Task Force 4
Refuelling Growth: Clean Energy and Green Transitions

FORGING A NATURE-POSITIVE ENERGY TRANSITION

July 2023

Linda Krueger, Director, Biodiversity & Infrastructure Policy, The Nature Conservancy

Anna Willingshofer, Policy Advisor Biodiversity & Sustainable Infrastructure, The Nature Conservancy

Bruce McKenney, Global Director Renewable Energy, The Nature Conservancy

Evan Freund, Senior Director – Sustainable Infrastructure & Finance, WWF

Ryan Bartlett, Director, Climate Risk Management and Resilience, WWF

Beatriz Nofal, Director USA Committee, Argentine Council for International Relations (CARI)

वसुधैव कुटुम्बकम्

ONE EARTH • ONE FAMILY • ONE FUTURE

Abstract

Rapid deployment of renewable energy (RE) is critical to meet rising energy needs and mitigate climate change. The energy infrastructure needed to meet net-zero greenhouse gas (GHG) emissions goals will have a large footprint that could impact people and biodiversity, as well as create conflicts that jeopardise investments and slow the clean energy transition. Materials needed for RE generation are also creating a new geography of mining impacts. Scientific assessments have shown the potential to meet the world's RE needs by channeling development in ways that optimise for carbon mitigation while protecting natural ecosystems and supporting equitable transition. Successful navigation of this narrow pathway will require early and careful planning, sourcing, and operation of RE facilities. The G20 policy guidance to the energy and finances sectors must ensure alignment with the Kunming-Montreal Global Biodiversity Framework, the Paris Agreement, and SDGs to enable effective and green transition.

The Challenge

1

Urgency of accelerating the deployment of RE: Climate, equity, security, and cost factors

To avoid the worst impacts of climate change, the world needs to cut greenhouse gas (GHG) emissions in half by 2030 and reach net-zero emissions by 2050.[1] With 73 percent of global emissions caused by energy use, it is not possible to achieve global climate and biodiversity goals without a rapid shift to clean and renewable energy (RE). An estimated 28,000 GW of renewable capacity will need to be installed by 2050—which is over nine times the current global capacity.[2] This means annual clean energy investment worldwide will need to more than triple by 2030, to approximately US$4 trillion, for the world to be on a path to net-zero goals.[3]

Accelerating RE is also urgently needed to address growing inequality around the world. Over 750 million people have no access to electricity, and many more need increased access to ensure their wellbeing and prosperity.[4] The energy transition should be equitable, supporting communities by increasing energy access, addressing energy poverty, and supporting just transition.

The urgency of RE development has been driven by Russia's 2022 invasion of Ukraine, which led to a global energy crisis and rekindled energy security concerns around the world. The crisis spiked prices across all fuels, with natural gas reaching record highs and oil prices showing the highest levels since 2008.[5] This led to a redoubling of RE commitments, such as Europe's new target of 42.5 percent renewables as an energy security initiative.

Aiding the acceleration, solar and wind energy prices have dropped by 90 percent and 50 percent, respectively, over the past decade.[6] They are now the cheapest generation sources and are expected to make up the majority of future energy investment. The urgent work now is putting in place policies to deploy RE at the rate and scale required to achieve net-zero emissions by 2050.

Risks to biodiversity from RE expansion: Land/sea use impacts and materials

The unprecedented scale of the RE buildout will have significant impacts on land and sea use.[7,8] In the US alone, meeting net-zero goals could require about 6 percent of the country's land area for utility-

scale RE projects, transmission, and associated infrastructure, even while maximising energy efficiency, deploying rooftop solar and offshore wind, and incorporating other technologies such as nuclear and carbon capture and storage.[9] Likewise, Germany estimates that at least 2 percent of its land will be needed for onshore wind projects over the next decade.[10] This large footprint raises the potential for widespread land-use conflicts due to community, environmental, cultural heritage, and other concerns that, in turn, could slow the transition to clean energy.

