

UPGRADING OUR SYSTEMS TOGETHER

A global challenge to accelerate sector breakthroughs
for COP26 – and beyond



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#RaceToZero

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The Race to Zero is on

The world is moving towards a healthier, more resilient, zero carbon world. Now that **73% of global emissions** are covered by a net zero goal, countries must translate national commitments into credible policies, while every sector must undergo an exponential transformation.

Solving the decarbonization challenge will create economic and societal advantages for the countries, businesses, cities, regions, investors and communities who emerge as leaders. Within this decade, upgrading to a zero carbon future can create **35 million more jobs and USD\$26 trillion more in economic benefits** compared with attempting to resuscitate the high-carbon status quo.

There is clear public support for a green recovery because people see what's in it for them: cleaner air; a just transition for their children; and the protection of nature that in turn protects their health, homes and livelihoods.

Even in the face of COVID-19, **net zero commitments roughly doubled in 2020**, with a **tenfold increase in the number of SMEs**, a fivefold increase in the number of financial institutions, and 37 healthcare institutions representing over 3,000 hospitals joining the Race to Zero campaign since it launched on World Environment Day 2020.

Corporate commitments alone under the Race to Zero campaign now cover over **15% of the global economy** and USD\$ 9.81 trillion in revenue, joined by nearly 800 cities and 31 regions covering 0.62 billion people with credible climate action commitments. At a national level, **countries have also stepped up** during the pandemic, with Japan, South Korea, and the US joining the EU, UK, South Africa, Chile and others mobilizing around the shared north star of net zero emissions.

This is the Race to Zero.

The next hurdle: achieving sector breakthroughs to deliver on the ambition

While significant change is already underway, it must accelerate in all areas of the economy and society in order to deliver a resilient zero carbon future in time.

To win the race to zero emissions by 2050, the world must achieve near term breakthroughs across every sector of the global economy.

Achieving these transformations at the pace and scale required will not be possible without alignment and collaboration. The individual efforts of regions, cities, businesses and investors taking climate action is critical - but racing in their tracks alone will only get us part of the way. *We need coordinated action from different players across economic systems to achieve a genuine step-change in progress. This will in turn enable governments to go further and faster in their efforts to decarbonise, activating the positive ambition loop between state and non-state actors.*

To help catalyze action, the “2030 Breakthroughs” pinpoint specific tipping points for every sector.

Collectively, they articulate what key actors must do, and by when, to deliver the systems change we need to achieve a resilient, zero carbon world in time. This creates a shared vision for all the different players in a system, helping to spur action.

Aligning around a shared vision and clarifying how each actor's efforts contribute to the whole means everyone gains greater confidence. As a critical mass of actors from across each sector move forward, their efforts help to facilitate and complement the actions of others. For example, it becomes easier to create new, innovative zero carbon products when there are clear signals of demand from consumers, supporting policies in place, financial support from investors and encouragement from civil society.

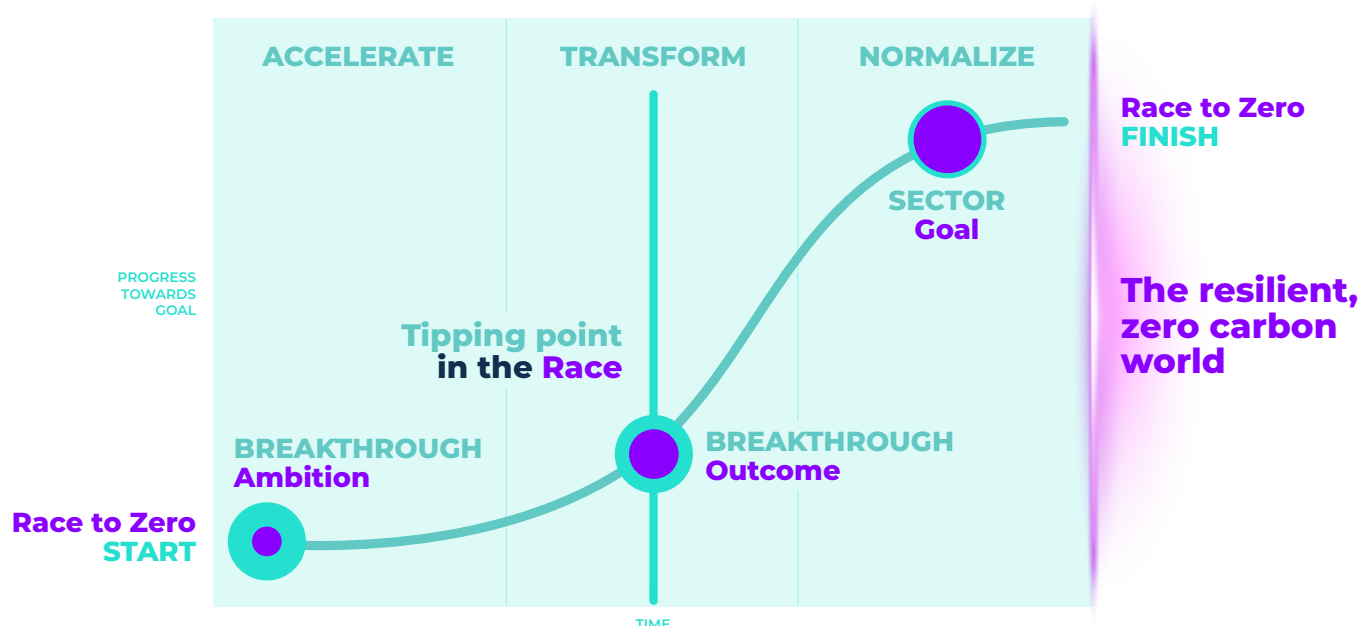
The 2030 Breakthroughs are derived from the *Climate Action Pathways*, a set of comprehensive roadmaps to achieve the Paris Agreement in line with 1.5°C across all sectors, which were developed by the UN High-Level Champions and the Marrakech Partnership - a vast coalition from across the climate action ecosystem. The Breakthroughs highlight key milestones and key actions that different actors can and must contribute to drive progress along these pathways.

