



GLOBAL ENERGY POLICY FRAMEWORK

NOVEMBER 2023



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Acknowledgements:
Thanks to the many people who contributed to the writing of this report.

Publication date: November 2023.

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Design:
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PREAMBLE

We are at a pivotal moment in time to secure a liveable and sustainable future for our planet. Greenhouse gas emissions continue to climb to the highest levels in human history, causing a climate crisis. This crisis has already led to human-induced global warming of 1.1°C above pre-industrial levels. We are not on track to meet the global goal of limiting warming to 1.5°C by the end of the century – our current trajectory is putting billions of lives and livelihoods at greater risk from floods, droughts, fires, and storms, and threatening a mass extinction of living species¹.

Abundant energy has so far greatly – although unequally – improved the quality of life for many people around the world, and remains critical to eliminating poverty and meeting the aspirations of many developing countries. But our current energy system poses a grave risk to the health of the planet and its inhabitants.

A rapid and fundamental transformation of the energy system is essential if we are to have any hope of limiting warming to 1.5°C and avoiding the worst effects of climate change. This transformation will address ~75% of global greenhouse gas emissions and help mitigate climate change. It will also save millions of lives each year by reducing air pollution², preventing permanent destruction of ecosystems such as coral reefs, river deltas, and rainforests, generating up to US\$12 trillion in energy savings and reduced damages by 2050³. It will promote global equity and prosperity – vastly improving the lives of billions of people in developing countries.

WWF last set out its energy-related goals in its 2011 The Energy Report. Even then, we foresaw the need for 100% renewable energy by 2050. But with the current period of global warming rapidly being replaced by an era of ‘global boiling’⁴, the emerging political importance of the energy transition is compelling us to have a more intense focus on energy. The evidence for the feasibility of a 100% renewables world has increased, though this should now have a different composition from the one we projected in 2011.

This Global Energy Policy Framework details WWF’s focus for energy stakeholders worldwide. We are already playing a major role in catalysing the energy transitions that are urgently needed, and by raising awareness of the broader context that will determine the sustainability of this global transformation. Our work to address energy access in Africa, to find ways of repowering Asia with renewables, and to demonstrate energy efficient applications combined with the use of solar power are examples of our contribution to new, clean energy solutions. Through the CLEANaction Coalition, we also aim to minimise any disruption to nature from energy transitions, and the Alliance for Just Energy Transformation highlights the need to recognise and manage the social impact.

WWF is well-placed to significantly influence the global response. Our independence and neutrality mean that we have no vested interests other than ensuring benefit for our planet and people. Our network of offices in over 100 countries can determine the most appropriate action according to local circumstances.

The growing recognition of WWF for energy-related activity gives us a platform to build networks and partnerships that enable positive and influential future interventions. In addition, we have the capacity and experience to address energy-related issues within a much broader environmental and social context. WWF is one of the few organisations that understands nature, climate, and energy, and so we are able to bring a holistic approach to solutions.

Energy transitions need to be faster, greener, and fairer. If we treat this global challenge with the urgency it demands, we can still achieve 100% renewables and phase out all fossil fuels quickly enough to create a world with greater energy security, a stable climate, and a sustainable future.

We hope this Global Energy Policy Framework inspires and enables leaders around the world to act boldly and rapidly. We offer our unwavering support at the international level, and in all the countries where we work, to make this transformation a reality.



A stylized, handwritten signature in black ink, consisting of several overlapping, sweeping strokes.

Manuel Pulgar-Vidal
Global Climate and Energy Lead
WWF International

¹ The Global Assessment Report On Biodiversity And Ecosystem Services - Summary For Policymakers (2019)

² <https://www.theguardian.com/environment/2018/dec/05/save-millions-of-lives-by-tackling-climate-change-says-world-health-organization>

³ The Oxford Student, 5 October 2022: <https://www.oxfordstudent.com/2022/10/05/switching-to-renewable-energy-could-save-trillions-new-study-finds/>

⁴ <https://news.un.org/en/story/2023/07/1139162>

EXECUTIVE SUMMARY

We face the connected emergencies of human-induced climate change and the loss of biodiversity. If we fail to tackle these, the impacts on our planet will be irreversible, threatening the well-being and even survival of current and future generations.

Over three billion people live in areas highly vulnerable to climate change. Our economies, livelihoods, and well-being depend on ecosystems whose future is highly uncertain, such as coral reefs, rainforests, and river deltas.

The largest contributor to the climate crisis is our reliance on fossil fuels. The production of energy and its use together generates roughly 75% of global greenhouse gas emissions. Climate science is unequivocal that the window of opportunity to avoid irreparable harm is rapidly closing - we must act now to eliminate fossil fuel emissions.

WWF understands the critical role that reliable energy systems play in global economies. Increased access to energy over the past three decades has helped raise millions of people out of poverty and allowed them to have productive lives.

Energy is critical in keeping global warming below 1.5°C and reversing biodiversity loss while achieving just and resilient development for all. WWF is committed to ensuring that energy solutions proposed do not impose disproportionate costs on those least able to bear them.

Although the overall pace and scale of energy transition is far off track, many of the renewable energy technologies we need are now already available and increasingly affordable, leading to trillions of dollars in energy savings.

This Global Energy Policy Framework ("the framework") provides WWF's high-level view of what is needed to transform the global energy system. This framework sits alongside WWF's strategies to reduce greenhouse gases from agriculture, forestry, and land-use change, and increase carbon sequestration through protection and restoration of ecosystems such as forests, wetlands, and grasslands.

It is flexible, recognising that the path to achieving these goals will differ across regions, countries, and communities. Our experts in over 100 countries are well-placed to adapt this framework to their local circumstances, ensuring equality for communities, whether they are located in the global North and South, rural or urban, modern or indigenous.



This framework urges action in five areas:

- energy demand must be cut through energy efficiency and self-sufficiency;
- fossil fuels must be phased out;
- energy systems must be powered by renewable energy only;
- all energy use, including transport, industry, and heating, must be electrified; and
- where electrification with renewables is not possible today, innovative renewable energy solutions must be developed.

