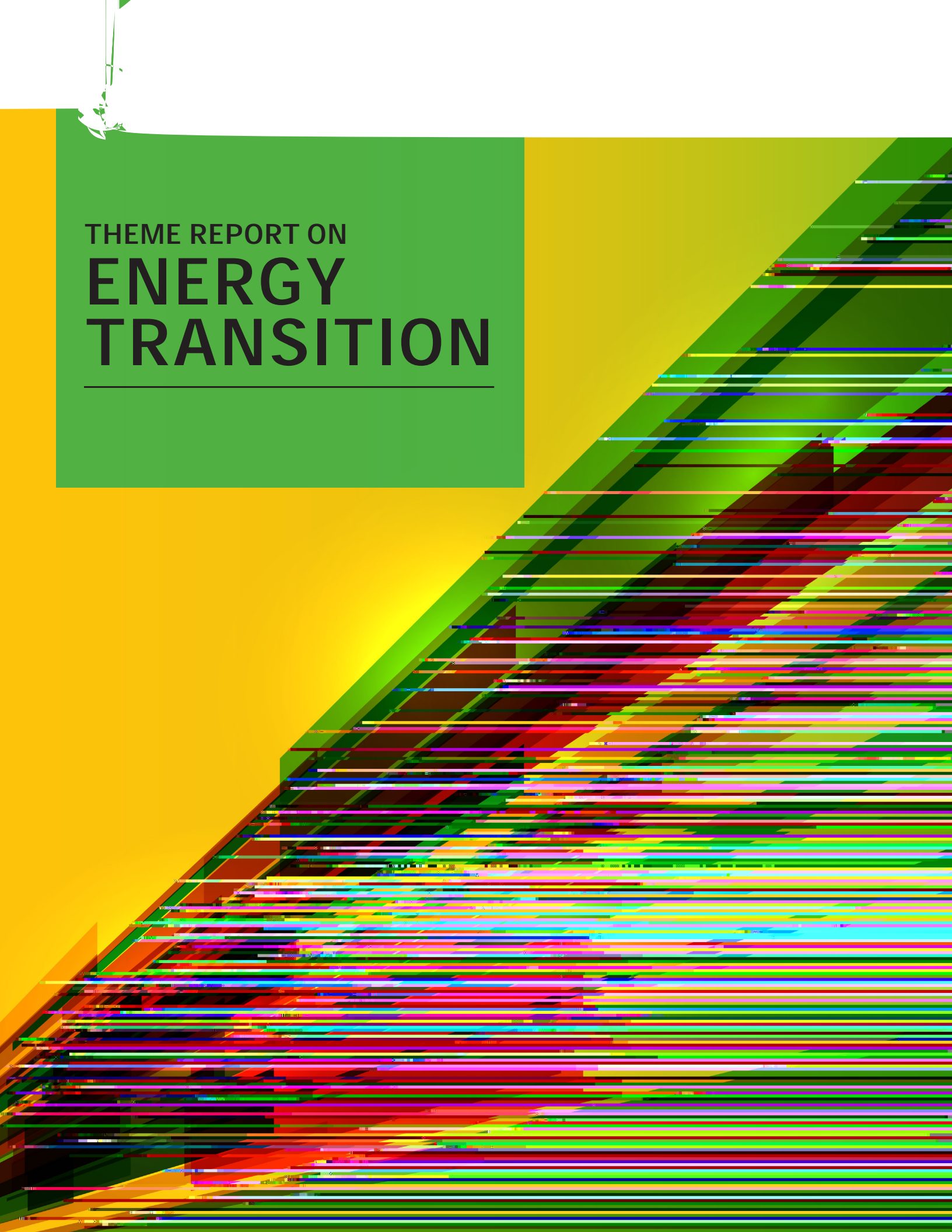


THEME REPORT ON
**ENERGY
TRANSITION**



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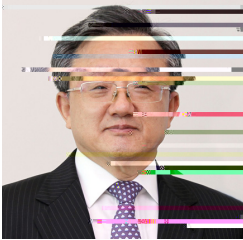
This report was prepared in support of the High-level Dialogue on Energy that will be convened by the UN Secretary-General under the auspices of the UN General Assembly in September 2021, in response to resolution 74/225. The preparation for the Dialogue has been coordinated under the leadership of the Dialogue Secretary-General, LIU Zhenmin, Under-Secretary-General for Economic and Social Affairs, and the Co-Chairs of the Dialogue and UN-Energy, Achim Steiner, Administrator of UNDP and Damilola Ogunbiyi, Special Representative of the UN Secretary-General for Sustainable Energy for All. The views expressed in this publication are those of the experts who contributed to it and do not necessarily reflect those of the United Nations or the or

The report was prepared based on a series of interactive meetings of the TWG, which were chaired by the Co-leads, to discuss draft versions in the period of February to May 2021. This was complemented by multiple rounds of written feedback on the drafts.

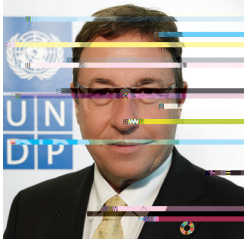
Additional input was received from representatives of some of the Member State Global Champions for Energy Transition: the Global Champions for Energy Transition are Brazil, Chile, Colombia, Denmark, Germany, India, Nigeria, Poland, Spain, and the United Kingdom. The views expressed in this publication do not necessarily reflect those of the Member State Global Champions.

