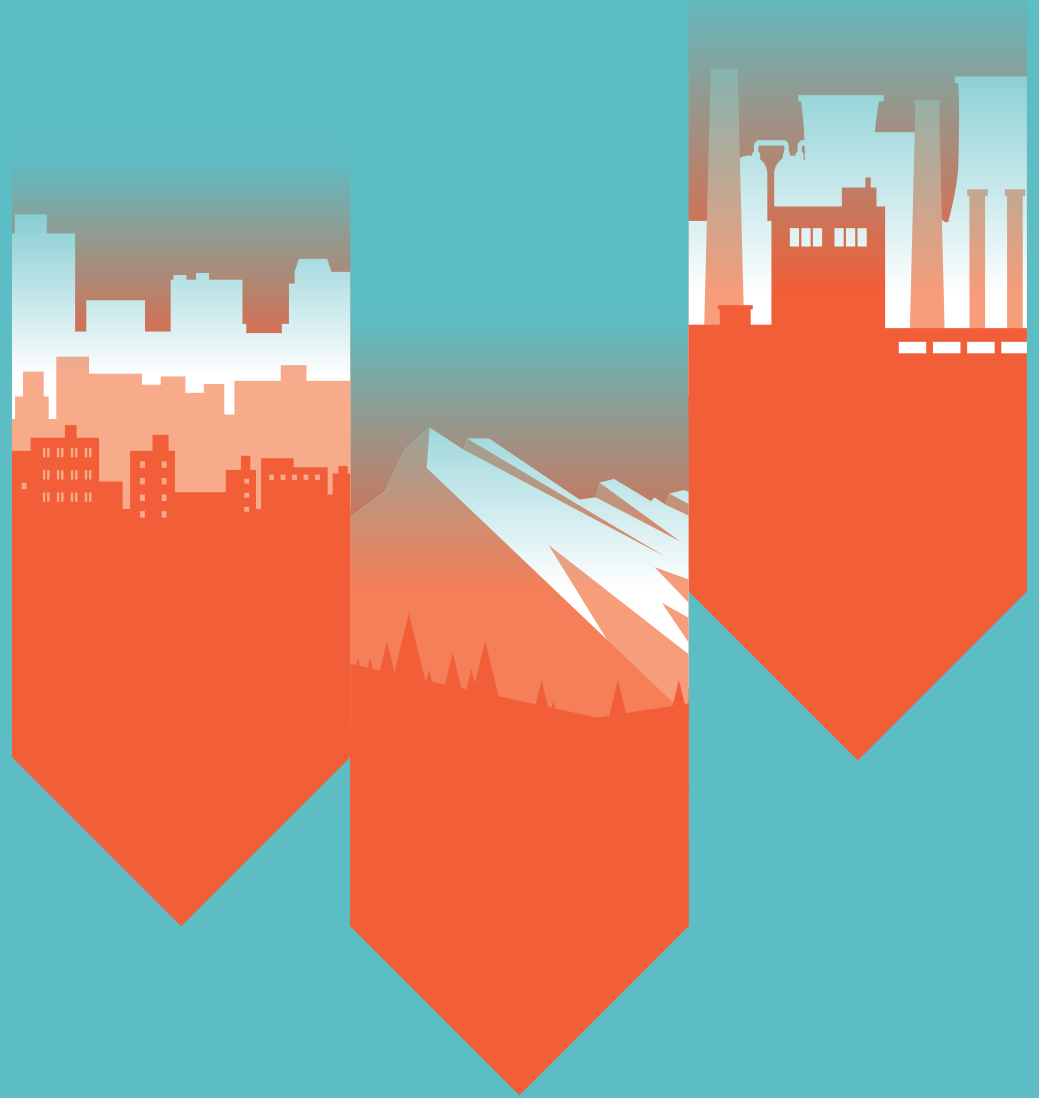09 / 2020

Accelerating Net Zero

Exploring Cities, Regions, and
Companies' Pledges to Decarbonise

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Abbreviations

°C	**Degrees Celsius**
CO_2	**Carbon Dioxide**
CO_2e	**Carbon Dioxide Equivalent**
GHG	**Greenhouse Gas**
GICS	**Global Industry Classification Standard**
IPCC	**Intergovernmental Panel on Climate Change**
MRV	**Monitoring, Reporting and Verification**
SBTi	**Science-Based Targets initiative**
UNFCCC	**United Nations Framework Convention on Climate Change**

Key Messages

The shift towards net-zero greenhouse gas emission pathways is accelerating, and the group of actors pledging net-zero targets is substantial:

- 823 cities and 101 regions have net-zero targets. These local governments represent more than 846 million people across every continent — 11 percent of the global population — and have an emissions footprint of more than 6.5 gigatonnes of GHG emissions, an amount greater than emissions from the U.S. in 2018.[1]

- 1,541 companies pledge to net-zero targets. They have a combined revenue of over US$ 11.4 trillion, equivalent to more than half of the U.S.'s GDP, and cover 3.5 gigatonnes in GHG emissions, an amount greater than India's annual emissions.[1]

- These actors have pledged to fully decarbonising their emissions footprints, adopted specific net-zero targets in sectors like energy, transport or buildings, or signed onto initiatives articulating net-zero goals. Some actors are even going beyond net-zero emissions within their direct emission scopes, and targeting supply-chain or down-stream consumption-based emissions.

- The timelines for net-zero targets vary widely, with some actors having already achieved net-zero emissions or aiming to by the end of 2020, while most others aim for 2030, 2040, or 2050, depending on the magnitude of their existing emissions, their progress in abating emissions to date, and the difficulty in eliminating the remaining emissions.

This first look at the state of play shows us where momentum is building, and where there is more work to be done:

- The number of net-zero pledges has roughly doubled in less than a year. Late 2019 found 11 regions, more than 100 cities, and roughly 500 businesses with economy or company-wide net-zero targets.[2] We find that an additional 90 regions, 700 more cities, and close to 1,000 businesses have recorded some form of net-zero pledge, from sector-specific targets (i.e., buildings or specific emission scopes) to economy- or company-wide targets.

- Subnational governments on every continent are making net-zero targets, and momentum is especially strong in certain regions:

  - Europe is the region with the greatest number of subnational governments — 291 cities and 38 regions – making net-zero pledges. These participating cities and regions cover more than 162 million people, more than 36 percent of the EU's total population.[3]

  - Latin America has the second highest number of participating subnational governments — 209 cities and 5 regions, covering 81 million people.

  - The East Asia and Pacific region includes 164 cities and 31 regions making net-zero pledges, representing over 223 million people, more than 10 percent of this region's total population.[3] Participating regions in Australia represent over 95 percent of the country's total population.

  - In North America, 27 regions and 121 cities have made net-zero pledges. These subnational governments encompass over 220 million people, an amount equal to about 60 percent of this region's total population.[3]

- While target announcements increase, implementation has yet to follow. Only a limited number of subnational governments have developed action plans towards their net-zero targets, or incorporated them into binding legislation.

  - 399 cities or regions (43 percent) have released action plans associated with their net-zero targets.
  - 227 cities or regions (>24 percent) have incorporated their net-zero targets into formal policies and legislation.
  - 42 percent of cities or regions reporting a specific emissions reduction goal by a target year are aiming for economy-wide net-zero emissions.
  - 123 cities and regions mention specific carbon offset projects in their net-zero plans. These carbon offset projects span a range of categories, including reforestation, renewable energy procurement and CO_2 removal.

- Companies across a wide range of sectors have made net-zero commitments.