The buildout of transmission lines and associated infrastructure like roads is an added barrier to the rapid deployment of RE and impacts biodiversity through habitat fragmentation, deforestation, and clearing to reduce the risk of interference with the transmission.[11] Accessing roads for maintenance compounds the effect and can open relatively intact natural ecosystems to incursion and resource exploitation. While this is primarily a biodiversity concern, natural ecosystems also sequester significant amounts of carbon dioxide (CO_2), such that their degradation can have perverse effects on climate as well as biodiversity, reducing the climate mitigation potential of RE transition.

Another challenge is the volume and type of raw materials required for RE. The construction of large-scale renewable facilities and storage requires a large quantity of rare and raw materials, including lithium, cobalt, copper, rare earth metals, aluminum, and silver. These minerals and metals are often found in geological formations or mineral deposits that occur in areas with sensitive ecosystems, such as forests, wetlands, and coastal areas. As a result, the extraction and processing of these materials can have a significant impact on biodiversity, including habitat destruction, pollution, and loss of species.[12,13]

Institutional barriers to integrating environmental and social components in RE

Many countries lack the capacity to conduct adequate planning to evaluate and incorporate biodiversity risks in the renewables sector. RE planning involves spatially resolving long-term energy needs with land-use suitability for different types of renewable generation, as well as integrating data

on biodiversity and ecosystem services, including natural carbon sequestration.

This creates challenges for permitting and licensing agencies that can slow the process or result in poor environmental outcomes. Permitting processes can be complex and time-consuming and involve several institutions as well as different review and approval procedures. A study undertaken in 2020 by the Council on Environmental Quality found that all federal agencies in the US needed an average of 4.5 years to complete Environmental Impact Statements (EIS).[14] In South Korea, permitting processes can take over 10 years to complete.[15] Several initiatives are underway to reduce the time and revise overall permitting procedures, such as the REPowerEU Strategy on wind and solar projects.[16] Achieving global climate and biodiversity goals will be challenging without streamlining permissions and reducing the regulatory burden on RE projects on a global scale.

The G20's Role

2

G20 Bali Roadmap for clean energy transition: Gap in biodiversity

The 2022 Bali Energy Transitions Roadmap mainly addresses the climate crisis. However, nowhere in the Bali Roadmap is there an acknowledgement of the large land-use requirements of solar and wind energy or the biodiversity crisis and the importance of healthy ecosystems and nature-based solutions to address both the climate and biodiversity crises. Natural ecosystems can sequester significant amounts of CO_2, and therefore, any further degradation—even if it is linked to the deployment of RE—can have perverse effects on climate as well as biodiversity and can reduce the climate mitigation potential of RE transition.

The Bali Roadmap's core principles are: (i) securing energy accessibility; (ii) scaling up smart and clean energy technologies; and (iii) advancing clean energy financing.[17] Each of these priorities includes milestones for 2030, and for each priority, four key actions and deliverables are contemplated to advance energy transition, listing the initiatives and G20 groups that conduct relevant work for their achievement.

The potential risks and impacts of RE expansion on biodiversity are not addressed, and the spatial dimension of RE deployment on land and sea use is not considered in the analysis of the priorities and actions. Only Priority 2 (scaling up smart and clean energy technologies) and Action 4 (promote the resilience and sustainability of clean energy supply chains) express G20 support for global standards for ESG to "lift barriers to diverse, responsible, sustainable, and resilient supply chains for critical mineral production, processing and recycling needed for clean energy technologies".[18]

No other actions or G20 guidance are contemplated to minimise the impact on biodiversity across the lifecycle of RE infrastructure. No actions or policy guidance are considered to minimise the ecological impact of new transmission lines, to avoid deforestation, or to encourage reforestation as a mitigation measure. While Priority 2 and Action 4 aim to lift barriers for sustainable supply chains of critical mineral production, the Roadmap text does not address the need to mitigate impacts when these resources are found in areas with sensitive ecosystems.

