

GLOBAL CLIMATE ACTION 2023

Ambition of Cities, Regions,
and Companies



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for credible climate action

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About Camda

Camda is a community of data and analytical experts, dedicated to providing credible climate action information from regions, cities, businesses, investors and civil society. It was initiated in 2017 by a call from Patricia Espinosa, Executive Secretary UN Climate Change, and Christiana Figueres, former Executive Secretary UN Climate Change, for a collaborative network of professionals and organizations to assess and communicate the impact of climate action and to record and track ambition and progress made by these actors in the context of the Paris Agreement. The organizations authoring this report are all part of the Camda Climate Action Tracking Initiative.



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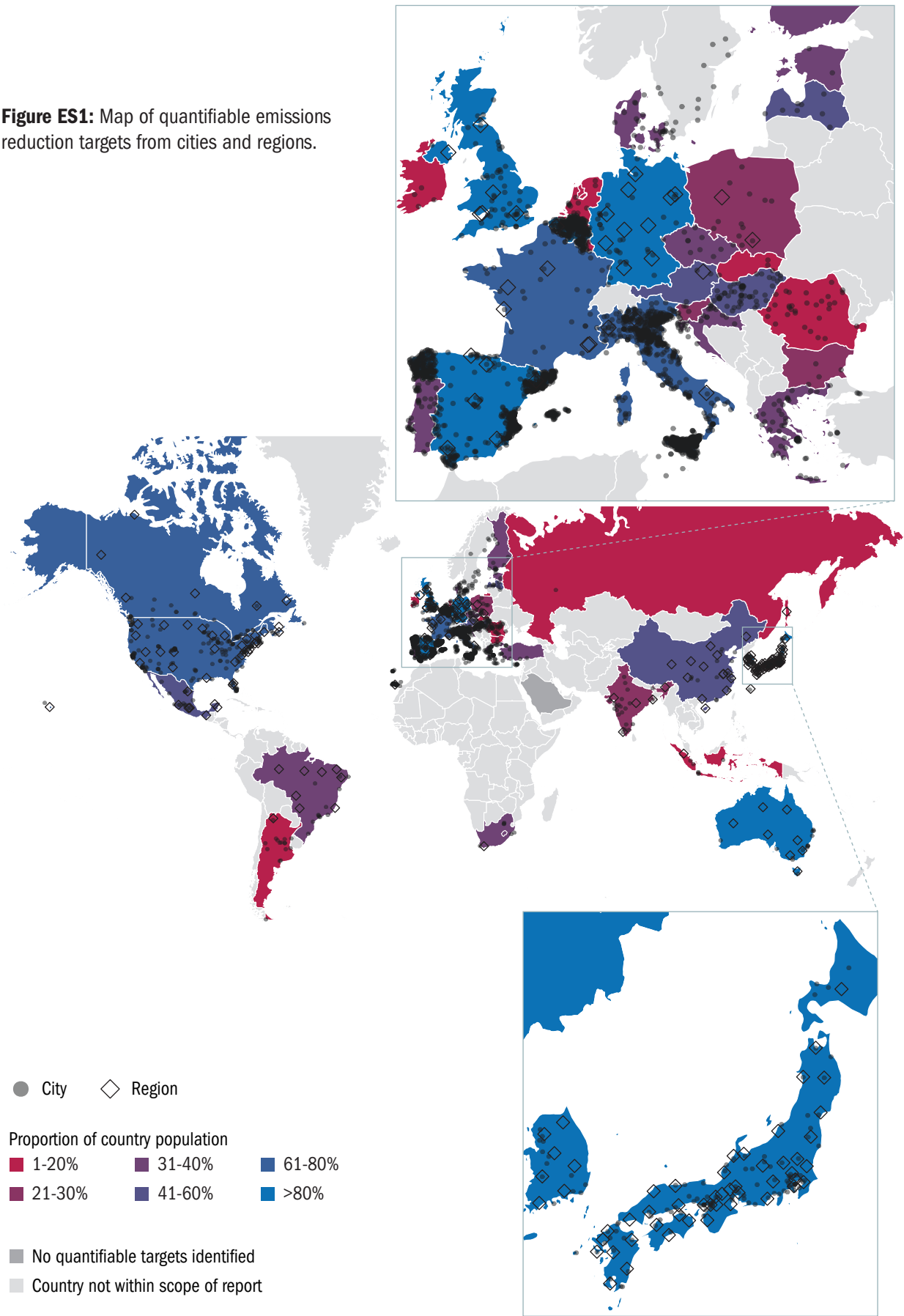
EXECUTIVE SUMMARY



Subnational government and private sector actors are critical agents to mobilize needed climate action. The recent UN Framework Convention on Climate Change's (UNFCCC) First Global Stocktake synthesis report emphasizes the need for "accountable and transparent actions by non-Party stakeholders" to "strengthen efforts for systems transformations." These 'whole of society' approaches are coming under greater scrutiny, as national and international policymakers strengthen efforts to develop more rigorous standards to reduce greenwashing and hold the increasing number of private businesses and subnational governments pledging more ambitious climate actions. In response to the resounding call for "ambition and action" at the 2023 Climate Ambition Summit convened in New York, we map subnational and business climate actions over the last five years.

For the fifth edition of *Global Climate Action of Cities, Regions and Companies*, we examine the state of subnational and private sector climate pledges and their ambition in helping to achieve global emissions reductions in line with the 1.5 degrees C temperature goal. While the UN's Global Climate Action Portal features more than 32,000 actors "engaging in climate action" as of September 2023, we narrow our focus to a subset of cities, regions and companies that have pledged quantifiable emission reduction targets, including net-zero and carbon neutrality goals, between 2018 and 2022. Overall, this report analyzes 3,008 cities, 175 regions and 2,839 companies from the G20 countries, including Argentina, Australia, Brazil, Canada, China, the European Union (EU), India, Indonesia, South Korea, Japan, Mexico, Russia, Saudi Arabia, South Africa, Türkiye, the United Kingdom, and the United States.

Figure ES1: Map of quantifiable emissions reduction targets from cities and regions.



Target-setting landscape for cities and regions

- As of March 2023, 3,008 cities and 175 subnational states and regions made quantifiable emission pledges covering 26.5% of the total global population. Three-quarters of these subnational governments come from the EU. In Australia, the United Kingdom and Japan, more than 99 percent of the national population is covered by city and regional climate targets. In some countries, cities and regions took the lead in setting net-zero targets before their respective national governments, demonstrating their ability to catalyze more ambitious climate actions (Figure ES1).
- Encouragingly, the number of cities and regions with quantifiable emission reduction targets has increased in 2023 compared to 2022, although some of this growth is due to enhanced data collection methods. North American countries, including Canada, the United States, and Mexico, have all seen notable increases in cities and regions recording targets.
- Most of the pledged emission reduction targets aim for the medium-term, between seven and 16 years from when cities disclose them. The most common target year is 2030, which indicates cities and regions are aligning their target time frames with countries' nationally determined contributions. Short-term targets, indicating target years within six years of a disclosure year, are the least commonly pledged goal, with less than five percent of all targets aimed for near-term action.
- A growing number of cities and regions have pledged net-zero and carbon neutrality. 572 cities and regions are aiming for 100 percent emission reductions, carbon neutrality or net-zero, with one-third aimed at before 2050 and the majority for 2050 or later. Over 35% of the net-zero targets are from Europe, with 26% from North America and another 26% from East Asia and the Pacific (Figure ES2). Among cities and regions with net-zero targets, only about half have reported quantifiable interim targets – a key indicator to a net-zero target's credibility and robustness. A higher proportion of cities and regions in North America and East Asia and the Pacific (with the majority from Japan) have interim percentage reduction targets, while actors in South Asia, Sub-Saharan Africa, and Latin America and the Caribbean have more standalone net-zero targets without interim targets.

Figure ES2: Percentage of targets that are net-zero or carbon neutrality targets, compared to total city and region targets.

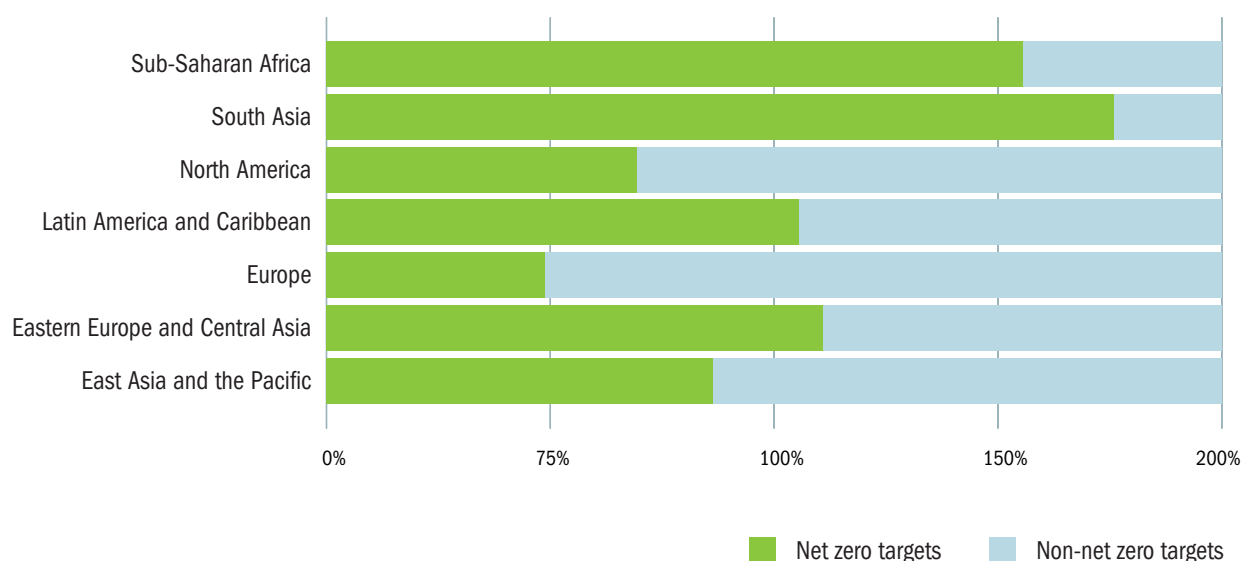
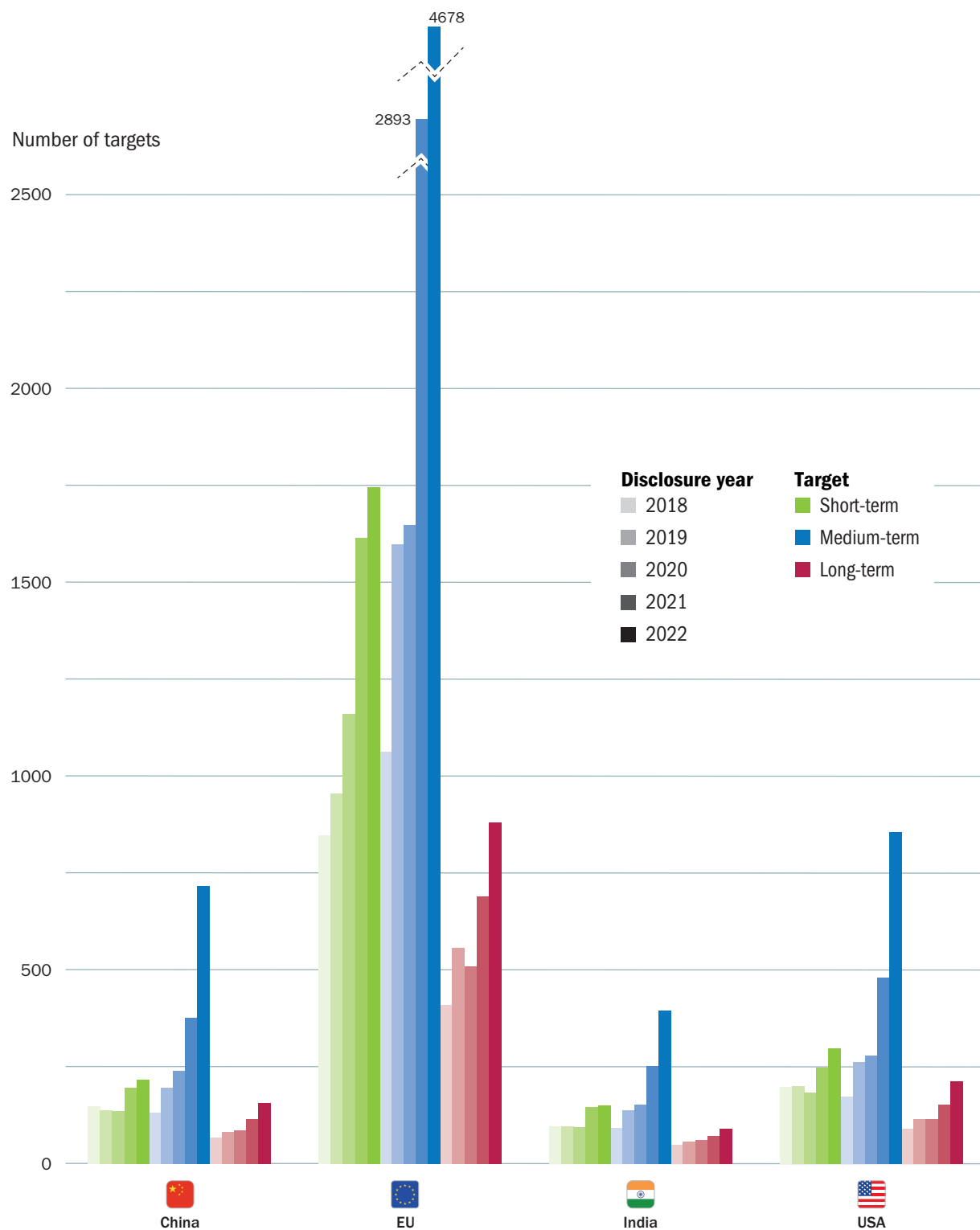


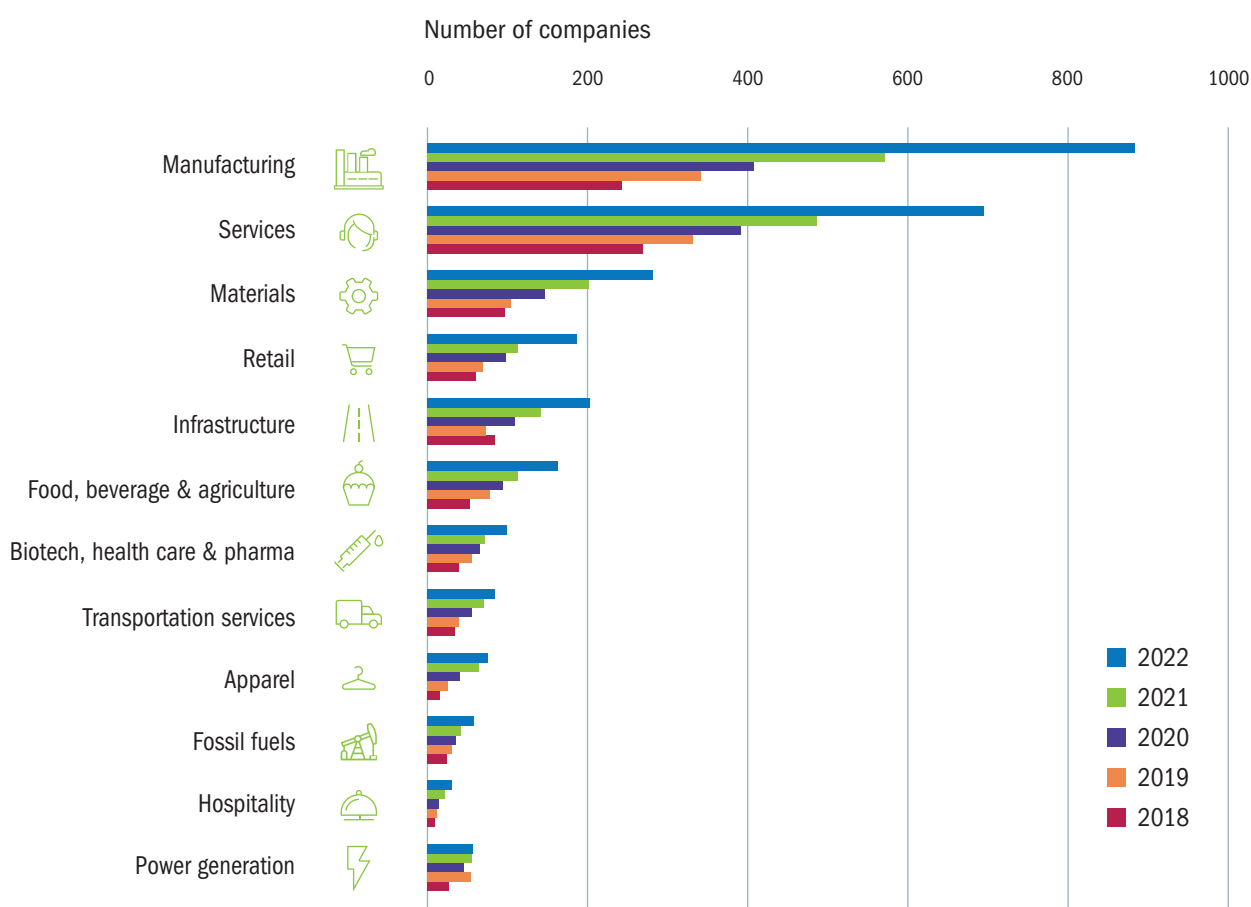
Figure ES3: Number of corporate targets for China, EU, India, and the United States in the period covering disclosure years 2018 to 2022.



Target-setting landscape for companies

- Between 2018 and 2022, companies have reported absolute emissions reductions targets to CDP, with a growing number of targets, indicating broader coverage of greenhouse gas (GHG) emissions. This trend also holds for net-zero targets made since 2021. The rising trend of target adoption is evident across various sectors, with manufacturing and services leading in the highest number of targets. Only the power generation sector shows a stabilizing trend in the number of targets made since 2019.
- Companies representing at least USD 15.4-27.4 trillion set between 1,667 and 4,909 quantifiable absolute emissions reduction targets reported to CDP. Most of these targets span all company branches. The number of corporate targets has increased over this period for most countries (Figure ES3), where EU has the most country branch targets. Companies dominantly have medium-term targets within 7 and 16 years of the disclosure year. Although long-term targets are the minority, the number is increasing.
- Looking specifically at scope 1 and 2 targets that represent emissions from own operations (scope 1) and electricity and heat use (scope 2), the same increasing trend between 2018 and 2022 is visible. Scope 1+2 targets represent 2.3 GtCO₂e in 2018 and 5.3 GtCO₂e in 2022, not accounting for overlap between scope 1 and 2. These targets cover both scope 1 and 2 in 65%

Figure ES4: Number of companies with net-zero targets per sector.



of the cases, while either scope 1 or 2, or also including scope 3 in the other cases. The increasing trend for scope 3 targets represents around 2.8 in 2018 and 21.4 GtCO₂e in 2022. Nevertheless, there may be overlap among these value chain emissions, but the extent of this overlap remains uncertain due to the difficulty of estimating it.

- Since 2021 net-zero targets reported to CDP show a significant increase between 2021 and 2022. The average net-zero target year from 2021 to 2022 changed from 2041 to 2044. In particular, the service sector is aiming for an earlier average net-zero year (2037/2040) (see Figure ES4). We have not assessed whether the net-zero targets include CO₂ only or all GHG emissions. However, this is an important consideration, as CO₂ emissions on a 1.5 degrees C pathway need to become net-zero around 10-15 years earlier compared to all GHG emissions.

