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Villagers plant trees for a nursery as part of a reforestation project in Mombeya, Guinea.
—PHOTO: VINCENT TREMONT/ WORLD BANK

PRIORITIZING KEY SYSTEMS TRANSITIONS

Five key systems—energy; agriculture, food, water, and land; cities; transport; and manufacturing—together generate over 90 percent of global GHG gas emissions. They must be transformed to address climate change, achieve a resilient and low-carbon future, and support natural capital and biodiversity. These systems face significant climate change impacts as well, making adaptation action critical across all five. They are also critical to achieving development goals. Transforming them is key for countries at all stages of development and requires action from the public and private sector: both to unlock major economic opportunities and create new markets and jobs, and to reduce the trajectory of emissions and limit climate vulnerabilities. Interventions that support these five key transitions will need to take into account macroeconomic and fiscal impacts in addition to managing social and labor impacts.

Climate action focused on both mitigation and adaptation across these key systems can lead to higher productivity, more jobs, more resilient economies, and greater social inclusion. Significant investment in education, training, and retraining to develop skills in these key sectors is essential for people in our client countries to benefit from the jobs created in the green economy. While we invest in a low-carbon future, we must simultaneously invest in adaptation so that countries are better prepared to deal with current and future climate impacts. The WBG will thus prioritize climate action across these systems to advance development objectives through impactful country operations and programs—including support for policy reforms, public and private sector investments, guarantees, and advisory services—and to support a just transition for our clients, including through additional financing. In addition to these five key systems, the WBG will also support adaptation action in other priority areas such as disaster risk management, coastal resilience, and water security.

ENERGY

The energy sector produces three-quarters of global GHG emissions, and coal combustion alone is responsible for nearly a third.[28] Yet today, about 800 million people live without electricity, and hundreds of millions have unreliable access.[29] Almost 3 billion people still cook with biomass, such as wood, and with other fuels that cause severe air pollution, with widespread health impacts. Modern energy services are critical to economic growth and human capital development, which is why achieving SDG 7—access to affordable, reliable, sustainable, and modern energy for all by 2030—is seen as crucial to achieving many other SDGs.[30] The WBG is committed to supporting countries and private clients to expand energy access consistent with the vision of SDG 7.

As we expand energy access, we urgently need a global transition to low-carbon energy. Technological improvements, including energy efficiency, battery storage, green hydrogen, nuclear developments, carbon storage, and decarbonization techniques will be important determinants of new energy directions in client countries.[31] It is also critical to develop solutions that make energy systems more resilient to climate change and extreme events. The WBG's priorities in the sector include helping countries with power sector planning, energy subsidy reforms, and improvements to the operational and financial performance of utilities; investing in projects to increase energy access, including through renewable energy and improved energy efficiency; and regional power cooperation and trade.

Priorities for climate-focused action in this sector will depend on the country context. In high-emitting middle-income countries, for example, key steps may include retiring coal-fired power plants, replacing fossil fuels across the economy, and removing market barriers for green technologies, while working to ensure a just transition. For lower-income countries still working to provide energy access to all, it is crucial to invest in low-carbon and climate-resilient baseload capacity, including renewable energy.

Scale Up Clean Energy Systems

The WBG will substantially scale up financing for clean energy transitions around the world. Clean energy has a key role to play through both utility-scale projects and small-scale projects alike.[32] The fast-declining costs of renewable energy and energy storage technologies, combined with innovative business models, offer significant opportunities to expand energy access and accelerate the energy transition. Renewable energy technologies create jobs throughout the supply chain and can spur broad and sustainable social and economic development. The WBG will continue to invest in renewable energy generation, integration, and enabling infrastructure. The WBG is the largest multilateral financier of mini-grids and off-grid solar, and this scaled-up support will also cover on-grid, off-grid and distributed renewables. A key element in the range of solutions is the Energy Storage Partnership convened by the World Bank, with 35 industry, research, and multilateral partners working to advance research, development, and deployment of energy storage and accelerate access.

The energy transition depends critically on key minerals, several of which are mainly mined in developing countries. The WBG, through its Climate Smart Mining initiative and by supporting private sector mining projects in those key minerals, will support the sustainable extraction, processing, and recycling of minerals and metals needed for low-carbon technologies while minimizing the climate and material footprints throughout their value chain.[33]

As offshore wind technology matures and costs decline, there is significant potential to expand its use in developing and emerging economies. World Bank analyses show excellent potential in several countries and a promising path for medium-term low-carbon electricity generation. Offshore wind projects are large-scale, capital-intensive, and complex, with significant infrastructure needs, requiring a coordinated WBG approach. IFC will evaluate, finance, and mobilize capital for such projects, working closely with the World Bank and MIGA for policy and project development and risk mitigation. In December 2018, the World Bank and IFC jointly launched the Offshore Wind program to assist emerging markets in accelerating their offshore wind uptake. IFC is leveraging its experience in renewable energy project development and financing to help create markets for new clean technologies and business models.

