Sector Transformation:
An SDG Roadmap for Electric Utilities

wbcsd

Contents

Foreword

Foreword

In 2015, the United Nations (UN) launched the 2030 Agenda for Sustainable Development as a powerful framework to guide the world towards prosperity for people and the planet. The 17 Sustainable Development Goals (SDGs) require the transformation of our financial, economic, societal and political systems and ambitious action by all stakeholders, including business. We are now over one third of the way through the timeframe for the 2030 Agenda and despite global recognition of the urgency to realize the SDGs, we are not on course to deliver them.

Moreover, the COVID-19 pandemic has emphasized the interconnections between climate, nature, health and social equity and proven that business can only prosper when societies thrive. There have been calls from all quarters of society to avoid a return to business as usual and ensure that recovery efforts center on sustainable development and true systems transformations. The impacts of COVID-19 have setback progress on the SDGs and there is an even greater need now for all stakeholders to intensify their efforts to achieve the Global Goals.

The future of business is dependent on the 2030 Agenda; those companies that embrace and embed the SDGs into their operations and management will build resilience and opportunities for growth. In addition to individual company action, collaboration within each sector is an important enabler to spur collective action and maximize impact.

At WBCSD, we support our member companies as they integrate the SDGs into their business models through the SDG Sector Roadmap project, which champions the development of robust sectoral SDG roadmaps to guide and inspire entire sectors and their value chains to achieve the 2030 Agenda.

For this roadmap, we are delighted that 11 forward-thinking companies in the electric utilities sector are recognizing the importance of collaborating within their sector to accelerate progress on the SDGs and have shown leadership by producing this Roadmap.

Sustainable and affordable energy is crucial to achieving the SDGs. Energy powers the economy and makes it possible for people to live the kinds of lives they aspire to. It enables vital supply chains and technology deployment, and is essential to the operations and modernization of all sectors, from healthcare and infrastructure, to agriculture and service industries. However, serious challenges remain, with 1 out of 10 people still lacking access to electricity. Accelerated efforts to scale renewables and drive energy efficiency remain critical to achieving long-term climate goals.

This Roadmap provides a vision, direction and a platform for collaboration that will enable the electric utilities sector to drive forward the SDGs on the road to 2030. I invite business leaders from all utilities to use this Roadmap to achieve the transformative change we need to build forward better.

Peter Bakker
President and CEO, WBCSD

This Roadmap shows how electrification plays an essential role in contributing to the SDGs. We have been working to drive towards decarbonization for decades, generating progress and employment, while promoting equality, innovation, health and partnerships to achieve the objectives of the 2030 Agenda.

Ignacio S. Galán
Chairman and CEO, Iberdrola

The COVID-19 pandemic has upended lives across the world and slowed our collective progress towards the SDGs. Tangible and measurable action is needed from our sector to support the economic green recovery of our communities and regain this lost ground. This WBCSD Roadmap provides an ambitious and attainable pathway from which we can collectively drive these efforts towards the 2030 targets.

Miguel Stilwell d'Andrade
CEO, EDP & EDPR

① Executive summary

① Executive summary

The Sustainable Development Goals (SDGs) provide a universal framework that companies can use to build strategies to address the world's most challenging sustainability issues. Successful implementation of these strategies strengthens a company's ability to generate value by capturing new market opportunities that meet societal needs; the Business and Sustainable Development Commission estimates that these market opportunities could have a total value of at least USD $12 trillion per year by 2030. In addition, companies aligning their strategies with the SDGs are in a better position to manage regulatory and reputational risks and build resilience against future shocks. They can also gain access to new capital streams as the integration of environmental, social and governance (ESG) metrics in investment decisions becomes mainstream.

The electric utilities sector has a fundamental role to play in realizing the SDGs, as the sector will shape the future of sustainable energy – which is essential for economic growth, social equity and efforts to combat climate change. Recognizing this, the World Business Council for Sustainable Development (WBCSD) has convened 11 electric utility companies to explore and

develop a joint, global vision for how the sector can best contribute to the SDGs through collaboration, innovation and leveraging its influence.

This Roadmap is a flagship publication for the sector. Developed by electric utilities with multinational operations spanning Asia-Pacific, the Americas, Africa and Europe, the Roadmap sets a new standard for global best practices on how the sector and its value chain can contribute to achieving the SDGs. It does this by identifying key impact opportunities and providing tangible actions that electric utilities can adopt to accelerate and optimize their impact in the run up to the 2030 deadline for the SDGs. Furthermore, the Roadmap provides suggested indicators for companies to assess progress on realizing these impact opportunities.

PRIORITY SDGS

While the electric utilities sector interacts with all 17 SDGs and their 169 targets, the nine SDGs illustrated below are priorities for electric utilities. These are the SDGs to which the sector has the greatest potential to contribute, by driving innovation and meaningful action in its own operations and leveraging its role in the value chain.

IMPACT OPPORTUNITIES

Electric utilities can maximize their contributions to the SDGs through seven impact opportunities, which fall into four main themes: climate and energy, people and communities, nature, and circular economy. This Roadmap further presents a series of actions for the sector and its value chain to catalyze the impact opportunities. Table 1 summarizes the highest impact actions for each impact opportunity and indicates the relevance for different types of electric utilities.

CALL TO ACTION

This Roadmap is a transition tool for the sector. Companies and value chain stakeholders should use it to map out priority SDGs and high-impact actions for their organization. The success of the Roadmap is dependent on collective action: all impact opportunities and actions need inclusive partnerships and collaborations with sector peers and other local and regional stakeholders, including the value chain, civil society and academia, to achieve greater impact.

Our electric utilities members commit to reviewing progress on the SDGs and refreshing the impact opportunities and actions of this Roadmap by 2026.

Table 1: Summary of actions with the potential for highest impact and relevance to different types of electric utilities

THEME	IMPACT OPPORTUNITY	HIGH IMPACT ACTIONS	GENERATION	TRANSMISSION	DISTRIBUTION	RETAIL
Climate and energy	1. Decarbonize electricity generation in line with limiting global warming to 1.5°C	• Scale up the deployment of low-carbon electricity generation technologies, with renewable electricity meeting 50% of global electricity consumption needs by 2030. • Reduce the share of unabated fossil fuel power generation by: committing to no new investments in additional unabated coal-fired power plants; and developing pathways to phase out unabated fossil fuel generation assets and transition to low-carbon technologies by no later than 2050, including reducing the share of coal in global electricity generation to less than 10% by 2030. • Increase investment and capital expenditure in low-carbon R&D, technologies and business models to improve efficiency, drive further price reductions and reduce their environmental impact.	●			
	2. Enhance electricity system flexibility, resilience and efficiency	• Increase investments in and deployment of flexibility solutions. • Facilitate the transition to smart, efficient and resilient communities by developing innovative and inclusive business models as service providers, such as street lighting, traffic lights, electric vehicle charging, energy efficiency in buildings and microgrids.	●	●	●	●
People and communities	3. Ensure access to affordable, reliable, sustainable and modern electricity services for all	• Ensure universal access to electricity by launching new business models that scale up the deployment of distributed renewable generation in off-grid areas and areas with limited access to reliable electricity, with a focus on developing countries. • Develop and implement action plans to ensure that 100% of vulnerable customers have access to affordable electricity services.	●		●	●
	4. Attract and retain a diverse and inclusive workforce	• Adopt policies to promote greater diversity, inclusion, equal opportunities and equal pay for all employees irrespective of age, gender, disability, race, ethnicity, origin, religion or economic or other status. • Ensure that 100% of employees and contractors across the organization earn a living wage, and scale impact by including this as a criterion in supplier contracts	●	●	●	●
	5. Leave no one behind in the energy transition and respect human rights	• Achieve a just transition by engaging in dialogue, developing and implementing plans to reduce impacts and actively assisting the workforce and contractors to upskill and re-skill for future opportunities. • Provide communities with co-benefits from electric utility projects through shared value business models. • Develop and publish a human rights policy that establishes a commitment to respect human rights and operationalize the United Nations Guiding Principles on Business and Human Rights (UNGPs), and encourage this throughout the supply chain.	●	●	●	●
Nature	6. Protect, restore and promote sustainable use of ecosystems and drive net biodiversity gains	• Adopt water stewardship strategies that are site and technology specific, are appropriate to local watershed conditions, and account for corporate risk exposure.	●			
		• Mitigate biodiversity risks and have a net-positive impact by conducting biodiversity risk assessments, developing and implementing biodiversity action plans and developing a sectoral approach to setting science-informed biodiversity targets for net biodiversity gain.	●	●	●	
Circular economy	7. Transition to a circular electric utility sector	• Accelerate the transition to a circular electric utility sector by: developing a market and supply chain strategy to address barriers related to scale, demand, logistics and skills; collaborating with equipment and infrastructure manufacturers to embed design for environment principles at early stages of product innovation; developing new business models that improve circularity, e.g., service-based contracts (with suppliers and/or customers), aligned with producer responsibility that incentivize suppliers to take back equipment after use; developing partnerships with waste management companies and potential end-users of waste to find new ways to reuse products; and investing in research and innovation for new technological solutions to recycle products at the end of their life and recover valuable materials and minerals.	●	●	●	●

(2) The SDGs and the electric utilities sector

② The SDGs and the electric utilites sector

2.1 INTRODUCTION

In 2015, all 193 United Nations (UN) Member States adopted the 2030 Agenda for Sustainable Development – an urgent call to action on the world's most critical economic, social and environmental challenges. Central to this agenda are 17 SDGs and their 169 targets, which lay out the ambition for 15 years of global collaborative action to build prosperity for people and the planet,[1] with 2021 marking a pivotal year as we are now more than one-third of the way through the timeframe.

Prior to the COVID-19 pandemic, the world was not on course to deliver the Global Goals by 2030. The UN's Sustainable Development Goals 2020 Report highlights that progress made over the last five years has been uneven.[2]
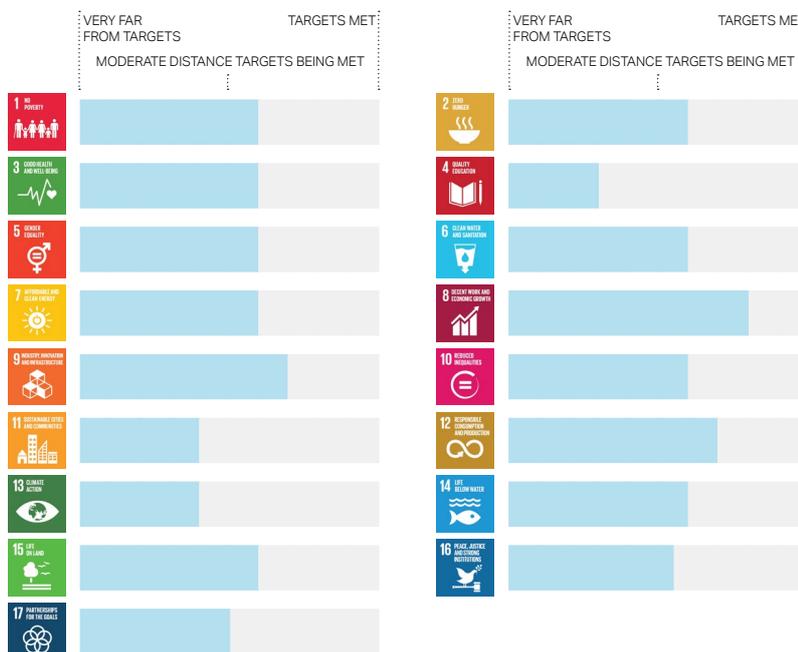
The report also notes that there has been regression in some areas, and that more focused and accelerated action is needed to achieve most of the goals (see Figure 1). Furthermore, of the 21 SDG targets that had a 2020 deadline — many of which are related to biodiversity — only three have been achieved on time.

