

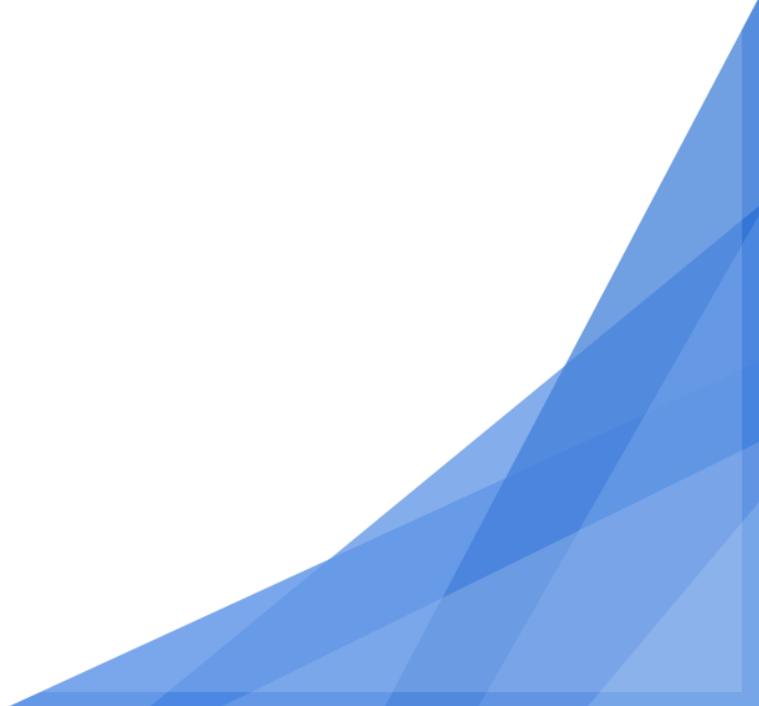


CLIMATE ACTION PATHWAY

INDUSTRY

Vision and Summary

2021



VISION

It is 2050 and the vision of the United Nations Sustainable Development Goals has been achieved. Industries generate emissions in line with what the natural world can safely process, while providing dramatically improved quality of life for citizens. Humanity is witnessing a convergence of new technologies, new business models, policy response to new risks, new consumer sentiment and a new investment paradigm.

Better fundamental design – of cities, supply chains, data centres, vehicles and fleets, and consumer goods – has eliminated waste and brought materials into a fully circular life cycle. Investors and asset owners broadly prefer companies motivated by and aligned with socioeconomic and environmental imperatives, identifiable through enhanced transparency and disclosure of climate-related risks and opportunities. Technology entrepreneurs and first movers deliver rapid technology change, which cascades across sectors and value chains with the support of an enabling ecosystem of capital providers and more adaptable regulation. Independent data-driven measurement, tracking and accountability systems expose businesses misaligned with environmental and social outcomes, which have competed of late for a rapidly disappearing share of outdated real and financial markets. Policies have evolved to generate, reflect and reinforce these dynamics as they emerge, especially in providing legally binding, meaningful pricing of externalities.

Collective response to systemic constraints and emerging opportunities has interacted in positive feedback loops to rapidly generate more frugal, efficient, responsibly data-driven and socially and environmentally sound industries that support nature and biodiversity regeneration. Workers worldwide and the trade unions that represent them, are engaged through social dialogue processes to proactively manage economic transitions and uncertainties, while holding and creating rewarding healthy and decent jobs. This involves setting up Just Transition processes as defined by the ILO with social partners and other relevant stakeholders.¹ Communities and industries have become more resilient to climate impacts and other natural disasters, due mostly to local renewable electrification and supply chain redundancies.

Meanwhile, industrial sector transitions have delivered profound benefits for human and natural health: particulate matter and other forms of pollution have fallen dramatically in line with the abolition of the combustion of fossil fuels and a switch away from ultra-harmful f-gases. Biodiversity loss was halted and reversed by 2030 and all the world's lands and oceans were protected and managed, allowing future generations to enjoy the beauty of our planet.

Quickly following an accelerated peak in developed economies' emissions, high-growth developing countries have progressed along innovative development patterns even as populations continue to grow. Important steps along this road include cutting global emissions in half by 2030, and in half again by 2040, keeping the world on a 1.5°C-aligned trajectory as a prerequisite for achieving net-zero emissions by 2050.

¹ ILO, "Guidelines for a just transition towards environmentally sustainable economies and societies for all" https://www.ilo.org/global/topics/green-jobs/publications/WCMS_432859/lang-en/index.htm

SYSTEM TRANSFORMATION SUMMARY

The Industry Climate Action Thematic Pathway is presented in two main sections. Heavy Industry includes [Aluminium](#), [Cement](#), [Chemicals](#), [Plastics](#), [Steel](#), and [Metals and Mining](#) sectors. Light Industry represents [Retail](#), [Consumer Goods](#), [Fashion](#), [Mobile and Information and Communications Technology](#) (ICT).

Decarbonising these sectors is technically and economically feasible through three pathways:

- Reducing materials and energy use
- Increasing the productivity of materials and energy use
- Decarbonizing production processes, including climate damaging f-gases, while implementing transitional solutions such as natural climate solutions where direct emissions reduction cannot be reduced²

Relative emphasis on these components in near- to medium-term decarbonisation efforts varies substantially from sector to sector, due to diverse value chains, sectoral footprints and low-carbon economic development opportunities around the world. Urgent action is required across sectors to reduce emissions by 30 to 45 per cent by 2030 and achieve net-zero emissions by 2050. Therefore, efforts to accelerate decarbonisation remain key, and mitigation and adaptation actions must be combined to build resilience and tackle current and future impacts of climate change. Fortunately, there are many levers that can drive sectoral decarbonisation:

- Digitisation and the application of the Internet of Things, AI and machine learning in whole-system design to use resources and energy more efficiently without sacrificing quality or cost in areas like buildings, cities, data centres and manufacturing.
- Stronger reuse and recycling of commodities and products to drive circular resource flows, rather than the linear “take-make-waste” model.
- Substituting low- or net-negative carbon materials for carbon-intensive alternatives, and adapting practices where substitutes are not perfect.
- Accelerating commercialisation of breakthrough technologies.
- A step change in climate change ambition in policies at every level, with climate integrated into active workforce support, product standards, mandates, subsidies, procurement, climate risk disclosure implementation and carbon-pricing.
- Jobs’ modelling, social dialogues to develop coherent Just Transition policies and plans enabling
- Increased financial transparency, disclosure, innovation in instruments and institutional action to facilitate accelerated asset retirement, scaled investment, climate risk valuation, and just labour force transitions.

² Oxford University, “The Oxford Principles for Net Zero Aligned Carbon Offsetting”

- Data transparency, tracking, and accounting of commodities' carbon and other attributes through supply chains as a force multiplier of other levers.
- The preferential demand for verifiably low- to zero-carbon commodities by businesses, consumers and governments to pull solutions through supply chains.
- Civil society campaigns, calls to action, independent research and community dialogues.

To activate these levers, collaboration among multiple stakeholders – governments, businesses, asset owners, consumers and civil society – across value chains and across sectors is essential. Given the short timeframe available, this collaboration must aim higher than incremental change. Fundamental transformation of industrial systems by unpacking and redesigning them can make industry fit for purpose in the 21st century.

HEAVY INDUSTRY

Aluminium

The global Aluminium sector faces a very steep but technically feasible pathway that will need to take into account differing regional and national scenarios. Producers, as well as customers, policymakers and investors will need to invest to make this pathway a reality.

The International Aluminium Institute recently published the GHG Pathways to 2050, which shows the sector's impacts:

- The global aluminium sector is currently responsible for about 1.2 billion tonnes CO₂/year or 2 per cent of total global emissions.
- More than 90 per cent of the emissions stem from the primary production process, and two thirds of industry emissions are energy related.
- With aluminium poised to be a key building block of the green economy, global demand for aluminium is expected to increase by 80 per cent by 2050, reaching 170 million tonnes.

Sector growth is driven by increasing demand in key applications, where aluminium's unique properties make it the innovative material of choice for the low carbon transition. It has uses in mobility, building and construction and packaging.

This campaign calls for a net-zero target on carbon emissions by 2050. The Race to Zero Breakthrough Ambition calls for 20 per cent of major aluminium producing companies (by annual production) to join the Race to Zero. The breakthrough achievement will be achieved by reaching 20% zero carbon aluminium by 2030.

The key routes that need to be pursued are clear.

- Decarbonizing the grid will be necessary to reduce the subsector's indirect emissions. Electricity producers can assist by offering electricity pricing incentives to aluminium producers using demand management systems. The aluminium subsector can in turn assist with grid decarbonisation by providing flexibility services that would help integrate a higher portion of variable renewables. Participants all along the value chain (aluminium producers, engineers, construction companies and product manufacturers) can also adopt material efficiency strategies to reduce overall aluminium demand. For the non-grid connected smelters, that are mostly using self-generated power, there will be a need for increased connection to decarbonizing grids and/or carbon capture, storage or utilisation (CCS/U) to address electricity related emissions.
- Collaboration between aluminium product manufacturers and waste collectors will ensure that manufacturing and end-of-life scrap is collected and transported back to producers. That will increase use of recycled aluminium in production. R and D should innovate production methods that reduce primary process and combustion emissions, to ensure technological advances for direct and thermal processes and to increase efficiency of CCS/U technologies to adapt them to smelting. More energy-efficient equipment and operations would be beneficial.
- To make the transition happen in the aluminium industry, investments between USD 0.5 trillion and USD 1.5 trillion will be required over the next three decades, equalling a cost of USD 30 to USD 100 per tonne of carbon. Investment can advance low-carbon smelters and technologies designed to make smelting emission free, such as inert anodes.
- Strong demand signals will be key to support demand generation and accelerate the transition. To strengthen and scale bilateral and multilateral industry collaborations, for example with demand-driven sectors such as automotive or packaging, are key signals for the future. Also, the initial announcement by the London Metal Exchange in June 2020 to establish a spot-trading platform for low-carbon aluminium was an important initial signal in this direction. This will further increase transparency in production and supply chains.
- There is also an opportunity to work directly with client companies in the main uptake industries such as construction, transport, electronics and packaging and make the case for low-carbon aluminium. The aluminium market is competitive and globally commoditised, so relevant governments can use fora like the G20 or G7 processes to push for global solutions and open space for a level playing field, which is key for unleashing investment and accelerating change. Engineers should consider reusability and recyclability in product design. Policy makers can assist by setting requirements for end-of-life material reuse and recycling.
- Social partners (business and trade unions) at company, sector and national level engage in and set up Just Transition plans to deal proactively with the impact of the transition on workers and communities.
- A push by all stakeholders is needed to advance the large-scale deployment of promising technologies that have already shown promise.

