# GLOBAL CLIMATE ACTION FROM CITIES, REGIONS AND BUSINESSES

Taking stock of the impact of individual actors and cooperative initiatives on global greenhouse gas emissions

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IKEA Foundation

# THIS IS THE DECADE IN WHICH WE TURN AMBITION INTO ACTION

*By **Gonzalo Muñoz** and **Nigel Topping**, UN High-Level Champions for Climate Action for Chile's COP25 and the UK's COP26 climate summit*

Climate action has hit a tipping point in the past year. Even in the midst of a global pandemic and economic collapse, we have seen more major economies, businesses, investors, cities, states and regions than ever before commit to full decarbonization in the 2040s.

The challenge of the 2020s is to translate that ambition into action. Through these long-term targets, we are plugging our destination into a global, collective GPS: net zero emissions before mid-century.

But we won't get there unless we plot the route, start the journey and openly track our progress along the way. Commitments to reach net zero emissions must be backed by robust, science-based roadmaps for getting there, signposted with interim targets starting this decade. And the science says that for our best chance of reaching net zero in the 2040s, we must halve greenhouse gas emissions between 2020 and 2030 while radically regenerating nature.

We won't get there without regular progress reports, which allow us to assess what is and is not working and how we can continually ramp up efforts. This report demonstrates why.

It finds that the number of cities, states, regions, businesses and investors setting interim targets around 2030 is growing, along with the membership of international cooperative initiatives - and that this momentum is pushing national governments to raise their ambition. Yet, in a first assessment of progress towards emissions targets, the report finds that only about half of these sub-national and non-state actors are on track to meet their goals. The other half need to boost their future emissions reductions in order to fulfill their commitments.

The one-year-old United Nations Race to Zero campaign is working intently to ensure that its members achieve their ambitious commitments to net zero emissions in the 2040s or sooner.

Under new criteria set this year, the local governments, businesses and investors that join the Race to Zero must prioritise reducing emissions rather than offsetting them with tree-planting or carbon capture technology. They must also cover the full scope of a member's direct and indirect emissions. Currently, the criteria make clear that there is no science-based route for oil and gas companies to join - because the race to zero is a race away from fossil fuels.

The momentum of the past year shows us that the will and determination to pursue a healthy, regenerative, resilient zero-emissions future is alive and growing. This is how we will emerge from the COVID-19 crisis with strengthened public health, the creation of well-paying jobs and greater equity and fairness.

## SO LET'S GET A MOVE ON.

# ES

# EXECUTIVE SUMMARY

**Cities, regions and businesses continue to take ambitious climate action. Despite a global pandemic, subnational and non-state actors have not retreated from their climate change commitments, and in many cases, have set long-term goals to achieve decarbonization. This report is the latest stocktake of city, region, and business climate action, building on previous reports aggregating these actors' greenhouse gas (GHG) emissions reduction impacts.**

This report not only provides an up-to-date assessment of the landscape and potential GHG emissions impact of climate change mitigation actions by cities, regions and businesses globally, but also features, for the first time, an assessment of their progress toward their pledges. Focusing on ten major emitting economies: Brazil, Canada, China, the European Union (EU-27) plus the United Kingdom (UK), India, Indonesia, Japan, Mexico, South Africa, and the United States (US), which together accounted for 60% of GHGs, 78% of GDP, and 58% of population in 2019 globally. We assess the aggregate potential for cities, regions, and companies to narrow the 2030 emissions gap between current policies and the reductions necessary to achieve the Paris Agreement's long-term temperature goal of limiting global warming to well below 2°C and making every effort to limit warming to 1.5°C. The GHG emissions analyses presented in this report do not consider finance-related pledges made by banks, investing firms and other financial institutions.

As in our previous reports, we assess climate actions by (1) individual non-state and subnational actors and by (2) "international cooperative initiatives" (ICIs) in which individual non-state and subnational actors, investors, civil society, national governments and international organizations cooperate beyond national borders to pursue common climate goals (Chan *et al.*, 2018; Hsu *et al.*, 2018; Hsu, Höhne, *et al.*, 2020). Many of the individual non-state and subnational actors assessed in this report participate in one or more ICIs.

1 Current national policies (pre-COVID-19) + individual actors' commitments

2 Current national policies (pre-COVID-19) + initiatives' goals

The impact of the COVID-19 pandemic on non-state and subnational climate actions, and in particular on future GHG emissions, is not comprehensively addressed in this report due to limited information available at the time of publication.

## The landscape of non-state and subnational climate action continues to broaden even during the COVID-19 pandemic

The number of individual non-state and subnational actors with quantifiable GHG emissions reduction targets continues to grow. Continued growth in 2020 is remarkable, as the COVID-19 pandemic and ensuing economic crisis could have resulted in a lower prioritisation of climate action by non-state and subnational actors.

Now that the year 2020 has passed, we observe significantly more non-state and subnational actors setting targets for the post-2020 period. In the ten major emitting economies covered here, 1,929 cities and 125 regions have made quantifiable commitments to reduce emissions beyond the year 2020, an increase of over 70 regions and over 1,500 cities with post-2020 targets compared to our 2019 global aggregation report. The subnational actors with post-2020 targets aggregated and analysed here cover 617 million people at the regional level, with an additional 238.8 million covered from city-level commitments or, together, around 11% of the global population. These subnational entities also collectively cover around 12% of global emissions. For companies, over 800 firms, operating within 10 of the world's major emitting economies, have already made quantifiable post-2020 absolute emissions reduction targets as reported to CDP. Their combined revenue totals around USD 13 trillion, just under the size of China's GDP.

Growing participation is also facilitated by 297 international cooperative initiatives (ICIs). These initiatives gather an unprecedented number of non-state and subnational actors of all types, including 13,583 businesses, 4,510 investors, 13,012 cities and regions, and 2,424 domestic and international NGOs.

## The aggregate 2030 ambition of non-state and subnational climate actions has not yet changed significantly. This picture may quickly change in the coming years as more actors set 2030 targets that are in line with mid-century net-zero emissions goals.

While there are more non-state and subnational actors committing to 2030 emissions reduction targets and long-term net-zero emissions targets, our updated analysis did not clearly demonstrate that the collective 2030 ambition of non-state and subnational climate actions has increased since our 2019 analysis.

By employing a methodology similar to the one applied in previous reports to aggregate individual actors' targets, we show that the full implementation of GHG emissions reduction targets by individual cities, regions and companies could lead to 2.0 to 2.5 $GtCO_2e$/year of additional emissions reductions compared to the baseline pre-COVID "current national policies scenario" in 2030 (Figure ES1). The estimated emissions reductions are similar to those from our 2019 analysis (1.2 to 2.0 $GtCO_2e$/year), while smaller than the possible impact of the COVID-19 pandemic (2 to 4 $GtCO_2e$/year in 2030). On the one hand, the downward revision of baseline emissions projections under current national policies compared to the 2019 analysis would inevitably imply to reduced potential GHG impact of non-state and subnational climate targets; on the other hand, more actors have set new, post-2020 targets.

We also observe that some recently-set 2030 targets may not have been considerably more ambitious than emissions projections under current national policies. This gap particularly may be the case in Japan and the EU: many cities and regions set 2030 targets similar to their respective countries' first nationally determined contributions (NDCs). While both subnational and national actors have updated their targets with more ambitious goals, countries are on track to (over)achieve their initial NDCs. This revision process may provide evidence of an "ambition loop" in which national and sub- and non-state targets iteratively support each other to ratchet up.

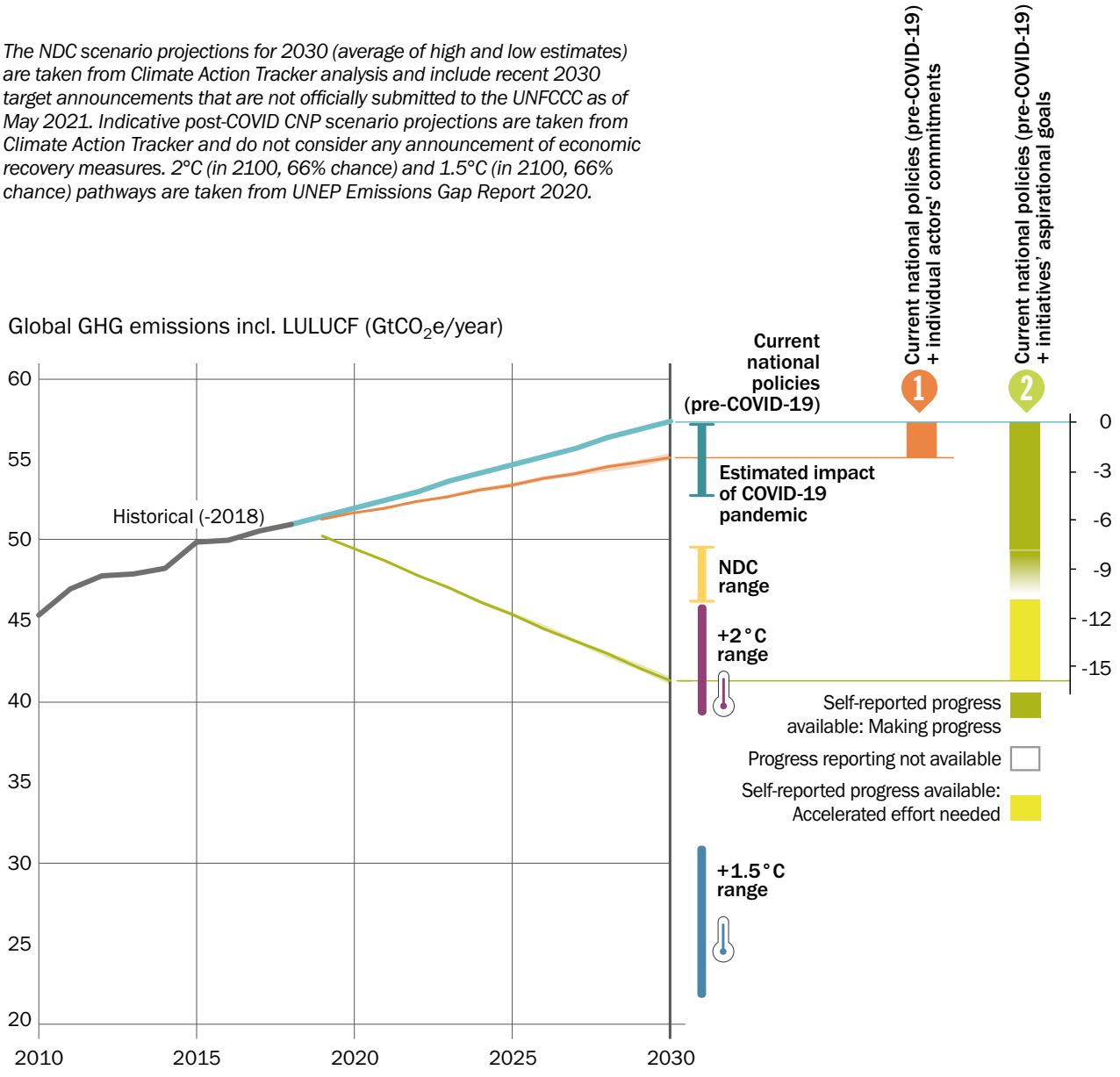
With several major emitting economies, notably China, the EU, and Japan, committed to long-term net-zero emissions, we anticipate that in the next several years many non-state and subnational actors will set 2030 targets that are consistent with net-zero emissions by 2050 or early in the second half of this century.

Besides tracking individual actor pledges we also updated the collective 2030 emission reduction ambition of major ICIs by revisiting the list of ICIs considered for potential impact quantification (e.g., removing those that are no longer functional, adding those that are highly active with a track record of delivering relevant outputs, updating the aspirational goals and/or membership targets where relevant). Our updated results show that ICIs' aspirational goals, if fully implemented, could lead to a reduction of 16 $GtCO_2e$/year below current national policies scenario emissions projections for 2030, leading to total emission levels close to the range for a 2°C emissions pathway.

With the recent updates of 2030 targets by several major emitting economies, the collective ambition of national governments is quickly catching up with the ambition of ICIs. At the same time, the number of ICIs in our analysis demonstrates that international efforts toward global net-zero emissions are strengthening and broadening in all sectors, including "hard-to-abate" sectors such as heavy industries, international aviation and shipping, freight transport and buildings and construction. Our analysis only partially captures the potential impact of these dynamic developments in the realm of international cooperative action.

**Figure ES1.** Potential global greenhouse gas (GHG) emissions reductions resulting from full implementation of individual actors' targets ("current national policies (CNP) plus individual actors' commitments" scenario) and international cooperative initiatives' goals ("CNP plus initiatives' aspirational goals" scenario) up to 2030.

*The NDC scenario projections for 2030 (average of high and low estimates) are taken from Climate Action Tracker analysis and include recent 2030 target announcements that are not officially submitted to the UNFCCC as of May 2021. Indicative post-COVID CNP scenario projections are taken from Climate Action Tracker and do not consider any announcement of economic recovery measures. 2°C (in 2100, 66% chance) and 1.5°C (in 2100, 66% chance) pathways are taken from UNEP Emissions Gap Report 2020.*



## Non-state and subnational actors are making progress towards their 2030 targets, but to varying degrees. Emissions trends in recent years suggest that more effort is needed for these actors to collectively achieve their targets.

Whether non-state and subnational actors are following through on their emission reduction pledges is critical to understanding what progress is being delivered. While the momentum of non-state and subnational climate actions continues to build, this report finds that there is limited evidence of this ambition corresponding to realised impact, given limited GHG inventory data by which to assess progress.

For individual actors, we assessed progress comparing GHG reductions achieved compared to the required reductions, assuming a linear trajectory of achievement. For ICIs, we analysed annual reports and survey results on self-assessments of progress toward mid-term goals.

Evidence from reported emission inventories indicates that half of individual subnational governments and 80% of individual companies are on track to deliver on their 2020 emission reduction targets. While these numbers do not entirely reflect 2020 emissions data, which were largely unavailable at the time of analysis, this modest progress suggests that cities, regions, and companies will need to accelerate their actions to stay on track or achieve their 2030 targets.

Progress towards mid-term (post-2020 to 2035) targets is varied among individual subnational actors. Forty-eight percent of cities and 51% of regions are on track to achieve or exceed their mid-term targets. Eighteen percent of cities and 11% of regions also showed negative target achievement rate, meaning that their emissions in the latest inventory year were higher than their target base year emissions. While cities' emissions reduction trajectories are not necessarily linear, these results nevertheless indicate that cities and regions overall need to strengthen their effort, in close cooperation with national governments, to achieve their 2030 targets.

For individual companies, the progress assessment of post-2020 targets was performed on 441 targets from 384 companies that accounted for approximately 2.5 $GtCO_2e$/year in 2019 (without accounting for overlaps). The results show that about two-thirds of the targets assessed are on track to be achieved or exceeded. Moreover, for roughly one-third of the targets, companies already reduced more than twice the pro-rated emissions reductions required in 2019. These high-level findings indicate that, notwithstanding a wide variation across cases, companies reporting to CDP are generally on track to meet their post-2020 company-wide absolute emissions reduction targets for 2030. While these results are encouraging, further research is needed to assess the extent to which this progress is attributable mainly to companies' implementation efforts, to national and subnational governments' policy measures or to their targets not being more ambitious than business-as-usual (BAU) trajectories.

Progress in emission reductions for ICIs is challenging to assess, as they involve multiple actors, but do not necessarily set actor-level targets. Further, initiatives set different types of targets that often do not result in emissions reductions directly, e.g., numbers of cities engaged, capacity building targets, campaigning targets. To account for these complications, this study analysed survey responses from initiative focal points. When available, annual reports describing different types of targets were also consulted. Assuming a linear progression between lapsed time and target achievement, initiatives' several are on track to meet 80% of targets. However, it is important to note that many targets are relatively new and whether they will see further progress is unknown at this stage. Moreover, in the forestry sector, self-reporting indicates that acceleration is needed to achieve current targets. Overall, we estimate that only about half of the emissions reduction potential presented in Figure ES1 is coming from initiatives that report that they are making progress.

The study also assessed 'output performance' of ICIs. This metric captures the consistency between what initiatives plan to do and what results they actually produce on an annual basis: higher output performance suggests a higher likelihood to meet desired impacts. Results in 2020 show that 60% of mitigation initiatives produce partial or high outputs, which implies meeting the minimum criteria to achieve their desired social or environmental impacts. Mitigation ICIs have demonstrated stable annual performance through the COVID-19 pandemic. This contrasts with adaptation-focused ICIs, which have experienced performance decreases as a result of mobility restrictions to stem the effects of the pandemic and other financial and technical constraints. Further data would be required to complete a full assessment.

## EV sales targets of car manufacturers would lead to higher share of EV sales than expected from national policies of the EU, China and the United States

A significant quantity of car manufacturers' emissions comes not from their own operations but from their value chain, notably the use of their products. We have made a first step in assessing these so-called scope 3 emissions by analysing the impact of electric vehicle (EV) sales targets from car manufacturers on total GHG emissions in the EU-27 and UK, the US, and China.

Our results show that car manufacturers could bring about transformational change if they fulfil their promises on car EV sales targets and improve fossil fuel cars in line with national estimates. These actions seem to be part of the ambition loop in which governments set ambitious targets and manufacturers respond, prompted as well by actions from competitors. That being said, several countries and cities are already considering more ambitious targets such as banning the sales or access to cities of fossil fuel cars before 2030. Car manufacturer targets are not in line with these plans yet. Subsequently, the impact of car manufacturer targets on greenhouse gas emissions is relatively small. Emission reductions would only materialise alongside increased EV uptake, and if more renewable electricity is installed.

This report compares EV sales shares by 2030 secured by national policies with those expected from car manufacturers. These manufacturers report EV sales targets in their sustainability reports, but in some cases already announced more ambitious ones outside these reports, which we analyse separately. The EU and UK already have a relatively ambitious EV target of 35% for new cars by 2030, but if car manufacturers implement their promises from their sustainability reports this would increase to 48%. The US is projected to have a new electric light-duty vehicle sales share of 5% by 2030 (EIA, 2020) under current national policies, but this could increase to 16% if car manufacturers achieve their EV targets from their sustainability reports. In addition, if General Motors would implement their recent announcement to end sales of gasoline cars by 2035, the EV share in new sales in the US would increase to 28% by 2030, and $CO_2$ emissions would decrease by 8% relative to the current policies scenario. In China, the impact on GHG emissions is limited due to the higher $CO_2$-intensity of the electricity grid. National policies and car manufacturer EV sales targets (from sustainability reports) together are expected to arrive at 25% of total sales. However, the Chinese government has announced more ambitious targets for 2025 and 2030, which is projected to result in EV sales constituting 36% of total sales.

Based on the aforementioned findings, we provide several recommendations:

### *Data and monitoring*

- **Greater transparency and reporting needed to close growing "accountability gap."** While momentum of non-state and subnational climate actions continues to build, this report finds that there is limited evidence of this ambition translating into realised impacts. Some of these actions are at an early stage of development and are yet to accelerate along an "S-shaped" curve of transformation. It is also possible, however, that our results suggest a widening "accountability" gap in non-state and subnational climate actions. Several initiatives and networks of cities, regions and companies continue to strengthen their efforts to encourage disclosure of relevant data and reporting that would close this gap, but there is still an overall need for greater transparency and accountability across a broader spectrum of non-state and subnational climate actions. As actors increasingly set long-term net-zero targets, regular assessments of progress and implementation toward near-term goals will be key for evaluating the credibility of these goals.
- **Historical time series data needed to examine trends.** Specifically on the continuous tracking of non-state and subnational actions, progress assessments would greatly benefit from consistent time series of historical GHG emissions. There are many cities, regions and companies that periodically report their annual GHG emissions as well as the historical time series to international networks or initiatives, but these datasets are not necessarily publicly available. Although advances in satellite remote sensing and statistical modelling have allowed for progress in systematic emissions data collection and estimation from various sources beyond aforementioned international initiatives and networks, it remains challenging to collect these data and process them to make them comparable.
- **Holistic and comprehensive data encompassing multiple aspects of progress tracking.** Cities, regions, and companies report limited data tracking the "full cycle" of progress, implementation and impact that determine the impact of climate actions. While our report provided a first progress tracking, it is limited to a few dimensions and indicators (i.e., emission reductions). Ideally, actors would report details on a range of inputs (e.g., policies, strategies) as well as outputs (e.g., activities and products) that would allow for a more complete understanding of where subnational and non-state actors are excelling and where they may require more support to accomplish their goals.

### *Implementation*

- **Early evidence suggests limited progress towards 2020 targets, requiring greater implementation towards post-2020 targets.** Analysis of reported greenhouse gas emission inventories indicates that only half of city governments and 80% of companies delivered on their 2020 emission reduction targets. While limited 2020 emissions data were available and it is possible greater achievement was realized, this modest progress suggests that cities, regions, and companies will need to accelerate their actions to stay on track for or achieve their 2030 targets.

### *Ambition*

- **Aligning mid-term ambition with national governments' long-term net-zero goals is necessary.** Many countries have set or strengthened 2030 emissions reduction targets and more are likely to follow suit in the coming months, towards the COP26. There is an important opportunity for non-state and subnational actors to similarly enhance their ambition further for the mid-term future in accordance with the Paris Agreement's long-term goal of global net-zero emissions. Our findings from the progress assessment suggest that a substantial number of actors can already strengthen their mid-term targets.
- **Seizing post-COVID opportunity to develop long-term decarbonization strategy.** Together with national governments, non-state and subnational actors can also seize COVID-19 recovery opportunities to lay a solid foundation for transition towards net-zero emissions. Most of the government spending on rescue and recovery measures to stimulate the economy in the first months of the COVID-19 were not conducive to a low-carbon transition and it is essential that future opportunities are fully utilized to keep the Paris Agreement goal within reach (UNEP, 2020). Several recent studies show that cities, regions and businesses can play a crucial role in materialising sustainable and resilient recovery.

## ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| **°C** | degrees Celsius |
| **AREI** | Africa Renewable Energy Initiative |
| **ATAG** | Air Transport Action Group |
| **BAU** | Business-as-usual |
| **BEV** | Battery Electric Vehicle |
| **C40** | C40 Cities for Climate Leadership Group |
| **CAAT** | Climate Action Aggregation Tool |
| **CAFE** | Corporate Average Fuel Economy |
| **CCAATW** | Collaborative Climate Action Across the Air Transport World Initiative |
| **CCAC** | Climate & Clean Air Coalition |
| **C-CID** | Climate Cooperative Initiatives Database |
| **CDP** | CDP (formerly Carbon Disclosure Project) |
| **CNCA** | Carbon Neutral Cities Alliance |
| **CNP** | Current national policies (scenario) |
| **$CO_2e$** | Carbon dioxide equivalent |
| **COP** | Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) |
| **DDL** | Data-Driven EnviroLab |
| **DIE** | German Development Institute/Deutsches Institut für Entwicklungspolitik |
| **DTU** | Technical University of Denmark |
| **ETIP PV** | European Technology & Innovation Platform for Photovoltaics |
| **EU** | European Union |
| **EU-27** | European Union with 27 member states, as of May 2021 |
| **EUCoM** | Global Covenant of Mayors, European Secretariat |
| **EV** | Electric vehicle |
| **FCEV** | Fuel Cell Electric Vehicle |
| **FOF** | Function-Output-Fit |
| **G20** | Group of Twenty |
| **GCA** | Global Center on Adaptation |
| **GCoM** | Global Covenant of Mayors for Climate & Energy |
| **GDP** | Gross Domestic Product |
| **GFEI** | Global Fuel Economy Initiative |
| **GGA** | Global Geothermal Alliance |
| **GHG** | Greenhouse gas |
| **Gt** | Gigatonne = $10^9$ tonne |
| **GW** | Gigawatt |
| **GWP** | Global warming potential |
| **ICAT** | Initiative for Climate Action Transparency |
| **ICI** | International Cooperative Initiative |
| **IEA** | International Energy Agency |
| **IIASA** | International Institute for Applied Systems Analysis |
| **IPCC** | Intergovernmental Panel on Climate Change |
| **ISA** | International Solar Alliance |
| **LULUCF** | Land use, land-use change and forestry |
| **Mt** | Million tonne = $10^6$ tonne |
| **NDC** | Nationally Determined Contribution |
| **NEV** | New Energy Vehicle |
| **NYDF** | New York Declaration on Forests Initiative |
| **OECD** | Organisation for Economic Co-operation and Development |
| **PBL** | PBL Netherlands Environmental Assessment Agency |
| **PHEV** | Plug-in Hybrid Electric Vehicles |
| **PPA** | Power Purchase Agreement |
| **RE** | Renewable Energy |
| **RoW** | Rest of the World |
| **SBTi** | Science-Based Targets Initiative |
| **SE4All-IEA** | SE4All's Industry Energy Accelerator |
| **SEAD** | Super-Efficient Equipment and Appliance Deployment Initiative |
| **SIDS** | Small Islands and Developing States |
| **TWh** | Terawatt-hour = $10^{12}$ watt-hour |
| **U4E** | United for Efficiency Initiative |
| **UK** | United Kingdom |
| **UN** | United Nations |
| **UNEP** | United Nations Environment Programme |
| **UNFCCC** | United Nations Framework Convention on Climate Change |
| **US** | United States |
| **USD** | United States Dollars |
| **ZEV** | Zero Emission Vehicle |
| **ZEVA** | International Zero-Emission Vehicles Alliance |

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# 01

# INTRODUCTION

## 1.1 BACKGROUND AND OBJECTIVES

Current policies from national governments are highly insufficient to limit global warming to 1.5°C as agreed under the Paris Agreement (Höhne *et al.*, 2020). Global climate action from subnational governments (e.g., cities, states and regions) and non-state actors (e.g., companies, investors, and civil society organisations) have the potential to make significant greenhouse gas (GHG) emissions reductions to bring the world closer to a 1.5°C-consistent emission pathway. The 2019 *Global Climate Action from Cities, Regions, and Companies: 2019 edition* (hereafter referred to as the global aggregation report), which was presented at the September 2019 United Nations (UN) Secretary General Climate Summit, demonstrated that the collective ambition of non-state and subnational actors up to 2030 could bring down emission levels in line with the warming of 2°C or lower, if fully implemented (NewClimate Institute *et al.*, 2019).

Since then, there have been rapid and dynamic developments around non-state and subnational climate action. We identify at least three important developments. The first is accelerated momentum around long-term net-zero emissions targets. The number of non-state and subnational actors with various forms of net-zero targets or their equivalents now equals 826 cities, 103 regions, and 1,565 companies globally (NewClimate Institute and Data-Driven EnviroLab, 2020). While many of these pledges are not yet supported by transparent implementation measures that will lead to deep decarbonisation (NewClimate Institute and Data-Driven EnviroLab, 2020; Black *et al.*, 2021), the pledges themselves are a clear sign that the global long-term net-zero emissions goal of the Paris Agreement is increasingly being shared beyond national governments and the UN Framework Convention on Climate Change (UNFCCC) process.

Second, while 2020 was once the key target year for climate action, there are an increasing number of cities, regions and companies setting climate targets for the post-2020 period. These mid-term targets and actions to achieve them are crucially important in the "decisive decade" to tackle climate change and keep warming below 1.5°C (U.S. Department of State, 2021). An increasing number of peer-reviewed studies on the potential GHG mitigation impact of non-state and subnational actors have recently been published (e.g. Bertoldi *et al.*, 2020; Hultman *et al.*, 2020; Palermo *et al.*, 2020; Salvia *et al.*, 2021).

Third, there is an increased interest in the progress of non-state and subnational actors towards their short- to mid-term GHG emissions reduction targets. The decision at the 25th Conference of the Parties (COP25) in 2019 requested the UNFCCC secretariat to "continue engaging with non-Party stakeholders and enhancing the effectiveness of the Non-State Actor Zone for Climate Action platform, including the tracking of voluntary action" (Decision 1/CP.25, clause 29) (UNFCCC, 2019). Indeed, there have been critical views regarding the effectiveness of non-state climate actions (Pattberg *et al.*, 2012; Chan *et al.*, 2015; Michaelowa and Michaelowa, 2017; Puig and Bakhtiari, 2021), and a recent study showed that there is a significant knowledge gap around ex post evaluation of emissions reduction achievements (Hale *et al.*, 2021).

Against this backdrop, this report provides an up-to-date assessment of city, region and business actions towards GHG emissions reductions by 2030 both in high-emitting countries and globally. We not only update the 2030 potential GHG impact assessment from the 2019 report (NewClimate Institute *et al.*, 2019) but also, for the first time, conduct a new set of analyses on the progress of different non-state and subnational actor groups toward their targets for the mid-term future (2026–2035). In

addition, we also conduct exploratory analysis of the potential impact of corporate production targets, with the example of car manufacturers' targets on shares of electric vehicles in future new car sales. We focus our analysis on ten major emitting economies: Brazil, Canada, China, the European Union (EU-27) plus the United Kingdom (UK), India, Indonesia, Japan, Mexico, South Africa, and the United States (US), which together accounted for 60% of GHGs including land use, land-use change and forestry (LULUCF) (see Appendix A1 for data sources), 78% of gross domestic product (GDP), and 58% of population globally in 2019 (World Bank, 2021a, 2021b).

As in the previous global aggregation reports, we investigate the aggregate impact of climate action at two relevant scales: (1) individual city, region, and business commitments (2) "international cooperative initiatives" (ICIs) in which individual non-state and subnational actors, investors, civil society, and national governments and international organisations, cooperate beyond national borders to pursue common climate goals. In the following sections, the term "non-state and subnational climate action" or its equivalent represents both individual non-state and subnational actors and ICIs (Chan *et al.*, 2018; Hsu *et al.*, 2018; Hsu, Höhne, *et al.*, 2020).

The GHG emissions analyses presented in this report do not consider finance-related pledges made by banks, investing firms and other financial institutions. A landscape analysis of financial sector actions as well as the challenges of quantifying their potential impact on GHG emissions can be found in e.g. Lütkehermöller *et al.* (2020).

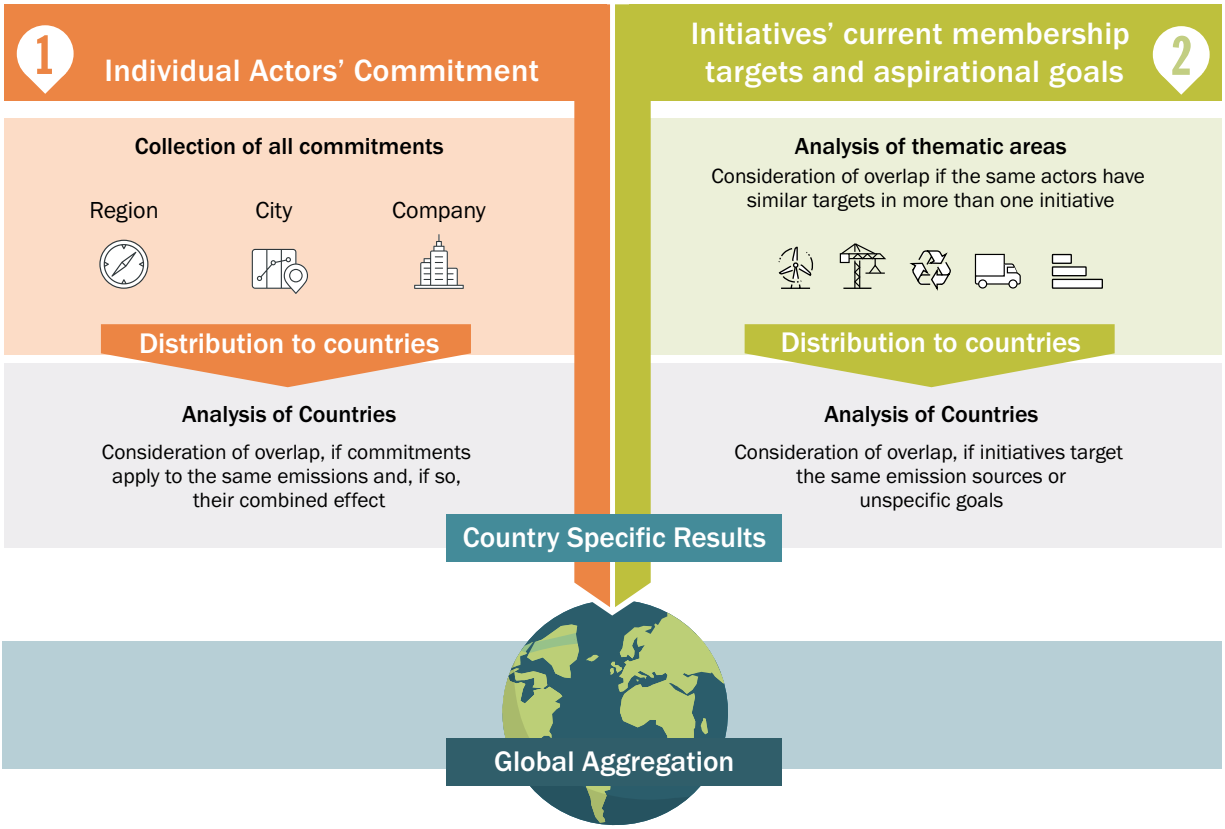
We note that the impact of the COVID-19 pandemic on non-state and subnational climate actions, and in particular on future GHG emissions, is not comprehensively addressed in this report due to limited information available at the time of publication.

## 1.2 NON-STATE AND SUBNATIONAL ACTION TYPES AND EMISSIONS SCENARIOS ASSESSED IN THIS REPORT

We aggregate the potential impact of individual non-state and subnational actions by actor type (i.e., cities, regions and companies), whereas calculations for ICIs' aggregate impact are conducted by thematic area (e.g. renewable energy, energy efficiency, forestry, subnational actors, etc.) (Figure 1).

Comparing scenarios for individual non-state and subnational actors and those for ICIs gives an indication of the relative impacts of currently recorded and quantified commitments and those resulting from ICIs' intended mid-term targets and long-term goals, often inspired by the 1.5°C warming limit. Many (but not all) of the individual actors whose commitments assessed in this report also participate in various ICIs; overlaps of this kind are accounted for throughout the assessments presented in this report. However, compared to individual commitments by cities, regions and companies, many ICIs (i) also involve national governments as participants, and (ii) aim to contribute to long-term systemic changes in agreement with the Paris Agreement's long-term temperature goal directly (e.g. through implementing GHG reduction projects on the ground) or indirectly (through, e.g. capacity building or knowledge dissemination).

**Figure 1.** Global aggregation of individual commitments and initiatives' goals (NewClimate Institute *et al.*, 2019).




The point of departure for GHG emissions impact analysis presented throughout this report is the baseline „Current National Policies" (CNP) scenario, which considers the likely path of emissions under current implemented national policies. This scenario does not assume that policy targets, including the NDCs, will be achieved even when they are codified in a law or a strategy document. For the 2021 update, it is important to note that the CNP scenario does not consider the impacts of the COVID-19 pandemic and of post-COVID policy measures on GHG emissions up to 2030. This limitation is mainly due to the lack of detailed energy balance projections that considered the impacts of the pandemic as of June 2021. Underlying data and assumptions used to develop pre-COVID CNP scenario projections, which are different from those in the 2018 and 2019 reports, can be found in Appendix A1. Where relevant, we present COVID-adjusted current policy emissions projections from Climate Action Tracker (2020).

One important assumption underlying the mitigation potential assessments presented in this report is that the non-state and subnational actions considered in the assessments do not displace other actors' existing climate actions under the CNP scenario (Kuramochi, Roelfsema, *et al.*, 2020; Lui *et al.*, 2021). Specifically, companies may intend to achieve their emissions reduction targets through use of various offsets of varied quality; their implications are not quantified in detail.

All GHG emissions figures presented in this report were aggregated with 100-year global warming potential (GWP) values of the IPCC Fourth Assessment Report. Global and national GHG emissions totals include emissions from land use, land-use change and forestry (LULUCF), unless otherwise noted.

## 1.3 NOTES ON THE ASSESSMENT OF PROGRESS

There are many different ways to assess progress of non-state and subnational actors towards their targets (Hale *et al.*, 2021). The most relevant progress indicator for a GHG emissions scenario analysis, which is at the core of this report, is "substantive progress", meaning improvements relative to baseline vis-a-vis targets and benchmarks (Hale *et al.*, 2021). Whenever feasible, this report assesses the substantive progress of both individual non-state and subnational actors and ICIs in GHG emissions reductions.

Our substantive progress assessment mainly focuses on mid-term targets (for 2026–2035), which is consistent with the time horizon set for the emissions scenario analysis (2030), but we also present results regarding the achievement of 2020 targets. A 2020 target achievement assessment would be most meaningful using actual 2020 emissions data, which is expected to be published in the next several years and will reflect the impact of the COVID-19 pandemic. G20 countries are collectively estimated to have overachieved their 2020 pledges, even without considering the impact of the COVID-19 pandemic (UNEP, 2020).

Progress of ICIs is also assessed using a wider range of progress indicators along the causal chain. (i.e., the chain that goes from inputs, to outputs, outcomes and impacts). The main functional scope of mitigation-related ICIs is broad, with many of them aiming to indirectly contribute to GHG emissions reductions through processes such as knowledge dissemination and capacity building (Chan *et al.*, 2018). The function-output-fit (FOF) analysis presented in Section 3.3 focuses on the "outputs" of ICIs whereas the survey results presented in Section 3.4 cover progress of different stages in the causal chain from "inputs" to "impact."

# 02

# INDIVIDUAL CITIES, REGIONS AND COMPANIES

# 2.1 LANDSCAPE ANALYSIS

Our analysis focuses on a subset of climate actors across the globe – cities, regions, and companies – who are pledging to reduce emissions. We gathered data from climate action networks and ICIs that collect and report information on their members. We then conducted an in-depth analysis on a subset of cities, regions, and companies with quantifiable commitments to reduce GHG emissions. The collection of this subnational actor data takes place at a critical inflection point, making this report's analysis landscape fundamentally different from previous reports. Although 2020 – a major benchmark for short-term target-setting – is now behind us, many cities, regions, and companies have yet to set targets beyond 2020. Others may not have set post-2020 targets at the time of submitting their 2020 disclosures. Additionally, the COVID-19 pandemic may have impacted commitment formulation and reporting timelines, although this effect is still largely uncertain. The sections below explore trends in the cities, regions, and companies making quantifiable commitments to reduce GHG emissions, and in the types of pledges they commit to. This analysis only includes actors who have made post-2020 commitments, whereas prior editions have included 2020 commitments.

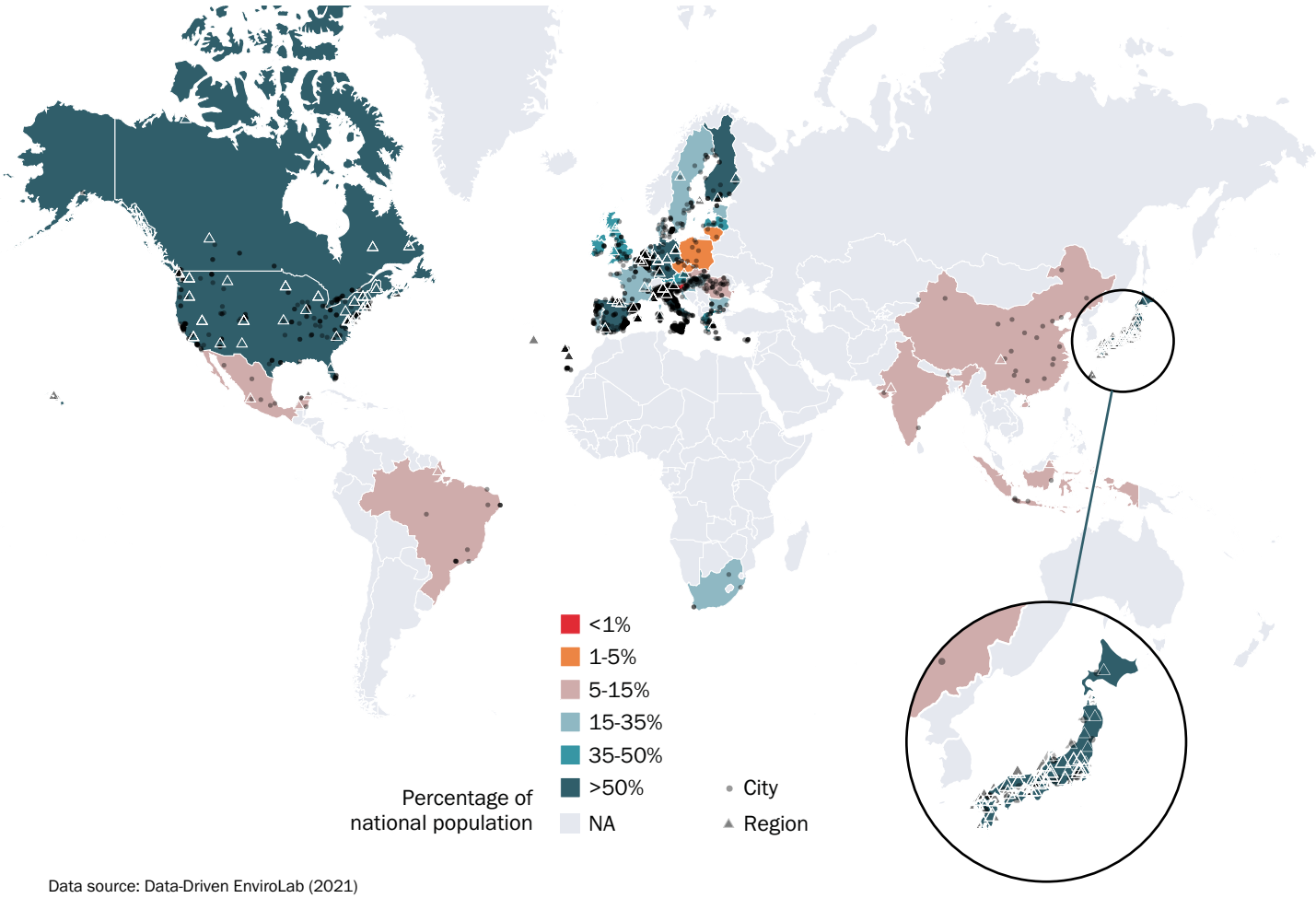
## 2.1.1 CITIES AND REGIONS

We focus here on a subset of 10 major emitting economies that collectively contribute a large share of global greenhouse gas emissions. In these areas, 1,929 cities and 125 regions have made quantifiable post-2020 emissions reduction commitments so far. The non-state and subnational actors aggregated and analysed here cover 617 million people at the regional level, with an additional 238.8 million covered from city-level commitments, after accounting for geographical overlap. Together, these actors represent around 11% of the global population. These entities also collectively cover around 12% of global emissions according to these actors' latest submitted inventories. Europe and North America continue to host the largest number of cities and regions making quantifiable commitments to reduce GHG emissions – with 200 non-state and subnational actors in North America and over 1,600 in Europe – the region with the most subnational emissions mitigation commitments by far.

In terms of population coverage, the East Asia Pacific region hosts the greatest number of people living in cities with a quantifiable mitigation target. Of those regions with post-2020 targets, Europe, North America, and the East Asia Pacific region lead in number of local governments making mitigation commitments, as well as in number of people covered under mitigation targets set by these actors.

The number of city-wide and regional commitments vary significantly across regions, as does population coverage of these targets. The Global Covenant of Mayors for Climate and Energy – European Secretariat (EUCoM) network has been a critical accelerator of European subnational-level commitments, and data sourced from EUCoM comprises over 75% of the commitment data analysed for this report. Despite the fact that the overwhelming majority of committed entities are European, in terms of population coverage, non-state and subnational actors in the United States (222 million) surpass those in the European region (203 million), as well as those in China (150 million) and Japan (127 million).

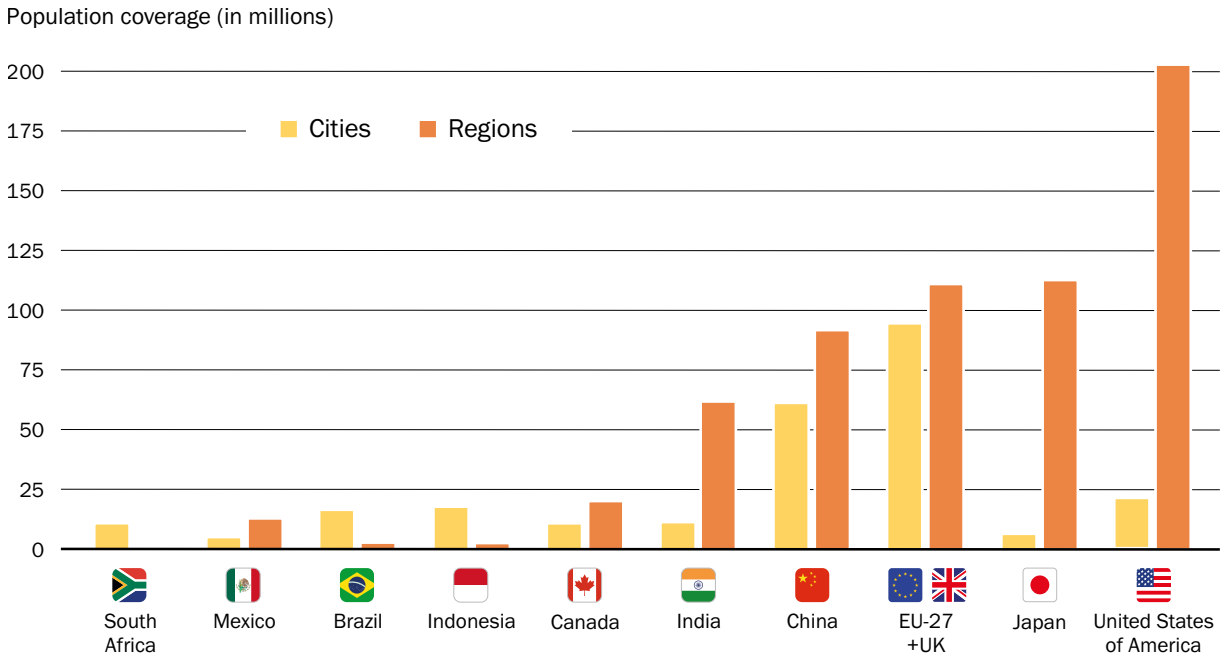
**Figure 2.** Map of quantifiable emissions reduction commitments from cities, states, and regions. Data only shown for ten major emitting economies.




Data source: Data-Driven EnviroLab (2021)

Emissions reduction commitments are most commonly set as absolute percentage reduction targets, measured against a base year that benchmarks the first year of data from which emissions are reduced. For instance, a city might pledge to reduce its GHG emissions by 25% from 2000 levels by 2025. As this report only considers post-2020 targets, the distribution of climate commitments has shifted compared to previous reports. A majority (68%) of subnational quantifiable emissions reduction commitments focus on medium-term targets, defined here as targets which aim to reduce emissions between 2026 and 2035. Thirty percent of targets are long-term – defined as having target years beyond 2035 – and just 3% of targets are now short-term, covering the next 5 years. A focus on mid-term targets is more common across Europe and Japan, while in North America the emphasis is more on long-term target setting. We also observe many actors pledge mid-term targets alongside longer-term commitments. In North America for example, of those non-state and subnational actors that have set long-term targets, over half have also set mid-term emissions reduction targets. Among the broader sample, of the 685 actors that have 2050 targets, 344 have set an additional interim target.

**Figure 3.** Population coverage of subnational actors pledging quantifiable emission reduction targets in ten major emitting economies.