Green hydrogen—defined as hydrogen produced with 100 percent renewable energy—is gaining recognition as an important sustainable fuel. Although further cost reductions in renewable energy to power clean electrolysis are needed for scaling it up, green hydrogen is steadily gaining attention as an alternative to fossil fuel-derived hydrogen. The WBG will facilitate the transformative penetration of innovative renewable energy in client countries, including green hydrogen.[34]

The WBG also sees hydropower as a key clean energy source—and an important option to support

the integration of wind and solar in power systems. The WBG will support countries in developing sustainable and resilient hydropower, while not damaging the ecosystems, and the associated water storage needed, including through regional cooperation to advance complementary investments across countries.

MIGA will seek to further engage investors and scale its renewables portfolio. Utility-scale solar, wind, hydropower, and geothermal will be significant components of its efforts. It will develop innovative ways for its guarantees to support micro- and off-grid solutions that can accelerate electrification to underserved communities, specifically in IDA countries and in those experiencing fragility, conflict, and violence. MIGA will work in coordination with the IFC and the World Bank to provide comprehensive and effective solutions that maximize private sector participation in renewable energy. IFC is taking the lead with private sector clients and is developing a net-zero transition roadmap as part of the initiative. IFC and MIGA may also invest in transmission and distribution, which is key to integrating renewables, balancing the grid, and ensuring private capital flow into generation. IFC and MIGA will also develop business models to mobilize private capital for the significant capital expenditures and efficiency improvements needed in that sector.

Power System Planning

As more people and economic sectors rely on the power grid, it needs to be reliable and resilient. Power infrastructure is vulnerable to many climate change impacts: from reduced water supplies, to more frequent extreme weather events, including severe heat, storms, and floods. System-level and operational planning—such as modifying existing equipment or making choices in selecting new facility sites and equipment purchases—can help build resilience. Actions that reduce demand (e.g., through improved energy efficiency, demand management tools such as smart metering, and reduced transmission losses) can help reduce stress on the overall power system.

Climate resilience is an emerging priority that relates to the stability and performance of energy systems against extreme climate events. This is particularly important as renewable generation and hydropower, as well as energy demand, are highly affected by climate conditions. Distributed energy resources—small-scale power generation from rooftop solar panels or battery storage, for example—can increase resilience, particularly as climate change brings more extreme weather events and greater potential for loss of power. The WBG aims to accelerate investments and mobilize concessional finance for battery storage to help countries integrate more renewable energy. In expanding clean energy systems, such as hydropower, it is crucial that infrastructure is built with attention to climate resilience, water-related shocks, and the multiple uses of reservoirs. This must be supported by sound river basin management and integrate biodiversity considerations to minimize potential adverse impacts. Especially in a changing climate, hydropower development poses risks that need to be assessed and managed carefully; the WBG is committed to supporting countries to develop and finance hydropower projects that are well suited to local conditions and are resilient to climate change. The WBG will be stepping up its efforts to support long-term energy planning and capacity building, focusing on carrying out long-term energy and climate adaptation planning; enhance the collection of meteorological and hydrological data and their use in energy models; and designing and implementing emergency preparedness, response, and recovery planning.

The World Bank will accelerate its support to countries for power system planning to identify and implement cost-effective low-carbon and resilient options. Moving forward, the Bank will work with countries to prepare electrification plans and power sector development plans that incorporate low-carbon and resilient energy scenarios, expand modern energy access, and provide reliable electricity for economic growth. In addition, carbon capture, utilization, and storage (CCUS) may be an important lever for decarbonization.[35]

Attracting finance for clean energy requires proper planning, adequate operational performance, and financial sustainability of the power sector. In many regions, chronic underinvestment and lack of maintenance have led to frequent blackouts and limited energy access for the poor. The World Bank will continue to support policies, reforms, and investments to strengthen the operational, commercial, and financial performance of utilities. For countries that commit to improving the performance of their utilities, the WBG will provide support, including risk mitigation instruments, when relevant, to enable private renewable energy investments at scale, facilitating investment opportunities for IFC and MIGA.

Fossil Fuel Subsidy Reform

The World Bank will continue to support its client countries in advancing fossil fuel reforms.[36] In response to strong demand from client countries for just and inclusive reforms to eliminate or reduce energy subsidies, the Bank will provide technical assistance through its Energy Subsidy Reform Facility and support policy reforms through lending operations. The Bank will focus on protecting the poor in these reforms by strengthening social safety nets and facilitating communication campaigns to address political economy challenges.

Energy Efficiency

Energy efficiency is one of the largest untapped sources of energy, and scaling it up is a critical element of the energy transition. It is often the cleanest and lowest-cost way to expand energy services. Investing in efficiency reduces investment needs for new energy supply, fiscal outlays for subsidies, and costs to consumers—all of which enhances competitiveness and energy security. There is potential all across the economy—from the energy sector itself, to cities, manufacturing, health, education, transport, and water; many engagements will be multisectoral. The WBG will support projects both on the supply side (in power generation and by reducing transmission and distribution losses) and the demand side (industry, municipalities and other public sector users, residential buildings, and agriculture).