  - The consumer discretionary sector leads the way, with 195 companies aiming for net zero. This sector also makes up the largest share of the total revenue, representing a combined US$ 2 trillion from 195 companies employing 3.9 million people.[4]
  - Industrials are the next most active sector, with 171 companies aiming for net zero, encompassing over US$ 1 trillion in revenue and over 3 million employees.[4]
  - There is still much room for accelerated action from real estate companies. The real estate sector makes up the smallest share of revenue out of companies committed to net zero, with US$ 11 billion in revenue, and over 1,000 employees from 15 companies.[4]

- Even in sectors traditionally considered hard to abate, some actors are setting ambitious targets. Some companies are aiming for net zero in the next few years, and others are going beyond their direct emission scopes, targeting supply-chain and downstream emissions.

  - Although only seven companies from the energy sector have set net-zero targets, those that did set aggressive target years — the energy sector has the earliest median target year, at 2025.[4]
  - The consumer staples sector has the next earliest median target year at 2028, with 24 companies.[4]

Though a direct and comprehensive reduction of an actor's own emissions is the most unambiguous approach for achieving net zero, there are many nuances associated with the range of approaches available to actors today.

  - The robustness of carbon offsets and the concept of additionality are key to assessing net-zero targets.
  - A forthcoming report in October 2020 will delve into these issues and evaluate the health of city, region and company net-zero commitments and how they can be successfully implemented.

Foreword

The COVID-19 pandemic has reminded us all that human and planetary health are interlinked. As we seek to rebuild our societies after this global pandemic, we must ensure that we put the world on a zero carbon pathway and contain temperature rise within 1.5°C. The acceleration of net-zero commitments during the global pandemic shows us that companies, cities, states, regions, investors and universities across the world understand that the twin challenges of tackling climate change and coronavirus go hand-in-hand.

Meeting the goal of net-zero carbon emissions by 2050 requires an unprecedented scale of action and collaboration across all levels of society. That is why we launched the Race to Zero campaign: to encourage businesses, investors and financial institutions, city and regional governments to set ambitious targets that will help move the world towards this goal. It is the largest ever alliance committed to achieving net-zero carbon emissions by 2050.

Even amidst the global crisis, momentum towards net zero is growing. The Business Ambition Coalition for 1.5°C alone has grown from 28 member companies in July 2019 to 291 today. More than 900 city and regional governments on every continent have committed to net-zero targets. Businesses from sectors as diverse as real estate and transportation are also pledging to decarbonize and even achieve negative emissions by 2050. Such levels of ambition send a critical signal to national leaders to step-up ambition towards COP26 in Glasgow.

This report explores where there have been huge uptakes in net-zero commitments in surprising sectors and geographies, quantifying the scale of net-zero commitments from cities, regions, and business actors. The findings show the growing momentum towards zero carbon, while revealing areas where there is the potential to scale up and accelerate crucial action in the coming decades. As we begin Climate Week NYC 2020, hosted on an interactive virtual platform for the first time, leaders of regions, cities, businesses, investment funds and universities are sending a clear message to national leaders: that they are ready to act decisively and build our zero-carbon future.

Nigel Topping and Gonzalo Muñoz
High-Level Champions for Climate Action of the COP26 and COP25 Presidencies

1
Relevance and rise of net-zero target setting

A growing number of cities, regions, and companies have set or are pledged to develop their own net-zero greenhouse gas (GHG) emission reduction targets. These include some of the world's largest companies, from Microsoft to Mahindra & Mahindra, which have garnered headlines for net-zero targets (We Mean Business, 2020). Hundreds of cities are also working to decarbonise: some, such as Copenhagen and Glasgow, plan to be carbon neutral within the next decade (CNCA, n.d.; GBNews, 2019). Many regions, including a number of U.S. states like California and New York, have mapped out plans to decarbonise economies and societies, at a scale on par with some national governments.

Momentum towards net-zero targets is growing, even in the midst of the global COVID-19 crisis. Many actors are making net-zero pledges on their own, or joining networks of like-minded actors. For instance, the Business Ambition Coalition for 1.5°C now includes over 280 companies with US\$ 3.6 trillion in market capitalisation, up from just 28 members in July 2019 (Science Based Targets, 2020; UNGC, SBTi & WMBC, 2019). In Japan, the number of net-zero announcements by local governments has steadily been increasing in 2020; the population coverage increased from less than 50 million in January 2020 to over 70 million, or 56% of the country's total population, as of August 2020. The United Nations Framework Convention on Climate Change (UNFCCC) Race To Zero campaign has mobilised initiatives that include 1,128 companies, 452 cities, and 22 regions, along with 45 investors and 549 universities, working towards achieving net-zero carbon dioxide (CO_2) emissions by 2050 (UNFCCC, 2020).

These targets could play a vital role in addressing the climate crisis. Avoiding the most dangerous impacts of climate change requires cutting greenhouse gas emissions at unprecedented rates. The world is already more than 1°C warmer than in pre-industrial times (IPCC, 2018). The Intergovernmental Panel on Climate Change (IPCC) Special Report on Global Warming of 1.5°C outlines the stakes for ecosystems and humans of allowing global temperatures to increase by even a half a degree C more. To limit the global temperature increase to 1.5°C, with no or limited overshoot, global CO_2 emissions must fall by about 45 percent from 2010 levels by 2030, and reach net zero around 2050 (IPCC, 2018).

On the global balance sheet, net-zero emissions occur when human-driven greenhouse gas emissions and removals equal each other out. In practice, reaching net zero means decarbonising rapidly and at scale by aligning political, social and technological systems to shift to renewable forms of energy; decarbonise buildings, transportation, and other infrastructure; reduce food waste; and make industrial processes less carbon-intensive (IPCC, 2018). At the same time, the world must also expand its ability to capture any remaining emissions through practices like protecting and planting forests, practicing climate-smart agriculture, and directly removing emissions through tools like air capture and storage technology.

Many paths to net zero could also help meet other sustainable development goals. Reducing GHG emissions would also decrease air pollution and prevent millions of premature deaths (IPCC, 2018). Shifting to energy efficiency and renewable energy could align with efforts to improve energy security and reduce poverty (IPCC, 2018). As the world seeks to recover from the COVID-19 pandemic, many actors are designing green recoveries that harness these synergies, creating jobs and economic recovery through investments in more sustainable and resilient energy, transportation, water, and health and sanitation systems (Hepburn et al., 2020).

Despite these positive signs, however, global emissions prior to COVID-19 have not been falling fast enough, and are stalling or rising in all major economic sectors (UNEP, 2019). Current national policies fall far short of the change needed to help the world avoid the worst impacts of global warming, putting the world on course for 3°C of global temperature rise by 2100 (UNEP, 2019). In an effort to get back on track, a growing number of national governments have ramped up their climate ambition. So far, 19 countries, along with European Union, have adopted net-zero targets, and more than 100 others are contemplating them (Levin et al., 2020). City, region, and company-level climate action could help implement these goals, and accelerate the pace of decarbonisation. While the number of net-zero pledges continues to grow, however, the scope and potential impact of these targets remains unclear (Höhne et al., 2019).

At this crucial moment for global climate action and post-COVID 19 recovery, this report aims to capture the current landscape of cities, regions, and companies setting net-zero targets. Section 2 explores trends in the types of targets being made, and the actors making them, while Section 3 highlights some of the key considerations in setting and understanding a net-zero target. This analysis provides a first look at the results of a forthcoming more in-depth analysis, *Navigating the Nuances of Net-Zero Targets*. This additional analysis will further explore what local governments and companies promise in their net-zero targets and will provide insights into how such targets can be successfully framed and implemented.