The Dialogue Co-Chairs' teams from the United Nations Development Programme and the Special Representative of the Secretary-General for Sustainable Energy for All provided coordination support and dedicated technical expertise throughout the entire processes of the TWG. Their tireless efforts

This proposed roadmap illuminates a way forward for how the world can achieve a sustainable energy future that leaves no one behind. We hope that it will help to inspire the actions needed to get there.



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Under-Secretary-General for
Economic and Social Affairs and
Dialogue Secretary-General



Mr. Achim Steiner
UNDP Administrator and Co-chair
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As co-leads of the Technical Working Group on the Energy Transition theme, the International Renewable Energy Agency (IRENA), United Nations Environment Programme (UNEP) and United Nations Economic and Social Commission for Asia and the Pacific (UN ESCAP) jointly prepared the Theme Report to provide an insight into the global energy landscape and highlight opportunities and challenges in navigating the energy transition. Drawing from the knowledge and expertise of IRENA, UNEP, and UN ESCAP, and with input from Champion Countries and a diverse group of experts of the Technical Working Group, we have outlined the collective action necessary in the coming decade that would make a lasting difference for people, planet and prosperity.

It has been long recognised that the global energy system needs to change. But if there ever was any doubt, the COP26 summit in Glasgow has made it clear that the time has come to act.

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1

PRIORITY RECOMMENDATIONS

INTRODUCTION

Over the next decade, every aspect of national energy systems will be affected by changes in climate and energy policy, and financing, continuous technological advancement, and shifts in energy supply and demand. The rapidly falling costs of renewable technologies have opened up previously unimagined possibilities across the globe. Ongoing developments in many countries offer a promising outlook for the security, inclusiveness, and sustainability inherent in a transformed energy sector. However, the transition needs to speed up significantly and broaden its scope to achieve SDG 7 and align with the goals of the Paris Agreement on climate change, while at the same time achieving implementation of the 2030 Agenda for Sustainable Development.

The energy transition can thus no longer be limited to incremental steps. It must become a transformational effort, a system overhaul, based on the rapid upscaling and implementation of all available technologies to innovate for the future. This is the right and only way forward.

behavioural change. Further, they must be considered across different sectors and areas, for instance, standards and norms for buildings and appliances, transport, industrial uses, and heating and cooling, among others.

RECOMMENDATION 3

Invest in physical infrastructure to enable the energy transition. Updating existing infrastructure or investing in expansion is an integral part of the energy transition and an enabler of modern technologies. Public finance can be used to attract private investment in the infrastructure needed, which will help create jobs. Investments in infrastructure must be aligned with long-term plans and be reflective of broader strategies, including regional market integration.

RECOMMENDATION 4

Countries of the Organisation for Economic Co-operation and Development (OECD) should phase out coal by 2030 and redirect international energy financing towards o, a acQ e of

2 RESULTS AND ACTIONS MATRIX

PRIORITY RESULTS	PRIORITY ACTION AREAS	STAKEHOLDER ACTIONS				MILESTONES
		Public	Private	Civil Society and Communities	International and Regional Institutions	

PRIORITY RESULTS	PRIORITY ACTION AREAS	STAKEHOLDER ACTIONS				MILESTONES		
		Public	Private	Civil Society and Communities	International and Regional Institutions	2025	2030	Towards 2050

Accelerate deployment of available solutions across the renewables, efficiency, and auxiliary sectors, while innovating for the future	Identify and map available resources							
	Remove barriers							



- The energy sector accounts for approximately 65% of total global GHG emissions;² these need to be reduced dramatically, and eventually eliminated, to meet the goals of the Paris Agreement.
- Energy systems must become increasingly resilient to future economic and environmental shocks.
- A massive shift from a highly centralized energy sector to increasingly decentralized energy production brings new participants into the energy value chain—including citizens—who can both produce and consume energy.
- Increased electrification of end-uses, such as transport, will significantly increase electricity demand.

To meet these challenges, a major transition of the energy sector is required in all countries. Massive efforts will be needed to increase energy efficiency and productivity, facilitate changes in consumption patterns and lifestyle choices, and expand renewable energy for power supply.

It is important to understand the underlying baseline and implementation-path assumptions for the three goals (in SDG7) to assess how achieving them would contribute to meeting the temperature goals set out in the Paris Agreement. For the energy sector globally, this would imply a 25–30% reduction in emissions by 2030 to stay on a below-2°C trajectory and a 50% reduction for a 1.5°C trajectory. This is in alignment with the statement by the Intergovernmental Panel on Climate Change (IPCC)⁷ that global net anthropogenic CO₂ emissions need to decline by about 45% from 2010 levels by 2030, and reach net zero around 2050 for there to be no, or limited, overshoot of the 1.5°C target by 2100.

The annual emissions Gap Report by the United Nations Environment Programme (UNEP) provides an assessment of how much the implementation of the NDCs would contribute to global mitigation by 2030; and it compares this with the realistic emissions level needed to stay on track to 1.5°C and 2°C by the end of the century. The 2020 Gap Report shows that countries are far from being on track, with a few exceptions. The recent Synthesis Report on NDCs by the Secretariat of the United Nations Framework Convention on Climate Change (UNFCCC) concludes that new or updated NDCs submitted before the

For the transition to successfully reach the SDG7 targets and pave the way for strategies to achieve net zero emissions by 2050, there must be: urgent and strong political leadership at the local, national and international levels; clear national targets and timetables; broad stakeholder engagement; and enabling policy frameworks that focus on job creation, economic wins, and environmental benefits, while ensuring that the transition is a "just" one, in the broadest sense.

