INITIATIVE FOR
Climate Action
Transparency

NewClimate Institute, World Resources Institute, CDP, The Climate Group

Non-State and Subnational Action Guidance

Guidance for integrating the impact of non-state and subnational mitigation actions into national greenhouse gas projections, targets and planning

First Draft, 26 July 2017

PART I: INTRODUCTION, OBJECTIVES AND KEY CONCEPTS

1. INTRODUCTION

The challenge of climate change requires a concerted effort by national governments and a diverse range of non-state and subnational actors, such as states and cities, businesses and civil society. Non-state and subnational climate action is needed to implement national mitigation contributions and targets, but can also go beyond them. It is therefore necessary that non-state and subnational actors are fully integrated into the national vision and are well coordinated with national policies to ensure buy-in and to fully realise the mitigation potential of a country.

1.1 Context for non-state and subnational action

The Paris Agreement recognises the importance of non-state and subnational actions and explicitly encourages non-state and subnational actors to scale up their climate actions.[1] Globally, there is an acceleration of non-state and subnational action with a growing number of commitments and initiatives being announced and implemented, which can have a direct impact on national emissions trajectories, national policy implementation and the achievement of national targets. At the same time, national governments often do not yet fully consider the impacts of mitigation activities of actors other than national governments themselves when determining national climate policies and preparing nationally determined contributions (NDCs).[2] Better understanding of climate actions at different scales and by different actors in a country can result in more realistic and comprehensive targets and effective policy planning to achieve these targets.

National governments may be unaware of the various climate mitigation actions undertaken by companies, investors, cities, states and regions; unsure about the extent to which those actions are a means toward achieving national climate targets or go beyond them; or unable to reflect the impact of those actions in national greenhouse gas (GHG) projections, target setting and planning. While monitoring of historic GHG emissions automatically, even only implicitly, reflects all emissions reductions efforts undertaken within a country, including those that were not driven by national governments,[3] explicitly taking into account non-state and subnational mitigation actions can contribute to accurate and comprehensive projections and inform effective planning and policies. It can also help countries identify promising subnational and non-state approaches that can be scaled up or supported by the national government or other partners.

Especially against the background of future contributions submitted by countries, climate mitigation projections play an ever more important role not only in identifying national and sectoral pathways and devising policies, but also in understanding whether countries will be able to reach their NDC targets. Current policy projections that help estimate future emission pathways often focus on national policies and do not explicitly account for other actions.

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[1] UNFCCC 2015, par. 135.

[2] Some national governments include state action in their national projections, for example the United States and Canada.

[3] Although not attributing changes in emissions to individual actions.

National government, subnational and non-state action together can lead to ambitious emission reductions and mutually reinforce each other. Recent research has shown that, when taken into account, non-state and subnational action can lead to emission reductions above and beyond those achieved by national policies alone.[4] To increase the accuracy of policy projections and gauge ambition at the policy level, there is thus compelling rationale for including the impact of non-state and subnational action in national climate analysis. Additionally, more comprehensive understanding of how non-state and subnational actions fit within overall national emissions projections, targets and policies can help ground-truth those actions by balancing intended emission reduction activities with the projected activities of other non-state and subnational actors.

However, policy makers face many challenges when attempting to identify, quantify and integrate the impact of non-state and subnational action into their own models and GHG emission projections and planning. These include data availability and data gaps, lack of harmonised data and common indicators, uncertainty about the attainment of targets, and the conversion of non-state and subnational actions and national policies to common metrics, among others. This document aims to offer solutions to these challenges by providing guidance to policymakers and other stakeholders to carry out comprehensive and targeted assessments of the impact of non-state and subnational climate action.

1.2 Purpose of the guidance

This guidance is intended to support efforts to identify, quantify and integrate the impact of non-state and subnational mitigation action into national and/or sectoral mitigation assessments and scenarios, policy development, policy evaluation and target setting through a step-by-step approach.