The energy transition must be faster, greener, and fairer to usher in a brighter future for people and planet.

A handwritten signature in black ink that reads 'Dean Cooper'.

Dean Cooper

WWF Global Energy Lead

Global Energy Policy Framework

Five key action areas



Use energy efficiency and sufficiency to reduce energy demand



Actively phase out all fossil fuels



Generate only renewable electricity



Electrify all we can



Deploy renewable solutions for energy that can't be electrified

Faster



- Transitional policy
- Buy-in from cities, companies, and citizens
- Financing

Greener



- Energy planning that minimises nature impacts
- Reduced footprints and increased circularity
- Conserving and restoring nature

Fairer



- Equitable energy access
- Climate justice
- A just energy transformation

Faster, greener, and fairer action in five key areas to achieve 100% renewables



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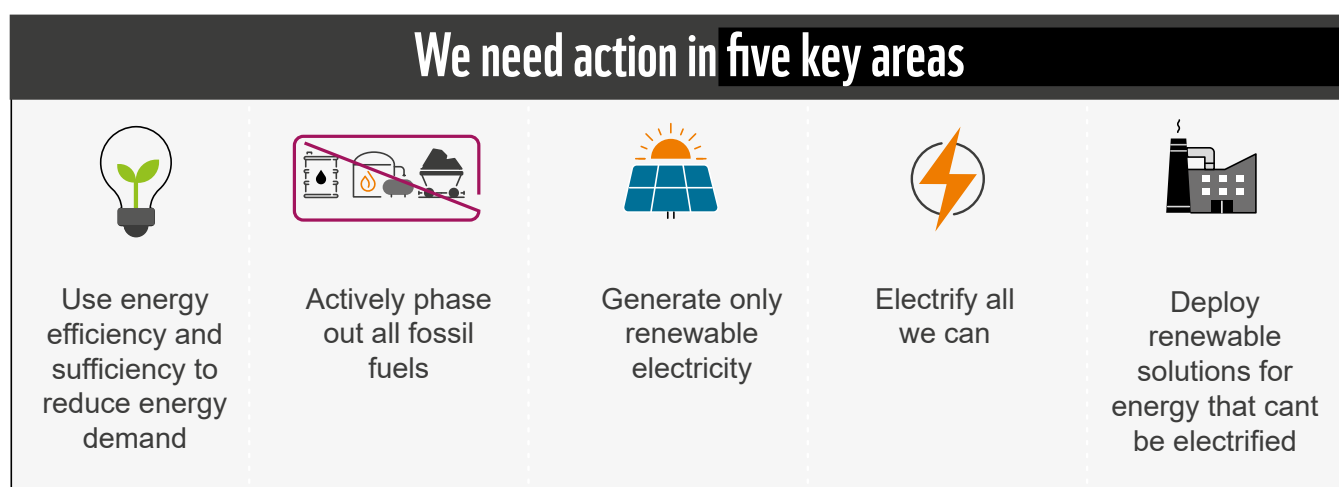


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ACTION AREAS

We know what we need to do to achieve 100% renewables. In the 2011 report, WWF showed that a global energy system powered by 100% renewables by 2050 was possible. Since then, the costs of renewable energy technologies such as wind and solar have fallen dramatically.⁵ Electricity produced by solar photovoltaics (PV) and onshore wind – even without any subsidies or considering associated externalities – are now the cheapest forms of energy in many parts of the world.⁶ In fact, new solar PV and onshore wind are in some cases cheaper than even the marginal cost of operating fully depreciated gas combined cycle, coal and nuclear facilities.⁷

We need action in five key areas to achieve 100% renewables⁸



⁵ [The Energy Report](#), WWF (2011)

⁶ 2023 Levelized Cost of Energy+ report, [Lazard](#) (2023)

⁷ 2023 Levelized Cost of Energy+ report, [Lazard](#) (2023)

⁸ There is no hierarchical or temporal order to the implementation of these five action areas all are essential and must be enacted simultaneously



1. Use energy efficiency and sufficiency to reduce energy demand

Reducing our energy demand is the fastest, cleanest and most direct way to increase our energy security, lower our energy bills, and help the world meet its climate change targets. It is also often the cheapest⁹. But we are not on track – we need 4% efficiency gains every year to achieve net-zero emissions by 2050.

Critical policy steps to increase energy efficiency include:

- **In industry**, governments need to implement strict¹⁰ minimum energy performance standards and energy labelling; put a price and caps on industrial carbon emissions; and prepare national policies that enhance energy management systems.
- **In buildings**, partnerships between national and local government can enable large-scale insulation and retrofitting programmes within existing buildings to reduce the energy needed for heating and cooling. For new buildings, clear clean energy building codes are urgently needed.
- **In transportation**, better walking, cycling, and public transport infrastructure and a switch to electric modes of transport will reduce energy use.

Electrification itself can be a driver of efficiency. A switch to industrial and residential heat pumps, high efficiency electric boilers and electric cooking devices, and electric vehicles can all increase efficiency and reduce energy use. These policy steps will also create new jobs. Due to the labour-intensive nature of many energy efficiency upgrades, US\$1 million spent on energy efficiency is estimated to generate between six and 15 jobs on average.¹¹

Protecting nature can also be our ally in achieving our energy efficiency goals. For example, increasing green spaces in urban areas can help address the urban heat island effect, and reduce energy demand for cooling. WWF experts co-wrote [a guide for city planners](#) containing a plethora of proven methods to use nature to help cool cities as part of our work leading the Cool Coalition's nature based solutions working group.

WWF is working to implement energy efficiency solutions around the world, from the textile sector in Viet Nam, to fishing communities in East Africa, to energy efficiency policy in

Europe. See more in [WWF's Energy Efficiency in Action](#) energy efficiency case study report.

Through the concept of “energy sufficiency”, WWF is pressing for fundamental adjustments in how we live in order to reduce energy demand. This means prioritising options that inherently require less energy, such as using well-designed public transport systems instead of personal cars. Energy sufficiency works hand-in-hand with energy efficiency, which aims to lower energy use for the same activities, such as by using more fuel-efficient vehicles for public transport.