By 2030, there should be a functioning market for low-carbon aluminium, which allows for transparency, and allows for the launch of core sustainability contracts. The first net-zero smelting facilities should be in

place and fully operational and several others should be in construction. Through intensified collaboration, the industry should have an implementation map ready to reduce direct emissions 60 per cent. Existing plants would have to be retrofitted and improved to perform at 2020 benchmark performance. The potential of the circular economy can be tapped by regulations that ensure products are designed and manufactured for value retention. In North America and Europe, large-scale aluminium sorting and remelting plants should already be gaining back the full value from the recycling chain.

Cement and concrete

Clear decarbonisation pathways exist for the cement and concrete industry, but abating both heat and process emissions means costs will be high relative to other heavy industries.

Pathways will need to take into account differing regional and national scenarios and speeds. Global carbon emissions from cement and concrete are around 2.2 Gt per annum, with business-as-usual scenarios predicting a rise to 2.3 Gt per annum by 2050. This is driven by:

- Emissions originate from direct process emissions (1.2 Gt), heat emissions from fuel combustion (0.75 Gt) and the remainder from smaller indirect emissions in the supply chain.
- Current progress is slow due the absence of a clear business case for large scale investment in advanced low-emission technologies.
- Lack of interaction in a highly fragmented value chain is also a barrier to developing innovative solutions and creating clear demand signals.³

This campaign calls for a net-zero target on carbon emissions by 2050. The Race to Zero Breakthrough Ambition calls for 20 per cent of major aluminium producing companies (by annual production) to join the Race to Zero. The breakthrough achievement will be achieved by reaching 25% of carbon neutral concrete by 2030.

Decarbonisation of the cement and concrete industry will require alignment across the value chain.

- Research shows that a combination of decreased demand, increased energy efficiency and investment in enhanced and breakthrough new technologies will be required to fully abate the sector. Demand management analysis suggests that global primary demand could be reduced by up to 35 per cent in a scenario where circular economy potential is realised. This will be primarily driven by an increase in recycle and reuse, materials efficiency (e.g. using less concrete per square metre) and developing innovative materials for the built environment sector, which will have to respond to high performance standards⁴.
- Energy efficiency levers are primarily relevant for clinker production and include improving refractories and energy management processes in kilns. Accelerated uptake and use of alternative non-fossil-based fuels (e.g. residual waste) and materials (e.g. slag, fly ash or calcined clays) can

³ ETC Making Mission Possible Cement Pathway

deliver emissions reductions in the short term, buying time for development of options that are necessary in a low carbon transition.

- Decarbonisation technologies must tackle both heat and process emissions and three promising examples are increased use of biomass, lower clinker content and CCS/U. The least costly solution is likely to vary by location, but in the absence of breakthroughs in cement and concrete chemistry, CCS/U will likely be the only solution to abatement of process emissions. Cost-effective ways to decarbonise heat emissions will depend on the price of renewable energy in a particular region. When hydrogen and electrified heat are fully scaled-up these strategies may be more prevalent.
- A combination of public procurement incentives and end-users attempting to reduce the carbon footprint of their practices will drive demand for carbon-neutral cement and concrete. Policy frameworks relevant for the transition in the cement and concrete industry will be crucial to fuelling the search for longer term solutions and uptake of existing decarbonisation technologies and practices. Policy levers include carbon pricing as well as smarter regulation on cement and concrete producers and construction companies. A shift to a more circular approach and reduction of material input should also be driven by these players.
- Suppliers should work closely with stakeholders across the value chain to establish more transparent targets, implement standards for tracking and certifying embodied carbon and supporting increases in regional carbon prices⁴. Finance actors and policy makers will play a key role in supporting R&D efforts in promising technologies and allocating funds for large-scale pilots. Investment in CCS/U is also critical due to the difficulties in completely eliminating all carbon across the cement and concrete value chain.

By 2030, governments and industry will take collaborative action to create favourable investment frameworks for accelerating the sustainable transition of the cement and concrete industry. All stakeholders should intensify collaborative action to implement state-of-the-art technologies and share best operating practices. Industry stakeholders should assess opportunities to use low-carbon technologies and develop plant-level action plans to increase the speed and scale of deployment of such technologies.

Social partners (business and trade unions) at company, sector and national level have engaged in and have set up “just transition plans” to deal proactively with the impact of the transition on workers and communities. Governments enable clean-energy grids to support the use of fuels that are less carbon-intensive in kilns. Joint efforts are undertaken to review and establish building regulations and specifications aimed at achieving carbon neutrality of the built environment over its entire life cycle, including during the use phase and at end of life. CCS/U facilities at commercial scale will be established through accelerated industry and regional collaborations and the right support from policymakers and researchers.⁴

⁴ CSI: “Technology Roadmap: Low-Carbon Transition in the Cement Industry”

Chemicals

In chemicals, various decarbonisation pathways and roadmaps exist, but more sector collaboration is needed to realize large-scale technology demonstration and drive ambition among key players.

Global chemical sales have increased exponentially over the last two decades, with sales surpassing €3,500bn in 2019 driven by China (€1,500bn) and Europe (€500bn).⁵ Looking at the industry, we see:

- The global chemicals sector is responsible for 5 per cent of total global emissions (1.5 Gt total direct emissions per year).⁶
- 60 per cent of total direct CO₂ emissions come from a small number of primary chemicals: n-fertilizer ammonia (30 per cent) and ethylene (16 per cent) and methanol (14 per cent) both used to make thermoplastics.⁷
- As of May 2021, only 6 per cent of major chemical companies by revenue (per the target company list from the High-Level Climate Action Champions) have joined the Race to Zero.⁸

This campaign calls for a net-zero target on carbon emissions by 2050 or sooner evidenced by interim 1.5-aligned science-based targets (SBTs).⁹ The Race to Zero Breakthrough Ambition, set by the High-Level Champions, calls for 20 per cent of supply actors (e.g., chemical companies) by revenue in a given sector to join the Race to Zero.¹⁰

Key actors throughout the system have important roles to play to support the decarbonisation of the chemicals sector to 2050.

- Policymakers should prioritise guidance on critical issues like access to affordable renewable energy, particularly as the sector will reach a critical “Breakthrough” when 60 per cent of electricity use across the global chemical sector is renewable.¹¹
- Finance stakeholders should work with industry to develop de-risking financing mechanisms to mobilise capital for large-scale deployment of low-carbon technology.

⁵ CEFIC, Facts and Figures 2021, https://cefic.org/app/uploads/2021/02/FactsFigures2021_Leaflet_V05.pdf.

⁶ Mission Possible Partnership, “Reaching net-zero carbon emissions from harder-to-abate sectors by mid-century: sectoral focus plastics”, 2018, <https://www.energy-transitions.org/publications/mission-possible-sectoral-focus-plastics/>.

⁷ Mission Possible Partnership, “Reaching net-zero carbon emissions from harder-to-abate sectors by mid-century: sectoral focus plastics”, 2018, <https://www.energy-transitions.org/publications/mission-possible-sectoral-focus-plastics/>.

⁸ Internal High-Level Champion team analysis, <https://unfccc.int/climate-action/marrakech-partnership/actors/meet-the-champions>.

⁹ UNGC Business Ambition for 1.5C calls on companies to set a net-zero target in line with a 1.5C future, in line with criteria and recommendations from the Science Based Target initiative, <https://unglobalcompact.org/take-action/events/climate-action-summit-2019/business-ambition>.

¹⁰ In line with the Race to Zero Breakthroughs released in January 2021, <https://racetozero.unfccc.int/breakthroughs/>. The 20 per cent of supply actors were chosen as part of a wide theory of change in line with Rogers’ bell curve of diffusion of innovations or technologies. Note that chemical companies are the target actors to join Race to Zero for both the chemicals and plastics sectors.

¹¹ Race to Zero Breakthroughs, January 2021, <https://racetozero.unfccc.int/breakthroughs/>. Breakthrough Outcome for the chemicals sector is modelled on corporate RE targets in line with RE100, <https://www.there100.org/>.

- Technology innovators should work with industry to develop and scale low-carbon solutions, exploring the use of alternative material inputs (biomass, waste product), scaling renewable electrification, and boosting low-carbon hydrogen production capacity.
- Businesses should ensure the full lifecycle of emissions associated with their products are included in net-zero emissions targets by 2050, supported by interim science-based targets.
- Workers organizations engage with businesses at company, sector and national level to set up Just Transition plans that deal proactively with the impact of the transition on workers and communities.
- Civil society should strengthen public awareness on the hidden costs of carbon-intensive chemical production and use throughout the value chain and influence key decision-makers to prioritise critical issues like renewable energy provision.

By 2030, global chemical sales are expected to double from 2017 levels, with demand largely driven by Asia (70 per cent), specifically China (50 per cent).¹² Businesses and Research, Design and Development (RD&D) professionals must accelerate plans for breakthrough technology deployment through further demonstration of next-generation technologies such as low-carbon hydrogen and commercially viable CCS/U. Policymakers and the investor community must support an increase in carbon prices to USD 60–100 per tonne.¹³

Metals and Mining

In metals and mining, accelerated action is needed to boost sustainable mining practices and drive portfolio shifts, and more value chain collaboration is required to address scope 3 emissions and drive ambition across the sector.

The global mining industry is early on its journey to set emission reduction goals and faces pressure to build climate resilience.

