Industrial policy oversight

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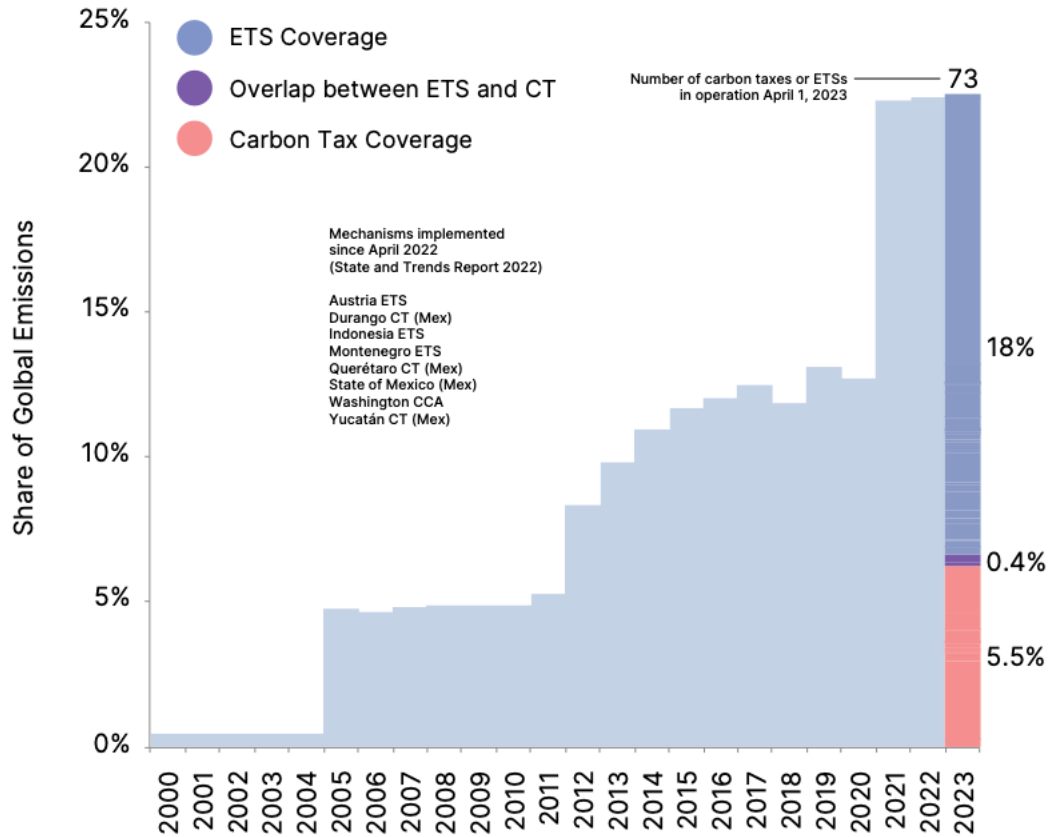
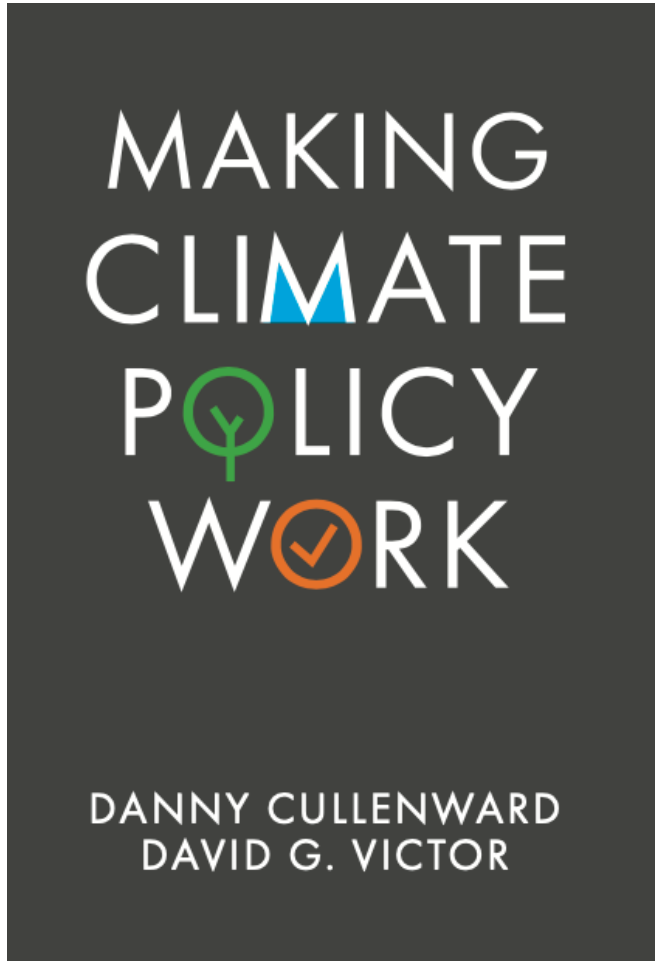
Source: Unsplash (carrot, stick)

