

RACE TO ZERO
BREAKTHROUGHS

TRANSFORMING OUR SYSTEMS TOGETHER

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



United Nations
Climate Change



UN CLIMATE
CHANGE
CONFERENCE
UK 2021

IN PARTNERSHIP WITH ITALY



COP25
CHILE
UN CLIMATE CHANGE
CONFERENCE

Marrakech
Partnership



#RaceToZero

For any further questions, please contact:
RaceToZero@unfccc.int

The Race to Zero is on

Together we are racing towards a healthier, more resilient, zero carbon world. Now that 63% 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, cities and companies 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**. Corporate commitments alone under the Race to Zero campaign now cover **over 12% of the global economy** and **USD\$ 9.81 trillion in revenue**. At a national level, new countries have also stepped up, with Japan, South Korea, and China – and now the US – joining the EU, UK, South Africa, Chile and others mobilizing around the shared guiding 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 world in time.

To win the race to zero emissions by 2050 at the very latest, 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.*

To help catalyze action, the ‘Race to Zero 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. This creates a shared vision for how all the different players in a system can contribute to the whole.

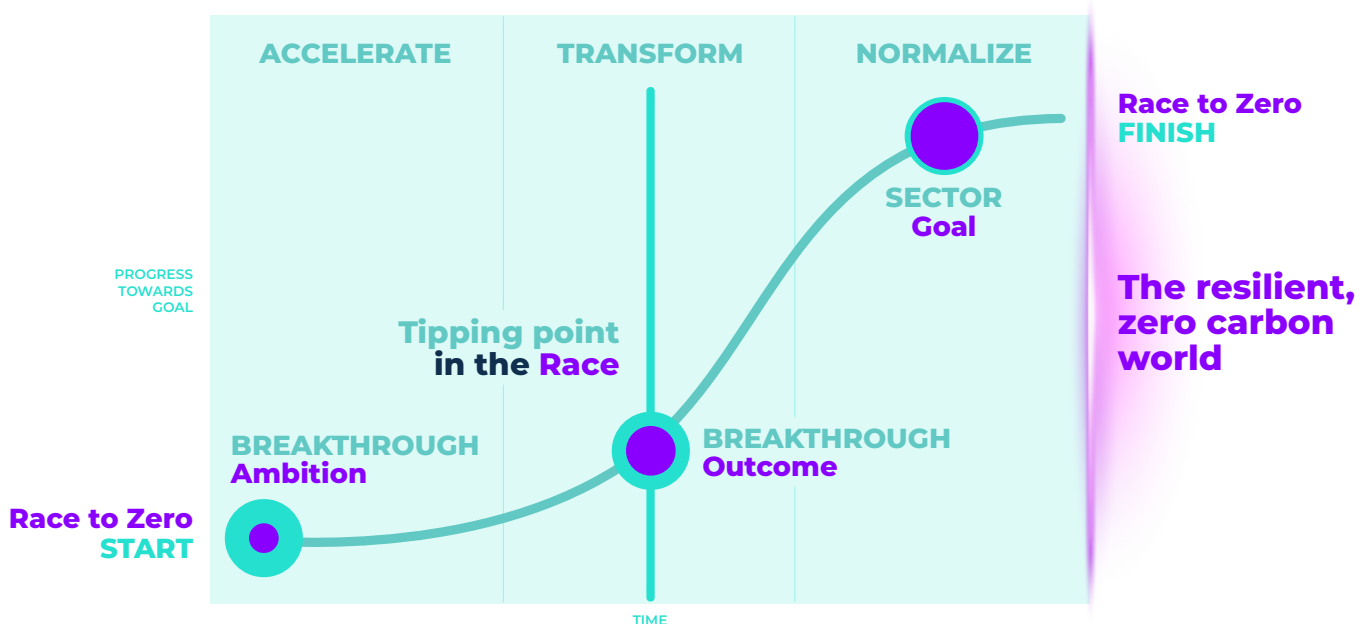
The Race to Zero Breakthroughs are derived from the *Climate Action Pathways*, a set of comprehensive roadmaps to achieve the Paris Agreement in line with 1.5°C across all sectors, which were developed by the UN High-Level Champions and the Marrakech Partnership – a vast coalition from across the climate action ecosystem. The Breakthroughs add specificity as to what 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 the more than 20 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.