They are lighting the way.

The challenge

To deliver the transformation that we need, across over 30 sectors that make up the global economy, the UN High-Level Champions call on all leaders to work in partnership and commit their skills, ingenuity, and resources to achieving these Breakthroughs.

Our immediate challenge is for 20% of key actors within each sector to commit to playing their part to transform the sector consistent with the Climate Action Pathways. We call this attaining **Breakthrough Ambition**: where sufficient momentum is generated among a critical mass of key actors, enabling them to break away from the business as usual path and together deliver breakthrough outcomes at pace. We see 20% as a tipping point because systemic change is not linear, but rather tends to be exponential, meaning that by the time 20% of the market is moving, the rate of growth is accelerating, and there is no turning back.



By COP26 we aim to reach Breakthrough Ambition (20% of key actors committed) for at least 10 sectors.

By 2023 and the Global Stocktake, we aim to attain this level of ambition for all sectors.

By 2030 we need to achieve Breakthrough Outcomes in all sectors of the global economy to deliver a zero carbon world in time.

On the way, we will track the progress of these key sectors as ambition is translated into action, and as more actors join and accelerate progress along the Climate Action Pathways.

The race is on.

Measuring Breakthrough Ambition

Breakthroughs cannot happen if individual entities work in isolation from one another. The challenges of competition and inertia often deter ambition, where individual actors cannot make the first move without putting themselves at a distinct disadvantage in the near term.

Rather, Breakthroughs happen when different actors -- across a sector -- move in synchronisation to support the transition in a way that ultimately benefits them all, activating the positive ambition loop between state and non-state actors. While every sector is unique and complex, the key actors needed to drive a Breakthrough can be thought of as falling into 5 groups:

Supply-side companies	Demand-side companies	Finance actors	Policy makers	Civil society
e.g. manufacturers, producers, supply chains	e.g. retailers, service providers, distributors	e.g. investors, asset managers, asset owners, banks, public funds	e.g. countries, cities, states, regions	e.g. customers, voters, universities, sports teams, local organizations

When each of these groups of actors can see each other working towards a common goal, their actions and progress are mutually reinforcing and it becomes possible to overcome obstacles. Owing to the fact that sector transformation requires various parts of the system to all move together, we propose that 20% adoption by key actors in just one of these groups is a good indication that the whole system is accelerating towards the achievement of a Breakthrough.

In this paper, we use membership of Race to Zero as the indicator that actors are credibly committed to playing their part in the transition to a zero-carbon economy. All members of Race to Zero are committed to reducing emissions across all scopes swiftly and fairly in line with the Paris Agreement, with transparent action plans and robust near-term targets that must meet **strict minimum criteria**.

But make no mistake: in order for a sector to be successful, these suppliers will need buyers, investors, supportive policy, and customer acceptance working in unison.




Defining ‘key actors’

The profile of companies within sectors of the real economy differs substantially, mirroring the variety in market composition found across sectors. In very fragmented sectors like retail, we have found that major retailers (those generating over US\$1 billion in revenue) only cover roughly 20% of the estimated total sector size, with a long tail of smaller companies. Conversely, in other, very consolidated industries like cooling or automotive, the top 3-4 biggest players already make up 20% of the total market, with identifiable ‘major players’ covering over 90% of the sector size.

Despite the varying extent of sector coverage, the influence of the biggest companies in a sector over their peers doesn’t come from their market share alone. Even in highly fragmented sectors, commitment from the top companies often generate enough momentum for the whole sector to progress towards their sector goal, via external media interest and/or internal best practice-sharing.

This is why we have adopted an approach of targeting key actors, or, the biggest companies, within each sector, with the ambition to recruit 20% of the key actors into Race to Zero. Our sectoral decarbonization work this year will focus on engaging leaders and influencers from all corners of society and working with them to catalyze systemic change.

