

A Solutions Approach to the GST Interim Technical Paper for Consultation¹ May 2023

The global stocktake (**GST**) process and outcome at COP28 must send clear and specific signals as to opportunities for Parties and non-Party stakeholders (**NPS**) to achieve the goals of the Paris Agreement and to avoid catastrophic climate change. Both greater formal climate ambition, including through nationally determined contributions (**NDCs**), as well as enhanced international cooperation to implement action will be critical. In that context, and to a large extent, what happens after GST ends at COP28 will define its success. Parties should commit to a post-COP28 response to the GST.

The outputs of an effective GST process could usefully be conceptualized in three tiers:

- a limited number of high-level **clear signals/high level asks** for mitigation, adaptation, loss and damage (*L&D*), and means of implementation (*MOI*) that catalyze the shift of the global economy toward the achievement of the goals of the Paris Agreement;
- a defined set of specific, available, and implementable high impact opportunities to enhance and implement ambition. These must speak to constituencies (such as national-level policy makers and NPS) best placed to convert the signals/high level asks into action, including through science-based policy pathways that emerge from the GST technical dialogue process. These opportunities should be supported by accessible and scaled up means of implementation;
- consolidated **technical resources** that Parties and NPS can draw on when developing and implementing climate action, consistent with the goals of the Paris Agreement.



¹ Please send any comments or suggestions to Jennifer Huang via: <u>https://www.c2es.org/content/global-stocktake-an-opportunity-for-ambition</u>.



This paper draws upon, and is produced in the context of, the GST technical dialogue process that has revealed a broad spectrum of opportunities to address the challenges of climate change, as well as a wealth of work on pathways and agendas for 2030 and 2050 climate action, including the International Energy Agency's *Credible Pathways to 1.5 °C: Four pillars for action in the 2020s* report,² the Intergovernmental Panel on Climate Change chapter on "Climate Resilient Development Pathways,"³ the High Level Climate Champions' Breakthrough Agenda,⁴ and the Marrakech Partnership for Global Climate Action Pathways,⁵ among others.

To effectively achieve its mandate, **the GST should in its outcomes focus on those opportunities that will have the best chance of resulting in positive near-term "high-impact.**" Identifying high-impact implementable opportunities necessitates the application of selection criteria, such as:

- certainty of impact (which may vary significantly according to geography)
- feasibility
- key relevant initiatives
- barriers
- synergies as well as trade-offs in achieving the Sustainable Development Goals (*SDGs*).

Applying these criteria, this paper identifies a range of suggested signal and opportunities to action them that have the potential for accelerating climate action and support in the near-term.⁶ C2ES will further test the viability of these solutions and welcomes comments and suggestions. At the same time, the general approach to identifying solutions has broader applicability to decision makers and stakeholders looking to identify and implement actionable solutions with near-term positive impact, including through enhanced international cooperation.

² <u>https://iea.blob.core.windows.net/assets/ea6587a0-ea87-4a85-8385-6fa668447f02/Crediblepathwaysto1.5C-</u> Fourpillarsforactioninthe2020s.pdf.

³ <u>https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SOD_Chapter18.pdf</u>.

⁴ <u>https://climatechampions.unfccc.int/system/breakthrough-agenda/.</u>

⁵ <u>https://unfccc.int/climate-action/marrakech-partnership/reporting-and-tracking/climate_action_pathways</u>.

⁶ This work builds on earlier work: landscape analyses, Distilling Critical Signals from the Global Stocktake, and TD1.3 submissions. See <u>https://www.c2es.org/content/global-stocktake-an-opportunity-for-ambition</u>.



 Increase the share of renewable energy sources—particularly wind and solar—in global electricity generation, aiming for 55–90 percent by 2030 and 98–100 percent by 2050, while simultaneously reducing the share of fossil sources Reduce methane emissions from the fossil fuel sector by 75 percent by 2030	Α.	Mitigation
 Increase the share of electric vehicles (EVs) in light-duty vehicle (LDV) sales to 75–95 perce 2030 and 100 percent by 2035. Increase the share of EVs in bus sales and medium- and heavy-duvehicle sales to 60 percent and 30 percent by 2030, respectively	1. ele sim 2.	Increase the share of renewable energy sources—particularly wind and solar—in global ectricity generation, aiming for 55–90 percent by 2030 and 98–100 percent by 2050, while nultaneously reducing the share of fossil sources
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3. Call upon multilateral development banks, international finance institutions, climate funds other multilateral and bilateral cooperation agencies to increase the share of grants and highly concessional instruments for developing countries, particularly for the design, implementation, a	2. sus 3. oth cor	Urges bilateral, multilateral, and private creditors to create mechanisms for debt payments spension, restructuring, and cancelation with a view to addressing climate-related needs,



4.	Urges tying fossil fuel subsidies reform to broader economy-wide just transition plans, and			
provi	de support to developing countries to implement it,			
5.	Calls for capacity building support to developing countries to operationalize Article 2.1.c of the			
Paris	Agreement			
6.	Urges MDBs, IFIs and private investors to revise and adjust their investment plans and portfolios			
by 20	030 to align with the temperature and resilience goals of the Paris Agreement			
7.	Call upon institutional investors and corporate actors to enhance understanding, disclosure and			
management of climate-related financial risks and opportunities				



