

Role of Carbon Capture in Reducing Climate Change

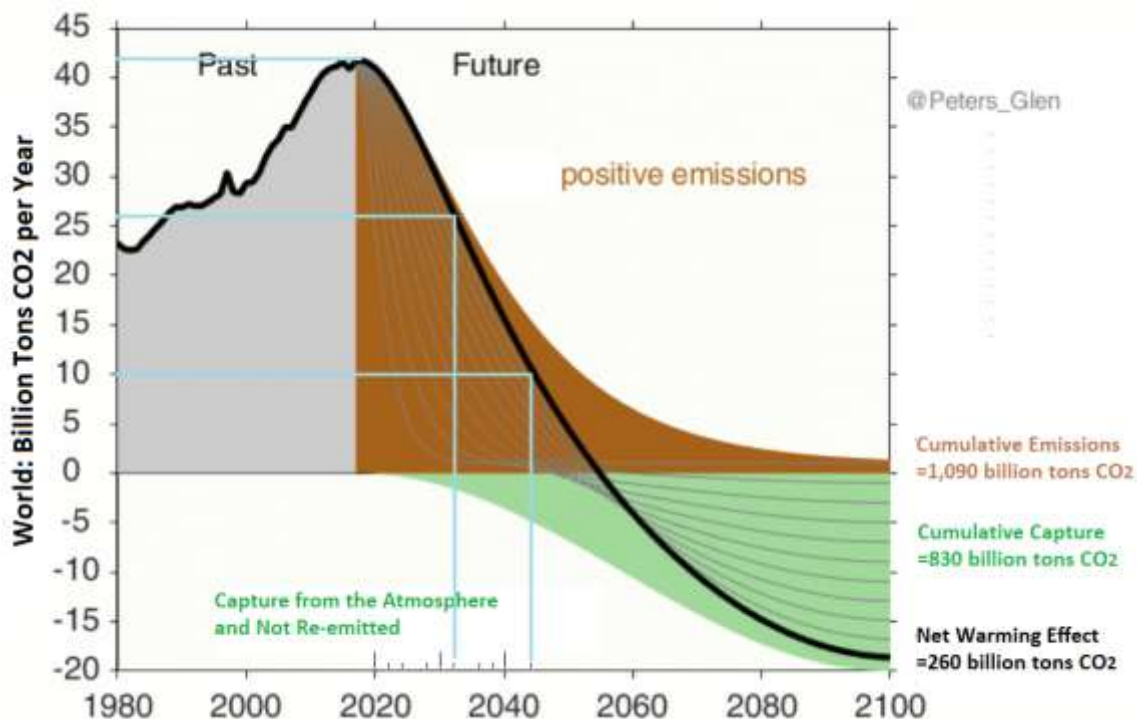
Draft by Paul Burke 5/23/19

To hold warming under 1.5°C (2.7°F), the world needs to do all the following.¹

- Direct air capture and storage of 2 billion metric tons of CO₂ per year by 2032
- Direct air capture and storage of 5 billion metric tons of CO₂ per year by 2044
- CO₂ emissions cuts of 40% by 2032
- CO₂ emissions cuts of another 40% by 2044
- Direct air capture and storage of another 40 billion tons of CO₂ for every extra year in which the world continues to emit 40 billion tons

This list uses 12-year periods, because CCL does, when it describes the 40% cut made by its policy.²