IFC and MIGA anticipate increasing support for energy efficiency projects as well. The COVID-19 crisis has reduced financial capacity across sectors to invest in clean technologies, threatening to stall progress. Looking ahead, the energy industry can respond quickly to new incentives, scale up readily available technologies, and create substantial savings and earnings for households and businesses in a post-pandemic recovery. IFC and MIGA aim to scale their energy efficiency finance through credit lines, green bonds, green loans, and guarantees and will work with real sector clients on large-scale energy efficiency investments, helping them to identify opportunities within larger projects. This work will support financial institutions' financing of energy efficiency projects, including industrial and building retrofits.

A Just Transition Away from Coal

Moving away from coal is crucial to achieving the goals of the Paris Agreement. This is a major undertaking that requires dedicated support at the macroeconomic and fiscal levels and across multiple sectors. The World Bank will significantly step up financing and advisory support for a just transition from coal to client countries that request it.[37] The World Bank will support national, regional, and local authorities to develop clear roadmaps for the transition, focusing on governance structures, the welfare of people and communities, and the remediation and repurposing of former mining lands and coal-fired power plants. IFC and MIGA will collaborate with the World Bank in these efforts and will work with their clients to support the coal transition in the private sector, including through innovative financing or de-risking instruments and incentives.

On the supply side, priorities in the transition from coal include accelerating the closure and repurposing of coal mines and coal-fired power plants, with due attention to distributional effects and the promotion of new sources of employment and economic growth for affected people and communities/regions. On the demand side, priorities include reducing, displacing, or avoiding coal use by increasing energy efficiency, switching to low-carbon energy sources, and substantially scaling up renewable energy investments.

In specific cases, natural gas may be useful in accelerating the transition away from coal—depending on country circumstances. For example, natural gas can have a role in providing household and business heating solutions in some countries over the medium term, and may be compatible with a country's goal of long-term decarbonization through the reuse of gas pipelines and other infrastructure for transportation and storage of cleaner hydrogen. Alternatively, a gas power plant may be essential to enhance power supply reliability and grid stability, thus facilitating higher rates of renewables integration. However, the long-lived nature of new gas infrastructure means that it is not always consistent with the need to decarbonize economies within this timescale. All investment in new gas infrastructure will be assessed for consistency with NDCs and LTSs.

The transition away from coal must be done justly, with due attention to people and the distributional effects. A just transition must integrate sustainability, including environmental remediation, as well as decent work, social inclusion, and poverty reduction. In the absence of good policy, there is a significant risk that as countries transition away from coal, workers and entire communities could be stranded. This requires the financing to build new skills, create jobs, and develop a more equitable and resilient economy. Programs to manage the social and labor impacts of the energy transition are a central element of the World Bank's toolkit to facilitate closures and to support a just transition for all. IFC and MIGA will work with their clients and collaborate with the World Bank to explore innovative solutions to accelerate the phase-out of coal and champion a just transition.

The WBG stopped direct financing of new utility-scale coal-fired power projects in 2010, and will significantly increase its programmatic support for the transition away from coal in client countries that request such assistance. The economics, construction and operation times, and emissions of coal power plants cannot be reconciled with the objectives of the Paris Agreement, nor with our efforts to support green, resilient, and inclusive development.

AGRICULTURE, FOOD, WATER, AND LAND

Agriculture and food production are key sources of employment and livelihoods for large numbers of people around the world, including the vast majority of the extremely poor.[38] In order to feed a projected global population of nearly 10 billion by 2050, these systems need to be scaled up even more.[39] At the same time, agriculture, forestry, and land use change produce almost a quarter of global GHG emissions.[40] The largest sources of GHG emissions linked to agriculture are land conversion (e.g., clearing forests for cropland); methane emissions from livestock and rice production; and nitrous oxide from the use of synthetic fertilizers. Agriculture is also the largest user of land and water, with impacts on forests, grasslands, wetlands, and biodiversity. Food and land use systems currently generate "hidden" environmental, health, and poverty costs estimated at almost $12 trillion per year.[41] Major changes are needed, but they must be undertaken with a people-centered approach.

At the same time, agriculture is one of the sectors most vulnerable to climate change, particularly for the most vulnerable populations: small-scale producers in low- and middle-income countries. Key risks to food production include water scarcity due to changes in precipitation and rising temperatures, sea-level rise, extreme weather events, declining biodiversity and ecosystem services, and new pests and crop diseases. Agriculture, food, water and land use are therefore priority sectors for both mitigation and adaptation efforts.

Climate-Smart Agriculture

The World Bank will step up support for climate-smart agriculture (CSA) across the entire agriculture and food value chains through robust policy and technological interventions. Doing this can achieve robust triple-win benefits: enhancing productivity, reducing GHG emissions, and improving resilience. Some subsectors warrant special attention. For example, livestock production is particularly GHG-intensive, but also plays a major role in providing livelihoods and food security—and there are well-known and cost-effective mitigation options.[42] Rice cultivation is a large source of GHG emissions, especially methane, but new varieties, techniques that reduce water use, improved management of inputs, and other strategies can enhance production, reduce emissions, and increase resilience. The World Bank will establish an Early Warning for Early Action Food Security Hub to support early detection and diagnosis of emerging food insecurity crises.

