

Role of CCUS in International Climate Negotiations

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Latest IPCC report

Having a likely chance to keep temperature change below 2 °C will require “rapid improvements of energy efficiency, a tripling to nearly a quadrupling of the share of zero- and low-carbon energy supply from renewables, nuclear energy and fossil energy with carbon dioxide capture and storage (CCS) or bioenergy with CCS (BECCS) by the year 2050.”

Latest IPCC report cont'd


- Most scenarios involve overshooting of concentration target. Addressing this requires “widespread deployment of BECCS and afforestation in the second half of the century.”
- To stabilize concentrations, “fossil fuel power generation without CCS [must be] phased out almost entirely by 2100.”
- Initially, was excluded from the CDM; in Durban in 2011, this was changed.

Will we do it?

- CCS is an add on cost.
- What's the cost? Unless and until we have multiple examples at scale, we won't know.
- Estimates are about \$120-\$180/tCO₂, possibly falling to \$35-\$70/CO₂ as the technology matures.
- Should be used if

$$SCC > \$MC_{CCS}$$

Some estimates

Study	Value (\$/tCO ₂)
Stern (2007)	\$85/tCO ₂
Nordhaus (2008)	\$12/tCO ₂ 
UK Government Economic Service (2002)	\$30/tCO ₂
Obama Administration (2009)	\$21/tCO ₂
Obama Administration (2013) for year 2020	\$43/tCO ₂ ; \$129/tCO ₂ 95%
Reference values	Value (\$/tCO ₂)
EU emissions trading price (today)	\$7/tCO ₂
RRGI auction price	\$3/tCO ₂
British Columbia carbon tax (current)	\$30/tCO ₂
Sweden carbon tax	\$150/tCO ₂ but with exemptions
Australia carbon tax	\$23/tCO ₂ , but for only 300 sources; to equal EU ETS price in 2015! New government wants to repeal.

Disaggregated SCC

Country	\$/tCO ₂ 2015
US	0.98
EU	1.12
Japan	0.21
Russia	0.14
Eurasia	0.13
China	2.84
India	2.18
Middle East	0.92
Africa	2.14
Latin America	0.71
OHI	0.37
Other developing	1.72
World	11.31

Last page of IPCC SPM

- About “international cooperation.”
- It doesn't say much.

Incentives to deploy CCUS

- IPCC assumes we'll do the right thing.
- Two problems:
 - uncertainty about impacts of crossing 450 ppm CO₂-eq “threshold.”
 - Uncertainty about the threshold.
- Economics v. Geophysics. Which matters most?

Look at climate negotiations



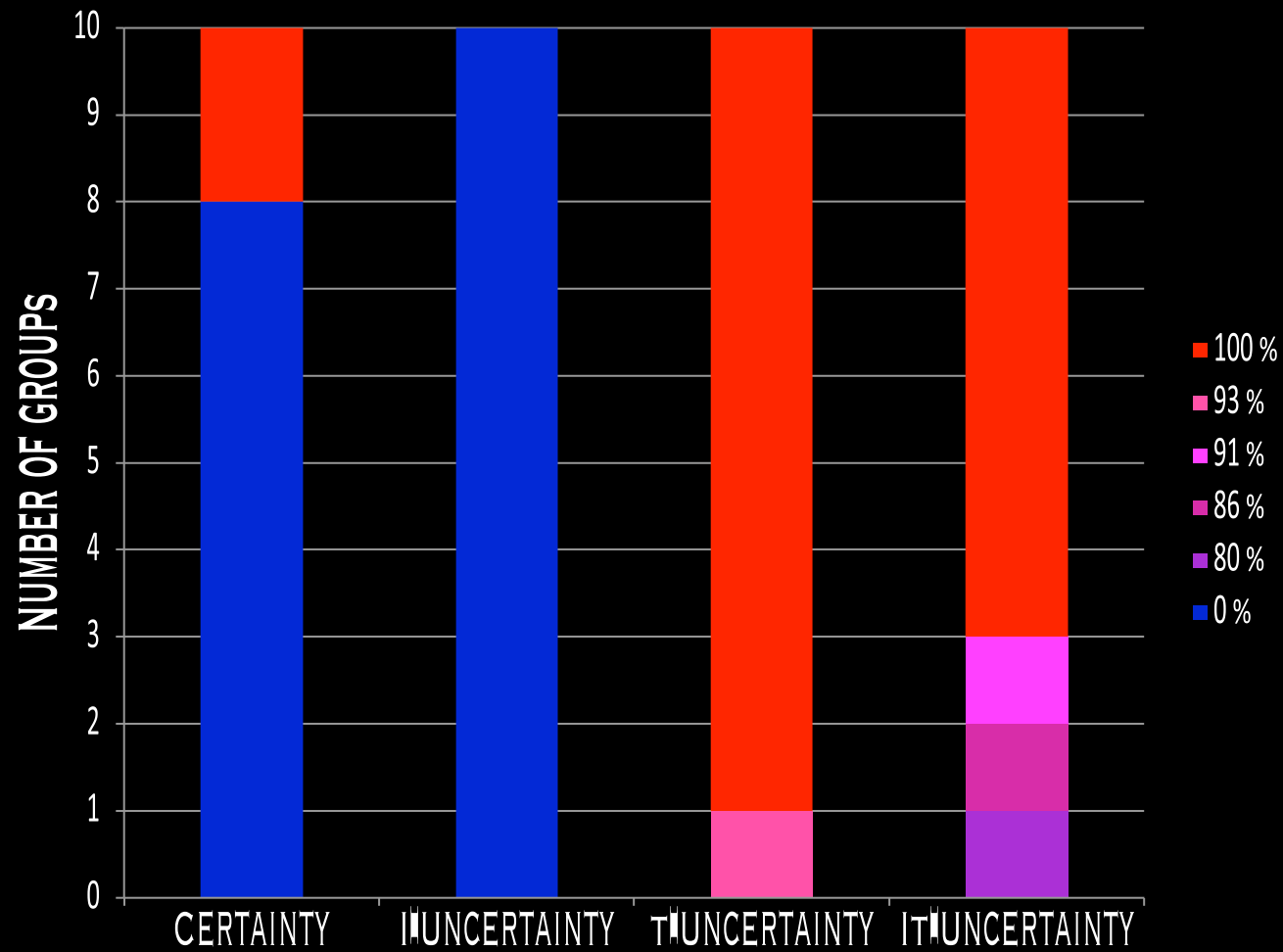
as a game.



Experiment

- “Gradual” versus “abrupt and catastrophic” climate change.
- Can use cheap or expensive chips. Must spend expensive chips to get over the threshold.
- Four treatments:
 1. Certainty
 2. Impact uncertainty, threshold certainty
 3. Impact certainty, threshold uncertainty
 4. Impact and threshold uncertainty

Main results



Lessons

- Uncertainty about the SCC doesn't matter; the expected value matters.
- Uncertainty about the threshold is crucial.
- In this experiment, it's best to avoid the threshold, but players can't help but cross it.
- It's not enough that CCUS be "economic." There also needs to be an *incentive* to use it.
- Climate doomsday machine.
- Other strategies for Paris 2015?