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Act Now for a Cleaner Tomorrow

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Agenda

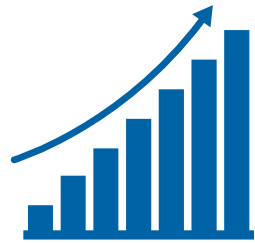
- Carbon Reduction Timing
- Cumulative Impact vs. Annual Accounting
- Comparing Cumulative Benefits
- Strategic Concepts

Carbon Reduction Timing

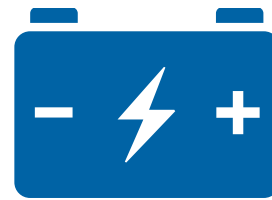
A Simple Step Today For A Better Tomorrow



Fossil fuels are the top contributor to GHG emissions



Emissions accumulate in the atmosphere



Waiting for future technology is doing harm



Biofuels: a simple step to reduce GHG emissions today

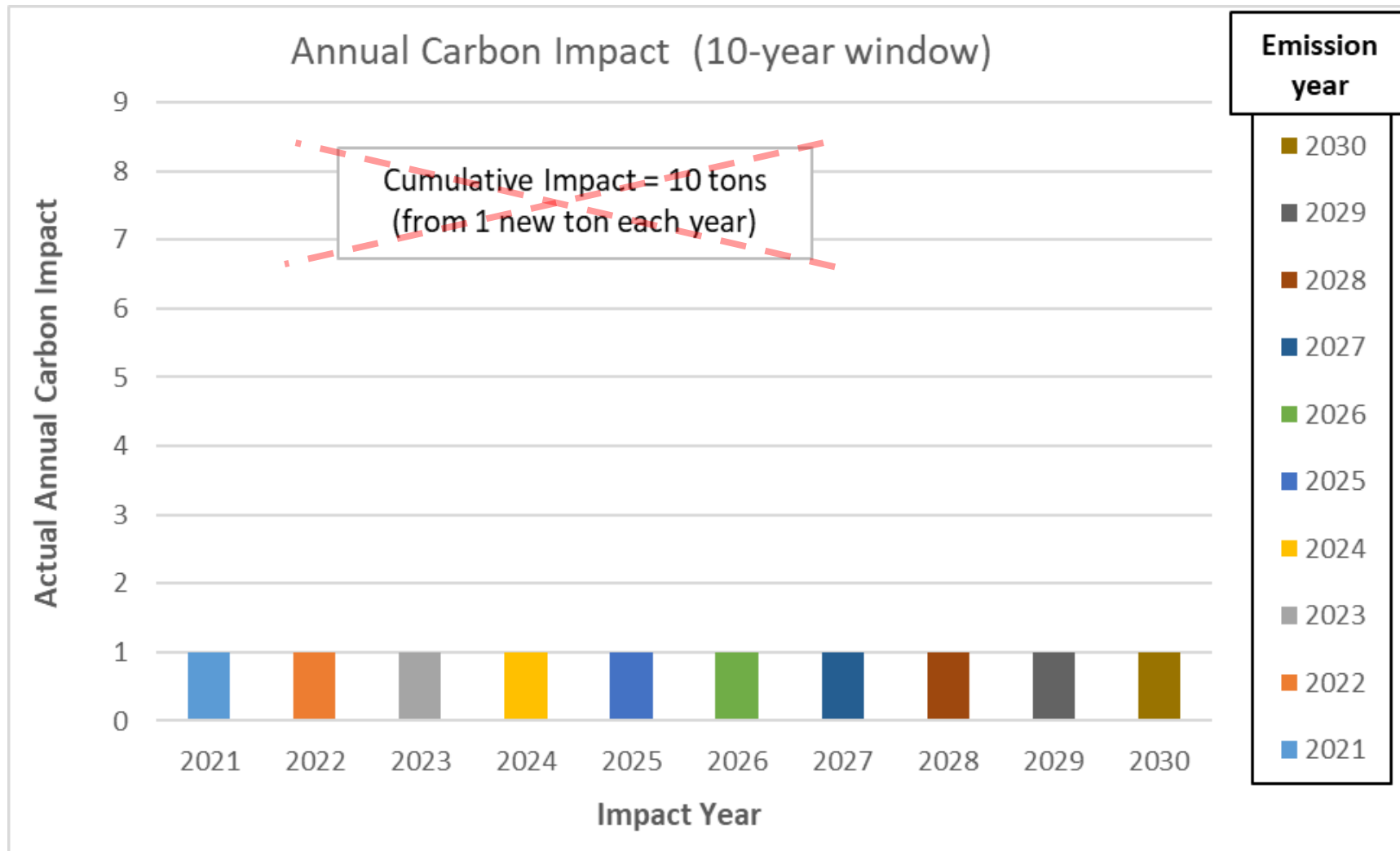
While we plan for the long-term, we must also ask: “What can we do now?”