Source: Unsplash (carrot), SCOTUS

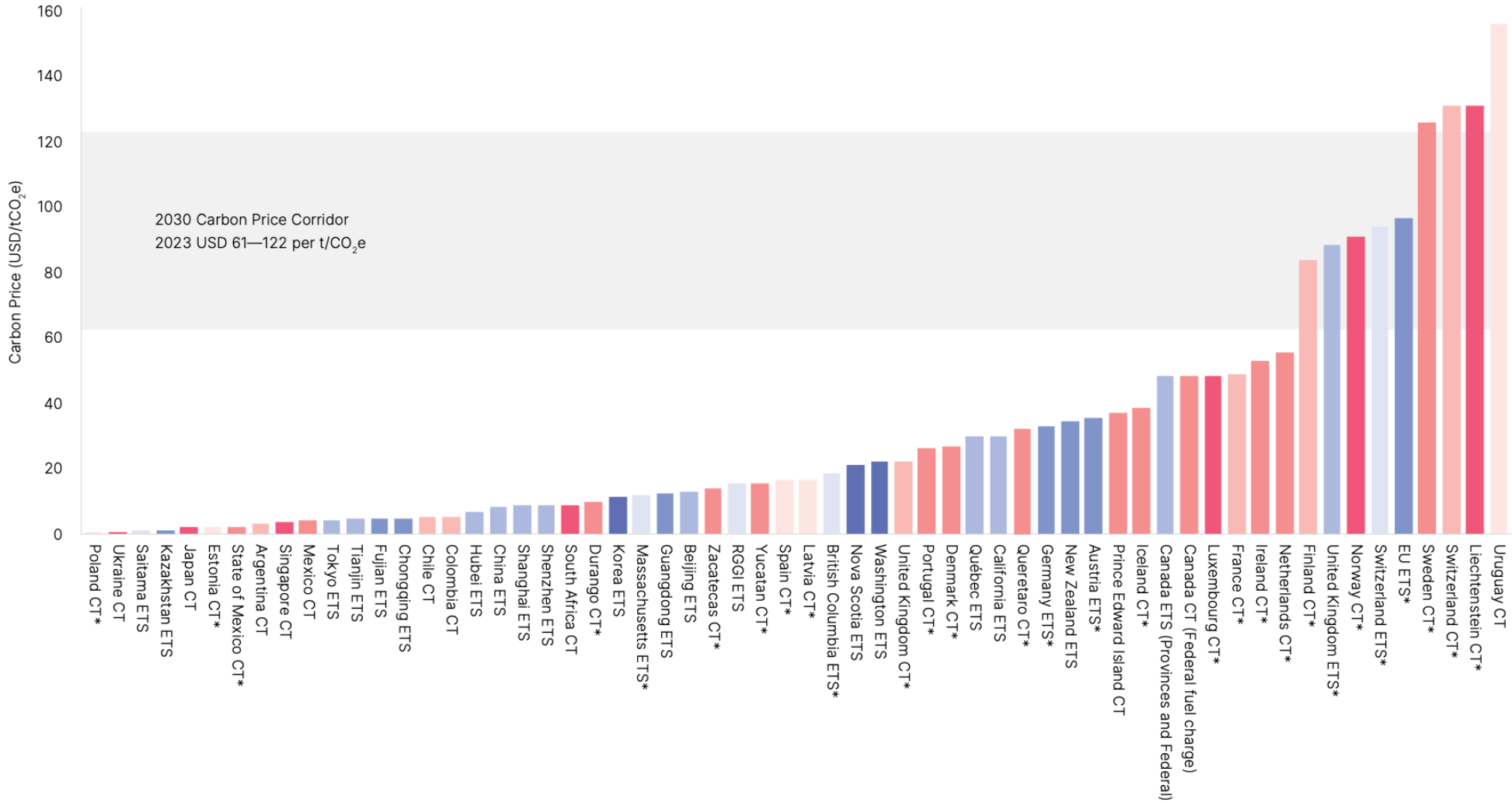
FIGURE 6
SHARE OF GLOBAL GHG EMISSIONS COVERED BY ETSS AND CARBON TAXES





Source: World Bank State and Trends of Carbon Pricing (2023); Cullenward and Victor (2020)

FIGURE 3
PRICES AND COVERAGE ACROSS ETSs AND CARBON TAXES



Note: Nominal prices on April 1, 2023, or most recent exchange-traded or auction prices before April 1, 2023, are shown for illustrative purposes only. Only the main rate is shown for each instrument. Some instruments are not shown in this graph as current price information is not available. Prices are not necessarily comparable between instruments because of (for example) differences in the sectors covered and allocation methods applied, specific exemptions, and compensation methods. The 2030 carbon price corridor is based on the recommendations in the report of the High-Level Commission on Carbon Prices adjusted for inflation. Several jurisdictions apply different carbon tax rates to different sectors or fuels. In these cases, the included price reflects the highest general tax rate or primary fuel covered by the carbon tax. The instruments included on the x-axis reflect prices provided by each instrument. Instruments indicated with* are in jurisdictions with multiple instruments, so coverage of those jurisdictions' total emissions may be higher than indicated by an individual instrument. The EU ETS includes 27 EU member states plus Norway, Iceland, and Liechtenstein. Several federal and subnational policies in Canada are priced at the same rate, reflecting the Pan-Canadian Approach that requires all Canadian provinces and territories to have a carbon pricing system in place that aligns with the minimum national stringency federal standards. These are presented in two instruments (a carbon tax and an ETS): the carbon tax entry (Canada provinces and federal) includes the federal fuel charge, British Columbia carbon tax, and Newfoundland and Labrador carbon tax, while Canada federal and provinces (ETS entry) includes the federal Output-Based Pricing System (OBPS), Alberta Technology Innovation Emissions Reduction regulation, New Brunswick ETS, Newfoundland and Labrador Performance Standard Systems, and Saskatchewan OBPS. The coverage under Canada reflects the combined coverage of Canada's total emissions by the included policies. Coverage estimates for subnational Mexico carbon taxes were not available-approximate estimates are included based on the fuels covered by each instrument.