A. Mitigation

Signal/high-level ask	1. Increase the share of renewable energy sources—particularly wind and solar—in global electricity generation, aiming for 55–90 percent by 2030 and 98–100 percent by 2050, ⁷ while simultaneously reducing the share of fossil sources, by:
High-impact	• Incentivizing the deployment of renewable energy technologies ⁸ and/or set
opportunities/	renewable energy targets or mandates based on national circumstances.
solutions	 Ending investments in new fossil fuel-based generation capacity and accelerate the reduction of the relative share of existing fossil fuel-based energy generation capacity, in a just and equitable manner, including by pricing or capping emissions from the electricity sector. Addressing regulatory barriers to the deployment, scale up, and use of
	renewable energy technologies, including grid infrastructure and storage.
	 Improving the integration of renewable energy sources into increasingly flexible electricity grids.⁹

Impact¹⁰

- Deploying wind and solar energy in particular offer substantial potential and could reduce net emissions by about 8 GtCO₂eq in 2030 relative to a baseline that reflects current (2015–19) policies.¹¹ While these technologies comprise a small share of global electricity generation, "recent growth rates signal the potential for these technologies to support substantial mitigation."¹²
- A clean, affordable, and reliable power sector is a prerequisite for the decarbonization of the transport, industry, and buildings sectors.¹³ This will require addressing both existing capacity and the new generation that will be needed to accommodate the electrification of major portions of the economy.

⁷ Sophie Boehm et al., "State of Climate Action 2021: Systems Transformations Required to Limit Global Warming to 1.5°C," (October 28, 2021), <u>https://www.wri.org/research/state-climate-action-2021</u>.

⁸ Incentivizing the deployment of renewable energy technologies could include, for example, investment tax credits, minimum price guarantees, and de-risking investment through innovative stacked climate financing options.

⁹ Improving the integration of renewable energy sources into increasingly flexible electricity grids could include, for example, clean firm power, expanded transmission and distribution infrastructure, demand-side management and energy efficiency, incorporation of smart grids, and expansion of cooperative- and community-run distributed generation schemes.

¹⁰ Impact includes climate impacts, development impacts, and other anticipated and potential impacts.

¹¹ "Climate Change 2022: Mitigation of Climate Change," SPM-42.

¹² "Climate Change 2022: Mitigation of Climate Change," 6-18.

¹³ "Climate Change 2022: Mitigation of Climate Change." 3-6.



Feasibility

- Renewables and energy storage technologies are generally mature, available, and quickly decreasing in cost (2015–20).¹⁴ The transformation of the electricity sector could be accelerated with scaled-up deployment of renewables and energy storage,¹⁵ along with targeted and scaled-up efforts to enhance energy efficiency.
- While appropriate renewable energy technologies will be highly context-specific, the costs of certain technologies (e.g., solar, wind) have declined over the last decade, making them price competitive with fossil fuel-based electricity generation in many geographies.¹⁶ Deployment of these technologies will become increasingly feasible over time.¹⁷

A selection of key existing initiatives

- The **Clean Power Breakthrough** aims for solar and wind to make up at least 40 percent—and all renewables to make up at least 60 percent—of global electricity generation by 2030.¹⁸
- Various initiatives aim to mobilize finance for electricity sector transition, including Just Energy Transition Partnerships and the recently announced Energy Transition Accelerator.
- **SEforALL** works in partnership with the United Nations to drive the achievement of SDG7, expanding access to energy, increasing the share of renewable energy in the global energy mix, and doubling the rate of improvement in energy efficiency.¹⁹
- **Powering Past Coal Alliance**, launched at COP23, is a coalition of 48 national governments, 48 subnational governments, and 71 global organizations "working to advance the transition from unabated coal power generation to clean energy."²⁰

Barriers

- Regulatory hurdles, high upfront capital costs, the amount of land required, and the need for public acceptance.
- Lack of accessible support for electricity sector transition in developing countries.
- Negative social impacts of plant shutdowns, such as the loss of jobs and livelihoods.
- The need for large-scale deployment of wind and solar resources to be complemented by clean firm power (i.e., clean power sources that can be dispatched as needed), energy storage, and expanded transmission infrastructure, given due to their variability and location.

Sustainable Development Goals

 Phasing out coal in favor of renewable energy sources can provide significant public health and air quality benefits.²¹

¹⁴ "Climate Change 2022: Mitigation of Climate Change." 4-41.

¹⁵ "Climate Change 2022: Mitigation of Climate Change." 4-41.

¹⁶ "BloombergNEF 2021 Executive Factbook," March 2, 2021, <u>https://about.bnef.com/blog/bloombergnef-2021-executive-factbook</u>.

¹⁷ "Climate Change 2022: Mitigation of Climate Change," SPM-48.

¹⁸ Climate Champions, "2030 Breakthroughs," n.d., <u>https://climatechampions.unfccc.int/system/breakthroughs/</u>.

¹⁹ "Sustainable Development Goal 7 (SDG7)," Sustainable Energy for All (SEforALL), n.d., <u>https://www.seforall.org/sustainable-development-goal-7-sdg7</u>.

²⁰ "Powering Past Coal Alliance," accessed January 4, 2023, <u>https://poweringpastcoal.org/</u>.

²¹ "Climate Change 2022: Mitigation of Climate Change," SPM-32.