Ambition of cities and regions

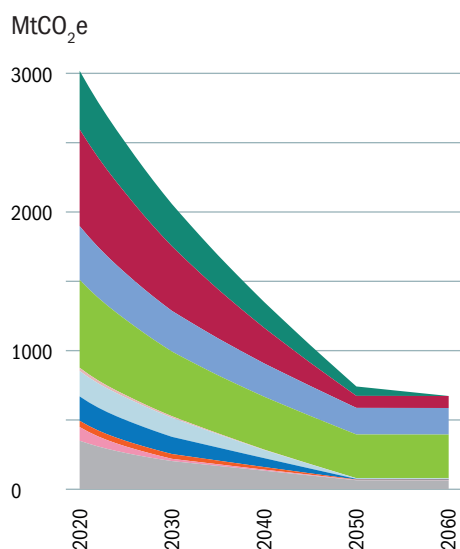
- Although subnationals' ambition pathways show that cities and regions have been increasing the ambition of their efforts over time, they are falling short of the pace required for 1.5 degrees Celsius, which requires halving global CO₂ emissions by 2030 and net-zero by 2050.
- Cities and regions in G20 countries, representing about 27% of global CO₂ emissions as of 2022, together aim to reduce approximately 9 GtCO₂e emissions by 2060. The United States, China, and Japan have pledged the most emission reductions at both the city and regional level (Figure ES4); their regional emission ambitions, however, only account for about 40%, 30%, and 20% of their national GHG emissions, respectively. Subnational actors in EU countries have developed more medium-term targets to rapidly reduce their CO₂ emissions, but they lag in long-term targets for decarbonization,

Figure ES5: Climate ambition pathways of subnational actors, shaded by country/region.

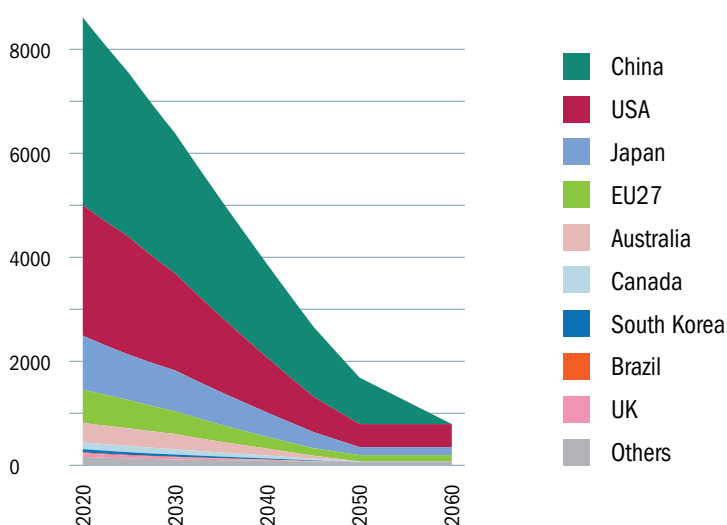
Note: Others denotes other G20 countries, including Argentina, India, Indonesia, Mexico, Russia, South Africa, Russia, Saudi Arabia, Türkiye; targets included do not necessarily consider all greenhouse gas emissions, nor do we include the potential of additional reductions via offsets.

Ambition Pathway 2023 – per country

City



Region



based on our conservative assumption of constant emissions beyond target years.

- Since 2020, cities and regions in the 10 highest-emitting countries (countries that were consistently evaluated in previous reports, from 2017 to 2022 data disclosure years) have been making progress in the ambition of their emission reduction targets, increasing both the level and the rate at which their emissions would be reduced in the next decades. With increasing net-zero targets and the addition of more participating cities and regions, the world could likely see the emissions gap further bridged between current national government policies and the 1.5 degrees C goal (UNEP, 2022).

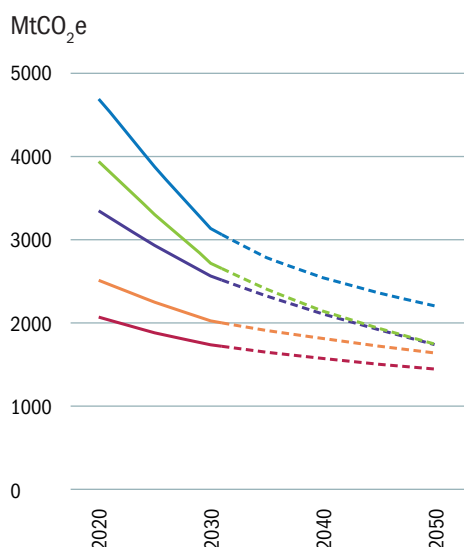
Ambition of companies

- The trend of rising ambition becomes evident when examining the combined ambition pathways of companies. More companies set targets, and average ambition increases. However, of the companies that have reported quantifiable absolute emissions reduction targets to CDP, only 25% have disclosed targets beyond 2030. For this reason, the combined company pathways do not reach net-zero by 2050.
- From the ambition pathways constructed for all companies committed to scope 1+2 absolute emissions reduction targets, two clear trends are visible: 1) 2020 emissions increase each disclosure year, and 2) the 2030 and 2050 emissions projections decrease (Figure ES6). The first trend can be attributed to more companies setting targets, companies increasing ambition or companies decreasing their base year emissions. The increasing number of targets and ambition is commend-

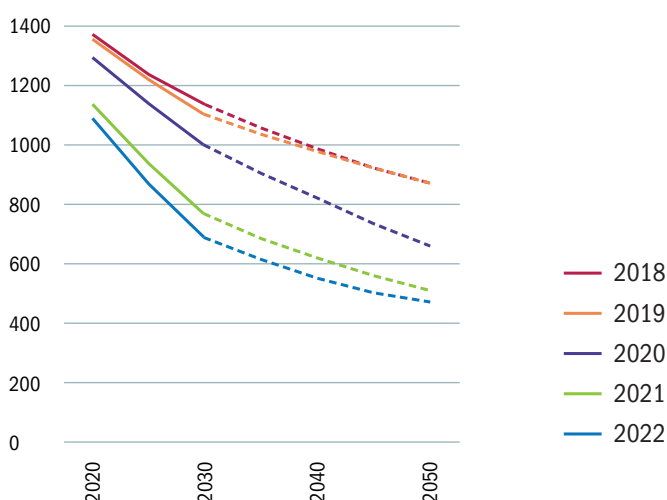
Figure ES6: Ambition pathways for all companies having disclosed scope 1+2 targets and emissions to CDP in the disclosure year 2018 to 2022, and for the 415 companies that have consistently reported targets and emissions in this period.

Note: as with subnationals, we do not consider the additional potential reductions of offsets in these scenarios.

All companies



Consistent companies



able, but change in base year emissions raises questions. Currently, no insights exist on which explanation dominates. Nonetheless, decreasing 2030 and 2050 emissions gives a positive signal, showing emissions reductions between 2020 and 2030 increasing from 16% to 33%.

- The emissions reductions for the 415 companies that have consistently reported targets and emissions throughout the disclosure years are higher than for all companies, showing an increase in reductions between 2020 and 2030 from 17% in the disclosure year 2018 to 37% in 2022.
- Nonetheless, projected emissions for 2050 are expected to remain significantly above zero due to several companies not setting targets beyond 2030, and even among those that have, not all have committed to net-zero goals.
- A slightly different trend is visible for scope 1+2 targets and emissions of the two high-energy use sectors 'chemical and petrochemical' and 'iron and steel'. In particular, early ambition, as demonstrated in the first two disclosure years, led to minimal reductions. However, this deficit has been offset by progress in the last two disclosure years, resulting in a targeted reduction of 26% between 2020 and 2030 in the 'chemical and petrochemical' sector (38-138 companies in 2018-2022 period), and 16% in the 'iron and steel' sector (5-18 companies in 2018-2022 period).

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01

INTRODUCTION



The 2023 Climate Ambition Summit convened in New York commences with the resounding message, “now must be the time for ambition and action.” This outcry urges governments, as well as business, finance, local authorities and civil society to accelerate climate actions to urgently address the growing emissions gap. Furthermore, the latest UN climate negotiations further solidified non-state and subnational actors’ role in global mitigation efforts in the ‘Sharm el-Sheikh Implementation plan, where they were encouraged to engage in climate action and collaborate with national governments. These calls for more inclusive and broad climate action come amidst a still large emissions gap between current national government policies and the emissions levels of a well below 2 degree C or 1.5 degree C pathway.

Subnational government and private sector actors are critical agents in mobilizing needed climate action to fill this emissions gap (Hsu et al., 2019). The recent UN Framework Convention on Climate Change’s (UNFCCC) First Global Stocktake synthesis report emphasizes the need for “accountable and transparent actions by non-Party stakeholders” to “strengthen efforts for systems transformations” (UNFCCC, 2023; p.4). These ‘whole of society’ approaches (UNFCCC, 2023 p.4) are coming under greater scrutiny, as national and international policymakers strengthen efforts to develop more rigorous standards to reduce greenwashing and hold the increasing number of private businesses and subnational governments pledging more ambitious climate actions (UN HLEG, 2022).

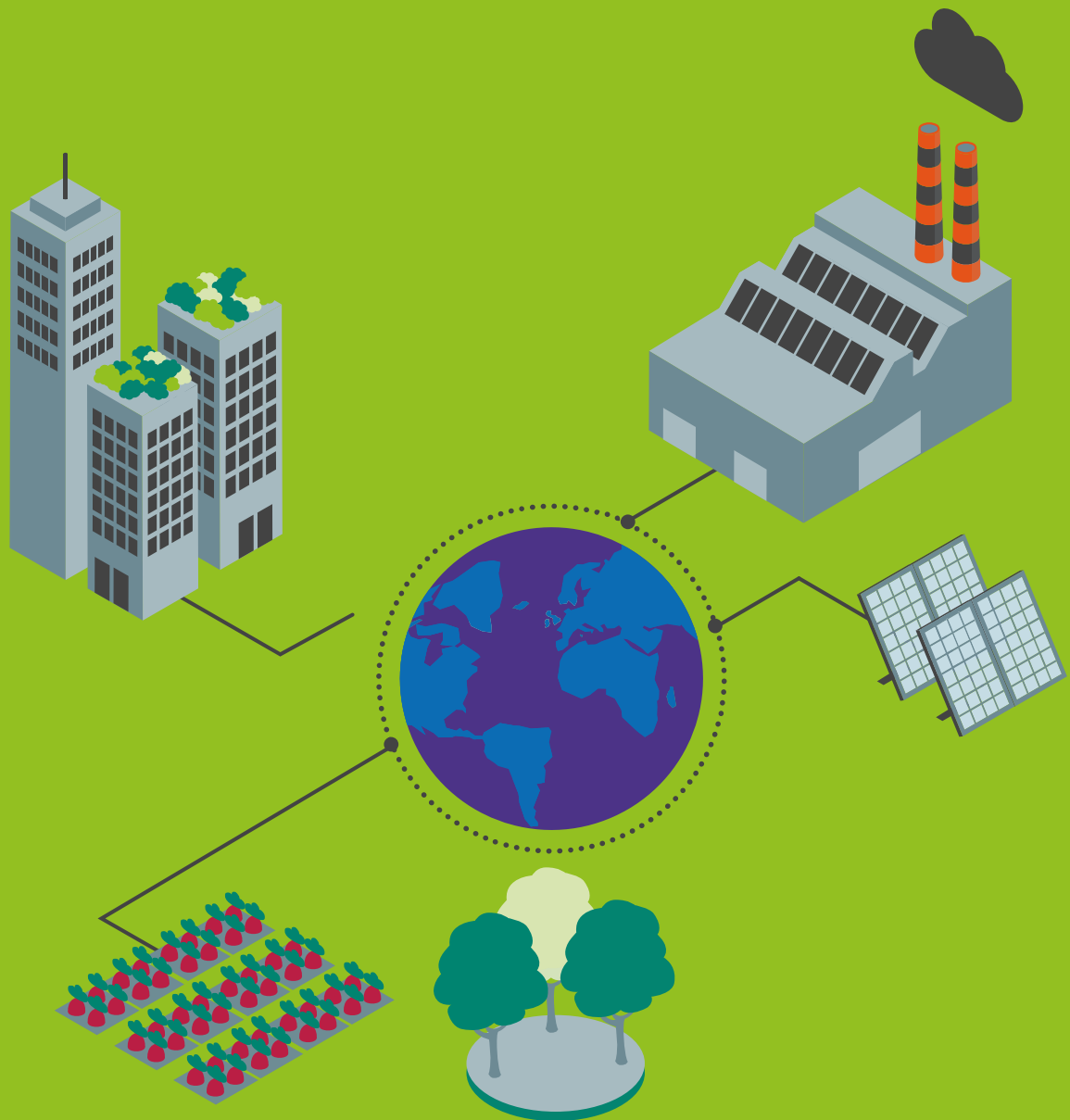
The UN’s High-Level Expert Group on the Net-Zero Commitments of Non-State Actors (HLEG) identified five principles to guide net-zero target setting and attainment: ambition, alignment with actions and investments, transparency, accountability, and commitment to equity and justice. In this 2023 *Global Climate Action of Cities, Regions and Companies* report, we focus on the first principle, examining the ambition of cities, regions and businesses aiming to deliver short- and medium-term emissions reductions that lead to net-zero emissions. This report does not delve into the specifics of how these actors plan to achieve their ambitious targets. Cities, in particular, are in the midst of transitioning from their expired 2020 goals to more ambitious 2030 targets, while a growing number of actors, notably businesses, are committing to their own net-zero objectives.

For the fifth edition of *Global Climate Action of Cities, Regions and Companies*, we examine the state of subnational and private sector climate pledges and their ambition in helping to achieve global emissions reductions in line with the 1.5 degrees Celsius temperature goal. While the UN’s Global Climate Action Portal features more than 32,000 actors ‘engaging in climate action’ as of September 2023, we narrow our focus to a subset of cities, regions and companies that have pledged quantifiable emission reduction targets, including net-zero and carbon neutrality goals, between 2018 and 2022. This period represents five years of cities, regions and companies responding to the Paris Agreement’s call to scale up climate actions, the occurrences of the worldwide COVID-19 pandemic, and the global economy being impacted by the war in Ukraine. Overall, this report analyzes 3,008 cities, and 175 regions from the G20 countries, and 2,839 companies. The countries include Argentina, Australia, Brazil, Canada, China, the European Union, India, Indonesia, South Korea, Japan, Mexico, Russia, Saudi Arabia, South Africa, Türkiye, the United Kingdom, and the United States.

This report is structured as follows: First, we provide an overview of city, region and company climate actions from the G20. We focus on quantifiable emission reduction pledges up until 2050/2060 and evaluate target-setting progress made in the short-term (6-year), medium-term (7-16-year) and long-term targets (>16 years), as well as net-zero target setting for mid-century. Next, we evaluate trends in ambition and how cities, regions, and companies are increasing their ambition over time (between 2018-2022 disclosure years) to more closely align with 1.5°C pathways.

02

GLOBAL LANDSCAPE OF TARGET SETTING



Our global stocktake of city, region, and company climate actions includes the G20. Together, these countries comprise more than 80 percent of global GDP, 60 percent of the global population, and 75-80% of global greenhouse gas emissions (D'Souza and Sarkar, 2023). Subnational governments and businesses participate in climate mitigation actions in a variety of ways, by signing up to participate in an international climate initiative (e.g., Global Covenant of Mayors for Climate and Energy (GCoM), RE100, or NY Declaration on Forests) or by individually pledging their own efforts to tackle climate mitigation, adaptation, or financing (see Appendix for full list of data sources). We narrow our focus solely on those actors who have pledged quantifiable mitigation targets, and net-zero or carbon neutrality targets. Quantifiable targets are defined as absolute reduction, net-zero or carbon neutrality emissions targets where the actor has specified and provided information on a baseline year and corresponding emissions, a reduction target, and a target year. We focus on quantifiable targets, since cities, regions, and companies that have established measurable goals are more likely to be implementing real actions (Hsu et al., 2021; Hsu et al., 2022).

2.1 Cities and Regions

Among the 20 focus economies, 3,008 cities and 175 regions have made quantifiable emissions reduction targets, as of March 2023 (Figure 1). After accounting for geographical overlaps, these subnational actors account for 2.1 billion people around the world, representing 26.5% of the total global population (World Bank, 2023a). Three-quarters of cities and regions pledging quantifiable climate actions are from the European Union. Subnational climate actions are particularly inclusive in Australia, the United Kingdom, and Japan where more than 99% of the national population is covered by targets from cities and regions. In Japan, cities have been especially active, particularly in net-zero pledges; as of June 2023, there were 972 local governments recognized as committing to net-zero carbon emissions by 2050 (METI, 2023). As Ohta and Barrett note in 2023, Japanese cities demonstrated an early commitment to addressing the IPCC's Special Report on Global Warming of 1.5 °C by setting their own net-zero targets, which exceeded those of the national governments at the time. After this wave of city-level net-zero commitments, the Japanese government established a national net-zero target. Australian states also pledged net-zero ahead of the

national government (Data-Driven EnviroLab and NewClimate Institute, 2020). The examples of Japanese cities and Australian regions show that subnational governments can help galvanize higher ambition, since national governments followed city and region efforts.

Together, cities and regions in the G20 have set 3,799 quantifiable emission reduction targets, with 532 subnational actors who have set more than one target. Targets set by regions cover 1.65 billion people, and city-level targets cover an additional 455 million people. While population coverage is driven by East Asia and the Pacific, since primarily large cities and provincial governments in China are pledging climate mitigation targets, Europe leads in the number of subnational governments with climate commitments (Figure 2). Approximately 80% of subnational actors with quantifiable targets are from Europe, followed by 8% from North America and 7% from East Asia and the Pacific. Spain, Italy and Belgium are the most active countries. As Figure 2 illustrates, however, these Europe cities and regions participating in climate initiatives tend to be much smaller in size, with a median population of 9,243 people, compared with East Asia and the Pacific, where the median population of climate-pledging cities and regions is 713,000 people.

Progress in participation

Encouragingly, the number of cities and regions with quantifiable emission reduction targets has increased in disclosure year 2022 compared to 2021 (Figure 3), although some of this increase is due to enhanced data collection methods (see Appendix). Only one country, India, had fewer actors participating in 2022 compared to 2021. The EU saw the highest absolute increase in subnational participation, with 359 new actors, although this was the lowest percentage increase among all countries (14%). Notably, the number of European cities and regions with quantifiable targets has not rebounded to pre-2020 levels, where we registered more than 6,000 with 2020 or pre-2020 emission reduction targets (NewClimate Institute, Data-Driven EnviroLab, 2019). Even still, three fourths of quantifiable targets overall are derived from the EU. Outside of the EU, the United Kingdom, Canada, and the United States have seen notable increases in the number of climate actors registered in 2023, with increases of 134%, 65%, and 19%. Although our database includes over 1,700 total Japanese

Figure 1 Map of quantifiable emissions reduction targets from cities and regions.

Note: Data only shown for the G20; for Japan, only subnational governments in Net Zero Tracker, prefectures and core cities with a population above 200,000 are included.