- Mining is responsible for 4-7 per cent of total global greenhouse gas (GHG) emissions.¹⁴
- As of May 2021, 2 per cent of major mining companies by revenue (per the target company list as defined by the High-Level Climate Action Champions) have joined the Race to Zero.¹⁵

This campaign calls for a net-zero target on carbon emissions by 2050 or sooner evidenced by interim 1.5-aligned science-based targets (SBTs). The Race to Zero Breakthrough Ambition calls for 20 per cent of

¹² CEFIC, Facts and Figures 2021, https://cefic.org/app/uploads/2021/02/FactsFigures2021_Leaflet_V05.pdf.

¹³ Mission Possible Partnership, “Reaching net-zero carbon emissions from harder-to-abate sectors by mid-century: sectoral focus plastics”, 2018, <https://www.energy-transitions.org/publications/mission-possible-sectoral-focus-plastics/>.

¹⁴ McKinsey & Company, Climate Risk and Decarbonisation: What every mining CEO needs to know, January 2020, <https://www.mckinsey.com/~media/McKinsey/Business%20Functions/Sustainability/Our%20Insights/Climate%20risk%20and%20decarbonization%20What%20every%20mining%20CEO%20needs%20to%20know/Climate-risk-and-decarbonization-What-every-mining-CEO-needs-to-know.ashx>.

¹⁵ Internal High-Level Champion team analysis.

supply actors (e.g., mining companies) by revenue in a given sector to join the Race to Zero.¹⁶ To support this ambition, demand signals need to come from a wide range of end-markets, including infrastructure and urban development, power and electricity, mobility, manufacturing, retail/consumer, and telecommunications.

Key actors throughout the system have important roles to play to support the decarbonisation of the metals and mining sector by 2050.

- Policymakers should ensure GHG emissions from mining companies are integrated into UNFCCC Nationally Determined Contributions (NDCs).
- Finance stakeholders should promote widespread industry use of responsible mining standards and encourage actors to set clear, science-based emissions reduction targets with roadmaps for action.
- Technology solutions are critical for the sector to green their operations (particularly through electrification, as mining emissions are largely driven by electricity supply). The sector will be considered to have reached a critical “Breakthrough” when 60 per cent of electricity use across the global mining sector is renewable by 2030.¹⁷
- Supply-side miners and producers should report and disclose their emissions, supported by a science-based commitment to net-zero emissions by 2050 or sooner.
- Civil society actors like NGOs, researchers, and think tanks should continue to raise awareness about the environmental and social costs of unsustainable mining practices on biodiversity and local communities, and help hold producers to account.
- Workers organizations engage with businesses at company, sector and national level to set up Just Transition plans that deal proactively with the impact of the transition on workers and communities.

By 2030, the global mining sector should be powered by 60 per cent renewable electricity at minimum and all large-scale mining companies should be reporting on net-zero emission pathways to 2050, with material mines independently verified as meeting a comprehensive and rigorous Environmental, Social and Governance (ESG) standard. Please refer to the Steel and Aluminium sections for more detailed information by commodity.

Plastics

In plastics, various decarbonisation pathways and roadmaps exist, but more cross-industry collaboration is needed to reduce plastic demand, promote circularity throughout the value chain, and drive ambition across the sector.

¹⁶ In line with the Race to Zero Breakthroughs released in January 2021, <https://racetozero.unfccc.int/breakthroughs/>. The 20 per cent of supply actors were chosen as part of a wide theory of change in line with Rogers’ bell curve of diffusion of innovations or technologies.

¹⁷ Race to Zero Breakthroughs, January 2021, <https://racetozero.unfccc.int/breakthroughs/>. Breakthrough Outcome for the metals and mining sector is modelled on corporate RE targets in line with RE100, <https://www.there100.org/>.

Demand for plastics has outpaced that of all other bulk materials (such as steel, aluminium or cement), and upstream production and emissions is forecast to nearly triple over the next 30 years.¹⁸ Looking at the sector, we see:

- Direct emissions of ethylene and methanol, used to make thermoplastic, accounts for approximately 30 per cent of the global chemicals sector direct emissions (1.5 Gt total direct emissions per year).¹⁹
- Plastics is complex due to the wide range of materials and products used in different demand markets, with primary use as polyethylene terephthalate (PET) for packaging.

Downstream, plastic waste remains a global challenge. Current commitments by governments and industry only reduce the annual volume of plastic flowing into the ocean by 7 per cent by 2040 and do not significantly curb the projected growth in plastic production.²⁰ Solutions vary by end-market and geography, but a globally coordinated approach to key issues like product design and waste management is key to realize and deliver solutions locally.

Key actors throughout the system have important roles to play to support the decarbonisation of the plastics sector to 2050.

- Policymakers should set the ambition and vision for transition to a low-carbon circular plastic economy.
- Finance stakeholders like investors can help develop and deploy financial instruments to drive changes in infrastructure, innovation, and business models. Interventions are particularly key in the East Asia and Pacific region, which accounts for approximately 60 per cent of mismanaged plastic waste.²¹
- Technology is a key lever to drive low-carbon production upstream, as well as advance new business models and services through the value chain.
- Businesses should set net-zero emissions reduction targets supported by interim science-based targets and consider the full lifecycle of emissions associated with their products.
- Civil society has a key role to play in strengthening public awareness of the externalities or “hidden costs” of carbon-intensive plastic production and poor waste management through policy advocacy, research, campaigns, and calls to action.
- Workers organizations engage with businesses at company, sector and national level to set up Just Transition plans that deal proactively with the impact of the transition on workers and communities.

¹⁸ Mission Possible Partnership, “Reaching net-zero carbon emissions from harder-to-abate sectors by mid-century: sectoral focus plastics”, 2018, <https://www.energy-transitions.org/publications/mission-possible-sectoral-focus-plastics/>.

¹⁹ Mission Possible Partnership, “Reaching net-zero carbon emissions from harder-to-abate sectors by mid-century: sectoral focus plastics”, 2018, <https://www.energy-transitions.org/publications/mission-possible-sectoral-focus-plastics/>.

²⁰ The Pew Charitable Trusts and SYSTEMIQ, “Breaking the Plastic Wave”, 2020, <https://www.pewtrusts.org/en/research-and-analysis/articles/2020/07/23/breaking-the-plastic-wave-top-findings>.

²¹ Our World in Data, “Plastic Pollution”, 2018, <https://ourworldindata.org/plastic-pollution>.

By 2030, policymakers must support measures to promote aspirational campaign goals such as ensuring zero plastic in the ocean.²² This involves significantly reducing production and use of plastics and pushing key regions to raise ambition for existing recycling targets, along with establishing clear national policy to standardize material inputs to enable circular design and increase the use of recycled content in plastic products. Businesses and RD&D professionals must accelerate plans for breakthrough technology deployment through further demonstration of next-generation technologies. The investor community can support an increase in carbon prices to USD 60–100 per tonne to unlock the investment required to facilitate such technology deployment at scale.

Steel

The global steel sector faces a steep but feasible pathway to decarbonisation through collaboration between suppliers, customers, policymakers, and investors.

The global steel market is characterised by a fierce cost competition and additional costs incurred from the needed transition will be challenging for the companies that are facing long asset lifetimes of 30 to 50 years and an excess primary production capacity of about 20 per cent of current production.

- Steel accounted for 3.6 (GtCO₂e) and 9 per cent of total energy-related emissions in 2019, of which 2.6 GtCO₂e, or 7 per cent of total, are directly energy-related.
- China supplies 50 per cent of the primary market today, a share set to decline by around 20 per cent by 2050
- India's demand is expected to grow by 40 per cent, tripling its share of the global total.

Despite these shifts, most forecasts suggest a long-term growth outlook for both primary and secondary steel production, although this may be challenged in scenarios of significant dematerialisation and materials efficiency/recycling²³ and accelerated behaviour change.²⁴

To ensure participation in ever-less carbon intensive steel production, at least 20% of steel producers are encouraged to join the Race to Zero by COP26. This participation reflects the clear paths to decarbonising steel by 2050 at minimal additional cost to end-customers.

- Demand management can reduce primary steel required by 25 to 40 per cent by 2050 through improved design of buildings and cars, extended lifetimes, and reduced waste. To achieve this, customers, building owners and construction companies must demand – or cities and states regulate – adoption of material efficiency measures by designers and architects, enabled by accelerated turnover in building codes and standards.

²² WWF, No Plastics in Nature campaign, <https://www.worldwildlife.org/initiatives/plastics>.

²³ BCG and the World Economic Forum, "Metals and Mining in a Sustainable World 2050", IEA "Materials Efficiency Scenario"

²⁴ IPCC Special Report 1.5, International Institute for Applied Systems Analysis, "A low energy demand scenario"

- Building developers and owners and automobile manufacturers can adopt substitutes and new practices, such as longer building lifetimes, driven by changing consumer preferences and synergistic value opportunities. An example of synergy would be lightweight electric vehicles that improve battery capacity with weight saving.
- Businesses and investors can lead investment in energy efficiency measures for near-term decarbonisation of young assets like those in India through national or joint international initiatives incentivizing deeper efficiency gains against leading benchmarks.
- Businesses with policy and investor support can accelerate collaborative RD&D efforts to speed and scale deployment of low- to zero-commercial-scale production facilities. This support must accompany electricity grid decarbonisation and accelerated transitions to nearly half recycled steel production using electric arc furnaces. In the context of a potentially evolving production base, industrial strategies, funding, and social dialogues need to help communities manage and support technology transitions across borders.

By 2030, progress along several dimensions will be critical.

- Cities and regions must launch net-zero embodied carbon strategies and policies, strengthened by collaborative mechanisms for learning and action like the Clean Construction Forum.
- Businesses and RD&D researchers must accelerate plans for breakthrough technology deployment through further demonstration of next-generation technologies and at least 20 commercial-scale, low- to zero-carbon production facilities in line with the UN Breakthrough Target.
- Initiatives like [Mission Innovation](#) and the [Net Zero Steel Initiative](#) can help ambitious businesses and policymakers agree on roadmaps to 1.5-degree aligned emissions reductions, as well as realize new value pools by redesigning supply chains through initiatives like the Green Hydrogen Catapult. These can help to clarify technology pathways for deployment at scale in the 2030s.
- Workers organizations engage with businesses at company, sector and national level to set up Just Transition plans that deal proactively with the impact on workers and communities.
- Investors can increase pressure and support for wider uptake of net-zero commitments, while enabling an end to new coal-based production capacity in developing countries long before 2030, with innovative concessional funding.

