The Long Haul: Navigating the energy transition to limit climate change

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Sponsored by:

- University of Victoria
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Workshop introduction

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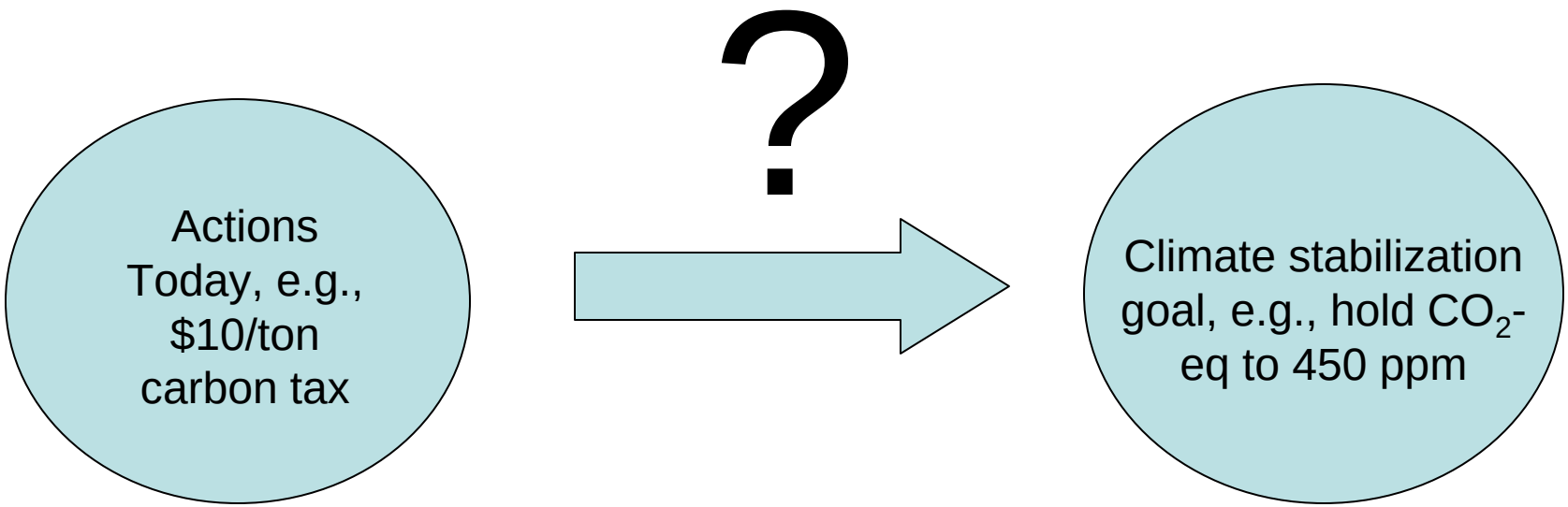
The Transition:

Links feasible current actions to stabilization goals (with both goal and path to reach it uncertain)



Understanding the transition …

- Has *Analytical* and *Institutional* dimensions (What C-price trajectory? Who decides, how?)
- *Crucial* for effective climate response … but neglected.

Scale of the problem

Avoid most severe impacts of climate change

~↓

Limit global-average Δ T to ~ 2 ^{o} C (now 0.74)

~↓

Limit atmospheric GHGs to ~ 450 ppm CO_2-eq (now 385)