Connecting RE infrastructure, quality infrastructure, and sustainable finance in the G20 agenda

Infrastructure has been a long-standing item on the G20 agenda. Since the Brisbane Leaders' Summit in 2014, the G20 has focused on infrastructure investment as a foundation of its balanced, sustainable, and inclusive growth agenda.[19] After 2015, sustainable infrastructure also became a necessary foundation for achieving the SDGs, including rapid reductions in GHG emissions, as mandated by the Paris Agreement. Considerable progress was made by the G20 leaders in 2019 during the Japan presidency regarding the sustainability of infrastructure investments with the endorsement of the Quality Infrastructure Investment (QII) Principles (Annex 6 – 2019 Osaka Leaders Communique).[20] The QII Principles confirmed that ecosystem, biodiversity, and climate considerations should be incorporated into infrastructure investing.[21]

The QII Principles must be used as a policy guidance tool to advance policy in order to improve the integration of environmental factors, particularly biodiversity, into quality infrastructure investments, clean energy transition, and sustainable finance. These three areas are clearly interrelated in the G20 agenda. However, since they are the domain of three different G20 working groups, their relationship loses preeminence or risks being lost. The G20 Sustainable Finance Roadmap, approved in 2021 during Italy's presidency, is a good example of how the relations between these three G20 working groups need to be considered.

Recommendations to the G20

3

The G20 has a key role to play in accelerating energy transformation while ensuring that biodiversity and natural ecosystems are not degraded. Thus, this Policy Brief recommends the following:

a. **The G20 Finance Ministers and Infrastructure Working Group should align policies and recommendations with the Kunming-Montreal Global Biodiversity Framework (GBF), formally endorse the GBF targets, and recommit member states to integrating GBF in energy policies and RE deployment.**

The G20 should align its global policy guidance and roadmaps related to quality infrastructure, clean energy transitions, and sustainable finance with the GBF, which was approved by 196 countries in December 2022 at COP 15. The G20 should endorse the GBF targets and mainstream them in its policy guidance for member countries to integrate the GBF in policies for clean energy transition, RE deployment, and quality infrastructure investments.

The GBF has created a clear mandate to mainstream biodiversity in the energy, infrastructure, and finance sectors in Target 14 and requires countries to conduct an integrated spatial planning process to address land- and sea-use change in Target 1. Ensuring implementation of these targets will require that they be adopted by entire economies and governments.

Mainstreaming biodiversity is an achievable goal for the RE sector. A global abundance of solar and wind resources provides the opportunity to build RE infrastructure in places where it can better avoid environmental and social conflicts and can be deployed faster. At a global scale, there is enough previously developed land with strong RE resources to meet the Paris Agreement goals 17 times over.[22] Most countries, including the ten highest emitters, have an abundance of already converted areas with good RE resources. These are lands like marginal farmlands, former mine lands, brownfields, and other degraded lands, the development of which could help make the land more productive, support local economic development,

and provide new revenue streams for farmers and other landowners while avoiding environmental and social impacts. Focusing on these places can also support a fair and just transition by bringing economic development and health benefits, such as cleaner air, to communities that have borne the brunt of impacts from fossil fuel energy infrastructure.

The G20 should incentivise the use of planning tools that integrate capacity expansion models with models to guide low-impact siting of new REs to help decision makers design systems that are low-carbon, low-cost, and low-impact. For example, the Nature Conservancy's "Power of Place" study is a first-of-its-kind energy planning approach that incorporates environmental and social values into long-term energy planning and decarbonisation scenarios. The "Power of Place – West" study of 11 US states shows that the US West can achieve net-zero economy-wide emissions reductions by 2050 while avoiding most sensitive natural areas and working lands. It also shows that energy planning that includes land-use considerations can dramatically reduce conservation impacts with minimal additional cost.[23]

Similarly, India has announced its target of meeting 50 percent of its energy needs from renewable sources by 2030, which will require nearly tripling its currently installed wind and solar power capacity. A study conducted by the Nature Conservancy and the Center for Study of Science, Technology and Policy (CSTEP) concluded that India can meet this target entirely by placing renewables infrastructure on lower-impact lands, many of which are degraded.[24]

Thus, the G20 can support governments to implement systems-scale planning and licensing focusing on integrated power systems to identify and develop those that are low-carbon and cost-competitive and create competitive frameworks to accelerate uptake that also meets international commitments and contributions to the Paris, SDGs, and GBF targets.

b. The G20 should drive the alignment of financial flows for energy development with GBF.