There have been calls from stakeholders throughout society to ensure that we take the opportunities presented by the COVID-19 pandemic to help realize the collective ambition of building forward better. There was consensus from UN Member States at the 2020 High-level Political Forum on Sustainable Development that the SDGs are the best way to recover from the pandemic, as they provide a ready-made universal framework to help realize this collective ambition. Delivering the Global

Goals will require transformational systems changes, strong political will and collaboration from all stakeholders: governments, business, civil society and individuals.

Eleven electric utility members of the WBCSD have come together to develop this Roadmap to identify how to maximize the sector's contribution to the SDGs. Section 1 of the Roadmap describes the role of the private sector in realizing the SDG Agenda, presents an introduction to the electric utilities sector and its value chain, explains why the sector will benefit from an SDG Roadmap, and describes the approach used to develop this Roadmap. Section 2 identifies areas where the sector can contribute most to achieving the SDGs and explores key opportunities and actions to accelerate and optimize its impact on the road to 2030.

Figure 1: Overview of SDG progress (extrapolated from UN DESA SDG progress charts 2020)

Section 3 concludes the Roadmap with a call to action from the participating electric utilities, asking the sector as a whole and its stakeholders to scale up and accelerate SDG impact together.

2.2 ROLE OF THE PRIVATE SECTOR

The private sector is a key driver of innovation and technology development. It is also an engine of economic growth, a provider of employment and plays an essential role in financing the transformations needed to achieve the SDGs. In this context, it is more important than ever that companies identify ways in which they can innovate and drive meaningful action in their own operations and value chains to contribute to the SDGs in collaboration with stakeholders.

Companies that successfully implement SDG-led strategies in core business activities can generate value as they are in a better position to anticipate customer interests, capture new market opportunities, manage regulatory and reputational risks and build resilience against future shocks. In addition, companies integrating the SDGs in their business models can gain access to new capital streams as ESG integration in investment analysis and decision-making becomes mainstream.

The size of new market opportunities is substantial — the Business and Sustainable Development Commission's Better Business, Better World report estimates that by 2030, achieving the SDGs would create at least USD $12 trillion per year in market opportunities needed to meet societal needs.[3] The report also recommends that to help realize this opportunity, players in all industries should produce detailed roadmaps to further guide their industry's shift to sustainable development, in line with the SDGs.

2.3 ROADMAP PURPOSE

The electric utilities sector has a fundamental role to play in achieving the SDGs. Former UN Secretary-General Ban Ki-moon emphasized that sustainable energy is the thread that connects economic growth, social equity and efforts to combat climate change.[4] Most importantly, low-carbon electricity is a crucial energy carrier that can increase the number of people who have access to electricity while at the same time mitigating air pollution related to fossil fuel combustion and negative health impacts (SDG 3, 7). Electricity is essential for most industrial activities and the provision of commercial services; as such, it is a key enabler of decent work and economic growth (SDG 8) and sustainable industrialization, innovation and infrastructure (SDG 9). However, there are also areas where electric utilities need to focus on minimizing their negative impact to contribute to the realization of the SDGs. These include moving from fossil fuel to low-carbon energy sources to mitigate climate change (SDG 13) and minimizing the sector's and value chain's impact on ecosystems (SDG 6, 14, 15).

This Roadmap is a tool that the electric utilities sector and its value chain should use to navigate the transition to the SDGs and respond to global issues influencing progress, from climate change, societal inequalities and biodiversity decline, to digital transformation. The Roadmap supports the sector by developing impact opportunities and concrete actions that companies can adopt to contribute to the SDGs while also responding to the global issues influencing the sector's progress on the SDGs, as summarized in Box 1.

Box 1: Global issues influencing SDG progress for electric utilities

We summarize global issues influencing SDG progress for the electric utilities sector below:

- **The physical impacts of climate change are becoming more frequent and severe.** The years from 2015 to 2020 were the warmest six years ever recorded on earth.[5] While the Paris Agreement aims to limit global warming to 1.5°C above pre-industrial levels, the average global temperature rise recorded in 2020 was about 1.2°C.[6] As the planet continues to warm, extreme weather events are already and will become more frequent and severe. Electric utilities have a vital role in global decarbonization efforts, as the power sector is responsible for 41% of global energy-related emissions – or 13.7 gigatons of carbon dioxide (GtCO2).[7]

- **Societal inequalities are at a tipping point.** COVID-19 has exposed the scale of societal inequalities and highlighted the interdependencies between business and communities, employees and customers: business success relies on thriving societies. For the electric utilities sector, this elevates the importance of tackling the challenges of sustainable electricity access and affordability to advance equal opportunities and reduce inequalities; the need to respect and remedy human rights across the value chain in line with the United Nations Guiding Principles on Business and Human Rights (UNGPs); and ensuring a just transition that protects workers and communities from potential negative consequences in the transition to a low-carbon energy system.

- **Ecosystems and biodiversity are rapidly declining due to human activities.** The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) Global Assessment Report on Biodiversity and Ecosystem Services found that human activities have significantly altered 75% of the world's land surface, led to the loss of over 85% of wetlands, and impacted 66% of ocean areas.[8] The decline of ecosystems and biodiversity can have severe societal impacts, ranging from vulnerable food supplies and adverse health outcomes, to loss of livelihoods. As the energy system transforms, electric utilities must address risks to ecosystems and biodiversity driven by climate change, land use change, water use and from mined metals and materials in the supply chain.

- **The digital transformation is disrupting electric utility business models.** This brings both opportunities and risks and is transforming society's engagement with the electricity system. In particular, the increasing volume of distributed energy resources such as rooftop solar photovoltaic (PV) panels and electric vehicles, combined with digitalization of the grid and the growth of internet of things (IoT) enabled devices is democratizing the energy system. This is enabling electricity consumers to actively participate in the electricity system as suppliers of power and flexibility services to the grid. Technology developments also mean that businesses of all types are using electricity to provide a continually growing range of services to customers, including mobility and heating, while at the same time, driving energy efficiency and decarbonization.

2.4 THE ELECTRIC UTILITY VALUE CHAIN

Electric utilities engage in activities that are essential to providing customers with electricity services: generation, transmission, distribution and retail. Historically, a single vertically integrated utility conducted all of these activities. However, in many markets today, utilities have unbundled these functions, with different companies carrying out each activity. In such markets, electric utility companies may engage in a combination of these activities, such as generation and retail, or focus on a single activity, such as generation or transmission. In addition to these core activities, some electric utilities have retail businesses that provide electricity and natural gas,[9] household appliances and other energy services, including energy efficiency, heating and electric vehicle charging.

While there are substantial differences between the energy mix of individual electric utilities, fossil fuel energy sources – coal, oil and natural gas – generate most electricity (63%) on average globally. Nuclear accounts for 10% and renewables account for the remaining 26%, as shown in Figure 2. While the installed capacity of wind and solar PV has grown rapidly over the past decade, hydro remains the largest source of renewable electricity. The diverse energy sources and technologies used in electricity transformation mean that there are many different actors in the electric utility supply chain.

This Roadmap is relevant for all electric utilities and for companies participating in the sector's supply chain, as well as downstream actors in the value chain, as shown in Figure 3.
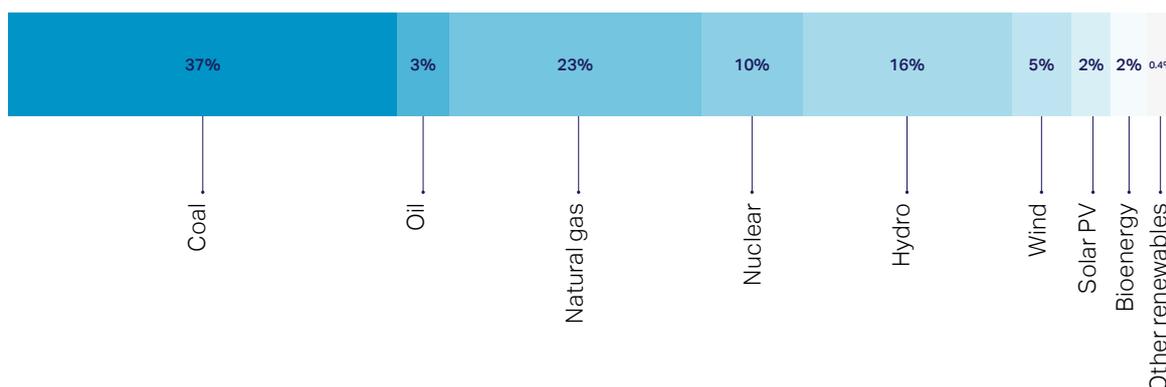
Extractives industries are critical to electric utilities. They extract energy resources that utilities transform into electricity, such as coal, oil, natural gas and uranium. Despite the shift to renewable electricity generation, the extractives industry will remain an important element of the electric utility value chain, as it also extracts minerals for transformation into materials used to manufacture infrastructure and equipment. For example, the industry mines silicon used in solar PV panels and lithium and cobalt for batteries. In addition, the extractives industry mines iron ore, copper ore and limestone for transformation into steel, copper and cement, respectively – important materials in current and future electricity systems.

The sector's main suppliers include companies that manufacture and supply the vast system of infrastructure and equipment needed to provide electricity to customers, including electricity generation assets and infrastructure, the power grid, and equipment used to ensure system reliability, such as sensors and meters. Other key suppliers for the sector are freight and logistics providers, and service providers such as information and communication technology suppliers, maintenance contractors, building contractors and call centers.
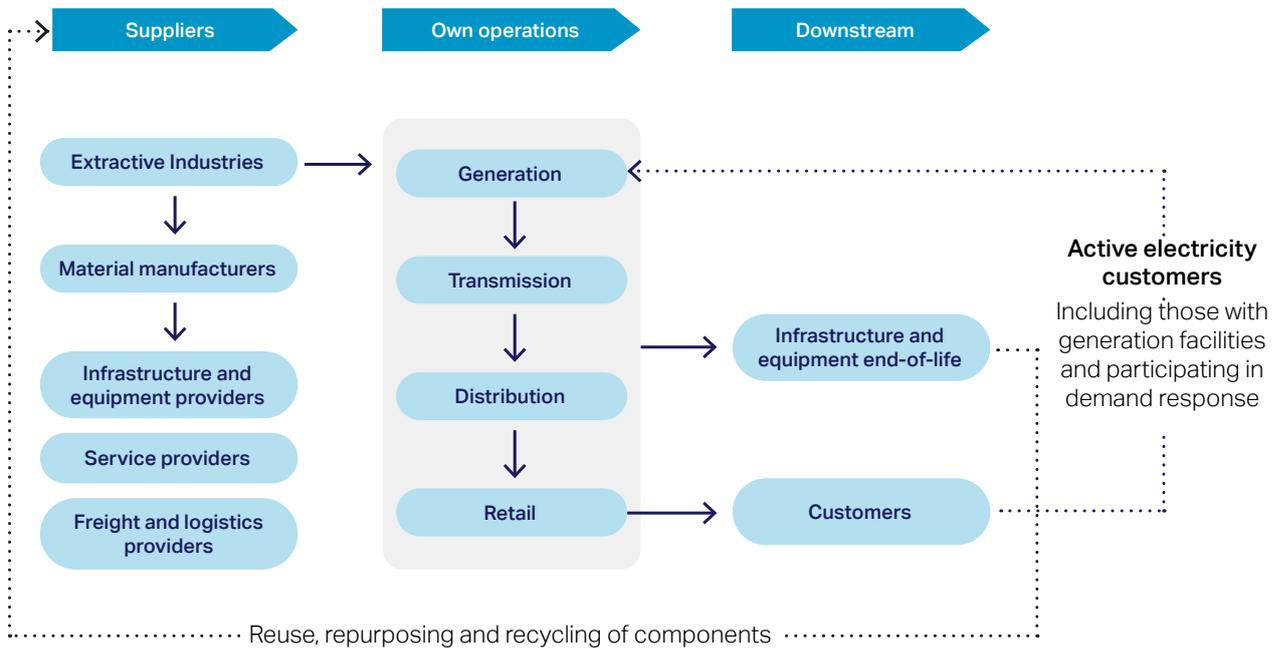
Downstream in the value chain, customers have traditionally played a passive role as electricity users. However, in modern electricity systems, business and household customers have an increasingly active role, for example, by selling distributed electricity generated through rooftop solar PV panels back to the grid and participating in demand response programs to provide flexibility services.