4 CONTEXT

How we achieve these goals and the extent to which their achievement supports sustainable, long-term economic development depends on actions taken in the next few years. Energy transitions can provide solutions to many global issues, including efforts against climate change, the achievement of sustainable development, and improvement of human wellbeing by reducing air, water, and land pollution. As these drivers converge—along with policies, innovations, and investments—they are creating a dynamic and inevitable path; and while the contours of a new energy system are still unclear, certain trends are now apparent.

According to IRENA,¹¹ capacity additions to the global power mix have been consistently dominated by renewables in recent years. In 2020, new renewable capacity addition reached 82% of the total installed capacity, compared to 73% in 2019 (Figure 1).

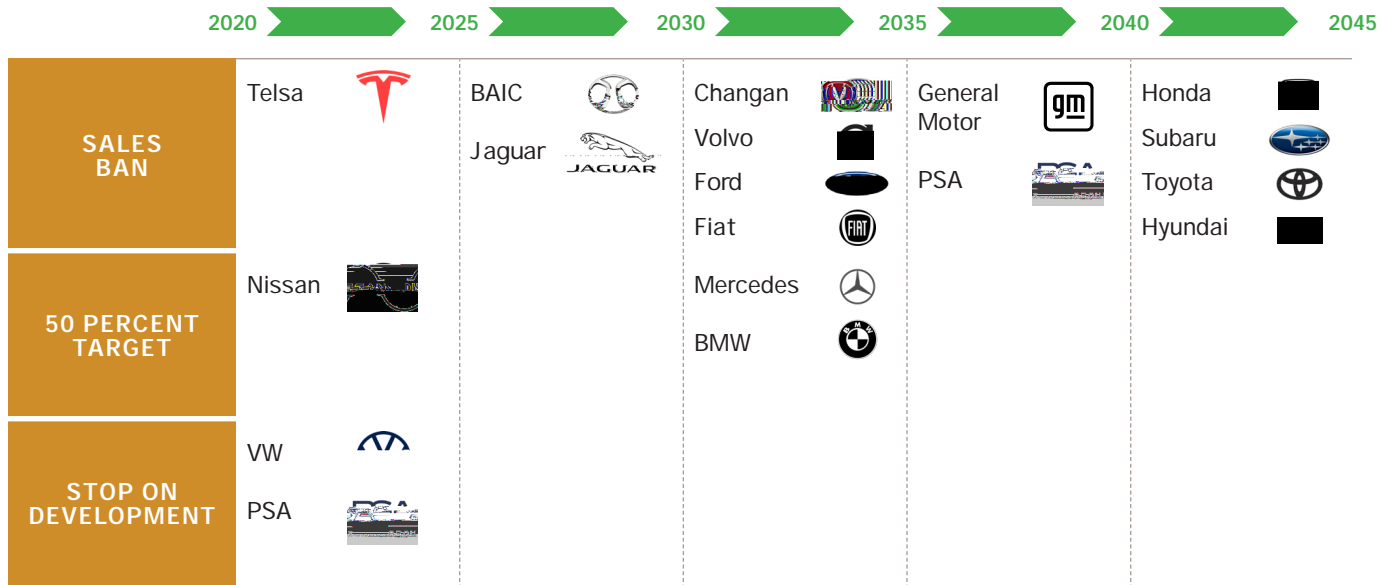
Geographical trends remain uneven. Places where energy access needs are the greatest continue to show

developers, concerns over climate change, and the need to protect human health. As the IEA states in its recent report, *Net Zero by 2050*: "The rapid drop in oil and natural gas demand in the net zero scenarios means that no fossil fuel exploration is required and no new oil and natural gas fields are required beyond those that have already been approved for development. No new coal mines or mine extensions are required either."

Market trends reflect that a transition from fossil fuels to clean energy is necessary and widely supported by shareholders and investors, as well as by consumers. For example, BlackRock, the world's largest asset manager, is incorporating climate impacts into its investment decisions.¹⁵ With BlackRock moving away from investing in fossil fuels, awareness of climate change and its associated impacts are clearly not only increasing, but also influencing decisions in the finance sector and markets.

IRENA finds that more than half of the renewable capacity added in 2019 achieved I... clesai... city

FIGURE 2. AUTOMAKERS LEAVING INTERNAL COMBUSTION ENGINE MARKET

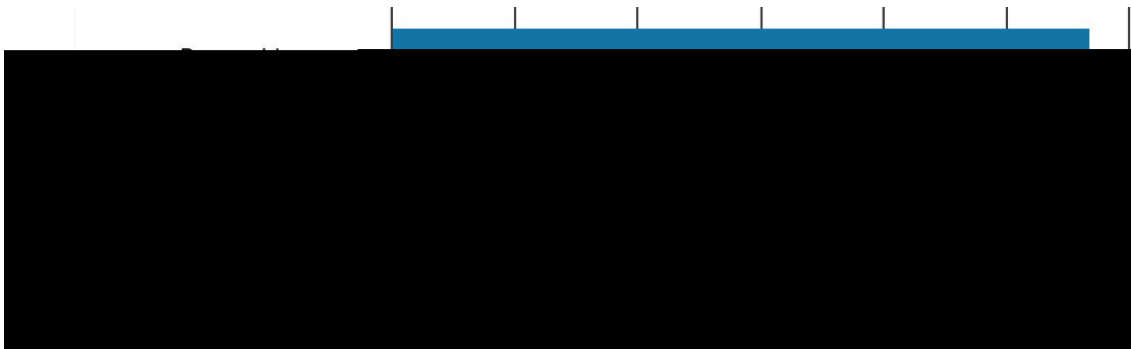


Source: Transformative Urban Mobility Initiative (TUMI).

stricter pollution regulations. Figure 2 shows the planned timing for different major automakers to stop producing cars with internal combustion engines; it will clearly be important for other producers to make this shift to stay in business.