- Renewable energy jobs could rise from 12.7 million today to 38.2 million in 2030, with losses in fossil fuel sectors more than offset by gains in renewables and other energy transition technologies.²² While not all workers in fossil fuel sectors will easily transition to employment in renewables, it is possible to provide training and other resources to displaced workers. Renewables will also create industries along the value chain and spur new industries—all of which create indirect and induced jobs.
- As renewable energy technologies are deployed, efforts must be taken to expand energy access and mitigate the effects on vulnerable populations of policy measures that reflect the costs of fossil fuel pollution.

Options for the outcome at COP28

The Glasgow Climate Pact called on Parties to "transition towards low-emission energy systems, including by rapidly scaling up the deployment of clean power generation and energy efficiency measures, including accelerating efforts towards the phasedown of unabated coal power and phase-out of inefficient fossil fuel subsidies."²³ The Sharm el-Sheikh Implementation Plan included similar language. This year, to further efforts to reduce emissions from the electricity sector, Parties could:

- Adopt or recognize collective targets for the accelerated deployment of renewable energy technologies (e.g., Parties call to accelerate the deployment of renewable energy technologies, in a just and equitable manner, aspiring to increase the share of renewables in global electricity generation to 55–90 percent by 2030 and 98–100 percent by 2050, while recognizing the pace of deployment will vary across geographies).
- Mobilize investments at scale for the energy transition in developing countries, both within and outside the UN climate regime, including by calling for real and measurable innovative financing to drive project implementation, and a shift from political agreements to implementation plans.
- Phase out unabated fossil fuel-fired power generation, halting overseas financing for fossil fuel-fired power generation, and/or ending fossil fuel subsidies.

Signal/high-level	2.	Reduce methane emissions from the fossil fuel sector by 75 percent by
ask		2030, by:
High-impact	٠	Setting standards for equipment technology, leak detection and repair, and
opportunities/		flaring and venting.
solutions	•	Measuring and reporting methane emissions.
	٠	Regulating upstream emissions, including by pricing emissions or setting
		performance or procurement standards.

Impact

• Reductions of methane emissions across all sectors can deliver 0.25 degree C of avoided temperature rise by 2050, a significant contribution to reaching the long-term temperature goal of the Paris

²² "World Energy Transitions Outlook 2022" (International Renewable Energy Agency, March 2022), <u>https://www.irena.org/publications/2022/mar/world-energy-transitions-outlook-2022</u>.

²³ "Glasgow Climate Pact."



Agreement.²⁴ While anthropogenic methane emissions are generated across the fossil fuel (35 percent), waste (20 percent), and agriculture (40 percent) sectors, the oil and gas sector offers the largest share of low- and negative-cost reduction opportunities.²⁵

• The IPCC found that reductions of methane emissions would lower peak warming and reduce the likelihood of overshooting warming limits.²⁶ Due to methane's warming power and relatively short atmospheric lifetime, reducing methane emissions is the fastest way to slow the rate of global warming in the near term.²⁷

Feasibility

- Technologies and practices to prevent vented and fugitive methane emissions in the energy sector are well-known, and a new wave of technologies holds promise for remote monitoring of methane, which could help improve inventory data.
- 50–80 percent of oil and gas sector methane emissions could be abated at less than US \$50 per ton of CO₂eq using currently available technologies.²⁸

A selection of key existing initiatives

A range of actors, from civil society to governments to the private sector, have actively cooperated to raise the profile of this issue over the last few years, and resources exist to help countries both improve their methane inventories and reduce methane emissions. Key existing initiatives include:

- Climate and Clean Air Coalition is comprised of governments, intergovernmental organizations, businesses, scientific institutions, and civil society organizations. It oversees a range of methane-related initiatives, including the Oil and Gas Methane Partnership 2.0, which is the only comprehensive, measurement-based reporting framework for the oil and gas industry.²⁹
- **Global Methane Pledge**, launched at COP26, commits participants to contributing "to a collective effort to reduce global methane emissions at least 30 percent from 2020 levels by 2030." 150 countries have joined the pledge, and more than 50 countries have developed (or are developing) national methane plans. Select participating countries have also now launched "pathways" for key emitting sectors—energy, agriculture, and waste.³⁰
- **Global Methane Hub** is a philanthropy that supports action under the Global Methane Pledge, with a focus on driving emission reductions in the highest emitting sectors and regions.³¹

²⁴ "Benefits of Measurement-Based Methane Estimates and Timely Emissions Reductions for Reaching the Long-Term Global Goal on Temperature: Submission to the Global Stocktake by the Environmental Defense Fund," August 3, 2022, <u>https://unfccc.int/sites/default/files/resource/202208040943--</u> Environmental%20Defense%20Fund GST%2004.08.22.pdf.

 ²⁵ "Benefits of Measurement-Based Methane Estimates and Timely Emissions Reductions for Reaching the Long-Term Global Goal on Temperature: Submission to the Global Stocktake by the Environmental Defense Fund."
 ²⁶ "Climate Change 2022: Mitigation of Climate Change," The Intergovernmental Panel on Climate Change 3-5 (2022). <u>https://www.ipcc.ch/report/ar6/wg3</u>.

²⁷ "Benefits of Measurement-Based Methane Estimates and Timely Emissions Reductions for Reaching the Long-Term Global Goal on Temperature: Submission to the Global Stocktake by the Environmental Defense Fund."

²⁸ "Climate Change 2022: Mitigation of Climate Change," SPM-37.