Source: World Bank State and Trends of Carbon Pricing (2023); Jenkins (2019)

INDUSTRIAL POLICY INSTRUMENTS

1. **Uncapped tax credits (so, so many)**
2. **Discretionary federal funding**

   Green banks and government co-financing (DOE Loan Program Office, EPA GGRF)
   Direct federal funding (hydrogen and DAC hubs)
   Federal procurement (USPS, carbon removal)

3. **Block grants (EPA, others)**
4. **Regulation**

UNCAPPED TAX CREDITS

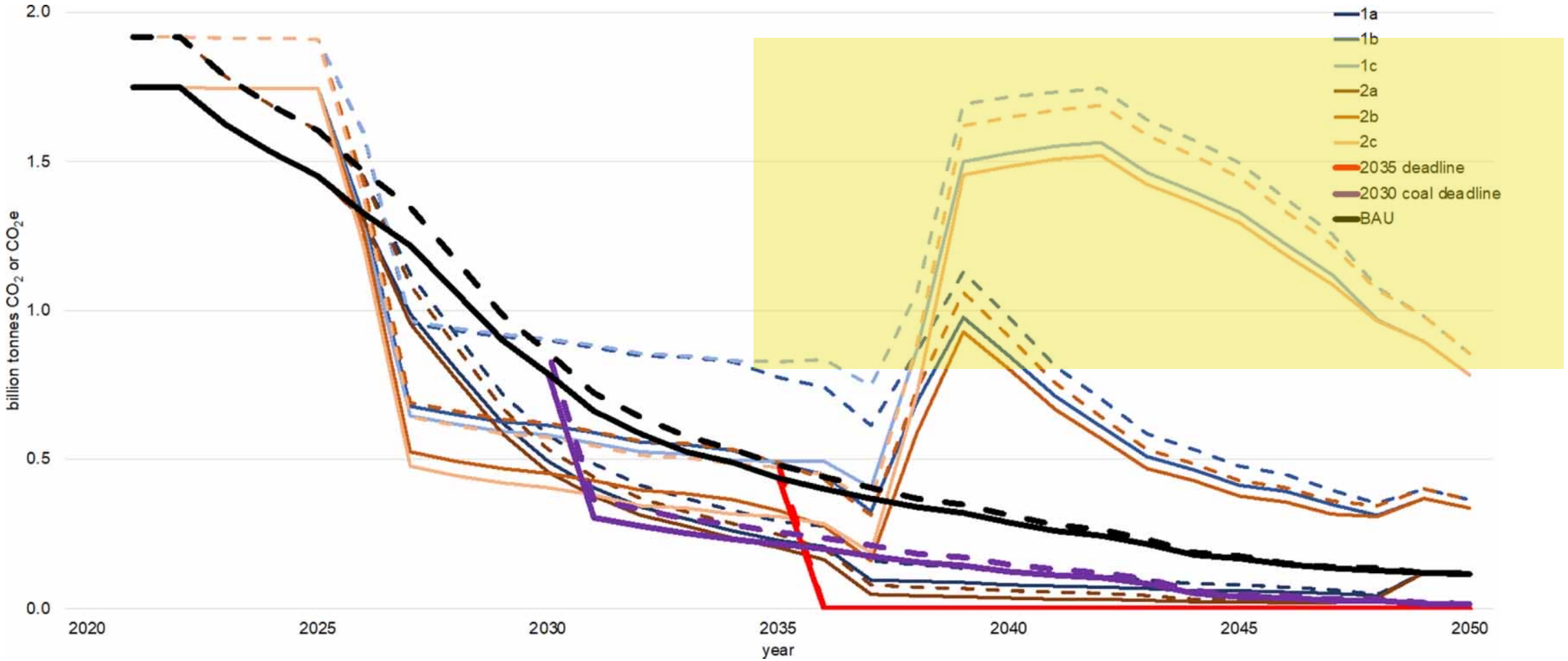
Limited statutory flexibility

Example: carbon capture and storage under 45Q

Significant statutory flexibility

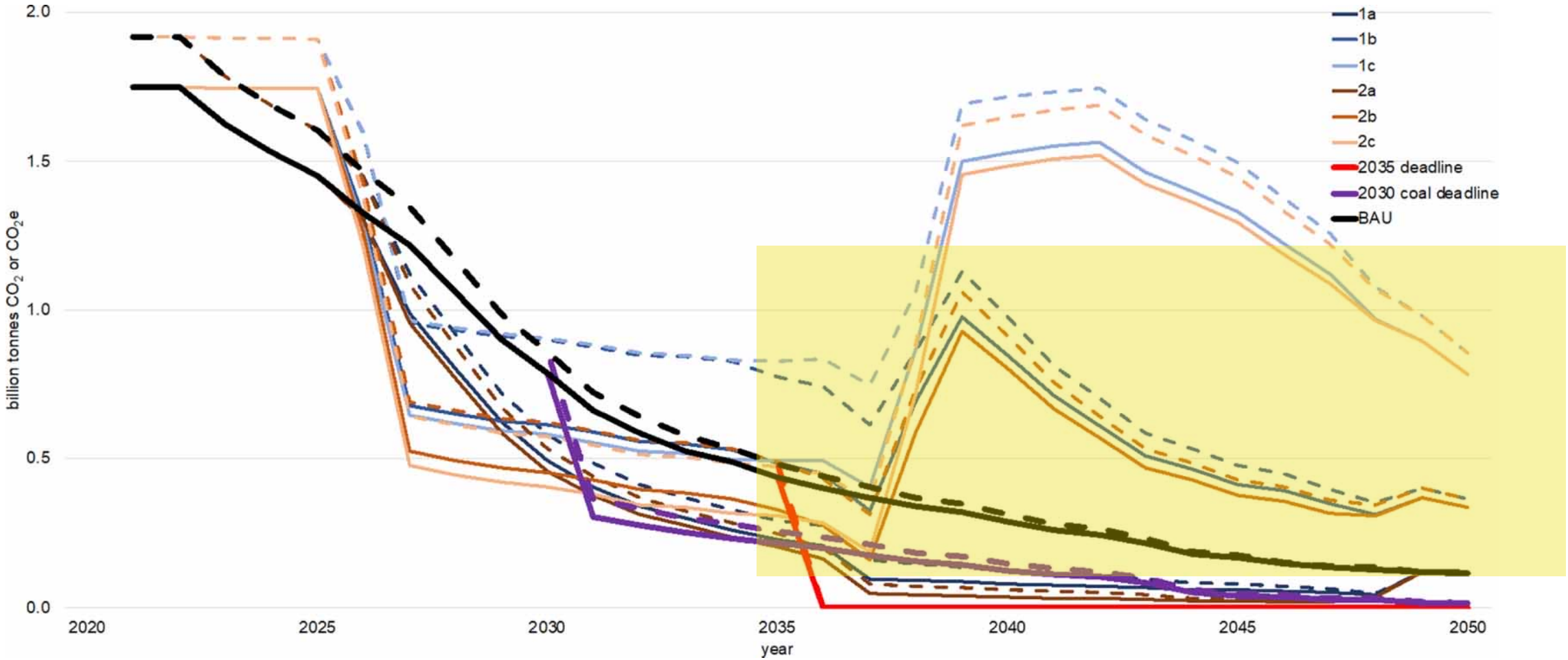
Example: hydrogen production tax credit under 45V