2
Landscape of net-zero targets

Since the IPCC Special Report on Warming of 1.5°C identified the need for global decarbonisation by 2050, various actors have started to adopt emission reduction targets that work towards this goal. Often termed "net-zero," "carbon neutral," or "zero emissions," these targets range in their emissions scope, timelines, sectors, among other characteristics. This section describes the terminology used to define these pledges (in Section 2.1), and explores the cities, regions, and companies making these pledges, as well as the types of targets they put forward (in Section 2.2).

2.1
Terminology of targets and claims

Net-zero terminology

In the run-up to the Paris Agreement, the idea of targeting a phase-out of greenhouse gases was developed, with the Paris Agreement stating that this goal should be achieved in the second half of the century (Haites, Yamin & Höhne, 2013). Since then, a number of non-state and subnational actors have set their own targets to achieve net-zero emissions. These pledges range from "net-zero emission" to "carbon neutral" to "zero emission" targets.

Most typically, **net-zero targets** suggest a state in which an actor reduces their emissions as much as possible and offsets the remainder – using either natural sinks, such as reforesting land or adopting agricultural best practices, or a technological solution, such as carbon capture and storage. **"Climate neutrality," "carbon neutrality"** and **"zero-emissions"** are other emission goals that have arisen

alongside net zero. Technically speaking, carbon neutrality implies net-zero emissions of only carbon dioxide, while climate neutrality suggests a broader focus on net-zero emissions of all greenhouse gases. In spite of their different implications, in practice these terms are often used interchangeably. Moreover, as with the phrase **"net-zero emissions,"** there is no definitive agreement on how these targets are put into practice. The content of two net-zero pledges can be dramatically different, aiming for different timelines, covering different kinds of GHG emissions, and relying on different kinds of offsets to varying extents.

Across this universe of net-zero, climate- or carbon-neutral, and zero-emissions commitments, timelines can range widely. Some companies claim that they are already achieving carbon neutrality (typically through heavy reliance on offsets), while others aim to decarbonise by 2050. Some carbon neutral targets focus just on CO_2, while others include other greenhouse gases, such as methane or nitrous oxide. Different actors may also include different emission scopes (i.e., direct scope 1 emissions or indirect scope 2 or 3 emissions). For both companies and local governments, data limitations can create challenges for following recommendations to include scope 3 emissions in emission reduction targets.

While, in general, a target that covers all scopes and greenhouse gases would be most comprehensive, suggestions for how to prioritise mitigation efforts vary. Some recommend focusing on the activities with the largest impact on emissions, while others suggest focusing on the emissions sources an actor has the most control over (University of Oxford, 2020). While most subnational jurisdictions focus on sector-based or territorial emissions — that is, the emissions produced by an actor — some actors suggest that net-zero goals should also address the consumption emissions embedded in purchases of goods and services (University of Oxford, 2020).

Taking a different tact, some suggest that "carbon neutrality" or "net-zero" applies only to global emissions (Carbone 4, 2020). While individual actors can contribute towards a global carbon neutral trajectory, in other words, they should not claim this term for their own emissions. This perspective argues that in our current inter-connected society, which is nowhere near emissions-free, no entity can currently be carbon neutral, and it is not constructive to make this claim.

High ambition terminology

In addition to phrases that explicitly delineate net-zero emissions goals, there are also phrases that suggest targets of high – but not necessarily net-zero – ambition. **"Deep decarbonisation"** falls under this category. While it can describe any sector, this term is used most often to describe heavy industry or sectors that are traditionally described as "hard to abate" – including power and the production of steel and cement. Importantly, the phrase suggests a focus on reducing emissions as much as possible – contrasting to alternative approaches that rely heavily on offsets (Carrillo, Pineda & Faria, 2019). **"Zero-emissions"** and **"emissions-free"** are also often used in the context of corporate climate action. These phrases refer to the lack of production of greenhouse gases in the first place, and are most commonly employed by companies to tout their product or production process.

Another term implicitly tied to net-zero targets is **"1.5°C pathways"** or **"1.5°C mitigation pathways."** In its Special Report on Warming of 1.5°C, the IPCC suggested that warming of less than 1.5°C is defined by humans achieving net-zero CO_2 emissions between 2050-2065 and achieving net-zero emissions of all greenhouse gases by 2070-2085. Accordingly, many actors with net-zero goals around this time frame state that their targets are aligned with warming of 1.5°C or less. This description is used as a reference point by the Science-Based Targets initiative, which is a partnership among several organisations to showcase company efforts to set targets in line with the Paris Agreement goals of 1.5 or 2°C. Although not all its members have explicitly set net-zero targets, the organisation requires that all must set targets which put them on track to achieve net-zero emissions by 2050. Over 280 companies have also signed onto the Business Ambition for 1.5C initiative, pledging to set either "science-based emissions reduction target across all relevant scopes, in line with 1.5°C emissions scenarios," or a "long-term target to reach net-zero value chain emissions by no later than 2050, alongside science-based targets across all relevant scopes and in line with the criteria and recommendations of the Science Based Targets initiative" (UN Global Compact, 2020; Business Ambition for 1.5°C Coalition; 2020).

Some actors have also aimed to go beyond net zero, setting carbon negative targets that aim to offset more greenhouse gas emissions than they emit. Microsoft grabbed headlines when it announced its goal to be **carbon negative** – offsetting more emissions than it emits – by 2030, and to "remove from the environment all the carbon the company has emitted either directly or by electrical consumption since it was founded in 1975" by 2050 (Smith, 2020).

Understanding the terminology that actors use when setting climate targets is an important step in assessing their potential impact. While delving into these nuances is outside the purview of this report, a forthcoming analysis will evaluate the details of various actors' net-zero targets and provide recommendations for how these pledges can be credibly implemented.

2.2
Overview of city, region, and company net-zero targets

This analysis draws from nine reporting platforms (see Appendix) to present the most comprehensive assessment of the landscape of subnational and corporate net-zero targets to date. It finds that from 2019 to 2020, momentum towards net-zero targets has grown significantly, roughly doubling the number of pledges.

In total, we find that 823 cities, 101 regions, and 1,541 companies have made net-zero pledges or signed onto initiatives aiming for this target through nine of the world's largest climate action reporting platforms[5]. These cities and regions represent a total of over 846 million people, equivalent to 11 percent of the global population. These companies have a combined revenue of US$ 11.4 trillion, equivalent to more than half of the U.S.'s GDP (World Bank, 2020b).

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5   We include any actors that aim to reduce their emissions by at least 80 percent, as well as those that explicitly state that they have made or intend to make a net-zero target. See the Appendix for more details about the data sources and methodology.

The number of actors making net-zero pledges has grown dramatically over the past year. One 2019 analysis of roughly 6,000 cities and regions making GHG emission reduction pledges found that 65 had made carbon neutrality targets (NewClimate Institute et al., 2019). A different deep dive into net-zero commitments in that same year turned up 11 regions, more than 100 cities, and roughly 500 businesses making economy-wide net-zero commitments (Höhne et al., 2019). While the underlying data sources for these analyses vary, the overall trend is clear: a growing number of actors are signalling an intent to pursue a net-zero trajectory. This momentum represents a first step towards mobilising much-needed speed and scale, though the ambition and implementation of these efforts varies widely.

Figure 1 shows Google Trends data for "net-zero emissions" searches, and suggests that interest in net zero has grown significantly since the 2018 release of the IPCC Special Report on 1.5 C. In some cases, interest seems to be catalysed by big announcements, such as the Race to Zero launch or the United Kingdom's announcement of the first net-zero emissions law from a major economy.

2.2.1
Cities and regions

Governments from 823 cities and 101 regions across every continent have made net-zero pledges, encompassing a total population of 846 million, about 11 percent of the global population. North America, East Asia and Pacific, and Europe are leading in the number of local governments making net-zero targets and the population covered by these actors.

