Some Thoughts on Air Capture and Climate Policy

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Options for addressing climate change

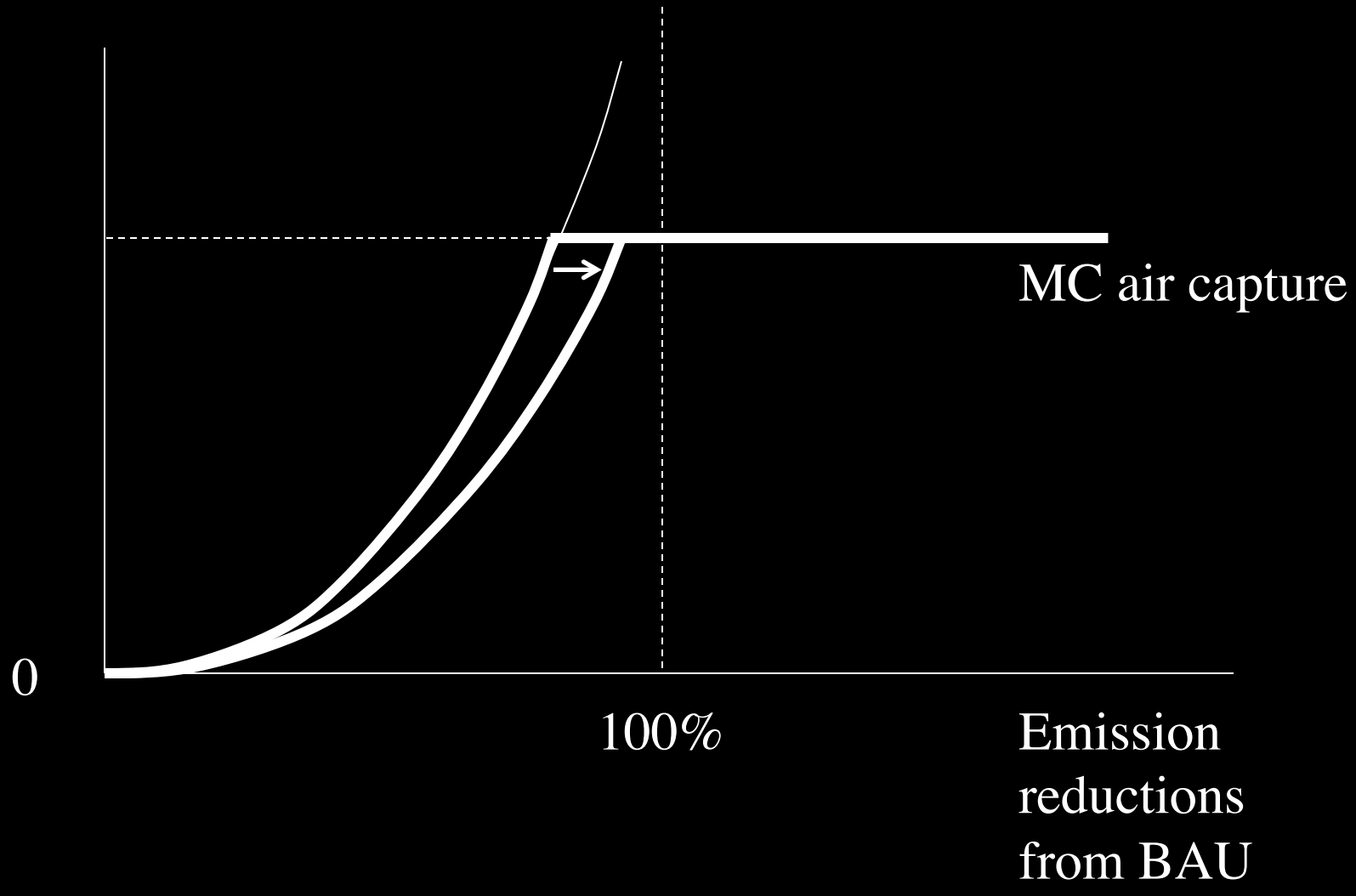
1. Reduce emissions
2. Adapt
3. Climate engineering (SRM)
4. Air capture

Air capture options

Option	$/tCO2	Scale
Land use change	Low but increasing	Limited
Ocean fertilization	$5	Limited
Biomass CCS	$50-$110	Limited
Industrial air capture	$40-$600	Potentially unlimited

Air Capture: A Backstop Technology

an option for limiting concentrations available in potentially near limitless quantities; a “safety net.”



Industrial air capture v. alternatives

	Emission reductions	Adaptation	Climate engineering	Air capture
International cooperation?	Yes	No	No	No
Trade leakage?	Yes	No	No	No
Spillovers	Yes (+)	No	Yes (+/-)	Yes (+)
Addresses root cause of problem	Yes	No	No	Yes
Scale limited?	Yes	Yes	No	No
Acts quickly	No	Yes	Yes	No
Cost of limiting temperature change	High	--	Very low	Very high
Governance problem?	No	No	Very much	A little

What should be the target?

- Framework Convention says that atmospheric concentrations of greenhouse gases should be stabilized "at a level that would prevent *dangerous* anthropogenic interference with the climate system."
- Copenhagen Accord recognizes "the scientific view that the increase in global temperature should be below 2 degrees Celsius."