CCS extends plant lifetimes by 20 years (1c, 2c)



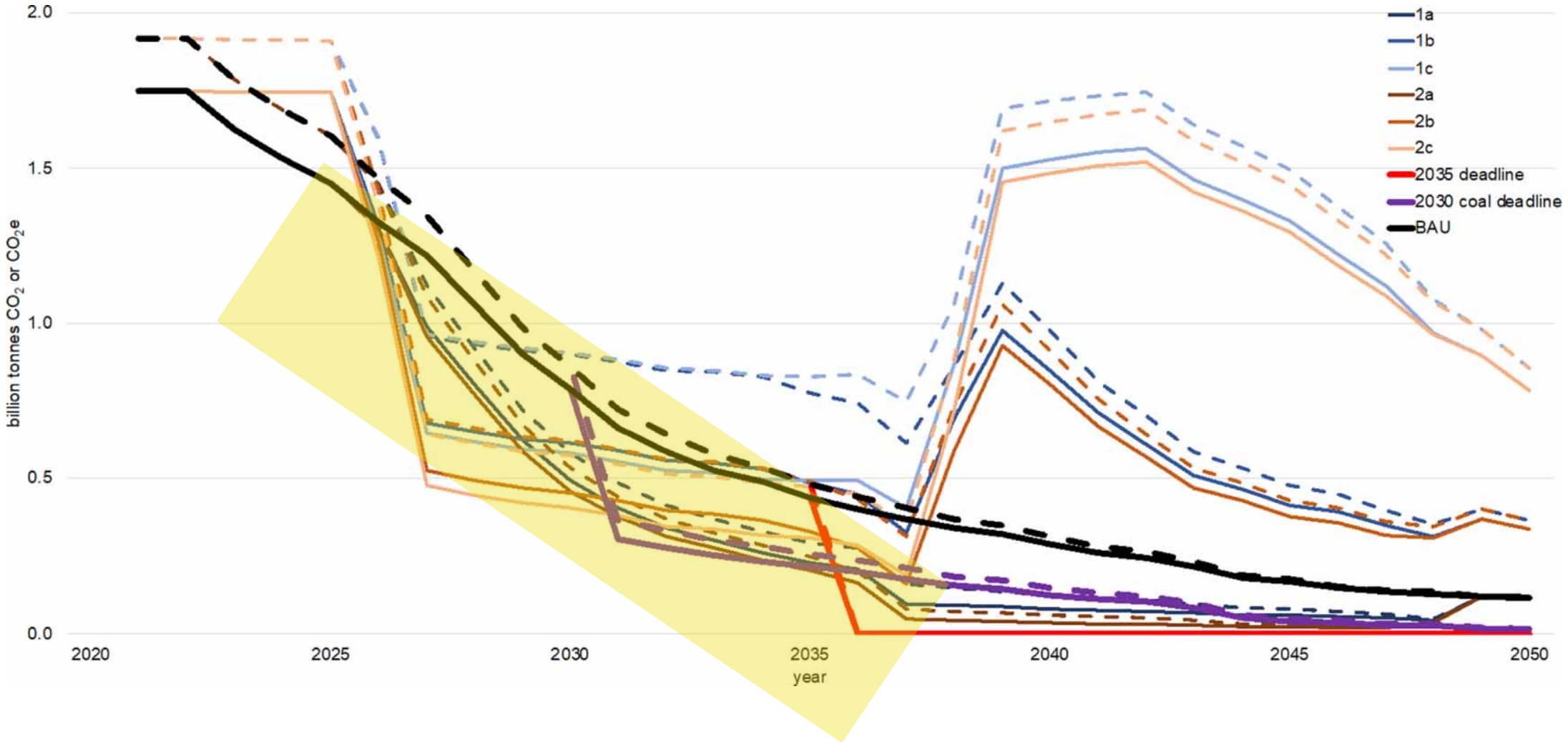
Source: Grubert and Sawyer (2023)

CCS extends plant lifetimes by 12 years (1b, 2b)



Source: Grubert and Sawyer (2023)

CCS does not extend plant lifetime (1a, 2a)



Source: Grubert and Sawyer (2023)