Also, organizations managing the end of life of infrastructure and equipment are important downstream stakeholders for electric utilities to partner with in the transition to a circular economy.

Figure 2: Share of electricity generation by energy source in 2019[10]

Coal	Oil	Natural gas	Nuclear	Hydro	Wind	Solar PV	Bioenergy	Other renewables
37%	3%	23%	10%	16%	5%	2%	2%	0.4%

Figure 3: Electric utilities value chain

2.5 APPROACH TO BUILDING THE ROADMAP

We applied the three-step process outlined in the [SDG Sector Roadmap Guidelines](#)[11] to develop this Roadmap as visualized in Figure 4.

The process consisted of:

1. **Establishing current position by mapping the electric utility sector's current level of SDG impact and identifying the priority SDGs for the sector**

The 17 SDGs and their 169 targets are interlinked with many cross-cutting elements between them. The electric utilities sector has the capacity to help advance each of the 17 goals either directly or indirectly;[12] however, for the purpose of this Roadmap, we identified the SDGs where the sector can have the most influence or ability to respond to societal needs by driving innovation and impact in its own operations and leveraging its role in the value chain.

This process included a review of corporate disclosures and a range of external literature sources to understand the current level of SDG impact and identify where the sector could contribute most to the SDGs. In addition, representatives from the 11 WBCSD member companies developing this Roadmap assessed the sector's current level of impact and potential to contribute to the realization of the SDGs by either minimizing negative or by maximizing positive impacts.

We identified the nine priority SDGs depicted below during the assessment and used them to inform the development of the impact opportunities and actions.

Figure 4: Roadmap development process

Establish current position	1	Identify key impact opportunities	2	Call to action	3

Map SDG impages across the sector value chain

Prioritize SDGs for the sector

Identify key opportunities to impact the SDG

Identify short-medium and long term actions to advance SDG Impact opportunities

Outline how sector and stakeholders can engage with the roadmap

State how WBCSD plans to catalyze impact through implementation

Figure 5: Priority SDGs for the electric utilities sector

Due to the interconnectedness of the SDGs, the impact opportunities and actions also support the achievement of other SDGs, most notably: 1 (no poverty), 3 (good health and well-being), 4 (quality education), 10 (reduced inequalities) and 14 (life below water). In addition, while the WBCSD member companies did not specifically identify SDG 17 (partnerships) as a priority goal for the sector, it is a recurring theme throughout this Roadmap. All impact opportunities and actions need inclusive partnerships and collaborations to succeed and we recognize the importance of scaling action in developing markets.

2. Identifying key impact opportunities for the sector to contribute to the SDGs and developing concrete actions that the sector can adopt to realize these opportunities

We held a series of virtual workshops and in-depth calls with subject matter experts to consider where and how the sector can make the most significant contribution to achieving the priority SDGs. This led to the identification of seven impact opportunities and 33 actions that companies in the sector can take to optimize their SDG contribution. As noted above, due to the interlinkages between SDGs, some of these actions impact goals beyond the list of priority SDGs. We consulted key external stakeholders to capture a broad range of perspectives and ensure that the actions listed in this Roadmap are relevant, ambitious and attainable.

3. Presenting a Call to Action

The call to action outlines how sector peers and stakeholders can engage with this Roadmap and how WBCSD plans to catalyze impact through implementation. We include a list of potential indicators that companies can use to assess progress on realizing the impact opportunities in Annex A.

③ Impact opportunities

③ Impact opportunities

This section presents seven impact opportunities for companies in the electric utilities sector to maximize their contribution to the SDGs. These impact opportunities fall into four main themes: climate and energy, people and communities, nature, and circular economy.

To realize these impact opportunities, we developed a series of actions that companies can take to minimize current negative impacts and bringing positive impacts to scale. While we developed these actions for the electric utilities sector to implement, we recognize that some individual companies may not be able to immediately implement all of these actions due to, for example, their regulatory environment and location of operation.

For each action, we are showing the following attributes – developed through workshops with the electric utilities and further refined based on external stakeholder feedback:

- **SDG targets** that the action will contribute to, with a focus on the targets from the priority SDGs, as well as other SDGs that are relevant for some actions. We have highlighted the SDG target(s) most directly aligned with the action; however, this does not necessarily indicate that the sector has the largest opportunity to impact that particular SDG target.

- **Level of potential impact that each action can have on the SDGs:**

  Low – the action will have a small, but necessary, role in contributing to the identified goals;

  Medium – the action will have an important role in contributing to the identified goals; and

  High – the action will have a pivotal role in achieving the identified goals.

- **Time to impact of each action on the SDGs:** the timeframe by which the action will begin to show expected outcomes, with a maximum time horizon of 10 years, in line with the 2030 objective of the 2030 Agenda (1-3 years is short term, 4-6 years is medium term, and 7-10 years is long term).

- **Level of contribution and control the electric utilities sector has to drive progress on the action:**

  Lead – the sector has a high degree of control and can make a significant contribution;

  Accelerate – the sector has moderate control and can directly contribute and/or accelerate current actions; and

  Influence – the sector has little control and can contribute by influencing other key stakeholders to take action.

- **Stakeholders:** the partners and stakeholders who must be involved alongside the electric utilities sector to maximize impact.

THEME	IMPACT OPPORTUNITY	PRIORITY SDGS TO MAXIMIZE POSITIVE IMPACT AND MINIMIZE NEGATIVE IMPACT
Climate and energy	• Decarbonize electricity generation in line with limiting global warming to 1.5°C • Enhance electricity system flexibility, resilience and efficiency	7 8 9 11 12 15
People and communities	• Ensure access to affordable, reliable, sustainable and modern electricity services for all • Attract and retain a diverse and inclusive workforce • Leave no one behind in the energy transition and respect human rights	5 7 8 9 12 13
Nature	• Protect, restore and promote sustainable use of ecosystems and drive net biodiversity gains" and not Regulatory compliance	6 15
Circular economy	• Transition to a circular electric utility sector	8 9 12

3.1 DECARBONIZE ELECTRICITY GENERATION IN LINE WITH LIMITING GLOBAL WARMING TO 1.5°C

To avoid the most devastating impacts of climate change, it is necessary to limit global warming to 1.5°C above pre-industrial levels. For example, the projected global mean sea level rise by 2100 is 0.1 meter lower under a 1.5°C warming scenario compared to 2°C, which means that 10 million fewer people would be exposed to related risks.[13] The electric utilities sector must take a leading role in global efforts to achieve net-zero emissions by no later than 2050. Under the International Energy Agency's (IEA) Sustainable Development Scenario (SDS), which is in line with a 50% probability of limiting the temperature rise to less than 1.65°C, CO_2 emissions from the power sector need to be 43% lower than 2019 levels by 2030 and 78% lower by 2040.[14]

To decarbonize electricity generation in line with a 1.5°C scenario, the sector must transform by implementing existing greenhouse gas (GHG) emissions mitigation solutions for electricity generation and innovating to develop new ones. This represents a significant shift for the sector. Alongside an overhaul in company strategies, policy support will be key to creating a market environment where electric utilities can build a business case for their investment decisions. A co-benefit of this transition is the mitigation of air pollution from fossil fuel combustion and the resulting improved health outcomes.

It is crucial that pathways to phasing out unabated fossil fuel generation strike a balance between decarbonization and avoiding negative impacts on people and communities. Ensuring sustainable, reliable and affordable electricity access and a just transition for affected workers, supply chains and communities are two key issues to tackle in parallel with decarbonization (see impact opportunities 3 and 5). Furthermore, scaling up sustainable finance mechanisms is necessary to facilitate the transformation.

SDG impact	3 GOOD HEALTH AND WELL-BEING	7 AFFORDABLE AND CLEAN ENERGY	8 DECENT WORK AND ECONOMIC GROWTH	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	13 CLIMATE ACTION	15 LIFE ON LAND

Actions	SDG targets	Level of impact on SDGs	Time to impact SDGs	Electric utility sector contribution	Key partners
1. Scale up the deployment of low-carbon electricity generation technologies, with the aim of increasing the share of renewable electricity across the sector to 50% of total electricity consumption globally by 2030.[15]	7.1 **7.2** 7.b 13.1	(H)	(M)	Lead	• Government/policy makers • Industry associations • Municipalities • NGOs • Sector peers
2. Reduce the share of unabated fossil fuel power generation[16] by: • Committing to no new investments in additional unabated coal-fired power plants; and • Developing pathways to phase out unabated fossil fuel generation assets and transition to low-carbon technologies[17] by no later than 2050, with the aim of reducing the share of coal in global electricity generation to less than 10% by 2030.[18]	3.9 **8.4** 12.2 13.1	(H)	(S) (M)	Lead	• System operators • Government/policy-makers/ regulators • Finance/investment
3. Advocate for policies and regulations that create a conducive market environment for decarbonizing electricity generation.	**7.2** 13.2	(M)	(M)	Accelerate	• Electricity consumers • System operators • Equipment providers • Electricity consumers • Government/policy-makers/ regulators
4. Increase investment and capital expenditure in low-carbon R&D, technologies and business models to improve efficiency, drive further price reductions and reduce their environmental impact.	**7.2** 9.5 13.1	(H)	(M)	Accelerate	• Academia • R&D organizations • Finance/investment • Equipment providers
5. Improve the efficiency of existing generation assets until their planned end of life, through upgrades and retrofits.	7.b **9.4**	(M)	(M)	Lead	• Government/policy-makers/ regulators • Equipment providers
6. Accelerate the adoption of carbon dioxide capture, use and storage, and carbon dioxide removal solutions by: • Creating partnerships to foster innovation; and • Investing in carbon dioxide removal solutions that contribute to biodiversity and ecosystem co-benefits, such as natural climate solutions including afforestation, reforestation and land management projects.	7.a **13.1** 13.3 15.2	(M)	(L)	Influence	• Academia • R&D organizations • Government/policy-makers/ regulators • Equipment providers • Project developers
7. Advance the development of sustainable finance products to support decarbonization activities by collaborating with the finance sector.	7.1 7.2 **8.4** 13.1	(M)	(M)	Accelerate	• Finance/investment

High (H)   Medium (M)   Low (L)   Long (L)   Medium (M)   Short (S)

WindFloat Project[19]

EDP has overcome the challenges related to abundant, high-speed offshore wind electricity generation in deep waters. Its WindFloat Project has developed an innovative technology aimed at exploiting offshore wind potential at sea at depths of more than 40 meters. Based on experience from the oil and gas industry, the project conceived a floating foundation to support multi-megawatt wind turbines in offshore applications. The floating foundation is semi-submersible and anchored to the seabed. EDP builds it entirely onshore – including the installation of the turbine – thereby avoiding impacts on marine resources.