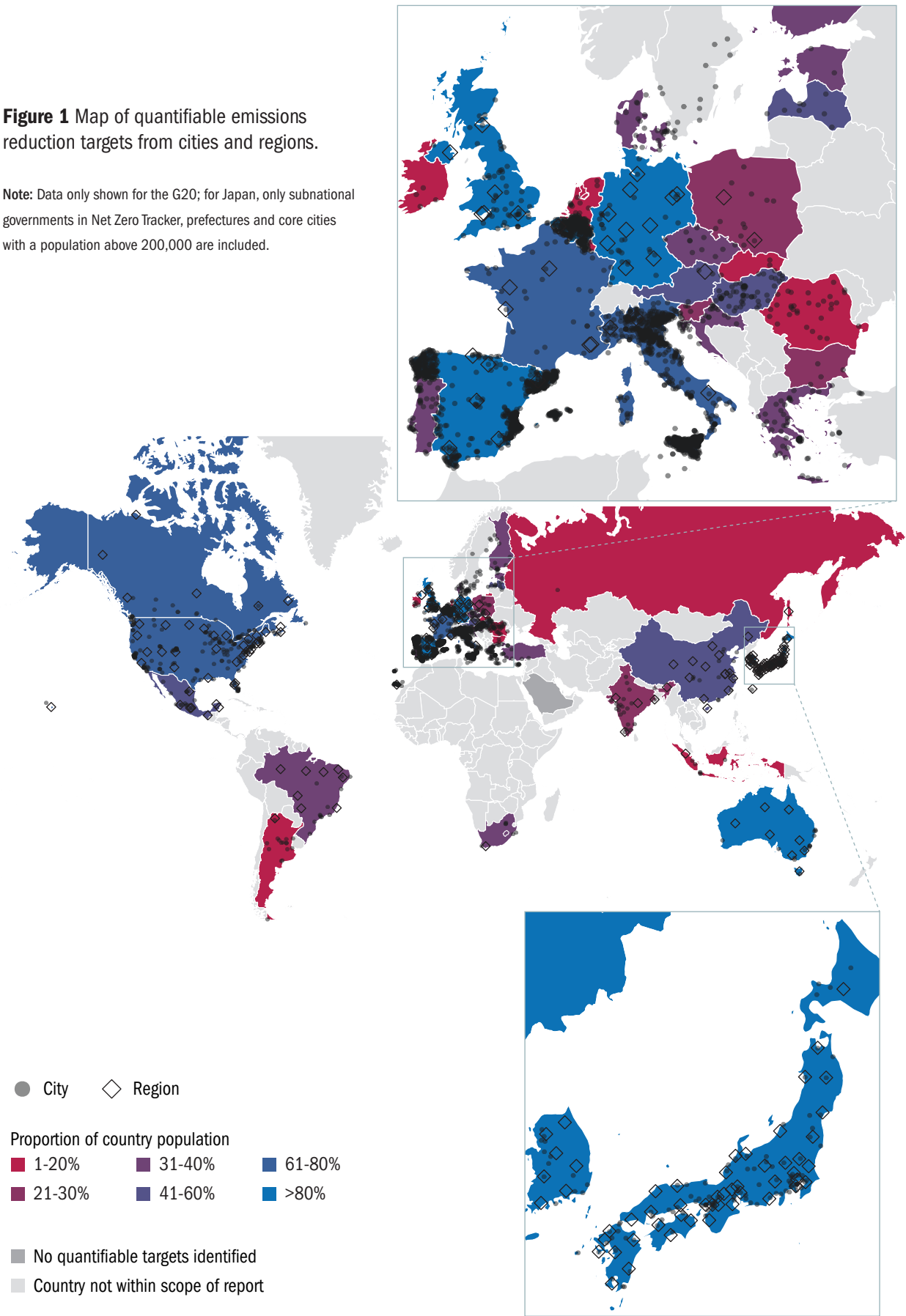
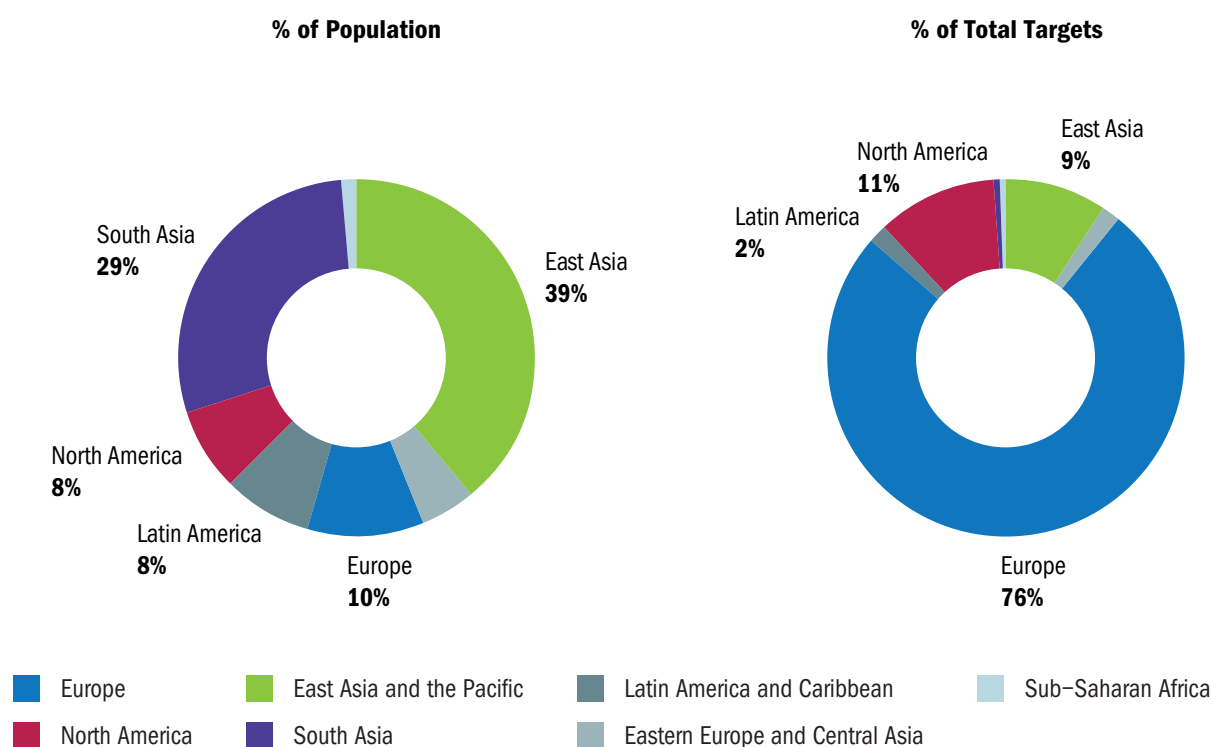


Figure 2 Distribution of the total population (left) and targets (right) covered by cities and regions with quantifiable mitigation targets by geographic region.



cities and regions, we only include regions and cities that appear in the Net zero Tracker, prefectures, and designated Japanese core cities for higher levels of coverage (Japan Local Government Centre, 2021).

Short-, medium-, and long-term targets

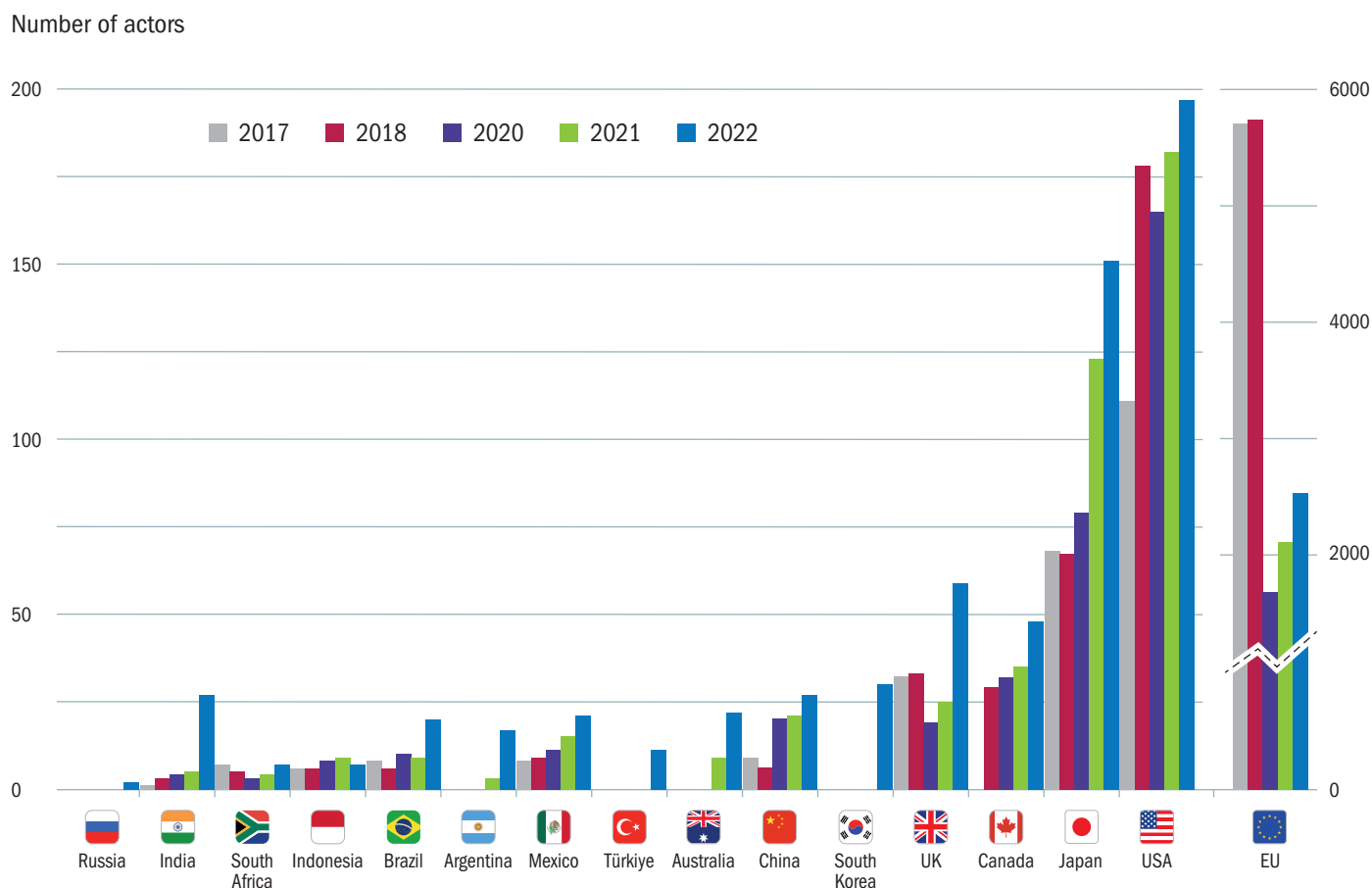
For subnational, in this report, ‘short-term’ targets are those within six years from the disclosure year; ‘medium-term’ as between 7 and 16 years from the disclosure year; and ‘long-term’ as those past 16 years from when cities and regions report their targets years. For the disclosure year 2022, we observe that most of the quantifiable targets (approximately 72% of the total targets) pledged are medium-term targets, with another 23% being long-term targets, and the remaining 4.6% short-term targets (Figure 4). While

the number of medium-term targets from cities and regions (around 2,737) is encouraging, signalling that subnational governments are aligning their mitigation timeframes with countries’ nationally-determined contributions (NDCs), the relative lack of short-term targets (177 total) is worrying. Cities and regions in the United States and Canada are pledging more long-term targets, compared to short or medium-term targets – half of their targets are long-term targets. In contrast, most targets (approximately 82%) from Europe are medium-term targets), and only 16% are long-term targets.

Short-term targets, indicating climate actions within 6 years, fell dramatically after 2020 and have increased slowly after the COVID years. Within the EU, the count of short-term targets in 2022 amounts to less than 1% of the number of EU short-term targets set by subnational governments in 2018. Of the total 5,820 EU actors that made quantifiable targets

Figure 3 Progression in the number of subnational climate actors included in the Global Climate Action of Cities, Regions, and Companies report since the 2018 report, which included data disclosures starting from 2017.

Note: Argentina and Australia were added to the analysis for the 2022 Global Climate Action Report; South Korea and Türkiye were added to the analysis for this year's report.



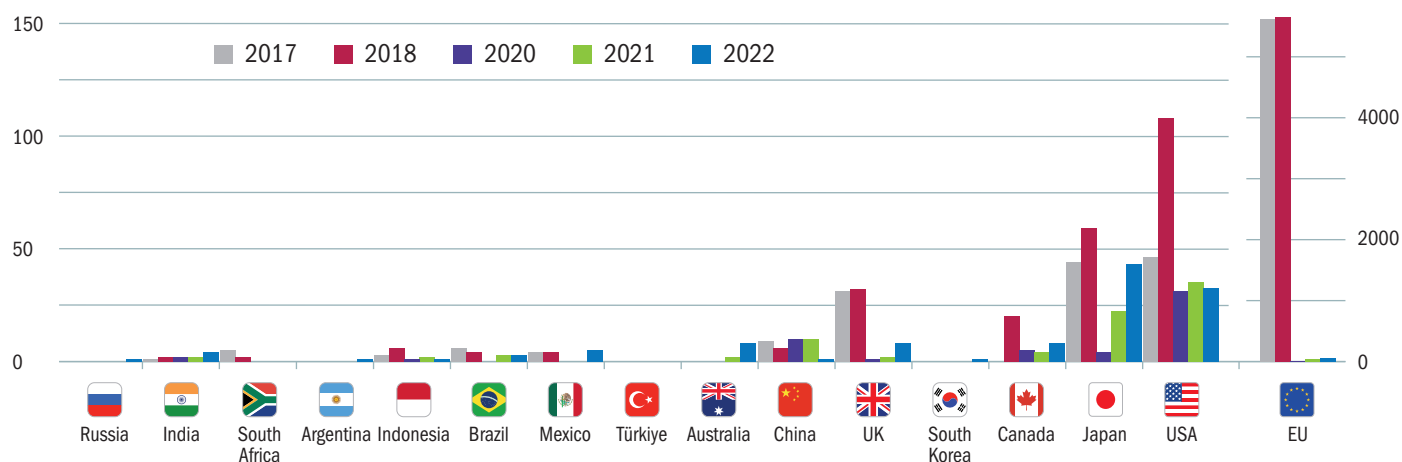
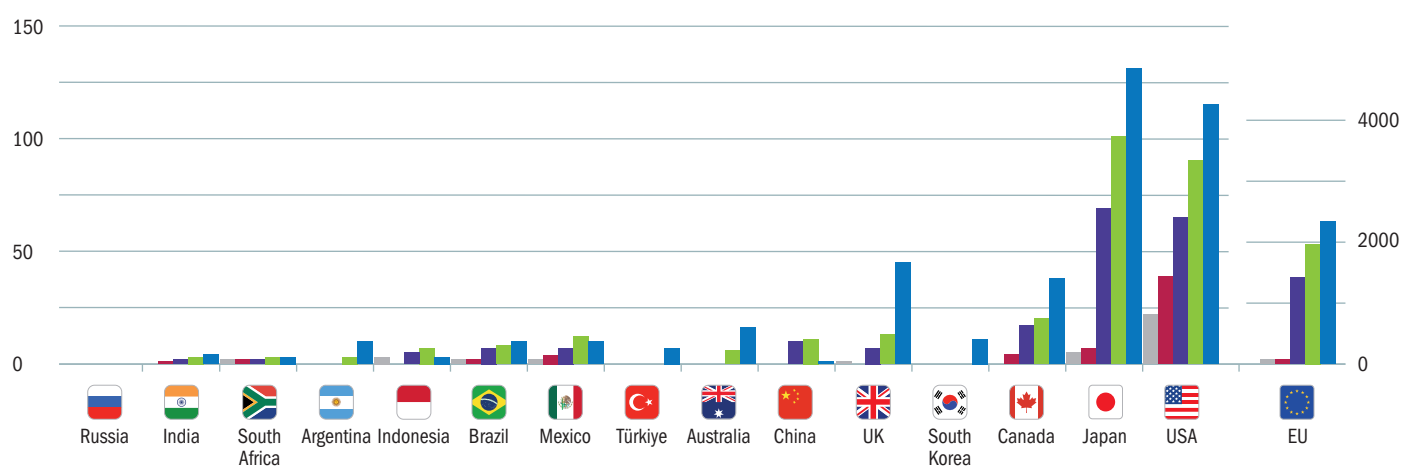
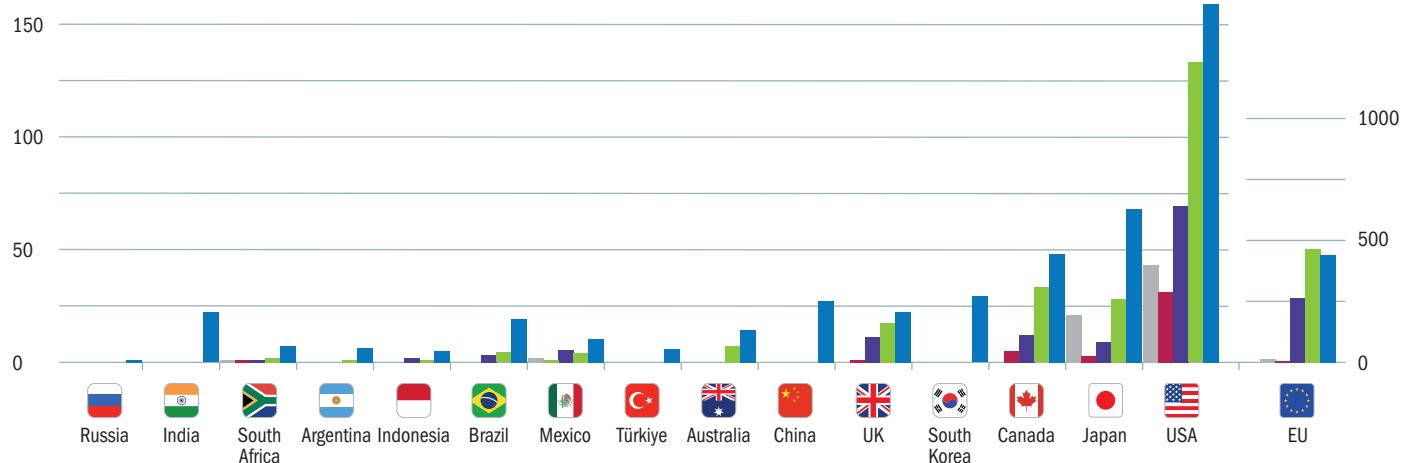
prior to 2020, over 72% of these actors (4,208) did not set new targets for the period after 2020. Only 23% (1,356) of these actors are still reporting quantifiable targets in 2023. Although short and medium-term EU targets have increased slightly, long-term targets in the EU have decreased in 2022.

We also observed more climate commitments from developing countries, such as China, Brazil, and Mexico. China pledged to decrease its carbon intensity by over 65% by 2030 relative to 2005 emissions levels, while aiming to “have CO₂ emissions peak before 2030 and achieve carbon

neutrality before 2060” (Xinhua News Agency, 2021). Following this national pledge and the ‘1+N’ framework, where various action plans have and will be made to achieve its national climate pledge, more provinces and cities developed their long-term climate targets (US Embassy, 2023). As of 2022, most of the quantifiable targets (with baseline emission years and inventories) are established at the province level in China. Even though we found evidence of Chinese cities with stated climate mitigation pledges, many were missing publicly available baseline emission inventories and were therefore not included in this report. In Brazil, following the reactivation of climate fund, pres-

Figure 4 Number of subnational climate targets from disclosure years 2017 to 2022 by country.

Note: the disclosure period 2019-2020 is missing due to the COVID-19 pandemic, which delayed data reporting for most subnational governments.

Short-term targets (within 6 years)**Medium-term targets (7-16 years)****Long-term targets (17+ years)**

ident election, and 2022 NDC submission, we observed a 25% increase in its medium-term climate targets and 375% increase in its long-term targets. Mexico's November 2022 NDC update, which targets a 35% reduction in GHG emissions by 2030 (up from the previous 22% reduction in the 2020 NDC), spurred increased responsiveness among subnational actors. While the absolute emission reduction remains relatively stable, there is a notable uptick in the number of accountable plans developed in response to the national updates (UNDP, 2022).