More evidence is emerging of the socio-economic impacts of energy transitions. IRENA estimates that of 58 million energy workers worldwide, 11.5 million worked in renewables in 2019.²² Moreover, investing in the energy transition would create three times more jobs than similar investment in fossil fuels.²³ Each USD 1 million invested in renewables or energy flexibility creates at least 25 jobs, while each million invested in efficiency creates about 10 jobs (Figure 3).²⁴

FIGURE 3. GLOBAL AVERAGE EMPLOYMENT INTENSITIES OF INVESTMENTS IN RENEWABLE ENERGY, ENERGY EFFICIENCY, AND ENERGY FLEXIBILITY

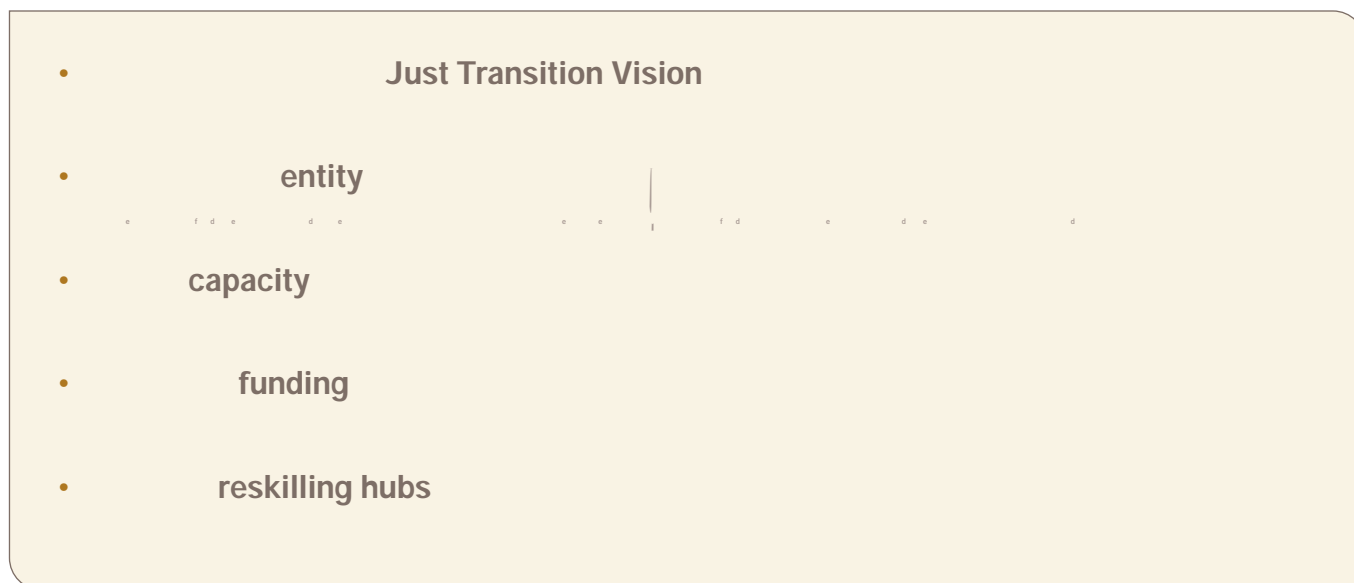


Source: IRENA.

We are in the early stages of a major transition that will radically change the way energy is produced and consumed. As the energy transition will therefore affect many parts of society, it is important for all stakeholders to participate in shaping the new system and making it fit for future generations. Cooperation at all levels of society will be necessary to build awareness and capacity at a pace that leaves no one behind.

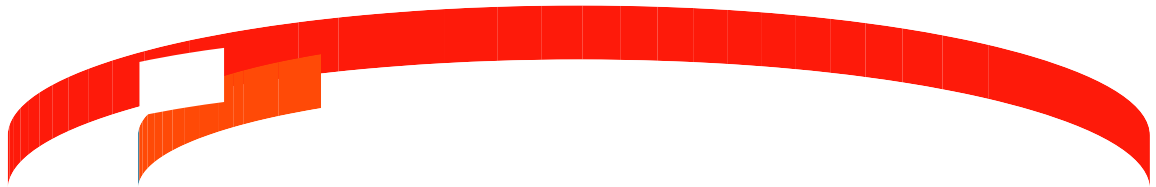
The transition process requires careful management and broad engagement in order to protect workers and communities. Some countries are closing coal mines due to non-compliance with environmental policies or because mines are nearing the end of their commercial lives. This brings to the fore the vulnerability of workers, communities, government sectors, and enterprises. It also highlights the necessity for comprehensive and coherent policies and measures to address the multifaceted challenges involved and to pursue environmentally sustainable growth, while at the same time ensuring a just transition for those affected. Employment gains in energy sectors that are transitioning will continue to grow, outweighing losses in traditional sectors. However, the skills required for the energy transition do not necessarily match the skills of workers directly impacted by changes. There are special concerns in oil- and gas-producing countries that depend fiscally on these sectors, and different concerns in countries with coal resources, where local employment is a significant factor. It will thus be important to enable countries to benefit from the local production of technologies as part of the transition. South Africa is an example of a country that has initiated a just transition of the power sector, moving gradually out of coal towards a renewables-based electricity system. The following elements were found to be critical for success for South Africa²⁵ and provide elements of learning for other countries (Figure 4).