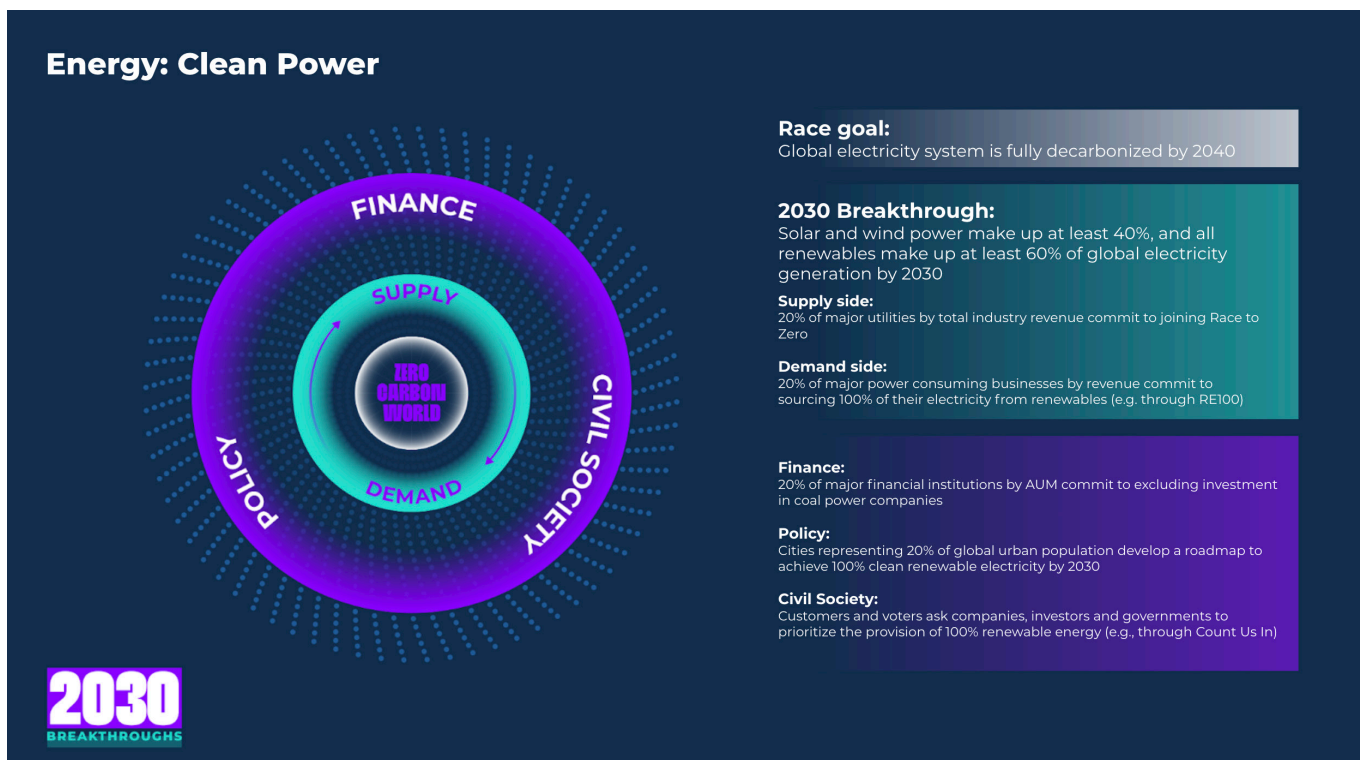
2030 Breakthroughs: Definitions

 BREAKTHROUGH Ambition	 BREAKTHROUGH Outcome	 SECTOR Goal
<p>Sector-specific target of 20% of key actors joining Race to Zero, or stakeholder commitment targets to be delivered by 2023 unless otherwise specified</p>	<p>Sector-specific tipping-point, indicating system change is inevitable. To be delivered by 2025, or 2030 at the latest.</p> <p>One per sector.</p>	<p>Sector-specific net zero future state following system change. To be delivered by 2050 (unless an earlier date is specified in the pathway / campaign).</p> <p>One per sector.</p>

A picture of wholesale systems transformation

On the following pages, you will find the list of Breakthroughs Outcomes for each sector of the global economy. Throughout, progress toward generating sufficient ambition will be tracked by one actor type -- the supply-side actor -- joining Race to Zero. But as discussed in this paper, sectoral transformations require different players across a system working together.




To illustrate this more holistic picture, we have mapped out seven critical 2030 Breakthroughs -- Clean Power and Hydrogen, Land Use and Agriculture, Built Environment and the end of ICE in three vehicle types -- in full to demonstrate the ambition needed for each actor type in a sector.