In addition, by improving awareness and understanding of the emission reduction potential from non-state and subnational mitigation action, it aims to help raise confidence for national governments to set realistic and potentially more ambitious climate mitigation targets and develop accurate and comprehensive projections accordingly. It also aims to improve coordination and communication between national, non-state and subnational actors for more efficient decision making to help national goverments put in place the right policies which in turn could provide confidence to non-state and subnational actors to set more ambitious targets themselves.

It thus enables policymakers to systematically gather and assess information about the impact of non-state and subnational climate action with a view to inform policy making and GHG emission projections. This forward-looking guidance is therefore fundamentally different from existing national GHG accounting guidance which covers all past/current emissions by all actors within a country jurisdiction including non-state and subnational.

By applying the guidance to the national or sectoral context, it can help policymakers answer the following questions, among others:

- What non-state and subnational climate actions are occuring in the country?
- Which of those actions will have a climate mitigation impact in the country or a specific sector?
- How big is their impact for a country-wide or sectoral mitigation pathway?

[4] UNEP 2016a.

- Which of these actions reinforce existing national and sectoral policies, or which go beyond and by how much?
- How can non-state and subnational action contribute to meet or overachieve NDC mitigation targets, and can targets be increased?
- Based on an analysis of potential impacts from non-state and subnational action, what opportunities exist for future national and international policies?

1.3 Intended users

This guidance is intended for use primarily by national government agencies, research institutions and non-governmental organisations (NGOs), but can also be used by non-state and subnational actors to inform their own actions and understand the relationships between subnational and national action. Throughout this guidance, the term "user" refers to the person implementing the guidance.

The following examples demonstrate how different types of users can use the guidance:

- **National government agencies**: Identify, quantify and integrate the impact of non-state and subnational mitigation action into national and/or sectoral mitigation assessments and scenarios, policy development, policy evaluation and target setting.
- **Research institutions and NGOs**: Identify and quantify the impact of non-state and subnational mitigation action to assess their mitigation potential in comparison to national policies or the NDC or provide support to decision makers.
- **Non-state and subnational actors**: Identify and quantify the impact of non-state and subnational mitigation action to assess their mitigation potential towards meeting and/or supplementing sectoral, national and international climate policy targets.

1.4 Scope and applicability of the guidance

The following topics are included in the scope of this guidance:

- Objectives for conducting an assessment of non-state and subnational action impacts.
- Key concepts and principles underlying the assessment of non-state and subnational action impacts.
- Assessment steps to identify, quantify and integrate the impact of non-state and subnational action into national greenhouse gas projections, targets and planning.
- Documenting results.

The guidance provides principles, concepts and procedures applicable to all types of non-state and subnational climate mitigation actions. It details a general process for users to follow when conducting an assessment, but it does not prescribe specific calculation methodologies, tools or data sources. Chapter 8 provides more information on possible methods and models that can be used to determine emission reduction potentials for specific non-state and subnational actions.

In order to respond to various user objectives, the guidance can provide for tailored options outlined in a stepwise approach. This allows users to skip through parts that are less relevant for their analysis. The guidance also contains examples and case studies (to be developed) that illustrate its applicability.

While this guidance suggests a specific methodology for conducting the assessment, users may consider an alternative order of steps. For example, users can carry out Chapters 5 and 7 in any order. Changing the order of steps should only be considered on a case-by-case basis and depends on the objective of the assessment.

The guidance focuses on those activities by subnational and non-state actors whose main objective is to mitigate climate change or related outcomes, such as increasing renewable energy generation. Further, the guidance also covers activities with an objective other than climate change mitigation, but where GHG emission reductions result as a broader sustainable development benefit. For example, collaborative international initiatives to improve air quality, which also reduce GHG emissions (see Box 1.1 for further discussion). While also recognising the equal importance of adaptation, due to significant differences in metrics and approaches and given that it is not currently considered in GHG emission projections, specific impacts of actions in this area are not further considered but could potentially be explored in the future.