Figure 2 captures participation trends across different geographic regions, drawing from nine data sources, and reflecting a wide range of different types of net-zero efforts – from economy-wide targets to more sector-specific goals, and from targets codified in legislature and climate action plans to voluntary announcements or pledges made through global initiatives (see the Appendix for more details about the data sources and selection criteria for net-zero targets).

Figure 1

Peaks in the interest in "net-zero emissions" from July 2018 to August 2020
align with key climate-related events to galvanise climate ambition
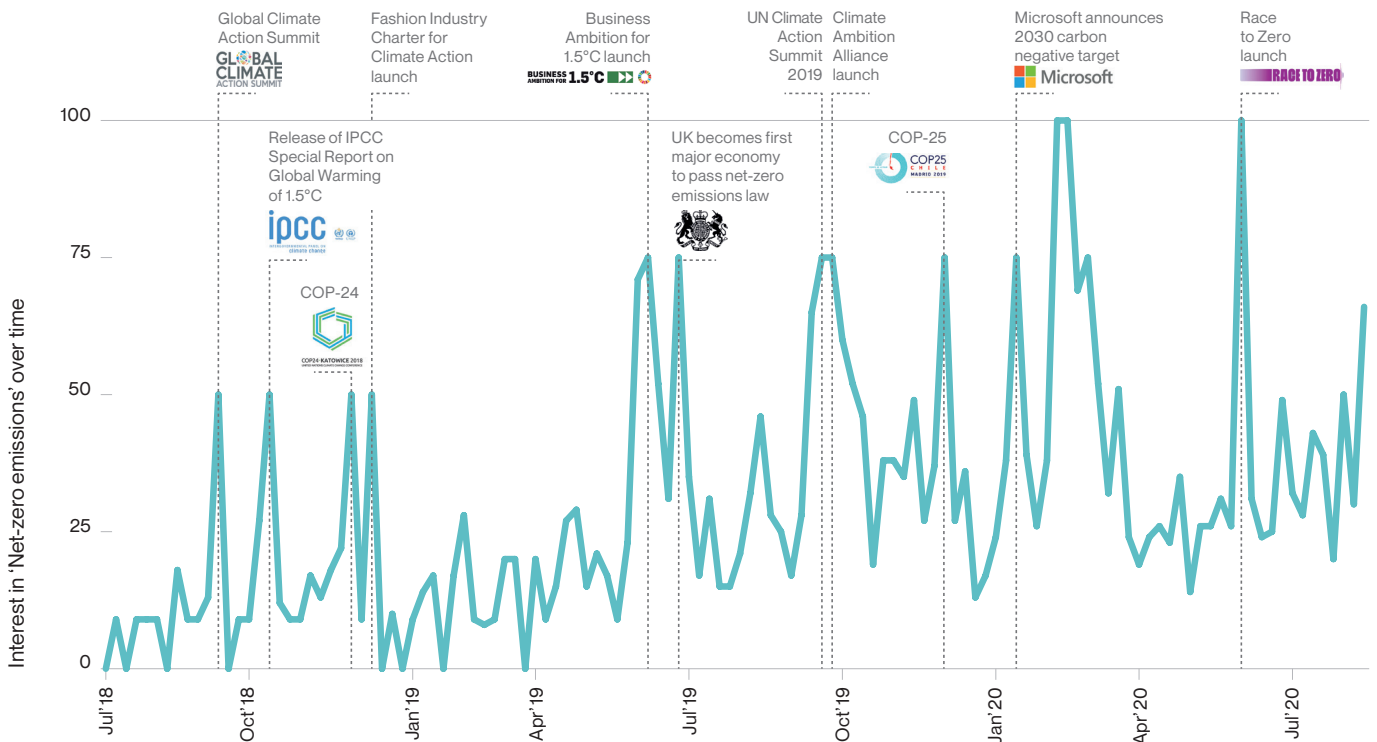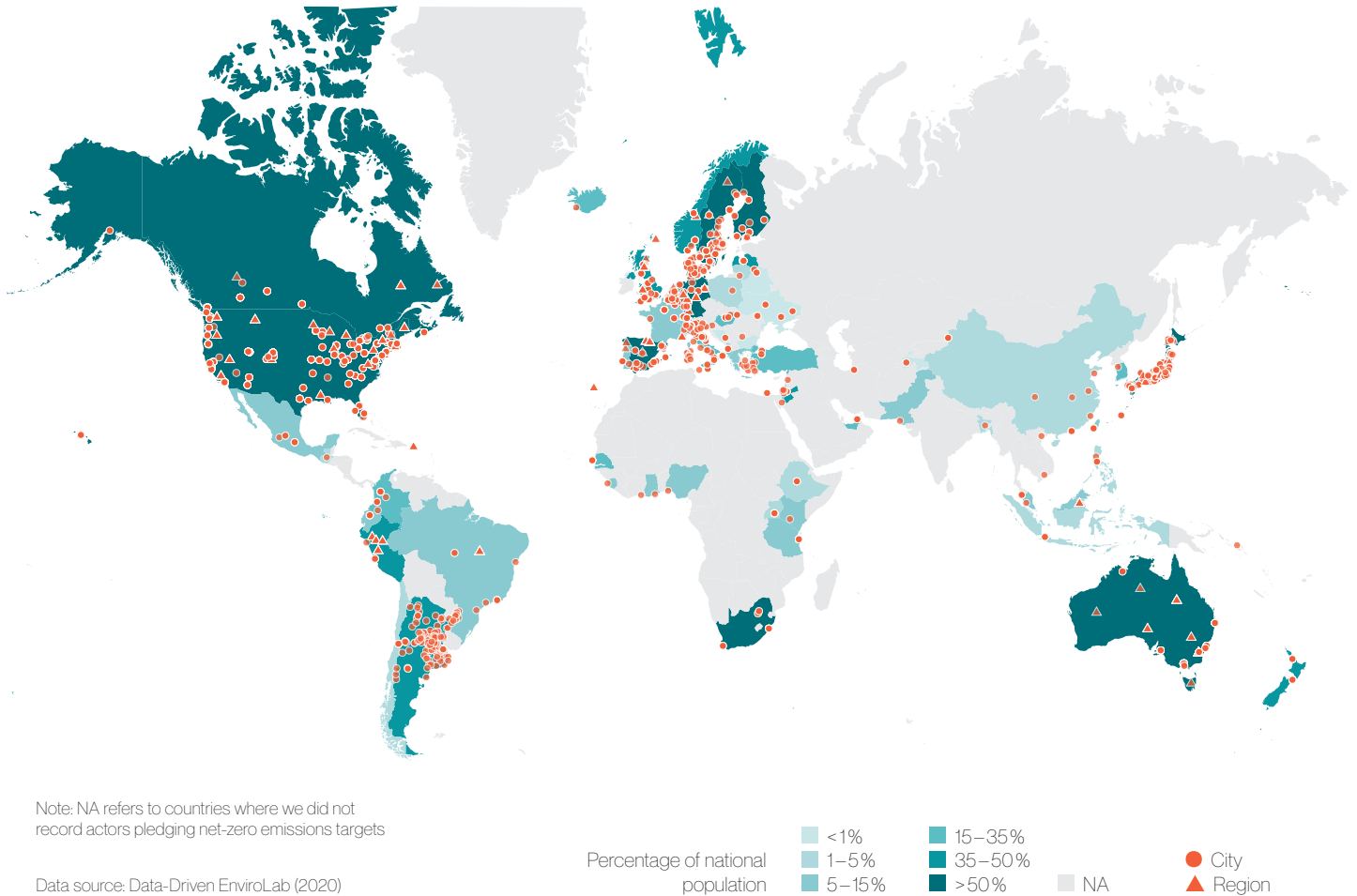
Data source: Google Trends

Figure 2

Map of cities and regions pledging some form of net-zero emissions target

Note: NA refers to countries where we did not record actors pledging net-zero emissions targets

Data source: Data-Driven EnviroLab (2020)

Percentage of national population

<1% 15–35%
1–5% 35–50%
5–15% >50% NA

● City
▲ Region

The global regions with the greatest participation – in terms of both the number of local governments pledging some type of net-zero action, and the population they represent – include North America, East Asia and the Pacific, and Europe. Europe has the highest number of cities and regions pursuing climate action – including many smaller municipalities aiming for net-zero emissions – while the local governments working towards net-zero emissions in the East Asia and Pacific region represent the largest combined population.