Visualisation of wholesale systems transformation with key actors: Clean Power

 SECTOR	 BREAKTHROUGH Ambition	 BREAKTHROUGH Outcome	 SECTOR Goal
Clean Power	<p>Supply-side 20% of major utilities by total industry revenue commit to joining Race to Zero</p> <p>Demand-side 20% of major power consuming businesses by revenue commit to sourcing 100% of their electricity from renewables (e.g. through RE100)</p> <p>Finance 20% of major financial institutions by AUM commit to excluding investment in coal power companies¹</p> <p>Policy Cities representing 20% of global urban population commit to 100% renewable electricity by 2035, or equivalent action (e.g., via Cities Race to Zero and/or C40 Clean Energy Declaration)</p> <p>Civil Society Customers and voters ask companies, investors and governments to prioritize the provision of 100% renewable energy (e.g., through Count Us In)</p>	<p>Solar and wind power make up at least 40%, and all renewables make up at least 60% of global electricity generation by 2030</p>	<p>Global electricity system is fully decarbonized by 2040</p>
Green Hydrogen	<p>Supply-side Public & private stakeholders commit to deploying 25 GW of green hydrogen capacity by 2026</p> <p>Demand-side End-users make commitments to purchase 25 GW of green hydrogen by 2026</p> <p>Finance Major banks / infrastructure investors commit to invest in the RD&D and deployment of 25 GW of capacity by 2026</p> <p>Policy Policy targets are announced to facilitate >25 GW of green hydrogen capacity by 2026</p>	<p>25 GW green hydrogen capacity is deployed to realise price below US\$2/kg by 2026</p>	<p>500–800 MMT production capacity is deployed by 2050</p>

¹ 'Coal power companies' refer to companies where coal makes up more than 25% of revenue

SECTOR	 BREAKTHROUGH Ambition	 BREAKTHROUGH Outcome	 SECTOR Goal
NbS: Land Use and Agriculture	<p>Supply-side 20% of major food suppliers² by revenue:</p> <ul style="list-style-type: none"> • Join Race to Zero • Implement deforestation free supply chains as part of the transition to halting land conversion • Fully adopt regenerative agriculture and land restoration practices by 2030 <p>20% of major forestry companies join Race to Zero</p> <p>Demand-side See civil society target</p> <p>Finance</p> <ul style="list-style-type: none"> • 20% of major financial institutions by AUM commit to deforestation free investment & loan portfolios by 2025 as part of the transition to halting land conversion • 20% of major financial institutions by AUM commit to become 'nature positive' including by reversing biodiversity loss associated with investment and lending portfolios by 2030 <p>Civil Society Civil society organizations create knowledge, awareness, demand and adoption of net zero and nature positive land use and food systems by all key stakeholders (e.g. Nature positive by 2030 campaigns; Innovation for agriculture by CCAFS; Bonn Challenge)</p>	<p>50 GT CO₂eq³ are mitigated by land use, food & agriculture practices and reducing inputs and waste by 2030</p>	<p>Entire forestry, food & agriculture industry is nature positive by 2030 and carbon negative by 2050</p>




² Consumer packaged goods, retailers, and agricultural commodity traders

³ To be revised or confirmed by COP26

SECTOR	 BREAKTHROUGH Ambition	 BREAKTHROUGH Outcome	 SECTOR Goal
End of ICE: Passenger vehicles & vans	<p>Supply-side</p> <ul style="list-style-type: none"> • 20% of major automakers by total revenue join the Race to Zero • 20% of major automakers by volume commit to 100% zero emission passenger cars & vans sales by 2035 (e.g. via RouteZero) <p>Demand-side</p> <p>20% of major delivery fleets, leasing companies and transport network companies commit to 100% zero emission passenger vehicles & vans by 2035 (e.g. via EV100)</p> <p>Finance</p> <p>20% of major financial institutions by AUM commit to excluding investment in companies that have not committed to phasing out ICE by 2035</p> <p>Policy</p> <p>Cities representing 20% of global urban population commit to ensuring a major area of their city is zero emission by 2030 (e.g., via Cities Race to Zero and/ or C40 Green and Healthy Streets)</p>	<p>ZEV makes up 15% of total global passenger vehicles & vans sales by 2025</p>	<p>ZEV makes up 100% in passenger vehicles & vans sales in leading markets⁴ by 2035⁵</p>
End of ICE: Heavy-goods vehicles	<p>Supply-side</p> <ul style="list-style-type: none"> • 20% of major automakers by total revenue join the Race to Zero • 20% of major automakers by volume commit to 100% zero emission heavy-goods vehicles sales by 2040 (via RouteZero) <p>Demand-side</p> <p>20% of major transport service providers by revenue commit to zero emission heavy-goods vehicles</p> <p>Finance</p> <p>20% of major financial institutions by AUM commit to excluding investment in companies that have not committed to phasing out ICE by 2035</p> <p>Policy</p> <p>Cities representing 20% of global urban population commit to ensuring a major area of their city is zero emission by 2030 (e.g., via Cities Race to Zero)</p>	<p>BEV and FCEV make up 8% of global heavy goods vehicles sales by 2025</p>	<p>BEV and FCEV makes up 100% of heavy-goods vehicles sales in leading markets⁴ by 2040⁵</p>