Box 1.1: Sustainable development impacts of non-state and subnational climate mitigation actions

Sustainable development impacts describe wider economic, social and environmental national development impacts or outcomes, beyond climate change mitigation. For example, a state government initiative targeting emissions reductions or energy savings, may have multiple benefits including climate change mitigation, improved air quality, positive impacts on health, and increased crop yields. These in turn can lead to reduced public spending for health or rural job creation and enhanced agriculture exports, which can further help with poverty reduction. For more information on how to assess these broader impacts, refer to the ICAT *Sustainable Development Guidance*.

The guidance is intended for ex-ante, forward-looking assessments to assess the expected future impacts of non-state and subnational action. Ex-post assessments are not included in this guidance, although they can be helpful for guiding future plans. The forward-looking approach of the guidance means that it can be applied on an ongoing basis as new non-state and subnational mitigation actions are implemented and more information becomes available.

The guidance is framed by larger topics on the interaction between governments and non-state and subnational actors. For example, the Paris Agreement explicitly encourages governments to work more closely with those actors.[5] The guidance aims to help inform these discussions without specifically addressing them. Users interested in these larger considerations might want to consult organisations who are already working on these topics, including adelphi, C40, CDKN, the Green Growth Best Practice Initiative (GGBP), LEDS Global Partnership on policy integration between the non-state/subnational and national level); and the European Commission, German Development Institute/Deutsches Institut für Entwicklungspolitik (DIE), OECD and UN Global Compact among others on non-state/subnational adaptation action.

The following topics are therefore not included in the scope of this guidance:

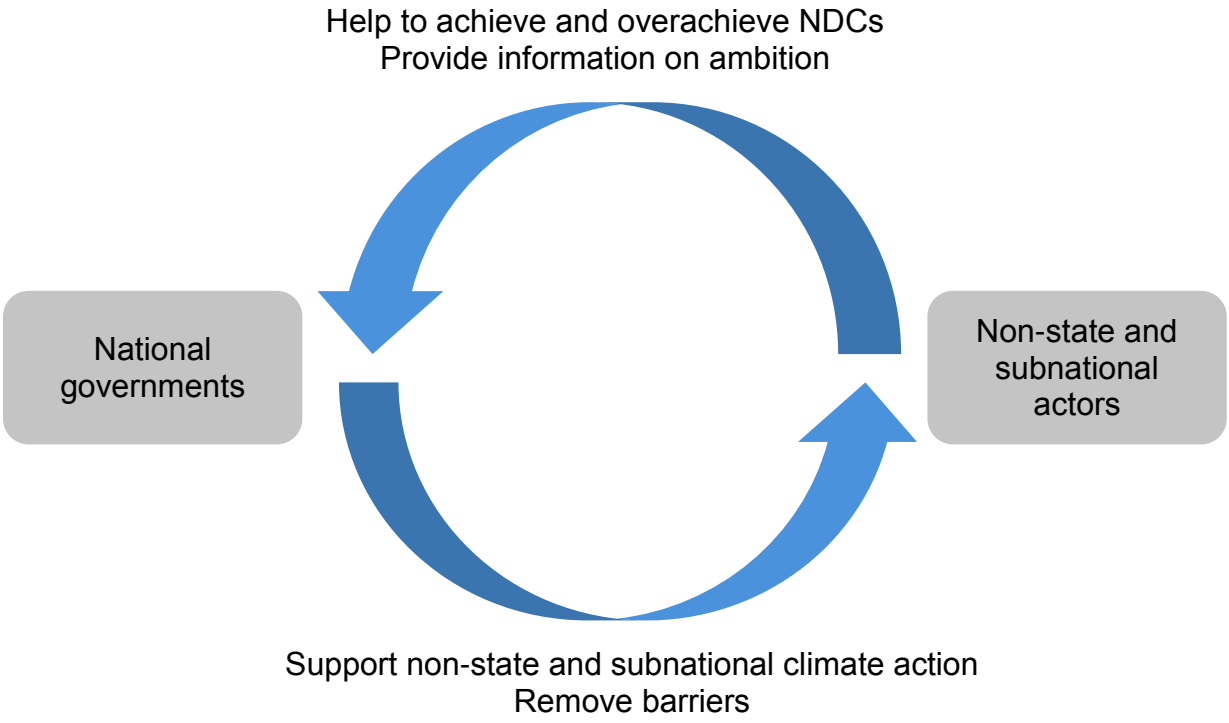
- What can governments do to promote (voluntary) non-state action within their country?