Cumulative Impact vs. Annual Accounting

What Is Cumulative Carbon Impact?

- **Cumulative Carbon Impact** can be estimated for any activity that generates fossil carbon emissions
 - Analogous to how we save for retirement
 - Except emission reductions are the currency (instead of deposits)
- The **Cumulative Carbon Impact** for fossil carbon emissions is determined by both the size of the emissions AND when they occur
 - Like retirement investing because the earlier an emissions behavior is changed, the more years that change can make a difference
 - Similar to annual deposits in a retirement account
 - But also like retirement investing because greenhouse gases persist in the atmosphere
 - Similar to compounded interest on annual deposits
 - Each year's emissions continue to have a negative impact for many years, which means every reduction in fossil carbon emissions has a multi-year benefit

Simple Annual Carbon Accounting Is **Wrong**

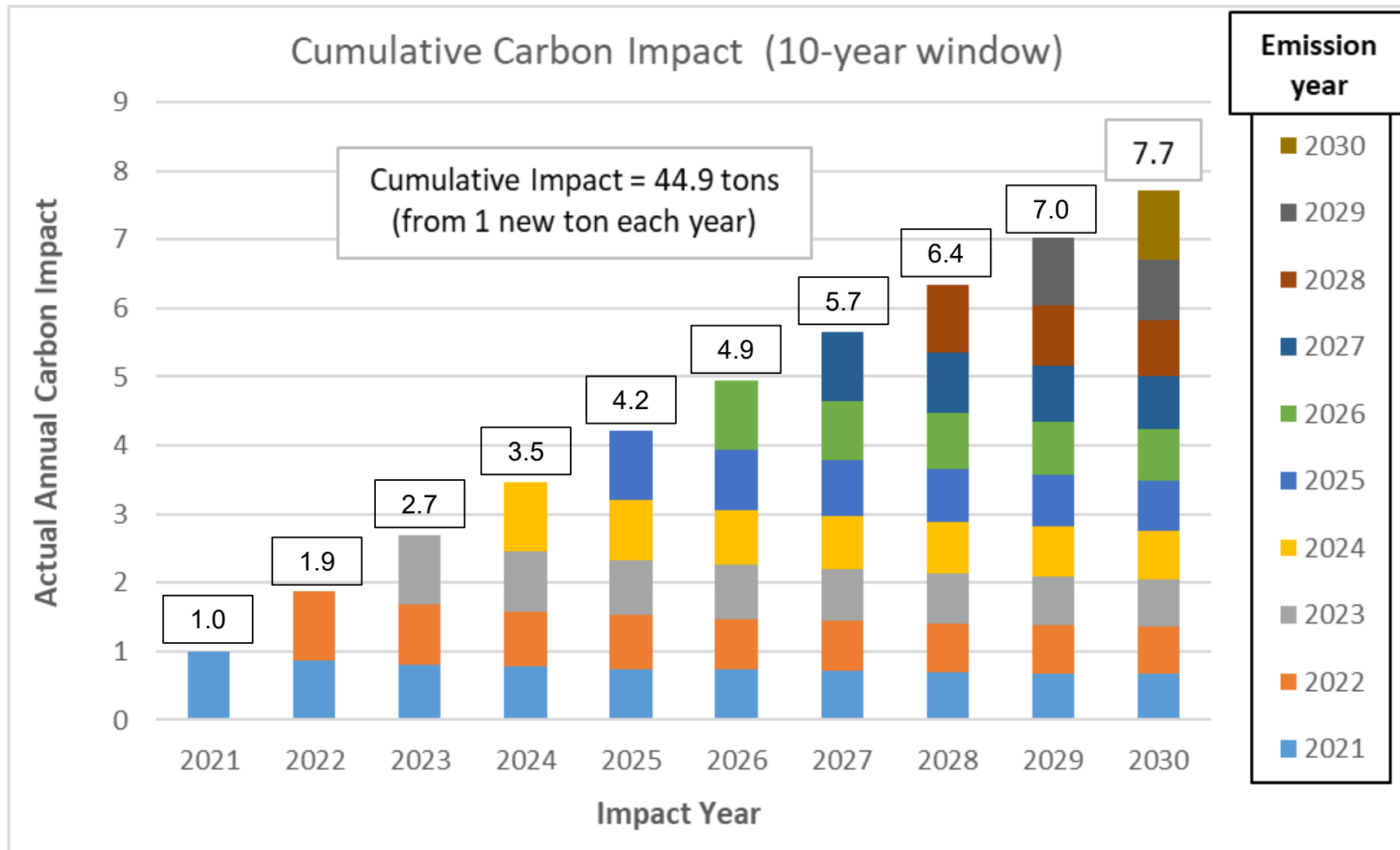


TAKEAWAYS

- Fossil carbon emissions DO NOT affect the atmosphere only in the year they were emitted
- The total of annual fossil carbon emissions DOES NOT reflect their actual impact on the environment



Cumulative Carbon Impact Is Reality



TAKEAWAYS

- New carbon impacts the atmosphere each year for many years (new carbon = fossil carbon)
- 44.9 tons of cumulative impact from only one ton per year for 10 years