The population represented by local governments pledging a net-zero target in all three regions, however, is substantial. Cities and regions in North America aiming for net zero represent over 222 million people, more than 60 percent of this region's total population (World Bank, 2020a). These include nearly half of all U.S. states[6] – including Louisiana, California, and New York – 24 in total – aiming to achieve net-zero emissions across their entire economy or within key sectors, such as energy. Subnational governments in the East Asia and Pacific region pledging net-zero targets include over 223 million people, over 10 percent of this global region's total population (World Bank, 2020a).These include eight of Australia's states, such as New South Wales (8 million) and Victoria (6.3 million), and 135 cities and 22 regions in Japan (combined population of 97 million), most of which are members of the 2050 Zero Carbon Cities in Japan initiative. European cities and regions cover more than 162 million people, over 36 percent of the EU's total population (World Bank, 2020a).

6   Includes Puerto Rico and Washington, D.C.

Latin America has the second highest number of participating subnational governments — 209 cities and 5 regions, covering over 81 million people. Although Sub-Saharan Africa has relatively few cities and no regions making net-zero targets, those that do are often large mega-cities like Lagos, whose actions help steer national economies and emissions trajectories. Combined, these cities represent more than 99 million people, roughly 9 percent of this region's total population (World Bank, 2020a). In other words, despite a smaller number of actors, local governments in this region could realise a large mitigation impact.

Representation — in terms of both participating actors and the populations they represent – is lowest in South Asia, the Middle East, and Eastern and Central Europe. When interpreting these numbers, it's important to note that many researchers have noted the gaps in the data tracking voluntary climate action, particularly in developing and emerging economies (Hsu et al., 2019). In other words, low rates of participation in some geographic areas may indicate a gap in climate action reporting, rather than a gap in climate action.

In some countries – notably, Australia, Sweden, South Africa, Canada, Japan, and Spain — cities and regions targeting net zero have reached a critical mass, representing more than 70 percent of their respective national populations. In Australia, where the national government has yet to set a net-zero target, city and regional actors, including eight of Australia's largest states, are pursuing this goal. These local governments represent over 95 percent of the country's total population, laying groundwork for a national decarbonisation strategy. National net-zero targets in Sweden, Japan, and Canada may have helped catalyse the creation of city and regional net-zero targets (Levin et al., 2020). Japan's high level of coverage (more than 75 percent of the national population) may also stem from additional national legislation requiring prefectures and municipalities to develop measures to curb GHG emissions (Japan Ministry of the Environment, 2020).

While actors may not report baseline emissions data, the information that is available suggests that cities and regions with net-zero targets cover more than 6.5 gigatonnes in annual emissions, an amount greater than the annual emissions from the U.S. (World Resources Institute, 2020).

Additional data on the baseline emissions that net-zero targets cover is vital to understanding the long-term impact of these targets. For instance, many of the countries where local governments pursuing net-zero targets cover more than 50 percent of their national population have per capita GHG emissions above 10 tons of CO_2 emissions per capita (World Bank, 2020c). For these net-zero targets to be meaningful, they will need to cover a large share of their actors' total GHG emissions and drive very steep reductions. However, the large emissions footprints of the actors pursuing net-zero emissions targets suggests that if their targets encompass a substantial portion of actors' emissions, and if they are fully implemented, they could have a significant impact on global and national emissions.

2.2.2
Companies

Over 1,500 companies, representing over US$ 11.4 trillion in revenue and 19.3 million employees, have set net-zero targets. The sectors with the highest number of participating companies are the consumer discretionary (195 companies), industrials (171 companies), and industrials (services) (128 companies) sectors, out of the companies with available data. In terms of revenue, consumer discretionary companies also lead the way (>US$ 2 trillion), followed by the financials sector (>US$ 1.9 trillion).

As of September 2020, four platforms were identified as data sources for companies' net-zero goals (see the Appendix for more details about the data sources and net-zero selection criteria). These pledges range from plans that encompass the majority of a company's scope 1, 2, and 3 emissions, to goals that are very narrowly targeted, sometimes to specific facilities or products. As with cities and regions, some companies outline specific targets, backed up by pledges to track and report their progress, while others make more general targets, or sign onto initiatives in which they pledge to further develop their targets and action plans.

In terms of revenue, participation is greatest among companies in the consumer discretionary sector, with over US$ 2 trillion in total revenue from 195 companies (see Figure 3). This sector ranges from hotels to food and beverage companies, such as McDonald's, and apparel brands like Nike. The second-largest sector in terms of revenue is the financials sector, with over US$ 1.9 trillion in revenue from 93 companies aiming for net zero[7]. Of the 19.3 million people working for companies pursuing net zero, companies in the

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7   Net-zero pledges from the financials sector can include targets aimed at reducing emissions from direct business operations (such as electricity use, business operations, etc.), or from emissions from a company's financed portfolios. For insights on the magnitude and ambition of climate-related investment targets and their relationships with GHG emissions in the real economy, see "Unpacking the finance sector's climate-related investment commitments: first analysis of financial sector climate-related investment pledges."

consumer discretionary sector hire the largest share of them, with over 3.9 million total employees. Companies in the information technology sector, which includes software service companies such as Microsoft and hardware manufacturers like Apple, follow close behind, employing over 3.5 million people.

Initiatives like the Race to Zero campaign, a global effort to bring these coalitions together to achieve net-zero emissions in 2050, can play a crucial role in catalysing action. The Race to Zero campaign includes a particularly high number of consumer discretionary companies and industrials (services) companies, which account for 29 percent and 18 percent of the Race to Zero companies with available sector data. The sectors that the Race to Zero disproportionately attracts are more consumer-facing — many of the Race to Zero participants are also B Corporations that prioritise sustainability in their corporate identity and as a selling point to consumers.