Multilateral development banks (MDBs) can drive smarter RE development by supporting the integration of energy,

climate, and biodiversity objectives at the national level and should be guided by the G20 to do so. While climate frameworks are relatively well developed, biodiversity has not been given the same attention. MDBs could provide funding and technical support to national governments to conduct landscape-scale, pre-feasibility planning for sustainable energy development. This would help address environmental and social risks at the project preparation stage and build stronger pipelines of bankable projects for both public and private financial institutions.[25] MDBs can also continue to lead standard-setting for REs through advancing their own standards, promoting industry standards, building institutional and human resources, and working with governments so that they incorporate sustainability criteria in requests for proposals for energy infrastructure.[26,27]

MDBs and other financial institutions should be required to screen for biodiversity risks in renewables investments. Whenever possible, banks should support upstream, landscape-level prioritisation to optimise the siting of energy infrastructure. Private finance should also align by screening investments for biodiversity risk in line with the emerging Task Force on Nature-Related Financial Disclosure (TNFD)[28] and the Science-Based Targets Network (SBTN).[29]

c. The G20 governments should support the defining of priority areas for accelerating renewables that are low impact for biodiversity and promote the integration of biodiversity-positive actions with RE development.

Upstream and larger scale planning processes can accelerate renewables and improve biodiversity outcomes by defining the most appropriate siting options for infrastructure, thus reducing the scope of project-level environmental reviews and speeding up licensing processes. Scenario planning at scale can highlight conflicts and tradeoffs and reduce land and sea requirements for new energy installations.[30,31] For example, in Europe, REPower-EU and RE Directive III call for member states to map their 'Renewables Acceleration Areas'. RE developed in these zones will have "simplified and fast permit-granting process"[32] as they have "a presumption of not having significant effects on the environment".[33] Member states are expected to implement this over the succeeding 27 months.

To ensure a sustainable energy transition preventing high rates of biodiversity loss, the G20 must also proactively address the new geographical distribution of mining impacts driven by RE materials and metal requirements. The G20 governments should assess the role of RE-generated needs for new materials and metals and seek to mitigate the impact of the extraction of these resources. This is consistent with Priority 2 and Action 4 of the Bali Roadmap. The G20 can facilitate an urgent dialogue, emphasising the need for improved science-based scenario modeling and data systems to inform better RE and extractive policies across countries.

Other government incentives can support the use of nature-based solutions (NbS) combined with RE projects to enhance the biodiversity value of a project site. For example, pollinator-friendly solar projects use deep-rooted perennial wildflowers and grasses throughout a project site to provide new habitats for declining pollinators.

d. The G20 must endorse nature-inclusive RE standards and metrics for nature-related risk disclosure

Several emerging standards for infrastructure development provide the basis for ensuring that RE does not work at cross-purposes with other SDGs. The FAST-Infra Sustainable Infrastructure Label is one such example. FAST is a globally applicable label for projects demonstrating significant positive sustainability performance. It is designed to enable developers and operators to show the positive impact of an infrastructure asset and attract investors seeking assets that positively contribute to sustainable outcomes. The label is designed to enable the transformation of sustainable infrastructure into a mainstream, liquid asset class.[34]

The GBF also calls on countries to require large businesses, including in the energy sector, to provide disclosure of biodiversity risks, impacts, and

dependencies. These disclosure requirements are modeled on the Task Force on Climate-Related Financial Disclosure,[35] which has been endorsed by the G20. The private-sector driven Task Force on Nature-Related Financial Disclosure released its first core disclosure metrics in March 2023;[36] these are likely to become the template for regulated disclosure requirements. The G20 could reduce the proliferation of requirements by encouraging the uniform and early adoption of a consistent set of nature-disclosure requirements.

Attribution: Linda Krueger et al., "Forging a Nature-Positive Energy Transition," *T20 Policy Brief*, July 2023.

Endnotes

1 IPCC, "Summary for Policymakers," in *Climate Change 2023: Synthesis Report*, eds., H. Lee and J. Romero (Geneva: IPCC, 2023).