UNCAPPED TAX CREDITS

Limited statutory flexibility

Example: carbon capture and storage under 45Q

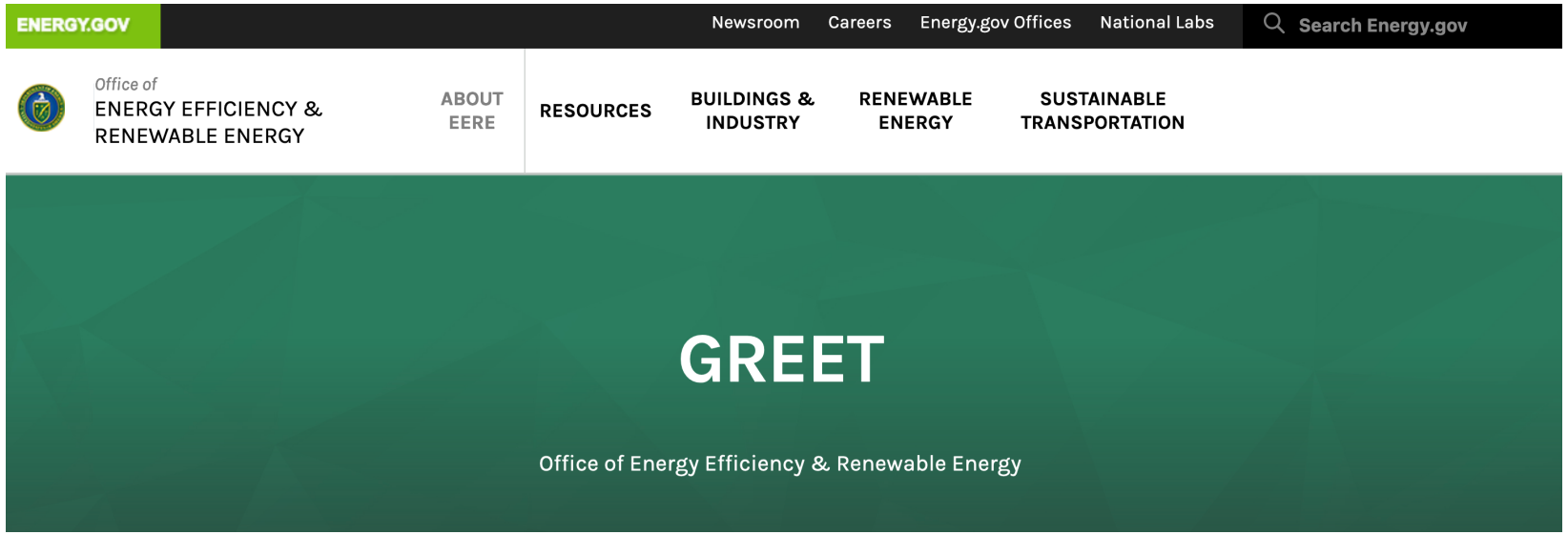
Significant statutory flexibility

Example: hydrogen production tax credit under 45V

Tax credit tier	Lifecycle emissions (kg CO2e per kg H2)	Tax credit (2022 $ per kg H2)
Highest tier	Less than 0.45	$3.00
	Less than 1.5	$1.00
	Less than 2.5	$0.75
Lowest tier	No more than 4.0	$0.60

HEATMAP

Source: Grubert and Cullenward (2024); 26 U.S.C. § 45V(b)(2)



Click to access specific GREET versions:

- R&D Greet: Argonne R&D GREET Model +
- 40BSAF-GREET +
- 45VH2-GREET +
- California Low-Carbon Fuel Standard (LCFS) GREET +
- International Civil Aviation Organization's (ICAO) Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) +

Source: US DOE

DRAFT HYDROGEN RULES

Incrementality

Powered by new clean energy (within 36 months) (≠ additionality)

