

“Making CCS happen”

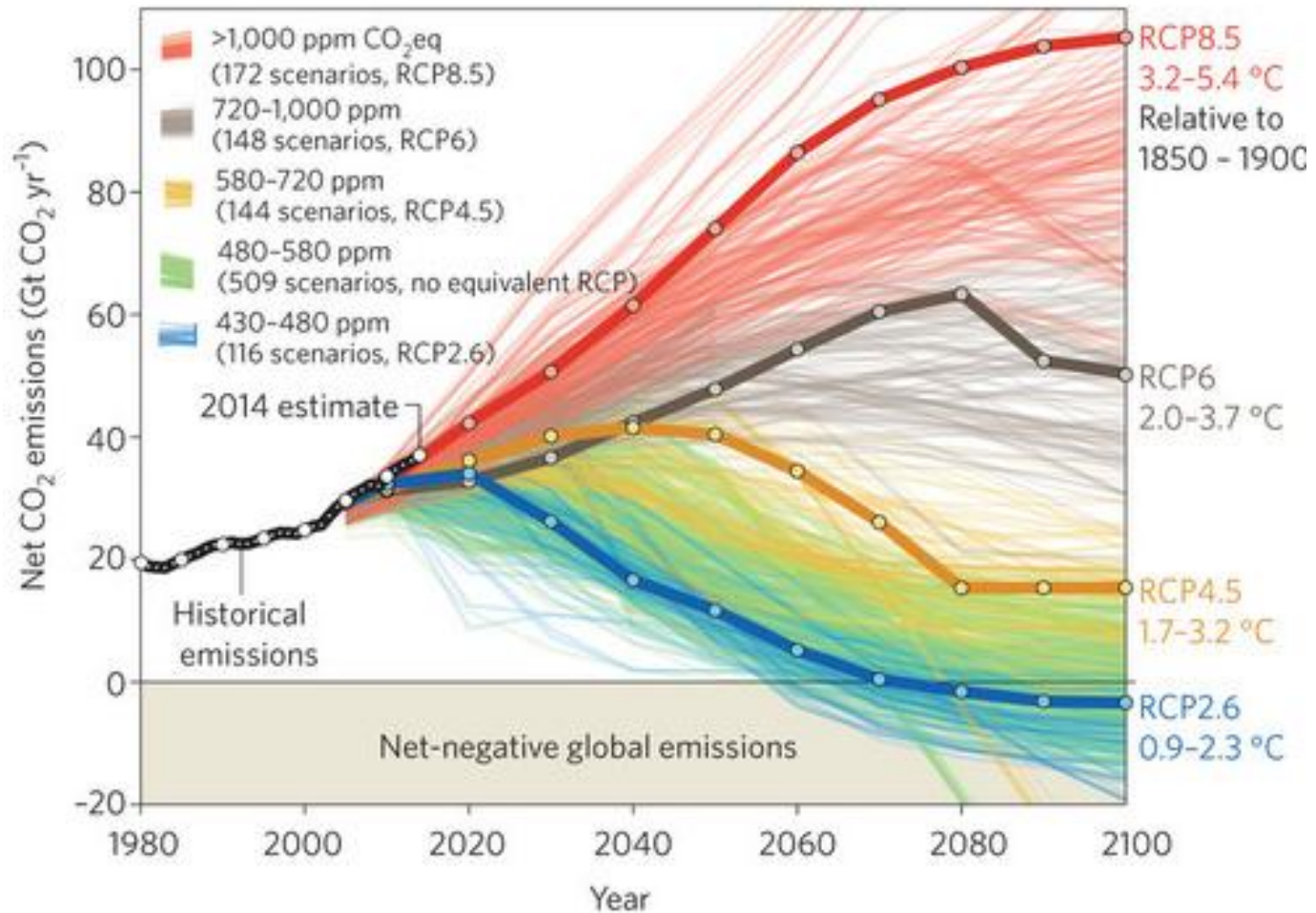
@EnergyIChemE

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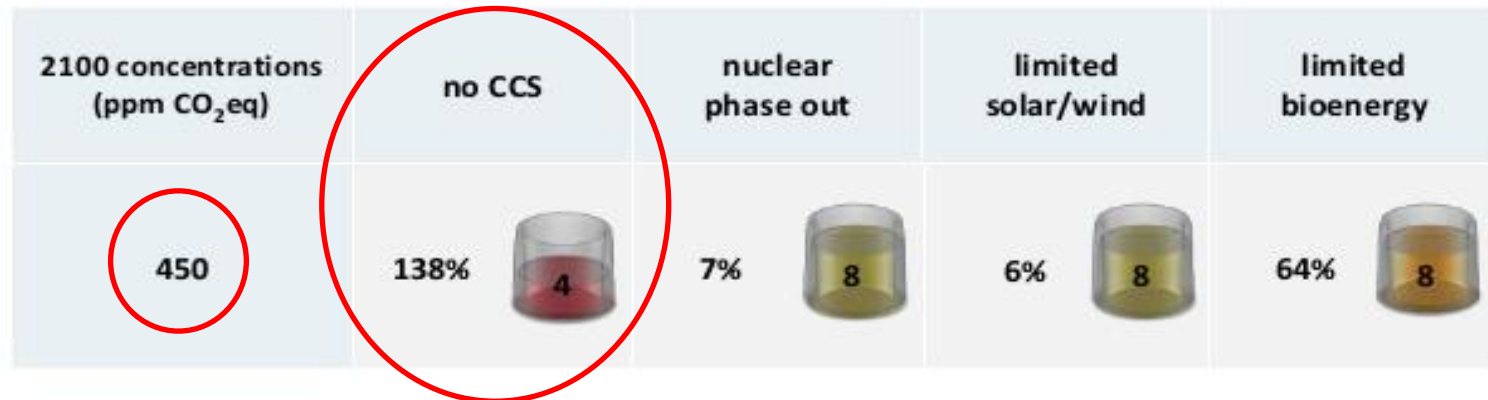
Outcome of COP21



Slide 2

Not having CCS is uniquely costly