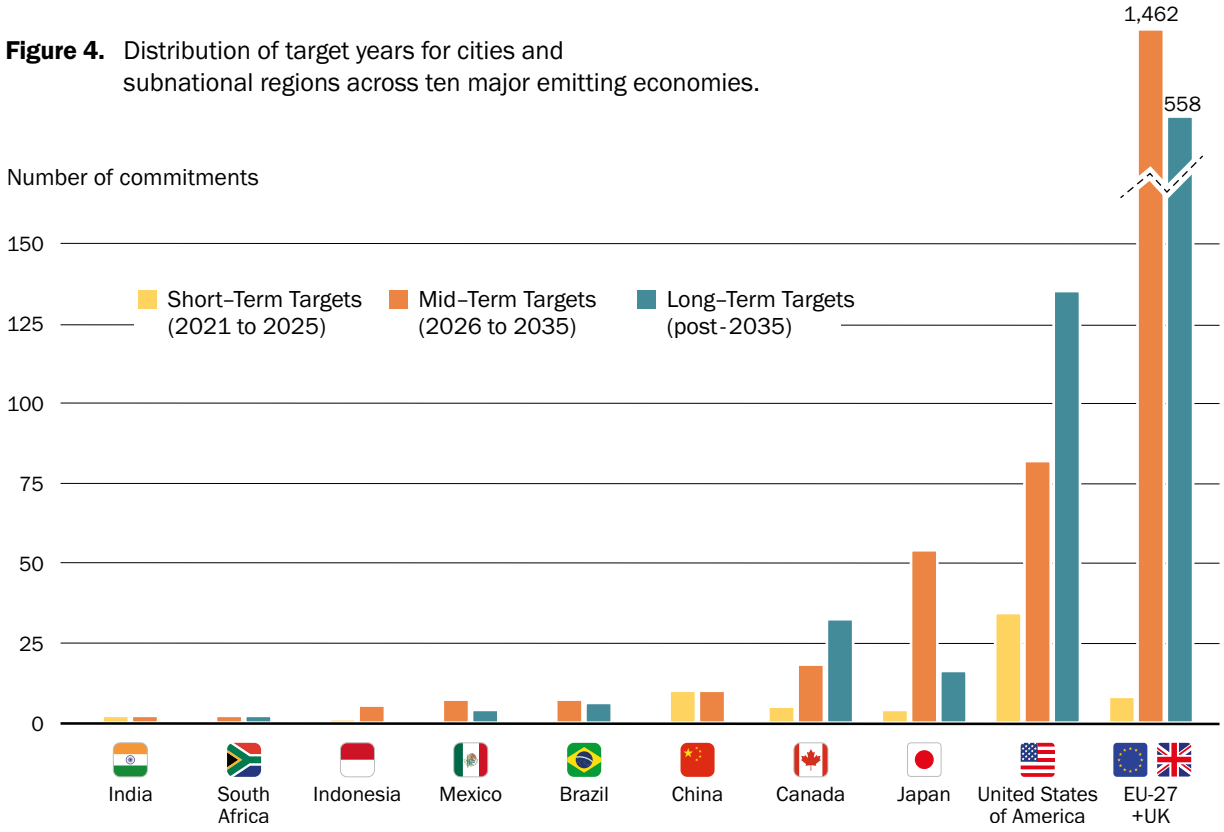



Data source: authors

Average short-term emissions reduction targets across cities and subnational regions are just over 23%, while the average mid-term (2026–2035) is 40%, and the average long-term target (set after 2035) is 57%. While short- and mid-term target strength tends to be similar across cities and regions, long-term targets tend to include steeper reductions commitments on average in regional commitments.

Momentum for subnational actors adopting mitigation targets has remained strong, even through the COVID-19 pandemic. Relative to the prior NSA aggregation report, post-2020 commitments in this year's report are up over 470% - with 1,592 more city-level commitments and 60 more region-level commitments. Population coverage of emissions mitigation targets has increased slightly from 2019, from around 10% of the global population (including pre-2021 targets) to over 11% of the global population covered in 2021 (not including pre-2021 targets), or an additional ~89 million people covered. Opportunities remain for actors in some regions (e.g. US, Canada) to adopt mid-term and short-term targets as checkpoints for existing mid- and longer-term targets.

**Figure 4.** Distribution of target years for cities and subnational regions across ten major emitting economies.




Data source: authors

### 2.1.2 COMPANIES

Over 800 companies, operating within 10 of the world's major emitting economies, have already made quantifiable post-2020 absolute emissions reduction targets through CDP. Their combined revenue totals USD13.1 trillion, just under the size of China's GDP (World Bank, 2021a). Nearly 40%, or more than 330 companies, are in the Fortune Global 500 and Global Forbes 2000 lists. Across the focus regions analysed here, the companies making quantifiable post-2020 GHG emission reduction commitments are mainly headquartered in the EU-27+UK (372), the US (169), and Japan (168). Companies headquartered in the US and the EU collectively cover the highest total emissions, whereas the US, South Africa, and Brazil host companies with the highest average baseline inventories. Companies headquartered in the EU, the US, and Japan represent the largest three respective revenue pools. Corporate emissions reduction commitments typically extend beyond the borders within which the company is headquartered, as targets may also be set for branches in different countries, etc.

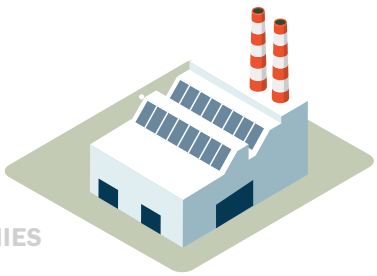
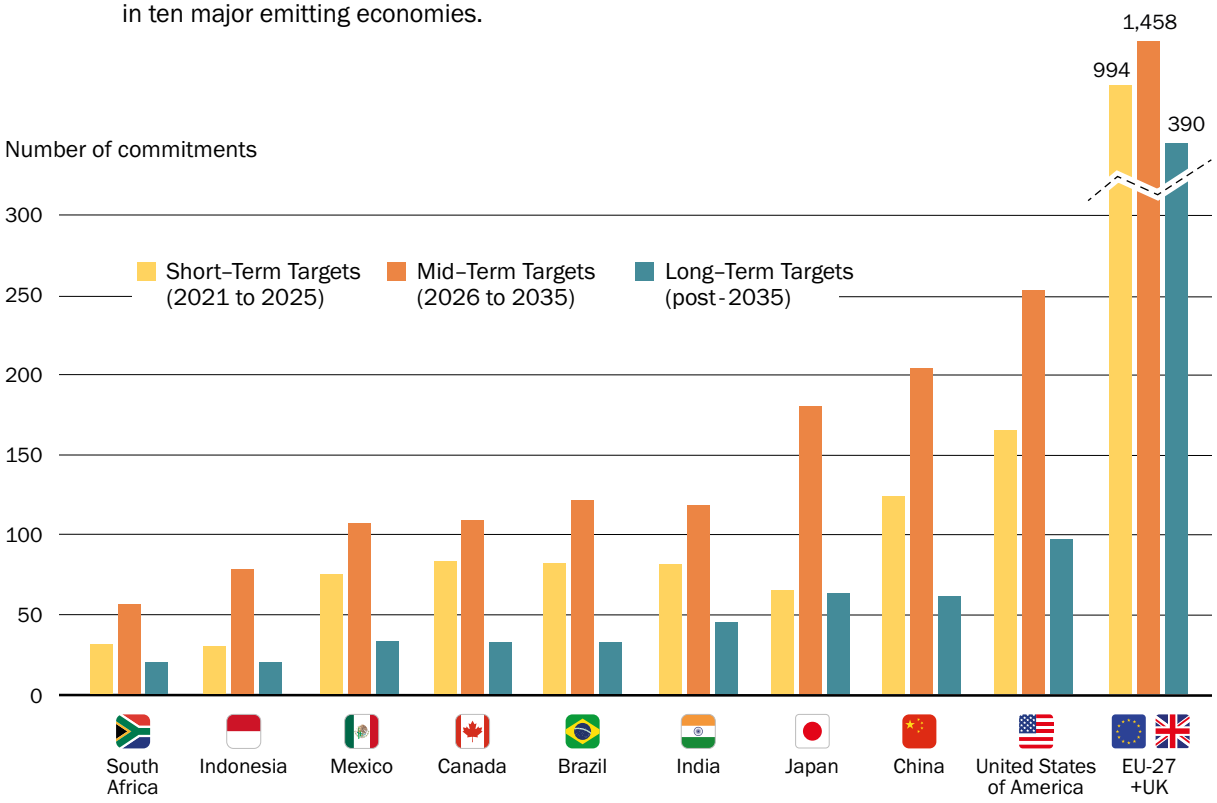


**Figure 5.** Time-frames of corporate emission reduction commitments in ten major emitting economies.

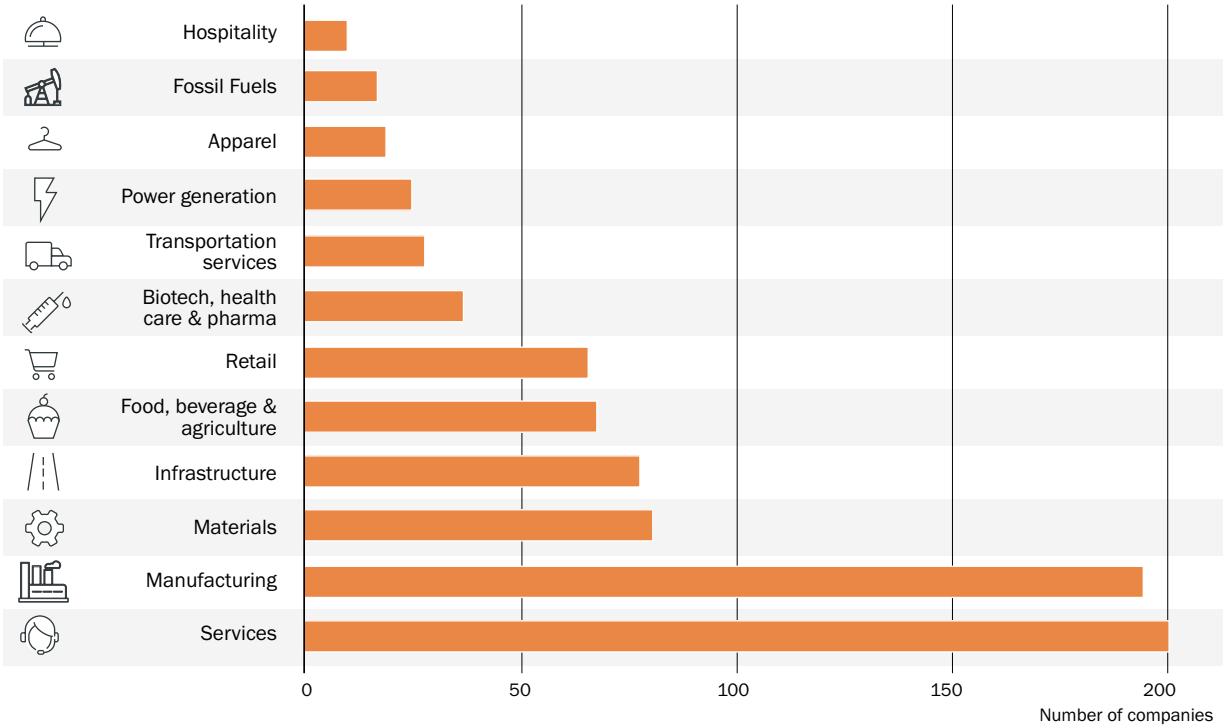



Data source: authors

Figure 5 aggregates corporate emissions reduction commitments by "host" country to assess coverage of location-based emissions reduction commitments. Among the regions considered here, mid-term targets (emissions reduction commitments with target years between 2026 and 2035) are generally the most common, though the distribution of short-, medium-, and long-term commitments varies across regions (Figure 5). In terms of commitment depth, the average percentage reduction for targets across all companies and timeframes is just under 40%. Thirty-three percent of targets are short-term (between 2021-2025), 51% of targets are mid-term (2026-2035), and 15% of targets are long-term (post-2035). The strongest commitments appear, on average, in South Africa, Japan, and Canada.

Companies pledging quantifiable climate action represent a range of sectors, with Services and Manufacturing accounting for just under half of all committing companies (see Figure 6). The top 5 industries by company count – Services, Manufacturing, Materials, Infrastructure, and Food, Beverage & Agriculture – were also the top 5 committing industries in the 2019 Global Climate Action report.

**Figure 6.** Number of companies making quantifiable GHG emissions reduction commitments by CDP-ACS Industry Classification




Data source: Responses to CDP questionnaire (CDP, 2020)

## 2.2 GLOBAL GHG EMISSIONS SCENARIO ANALYSIS

### 2.2.1 SCOPE OF THIS YEAR'S ANALYSIS

In this section we quantify the potential aggregate GHG emissions reductions from individual actors. We focus our analysis on the ten major emitting economies introduced earlier. Information on city, region, and company commitments was gathered from various climate action networks and platforms using similar methodologies as in the 2019 report. Detailed description is available in Technical Annex I. For companies' targets, as in our previous analyses we considered scope 1 emissions (direct GHG emissions by the actors) and scope 2 emissions (electricity consumption-related emissions).

The "CNP plus individual actors' commitments" scenario, as assessed in our 2019 update report, models the potential impact of both current implemented national and federal policies, as well as recorded and quantifiable commitments by individual cities, regions and companies (Kuramochi, Roelfsema, *et al.*, 2020). This approach accounts for overlap between actors, to avoid double-counting emission reductions. We do not quantify the coordination effects between national governments and other actors, nor the interaction between policy instruments at different scales. Instead, we assume additional reductions take place for each actor group (e.g. cities, regions, businesses) if their aggregated reductions are higher than those that would result from (evenly distributed) implementation of national policies.

As noted in the introduction, we also assume that both national governments and other actors do not change their existing climate policies and actions, in response to these subnational and non-state actors' efforts (Kuramochi, Roelfsema, *et al.*, 2020). Specifically for companies, the analysis does not examine the implications of the potential use of offset credits and other market-based measures on overall emissions reductions.[1]

The variation in emissions reduction estimates represent different baseline emissions projections in 2030 for individual non-state and subnational actors with targets. We explored two cases: (i) baseline emissions follow the national average trajectory, and (ii) baseline trajectory becomes 5% lower than the national average by 2030. The second case accounts for individual actors with commitments for which higher autonomous improvements might already be expected, independent of their targets (Kuramochi, Roelfsema, *et al.*, 2020). For example, such actors might foresee declining emissions trends under their jurisdiction even without policies, or are frontrunners within their country on climate action with more measures implemented than in regions, cities, and companies without commitments.

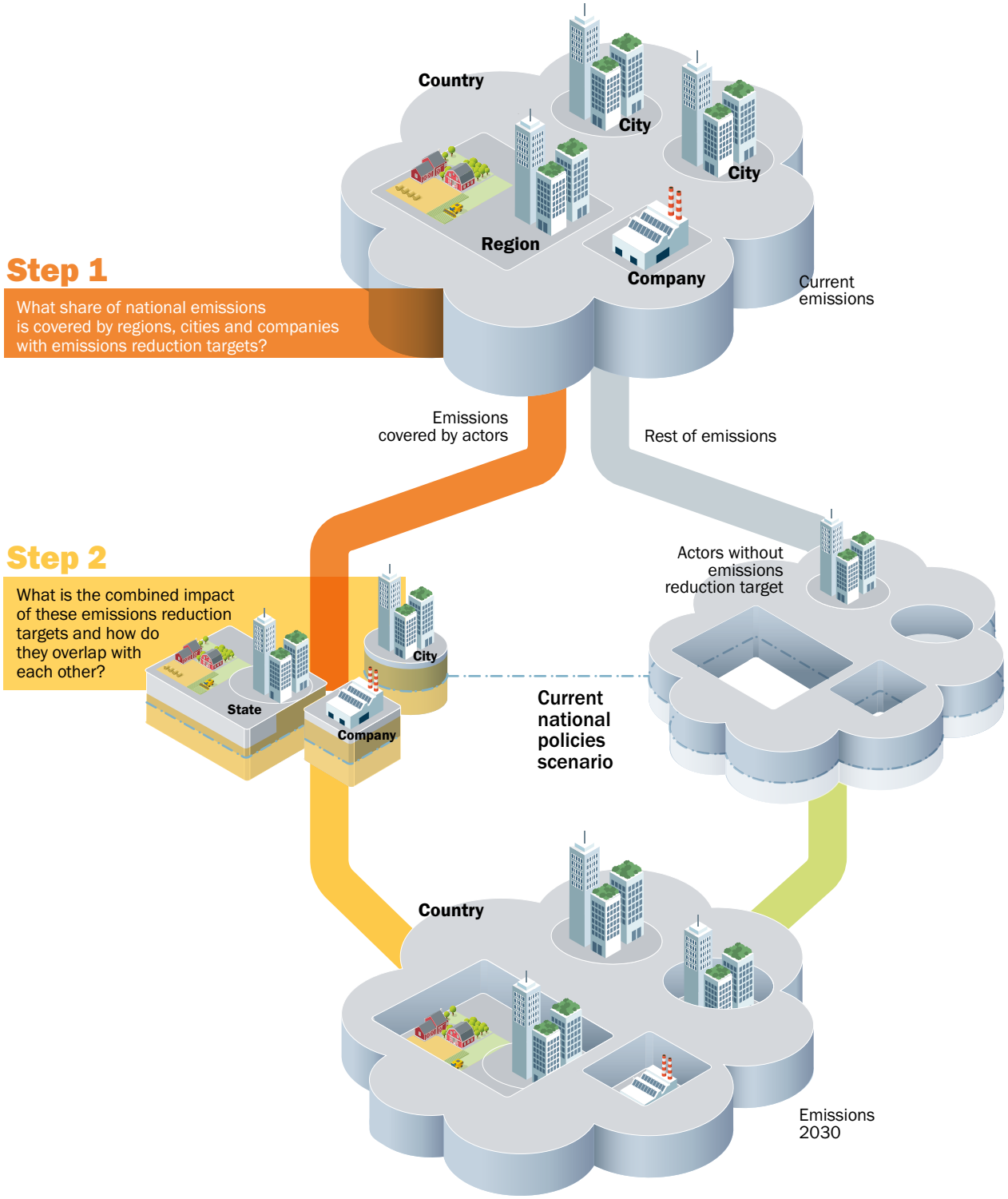
The scenario analysis quantification builds upon a stepwise approach similar to the 2019 assessment (Figure 7). Specifically, the potential GHG emissions reduction of actors was aggregated using methods developed under previous phases of this project that were integrated into the Climate Action Aggregation Tool (CAAT) developed under the Initiative for Climate Action Transparency (ICAT, 2021). The CAAT tool refined the aggregation methodology presented in Kuramochi *et al.* (2020) used for the 2018 and 2019 global aggregation reports (Data-Driven Yale, NewClimate Institute and PBL, 2018; NewClimate Institute *et al.*, 2019) and ICAT (2020).

There are two notes on the non-state and subnational actors' emissions and targets data used for aggregation. First, the 2021 analysis builds upon a smaller actor sample for cities and business given that all pre-2020 targets only have been excluded, while 2019 assumed full implementation of these targets. Second, for companies, the 2021 analysis does not include corporate intensity targets due to several uncertainties we identified on the company responses to CDP we could not fully resolve. Analysis for India remains the only exception; it includes nine manually collected intensity targets for companies located in India.

The assessment of several selected industrial sub-sectors – *cement and concrete, chemicals, metal products manufacturing, metal smelting, and refining and forming* – reveals that these are generally underrepresented in our analysis. Companies in these industrial (sub-)sectors are less likely to set absolute emission targets to date, instead rather setting intensity targets for the short- to medium-term future. Given limitations in data availability explained above, the exclusion of intensity targets from our analysis (except for a nine Indian companies, three of which in these sub-sectors) prevents a more conclusive analysis for these sub-sectors. This is particularly relevant for the cement and concrete sector. A detailed overview of their Scope 1 and Scope 2 emissions coverage in the most recent inventory year for ten major emitting economies is available in Technical Annex I.

1 The CDP 2020 Climate Change Questionnaire (CDP, 2020) requests data on gross emissions, i.e. "total emissions before any deductions or other adjustments are made to take account of offset credits, avoided emissions from the use of goods and services and/or reductions attributable to the sequestration or transfer of GHGs". However, there may be some companies that do not correctly follow the guidance.

**Figure 7.** Steps taken to quantify the overall impact of emission reduction targets from regions, cities, and companies on national GHG emissions (NewClimate Institute *et al.*, 2019).



### 2.2.2 RESULTS AND KEY INSIGHTS: MITIGATION POTENTIAL FROM INDIVIDUAL ACTOR COMMITMENTS

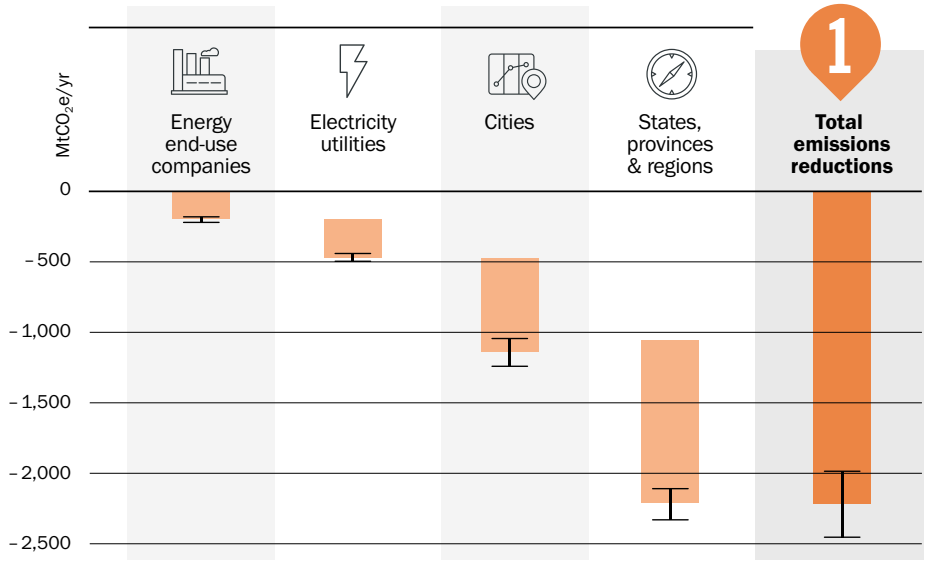
Consistent with previous reports, this analysis finds significant mitigation potential from city, region, and business commitments. Global GHG emissions in 2030 would be around 2.0 to 2.5 $GtCO_2e$/year lower than the pre-COVID CNP scenario, if recorded and quantified commitments by individual cities, regions and companies are fully implemented and do not replace the pace of action elsewhere (see Figure 8). The previous 2019 analysis had found a mitigation potential from existing commitments of 1.2 to 2.0 $GtCO_2e$/year by 2030.

At the national scale, individual commitments from cities, regions and energy end-use companies could all potentially deliver considerable GHG emissions reductions in the ten major emitting economies this report focuses on. Energy end-use companies and energy utilities have made sizeable commitments, but to a lesser extent. Technical Annex I provides country-level results for the ten major emitting economies.

The identified mitigation potential from city, region, and business commitments ranges in the same order of magnitude as the most recent estimates of the COVID-19 pandemic's 2030 global emissions impact (Climate Action Tracker, 2020; UNEP, 2020). Post-COVID current policy projections for 2030 were found to be 2 to 4 $GtCO_2e$/year lower than the pre-COVID current policy projection (Climate Action Tracker, 2020; UNEP, 2020). Future analyses will assess COVID-19's impact on future mitigation potential of non-state and subnational climate commitments. Comparison to the 2019 analysis reveals an overall higher mitigation ambition of around 0.5 to 0.7 $GtCO_2e$/year for 2030. However, this amount does not represent a substantial increase over the last two years since 2019, considering methodological updates and uncertainties involved in the analysis. While we have documented accelerated momentum of regions, cities and businesses committing to net-zero targets by around mid-century (NewClimate Institute and Data-Driven EnviroLab, 2020), it has not translated into more ambitious short- and medium-term climate targets by the time of this analysis.