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. 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. 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

e.g.
manufacturers,
producers,
supply chains

Demand-side companies

e.g. retailers,
service providers,
distributors

Finance actors

e.g. investors,
asset managers,
asset owners,
banks, public
funds

Policy makers

e.g. countries,
cities, states,
regions

Civil society

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 the supply-side actor as our proxy indicator for measuring if the sector has attained **Breakthrough Ambition**. 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.

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.

Race to Zero Breakthroughs: Definitions



BREAKTHROUGH Ambition

Sector-specific target of 20% key actors joining the Race to Zero

- Targets are set for the 2023 Global Stocktake, although we aim to deliver >10 before COP26
- Targets are consistent with the GCA Pathways and the Race to Zero approach



BREAKTHROUGH Outcome

Sector-specific tipping point indicating system transformation is inevitable

- Targets are consistent with the GCA Pathways and are to be delivered by 2025, or 2030 at the latest



SECTOR Goal

Sector-specific net zero world state following the system transformation

- To be delivered by 2050 (at the very latest)

Race to Zero Breakthroughs

On the following pages, you will find the full list of Race to Zero Breakthroughs for each sector of the global economy. Throughout, Breakthrough Ambition has been defined by one actor type: the supply-side actor. But as discussed in this paper, sectoral transformations require different players across a system to be working together.

To illustrate this more holistic picture, we have mapped out one Race to Zero Breakthrough – **Clean power** – in full to demonstrate the ambition needed for each actor type in a sector.

Example of wholesale systems transformation: Clean Power

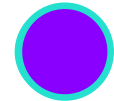
SECTOR	BREAKTHROUGH Ambition	BREAKTHROUGH Outcome	SECTOR Goal
Clean Power	<p>Supply-side 20% of global utilities by total industry revenue commit to joining Race to Zero</p> <p>Demand-side Major power users commit to sourcing 100% of their electricity from renewables e.g. through RE100</p> <p>Finance Investors representing 20% of energy finance commit to decarbonizing power sector portfolios e.g. through Net Zero Asset Owners Alliance and the Net Zero Asset Managers Alliance</p> <p>Policy Cities and regions commit to 100% clean power and coal phaseout e.g. through the Powering Past Coal Alliance</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>	30% share of global electricity generation from solar and wind power by 2030, and 60% from all renewables	Fully decarbonized global electricity system in 2040s



BREAKTHROUGH Ambition



BREAKTHROUGH Outcome



SECTOR Goal

SECTOR	BREAKTHROUGH Ambition	BREAKTHROUGH Outcome	SECTOR Goal
Aluminium	20% of major aluminium producing companies by annual production volume	20% zero carbon aluminium production as a percent of total global production	100% by 2050
Apparel	20% of major apparel companies by revenue	30% reduction in GHG emissions by 2030 for all Fashion Charter signatories	Net Zero emissions by 2050 for all Fashion Charter signatories
Aviation	20% of major airlines by revenue	10% SAF globally by 2030	100% by 2050
Built environment	20% of major real estate and infrastructure companies/ investment managers by value	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	By 2050, 100% of projects (new and existing) are net zero carbon across the whole life cycle
Cement/ Concrete	20% of major cement/ concrete producers by annual production volume	25% of carbon neutral concrete as percentage of total global production	100% by 2050
Chemicals	20% of major chemical companies by total revenue	60% of global chemicals sector electricity use from renewable sources by 2030	100% by 2050
Clean Power	20% of major utilities by total revenue	30% share of global electricity generation from solar and wind power by 2030, and 60% from all renewables	Fully decarbonized global electricity system in 2040s

SECTOR	BREAKTHROUGH Ambition	BREAKTHROUGH Outcome	SECTOR Goal
Cooling	20% of major residential AC manufacturers by total revenue	20% of global AC manufacturers bring to market affordable residential AC units that have 5x lower climate impact than today's units by 2025	Net zero residential AC by 2050
End of ICE – Buses	20% of major automakers by total revenue ¹	75% of BEV and FCEV sales as a percentage of global bus sales by 2025 ³	100% in leading markets² by 2030³
End of ICE – Heavy goods vehicles	20% of major automakers by total revenue ¹	8% of BEV and FCEV sales as a percentage of global MHDV sales by 2025 ³	100% in leading markets² by 2040³
End of ICE – Passenger vehicles & vans	20% of major automakers by total revenue ¹	15% ZEV sales as percentage of total global passenger vehicles & vans sales by 2025 ³	100% in leading markets² by 2035³
Finance – Banks	20% of systemically important banks	Systemically important banks set and achieve 2030 targets for net zero emissions from all activities and portfolios by 2050	All activities net zero by 2050
Finance – Asset Managers	20% of major asset managers by assets under management	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	Fully net zero emissions client portfolios by 2050