The WindFloat Project started with WindFloat 1 – a 2 MW demonstration unit that operated from 2011 to 2016. In 2019-20, it established a three-turbine wind farm with a total installed capacity of 25 MW, 20 kilometers off the coast of Viana do Castelo (Portugal) and at a sea depth of 100 meters. Fully operational since July 2020, the wind farm generates enough electricity to supply 60,000 homes and avoid up to 28,000 metric tons of CO_2 emissions annually.

Floating solar photovoltaic plant[20]

CHESF, an Eletrobras subsidiary, operates a hydroelectric plant in the Sobradinho Reservoir in Bahia, Brazil – a region with high solar PV potential. To capture this potential, while at the same time avoiding land conversion, CHESF installed Brazil's first floating solar PV plant in 2019. The 1 MW plant consists of 3,792 solar plate modules with a total area of 11,000 m2. The research and development project will analyze the efficiency of solar energy production and interactions with hydroelectric plant operations. In addition, the project includes environmental studies that will assess the impact of the PV plant on river water and aquatic biota. The second stage of the project will see the installation of an additional floating solar PV plant in the Sobradinho Reservoir, increasing the total capacity to 2.5 MW, with a total investment of R $56 million (USD $10 million).

Enel's ambition to responsibly phase out coal

Enel's decarbonization strategy aims to reduce direct greenhouse gas emissions per kWh by 80% by 2030 compared to the 2017 baseline – a target that the Science Based Targets Initiative has validated as aligned with a 1.5°C pathway. In 2020, Enel reduced its emissions intensity by more than 47% compared to 2017 levels and the company plans to continue this trend through major investments in renewables and the decommissioning of thermal power plants, including coal-fired power plants.

Enel initially announced in 2019 a target to phase out coal by 2030 and recognized impairment losses totaling EUR €4.010 billion (USD $4.8 billion) in its balance sheet. However, this has had no impact on Enel's market capitalization. The company remains the largest European electric utility by market capitalization, leading the way by "sustainability is value" across the energy transition, through renewables growth, innovative grids, commodities and beyond commodities services to customers.

In 2020, Enel accelerated this target and now aims to exit from coal by 2027.

The company is making progress on achieving this goal. Due to coal-fired capacity retirements, only 7% of the group's total electricity generation was from coal-fired power plants in 2020, compared to 28% in 2017. In addition, electricity produced from coal represented just 2.6% of total group revenues in the first half of 2020.

3.2 ENHANCE ELECTRICITY SYSTEM FLEXIBILITY, RESILIENCE AND EFFICIENCY

Electricity systems are undergoing a major transformation around the world: the share of renewable generation is expanding and estimates suggest it will account for half of electricity generation by 2030 under the IEA's Sustainable Development Scenario.[21] At the same time, electricity demand is set to grow by approximately 17% over the next decade under this scenario due to the shift away from fossil fuels towards lower carbon energy carriers in other sectors. In particular, there is a large opportunity to reduce society's reliance on oil for mobility and natural gas for heating by shifting to electricity-based solutions.[22]

To ensure security of supply, innovation and investment in flexibility solutions and enhancing system efficiency will be increasingly important to balance electricity demand and supply. Digitalization of grids – including smart meters and remote monitoring and control systems – is a key enabler. Ensuring security of power supply also requires expanding transmission and distribution infrastructure, different dispatchable, low-carbon generation technologies, and energy storage. Active engagement with electricity consumers – both households and businesses – is equally important, as they will play a growing role in balancing the grid through efficient energy use and demand response. In addition, electricity systems also need to build resilience to other risks, including impacts from climate change and cyberattacks.

SDG impact	7 AFFORDABLE AND CLEAN ENERGY	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	11 SUSTAINABLE CITIES AND COMMUNITIES	12 RESPONSIBLE CONSUMPTION AND PRODUCTION	13 CLIMATE ACTION	

Actions	SDG targets	Level of impact on SDGs	Time to impact SDGs	Electric utility sector contribution	Key partners
1. Invest in or advocate for appropriate regulation to accelerate the expansion and refurbishment of transmission and distribution infrastructure.	7.1 7.3 7.a 7.b **9.4**	(M)	(M)	Lead	• Government/policy-makers/regulators • Equipment providers • Finance/investors • T&D owners
2. Increase investment in and deployment of flexibility solutions. These include technologies such as smart meters, energy storage, demand response, as well as software solutions such as virtual power plants, distributed energy management systems, advanced forecasting of variable renewable power generation and improved demand forecasting.	**7.2** 7.a 7.b	(H)	(M)	Lead	• Government/policy-makers/regulators • Customers (residential, and other sectors including services and transport) • Equipment and software providers • System operators
3. Collaborate with other utilities, governments and system operators to develop market and regulatory frameworks and technical requirements that unlock flexibility solutions.	**7.2** 13.2	(M)	(M)	Accelerate	• Government/policy-makers/regulators • System operators • Customers • Equipment and software providers
4. Scale up the installation of distributed renewable generation plants by developing innovative ownership and business models. Examples include remote net metering arrangements, community ownership, and pay-as-you go models.[23]	**7.2** 7.a	(M)	(M)	Accelerate	• Local communities • Government/policy-makers/regulators • Equipment and service providers
5. Facilitate the transition to smart, efficient and resilient communities by developing innovative and inclusive business models as service providers, such as street lighting, traffic lights, electric vehicle charging, energy efficiency in buildings and microgrids.	7.3 11.2 11.6	(H)	(M)	Accelerate	• Local communities • Government/policy-makers/regulators • R&D organizations • Equipment providers • Supply chain partners
6. Advance the deployment of electric mobility services[24] with low-carbon electricity by: • Accelerating the deployment of charging infrastructure, including promoting the installation of power charging stations in corporate and public premises; • Engaging with policy-makers for market support and incentive mechanisms such as time-of-use pricing and enabling regulations for electric vehicles deployment, charging infrastructure installation, and efficient charging and system operation for flexibility; • Collaborating with local governments to accelerate the deployment of electrified urban mobility, e.g., buses, taxis and ambulances; • Developing business models that provide financial benefits to consumers and operational benefits for electric utilities, e.g., smart charging and vehicle to grid.	7.3 **11.2** 11.6 12.8 13.2	(M)	(S)	Accelerate	• Transport sector, including public transport operators, transport planners, vehicle leasing companies and vehicle manufacturers • Equipment providers • Government/policy-makers/regulators • Customers • System operators

Actions	SDG targets	Level of impact on SDGs	Time to impact SDGs	Electric utility sector contribution	Stakeholders
7. Facilitate the scale up of electric heating and cooling solutions in buildings with low-carbon electricity by: • Collaborating with buildings developers and their supply chain, e.g., building service technology providers and architects; • Developing business models for energy efficiency services, and delivering temperature/comfort outcomes; • Raising awareness and strengthening trust with building occupants and managers; and • Engaging with policy-makers for incentives and standards/ regulations to support market uptake of electric heating/cooling technologies, and the participation of these technologies in demand side management.	7.3 **11.6** 13.2 13.3	(M)	(L)	Influence	• Buildings developers • Equipment providers • Building occupants and managers • Government/policy-makers/ regulators • Other energy service companies
8. Accelerate the development of low-carbon electrolysis-based hydrogen technologies[25] by: • Investing in R&D projects through joint ventures with technology providers and hydrogen users; • Collaborating with peers and the hydrogen value chain to share learnings and identify potential new partnership opportunities; and • Engaging with government to develop enabling policy.	7.2 **7.a** 9.5 13.2	(M)	(L)	Influence	• Technology providers • Government/policy-makers/ regulators • Academia
9. Improve electricity system resilience by: • Developing a clear strategy to address resilience issues; • Engaging with regulatory authorities to improve technical standards for resilient infrastructure; • Integrating disaster resilience into new asset design and existing infrastructure, covering electric utility assets as well as neighboring critical infrastructure, such as roads and water; and • Developing emergency response plans to extreme climate events, for example floods and fires.	**9.1** 9.a 13.1	(M)	(M)	Lead	• Local authorities • Local communities • Government/policymakers/ regulators • Customers • Equipment providers and infrastructure developers

ACCIONA is tracing the renewable origin of electricity

ACCIONA is using blockchain technology to trace the renewable origin of its electricity generation.

GREENCHAIN enables clients to check – in real time and from any location – that 100% of the electricity they consume is clean. The platform is a valuable tool for organizations that have established commitments to use clean and renewable energy in their sustainability policies as it increases client transparency, favors the growth of these types of contracts and promotes the use of clean energy. Its integration into ACCIONA and end-client data systems is simple and the blockchain provides ease of access, scalability, and security and privacy. The World Economic Forum has selected this platform as one of the most innovative energy solutions of the decade

GreenH2chain is the world's first platform based on blockchain technology that guarantees the renewable origin of green hydrogen. It also allows clients to verify the transportation and delivery process. Through the digital platform, ACCIONA's customers can verify and visualize the entire green hydrogen value chain in real time and from anywhere in the world.

Puertollano green hydrogen plant[26]

Iberdrola is partnering with Fertiberia – a fertilizer manufacturer – to help position Spain as an industrial leader in green hydrogen technology and enhance electricity system flexibility, resilience and efficiency.

Iberdrola and Fertiberia are building a EUR €150 million green hydrogen plant in Puertollano, Spain, which will be operational in 2021. The plant will consist of a 100 MW solar photovoltaic (PV) plant, a lithium-ion battery system with a storage capacity of 20 MWh, and a 20 MW electrolytic hydrogen production system. Fertiberia's use of the green hydrogen produced at its ammonia plant in Puertollano will lead to a 10% reduction in natural gas requirements at the plant and 39,000 tonnes of CO_2 emissions avoided each year. The initiative will also create up to 700 jobs.

In the future, Iberdrola and Fertiberia plan to expand their green hydrogen plant capacity to 800 MW through the development of three additional projects between 2023 and 2027, carried out at Fertiberia's plants in Puertollano and Palos de la Frontera.

Optimizing onsite solar PV and battery storage systems

Kansai Electric Power Company recognizes the important contribution that distributed electricity generation resources can provide to ensure secure and stable electricity supplies. In 2020, Kansai initiated a pilot study on distributed energy management with its business customers, combining onsite solar PV generation and energy storage through batteries. The businesses stored surplus power generation in batteries and used it during periods when solar panels did not generate, or generated less, electricity, such as on cloudy days or in the evening. In the pilot study, Kansai also used its Virtual Power Plant (VPP) information platform – Kanden VPP Integrated Platform System – to control onsite batteries and integrate them in a virtual power plant. This study shows the potential for combined solar PV and energy storage systems to reduce electricity bills and improve resilience to electricity outages. It also shows how this technology could also unlock the potential of customers to contribute to flexibility through demand response and virtual power plants.

In the future, Kansai plans to scale up this solution to offer more customers the benefits of optimized solar PV use, lower electricity bills and profits from participating in a VPP.

Pilot study on trading the environmental attributes of electric vehicles using blockchain technology

Kansai initiated a study to develop a blockchain-based technology to facilitate peer-to-peer (P2P) renewable electricity trading, using electric vehicles (EVs) as the electricity transfer medium. Kansai believes that peer-to-peer trading will provide customers with benefits, while at the same time improving the business case for distributed renewables, as it enables prosumers who want to sell surplus renewable electricity at a higher price to connect with consumers who want to buy electricity at a lower price.

In this study, prosumers charge EVs using electricity generated by rooftop solar PV panels (on customer homes or Kansai's demonstration site). Blockchain technologies record and manage the volume of renewable electricity stored in the EV. The EVs move to other locations and discharge the renewable electricity, with the amount of renewable electricity transferred to the consumer again reported through blockchain technology. This pilot study demonstrates the potential of blockchain technology to lower P2P renewable trading transaction costs and shows that it is possible to automate transactions between prosumers and consumers. Because of the difficulty in falsifying blockchain records, this approach also ensures the integrity of P2P trading.