IFC and MIGA promote CSA through their work with private sector clients. IFC will focus on three strategic themes: (i) helping to improve productivity while reducing input use and GHG emissions per ton of output, especially through precision farming and regenerative or conservation agriculture; (ii) making livestock production more sustainable while increasing productivity; and (iii) reducing post-harvest losses in supply chains globally (e.g., through improved logistics and distribution, appropriate packaging solutions, modern storage facilities, and cold chains). IFC is exploring areas that may lead to paradigm shifts, including soil carbon, health, and fertility management, fertigation, commercially viable innovative animal protein alternatives, and new models to promote drip irrigation and build climate resilience. Increasing the volume of IFC's direct investments in agriculture firms and indirect investments in financial intermediaries and MIGA guarantees that contribute to CSA will entail transferring both disruptive technologies and proven interventions as well as business models that

overcome the well-known barriers to investments in this sector. There is a need for aggregation and risk-sharing solutions to align interests and achieve scale. IFC typically works with an "anchor client," such as an integrated food company, processor, trader, or food retailer, to help it implement climate-smart practices across its supply chains. IFC will leverage climate financing products to help build a pipeline with suitable profile clients. Many CSA engagements, especially those that involve financing for supply chain traders, processors, and smallholders, will require leveraging IFC's partner network of financial intermediaries and blended concessional finance to reduce or align risks or partially compensate for the public benefits associated with these investments.

Food Loss and Waste

A third of all food produced globally goes to waste, amounting to significant costs to society. The World Bank is already addressing policy options and trade-offs involved in tackling food loss and waste, and will implement farm-to-fork food system diagnostics to identify cost-effective climate mitigation and adaptation priorities across the value chain.[43] IFC is developing a food losses calculator that will help IFC and its clients to quantify the GHG benefits and cost savings of projects that reduce food losses. MIGA is working with its clients to lower the water and emissions footprints of food manufacturing, and to enhance the climate resilience of agricultural value chains by demonstrating the materiality of climate risks and interventions in the feasibility assessments of projects.

Nature-Based Solutions

The WBG sees NBS as critical elements of the food, water, and land systems transition. In agriculture and food production, NBS can enhance ecosystem functions in landscapes affected by agricultural practices and land degradation, improving water availability and quality, productivity of crop systems, and livestock health. NBS can achieve benefits for soil health, carbon sequestration, biodiversity, and climate resilience, among others. At the sectoral level, the Bank, through the Forest Carbon Partnership Facility, is building capacity for clients in their emission reduction programs and Reducing Emissions from Deforestation and Forest Degradation (REDD+) strategies. NBS can also be applied in coastal areas to stabilize shorelines and reduce flooding and erosion impacts, which helps to maintain fisheries as food sources and sustains livelihoods relating to fisheries, tourism, and recreation. Wetland restoration can also increase the storage capacity of freshwater supply and improve water quality alongside the enhancement of habitat and biodiversity. IFC is in the preliminary stages of developing sector-wide approaches to integrate biodiversity considerations at the earliest stages of landscape planning, particularly for the agriculture and infrastructure sectors. IFC will work to develop new approaches and business models to support biodiversity finance and explore catalyzing private financing in its client markets.

BOX 5

Water, Development, and Climate Change

Water is central to multiple SDGs. It is vital for producing food, and thus for achieving SDG 2, to end hunger; safe drinking water is necessary for achieving SDG 3, good health and well-being; and SDG 6 calls for clean water and sanitation for all. Climate change threatens water supplies through rising temperatures, shorter rainy seasons, more frequent droughts, and extreme precipitation. This has implications for water security and for the viability of agriculture, livestock, and aquaculture, with disproportionate impacts on the poor and most vulnerable.

At the same time, drinking water, sanitation, and irrigation services all demand energy, and demand is projected to grow significantly in the coming years. Water supply systems often use energy inefficiently and also waste water.

Without enhancing water security, regions and countries will not be able to adapt, decarbonize, and be resilient to climate change and other stresses and shocks. Strengthening water security is required for achieving emission reduction goals in the sector, but water also plays a key role in achieving emission reductions in other sectors, such as energy, agriculture, forestry, and transportation (including inland waterways). The WBG aims to support countries to enhance water security, manage water to adapt to and mitigate climate change, and close the gap in the water-energy-GHG emissions cycle through:

- Ensuring that water infrastructure is planned for and designed to address increasing uncertainty under a changing climate;
- Improving energy efficiency in the water sector, both directly and by addressing water leaks and reducing water losses in irrigation, and incorporating renewable energy sources in the delivery of services;
- Promoting circular economy approaches by reducing water losses; managing water demand; recovering and capturing valuable resources such as biogas, nutrients, and heavy metals from wastewater treatment; and adapting reuse of treated effluent and resource recovery;
- Promoting the sustainable diversification of water supplies;
- Promoting good watershed management practices that protect water sources from increased drought and water quality risk, while also protecting or rehabilitating landscapes that act as carbon sinks in the natural environment;
- Designing resilient sanitation service chain to reduce leaks of polluted water into the surrounding environment;
- Increasing and optimizing water storage by conventional surface water storage infrastructure to boost hydropower generation needed to drive the green energy transition, installing floating solar panels on storage reservoirs, scaling-up nature-based solutions, and promoting adaptive and flexible water allocation mechanisms. Combined, these help to build resilience of water services delivery by managing variable water supplies over time and providing protection during floods and droughts;
- Designing water-related infrastructure and pursuing policies to limit and/or reduce the emissions of non-CO_2 GHG emissions, particularly methane and nitrous oxide;
- Harnessing water-energy innovations and digital technologies; and
- Working to ensure that the decarbonization pathways selected by countries do not compromise their water security objectives, and that water is not a limiting factor for achieving them.