Figure 3

Revenue of actors pursuing net-zero emissions, according to their
Global Industry Classification Standard (GICS) sector
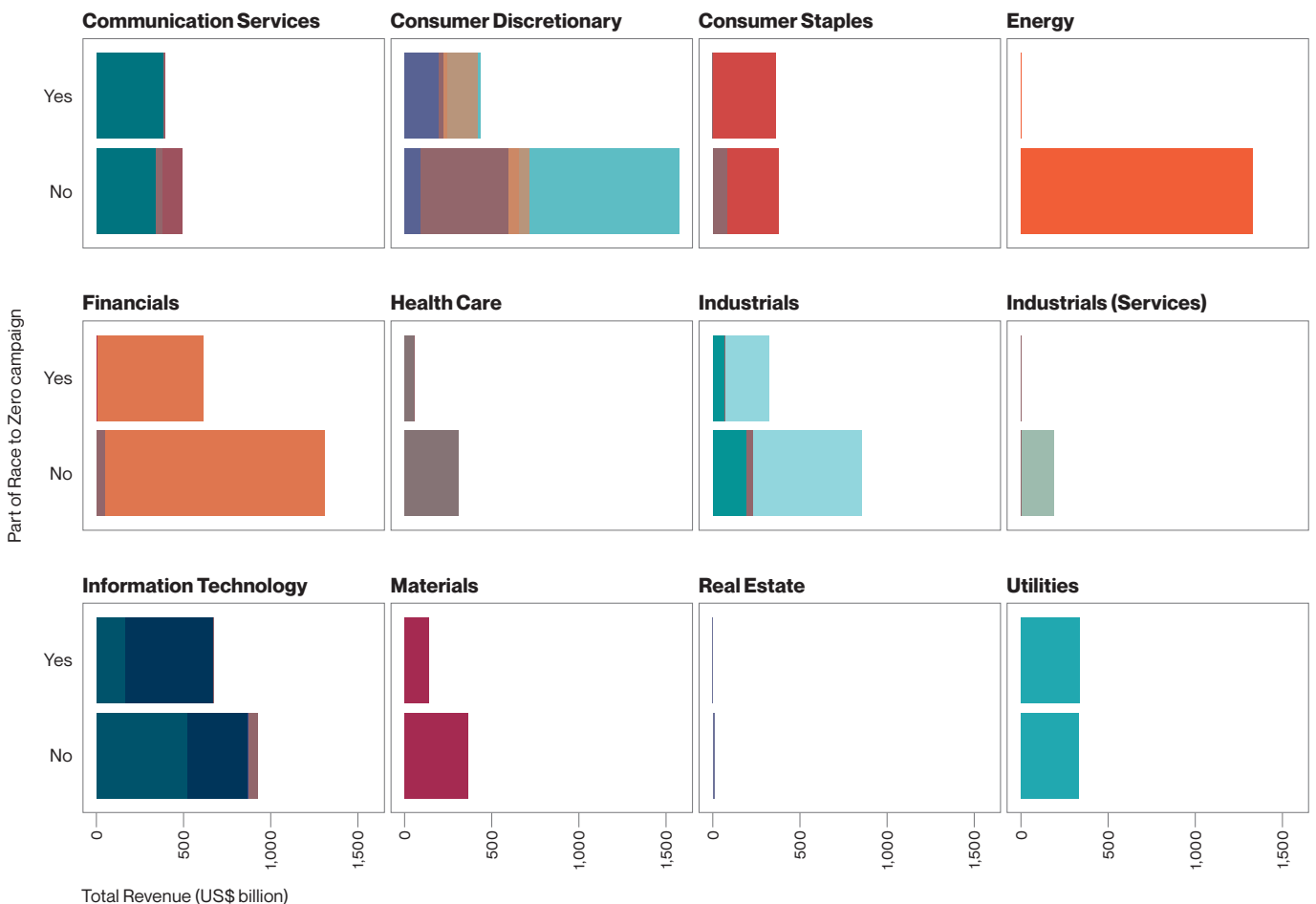
Figure 4

Net-zero target years for the different actor types
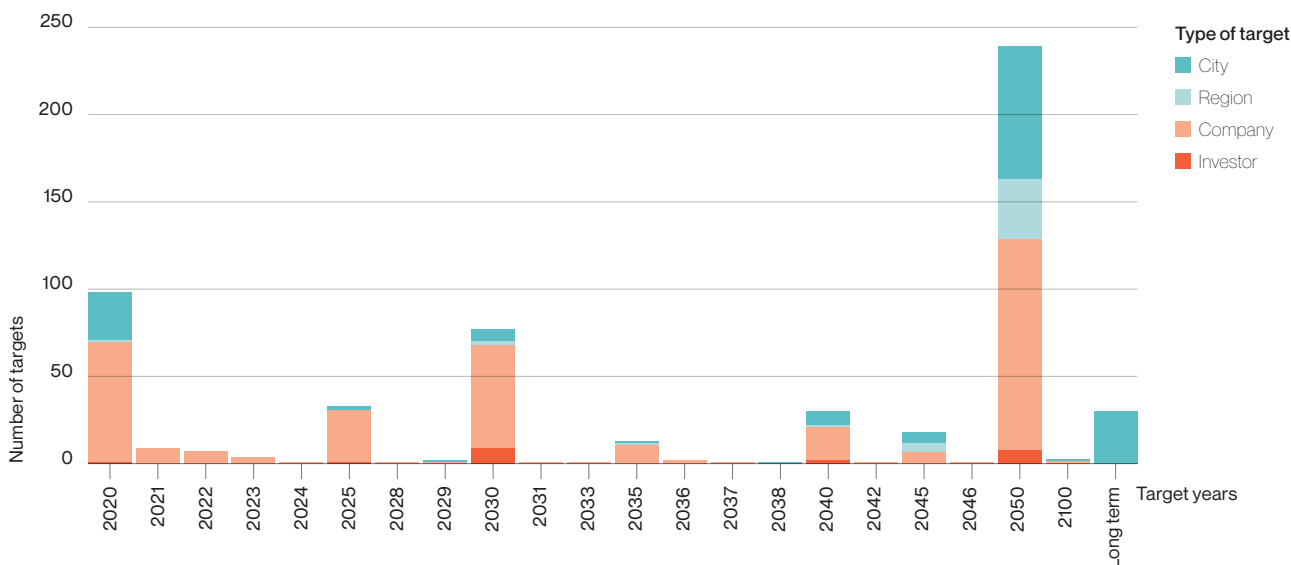(cities, regions, companies, investors)

In total, companies pursuing net-zero emissions targets have a footprint of over 3.5 gigatonnes GHG in annual emissions, more than India's annual emissions (World Resources Institute, 2020). Data gaps make it challenging to assess what percentage of their emissions are covered by their emissions targets, and many have set net-zero goals that focus on a specific scope or subset of their emissions, rather than their entire footprint. Still, this figure suggests that companies with an emission footprint equivalent to one of the world's largest emitters have taken at least a first step on the path to decarbonising their operations.

2.2.3
Targets

Though most net-zero goals use 2050 as the target year, there is a large degree of heterogeneity in actors' targets. For instance, targets vary in terms of whether they apply to a subset or the entirety of an actor's emissions, and to what extent an actor intends to use carbon offsets to reach net zero.

The analysis in this report includes a wide net of target types. Net-zero goals range from pledges to reduce emissions by a specific percentage (i.e., 80 percent reduction from a baseline year or higher), before a target year, which are often reported through platforms such as CDP, to far more general announcements of net-zero ambition (i.e., a pledge of carbon neutrality by mid-century).

Figure 4 hones in on a subset of these targets: economy-wide city and region pledges to reduce emissions by at least 80 percent by a specific year, and company targets to reduce emissions by at

least 80 percent by a specific year (these company targets are not necessarily company-wide). Of the more than 900 cities or regions aiming for net-zero emissions, only 460 have targets that specify goals to reduce emissions by a certain percentage by a specific year, and even fewer, 195 (42 percent), are economy-wide targets.

Of this subset of actors, most aim to achieve net-zero emissions around the years 2020, 2030, and 2050, or along more loosely defined "long-term" timelines. Most cities and regions aim for 2050 target years, though a significant number of cities set earlier targets. Copenhagen, for instance, aims to be the first carbon neutral capital by 2025 (CNCA, 2020). The Finnish city of Turku has set a goal to become carbon neutral by 2029, and a "climate positive city," with negative net emissions, after that point (Turku City Council, 2018).