On the contrary, many cities, regions and businesses with previous short-term targets prior to 2020 targets have not yet communicated new post-2020 targets. Non-state

**Figure 8.** Fully implemented, recorded and quantified region, city and business commitments' impact on global greenhouse gas (GHG) emissions for ten major emitting economies by actor group in 2030




Data source: authors

and subnational actors may be currently preoccupied with managing the immediate social and economic impacts of the COVID-19 pandemic, pushing target-setting processes beyond 2020, similar to national-level delays with the submissions of updated NDCs. This context might change in the nearby future as governments get the COVID-19 pandemic under control and updated NDCs will have been submitted by governments worldwide.

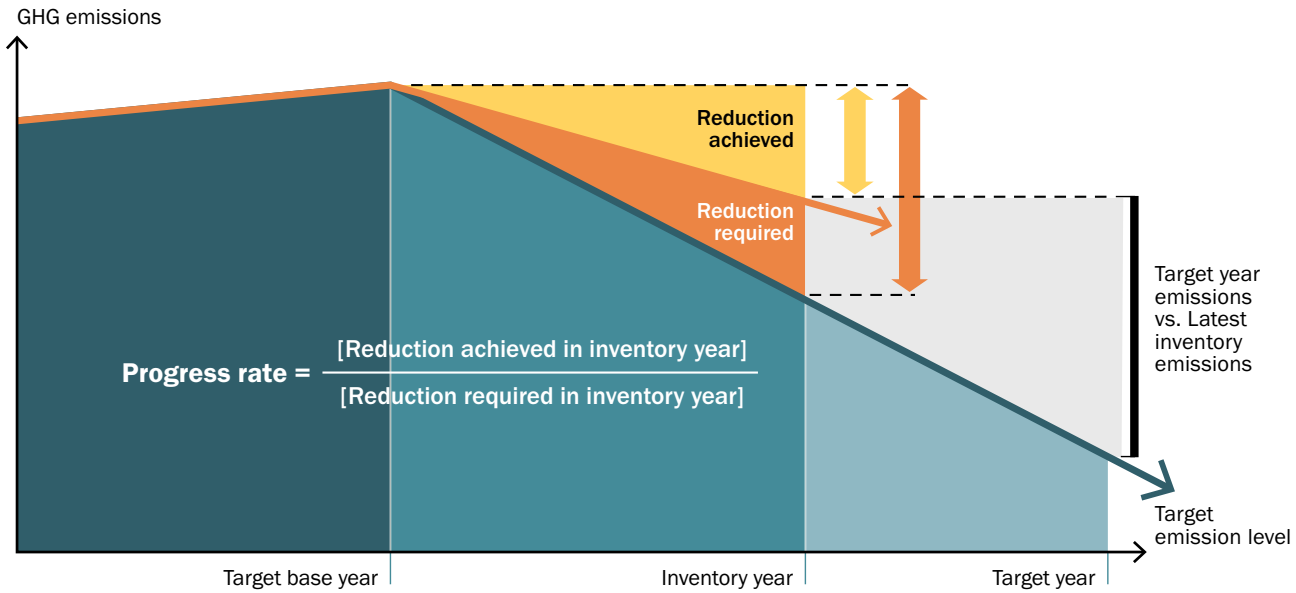
Cities, regions and businesses can seize opportunities provided by COVID-19 recovery and accelerated momentum of ambitious long-term targets to revisit and re-think their mitigation ambitions towards 2030. Ambitious interim targets for the short and medium term (e.g. 2030), coupled with impactful implementation measures, are key to the achievement of long-term targets (for e.g. 2050) (NewClimate Institute and Data-Driven EnviroLab, 2020). Newly adopted or updated targets for the period towards 2030 thus help actors to ensure a successful and ambitious implementation of long-term mitigation ambition. Non-state and subnational actors can further maximise synergies by guiding their fiscal recovery spending in response to the COVID-19 pandemic to be aligned with their newly adopted or updated mid-term targets.

## 2.3 PROGRESS ASSESSMENT

Whether individual cities, regions, and companies are following through on their emission reduction pledges is critical to understanding what progress is being delivered. For cities, regions and companies that report post-2020 targets (up to 2035), we assessed if they are on track to meet their emissions reduction targets. Where data were available, we also assessed 2020 target achievement for a subset of cities and companies. Following the approach used by Hsu *et al.* (2020), we first calculated "pro-rated" target emissions reductions (i.e., progress rate) for the most recent inventory year, compared to base year emissions, by assuming a linear emissions reduction between the base year and the target year (Figure 9). Then we compared the actual emissions reductions achieved in the last inventory year to the pro-rated target emissions reductions.

The assumption of linear emissions reduction between the base year and the target year to calculate "pro-rated" target emissions reductions (i.e., progress rate) for the last inventory year has direct implications for our progress assessment. Subnational and non-state actors might reduce their emissions non-linearly over time towards

**Figure 9.** Quantification of progress towards an emissions reduction target.



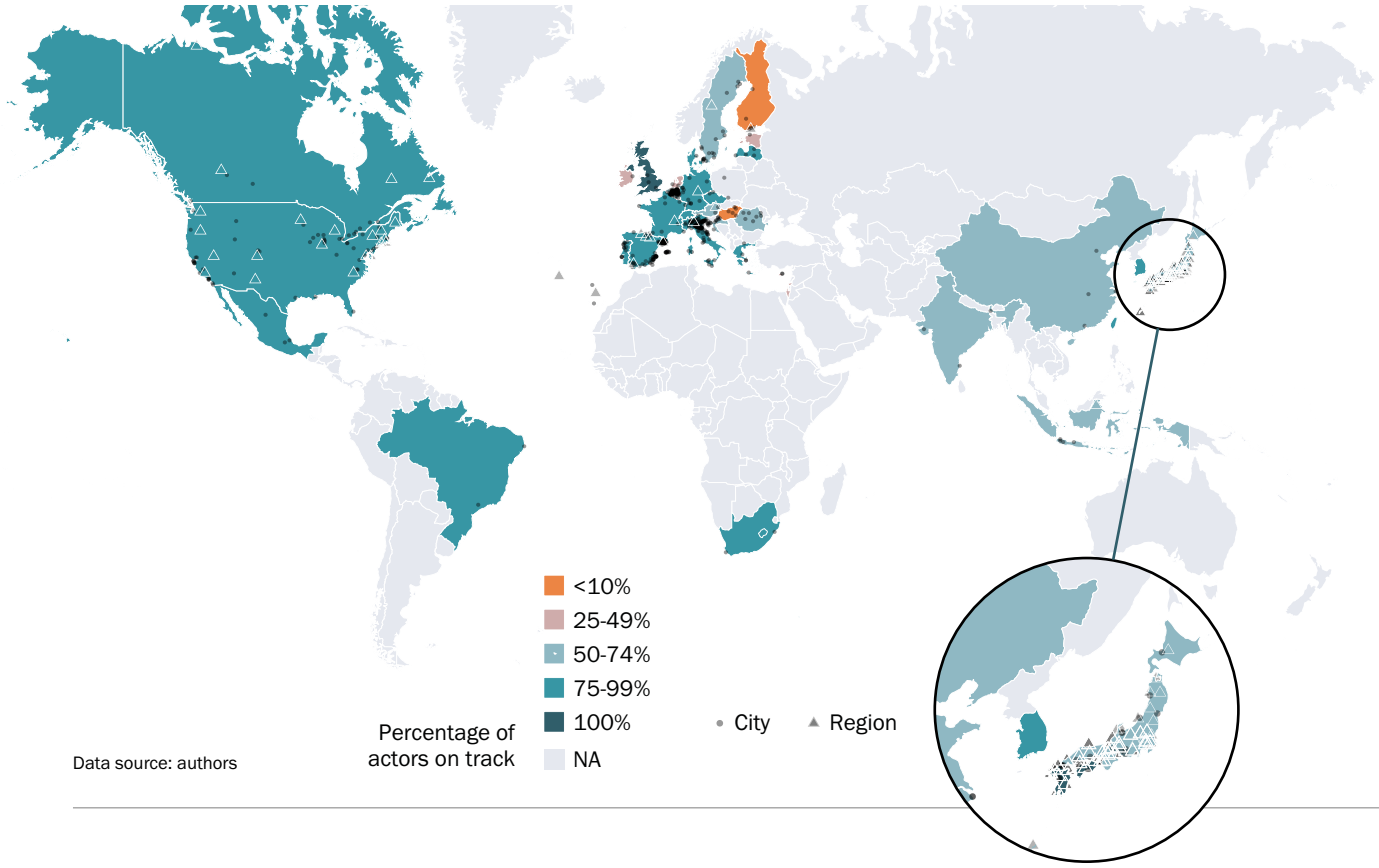
their respective target year and experience different emission reduction rates during different periods of time (e.g., actors with high "easy-to-abate" emissions reduction potentials can realise higher reduction rates early on, or vice versa). For this reason, actors might seem to (over) achieve or underachieve at the time of the latest inventory year, whereas their progress might look different assuming a non-linear reduction (e.g., shaped as a reversed logistic curve). In addition, the latest available emissions inventory data available differs between cities, regions, and companies. The time lapsed (in %) specifies how much time the inventory year covers between the target base year and the target year. For example, the most recent inventory year for regions in this analysis varies between 2012 and 2019 with the time lapsed ranging between 12% and 70% of the period between target base year and target year. A more nuanced assessment of these shortcomings and sensitivities remains outside the scope of this analysis.

With progress rate or pro-rated achievement rate as one metric of progress, we also calculate for all actor groups the target-year emissions (i.e., the anticipated emissions levels in the target year) divided by the latest inventory emissions to show how much of the target has been completed already. Actors that have values above 50% suggests that their emission reduction pledges have more than halfway been achieved, which could indicate the need for higher ambition.

### 2.3.1 OVERVIEW

The picture of progress is mixed and by far unclear, largely due to the lack of reported emission inventory data available by which to assess progress towards emission reduction goals. As described in the following section, only a fraction of the thousands of cities, regions and companies pledging climate action are included in this inaugural progress assessment. Figure 10 provides a summary of global subnational and

**Figure 10.** Map of all actors' progress towards post-2020 climate targets, with countries shaded in blue registering 50% or more cities on track to meet their targets. Companies' locations are not designated since their coordinates are not available.




Data source: authors

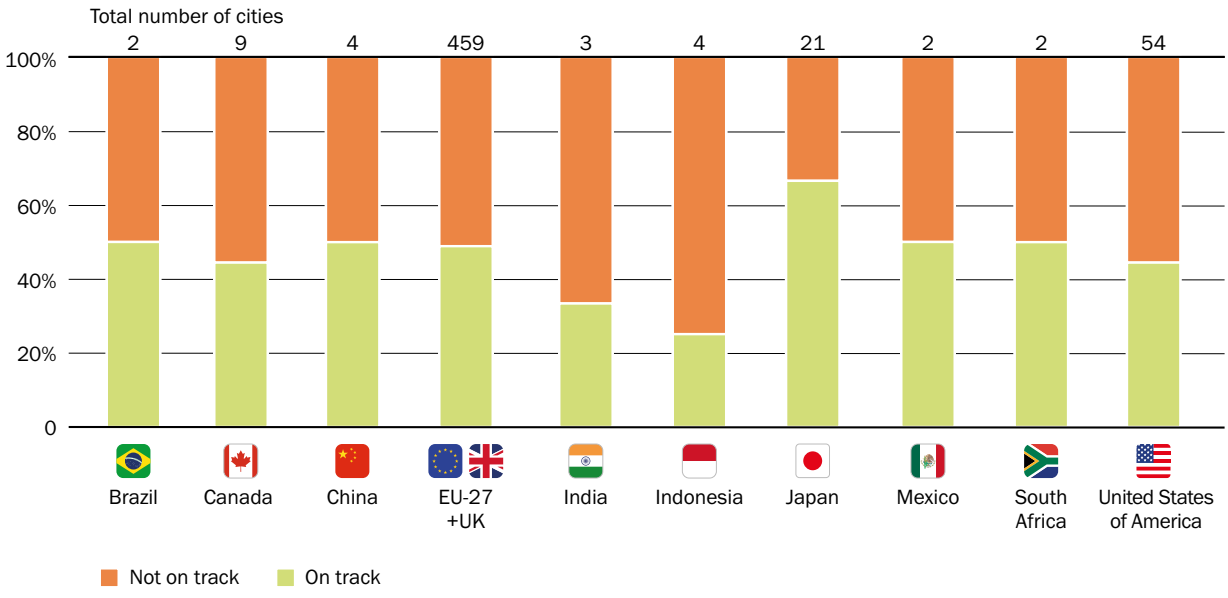
non-state climate action progress, aggregated to the country level. A few countries in Europe, including Spain and Italy, as well as Japan and the United States have more 50% of cities, regions, and companies with available data on track to meet their mid-term emission reduction pledges. Some countries have very few actors that have reported inventory data to track progress, including the UK (only 10 actors with available data), although 80% are on track to achieve their targets. Some countries (shaded in pink and red in Figure 10) have fewer than 50% of cities, regions and companies with available data that are on track to meet their targets. In some cases, these actors are increasing their emissions or not reducing emissions at a pace sufficient to meet their targets.

### 2.3.2 CITIES

For the post-2020 period, out of the 1,929 cities that have targets, only 681 have reported emissions inventory data to track their progress against a baseline year, and 560 of these cities have a target year between 2021 and 2035. Most of these cities (80%) are located in Europe, followed by the US (14%). The average emissions reduction target of cities that have sufficient data to evaluate progress is 40.5 ± 14.4%. The most common target year for these cities is 2030. Forty-nine percent are on track to meet their targets, meaning that the rate at which they are reducing emissions is sufficient to achieve their target by their intended year (see Figure 12). Thirty-three percent of cities - while reducing some emissions - must accelerate the pace of their emissions reductions (see Figure 12, cities with progress rate (y-axis) between 0 and 100%). Seventeen percent of cities are heading in the wrong direction, with their emissions increasing thus far (Figure 12). Fewer than 1% of cities' target-year emissions relative to their latest inventory emissions is greater than 50%, indicating that only a handful cities' targets could be considered requiring more ambition.

While cities in nearly every country evaluated are making progress towards their emissions reduction targets, some countries boast a greater share of cities that are on track (Figure 11). China has half of its cities (including intensity reduction targets only) on track, and the EU-27+UK has nearly the same number of cities on track as those that are not making sufficient progress.

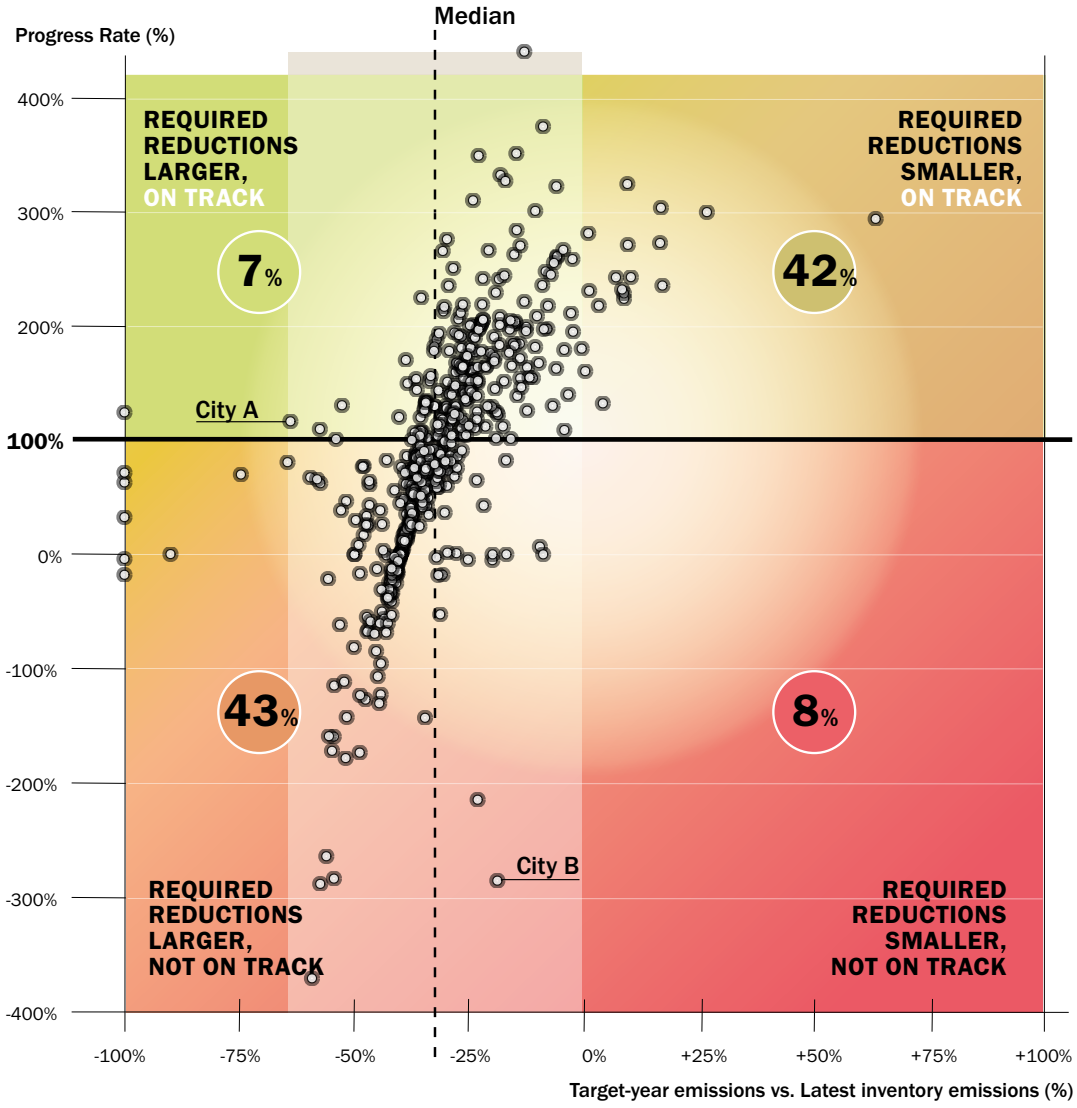
**Figure 11.** Country breakdown of the number of city actors on track and not on track to meet their post-2020 climate targets.




Data source: authors

For 2020 targets, nearly 6,000 cities set emission reduction targets, but only 29% reported emissions inventory data by which to gauge progress. Out of the 1,730 cities with 2020 targets and available emissions inventory data, 52% are likely to have achieved their target based on a linear projection of emissions reductions achieved by the latest inventory year.

**Figure 12.** Plot of cities' progress rate (y-axis; see Figure 9) and target year emissions relative to latest inventory emissions (x-axis) (n=560).




This four-quadrant typology plot illustrates cities' progress according to two dimensions: target-year emissions vs. their latest inventory emissions (x-axis), which tracks the necessary emission reduction gap between the target-year emissions and the latest inventory emissions; and the progress-rate (y-axis) that signals whether a city is on-track to meet its target.

**City A**, for example, is exceeding the required reduction rate (progress rate above 100%) with a relatively larger reduction required, while **City B** is falling below the reduction rate required to meet their target with a relatively smaller reduction required.

The shaded area around the median signifies +/- 1 standard deviation. Percentages in each quadrant represent the proportion of cities falling into each area.

Source: Authors' analysis.

### 2.3.3 REGIONS

We calculated the target achievement rates for a subset of regions with post-2020 GHG emissions reduction targets for 2035 or earlier. Out of the 125 regions that have post-2020 targets, 107 have reported emissions inventory data to track progress against a baseline year, and 83 of these regions have a target year 2035 or earlier. Most of these regions are located in three countries or regions: Japan (n=44, 53%), the US (n=17, 20%) and EU-27 (n=16, 19%). The most recent inventory year ranged between 2012 and 2019. The time lapsed—representing how much time the inventory year covers between the base year and the target year—ranges between 12% and 70% across all regions. The target emissions reduction rates relative to last inventory year emissions are also presented to examine if there is any correlation between the target achievement rates and the target reduction rates.

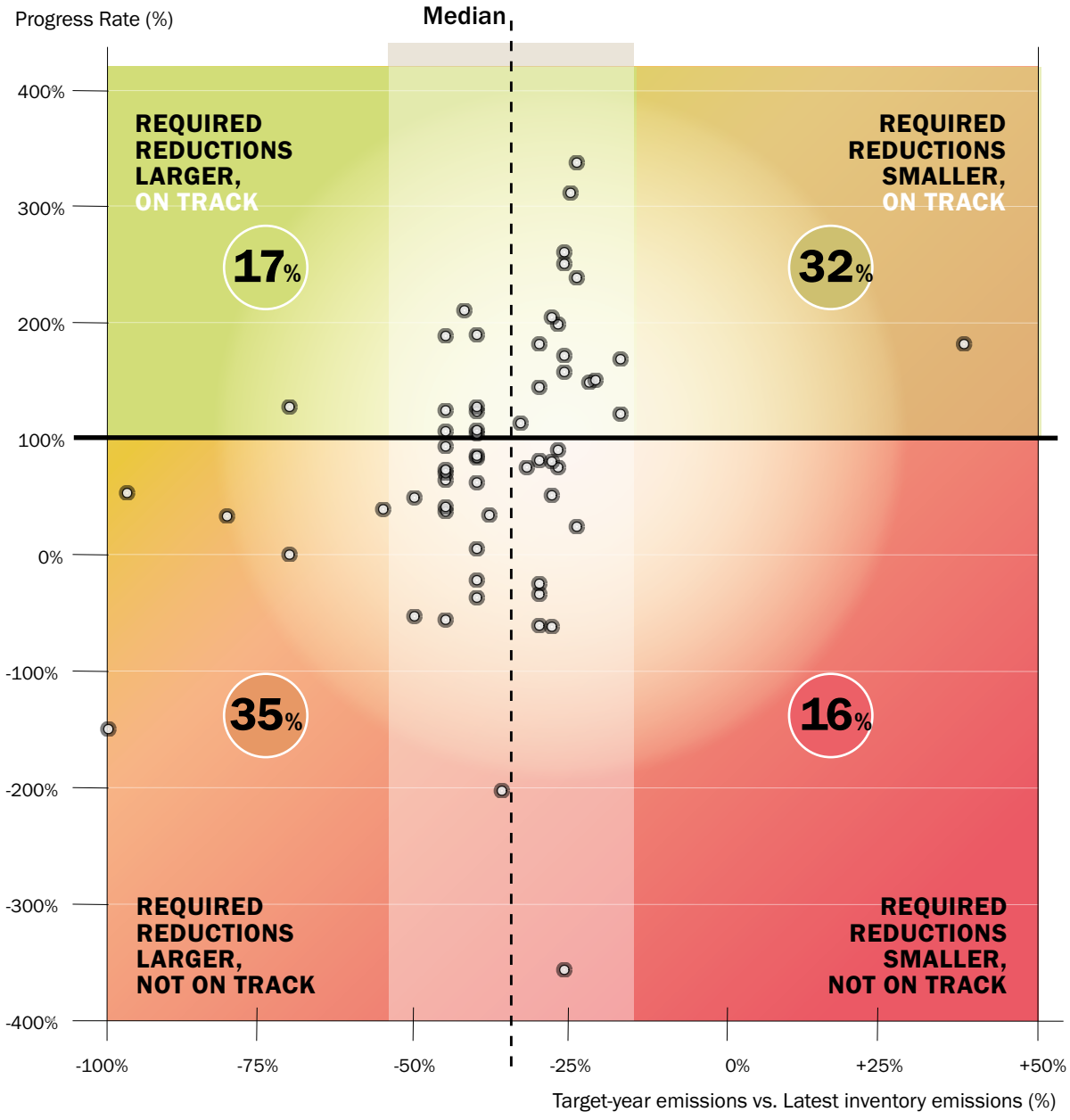
Our analysis shows that as of their last inventory year around half of the regions (n=42, ~51%) assessed are on track to achieve or exceed their targets towards 2035 (above 100%-threshold on y-axis in panel of Figure 13). These regions generally can consider increasing ambition of their climate targets towards 2035. This is particularly relevant for the 28 Japanese prefectures and 7 US regions currently on track to achieve or exceed their existing targets, given that their national governments presented updated and more ambitious NDC targets for 2030 in April 2021 (Climate Action Tracker, 2021c). In April 2021, the USA announced to reduce emission by 50% to 52% below 2005 levels, while Japan announced a reduction of 46% below 2013 levels (U.S. Department of State, 2021). The EU previously had committed to reduce emissions at least 55% reduction below 1990. Comparing regions on track to achieve or exceed their targets in light of these latest NDC submissions, 41 of 42 regions have quantified target emissions reduction rates below last inventory year levels of 50% or less. This implies that these regions would need to increase their ambition levels to align with updated national-level NDC targets.