Circular cities – cities of tomorrow [27]

Cities around the world are tackling complex and interrelated social, economic and environmental issues arising from drivers such as urbanization, climate change and COVID-19. Recognizing the potential of urban areas, Enel has developed a long-term vision for the circular cities of tomorrow – which leverages the electrification of energy consumption, renewable energy, network flexibility and digitalization – and is deploying solutions to holistically contribute to addressing challenges that cities are facing. The collaboration between different stakeholders – from public to private, from universities to civil society – and the circular approach of main city dimensions (e.g., energy, mobility, construction, food, etc.) will contribute to improving the competitiveness and socio-economic conditions of its inhabitants and help accelerate decarbonization and support a just transition.

This includes Enel's Urban Futurability project, launched in 2019 in São Paulo, Brazil, which will implement new solutions to digitalize the distribution network, improve network resilience and automation, and deploy advanced energy services, including electric vehicle infrastructure, smart street lighting and traffic lights.

Enel is also providing electric mobility solutions – a key element in the transition to circular cities of the future. For example, Enel has delivered integrated electric public transport projects, including the installation and management of the charging infrastructure (batteries and charging stations) and low-carbon electricity supplies. These projects have collectively deployed about 990 e-buses in Santiago (Chile), Bogotà (Colombia), Montevideo (Uruguay) and Barcelona (Spain).

3.3 ENSURE ACCESS TO AFFORDABLE, RELIABLE, SUSTAINABLE AND MODERN ELECTRICITY SERVICES FOR ALL

The latest data show that 10% of the world's population (or 789 million people) did not have access to electricity in 2018.[28] Furthermore, even in regions where electricity is available, low incomes, high electricity costs, inefficient equipment or poorly insulated homes may lead to vulnerable customers not being able to afford electricity services. The electric utilities sector can have significant impact by providing access to electricity through the deployment of distributed renewables, particularly in sub-Saharan Africa. The sector should also contribute to addressing affordability issues by implementing measures targeting vulnerable customers and collaborating with stakeholders to raise awareness and positively change electricity consumer behavior.

SDG impact	7 AFFORDABLE AND CLEAN ENERGY	12 RESPONSIBLE CONSUMPTION AND PRODUCTION	13 CLIMATE ACTION		

Actions	SDG targets	Level of impact on SDGs	Time to impact SDGs	Electric utility sector contribution	Stakeholders
1. Ensure universal access to electricity by launching new business models that scale up the deployment of distributed renewable generation in off-grid areas and areas with limited access to reliable electricity, with a focus on developing countries.	7.1 7.2 7.b	H	M	Lead	• Local communities • Customers • NGOs/international organizations • Government/policy-makers/regulators • Energy and development donors
2. Develop and implement action plans to ensure that 100% of vulnerable customers have access to affordable electricity services by: • Improving the identification of vulnerable customers; • Establishing support schemes, such as fiscal/financial incentives and education, to support and encourage low-income households to adopt energy efficiency measures in buildings; and • Collaborating with policy-makers to address the root causes of high costs and inability to pay for electricity services.	7.1 7.3	H	S	Accelerate	• Government/policy-makers/regulators • NGOs/international organizations • Local communities • Customers • Other electric utilities • Energy and development donors • Local industry players and suppliers • Finance/investors
3. Improve electricity consumer behavior by collaborating with other utilities, NGOs and public institutions to raise awareness of electricity consumption patterns, energy efficiency and potential cost savings.	7.3 12.8 13.3	L	M	Accelerate	• Customers • NGOs • Government/policy-makers/regulators • Energy and development donors

Electricity for All program[29]

The Electricity for All program is Iberdrola's response to calls from the international community to ensure universal access to reliable and modern energy services (linked to SDG 7.1), with a focus on sustainable electrification activities in emerging and developing countries, and vulnerable people in developed countries.

Since its launch from 2014 through 2019, the program has contributed to providing 7 million people in Latin America and Africa with access to electricity through three primary areas of activity: financing projects through equity investments, developing electrification projects in countries where Iberdrola is present, and partnering with NGOs and corporate volunteering to develop electrification projects with a high social impact. Iberdrola has set a target to reach 16 million beneficiaries in developing countries by 2030.

In addition, the Electricity for All program provided electricity access to 2.5 million vulnerable people in 2019 in developed countries through agreements and projects. The financial support mechanisms aim to achieve electricity access and therefore access to its products for economically vulnerable consumers.

Investment in Access to Energy companies[30]

In 2018, EDP defined new strategic guidelines and a renewed vision for its Access to Energy (A2E) program: to promote sustainable energy for all, as a profitable A2E operator in off-grid emerging markets using renewable energies, with a focus on investing in A2E companies, complemented with corporate social responsibility (CSR) activities. These investments include:

- USD $500,000 million investment in SOLshare, a Bangladeshi company that has developed a new solution that facilitates the creation and management of microgrids to bring solar energy to homes without access to the grid.

- USD $2.4 million in SolarWorks!, a Dutch company selling decentralized solar energy solutions with a pay-as-you-go business model for off-grid domestic and business customers in Mozambique and Malawi. Its key product line is solar home systems, which provide people with access to energy for the first time and cover needs such as lighting and charging mobile phones; larger systems are also able to offer television and refrigeration.

- USD $3 million in Rensource, a holding company bringing together clean energy-based, off-grid micro-utilities in Nigeria. The company provides clean and reliable electricity to commercial clusters and small and medium-sized enterprises.

Becoming a minority shareholder in A2E companies provides value to EDP as it enables the company to improve local knowledge in new markets and leverage opportunities for new conventional investments. At the same time, it reinforces EDP's reputation.

Tata Power Club Enerji[31]

Electricity conservation is a key measure to reduce CO_2 emissions, one that is particularly important in India due to rapidly growing electricity demand. Recognizing the value of schools and children in promoting behavior change, Tata Power launched India's first energy and resource conservation club – Tata Power Club Enerji – in 2007. The program educates school students on the importance of energy and resource conservation, how to understand electricity bills, simple conservation tips, and moral and civic values. In turn, students raise awareness of these issues in their families and neighborhoods, with the most engaged students conferred the title of Energy Champion and Energy Ambassador. Since its launch, the program has reached over 533 schools throughout India, with 360,000 Energy Champions and 410,000 Energy Ambassadors. The program has educated over 26.4 million citizens on energy conservation, leading to a cumulative reduction in electricity consumption of 31.8 GWh and 28,000 tonnes of CO_2 emissions avoided from 2007 to 2020.

3.4 ATTRACT AND RETAIN A DIVERSE AND INCLUSIVE WORKFORCE

A diverse workforce is a key driver to innovation and the development of inclusive customer solutions. However, the electric utilities sector is currently a male-dominated sector, with women facing not only barriers to entry, but also barriers to career advancement. A study by the International Renewable Energy Agency (IRENA) found that women represent only 32% of full time employees in the field of renewable energy, despite representing 48% of the global workforce,[32] while EY's Women in Power and Utility Index found that women make up only 15% of senior management in electric utilities.[33] Barriers to gender equality include perception of gender roles, cultural and social norms, and lack of flexibility in the workplace.[34]

In addition to gender, inequalities in the workplace may also arise due to age, disability, race, sexual orientation, ethnicity, origin, religion or economic or other status. The electric utilities sector should enhance the sector's attractiveness by implementing policies that promote greater diversity and inclusiveness and eliminate any form of discrimination.

SDG impact	5 GENDER EQUALITY	8 DECENT WORK AND ECONOMIC GROWTH	10 REDUCED INEQUALITIES		
Actions	**SDG targets**	**Level of impact on SDGs**	**Time to impact SDGs**	**Electric utility sector contribution**	**Stakeholders**
1. Adopt policies to promote greater diversity, inclusion, equal opportunities and equal pay for all employees irrespective of age, gender, disability, race, ethnicity, origin, religion or economic or other status.	5.5 **8.5** 8.8 10.2 10.3 10.4	(H)	(S)	Lead	• Employees • Supply chain • Contractors • Customers • Government
2. Ensure that 100% of employees and contractors across the organization earn a living wage, and scale impact by including this as a criterion in supplier contracts.	**8.5**	(H)	(S)	Lead	• Employees • Suppliers • Contractors
3. Provide women with equal opportunities for leadership and learning at all levels of the organization's management.	5.5 10.2 10.3	(M)	(S)	Lead	• Employees
4. Champion occupational health, safety and well-being, and mental health by: • Establishing rigorous workplace policies; and • Monitoring and reporting of performance.	**8.8** 10.4	(M)	(S)	Lead	• Supply chain • Employees • Contractors • Customers

Yo elijo cuidarme (I choose to take care of myself)[35]

Celsia launched the Yo elijo cuidarme (I choose to take care of myself) initiative to transform the company's health and safety culture by instilling safety as a habit for employees and contractors. The initiative is based on three pillars: evaluating health and safety risks and implementing best practices, adopting a vigilant and proactive attitude to preventing incidents, and establishing safety as a collective responsibility with all employees demanding and promoting it.

As part of the initiative, Celsia conducted discussions with different teams in the company to identify occupational health and safety (OHS) improvements. Following these discussions, starting in 2016, Celsia delivered training programs focusing on observing safety behavior, operational discipline, and tools for incident analysis investigation to all 2,131 employees and 100% of its suppliers. As a result of the program, in 2020 Celsia achieved a zero-fatality rate for employees

and contractors and a 12.14% reduction in the frequency and 11.91% reduction in the severity of accidents compared to the previous year. In the long term, Celsia aims to set the benchmark in the energy sector in terms of OHS in the countries where it has operations by applying data science to develop predictive analyses of health and safety indicators to maintain zero fatalities and continue to reduce the frequency and severity rate in both employees and contractors.

Supporting women in engineering

CLP needs people from diverse backgrounds who want to make a difference and help transform the business. As part of this, the company has committed to increasing the number and developing a strong network of women engineers throughout the group. CLP launched a mentoring program in Hong Kong in 2015 to provide opportunities for women engineering students to better understand the engineering profession and the power industry,

and to support them in pursuing a career in engineering. To date, over 230 women have participated in the program as mentees and mentors, with over 80% of mentees indicating an increased interest in an engineering career. In 2020, four mentees joined CLP as engineering graduate trainees upon their graduation. Through the program, women engineers at CLP also developed their coaching skills and expanded their professional and personal networks.

CLP recognizes that a lack of peer group support is one of the key reasons why women leave engineering careers. To address this issue, it organizes group-wide networking events for women engineers annually, bringing together over 20 participants to exchange ideas, gain insights into renewables technologies, innovation and business models, and attend leadership training.
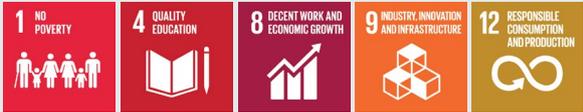
3.5 LEAVE NO ONE BEHIND IN THE ENERGY TRANSITION AND RESPECT HUMAN RIGHTS

The transition to a low-carbon electricity system will have a substantial impact on workers and communities whose livelihoods rely on fossil fuel-based generation, including its supply chains. While the overall employment outcomes of the energy transition will likely be positive at a global level, with 42 million jobs from the renewable energy sector alone by 2050,[36] these gains in low-carbon energy jobs do not necessarily match employment losses – in terms of skills, locations and availability.

The electric utilities sector needs to ensure a just transition that leaves no one behind by engaging with the workforce, supply chains, communities and other relevant stakeholders on the anticipated impacts of the transition to a low-carbon electricity system, including potential challenges and opportunities. Electric utilities can also empower workers and communities to benefit from the transition through, for instance, providing support to affected workers and developing shared

value business models that benefit communities as well as business.