⁴ China, EU, Japan, US

⁵ Excludes hybrids

SECTOR	 BREAKTHROUGH Ambition	 BREAKTHROUGH Outcome	 SECTOR Goal
End of ICE: Buses	<p>Supply-side</p> <ul style="list-style-type: none"> • 20% of major automakers by total revenue commit to joining the Race to Zero • 20% of major automakers by volume commit to 100% zero emission buses sales by 2030 (via RouteZero) <p>Demand-side See policy target</p> <p>Finance 20% of major financial institutions by AUM commit to excluding investment in companies that have not committed to phasing out ICE by 2035</p> <p>Policy Cities representing 20% of global urban population commit to procuring only zero-emission buses from 2025 (e.g., via Cities Race to Zero and/or C40 Green and Healthy Streets Declaration)</p>	<p>BEV and FCEV make up 75% of global bus sales by 2025</p>	<p>BEV and FCEV make up 100% of bus sales in leading markets⁴ by 2030⁵</p>
Built Environment	<p>Supply-side</p> <ul style="list-style-type: none"> • 20% of major construction companies by revenue join Race to Zero • 20% of major architects and engineers by revenue join Race to Zero <p>Demand-side 20% of major real estate asset managers by AUM and investment companies by revenue join Race to Zero</p> <p>Finance See demand-side target</p> <p>Policy Cities representing 20% of global urban population commit to significant actions to put new buildings on a pathway to net-zero by 2030, and all buildings by 2050, including embodied emissions (e.g., via Cities Race to Zero and/or C40 Net-Zero Buildings Declaration and C40 Clean Construction Declaration)</p>	<p>100% of projects due to be completed in 2030 or after are net zero carbon in operation (with at least 40% less embodied carbon compared to current practice)</p>	<p>100% of projects (new and existing) are net zero carbon across the whole life cycle by 2050</p>

⁴ China, EU, Japan, US

⁵ Excludes hybrids

Real Economy

SECTOR	BREAKTHROUGH Ambition	BREAKTHROUGH Outcome	SECTOR Goal
Aluminium	20% of major aluminium producing companies by revenue join Race to Zero	Zero carbon aluminium represents 20% of total global aluminium production by 2035	Zero carbon aluminium represents 100% of total global aluminium production by 2050
Aviation	20% of major airlines by revenue join Race to Zero	Sustainable aviation fuels (SAF) make up 10% of fuels globally by 2030	Sustainable aviation fuels (SAF) make up 100% of fuels globally by 2050
CCS/U networks serving heavy industry⁶	Private & public actors commit to develop CCS/U networks in 10 new countries by 2023	Over 50 new CCS/U networks reach FID by 2026, totalling 400 Mtpa in new capacity. Each includes one or more heavy industry participants ⁷	Heavy industries achieve net-zero emissions by 2050; global electricity system is fully decarbonized by 2040
Cement / Concrete	20% of major cement/concrete producers by revenue join Race to Zero	Carbon neutral concrete makes up 25% of global concrete production by 2035	Carbon neutral concrete makes up 100% of global concrete production by 2050
Chemicals	20% of major chemical companies by revenue join Race to Zero	60% of global chemicals sector electricity use from renewable sources by 2030	100% of industry electricity use is decarbonized by 2040
Clean Power	20% of major utilities by revenue join Race to Zero	Solar and wind power make up at least 40%, and all renewables make up at least 60% of global electricity generation by 2030	Global electricity system is fully decarbonized by 2040
Cooling	20% of major residential AC manufacturers by revenue join Race to Zero	20% of global AC manufacturers bring to market affordable residential AC units that have 5x lower climate impact than today's units by 2025	All residential AC units are net zero by 2050

⁶ Carbon Capture, Storage and/or Utilisation in heavy industry, refers to the prevention of emissions by capturing CO₂ at point-sources (e.g., industrial flue stacks). We exclude Enhanced Oil Recovery (EOR)

⁷ To count against this target, hubs must offer the potential for CO₂ offtake from heavy industry sectors (e.g., aluminium, cement, chemicals, plastic or steel facilities). Networks dedicated exclusively towards power generation or EOR are excluded.

SECTOR	BREAKTHROUGH Ambition	BREAKTHROUGH Outcome	SECTOR Goal
Consumer goods	20% of major Consumer goods companies by revenue join Race to Zero	30% of suppliers set SBTs by 2025	Entire consumer goods supply chain is net zero by 2050
End of ICE - Buses	20% of major automakers by revenue ⁹ join Race to Zero	BEV and FCEV make up 75% of global bus sales by 2025	BEV and FCEV make up 100% of bus sales in leading markets ¹⁰ by 2030 ¹¹
End of ICE - Heavy goods vehicles	20% of major automakers by revenue ⁹ join Race to Zero	BEV and FCEV makes up 8% of global heavy goods vehicles sales by 2025	BEV and FCEV make up 100% of heavy goods vehicles sales in leading markets ¹⁰ by 2040 ¹¹
End of ICE - Passenger vehicles & vans	20% of major automakers by revenue ⁹ join Race to Zero	ZEV makes up 15% of total global passenger vehicles & vans sales by 2025	ZEV makes up 100% of passenger vehicles & vans sales in leading markets ¹⁰ by 2035 ¹¹
Engineered Carbon Removal¹²	Public commitments are made for 100 Mtpa ¹³ of CO2 removal in 2030	100 Mtpa of capacity is operational across a portfolio of technological solutions	Over 5 Gtpa of CO2 removal and storage capacity is operational by 2050
Fashion	20% of major Fashion companies by revenue join Race to Zero	At least 25% of raw materials come from lower climate impact sources by 2025 ¹⁴	Reductions in GHG emissions related to textile fiber and materials production consistent with net zero industry emissions by 2050
Green Hydrogen	Public and private stakeholders publicly commit to deploying 25GW of green hydrogen capacity by 2026	25 GW green hydrogen capacity is deployed to realise price below US\$2/kg by 2026	500–800 MMT production capacity is deployed by 2050