The other half of the regions analysed (n=41, ~49%) are currently not on track to meet their targets towards 2035 (below 100%-threshold on y-axis in panel of Figure 13). Negative achievement rates were observed for 9 of these 42 regions (~11%); in other words, these regions' emissions in the latest inventory year were higher than their targets' base year emissions. Apart from five exceptions, the targets levels for these 37 regions are not necessarily more ambitious than other regions assessed (for example, reducing emissions by more than 50% compared to most recent inventory data). A nuanced assessment of the reasons why these regions are not on track to meet their targets towards 2035 requires case-specific deep-dives and thus remains outside of the scope of this analysis.

Our analysis emphasises that additional effort is necessary for regions to meet or exceed their targets towards 2035, regardless of whether they are currently on track or not. Our results indicate that at least around half of the regions assessed can immediately consider increasing their mitigation ambition as they are already on track to achieve or exceed their current targets, particularly Japanese prefectures and US regions. Many national governments including Japan and the US have updated their 2030 targets, or currently remain in the process of doing so (Climate Action Tracker, 2021a).[2] Ambitious regional targets and their stringent implementation will be a key contributing factor to achieve these national commitments.

2 The Climate Target Update Tracker by the Climate Action Tracker (CAT) provides an up-to-date overview of updated NDCs submitted to the UNFCCC available under: https://climateactiontracker.org/climate-target-update-tracker/ (accessed on 6 May 2021).

**Figure 13.** Plot of subnational regions' progress rates (y-axis) and target year emissions relative to latest inventory emissions (x-axis) (n=83).




This four-quadrant typology plot illustrates cities' progress according to two dimensions: target-year emissions vs. their latest inventory emissions (x-axis), which tracks the necessary emission reduction gap between the target-year emissions and the latest inventory emissions; and the progress rate (y-axis) that signals whether a region is on-track to meet its target.

The shaded area around the median signifies +/- 1 standard deviation. Percentages in each quadrant represent the proportion of cities falling into each area.

Source: Authors' analysis.

### 2.3.4 COMPANIES

We have assessed progress made on 2020 and post-2020 absolute GHG emissions reduction targets set by companies reporting to the 2020 CDP Climate Change Questionnaire (CDP, 2020), in which the latest inventory year provided by most companies is 2019.

Many of the highest performing companies that respond to CDP are included in the analysis, with over 60% of those with post-2020 targets having scored an A or A- for their 2020 response. The targets included in the analysis (i) are reported as "company-wide", (ii) cover complete scope categories, i.e. no targets limited to a single scope 3 subcategory were included, (iii) cover between 95-100% of the emission scope(s) identified in the target, and (iv) did not receive a "poor" target boundary accuracy rating, which compares the consistency of target and inventory emissions data. Additionally for 2020 targets, we have only considered those with a base year of 2017 or before. Therefore, this analysis is skewed toward "good" companies and the results should be interpreted accordingly.

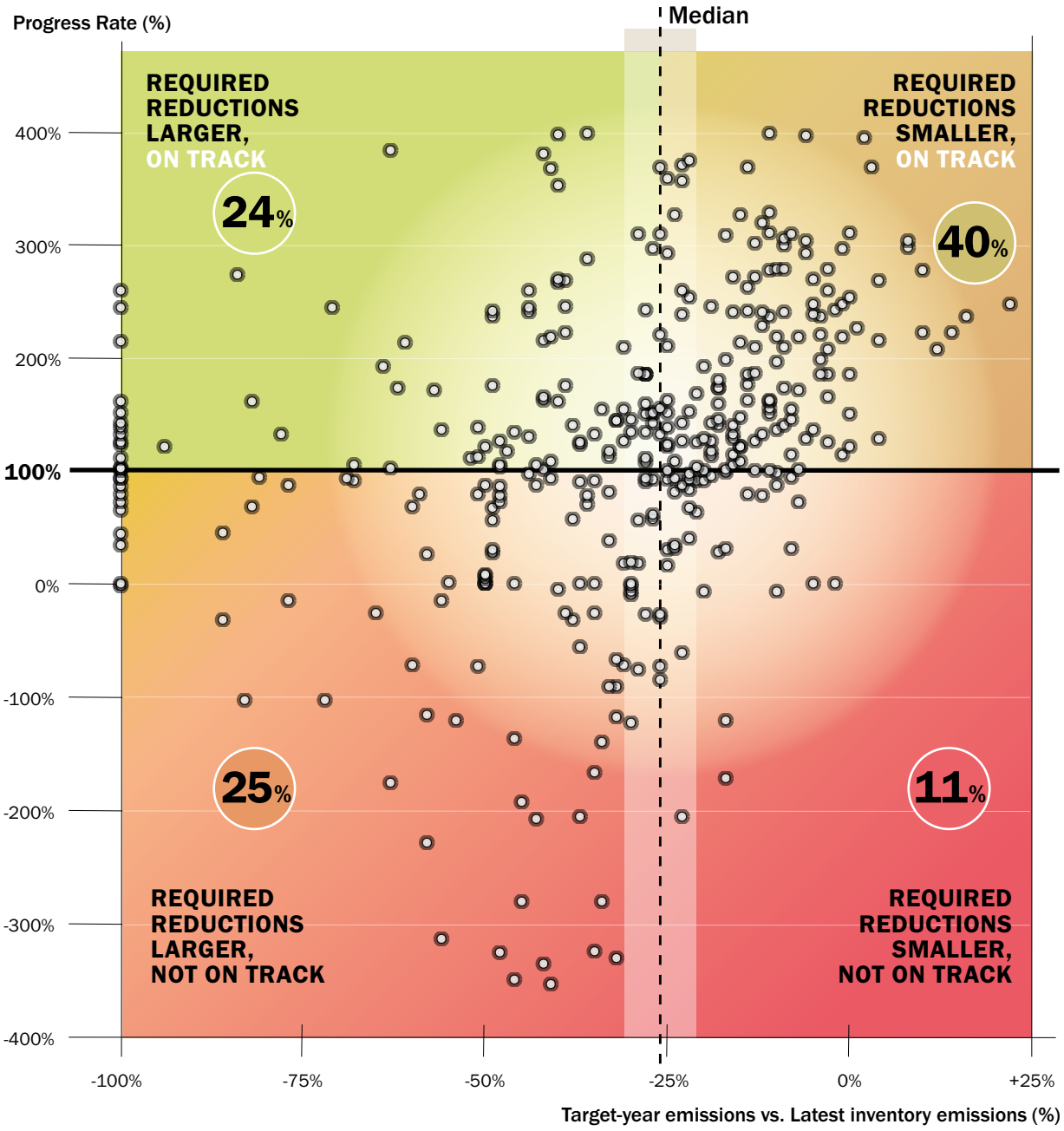
Another important caveat is that targets considered in this analysis may ultimately be achieved by use of offsets. Therefore, even if our analysis results suggested that a company's far off track to meet its target based on the latest emission inventory data and does not accelerate the pace of emissions reductions by the target year, the company might still meet its target by acquiring sufficient offsets in the target year.

Our analysis of 2020 targets covers 130 targets from 119 companies and showed approximately 80% of companies on track to overachieve these targets. For post-2020 targets, which have a target year between 2021 and 2035, the results show that about two thirds of the targets assessed are on track to be (over)achieved, based on 441 targets from 384 companies that together accounted for about 2.5 $GtCO_2e$/year (without accounting for overlaps) in 2019. Moreover, roughly one third of the pro-rated emissions reductions required by 2019 have already been overachieved by more than 100%. Figure 14 shows that such overachievements are observed mainly for weaker targets. Similar trends of overachievement were also observed when the targets assessed were limited to the ones approved as "science-based" by the Science Based Targets initiative (n=167) and to those with emissions coverage of more than 500,000 $tCO_2e$/year in the base year (n=145).

At the same time, negative achievement rates were observed for well over 10% of the targets. In other words, the 2019 emissions represented by the targets were higher than their base year emissions. While there are many possible explanations for this result (e.g. target implementation period only started recently, $CO_2$ emission factor of the grid electricity increased, company mergers, emissions peaked after the base year, etc.), significant additional effort by the companies would be required to meet these targets.

These high-level findings indicate that the companies reporting to CDP with sufficient data disclosure are generally on track to meet their post-2020 company-wide absolute emissions reduction targets through 2035, though there is wide variation across this pool of actors. Likewise, while these results are encouraging, further research is needed to assess if such high level of progress is attributable to companies' implementation effort, to national and subnational governments' policy measures, or to the companies' targets not being more ambitious than their business-as-usual (BAU) trajectories. Sector- and country-level assessments are also needed to gain further insights into the climate action performance of these companies.

**Figure 14.** Plot of progress rates (y-axis) for selected targets by CDP companies and target year emissions relative to 2019 inventory emissions (x-axis) (n=441).




This four-quadrant typology plot illustrates cities' progress according to two dimensions: target-year emissions vs. their latest inventory emissions (x-axis), which tracks the necessary emission reduction gap between the target-year emissions and the latest inventory emissions; and the progress rate (y-axis) that signals whether a region is on-track to meet its target.

The shaded area around the median signifies +/- 1 standard deviation. Percentages in each quadrant represent the proportion of cities falling into each area.

Source: Responses to CDP questionnaire (CDP, 2020)

# 03

# INTERNATIONAL COOPERATIVE INITIATIVES

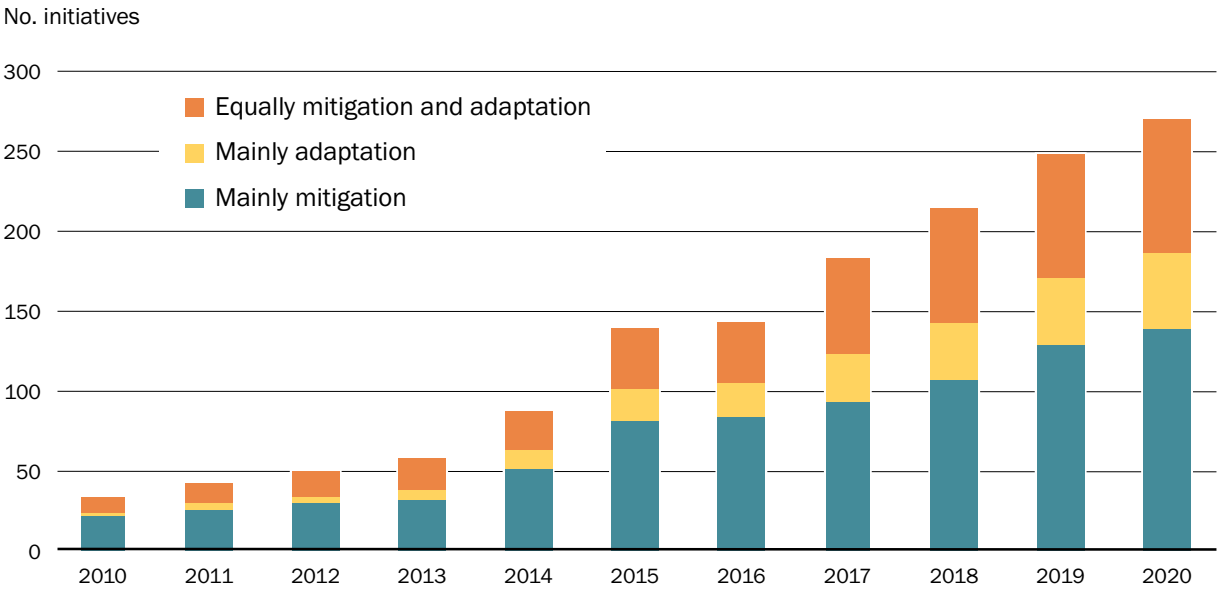
## 3.1 LANDSCAPE ANALYSIS

(ICIs) are networks in which individual non-state and subnational actors, investors, civil society, national governments and international organizations, cooperate beyond national borders to pursue common climate goals (Chan *et al.*, 2018; Hsu *et al.*, 2018; Hsu, Höhne, *et al.*, 2020). If actors of a particular ICI belong to a single country, they must implement their actions in more than one country to be considered. We do not include domestic cooperative initiatives – those that only include actors from the same country or implement in a single country – though these are also an important aspect of climate action around the world. Most of the 297 initiatives in the sample are currently active, though some have concluded their campaigns.

This report's focus on ICIs is particularly interesting in the light of recent studies that estimate their climate mitigation potential to be considerably higher than individual initiatives and commitments by non-state and subnational actors. For example, an analysis by Lui *et al.* (2021) investigated the emissions-reduction potential of 17 ICIs, including United for Efficiency, RE100, Global Covenant of Mayors for Climate and Energy (GCoM), and SBTi; by 2030, if the targets of these ICIs are achieved, global emissions could be reduced to a level consistent with a 2°C pathway.

By the end of 2020, an unprecedented number of actors of all types were participating in cooperative initiatives. These include 13,583 businesses, 4,510 investors, 13,012 cities and regions, and 2,424 domestic and international NGOs. When actor numbers are sorted by climate policy focus (mitigation, adaptation, or mixed mitigation-adaptation), greater participation rates were noted in mitigation initiatives (18,510) and mixed adaptation-mitigation initiatives (17,607) than in initiatives that mainly focus on adaptation (1,665) (Chan *et al.*, 2021). Moreover, in recent years the number of ICIs has steadily increased. They are recorded by the UNFCCC's "Global Climate Action Portal", UDP's "Climate Initiatives Platform", and the

**Figure 15.** Count of international cooperative initiatives by policy focus.




Source: Chan *et al.* (2021)

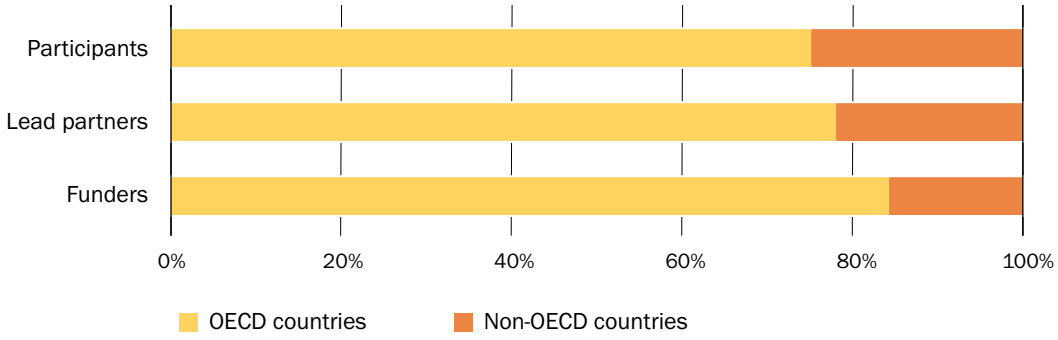
Climate Cooperative Initiatives Database (C-CID) (Chan *et al.*, 2021) (Figure 15). Given challenges related to the COVID-19 pandemic, continued growth in 2020 seems remarkable. Some new initiatives include the Business Ambition for 1.5°C Coalition, which aims to increase the number of companies setting net-zero targets in line with a 1.5°C future, and the Three Percent Club – a collaboration between governments, international organizations, and industry that is targeting greater energy efficiency.

However, significant geographic imbalances persist, with most participants (actors that take part in an initiative), lead partners (actors that coordinate within an initiative) and funders (actors that fund an initiative) based in highly developed, industrialized nations (Figure 16). Although high-income, industrialized (members of the Organization for Economic Cooperation and Development: OECD) countries approximately account for just 18% of the world population, they account for a large majority of participants, lead partners and funders in ICIs, while fewer networks are based in developing (non- OECD) countries.

However, even among developing countries significant differences in representation are found. For example, businesses from Latin America and the Caribbean are relatively well represented as participants in initiatives (1,018 businesses). In Sub-Saharan Africa, education and research organizations are well represented. These patterns may be due to regional platforms that support non-state engagement. For instance, the Latin-American ActionLAC platform supports non-state and local actors throughout a 'lifecycle of climate action', helping actors with everything from their initial planning and fundraising to operational functions and impact evaluation. By contrast, much lower engagement among non-state actors in cooperative initiatives is found across the Middle East and North Africa. Within the EU – which is otherwise densely populated with (lead) partners and funding partners – much lower engagement is found across Central and Eastern Europe.

To some degree, such geographic imbalances may be due to biases in existing records. They can also reflect differing

**Figure 16.** Share of participants, lead partners, and funders based in OECD and non-OECD countries, for international cooperative initiatives with a main focus on mitigation.




Source: Chan *et al.* (2021)

public expectations. For instance one might argue that actors based in industrialized countries should engage more in climate action, particularly in mitigation efforts, since those countries are historically responsible for more emissions. More worryingly, the imbalance of participatory patterns may also be due to stark differences in available resources and capacities for climate action across industrialized and developing countries.

Even if participatory patterns are highly imbalanced, initiatives may still benefit least developed and vulnerable nations. We observe some encouraging implementation patterns: although most participants are based in high income (OECD) nations, initiatives tend to implement their projects more often in developing (non-OECD) countries (Figure 17). Initiatives that target mitigation, for example, implement projects in non-OECD countries relatively more than they do in OECD countries.

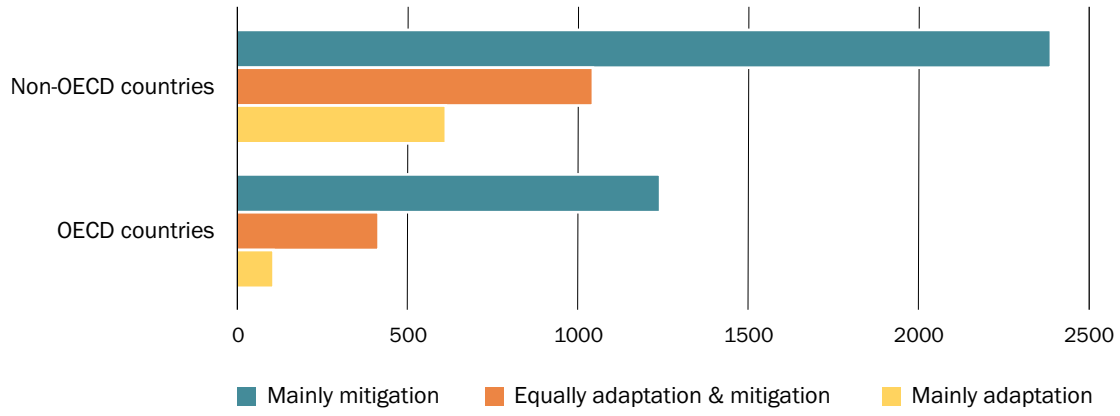
The overrepresentation of non-OECD countries in implementation, despite lower participation rates by developing country-based actors, suggests that OECD-country partners often play a supportive role in initiatives that implement projects in developing countries. Implementation in developing countries, however, must be matched by inclusive decision-making structures to ensure the representation of local stakeholders.

## 3.2 GLOBAL GHG EMISSIONS SCENARIO ANALYSIS

### 3.2.1 DATA AND METHODS UPDATES FROM THE 2019 ANALYSIS

There are several important updates in this report regarding our quantification of GHG emissions reduction potential of international cooperative initiatives (ICIs). First, the list of selected ICIs has been updated. The ICIs considered in this scenario were selected out of a list of 297 by applying six different criteria as described in Lui *et al.* (2021). On the one hand, three ICIs were excluded in this year's update due to limited recent activity (based on the output-based performance assessment elaborated in Section 3.3) or changes in their objectives (e.g. to support implementation of certain national policy targets): Super-efficient Equipment and Appliance Deployment initiative (SEAD), the European Technology & Innovation Platform for Photovoltaics (ETIP PV), and the Collective Action Across the Air Transport World initiative (CCAATW). On the other hand, five ICIs were added to the list: SE4All's Industry Energy Accelerator, the Air Transport Action Group (ATAG), the International Zero Emissions Vehicles Alliance (ZEVA), EV100 and the Urban Electric Mobility initiative; the latter three networks contribute to the Global Fuel Economy Initiative and Lean & Green. In total, the 2021 analysis considered 20 ICIs.

**Figure 17.** Planned implementation locations in OECD and non-OECD countries.



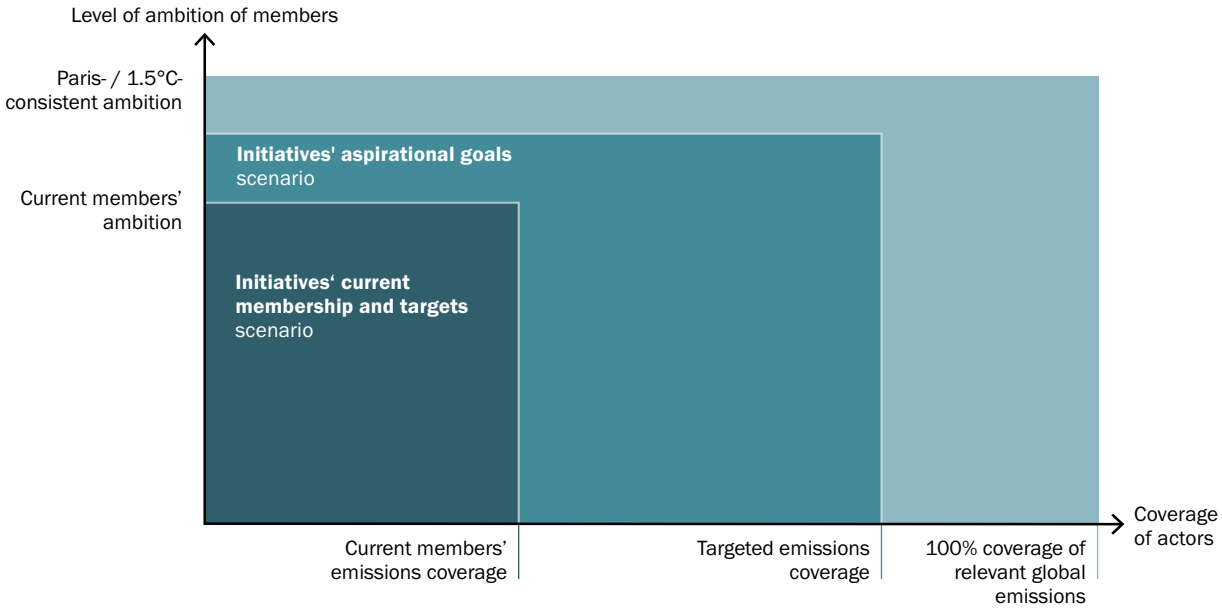

Source: Chan *et al.* (2021)

It should be noted that this scenario analysis only represents a small portion of the total universe of ICIs. There are also many ICIs that are at least partially represented in the analysis through individual members; for example, a considerable number of non-state and subnational actors that are part of the Alliances for Climate Action and its national partner organisations are covered in the analysis presented in Section 2 (Alliances for Climate Action, 2021). Also, while cooperative actions are accelerating in the financial sector (Lütkehermöller *et al.*, 2020), we did not include them in the global aggregation due to the lack of data on the potential GHG impact of these actions and insufficient capacity to identify and quantify overlaps with other actions.

Second, one major update concerning the analysis of GHG emission scenarios is the introduction of a distinction between "aspirational goals" and "current membership and targets" impact quantification (Figure 18). The "CNP plus initiatives' aspirational goals" scenario, as assessed in our 2019 update report, models the potential impact of currently implemented national and federal policies as well as the quantifiable goals made by selected ICIs in terms of geographic coverage and/or membership (aspirational membership) (Lui *et al.*, 2021). A new scenario not included in the 2019 update report is the "CNP plus initiatives' current membership and targets" scenario, which models the potential impact of currently implemented national and federal policies as well as of current members of the same subset of ICIs assessed for the "CNP plus initiatives' goals" scenario. This scenario does not account for the potential emissions reductions from aspirational members in the target year and only covers members with quantifiable emissions targets, inventory data and post-2020 targets. The CNP plus initiatives' goals scenario uses the potential from the current membership scenario when an ICI does not have own quantifiable membership goals.