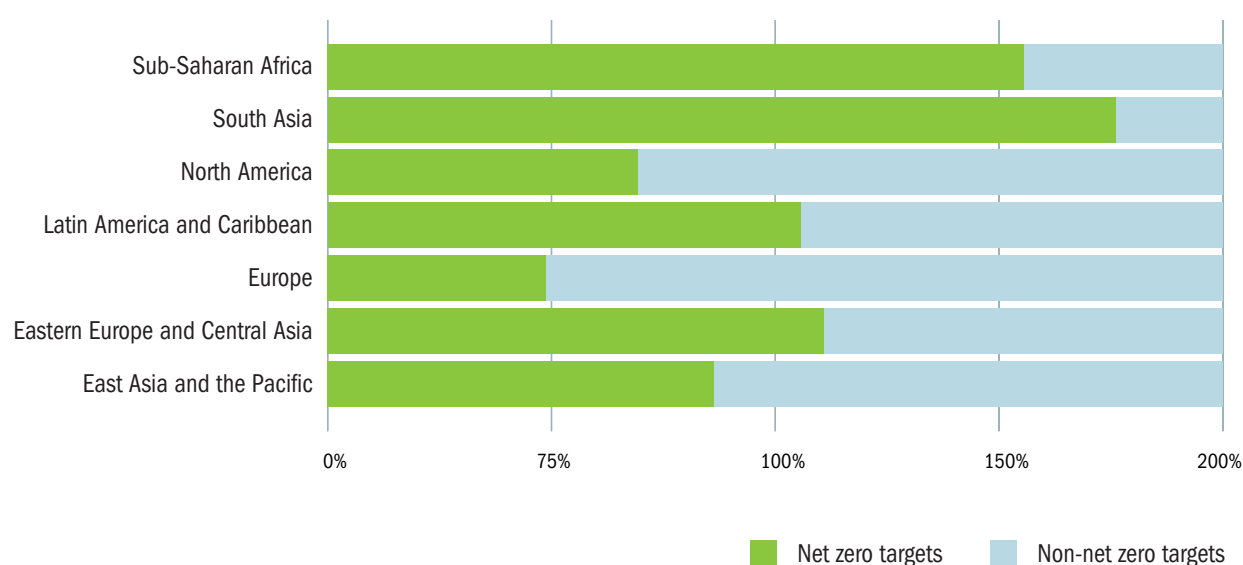
Progress in net-zero target setting

An increasing number of cities and regions have made ambitious climate commitments, including net-zero pledges and carbon neutrality. While carbon neutrality means balancing carbon emissions and sinks, net-zero pledges strive to make further steps to cut not only CO₂ emissions but also other GHG emissions to “as close to zero as possible, with any remaining emissions re-absorbed from the atmosphere, by oceans and forests for instance” (UN, 2023). In the 2022 Global Climate Action report, quantitative net-zero targets were defined as those with net-zero related terms in

their commitments and a percentage reduction goal of at least 80% by 2050. Due to the variation in how subnational governments have specified net-zero or carbon neutrality goals, this year we tried to be as broad as possible. Therefore, we included cities and regions that have committed to net-zero emissions (e.g., by participating in the UNFCCC's Race to Zero campaign), have disclosed intentions in their climate action plans to achieve carbon neutrality, or who have pledged to reduce community-wide emissions by 100 percent. Each of these targets are labelled as ‘net-zero.’

Using this revised net-zero definition, we identified 572 net-zero targets. This statistic includes 188 targets with target years before 2050, with the majority (384) slated for 2050 or later. From this total, 443 and 129 net-zero targets come from cities and regions, respectively. Only around 13% of all city targets qualify as net-zero, while nearly half (46%) of all region targets are net-zero. While net-zero targets have increased substantially since 2022, we find that subnational net-zero commitments are still concentrated in the Global North. Europe and North America lead in subnational action towards carbon neutrality, with 201 (35%) and 150 (26%) net-zero targets, respectively, followed by East Asia and the Pacific with 148 (25%). The U.S. leads in terms of cities and regions that have set net-zero targets, with 114 subnational

Figure 5 Percentage of city and region targets that qualify as net-zero targets out of the total number of targets in a geographic region.



governments. Within Europe, the UK leads with 53 net-zero targets, accounting for 26% of European net-zero targets and 9% of all net-zero targets. Eastern Europe and Central Asia, South Asia and Sub-Saharan Africa all lag in terms of net-zero target setting.

Figure 5 shows the percentage of subnational targets that qualify as net-zero targets by world region. North America has the highest overall percentage of total targets that are net-zero targets, at 29%, followed by Latin America and the Caribbean with 25%. Just under half of the cities and regions with net-zero targets also have an interim reduction target, which is an important indicator of credibility and robustness (Net Zero Tracker, 2023). In East Asia and the Pacific, as well as in North America, a significant number of cities and regions (90 actors in East Asia and the Pacific – primarily from Japan – and 88 actors in North America) have interim targets. A higher percentage of subnational governments in South Asia, Sub-Saharan Africa, and Latin America and the Caribbean have standalone net-zero targets without interim targets, although the number of participating actors in these regions is small (92 actors). Although Europe leads in total targets, only 8% (201) of European cities and regions have made net-zero commitments.

2.2 Companies

The corporate climate action environment is changing significantly, and many topics are high on the agenda. First, there is a large increase in disclosed targets showing corporate ambition, as well as an increase in net-zero emissions targets. At the same time, the United States and the EU are implementing disclosure regulations demanding companies to report on their environmental impact. In addition, transparency about targets and actions is increasingly demanded (Bjørn et al., 2023; NewClimate, 2023). Although the latter two are important topics, the focus of this report is on the ambition set by companies, which we see as the first step in the process of achieving emissions reductions. Therefore, we assess companies that have disclosed information to CDP between 2018 and 2022. The data on companies is collected from the CDP Climate Change Questionnaire 2018-2022 (CDP, 2020) (see Appendix) and includes data on companies that have agreed to make their questionnaire responses public. This data is self-reported by the companies, and not audited by others. While processing the data, a few outliers were removed (see Appendix)

The number of companies that report climate information to CDP has more than tripled between 2018 and 2022, resulting in more than 8,300 companies disclosing information in 2022. Among these companies, approximately 25-40% do not provide any disclosure of climate targets, while 40-45% have disclosed their absolute emissions reduction targets, which is the primary focus of this report. Intensity and other types of targets are not included in this assessment.

Emission reduction targets

From companies' reported absolute targets, around 80% could be used to quantify the emissions level at target years, which means base year, target year, base year emissions, target reduction and scope were reported. The result is between 1,667 and 4,909 absolute reduction targets from 965 to 2,839 companies for the period 2018 to 2022. From these targets, the percentage of company-wide targets ranges between 80-90%. As revenue data is mostly available for exchange traded companies, we provide a lower end estimate based on 66-81.8 % of the companies with quantifiable absolute reduction targets (Table 1). These companies represent revenue of at least USD 15.4 trillion

Table 1 Revenue of companies with absolute reduction targets, for which data was available. The 2022 data is based on 2021 revenues and 2022 disclosure year companies.

	2018	2019	2020	2021	2022
Revenue	\$15.4	\$17.9	\$19.4	\$23.9	\$27.4
Number of companies	791	921	1142	1415	1874
Coverage	81.8%	75.7%	75.6%	71.9%	66.0%

to 27.4 trillion. The coverage of companies decreases as between 2018 and 2022 the number of exchange traded companies disclosing to CDP decrease relatively to those that are not exchange traded companies.

though long-term targets constitutes the smallest category, they do increase over the disclosure years.

Most companies operate in multiple countries and if corporate emissions reductions targets are allocated to countries where they operate, it shows that the number of targets for these countries has increased significantly in the period 2018 to 2022 (Figure 6). In contrast to the main assessment of companies in this report where targets are only considered per company based on headquarters, here we count the targets that apply to each country branch. The result is that one company-wide target can be counted as multiple country branch targets. In addition, the EU numbers aggregate all Member State counts, and therefore multiple country targets (e.g., Germany and France) can represent one company operating within the EU.

The results show that the EU has the largest coverage, followed by the US, China and India. See Appendix for target information for eight other large G20 countries. The EU has the largest number of targets, and in the 2022 disclosure year it covers approximately 7,300 targets, of which most have a target year between 2022 and 2032. The four countries included have increased GDP between 2018 and 2022 by 4%, 24%, 29%, and 25% respectively (World Bank, 2023b). The target periods are categorized into three rangesspanning from within six years of the disclosure year (short-term), between 7 and 16 years (medium-term), and extending beyond 16 years (long-term). In each of the four countries, the number of targets increases between 2018-2022 disclosure years, with the largest increase in 2022, especially for medium-term targets. The majority of the targets is medium-term, followed by short-term targets. Al-

Figure 6 Targets in China, EU, India and USA covered by targets in three time period: within six years of the disclosure year (short-term), between 7 and 16 years (medium-term), and extending beyond 16 years (long-term).

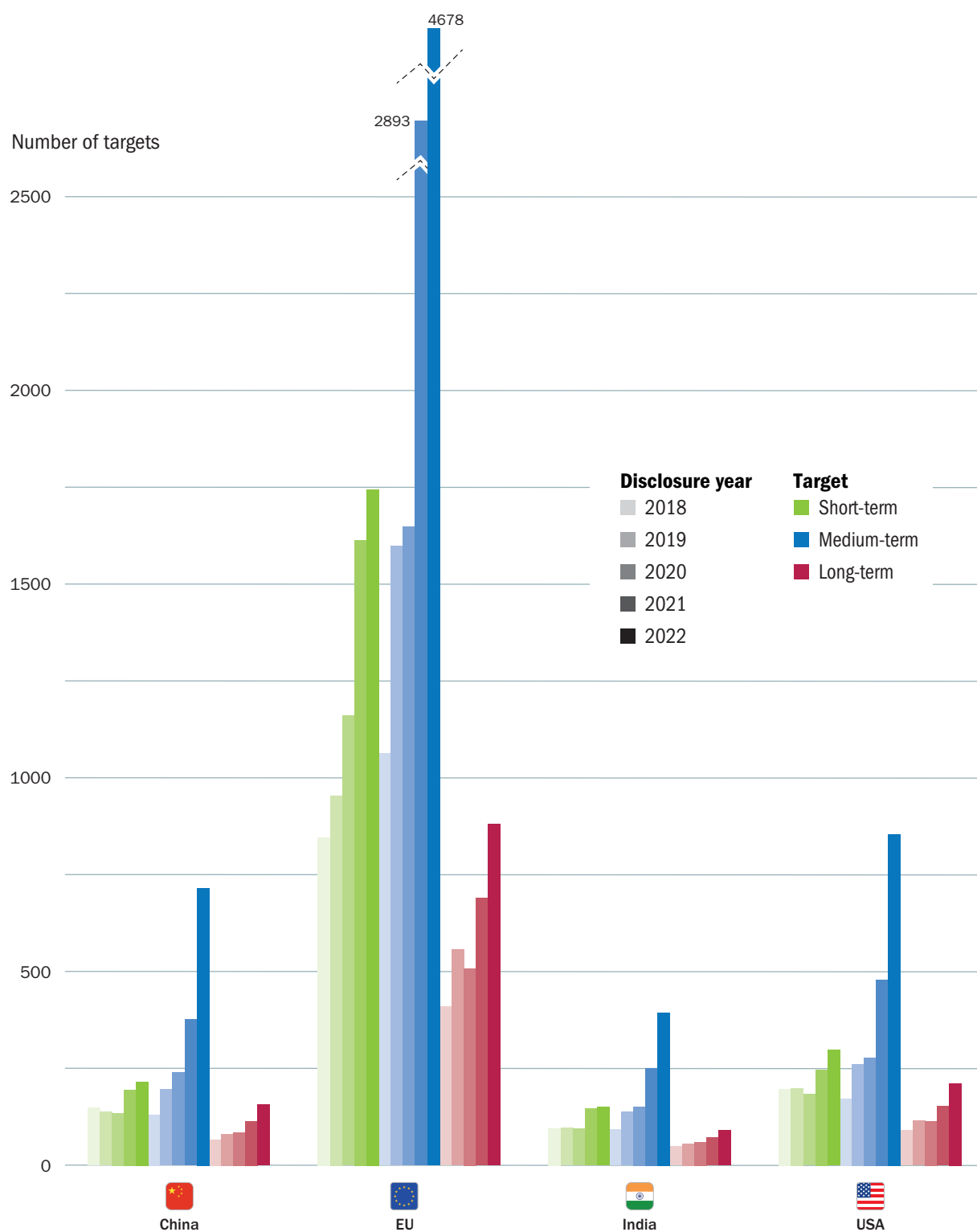
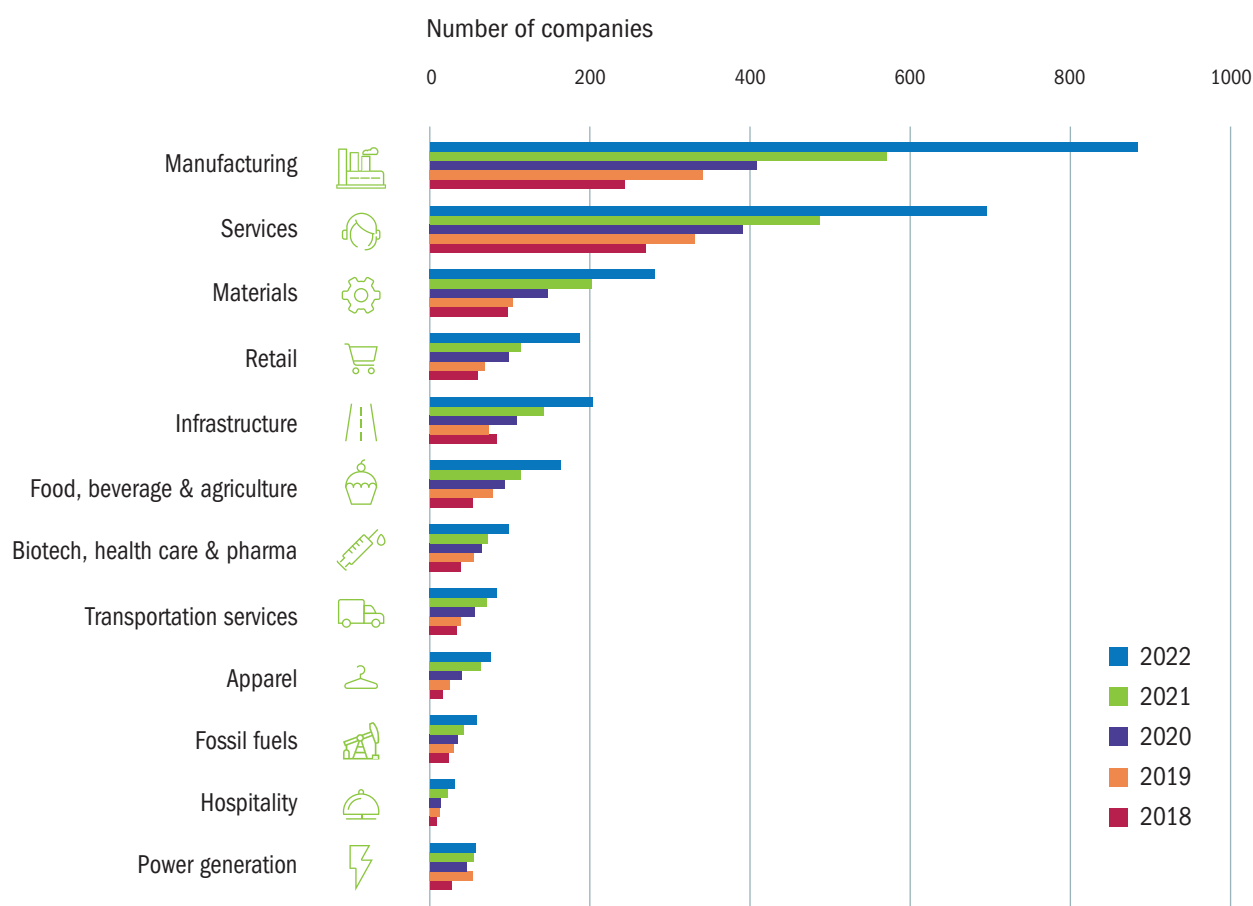


Figure 7 Number of companies making quantifiable GHG emissions reduction targets by CDP-ACS industry classification.



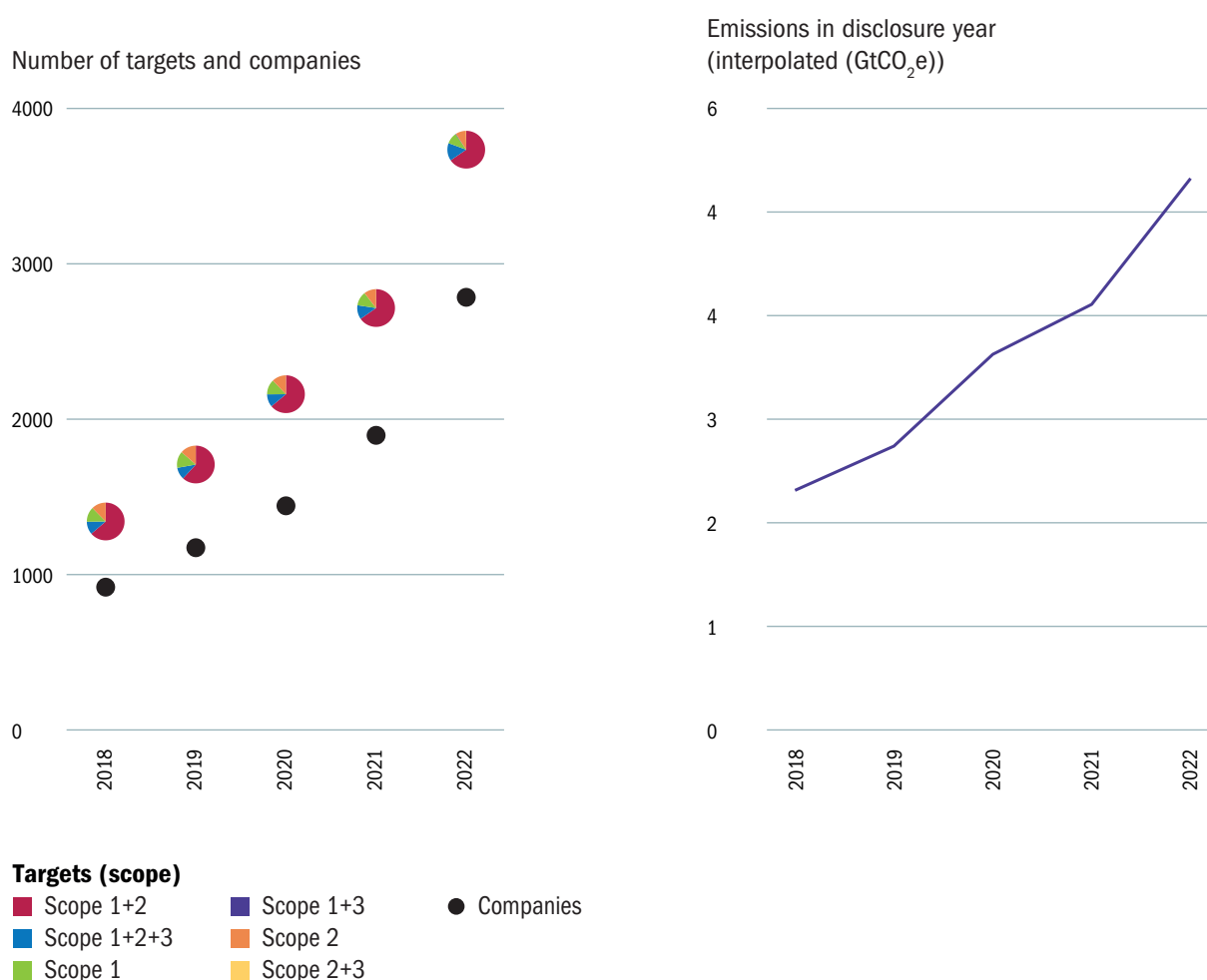
Companies from a wide range of industries have made quantifiable climate targets. The manufacturing and service sectors include the largest amount of targets, accounting for over half of all included companies (Figure 7). Each sector shows a gradual increase between 2018 and 2022 in the number of targets, except for the power generation companies with a peak in 2019, and a small fall in the number of infrastructure companies in 2019.

