

How is CO₂ a Solution to the CO₂ Problem?

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Innovation for Cool Earth Forum



Magnitudes and Time Scales

Now

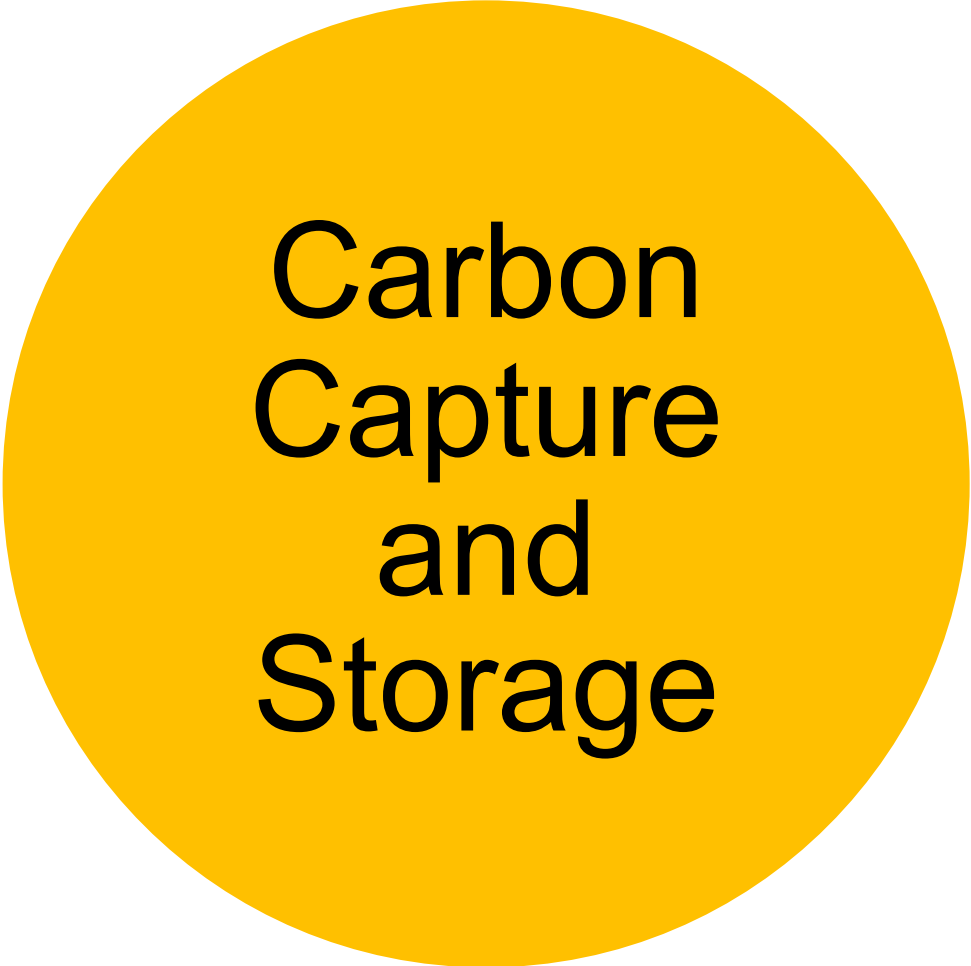


Legacy emissions


Now & perpetually



Inevitable emissions

A large yellow circle containing the text "Carbon Capture and Storage".

Carbon
Capture
and
Storage

A large blue circle containing the text "Carbon Capture and Utilization".

