Chapter **10** Technical Annex

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Method	Potential range (constrained)	Potential range (expanded)	Cost range (constrained)	Cost range (expanded)	Significant constraints considered	Key references
Afforestation, reforestation, agroforestry and forest management	0.4-3.1	0.05-13	5-53	0-240	Potentials across studies are primarily constrained by the amount of suitable land available for forests. However, studies differ concerning what is considered suitable and what counts as forest with more conservative or precautionary definitions of suitability and forests leading to lower estimated potentials. Cost is constrained by overlapping cost ranges across studies.	For potential: Fesenmeyer et al. 2025; Dooley et al. 2024; Cook-Patton et al. 2020; Deprez et al. 2024. For cost: Cobo et al. 2023; Fuss et al. 2018; IPCC 2022.
Coastal wetland restoration	0.05–0.2	0.024-0.85	11-300	1200	Potential is constrained by availability at <$100/ton CO_2. Cost is constrained by practitioners' insights; the full range in peer-reviewed literature is much higher and wider.	For potential: IPCC 2022; Griscom et al. 2020; Rischer et al. (under review). For cost: Rischer et al. (under review); Bayraktarov et al. 2016.
Peatland restoration	0.49-1.3	0.3-3.4	N/A	N/A	Constrained range from IPCC 2022. The literature generally ranges from a lower value to a much higher one (=expanded range); it is not possible to disentangle whether that is due to less stringent assumptions or smaller scope. Note that the potentials for this method also contain emissions reductions, with only a small fraction likely representing removals.	For potential: Leifeld et al. 2018; IPCC 2022; Griscom et al. 2017.

Method	Potential range (constrained)	Potential range (expanded)	Cost range (constrained)	Cost range (expanded)	Significant constraints considered	Key references
Durable wood products	N/A	0.04-2.5	N/A	N/A	No constrained range.	For potential: Fuller et al. 2025; Churkina et al. 2020; Johnston et al. 2016; Lan et al. 2023.
Soil carbon sequestration in croplands and grasslands	0.5-3.4	0.5-10.2	0-100	-45-105	Potential is primarily constrained by assumptions around availability of suitable land and organic fertiliser. Cost is constrained by overlapping cost ranges across studies.	For potential: Lessmann et al. 2021; Fuss et al. 2018; Bai and Cotrufo 2022. For cost: Cobo et al. 2023; Fuss et al. 2018.
Alkalinity enhancement of water bodies	0.1-1	0.1-100	100-295	40-380	Potential constrained by infrastructure and resource needs (for mineral-based methods), and energy and water needs (for electrochemical methods), as discussed in NASEM 2022. Costs constrained by overlapping cost ranges across studies.	For potential: Babiker et al. 2022; NASEM 2022. For cost: Renforth et al. 2018; Babiker et al. 2022; NASEM 2022; Renforth et al. 2022; Kowalczyk et al. 2024.
Biochar	0.03-2.7	0.03-11	70-360	10-360	Potential is primarily constrained by assumptions around availability of biomass, yield of pyrolysis, and persistence of biochar carbon. Biomass availability estimates vary and primarily depend on assumed sustainability and economic viability. Cost is constrained by overlapping cost ranges across studies.	For potential: Weng and Cowie 2025; For cost: Chiquier et al. 2025; Fuss et al. 2018.

Method	Potential range (constrained)	Potential range (expanded)	Cost range (constrained)	Cost range (expanded)	Significant constraints considered	Key references
Biomass burial	N/A	1-12.4	N/A	10-200	Potentials rely on availability of biomass, which is commonly approximated using an assumed extractability rate of terrestrial net primary production (often around 5%).	For potential: Zeng et al. 2024; Luo et al. 2025; Zeng et al. 2013; Snyder, 2022. For cost: Zeng et al. 2024; Zeng and Hausmann 2022; Yablonovitch and Deckman 2023; Snyder 2022.
Biomass sinking	N/A	0.1-1	1,120-2,090	100 - >20,000	For macroalgae sinking, cost is constrained by efficient production systems and very large farms. There is no constrained cost range for terrestrial biomass sinking, given insufficient data.	For macroalgae potential: NASEM 2022. For macroalgae costs: Froelich et al. 2019; DeAngelo et al. 2022; NASEM 2022; Coleman et al. 2022.
Bio-oil storage	N/A	N/A	N/A	100-550		For cost: Dubey et al. 2025; Mercer et al. 2024.
BECCS	0.5-5	0.1-11.3	75-300	15-400	Potential constrained by sustainable biomass supply and land availability. Cost constrained by highest overlap of available estimates for variety of BECCS pathways	For potential: Babiker et al. 2022; Fuss et al. 2018; Braun et al. 2025. For cost: Babiker et al. 2022; IEA 2025; Abegg et al. 2024.
DACCS	0.5-5	Unlimited, provided energy requirements can be met	100-600	18-3616	Potential constrained by storage availability and high cost. Cost constrained using plausible costs for NOAK mature technologies.	For potential: Babiker et al. (2022); Fuss et al. 2018; van der Spek et al. 2026. For cost: van der Spek et al. 2026.

Method	Potential range (constrained)	Potential range (expanded)	Cost range (constrained)	Cost range (expanded)	Significant constraints considered	Key references
DOCCS	N/A	0.1-1	500-2050	150-2500	Cost constrained by more detailed analyses considering engineering, CapEx, and OpEx.	For potential: NASEM 2022. For cost: Eisaman et al. 2018; Digdaya et al. 2020; NASEM 2022.
EW	N/A	0.2-2.9	80-310	50-1150	Cost constrained using best estimates from systematic review, and consideration of global applications (not specific to costs in a single country).	For potential: Beerling et al. 2020; Baek et al. 2023; Hartmann & Kemp 2023. For cost: Beerling et al. 2020; Babiker et al. 2022; Zhang et al. 2023; CO2RE & ERM 2025, with consideration of Suhrhoff et al. (in prep).
Mineral products	0-1	0-5.9	20-200	20-600	Potential constrained by current rates of feedstock production. Cost constrained by most available feedstock types and integration with construction industry.	For potential: Power et al. 2013; Renforth et al. 2013; NASEM 2019. For cost: NASEM 2019; Abdelshafy et al. 2025.
Ocean fertilization	0.1-1	0-5	25-100	25 - 53,000	Potential constrained by more publications/expert consensus. Cost constrained by large-scale deployment and optimal locations with most efficient export.	For potential: NASEM 2022; Ocean Visions 2025. For cost: NASEM 2022; Bach et al. 2023; Ocean Visions 2025.

Table A10.1 *Reported cost and potential ranges underlying Fig. 10.1: The table summarizes ranges of cost and mitigation potential estimates for different CDR methods based on the surveyed literature. For each method, we report an expanded range (full spread of reported estimates) and a constrained range, reflecting estimates that assume more restrictive deployment conditions or show higher agreement across studies. These ranges are indicative of the diversity in the literature and should not be interpreted as precise or directly comparable values due to differences in system boundaries, assumptions, and cost definitions. N/A represents insufficient data to support ranges with confidence. See Chapter 10 for full references cited in this table and three additional references[1-3].*

References

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