FIGURE 4. GLOBAL AVERAGE EMPLOYMENT INTENSITIES OF INVESTMENTS IN RENEWABLE ENERGY, ENERGY EFFICIENCY, AND ENERGY FLEXIBILITY.



Source: RES4Africa Foundation, A Just Energy Transition in South Africa





5.2.1 CHALLENGES

Sector coupling will also be an important component, as governments encourage different sectors to ensure that resources are preserved and used effectively. Moreover, reusing and repurposing existing infrastructure can contribute to the technical, financial, and social benefits of energy transitions.

Underpinning everything must be robust and up-to-date data. Policymakers must put structures in place to enable effective data collection and use, calling on the international community to support this process and to share relevant data. All planning must be continuous and transparent, reacting to changes in the market and ensuring objectives are being met, in other words, giving industry the confidence to invest.

A major action area is to build the capacities amongst utility staff, in particular, power system planners, system operators, etc., to understand and apply the technical options available to manage the new challenges of the changing power system. This is a long-term process which should be structured to match the progressing penetration levels of variable renewables. Creating these capacities within utilities, particularly in countries less advanced in the energy transition, will be a prerequisite for a smooth integration of renewables. It will also be an important contribution in overcoming incumbent resistance.

Planners also need to engage at regional and global levels. The growing importance of the effective use of resources at an aggregate level, together with the new possibilities of energy trade with an increased number of producers, signify just how much these interconnections are needed. Policymakers should collaborate with regional and international institutions to identify where interconnections will work well and facilitate their introduction. The increasingly important role of the local level needs to be recognized; with rapid urbanization in most regions, city-level planning is becoming a more important factor in the energy transition. Decentralized renewables will increasingly shift power generation to the local level, and the role of local distributors and municipal utilities, for example, will become even more important.

Appropriate financing is needed to realize transition plans. According to IRENA's World Energy Transitions Outlook,²⁹ the annual investments of USD 3.4 trillion planned to finance the energy transition should increase to USD 4.4 trillion, if global temperature rise is to be limited to 1.5°C. Public investment must continue to help support new technologies, spread risk, and encourage private investment where it is

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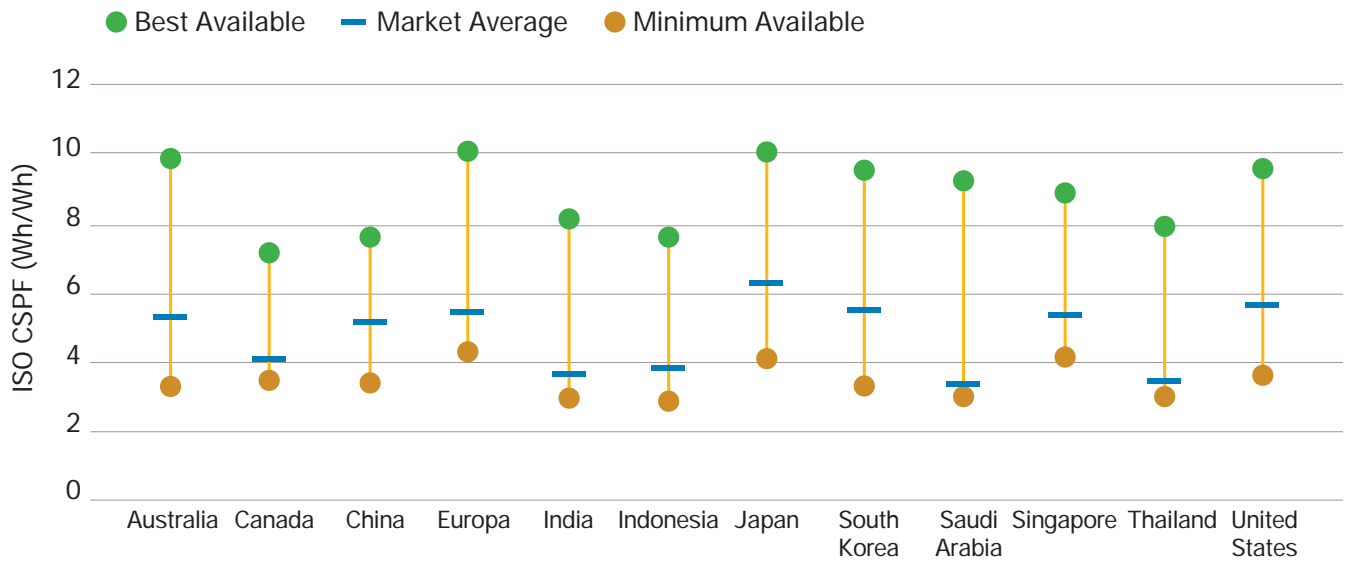
renewable energy supply are receiving increased attention, especially for heavy duty transport, shipping, and aviation, and other hard-to-abate sectors. Natural gas-based hydrogen production with Carbon Capture and Storage (CCS)—blue hydrogen—is also being considered, using existing infrastructure. This

need for financial instruments to improve the bankability conditions for renewable energy in developing countries where currency risk, off-taker non-payment risk, and other forms of risk are high, especially in the wake of COVID-19 (Figure 7)

Established instruments can be complemented by innovative sustainable-impact investment mechanisms that go beyond traditional project-focused green finance. SDG-linked bonds are a recent example of linking investment returns with companies' sustainability performance. In this area, the

in other countries, and where in-country technical capacity and expertise are lacking. In this regard,

FIGURE 8. AIR CONDITIONER EFFICIENCIES IN SELECT COUNTRIES



Source: IEA³⁹

Cities are critical actors for decarbonization, as they account for 70% of global emissions. This percentage will rise without action. Urbanization is increasing rapidly, with up to 68% of the global population expected to live in cities by 2050, compared to 55% today.³⁶

The building sector is key to energy efficiency, especially in cities, and opportunities for efficiency measures exist in both new and existing buildings—including high efficiency insulation, windows, and building materials; high efficiency heating, cooling, hot water, and lighting systems; and smart energy management services. Increased recycling of building materials will reduce much of the need for new concrete and steel, which will contribute to reduced emissions from these sectors. This opportunity is described in greater detail below.