Policy Recommendations:

- strict minimum energy performance standards and energy labelling for key industrial technologies;
- national policies to enhance energy management systems;
- large-scale national programmes, in partnership with local governments, to include energy efficiency measures in new buildings, and the retrofitting of existing buildings;
- government support for alternatives to private transport, and incentives for a switch to electric vehicles;
- incentives from governments that encourage industry to reduce the level of energy demand, reuse relevant components, and increase recycling;
- government and buildings authorities to explore solutions that reduce the number of new buildings and/or encourage more energy efficient design;
- government and buildings authorities to consider the design and management of buildings and urban planning in urban areas at the neighbourhood level to maximise efficient energy-exchange options. In addition, they must make use of more efficient transportation options such as cycling, walking and public transport;
- policies to ensure the cost-benefit to users of public transport, including taxes on high energy use transport options, and integrated transport systems in cities.

⁹ <https://www.iea.org/reports/energy-efficiency-2021>

¹⁰ These efficiency standards and labels should also be dynamic, becoming stricter over time as technology improves and costs fall

¹¹ [Energy efficiency jobs and the recovery](#), IEA (2020)



2. Actively phase-out fossil fuels



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Fossil fuel use is still rising, subsidies for fossil fuels remain in place, and new exploration projects are being announced.

In 2021 fossil fuels still represented 62% of the electricity mix and 83% of the overall energy mix, despite electricity generation by wind and solar growing nearly 25 times as much as that by fossil fuels in the preceding ten years¹².

We need to address the underlying drivers of the continued use and growth of fossil fuels.

The effective phase out of fossil fuels will require careful planning. Developed countries should rapidly transition to renewables, while developing countries should 'leapfrog' fossil fuels and power their development with renewables. During the transition period, existing fossil fuel infrastructure, particularly power plants, should be retired as soon as adequate alternatives come online, ensuring that baseload energy supplies remain uninterrupted.

WWF works through international climate negotiations, national policy discussions, and local on-the-ground initiatives to advocate the urgent phase out of all fossil fuels.

Policy Recommendations:

- High- and upper-middle income countries need to end oil and gas extraction by 2040 at the latest, while low-income countries should end extraction by 2050¹³;
- Countries should define clear plans with targets and timelines for fossil fuel phase out;
- Phasing out and repurposing all subsidies for fossil fuel (coal, oil, and gas) production and consumption to support increased energy efficiency and the deployment of renewable energy;
- No new investment in coal production or the development of oil and gas reserves;
- Banning exploration for new oil and gas reserves;
- Phasing out coal power stations, regardless of the duration of licences and economic life span of the installation;
- No new infrastructure for production, refining, transport or use of oil and gas (including power plants) that produce emissions exceeding the carbon budget aligned with the 1.5°C threshold;
- Banning methane flaring/venting immediately.

¹² <https://ourworldindata.org/fossil-fuels>

¹³ In line with recommendations from WWF Finance Practice: Oil and gas asset owner guide, 2019. https://wwf.panda.org/discover/our_focus/finance/?349870/asset-owner-guide-to-oil-gas-producers



3. Generate only renewable electricity

Electricity is a versatile and efficient energy carrier that can be produced by 100% renewable technologies. Much progress has been made recently due to dramatic cost reductions in wind and solar, which are now the cheapest forms of electricity in many parts of the world.¹⁴

To realise the full potential of these resources globally, we will need to manage the intermittency of wind and solar power to ensure the continuous availability of baseload power. This will require significant deployment of new battery storage, seasonal storage technologies, and expanded and robust electricity grids.

The transition to a 100% renewables world should focus on well-sited¹⁵ wind and solar for the vast majority of electricity production. These technologies have significantly lower environmental and human impacts compared with other renewable energy types.

Fortunately, electricity produced by wind and solar is the cheapest form of energy in many parts of the world. There is also significant potential to build low-cost wind and solar in areas with low impact on people and nature, such as pastures, rooftops and degraded land. The global technical potential of utility scale, low-impact wind and solar exceeds the projected 2050 demands under a scenario where all sectors of the economy become electrified.¹⁶

Policy Recommendations:

- Policies must encourage the active phase out of coal, using experience from countries that have already adopted associated measures, such as the UK;
- In the transport sector, promote conversion to electric vehicles with associated supplies of renewable energy;
- Facilitate the identification of appropriate sites for wind and solar technologies;
- Raise the profile of benefits associated with transition to renewable energy, including reduced social and environmental impact, with particular benefits for human health;
- Highlight the low level of disruption to biodiversity from renewables compared to fossil fuels;
- Highlight the economic benefits of wind and solar as low-cost forms of energy;
- Raise the awareness of all energy-related stakeholders including users, suppliers, and financiers regarding the potential for utility-scale wind and solar installations worldwide.

WWF works to initiate, accelerate, and sustain the transition to 100% renewable electricity worldwide by supporting the redirection of investment towards renewable solutions such as wind and solar, demonstrating renewables in practice, and helping communities and businesses access renewable electricity. For example, the Africa Energy Access Initiative, Cool and Solar programme, and RePowering Asia experience are examples of WWF work to meet these objectives.



14 2023 Levelized Cost of Energy+ report, [Lazard](#) (2023)

15 The space required for wind and solar technologies to enable the transition to net-zero points to the need for careful siting. Furthermore, the need for additional transmission lines must also be carefully addressed. See WWF's recommendations in [Linking energy and nature to tackle the climate and biodiversity crises](#), (TBC & WWF 2023)

16 Baruch-Mordo, S., Kiesecker, J., Kennedy, C.M., Oakleaf, J.R. and Opperman, J.J., (2019): "From Paris to practice: sustainable implementation of renewable energy goals. [Environmental Research Letters](#)," see more at page 23 and 63 in [connected_and_flowring_wwf_tnc_report_5.pdf](#) ([panda.org](#))



4. Electrify all we can



Across the industry, transportation, and building sectors, one of the most effective ways to reduce emissions is to transition from directly combusting fossil fuels to using electricity. When combined with achieving 100% renewable electricity, this leads to a reduction in overall emissions because of the inherent low efficiency of processes based on combustion.