[5] UNFCCC 2015, par. 119.

- Which options exist to engage non-state and subnational actors in the country?
- How can national governments and non-state/subnational actors work together more effectively?
- How can non-state and subnational action policies be better integrated into national policies and vice-versa?
- How can national governments and non-state/subnational actors work towards using comparable GHG accounting methodologies, assumptions, reporting formats and target metrics?

When applying the guidance, users should bear in mind that national government and non-state and subnational mitigation action can mutually reinforce each other, as shown in Figure 1.1. However, in many cases it is impossible or unnecessary to determine which action comes first. In fact, non-state and subnational actors and national governments operate in one system, where governments set the rules and regulations of the economic activitiy in their juridisction. Except for a very small amount of direct emissions from government activities, a majority of emissions, and therefore emissions reductions (or growth) in most countries, comes from non-state and subnational actors. At the same time, these reductions are often influenced by or are a result of government policies.

Figure 1.1: Relationship between national and non-state/subnational climate action



1.5 Key recommendations

This guidance includes key recommendations to follow when assessing and reporting impacts. Key recommendations are intended to assist users in producing credible impact assessments that pursue high quality and are based on the principles of relevance, completeness, consistency, transparency, comparabilty and accuracy.

The key recomendations focus on the critical steps that users are suggested to follow, rather than on any specific methods, models or tools. They focus more on the "what" users should do than the "how" they should do it. The guidance that accompanies each key recommendations expands on the "how."

Key recommendations are indicated in subsequent chapters by the phrase "It is a *key recommendation* to…." They are also compiled in a checklist at the beginning of each chapter.

Key recommendations are provided as an option to users that want to assess and report impacts according to a consistent set of steps and approaches. Users that want to follow a more flexible approach may choose to use the guidance without adhering to them. The ICAT *Introductory Guide* provides further description of how and why key recommendations are used within the ICAT guidance documents, as well as more information about following either the "key recommendations" or "flexible approach" when using the guidance.

1.6 Relationship to other guidance

This guidance is part of the Initiative for Climate Action Transparency (ICAT) series of guidance for assessing impacts of policies and actions. It is intended to be used in parallel with any other ICAT guidance documents that users choose to apply, including:

- Sector-level guidance for assessing greenhouse gas impacts of policies and actions in the energy, transport, agriculture and forestry sectors
- Sustainable development guidance on how to assess the environmental, social and economic impacts of policies and actions
- Transformational change guidance on how to assess the transformational impacts or potential of policies and actions
- Stakeholder participation guidance on how to carry out effective stakeholder participation when designing and assessing policies and actions
- Technical review guidance on how to review assessment reports, covering the impact of non-state and subnational actions, and greenhouse gas, sustainable development and transformational impacts

The series of ICAT guidance is intended to enable users that choose to assess the greenhouse gas impacts, sustainable development impacts and transformational impacts of a policy or action to do so in an integrated and consistent way within a single impact assessment process. Users should refer to the ICAT *Introductory Guide* for a more detailed description of how to apply the ICAT guidance documents in combination.

1.7 Process for developing the guidance

This guidance was developed through an inclusive, multi-stakeholder process convened by the Initiative for Climate Action Transparency. Its development is led by project team composed of NewClimate Institute (lead), World Resources Institute, The Climate Group and CDP. The draft was developed by the project team with inputs from a Technical Working Group. The Technical Working Group consisted of experts and stakeholders from a range of countries identified through a public call for expressions of

interest. The Technical Working Group contributed to the development of the technical content for the guidance through participation in regular meetings and written comments.