Source: World Bank.

Water

Global food security depends on water of sufficient quantity and quality to support the transition. This includes irrigation to expand arable land area, support needed crop production, and provide a buffer from increasingly hot and dry growing seasons. With climate change, the water cycle is expected to undergo significant change, with potentially large negative impacts on food production. In order to meet these challenges head on, countries must invest in better planning and institutional strengthening, increased water storage capacity, improved water reuse systems, and flood and drought infrastructure, including climate-resilient green infrastructure and hybrid green-gray solutions. The WBG will help countries manage flood and drought risks together, reducing the water-related shocks and protecting livelihoods and productive resources. The World Bank will expand access to high-quality hydro-meteorological data and flood forecasting and early warning systems to better manage water risks.[44] It will also expand support to climate-informed river basin management to manage transition risks, including for shared water resources such as lakes, rivers, and other international watersheds that collectively draw on one water resource.

IFC and MIGA will support countries, cities, and industrial players to expand and improve their water operations in order to reach key climate impact mitigation goals and increase adaptation capability and resilience of their infrastructure. As such, IFC and MIGA will work closely with their clients and partners to (i) promote climate friendly and resilient technologies; (ii) reinforce energy and water efficiency initiatives (e.g., non-revenue water reduction, water source management, operations optimization through digitalization); (iii) support economic activities by identifying sustainable sources of water for industrial use and scaling up treated wastewater reuse projects to limit the impact of water supply in water stressed regions; and (iv) invest in wastewater collection and wastewater treatment infrastructures.

Carbon Sinks

Terrestrial carbon conservation in which large volumes of carbon stored in natural forests, grasslands, and wetlands remain stored as carbon stocks is important for climate change adaptation and mitigation and is essential to increasing the resilience of ecosystems. Soils are among the planet's largest reservoirs of carbon. Soil carbon storage can be increased by using plant varieties that have deeper roots, agroforestry, adding organic materials, and changing crop rotations, and avoiding deforestation.[45] Along with its mitigation benefits, enhancing soil carbon can improve soil health and increase yields, and could potentially be monetized by farmers through carbon markets. The World Bank will support countries in providing incentives to farmers to invest in NBS to improve soil carbon storage and build resilience. The WBG will pilot in operations a low-cost, near real-time Monitoring, Reporting and Verification (MRV) Protocol that can leverage private capital for enhanced soil carbon sequestration.

Blue Economy

Fisheries and aquaculture have a significant role in food security and economy of many countries and have the potential to further support the nutritional needs of growing populations. The WBG will focus on helping countries and the private sector to protect marine areas, diversify the blue economy, reduce

marine pollution, and repopulate coral reefs. Healthy oceans provide jobs and food, sustain economic growth, regulate the climate, and support the well-being of coastal and urban communities. The WBG will contribute to blue growth through analytical services, policy dialogue, financing, and supporting activities related to more efficient use of resources, while strengthening waste diversion systems and infrastructure to collect and process plastic materials and recapture the value of plastics in the economy.

De-Risking Private Investment

MIGA will increase its support for sustainable agribusiness transactions. MIGA sees an opportunity to support investors in de-risking private financial flows and climate finance to agribusiness operations and their value chains. MIGA will also increase emphasis on the adoption of climate-smart techniques that lead to increased resilience to climate-related shocks. MIGA will initiate technical guidance on CSA solutions, raising awareness of climate risk identification and management practices, and introducing GHG emissions accounting methods tailored to clients' operations.

CITIES

Cities consume over two-thirds of the world's energy and produce over 70 percent of global CO_2 emissions.[46] Transforming urban systems will be critical for achieving climate goals, and also for achieving SDG 11, to make cities inclusive, safe, resilient, and sustainable.[47] The WBG will support both national and local governments to develop, finance, and implement solutions for cities that reduce emissions, build resilience, and promote shared prosperity. Through its work with governments, the World Bank will also identify opportunities for IFC to support sectors that require more private sector investment—for instance, to retrofit existing infrastructure and improve water operations—and for MIGA to design solutions and provide financing to cities to achieve these goals.[48]

Planning for Low-Carbon and Resilient Cities

The WBG will step up support to cities, including technical assistance and financing, to help them decarbonize and build resilience. This means ensuring policies, regulations, and investments are in place to improve urban air quality; decarbonize urban energy systems; promote green and resource-efficient buildings and infrastructure, through new construction and retrofitting; promote integrated solid-waste management and circular-economy approaches; improve urban transportation, including public transit and non-motorized options; and improve the coverage, efficiency, and resilience of urban water supply, sanitation, and wastewater treatment. Improving urban land use planning and regulations is particularly important. A key enabler of all this work will be the City Climate Finance Gap Fund.[49]

