

IPCC WGIII AR7

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WGIII Focus

- Working Group III focuses on climate change mitigation, assessing methods for reducing greenhouse gas emissions, and removing greenhouse gases from the atmosphere.

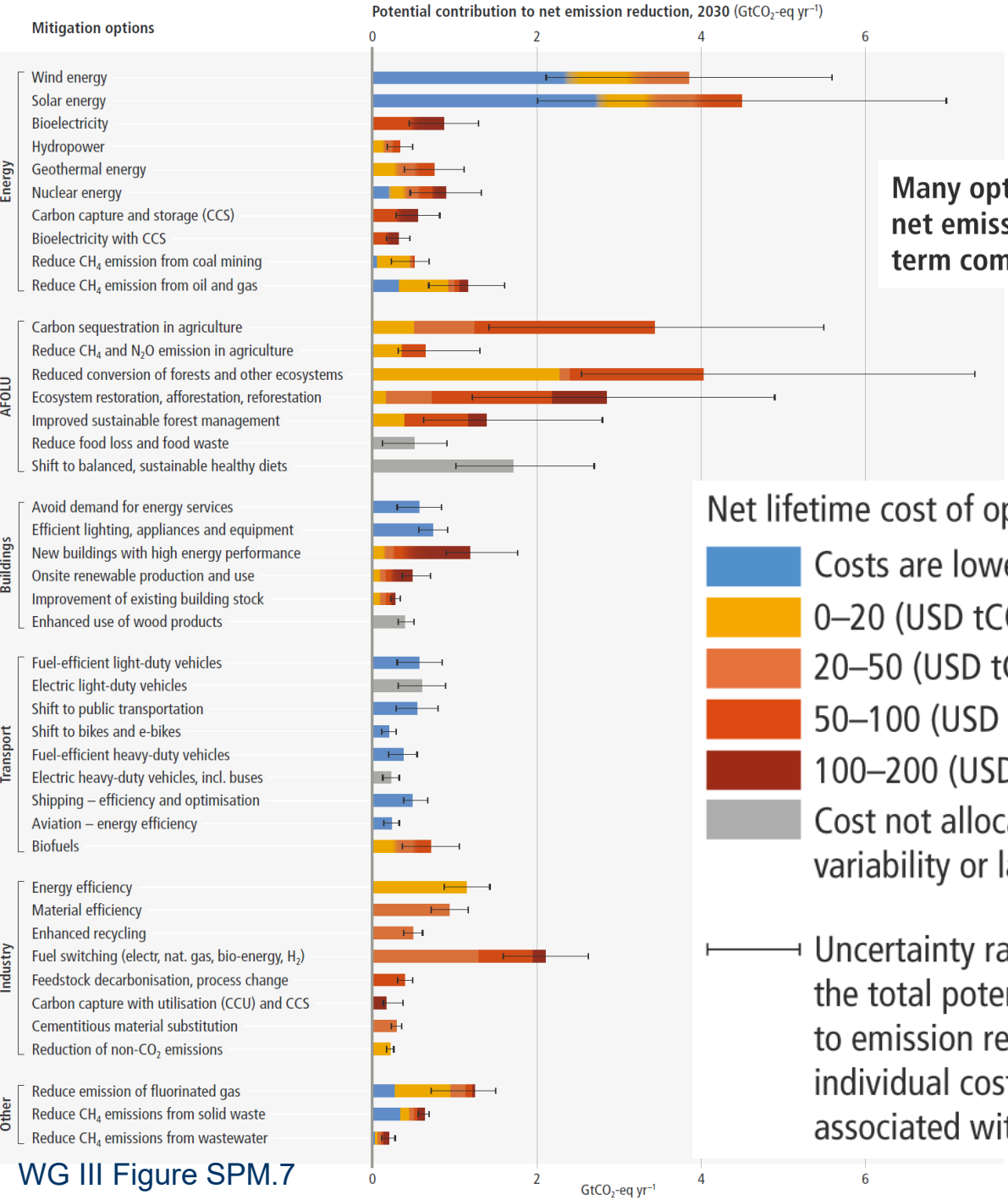
Seventh Assessment Cycle | Timeline



AR6 Chapters

- Chapter 1: Introduction and framing
- Chapter 2: Emissions trends and drivers
- Chapter 3: Long-term mitigation goals and pathways
- Chapter 4: Mitigation pathways compatible with long-term goals
- Chapter 5: Demand, services and social aspects of mitigation
- Chapter 6: Energy systems
- Chapter 7: Agriculture, Forestry, and Other Land Uses (AFOLU)
- Chapter 8: Urban systems and other settlements
- Chapter 9: Buildings
- Chapter 10: Transport
- Chapter 11: Industry
- Chapter 12: Cross sectoral perspectives
- Chapter 13: National and sub-national policies and institutions
- Chapter 14: International cooperation
- Chapter 15: Investment and finance
- Chapter 16: Innovation, technology development and technology transfer
- Chapter 17: Accelerating the transition in the context of sustainable development

Many options available now in all sectors are estimated to offer substantial potential to reduce net emissions by 2030. Relative potentials and costs will vary across countries and in the longer term compared to 2030.