Third, several ICIs updated their mid- and long-term targets or potential assessments, namely the Climate and Clean Air Coalition (CCAC, 2020). For a few other ICIs, such as RE100, the Science Based Targets initiative (SBTi) and C40 Cities, we removed or adjusted ICIs' aspirational goals quantified in our 2018 and 2019 reports because they were not reiterated in their recent publications.

**Figure 18.** Different definitions of greenhouse gas emissions reduction potentials for international cooperative initiatives (adapted from Lui *et al.*, 2021).

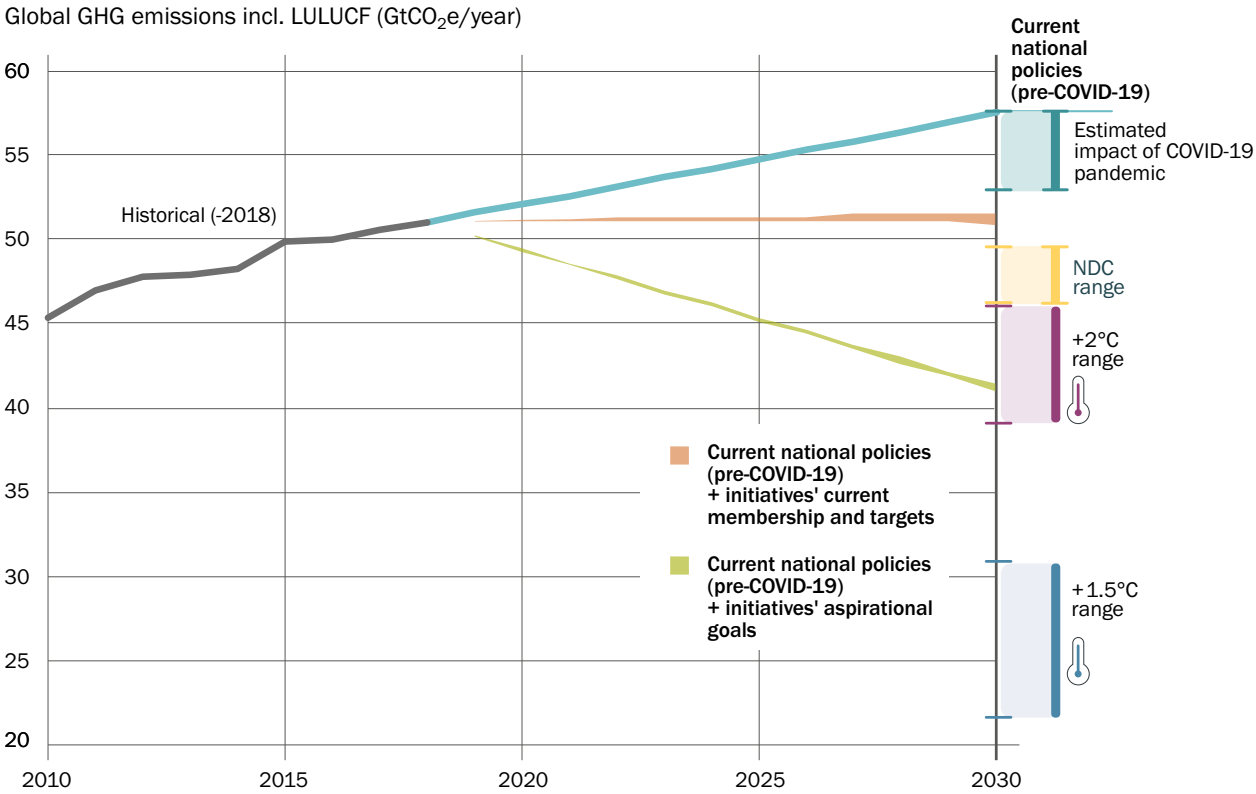


Potential emissions reductions were first calculated for the ten focus economies plus the Rest of the World (RoW), and we accounted for overlaps between ICIs for each economy based on the approach proposed in Lui *et al.* (2021). We assume that all ICIs meet their targets and that their efforts do not change the pace of action elsewhere. Whenever possible, we also show breakdowns of the calculated potential emissions reductions by the degree of progress presented for all three non-state and subnational action scenarios.

### 3.2.2 RESULTS

Our updated aggregation analysis shows that current members of ICIs could reduce global GHG emissions in 2030 by 5.8 to 6.4 $GtCO_2e$/year below the emissions expected under the CNP scenario. The results for individual ICIs are presented in Table A1 in Appendix A2. Moreover, the ICIs' aspirational goals hold a GHG emissions reduction potential of 15.9 to 16.3 $GtCO_2e$/year in 2030 (Figure 19). The 2030 targets of selected ICIs' current members could, if they are

**Figure 19.** Potential global greenhouse gas (GHG) emissions reductions resulting from full implementation of international cooperative initiatives, under current membership and aspirational goals.




*Historical data and pre-COVID current national policies scenario (CNP) projections based on various sources (APERC, 2019; Gütschow et al., 2019; IEA, 2019b; Kuramochi et al., 2019; U.S. EPA, 2019).*

*The NDC scenario projections for 2030 are taken from Climate Action Tracker and include recent 2030 target announcements that are not officially submitted to the UNFCCC as of May 2021 (Climate Action Tracker, 2021b).*

*Indicative post-COVID CNP scenario projections (average of high and low estimates) are taken from Climate Action Tracker (Climate Action Tracker, 2020) and do not consider any announcement of economic recovery measures.*

*2°C (in 2100, 66% chance) and 1.5°C (in 2100, 66% chance) pathways are taken from UNEP (2020).*

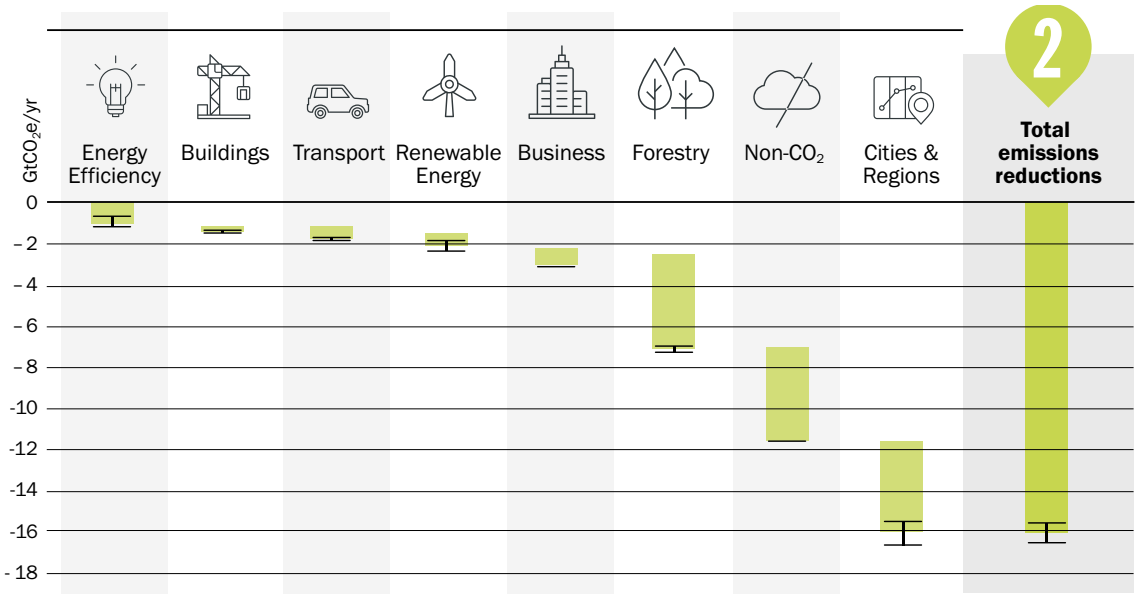
fully implemented and do not change the pace of action elsewhere, contribute to plateauing global GHG emissions at current levels. In addition, the selected ICIs' collective ambition could, if fully implemented, close the global emissions gap in 2030 to a range consistent with limiting temperature rise below 2°C (in 2100, 66% chance) (UNEP, 2020).

We found the largest emission reduction potentials for ICIs that focus on non-$CO_2$ GHGs (CCAC), forestry (NYDF) and cities and regions (C40, GCoM and Under2 Coalition) (Figure 20). For the cities and regions ICIs, we used the same targets as assessed under the individual actor aggregation (see Section 2.2). Hence, there is full overlap between actors that are members of any of the three cities and regions ICIs and those actors analysed under the individual actor aggregation, leading to similar results.

Compared to our 2019 analysis, the estimated global emissions level in absolute terms under the ICIs' aspirational goals scenario remained similar, while the aggregated emissions reduction potential compared to the CNP scenario decreased. There are two major explanations for this finding: (i) the CNP scenario projections for 2030 declined by 2 to 5 $GtCO_2e$/year from the 2019 report, and (ii) the estimates on aspirational goals for some ICIs declined.

We identified three key policy-relevant implications of the GHG emission reduction potentials. First, even the ambitious goals of existing ICIs would not be able to fully bridge the gap between the current policies and the pathway for limiting temperature rise below 1.5°C (in 2100, 66% chance) in 2030. At the same time, the number of ICIs represented by our analysis demonstrates that international efforts toward global net-zero emissions are strengthening and broadening in all sectors, including "hard-to-abate" sectors such as heavy industries, international aviation and shipping, freight transport and buildings and construction. Our analysis only partially captures the potential impact of these dynamic developments in the realm of international cooperative action. Some that may be noted are the Smart Freight Center, the Net Zero Carbon

**Figure 20.** Potential global GHG emissions reductions (average estimates) of international cooperative initiatives (ICIs) by thematic area under the ICIs' aspirational goals scenario in 2030.



Buildings Commitment, and the Global Drive to Zero (World Green Building Council, 2020; Global Drive to Zero, 2021; Smart Freight Centre, 2021).

Second, the significant difference between the 2030 emissions reduction potentials for the two scenarios analysed indicates that some ICIs need to scale up their coverage of geographies and actors considerably to realise their aspirational goals. Similarly, for some ICIs, the difference between the current and targeted membership is of such a magnitude that significant efforts are needed during the next ten years to realise their aspirational goals potential.

Third, ICIs account for recent updates to CNP scenario projections in their targets to remain ambitious. Efforts are entirely lacking in some areas, and targets and ambitions need to be updated in others. The CNP scenario projections for 2030 are also catching up with ICIs' aspirational goals in some areas such as renewable energy (RE) and electric vehicle (EV) deployment. For example, targeted RE capacities that were considered highly ambitious until recently are now becoming increasingly realistic.

## 3.3 OUTPUT-BASED PERFORMANCE ASSESSMENT

### 3.3.1 PERFORMANCE ON OUTPUTS RELEVANT TO KEY FUNCTIONS

We present an update assessment of function-output-fit (FOF), which measures whether initiatives are producing outputs that demonstrate progress consistent with their main functions (Chan *et al.*, 2018). Outputs are part of a causal chain: Inputs → Outputs → Outcomes → Impact. A high production of outputs, relevant to stated functions, leads to – not high outcomes, necessarily but demonstrates a high *likelihood* of achievement of outcomes.

Using the FOF performance methodology, we find a slight decrease in ICI performance from 2018 to 2020 (not shown). When ICI performance is disaggregated by a focus on mitigation or adaptation (Figure 21), mitigation experiences both higher performance and an upward trend. For adaptation ICIs, we see the opposite: lower performance and a downward trend. One explanation is that adaptation initiatives are more often implemented in challenging local and developing country contexts (Chan and Amling, 2019). About 60% of mitigation initiatives produced relevant outputs for a majority or all their planned activities, making desired environmental and social impacts more likely. Indeed, better performing initiatives are found in areas typically associated with mitigation action, for instance in energy, industry and transport.

Many factors may account for differences in performance across thematic areas. Robust sectoral networks could support initiatives within particular areas by effectively convening partners, brokering new collaborations, and supporting new initiatives with material and non-material resources. International networks between cities that facilitate predictable funding and financial mechanisms, for example, could furthermore support commitments and readiness at the local level. Governments also have an important role to play in stimulating collaboration with non-state actors and coordinating long-term responses.

### 3.3.2 IMPACT OF COVID-19 ON OUTPUT PERFORMANCE

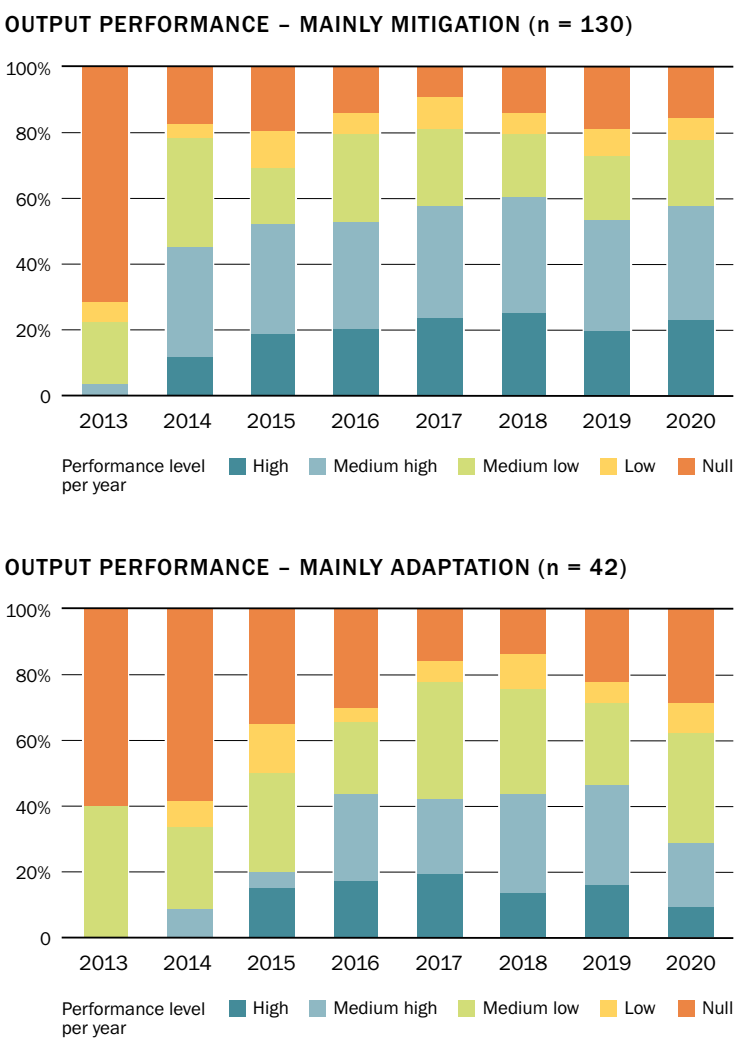
2020 was set to be a year of climate action coinciding with the start of the first implementation cycle of the Paris Agreement, and the large-scale mobilization of action towards the UN Climate Conference in Glasgow. However, the world was confronted with the COVID-19 pandemic, responses to which have severely impacted climate action. These impacts may be negative. For instance, non-state and subnational actors may deprioritize climate action to deal with immediate health, economic and financial impacts. The COVID-19 crisis also strained capacities at the local level, testing the resilience of cities and revealing the need for appropriate governance responses that can leverage support from non-state actors, such as civil society organizations (see Box 1). Impacts of the pandemic, however, may also be positive. For instance, the shift towards online activities among many climate action networks may enable participation by people who otherwise would not have the means or ability to take part in events that require physical presence.

Because of our analytical focus on output performance, we can indicate early impacts of the COVID-19 crisis on cooperative initiatives. The performance of mitigation initiatives throughout the COVID-19 pandemic remained remarkably stable, showing even a slightly higher share of initiatives with high or medium-high output performance. This stands in stark contrast to adaptation initiatives, which show a sharp dip in average performance in 2020 (Figure 15). This may be an early indication of the pandemic's negative impact on adaptation initiatives and the limited impact on mitigation initiatives.

To understand how initiatives have been affected, data was collected from publicly available responses by mitigation-focused initiatives to COVID-19, for instance from their websites and social media. This data was used to determine which functions were negatively affected, neutrally affected (affected but neither negatively nor positively) or positively affected (Figure 22).

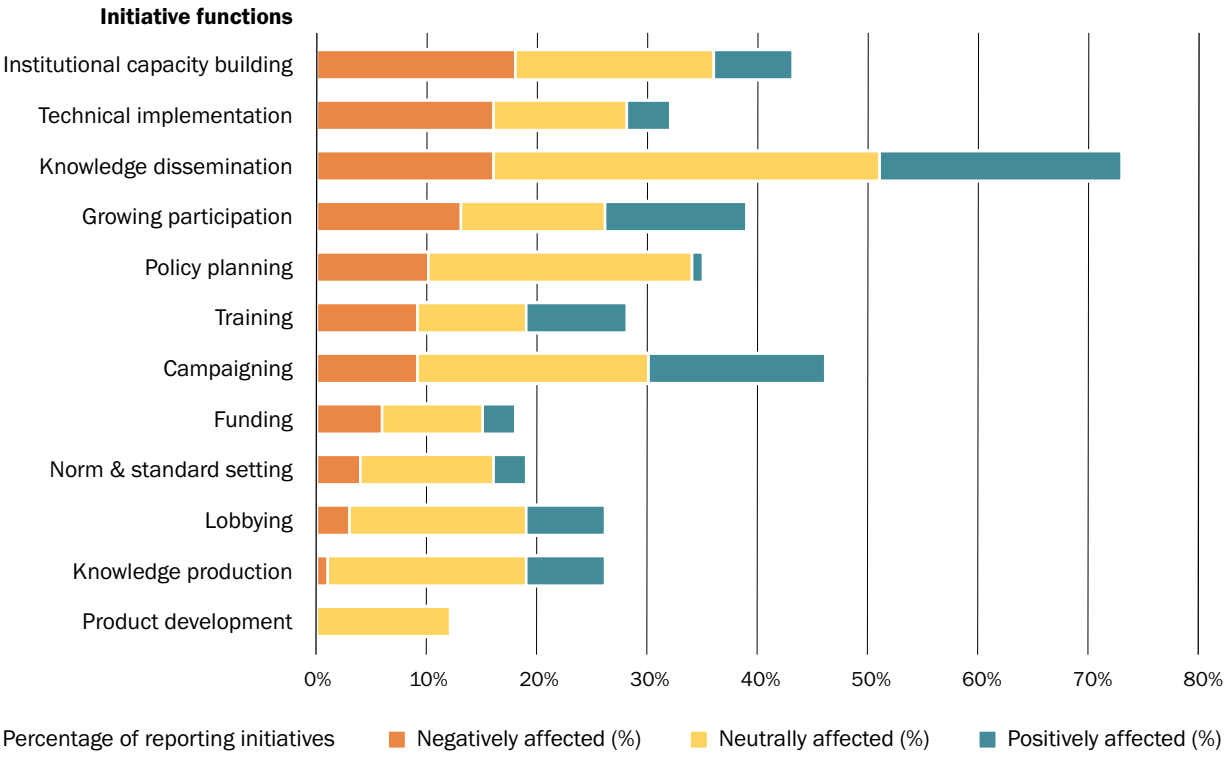
Responses to the COVID-19 pandemic were recorded for 48% of initiatives. These responses vary greatly (see Box 1). Results show that COVID-19 has generally negatively affected the activities of mitigation initiatives in institutional capacity building, technical (on-the-ground)

**Figure 21.** The share of mitigation/adaptation initiatives at different levels of performance




Source: Chan *et al.* (2021)

**Figure 22.** COVID-19 impacts on function/activities of mitigation initiatives.




Sources: Chan *et al.* (2021)

implementation, and policy planning. Positive effects were noted in efforts to increase participant numbers and campaigning. The use of digital communication likely accounts for many of the pandemic's neutral and positive impacts on knowledge dissemination. A multitude of virtual exchanges occurred in 2020. As they are easier to prepare and many are available online, virtual events by these initiatives were able to reach larger audiences than their physical counterparts. Further investigation would be necessary to determine the in-depth causes of these impact patterns on the networks' different functions and activities. It is important to note that many effects of the COVID-19 pandemic may only manifest later. For example, the budgets of many initiatives have been allocated for multiple years and financial implications – due to funding decreases or budgets diverted to managing COVID-19 – may only become visible with time.

## 3.4 PROGRESS IN MITIGATION-RELATED INITIATIVES: A SELF-ASSESSMENT

The 2020 Survey of International Cooperative Initiatives was a coordinated effort by the German Development Institute/Deutsches Institut für Entwicklungspolitik (DIE), the Global Center on Adaptation (GCA), the UNFCCC Secretariat, and the UNEP DTU Partnership. Survey responses were received from 52 initiatives, representing over 2,500 actors. Focal points provided information on actor involvement, details of progress toward targets, and categorised the impact of the COVID-19 pandemic on their operations.

Mitigation targets included energy efficiency, renewable energy, emissions reduction, funds mobilized, and capacity building. Sixteen ICIs described these targets and

### BOX 1: COLLECTED EXAMPLES OF COVID-19 RESPONSES BY MITIGATION INITIATIVES.

- **Science-based Targets** called on governments to prioritize a faster and fairer transition from a grey to a green economy; corporate participation increased 34% as of June 2020 from COP25, in December 2019. Two hundred-thirty-seven companies became founder-members of the Race to Zero campaign
- The **1.5°C initiative** increased business membership by 70 and similar increases have occurred for other initiatives under the We Mean Business umbrella
- The **Climate and Clean Air Coalition (CCAC)** offered webcasts on links between air pollution and COVID-19; the CCAC stressed the importance of their cause for improving air quality and health as some countries are loosening advised measures or policies due to economic pressures
- **Blue Forests** promoted live streams of ocean wildlife for website visitors to watch and enjoy during quarantine
- **Small Island & Developing States (SIDS) Lighthouses Initiative** experienced an influx of funding and increased participation in their virtual events. However, the impossibility to travel raised challenges for their capacity-building activities
- **Airport Carbon Accreditation** added new partners and continued to produce and disseminate knowledge on best practices and the importance of climate action in a post-pandemic world
- The pandemic affected mobilization efforts of the **Carbon Neutral Cities Alliance (CNCA)**, as they were are unable to convene members; they worked with digital facilitation experts, trained staff, and members in using digital tools for collaboration, and hosted a series of digital meetings, workshops, and webcasts
- The **International Solar Alliance (ISA)** lobbied manufacturers of ventilators to use their Solar Kits to supply power to life saving equipment – including ventilators – to increase availability in places with less reliable power connections. In 2020 the alliance developed plans to supply 24x7 electricity to 500 hospitals across 47 least-developed countries to allow for vaccine storage

Sources: Chan *et al.* (2021)

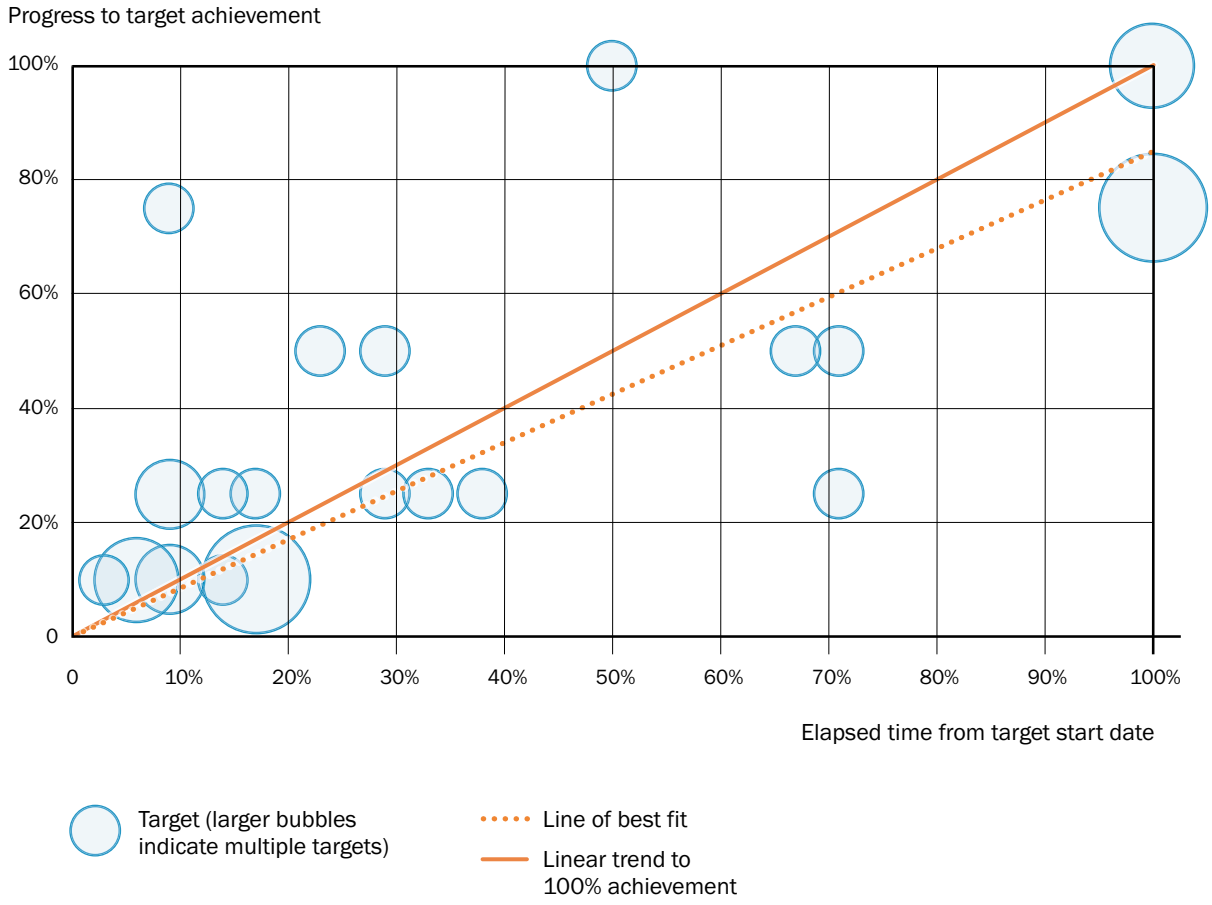
chose a predefined percentage to estimate their progress. Anonymized results are shown in Figure 23. To compare targets with multiple end-dates (2020, 2025, 2030, and 2050), the time is expressed as a percentage: 0% as the first year; 100%, the final year. If not provided, initiative websites were checked to obtain target baseline years. When a target start-year was not available, the initiative launch year was used.