A Review Group will provide written feedback on multiple drafts of the guidance. The draft will also be circulated for public consultation more broadly. The draft guidance will be tested with interested countries to ensure that it can be practically implemented, gather feedback for its improvement and provide case studies for the final publication. Anyone interested in testing the guidance is encouraged to get in touch with the ICAT team.

ICAT's Advisory Committee provided strategic advice to the initiative. More information about the guidance development process, including governance of the initiative and the participating countries, is available on the ICAT website.

All contributors are listed in the "Contributors" section.

2. Objectives of Integrating the Impact of Non-State and Subnational Actions into National GHG Projections, Targets and Planning

This chapter provides an overview of objectives users may have in assessing the impacts of non-state and subnational climate actions. Determining the assessment objectives is an important first step, since decisions made in later chapters are guided by the stated objectives.

Checklist of key recommendations

- Determine the objectives of the assessment at the beginning of the impact assessment process

Recognising that governments have limited resources and that resources can vary significantly between countries, this guidance offers a tailored approach based on the assessment objectives of users.

It is a *key recommendation* to determine the objectives of the assessment at the beginning of the impact assessment process. Table 2.1 provides an overview of possible objectives of the assessment, including examples. Options are divided into comprehensive (or nationwide) and more targeted (or sector specific) assessments. For example, users might be interested in determining the impact of non-state and subnational action on an emissions pathway for the transport sector because they would like to make more accurate projections for the transport electrification scenario (targeted assessment) or because they would like to identify opportunities for future national policies (comprehensive assessment). The chosen objective of the assessment links to specific actions in subsequent chapters in this guidance which can differ in format and resource requirements. This allows users to skip through parts of the guidance which are less relevant for their assessment.

Table 2.1: Examples of objectives for the assessment requiring comprehensive or targeted approach

Objectives requiring a comprehensive (national level) assessment	Objectives requiring a targeted (sector level) assessment
• Determine untapped nationwide emission reduction potential to decide how to meet national climate change targets, i.e., how much additional mitigation potential do non-state and subnational action have which can help go beyond existing national climate mitigation targets? • Determine how non-state and subnational action contribute to the national climate change plan or the NDC • Help determine the emissions gap at the national level, i.e., taking into account subnational and non-state	• Determine untapped sector-wide or subsector-wide emission reduction potential; i.e., how much additional mitigation potential do non-state and subnational action have which can help go beyond existing sector level targets? • Determine how non-state and subnational action contribute to a sectoral climate change plan or scenario • Help determine the emissions gap at the sector level, i.e., taking into account subnational and non-state action, how much more sector-level action is needed to achieve the sector NDC target? • Improve climate mitigation projections or revise target(s), e.g., revise a renewable energy target • Determine how non-state and subnational action

action, how much more national action is needed to achieve the NDC target? • Improve climate mitigation projections or revise economy-wide target(s), e.g., revise an economy-wide emission reduction target	impacts the ambition set out in one particular policy instrument, e.g., to what extent can non-state and subnational action contribute to national policies to phase out HFCs • Determine opportunities for engagement with non-state and/or subnational actors, i.e., identify subsectors where engagement would significantly promote more non-state and subnational action

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3. KEY CONCEPTS, STEPS AND ASSESSMENT PRINCIPLES

This chapter introduces key concepts contained in this guidance, an overview of the steps involved, and outlines principles to help guide the assessment.

Checklist of key recommendations

- Base the assessment on the principles of relevance, completeness, consistency, accuracy, comparability and transparency

3.1 Key concepts

This section provides an overview of key concepts used throughout the guidance.

Non-state and subnational actors

A non-state actor is any actor other than a national and subnational government. This includes private actors, such as companies and investors, civil society and international organisations, among others.

A subnational actor is any form of government which is not a national government, such as cities, states, provinces and regions.