To enhance climate resilience, the WBG will support cities with (i) enhanced access to tools and technical support to integrate climate and disaster risks in spatial planning; (ii) strengthened capacity to effectively prepare for and manage those risks; (iii) assistance to make key infrastructure more resilient, including buildings, schools, and hospitals; (iv) access to more financing for investments in resilience

and in service delivery; and (v) access to more global and regional partnerships to achieve resilience objectives. NBS are also crucial for increasing resilience, including water security, and reducing disaster risks such as floods. Without enhancing water security, many regions and countries will not be able to adapt, decarbonize, and be resilient to climate change and other stresses and shocks. NBS can be used as "green infrastructure," which gains value over time given the range of benefits that are produced as ecosystems mature. Key enablers for this work include partnerships such as the Global Facility for Disaster Reduction and Recovery (GFDRR) and its flagship programs.

IFC will scale up strategic partnerships through a fully integrated investment and advisory approach to help cities address current market failures, such as limited funds for project preparation, low creditworthiness, and lack of technical expertise. This early upstream engagement is designed to pave the way for new and complementary IFC investments, thereby assisting cities in prioritizing projects and increasing the delivery of sustainable municipal infrastructure projects that meet their development goals.[50] IFC's new green cities tool, Advance Practices for Environmental Excellence in Cities Green Program (APEX), supports emerging market cities to accelerate policy actions and investments that contribute to the low-carbon transition and resource-efficient growth pathways.[51] This will be complemented by efforts to further deploy green finance solutions such as green loans, green bonds, and Breathe Better Bonds.[52] MIGA will expand its sustainable cities portfolio through innovative applications of its products to facilitate the modernization of economic and social infrastructure that is aligned with climate-resilient development pathways. MIGA will work with the private sector to adopt a more holistic view so that projects to do not contribute to maladaptation or any other adverse impacts within and beyond the project boundary.

Green Buildings

IFC and MIGA will scale up their green building business, both through direct financing and de-risking of asset owners and by increasing the use of green mortgages and green construction finance through financial intermediaries. IFC will continue to promote Excellence in Design for Greater Efficiencies (EDGE) across a range of asset classes, including green homes, offices, hotels, hospitals, higher education institutions, retail stores, warehouses and industrial parks, light industrial buildings and factories, data centers, airports, and green property funds.[53] IFC will develop green retrofit programs and expand its EDGE certification program to help establish standards in this area. It will also support building owners and clients to achieve their climate strategies and targets and align IFC investments with the objectives of the Paris Agreement. To contribute to adaptation and resilience, IFC will pilot its newly developed Building Resilience Index.[54] MIGA will back investments in green buildings and work with clients to obtain green building certifications, such as the EDGE certification.

Integrated Waste Management and Circular Economy

The WBG is helping countries and cities adopt integrated waste management and circular economy approaches to advance climate, development, and broader sustainability goals. The World Bank will support cities in promoting these approaches across the value chain. IFC will focus on three strategic priorities for the waste sector: (i) strengthening the municipal solid waste value chain from collection to

disposal, particularly in areas where this infrastructure is limited and/or heavily reliant on the informal sector; (ii) promoting sustainable resource recovery solutions, including recycling, refuse-derived fuel, landfill gas capture and use, and waste-to-energy; and (iii) developing capacity to manage specialty waste streams, such as electronics and hazardous waste. These priorities will enable emerging markets to tackle their current and growing waste management concerns and lay the groundwork for a transition to circular economy principles.

BOX 6

Building Coastal Resilience to Protect Lives and Livelihoods

While some climate-change-related impacts on agriculture, such as temperature and rainfall, are similar for coastal and non-coastal settings, there are other factors that impact coastal agriculture, such as soil salinity, coastal erosion, seawater intrusion, and increased exposure to cyclones. Climate-smart agriculture has been adopted in many parts of the world as a way to cope with climate shocks and minimize GHG emissions while sustaining crop yields, and this approach remains relevant for coastal farming, together with integrated coastal resource management and strengthened land use planning.

Beyond agriculture, coastal areas in several countries are highly populated and generate an outsize share of economic growth. This means that large numbers of people and significant assets are vulnerable to coastal climate change impacts. Despite significant progress in recent years—which has saved lives, reduced economic losses, and protected crucial development gains—many countries still need to do far more to address vulnerabilities. The WBG aims to support countries to strengthen coastal resilience in both rural and urban settings, in a number of key areas:

- Strengthening data and decision-making tools by establishing openly accessible natural disaster databases, as well as asset management systems for critical infrastructure;
- Factoring risks in zoning and spatial planning based on the best available information;
- Strengthening the resilience of infrastructure systems and public services by upgrading such assets in the most exposed and under-protected areas and updating existing safety standards;
- Using NBS by tapping into the protective function and economic contribution of ecosystems in a systematic manner; and
- Improving disaster preparedness and response capacity by upgrading early warning systems, strengthening local response capacity, improving social safety nets, and implementing comprehensive risk financing.

Source: World Bank.