⁹ Revenue of relevant segment (e.g., bus sales for “End of ICE – buses” campaign)




¹⁰ China, EU, Japan, US

¹¹ Excludes hybrids

¹² Distinction is made between reduction of point source emissions (see: CCS/U networks serving heavy industry), and removal of atmospheric CO2. The latter refers to technologies incl. Bioenergy with Carbon Capture and Storage (BECCS); Direct Air Capture and Storage (DACs), biochar, mineralisation and ocean-based approaches

¹³ The majority (>75 Mtpa) should be permanently stored in durable products (e.g., cement) or geological formations, without supporting Enhanced Oil Recovery (EOR)

¹⁴ See Textile Exchange's definition of preferred fiber or material

SECTOR	 BREAKTHROUGH Ambition	 BREAKTHROUGH Outcome	 SECTOR Goal
ICT	20% of the ICT industry by revenue join Race to Zero	80% of industry electricity use is decarbonized by 2030	100% of industry electricity use is decarbonized by 2040
Metals & Mining	20% of major companies by total revenue join Race to Zero	60% of global mining sector electricity use is decarbonized by 2030	100% of industry electricity use is decarbonized by 2040
Mobile	20% of the Mobile industry by revenue join Race to Zero	70% of industry electricity use is decarbonized by 2030	100% of industry electricity use is decarbonized by 2040
NbS: Land Use and Agriculture	20% of major food suppliers by revenue join Race to Zero	50 GT CO ₂ eq are mitigated by land use, food & agriculture practices and reducing inputs and waste	Entire forestry, food & agriculture industry is carbon negative by 2050
Oceans	20% of major fishing and aquaculture companies ¹⁵ by revenue join Race to Zero	20% of the largest companies in each ocean economy sector are publicly reporting on actions taken to reverse Blue Carbon Ecosystems loss by 2030	100% of the Blue Carbon Ecosystems are conserved and restored
Pharma	20% of major pharmaceutical companies by revenue join Race to Zero	95% of labs across major pharma and med tech companies are My Green Lab certified at the green-level by 2030 ¹⁶	Entire pharma sector is net zero by 2050
Plastics	20% of major chemical companies by revenue join Race to Zero	100% plastic packaging is reusable, recyclable, or compostable by 2025	100% of industry electricity use is decarbonized by 2040

¹⁵ The Oceans breakthrough also aims to engage with additional ocean-based industries, including oil & gas, container shipping, cruise lines, ship builders, ship repairs, marine equipment and construction, and ports

¹⁶ Green Lab Certification is a program run by My Green Lab, a comprehensive assessment across 14 topics around energy, water, waste, chemicals and community. The Green level certification is the highest level. Labs go through recertification to ensure continuous improvement to their sustainability practices

SECTOR	BREAKTHROUGH Ambition	BREAKTHROUGH Outcome	SECTOR Goal
Retail	20% of major retail companies by revenue join Race to Zero	30% of suppliers set SBTs by 2025	Entire retail sector is net-zero by 2050
Shipping	20% of major shipping owners/ carriers/ liners by revenue join Race to Zero	Zero emission fuels make up 5% of international shipping fuels and 15% of domestic shipping fuels by 2030	Zero emission fuels make up 100% of fuels by 2050
Steel	20% of major steel producers by revenue join Race to Zero	20 zero-carbon, commercial-scale facilities (at >1 million tons per annum) are operational by 2030	Entire steel sector is net zero by 2050
Tourism	20% of major tourism companies by revenue join Race to Zero	Tourism emissions are reduced by 55% from 2017 level by 2030	Entire tourism industry is net zero by 2050
Water	Major water and wastewater utilities responsible for 20% of global water supply join Race to Zero	Water and wastewater services are fully decarbonised in 20 countries, by 2030	Water and wastewater services are fully decarbonised globally, by 2050

Finance

Achieving the objective of the Paris Agreement to limit global temperature increases to 1.5°C from pre-industrial levels requires a whole of economy transition – every company, bank, insurer and investor will have to adjust their business models, develop credible plans for the transition and implement them. Mainstream private finance will help all companies realign their business models for net zero. It will also fund initiatives and technological innovations critical to building zero-carbon and resilient economies, and turn billions of public finance commitments into trillions of total climate investment.