Non-state and subnational mitigation action (non-state and subnational action)

Non-state and subnational action is any kind of activity that is directly or indirectly aimed at reducing GHG emissions and that is led by non-state and subnational actors. Actions can be put forward and pursued individually (by *one* subnational or non-state actor) or cooperatively in the form of initiatives (by a *group* of actors, including non-state and/or subnational actors). A huge variety of individual and collaborative actions exist (see examples below), ranging from general statements calling for action to specific, quantifiable targets for reducing emissions. Many of these actions are voluntary for the actor(s), in particular those led by non-state actors.

Examples of non-state action include:[6]

- Iberdrola, a Spanish utility, aims to reduce direct CO_2e emissions by 91% from 2007 to 2050 through increased energy efficiency and renewable energy installations
- ACC, India (a cement company) aims to reduce operational CO_2e emissions intensity by 35% per tonne of product from 1990 to 2017 through increased energy efficiency
- ANZ Bank of Australia issues green bonds worth USD 470 million for projects in renewable energy and energy efficiency in buildings
- Mahindra Lifespace Developers Limited (an Indian investor) aims to reduce operations CO_2e emissions intensity by 10% per square meter from 2012 to 2020 through increased energy efficiency and solar energy installations

Examples of subnational action include:[6]

- The city of Glasgow aims to reduce CO_2e emissions from government operations by 30% from 2005 to 2020
- The province of Alberta is committed to reduce methane emissions from the oil and gas sector by 45% by 2025
- The Oriental Region of Morocco has pledged to increase the share of renewables for the community to 42% by 2020

Examples of international collaborative non-state and/or subnational action include:

- The RE100 initiative where a group of companies from different countries commits each to procure 100% of their electricity consumption from renewable energy[7]
- The Alliance of Peaking Pioneer Cities (APPC) in China where 42 cities have pledged to peak their emissions ahead of the national target (i.e., 2030)[8]
- The CCAC Agriculture Initiative where several international organisations and countries aim at reducing methane and black carbon emissions from key agricultural sectors by sharing and implementing best practices.[9]

Non-state and subnational commitments

Non-state and subnational commitments refer to planned non-state and subnational action which have been publicly announced. However, in contrast to the non-state and subnational actions, implementation of the action is not yet underway. An example is the "Science Based Targets Initiative" where companies commit to develop a science-based target within 24 months after their public announcement.[10] In practice though, the difference between commitments and action is often not clear. For example, planning how to implement a target could be considered an action.

This guidance therefore applies to both existing actions underway and planned commitments. Apart from a specific section on how to treat commitments (Chapter 6), hereafter this guidance uses the generic term "action" rather than referring to commitments and actions separately.

National policies and actions

National policies and actions are interventions taken or mandated by a national government, which may include laws, directives, decrees, regulations, standards, incentives and other types of policy instruments

[6] Examples taken from UNFCCC's NAZCA platform. For more information, see: http://climateaction.unfccc.int/

[7] Further information on RE100 is available at: http://there100.org/re100

[8] Further information on APPC is available at: http://appc.ccchina.gov.cn/archiver/APPC/UpFile/Files/Default/20160707172605704491.pdf

[9] Further information on the CCAC Agriculture Initiative is available at: http://www.ccacoalition.org/fr/node/76