~↓

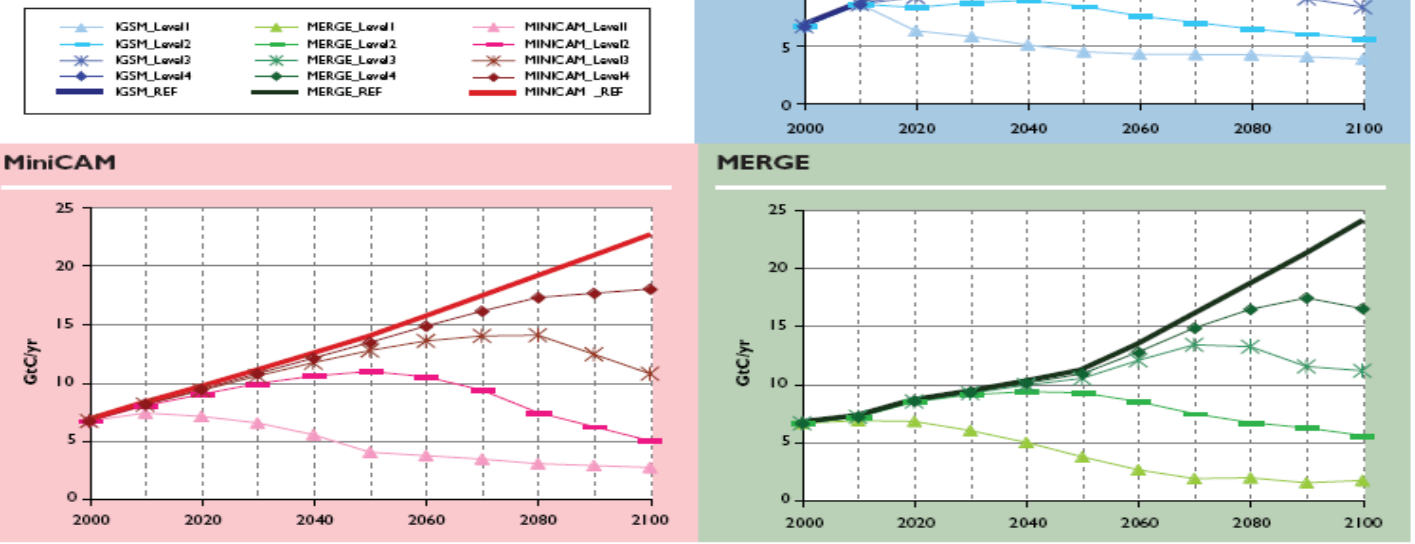
Cut world emissions 50 – 85% by 2050

~↓

Cut emissions in rich countries at least 80% by 2050

Neglected? What about the stabilization scenarios – showing emissions trajectories…

Figure TS.10 Global Emissions of CO_2 from Fossil and other Industrial Sources Across Scenarios (GtC/yr). The tighter the constraint on radiative forcing, the faster carbon emissions must decline from those in the reference scenarios. This is because the stabilization level defines a long-term carbon budget; that is, the remaining amount of carbon that can be emitted in the future. The gradual deflection of the emissions from the reference reflects the assumption of *when* flexibility, with carbon prices rising gradually. Under the most stringent radiative forcing stabilization levels, CO_2 emissions begin to decline immediately or within a matter of decades. Under less stringent radiative forcing stabilization levels, CO_2 emissions do not peak until late in the century or beyond, and they are 1½ to over 2½ times today's levels in 2100.



And world carbon prices.

Figure 4.20. Carbon Prices Across Stabilization Scenarios ($/tonne C, 2000$). In all the stabilization scenarios, the carbon price rises, by design, over time until stabilization is achieved (or the end-year 2100 is reached), and the prices are higher the more stringent is the stabilization level. There are substantial differences in carbon prices between MERGE and MiniCAM stabilization scenarios, on the one hand, and the IGSM stabilization scenarios on the other. Differences between the models reflect differences in the emissions reductions necessary for stabilization and differences in the technologies that might facilitate carbon emissions reductions, particularly in the second half of the century.

From stabilization scenarios to decision-relevant insights?

How scenarios treat uncertainty, learning, adaptation:

- Uncertainties: each scenario embeds specific assumed resolution of many uncertainties
- Foresight and decision: either myopic current-period optimization or full dynamic optimization

Contrast real decision environment:

- Uncertainties: really are uncertain, resolve incrementally over time (or maybe not)
- Foresight and decision: some look-ahead, based on history to date, imperfect signals

Using modeled scenarios to inform adaptive decision-making: a big hard problem?

Maybe not so hard … two extreme views

Just do it
(from a visionary analyst/ modeler):

- Take C-tax trajectory from a stabilization scenario you want to pursue
- Create expert body, insulated from politics
- Give them the trajectory (or equivalent instructions)
- Empower them to steer the course through the transition

Muddling through
(from a seasoned political hand):

- Pretending to do long-term planning (let alone "adaptive management") is academic vanity: All decisions are short-term
- The most we can do to shape future decisions is occasionally compel them to pay attention (e.g., periodic legislative re-authorization, review of treaty provisions) …
- Try to constrain them more than that, they'll just undo it.
- Strongest example: Montreal Protocol?

Both unsatisfactory??

Fruitful ground between these extremes? Parse question into two parts

Part 1 (Analytical): Suppose you had a steering wheel ..

- How would you steer, over time?
- What information would you use in deciding how to steer, how would you use it? (a problem in adaptive control)
- What information is available?

Part 2: (Legal/Institutional) What levers do we have?

- What are available legal, institutional, political mechanisms to influence long-term social trends?
- How do they work? How well/confidently can they be controlled?
- At what cost/risk, with what pitfalls?

Plan for the Workshop

Briefings …

- Two: background on energy/climate issues, current proposals
- Two + 1: Analogies to other issues, to provoke and stimulate

"Suppose you had a steering wheel" (~ 2 sessions)

- How do formal models, scenarios handle uncertainty, learning, adaptation over time; how could they inform adaptive decisions?
- How does need for future adaptation influence near-term choice of policies?

"What levers do we have, how do they work"? (~ 3 sessions)

- Overview: mechanisms, causal factors to resolve dual problems: binding the future, while empowering adjustment
- Complicate with Inter-temporal distribution of burden, uncertainty, gaming
- Complicate with international bargaining, multi-level decision-making

Wrapup: "And then a miracle happens …"

Objectives of the workshop

- Identify and link relevant knowledge – what do we already know about this problem?
- Practical insights for near-term decisions
- Sharpen key questions for further research and analysis … what do we need to do better in 2 years? 5? 10?
- Follow-up .
  - Papers, Publications subsequent to this meeting?
  - First step in continuing research program, collaboration?

Spirit of the workshop

Anonymous colleague: “a fascinating topic … but *very* difficult …” Well, yes.

Queen of Hearts: “Six impossible things before breakfast …”