2 International Renewable Energy Agency (IRENA), *Renewable Energy Targets in 2022: A Guide to Design* (Abu Dhabi: IRENA, 2022), https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2022/Jul/IRENA_Power_Generation_Costs_2021.pdf?rev=34c22a4b244d434da0accde7de7c73d8.

3 International Energy Agency (IEA), *Net Zero by 2050: A Roadmap for the Global Energy Sector* (Paris: IEA, 2021), https://www.iea.org/reports/net-zero-by-2050.

4 Laura Cozzi et al., "For the First Time in Decades, the Number of People Without Access to Electricity is Set to Increase in 2022," International Energy Agency, April 5, 2023, https://www.iea.org/commentaries/for-the-first-time-in-decades-the-number-of-people-without-access-to-electricity-is-set-to-increase-in-2022.

5 World Bank Group, *Commodity Markets Outlook: Pandemic, War, Recession: Drivers of Aluminum and Copper Prices* (Washington, DC: World Bank, 2022).

6 International Renewable Energy Agency (IRENA), *Renewable Power Generation Costs in 2021* (Abu Dhabi: IRENA, 2022), https://www.irena.org/publications/2022/Jul/Renewable-Power-Generation-Costs-in-2021.

7 James R. Oakleaf et al., "Mapping Global Development Potential for Renewable Energy, Fossil Fuels, Mining and Agriculture Sectors," *Scientific Data* 6, no. 1 (2019): 101, doi:10.1038/s41597-019-0084-8.

8 Vasilis Fthenakis and H. C. Kim, "Land Use and Electricity Generation: A Life-Cycle Analysis," *Renewable and Sustainable Energy Reviews* 13 no. 6–7 (2009): 1465–74, doi:10.1016/j.rser.2008.09.017.

9 Eric Larsen et al., *Net Zero America: Potential Pathways, Infrastructure, and Impacts, Final Report* (Princeton: Princeton University, 2021), https://netzeroamerica.princeton.edu/the-report.

10 "New Law Reserves 2% of German Land Area for Onshore Wind by 2032," Clean Energy Wire, accessed April 5, 2023, https://www.euractiv.com/section/electricity/news/new-law-reserves-2-of-german-land-area-for-onshore-wind-by-2032/.

11 Larissa D. Biasotto and Andreas Kindel, "Power Lines and Impacts on Biodiversity: A Systematic Review," *Environmental Impact Assessment Review* 71 (2018): 110–119, doi:10.1016/j.eiar.2018.04.010.

12 Laura J. Sonter et al., "Renewable Energy Production Will Exacerbate Mining Threats to Biodiversity," *Nature Communications* 11, no. 1 (2020): 4174, doi:10.1038/s41467-020-17928-5.

13 International Energy Agency, *The Role of Critical Minerals in Clean Energy Transitions* (Paris: IEA, 2022), https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions.

14 Council on Environmental Quality (US), *Environmental Impact Statement Timelines (2010-2018)* (Washington, DC: CEQ, 2020), https://ceq.doe.gov/docs/nepa-practice/CEQ_EIS_Timeline_Report_2020-6-12.pdf.

15 "98% of South Korean Offshore Wind Projects Stuck in Bureaucratic Nightmare," Solutions for Our Climate (SFOC), accessed April 6, 2023 https://forourclimate.org/en/sub/news/.

16 "REPowerEU: Council Agrees on Accelerated Permitting Rules for Renewables – Consilium," Council of the EU, accessed April 6, 2023, https://www.consilium.europa.eu/en/press/press-releases/2022/12/19/repowereu-council-agrees-on-accelerated-permitting-rules-for-renewables/ .

17 G20, "G20 Bali Roadmap for the Clean Energy Transition," 2022, http://www.g20.utoronto.ca/2022/220902-energy-roadmap.html.