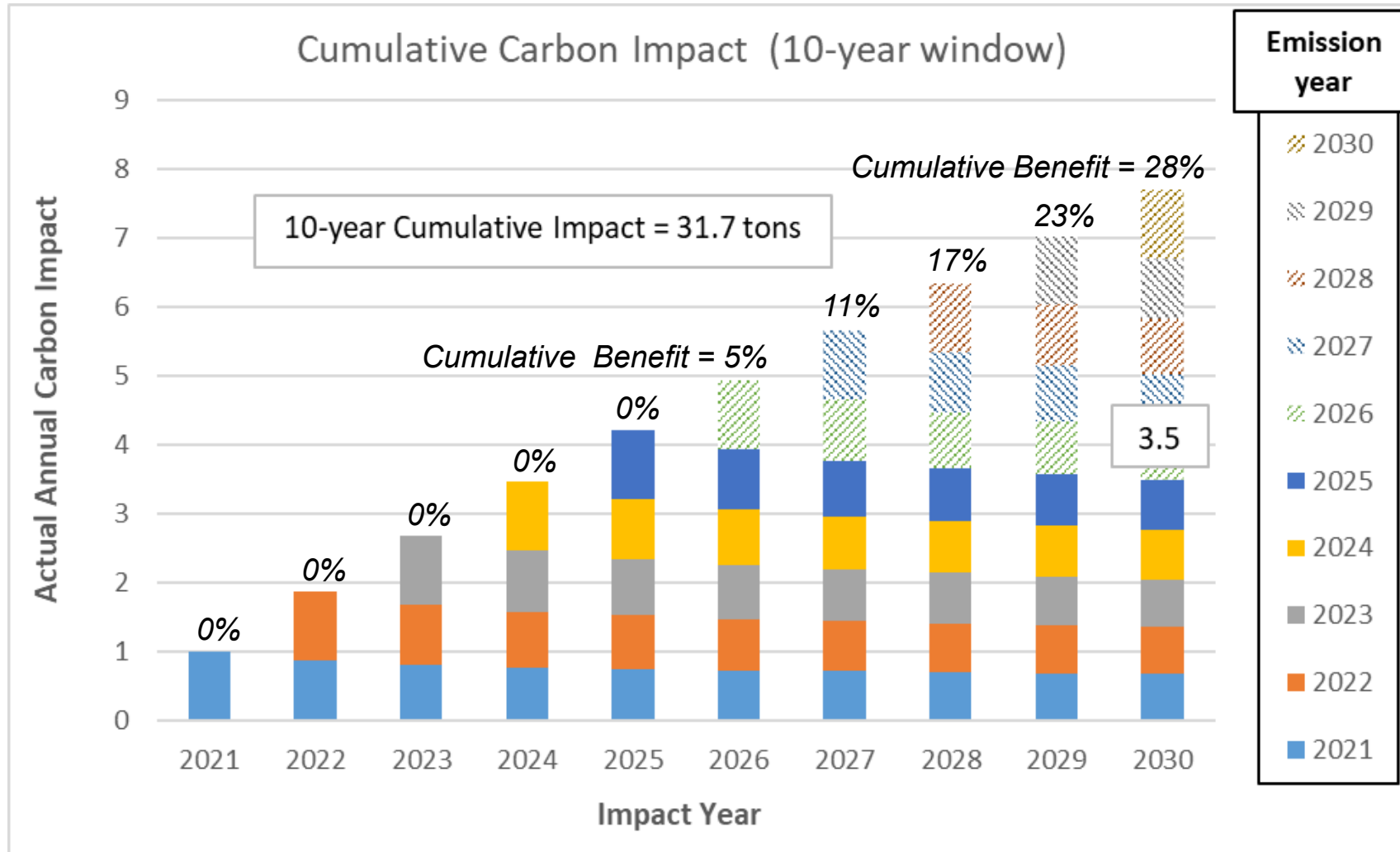
* Using the Bern Carbon Cycle CO₂ decay function provided in the Technical Summary of the 4th Assessment Report of the IPCC (2007) and in Kendall, et al. (2009) based on a background atmospheric CO₂ concentration of 378 ppm

Defining Cumulative Benefit

Unlike simple annual accounting, cumulative impact accounting for fossil carbon emissions reflects their actual real-world impact over the time period of interest

- Cumulative Carbon Impact = the total of the actual annual fossil carbon impacts over the time period of interest
- Cumulative Benefit = the decrease in Cumulative Carbon Impact relative to the baseline case (i.e., the status quo)