TRANSPORT

Sustainable transport is critical for fostering inclusive growth, expanding access to essential services, and combating climate change. The WBG works with clients to provide safe, clean, resilient, efficient, and inclusive mobility. Transport produces almost a quarter of global CO_2 emissions from fossil fuel combustion, and the sector's emissions are rising rapidly.[55] Demand for transport is projected to grow rapidly in the coming decades, as low- and middle-income countries continue their economic development and urbanization. Without aggressive measures, CO_2 emissions from transport are expected to grow by 60 percent between 2015 and 2050.[56] To support a low-carbon and resilient

transport sector, the WBG will support three main pillars of the transport sector: mobility and access, logistics and freight, and resilient transport systems.[57]

Mobility and Access

The World Bank will support cities and urban areas in planning, developing, and managing integrated transport systems, including high-quality public transit to replace private vehicles and fragmented informal urban transport services, as well as supporting active mobility through non-motorized modes. Digital technologies offer significant opportunities to improve efficiency; reduce congestion, air pollution, and GHG emissions; and transform how people and goods move around the world. The Bank will also support governments in efforts to improve urban accessibility by formalizing public transit in areas with large reliance on informal services. This requires careful planning, so that formal services are affordable and meet local mobility needs, and to transition informal operators, so they do not lose their livelihoods. The World Bank's work in this realm will facilitate IFC and MIGA's mobilization of private capital.

Electric vehicles (EVs) hold significant potential, especially as the power sector is decarbonized. A shift to EVs, including private vehicles as well as buses and trucks, would reduce GHG emissions as well as air pollution and associated health impacts. The WBG will support countries or cities in planning and implementing e-mobility solutions, to electrify public transit, green government fleets, adopt micro-mobility solutions, incentivize individual EV adoption, and build the necessary support infrastructure, such as charging stations.[58] A key IFC focus area is electric buses for public transit in cities. IFC is executing a three-pronged approach to scale up its investments in this sector.[59]

Pricing and regulatory reforms for fuels and vehicles can be effective tools for reducing GHG emissions, by raising the price of private vehicle relative to public transit in cities, and by encouraging the purchase of cleaner and more fuel-efficient vehicles. At the same time, most cars, trucks, and buses imported to low-income countries are secondhand, often many years or even decades old, contributing significantly to air pollution and GHG emissions. The World Bank will support fleet modernization, including by supporting policies to regulate the secondhand vehicle market by banning imports older than a certain age or imposing additional excise duties on them.

Logistics and Freight

Interventions to decarbonize the freight sector and deliver competitive logistics include interventions to re-engineer supply chains, change inventory practices, reduce the fragmentation of production, bring production closer to customers, shift to lower-carbon transport modes, switch to energy-efficient and low-carbon vehicles across modes, including in maritime transport, and optimize networks. Green logistics and green infrastructure not only provide improved connectivity, but can also be a cost-efficient way of reducing emissions and climate-related natural hazards, supporting nature and climate objectives. The WBG will support countries in preparing and implementing measures to help decarbonize the freight sector by enabling and incentivizing modal shift, a long-term transition to green logistics, and modernization of the trucking, rail, and maritime sectors. To sustain this transition, IFC and MIGA will support investments in energy-efficient equipment and green buildings in subsectors

such as ports, airports, and shipping, and will expand their climate-related investments in third-party and temperature-controlled logistics.

Resilient Transport Systems

The long-term performance and reliability of transportation systems will increasingly need to consider and plan for climate change and extreme weather events. The WBG will apply a range of tools and approaches to its engagement in building resilient transport systems. These include: (i) upstream sectoral and strategic spatial planning informed by assessments of risk and vulnerability; (ii) resilient infrastructure solutions, which comprise investments in physical infrastructure, new technologies, and community-based adaptation; (iii) enhancing the enabling environment through institutional and capacity support, awareness-raising, and finance to enhance the capabilities of the relevant stakeholders at the policy and regulatory level; and (iv) post-disaster risk and recovery support so that climate change risk and resilience are integrated into rebuilding efforts. These solutions will be underpinned by country-based assessments of a transport system's ability to withstand climate change, based on an inventory of transport facilities, an analysis of climate-related risk factors, potential adaptation responses, and an economic assessment of response packages.

MANUFACTURING

Manufacturing is a significant source of GHG emissions, especially from heavy industries producing base materials such as chemicals, steel, cement, and glass; for which direct industrial processes account for 5.2 percent of global GHG emissions and energy use in industry for an additional 24.2 percent.[60] Base materials are inherently GHG-intensive, but they currently have no technically and economically viable substitutes that can offer similar functions at scale. This is a major challenge, because they underpin a range of economic activities, create jobs along all value chains, and drive the economic growth of countries. These are essential products, from agricultural fertilizers, to fibers, to construction materials, and they enable solutions for housing, waste treatment, food safety, health care, and consumer goods that are central to the quality, affordability, and comfort of modern life. As countries industrialize their economies, it is important to adopt the best available practices and new business models that support sustainability and low carbon development pathways, while working to ensure that manufacturing becomes more resilient to natural disasters.