In Europe, well before 2025, policymakers can increase carbon prices to more than USD 60/tonne to unlock fuel-switching and carbon capture investments, coupled with specific product requirements. These investments can be supported by differentiating steel markets with non-profit certification and accounting regimes like Responsible Steel and COMET, emerging asset-level emissions transparency, and procurement commitments by government and corporate steel buyers. This can unfold against a backdrop of ramped-up production of fully scrap-based, recycled steel supply and demand enabled by better collection, sorting, and renewable electrification.

Point-source carbon Capture and storage/utilization (CCS/U) and atmospheric removals for Heavy Industry

Throughout this document, CCS/U refers to carbon capture and storage or utilisation, from emission point-sources.

This focuses on the capture of concentrated point-source emissions from industrial operations or their associated fuel emissions. Alternative approaches to capture diffuse atmospheric emissions (e.g., Direct Air Capture) from other sectors, such as long-distance aviation, are likely to rely on the infrastructure and experience of point-source CCS/U applications.

By 2050, approximately 2 – 4 gigatonnes per annum (Gtpa) of atmospheric emissions could be avoided via CCS/U in the aluminium, ²⁵chemicals and steel industries combined. This represents a substantial increase of 50x – 100x on today's global CCS/U operating capacity of just 0.04 Gtpa across all sectors and industries. The current global project pipeline stands at an additional 0.04 Gtpa²⁶ at the front-end engineering design stage or further.

For certain stakeholder groups, the deployment of CCS/U at scale remains controversial. Concerns commonly centre around themes of geological security, economic viability, technological readiness, and the moral hazard that CCS/U will delay the transition from fossil fuels to renewables. While some concerns are appropriate, CCS/U offers potential to avoid large portions of heavy industry's hardest-to-abate emissions where it becomes apparent no clear alternative exists. As such, these concerns must be addressed in parallel to increased investment and learning at scale.

By 2030, progress along several dimensions will be critical.

- Policymakers, investors and businesses across heavy industry must be poised to deploy CCS/U at a meaningful (Gtpa) scale in the following decade. Project development timelines are long: five years being a typical expectation from commitment to operation, though in practice far longer is likely required for the first gigatonne(s) of capacity. As such, national capacity targets are needed in the early 2020s, particularly in sectors where there is little-to-no deployment today (e.g., steel, cement, aluminium).
- Technological innovation can unlock new utilisation pathways (e.g., building materials), but requires the support of policymakers who draw on the power of government procurement and product standards, ensuring public infrastructure projects drive demand for recycled CO₂ (e.g., stored in cement). For geological storage, new regulatory frameworks are needed to clarify international obligations and liabilities associated with leakage from rock formations.
- Cross-industry partnerships must identify clusters or 'hubs' of industrial sites, that offer the potential to share a common transport and storage infrastructure, further reducing operational costs. Here, the Oil and Gas Climate Initiative's (OGCI's) KickStarter initiative represents a crucial

²⁵ ETC and SYSTEMIQ analyses on negative emissions, April 2021 (supported by We Mean Business); ETC hydrogen work, IEA ETP 2017, Global CCS Institute

²⁶ Global CCS Institute – Global Status of CCS 2020

first step.²⁷ Granular mapping can also clarify potential resource constraints (i.e., due to increased water consumption).

- Investors and businesses must respond to all of the above by earmarking more capital, with just USD 35bn currently allocated to CCS/U projects, well short of the estimated USD 500bn required to reach the first milestone of 1.0 Gtpa.²⁸

In addition to avoiding emissions through the capture and storage of concentrated point source CO₂, industrial sectors can remove emissions accrued during the decarbonisation transition, via the likes of natural climate solutions (NCS) or technological solutions that capture diffuse emissions (e.g., Direct Air Capture, or enhanced mineralisation). Solutions for the deployment of these technologies in a sustainable manner are being explored as part of the broad suite of solutions to help raise ambition on climate action in sectors that need them.

LIGHT INDUSTRY

Consumer Goods

Although the consumer goods sector is well represented in climate leadership at the individual brand level, no global decarbonisation roadmap has been identified for the sector, and existing efforts to baseline carbon emissions are poor.

The consumer goods sector is a high-emission sector with significant efforts needed to achieve decarbonisation.

- Analysis suggests that the sector is responsible for an estimated annual 33Gt CO₂e emissions, or 60 per cent of global total.
- The same analysis suggests a future expected industry growth rate of 5.3 per cent per annum for the next two decades.
- The sector must reduce emissions by more than 50 per cent to meet 2050 targets required to maintain warming at below 1.5°C.²⁹

The consumer goods sector is in a key position to influence consumption behaviours and diets through ingredient sourcing, product design and category choices. More than 80 per cent of consumer goods GHG emissions lie in supply chains, yet only 25 per cent of companies currently engage their suppliers to address

²⁷ OGCI Kickstarter Initiative

²⁸ Commitments from BCG analysis of NDCs and IOCs (March 2021); IEA "CCS/U in Clean Energy Transitions"; Zero Emission Platform, "Costs of CO₂ Storage"

²⁹ IPCC & [McKinsey](#), 2016.

emissions, creating an opportunity to influence upstream emissions with stronger scope 3 target-setting and monitoring.³⁰ Further strategies to decarbonise the consumer goods sector include tackling commodity-driven deforestation, reducing food waste, reducing the use of harmful refrigerants, moving to zero-carbon logistics, and addressing plastic waste.

Actors throughout the system have important roles to play in decarbonising the consumer goods sector.

- Policymakers play a role in accelerating deployment of low-carbon logistics, investing in circular economy solutions, eliminating deforestation, extending producer responsibility for waste and plastic packaging, supporting regenerative agricultural practices, restoring, and protecting land, and helping customers to lead low-carbon lifestyles.
- Supply chain actors upstream and in agriculture react to signals by consumer goods companies as they align with buyers' decarbonisation agendas, creating a key feedback loop. Strengthening standard certification for soft commodities by investing in producer capacity-building enables brand integrity in reporting on scope 3 emissions. Supply chains should be transparent, traceable, and working towards a zero natural deforestation goal.
- Policymakers and supply chain actors have to guarantee the protection of labour rights over the complete supply chain. Workers organizations engage with businesses at company, sector, and national level to set up Just Transition plans that deal proactively with the impact on workers and communities.
- Demand on the consumer side can be influenced by through category innovation (e.g. alternative proteins as a substitute for meat), product design changes (e.g. to increase shelf-life), carbon labelling, and environmentally positive advertising and marketing of brands, creating a positive feedback loop with the rest of the supply chain.
- Civil society plays a role in strengthening public awareness of social and environmental externalities or hidden costs, such as loss of natural habitats as a result of deforestation.
- Technology and innovation are needed to deliver climate-smart solutions. Focus areas for consumer goods should include electrification of heavy-good vehicles, eliminating natural gas from heating and cooling processes, scaling supply chain traceability solutions, developing low-carbon last-mile delivery for growing e-commerce services, overcoming technical barriers to recycling, designing products which minimize in-use consumer emission footprints, developing effective substitutes for plastic, and shifting to natural refrigerants and more efficient refrigeration.

By 2030, consumer goods companies must ensure zero deforestation from sourcing of major commodities, that farmland under regenerative practice in their own supply chains is doubled, and that food waste is cut by 50 per cent within own operations and at the consumer level. Sales of circular and plant-based products should increase by 50 per cent, with climate information appearing on all products. In accordance with the Ellen MacArthur Foundation's Plastics Pact, problematic plastic-packaging should be eliminated. Of remaining plastic packaging, 100 per cent should be reusable, recyclable, or compostable, and recycled content should be significantly increased. To meet the requirements of the European Union F-Gas

³⁰ Of companies that report to CDP.

Regulations by 2030, hydrofluorocarbon refrigerant gases must be reduced by 79 per cent. By 2030, consumer goods companies should transition their LGV fleets to 100 per cent zero-carbon and made significant progress in decarbonising both last-mile logistics and their HGV fleets. Finally, 100 per cent of renewable energy should be sourced at all sites, with 100 per cent of LEDs adopted in new buildings, and 80 per cent in existing buildings.

Fashion

In Fashion, various carbon assessments and analyses exist, however further cross-industry collaboration is underway to build consensus around decarbonisation milestones and a shared narrative on addressing focal areas.

The Fashion sector is a highly GHG-intensive industry, that is expected to grow significantly over the next decade. In looking at the sector, we see:

- Estimated emissions range from 1.2 billion to 3.9 billion tonnes of CO₂e annually, or 2–8 per cent of the global total.
- More than 70 per cent of the emissions come from upstream activities, particularly energy-intensive raw material production, preparation, and processing.
- The remaining 30 per cent are generated by downstream activities such as transport, packaging, retail operations, usage, and end of use.³¹

High demand growth for Fashion of up to 63 per cent is anticipated over next 10 years in some emerging markets. This follows the trajectory of the past 15 years, where global production of clothing doubled despite garment utilisation dropping by 36 per cent.³² Under its current trajectory, the Fashion industry will miss the 1.5°C pathway by 50 per cent.

Key carbon impact areas for the Fashion sector are manufacturing and fibre production, which includes the sourcing of material alternatives to high-carbon fibres such as cotton, the procurement of renewable energy, and the phase-out of coal for industrial heat production.

As a downstream and consumer-facing industry, the sector is in a key position to influence consumption patterns as well as in-use impacts, and so the circular economy should continue to be leveraged as a key enabler of behavioural change. Overall, 60 per cent of abatement potential lies in decarbonizing upstream operations, 20 per cent lies in brands' own operations, and 20 per cent on sustainable consumer behaviours. Other analysis shows that roughly 250 million tonnes of CO₂e could be reduced through a 50 per cent shift to renewable energy in tier 2 and 3 production.³³

Key actors throughout the system have important roles to play in decarbonizing the Fashion sector.

