# WE CAN POWER A NET-ZERO WORLD

**ENERGY POWERS THE ECONOMY AND MAKES IT POSSIBLE FOR PEOPLE TO LIVE THE KINDS OF LIVES THEY ASPIRE TO.**

It exists in different forms, such as electricity; heat; and solid, liquid or gaseous fuels. The energy system is defined as everything involved in the production, conversion, storage, delivery and use of energy. On the energy supply side, the system includes the extraction and refining of oil and gas, coal and uranium mining, and thermal and renewable generation plants. The system also includes modes of delivery including oil and gas pipelines, shipping, and electricity transmission and distribution networks. On the demand side, key components of the system include energy use in industry, transport and buildings.

***EXPLORE THE ENERGY PATHWAY BUSINESS ACTION AREAS***

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# *OUR 2050 VISION FOR ENERGY*

## A SUSTAINABLE ENERGY SYSTEM PROVIDING RELIABLE AND AFFORDABLE NET-ZERO CARBON ENERGY FOR ALL

### RELIABLE AND AFFORDABLE ENERGY FOR ALL

All individuals, communities and organizations have access to the reliable and affordable energy they need to live well. This energy fuels our transport, provides comfortable home and working environments, and powers our industrial and innovation processes. Resilient infrastructure produces and delivers this energy worldwide.

### DEMAND FOR AND DELIVERY OF NET-ZERO CARBON ENERGY

Total global greenhouse gas emissions from the energy system are consistent with limiting global warming to a 1.5°C temperature increase above pre-industrial levels. Businesses and consumers demand net-zero carbon energy as standard. Radical innovations – in the generation, conversion, transmission, distribution, storage and use of energy – have supported the decarbonization of the global energy system. Where emissions remain unavoidable, carbon removal, sequestration and use solutions are deployed.

### AN EFFICIENT ELECTRIC ENERGY SYSTEM

The energy system has become largely electric and digitalized. Circularity and energy efficiency have been designed into all manufacturing processes, living spaces, and transport modes worldwide.

### BUILT ON THE FOUNDATIONS OF A JUST AND FAIR TRANSITION

The energy system transition has happened in a just, equitable and inclusive way, where clean energy is affordable to all. It has created millions of new jobs while contributing to enhanced health and wellbeing through improved air quality. Individuals whose livelihoods were vulnerable to the shift toward a net-zero carbon economy have been successfully upskilled or reskilled and are empowered to prosper. Human rights are protected and respected throughout the energy value chain.

# KEY TRANSITIONS

### ZERO CARBON ELECTRICITY GENERATION TECHNOLOGIES ARE FURTHER INNOVATED AND ADOPTED GLOBALLY AT SPEED

- Unabated fossil fuel generation is phased out, driven by the removal of fossil fuel subsidies, the introduction of incentives for net-zero carbon energy, and carbon pricing.
- Financial institutions shift investments from fossil fuels to zero- and low-carbon energy sources. New business models and financing mechanisms overcome cost barriers, enabling existing and emerging low-carbon technologies to mature and be deployed. Businesses and governments develop robust strategies to minimize and manage the impact of sunk fossil fuel investments and other unrecoverable costs.
- Clean electricity generation technologies are rapidly scaled up around the world. Solar and wind expand exponentially to make up more than 60% of electricity generation by 2050, while other technologies, such as hydro, nuclear and biomass, also play an important role.
- Power grids manage increased supplies of renewable electricity, and respond to mounting demand, through flexible solutions including demand-side management and energy storage technologies such as batteries and hydrogen.
- Policies are developed to ensure that suitable on- and offshore areas are available to meet future demand for renewable energy generation, while simultaneously respecting the rights of local communities, protecting biodiversity and aligning with other essential land uses such as food production.
- Companies capture emerging opportunities to leverage their existing expertise in order to transition to new business models, repurpose buildings and other assets, and restore land.

### NET-ZERO CARBON ENERGY BECOMES AFFORDABLE, RELIABLE AND RESILIENT

- Business works with governments, civil society organizations, consumers and other stakeholders to ensure that reliable, net-zero carbon energy services are accessible and affordable for all.
- Incentive schemes, subsidies and initiatives such as the Task Force on Climate-related Financial Disclosures (TCFD) and green and transition taxonomies help to foster significant investment in the infrastructure needed to provide reliable and resilient net-zero carbon energy across the globe.
- Innovations in grid integration and energy storage help to ensure constant and reliable access to energy for communities around the world.
- Business supports government and municipal leaders in incorporating resilience into new infrastructure planning, and collaborative action is taken to ensure existing energy systems and related public infrastructure are sufficiently protected from future disruptions.

### HEAVY INDUSTRIES AND HEAVY-DUTY TRANSPORT DECARBONIZE

- With policy support, harder-to-abate heavy industry sectors (including cement, steel and chemicals) decarbonize through a combination of materials efficiency and circularity, energy efficiency improvements, and innovative decarbonization technologies.
- Alternative electro-fuels, such as low-carbon hydrogen produced through electrolysis, and sustainable biomass or biogas, replace fossil fuels in industrial high heat-generating processes.
- Heavy road transport, shipping and aviation decarbonize through a combination of electric solutions, electro-fuels and sustainable low-carbon biofuels.
- Where full decarbonization is not achievable, all carbon emissions are effectively captured, reused or stored.

