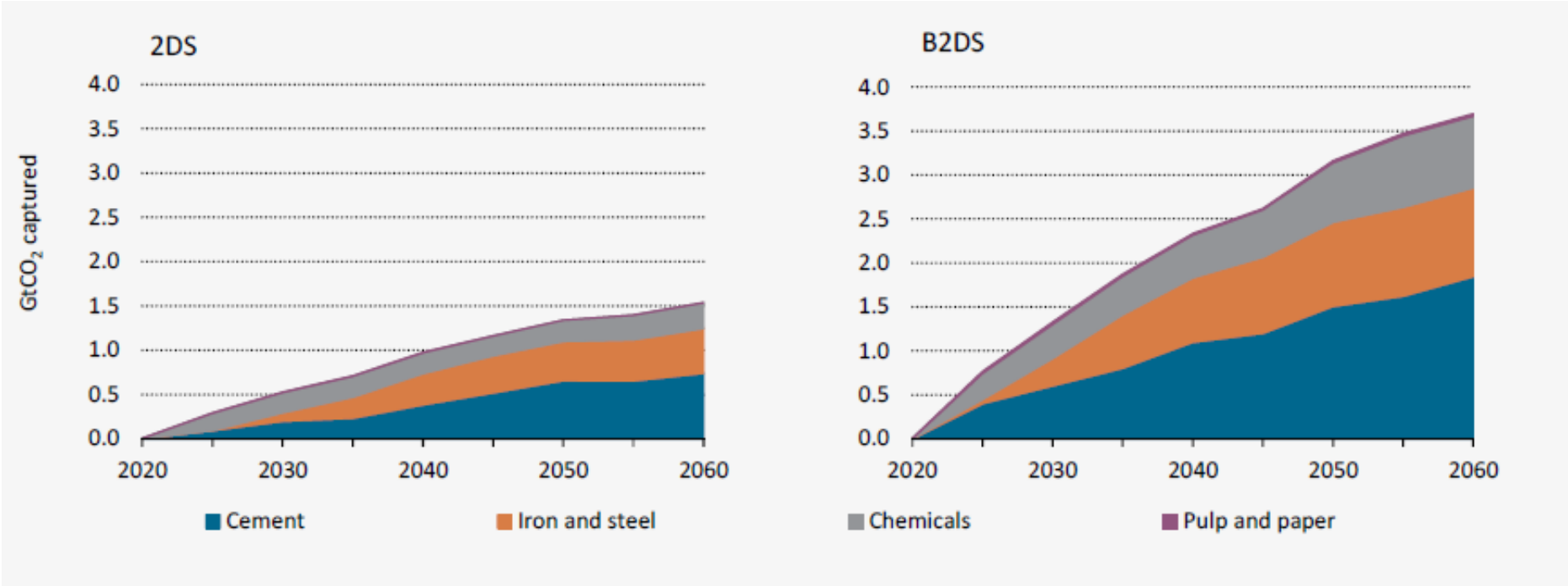
Global direct CO_2 emissions from industry by scenario (IEA ETP, 2017)



CCS deployment rates in industry – 2DS and B2DS (IEA ETP, 2017)



CO_2 captured from by industry subsector (IEA ETP, 2017)



Key observations

- Pathways limiting global warming to 1.5°C with no or limited overshoot would require rapid and far-reaching transitions in energy, land, urban and infrastructure (including transport and buildings), and industrial systems.
- CCS is required in all scenarios that assume an increase in energy demand towards 2050.
- Delaying near-term climate action means that more CDR is necessary, particularly from BECCS.
- Personal observation – BECCS and CCS appear to be framed separately, and the technological link between the two is not emphasized enough!
- To allow BECCS to happen, we need near-term CCS deployment!