18 G20, "G20 Bali Roadmap for the Clean Energy Transition"

19 See, for example, *G20 Hamburg Climate and Energy Action Plan for Growth*, 2017, http://www.g20.utoronto.ca/2017/2017-g20-climate-and-energy.html; "Communiqué: Finance Ministers & Central Bank Governors," March 19-20, 2018, http://www.g20.utoronto.ca/2018/2018-03-30-g20_finance_communique-en.pdf; "G20 Principles for Quality Infrastructure Investment," 2019, http://www.g20.utoronto.ca/2018/2018-03-30-g20_finance_communique-en.pdf.

20 Beatriz Nofal, "A Global Partnership for Infrastructure Sustainability," *ReCoupling, Global Solutions Journal*, no. 7 (2021).

21 Linda Krueger et al., "A Compass for Global Recovery: Integrating Environmental Criteria into Infrastructure Investment," 2021, https://www.t20italy.org/wp-content/uploads/2021/10/TF7_PB04_LM03.pdf.

22 S. Baruch-Mordo et al., "From Paris to Practice: Sustainable Implementation of Renewable Energy Goals," *Environmental Research Letters* 14, no. 2 (2019): 024013–9, doi:10.1088/1748-9326/aaf6e0.

23 Grace C. Wu et al., "Minimizing Habitat Conflicts in Meeting Net-Zero Energy Targets in the Western United States," *PNAS*, January 19, 2023, https://www.pnas.org/doi/10.1073/pnas.2204098120.

24 Joseph Kiesecker et al., "Renewable Energy and Land Use in India: A Vision to Facilitate Sustainable Development," *Sustainability* 12, no. 1 (2019): 281, doi:10.3390/su12010281.

25 Amar Bhattacharya et al., "Policy and Institutional Framework for Delivering on Sustainable Infrastructure," in *T20 Task Force on Economic Effects of Infrastructure Investment and Its Financing* (Japan: 2019), https://t20japan.org/wp-content/uploads/2019/05/t20-japan-tf4-10-policy-institutional-framework-delivering-sustainable-infrastructure.pdf.

26 Aaron Bielenberg et al., *Financing Change: How to Mobilize Private-Sector Financing for Sustainable Infrastructure* (McKinsey & Company, 2016).

27 Amar Bhattacharya, J. Oppenheim, and Nicholas Stern, “Driving Sustainable Development Through Better Infrastructure: Key Elements of a Transformation Program,” Global Economy & Development Working Paper No. 91, 2015.

28 “TNFD Nature-Related Risk & Opportunity Management and Disclosure Framework v0.4 Beta Release,” Task Force on Nature-Related Financial Disclosures, accessed July 8, 2023. https://framework.tnfd.global.

29 Science Based Targets Network, accessed July 8, 2023, https://sciencebasedtargetsnetwork.org/resources/

30 Nofal, “A Global Partnership for Infrastructure Sustainability”

31 Hise et al., “Site Wind Right: Identifying Low-Impact Wind Development Areas in the Central United States,” *Land* 11, no. 4 (2022), https://doi.org/10.3390/land11040462.

32 “Council and Parliament Reach Provisional Deal on Renewable Energy Directive – Consilium,” Council of the EU, accessed April 6, 2023, https://www.consilium.europa.eu/en/press/press-releases/2023/03/30/council-and-parliament-reach-provisional-deal-on-renewable-energy-directive/ .

33 “Renewable Energy, Energy Performance of Buildings and Energy Efficiency Directives: Amendments (REPowerEU),” European Parliament, accessed April 5, 2023, https://www.europarl.europa.eu/doceo/document/TA-9-2022-0441_EN.html.

34 “Fast Infra Sustainable Infrastructure Label,” Climate Policy Initiative, accessed March 29, 2023, https://www.climatepolicyinitiative.org/fast-infra-sustainable-infrastructure-label/.

35 Task Force on Climate-related Financial Disclosures, accessed July 8, 2023, https://www.fsb-tcfd.org

36 “TNFD Nature-Related Risk & Opportunity Management and Disclosure Framework,” Task Force on Nature-Related Financial Disclosure (TNFD), accessed April 6, 2023, https://framework.tnfd.global/.

वसुधैव कुटुम्बकम्

ONE EARTH • ONE FAMILY • ONE FUTURE