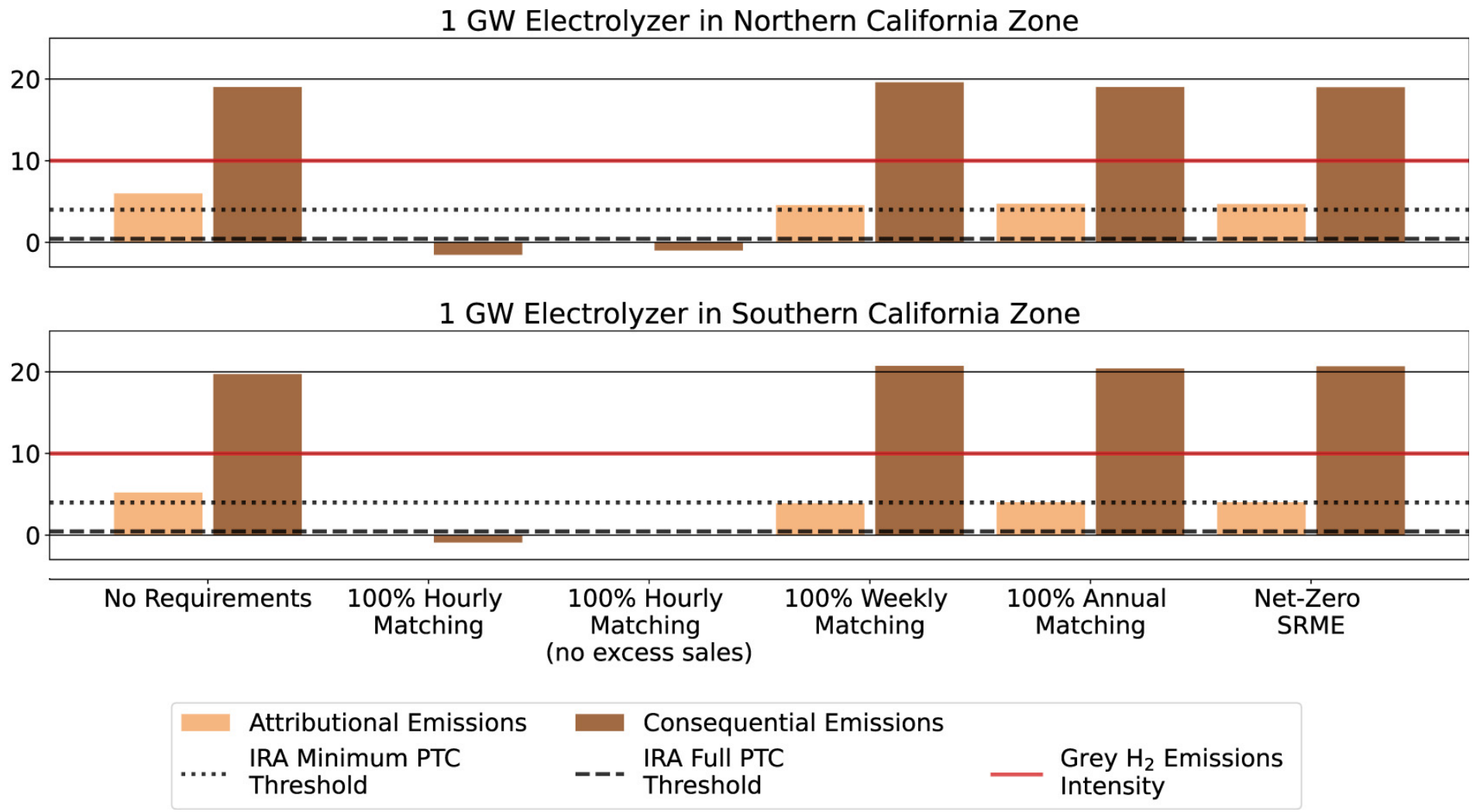
Deliverability

Clean energy located in the same grid area

Hourly matching

Clean energy and electrolyzer load matched each hour

Hydrogen Emissions kCO_2e/kgH_2



Source: Ricks et al. (2023)

Our hubs and/or state agencies will go into more detail, but all our comments are built on the same foundation: to enable success in all states, 45V regulations should have an alternative compliance pathway for states with firm commitments to get to 100 percent clean electricity. This position does not reflect a lack of concern about the risk that hydrogen production could lead to indirect increases in greenhouse gas emissions, but rather, that state policies address the concern without imposing cumbersome and expensive project-level limitations on use of clean electricity sources. An alternate compliance pathway would enable grid-connected projects to be built in our states, which already meet the intent behind draft guidelines, without impacting the proposed framework in states that do not have 100 percent clean electricity commitments.

Sincerely,

Gavin Newsom
Governor
State of California

Tina Kotek
Governor
State of Oregon

Jay Inslee
Governor
State of Washington

Source: Regulations.gov

- Any new load added on the electric grid in California will be served only with new renewable and zero carbon resources that will be added to the electric grid.

Thank you for your consideration,

Liane Randolph
Chair, California Air Resources Board (CARB)

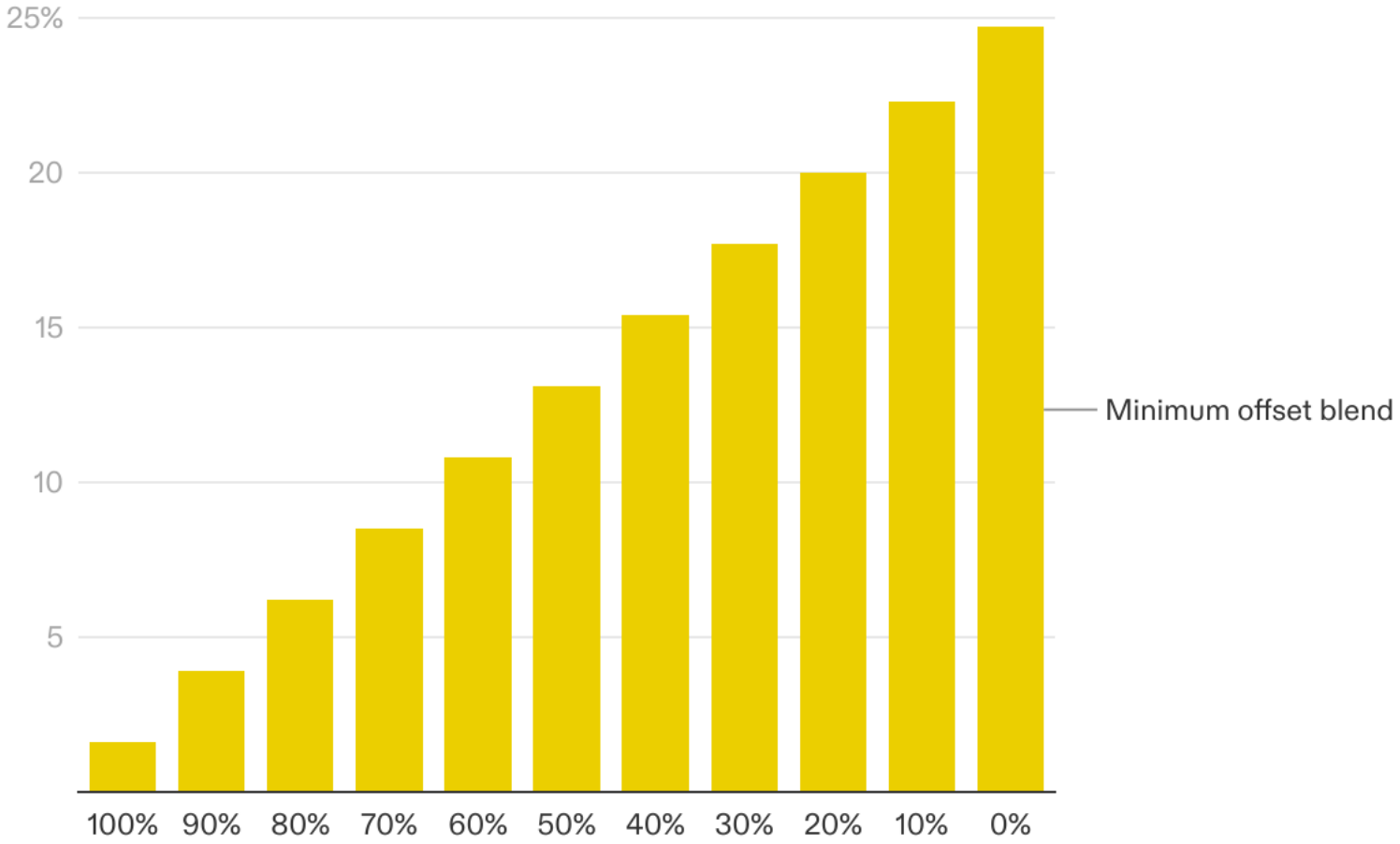
David Hochschild
Chair, California Energy Commission (CEC)