³¹ [Fashion on Climate](#), McKinsey and GFA, 2020

³² [A New Textiles Economy](#), Ellen MacArthur Foundation, 2017

³³ [Roadmap to Net Zero](#), World Resources Institute and Apparel Impact Institute, 2020

- Policymakers have a key role in supporting energy decarbonisation by catalysing investment, developing incentives for manufacturers to move towards renewable tariffs, strengthening extended producer responsibilities and penalties for “fast fashion”, improving recycling infrastructure, standardizing taxonomies, restoring and protecting land, ensuring that coal used for the production of industrial heat is phased out in a timely manner, taking action on microfiber pollution in oceans, enabling circular economy initiatives, and helping consumers lead low-carbon lifestyles.
- Supply chain actors are influenced by the scope 3 commitments of downstream and customer-facing fashion brands, forming a key feedback loop. Helping create favourable policy environments for renewable energy procurement in key producer markets and strengthening standard certification for crops such as cotton by investing in producer capacity-building enables brands to preserve integrity in reporting on scope 3 emissions.
- Policymakers and supply chain actors have to guarantee the protection of labour rights over the complete supply chain in the fashion sector, as has been advocated for example by the Clean Clothes Campaign.³⁴ Workers organizations engage with businesses at company, sector and national level to set up Just Transition plans that deal proactively with the impact on workers and communities.
- Demand on the consumer side can be influenced through changes in product design, material substitution, greater investment in recycling, repair and reuse of clothing at end of life, and promotion of greener consumption habits at the point of sale and through advertising and marketing, creating a positive feedback loop across the supply chain.
- Civil society plays a role in strengthening public awareness of the externalities or “hidden costs” of carbon-intensive practices – for instance, the high waste volumes and low quality and hence low garment utilisation rates particular to “fast fashion” business models.
- Finance and the investor community can spur the development, scaling and uptake of critical technologies and reallocate capital from old, carbon-intensive assets and practices towards greener ones. By 2030, the fashion industry must meet a USD 20-30 billion financing requirement, to fund and scale the innovative technologies needed to unlock a circular textiles economy. Philanthropic capital can also support capacity-building and investment in producer markets.
- Technology and innovation are needed to deliver and scale synthetic, recycled and alternative fibres for garment production, mechanical and biological fibre recycling techniques, and virtual and augmented reality concepts, which may support reductions in overall consumer demand.

Overall, businesses must meet the headline commitment of the UNFCCC Fashion Charter to reduce emissions across all scopes by 30 per cent by 2030. Brands must source 100 per cent renewable energy across their value chains and achieve 80 per cent efficiency gains in retail operations and across heating, ventilation, and air conditioning equipment. In terms of material mix, more than 50 per cent of global cotton produced must be sustainable by 2030, with use of alternatives such as recycled polyester, organic

³⁴ <https://cleanclothes.org/>

and bio-based materials significantly increased. In promoting changes in consumer buying patterns and the shift to circular behaviours, brands should trade one in five garments through circular business models and reduce e-commerce return rates to 15 per cent from the current 35 per cent.

Information and Communications Technology (ICT) and Mobile

Leading ICT and mobile businesses have substantially decarbonised by switching to renewable energy, investing in energy efficiency and supporting suppliers to do the same.

ICT and mobile sectors can decarbonise rapidly and have huge potential to act as change agents for other sectors.

- These sectors account for approximately 1.4 per cent of global GHG emissions corresponding to a 2015 baseline.³⁵
- They established their own pathway in line with a 1.5°C scenario³⁶ with SBTi, working with the United Nations International Telecommunication Union (ITU), GSMA mobile industry association, and the Global eSustainability Initiative.
- Over 30 per cent³⁷ of ICT and mobile sectors by revenue have joined the Race To Zero, by committing to the UN Global Compact Business Ambition for 1.5°C or other partner initiatives including the Exponential Roadmap, SME Climate Hub, B Corporations, The Climate Pledge, the B Team (Net Zero by 2050).

The ITU pathway requires sub-sector reductions ranging from 45 per cent to 62 per cent between 2020 and 2030 for network and data centre operators, with further work soon to be published for other sub sectors.³⁸ An estimated 80 per cent of emission reductions can be achieved by operators and their suppliers switching to renewable energy.

The ICT and Mobile sectors accelerate change in other sectors, with potential to help decarbonise and improve their resilience. As an enabling force, the sectors hold potential to deliver benefits beyond their own sectoral footprint. A 2019 study of the mobile industry calculated that a reduction of ten times its own emissions were enabled in other sectors.³⁹ The ICT sector has already been a significant driver of additional renewable electricity beyond the companies own power needs. ICT and mobile also enable agency for more than 5 billion people using ICT products. To capitalise on this potential, the sector must move quickly on renewable energy in its own operations and supply chains, decarbonise the internet, and improve circularity for end-user products.

³⁵ ITU-T L.1470 Greenhouse gas emissions trajectories for the information and communication technology sector compatible with the UNFCCC Paris Agreement

³⁶ Ref: <https://sciencebasedtargets.org/sectors/ict>

³⁷ Analysis by GSMA and Climate Champions, 2021

³⁸ ITU-T L.1470 Supplement 38: Guidance for information and communication technology manufacturers on setting 1.5°C aligned targets compliant with Recommendation ITU-T L.1470

³⁹ [The Enablement Effect](#), GSMA, 2019

For resilient, decarbonised ICT and mobile sectors, action is required in four areas that will drive exponential change within their own systems and the wider economy.

- Operational Efficiency – ICT and mobile and data centre operators consume large amounts of electricity in direct operations. Commercial feedback loops continue to drive efficiency, reducing costs of renewables. Policy changes in many markets will accelerate the adoption of renewable energy. At the same time, operations must be resilient against increasing extreme weather events and rising sea levels, with an aim to add resilience in the communities they serve guided by a vision of digital connectivity for all.
- Supply Chain – The recognition that the supply chain, primarily for devices, may be responsible for over half of total end-to-end value chain emissions should drive operators pursuing SBTs to partner with suppliers on emissions reduction programmes, disclosure and target-setting. Such programmes cover emissions reduction activities, including energy efficiency, renewables uptake, process efficiency, reducing material waste, smarter logistics, reduced packaging, and raw materials with lower embodied carbon, among others.
- e-Waste – Enterprise customers and consumers of ICT devices increasingly demand low-carbon, low-waste products. This drives equipment suppliers to seek emission reductions in their supply chains and innovate in ways that move from a linear economy to a circular one. Such innovation extends product use and expands options for reuse and recycling, and should be mindful of impacts from extraction of rare earth metals and water use, especially in electronics and battery component manufacture (see also the Water Pathway and the Metals and Mining sub-sector in this document).
- Enablement – ICT and mobile sectors recognize the commercial opportunities in decarbonisation and resilience in other sectors. From videoconferencing, teleworking, social media, e-commerce and the Internet of Things, through to AI, 5G, blockchain and digital twins, ICT is changing the way the economy works. These changes increasingly drive efficiencies in other sectors from energy to transport, the built environment, and health, to agriculture. The right policy environment is required to ensure that these efficiencies deliver more resilience and faster decarbonisation.

Key actors have important roles in unleashing the decarbonisation potential of ICT and mobile.

- Policymakers can support ICT and mobile transformation with continued support for the energy sector to move towards 100 per cent decarbonised energy, including 100 per cent renewables when possible. Policy can enable global sector direct procurement of additional renewable energy capacity, driving demand from operations and supply chains. Policy changes are also required to stimulate circular economy innovation and business models for ICT devices. For the ICT and mobile sector to enable wider resilience and decarbonisation across the economy, policies that incentivize decarbonisation and dematerialisation and encourage rollout of high-speed digital connectivity are key.
- Finance and investment are needed to support and scale up clean technology innovation and create markets for renewable energy across multiple sectors.
- Technology and innovation are critical to deliver the step-change efficiency improvements needed to continue to support accelerated growth of data across networks and services.

- Business and services must get behind the switch to renewable energy and decarbonisation of operations through campaigns such as The Climate Group’s RE100, EV100 and EP100. Older, less efficient technologies must be decommissioned, and newer technologies should be commissioned with high performance at the energy system level as a key characteristic. Device and end-user service product information is needed to inform consumers of the (approximate) CO₂e content of their purchases.
- Policymakers and supply chain actors have to guarantee the protection of labour rights over the complete supply chain. Workers organizations engage with businesses at company, sector and national level to set up Just Transition plans that deal proactively with the impact on workers and communities.
- Civil society can get behind policies and businesses that decarbonise ICT, promote a “green internet” and enable the transformation of other sectors in the economy.

By 2030, it must be possible for operators and other actors in these sectors to purchase renewable energy directly at a price that reflects the lower wholesale costs of renewables, and policy incentives for the switch to renewable energy must be implemented across regions. This is critical for networks and edge-based data centres which need to be physically present close to end-users.

Solutions must be developed for the sectors’ remote sites and fleets to operate with renewable energy. Policies need to be enacted that will encourage the decarbonisation and dematerialisation of business processes – and a shift from products to services – in all sectors of the economy to leverage ICT’s ability to decarbonise well beyond its own operations. High-speed digital connectivity needs to be extended to support remote working and inclusiveness - the importance of inclusive connectivity has been clearly demonstrated during the Covid-19 pandemic. Business models must be launched that provide zero-carbon use by consumers, and customers need to know the carbon impact of the products and services they purchase. The majority of ICT devices must be reused and/or recycled and product lifetimes and upgradability should be extended.

Retail

In retail, global action and leadership are required to establish key milestones for the sector and to ensure delivery through effective collaboration, with the United Kingdom’s 2020 Climate Action Roadmap setting a strong example.

The retail sector includes businesses engaged in the sale without transformation of new and used goods, mainly to the general public, for personal or household consumption or use.