Where are we going?

- A BAU-like scenario suggests 3.7-4.8 °C by 2100 (ignoring "climate uncertainty"), with concentrations at 750-1300 ppm CO_2-eq.
- To limit temperature change to 2 °C, concentrations should be limited to about 450 ppm CO_2-eq.
- IPCC predicts that we will pass this level by 2030.

What do we need to do?

- To get to 450 ppm CO_2-eq by 2100, we must reduce emissions 40-70% from today's level by 2050 and to near zero by 2100.
- IPCC predicts that unless action is taken to limit emissions, we will pass 450 ppm CO_2-eq by 2030.
- *"The report warns that if greater efforts to cut emissions are not implemented soon, future generations seeking to limit or reverse climate damage will have to depend on technologies that permanently remove greenhouse gases from the air; in effect, they will be trying to undo the damage caused by the people of today."*

New York Times, 13 April 2014

Another approach, based on human values

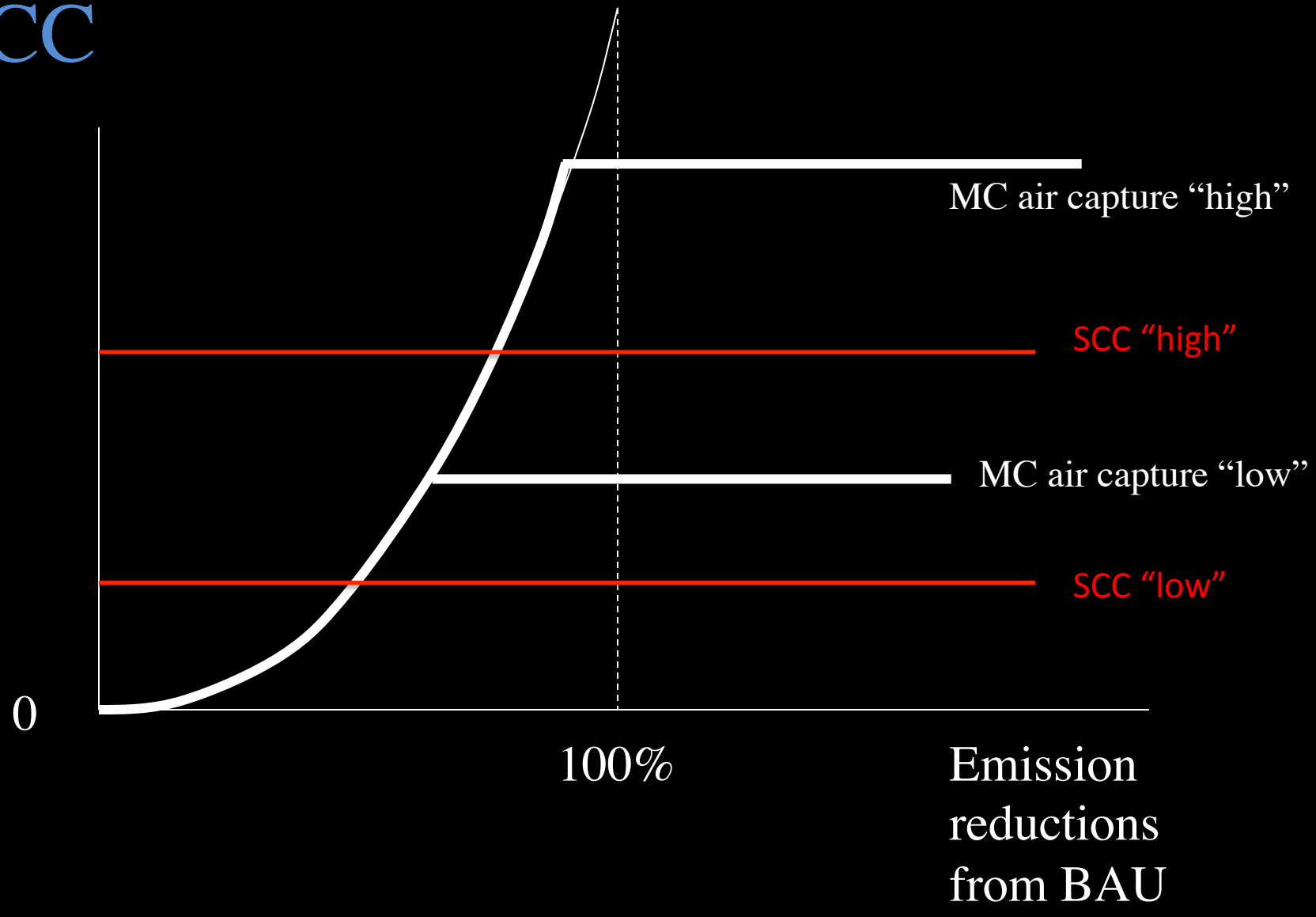
Social Cost of Carbon

Net present value of climate impacts due to increasing emissions by one tonne.

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.

Economics depend on MC relative to SCC



R&D

- Uncertainties around the costs of air capture are huge.
- Since air capture could play a major role, R&D is needed to reveal the “true” cost of air capture, including any associated risks.