- **In industry**, low- and medium- temperature processes can be electrified with cost competitive technologies such as heat pumps, electric steam boilers and electric arc furnaces.
- **In buildings**, much of the energy used can be electrified by switching to electric heat pumps, which can provide both heat in the cooler months and cooling in the warmer months. Energy used for cooking should also come from electricity.
- **In transportation**, there is significant opportunity to phase out internal combustion cars, buses, trains, and trucks and replace them with electric vehicles powered by batteries or possibly overhead power lines.

Policy Recommendations:

- Raise awareness among energy-related decision-makers of the economic, environmental and social benefits of switching from fossil fuel combustion to electricity powered by renewables;
- Electrify low- and medium- temperature processes (<500°C) with available, efficient technologies;
- Legislate to enforce the inclusion of electric heat pumps for all new buildings;
- Provide incentives/subsidies for retrofitting heat pumps to existing properties using fossil-fuel energy generation;
- Legislate for new buildings to be fitted with electric cookers only;
- Provide incentives/subsidies for the replacement of cookers fired by gas, coal, biomass, or kerosene with electric alternatives;
- Phase out internal combustion cars, buses, trains, and trucks for electric vehicles powered by batteries or possibly overhead power lines;
- Legislate for the extension of charging infrastructure to accommodate the required increase in electric vehicles.



5. Deploy renewable solutions for energy services that cannot be directly electrified

Some energy services are difficult to electrify. Certain industrial processes rely on high-temperature heat that is difficult or prohibitively expensive to generate with electricity. These include iron and steel, cement, chemicals, and building materials, which together are responsible for approximately 30% of the world's annual CO₂ emissions¹⁷. Long distance aviation and shipping also currently rely on fuels that have high energy density relative to their weight and/or volume. Eliminating emissions from these specific areas will be challenging and may take longer than parts of the economy that can be easily electrified.

However, there is potential for the application of innovative technology that will enable these areas to also be electrified. To eliminate emissions from hard to electrify sectors, we need to:

- **Support the development and targeted deployment of renewable hydrogen** produced via excess renewable electricity - and/or additional, properly-sited wind and/or solar energy. This renewable hydrogen can be used to help reduce emissions in certain industrial processes and should not be considered for other energy needs that can be met directly from renewable sources.
- **Use certain types of biomass feedstocks** such as fast-decaying wastes and residues that are not currently used for products, and whose extraction does not have harmful impacts on soil carbon or on biodiversity.

Given the challenges in finding renewable energy options for energy-intensive applications, it may be necessary to

find short-term alternatives until longer-term solutions are developed. One example being seriously considered by many countries is Carbon Capture and Storage (CCS). There are wide-ranging views on the impact of CCS. On one hand, it can reduce emissions at the source of their generation, on the other, it is expensive, and is used by some to justify the continued production of fossil fuels.

At WWF, we have concerns over the impact and uncertainties associated with CCS. We recognise that transitory solutions such as CCS may be needed in limited, specific applications to reduce atmospheric emissions until innovative renewable or non-carbon emitting processes are developed.

Policy Recommendations:

- Urgently accelerate the efforts and resources devoted to the development of renewable energy solutions for hard-to-abate sectors;
- Support the development and targeted deployment of renewable hydrogen produced via excess renewable electricity;
- Investigate the use of biomass for energy-intensive industries, considering only biomass sources that are not currently used for products, and whose extraction does not harm biodiversity;
- Assess whether using CCS in the short term is likely to encourage the continued use of gas during the transition to renewable energy.



¹⁷ [Clean Hydrogen: A long-awaited solution for hard-to-abate sectors](#), Harvard School of Engineering, 2022



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HOW TO DO IT FASTER, GREENER AND FAIRER

Every country will need low carbon, low cost, and low conflict (in terms of both people and nature) planning to identify the best renewable solutions within their context.¹⁸ The exact composition of energy mixes will vary, but together, action in these key areas can help every country achieve 100% renewables. It is now time to build *faster* – to keep 1.5°C in reach, *greener* – to reverse biodiversity loss, and *fairer* – to achieve just and resilient development.

To ensure we have stable and renewable electricity, several supporting solutions need to be deployed:

- Enablers of wind and solar dominated electricity systems, including demand-side management, grid infrastructure that enables the integration of renewable energy sources on a large scale, and seasonal storage systems in regions with significant seasonal differences in solar and wind energy generation.
- Electricity (or electricity-derived) storage solutions to accommodate the variable profile of wind and solar, including thermal storage, batteries, and low-impact, off-river pumped storage hydropower, and renewable hydrogen¹⁹ that can also contribute to grid stability by providing flexible demand and reducing the curtailment of renewables.

Full commitment from all involved to dramatically increase levels of solar and wind energy use before 2050 is clearly needed. However, we must also take full account of the ongoing biodiversity and nature crises. The spatial allocation of wind and solar power must be considered against the broader environmental impact, especially if this may challenge the sustainability of the renewable energy transition²⁰.

Although wind and solar are the preferable renewable energy options, care must be taken to ensure that systems are implemented with the least disruption to nature. For example, it is important to choose sites for ground-mounted solar plants carefully in order to minimise the impacts on existing habitats. This is not only a matter for the developers, but also concerns policymakers who should reinforce sustainability measures over protected areas. The broader community acceptance of wind and solar power infrastructure is a potential barrier to new installations, and therefore appropriate siting of wind and solar farms (onshore and offshore) is a key question.