The general potential and barriers are illustrated with one example in an area that is receiving increased attention—cooling. Cooling is a holistic issue, which cuts across various sectors: buildings (space cooling), transport (mobile AC), food cold chain, health cold chain (transportation and storage of medicines, vaccines, space cooling in hospitals) and industry (process cooling). Many countries are developing cooling action plans. These need to be closely integrated with the energy sector transformation, as energy use for cooling is increasing rapidly.

Globally, an estimated 3.6 billion cooling appliances are in use, projected to increase to 9.5 billion by 2050 because of growing populations, greater affordability, and a warming world.³⁷ District cooling, better housing design, and passive cooling efforts can contribute to solving part of this challenge, but most space-cooling services will still be air conditioners (AC). According to the IEA,³⁸ around 2000 TWh annually are used for cooling devices. This is almost 10% of global power demand and is set to increase with the projected number of new appliances. This demand typically occurs during peak hours, increasing the pressure on power capacity in many developing countries.

It is therefore very important that new ACs are as efficient as possible. Figure 8 shows that the average energy efficiency of ACs is only a fraction of that of the best available equipment on the market in

most countries, so there is clearly much room for improvement. An important issue from a climate perspective is that more efficient ACs can also be linked to the phase-out of high-GWP refrigerant gases, in line with the Kigali Amendment to the Montreal Protocol.

This illustrates one of the basic issues involved in promoting energy efficiency. Upfront costs are often higher but, in most cases, this cost difference is more than compensated for by savings over the lifetime of the equipment. Simple financing schemes will need to be made available for customers, and regulation will be needed to overcome the split incentives between, for example, building owners and users.

5.4.2 ACTION

Given the diverse nature of energy efficiency, it is very important to engage actors in all sectors of society and for national-, local-, and city-level government to both regulate and incentivize action.

A long list of tested and proven policy options is available, including:

- **Regulation**, such as building codes, minimum energy performance standards for equipment, and



Aggregation or bundling of activities, combined with assistance for project development, has proved effective because many project promoters, like cities, local authorities, individuals, and businesses, frequently do not have the skills or capacity to develop, implement, and finance energy efficiency projects.

A recent example is the Argentinian Network of Municipalities against Climate Change (RAMCC), which has established a common fund to attract financing and support retrofitting of street lighting to over 200 municipalities. This approach aims to address the problems of small scale and poor technical capacity faced by each city and facilitate solutions to a common problem.

Energy Service Companies (ESCOs) are another approach, in which a private or public entity provides comprehensive energy solutions; for example, by offering energy saving services against payment, and therefore limiting the investment risk of the customers, with the shared goal of improving efficiency. One example of a publicly owned ESCO is Energy Efficiency Services Limited (EESL) of India.

Road transport currently accounts for nearly three quarters of transport CO₂ emissions. Up to 2019, however, emissions from aviation and shipping were growing faster. They are predicted to continue this trend in the next decades. Depending on post-COVID-19 recovery trends, this prediction may change. The transformation of global value chains and political concerns about high import dependency may bring changes to intercontinental shipping. Similarly, holiday patterns may change, as may some business travel, as the world shifts to rely more on virtual meetings, etc.

No matter how post-COVID developments impact transport demand, there is still an urgent need to transform the transport sector to improve mobility, especially in developing countries, and, at the same time, to reduce the energy consumption and associated emissions of CO₂ and other air pollutants. Such a transformation will require sustained policy efforts by all countries to address the challenges facing the different parts of the sector. The electrification of private p l r r a

Governments should adopt a comprehensive “avoid-shift-improve” approach, where reducing demand,

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5.6.1 CHALLENGES

With the 2030 focus of the SDGs and NDCs, there is a natural emphasis on the most effective short-term

competition and the need to reduce energy costs. There are, however, opportunities for improvement in many older facilities, including through the use of new digital control and measurement technologies. The ETC estimates that short-term gains from efficiency could help abate up to 15–20% of current emissions. Above and beyond the introduction of direct efficiency measures, industries may themselves contribute to system effectiveness; for example, fertilizer production and desalination plants can utilise surplus electricity from variable renewable energy supply, and in that way, complement storage needs.

The main challenge for most of these industries, however, will be to substitute the current use of fossil fuels directly, both in their production processes and in their energy supply. With the framing of a net-zero target by 2050, a clear focus is needed on this objective when options are evaluated. The IRENA report has articulated this ver

As mentioned earlier, the relevance of the different options varies between countries. As some of the proposed solutions are still not fully commercial at the scale required, further support for innovation will be needed. The pace of decarbonization of these hard-to-abate industries will depend on the speed of the overall energy sector transition. The pace at which renewable power capacity is expanded and made available will partly determine the new power sector structures, the relevance of fossil fuels with the

6 RECOMMENDATIONS

RECOMMENDATION 1

Rapidly scale-up deployment of available energy transition solutions to reach 8000 GW

RECOMMENDATION 4

Countries of the Organisation for Economic Co-operation and Development (OECD) should phase out

RECOMMENDATION 9

Develop sustainable transport roadmaps.