### UNAVOIDABLE EMISSIONS ARE TACKLED VIA NATURAL AND INDUSTRIAL CARBON REMOVAL AND STORAGE SOLUTIONS

- Where technical or economic constraints mean that it remains unfeasible to eliminate residual emissions, carbon neutralization measures supplement, but do not substitute, science-based emissions reduction efforts. Companies follow a mitigation hierarchy that prioritizes eliminating sources of emissions within their value chain.
- Credible and reliable nature-based solutions, including avoided deforestation, reforestation and afforestation projects, are deployed at scale. Nature-based solutions follow robust social and environmental principles, ensuring protection and restoration of naturally occurring ecosystems and biodiversity, while implementing stringent social safeguards.
- Carbon capture, usage and storage technologies achieve scale as solutions for hard-to-abate sectors, supported by public policy and ongoing research and development. Opportunities for industrial symbiosis emerge, further enhancing economic viability.

### ELECTRIFICATION, CIRCULARITY AND DIGITALIZATION MAKE ALL SECTORS HIGHLY ENERGY EFFICIENT

- Energy efficiency improves exponentially across all sectors including transport, buildings and industry, in part driven by a rapid increase in electrification. Electricity becomes the main energy carrier, accounting for over 50% of total final energy consumption by 2050.[40]
- Supply- and demand-side efficiencies are enabled through the digitalization of the power sector through smart grid technologies and other emerging business models. Digitalization also allows for more efficient network management and monitoring, providing power grids with real-time adaptive capabilities to balance variable generation and demand at local levels. Digitalization is accompanied by robust cyber-security.
- Shifts toward circular, sharing and service business models propel efficiencies and help to reduce emissions. The energy sector itself adopts more circular models in terms of the materials and fuels that it uses.

### SHIFTS IN BEHAVIOR AND DEMAND ACCELERATE THE TRANSITION TO NET-ZERO CARBON ENERGY

- Decarbonizing the global energy system moves up the political agenda, driven by widespread public activism. This leads to more ambitious policy action to support zero carbon energy carriers, including carbon pricing and energy taxation. Policies are designed to protect consumer purchasing power.
- Businesses increasingly switch to zero carbon energy. A range of different sectors come to rely on technology that needs clean energy, creating further demand.
- Significant players in the global economy, including the financial sector, continue to divest from fossil fuel-related activity to support the transition to net-zero carbon energy sources.
- Public awareness campaigns, education initiatives and advertising empower people with better information on where their energy comes from, and its impacts. At the same time, technological developments and financial incentives help people to take up more sustainable energy offerings.

### THE ENERGY TRANSITION LEAVES NO ONE BEHIND

- The low-carbon energy transition creates at least 18 million new jobs by 2030.[41] Businesses, governments, labor unions and civil society organizations come together to develop long-term strategic plans to address any adverse impacts the transition may have on vulnerable workers and communities.
- Business proactively engages with workers and empowers them to benefit from emerging technologies and business models. Measures such as near-term employment and wage protections, medium-term upskilling, reskilling and investment in alternative industries, long-term education and innovation, help to ensure worker prosperity.
- In parallel, business, government and multi-stakeholder initiatives continually step up collaborative efforts to eliminate human rights violations along the energy value chain.

## RELEVANT SDGs


**3.9** By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.

**7.1** By 2030, ensure universal access to affordable, reliable and modern energy services.

**7.2** By 2030, increase substantially the share of renewable energy in the global energy mix.

**7.3** By 2030, double the global rate of improvement in energy efficiency.

**7.A** By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology.

**7.B** By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular the least developed countries, small island developing states, and land-locked developing countries, in accordance with their respective programmes of support.

**8.5** By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value.

**8.7** Take immediate and effective measures to eradicate forced labor, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labor, including recruitment and use of child soldiers, and by 2025 end child labor in all its forms.

**8.8** Protect labor rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment.

**9.4** By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally-sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities.

**11.6** By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.

**12.2** By 2030, achieve the sustainable management and efficient use of natural resources.

**12.5** By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.

**12.8** By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.

**13.1** Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.

**13.2** Integrate climate change measures into national policies, strategies and planning.

**13.3** Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.

**14.2** By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, by strengthening their resilience, and taking action toward their restoration in order to achieve healthy and productive oceans.

**15.5** Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species.

# ENERGY

# ACTION AREAS FOR BUSINESS 2020 – 2030

01 Construct no new coal power plants. Plan and implement a phase-out of all unabated coal power generation by 2040 and reduce the share of coal in total global electricity generation to less than 10% by 2030.

02 Advocate for policies, such as carbon pricing, that will lead to the effective removal of fossil fuel subsidies and will integrate environmental externalities into market prices to an extent that favors low- and zero carbon solutions.

03 Send a strong demand signal by sourcing net-zero carbon energy for all operations while encouraging and supporting supply chains and customers to do the same.

04 Collaborate with peers, cities and governments around the globe to align on common net-zero carbon ambitions, set science-based targets, and drive implementation accordingly.

05 Ramp up investment and accelerate innovation to drive down the cost of existing solutions, commercialize breakthrough technologies, and digitalize the energy system. In particular, invest in the development and deployment of energy storage technologies and robust power grids to cater for increasing demand.

06 Transition to circular designs and business models to reduce energy demand and resource use across the value chain.

07 Electrify energy end-use wherever possible in buildings, mobility and industry, while also scaling up development and deployment of sustainable fuels to provide the high-temperatures required for industry and long-distance transport.

08 Support information-sharing and education initiatives to increase people's understanding and energy-aware behavior.

09 Invest in high quality nature-based solutions to remove emissions from the atmosphere while also enhancing biodiversity and ecosystem services. When fossil fuels cannot be displaced by low-carbon energy carriers, deploy carbon capture and storage technologies.

10 Mobilize coalitions with policymakers and other stakeholders to develop comprehensive strategies that ensure respect for human rights throughout the energy value chain and support a just and fair energy transition while phasing out fossil fuels.