Scope 1+2 targets

Scope 1+2 targets cover either or both scope 1 and 2 targets (see Appendix). In most cases, the self-reported company targets for scope 1+2 cover all business oper-

ations and locations. However, it appears that cases exist that exclude part of the operations, while full scope 1+2 is disclosed (NewClimate, 2023). A company can have multiple absolute emissions reduction targets, covering different scopes or set for different target years. The number of companies that report targets covering scope 1+2 has increased significantly between 2018 and 2022 (Figure 8), from 1,350 in 2018 to 3,750 in 2022. The scope of these targets varies, and the majority (around 65%) covers both scope 1 and 2. This share is practically constant over time. The increase of companies and targets results in a clear increase in emissions covered by these targets, from 2.3 GtCO₂e in 2018 to 5.3 GtCO₂e in 2022. The overlap between scope 2 emissions of companies that are also covered by scope 1 from electricity-generating companies is

Figure 8 The number of companies and targets with scope 1+2 targets and the emissions covered by these targets in the disclosure years (through linear interpolation between base year and target year).



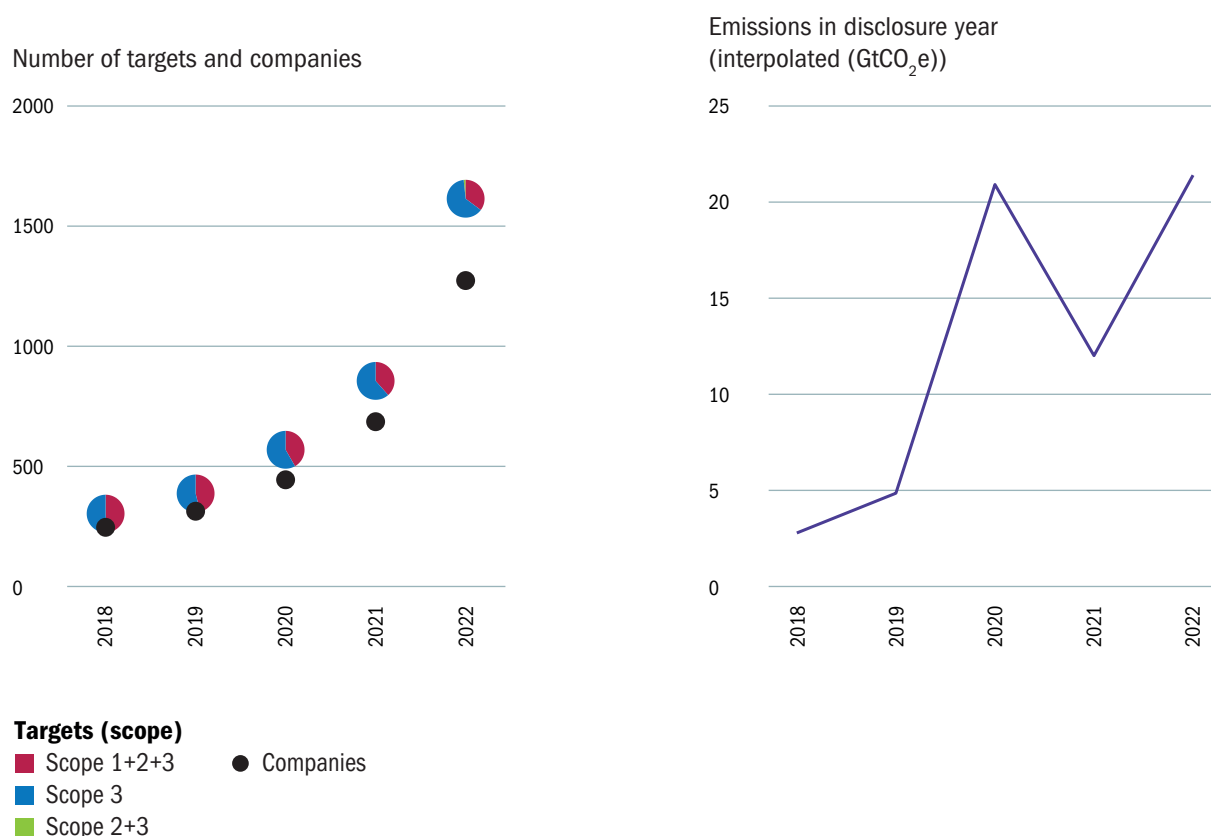
not accounted for. The scope 1+2 emissions are calculated for the disclosure year by interpolating between base year and target year.

Scope 3 targets

Although reducing scope 1 and 2 emissions by companies is inevitable, scope 3 emissions – originating from the value chain and often inducing sizable emissions, are often overlooked in company-wide emission reduction plans. Historically, between 1995 and 2015, scope 3 emissions grew faster (84%) than scope 1 (47%) and 2 (78%) globally

(Hertwich and Wood, 2018). Companies can set targets for different scope 3 categories (as defined in WRI and WBCSD (2011)), such as business travel or purchased goods and services (see Appendix). However, we have aggregated these scope 3 emissions targets per company for each unique combination of target year, scope and target coverage (e.g. company-wide, business unit). In the period between 2018 and 2022, we see an increasing number of companies and targets that cover scope 3 emissions, and especially a large increase in 2022 (Figure 9). These targets cover 2.8 GtCO₂e in 2018 and 21.4 GtCO₂e in 2022. Overlaps between scope 3 and other emissions scopes are not taken into account. In addition, the share of scope-3 only targets

Figure 9 The number of companies and targets with targets including scope 3 targets (sometimes as part of scope 1+2+3 targets) and the emissions covered by these targets in the disclosure years (through linear interpolation between base year and target year). The total scope 3 emissions are not adjusted for overlap.



increases in the period 2018-2022, from around 50% to 65%. Having separate scope 3 targets is essential, as it improves transparency and requires different strategies and processes to achieve reductions due to different influence and responsibilities in the value chain. The percent increase in emissions in this time period is higher compared to the increase from the coverage of scope 1+2 targets.

Net-zero targets

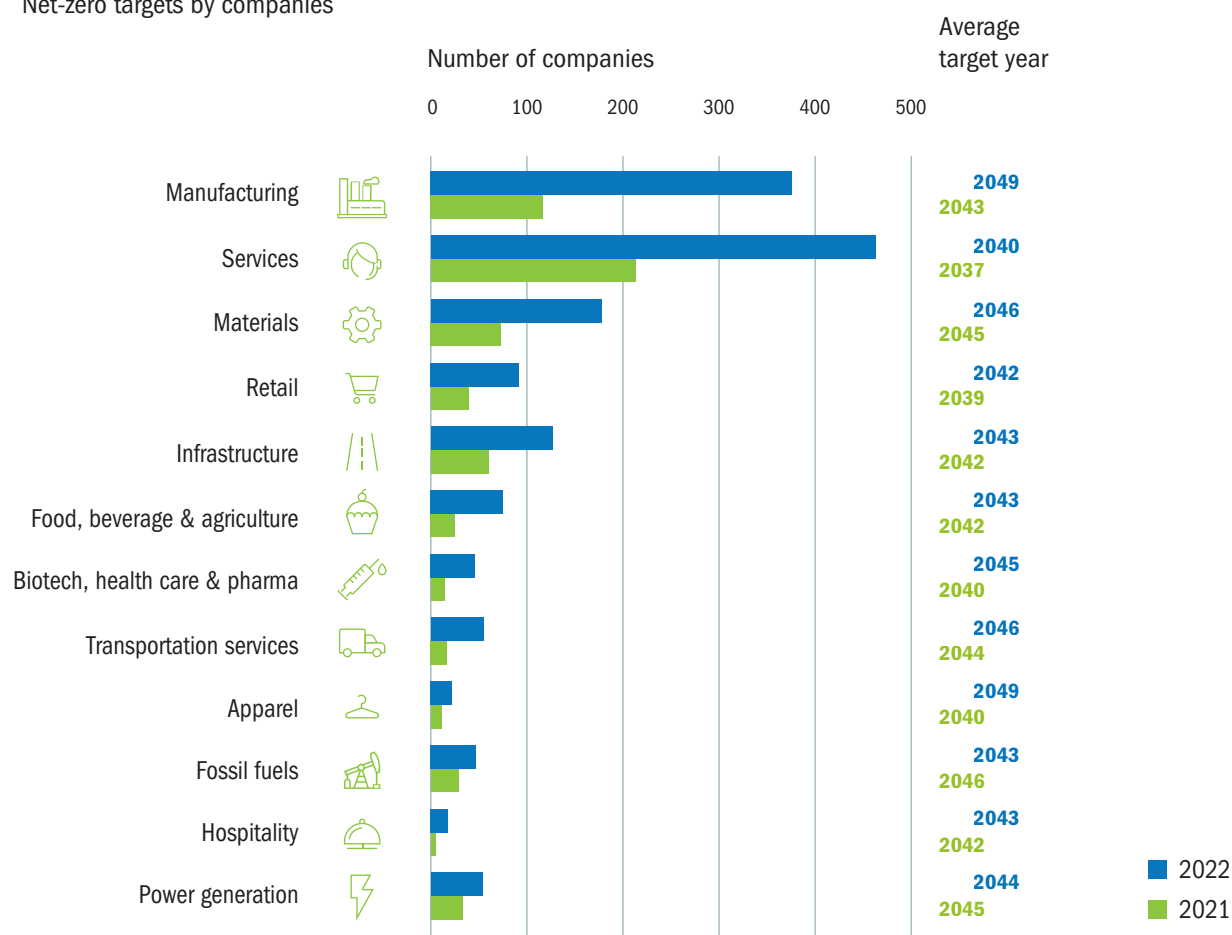
The Net Zero Stocktake 2023 report signalled that “company net-zero target-setting momentum continues at speed” (NewClimate et al., 2023). Our analysis shows that companies have been reporting net-zero targets to CDP since

2021, and the numbers of targets display a steep increase from 2021 to 2022 (Figure 10a). Similar to absolute targets, the majority of targets is from the manufacturing and services sectors. The average net-zero target year is 2041 for the 2021 disclosure year, and increases to 2044 in the 2022 disclosure year based on respectively 636 and 1553 companies. In the services sector, the average net-zero year is clearly the overall average. Note that we have not assessed to what extent offsets or sequestration are anticipated to be deployed to achieve these targets. Most of the net-zero targets (around 75%) are covered by absolute reduction targets (Figure 10b).

Figure 10 Number of companies with net-zero targets (absolute, intensity, portfolio) and average target year per industry.

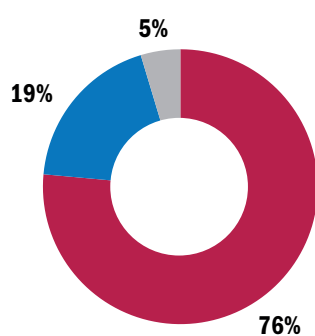
A

Net-zero targets by companies



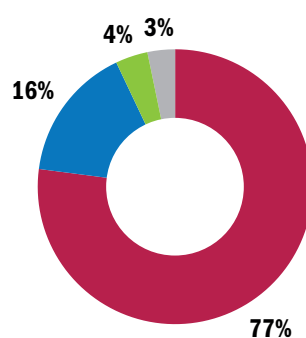
B

Underlying targets linked to net-zero commitments, 2021



C

Underlying targets linked to net-zero commitments, 2022



Legend: Absolute (Red), Intensity (Blue), Portfolio (Green), Other (Grey)

03

PROGRESS OF AMBITION



This year saw a notable expansion in the global landscape of city, region, and company climate action, with an increase in both the number of targets and emissions subject to absolute reduction targets. But to assess the effectiveness in the context of the Paris goals, we need to find out how these targets translate into future emissions levels. For this purpose, we constructed emission ambition pathways for each company and subnational government between 2020 and the target years, interpolating between base year, and possibly multiple target years. In situations where the target year is before 2050/2060, extrapolations were used (see Section 3.1 and 3.2). The emissions represent gross emissions before deductions due to credits or avoided emissions are taken into account. For each disclosure year, these data were aggregated into one ambition pathway on the global, country or sector level, illustrating targeted emissions levels between 2020 and 2050/2060.

3.1 Cities and Regions

National ambition over time

Ambition pathways for cities and regions were constructed by considering baseline year, baseline emissions, target year, and the expected emissions associated with their emission reduction targets. We used the most recent year's inventory emissions (when available) for net-zero targets with no baseline year or baseline emissions reported. For this purpose, 2,949 cities and 139 regions were included, covering roughly 10 GtCO₂e emissions standardized to 2022, representing about 27% global CO₂ emissions (IEA, 2023a). Together, these subnational actors together aim to reduce roughly 9 GtCO₂e emissions by 2060, considering the highest administrative jurisdictions with no geographical overlap.

Although subnationals' ambition pathways show that cities and regions have been increasing the ambition of their efforts over time, they are falling short of the pace required for 1.5 degrees Celsius, which requires halving global CO₂ emissions by 2030 and net-zero by 2050. Given that cities and regions have different levels of ambition and may overlap on targeted emission reductions, cities and regions are evaluated separately (Figure 11). Regions typically cover greater population and emissions and aim to reduce their CO₂ emissions over three times by 2060, compared to cities. The shift upwards in 2020 emissions is due to increasing number of cities and regions with emissions reduction targets.

The United States, China, and Japan aim for the greatest emission reductions at both the city and regional level, however, their ambitions at the regional level only account for about 40%, 30%, and 20% of their national GHG emissions, respectively. Subnational actors in EU countries developed more medium-term targets to rapidly reduce their GHG emissions, however, lag in long-term targets for decarbonization.

Following Australia's Nationally Determined Contribution (NDC) update in 2022, which raised ambition to reduce GHG emissions to 43% below 2005 levels by 2030 and to achieve net-zero targets by 2050, we saw more short-term, medium-term and long-term targets at both region and city level. Regional climate targets in Australia cover more emissions and population than its city-level counterparts.

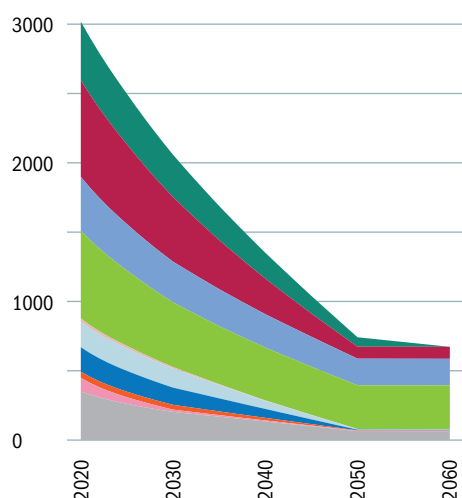
Figure 11 Climate ambition pathway by city/region from 2020 to 2060.

Note: Others denotes other G20 countries, including Argentina, India, Indonesia, Mexico, Russia, South Africa, Russia, Saudi Arabia, Türkiye; targets included do not necessarily consider all greenhouse gas emissions, nor do we include the potential of additional reductions via offsets.

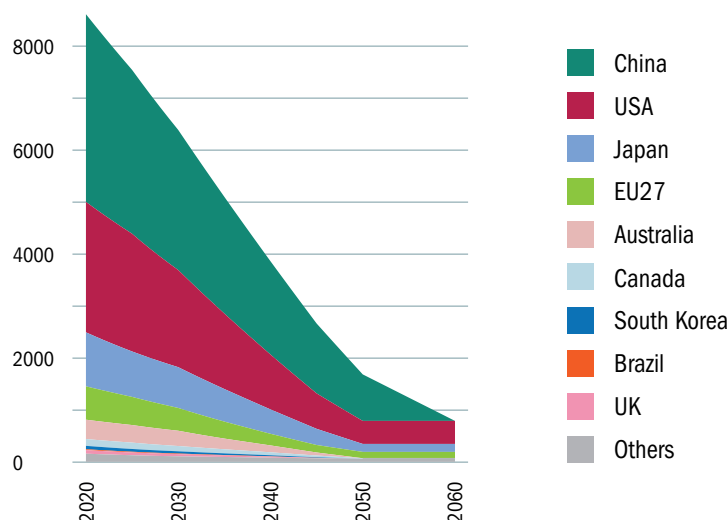
Ambition Pathway 2023 – per country

City

MtCO₂e



Region



Driven by Canada's commitment to achieve net-zero emissions by 2050 and the Canadian Net-Zero Emissions Accountability Act which was enforced into law on June 29, 2021 (Government of Canada, 2023), Canadian cities and regions aim to reduce CO₂ emissions rapidly between 2030 and 2050, at a faster speed than before 2030. The aggregated ambition at the city level surpasses those at the regional level.

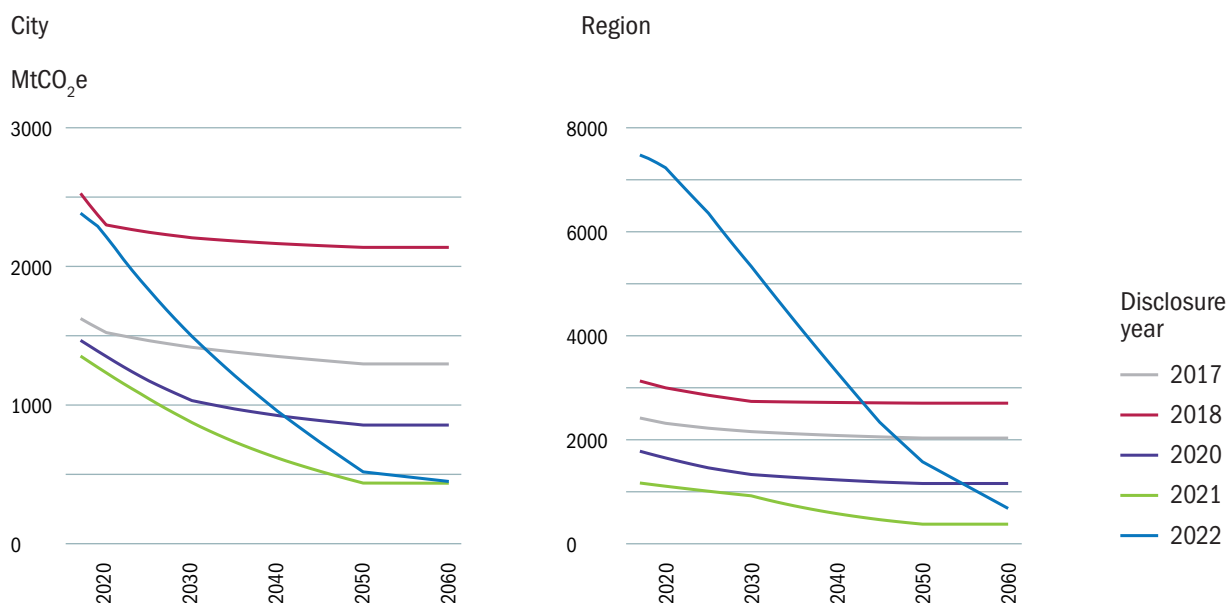
As a response to the 2020 climate and energy legislation set forth by the European Parliament, which mandates Member States to develop climate action plans spanning from 2021 to 2030 (Think Tank, 2020), subnational actors in EU countries developed more 2030 targets to rapidly reduce their GHG/CO₂ emissions. For example, countries such as Spain and Italy make bold moves before 2030 at the city level, but lack ambition beyond 2030 (Appendix Figure S1). In the UK, regions aim to reduce CO₂ emissions by 2030 at a faster rate than before 2030.

Collective ambition over time (2018-2022)

In this section, we analyze cities and regions' ambition pathways from G10 countries, including Brazil, Canada, China, India, Japan, Mexico, South Africa, the United States, the United Kingdom, and the EU, since these countries were consistently included in previous reports, from 2017 to 2022 disclosure years.

Since 2020, cities and regions from G10 countries have been making progress in their ambition to emissions through pledged reduction targets. As illustrated in Figure 12, the steeper slope of cities and regions' collective 2022 efforts indicate they have pledged to reduce emissions at a higher speed than previous years. The projected emissions beyond 2030 further indicate cities and regions' combined ambition, showing an increase in ambition among the disclosure years. Greater ambition through greater city and regional efforts, however, are needed to narrow the

Figure 12 Ambition pathways of aggregated subnational actors for G10 countries for the disclosure years between 2017 and 2022.



emissions gap between current national policies and the 1.5 degree C goal could close further (UNEP, 2022).