Based on an “avoid–shift–improve” approach. Country-specific plans that include urban strategies should include time-bound roadmaps for all modes of transport, with full consideration of mobility needs, efficiency, and renewable options. Across all regions, plans must include solutions such as electrification, sustainable bioenergy or green hydrogen, enhanced public transport and shared mobility, and promotion of regional and international cooperation and action.

RECOMMENDATION 10

Tailor labour and social protection policies to the specific needs of each region and country.

Although clear global gains in job creation will be made, the structural and labour-market impacts of energy transition will vary among locations, job types, and sectors. In cooperation with all involved stakeholders, countries should enact strategies for a just transition, maximizing opportunities, and minimizing hardship for individuals and communities.

RECOMMENDATION 11

Make the energy transition a participatory enterprise.

Participatory approaches that meaningfully engage all actors, multi-stakeholder coalitions, and public–private partnerships will help shape the desired energy futures and also manage expectations. The private sector must play a significant role in the implementation of the energy transition. Equally important is the empowerment of citizens, youth, local governments, research institutions, and indigenous communities to become part of the energy system.



As already outlined in this paper, many initiatives exist in almost all areas of the energy sector. Some of the major ones, both global and regional, are briefly introduced below. This can facilitate a discussion of which compacts could provide useful foundations on which to build with strengthened commitments, and where there are gaps that new compacts could usefully address. The listing is not all-inclusive but provides some key examples.

RENEWABLES-BASED POWER SYSTEM

Energy Transition Council: A global coalition of leaders from across the energy landscape committed

HYDROGEN

Green Hydrogen Catapult: The “Green Hydrogen Catapult” initiative will see green hydrogen industry leaders, including ACWA Power, CWP Renewables, Envision, Iberdrola, Ørsted, Snam, and Yara, target the deployment of 25 gigawatts of renewables-based hydrogen production through 2026, with a view to halving the current cost of hydrogen to below USD 2 per kilogramme.

IRENA's Collaborative Framework (CF) on Green Hydrogen: IRENA's CF on Green Hydrogen is an initiative to provide a platform for IRENA Members and other partners of the Framework (including the private sector) to have a dialogue, collaborate, and share information and best practices on green hydrogen deployment7 (gigawatts)1.8 (of r)8. Renewable-based a 10 38 and)1.2 (Y)0 Tw 10 0 0 10 104.6s IRENA's C

COAL PHASE OUT

Powering Past Coal Alliance: The members of the Powering Past Coal Alliance work together to share real-world examples and best practices to support the phase-out of unabated coal. These include the use of climate finance and the adoption of practical initiatives to support this transition, for example, through the development of clean energy plans and targets. The commitment is informed by science-based benchmarks which show that EU and OECD countries must phase out unabated coal-fired electricity generation by no later than 2030, with the rest of the world following by no later than 2050 in order to limit global warming and the impacts of climate change.

Clean Air Fund: The Clean Air Fund calls for all relevant organizations, Multilateral Development Banks, philanthropists, and donor countries to increase financing for resilient health systems and air quality. It has raised USD 50 million of its USD 100 million target. Donors include IKEA Foundation, Children's Investment Fund Foundation, Bernard Van Leer Foundation, Oak Foundation, Saint Thomas Charity, and FIA Foundation.

OIL AND GAS

Science-Based Targets Initiative encourages companies to set targets for their carbon reductions based on scientific evidence and aligned with 1.5°C

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TRANSPORT, INCLUDING BIOFUELS

Partnership on sustainable low-carbon transport (SLOCAT): The partnership engages an international, multi-stakeholder group of over 90 entities across transport sectors associations, knowledge and academia, governments, multilateral organizations, NGOs, philanthropy and industry, as well as a large community of world-class experts and change-makers.

Global Fuel Economy Initiative (GFEI): The Global Fuel Economy Initiative (GFEI) was founded in 2009 with the purpose of promoting and supporting government action to improve energy efficiency of the global light-duty vehicle fleet.

Global Bioenergy Partnership (GBEP): GBEP brings together public, private and civil society stakeholders in a joint commitment to promote bioenergy for sustainable development.

Transport Decarbonization Alliance: The Transport Decarbonization Alliance is a collaboration of countries, cities/regions, and companies working to transform the transport sector into a net-zero emission mobility system before 2050.

Transformative Urban Mobility Initiative (TUMI): TUMI is a global implementation initiative on sustainable mobility formed through the union of 11 partners. TUMI supports transport projects all around the world and enables policymakers to transform urban mobility.

Biofuture Platform: The Biofuture Platform is an action-oriented, country-led, multi-stakeholder mechanism for policy dialogue and collaboration among leading countries, organizations, academia and the private sector that are conscious of the need to accelerate development and scale up deployment of modern sustainable low carbon alternatives to fossil fuel-based solutions in transport, chemicals, plastics, and other sectors.

Getting to Zero Coalition: The Getting to Zero Coalition is an alliance of more than 140 companies within the maritime, energy, infrastructure, and finance sectors, supported by key governments and intergovernmental organizations. The Coalition is committed to getting commercially viable deep sea zero-emission vessels powered by zero emission fuels into operation by 2030.