Low-carbon electricity systems still face human rights challenges, such as land grabs, poor labor conditions, dangerous working conditions, and harm to indigenous peoples' lives and livelihoods. Companies have a responsibility to respect and remedy human rights and ensure decent work for their employees and workers in their value chain.

SDG impact

1 NO POVERTY | 4 QUALITY EDUCATION | 8 DECENT WORK AND ECONOMIC GROWTH | 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE | 12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Actions	SDG targets	Level of impact on SDGs	Time to impact SDGs	Electric utility sector contribution	Stakeholders
1. Achieve a just transition by: • Engaging in dialogue with relevant stakeholders in the planning phase of energy transition activities; • Developing and implementing action plans to reduce impacts on vulnerable communities and supply chains; and • Actively assisting the workforce and contractors to upskill and re-skill for future opportunities.	4.4 **8.2** 8.3 8.5	H	M	Lead	• Employees • NGOs • Government/policy-makers/regulators • Local communities
2. Provide communities with co-benefits from electric utility projects through shared value business models that include: • Providing direct employment; • Prioritizing local suppliers; • Building skills; and • Sharing the benefits of infrastructure developed through the project.	1.4 4.4 8.2 **8.3** 8.5 9.1	H	S	Lead	• NGOs • Local communities • Government/policy-makers/regulators
3. Develop and publish a human rights policy that establishes a commitment to respect human rights and operationalize the United Nations Guiding Principles on Business and Human Rights (UNGPs) and encourage this throughout the supply chain by: • Adopting policies that ensure respect for human rights, with particular emphasis on salient human rights issues for the sector, including: > Engaging stakeholders and providing appropriate compensation for use of land, water and natural resources; > Respecting access and tenure rights of Indigenous Peoples and communities through implementation of best practices such as participatory planning in line with the principles of free prior informed consent (FPIC); and > Adhering to labor rights policies in line with the International Labor Organization's fundamental conventions. • Conducting human rights due diligence on own operations and the supply chain; and • Establishing grievance mechanisms and providing for or cooperating in providing remedy for adverse impacts.	8.7 8.8 12.6	M	M	Lead	• Employees • Employee unions • Suppliers • NGOs

Case studies illustrating actions

Ensuring local communities thrive through the redevelopment of a thermal power plant site[37]

In April 2016, EDF closed its 1,400 MW Aramon heavy fuel oil thermal power station located in the Gard department (France) and engaged in dialogue with local communities to define a roadmap to sustainably redevelop the site and respond to the needs of the wider communities in the region. This has resulted in the launch of Cleantech Vallée – a public-private partnership located on the Aramon site that supports the development of clean technology projects in the wider region and involving other large industrial companies, elected representatives and entrepreneurs. Cleantech Vallée also hosts the Cleantech Booster – an accelerator to support the development of start-ups and small to medium-sized cleantech businesses.

In September 2019, EDF also commissioned a 5 MW solar photovoltaic (PV) plant. Consisting of over 14,000 modules, the plant generates the equivalent of the combined electricity consumption of 3,500 people. EDF encouraged local ownership of the asset by creating a crowdfunding campaign for EUR €200,000 reserved for local residents who now own their solar plant.

Celsia Solar Yumbo[38]

Celsia was the first company to harness Colombia's abundant solar resource potential at scale by developing and commissioning the country's first utility-scale solar farm, Celsia Solar Yumbo, in September 2017. Celsia built the solar farm on a site that hosted the Termoyumbo coal-fired power plant, which had closed two decades earlier. The construction phase generated more than 110 jobs and created social value through the recruitment of 60% of the skilled labor force directly from the region.

The solar farm has an installed capacity of 9.8 MW and generates around 16.5 GWh annually, equivalent to the electricity consumption of 8,000 households. Over its 25-year lifetime, the plant will avoid 160,000 metric tons of CO_2 emissions. The plant consists of 35,000 photovoltaic modules and 9 inverters, which occupy 18 hectares of land.

3.6 PROTECT, RESTORE AND PROMOTE SUSTAINABLE USE OF ECOSYSTEMS AND DRIVE NET BIODIVERSITY GAINS

Electric utilities can have a substantial impact on land, soil, freshwater and marine ecosystems, as their activities can contribute to some of the direct drivers of biodiversity and ecosystem change, including land-use change, climate change and air pollution.[39] The impacts arise from the supply chain, including land and water use for raw mineral and fossil fuel extraction, as well as in generation activities, for example, land use related to utility scale solar PV, water withdrawals for thermal power plant cooling systems and alterations to the watershed from hydroelectric plants.

The sector can work together to protect, restore and promote the sustainable use of ecosystems, and scale up impact by supporting their supply chain to take action. Halting the rapid rate of biodiversity loss is particularly urgent; left unchecked, around 1 million plant and animal species face extinction within decades.[40] The sector also has potential to improve the integration and management of biodiversity and ecosystems through improved knowledge capture and sharing, collaboration across sectors to assess and value impacts, developing tools, improved target setting, and risk management activities.

SDG impact	6 CLEAN WATER AND SANITATION	14 LIFE BELOW WATER	15 LIFE ON LAND

Actions	SDG targets	Level of impact on SDGs	Time to impact SDGs	Electric utility sector contribution	Stakeholders
1. Adopt water stewardship strategies that are: • Site specific and reflective of the relevant electric utility technology; • Appropriate to local watershed conditions, including withdrawal quantity and discharge quality thresholds; and • Account for corporate risk exposure.	6.4 **6.5** 6.6	H	M	Lead	• Local and indigenous communities • Academia • NGOs • Government/policy-makers/regulators • Local and regional government • Land owners
2. Mitigate biodiversity risks and have a net-positive impact by: • Conducting biodiversity risk assessments to understand material issues with positive and/or negative impacts; • Developing and implementing biodiversity action plans in consultation with local communities and scientists; and • Developing a sectoral approach to setting science-informed biodiversity targets for net biodiversity gain.	15.1 **15.5**	H	M	Lead	• Local and indigenous communities • NGOs • Biodiversity experts from academia and scientific institutions
3. Improve and increase access to knowledge and data on the local environment, ecosystems and biodiversity by: • Developing/updating appropriate data standards, and management mechanisms with stakeholders; • Engaging with local communities and indigenous peoples to capture knowledge; and • Sharing knowledge across sectors using intelligent data solutions.	6.5 14.2 **15.1** 15.5	L	M	Influence	• Employees • Employee unions • Suppliers • NGOs
4. Collaborate within the sector, NGOs and the scientific community to agree to – and widely adopt – approaches to measure, value and manage direct and indirect impacts to land, soil, air and water.	6.5 14.2 **15.1** 15.5 15.9	L	M	Accelerate	• Academia • R&D organizations • Government/policy-makers/regulators

Romanche-Gavet hydroelectric plant rehabilitation and upgrade[41]

EDF commissioned the 97 MW Romanche-Gavet hydroelectric plant at the end of 2020. The plant replaces six plants and five dams built early in the 20th century and increases power output by 40% along the same stretch of the Romanche River in southeastern France. The new plant comprises a single new dam and a new underground plant that blends into the Romanche valley landscape while preserving the environment and biodiversity.

The plant enhances the water quality in the bypassed stretch of the river compared to its pre-project condition; the removal of five dams has created a sediment flow regime that is similar to the natural flow. The dam includes a fish ladder and a downstream device that adapts the flow of the stream to the needs of trout and sculpins – the two most common fish species located in the river. As part of the rehabilitation project, EDF restored over 3 km of dam banks covering 10 hectares of land through the planting of local species gathered from within a 25-km radius of the plant.

The Forest Germplasm program [42]

The Forest Germplasm program, led by Eletronorte, an Eletrobras subsidiary, aims to manage and conserve native forest species and contribute to reforestation, mainly in the lower Tocantins region in Pará, Brazil, focusing on areas surrounding the lake region of Eletronorte's Tucuruí Hydroelectric Plant.

The program provides seeds and seedlings to the community and institutions such as city halls, environmental agencies, civil society organizations, associations, research institutes, and universities. In 2019, the program donated 1,315,194 seeds and 27,723 seedlings, equivalent to 197 and 16 reforested hectares, respectively. The program also provides an income stream to the indigenous Parakanã community, which sells the seeds of commercially important species, such as mahogany, tatajuba and Brazil nuts. In addition to providing seeds, the Forest Germplasm program maintains a genetic bank with seeds from more than 280 forest species and hosts a seed analysis laboratory.

Mahseer Conservation in the Western Ghats biodiversity hotspot

The Western Ghats in India is a biodiversity hotspot with a high number of endemic plant and animal species. However, the area has been facing pressure from human activities. Recognizing the importance of maintaining biodiversity, Tata Power has undertaken a series of initiatives since 1975 to ensure effective biodiversity management within and beyond the scope of its business operations in the Western Ghats.

Tata Power's flagship program is the Mahseer Conservation Program. Launched five decades ago, it aims to conserve this endangered species, improve hydropower lakes, and generate employment in local villages. The project gained momentum through the breeding and reintroduction of this fish in its natural ecosystem. To date, the program has produced millions of fish seeds and distributed them to various states in India through collaboration with state fishery departments. In addition, Tata Power has trained over 300 fisheries scientists from India and held five workshops to facilitate knowledge exchange with international experts and to move the conservation agenda into the mainstream.

Tata Power also conducted a comprehensive assessment of the humpbacked mahseer in the Kaveri river basin. This has enabled its scientific naming and inclusion in the International Union for Conservation of Nature's (IUCN) Red List as a critically endangered species.

3.7 ACCELERATE THE TRANSITION TO A CIRCULAR ELECTRIC UTILITY SECTOR

The energy transition will contribute to significant growth in demand for specific minerals and materials that are essential for the manufacture of some technologies. The process of converting minerals to materials is energy- and emissions-intensive. In addition, the sector faces challenges in the end-of-life management of equipment and infrastructure, spanning the value chain from generation, transmission and distribution infrastructure to end-consumer equipment and appliances. Electricity generators will increasingly need to manage waste streams from retired fossil fuel generation plants displaced by low-carbon generation technologies.

The latter face their own share of challenges, for example, related to recycling wind turbine blades, solar PV panels, dam removals, and safe long-term management of nuclear waste.

Agreement on and widespread adoption of circular economy principles will be key to minimizing the material and climate footprint, and the related environmental and social impact of manufacturing activities. In particular, embedding environmental principles in design at early stages of product innovation is essential to designing out waste and ensuring product reuse, repurposing or recycling.

Circular economy principles are equally important to managing waste streams originating from existing infrastructure and equipment at the end of their life across the electric utility value chain.

Collaboration across the entire value chain and cross-sectoral partnerships will be essential for the sector to deliver impact at scale. For example, electric utilities can collaborate with electric vehicle manufacturers and battery refurbishment companies to design batteries that facilitate second-life applications in stationary energy storage.