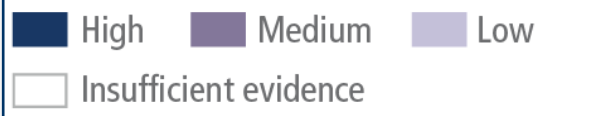
Net lifetime cost of options:

- Costs are lower than the reference
- 0–20 (USD tCO₂-eq⁻¹)
- 20–50 (USD tCO₂-eq⁻¹)
- 50–100 (USD tCO₂-eq⁻¹)
- 100–200 (USD tCO₂-eq⁻¹)
- Cost not allocated due to high variability or lack of data

⌈—————⌋ Uncertainty range applies to the total potential contribution to emission reduction. The individual cost ranges are also associated with uncertainty

WG III Figure SPM.7

Feasibility level and synergies with mitigation

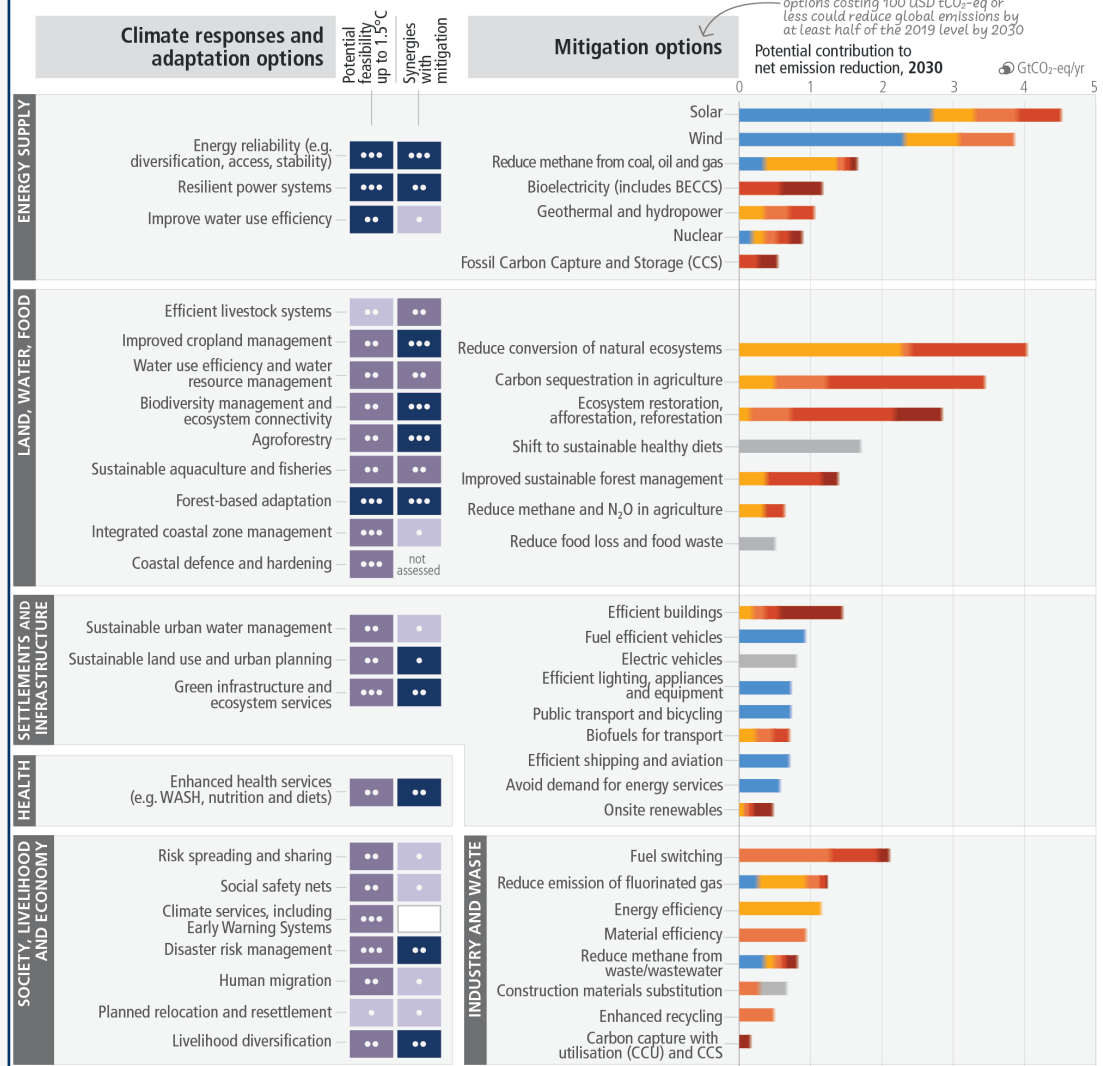


Confidence level in potential feasibility and in synergies with mitigation



There are multiple opportunities for scaling up climate action

a) Feasibility of climate responses and adaptation, and potential of mitigation options in the near-term



Net lifetime cost of options:



Sectoral and system mitigation options

Relation with Sustainable Development Goals

Chapter source

	1	2	3	4	5	6	7	8	9	10	11	12	14	15	16	17		
Energy systems	Wind energy	+	•	+			+	+	+	+		+	•	•			Sections 6.4.2, 6.7.7	
	Solar energy	+	•	+			•	+	+	+		+	•	•			Sections 6.4.2, 6.7.7	
	Bioenergy	•	•	•			•	•	+	+		+	+	•	•		Sections 6.4.2, 12.5, Box 6.1	
	Hydropower		•	+			+	+							•	•	Section 6.4.2	
	Geothermal energy	+		•			+	+				+					Section 6.4.2	
	Nuclear power			•			•	•	+	+			•	•	•			Section 6.4.2, Figure 6.18
	Carbon capture and storage (CCS)			+			•	•	+	+			•					Section 6.4.2, 6.7.7
Agriculture, forestry and other land use (AFOLU)	Carbon sequestration in agriculture ¹	+	+	•			+		+			•	+	+	+		Sections 7.3, 7.4, 7.6	
	Reduce CH ₄ and N ₂ O emission in agriculture		•	+			•					+	+	+			Section 7.4	
	Reduced conversion of forests and other ecosystems ²	•	•	•			+		•			•	•	•	•	•	Section 7.4	
	Ecosystem restoration, reforestation, afforestation	+	•	+			•		•		•	+	+	+			Section 7.4	
	Improved sustainable forest management	+	•	•			+	•	+	+	•	•	•	•	•			Section 7.4
	Reduce food loss and food waste	+	+	+			+	+			•	•	•	•	•	•		Section 7.5
	Shift to balanced, sustainable healthy diets	•	•	•			+	+			•	•	•	•	•	•		Section 7.4
Renewables supply ³	•	•	•			•	•	+	+			•	•				Section 7.6	
Urban systems	Urban land use and spatial planning	+	•	+	+	+	+	+	+	+	•	+	•	•	•	+	Sections 8.2, 8.4, 8.6	
	Electrification of the urban energy system	+	•	+	+	+	+	+	+	+	+	•	•	•	•	+	Sections 8.2, 8.4, 8.6	