Alice Reynolds
President, California Public Utilities Commission (CPUC)

Dee Dee Myers
Senior Advisor to the Governor
Director, Governor's Office of Business and Economic Development (GO-Biz)

Source: Regulations.gov

Methane Offsets Needed to Qualify for the Top-Tier Hydrogen Tax Credit



Results are expressed as a mass fraction of the project's feedstock, based on an assumption of 0.9% life cycle methane emissions for the primary feedstock and a carbon intensity of -150 gCO2e/MJ for the methane offset.

HEATMAP

Source: Grubert and Cullenward (2024)

Briefing Book

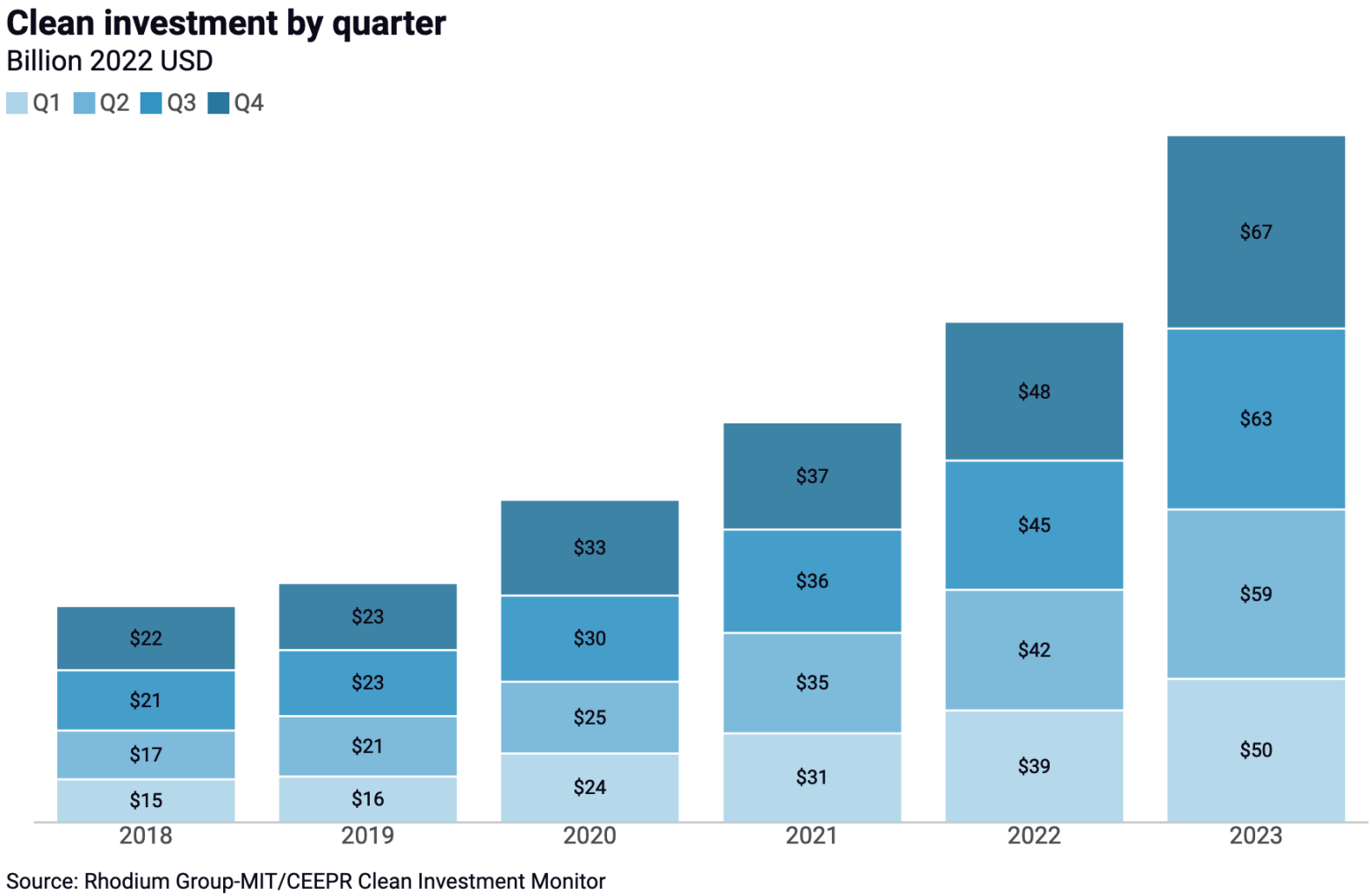
How much hot air?