3.2 Companies

Companies that reported emissions reduction targets to CDP between 2018 and 2022 have consistently increased their ambition year by year, resulting in a lower emissions trajectory through 2050, assuming all emissions reduction targets are met. The focus of this analysis is on the period before 2030, as 75% of the included companies do not have a target beyond this year. However, we also include a projection to 2050 assuming companies without a target follow national current policy pathways. More details on how these corporate ambition pathways were constructed can be found in the Appendix.

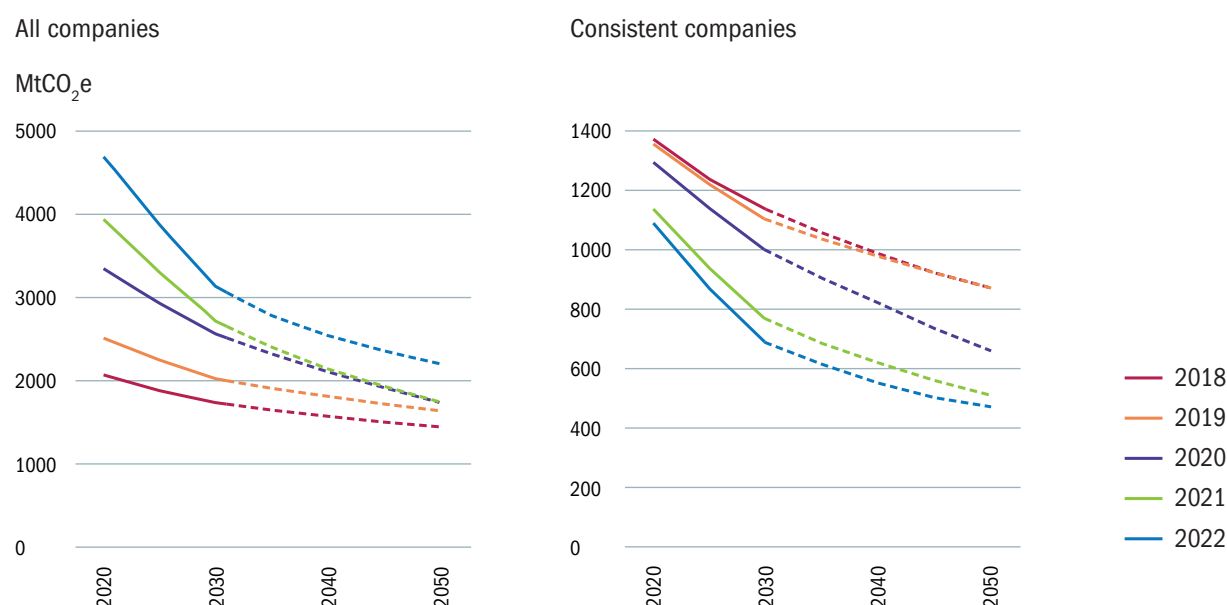
Ambition pathways for all and overlapping companies

Aggregated ambition pathways for companies were constructed by selecting only those absolute emissions targets

disclosed that covered scope 1 and/or scope 2 emissions, and covering at least 75% of company-wide emissions (See Appendix). A time series was created between 2020-2050 for each company by linearly interpolating the emissions trajectory between a company's base year emissions and (multiple) target year emissions, and extrapolating emissions growth thereafter according to the most recent IMAGE model global Current Policies scenario (Dafnomilis et al., 2023; Nascimento et al., 2022) (see Appendix). Since 75% of the companies have set reduction targets before or at 2030, they dominate trends until 2030, while in the period 2030 to 2050, the trajectory is largely determined by national policy trends. We then aggregated all company time series in each disclosure year together to construct an overall ambition pathway.

The analysis of ambition pathways was divided in two parts: 1) looking at the ambition of all companies within each disclosure year (left side of Figure 13), and 2) looking only at those companies which reported in each of the 5 disclosure years between 2018-2022, referred to as consistent companies (right side of Figure 13). The trend line for all companies in each successive disclosure year from 2018 to 2021 shifts upwards, indicating higher overall emissions. This shift

Figure 13 Ambition pathways for disclosure years 2018-2022. These pathways represent aggregated emissions using interpolation between disclosed base and target year emissions, and extrapolation based on reduction trends from a global current policies pathway (from IMAGE model). Pathways after 2030 are shown as dashed lines because only 25% of the companies included have a target year after 2030 and extrapolation is used for the remaining 75% of the companies.



results from an increasing number of companies committing to emissions reductions targets, changes in ambition, and base year depreciation. The number of companies disclosing and included in the pathway analysis grew from 750 in 2018 to 2,487 in 2022. As a result, the starting point of the ambition pathways representing all companies increased from 2.0 GtCO₂e in 2020 for the 2018 disclosure cycle to 4.7 GtCO₂e in 2020 for the 2022 disclosure cycle (Table 2). In addition, the overall reduction in emissions between 2020 and 2030 based on all companies' ambition improved steadily between 2018 – 2022 disclosures. Even in the COVID-19 years, both the number of companies and ambition increased. While the ambition pathway in the 2018 disclosure cycle resulted in a 16% reduction by 2030 compared to 2020, this increased to a 33% reduction in emissions by 2030 in the 2022 disclosure cycle.

It is important to note that in addition to emissions projections decreasing with each successive disclosure cycle, the projected emissions beginning in 2020 also decrease with increasing disclosure year (for total of all companies). There

are a few factors that may contribute to this trend. First, it is possible that companies have made considerable progress over the disclosure cycles, increased targeted reductions or added new ambitious targets resulting in lower (interpolated) emissions in the disclosure year, and therefore an overall lower starting point for the ambition trajectory. Another possibility is that companies have lowered the base year emissions they have used as the starting point for their targeted reductions over the disclosure cycles or changed their target coverage. This is an area for further research.

The 415 companies that were identified as consistently reporting among the disclosure years show a clear improvement in ambition from 2018 through 2022, with each disclosure year's trend resulting in lower emissions by 2030 and 2050 (left Figure 13). The consistent companies' ambition pathway for the 2022 disclosure cycle results not only in the lowest projected 2050 emissions, but also in the steepest emissions reductions between 2020 and 2030. Targeted emissions reductions for these companies between

Table 2 Percent change in emissions from 2020-2050 across disclosure cycles for both consistent and all companies.

Disclosure Cycle	All Companies		Consistent Companies	
	2020 (GtCO ₂ e)	Percent change 2020-2030	2020 (GtCO ₂ e)	Percent change 2020-2030
2018	2.0	-16	1.4	-17
2019	2.5	-19	1.4	-19
2020	3.4	-23	1.3	-23
2021	4.0	-31	1.1	-33
2022	4.7	-33	1.1	-37

2020 and 2030 increase from 17% in 2018 to 37% in 2022 (Table 2).

Ambition pathways for key sectors

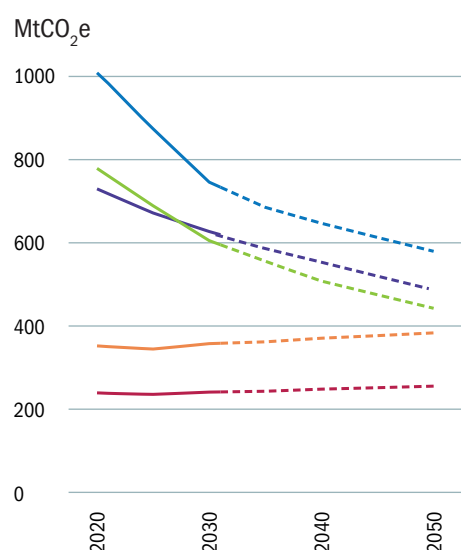
Two key sectors (see energy balances (IEA, 2023b) and Appendix) have historically high energy use: 'chemical and

petrochemical' companies, and 'iron and steel'. Although scope 3 emissions could be large for some of these companies, this assessment only includes scope 1+2 emissions. The total companies in these two sectors is 43 in 2018 to 156 in 2022 (see Appendix for details).

The sectoral ambition pathways show a slightly different trend compared to that for all sectors (Figure 14). In

Figure 14 Ambition pathways for sectors chemicals, iron & steel and across disclosure years 2018-2022 based on in total 45 in 2018 to 182 in 2022 companies.

Chemical and petrochemical companies



Iron and steel companies

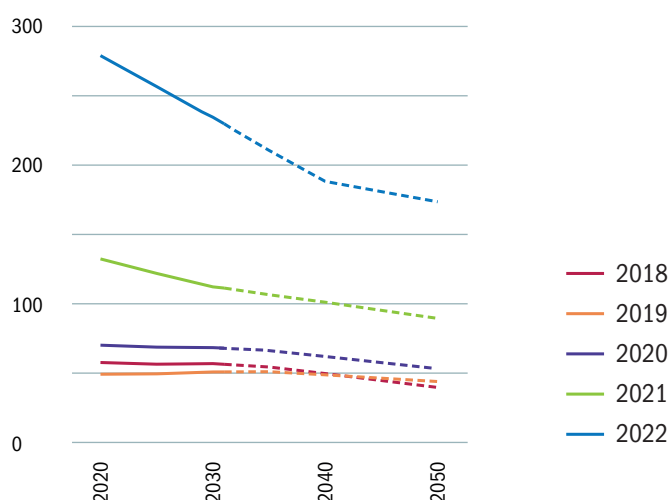


Table 3 Percent change in emissions from 2020-2050 across disclosure cycles for both consistent and all companies.

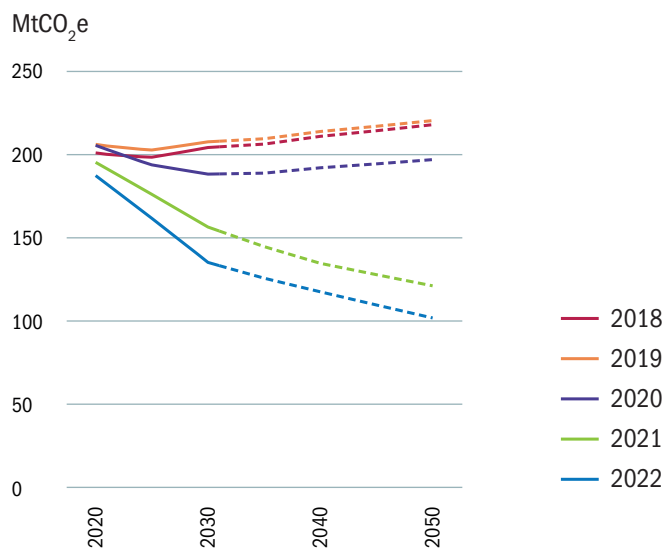
Disclosure cycle	Chemical and petrochemical		Iron and steel	
	Percent change (2020-2030) / Number of companies			
2018	+1	38	-1	5
2019	+2	47	+3	5
2020	-14	75	-3	7
2021	-22	94	-15	10
2022	-26	138	-16	18

particular, early ambition, as demonstrated in the first and second disclosure years, led to minimal reductions. However, this deficit has been offset by progress in the last two disclosure years, resulting in a targeted reduction of 26% between 2020 and 2030 in the 'chemical and petrochemical' sector (based on 38-138 companies in 2018-2022 period), and 16% in the 'iron and steel' sector (based on 5-18 companies in 2018-2022 period) (Table 3). In addition, the iron & steel sectors show a large increase in starting point emissions in the 2022 disclosure year.

Only two companies were found in the steel sector that reported consistently over the disclosure years and were therefore excluded. The consistent companies (a total of 31) in the chemical and petrochemical sector show a similar trend to the consistent companies of all sectors (Figure 15). Emissions in the beginning years of the time series decrease with each successive disclosure cycle, as these companies either make progress on existing targets or they have adjusted their base year emissions. Meanwhile, the ambition of their current targets also increases, as seen by both the increasing slope of the emissions pathways and the decreasing resulting emissions by 2050, with each successive disclosure cycle. Significantly, since 2021, this sector has witnessed a boost in ambition, aiming for a 28% reduction target between 2020 and 2030.

Figure 15 Ambition pathways for sectors chemicals, and iron & steel, including only companies that disclosed in all years 2018-2022.

Consistent chemical and petrochemical companies



04

CONCLUSIONS/ WAY FORWARD



4.1 Summary of Key Findings

Cities and regions

- **The number of cities and regions pledging climate mitigation goals has increased globally.** Over 26.5% of the total global population is covered by climate mitigation action from cities and regions. In some countries, including Australia, Japan, and the United Kingdom, these actions cover more than 99 percent of citizens. The European Union also stands out, representing 75% of the 3,008 city and 175 region governments analysed in this report. The number of EU cities and regions planning post-2020 action, however, has not equaled pre-2020 levels. Additionally, the EU witnessed the smallest percentage increase in new actor participation this year, compared to all other countries in the analysis, and the EU trails behind other nations in net-zero commitments.
- **Cities and regions are primarily aiming to reduce emissions within the medium-term.** The majority of the 3,799 quantifiable city and region targets evaluated in this report are set for the medium-term – between seven and 16 years from the time they are disclosed. For the 2022 disclosure year, this means most targets are set to expire between 2028 and 2037. The high proportion of medium-term targets is encouraging, as it indicates that subnational actors are aligning with their countries nationally determined contributions, but the relative lack of short-term targets suggests that subnational actors are not focusing on critical, immediate mitigation actions.
- **The number of net-zero and carbon neutrality targets is increasing.** Net-zero pledges from subnational governments and companies continued to accelerate in 2022, with 572 cities and regions committing to decarbonization. For subnational governments, over two-thirds of net-zero targets are slated for 2050 or later. Progress in net-zero target setting, however, is concentrated in the Global North, and while we observe progress in cities and regions setting net-zero or equivalent goals in South Asia, Sub-Saharan Africa, and Latin America, many have set these targets without quantifiable interim

measures, indicating a need for nearer-term action to ensure their achievement.

- **Although city and region climate efforts have been increasing in ambition over time, this increase is not enough for the pace required to align with the 1.5 degrees C Paris Agreement goal.** Collectively, cities and regions from the G20 that have pledged quantifiable emission reduction commitments have the ability to reduce approximately 9 GtCO₂ by 2060 – a quarter of today's annual emissions. Cities and regions in the United States, China and Japan have pledged the greatest reductions at the subnational level, while EU counterparts lag in developing long-term decarbonization goals.

Companies

- **Companies disclosing absolute emissions reduction targets to CDP in the period 2018 to 2022 have committed to an increasing number of targets representing higher coverage of greenhouse gas (GHG) emissions.** The number of companies that report climate information to CDP has more than tripled between 2018 and 2022. From these companies, 40-45% have disclosed absolute emissions reduction targets representing at least USD 15-27 trillion. In 2022, they together cover direct (scope 1) and purchased electricity emissions (scope 2) as large as current US emissions.
- **The same increasing trends are visible when narrowing focus on country branches, scopes, and sectors.** If targets are broken down to country branches, China, EU, USA all show an increasing number of targets, for which the majority is medium-term (between 6 and 15 years from disclosure). The EU has the largest number of targets in all disclosure years. For both scope 1+2 and scope 3 targets, the total number increases between 2018 and 2022 disclosure years. These targets cover 5.3 GtCO₂e in 2022 for scope 1+2 and 21.4 GtCO₂e for scope 3, not accounting for overlaps between scope 1, 2 and 3. All sectors, except the power generation sector show the same increasing trends. Manufacturing and services show largest number of targets in all disclosure years

→ **The net-zero targets that are reported since 2021 to CDP show a significant increase between 2021 and 2022.** The average net-zero target year increases from 2041 to 2044. The closest net-zero target year for disclosure year 2022 is found in the services sector 2040/2037.

→ **Company ambitions gradually improve between 2018 and 2022, but in total do not lead to 1.5 C degrees pathways.** Around 75% of the companies do not have absolute emissions reductions targets beyond 2030. The combined ambition pathways developed between base year, target year and extrapolated with national current policy pathways show increasing ambition as reductions between 2020 and 2030 increase from 16% in the 2018 disclosure year to 33% in 2022. From these companies, 415 have consistently reported targets in all five disclosure years, and in total increase ambition between 2020 and 2030 from 17% in 2018 to 37% in 2030.

4.2 Recommendations

- **Cities, regions and companies must increase near-term ambition to help accelerate needed transitions to keep the 1.5 degrees C goal alive.** Although we find growth in climate action participation, with EU cities and regions in particular somewhat rebounding from a COVID-era lag, the majority of emission reduction goals are set for the medium-term – seven to 16 years from the time they are declared. Equally for companies, we see increasing ambition from targets set before or at 2030, but only 25% of the companies have committed to climate actions beyond this year. The time frame for immediate action is closing, as the IPCC Special Report on 1.5 degrees C (IPCC, 2018) notes that global emissions must be halved by 2030 to achieve net-zero by mid-century. The UNFCCC further calls for all non-state actors to step up climate actions to assist in needed systemic transformations required for deep decarbonization.
- **While overall climate ambition from cities, regions, and companies is increasing, the pace of ambition must accelerate.** Evidence in this report demonstrates that both subnational actors and companies are increasing the ambition of their climate actions over

time, in part due to countries' NDC updates and greater alignment with net-zero targets. Cities, regions, and companies are deepening their emissions reduction targets, setting more medium-term goals along with net-zero or carbon neutrality targets, although there are some areas and sectors, such as the EU and fossil fuels sector, where some entities lag.

- **Net-zero target setting is now an established norm, but more interim targets are needed for credibility.** The growth in the number of city, region, and company net-zero targets is encouraging, but credibility in the pursuit of these ambitious goals requires the implementation of interim targets and action plans that demonstrate tangible progress towards net-zero emissions. These interim steps not only enhance accountability but also provide a clear roadmap to assess and ensure the alignment of actions with overarching net-zero objectives. Already, intergovernmental efforts by the UN and UNFCCC, through the HLEG recommendations for net-zero integrity and the Non-Party Actor Recognition and Accountability Framework announced in June 2023 (UNFCCC, 2023), are aiming to hold business and subnational governments responsible for action and transition plans that make clear the immediate, tangible steps towards net-zero goals.
- **Greater alignment with national government efforts is needed to achieve the 'net-zero conveyor belt.'** Despite the rise in target-setting and ambition, near-term global emissions continue to increase, emphasizing the urgency of improved alignment with national governments to collaboratively address more immediate action. This call for alignment emphasizes the importance of integrating subnational and non-state climate actions into broader national policies and frameworks (see Hale, 2022). Collaboration between local, regional, and national stakeholders is vital to bridge the gap between current actions and the ambitious targets necessary to combat climate change effectively.

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APPENDIX

APPENDIX to Global Climate Action 2023: Ambition of Cities, Regions, and Companies

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1 BACKGROUND

The global climate action reports (Data-Driven Yale et al., 2018; Data-Driven EnviroLab and Utrecht University, 2022a, 2022b, p. 202; NewClimate Institute et al., 2021a; Utrecht University, et al., 2023a) are based on more than ten data sources (listed in 2.1.1) and CDP datasets. In this document, we describe the data sources where we collect subnational climate targets corporate targets, and the methodology used to track progress and assess ambition.

In the first three global climate action reports (Data Driven Yale et al., 2018; NewClimate Institute et al., 2021a, 2019a), emission and climate target data for cities, regions and corporates were mainly used to develop aggregated current policies and non-state action emission pathway on global and country level that represents both the economy-wide impacts of national policies on GHG emissions and the possible voluntary additional reductions from targets put forward by regions, cities and companies. In the 2022 global ambition report (Data-Driven EnviroLab and Utrecht University, 2022b) we compared individual company progress and ambition to identify where these companies stand towards mitigating greenhouse gas emissions. The 2023 global ambition report (Utrecht University, et al., 2023b) shows the trend of subnational and non-state actors in setting targets and compares progress of ambition.