²⁹ "Climate and Clean Air Coalition," n.d., <u>https://www.ccacoalition.org/en</u>.

³⁰ "Global Methane Pledge: From Moment to Momentum" (U.S. Department of State, November 17, 2022), <u>https://www.state.gov/global-methane-pledge-from-moment-to-momentum</u>.

³¹ "Global Methane Hub," n.d., <u>https://www.globalmethanehub.org/</u>.



Barriers

- Abatement of methane emissions depends on accurate characterization of emission sources, and existing inventory methodologies do not fully capture methane emissions.³²
- Lack of infrastructure may prevent captured gas from being brought to market, especially where gas is co-produced with oil.³³
- Lack of incentives and technical expertise for abatement, including in contexts where the environmental costs of emissions are not considered.³⁴
- Difficult-to-quantify costs of refining business operations and worker training, as well as institutional inertia.

Sustainable Development Goals

- Methane is a precursor to ground-level or tropospheric ozone, exposure to which causes about one million premature deaths per year. Addressing methane emissions can have positive effects on human health and air quality.³⁵ Reducing methane emissions by 30 percent below 2020 levels by 2030 could avoid roughly 6 million premature deaths per year due to ozone exposure and about 1,600 billion lost work hours per year due to heat exposure.³⁶
- Strategies to reduce methane emissions (and resulting tropospheric ozone) can also positively impact agricultural yields and ecosystem services (including carbon sequestration), with benefits for the economy and employment.³⁷ Reducing methane emissions by 30 percent below 2020 levels by 2030 is estimated to avoid approximately 580 million tons of yield losses to wheat, corn, rice, and soybeans per year.³⁸ Crop yield benefits are felt strongest in locations near the equator.

Options for the outcome at COP28

The Glasgow Climate Pact invited Parties to "consider further actions to reduce by 2030 non-carbon dioxide greenhouse gases emissions, including methane."³⁹ This year, to further efforts to reduce methane emissions from the energy sector, Parties could:

• Initiate a process to regularly take stock of the progress made toward the Global Methane Pledge, including by incorporating insights from annual ministerial meetings.

 ³² "Benefits of Measurement-Based Methane Estimates and Timely Emissions Reductions for Reaching the Long-Term Global Goal on Temperature: Submission to the Global Stocktake by the Environmental Defense Fund."
 ³³ "Driving Down Methane Leaks from the Oil and Gas Industry: A Regulatory Roadmap and Toolkit" (International Energy Agency, January 2021), <u>https://iea.blob.core.windows.net/assets/465cb813-5bf0-46e5-a267-</u>
 <u>3be0ccf332c4/Driving Down Methane Leaks from the Oil and Gas Industry.pdf.</u>

³⁴ "Driving Down Methane Leaks from the Oil and Gas Industry: A Regulatory Roadmap and Toolkit."

³⁵ "Methane Emissions Are Driving Climate Change. Here's How to Reduce Them," UNEP, August 20, 2021, <u>http://www.unep.org/news-and-stories/story/methane-emissions-are-driving-climate-change-heres-how-reduce-them</u>.

³⁶ "Global Methane Assessment: 2030 Baseline Report" (United Nations Environment Programme, 2022), <u>https://wedocs.unep.org/bitstream/handle/20.500.11822/41108/methane_2030_SPM.pdf?sequence=1&isAllowe_d=y</u>.

³⁷ "Tropospheric Ozone," Climate & Clean Air Coalition, n.d., <u>https://www.ccacoalition.org/en/slcps/tropospheric-</u> ozone.

³⁸ "Global Methane Assessment: 2030 Baseline Report."

³⁹ "Glasgow Climate Pact," UNFCCC, November 13, 2021, <u>https://unfccc.int/documents/310475</u>.



- Adopt or recognize collective targets for reducing methane emissions overall (e.g., 30 percent by 2030) or in specific sub-sectors (e.g., 75 percent by 2030 in the fossil fuel sector).
- Call on all countries to include non-carbon dioxide greenhouse gas emissions, including methane, in their updated NDCs and sectoral mitigation plans, when available.
- Encourage all Parties to address methane emissions in the energy sector—possibly in the context of a broader approach to reducing methane emissions—and include related targets in their NDCs.
- Encourage countries to improve methane inventories using newly available measurement-based methane data, consistent with IPCC guidelines.
- Encourage all oil and gas companies to report and reduce their methane emissions, including by employing the United Nations Environment Programme's Oil and Gas Methane Partnership 2.0 Framework.

Signal/high-level ask	3.	Increase the share of electric vehicles (EVs) in light-duty vehicle (LDV) sales to 75–95 percent by 2030 and 100 percent by 2035. Increase the share of EVs in bus sales and medium- and heavy-duty vehicle sales to 60 percent and 30 percent by 2030, respectively, by: ⁴⁰
High-impact opportunities/ solutions	•	Incentivizing a shift toward EVs through purchase subsidies or mandates, charging discounts, regulations that cap emissions or limit emissions intensity, and/or gas taxes that reflect the negative impacts of fossil fuel combustion.
	•	Investing in battery technology improvements and the coordinated expansion—and standardization—of charging infrastructure, especially on priority routes.
	•	Phasing out internal combustion engines and tightening of regulatory trajectories across key markets in a coordinated way.
	•	Providing alternatives to private vehicles by incentivizing modal shifts and expanding viable public transportation options, including by investing in electrified public transit.
	•	Implementing strong normative safeguards in mining operations for lithium, cobalt, and other critical minerals for renewable energy technologies.