Impact Of Zero Fossil Carbon Emissions Starting In 2026



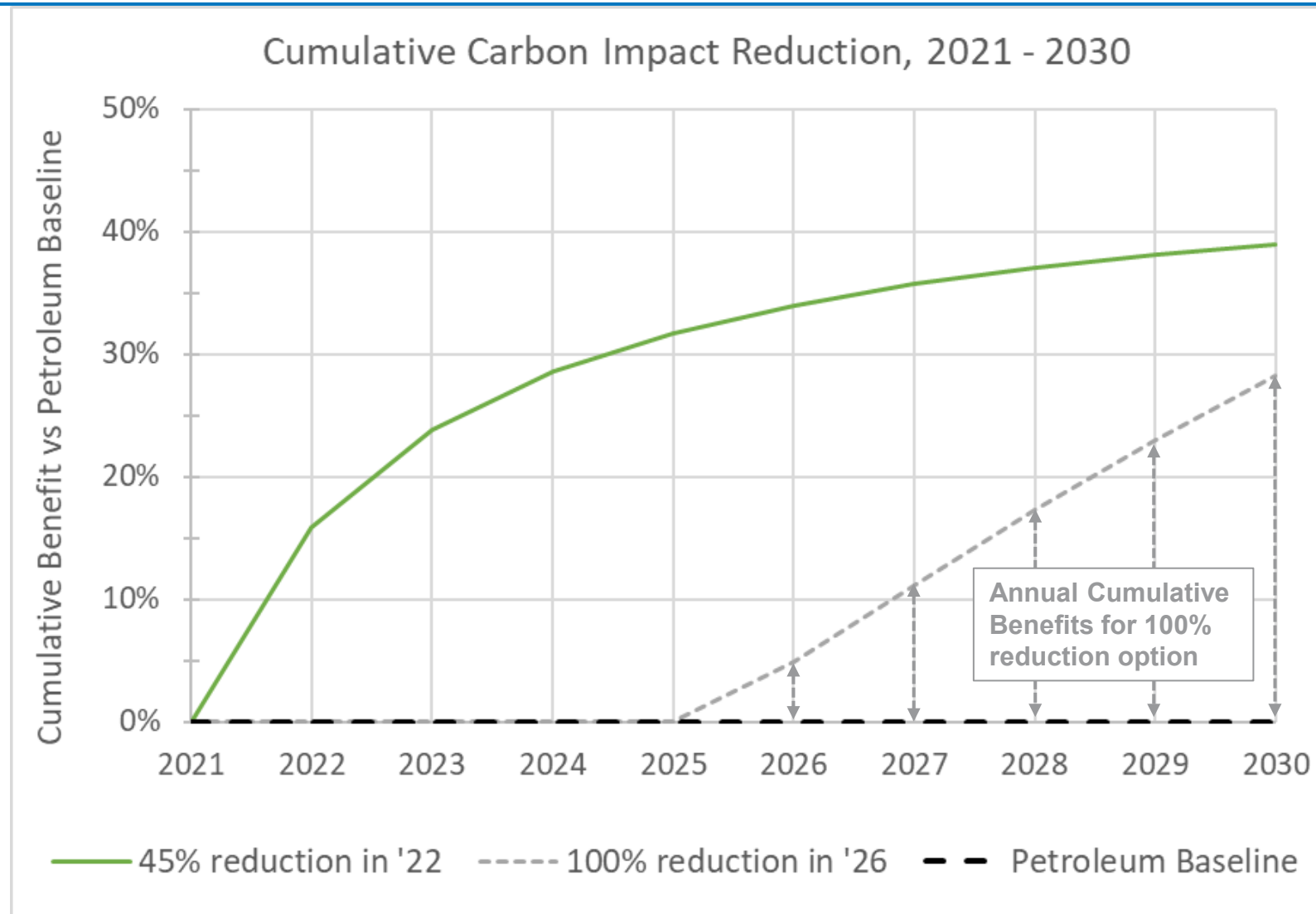
TAKEAWAYS

- No benefit at all until 2026
- Significant new fossil carbon remains in the atmosphere for many yrs (3.5 tons in 2030)
- 5% Cumulative Benefit in 2026; increases to 28% CB by 2030

* Using the Bern Carbon Cycle CO₂ decay function provided in the Technical Summary of the 4th Assessment Report of the IPCC (2007) and in Kendall, et al. (2009) based on a background atmospheric CO₂ concentration of 378 ppm

