

Stabilization Wedges: Solving the Climate Problem for the Next 50 Years
with Current Technology

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Abstract

Does humanity already have the tools to “solve” the global carbon problem for the next half century? We conclude: Yes. An excuse for inaction based on the world’s lack of technological readiness does not exist.

The focus is on the next 50 years, rather than the next 100 years, in order to relate to the time horizons of business strategy and public policy. We identify the CO₂ target of stabilization “below doubling” (stabilization at an atmospheric concentration of CO₂ less than twice the pre-industrial concentration) with an approximately equivalent interim goal: *a rate of global CO₂ emission in 2054 no higher than today’s.*

Today, CO₂ is emitted at a rate of seven billion tons of carbon per year. The interim goal, therefore, is to emit seven billion tons of carbon per year, or less, in 2054.

In 2054, in the absence of deliberate carbon policy, carbon emissions could be approximately 14 billion tons of carbon per year. Then, the 50-year task of achieving stabilization “below doubling” requires eliminating seven billion tons of carbon emissions per year by 2054 – half of expected emissions.

It is useful to think of this task as seven “wedges,” where a wedge is a 50-year campaign that results in the elimination of *one* billion tons of carbon emissions per year by 2054. The formulation in terms of seven wedges (several parallel 50-year campaigns) is intended to elicit new thinking about policy levers and to encourage the invention of new coalitions.

The wedge is a useful unit of action, because it permits quantitative discussion of cost, pace, risk, and trade-off. All carbon-emission-reduction strategies are put on a common footing, based on how much carbon each can displace. These strategies include energy efficiency, coal combustion with carbon capture and storage, biofuels, and hydrogen – those highlighted at this workshop – as well as strategies not highlighted at this workshop, such as wind and other renewable sources of electricity, nuclear power, fuel shifts among the fossil fuels, reduced deforestation, and increased reforestation.

We argue that in all these instances at least one wedge can be achieved by the scale-up of already commercialized technologies. Although in no case is this scale-up easy to achieve or free of environmental and social costs, its achievement in a supportive policy environment is plausible.