Subnational climate target and emission data are collected from various International Climate Initiatives, where cities and regions voluntarily report their climate commitments. The data was updated based on each initiative's disclosure cycle and subnational actors report information based on requirements from each initiative. CDP receives information on greenhouse gas emissions and climate action targets based on the annual questionnaire (CDP, 2020) they send out to companies. This data is used in the reports to aggregate company emissions and target data.

Table 1 Overview of Global Action Reports between 2018 and 2023

#nr	Year	Title	CDP Questionnaire (disclosure year)	Link
1	2018	GLOBAL CLIMATE ACTION FROM CITIES, REGIONS AND BUSINESSES Impact of individual actors and cooperative initiatives on global and national emissions	2017	https://datadrivenlab.org/wp-content/uploads/2018/08/YALE-NCI-PBL_Global_climate_action.pdf
2	2019	GLOBAL CLIMATE ACTION FROM CITIES, REGIONS AND BUSINESSES Impact of individual actors and cooperative initiatives on global and national emissions	2018	https://newclimate.org/resources/publications/global-climate-action-from-cities-regions-and-businesses-2019
3	2021	GLOBAL CLIMATE ACTION FROM CITIES, REGIONS AND BUSINESSES Taking stock of the impact of individual actors and cooperative initiatives on global greenhouse gas emissions	2020	https://newclimate.org/resources/publications/global-climate-action-from-cities-regions-and-businesses-2021
4	2022	GLOBAL CLIMATE ACTION 2022 Progress and Ambition of Cities, Regions, and Companies	2021	https://www.uu.nl/sites/default/files/Global%20Climate%20Action_Cities%2CRegions%2CCompanies_Final.pdf

	2022	GLOBAL CLIMATE ACTION 2022 How to have international climate initiatives delivered, and what more is possible?	NA	https://newclimate.org/sites/default/files/2022-11/NewClimate_GCA2022_Initiatives_Nov22.pdf
5	2023	GLOBAL CLIMATE ACTION 2023	2022	https://www.uu.nl/en/news/subnational-governments-and-private-businesses-crucial-drivers-of-climate-action-says-new-report

1.1 Results

In this section background results are presented giving more details and insights

1.1.1 Cities and regions

Ambition pathways

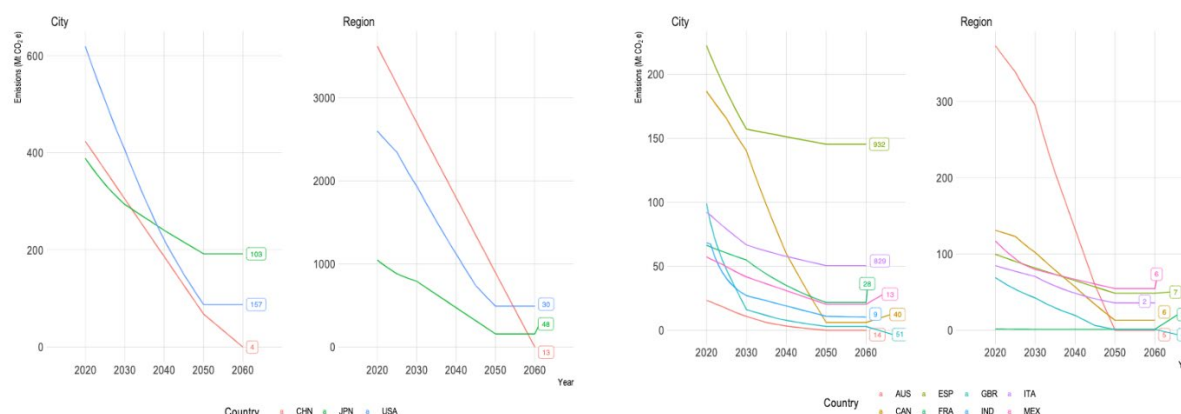


Figure S 1 Ambition pathways of top 10 GHG emitters by country

1.1.2 Companies

Landscape

The scope of the report is to assess G-20 countries, including Argentina, Australia, Brazil, Canada, China, the European Union (EU), India, Indonesia, Japan, Mexico, South Africa, the United Kingdom, and the United States. In the report only China, EU, India and the USA were shown. Figure S2 shows that the increasing trend identified for China, the EU, the US and India in the main report for the number of mid-term targets is often valid for other countries. Short-term targets remain at the same level for the first few years and especially increase in 2021 and 2022. Only the EU already shows an increasing trend from the start. The short-term targets sometimes show different patterns and Japan's number of mid-targets first decreased after 2018, but are back at the same level in 2022. Both mid-term and long-term targets gradually increase between 2018 and 2022.

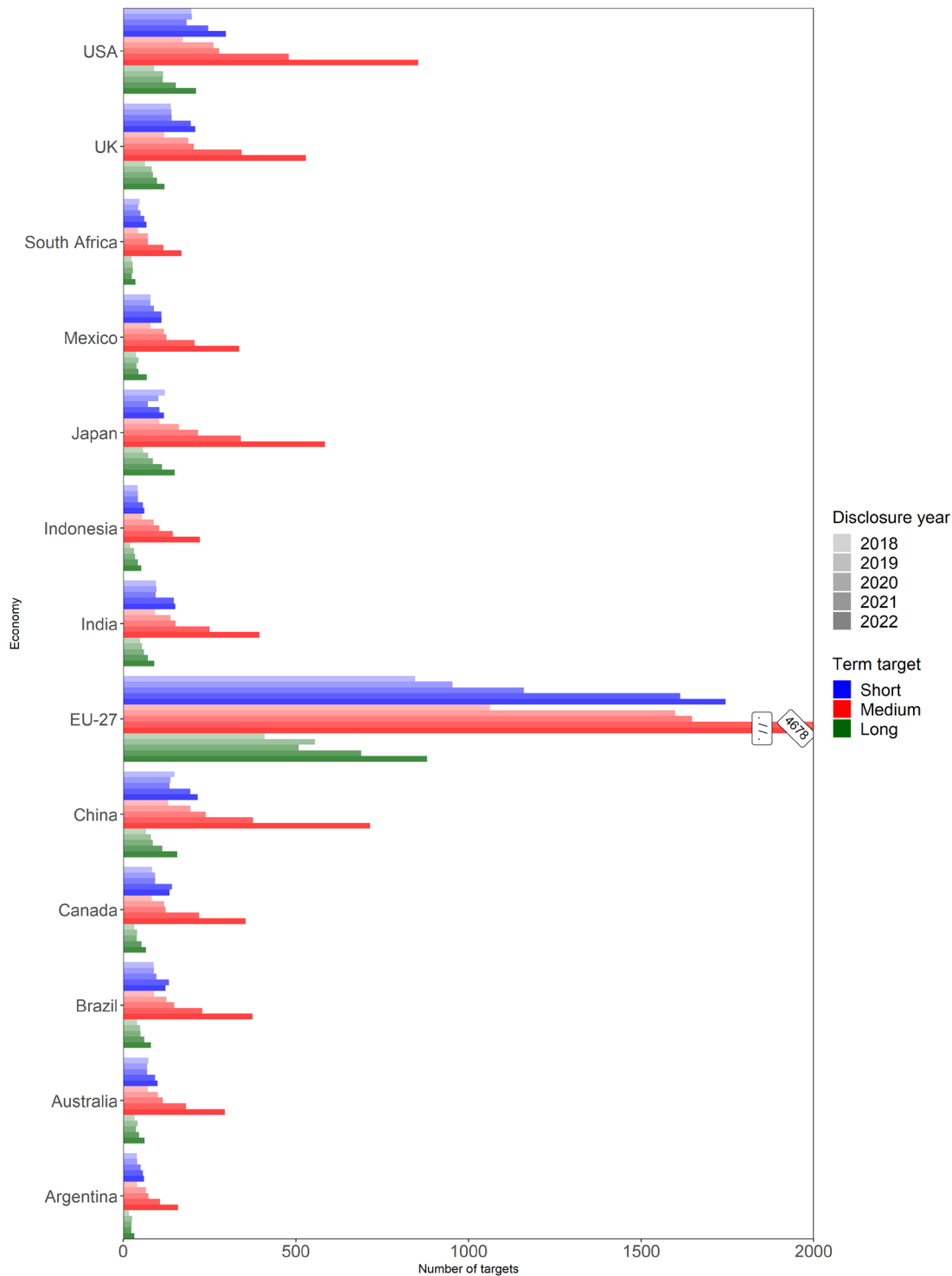


Figure S 2 Number of targets per disclosure year and target term for 13 G-20 countries

Ambition pathways

For corporate ambition pathways, we zoom in into two sectors with high energy use: the 'chemical and petrochemical' and 'iron and steel' sectors. We show

1. Pathways that include all companies within these sectors for the 2018-2022 disclosure years
2. Pathway for the companies in the 'chemical and petrochemical' sector that have consistently reported among the 2018-2022 disclosure years.

The number of companies included in these pathways is

	Year	Sectors	Total companies	Total targets	Short targets	Medium targets	Long targets
All companies	2018	Chemical and petrochemical	38	47	11	11	5
		Iron and steel	5	7	1	2	2
	2019	Chemical and petrochemical	47	60	13	20	7
		Iron and steel	5	8	1	2	2
	2020	Chemical and petrochemical	75	93	22	38	16
		Iron and steel	7	9	1	2	4
	2021	Chemical and petrochemical	94	119	28	65	23
		Iron and steel	10	15	2	7	5
	2022	Chemical and petrochemical	138	172	33	109	30
		Iron and steel	18	23	6	13	4
Consistent companies	2018	Chemical and petrochemical	29	38	10	10	4
	2019	Chemical and petrochemical	29	40	10	14	5
	2020	Chemical and petrochemical	29	37	9	15	6
	2021	Chemical and petrochemical	29	43	5	27	10
	2022	Chemical and petrochemical	29	40	5	26	9

If we look at the distribution of targeted reductions, it shows that the average reduction increases over the disclosure years. For the 2018-2019 disclosure years, the majority is between 0-20%, but this changes gradually to 40%, with an increasing amount in the 40-60% bin (see Figure S 3). In addition, the 80-100% reduction targets increase, especially in between 2021 and 2022.

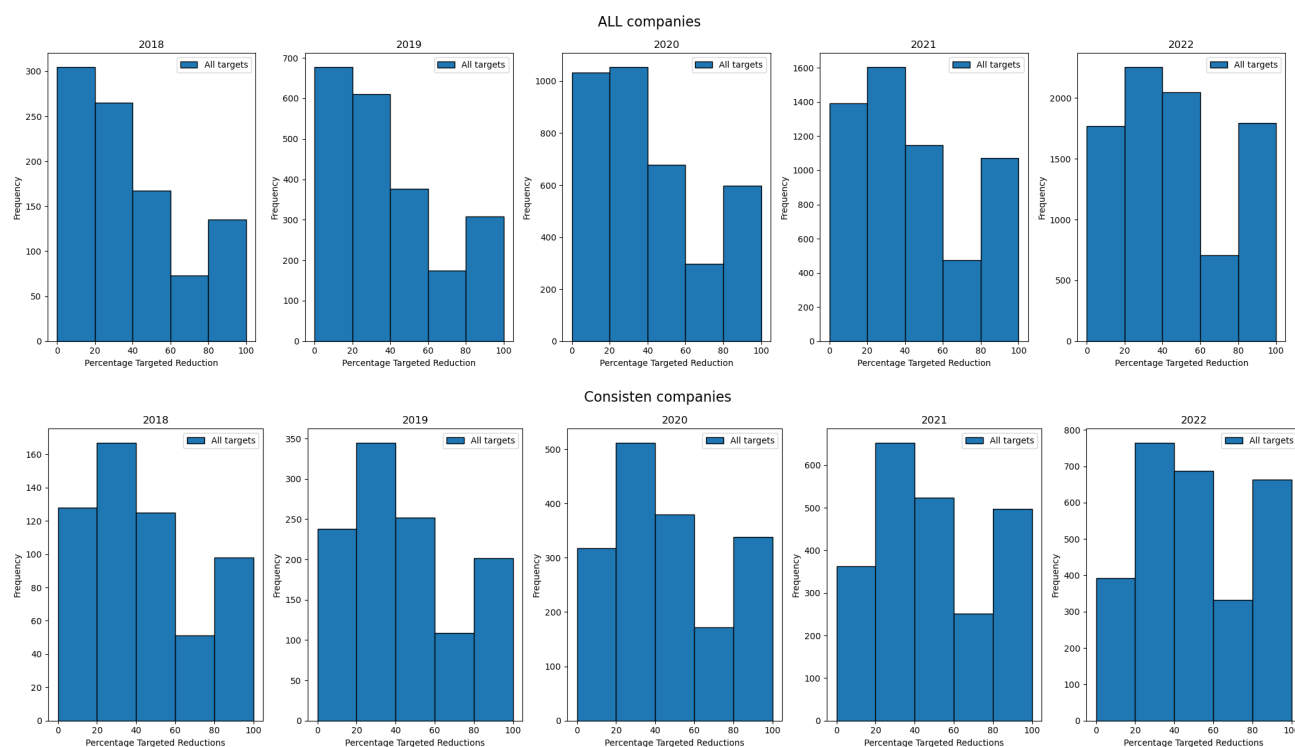


Figure S 3 Distribution of targeted reduction for all companies and consistent reporting companies

1.2 Sensitivity analysis ambition pathways

1.2.1 Cities and regions

In the main report Figure 11, we present ambition pathways of cities and regions based on a conservative assumption that emissions will remain constant beyond the target year. Here Figure S4 shows the ambition pathways of cities and regions using extrapolation of IMAGE current policy scenarios after the final target year. The difference between the two scenarios is very small, mainly because most of the big emitters have developed long-term targets, while the majority of the cities with target year 2030 are located in EU countries where the emission reduction under the current policies do not present substantial changes.

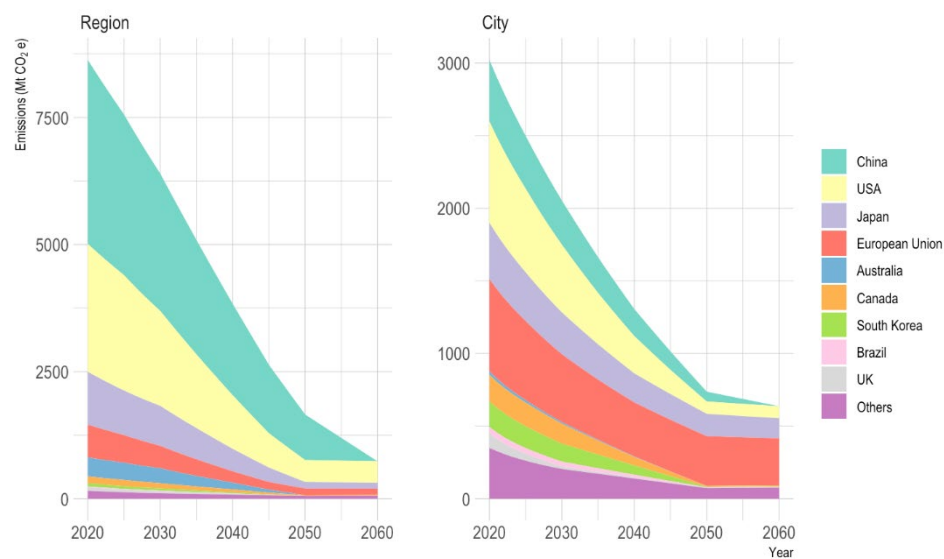


Figure S 4a Ambition pathways of cities and regions under current policy scenarios beyond target year in G20 countries

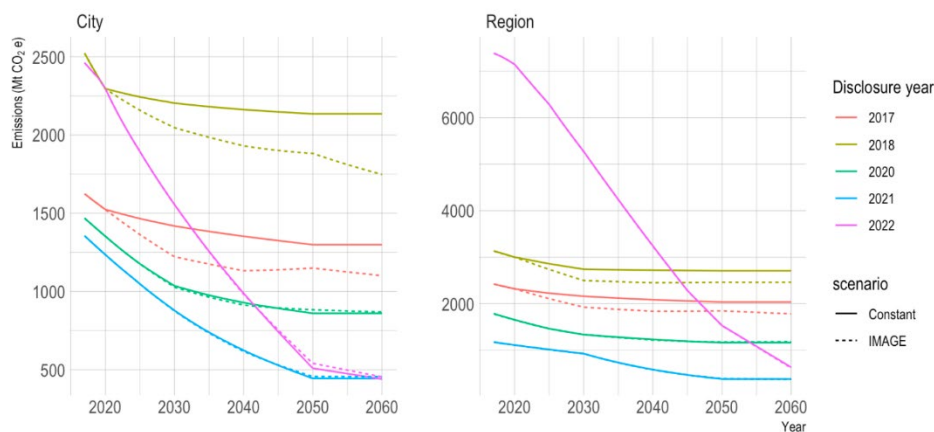


Figure S 5b Ambition pathways of cities and regions under current policy scenarios beyond target year in G10 countries from the disclosure year 2017 to 2022

1.2.2 Companies

In the main report, the emissions for ambition pathways after the final target year are extrapolated with the IMAGE current policies scenario (Dafnomilis et al., 2023; Nascimento et al., 2022). About 75% of

the companies do not have a target beyond 2030. To show the sensitivity of this assumption regarding extrapolation, we show the range based on extrapolation with the current policies scenario and extrapolation assuming emissions levels after target years remain constant (is 0% growth). See Figure S 6.

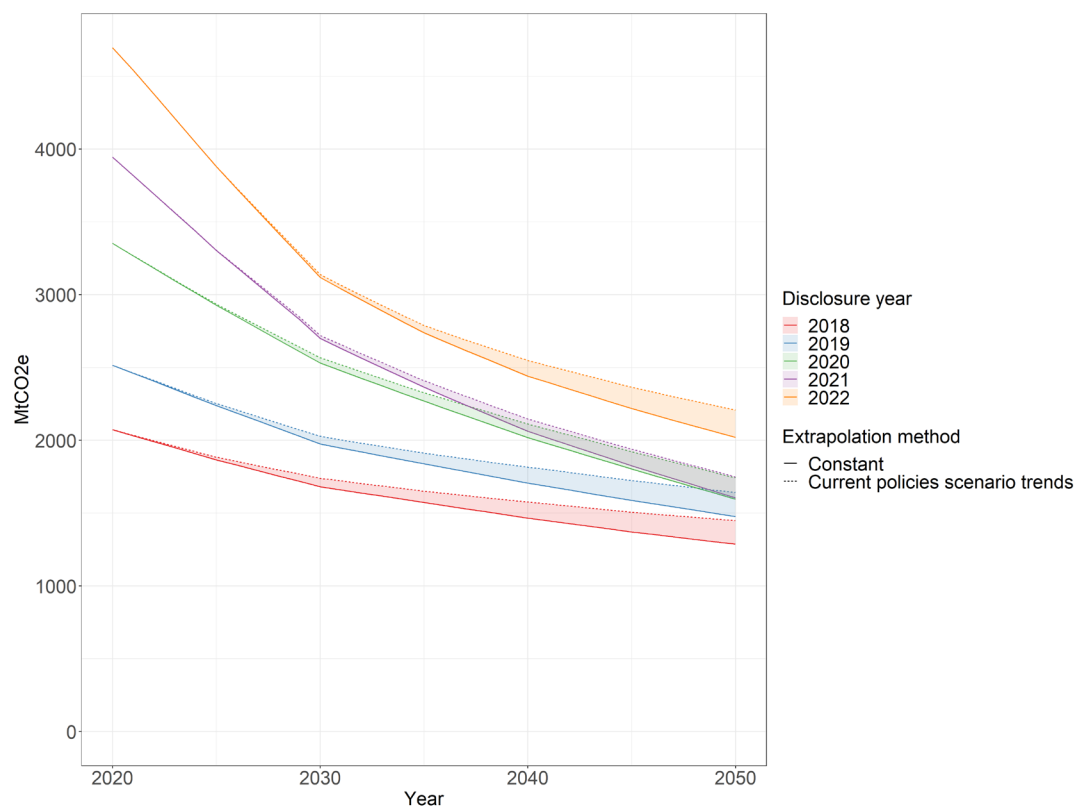


Figure S 6 Sensitivity analysis for ambition pathways on assumption regarding extrapolation after target year: 1) with current policies scenarios, 2) assuming constant emissions levels

2 METHODOLOGY

2.1 Data description

For both subnational and corporate actors we collect and process data for different years. The table below explains a few terms we used in this report.

