

Carbon Neutrality: The Role of Carbon Capture, Sequestration, and Options for Utilization

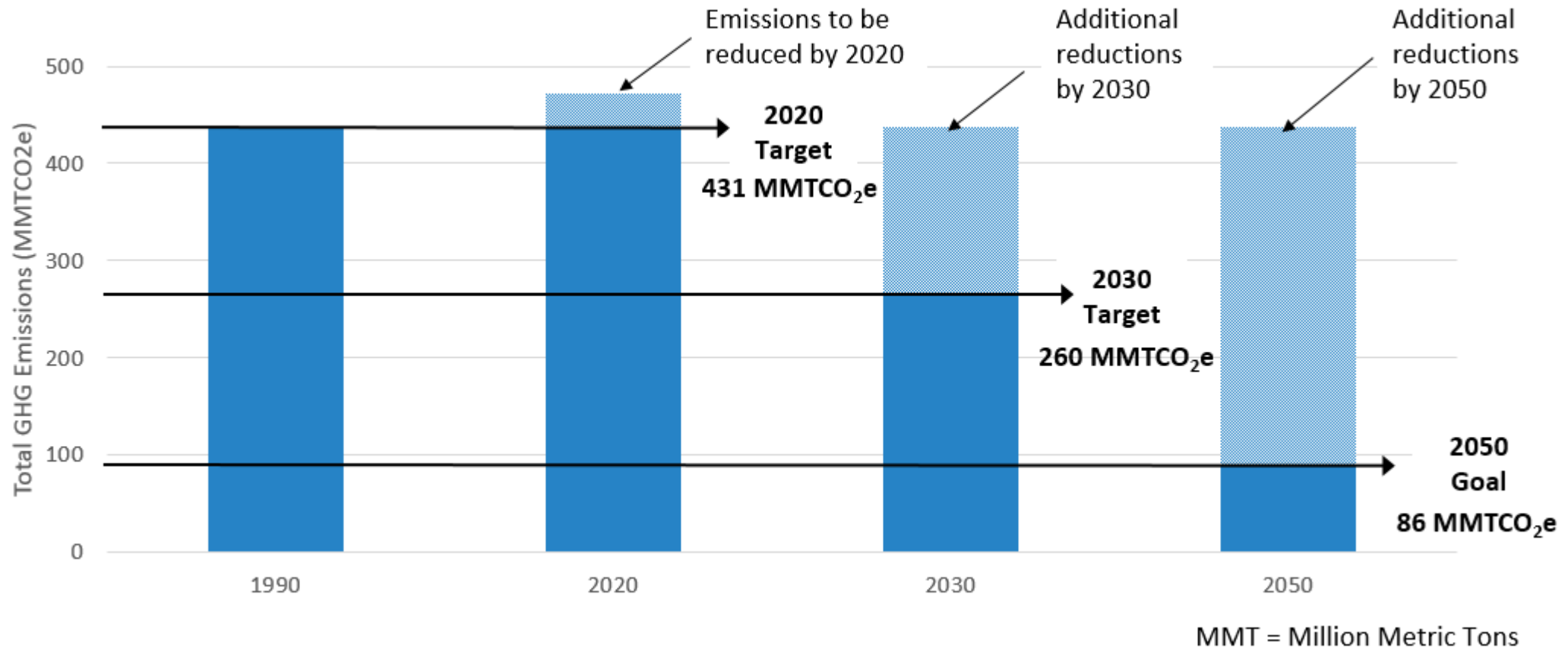
DECEMBER 11, 2019



Webinar Logistics

- Presentation and link to submit and view informal comments:
<https://ww3.arb.ca.gov/cc/scopingplan/meetings/meetings.htm>
- Webcast available: <https://video.calepa.ca.gov/>

California's GHG Emissions Reduction Targets



Source: CARB, 2018

Framing the Path Forward

IPCC Report – Carbon neutrality by 2045 may hold global warming to 1.5°C



Some regions are net emitters; others are sinks



Carbon Neutrality by 2045



Reduce fossil energy and NWL emissions; evaluate potential sinks

California Carbon Neutrality (CO₂e)

Today

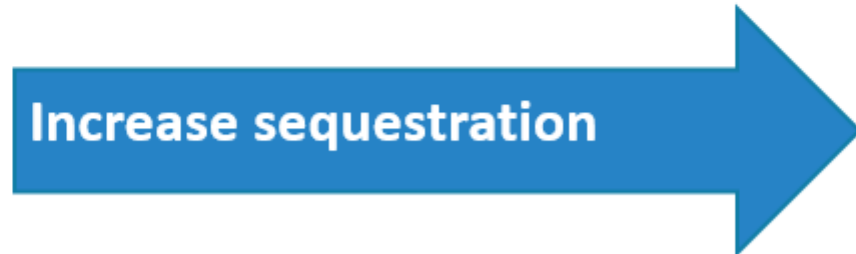


AB 32 GHG Inventory



Conversion

Natural & Working
Lands Inventory



Mid-century

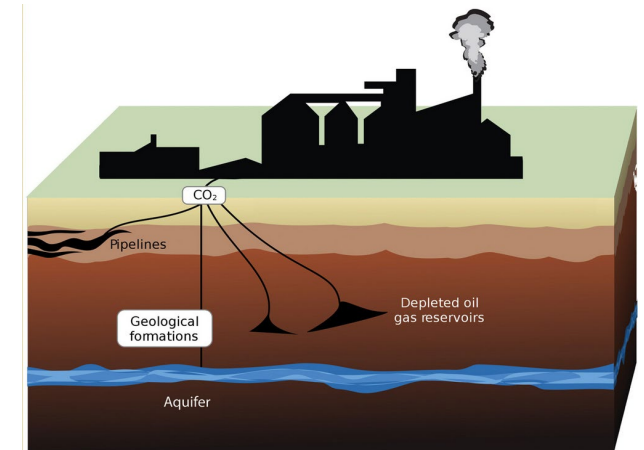


Both categories emit GHGs

No net GHG emissions

Carbon Capture and Sequestration Protocol: Low Carbon Fuel Standard

- Protocol allows CCS credit generation for:
 - Low carbon fuel pathways (e.g. ethanol)
 - Direct air capture projects
 - Projects at crude oil extraction operations and refineries
- Rigorous accounting & permanence requirements
 - Includes 100-year post-injection monitoring



Today's Workshop

- What are the biggest barriers to near-term deployment of capture technology, and what actions can industry and policy-makers undertake to overcome these barriers?
- How can existing infrastructure be transitioned to process, transport, store and monitor CO₂?
- What are the tradeoffs between reducing fossil fuel combustion versus relying on carbon capture and sequestration for achieving our deep decarbonization goals?

Panelists:

- Ben Haley, Co-Founder, Evolved Energy Research
- Lee Beck, Senior Advisor, Global CCS Institute
- Jeffrey Brown, Principal, Brown Brothers Energy and Environment, LLC
- Jennifer Wilcox, Professor, Worcester Polytechnic Institute
- Geoff Holmes, Business Development, Carbon Engineering
- Keith Pronske, President and CEO, Clean Energy Systems

Resources

- CARB, 2017: [California's 2017 Climate Change Scoping Plan](#)
- IPCC, 2018: [Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty](#)
- USGCRP, 2018: [Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II](#)

Thank You

- Climate Change Scoping Plan
 - <https://ww3.arb.ca.gov/cc/scopingplan/scopingplan.htm>
- Carbon Neutrality Workshops
 - <https://ww3.arb.ca.gov/cc/scopingplan/meetings/meetings.htm>