Impact

- In land transport, roughly 85 percent of CO₂ emission reductions needed for 1.5 degree C can be achieved with existing and emerging transport policies and technologies, with the other 15 percent driven by changes in behavior, especially for urban passenger transport.⁴¹
- EVs offer the largest decarbonization potential for land-based transport (compared to sustainable biofuels and other measures), if they are powered by low-emissions electricity.⁴² As such, they are an

⁴⁰ Sophie Boehm, "State of Climate Action 2022" (World Resources Institute, October 2022), https://www.wri.org/research/state-climate-action-2022.

⁴¹ "Climate Action Pathway: Transport Vision and Summary," UNFCCC, 2021, <u>https://unfccc.int/sites/default/files/resource/Transport_Vision%26Summary_2.1.pdf</u>.

⁴² "Climate Change 2022: Mitigation of Climate Change," SPM.



essential piece of a broader decarbonization strategy—along with demand-side shifts and alternative fuels—for a sector in which emissions have remained roughly constant.⁴³

• Scaling solutions in this sector is critical to reduce emissions in developed countries and limit emissions growth in developing countries.⁴⁴ Demand for transport is expected to continue rising rapidly⁴⁵ and, without intervention, "CO₂ emissions from transport could grow in the range of 16 percent and 50 percent by 2050."⁴⁶

Feasibility

- EVs are "proven technology for light-duty vehicles, buses, small- or medium-sized trucks used for urban logistics, and other short-distance or intra-city freight transport."⁴⁷ They are increasingly competitive with internal combustion engines, and the cost of batteries has fallen dramatically.⁴⁸
- While decarbonization of long-haul heavy transport may require a broader portfolio of solutions, "advances in battery technologies could facilitate the electrification of heavy-duty trucks."⁴⁹

A selection of key existing initiatives

- The **Road Transport Breakthroughs** set targets for buses, heavy goods vehicles, passenger vehicles, and vans, including a target for 100 percent of global passenger vehicle and van sales to be ZEVs by 2030 (in key markets).⁵⁰
- The COP26 Declaration on Accelerating the Transition to 100% Zero Emissions Cars and Vans garnered more than 120 signatories at COP26 (and 200 by COP27), including countries, carmakers, subnational governments, fleet owners, and financial institutions. Signatories aim to ensure all sales of new vehicles are zero emission by 2040 globally (and no later than 2035 in leading markets).⁵¹ The Accelerating to Zero Coalition was launched to secure more signatories and support implementation.⁵²
- Zero Emission Government Fleet Declaration and EV30@30, campaigns of the Clean Energy Ministerial, aim for 100 percent zero-emission LDV acquisitions of government-owned and operated fleets by 2035 and 30% of vehicle sales to be EVs by 2030, respectively.⁵³
- **EV100** is comprised of companies that have committed to switching their vehicle fleets to EVs and/or installing charging infrastructure for staff and customers by 2030.⁵⁴

⁴³ "Climate Change 2022: Mitigation of Climate Change."

⁴⁴ "Climate Change 2022: Mitigation of Climate Change," SPM-32.

⁴⁵ "Transport," IEA, n.d., <u>https://www.iea.org/topics/transport</u>.

⁴⁶ "Climate Change 2022: Mitigation of Climate Change," 1053.

⁴⁷ "Transport Vision and Summary."

⁴⁸ "Climate Change 2022: Mitigation of Climate Change," TS-53, TS-10, SPM.

⁴⁹ "Climate Change 2022: Mitigation of Climate Change," SPM-42.

⁵⁰ Climate Champions, "2030 Breakthroughs."

⁵¹ "COP26 Declaration on Accelerating the Transition to 100% Zero Emission Cars and Vans," gov.uk, August 1, 2022, <u>https://www.gov.uk/government/publications/cop26-declaration-zero-emission-cars-and-vans/cop26-declaration-on-accelerating-the-transition-to-100-zero-emission-cars-and-vans.</u>

⁵² "COP26 Presidency Outcomes," accessed January 5, 2023, <u>https://ukcop26.wpenginepowered.com/wp-content/uploads/2022/11/COP26-Presidency-Outcomes.pdf</u>.

⁵³ "EV30@30 Campaign," accessed January 5, 2023, <u>https://www.cleanenergyministerial.org/initiatives-</u> campaigns/ev3030-campaign/.

⁵⁴ "EV100 Members," Climate Group, n.d., <u>https://www.theclimategroup.org/ev100-members</u>.



• The **Zero Emissions Vehicles (ZEVs) Transition Council**, launched in 2020, provides a forum for many of the world's largest automotive markets to enhance political cooperation on the transition to ZEVs.⁵⁵

Barriers

- Lack of charging infrastructure and high up-front costs of some EVs (e.g., zero-emission trucks), especially in developing countries.⁵⁶
- Supply chain limitations, geopolitical risks, and negative environmental and social impacts associated with critical minerals used in batteries.