	District heating and cooling networks	+	•	+			+	+	+			+	+	•	•	+	Sections 8.2, 8.4, 8.6	
	Urban green and blue infrastructure	+	+	+	+		+	+	+	•	•	+	+	+	+	+	Sections 8.2, 8.4, 8.6	
	Waste prevention, minimisation and management	+	+	•			+		•	+		+	•	•	•	•	Sections 8.2, 8.4, 8.6	
Integrating sectors, strategies and innovations	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	Sections 8.2, 8.4, 8.6		
Buildings	Demand-side management	+	•	+			+	+	•	•	•	+	+				Section 9.8, Table 9.5	
	Highly energy efficient building envelope	•	•	•	+		+	+	•	•	•	•	•	•	•	+	Section 9.8, Table 9.5	
	Efficient heating, ventilation and air conditioning (HVAC)	•	•	•			+	+	•	•	•	•	•	•	•		Section 9.8, Table 9.5	
	Efficient appliances	•	+	+	+	+	+	+	•	•	•	•	•	•	•	+	Section 9.8, Table 9.5	
	Building design and performance	+	+	+			+	+	•	•	•	•	•	•	•	+	Section 9.8, Table 9.5	
	On-site and nearby production and use of renewables	•	•	•	+	+	•	•	•	•	•	•	•	•	•	•	Section 9.8, Table 9.5	
	Change in construction methods and circular economy			+			•	•	•	•	•	•	•	•	•	•	Sections 9.4, 9.5	
Change in construction materials			•			•	•	•	•	•	•	•	•	•	•	Section 9.4		
Transport	Fuel efficiency – light-duty vehicle	+		+			+	+			+						Sections 10.3, 10.4, 10.8	
	Electric light-duty vehicles		•				•	•	•	•	•	•	•				Sections 10.3, 10.4, 10.8	
	Shift to public transport	+	+	+	+		+	+	•	•	•	•	•				Sections 10.2, 10.8, Table 10.3	
	Shift to bikes, e-bikes and non motorised transport	+	•	•	•		+	+	•	•	•	•	•				Sections 10.2, 10.8, Table 10.3	
	Fuel efficiency – heavy-duty vehicle	+		+			+	+									Sections 10.3, 10.4, 10.8	
	Fuel shift (including electricity) – heavy-duty vehicle			+			+	•	•				•				Sections 10.3, 10.4, 10.8	
	Shipping efficiency, logistics optimisation, new fuels						+	•	•								Sections 10.6, 10.8	
	Aviation – energy efficiency, new fuels						+	•	•								Sections 10.5, 10.8	
	Biofuels		•	•			•	•	•			+		•	•			Sections 10.3, 10.4, 10.5, 10.6, 10.8
Industry	Energy efficiency			+			+	+	+								Section 11.5.3	
	Material efficiency and demand reduction						•	•	•			+					Section 11.5.3	
	Circular material flows			+			+	+	+			+	+	+	+	+	Section 11.5.3	
	Electrification	+	•	•			+	+							•		Sections 11.5.3, 6.7.7	
CCS and carbon capture and utilisation (CCU)			•			•	•	•	•		+			•		Section 11.5.3		