There is already growing ambition and action from leading financial institutions. The world's largest **asset owners** and **managers**, controlling over USD\$37 trillion, have joined the Race to Zero. However, unlocking systemic change will require further scaling these commitments and enhancing coordination between all finance sub sectors - banks, asset owners, asset managers, insurance underwriters

The [Glasgow Financial Alliance for Net Zero](#) (GFANZ) was launched in April 2021 to bring together existing and new net zero finance initiatives into one sector-wide strategic forum. GFANZ will enable greater coordination among the leaders of financial institutions and mobilise the trillions of dollars necessary to build a global zero emissions economy.

FINANCIAL Sector	BREAKTHROUGH Ambition	BREAKTHROUGH Outcome	SECTOR Goal
Asset Managers	20% of major asset managers by assets under management commit to Net Zero Asset Managers	Major asset managers set and achieve targets for assets under management aligned with net zero by 2050, with commitment to interim targets and at least halve emissions by 2030	All client portfolios are fully net zero by 2050
Asset Owners	20% of major asset owners by assets under management commit to Net Zero Asset Owners Alliance	Major asset owners set and achieve 5-year (2025 and 2030) targets for net zero aligned portfolios covering emissions reduction, engagement on sector transition, policy advocacy and financing transition	All portfolios are fully net zero-aligned by 2050
Banks	20% of systemically important banks commit to Net Zero Banking Alliance	Systemically important banks set and achieve 2030 targets for net zero emissions from all activities and portfolios by 2050	All activities are net zero by 2050
Insurers	20% of major insurers by global premium volume commit to Net Zero Insurance Alliance	Major insurers set and achieve 5-year (2025 and 2030) targets for net zero aligned investment, insurance and reinsurance underwriting portfolios	All investment, insurance and reinsurance underwriting portfolios are net zero by 2050




Oil & Gas

Production and use of oil and gas accounts for over half of global greenhouse gas emissions associated with energy consumption. To follow a 1.5°C-consistent pathway, the world will need to reduce oil and gas production between 2020 and 2030 by an estimated 4% and 3% per year, respectively.¹⁷ Existing government support for fossil fuels, lack of company regulations, and over-reliance on oil and gas across demand sectors have led to the industry making limited progress to date in decarbonization.

It is critical that oil and gas companies develop science-based strategies to reach net zero emissions by 2050 at the latest. This means fundamentally transitioning the company's business model while immediately mitigating Scope 1, Scope 2 and Scope 3 emissions and reducing production. The route to decarbonization depends partly on progress in the various demand sectors (e.g. transport, industry, power). Oil and gas companies are uniquely positioned to support a just transition by rapidly scaling clean energy technologies including renewable energy, green hydrogen and CCS/U.¹⁸

According to the IEA, oil demand has peaked and no new oil fields are necessary beyond those already under development.¹⁷ Similarly, no new gas fields are required and many of the liquefied natural gas facilities currently under construction or at the planning stage are not needed. Not only does new oil and gas infrastructure endanger our likelihood of meeting a 1.5°C pathway, there is a serious financial risk of stranded assets as the renewable energy transition accelerates and policy moves away from fossil fuels.

Current projections suggest an annual increase in natural gas in the 2020s. This projected increase in global production of natural gas is at odds with a climate-safe future. While a timely, managed phase out of natural gas is critical to achieving net zero by 2050, each country and region faces unique challenges in its transition away from natural gas, contingent on their dependence and capacity for a just transition.

SECTOR	 BREAKTHROUGH Ambition	 BREAKTHROUGH Outcome	 SECTOR Goal
Oil & Gas	Not applicable ¹⁹	40% of oil and gas production has been reduced by 2030, on a 2019 baseline	Global oil & gas net zero by 2050

¹⁷ IEA (2021), "Net Zero by 2050: A Roadmap for the Global Energy Sector"

¹⁸ CCS/U= Carbon capture, storage & utilisation

¹⁹ O&G companies cannot currently join Race to Zero because there is no 1.5C-aligned methodology for this sector. A methodology is being developed by CDP and SBTi and is expected to be released in 2021. Once published, O&G companies can join Race to Zero if they both (a) join BA1.5 and (b) if they have an approved Science-Based Target.

Achieving Breakthrough Outcomes

We have identified [joining Race to Zero](#) as the clear marker that an actor -- such as a company, city, or financial institution -- is credibly committed to accelerating our transition to a zero carbon economy. Members of Race to Zero commit to take rigorous and immediate action, reducing their emissions across all scopes swiftly and fairly in line with the Paris Agreement, with transparent action plans and robust near-term targets.

However, joining Race to Zero is only the first step of many that are required to deliver a zero carbon world in time, and some actors are currently unable to join. To enable actors across the real economy to deliver the systems change we need to halve global emissions by 2030, the Breakthroughs can be used in two main ways.

Plan and Proceed in the Race to Zero

Members of Race to Zero must meet a [minimum set of common criteria](#), which define procedural steps for all actors in the Race to Zero.