Carbon
Capture
and
Utilization

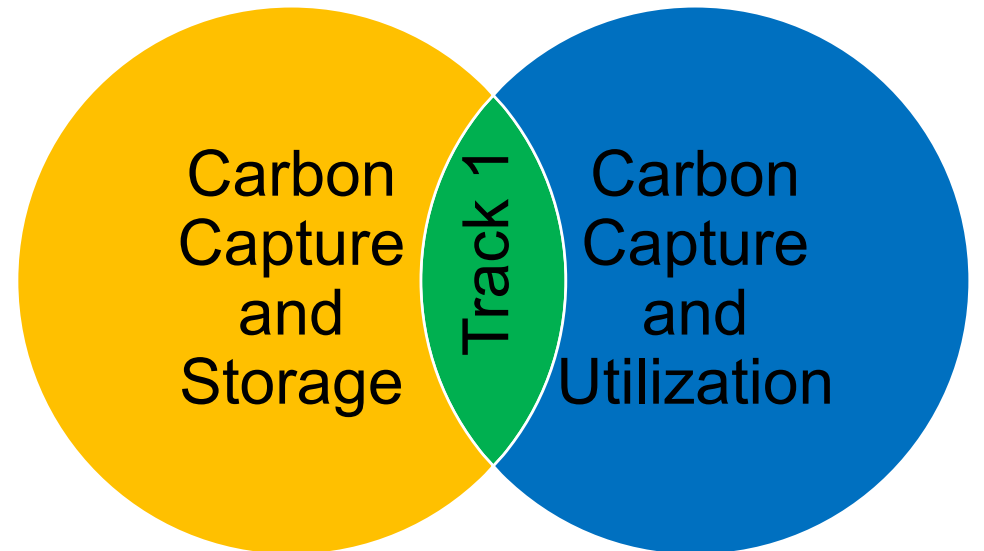
Utilization or Storage?



TRACK 1 materials
remove CO₂ for more
than 100 years



TRACK 2 materials
remove CO₂ for less
than 100 years



Utilization or Storage?



TRACK 1 materials
remove CO₂ for more
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CO₂ removal, 'Surface-CCS'



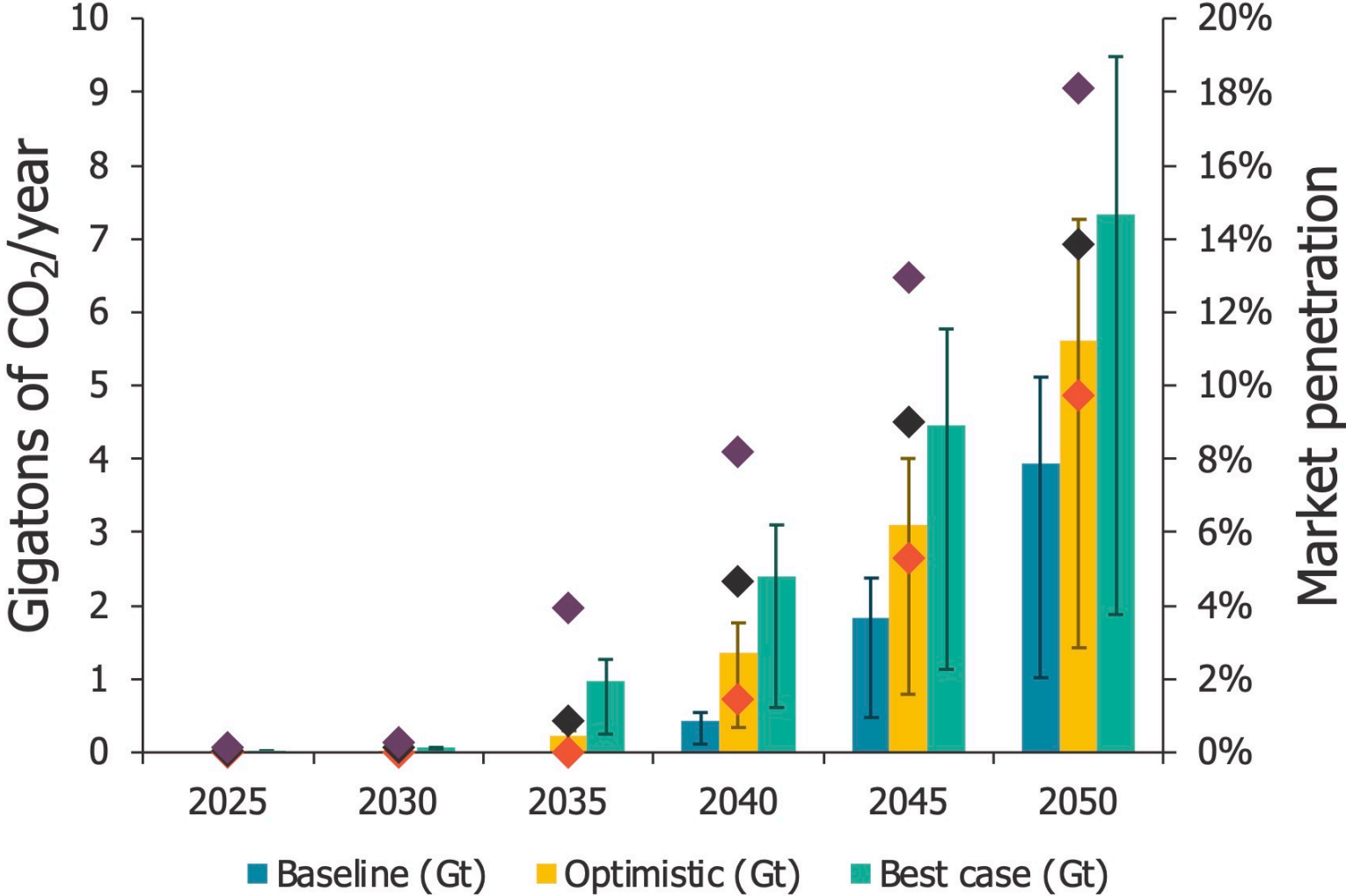
TRACK 2 materials
remove CO₂ for less
than 100 years