Mitigation options have synergies with many Sustainable Development Goals, but some options can also have trade-offs. The synergies and trade-offs vary dependent on context and scale.

Type of relations:

- + Synergies
- Trade-offs
- Both synergies and trade-offs⁴
- Blanks represent no assessment⁵

Confidence level:

- High confidence
- Medium confidence
- Low confidence

¹ Soil carbon management in cropland and grasslands, agroforestry, biochar

² Deforestation, loss and degradation of peatlands and coastal wetlands

³ Timber, biomass, agri feedstock

⁴ Lower of the two confidence levels has been reported

⁵ Not assessed due to limited literature

WG III Figure SPM.8

Context for the AR7 WGIII Report

- “Policies and laws addressing mitigation have consistently expanded since AR5.” {SYR SPM A.4}
- “Several mitigation options, notably solar energy, wind energy, electrification of urban systems, urban green infrastructure, energy efficiency, demand-side management, improved forest and crop/grassland management, and reduced food waste and loss, are technically viable, are becoming increasingly cost effective and are generally supported by the public.” {SYR SPM A.4.2}

Context for the AR7 WGIII Report

- “Global GHG emissions in 2030 implied by nationally determined contributions (NDCs) announced by October 2021 make it likely that warming will exceed 1.5°C during the 21st century and make it harder to limit warming below 2°C. There are gaps between projected emissions from implemented policies and those from NDCs and finance flows fall short of the levels needed to meet climate goals across all sectors and regions.” {SYR SPM A.4}
- “Continued greenhouse gas emissions will lead to increasing global warming, with the best estimate of reaching 1.5°C in the near term in considered scenarios and modelled pathways.” {SYR SPM B.1}

Context for the AR7 WGIII Report

- Limiting human-caused global warming requires net zero CO₂ emissions. Cumulative carbon emissions until the time of reaching net zero CO₂ emissions and the level of greenhouse gas emission reductions this decade largely determine whether warming can be limited to 1.5°C or 2°C (high confidence).
- Projected CO₂ emissions from existing fossil fuel infrastructure without additional abatement would exceed the remaining carbon budget for 1.5°C (50%) (high confidence). {2.3, 3.1, 3.3, Table 3.1} {SYR SPM B.5}

Context for the AR7 WGIII Report

- All global modelled pathways that limit warming to 1.5°C (>50%) with no or limited overshoot, and those that limit warming to 2°C (>67%), involve rapid and deep and, in most cases, immediate greenhouse gas emissions reductions in all sectors this decade. Global net zero CO₂ emissions are reached for these pathway categories, in the early 2050s and around the early 2070s, respectively. (high confidence) {3.3, 3.4, 4.1, 4.5, Table 3.1} (Figure SPM.5, Box SPM.1) {SYR SPM B.6}

Vision from WGIII

- More cross Working Group integration, including integration with the Task Force on National Greenhouse Gas Inventories
- More integration within WGIII
- Increased inclusivity

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