Pledge	Pledge at the head-of-organization level to reach (net) zero GHGs as soon as possible, and by midcentury at the latest, in line with global efforts to limit warming to 1.5C. Set an interim target to achieve in the next decade, which reflects maximum effort toward or beyond a fair share of the 50% global reduction in CO2 by 2030 identified in the IPCC Special Report on Global Warming of 1.5C
Plan	Within 12 months of joining, explain what actions will be taken toward achieving both interim and longer-term pledges, especially in the short- to medium-term.
Proceed	Take immediate action toward achieving (net) zero, consistent with delivering interim targets specified.
Publish	Commit to report publicly both progress against interim and long-term targets, as well as the actions being taken, at least annually. To the extent possible, report via platforms that feed into the UNFCCC Global Climate Action Portal.

Members of Race to Zero developing the Plan and Proceed elements of their criteria are encouraged to include the relevant Breakthrough Outcome(s) as part of their plans to deliver their net-zero commitment.

Aligning around a shared vision and clarifying how each actor's efforts contribute to the whole means everyone gains greater confidence. As a critical mass of actors from across each sector move forward, their efforts will help to facilitate and complement the actions of others.

The relevant actions outlined in the [Marrakech Partnership Climate Action Pathways](#) -- which underpin the 2030 Breakthroughs -- articulate what key actors must do, and by when, to deliver the systems change we need to achieve a resilient, zero carbon world in time. Members of Race to Zero are encouraged to use them to augment their short- and medium-term implementation strategy and enable them to accelerate progress to deliver the critical Breakthrough Outcomes.

Meeting the Starting Line

Joining Race to Zero is a difficult undertaking for most actors, with substantial and far reaching consequences for an organisation's future strategy, core activities, and business model. There are also several sectors where the specific methodology for decarbonisation, and relevant technologies, are not yet sufficiently developed for a credible pledge and plan to be put in place to meet Race to Zero's rigorous minimum criteria.

Actors that cannot yet join as a result of these methodological or technological constraints can use the 2030 Breakthroughs as their guiding star whilst they work to reach the 'Starting Line' of Race to Zero. Actors are encouraged to endorse the relevant Breakthrough Outcome(s) of their sector, and commit to undertaking the relevant actions outlined in the [Marrakech Partnership Climate Action Pathways](#) to deliver these Breakthrough Outcomes.

These efforts are a critical part of delivering the systems change required to rapidly accelerate the transition to a zero-carbon economy, and should complement actors' efforts to reach the 'Starting Line' of Race to Zero.

Delivering systems change

We need coordinated action from different players across economic systems to achieve a genuine step-change in progress. The UN High Level Climate Champions have identified many of the [major sector-specific campaigns](#) that members of Race to Zero -- and those working to join Race to Zero -- can join to contribute to this coordinated action to achieve specific Breakthrough Outcomes. The list is not exhaustive, and we encourage stakeholders to recommend any additional campaigns that are driving collaborative action from different players to deliver sectoral Breakthroughs.

The list can be found [here](#), and will be periodically updated.

The Race to Zero will be driven by exponential change

The transition to net zero will occur through exponential change. We know this because it has happened before in every major industrial disruption — it will happen again with decarbonization.

Technologies and new markets often grow on exponential curves, rather than in straight lines. From the motorised car to colour TVs, disruptive solutions can scale from 2-3% market share to over 80% share within 10-15 years. Consider renewable energy: in 2014, one year before the Paris Agreement was reached, electricity from solar and wind was cheaper than new coal and gas plants in only about 1% of the world. Today, in 2021, solar and wind are the cheapest form of new generation in countries covering over 70% of global GDP.

There is a consistent pattern to this kind of change. At first, when a technology or idea is new, there are high costs and a high level of uncertainty, but then, as it moves through the early innovation stages and into the demonstration or emergence phase, there is rapid learning, and costs start to come down. As this happens and complementary infrastructure and products begin to develop, the technology enters into a diffusion phase. Different actors - across sectors, geographies and economies - start to support the transition, and the positive feedback between them further raises confidence and increases demand and investment along every stage of the value chain, making it systemic. Initially the market share of the new technology seems small, growing from something like 1% to 2% of the market each year.

Many will point to the size of the percentage, but miss the doubling rate, which is the indicator that shows the transformation is happening exponentially. As the market share of the new technology doubles, it quickly reaches 4%, to 8%, to 16%, to 32%, and so on as more actors overcome the technological obstacles, gain confidence in the new technology, and follow the path forged by the first movers.

The volumes go up, the costs go down, and the transformation follows an 'S-shaped' curve through to full market adoption, faster than any of the incumbents ever predicted. The curve levels out when progress eventually stabilizes into the new normal.

Climate Action Pathways

Emerging from Paris, the [Marrakech Partnership](#) -- an ecosystem of more than 300 institutions and region, city, business and investor climate leadership coalitions -- was established to strengthen collaboration between governments and key stakeholders in the race to reduce emissions and build climate resilience.

This global partnership under the guidance of the UN High-Level Climate Champions has worked to give clarity and direction for sectoral transformations with the [Climate Action Pathways](#), launched in November 2020 at the [Race to Zero Dialogues](#). These pathways underpin the 2030 Breakthroughs as the actionable roadmaps for policymakers, businesses, financial institutions, technology providers and civil society, to collectively achieve net zero and deliver the promise of the Paris Agreement.

2030

BREAKTHROUGHS



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Climate Change



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