AC = Air Conditioning
 ICE = Internal Combustion Engine
 ZEV = Zero Emissions Vehicle
 BEV = Battery Electric Vehicle
 FCEV = Fuel Cell Electric Vehicle
 HDVs = Heavy Duty Vehicle
 MHDV = Medium Heavy Duty Vehicle

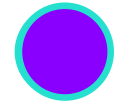
1. Revenue of relevant segment (e.g. bus sales for “End of ICE – buses” campaign); 2. China, EU, Japan, US; 3. Excludes hybrids



BREAKTHROUGH Ambition



BREAKTHROUGH Outcome



SECTOR Goal

SECTOR	BREAKTHROUGH Ambition	BREAKTHROUGH Outcome	SECTOR Goal
Finance – Asset Owners	20% of major asset owners by assets under management	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	Fully net zero aligned portfolios by 2050
Finance – Insurers	20% of global premium volume	Major insurers set and achieve 5-year (2025 and 2030) targets for net zero aligned investment, insurance and reinsurance underwriting portfolios	Fully net zero investment, insurance and reinsurance underwriting portfolios by 2050
FMCG	20% of major FMCG companies by revenue	Breakthrough outcome to be defined in the coming months	Net zero by 2050
Hydrogen	Public and private stakeholders collaborate to deploy 25GW of green hydrogen capacity by 2026	25GW green hydrogen capacity deployed by 2026	500 – 800 MMT installed capacity by 2050
ICT	20% of the ICT industry by total revenue	80% of industry electricity use coming from renewables by 2030	100% by 2050
Metals & Mining	20% of major companies by total revenue	60% of global mining sector electricity use from renewable sources by 2030 (in line with RE100)	100% by 2050 (in line with RE100)
Mobile	20% of the Mobile industry by total revenue	70% of industry electricity use coming from renewables by 2030	100% by 2050

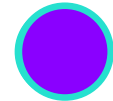


SECTOR

BREAKTHROUGH Ambition



BREAKTHROUGH Outcome



SECTOR Goal

SECTOR	BREAKTHROUGH Ambition	BREAKTHROUGH Outcome	SECTOR Goal
NbS: Land Use	20% of major food suppliers by annual production	50 GT CO ₂ eq are mitigated by food & agriculture by 2030 by changing agriculture practices and reducing inputs and waste	Entire food & agriculture industry carbon negative by 2050
Oceans	20% of major fishing and aquaculture companies	Secure a fund that delivers resources to local communities and subnational/ local governments to address 30x30, protection of the ocean, and mitigation	By 2050 at least 50% of our lands and oceans are protected and restored, and ensure our planet is completely sustainably managed.
Oil & Gas	20% of major O&G companies (excl. national oil companies) by total revenue	40% of oil & gas production has been reduced by 2030, on a 2019 baseline	Global O&G net zero by 2050
Plastics	20% of major chemical companies by total revenue	60% of global chemicals sector electricity use from renewable sources by 2030	100% by 2050
Retail	20% of major retail companies by revenue	Breakthrough outcome to be defined in the coming months	Net zero by 2050
Shipping	20% of major shipping owners/ carriers/ liners by total revenue	5% of zero emission intl. shipping fuels, and 15% of zero emission domestic shipping fuels by 2030	100% by 2050
Steel	20% of major steel producers by annual production volume	10 low-carbon steel facilities operational by 2030	Net zero by 2050
Water	Major water and wastewater utilities responsible for 20% of global water supply	Full decarbonisation of water and wastewater services, in 20 countries, by 2030	100% of countries by 2050

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 motorized 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 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 to sectoral transformations with the [Climate Action Pathways](#), launched in November 2020 at the [Race to Zero Dialogues](#). These pathways underpin the Race to Zero Breakthroughs as the **actionable roadmaps for policymakers, businesses, financial institutions, technology providers and civil society to collectively achieve net zero**, and deliver on the promise of the Paris Agreement.

Together, we can do this.

RACE TO ZERO

BREAKTHROUGHS



United Nations
Climate Change



UN CLIMATE
CHANGE
CONFERENCE
UK 2021

IN PARTNERSHIP WITH ITALY



COP25
CHILE
UN CLIMATE CHANGE
CONFERENCE

Marrakech
Partnership



#RaceToZero

For any further questions, please contact:
RaceToZero@unfccc.int