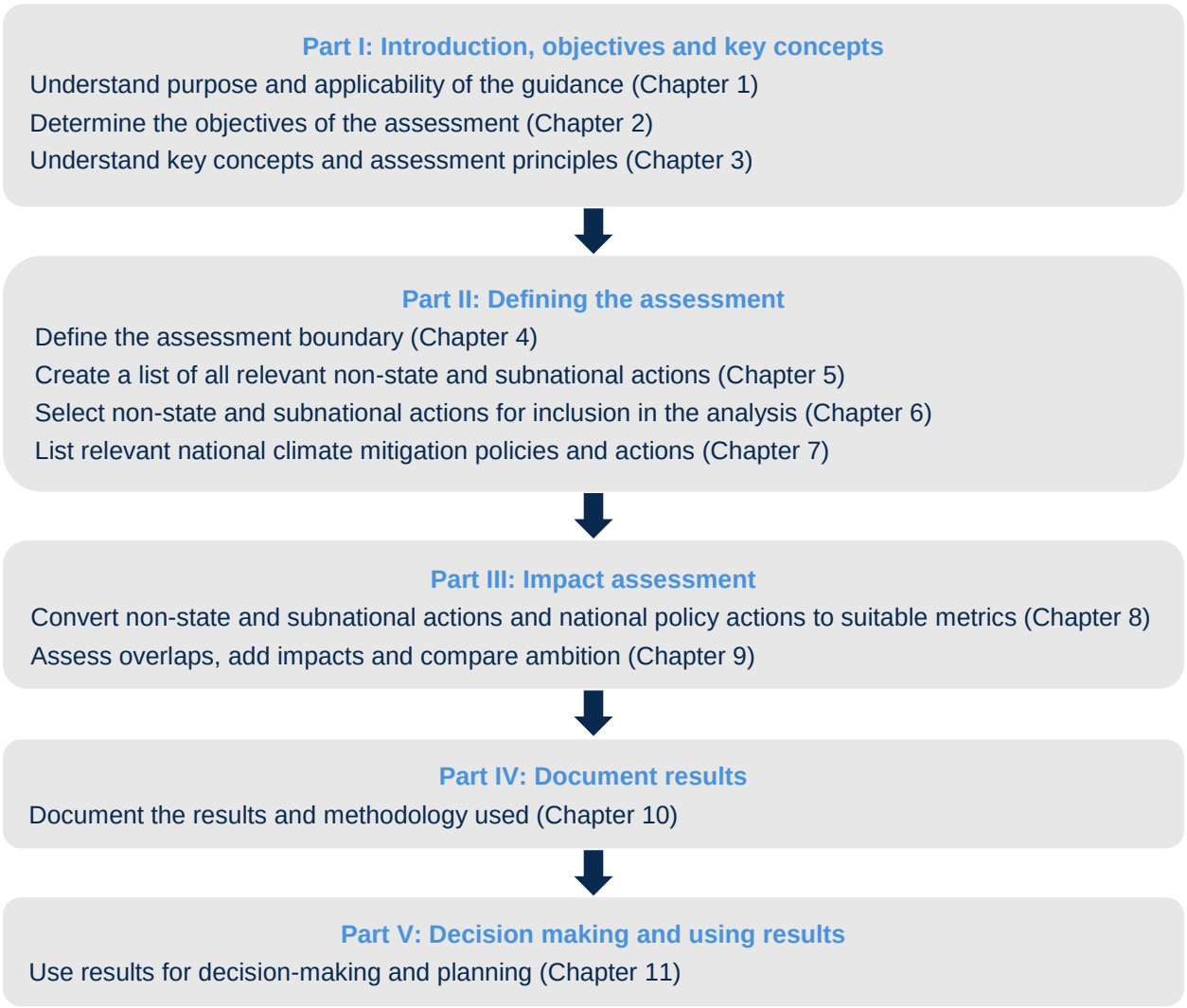
[10] Further information on the Science based Targets Initiative is available at: http://sciencebasedtargets.org/

aimed to achieve a specific target.[11] These also apply to non-state and/or subnational actors within the national jurisdiction.

3.2 Overview of steps

This guidance is organised according to the steps a user follows in assessing the impacts of non-state and subnational action and integrating these actions into national greenhouse gas projections, targets and planning (Figure 3.1). Steps are organised by chapters. Depending on when the guidance is applied and the objectives chosen, users may skip certain steps (chapters). Detailed guidance on which steps users can skip is provided in Part II.

Figure 3.1: Overview of key steps



[11] WRI 2014.

3.2.1 Planning the assessment

It is important to plan the steps, responsibilities and resources needed to meet the objectives for assessing non-state and subnational impacts. The time and human resources required to use the guidance in its entirety depend on a variety of factors, such as whether it is national or sectoral assessment, the range of non-state and subnational actions selected, the extent of data collection needed and whether relevant data has already been collected.