¹⁸ “Low-carbon” refers to energy options that minimise GREENHOUSE GAS emissions, “Low-cost” refers to energy options that are reliable and affordable, and “Low-conflict” refers to energy options which minimise negative impacts on communities and the environment. See more in [Connected and Flowing](#), WWF & TNC (2019)

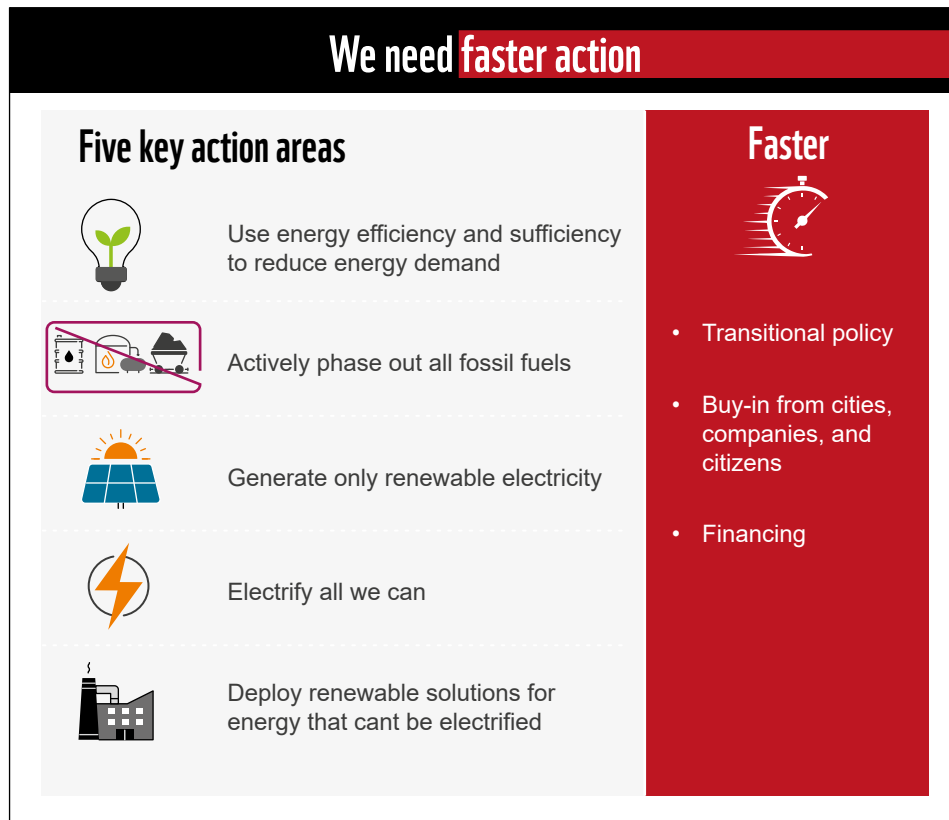
¹⁹ “Renewable hydrogen” describes hydrogen produced using renewable energy resources. This does not include nuclear-powered hydrogen production, or production using unsustainable bioenergy resources (which are both often incorporated in the definition of “green hydrogen”).

²⁰ Grimsrud, K., Hagem, C., Haaskjold, K. *et al.* Spatial Trade-Offs in National Land-Based Wind Power Production in Times of Biodiversity and Climate Crises. *Environ Resource Econ* (2023). <https://doi.org/10.1007/s10640-023-00764-8>



To keep global warming below 1.5°C, climate science tells us that we must halve global GHG emissions before 2030. This will require a far more rapid response than is currently being considered.

To catalyse action, we need transitional policy; buy-in from local authorities, companies, and citizens; and a massive increase in financing.



Transitional Policy

Moving faster requires much stronger energy policy that ensures climate-resilient development, energy efficiency, and clean renewable energy for all, now. **This** includes:

- Taxes, regulation, and market-based mechanisms which make polluters pay to speed the phase out of fossil fuels
- More ambitious energy efficiency standards and regulations
- Direct subsidies and/or tax credits for energy efficiency and renewable energy
- Improved permitting systems that enable both the rapid deployment of renewables and appropriate environmental and social safeguards
- Subsidies and/or grants for innovation in energy efficient technologies, renewables for hard-to-decarbonise sectors and renewable storage technologies
- Direct investment in public infrastructure
- Systemic change in traditional energy financing
- Commitments to achieve 100% renewable energy systems

While each country must set the right policies to encourage faster action, international cooperation is also crucial. Examples of international policies include lowering or removing tariffs, establishing intellectual property rights, setting common standards for renewable energy equipment, and multilateral trade agreements.

Buy-in from city authorities, companies, and citizens

Faster action will not be possible without the acceptance and action of city authorities, companies, and citizens. Home to 55% of the global population and [75% of primary energy use](#), city authorities must include policies, planning, and actions to scale up efforts on energy efficiency and renewable energy.

City authorities can:

- Report and track emissions
- Encourage urban planning and policy that facilitates energy efficiency and integrated renewables by design, as well as maximising the benefits of walking, cycling and public transport

- Serve as a test bed for new innovations
- Work with citizens and local stakeholders including on behaviour change programmes

Ambitious energy-related action from the private sector is also essential.

Companies can²¹:

- Account for and disclose emissions
- Reduce value chain emissions, in line with a science-based target pathway
- Quantify a financial commitment by pricing remaining emissions
- Confirm clear commitment and targeted investment for climate and nature impact from energy use

Citizen buy-in can only truly happen when the right policies and planning are in place to make switching to renewables available and affordable. To create acceptance and commitment, governments, companies, NGOs, and communities need to:

- Educate, communicate, and listen
- Create cultures and communities that promote sustainability
- Directly participate in deploying renewables and increasing energy efficiency.

Faster action is not just about having the right tools or policy in place – cities, companies, citizens, and communities must proactively support the need to change. Only when working together can we build a more sustainable future.

Financing

Faster action will not be possible without committing very large amounts of capital investment for clean energy in innovative ways. To transition to net-zero emissions globally, the [IEA foresees](#) that by 2030, the world needs to be investing at least US\$4.5 trillion annually in energy efficiency, renewables and low-carbon energy, and supporting infrastructure.²² In 2022, the world invested an estimated US\$1.5 trillion in these areas.

In other words, efforts must be tripled. This will involve policy levers such as subsidies, tax credits, and carbon pricing as well as collective buy-in.