- No comprehensive study has recently been conducted on the emissions impacts of the sector globally, with regards to retailing activities specifically, or the cumulative emissions profile of retail companies.

- Over 27 per cent of major players within the retail sector by revenue have joined the Race to Zero, by committing to the UN Global Compact Business Ambition for 1.5°C or other partner initiatives including the Exponential Roadmap, The Climate Pledge and SME Climate Hub.⁴⁰

As a downstream and consumer-facing industry, the retail sector is in a key position to influence consumption behaviours and patterns as well as activities of its suppliers and the consumer goods industry. This is accomplished by setting ambitious scope 3 targets and improving capabilities to measure and track them effectively. Further strategies to decarbonise the retail sector include operating efficient, net-zero sites powered by renewable energy, moving to zero-carbon logistics, sustainably sourcing raw materials, and helping customers live low-carbon lifestyles.

Key actors throughout the system have important roles to play to support the decarbonisation of the retail sector.

- Policymakers have a key role in supporting whole life-cycle decarbonisation for buildings, creating incentives for moving towards renewable energy tariffs, improving building efficiency through enhanced certification requirements for landlords, supporting infrastructure for customer and logistics vehicle electrification, supporting regenerative agricultural practices, restoring and protecting land, and helping consumers lead low-carbon lifestyles, for instance through action on plastic packaging.
- Supply chain actors react to signals set by retailers, as they look to align with their buyers' decarbonisation agendas. In meeting the commitments set by those agendas, suppliers may set science-based or net-zero targets, increase their level of disclosure, invest in R&D, and engage their own suppliers further upstream.
- Retailers can influence consumer side demand through product design changes, material substitution, environmentally positive advertising and marketing and information-sharing at the point of sale and creating a positive feedback loop with the rest of the supply chain.
- Civil society plays a role in strengthening public awareness of the externalities or hidden costs of carbon-intensive practices, through campaigns and calls to action, addressing information gaps to influence sustainable purchasing choices.
- Finance and the investor community can spur the development, scaling and uptake of critical technologies and reallocate capital from old, carbon-intensive assets and practices towards greener ones – for instance, through the development of energy-efficient and circular buildings. Mechanisms such as preferential interest rates, guarantee schemes and risk-sharing facilities can help drive this.
- Technology and innovation are needed to deliver climate-smart solutions. Focus areas for retail include electrification of heavy-goods vehicles (HGVs), designing green and circular buildings, scaling supply chain traceability solutions, and shifting to natural refrigerants and more efficient refrigeration. Storage deployment for on-site renewable energy production and smart grid development to distribute energy surplus from variable renewable energy sources are other key focus areas.

⁴⁰ Analysis by Climate Champions, May 2021

- Policymakers and supply chain actors have to guarantee the protection of labour rights over the complete supply chain. Workers organizations engage with businesses at company, sector, and national level to set up Just Transition plans that deal proactively with the impact on workers and communities.

By 2030, whole life-cycle carbon emissions from buildings must be significantly reduced, with all new buildings as nearly-zero-energy buildings and emissions intensity (kgCO₂e/m²), following reduction trajectories for commercial real estate as set out by the Carbon Risk Real Estate Monitor global pathways. A total of 100 per cent of renewable energy must be sourced for all sites, with 100 per cent Light-Emitting Diodes (LEDs) adopted in new buildings, and 80 per cent in existing buildings. To meet the requirements of the European Union F-Gas Regulations by 2030, hydrofluorocarbon refrigerant gases must be reduced by 79 per cent. By 2030, retailers must have transitioned their entire large-goods vehicle (LGV) fleets to 100 per cent zero carbon and made significant progress in decarbonizing both last-mile logistics and their HGV fleets. Retailers must ensure zero deforestation from major commodities, that farmland under regenerative practice in their own supply chains is doubled, and that food waste is cut by 50 per cent at the retail level. On the consumer side, retailers should increase sales of circular products by 50 per cent, provide climate information on all products, and eliminate problematic plastic packaging.

MILESTONES TOWARDS 2050

| | By 2021 ▼ | By 2025 ▼ | By 2030 ▼ | By 2040 ▼ |
|------------------------------|---|---|---|---|
| Heavy Industry | | | | |
| Aluminium | <ul style="list-style-type: none"> A sector wide roadmap in place to reach a net-zero by 2050 ambition | <ul style="list-style-type: none"> 10 per cent of global production committed to roadmap Sector and company plans are established to create a just transition & guarantee quality jobs & decent work. | <ul style="list-style-type: none"> First net-zero smelter fully operational Core sustainability contracts launched on central exchange platform at LME's low-carbon Aluminium exchange | <ul style="list-style-type: none"> Recycling: collection rates for end-of-life products is 95 per cent; recovery of collected scrap is at full value |
| Concrete & Cement | <ul style="list-style-type: none"> A sector wide roadmap in place to reach net-zero by 2050 ambition | <ul style="list-style-type: none"> A substantial portion of all new construction is covered by gradually increasing targets for net-zero embodied and operational emissions Differentiated low- to zero-carbon markets are established Sector and company plans are established to create a just transition & guarantee quality jobs & decent work. | <ul style="list-style-type: none"> First integrated net-zero cement plant fully operational | <ul style="list-style-type: none"> 5 of top 10 cement producers being carbon negative |
| Chemicals | <ul style="list-style-type: none"> 20% of major chemical companies by revenue (of the High-Level Champion target company list) join Race to Zero. (UNFCCC Race to Zero Breakthroughs) Major chemical companies set science-based emissions reduction targets aligned with 1.5°C trajectory verified by credible third-party assurance provider (e.g., SBTi) Social partners engage in social dialogue processes to facilitate the implementation of the roadmap. 20% of major metals and mining companies by revenue (of the High-Level Champion target company list) join Race to Zero. (UNFCCC Race to Zero Breakthroughs) Leading mining companies set science-based emissions reduction targets aligned with 1.5°C trajectory verified by credible third-party assurance provider (e.g., SBTi) | <ul style="list-style-type: none"> Technology readiness level of decarbonisation technologies increased (biomass, electrification, recycling). Several large-scale low-carbon hydrogen demonstration projects in operation. Sector and company Just Transition plans are set up to create and guarantee quality jobs and decent work. Leading mining companies have material mines independently verified as meeting a comprehensive and rigorous ESG standard for mining. Sector and company Just Transition plans are set up to create and guarantee quality jobs and decent work. | <ul style="list-style-type: none"> Several large-scale pilot projects are in-flight across key low-carbon technologies. Major chemical companies source 60% renewable electricity. (E.g., in line with RE100, UNFCCC Race to Zero Breakthroughs) Carbon price targeting over USD 100/ton CO₂ realised. (Making Mission Possible, September 2020) All major mining companies to source 60% renewable electricity by 2030. (E.g., in line with RE100, UNFCCC Race to Zero Breakthroughs) Most construction, automotive, infrastructure, and other end-customers have set net-zero by 2050 commitments covering scope 3 emissions. | <ul style="list-style-type: none"> Proliferation of large-scale demonstration projects on a global scale. Major chemical companies source 90% renewable electricity. (E.g., in line with RE100, UNFCCC Race to Zero Breakthroughs) All major mining companies to source 90% renewable electricity by 2030. (E.g., in line with RE100, UNFCCC Race to Zero Breakthroughs) Major mining companies have majority of their mines certified as meeting a comprehensive and rigorous ESG standard for mining. |

| | By 2021 | By 2025 | By 2030 | By 2040 |
|----------------------------|---|---|--|---|
| Heavy Industry | | | | |
| Metals & Mining | <ul style="list-style-type: none"> Social partners engage in social dialogue processes to facilitate the implementation of the roadmap. | <ul style="list-style-type: none"> Leading mining companies have material mines independently verified as meeting a comprehensive and rigorous ESG standard for mining. Sector and company Just Transition plans are set up to create and guarantee quality jobs and decent work. | <ul style="list-style-type: none"> All major mining companies to source 60% renewable electricity by 2030. (E.g., in line with RE100, UNFCCC Race to Zero Breakthroughs) Most construction, automotive, infrastructure, and other end-customers have set net-zero by 2050 commitments covering scope 3 emissions. | <ul style="list-style-type: none"> All major mining companies to source 90% renewable electricity by 2030. (E.g., in line with RE100, UNFCCC Race to Zero Breakthroughs) Major mining companies have majority of their mines certified as meeting a comprehensive and rigorous ESG standard for mining. |
| Plastics | <ul style="list-style-type: none"> 20% of major chemical companies by revenue (of the High-Level Champion target company list) join Race to Zero (UNFCCC Race to Zero Breakthroughs) Major chemical companies set science-based emissions reduction targets aligned with 1.5°C trajectory verified by credible third-party assurance provider (e.g. SBTi). Social partners engage in social dialogue processes to facilitate the implementation of the roadmap | <ul style="list-style-type: none"> 50% of all plastic packaging in the EU is recycled. (EU Packaging Directive) Sector and company Just Transition plans are set up to create and guarantee quality jobs and decent work | <ul style="list-style-type: none"> Several large-scale pilot projects are in-flight across key low-carbon technologies. At least 55% of all plastic packaging in the EU is recycled. (EU Packaging Directive) Major chemical companies source 60% renewable electricity. (E.g. in line with RE100, UNFCCC Race to Zero Breakthroughs) | <ul style="list-style-type: none"> Proliferation of large-scale demonstration projects on a global scale. Major chemical companies source 90% renewable electricity. (E.g. in line with RE100, UNFCCC Race to Zero Breakthroughs) |
| Steel | <ul style="list-style-type: none"> 20 major constructions, automotive, infrastructure, other end-customer companies have set 2030 green steel procurement commitments Social partners engage in social dialogue processes to facilitate the implementation of the roadmap. | <ul style="list-style-type: none"> A substantial portion of all new construction is covered by gradually increasing targets for net-zero embodied and operational emissions Differentiated low- to zero-carbon markets are established Sector and company Just Transition plans are set up to create and guarantee quality jobs and decent work. | <ul style="list-style-type: none"> At least 10 commercial-scale low- to zero-carbon steel facilities in place | <ul style="list-style-type: none"> More efficient building design, reuse, and high utilisation buildings and transport avoid nearly 400 Million Metric Tonnes (MMT) per annum production of steel. Green commercial steel facilities are operational and producing 500MMT total annual capacity |