Sustainable development impacts

- Reducing emissions from on-road transportation can deliver a range of co-benefits, including improved air quality and public health.
- Jobs in energy transition-related sectors—including EVs—could reach 74.2 million in 2030 under the International Renewable Energy Agency's 1.5 degree C scenario. This compares to 45.8 million under governments' 2020 energy plans, targets, and policies.⁵⁷
- Some policy options to shift toward EVs and away from internal combustion engines (e.g., gas taxes) could have regressive impacts on low-income populations.
- Negative environmental and social impacts are associated with the mining of critical minerals, which are required for batteries and found in a limited number of countries.⁵⁸

Options for the outcome at COP28

COP decisions have not yet recognized the importance of specific measures to decarbonize the transport sector. Nevertheless, to further efforts to reduce emissions from the transport sector, Parties could:

- Adopt or recognize collective targets for the phase out of internal combustion engines and the scaledup deployment of EVs (e.g., increase the share of EVs in light-duty vehicle sales by to 75–95 percent by 2030 and 100 percent by 2035), with an accelerated timeline for leading markets.
- Commit to additional concrete measures (e.g., the Clean Energy Ministerial's Zero Emission Government Fleet Declaration) and encourage initiatives to align these measures with the scale and speed of the transition required for 1.5 degree C scenarios.

⁵⁵ "ZEV Transition Council," n.d., https://zevtc.org/.

⁵⁶ David G. Victor, Frank W. Geels, and Simon Sharpe, "Accelerating the Low Carbon Transition: The Case for Stronger, More Targeted and Coordinated International Action" (Brookings, December 9, 2019), https://www.brookings.edu/research/accelerating-the-low-carbon-transition/.

⁵⁷ "World Energy Transitions Outlook 2022."

⁵⁸ "Climate Change 2022: Mitigation of Climate Change," 6-31.



Signal/high-level ask	4.	Halt and reverse forest loss and land degradation by 2030, ⁵⁹ by:
High-impact opportunities/	•	Conserving healthy, living forests, and supporting the livelihoods of forest dependent communities, including through large-scale incentive programs
Solutions	•	Curbing and reversing deforestation and degradation, including by expanding conservation areas, instituting moratoria on forest conversion, securing tenure and protection of Indigenous territories, encouraging sustainable land-use practices, developing sustainable land-use and management plans, and decreasing pressure from the agricultural sector.
	•	Implementing moratoria on products associated with deforestation and provide support for monitoring and verification of deforestation-related products.
	•	Integrating local communities and civil society in the planning, implementation, and monitoring of conservation activities to ensure good governance, accountability, rule of law, and the upholding of human rights.

Impact

- Estimates suggest that cost-effective land-based climate mitigation measures could mitigate up to 13.8 GtCO₂eq per year between 2020 and 2050, with "50 percent from forests and other ecosystems, 35 percent from agriculture, and 15 percent from demand-side measures."⁶⁰
- Protecting, managing, and restoring forests and other ecosystems represent the largest potential among mitigation options for land-based mitigation assessed by the IPCC, with the ability to reduce emissions and/or sequester 7.3 GtCO₂eq per year.⁶¹ Reduced deforestation in tropical regions holds the highest mitigation potential.⁶²

Halting and reversing forest loss and land degradation "would deliver 10 percent of the climate mitigation action needed by 2030 to deliver on the Paris Agreement," according to the Forests and Climate Leaders' Partnership.⁶³

Feasibility

 Most mitigation options in forests and other natural ecosystems—and in the Agriculture, Forestry, and Other Land Use (AFOLU) sector more generally—are available and ready to deploy. Additionally, the conservation of natural ecosystems has especially high co-benefits and cost efficiency.⁶⁴

⁵⁹ "Glasgow Leaders' Declaration on Forests and Land Use," UN Climate Change Conference UK 2021, February 11, 2021, <u>https://ukcop26.org/glasgow-leaders-declaration-on-forests-and-land-use</u>.

⁶⁰ Stephanie Roe, Charlotte Streck, and Robert Beach, "Land-Based Measures to Mitigate Climate Change: Potential and Feasibility by Country" 27, no. 23 (October 11, 2021),

https://onlinelibrary.wiley.com/doi/full/10.1111/gcb.15873.

⁶¹ "Climate Change 2022: Mitigation of Climate Change," 108.

⁶² "Climate Change 2022: Mitigation of Climate Change," SPM-33.

⁶³ "World Leaders Launch Forests and Climate Leaders' Partnership to Accelerate Momentum to Halt and Reverse Forest Loss and Land Degradation by 2030," November 7, 2022, <u>https://ukcop26.org/world-leaders-launch-forests-and-climate-leaders-partnership-to-accelerate-momentum-to-halt-and-reverse-forest-loss-and-land-degradation-by-2030/</u>.

⁶⁴ "Climate Change 2022: Mitigation of Climate Change."



• The annual mitigation potential of protecting, restoring, and managing forests and other ecosystems is 2.9 GtCO₂eq at less than US \$20 per tCO₂eq. This increases to 3.1 GtCO₂eq at less than US \$50 per tCO₂eq and 7.3 GtCO₂eq per year at less than US \$100 per tCO₂eq.⁶⁵