CITIES

Mobilize your city: A partnership between countries and cities focusing on supporting sustainable mobility planning

C40: C40 is a network of the world's megacities committed to addressing climate change. C40 supports cities to collaborate effectively, share knowledge, and drive meaningful, measurable, and sustainable action on climate change.

ICLEI-Local Governments for Sustainability: ICLEI is a global network of more than 2,500 local and regional governments committed to sustainable urban development. It is active in 125+ countries on sustainability policy and local action for low-emission, nature-based, equitable, resilient, and circular development.

Global Covenant of Mayors for Climate and Energy (GCoM): GCoM is the largest global alliance for city climate leadership, built upon the commitment of over 10,000 cities and local governments.

In the last few years, an increasing number of global, regional, and national initiatives have emerged that promote the energy transition as a solution to climate change, while galvanizing cooperation at different levels. Many of these initiatives are using the upcoming COP26 (in November 2021) as a time frame to set the world on a climate-safe pathway.

Marrakech Partnership for Global Climate Action: Under the leadership of the High-Level Climate Champions, the Marrakech Partnership for Global Climate Action⁵² supports implementation of the Paris Agreement by enabling collaboration between governments and the cities, regions, businesses, and investors that must act on climate change. Promoting the higher ambition of all stakeholders to collectively strive for the 1.5°C goal and a climate-neutral and resilient world, the High-Level Champions have led the development of Climate Action Pathways⁵³ for several sectors, including energy. The Energy Pathway provides an overview of the transformational actions and milestones needed for the power sector, green hydrogen, coal phase-out, end-use sectors, and the oil and gas sectors. The pathways also highlight the synergies and interlinkages across the thematic and cross-cutting area that assist all actors to take an integrated approach to achieve 1.5°C by 2050.

COP26 Energy Transition Council: The COP26 Energy Transition Council, co-chaired by the UK Government and Sustainable Energy for All (SEforAll), brings together global leaders from politics, finance, and technology to accelerate the global transition from coal to clean power as part of a green economic recovery. The Council focuses on improving the international offer of support for clean power to developing countries, making it the most attractive new power-generation option and enabling coal-intensive economies to equitably transition from coal. The overall purpose of the Council is to facilitate an effective dialogue between countries that are looking for greater support in their energy transition and the major international actors offering that support, so that solutions can be found and implemented more rapidly. The Council has recently launched a Rapid Response Facility to provide technical assistance to developing countries requesting support to develop plans for an energy transition.

SIDS Lighthouses Initiative: The Small Island Developing States (SIDS) Lighthouses initiative (LHI),⁵⁴ coordinated by IRENA, is a framework for action to support SIDS in the transformation to a renewables-based and resilient energy system through the implementation of enhanced NDCs. The initiative addresses all elements of the energy transition, from policy and market frameworks to technology options and capacity building. SIDS LHI brings together 36 SIDS as well as 29 other partners, including regional and international organizations, development agencies, private companies, research institutes, and non-profit organizations.

Three Percent Club i 34e nciinc

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IMPACTS

The COVID pandemic has forced a dramatic break with business as usual. It has exposed the vulnerabilities inherent in an economic system that puts relentless stress on natural resources and at the same time leaves many people behind. The pandemic has also exposed structural connections between the current COVID-19 crisis and the less immediate but no less urgent climate crisis. Piecemeal responses will not suffice in either case. The global sustainable development agenda needs to be comprehensive, systemic, and transformative.

Energy transition strategies offer a vehicle for navigating the rapidly changing world, understanding trade-offs, and devising actions that meet broader sustainable development as well as climate objectives. Governments must find ways to harness the technical, economic, social, and environmental expertise available across all parts of society and ensure cohesion and unity of purpose. True solutions demand wisdom and a holistic view, just as much as they require nuts-and-bolts technical understanding. Similarly, international cooperation is indispensable to drawing on the capabilities and resources of countries around the world, making certain that lessons and solutions are shared, and ensuring that no region, country, or community is left behind.

The assessment and recommendations presented in this paper show the actions required by the global community to deliver on SDG7 targets for renewable energy and energy efficiency; it also shows what is additionally required in order to stay on track to meet the goals of the Paris Agreement.

ENDNOTES

- ¹ Estimate based on IRENA's World Energy Transitions Outlook, and compatible with the recent IEA 'Net Zero by 2050' report
- ² UNEP (2020). The Emissions Gap Report 2020: Synthesis Report. Available at: www.unep.org/resources/report/emissions-gap-report-2017-synthesis
- ³ IRENA (2021). World Energy Transitions Outlook: 1.5°C Pathway. International Renewable Energy Agency (IRENA). Abu Dhabi
- ⁴ IRENA (2021). Renewable capacity statistics 2021 International Renewable Energy Agency (IRENA). Abu Dhabi
- ⁵ IEA (2021). Net Zero by 2050 – a roadmap for the global energy sector. International Energy Agency (IEA). Paris
- ⁶ IRENA (2020). The post-COVID recovery: An agenda for resilience, development and equality. International Renewable Energy Agency, Abu Dhabi
- ⁷ IPCC (2018). Summary for Policymakers. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.

²⁴ IRENA (2020). The post-COVID recovery: An agenda for resilience, development and equality. International Renewable Energy Agency, Abu Dhabi

⁴⁹ Sweden's LKAb plans \$47bn push into carbon free iron ore. Available at:
www.ft.com/content/0cbc20c6-d781-44da-a77b-cb7679f9820a

⁵⁰ IRENA (2021), World Energy Transitions Outlook: 1.5°C Pathway, International Renewable Energy Agency,