Year	Description
Base year	The target reduction is defined relative to this year
Year target set	The year that a non-state or subnational actor published the target for the first time. For cities and regions, this information is not always available, while CDP companies add this in their responses to CDP.
Reporting year	The year in which GHG emissions are emitted
Disclosure year	The year emissions and targets are disclosed to subnational initiatives and CDP. For cities and regions, this is also the year the data is collected by DDL from different sources. In general the disclosure year = reporting year + 1
Report year	The year the Global Climate Ambition report is published. In general, this is disclosure year + 1
Target year	The year the targeted reduction relative to the base year is said to be achieved

2.1.1 Cities and regions

Self-reported subnational actors and targets are obtained from the following sources: Carbon Disclosure Project (CDP), Global Climate Action Portal (GCAP), C40 Cities for Climate Leadership Group, EU Covenant of Mayors, Global Covenant of Mayors, Local Governments for Sustainability carbonn@Climate Registry (ICLEI), Net Zero Tracker, China Carbon Neutrality Tracker (CCNT), Japanese Ministry of the Environment, and US initiatives (US Climate Mayors, US Climate Alliance, We Are Still In). Data from various sources are cleaned and harmonized based on the relational data model (<https://github.com/Open-Earth-Foundation/OpenClimate-Schema>) and ClimActor package in R. Several measures are taken to fill the data gaps in baseline emissions and contextual information including geographical location and population. We fill the baseline emissions across data sources, by prioritizing baseline emissions if the same baseline year in another target for the specific actor appears; then filling in the gap with additional data sources from the government disclosure. We used US EIA, Japanese city-level emission inventory from the Ministry of the Environment, and CCNT to fill the missing emission values at the baseline year for US states, Japanese cities and regions, and Chinese provinces, respectively. Many net-zero targets did not provide corresponding baseline year and associated emissions, we fill in with emissions from the most recent inventory if no other targets provide baseline emission information. Location data are prioritized for self-reporting data, additional data used to fill in the missing information are derived from Wikipedia and OpenStreetMap. Population data are derived from a combination of self-reporting information from cities and regions, census data and governmental statistics disclosure.

Subnational actors reported their climate pledges to different platforms. These self-reported climate targets, however, are not consistent in terms of emission scope, whether and what offset measures are taken, types of GHG emissions or units. Therefore, we standardized the reported targets and emissions into CO₂ equivalent (CO₂e) according to Global Warming Potential (GWP) - 100 used in IPCC reports.

Various types of targets are reported to the above platforms where we obtain data from, including absolute emission reduction targets (where the emission reduction is compared with historical baseline emissions), relative emission reduction targets (where the emission reduction is compared with projected business-as-usual emissions), emission intensity targets (when targets aim to reduce emissions per capita or GDP), Net Zero targets, carbon Neutrality targets etc. In this report, we focus

on quantifiable targets and targets with net-zero and carbon neutrality goals. Quantifiable targets are defined as absolute reduction, net zero or carbon neutrality emissions targets where the actor has specified and provided information on a baseline year and corresponding emissions, a reduction target, and a target year. We focus on quantifiable targets since cities, regions, and companies that have established measurable goals are more likely to be implementing real actions (Hsu et al., 2021; Hsu et al., 2022). As cities and regions may update their targets, multiple targets may appear in the combined dataset. We included all interim targets if they have different target years and constitute stage-by-stage climate targets, but we excluded the less ambitious targets when there is another target with the same baseline year and target year that have more ambitious targets.

2.1.2 Companies

The periodically published reports ‘global climate action from cities, regions and companies’ make use of corporate data on GHG emissions and targets reported to CDP (CDP, 2021). This document describes the data used from the CDP dataset and the selection procedure necessary for the aggregation. The dataset is distributed by CDP and includes, among others, company GHG emissions and targets, which we have aggregated to provide the landscape of emissions and targets, and project 2030 and 2050 company-level emissions levels in combination with projections from national current policies scenarios.

Landscape

Our starting point is the CDP raw response data, containing information on companies self-reported to CDP. This data includes the full emission profile of companies and was gathered directly from the responses given by companies in the 2018 to 2022 CDP surveys concerning their base year (BY) emissions, most recent year (MRY) emissions and targeted reductions, broken down by Scope 1, Scope 2 and Scope 3. In this assessment, we have used data from the CDP Climate Change 2018-2022 (see Table 2). Targets are included in the C4 part of the questionnaire.

Table 2 Questionnaires

Disclosure year	Link
2018	https://guidance.cdp.net/en/guidance?cid=2&ctype=theme&idtype=ThemeID&incchilid=1&microsite=0&otype=Guidance&page=1&tags=TAG-646%2CTAG-605%2CTAG-599%2CTAG-600%2CTAG-13145%2CTAG-13135%2CTAG-13140
2019	https://guidance.cdp.net/en/guidance?cid=8&ctype=theme&idtype=ThemeID&incchilid=1&microsite=0&otype=Guidance&tags=TAG-646
2020	https://guidance.cdp.net/en/guidance?cid=13&ctype=theme&idtype=ThemeID&incchilid=1&microsite=0&otype=Guidance&page=1&tags=TAG-646%2CTAG-604%2CTAG-60A
2021	https://guidance.cdp.net/en/guidance?cid=18&ctype=theme&idtype=ThemeID&incchilid=1&microsite=0&otype=Questionnaire&tags=TAG-646%2CTAG-605%2CTAG-600
2022	https://guidance.cdp.net/en/guidance?cid=30&ctype=theme&idtype=ThemeID&incchilid=1&microsite=0&otype=Guidance&tags=TAG-646%2CTAG-605%2CTAG-599%2CTAG-600%2CTAG-13145%2CTAG-13135%2CTAG-13140

The CDP dataset includes GHG emissions linked to the target for the base year, reporting year and target year. The GHG emissions are often reported for specific scopes or combinations of scopes. GHG emissions from companies can be divided into three scopes (The Greenhouse Gas Protocol, 2012)

1. Direct emissions from sources owned or controlled by the company
2. Indirect emissions from the generation of purchased electricity consumed by the company (L=location-based, M=market-based).
3. Other indirect emissions as a consequence of company activities but not owned or controlled by the company

Scope 2 emissions can be location-based or market-based, which is defined in the GHG Protocol Scope 2 Guidance (WRI, 2014)

- A location-based method reflects the average emissions intensity of grids on which energy consumption occurs (using mostly grid-average emission factor data).
- A market-based method reflects emissions from electricity that companies have purposefully chosen (or their lack of choice). It derives emission factors from contractual instruments, which include any type of contract between two parties for the sale and purchase of energy bundled with attributes about the energy generation, or for unbundled attribute claims.

Emissions for the target year are calculated from base year emissions and the reduction target. Emissions targets are defined for one scope or a combination of scopes and can cover a certain percentage of the total (base year) emissions in these scope(s) (see Figure S 6 **Error! Reference source not found.**). In addition, the target coverage specifies which parts of the company activities (e.g. company-wide, business division) are covered.

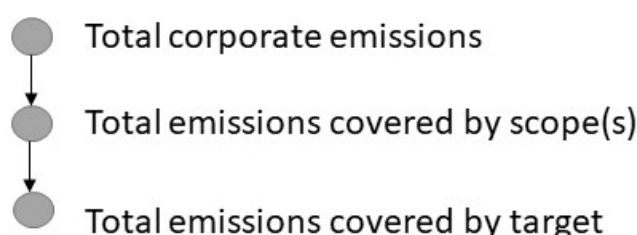


Figure S 7 Hierarchy corporate emissions reduction targets

The CDP raw data is processed to a dataset that is used for the landscape of scope 1+2, scope 3 target and emissions consisting of the following steps

1. Column names between disclosure years are made the same
2. Target information is cleaned by removing
 - a. Companies that do not disclose targets
 - b. Rows where target year, targeted reduction, base year emissions or base year are missing
 - c. Rows where the target year is beyond disclosure year
 - d. Rows where the status target is 'expired', 'replaced' or 'retired'
 - e. Rows where target coverage is 'other'
3. Outliers are defined as target base year, disclosure year or target year scope 1+2 emissions larger than 300,000,000 tCO₂e. Emissions from outliers are compared with their emissions disclosure (C6 of Questionnaire). If possible, the GHG emissions are adjusted, otherwise, they are removed. (see Figure S 8).

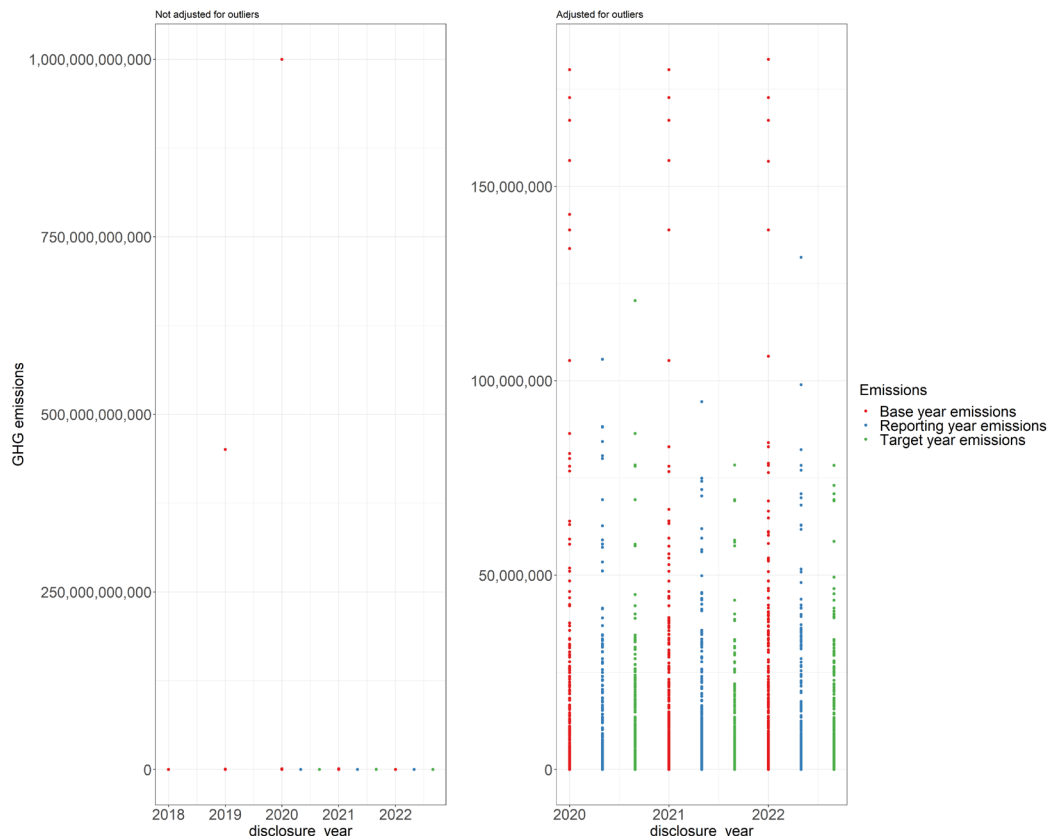


Figure S 8 Outliers (left figure) defined as targets with base year, reporting year (interpolated between base year and target year) or target year emissions larger than 3 GtCO₂e for scope 1+2. The right figure shows emissions after removing outliers

For the scope 1+2 targets, we select the targets with scope

- Scope 1+2
- Scope 1+2+3
- Scope 1
- Scope 2
- Scope 2+3

and adjust for the scope 3 emissions. This is done for the disclosure year 2018-2021 by calculating the ratio of scope 3 emissions covered by the target and total emissions covered by the target from the most recent reporting year emissions from the inventory (C6 Questionnaire). This ratio is multiplied with base year, (interpolated) most recent year and target year emissions. The 2022 disclosure year for the first time splits up base year emissions for scopes 1, 2 and 3, and therefore the adjustment based on the ratio is not needed as scope 1 and 2 emissions are directly available.

For scope 3 targets we select

- Scope 3
- Scope 1+2+3
- Scope 2+3

and use the same ratio as for scope 1+2 targets, but only 1 +/- ratio. In the disclosure years companies can set scope 3 targets for different scope 3 categories: upstream (Purchased goods and services, Capital goods, Fuel- and energy-related activities (not included in scope 1 or scope 2), Upstream transportation and distribution, Waste generated in operations, Business travel, Employee commuting, Upstream leased assets) and downstream (Downstream transportation and distribution, Processing of sold products, Use of sold products, End-of-life treatment of sold products, Downstream leased assets, Franchises, Investments), see (WRI and WBCSD, 2011). For disclosure years 2018-2021 companies can define targets for each category or for upstream, downstream, upstream/downstream, often resulting in multiple scope 3 targets per company. These targets and emissions are aggregated to one

target per scope/target coverage. As of disclosure year 2022, companies can include only one target per target year for scope 3 specifying the included scope 3 categories.

As a company can have multiple targets for the same scope, and target year, we have removed duplicates by selecting the following variables (in this order and largest value has the highest priority)

- Target status: new, underway, revised, achieved
- Total company base year emissions covered by the target
- Base year
- Year target was set
- Targeted reduction
- Scope accounting method: location, market
- Total emissions in the base year

2.2 Methodology

In this report, we defined short-term, mid-term, and long-term emissions reduction targets, where 'short-term' targets are those within six years from the disclosure year; 'medium-term' as between 7 and 16 years from the disclosure year; and 'long-term' as those past 17 years from when cities and regions report their targets years. See how this plays out for the disclosure years 2018-2022 in Table 3.

Table 3 Target terms used in the report

Disclosure Year	Report Year	Target Term	First Year	Last Year	Total Years
2017	2018	Short	2017	2022	6
2017	2018	Medium	2023	2032	10
2017	2018	Long	2033	2050	18
2018	2019	Short	2018	2023	6
2018	2019	Medium	2024	2033	10
2018	2019	Long	2034	2050	17
2020	2021	Short	2020	2025	6
2020	2021	Medium	2026	2035	10
2020	2021	Long	2036	2050	15
2021	2022	Short	2021	2026	6
2021	2022	Medium	2027	2036	10
2021	2022	Long	2037	2050	14
2022	2023	Short	2022	2027	6
2022	2023	Medium	2028	2037	10
2022	2023	Long	2038	2050	13

The companies dataset includes emissions in the disclosure year, which is different from the cities and regions dataset. In the CDP dataset, the disclosure year is explicitly included in the dataset, while for cities and regions, this is not always clear due to the different data sources used. The percentage of company targets included in our analysis is between zero and 27% and between zero and 2.9% of the companies.

Table 4 Percentage of targets and companies with targets in disclosure year

Companies	Percentage of targets in disclosure year	Percentage of companies with targets in disclosure year
2018	0	0
2019	2.5	2.9
2020	27	2.3
2021	3.9	1.9
2022	4.2	1.4

2.2.1 Cities and regions

Subnational climate actions

We interpolate the ambition pathway between the baseline year and target year in an exponential form, assuming that cities and regions reduce their emissions at the same annual emissions reduction rate. We assume that cities or regions that have step-by-step targets (more than one target with different target years) will achieve their targets one by one, thus we calculate the annual reduction rate for each stage. However, if the last stage target is a net-zero target, carbon neutrality target or a target that aims to reduce 100% of emissions, we assume a linear trend for interpolation. For actors with a target year before 2060, and have not reached net zero yet, we conservatively assume constant annual emissions.

To analyze ambition pathways from 2017 to 2022, we selected the top 10 largest emitters, namely, Brazil, Canada, China, India, Japan, Mexico, South Africa, the United States, the United Kingdom, and the EU, since these countries were consistently included in previous reports, from 2017 to 2022 disclosure years. The number of actors for each year is shown in Appendix Table 1.

Table S1 Number of subnational actors in ambition pathway from 2017 to 2022

Disclosure year	Regions	Cities
2017	57	5814
2018	55	5954
2020	44	1839
2021	32	1322
2022	82	2788

All targets analyzed in this report indicate quantifiable emission reduction between the baseline year and the target year. Peak emission targets, where the peak emissions cannot be quantifiable, are thus excluded from the current analysis. Based on the emission reduction targets, we assume a decreasing trend for each actor, therefore the ambition pathway does not reflect potential emissions peak and decline trends.

2.2.2 Companies

Ambition pathways

The ambition pathways in the report are created by collecting unique targets per scope/target coverage year for each company and linearly interpolating between the base year and one or more target years. The construction of these pathways consisted of two steps

1. Processing data
2. Construction of pathways.

The starting point of the data processing is the scope 1+2 emissions per target as described in Section 2.1.2 until bullet point 3. Only targets that cover at least 75% of total company emissions are included.

With this dataset, company targets are categorized into different profiles. The profiles aggregate target data per company and are divided into different groups with similar target characteristics following four different company profiles.

- Profile 1 companies reported only one target in a single year
- Profile 2 companies are companies with multiple sequential targets, but which refer to the same defined scope of emissions
- Profile 3 companies are companies that have multiple targets that cover different emission scopes (i.e. a Scope 1 emissions target for 2030 and a Scope 2 emissions target for 2035)
- Profile 4 companies are those companies which do not fit in any of the previously defined profiles and for which one scope and target year combination is prioritized

The second step is the processing (in Python) to construct ambition pathways per company. Profile 3 was not included due to the complexity it brings in constructing pathways. As companies can report different scopes or different target coverage, companies were sometimes included in different profiles. For this reason, we first selected one set of targets based on (in that order, from highest to lowest priority)

- Profile 2, profile 1, and profile 4
- Scope 1+2, Scope 1, Scope 2, Scope 1+2+3, Scope 1+3, Scope 2+3
- Scope 2 location-based, Scope 2 market-based
- Number of targets in scope/coverage combination
- Percentage of base year emissions in scope of total company emissions

After the above data selection, emissions pathways were then constructed in Python for each profile group by interpolation using the BY and TY emissions. A constant growth rate calculated from the most recent PBL IMAGE Current Policies emissions scenario was applied to emissions for extrapolation beyond the final target year. This scenario included current implemented policies from all G-20 economies. National policies in this scenario are considered implemented if they are adopted by the government through legislation or executive orders (Roelfsema et al., 2020). After the target of a policy, the scenario pathways revert to the underlying SSP2 (Vuuren et al., 2021).

Emissions pathways were constructed including years from 1990 to 2050, beginning with each company's base year. Emissions pathways were constructed for two subsets of the data: ambition pathways for all companies in each reporting year (referred to as all companies) and ambition pathways for only those companies who reported in each year between 2018 – 2022 (referred to as consistent companies). Ambition pathways for all companies were constructed by plotting the total emissions for each year from 2020 through 2050 in the projected ambition time series for each data set.

Separate emissions pathways were constructed for companies falling with the largest IEA sectors of Chemical & petrochemical, and Iron & steel and Non-metallic mineral sectors. As the companies in the dataset from non-metallic companies were very small for the 2018-2020 disclosure years, these were not shown in our report as separate ambition pathways. The pathways were constructed for both companies and companies consistently reporting through all disclosure years. For the latter, Iron& Steel

were excluded due to the small amount of companies. Companies were mapped into one of the following sectors if their “Primary activity” as determined by CDP was one of the following:

- 'Iron & steel': 'Iron and steel',
- 'Basic plastics' : 'Chemical and petrochemical',
- 'Agricultural chemicals' : 'Chemical and petrochemical',
- 'Inorganic base chemicals' : 'Chemical and petrochemical',
- 'Specialty chemicals' : 'Chemical and petrochemical',
- 'Other base chemicals' : 'Chemical and petrochemical',
- 'Oil & gas refining' : 'Chemical and petrochemical',

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