Key actions include:

- National and international finance institutions must work closely with the private sector to identify tools that will enable faster commitment of large scale investment'
- Investors need greater understanding to award higher priority to clean energy applications;
- Multilateral Development Banks (MDBs) should update their mission and reflect in their investments the link between clean energy and sustainable development;
- International financial institutions should develop risk mitigation instruments to reduce the cost of capital and increase investment for renewable projects in developing countries;

Financial institutions have an important role to play in decarbonising the economy. They can:

- Finance or enable the development and scaling of climate solutions, particularly those which have proven benefits for people and nature;
- Finance or enable companies already aligned to a 1.5°C pathway, or those transitioning according to robust net-zero transition plans;
- Refuse to provide finance or insurance to any new fossil fuel related activities;
- Finance or enable the managed phase-out of high-emitting physical assets.

Many financial institutions have made net-zero commitments in recent years, acknowledging that they have a role to play in the global energy transformation. They now need clarity and guidance on how to implement their net-zero, nature-positive strategies related to energy.

WWF is pushing governments to set ambitious policies to speed up the energy transition. We work on key global agreements and forums, such as the United Nations Framework Convention on Climate Change, to create frameworks to push policy in this area forwards.

WWF also works to promote renewables among consumers and end users. All over the world, WWF and partners have convened coalitions of businesses that jointly procure renewable energy, and advocate to make buying renewable energy easier. For example, we created the [Climate Business Network](#) – a network of ambitious and influential companies that supports the transition to a 1.5°C future. [WWF is also working](#) to redirect the flow of finance away from activities that harm our planet toward those that heal.

21 Beyond Science-Based Targets: A BLUEPRINT FOR CORPORATE ACTION ON CLIMATE AND NATURE, WWF and BCG (2020)

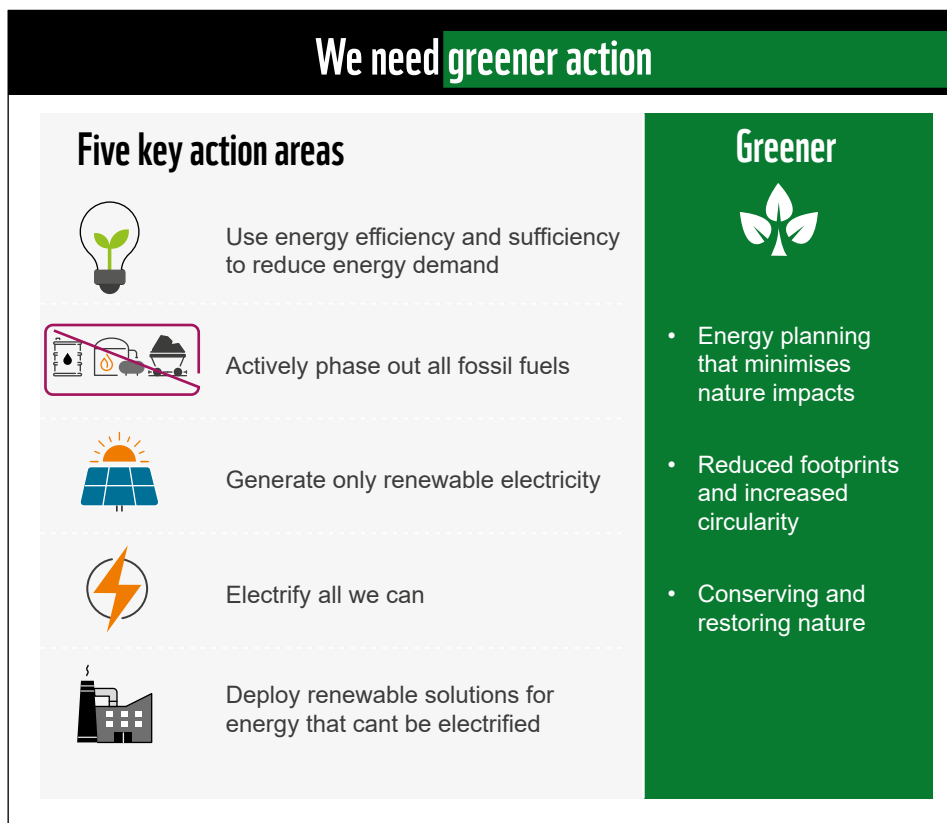
22 IEA (2022), *World Energy Investment 2022*, IEA, Paris <https://www.iea.org/reports/world-energy-investment-2022>, Licence: CC BY 4.0

Nature is in free-fall. WWF's Living Planet Report 2022 highlights a 69% decline in average population sizes of wildlife across the globe over the past 50 years, with climate change identified as one of the key contributory factors. The climate crisis is predicted to be the dominant cause of biodiversity loss in the coming decades.²³ In turn, we will not halt climate change if we allow the nature crisis to continue unabated.

However, it is important to recognise that every form of energy will cause some level of disruption to nature. Though

renewable energy technologies cause minimal disruption when compared to fossil fuels, it is still important that installing it in any location is carefully managed to avoid any disturbing or harming local biodiversity.

Keys to greener action include energy (and associated infrastructure) planning and siting that ensures harmony with nature, reduces footprints and increases circularity across the economy, and encourages deliberate investment and action aimed at conserving and restoring nature.



Energy planning that accounts for nature and climate

Achieving 100% renewable energy requires a significant amount of building – both the generation technologies required to decarbonise energy systems, but also associated infrastructure such as grids and storage. Early and strategic energy planning that considers climate and nature goals as part of a human-rights based approach is key to guide the right types of renewables in the right places:

- Governments can support planning exercises to understand options for meeting future energy demands;
- Governments, companies, and investors should take international agreements into account to include the Rights of Indigenous Peoples⁴¹, engage all relevant stakeholders, use long-term scenario planning, respect biodiversity conservation targets, and achieve improved socio-economic outcomes;

- Renewable energy technologies can benefit both nature and climate with nature-inclusive design, construction, operation and decommissioning that mitigates any negative effects;
- The most appropriate renewable energy system for any given location will take full account of nature, and provide lower impact solutions, such as wind turbines that avoid the migratory paths of birds, or solar systems that are spaced sufficiently on land to allow continued animal grazing and not damage existing food chains.