The World Bank will support countries and their industries in developing sectoral policies that promote low-carbon and resilient growth, while helping to improve their green competitiveness and the role of the private sector. The Bank is looking to maximize its climate impact through the Circular Economy for Private Sector Development Program (CEPSD) by focusing on reducing emissions at base in industries and up the value chain. The WBG is helping all manufacturing sectors to get on a path toward decarbonization and achieving SDG 12— sustainable consumption and production patterns—via resource efficiency, low-carbon solutions, and circularity. Digitalization of industries will greatly affect production efficiency and enable the viability of circular economy solutions. As a large player in the manufacturing space, the Bank will also work with industrial parks to help them offer low-carbon industrial infrastructure and services through its eco-industrial parks program.[61]

The World Bank has launched a Resilient Industries program to improve competitiveness through business continuity planning, improved management of supply chains and industrial parks in the face of natural disasters.[62] The Bank will help developing country governments increase the resilience of their key industries to climate-related and other natural disasters through a focus on business continuity planning. This will be done by analyzing the main risks posed to industries, supply chains, and their employees, and providing instruments related to financing, industrial infrastructure development, and improved preparedness planning. In the event of a disaster, the Bank will coordinate with humanitarian efforts to support rapid damage assessment, address critical infrastructure damage, and develop financing mechanisms to help employees and businesses to shelter and recover. Resilience planning also needs to account for events not linked to disasters, such as rising sea levels. The WBG will support industry resilience solutions, including those related to planning, location of future facilities, and identifying backup supply and distribution chains.

Globally, the largest mitigation potential in manufacturing is in energy-intensive and material conversion industries. IFC and MIGA will apply three principles to investments across heavy manufacturing industries: First, they will not support new coal-fired power projects or wet process in cement. Second, they will differentiate the sustainability and climate "bar" for investments based on the development stage of client countries and promote progressive transitional sustainability improvements where absolute sustainability is not yet achievable. Third, they will assess the sustainability and climate-related drivers in projects, such as (i) energy source and alternatives; (ii) materials used and alternatives; (iii) products produced and alternatives; and (iv) process technology, striving for best-in-class production processes.

IFC and MIGA will work with committed sponsors and private companies that are dedicated to achieving strategic climate and broader sustainability objectives. IFC leverages and promotes climate finance products and advisory services, and MIGA provides de-risking products, to support proven abatement measures and pilot innovative technologies. Core mitigation areas common to all industries include circular economy-type interventions (redesign, reduce, reuse, and recycle products), energy and resource efficiency, use of renewable energy, including distributed generation and both product and manufacturing process related innovations. IFC and MIGA will work with corporate clients in manufacturing to help them meet their climate strategies and targets, aligned with WBG objectives and SDGs.

BOX 7

Financing Adaptation for Impact

In 2020, the WBG delivered more than two thirds of total MDB adaptation finance for developing countries, reflecting its central role in financing adaptation and resilience action worldwide. Increased support on adaptation is critical, especially for IDA countries, fragile states, and SIDS. Investment in adaptation infrastructure is likely to have positive effects on employment, in particular because of the increased demand for construction work in projects to reduce climate-related risks. Climate change is recognized as a driver of fragility and a threat multiplier, making adaptation an important element of the WBG's Strategy for Fragility, Conflict and Violence. It is urgent to scale up action on adaptation and resilience, given the increasingly severe impacts of climate change.

In addition to the IBRD/IDA target of at least 50 percent climate finance for adaptation, the WBG has committed, under its existing Climate Adaptation and Resilience Action Plan, to support a mainstreamed, whole-of-government approach to help countries shift from addressing adaptation as an isolated investment, to systematically managing and incorporating climate risks. This complements the whole-of-country approach outlined above. Successful adaptation requires planning for and doing development differently, systematically taking account of both present-day and future climate risks from the start. A key entry point for mainstreaming adaptation is to provide tools and analytics to line ministries, to help them integrate resilience measures into sectoral investment planning, design, and implementation. The objective is to help client countries benefit not only from individual climate-smart projects, but also from systemic sectoral resilience and disaster preparedness.

Adaptation and resilience are critical elements in the Action Plan, necessary across all areas that the WBG supports clients, and critical for the success of the five key systems transitions outlined in Section 3. In addition to the five key transitions, the WBG will support investments in the following priority areas:

- **Disaster risk management:** Expanding access to high-quality hydrometeorological data and early warning systems and supporting agencies with improved meteorological, hydrological, and/or flood forecasting systems;
- **Water security:** Supporting river basins with climate-informed management plans and/or improved river basin management governance, and providing people with improved flood and drought risk management infrastructure;
- **Coastal resilience:** Helping countries adopt measures to increase their resilience to climate-related shocks and stressors in coastal areas;
- **Human development:** Supporting climate hot-spot countries with human development engagements (education; health, nutrition, and population; social protection and jobs) to effectively implement resilience strategies;
- **Financial protection:** Supporting countries in their efforts to respond early to and recover faster from climate and disaster shocks with additional financial protection instruments, and reduce climate-related risks through financial sector regulatory reforms; and
- **Forests and integrated landscape management:** Supporting interventions through an integrated landscape management approach for avoiding deforestation and promoting landscape restoration or sustainable forest management.

Source: World Bank. 2019. "The World Bank Group Action Plan on Climate Change Adaptation and Resilience."