Circular carbon economy
Fossil-free carbon products

Opportunities for CO₂-based products

	\$0.5 to \$2 trillion/year opportunity	2 to 8 Gigatons of CO ₂ / year		
		Annual Market Opportunity (USD Billions)	Annual CO ₂ Consumption (Million Tons)	
Track 1	 Construction materials Concrete, aggregates	165-550	900-5,000	CO ₂ is a new ingredient
Track 2	 Fuels Natural gas replacement, gasoline, diesel fuel, jet fuel	10-250	700-2,100	
Track 2	 Chemicals Solvents, detergents	200-750	135-565	CO ₂ replaces fossil carbon
Track 1 or 2	 Engineered materials Carbon fiber, carbon nanotubes, graphene, carbon ceramics	140-400	30-84	
Track 1 or 2	 Polymers Plastic foils, containers, furniture, plastic housings, toys	2-25	1-20	
Track 2	 Agriculture & food Fertilizer, protein for human consumption, feed for animals	> 25	> 40	CO ₂ is a new ingredient

Outlook for Aggregates produced with CO₂



Which technologies are best?



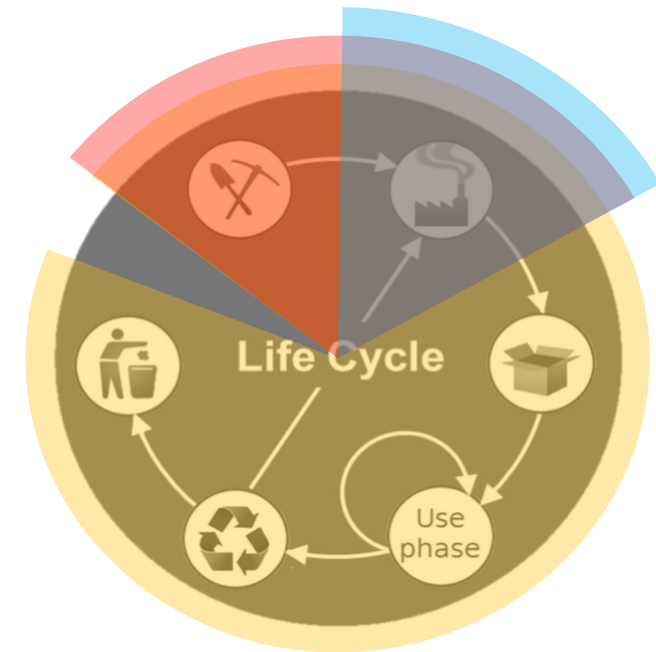
Few CO₂ uses can become carbon-negative, many carbon-neutral (still a win)!



Economic viability depends on many factors



Multitude of factors beyond CO₂ and \$\$\$



<https://www.globalco2initiative.org/evaluation/>
<https://assessccus.globalco2initiative.org/>

Key messages

- CCU and CCS can be complementary
- CCU creates revenue from the products
- Track 1 products remove carbon
- Track 2 products support a circular carbon economy