Comparing Cumulative Benefits

Cumulative Benefit Comparison Example

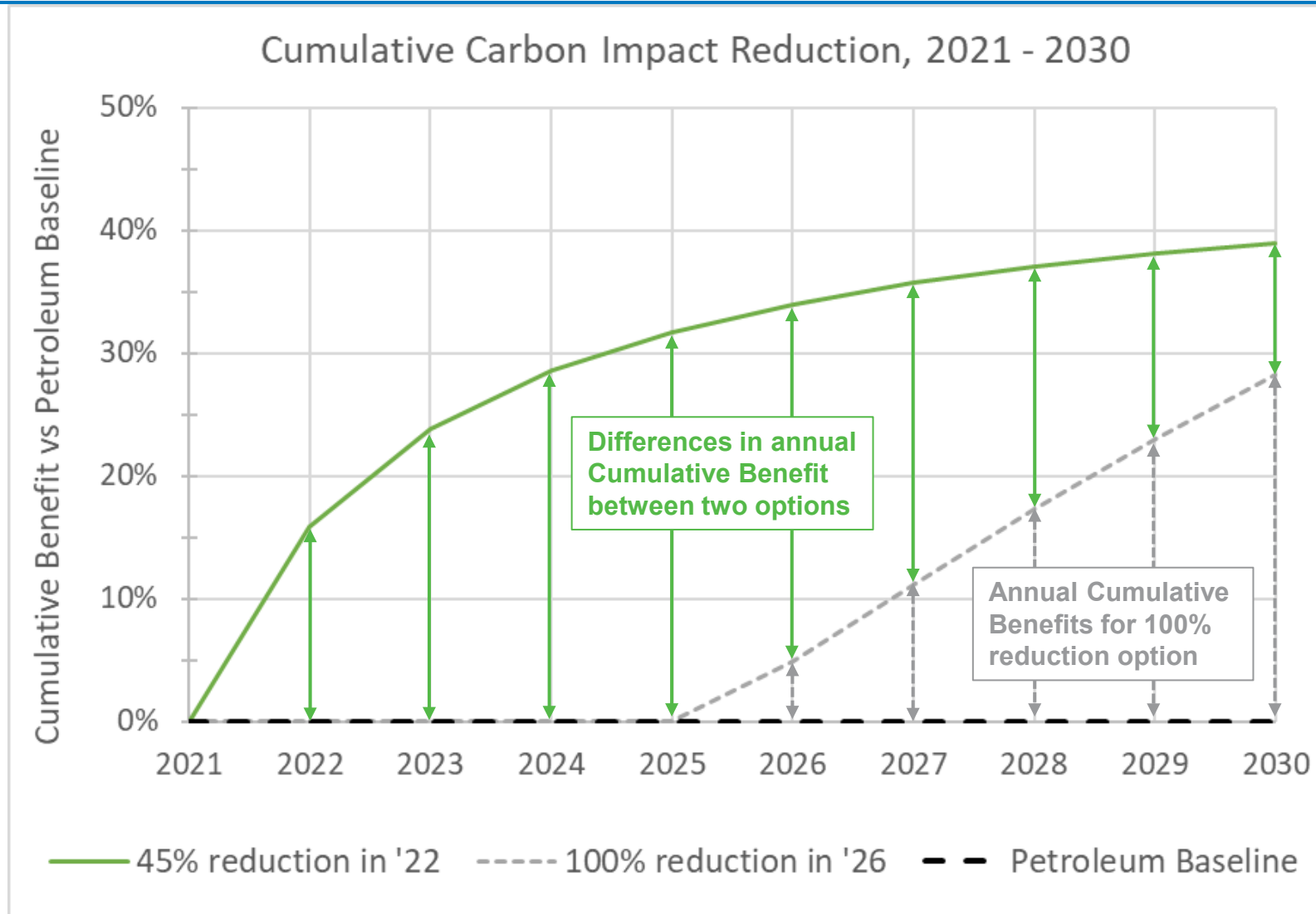


TAKEAWAYS

- Fossil carbon emissions continue to have an impact for many years
- Cumulative Benefits can be estimated for each year



Cumulative Benefit Comparison Example



TAKEAWAYS

- Fossil carbon emissions continue to have an impact for many years
- Cumulative Benefits can be estimated for each year

Strategic Concepts

Key Concepts to Communicate

- Embrace the urgency: the goal must be **Carbon Reduction Now!**
 - Focus on fossil carbon reduction by any and all means available
 - We can't let presumptions of perfection in the future remain obstacles to helpful steps today
- In an emergency, verifiable reality must overrule speculations or assumptions
 - Carbon intensities directly associated with fuel use can be (& have been) accurately estimated
 - We should only consider verifiable impacts (e.g., no ILUC – unless verified)
- Disabuse people of “silver bullet syndrome”
 - There is no perfect solution
 - Every option has pros and cons
 - Educate on the unique advantages of liquid fuels; acknowledge unique advantages of other options
 - Insist on policies that get the most good for the \$\$ required to implement
 - Remind people of the value of acting sooner
 - **Biofuels are available TODAY**, with production and infrastructure already paid for



Thank you.

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