A selection of key existing initiatives

- The Land Use Breakthrough aims for more than 10 GtCO₂eq mitigated per year through nature-based solutions by 2030.⁶⁶
- Glasgow Leaders' Declaration on Forest and Land Use, signed by 145 global leaders, is a collective commitment to halt and reverse forest loss and land degradation by 2030 while delivering sustainable development and promoting an inclusive rural transformation.⁶⁷ At COP27, 26 countries and the European Union launched the Forests and Climate Leaders' Partnership to drive accountability through annual high-level events and progress reports.⁶⁸
- The **Green Gigaton Challenge** is a global effort that brings together public, private, and philanthropic partners to transact one gigaton of high-quality emissions reductions from forest-based natural climate solutions by 2025 (and annually after that).⁶⁹
- The **High Ambition Coalition for Nature and People**, led by Costa Rica and France, aims to protect and conserve 30 percent of land and ocean by 2030.⁷⁰ More than 100 countries joined the coalition, and the 30x30 target was enshrined in the Kunming-Montreal Global Biodiversity Framework.
- The **FACT Dialogue** convenes producers and consumers of internationally traded agricultural commodities,⁷¹ and the **Tropical Forest Alliance**, hosted by the World Economic Forum, aims to remove deforestation from supply chains.⁷²

Barriers

- Insufficient access to finance,⁷³ pressures from large-scale commodity production and extractive industries, commodity demand from developed countries, and lack of institutional capacity.
- Insecure land rights, human rights violations, and violence against environmental defenders, particularly in countries with the highest deforestation rates.⁷⁴
- Perceived illegitimacy of conservation actions due to lack of community participation, and the perception that forest conservation is incompatible with sustainable development and growth.

⁶⁵ "Climate Change 2022: Mitigation of Climate Change," TS-86.

⁶⁶ Climate Champions, "2030 Breakthroughs."

⁶⁷ "Glasgow Leaders' Declaration on Forests and Land Use."

⁶⁸ "World Leaders Launch Forests and Climate Leaders' Partnership to Accelerate Momentum to Halt and Reverse Forest Loss and Land Degradation by 2030."

⁶⁹ "Green Gigaton Challenge," n.d., <u>https://www.greengigaton.com/</u>.

⁷⁰ "High Ambition Coalition for People and Nature," n.d., <u>https://www.hacfornatureandpeople.org/home</u>.

⁷¹ "FACT Dialogue," n.d., <u>https://www.factdialogue.org/</u>.

⁷² "Tropical Forest Alliance," n.d., <u>https://www.tropicalforestalliance.org/</u>.

⁷³ "Climate Change 2022: Mitigation of Climate Change," TS-86.

⁷⁴ "Climate Change 2022: Mitigation of Climate Change."



Sustainable Development Goals

 Conserving, managing, and restoring forests and other ecosystems have implications for mitigation, adaptation, food security, biodiversity, and ecosystem services.⁷⁵ If implemented in a manner that prioritizes high quality decision making, these measures can achieve climate and non-climate goals, such as increasing resilience, preserving biodiversity, enhancing food security and human health, and safeguarding livelihoods.^{76,77}

Options for the outcome at COP28

The Glasgow Climate Pact emphasized the importance of "protecting, conserving and restoring nature and ecosystems, including forests and other terrestrial and marine ecosystems, to achieve the long-term global goal of the UNFCCC by acting as sinks and reservoirs of greenhouse gases and protecting biodiversity, while ensuring social and environmental safeguards."⁷⁸ The Sharm el-Sheikh Implementation Plan reiterates this language and goes one step further, encouraging Parties to consider nature-based solutions or ecosystem-based approaches for their mitigation and adaptation action.⁷⁹

To further efforts to conserve, manage, and restore forests and other ecosystems, Parties could:

- Initiate a process to regularly take stock of the progress made toward the Glasgow Leaders' Declaration on Forest and Land Use, including by incorporating insights from the Forests and Climate Leaders' Partnership's annual high-level events and progress reports.
- Consider nature-based solutions and ecosystem-based approaches as a crucial components of their efforts to meet the goals of the Paris Agreement, as well as to advance global goals on biodiversity, human health, and sustainable development.
- Emphasize that nature-based solutions are not a substitute for decarbonization of the energy sector but rather an essential complement to decarbonization efforts.⁸⁰

⁷⁵ "Climate Change 2022: Mitigation of Climate Change," 7-40.

⁷⁶ Conservation International, Environmental Defense Fund, and The Nature Conservancy, "Submission for the Information Collection and Preparation (ICP) Component of the Global Stocktake (GST)," UNFCCC, n.d., <u>https://www4.unfccc.int/sites/SubmissionsStaging/Documents/202202281912---CI-EDF-</u>

TNC%20Joint%20Submission%20for%20the%20ICP%20Component%20of%20the%20GST%20-%20FINAL.pdf. ⁷⁷ Bronson Griscom et al., "Natural Climate Solutions," *Publication of the National Academy of Sciences of the United States of America* 114, no. 44 (October 16, 2017), <u>https://doi.org/10.1073/pnas.1710465114</u>.

⁷⁸ "Glasgow Climate Pact."

⁷⁹ "Sharm El-Sheikh Implementation Plan," November 20, 2022, <u>https://unfccc.int/documents/624441</u>.

⁸⁰ Conservation International, Environmental Defense Fund, and The Nature Conservancy, "Submission for the Information Collection and Preparation (ICP) Component of the Global Stocktake (GST)."



Signal/high-level ask	5.	Reduce the carbon intensity of building operations, minimize embodied emissions, and increase the rate of building retrofits to 3.5 percent by 2040, aiming for all new and existing assets to be net zero across their life cycles by 2050, ⁸¹ by:
High-impact	٠	Electrifying energy end-use in buildings and improving energy efficiency. ⁸²
opportunities/ solutions	•	Adopting green procurement policies or revising construction codes to require the purchase of low-carbon construction materials (e.g., low-carbon cement).
	•	Utilizing innovative finance models that reduce up-front costs.