Hydrogen tax credits highlight the challenges of climate policy without economy-wide climate regulation

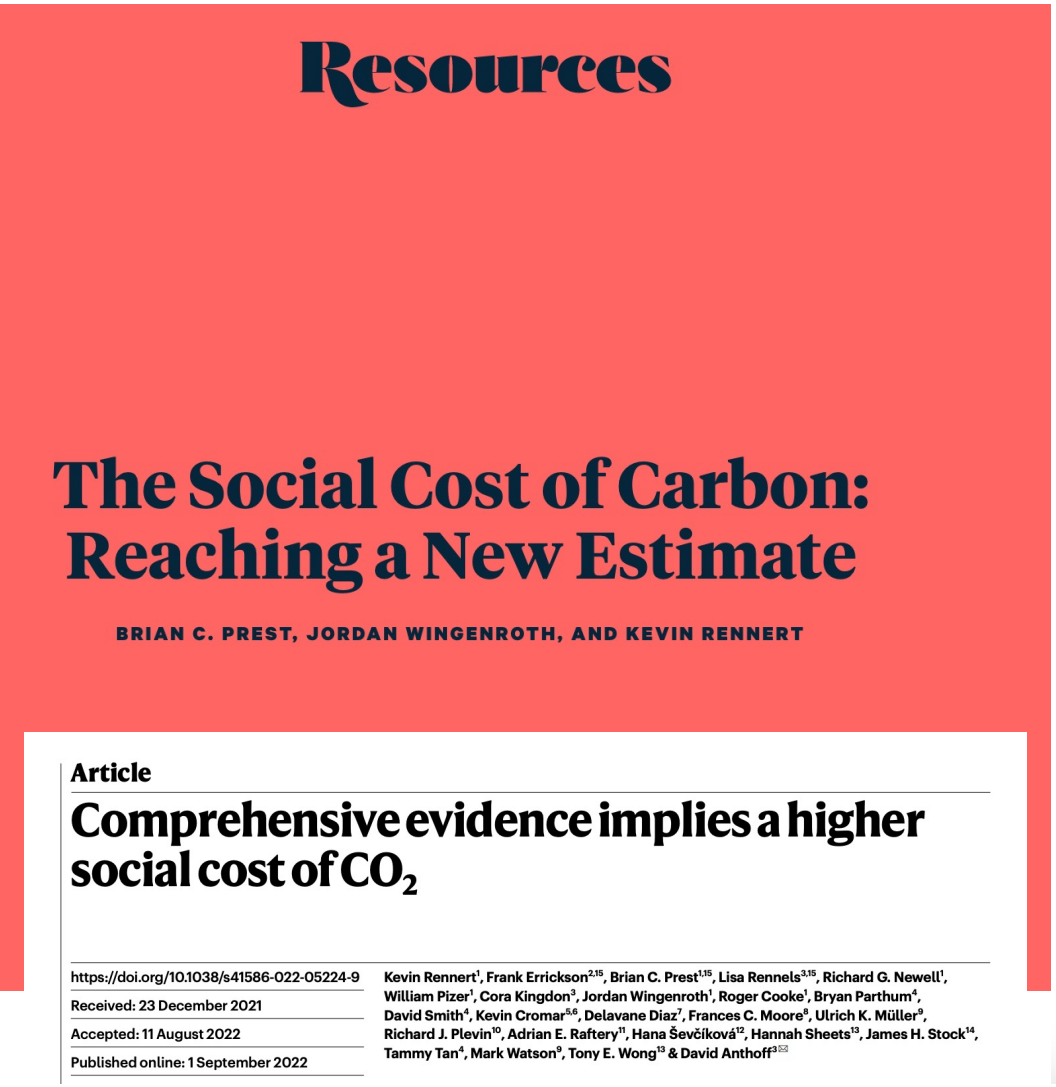
FRAN MOORE

FEB 19, 2024

The saga of the 45V credits, however, highlights the challenges of attempting to build major climate policy on emissions accounting rules developed for individual, project level analysis. The U.S., recognizing the serious threat posed by climate change, has ambitious emissions-reduction goals. Achieving these goals using any policy instrument - subsidies, taxes, or regulation - will generate large relative price changes between dirty and clean technologies, driving changes in production and consumption behavior across the economy. In the absence of economy-wide carbon pricing or regulation, these responses will act to undermine policy effectiveness and confound emissions reduction goals. We should take away two main lessons: design of major U.S. climate policy cannot rest on project-level lifecycle emissions accounting that omits partial and general equilibrium responses; and economy-wide carbon pricing or regulation directly addressing the unpriced externalities from greenhouse gas emissions is likely to be an essential complement to the technology-focused policies of the IRA.



Source: Rhodium Group / MIT-CEEPR Clean Investment Monitor



Setting the Scene

Since 2017, Resources for the Future (RFF) has been working toward updating the scientific basis that underlies the social cost of carbon (SCC). The SCC is an estimate of the economic damages, in dollars, resulting from the addition of an incremental ton of carbon dioxide (CO_2) into Earth's atmosphere. The value has been used widely to quantify the economic benefits of policies that reduce greenhouse gas emissions, including vehicle fuel economy standards, power plant regulations, and rules that reduce emissions from oil and gas infrastructure.

As part of these efforts, **RFF's Social Cost of Carbon Initiative** assembled a large group of multidisciplinary researchers across many institutions to update the science that underlies the SCC in a manner fully responsive to a series of recommendations from a landmark **2017 report** published by the National Academies of Sciences, Engineering, and Medicine (NASEM). That work has proven timely, given President Joe Biden's January 2021 **executive order**, which instructs his administration to update the official value for the SCC so that it takes into consideration these NASEM recommendations and the recent and ongoing scientific progress that the NASEM guidance has steered.

Source: Resources for the Future; Rennert et al. (2022)