Companies' targets also vary widely, ranging from some actors claiming to be already achieving annual net-zero emissions, largely through the use of offsets, to a company aiming for a 100 percent reduction in emissions from its purchased electricity by 2100. Even in sectors considered traditionally hard to abate, some actors are setting net-zero targets with deadlines in the next few years. Though only seven energy companies set net-zero targets, those that did set early deadlines, with the median sectoral deadline year at 2025, the earliest out of the companies with sector data. Similarly, the 24 consumer staples companies with reported sector data had a median target year of 2028 for their net-zero targets. However, it is important to note that these targets do not necessarily apply to the entire extent of the companies' emissions.

As Box 1 discusses, it is difficult to judge an actor's ambition based solely on its timeline. While most guidelines suggest aiming for net-zero emissions by 2040, or 2050 at the latest (University of Oxford, 2020), many other factors, ranging from an actor's emissions sources and its control over them; the emissions scopes and greenhouse gases targeted by a goal; and the presence or absence of a plan for implementation can determine a target's overall impact on emissions.

Additionally, these targets can be extremely heterogeneous. Of the 123 cities and regions that mention specific carbon offset projects in their net-zero plans, these approaches range from reforestation to renewable energy procurement and CO_2 removal. Some actors set goals targeting all or nearly all of their emissions profiles; actors including Microsoft and Moody's have also set out goals to address their historic emissions. Other targets hone in on specific sectors, such as the energy and buildings sector. Many corporate targets focus on certain products or locations — specifying goals in terms of tons of CO_2 per hotel room or outlining goals for specific airports.

Box 1

Understanding Ambition

It is difficult to evaluate a city, region or company's ambition from its target year alone. Targets vary widely, and cover different portions of an actor's overall emissions. A 2050 target that encompasses all of an actor's direct (scope 1) and indirect (scope 2 and 3) emissions and greenhouse gases may be equally or more ambitious than a 2030 target focusing only on carbon dioxide emissions in a single sector.

Actors' varying emissions profiles can also lead to very different climate action plans and timelines. A largely industrialised state or region may be more challenging to decarbonise than a highly forested region. Both Scotland and Wales have set targets supporting the United Kingdom's goal of reducing emissions by 80% (from 1990 levels) by 2050. However, the UK Committee on Climate Change suggested that while Wales should target a 95% reduction by 2050 relative to 1990, Scotland should set a net-zero GHG target for 2045, "reflecting Scotland's greater relative capacity to remove emissions than the UK as a whole" (Committee on Climate Change, 2019). Given Scotland's "larger land area per person and its significant CO_2 storage potential…it can credibly reach net-zero GHGs earlier," while Wales "has less opportunity for CO_2 storage and relatively high agricultural emissions that are hard to reduce" (Committee on Climate Change, 2019). Similar trends hold true for corporate emissions – some sectors need to harness existing solutions in transportation, energy, and energy and material efficiency, while others must also accelerate the research, development, and adoption of new technologies (Ge et al., 2019; International Energy Agency, 2017; International Energy Agency, 2019).

Similarly, actors may have different levels of control over their emissions, according to their resources and the political context they operate in (Bataille, 2019). Low-carbon measures could reduce the emissions from urban buildings, materials, transport and waste by nearly 90% in 2050 (Coalition for Urban Transitions, 2019). However, by one estimate, just 28 percent of urban mitigation potential is controlled by local governments; 35 percent is in the hands of national and regional governments, and the remaining 37 percent is controlled by collaborations among local, regional and national governments (Coalition for Urban Transitions, 2019). Cities and regions with national governments that are also pursuing ambitious emissions reductions goals may have the financial, technical, and political support to move more quickly (Hsu et al., 2020). Local governments in developing and emerging economies often have less access to the capital needed to implement climate policies, even if these strategies end up saving money over the long term (Coalition for Urban Transitions, 2019; Beard et al., 2016). The process of setting a target for a large multinational corporation may look quite different from the path taken by small and medium enterprises; a fact that several reporting platforms have recognised and responded to (Tickell & Robins, 2020; Farsan, 2020).

3

Looking Ahead: Navigating the Nuances of Net-Zero Targets

The momentum for cities, regions, and companies to set and communicate net-zero targets is strong and accelerating. Such targets are multifaceted and highly nuanced; a broad range of definitions, scopes and implementation approaches underpin key differences to these targets' ambition, and their potential impacts to the threat of climate change.

To explore these differences further, a forthcoming report – *Navigating the nuances of net-zero targets* – will systematically assess the following key issues to cast light on the ambition and impact associated with different approaches. The analysis will provide a foundation for ambitious local governments and corporate actors to fully understand the implications of their intended approaches, as well as for observers to critically assess the targets communicated by those actors.

Critical comparison of net-zero target implementation approaches

Cities, regions and companies adopt a wide range of approaches for setting net-zero emission targets. Beyond variations in the terminology used and the claims made, there are significant differences in how actors intend to achieve "net-zero emissions."

Net-zero targets may not always cover an actor's full emissions scope. Significant variations exist in actors' targeted emission scopes, and the extent to which this is transparently communicated through actors' targets and claims.

Having clear and robust plans for the reduction of an actor's own emissions is the most unambiguous way to implement a net-zero target. Net-zero targets focus on an actors' own emissions (in comparison to relying on offsets that reduce emissions elsewhere) to different degrees. Additionally, the extent to which net-zero roadmaps are built on robust and meaningful planning processes varies.

Approaches for reducing emissions from procured energy – including unbundled renewable energy certificates (RECs), utility green procurement, and different forms of purchase power agreements – vary widely in their stringency, expense and impact.

Targets underpinned by offsetting strategies need to be critically reviewed. Historically, observers and consumers have largely accepted the practice of offsetting emissions, although it has been broadly recognised that the impact associated with the procurement of offset credits is more ambiguous than from the reduction of one's own emissions. In the post-2020 context, the suitability of offsetting as a dominant strategy for achieving net-zero emissions is even more nuanced and critical. Some actors are starting to move away from a compensation claim model to a more transparent contribution claim model, where the ownership of the emission reduction outcomes from support provided is not transferred but remains with the host country.[8]

Support for carbon-dioxide removal practices and technologies is often treated as a form of offsetting, but some actors recognise key differences in the permanence and certainty of carbon-dioxide removals and opt to pursue separate removal targets for carbon dioxide removal and for emissions reduction (Jeffery et al., 2020).

8 See, for example, NewClimate Institute's "Climate Responsibility" approach (NewClimate Institute, 2020).

Real implications of net-zero target implementation approaches for global decarbonisation

Key differences in approaches to implementing net-zero targets lead to different climate change mitigation and global decarbonisation outcomes.

The *additionality* of an emissions reduction action is not always clear or possible to objectively define. When an actor seeks to implement a target through means other than directly reducing their own emissions, it is important to evaluate to what extent these efforts are additional (i.e., would not have occurred otherwise). Historic definitions of additionality – particularly those related to offsetting approaches – need to be redefined to reflect the post-2020 context under the Paris Agreement.

The environmental integrity of emission reduction action is especially relevant in cases where an actor seeks to implement a target through means other than directly reducing their own emissions. For example, uncertainties related to monitoring, reporting and verification (MRV) methodologies to verify emissions offsets and establish the permanence of carbon dioxide removal can affect the extent to which actions' outcomes can be considered reliably equivalent to other potential approaches.

The implementation of net-zero targets can require different levels of effort, according to an actors' circumstances. The relative location of emission reductions, and the marginal cost of pursuing those emission reduction measures, can vary significantly between different implementation approaches, with potential implications for equitable effort sharing.

The extent to which net-zero targets translate to long-term decarbonisation depends on implementation. They must drive or incentivise an actor to make the transformational shift to a decarbonisation pathway, and must apply to the hardest to abate sectors. Pursuing least-cost approaches in the short-term may not necessarily be the most efficient and constructive approach for deep decarbonisation over the long-term.