SDG impact	**8** DECENT WORK AND ECONOMIC GROWTH	**9** INDUSTRY, INNOVATION AND INFRASTRUCTURE	**12** RESPONSIBLE CONSUMPTION AND PRODUCTION

Actions	SDG targets	Level of impact on SDGs	Time to impact SDGs	Electric utility sector contribution	Stakeholders
1. Improve circularity performance by: • Aligning on a standardized definition and methodology for evaluating circularity performance (e.g., leverage WBCSD's Circular Transition Indicators (CTI) workstream); • Disclosing circularity performance to drive improvements; and • Assessing circularity potential as part of procurement processes.	**12.2** 12.5 8.4	(L)	(M)	Lead	• Customers • Waste management sector • Minerals extraction companies • Manufacturing sectors
2. Accelerate the transition to a circular electric utility sector by: • Developing a market and supply chain strategy to address barriers related to scale, demand, logistics and skills; • Collaborating with equipment and infrastructure manufacturers to embed design for environment principles at early stages of product innovation; • Developing new business models that improve circularity, e.g., service-based contracts (with suppliers and/or customers), aligned with producer responsibility that incentivize suppliers to take back equipment after use; • Developing partnerships with waste management companies and potential end-users of waste to find new ways to reuse products; and • Investing in research and innovation for new technological solutions to recycle products at the end of their life and recover valuable materials and minerals	8.4 9.4 **12.2** 12.5	(H)	(L)	Lead	• Equipment providers • Government/policy-makers/regulators • Customers • Manufacturing sectors • Waste management sector

3. Ensure sustainable consumption from the electric utility supply chain of critical minerals needed for the low-carbon economy transition by: • Reducing the use of these raw minerals through innovation to find suitable alternatives and improved design; • Requesting environmental product declarations from suppliers and using these in procurement decisions; • Recovering and recycling critical minerals from products at the end of their life; and • Supporting the mitigation of environmental, social and governance issues in high-risk areas.	12.2	**M**	**L**	Accelerate	• Equipment providers • Mining and materials companies • Government/policy-makers/regulators • Local communities • NGOs

Case studies illustrating actions

Repurposing biomass slag

ACCIONA operates three biomass plants in Spain with a total installed capacity of 61 MW. The electricity generated is carbon neutral (Scope 1 and 2 emissions) and classified as environmentally sustainable under the EU taxonomy for sustainable activities. However, biomass combustion generates slag – a waste stream that companies should divert from landfill and recycled.

To improve the circularity of this technology, ACCIONA conducted R&D studies to identify the best ways to repurpose biomass slags generated in its operations. These studies identified two approaches:

• Using slag to restore disused uranium mines in Salamanca (Spain) by incorporating slag-based "techno-soils". These techno-soils neutralize acidic water in the mines and provide nutrients to the soil.

• Using slag in cement manufacturing. Slag provides silica and calcium, enabling a reduction in the use of raw materials such as limestone and lowering the emissions intensity of cement production.

Since 2018, ACCIONA has managed over 10,000 metric tons of biomass slag through these initiatives.

Solar panel take-back scheme

End-of-life solar PV panels create large volumes of waste and separating their different components for subsequent recycling is not easy.

Organizations are still developing technologies for the full recycling of solar panels for rollout to meet market needs.

CLP identified that used solar panels would be a key environmental impact from its Jinchang solar power plant in Gansu province, China. During the Environmental Impact Assessment

(EIA) stage of the project, there was a recommendation that the company recycle all spent or damaged solar panels rather than disposing of them. As a result, CLP detailed the handling of these panels in the environmental management system and set targets accordingly.

Manufacturers currently take back all spent/damaged solar panels from the Jinchang solar power plant.

Under the manufacturer's take-back scheme, it dismantles the panels: it reuses the aluminum frames, which account a large part of the waste, and recovers other components, such as silicon and silver embedded in the panels, as far as possible. Since the launch of the scheme in 2017, manufacturers have taken back more than 2,000 solar panels, about 40 metric tons, reusing and recycling about 80% of materials.

(4) Call to action

④ Call to action

This Roadmap lays out seven impact opportunities and a series of tangible actions for the electric utilities sector to maximize its contribution to the SDGs in the run up to 2030. We have categorized the actions by their potential level of impact and the likely timeframes for impact achievement. They provide clear pathways that enable the sector to generate value and build resilience by better anticipating customer needs, capturing new market opportunities and managing exposure to future risks, while at the same time maximizing their contributions to the SDGs.

The success of the Roadmap is dependent on collaborative action: all impact opportunities and actions need inclusive partnerships and collaborations with sector peers and other stakeholders, including members of the value chain, civil society and academia, to achieve high impact. We welcome interested parties to contact WBCSD with ideas on how to align projects or strengthen partnerships to accelerate SDG impact for electric utilities.

4.1 ASSESSING PROGRESS

In the Annex we present indicators that the electric utilities sector can use to assess the degree to which they are fulfilling their potential to realize the impact opportunities in this Roadmap. We may revisit these indicators and build upon them in the future as impact measurement, reporting frameworks and best practices evolve. We encourage individual electric utilities to consider setting targets against these indicators and reporting their progress on implementation of the impact opportunities. We also encourage the sector's supply chain partners to consider adopting, as appropriate, similar indicators and targets to scale up action.

Companies seeking to adopt further indicators to measure their contribution to the SDG Agenda can refer to the SDG Compass's Inventory of Business Indicators,[43] which maps existing business indicators drawn from reporting standards against the SDGs.

4.2 LEVERAGING WBCSD PROGRAMS AND PROJECTS

WBCSD's Energy Solutions project is advancing several of the actions identified in this Roadmap. Its workstreams are:

- Sustainable Energy Supply supports energy companies to transition their strategies to achieve positive impact on the SDGs and emission reductions in line with 1.5°C. We do this by convening a global sustainability platform of energy companies that enables peer-to-peer exchanges and develops best practices, leading to the collaborative creation of tools and guides for the industry.

- Scaling Renewable Electricity supports electricity buyers and suppliers to deploy renewable electricity solutions. Through peer-to-peer knowledge sharing and exploration of innovative solutions, we increase our members' understanding of and ability to tackle barriers to the uptake of renewable electricity (impact opportunity 1, action 1 and 3);

- Heating & Cooling supports companies to deploy renewable solutions for heat of up to 400°C, as well as cooling, across various use cases and sectors. Through knowledge sharing and capacity building on commercial, financing and policy levers, we empower our members to implement renewable heating and

cooling solutions and mobilize investment from the financial sector (impact opportunity 2, action 7); and

- Low-carbon Hydrogen supports companies in scaling up the development of low-carbon hydrogen technologies. We do this by promoting a technology-neutral low-carbon hydrogen standard and encouraging the creation of enabling policies for low-carbon hydrogen globally (impact opportunity 2, action 8).
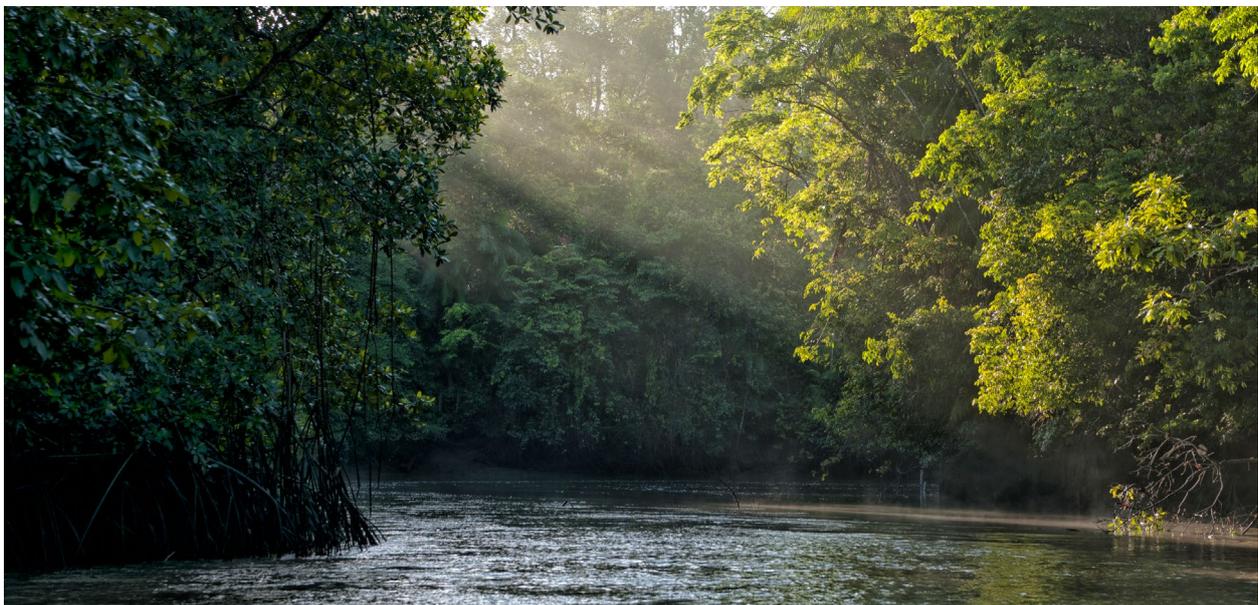
Other WBCSD programs and projects are also supporting the realization of the Roadmap's impact opportunities and actions, including:

- **Factor10**,[44] which tackles both systemic (metrics and policy) and value-chain specific (built environment and bioeconomy) barriers towards a circular transition (impact opportunity 7);

- **Mobility Decarbonization**, which seeks to unlock the value at the intersection of mobility, energy and real estate by creating and demonstrating a framework for faster deployment of viable charging infrastructure and efficient electric fleet management (impact opportunity 2, action 6); and

- **Tackling Inequality**, which seeks to explore and articulate the multi-faceted role and responsibility of business in tackling inequality and renewing the social contract for the 21st century (impact opportunity 5).

4.3 ANTICIPATING FUTURE DEVELOPMENTS

To ensure the electric utility sector's contribution to the SDG agenda remains relevant and partnerships continue to focus on the areas where action is most needed, implementation of the Roadmap requires the monitoring of emerging trends and developments with respect to policy and other global efforts, which may influence the opportunities and actions outlined in this Roadmap. Our electric utilities members commit to conducting a review of the progress made on the SDGs and refreshing the impact opportunities and actions of the Roadmap by 2026.

Annex: Suggested indicators to assess progress

IMPACT OPPORTUNITY	SUGGESTED INDICATOR	RELATED SDG INDICATOR
1. Decarbonize electricity generation in line with limiting global warming to 1.5°C	% of low-carbon generation in total electricity generation	7.2.1 Renewable energy share in the total final energy consumption
	GHG intensity of electricity generation (gCO2e/kWh)	9.4.1 CO_2 emission per unit of value added
2. Enhance electricity system flexibility, resilience and efficiency	Expenditure on electricity network infrastructure as a proportion of GVA (USD per GVA) 9.a.1 Total official international support (official development assistance plus other official flows) to infrastructure	9.a.1 Total official international support (official development assistance plus other official flows) to infrastructure
3. Ensure access to affordable, reliable, sustainable and modern electricity services for all	Percentage of population unserved in licensed distribution areas, broken down by population in rural areas and urban areas	7.1.1 Proportion of population with access to electricity
	Estimated electricity saved through energy efficiency programs targeted at residential customers as a proportion of total residential electricity sales	7.3.1 Energy intensity measured in terms of primary energy and GDP
4. Attract and retain a diverse and inclusive workforce	Percentage of women in managerial positions	5.5.2 Proportion of women in managerial positions
	Lost time injury frequency rate	8.8.1 Fatal and non-fatal occupational injuries per 100,000 workers, by sex and migrant status
5. Leave no one behind in the energy transition and respect human rights	Percentage of operations with implemented local community engagement, impact assessments and/or development programs	1.4.1 Proportion of population living in households with access to basic services
	Human Rights Due Diligence Score of the Corporate Human Rights Benchmark Methodology[45]	None
6. Protect, restore and promote sustainable use of ecosystems and drive net biodiversity gains	Training hours provided that support skill development related to the energy transition	None
	Total water withdrawal from areas with medium, high or extreme water stress per unit of GVA (m^3 per GVA)	6.4.2 Level of water stress: freshwater withdrawal as a proportion of available freshwater resources
	% of land use from own operations that has resulted in the conversion of natural ecosystems	None
		Adapted from the Science-Based Targets for Nature Initial Guidance[46]
7. Accelerate the transition to a circular electric utility sector	% circular inflow	12.5.1 National recycling rate, tons of material recycled
	% circular outflow	Adapted from WBCSD's Circular Transition Indicators[47]

Endnotes

1 United Nations (2015). Transforming our World: the 2030 Agenda for Sustainable Development. Available at: https://sustainabledevelopment.un.org/post2015/transformingourworld.