Carbon Emissions (Brown) and Capture (Pale Green) to Keep Warming under 1.5°C³

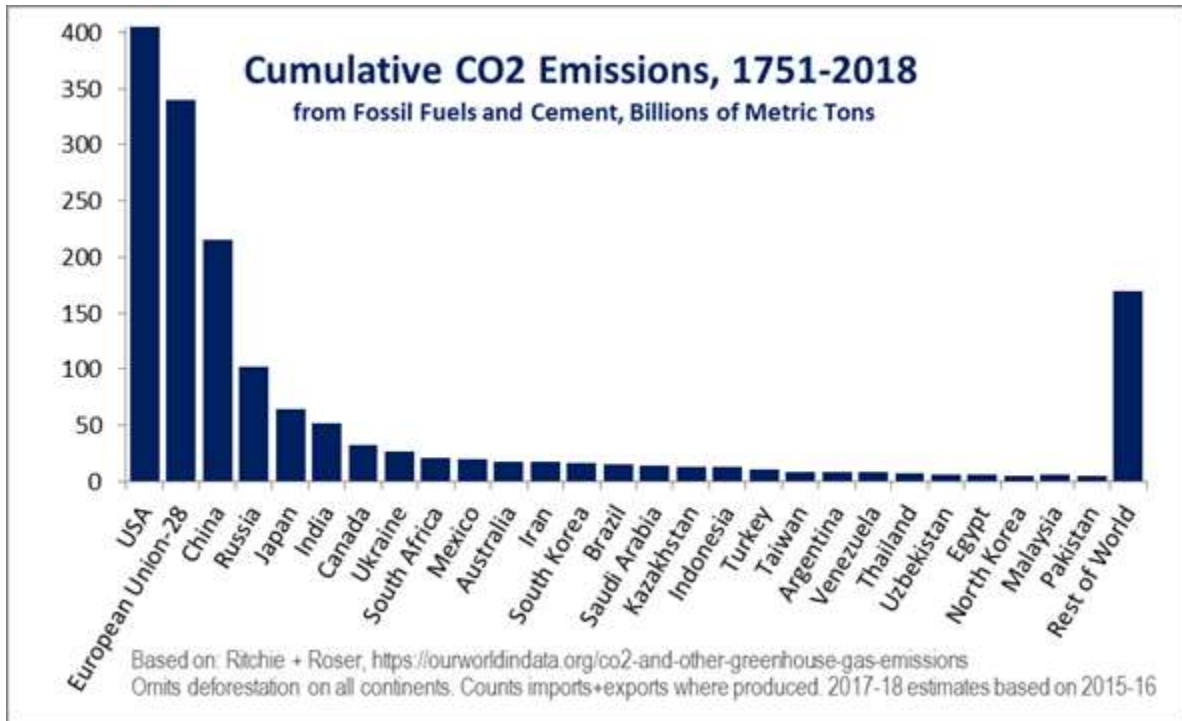


The faint gray lines in the graph show alternate paths, with faster cuts in CO₂, so they need less capture of CO₂. However those alternate cuts are even more precipitous and less realistic.

CO ₂ Emissions to Keep Warming under 1.5°C ⁴	World Emissions	World Capture Needed	USA Emissions with HR 763 ⁵
CO ₂ now, billion metric tons per year	42	0	5
CO ₂ in 12 years	26	2	3
Change as % of original level	-40%		-40% ²
CO ₂ in 24 years	10	5	2
Additional Change as % of original level	-40%		-20% ⁶

As shown in the table above, even CCL's steadily rising fee has less effect in the second 12 years, and we need research on how to cut emissions more in that period.

The world has to cut CO2 this drastically now, because of past emissions by the US and Europe,⁷ so it is incumbent on the US to cut and capture more than other countries in the future, and it needs research to do so.



Scientists widely agree research on carbon capture and use is needed. A study in *Nature* says we can only avoid excessive global warming if we invent much better ways than we have now to take CO2 out and keep it out of the air, *"in all but the most optimistic cases, we also find negative emission requirements that have not yet been shown to be achievable"*⁸

IPCC says, *"All pathways that limit global warming to 1.5°C [2.7°F] with limited or no overshoot project the use of carbon dioxide removal (CDR) on the order of 100-1000 GtCO2 over the 21st century. CDR would be used to compensate for residual emissions and, in most cases, achieve net negative emissions to return global warming to 1.5°C following a peak (high confidence)."*⁹

Even for the less strict goal of 2°C [3.6°F] warming, carbon capture and use are needed. IPCC has only one scenario (they call it a "Representative Concentration Pathway" RCP) which limits warming to 3.6°F: *"RCP2.6 is representative of a scenario that aims to keep global warming likely below 2°C above pre-industrial temperatures. The majority of models indicate that scenarios meeting forcing levels similar to RCP2.6 are characterized by **substantial net negative emissions** by 2100, on average around 2 GtCO2/yr"*¹⁰ (emphasis added).

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- ¹ **2018 Peters**, Glen. CICERO Center for International Climate Research. <https://energiogklima.no/blogg/stylised-pathways-to-well-below-2c/>
- ² <https://energyinnovationact.org/>
- ³ **2018 Peters**, Glen. CICERO Center for International Climate Research. <https://energiogklima.no/blogg/stylised-pathways-to-well-below-2c/>
- ⁴ **2018 Peters**, Glen. CICERO Center for International Climate Research. <https://energiogklima.no/blogg/stylised-pathways-to-well-below-2c/>
- ⁵ **2014 REMI**. Nystrom, Scott, and Patrick Luckow. "The Economic, Climate, Fiscal, Power, and Demographic Impact of a National Fee-and-Dividend Carbon Tax ." *REMI and Synapse Study*, Regional Economic Model Institute, 9 June 2014, <https://citizensclimatelobby.org/remi-report/>
- ⁶ **2014 REMI**. Nystrom, Scott, and Patrick Luckow. "The Economic, Climate, Fiscal, Power, and Demographic Impact of a National Fee-and-Dividend Carbon Tax ." *REMI and Synapse Study*, Regional Economic Model Institute, 9 June 2014, <https://citizensclimatelobby.org/remi-report/>
- ⁷ **2017 Ritchie**, Hannah and Max Roser "CO₂ and other Greenhouse Gas Emissions" <https://ourworldindata.org/co2-and-other-greenhouse-gas-emissions>
- ⁸ **2015 Gasser** et al. "Negative emissions physically needed to keep global warming below 2 °C" *Nature Communications* <https://www.nature.com/articles/ncomms8958>
- ⁹ **2018 IPCC** p.19 "Global warming of 1.5°C Summary for Policymakers" <https://www.ipcc.ch/sr15/chapter/summary-for-policy-makers/>
- 2018 Noerpel**. "IPCC SR 15 Reliance on Negative Emissions" <https://blueridgeleader.com/ipcc-sr-15-reliance-on-negative-emissions/>
- ¹⁰ **2015 IPCC**. p.57 "Climate Change 2014 Synthesis Report" https://ar5-syr.ipcc.ch/topic_futurechanges.php