Transparency is important for observers and consumers to understand the ambition and impact of a net-zero target. Because city, regional and corporate actors are part of an interconnected society that is not emissions-free, full emissions reduction may not be possible. Ambitious actors can be constructive by reducing their own emissions as far as possible and within their control, and then being transparent about the challenges around reducing remaining emissions. The identification of solutions for hard-to-abate activities requires an especially transparent and constructive dialogue. Observers and consumers should recognise that, in this regard, constructive transparency can be far more ambitious and solution-oriented than net-zero claims that are based on ambiguous accounting approaches.

4
Conclusion

Reaching global net-zero emissions will require a rapid transformation of social, economic, and political systems. City, region, and company efforts to decarbonise can play a powerful role in modelling this shift, and calling for accelerated action from their peers and national governments. This report finds significant mobilisation towards net-zero emissions among cities, regions and cities captured through the world's largest climate action reporting platforms. Their ultimate impact, however, will depend on the details of their efforts, and their ability to implement them. A forthcoming report will dive further into the details of these net-zero efforts, outlining strategies for developing and realising effective decarbonisation strategies.

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Appendix

Defining net-zero targets

This analysis considers an actor to be *pledging a net-zero target* if it meets one of the following criteria:

- It sets a GHG emissions reduction target of 80 percent or more, either on an economy or operations-wide basis, or for a specific sector (i.e., energy, buildings, or transport).
- The actor explicitly mentions a "net-zero," "carbon neutral," or "zero emissions" goal in its pledge or disclosure.
- The actor has set an approved Science Based short-term or medium-term target that extrapolates to an 80% emissions reduction by 2050 (assuming a linear extrapolation of the annualised percentage reduction goal to 2050).

This analysis casts a wide net, particularly for companies, including both sector-specific and economy-wide targets, based on the definitions above. Since our goal was to understand the full range of net-zero commitments, we did not apply any other filtering criteria (e.g., such as only including commitments that included particular emissions scopes or GHGs, or only applied to economy or community-wide emissions).

Data sources

Actors that choose to report their climate action often have multiple platforms where they can report their commitments, ranging from global initiatives (such as the Global Covenant of Mayors) to more localised ones (examples include We Are Still In and the US Climate Alliance).

Table 1 summarises the data sources for both net-zero commitments, and for the contextual information (such as population, revenue, and emissions) noted in the report.

Table 1
Data sources

Description	Data source
Business ambition for 1.5°C	Business ambition for 1.5. (9 September 2020). Science-Based Targets, United Nations Global Compact, and the We Mean Business Coalition. Data shared directly by Business ambition for 1.5°C.
CDP Cities Data This includes data reported as part of cities participating in other networks, such as the **C40 Cities Climate Leadership Network, Global Covenant of Mayors for Climate & Energy, and the ICLEI carbonn Climate Registry.** Data from the 2019 Full Cities Dataset was used as the primary data source; if an actor was not included in this source, then data from the 2018-2019 Full Cities Dataset was used.	CDP. (2020). 2019 Full Cities Dataset. https://data.cdp.net/Governance/2019-Full-Cities-Dataset/iapx-bpuk (accessed July 1 2020). CDP. (2020). 2018 - 2019 Full Cities Dataset. https://data.cdp.net/Governance/2018-2019-Full-Cities-Dataset/vzxs-ejjs (accessed July 1 2020). *In their disclosures, actors report on the results of the earlier year's GHG emissions and activities (e.g., a 2019 disclosure form reports on an actor's 2018 emissions and activities).*

Description	Data source
CDP States and Regions Data This includes data reported as part of cities participating in other networks, such as **The Climate Group** and the **ICLEI carbon*n* Climate Registry**.	CDP. (2020). 2018-2019 Full States and Regions Dataset. https://data.cdp.net/States-and-Regions/2018-2019-Full-States-and-Regions-Dataset/hmhn-9g99 (accessed July 15 2020). *In their disclosures, actors report on the results of the earlier year's GHG emissions and activities (e.g., a 2019 disclosure form reports on an actor's 2018 emissions and activities).*
CDP Companies Data	CDP. (2020). 2019 Disclosure Survey. Provided directly by CDP. *In their disclosures, actors report on the results of the earlier year's GHG emissions and activities (e.g., a 2019 disclosure form reports on an actor's 2018 emissions and activities).*
ClimActor R Package A harmonised dataset of 10,000+ city and region transnational climate network participation, along with contextual information including population, geographic location, and administrative jurisdiction.	Hsu, A., et al. (Forthcoming). ClimActor, a harmonised dataset of 10,000+ city and region transnational climate network participation. Nature Scientific Data.
Energy and Climate Intelligence Unit (ECIU)	Energy and Climate Intelligence Unit (ECIU). (2020). Net Zero Tracker. https://eciu.net/netzerotracker/map (accessed September 2020). We included company and subnational net-zero commitments from the ECIU's Net Zero Tracker in our analysis.
EU Covenant of Mayors for Climate & Energy	EU Covenant of Mayors for Climate & Energy. (2020). Individual targets and emissions data for reporting members. www.globalcovenantofmayors.org (accessed July 2020).
Forbes Global 2000 Forbes Global 2000 was used as a source of company revenue data.	Murphy, A., Tucker, H., Coyne, M., and Touryalai, H. (13 May 2020). Global 2000: The World's Largest Public Companies. Forbes. https://www.forbes.com/global2000/#6f882c67335d
Fortune Global 500 Fortune Global 500 was used as a source of company revenue data.	Fortune. (2020). Global 500. https://fortune.com/global500/
Global Climate Action Portal The Global Climate Action Portal synthesis data from many climate action reporting platforms. We used this data source primarily to identify the city, region, and company participants in initiatives that are part of the **Race to Zero** campaign.	United Nations Framework Convention on Climate Change. (2020). Global Climate Action Portal. https://climateaction.unfccc.int/ (accessed June 2020).
Global Covenant of Mayors for Climate & Energy	Global Covenant of Mayors for Climate & Energy. (accessed July 2020). Individual targets and emissions data for reporting members.

Description	Data source
Dun & Bradstreet Hoovers Hoovers was used as a source of company revenue data.	Dun & Bradstreet Hoovers. (2020). Sales Revenue. https://www.dnb.com/products/marketing-sales/dnb-hoovers.html (accessed August 2020).
Government of Japan, Ministry of the Environment	Government of Japan, Ministry of the Environment. (2020). 2050 Zero Carbon Cities in Japan. http://www.env.go.jp/en/earth/cc/2050_zero_carbon_cities_in_japan.htm (accessed August 11 2020). Government of Japan, Ministry of the Environment. (2020). Status of 2050 carbon dioxide emission virtually zero statement by local governments. https://www.env.go.jp/policy/zerocarbon.html (accessed August 11 2020).
Swedish municipalities	Widerberg, O. & C. Fast (2020) Zeroing in on cities: Exploring definitions, scope and residual emissions in net-zero emission targets by Swedish municipalities. Manuscript in preparation. (https://act-sweden.se/)
Thomson Reuters Thomson Reuters was used as a source of company revenue and emissions data, if they were not available from the company's disclosure form or through the other sources for revenue data.	Thomson Reuters. Company dataset. Shared directly by Thomson Reuters in October 2016.
US Climate Alliance	U.S. Climate Alliance. State Climate Energy Policies. Accessed June 2020 from: https://www.usclimatealliance.org/state-climate-energy-policies. Information from this source was supplemented through desk research of participants' climate action targets or plans.
US Climate Mayors	US Climate Mayors. Accessed July 2020 from: www.climatemayors.org and http://climatemayors.org/actions/climate-action-compendium/. Information from this source was supplemented through desk research of participants' climate action targets or plans.

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