| | By 2021 | By 2025 | By 2030 | By 2040 |
|-------------------------|--|---|--|--|
| Light Industry | | | | |
| Consumer Goods | <ul style="list-style-type: none"> Achieve Breakthrough Ambition of 20 per cent of major players by revenue in the Race to Zero 100 per cent sustainable palm oil (RSPO) | <ul style="list-style-type: none"> Top 30 per cent of suppliers join the Race to Zero Plastics Pact targets observed (EMF) | <ul style="list-style-type: none"> Zero deforestation major commodities On-pack climate information on 100 per cent products Double farmland under regenerative practice 50 per cent reduction in food waste at the consumer level (Champions 12.3) | <ul style="list-style-type: none"> HGV fleets at 100 per cent zero carbon Net-zero agricultural production Protect 50 per cent of land |
| Fashion | <ul style="list-style-type: none"> Expand signatory base to cover 50 per cent+ brands by sales (Fashion Charter) USD 1 billion green bond issuance from brands | <ul style="list-style-type: none"> 50 per cent global cotton produced to be sustainable (Textile Exchange) 25% of key raw materials are from lower climate impact sources EU Member States required to set up separate collection of textiles by 2025 (Policy Hub) | <ul style="list-style-type: none"> 30 per cent emissions reduction across all scopes (Fashion Charter) USD 20-30 billion required in financing per year (BCG, GFA) | <ul style="list-style-type: none"> Net-zero GHG emissions across scope 1, 2 and 3 by 2050 (Fashion Charter) |
| ICT & Mobile | <ul style="list-style-type: none"> Sectors achieve breakthrough ambition with over 20 per cent by revenue committed to Race To Zero Initiatives launched for Race To Resilience Set target dates no later than 2040 for operators to run 100 per cent on decarbonised energy / RE | <ul style="list-style-type: none"> Policy incentives for ICT to enable other sectors to decarbonise New circular economy business models deployed in ICT and Mobile sectors including low-carbon supply for end-user devices | <ul style="list-style-type: none"> Sector emissions reduced by 50 per cent from 2020 80 per cent of ICT sector electricity supply from decarbonised sources 70 per cent of Mobile sector electricity supply from decarbonised sources | <ul style="list-style-type: none"> Sector operations 100 per cent on decarbonised energy / RE Sector emissions reduced by 50 per cent from 2030 |
| Retail | <ul style="list-style-type: none"> Achieve Breakthrough Ambition of 20 per cent of major players by revenue in the Race to Zero All new buildings to be zNEBs by 2020 (European Parliament) Zero food waste to landfill by 2020 (Vision 2020) | <ul style="list-style-type: none"> Top 30 per cent of suppliers join the Race to Zero Plastics Pact targets observed (EMF) | <ul style="list-style-type: none"> LGV fleets at 100 per cent zero carbon 100 per cent RE sourced at all sites 100 per cent LEDs in new buildings On-pack climate information on 100 per cent products 50 per cent reduction in food waste at the retail level (Champions 12.3) | <ul style="list-style-type: none"> Industry at 100 per cent net zero carbon HGV fleets at 100 per cent zero carbon Use only low impact refrigerant gases (max 150GWP) for all systems |

PROGRESS

Heavy Industry

Hard to abate sectors in Heavy industry include Aluminium, Concrete and Cement, Chemicals and Steel. Bringing together initiatives and work represented in this Industry pathway, the Mission Possible Partnership is developing detailed analysis and roadmaps for these sectors.⁴¹ These reports will be developed through 2022 and should outline key milestones and actions.

Aluminium – Progress needs to pick up speed. Recent months have seen net-zero announcements from several key sector players, among them Rio Tinto. There is a growing schism between companies that see clean aluminium as a market opportunity with higher prizes and producers that are less willing to change along this pathway. Certainly, if producers are serious, they need to look beyond power generation. Ultimately, large investments are needed in new smelting technologies. Several innovations exist, such as inert anodes, which can make smelting carbon-emissions-free. More collaboration and policy support are needed to ensure proper scaling up and higher impact. The newly announced commitment by China to achieve carbon neutrality by 2060 could be a real game-changer, as half of all global aluminium production is in China, with the majority of the production still fossil-based.

Concrete and Cement – The year 2020 saw the launch of the Global Cement and Concrete Association's 2050 Climate Ambition for carbon-neutral concrete by 2050 and the European Cement Association's 2050 Carbon Neutrality Roadmap. Several of the top-producing companies have clear ambition for carbon neutrality by 2050. Indian producer Dalmia raised ambition in 2019 by announcing a carbon-negative by 2040 target. Overall, nearly one third of global production is in line with the Paris Agreement targets. Generally, progress will need to accelerate compared to recent years. The industry has delivered a 19 per cent reduction in carbon emissions per tonne compared to 1990. Important are the increasing signals from the technology front around memoranda of understanding being signed to scale up CCS/U.

Chemicals – Of the major chemical companies by revenue on the High-Level Champion target company list, 6 per cent have joined the Race to Zero campaign.⁴² Reporting on and reducing scope 3 emissions are a particular challenge for the sector, given the length of value chains across many demand sectors. As of May 2021, 41 chemical companies have committed or set science-based targets (SBTs) through SBTi.⁴³ SBTi is currently developing chemical sector-specific methods and guidance to set SBTs, which should help elicit more ambitious commitment through 2021.⁴⁴ The majority of technologies required to decarbonise the chemicals sector remain in pilot or pre-commercial stages, so initiatives like the Mission Possible Partnership [Collaborative Innovation for Low-Carbon Emitting Technologies](#) in the chemical industry play a key role for large-scale technology demonstration.

Metals and Mining – There is ongoing pressure to accelerate a low-carbon transition. The sector has a key role to play in supplying the minerals and metals needed for the clean transition (such as cobalt and lithium

⁴¹ <https://missionpossiblepartnership.org/action-areas>.

⁴² Internal High-Level Champion team analysis.

⁴³ Science-Based Targets initiative, company tracker, <https://sciencebasedtargets.org/companies-taking-action#anchor-link-test>.

⁴⁴ Science-Based Targets initiative, Chemicals Sector Scoping Document, December 2020, <https://sciencebasedtargets.org/resources/files/SBTi-Chemicals-Scoping-Document-12.2020.pdf>.

for batteries, aluminium and copper for storage), the production of which is expected to increase by 500 per cent by 2050.⁴⁵ Boosting renewable electricity supply and storage is critical, as mining emissions are largely driven by electricity. Long-term vision and leadership are also key. As of May 2021, 17 metals or mining companies have either committed or set science-based targets through SBTi.⁴⁶ 2 per cent of major metals and mining companies (per the High-Level Champion target company list) by revenue have joined the Race to Zero campaign.⁴⁷

Plastics – More work is needed to mitigate emissions through production upstream and reduce plastic waste downstream. Current commitments by governments and industry only reduce the annual volume of plastic flowing into the ocean by 7 per cent by 2040 and do not significantly curb projected growth in plastic production.⁴⁸ There has been more progress promoting reuse and recyclability, particularly for plastic packaging, with initiatives like the Ellen MacArthur Foundation [Global Commitment](#). The commitment represents 20 per cent of all plastic packaging produced globally, including governments and non-state actors, calling for a circular economy on plastics. More ambitious, coordinated policy and regulation on plastic production and waste management is critical, as is more support and funding in local regions and cities to ensure effective recycling infrastructure and funding.

Steel – Progress is building on several fronts. Growing awareness of improved design potential grows, as more efficiently designed buildings become mainstream. For example, the 128-story Shanghai Tower shrank structural systems by 24 per cent. The European Union Green Deal’s Circular Economy Action Plan will revise material recovery targets in waste and integrate the European Union Sustainable Finance Framework with the required life-cycle assessment in public procurement, improving on California’s Environmental Product Declaration requirements. Innovation in alternative materials markets is accelerating, as cross-laminated timber demand booms in both mid- and high-rise buildings (e.g. a 350-metre wood tower planned in Japan). In addition, 5 per cent of global production capacity is now covered by commitments to net-zero by 2050 through the recent announcement by ArcelorMittal, the world’s largest steel producer. Driven by renewable energy’s role as the cheapest form of energy on earth, direct and indirect electrification of primary and secondary steel production is set to increase through the 2020s: three commercial-scale production facilities envisioning the use of green hydrogen have been announced for delivery this decade. The Clean Construction Forum, led by the City of Oslo and supported by C40, will leverage the collective purchasing power and political clout of cities to develop a market for low-emission construction materials and construction equipment, matched by the SteelZero Initiative’s announcement of low-carbon steel procurement commitments in the private sector. These are facilitated by increasing transparency of steel supply chains embodied by the multi-stakeholder Responsible Steel standard launched last year.

CCS/U across Heavy Industry – Since 1996, just 0.3 Gt of anthropogenic CO₂ has been injected into geological formations for long-term storage onshore and offshore, with 0.04 Gt added each year. To date,

⁴⁵ World Bank, Minerals for Climate Action: The Mineral Intensity of the Clean Energy Transition, May 2020, <https://www.worldbank.org/en/news/press-release/2020/05/11/mineral-production-to-soar-as-demand-for-clean-energy-increases>.

⁴⁶ Science-Based Targets initiative, company tracker, <https://sciencebasedtargets.org/companies-taking-action#anchor-link-test>.

⁴⁷ Internal High-Level Champion team analysis.