The renewable technology to be installed in any particular location should be carefully considered. Wind and solar technologies have significantly reduced environmental impacts compared with other renewable energy technologies. For example, hydropower has had devastating impacts on nature,

²³ [Living Planet Report](#), WWF (2022)

and so its contribution to the energy transition must be rethought in the context of the nature and biodiversity crises. Similarly, the use of biomass for energy must be robustly assessed since some types of biomass can have seriously negative impacts on nature, climate, and food security.

Proper siting can significantly increase the environmental and social sustainability of the chosen technology, and there are many tools available which can support this.²⁴ We need to make wise choices about what we build and where, involve all those likely to be affected, and pursue nature-positive outcomes. In addition, we need to make wise choices in materials used, for example to minimise the use of critical minerals that cause local disruption to nature from associated mining.

Reduced footprints and increased circularity

Manufacturing and consuming everyday products such as clothing and food requires a large amount of energy. In fact, maintaining our current use of natural resources has been estimated²⁵ to require 1.6 earths. Reducing this imbalance between our demands and nature's supply is essential - we must halve our consumption and production footprint. This is a huge challenge, and includes addressing "deep-rooted, widespread institutional failure" that has led to nature's worth to society not being reflected in market prices.²⁶ Some important opportunities include:

Revolutionising food systems that currently lose or waste around 40% of all food produced globally. Energy supplies are wasted producing and transporting food that goes to waste, causing **roughly 10%** of global greenhouse gas emissions, as well as devastating impacts on nature.²⁷

- Increasing circularity – creating systems that aim to eliminate waste and maximise reuse of materials is essential to reduce the energy used by production systems.

It will also be crucial to:

- Improve collection and recycling rates to enable circularity in the economy
- Invest in technological advances which can reduce mineral and material demand
- Prohibit deep sea mining.

Mining for critical minerals to support the 100% renewable transition must be done responsibly, avoiding protected areas.

WWF is working to ensure that this energy transition is done responsibly and through increased circularity across the economy – see more in [The Future is Circular](#). WWF co-founded the [Coalition Linking Energy And Nature for action \(CLEANaction\)](#) to protect nature while accelerating the energy transition.



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²⁴ Some examples include [WWF Water Risk Filter](#), [WWF Biodiversity Risk Filter](#), BirdLife's [AVISTEP](#): the Avian Sensitivity Tool for Energy Planning, and the Nature Conservancy's [Paris to Practice Tool](#). See more in Nature-safe Energy: Linking energy and nature to tackle the climate and biodiversity crises, The Biodiversity Consultancy & WWF (2023)

²⁵ Dasgupta, P. (2021), The Economics of Biodiversity: The Dasgupta Review.

²⁶ Dasgupta, P. (2021), The Economics of Biodiversity: The Dasgupta Review.

²⁷ <https://www.worldwildlife.org/initiatives/food-waste>



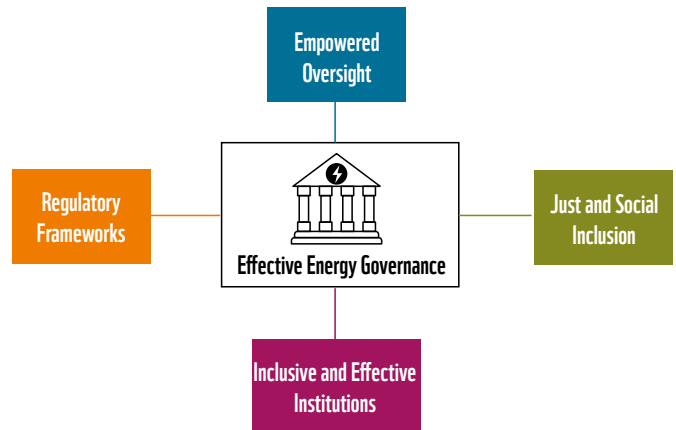
The energy transition to 100% renewables will have wide-ranging impacts across all parts of society. The world's heavy reliance on fossil fuels for energy has created deep-seated power dynamics, often leading to inequality and conflicts over resources.

Shifting from a world powered by fossil fuels to one using 100% renewables holds immense potential to address inequality and conflicts, but it also may reshape the global power balance. This may add to the difficulty of phasing out fossil fuels, and these challenges must be addressed with transparency and inclusivity, working towards a just transformation that considers the social, economic, and political implications.

WWF is committed to ensuring that the solutions proposed do not have unintended consequences for society, such as imposing disproportionate costs on those least able to bear them.