Percentage increase in total discounted mitigation costs (2015-2100)
relative to default technology assumptions – median estimate



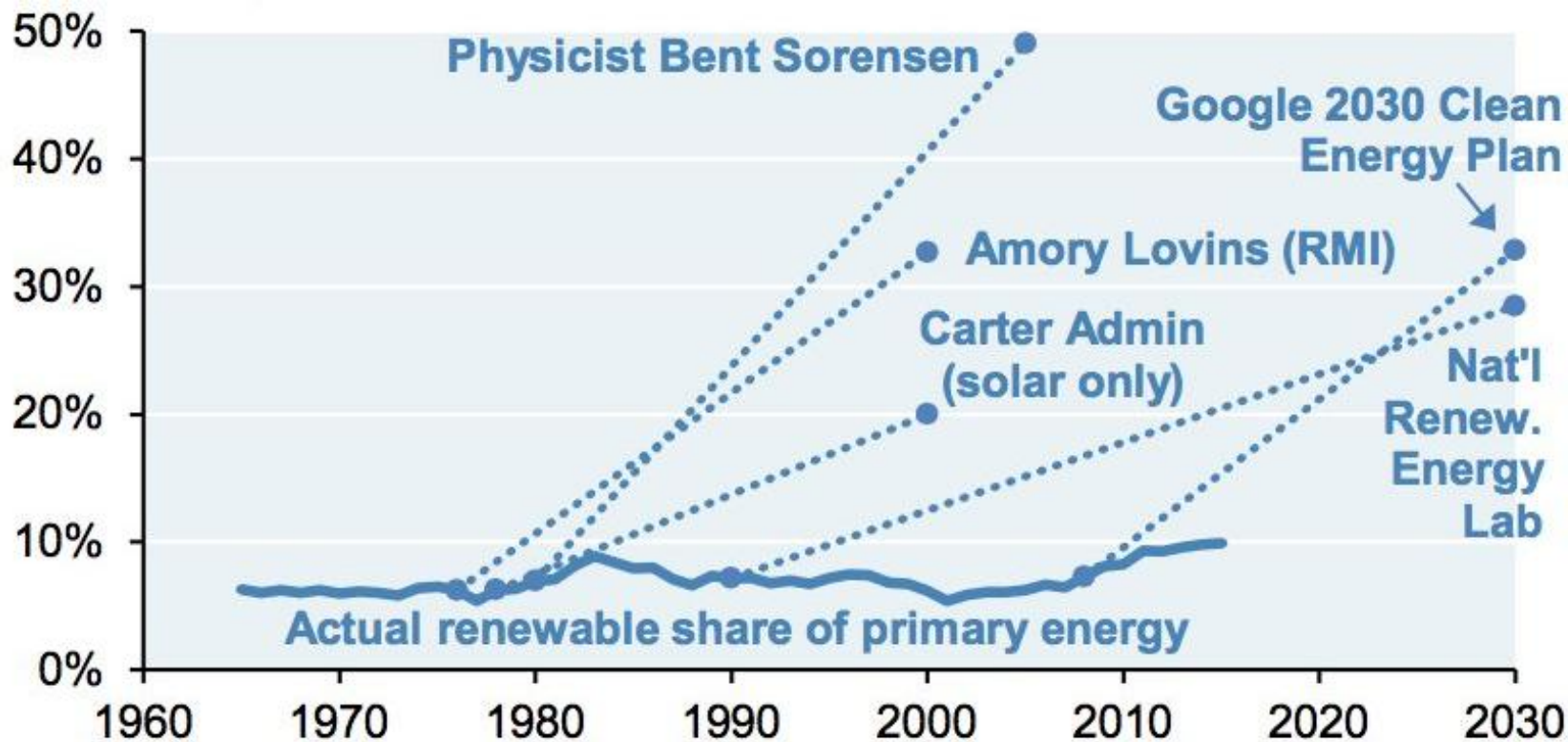
Symbol legend – fraction of models successful in producing scenarios (numbers indicate number of successful models)