2 United Nations (2020). The Sustainable Development Goals Report. Available at: https://unstats.un.org/sdgs/report/2020/The-Sustainable-Development-Goals-Report-2020.pdf.

3 Business and Sustainable Development Commission (2017). Better Business, Better World.

4 United Nations (2018). Remarks to the World Future Energy Summit. Available at: https://www.un.org/sg/en/content/sg/speeches/2016-01-18/remarks-world-future-energy-summit.

5 World Meteorological Organization (2020). 2020 on track to be one of three warmest years on record. Available at: https://public.wmo.int/en/media/press-release/2020-track-be-one-of-three-warmest-years-record.

6 World Meteorological Organization (2020). 2020 on track to be one of three warmest years on record. Available at: https://public.wmo.int/en/media/press-release/2020-track-be-one-of-three-warmest-years-record.

7 International Energy Agency (2020). World Energy Outlook 2020. Available at: https://www.iea.org/reports/world-energy-outlook-2020.

8 Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) (2020). Global Assessment Report on Biodiversity and Ecosystem Services: Summary for Policymakers Available at: https://ipbes.net/sites/default/files/2020-02/ipbes_global_assessment_report_summary_for_policymakers_en.pdf.

9 While some electric utilities have a natural gas distribution and sales business, we did not include the potential for this activity to contribute to the SDGs in the scope of this Roadmap.

10 International Energy Agency (2020). World Energy Outlook 2020. Available at: https://www.iea.org/reports/world-energy-outlook-2020.

11 WBCSD (2018). SDG Sector Roadmaps. Available at: https://www.wbcsd.org/Programs/People/Sustainable-Development-Goals/SDG-Sector-Roadmaps/Resources/SDG-Sector-Roadmaps.

12 For further information on how the electric utilities sector can advance each of the 17 goals, see: Sustainable Development Solutions Network (2019). Mapping the Renewable Energy Sector to the Sustainable Development Goals: An Atlas. Available at: https://irp-cdn.multiscreensite.com/be6d1d56/files/uploaded/190603-mapping-renewables-report-interactive.pdf.

13 Intergovernmental Panel on Climate Change (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. Available at: https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_SPM_version_report_LR.pdf.

14 International Energy Agency (2020). World Energy Outlook 2020, Sustainable Development Scenario. Available at: https://www.iea.org/reports/world-energy-outlook-2020.

15 Intergovernmental Panel on Climate Change (IPCC) (2019). Chapter 2: Mitigation Pathways Compatible with 1.5°C in the Context of Sustainable Development. Available at: https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_Chapter2_Low_Res.pdf. International Energy Agency (2020). World Energy Outlook, Sustainable Development Scenario. Available at: https://www.iea.org/reports/world-energy-outlook-2020.

16 Unabated fossil fuel power generation are fossil fuel generation plants, e.g., coal and natural gas that operate without emissions abatement technologies such as carbon capture, use and storage (CCUS).

17 Low-carbon technologies are those that generate electricity with close to zero GHG emissions, such as renewable and nuclear generation technologies.

18 Intergovernmental Panel on Climate Change (IPCC) (2019). Chapter 2: Mitigation Pathways Compatible with 1.5°C in the Context of Sustainable Development. Available at: https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_Chapter2_Low_Res.pdf.

19 EDP (2020). WindFloat Atlantics. Available at: https://www.edp.com/en/innovation/windfloat.

20 CHESF (Centro de Referencia em Energia Solar de Petrolina) (n.d.). Available at: https://www.chesf.gov.br/ImagensNoticias/Material_Institucional_CRESP.pdf. CHESF (Centro de Referencia em Energia Solar de Petrolina) (2019). Chesf energiza Usina Solar Flutuante. Available at: https://www.chesf.gov.br/_layouts/15/Chesf_Noticias_Farm/Noticia.aspx?IDNoticia=373.

21 International Energy Agency (2020). World Energy Outlook 2020 Sustainable Development Scenario. Available at: https://www.iea.org/reports/world-energy-outlook-2020.

22 International Energy Agency (2020). World Energy Outlook 2020. Available at: https://www.iea.org/reports/world-energy-outlook-2020.

23 International Renewable Energy Agency (IRENA) (2019). Innovation Landscape for a Renewable Powered Future: Solutions to Integrate Variable Renewables. Available at: https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/Feb/IRENA_Innovation_Landscape_2019_report.pdf.

24 We define electric mobility services as passenger transport services, e.g., private vehicle, buses, taxis, delivered by electric drive train vehicles, including both battery electric and hydrogen fuel cell vehicles.

25 Low-carbon electrolysis-based hydrogen technologies are technologies that produce hydrogen through electrolysis powered by close-to-zero emissions electricity, e.g., renewable or nuclear power.

26 Iberdrola (2020). Iberdrola will construct the largest green hydrogen plant for industrial use in Europe. Available at: https://www.iberdrola.com/about-us/lines-business/flagship-projects/puertollano-green-hydrogen-plant.

27 Enel (2019). Circular Cities: Cities of Tomorrow. Available at: https://www.enel.com/content/dam/enel-com/documenti/media/circular-cities_october2019.pdf.

28 International Energy Agency, IRENA, UN Statistics Division, World Bank and World Health Organization (2020). Tracking SDG7L The Energy Progress Report 2020. Available at: https://trackingsdg7.esmap.org/data/files/download-documents/tracking_sdg_7_2020-full_report_-_web_0.pdf.

29 Iberdrola (n.d.). We are bringing electricity to more than 16 million people who currently do not have it. Available at: https://www.iberdrola.com/social-commitment/disadvantaged-groups/electricity-all-programme.

30 EDP (2018). Energy Access Fund. Available at: https://www.edp.com/en/access-energy-fund-program#a2e-fund-program.

31 Tata Power (2021). Club Enerji. Available at: https://www.clubenerji.com/.

32 International Renewable Energy Agency (IRENA) (2019). Renewable Energy: A Gender Perspective. Available at: https://irena.org/-/media/Files/IRENA/Agency/Publication/2019/Jan/IRENA_Gender_perspective_2019.pdf.

33 EY (2019). Could gender equality be the innovation boost utilities need? Available at: https://www.ey.com/en_gl/women-power-utilities/could-gender-equality-be-the-innovation-boost-utilities-need.

34 International Renewable Energy Agency (IRENA) (2019). Renewable Energy: A Gender Perspective. Available at: https://irena.org/-/media/Files/IRENA/Agency/Publication/2019/Jan/IRENA_Gender_perspective_2019.pdf.

35 Celsia (2019). Seguridad y Salud en el Trabajo, Available at: https://reporteintegrado2019.celsia.com/cultura-celsia/seguridad-y-salud-en-el-trabajo/.

36 International Renewable Energy Agency (IRENA) (2020). Measuring the Socio-Economics of Transition: Focus on Jobsl. Available at: https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2020/Feb/IRENA_Transition_jobs_2020.pdf.

37 EDF (2019). Le groupe EDF inaugre la centrale solaire photovoltaique d'Aramon et le "Cleantech Booster", un accelerateur pour les entreprises innovantes des cleantech. Available

at: https://www.edf.fr/groupe-edf/espaces-dedies/journalistes/tous-les-communiques-de-presse/le-groupe-edf-inaugure-la-centrale-solaire-photovoltaique-d-aramon-et-le-cleantech-booster-un-accelerateur-pour-les-entreprises-innovantes-des-cleantech.

38 Celsia (n.d.). Solar Farms. Available at: https://www.celsia.com/en/SolarFarms/.

39 Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) (2020). The global assessment report on Biodiversity and Ecosystem Services: Summary for Policymakers. Available at: https://ipbes.net/sites/default/files/2020-02/ipbes_global_assessment_report_summary_for_policymakers_en.pdf.

40 Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) (2020). The global assessment report on Biodiversity and Ecosystem Services: Summary for Policymakers. Available at: https://ipbes.net/sites/default/files/2020-02/ipbes_global_assessment_report_summary_for_policymakers_en.pdf.

41 EDF (2020). EDF commissions its new Romanche-Gavet hydroelectric plant (Isere). Available at: https://www.edf.fr/en/the-edf-group/dedicated-sections/journalists/all-press-releases/edf-commissions-its-new-romanche-gavet-hydroelectric-plant-isere.

42 Eletrobras Eletronorte (2019). In Tucurui, Eletronorte produces 6 thousand seedlings of native species per month. Available at: http://agencia.eletronorte.gov.br/site/eletronorte/2019/07/08/em-tucurui-eletronorte-produz-6-mil-mudas-de-especies-nativas-por-mes/.

43 Eletrobras Eletronorte (2020). At Eletronorte, environmental sustainability is a possible reality. Available at: http://agencia.eletronorte.gov.br/site/eletronorte/2020/06/22/na-eletronorte-sustentabilidade-ambiental-e-uma-realidade-possivel/.

44 GRI, UN Global Compact and WBCSD (2015). SDG Compass Inventory of Business Indicators. Available at: https://sdgcompass.org/business-indicators/.

45 WBCSD (n.d.). Factor 10. Available at: https://www.wbcsd.org/Programs/Circular-Economy/Factor-10.

46 Corporate Human Rights Benchmark (2020). CHRB Methodology. Available at: https://www.corporatebenchmark.org/chrb-methodology.

47 Science Based Targets Network (2020). Science Based Targets for Nature. Available at: https://sciencebasedtargetsnetwork.org/wp-content/uploads/2020/11/Science-Based-Targets-for-Nature-Initial-Guidance-for-Business.pdf.

48 WBCSD (2020). Circular Transition Indicators V1.0 – Metrics for business, by business. Available at: https://www.wbcsd.org/Programs/Circular-Economy/Factor-10/Metrics-Measurement/Resources/Circular-Transition-Indicators-V1.0-Metrics-for-business-by-business.

ACKNOWLEDGEMENTS

DISCLAIMER

This publication is released in the name of the WBCSD. Like other WBCSD publications, it is the result of a collaborative effort from member companies. A wide range of members reviewed this roadmap, thereby ensuring that the document broadly represents the perspective of the WBCSD membership. It does not mean, however, that every member company agrees with every word or is committed to a specific action.

To contact WBCSD about this report:

Mariana Heinrich
Director, Energy
heinrich@wbcsd.org

James Gomme
Director, People & Society
gomme@wbcsd.org

ABOUT WBCSD

WBCSD is a global, CEO-led organization of over 200 leading businesses working together to accelerate the transition to a sustainable world. We help make our member companies more successful and sustainable by focusing on the maximum positive impact for shareholders, the environment and societies.

Our member companies come from all business sectors and all major economies, representing a combined revenue of more than USD $8.5 trillion and 19 million employees. Our global network of almost 70 national business councils gives our members unparalleled reach across the globe. Since 1995, WBCSD has been uniquely positioned to work with member companies along and across value chains to deliver impactful business solutions to the most challenging sustainability issues.

Together, we are the leading voice of business for sustainability: united by our vision of a world where more than 9 billion people are all living well and within the boundaries of our planet, by 2050.

Follow us on Twitter and LinkedIn

www.wbcsd.org

COPYRIGHT

**World Business Council
for Sustainable Development**

Geneva, Beijing, Delhi, London, New York, Singapore

www.wbcsd.org