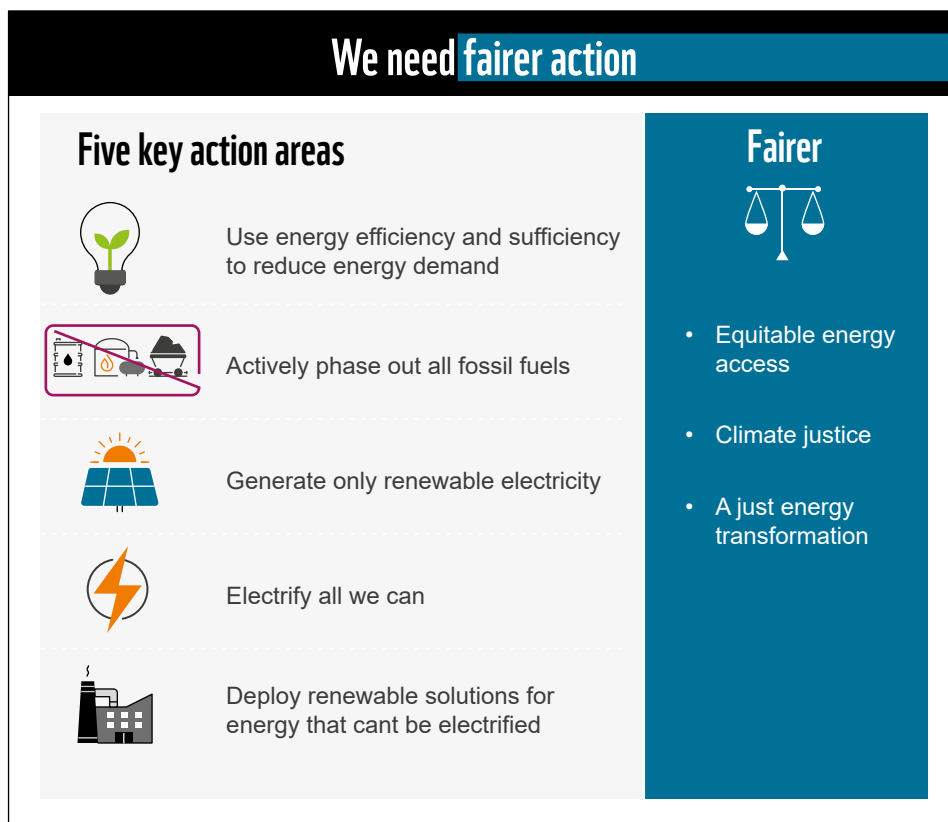
Effective governance will be critical to achieve the global shift in energy supply and demand that is so urgently required. The relevant institutions must be provided with sufficient well-informed skills and capacity to develop the policy frameworks that will commit government authorities at all levels to

demanding but achievable energy goals. The transition from fossil fuels to renewable energy must be just and socially-inclusive if it is to be sustainable.



Actionable priorities that are a key part of effective energy governance

The transition will be fairer if it includes equitable energy access, climate justice, and a just energy transformation.



Equitable energy access

A fairer transition must achieve full and equitable renewable energy access to all, by²⁸:

- Increasing targeted financial flows and incentives to renewable energy access programs
- Educating communities
- Matching appropriate technologies to community needs
- Facilitating the productive use of energy systems by building local capacity
- Developing energy communities that cooperate over renewable electricity generation
- Ensuring wide access to appropriate energy sources, including financial assistance

Climate justice

The use of fossil fuels for energy has been and continues to be the largest contributor to human-induced climate change. All countries must act if we are to eliminate energy emissions and limit warming to less than 1.5°C. Developing countries are suffering disproportionately from climate change.²⁹

Rich, developed countries have the responsibility to not only reduce their own emissions, but also to actively help developing countries by:³⁰

- Accepting and committing to the obligation to drive global change
- Providing additional, equitable climate finance
- Providing financing to address loss and damage
- Developing supportive frameworks for best practice sharing and encouragement
- Giving technical and financial support
- Enforcing the 'polluter pays' principle

Rich individuals everywhere are responsible for reducing their energy consumption, through measures such as:

- Reducing home energy use by installing energy efficient appliances
- Travelling responsibly
- Consuming responsibly and eliminating overconsumption
- Wasting less food and eating less meat
- Applying the reduce, reuse and recycle approach
- Considering contributing to climate action, or increasing awareness of the need for behaviour change with their finance, time and/or influence

A just energy transformation

For any community, the nature of the shift to renewable energy will depend on the local conditions and available resources. The path to a clean energy future will be different for every community, though the broad principles³¹ that govern this direction can be applied to all. Together, these community-level energy transitions will amount to a just energy transformation that moves the world to a more equitable and accessible division of global energy resources.

Some important steps for the just transformation include:

- A human-rights-based approach that places people at the centre of action and decision-making
- Adequate and timely financial and technical support
- Equitable benefits from the transformation
- Access to justice, decision-making, and information
- Free prior informed consent for energy projects based on accessible, high quality information
- A focus on the systemic changes needed for a sustainable energy sector
- Helping those whose livelihoods are negatively impacted

International cooperation will be essential to ensure that all efforts aiming to support the just energy transformation are coordinated and, where possible, integrated to ensure a common purpose and the most effective use of available resources.

WWF is working to [provide affordable renewable solutions to people without energy access](#) because renewables can end energy poverty and are a vector towards sustainable development.

We have also co-founded the [Alliance for a Just Energy Transformation](#), joining forces with other stakeholders to drive the worldwide implementation of policies including climate justice, international cooperation, equitable social and economic policies, community and environmental resilience, and access to finance.

28 WWF Discussion Paper, Just Energy Transformation (2021)

29 <https://www.bcg.com/publications/2023/exploring-challenges-of-just-transition>

30 Items taken from WWF Discussion Paper, Just Energy Transformation (2021)

31 See more on WWF's vision for a just energy transformation approach in [WWF's Discussion Paper, Just Energy Transformation](#) (2021)



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HOW WWF CAN HELP

WWF is well-placed to significantly influence the global response to the impact of energy production and consumption on the rate of climate change and the loss of biodiversity. WWF's independence and neutrality mean that our engagement with key stakeholders is free of any internal agenda other than benefit for our planet and people. Moreover, WWF country offices are able to adapt this framework to their local circumstances and determine the most appropriate action under local conditions. Our network of offices can also use the framework to influence private sector plans, initiatives, and pledges.

WWF can offer significant added value in the energy field, having the capacity and experience to address energy-related issues within a much broader environmental and social context. WWF is one of few organisations that understands the current global energy, climate, and nature crises from all three perspectives.

We have expertise across many sectors related to energy supply, transmission, and use, and also its impacts and dependencies on nature. This means we can play a leading role in identifying, motivating, and applying the system changes that are urgently-required worldwide.

The growing recognition of WWF for energy-related activity provides a platform to build networks and partnerships that enable positive and influential future interventions. WWF's Global Energy Policy Framework offers a foundation on which to focus resources, and to address the global energy needs - *faster, greener, and fairer*.

WWF believes that if we treat the challenge with the urgency it demands, the world can achieve 100% renewable energy and phase out all fossil fuels, creating a world with greater energy security, a stable climate, and a sustainable future.



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Find the report on our website here
www.panda.org/climateenergy



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