Source: IPCC Fifth Assessment Synthesis Report, November 2014.



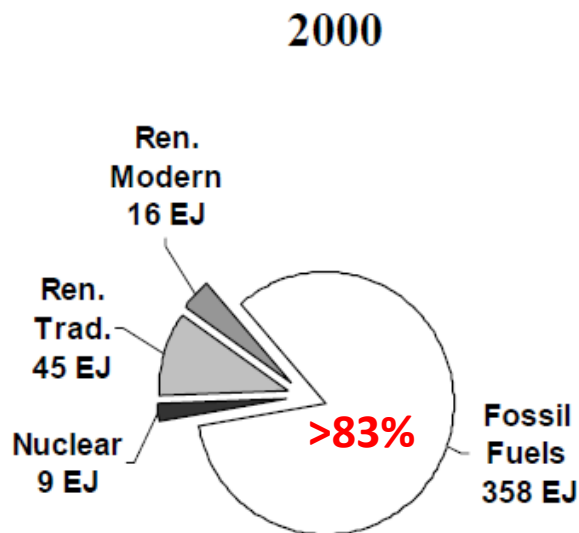
Energy systems change slowly



Source: EIA, listed authors, Vaclav Smil, JPMAM. 2015. Renewables include wind, solar, hydropower, geothermal, biomass, wood and waste.

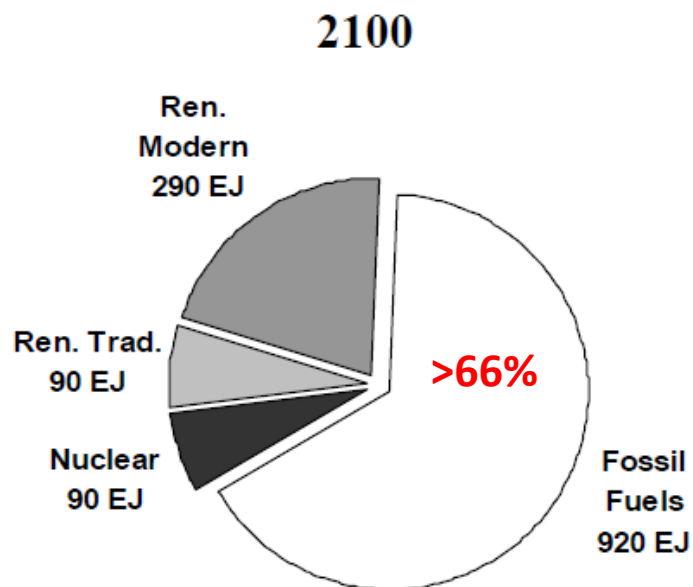


Sustainable fossil fuels?



Total =: 429 EJ
6 GtC/year

Population - 6 billion
E/GDP - 13.5MJ/\$



Total =: 1,390 EJ
>20 GtC/year

Population - 10.5 billion
E/GDP - 6 MJ/\$



Ample evidence, limited action

- CCS is key to least cost climate change mitigation
- Individual technology elements are well understood
- Limited deployment success, despite large effort
- What is the solution?