⁴⁸ The Pew Charitable Trusts and SYSTEMIQ, “Breaking the Plastic Wave”, 2020, <https://www.pewtrusts.org/en/research-and-analysis/articles/2020/07/23/breaking-the-plastic-wave-top-findings>.

capacity commitments from international oil companies are few and far between (Shell, Total, Eni), amounting to just 0.05-0.1 Gtpa by 2050. At the national level, just 15 Parties reference CCS/U in NDCs. The United Kingdom was one of the first countries to set a national-level target, the United States has set the largest tax incentive to date (\$50/ton, 45Q), and Norway's Northern Lights is the single largest project investment to date. Further announcements from China, USA, and Saudi Arabia are keenly anticipated. In general, perceived security risks remain a significant barrier to implementation, particularly in Europe, despite major peer-reviewed studies having estimated the risk of leakage to be low. A 2018 publication in *Nature* determined 98 per cent subsurface retention of CO₂ was likely over a 10,000 year period, in regions with well-regulated storage and moderate well densities.⁴⁹ Globally, just 400 billion tonnes of CO₂ storage of discovered resources have been technically proven, yet significant (12,000 billion tonnes) of undiscovered potential exists.⁵⁰ Over the next 5 years, a major effort by the Global CO₂ Storage Resource Catalogue promises to technically assess every major CO₂ storage basin in the world.⁵¹ Yet even with these efforts, certain key countries (e.g., India, Japan) expected to have a storage shortfall. While the use of waste CO₂ can strengthen the economic case for capture, today's global market is relatively small – around 0.2 Gtpa – consumed mainly in fertilizer (54 per cent) and oil and gas industries (34 per cent). Substantial short-term growth is unlikely, though breakthrough innovations could unlock new demand sources. The most promising area is building materials, where CO₂ can be used to cure concrete, replacing water. Numerous large-scale plants are now operational, with many more planned. Innovation in this space is led by a number of promising companies, backed by the venture, corporate and philanthropic communities (see Carbon XPRIZE).

Light Industry

Consumer Goods – No global decarbonisation roadmap had been identified as of November 2020. However, the British Retail Consortium's 2020 Climate Roadmap, whilst developed with a predominantly retail focus, features many areas of common relevance. Various civil society and industry actors are leading on addressing the issues of plastics and packaging, food waste and deforestation. Brands are increasingly directing research and innovation resources towards solving for these issues and are working pre-competitively through trade organisations. For instance, the Consumer Goods Forum's Coalitions of Action and newly-established Net Zero Task Force will help support collaboration around shared goals and coordinate and track momentum towards a sectoral net zero tipping point. Currently, over 28 per cent of major players within the consumer goods sector, who together represent 32 per cent of the sector, by revenue have joined the Race to Zero, by committing to the UN Global Compact Business Ambition for 1.5°C or other partner initiatives including the Exponential Roadmap, The Climate Pledge and SME Climate Hub.⁵² In terms of best performance at a regional level and based on company HQs, 52 per cent of

⁴⁹ Estimating geological CO₂ storage security to deliver on climate mitigation, Alcalde, J., Flude, S., Wilkinson, M. et al., *Nature* 2201 (2018)

⁵⁰ Under the Society of Petroleum Engineers (SPE) Storage Resources Management System (SRMS), July 2017

⁵¹ Funded by the Oil and Gas Climate Initiative (OGCI) with Pale Blue Dot Energy and the Global CCS Institute

⁵² Analysis by Climate Champions, May 2021

European major players by revenue have joined the Race to Zero, whilst this figure is 22 per cent in Latin America, 20 per cent in Asia and 16 per cent in North America.⁵³

Fashion – System-wide collaboration is required to reduce emissions to net-zero by 2050 across all scopes and by at least 30 per cent by 2030. Over 49 per cent of major players within the fashion sector by revenue have joined the Race to Zero. The majority of these companies have done so by committing to the UNFCCC Fashion Industry Charter for Climate Action, which is the official fashion sector partner for the Race to Zero.⁵⁴ In the fashion sector, and according to the location of company HQs, 80 per cent of major players by revenue have joined the Race to Zero, whilst this figure is 53 per cent in Europe and 25 per cent in Asia.⁵⁵ Efforts are ongoing to develop a commonly-accepted approach of segmenting the fashion value chain so that the source and volume of emissions is better understood and more commonly quantified across the industry. Several key multi-stakeholder organisations convened by UNFCCC Fashion Charter worked on decarbonisation analysis in a cross-industry consultation in 2021.

ICT and Mobile – Race To Zero commitments are accelerating. In the mobile sub-sector, companies representing over 50 per cent of global mobile revenues are committed to setting science-based targets and over 30 per cent have joined the Race To Zero.⁵⁶ Sector and sub-sector trajectories aligned to a 1.5°C warming scenario have been established⁵⁷ and over 20 per cent by revenue have set a 1.5°C target or have committed to the UN Global Compact Business Ambition for 1.5°C.⁵⁸ More widely, notable brands in ICT and mobile have already matched their energy use with 100 per cent renewable energy supplies and supported their supply chains to do the same. Others need to follow. More work is needed to increase renewable energy use in the ICT supply chain, and challenges remain in some markets and for remote mobile sites powered by diesel generators. ICT devices represent over 50 per cent of emissions in the sector when considering both use and lifecycle emissions. More work is needed to provide consumer information, reduce end-user product emissions, extend device lifecycles and make them more easily refurbished and reused. Resilience is being built into ICT and mobile sectors as they adapt to a warmer world and more frequent extreme weather events. The opportunities for the ICT and mobile sectors to decarbonise the wider economy are increasingly recognised and further policy support encourages a faster switch from high-carbon products to low-carbon, efficient digital solutions. Further work is needed to strengthen the sectors' focus on enabling resilience in other sectors just as it is focused on enabling decarbonisation.

Retail – Recent encouraging examples of progress have come from policy and industry actors. In Britain, the industry association British Retail Consortium developed a 2020 Climate Roadmap detailing actions of policy and business, signposting towards key initiatives and launching net-zero targets across all scopes. Over 60 members committed to the plan, which includes milestones for action for 2025, 2030, 2040 and 2050. Milestones cover key areas such renewable energy, low carbon logistics, sustainable sourcing, and consumer behaviour. This is supported by public policy requests to the UK government that support the

⁵³ Analysis by Climate Champions, May 2021

⁵⁴ Analysis by Climate Champions, May 2021

⁵⁵ Analysis by Climate Champions, May 2021

⁵⁶ GSMA

⁵⁷ ITU-T L.1470

⁵⁸ GSMA and Climate Champions analysis

targets and build on recent legislation such as a bill prohibiting illegal deforestation for UK companies. A new initiative to engage regional and global specialist retail trade associations on Race to Zero, with the aim of recruiting and supporting them, has been established by the Climate Champions team in partnership with a set of leading global retailers, with support from the World Business Council for Sustainable Development as secretariat. Currently, over 27 per cent of major players within the retail sector, who together represent 22 per cent of the sector, by revenue have joined the Race to Zero, by committing to the UN Global Compact Business Ambition for 1.5°C or other partner initiatives including the Exponential Roadmap, The Climate Pledge and SME Climate Hub. In terms of strongest performance at a regional level, and based on the location of company HQs, 35 per cent of major players by revenue in North America have joined the Race to Zero, whilst this number is 31 per cent for European retailers.⁵⁹

INDUSTRY COMMITMENTS AND INITIATIVES

As of May 2021, more than 2,300 companies have signed up to the Race to Zero campaign to send a resounding signal to governments that businesses, cities, regions, universities and investors are united in meeting the Paris goals and creating a more inclusive and resilient economy. These companies have made a commitment through one or more of the following initiatives:

- [The Business Ambition for 1.5°C Pledge](#) represents a call to action for leading companies to step up and commit to setting science-based targets aligned with limiting global temperature rise to 1.5°C above pre-industrial levels.
- [The Climate Pledge](#) was founded on the conviction that global businesses are responsible, accountable, and able to act on the climate crisis, and that doing so would transform societies and what's possible with collective action. Its members are committed to achieving the goals of the Paris Agreement ten years early.
- [The Exponential Roadmap Initiative](#) brings together organisations taking action in line with 1.5°C ambition, ranging from technology innovators, scientists, companies and NGOs, with the mission to halve emissions by 2030 and drive exponential scaling of climate action. An associated initiative is the 1.5°C Supply Chain Leaders, with several ICT companies as members, which aim to amplify the efforts to decarbonise supply chains. This initiative is also closely linked to the SME Climate Hub.
- [The B Corp Climate Collective](#) is a group of Certified B Corporations working together to take action on the climate emergency. A collective of purpose-driven businesses, it is working to identify concrete steps to accelerate climate mitigation and to work collectively, as individual companies, and through cross-sector collaboration and public advocacy.
- [The SME Climate Hub](#) is an initiative that aims to streamline the path for small and medium-sized enterprises (SMEs) to become climate-resilient businesses. The hub allows SMEs to make the internationally recognised SME Climate Commitment, access practical tools and resources to measure and help curb emissions and unlock valuable commercial incentives. The SME Climate Hub

⁵⁹ Analysis by Climate Champions, May 2021

is an initiative of the International Chamber of Commerce, the Exponential Roadmap initiative, the We Mean Business Coalition, and the UN Race to Zero campaign.

- Over 1,350 companies, representing nearly USD 19.3 trillion – or one quarter of global gross domestic product (GDP) – are taking bold climate action through the We Mean Business Coalition’s Take Action campaign. Major initiatives include:
 - [SBTi](#)
 - [WBCSD’s SOS1.5](#)
 - [RE100](#)
 - [EV100](#)
- [The Mission Possible Platform](#) is a coalition of public and private partners working on the industry transition to set heavy industry and mobility sectors on the pathway to net-zero emissions by mid-century.
- Over 1,300 companies, including more than 100 Fortune Global 500 companies with collective annual revenues of about USD 7 trillion, have disclosed through the use of internal carbon pricing, or plans to implement internal carbon pricing within two years.
- Over 2,100 chambers of commerce, representing millions of businesses worldwide, have joined the International Chamber of Commerce’s [Chambers Climate Coalition](#), committing to set climate targets aligned with the 1.5°C goal and reaching net-zero emissions by no later than 2050.
- [Climate Leadership Now](#), a new guide from the We Mean Business coalition, lays out the coalition’s shared vision for what corporate climate leadership needs to look like in this critical decade.