The graph includes two fitted lines: a solid orange line assumes a linear or proportionate progression between time lapsed and achievements towards targets; a dotted line shows the estimated future progress. Bubble sizes indicate the number of targets they encompass; smallest: a single target, the largest: five targets.

A summary of three groups of targets in Figure 23 are provided below:

- **Targets at bottom-left:** most targets reside here; those which are up to 10% completed have been recently set or set by recently launched ICIs. Slightly above this area is a row of targets by initiatives which are making good progress (25% completion) and are on or ahead of their schedules.
- **Targets at top-right:** these represent 2020 as a target year and are 75% to 100% completed.
- **Dispersed targets:** Approximately half are ahead of schedule, the other half, behind. The dotted line indicates 80% future achievement, assuming progress is linear. In summary, while these ICIs are collectively on track to reach 80% of mitigation targets, it may be premature to state that this trend will continue, given that the majority of targets have been recently launched.

**Figure 23.** Self-reported progress on targets by mitigation-focused international cooperative initiatives (anonymised).




Sources: Chan *et al.* (2021)

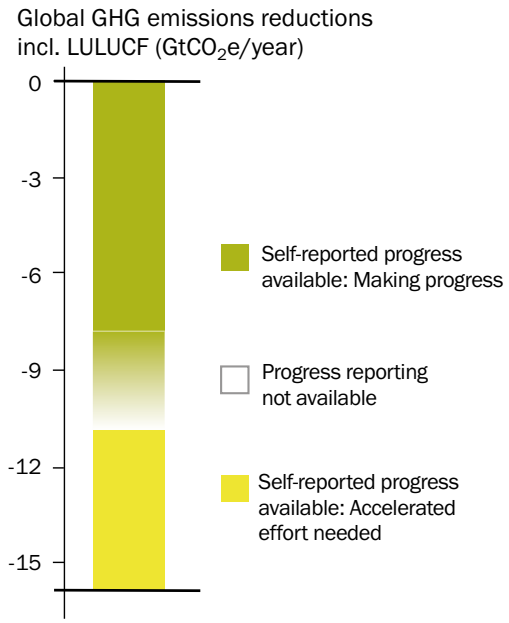
### 3.4.1 IMPLICATIONS ON THE EMISSIONS REDUCTIONS ACHIEVED IN 2030

Of the 20 ICIs that were considered for the GHG emissions scenario analysis, four responded to the survey question on progress (GGA, GFEI, Oil and Gas Methane Partnership under CCAC). There are several other ICIs that did not respond to the survey but published their own assessments on substantive progress towards their goals. Among these ICIs are RE100, SBTi and Under2 Coalition (RE100, The Climate Group and CDP, 2020; The Climate Group and CDP, 2020; Science Based Targets initiative, 2021). The New York Declaration on Forests (NYDF)'s self-assessment concluded that it is not on track to meet its global goals to end natural forest loss and restore 350 million hectares of degraded forest by 2030 (NYDF Assessment Partners, 2020a, 2020b).

By combining the results from the survey and the progress (or lack thereof) reported by the ICIs themselves, the GHG emission reduction potential can be broken down into 1) making progress 2) progress reporting not available and 3) accelerated effort needed. Figure 24 shows these three different categories of the ICIs' aspirational goals emission reduction potential, as presented in Section 3.2. It highlights that roughly half of the aspirational goals' GHG emission reduction potential, 8 $GtCO_2e$/year in 2030, is from ICIs that have made substantive progress toward target realisation, according to their survey responses or their progress reports. Just below a third of the emission reduction potential originates from ICIs that have not made any progress, according to their own assessment. This share is entirely based on NYDF. For the remaining 3 $GtCO_2e$/year in 2030 of potential GHG emission reductions, no information on progress is available.

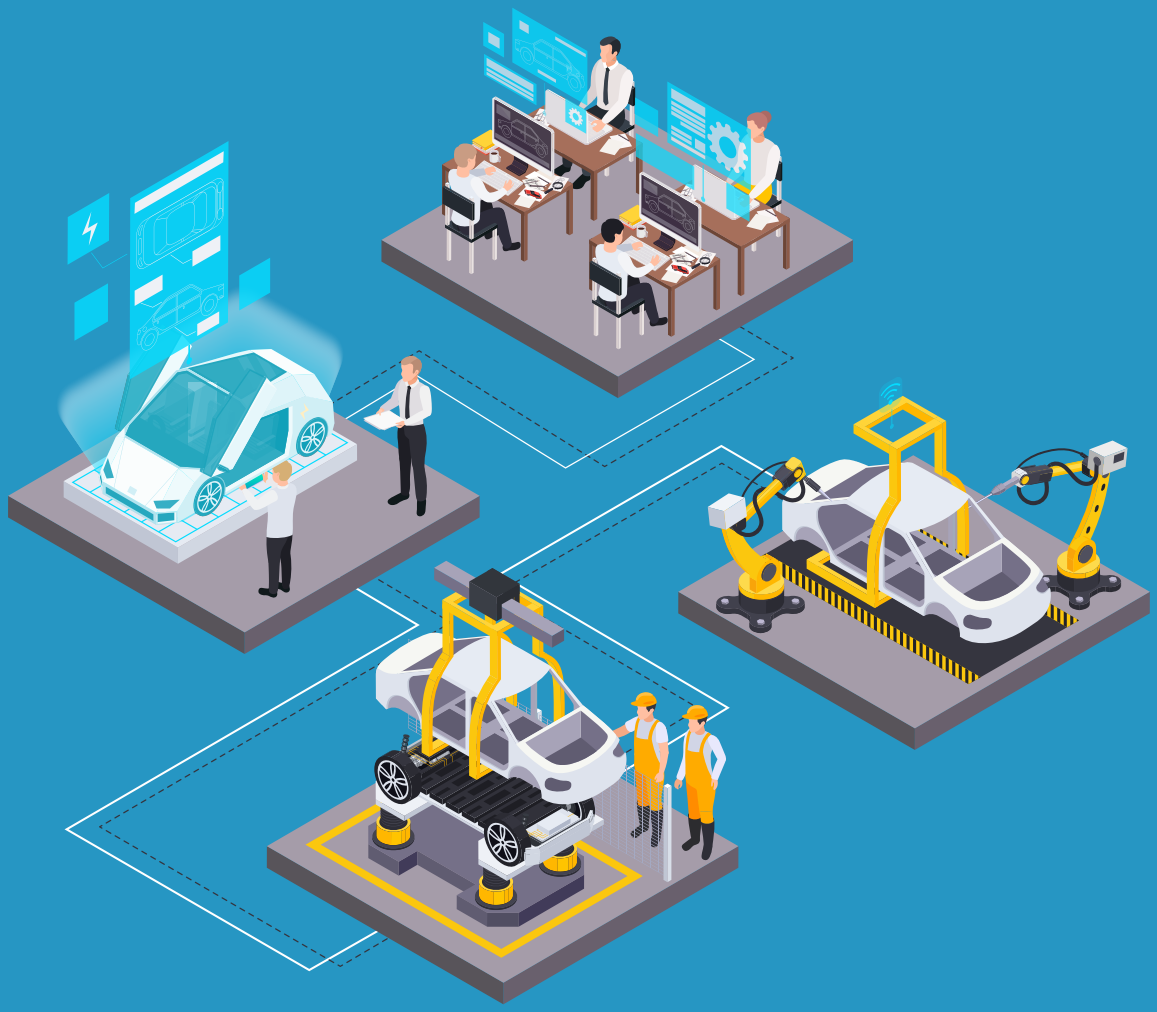
These results hold several important implications. First, although the emission reduction potential of ICIs that are making progress is the largest, there is limited understanding about the extent of this progress. The reported substantive progress can mean anything from full to little target realisation. Second and closely related, better and more frequent progress reporting is necessary to achieve a higher level of understanding about the actual extent of progress and, more importantly, to account for the share of emissions reduction potential that is currently unknown in terms of progress. Third, this assessment clearly shows the lack of progress of ICIs operating in forestry. More efforts and meaningful actions are needed to realise the immense mitigation potential of ICIs in this sector.

**Figure 24.** Substantive progress towards the GHG emission reduction potential of ICIs' aspirational goals.



# 04

# EXPLORATORY ANALYSIS OF THE POTENTIAL IMPACT OF CAR MANUFACTURERS' COMMITMENTS



Companies' GHG emissions impact occurs not only through their own operations, but also along their value chain. As these emissions could potentially be large for many industries, it is important to assess the impact of corporate value chain targets. In this context, we make a first step to address car manufacturer commitments for electric vehicles sales for which $CO_2$ emissions from driving fall outside their own operations. As indicated in the previous section on ICIs' impact quantification, the transport sector is one of the sectors where many transformative actions are emerging.

## 4.1 INTRODUCTION

The transport sector accounts for around 25% of total CO2 emissions, largely due to the combustion of fossil fuels. These emissions have increased globally by 16% in the last century, but decreased by 2% in 2020 due to reduced activity during the COVID-19 pandemic (IEA, 2019a). Passenger cars alone represent close to 45% of transport related emissions (3.5 Gt $CO_2$ in 2019). Therefore, passenger EVs play an important role in the transition towards a zero-carbon world that fulfils the Paris Agreement's goals. More than 2.1 million electric cars were sold in 2019, accounting for 2.6% of global car sales; almost 50% of these sales occurred in China (IEA, 2020b). In the next decade, electric cars are expected to contribute to the reduction of GHG emissions by replacing polluting fossil fuel cars. Their emissions reduction depends on the emissions intensity of the electricity grid, which is expected to decline with the continuous expansion of renewable energy systems. However, even with current electricity grid emissions intensities, electric cars are already less emission intensive than fossil fuel vehicles in many regions and probably will be in most world regions in the near future too, even with only modest end-use electrification (Knobloch *et al.*, 2020). In addition, EV battery prices have decreased significantly, such that EVs are expected to be competitive with fossil fuel vehicles within a few years (The Climate Group, 2020).

This analysis looks at the emissions of passenger cars and assesses the additional impact of EV sales targets from car manufacturers relative to the national policies scenario that includes fuel efficiency standards for cars and electric vehicle targets. More and more car manufacturers are reporting electric vehicle sales targets, and at the same time, governments are strengthening their electrified or zero emission vehicles regulations. The emissions from cars are scope 3 emissions (use of sold products) for car manufacturers (WRI and WBCSD, 2013); these are not included in the analysis from Section 2.2. Scope 3 emissions are not owned or controlled by the company but are part of their upstream and downstream value chain, where they have an indirect impact.

National governments cannot act on climate change alone but need collaboration with local governments and businesses. This collaboration creates an ambition loop in which governments set and strengthen policies, companies support strong action, and financial institutions unlock investments (Dickerson *et al.*, 2018). In this setting, car manufacturers respond to both the disruptive introduction of EVs by competitors and the tightening regulation of government (CDP, 2018). They include climate targets in their sustainability strategies and announced EV sales targets. For example, General Motors recently announced that by 2035 they will only produce electric cars (Eisenstein, 2021). The geographical scope of this study is EU-27+UK, US and China, which together represent around 50% of global road transport emissions in 2020. We have selected the ten largest car manufacturers globally in terms of revenue, and per country additionally the five largest in terms of sales for 2019. This selection represents 75% of annual car sales in the EU and UK, 80% in the US and 60% in China.

## 4.2 APPROACH

The study compares two scenarios showing $CO_2$ emissions pathways for cars (US also includes vans). The „national policy baseline" scenario represents the impact of government policies, and the „national policy and EV targets from car manufacturers" scenario additionally takes stock of EV sales targets from car manufacturers. The assessment is based on a simple model that combines projections from existing studies (ICCT, 2012, 2017; European Commission, 2013; EIA, 2020) with national fuel efficiency and electric vehicles (new registrations) targets (Table 1). . Therefore, the national policy baseline specifically developed for vehicle emissions is largely consistent with the CNP scenario projections presented in previous sections.

Implemented targets have been adopted by the government through legislation or executive orders, planned policies are in the pipeline to be implemented, and announcements are only put forward in preliminary or indicative studies. These pathways are compared with pathways that also integrated the impact on greenhouse gas emissions of EV sales targets put forward by car manufacturers reported in their sustainability reports (see Appendix A3 with national fuel efficiency and electric vehicles (new registrations) targets. Implemented targets are adopted by the government through legislation or executive orders, planned policies are in the pipeline to be implemented, and announcements are only put forward in preliminary or indicative studies. These pathways are compared with pathways that also integrated the impact on GHG emissions of EV sales targets put forward by car manufacturers reported in their sustainability reports (see Appendix A3).

Two important assumptions that we make is that manufacturers meet their EV sales targets and increase the efficiency of fossil fuel cars in line with the projected impact of national policy. Further, EV sales targets are assumed to represent full-battery electric vehicles (BEV), unless the share of plug-in electric vehicles (PHEV) is explicitly defined. Car sales for each manufacturer are projected to grow with national trends included in the selected national studies. The $CO_2$ intensity of electric cars is based on the average intensity of the national electricity grid. In addition, we have calculated a few sensitivities showing the impact of planned and announced national targets together with announcements of car manufacturers beyond those secured by sustainability reports, as well as the possible impact of the COVID-19 pandemic.

**Table 1.** National EV and fuel efficiency policy targets based on implemented, planned or announced targets or from national studies for EU-27+UK, US and China

| | EU-27+UK | US | China |
|---|---|---|---|
| **Fuel efficiency standard new vehicles** | (implemented)<br>95 $gCO_2$/km by 2020<br>80.8 $gCO_2$/km by 2020<br>59.4 $gCO_2$/km by 2020 | (implemented)<br>5.82 l/100km by 2026<br><br>(projection)<br>44.5 mpg by 2030 | (implemented)<br>5.0 l/100km by 2020<br><br>(planned/announcement)<br>4.0 l/100km by 2025<br>3.2 l/100km by 2030 |
| **EV targets new vehicles** | (implemented)<br>15% by 2025<br>30% by 2030 | (national study)<br>5% by 2030 | (implemented)<br>20% (new energy vehicles: NEVs) by 2020<br>(announcement)<br>25% (NEVs) by 2025<br>50-60% by 2030 |

See Technical Annex I for data sources

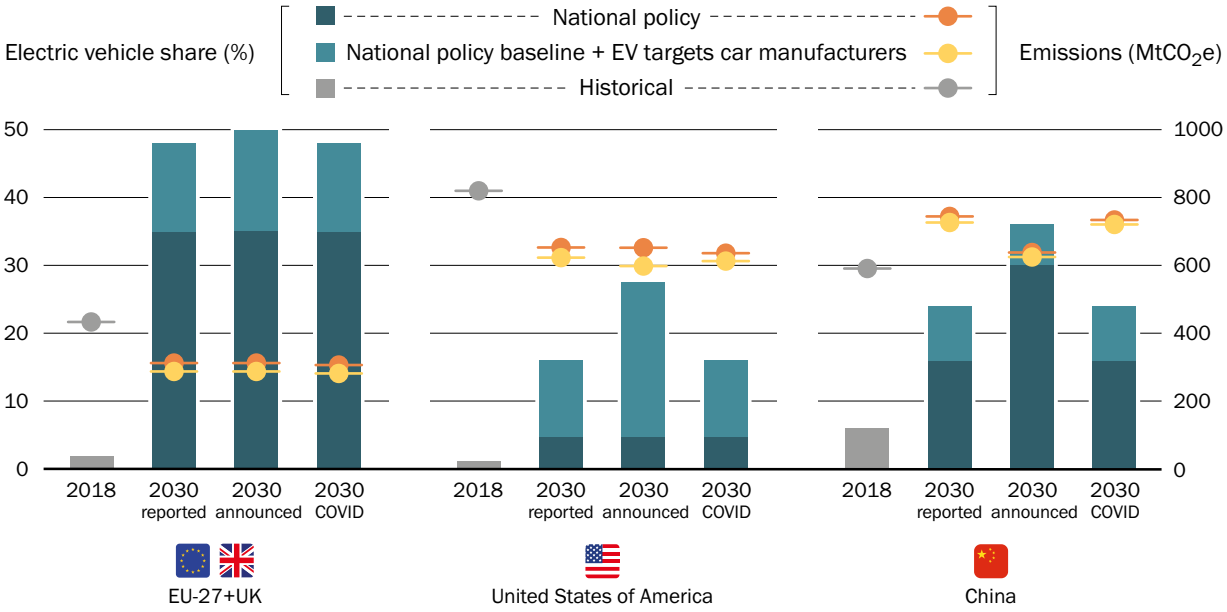
# 4.3 RESULTS

## 4.3.1 EU-27+UK

The EU-27+UK has specified voluntary zero emission vehicle (ZEV) targets, which are part of the $CO_2$ performance standard for cars (Rokadiya and Yang, 2019) (Figure 25). In 2020 car manufacturers were required to keep fleet performance below 95g$CO_2$/km, and this target decreases by 15% for 2025 and 37.5% for 2030 (European Commission, 2019). Only tailpipe emissions are accounted for, whereby manufacturers receive additional credits for ZEV targets if they comply with 15% ZEV vehicles by 2025 and 30% by 2030 (Rokadiya and Yang, 2019).

The EU-27+UK including EV target is already expected to increase by 35% in 2030 due to current implemented policies. Accordingly, if car manufacturers produce fossil fuel cars in line with national policies and achieve their EV sales targets, the EU-wide EV share of new cars by 2030 is estimated to increase by almost half of all new car sales (48%), and reduce transport emissions by 7.5% relative to the national policy baseline (Figure 25). Incorporating the announcements made by BMW and General Motors and accounting for reductions in sales due to the COVID-19 pandemic do not change the results significantly.

**Figure 25.** Domestic EV shares and $CO_2$ emissions from passenger vehicles in 2030 in the „National policy baseline" and „National policy + EV targets car manufacturers" scenarios for the EU-27+UK, US and China for currently implemented targets (reported), and sensitivities of the results to additionally planned and announced targets (announced), and possible impacts of the COVID-19 pandemic.




Sources: Authors

### 4.3.2 UNITED STATES

The US does not have federal EV targets; however, ten states accounting for one third of the market have adopted EV targets (Rokadiya and Yang, 2019). In general, these mandates are based on the California policy, which was already implemented in 1990 and requires car manufacturers to sell a certain percentage of ZEVs (ibid). In addition, the federal Corporate Average Fuel Economy (CAFE) standard requires manufacturers to limit average fleet fuel use to 5.82 l/100km by 2026 for new light-duty vehicles (IEA, 2020a), and only accounts for tailpipe emissions. The Annual Energy Outlook (EIA, 2020) projects that by 2030, with current policies, the share of EV sales will be 5% and fuel consumption of light-duty vehicles is 44.5 miles per gallon. The Biden Climate Plan aims to restore full EV tax credits, extend charging infrastructure, and implement federal procurement targets for EVs (Biden, 2020), but is not implemented yet.

The national policy baseline scenario is based on the Annual Energy Outlook (EIA, 2020) and reaches a 5% EV share for new car sales in 2030, but if car manufacturers realise their proposed EV sales targets, this share would increase to 16%. Moreover, if General Motors fulfil their intention to end the sale of fossil fuel cars by 2035 as reported (Gearino, 2021), the US EV share would increase to 28%. In the latter case, emissions would be reduced by 8% in 2030 relative to the national policy baseline. The COVID-19 impact is estimated to result in 2% emissions reductions by 2030.

### 4.3.3 CHINA

China's policy on electric vehicles is the new-energy vehicle (NEV) mandate, and includes PHEV, BEV and fuel cell electric vehicles (FCEV) (Rokadiya and Yang, 2019). This policy sets NEV targets for car manufacturers in the same way as is done in California, but it also includes the option that surplus credits can be sold to other companies (ibid). The EV share target for new cars is 11% in 2020 (CAAM, 2021) and is expected to increase to 15-25% by 2025 and to 50-60% by 2030 (Bloomberg Quint, 2020). China's fuel economy standards limit fuel use to 5 l/100km by 2020, 4 l/100km (planned policy) by 2025 (IEA, 2020a). In the national plan "Made in China 2025", China announced the aspirational target to limit fuel use for average passenger cars to 3.2 l/100km (Yang and Cui, 2020).

The impact of car manufacturers' EV sales targets on Chinese $CO_2$-emissions is relatively small, but the additional increase of EV share by 2030 is projected at 8%, which would result in EVs representing almost a quarter of new cars sales by 2030. The change is especially noteworthy for both EV share of new cars and emissions if recent announcements from the Chinese government are taken into account that suggest the EV share of new cars is expected to arrive at 36%. However, to what extend this would result in $CO_2$ reductions is highly dependent on the $CO_2$-intensity of the electricity grid. For example, a sensitivity analysis that estimates the impact of more electricity intensive cars (160 kWh/km to 300 kWh/km) resulted in an increase in emissions relative to the national policy baseline. This is illustrated by Gan *et al.* (2021), which assessed $CO_2$-intensity of electric cars in China provinces and found that there is a wide variation dependent on the use of coal-based electricity and engine performance due to cold weather.