Impact

- The global mitigation potential of existing solutions in the buildings sector is substantial—at least 8.2 GtCO₂eq, or 61 percent, of global building emissions by 2050 compared to their baseline—with the largest potential available in developing countries.⁸³ In 2019, the sector was responsible for 16 percent of total greenhouse gas emissions.⁸⁴
- Nevertheless, emissions from the sector have increased by 0.7 percent per year over the last decade, with emission increases outpacing efficiency improvements and the decarbonization of electricity and heating. Addressing this trend is critical to reaching Paris temperature goals. 40 percent of buildings expected to exist in 2050 have yet to be built,⁸⁵ and adaptation measures could increase demand for energy and materials in this sector.⁸⁶

Feasibility

 Reducing emissions from the buildings sector relies "primarily on technologies that are already available,"⁸⁷ and literature reviewed by IPCC scientists foresees a significant cost reduction for key decarbonization technologies.⁸⁸ However, much of the mitigation potential of this sector remains untapped.⁸⁹

A selection of key existing initiatives

• The upcoming **Buildings Breakthrough**, due to launch in advance of COP28 and coordinated by the **Global Alliance for Buildings and Construction (***GlobalABC***)**, will aim to make near-zero emission and resilient buildings the new normal by 2030.

https://unfccc.int/sites/default/files/resource/HS Vision%26Summary 2.1 0.pdf.

⁸¹ Boehm, "State of Climate Action 2022."

⁸² This could be done by enacting increasingly stringent (and/or more broadly applicable) building energy codes and appliance performance standards, mandating the use of fossil-free energy sources, and/or offering incentives for efficient appliances.

⁸³ "Climate Change 2022: Mitigation of Climate Change," SPM-31.

⁸⁴ "Climate Change 2022: Mitigation of Climate Change," SPM-8.

⁸⁵ "Climate Action Pathway: Human Settlements Vision and Summary," UNFCCC, 2021,

⁸⁶ "Climate Change 2022: Mitigation of Climate Change."

⁸⁷ Boehm et al., "State of Climate Action 2021."

⁸⁸ "Climate Change 2022: Mitigation of Climate Change," 994.

⁸⁹ "Human Settlements Vision and Summary."



- The **C40 Net Zero Carbon Buildings Declaration** aims to ensure that new buildings operate at net-zero carbon by 2030, and all buildings by 2050.⁹⁰
- The **Zero Carbon Buildings for All** initiative also aims for the decarbonization of new buildings by 2030 and existing buildings by 2050, as well as the mobilization of US \$1 trillion in "Paris-compliant" building investments in developing countries by 2030."⁹¹
- The World Green Building Council's **Net Zero Carbon Buildings Commitment** brings together over 170 signatories to address both operational and embodied carbon in the built environment.⁹²

Barriers

- High heterogeneity of the sector, with varying approaches required for individual buildings and differing heating and cooling needs across regions.⁹³
- Lack of institutional capacity and appropriate governance structures,⁹⁴ with sometimes competing priorities for key actors (e.g., building owners vs. tenants).⁹⁵
- Limited incentives and high upfront investment costs.

Sustainable Development Goals

- Decarbonizing the buildings sector has positive implications for employment and economic growth. Up to 30 jobs could be created for every million dollars (USD) invested in building retrofits or new energy efficient buildings.⁹⁶
- Measures to reduce emissions in the buildings sector can also yield co-benefits that improve wellbeing, including by improving indoor air quality, reducing gender inequalities, and addressing energy poverty.⁹⁷

Options for the outcome at COP28

In the GST outcome, Parties could:

- Recognize or adopt ambitious targets, such as the 2030 Breakthrough for the built environment (which aims for all new projects from 2030 to be net zero in their operation, with a more than 40% reduction in embodied carbon),⁹⁸ or targets for the electrification of energy end-use in buildings, energy efficiency, and/or the retrofit of buildings.
- Recognize the need for measurement and reporting of operational and embodied emissions from the built environment.

https://worldgbc.org/thecommitment/.

 ⁹⁰ "Net Zero Carbon Buildings Declaration" (C40 Cities), accessed February 7, 2023, <u>https://www.c40.org/wp-content/uploads/2022/02/C40-Net-Zero-Carbon-Buildings-Declaration Public-progress-report Feb-2022.pdf</u>.
 ⁹¹ "Zero Carbon Buildings for All" (UN Habitat), accessed February 7, 2023,

https://unhabitat.org/sites/default/files/documents/2019-09/zcbs_for_all_overview_6_aug_19_1.pdf. ⁹² "The Net Zero Carbon Buildings Commitment," accessed February 7, 2023,

⁹³ "Climate Change 2022: Mitigation of Climate Change," 956.

⁹⁴ "Climate Change 2022: Mitigation of Climate Change," 956.

⁹⁵ Boehm, "State of Climate Action 2022."

⁹⁶ "Climate Change 2022: Mitigation of Climate Change," 999.

⁹⁷ "Climate Change 2022: Mitigation of Climate Change." 959.

⁹⁸ "2030 Breakthrough: Built Environment," accessed February 7, 2023, <u>https://climatechampions.unfccc.int/system/builtenvironment/</u>.