## 4.4 DISCUSSION

Although the impact on greenhouse gas emissions is small, the EV sales targets from car manufacturers could increase the EV uptake significantly. If this parallels an increase in installed renewable electricity, the impact on emissions would be much higher than shown in this study. However, the promises made by businesses in their sustainability reports do not have the same reliability as implemented government policies that are secured by legislation and subject to rigorous monitoring and verification. In addition, we have assumed that manufacturers do not decrease the development of more efficient fossil fuel cars, which car manufacturers can do under current fuel efficiency standards. This shows the important interaction between national governments and other actors that could together create the ambition loop in which governments could increase policy stringency based on ambitious car manufacturers' targets and improve overall ambition. In fact, ambition needs to increase to 100% sales of non-fossil cars by 2035 if the world wants to reach net-zero emissions by 2050 (IEA, 2021). We know already that the EU-27 will increase $CO_2$ performance standards for cars in line with the update of the economy-wide target to -55% relative to 1990, President Biden is bound to implement the climate plan in the US where EV adoption is a key topic, and China is already discussing an ambitious EV target for 2030 both as a response to climate change and air pollution in cities. In addition, several countries and cities are already banning fossil fuel cars by 2030. This shows that car manufacturers will need to remain active in the aforementioned ambition loop to realise the production of electric cars required to stay on track to meet the Paris Agreement's goals.

# 05

# CONCLUSION AND WAY FORWARD

## 5.1 SUMMARY OF THE KEY FINDINGS

The number of individual non-state and subnational actors with quantifiable GHG emissions reduction targets continues to grow. Continued growth throughout 2020 is remarkable, as the COVID-19 pandemic and ensuing economic crisis could have resulted in non-state and subnational actors deprioritising climate action.

While there are more individual non-state and subnational actors committing to 2030 emissions reduction targets and long-term net-zero emissions targets, our updated analysis did not clearly demonstrate that the collective 2030 ambition of non-state and subnational climate actions has increased since our 2019 analysis. At the same time, our exploratory analysis on car manufacturers' EV sales targets in the EU-27 and UK, the US, and China showed the importance of incorporating Scope 3 emissions reduction targets to fully capture the potential impact of non-state and subnational climate actions. Future research should develop a robust methodology to incorporate the impact of actions on Scope 3 emissions.

While the momentum of non-state and subnational climate actions continues to build, this report finds that there is limited evidence of this ambition corresponding to realised impact, given limited GHG inventory data by which to assess progress. For 2020 targets, evidence from reported emission inventories indicates that half of individual subnational governments and 80% of individual companies are on track to deliver on their 2020 emission reduction targets. While these numbers do not entirely reflect 2020 emissions inventory data, which were largely unavailable at the time of analysis, this modest progress suggests that cities, regions, and companies will need to accelerate their actions to stay on track or achieve their 2030 targets.

Progress towards mid-term (post-2020 to 2035) targets is varied among individual subnational actors. While their emissions reduction trajectories are not necessarily linear, these results nevertheless indicate that cities and regions overall need to strengthen their effort, in close cooperation with national governments, to achieve their 2030 targets. For individual companies, the progress assessment of post-2020 targets show that about two-thirds of the absolute emissions reduction targets assessed are on track to be achieved or exceeded. Moreover, for roughly one-third of the targets, companies already reduced more than twice the pro-rated emissions reductions required in 2019. While these results are encouraging, further research is needed to assess the extent to which this progress is attributable mainly to companies' implementation efforts, to national and subnational governments' policy measures or to their targets not being more ambitious than business-as-usual (BAU) trajectories.

For ICIs, this study analysed survey responses on implementation progress from initiative focal points. Assuming a linear progression between lapsed time and target achievement, initiatives' several are on track to meet 80% of targets. However, it is important to note that many targets are relatively new and whether they will further progress is unknown at this stage. Moreover, in the forestry sector, self-reporting indicates that acceleration is needed to achieve current targets. The study also assessed 'output performance' of ICIs: results in 2020 show that 60% of mitigation initiatives produce partial or high outputs, which implies meeting the minimum criteria to achieve their desired social or environmental impacts. Mitigation ICIs have demonstrated stable annual performance through the COVID-19 pandemic. This contrasts with adaptation-focused ICIs, which have experienced performance decreases because of mobility restrictions to stem the effects of the pandemic and other financial and technical constraints. Further data would be required to complete a full assessment.

## 5.2 RECOMMENDATIONS

Based on the aforementioned findings, we provide several recommendations:

### *Data and monitoring*

- **Greater transparency and reporting needed to close the growing "accountability gap."** While momentum of non-state and subnational climate actions continues to build, this report finds that there is limited evidence of this ambition translating into realised impacts. Some of these actions are at an early stage of development and are yet to accelerate along an "S-shaped" curve of transformation (UNFCCC, 2021); however, it is also possible that our results suggest a widening "accountability" gap in non-state and subnational climate actions. Several initiatives and networks of cities, regions and companies continue to strengthen their efforts to encourage disclosure of relevant data and reporting that would close this gap, but there is still an overall need for greater transparency and accountability across a broader spectrum of non-state and subnational climate actions. As actors increasingly set long-term net-zero targets, regular assessments of progress and implementation toward near-term goals will be key for evaluating the credibility of these goals.
- **Historical time series data needed to examine trends.** Specifically on the continuous tracking of non-state and subnational actions, progress assessments would greatly benefit from consistent time series of historical GHG emissions. There are many cities, regions and companies that periodically report their annual GHG emissions as well as the historical time series to international networks or initiatives, but these datasets are not necessarily publicly available. Although advances in satellite remote sensing and statistical modelling have allowed for progress in systematic emissions data collection and estimation from various sources beyond aforementioned international initiatives and networks, it remains challenging to collect these data and process them to make them comparable) (Mueller *et al.*, 2020).
- **Holistic and comprehensive data encompassing multiple aspects of progress tracking.** Cities, regions, and companies report limited data tracking the "full cycle" of progress, implementation and impact that determine the impact of climate actions (Hale *et al.*, 2021). While our report provided a first progress tracking, it is limited to a few dimensions and indicators (i.e., emission reductions). Ideally, actors would report details on a range of inputs (e.g., policies, strategies) as well as outputs (e.g., activities and products) that would allow for a more complete understanding of where subnational and non-state actors are excelling and where they may require more support to accomplish their goals.

### *Implementation*

- **Early evidence suggests limited progress towards 2020 targets, requiring greater implementation towards post-2020 targets.** Analysis of reported greenhouse gas emission inventories indicates that only half of city governments and 80% of companies delivered on their 2020 emission reduction targets. While limited 2020 emissions data were available and it is possible greater achievement was realized, this modest progress suggests that cities, regions, and companies will need to accelerate their actions to stay on track for or achieve their 2030 targets.

### *Ambition*

- **Aligning mid-term ambition with national governments' long-term net-zero goals is necessary.** Many countries have set or strengthened 2030 emissions reduction targets and more are likely to follow suit in the coming months towards the COP26. There is an important opportunity for non-state and subnational actors to similarly enhance their ambition further for the mid-term future in accordance with the Paris Agreement's long-term goal of global net-zero emissions. Our findings from the progress assessment suggest that a substantial number of actors can already strengthen their mid-term targets.
- **Seizing post-COVID opportunity to develop long-term decarbonization strategy.** Together with national governments, non-state and subnational actors can also seize COVID-19 recovery opportunities to lay a solid foundation for transition towards net-zero emissions. Most of the government spending on rescue and recovery measures to stimulate the economy in the first months of the COVID-19 were not conducive to a low-carbon transition and it is essential that future opportunities are fully utilized to keep the Paris Agreement goal within reach (UNEP, 2020). Several recent studies show that cities, regions and businesses can play a crucial role in materialising sustainable and resilient recovery (Under2 Coalition, 2020; We Mean Business, 2020; Coalition for Urban Transitions, 2021).

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# GLOSSARY

**Cities:** Local governments that are administrative units of a specific geographical territory. For the purposes of this report, the term "cities" includes towns, urban communities, districts, and counties, as defined by the actors themselves and often also defined in the country's legal system.

**Climate action by subnational and non-state actors:** Any kind of activity that is directly or indirectly aimed at reducing GHG emissions or driving climate change adaptation and resilience that is led by these actors. Actions can be pursued individually (by one sub-national or non-state actor) or cooperatively in the form of initiatives (by a group of actors, including non-state and/or sub-national actors).

**Commitments by subnational and non-state actors:** Planned climate action as well as action currently under implementation, which has been publicly announced. Commitments can be put forward and pursued individually (by one sub-national or non-state actor) or cooperatively in the form of initiatives (by a group of actors, including non-state and/or sub-national actors).

**International Cooperative Initiative (ICI):** Multi-stakeholder arrangement through which subnational and non-state actors (e.g., cities, regions, businesses, NGOs, etc.) cooperate across border to mitigate or adapt to climate change, often in partnership with national governments or international organizations.

**Non-state actor:** Any actor other than a national government. This includes local and other sub-national governments, private actors, such as companies and investors, civil society and international organizations, among others.

**Quantifiable commitments to reduce greenhouse gas emissions:** For the purposes of this report, quantifiable commitments typically include a specific emissions reduction goal, target year, and baseline year (e.g., a goal to reduce emissions by 20% compared to 2000 levels by 2020). In addition, calculating these targets' mitigation impact requires baseline year emissions. (See Technical Annexes I and II for more details on how emissions reductions commitments are selected and quantified).

**Scope 1 emissions:** Direct emissions resulting from owned or controlled sources. See www.ghgprotocol.org for further details.

**Scope 2 emissions:** Indirect emissions resulting from purchased electricity, heat or steam. See www.ghgprotocol.org for further details.

**Scope 3 emissions:** Other indirect emissions not included in Scope 2 that are in the value chain of a reporting actor, including both upstream and downstream sources. See www.ghgprotocol.org for further details.

**Regions:** Subnational administrative units that are generally broader in population and in scope than cities. They usually have separate governing bodies from national and city governments but encompass lower administrative levels of government; often, they are the first administrative level below the national government. "Regions" in this report includes US and Indian states, German Länder, and Chinese provinces. Regions can also include councils of subnational governments acting together.

**Sub-national actor:** Any form of government that is not a national government, such as cities, sub-national states, provinces and regions.

# APPENDIX

## A1: CONSTRUCT OF HISTORICAL EMISSIONS TIME SERIES AND DEVELOPMENT OF CURRENT NATIONAL POLICIES (CNP) SCENARIO EMISSIONS PROJECTIONS

In this report, country-level emissions projections were developed based on projections from IEA World Energy Outlook 2019 (China, Brazil, EU, India, Japan, Russia, South Africa) and APEC Energy Demand and Supply Outlook 2019 (Canada, Indonesia, Mexico) for energy-related $CO_2$ emissions (APERC, 2019; IEA, 2019b), U.S. Environmental Protection Agency for non-$CO_2$ GHGs (U.S. EPA, 2019), PRIMAP data with the WEO 2019's industry emissions growth rate for non-energy $CO_2$ emissions (third-party data prioritised) (Gütschow *et al.*, 2019) and IIASA projections for land-use sector emissions (Kuramochi et al., 2019). Where relevant, historical emissions data are taken from the PRIMAP database (third-party data prioritised) (Gütschow *et al.*, 2019). These referenced studies are similar to those in Climate Action Tracker country assessments (Climate Action Tracker, 2021d) and provide sufficient sector resolution on energy use and emissions to allow for detailed impact quantification of non-state and subnational climate action in specific (sub-)sectors. While not all main climate and energy policies implemented in recent years are explicitly considered in these sources, the emissions projections for the ten major economies and the global total are found to be within the ranges estimated in the 2020 UNEP Emissions Gap Report (Kuramochi, den Elzen, *et al.*, 2020).

## A2: INTERNATIONAL COOPERATIVE INITIATIVES AGGREGATION

Table A1 presents the quantified global emissions reduction potential for 2030 of 20 selected ICIs compared to pre-COVID CNP scenario projections. See Technical Annex II for detailed quantification steps for each ICI. When we found large differences with our 2019 results, we explain the underlying reasons here.

ICIs marked with one asterisk (*) have updated their targets significantly since our last analysis. ICIs marked with two asterisks (**) are new to our analysis. For ICIs marked with three asterisks (***), we updated our quantification approach substantially (e.g., regarding membership assumptions).

**Table A1.** Global GHG emissions reduction potential of selected ICIs, under their current membership and targets and aspirational goals.

| Name of ICI | Scenario | Regions covered | Targets and goals quantified | Global GHG emission reduction potential in 2030, compared to CNP scenario ($GtCO_2e$/year) |
|---|---|---|---|---|
| **Energy Efficiency** | | | | |
| **United for Efficiency (U4E)** | Current | U4E or en.lighten countries (Global South only) | Realisation of country-level electricity savings potential as calculated by the initiative.[3] | 0.08 to 0.3 |
| | Aspirational | Global, except for highly developed countries | | 0.8 to 1.3 |
| **Industry Energy Accelerator (SE4All-IEA)**** | Current | Countries where SE4All-IEA has projects[4] | Realisation of targeted energy use reduction percentage. | 0.03 to 0.06 |
| | Aspirational | All non-OECD countries | | 0.04 to 0.08 |
| **Buildings** | | | | |
| **Architecture 2030** | Current | Global, with coverage percentage US and Canada 90%, EU-27+UK and China 30% and RoW: 1% in 2050 | Carbon neutrality for new buildings and major renovations (as compared to energy use from buildings in WEO). | 0.2 |
| | Aspirational | Global, with coverage percentage US and Canada 100%, EU-27+UK and China 50% and RoW: 5% in 2050 | | 0.3 |
| **Transport** | | | | |
| **Air Transport Action Group (ATAG)**** | Current | Global | Zero emissions in 2050, GHG emission potential in 2030 without offsets. | 0.09 to 0.2 |
| | Aspirational | | | |
| **Global Fuel Economy Initiative (GFEI)** | Current | GFEI member countries | Improve Light Duty Vehicle fuel economy by 50% by 2030 for new vehicles, and 2050 for all vehicles & Improve Heavy Duty Vehicle fuel consumption by 35% by 2035 for new vehicles. | 0.4 |
| | Aspirational | Global | | 0.4 |
| **Zero Emission Vehicles Alliance (ZEVA)**** | Current | Western Europe | All passenger cars fully electric by individual target year or 2050 latest. | 0.03 |
| | Aspirational | | | |
| **Lean & Green** | Not quantified separately (potential impact assumed to be fully overlapping with GFEI and ZEVA) | | | |
| **Urban Electric Mobility Initiative**** | Not quantified separately (potential impact assumed to be fully overlapping with GFEI and ZEVA) | | | |
| **EV100**** | Not quantified separately (potential impact assumed to be fully overlapping with GFEI and ZEVA) | | | |

3 https://united4efficiency.org/countries/country-assessments/

4 https://www.industrialenergyaccelerator.org/action/

**Table A1.** Global GHG emission reduction potential of selected ICIs, under their current membership and aspirational goals. (continued)

| Name of ICI | Scenario | Regions covered | Targets and goals quantified | Global GHG emission reduction potential in 2030, compared to CNP scenario ($GtCO_2e$/year) |
|---|---|---|---|---|
| **Renewable Energy** | | | | |
| **African Renewable Energy Initiative (AREI)** | Current | African Continent | 300 GW installed RE capacity by 2030. | 0.2 to 0.5 |
| | Aspirational | | | |
| **Global Geothermal Alliance (GGA)** | Current | Global | Five-fold growth in installed capacity for geothermal power generation and more than two-fold growth in geothermal heating by 2030, compared to 2014 levels. | 0.2 to 0.3 |
| | Aspirational | | | |
| **Business & Industry** | | | | |
| **RE100 Initiative*** ** | Current | Global | Electricity demand of RE100 members will be 100% renewable in 2030. We assumed a continued growth of membership and proportional growth of electricity demand. For further information on assumptions of the baseline RE demand, please see Annex II. Although these assumptions are in line with RE100's recent growth, this is not an official target or goal of RE100. | 0.05 to 0.1 |
| | Aspirational | Global | | 0.1 to 0.3 |
| **Science Based Targets initiative (SBTi)*** ** | Current | 10 major emitting economies | We quantified SBTi members' targets that are reported to CDP as approved SBTi targets. | 0.2 |
| | Aspirational | Global | We quantified SBTi's aspirational global emissions coverage of 5 $GtCO_2e$ in 2025, extrapolated to 2030.[5] For further information, please see Annex II. | 1.1 |

* Updated targets

** New to our analysis

*** Major update in quantification

5 https://sciencebasedtargets.org/resources/files/SBTiProgressReport2020.pdf

**Table A1.** Global GHG emission reduction potential of selected ICIs, under their current membership and aspirational goals. (continued)

| Name of ICI | Scenario | Regions covered | Targets and goals quantified | Global GHG emission reduction potential in 2030, compared to CNP scenario ($GtCO_2e$/year) |
|---|---|---|---|---|
| **Forestry** | | | | |
| **New York Declaration on Forests (NYDF)*** ** | Current | All endorsers of Declaration | Goal 1 (end natural forest loss) and Goal 5 (restore forests): global positive forestry emissions go to zero in 2030 (Goal 1), negative forestry emissions remain as projected | 1.3 |
| | Aspirational | Global | | 4.9 to 5.1 |
| **Governors' Climate and Forests Task Force** | Not quantified separately. Potential impact assumed to be fully covered by NYDF. | | | |
| **Bonn Challenge** | Not quantified separately. Potential impact assumed to be fully covered by NYDF. | | | |
| **Non-$CO_2$ GHGs** | | | | |
| **Climate and Clean Air Coalition (CCAC) (HFCs and methane)*** | Current | CCAC member countries | 40% reduction of $CH_4$ emissions by 2030 and 99.5% reduction of HFCs by 2050, both compared to 2010 levels. | 2.2 |
| | Aspirational | Global | | 5.2 |
| **Cities & Regions** | | | | |
| **C40 Cities Climate Leadership Group *** ** | Current | 10 major emitting economies | Individual city targets | 0.6 |
| | Aspirational | | | |
| **Global Covenant of Majors for Climate & Energy*** ** | Current | 10 major emitting economies | Individual city targets | 0.4 |
| | Aspirational | Global | We quantified GCoM's aspirational global coverage and ambition and compared it to a current policies baseline.[6] For further information, see Annex II. | 1.6 |
| **Under2 Coalition*** ** | Current | 10 major emitting economies | Individual region targets | 0.6 |
| | Aspirational | Global | We quantified Under2 Coalition's aspirational emissions reduction target of 80-95% in 2050, assuming linear realisation. We used Under2's population coverage as a proxy for emissions coverage in 2030, and applied the reduction target to the resulting emissions. For further information, please see Annex II. | 3.3 to 3.9 |

6 https://www.globalcovenantofmayors.org/impact2019/

In addition to the new quantification of current membership, the differences between our previous reports and the current report regarding GHG emission mitigation potentials result from a variety of other reasons. First, some ICIs updated their targets which naturally affects the GHG emission reduction potential. Secondly, for some initiatives (U4E, GFEI and NYDF), only the GHG emission reduction potential of current members is significantly lower than the result from our previous analysis, whereas the aspirational scenario potential roughly compares to the previous result. Hence, the GHG emission reduction potential of the aspirational membership of this analysis is similar to the GHG emission reduction potential of previous analyses. Second, the GHG emission reduction potential of the aspirational membership is higher based on the membership assumptions. For example, the GHG emission reduction potential of Architecture2030 is estimated to be higher than the potential presented in our previous report, as we assumed a larger aspirational coverage for the EU-27+UK and China (50%) than for our previous analysis (20%).

## A3: DATA CAR MANUFACTURERS ANALYSIS

**Table A2.** Car manufacturers and electric vehicle sales targets included in study (orange numbers are calculated based on absolute EV targets and the assumption that sales grow with national projected car sales).

| Name | Year | Target | Description |
|---|---|---|---|
| Toyota Motor Corporation | 2030 | 14%* | We will expand the product line-up according to customer needs while seeking global sales of more than 5.5 million electrified vehicles including 1 million or more battery electric vehicles (BEVs) and fuel cell electric vehicles (FCEVs), which are ZEVs, by 2030. (Toyota Motor Corporation, 2020) |
| Ford Motor Company | | 0% | We are investing more than $11.5 billion in electrification globally over five years. The all-electric Mustang Mach-E is being launched in the United States and Europe. Other zero-emission vehicles include Ford Escape and Lincoln Aviator plug-in hybrids, the Territory EV in China and an all-electric Transit in Europe and North America for the 2022 model year. (Ford Motor Company, 2020) |
| Fiat Chrysler Automobiles | | | By 2022, we expect to offer more than 30 nameplates with electrified powertrains. (FCA, 2020) |
| Volkswagen Group | 2025 | 22.5% | By 2025, the share of battery electric vehicles in our model portfolio will be between 20 and 25%. The share of electric vehicles in the Group fleet is to rise to at least 40%by 2030. (Volkswagen AG, 2019) |
| | 2030 | 40% | The Volkswagen Group intends to launch almost 70 new electric models on the market in the next ten years – instead of 50 as previously planned. This means a rise in the number of electric vehicles projected for the next decade that are to be built on the Group's e-platforms from 15 million to 22 million. The proportion of the fleet that is electric should rise to at least 40% by 2030. As early as this year, the first new generation of electric cars will go into production. (Volkswagen AG, 2020) |

**Table A2.** Car manufacturers and electric vehicle sales targets included in study (orange numbers are calculated based on absolute EV targets and the assumption that sales grow with national projected car sales). (continued)

| Name | Year | Target | Description |
|---|---|---|---|
| BMW | 2025 | 25% | 7 million electrified vehicles delivered by 2030. ≥ 25 %proportion of electrified vehicles in total deliveries by 2025 |
| | 2030 | 50% | Electric vehicles will make up Half of sales by 2030. (BMW, 2020)<br>(announcement) ELECTRIFIED VEHICLES: The BMW Group uses the terms Battery Electric Vehicle (BEV) to denote fully electric vehicles and Plug-in Hybrid Vehicle (PHEV) to denote vehicles that can be charged and driven on a fully electric basis. (Forbes, 2021) |
| Honda | 2030 | 66.7% | Honda has been working to achieve the target of electrifying two-thirds of its global automobile sales by 2030. 2030: Two-thirds of automobiles sold to be electrified vehicles. (Honda, 2020) |
| General Motors | 2025 | | By mid-decade, our intent is to sell a million EVs per year in our two largest markets North America and China, where we are working with our joint venture partners. (General Motors, 2019) |
| | 2030 | 70% | (announcement) 100% electric by 2035. (Gearino, 2021)<br>GM to go all-electric by 2035, phase out gas and diesel engines. (NBC News, 2021)<br>Interpolated between 2018 and 2035 to get 2030 target |
| Nissan | 2022 | 18%* | We are aiming for annual aggregate sales of 1 million 100% electric vehicles (EVs) and e-POWER vehicles by fiscal 2022. (Nissan Motor Corporation, 2020) |
| Mazda | 2030 | 5% | We expect that by 2030, internal combustion engines combined with some form of electrification technology will account for 95% of the vehicles we produce and that battery EVs will account for 5%. (Mazda, 2020) |
| Tesla | 2030 | 100% | (Tesla, 2019) |
| Daimler AG/ Mercedes-Benz | 2025 | 25% | Depending on how conditions develop, we plan to have all-electric vehicles account for up to 25% of unit sales by 2025. |
| | 2030 | 50% | Goal is to have plug-in hybrids or all-electric vehicles account for more than 50% of its car sales by 2030. (Daimler AG, 2019) |
| Peugeot | 2025 | 50% | Based on its technological offer and especially its line of vehicles to be 100% electrified by 2025: achieve more than 50% of Group sales with electric, fuel cells and hybrid vehicles with an emission-free mode; deploy state-of-the-art after-treatment systems for internal combustion vehicles in all countries where the Group operates. (PSA Groupe, 2019) |
| Renault | 2025 | 50% | Half of launches in Europe being full EVs, with higher margin contribution than ICE (in €). Challenger in hybrid market with 35% hybrid mix. (Groupe Renault, 2021) |
| Geely | 2025 | 35% | By 2020 Geely aims for 90% of its vehicle sales to consist of new energy vehicle sales.<br>(announcement) Geely expects that by 2020 its new energy sales will be split into 65% PHEV and HEV and 35% EV. (Geely Auto Group, 2015; Bloomberg, 2021)<br>As Geely has not met its EV share target in 2020, we assume it will be met in 2025. |

* target is calculated based on number of targeted electric vehicles and growth projections of total vehicles from national studies.

# GLOBAL CLIMATE ACTION FROM CITIES, REGIONS AND BUSINESSES

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