Planning stakeholder participation

Stakeholder participation is recommended in many steps throughout the guidance. It can strengthen the assessment in many ways, including by:

- Providing a mechanism through which stakeholders who are familiar with or likely to be affected by non-state and subnational actions are provided with an opportunity to raise issues and to have these issues considered in the assessment
- Build understanding, participation and support for national or sectoral targets or policies or projections among stakeholders
- Faciliating buy-in from stakeholders for assessment objectives and its results
- Raising awareness and enabling better understanding of complex issues for all parties involved, building their capacity to contribute effectively
- Building trust, collaboration, shared ownership and support for actions among stakeholder groups, leading to less conflict and greater impact
- Addressing stakeholder perceptions of risks and impacts and helping to develop measures to reduce negative impacts and enhance benefits for all stakeholder groups, including the most vulnerable
- Enhancing the credibility, accuracy and comprehensiveness of the assessment, drawing on diverse expert, local and traditional knowledge and practices, for example, to provide inputs on data sources, methods, and assumptions
- Enhancing transparency, accountability, legitimacy and respect for stakeholders' rights
- Enabling enhanced ambition and finance by strengthening the underlying assessment to integrate non-state and subnational actions in national/sectoral scenarios or policies

Various sections throughout this guidance explain where stakeholder participation is recommended—for example, in creating a list and selecting relevant non-state and subnational actions to assess (Chapter 5 and 6), assessing overlaps and comparing ambition (Chapter 9), documenting results (Chapter 10) and decision making and using results (Chapter 11).

Before beginning the assessment process, consider how stakeholder participation can support the objectives and include relevant activities and associated resources in the assessment plans. It may be helpful to combine stakeholder participation for non-state and subnational impact assessment with other participatory processes involving similar stakeholders, such as those being conducted for the assessment of GHG and sustainable development impacts in the same sector.

It is important to ensure conformity with national legal requirements and norms for stakeholder participation in public policies as relevant, as well as requirements of specific donors and of international treaties, conventions and other instruments that the country is party to. These are likely to include requirements for disclosure, impact assessments and consultations, and may include specific requirements for certain stakeholder groups (e.g., UN Declaration of the Rights of Indigenous Peoples, International Labour Organisation Convention 169) or specific types of policies and actions (e.g., UNFCCC guidance on safeguards for activities reducing emissions from deforestation and degradation in developing countries).

During the planning phase, it is recommended to identify stakeholder groups that may be affected by or may influence the assessment. Appropriate approaches should be identified to engage with the identified stakeholder groups, including through their legitimate representatives. To facilitate effective stakeholder participation, consider establishing a multi-stakeholder working group or advisory body consisting of stakeholders and experts with relevant and diverse knowledge and experience. Such a group may advise and potentially contribute to decision making to ensure that stakeholder interests are reflected in the assessment. It is also important to ensure that stakeholders have access to a grievance redress mechanism to secure adequate protection of stakeholders' rights related to the impacts of non-state and subnational actions.

Refer to the ICAT *Stakeholder Participation Guidance* for more information, such as how to plan effective stakeholder participation (Chapter 4), identify and analyse different stakeholder groups (Chapter 5), establish multi-stakeholder bodies (Chapter 6), provide information (Chapter 7), design and conduct consultations (Chapter 8) and establish grievance redress mechanisms (Chapter 9). Appendix B summarises the steps in this guidance where stakeholder participation is recommended along with specific references to relevant guidance in the *Stakeholder Participation Guidance*.

Planning technical review (if relevant)

Before beginning the assessment process, consider whether technical review of the assessment report will be pursued. The technical review process emphasises learning and continual improvement and can help users identify areas for improving future assessments. Technical review can also provide confidence that the impacts of non-state and subnational actions have been estimated and documented according to ICAT key recommendations. Refer to the ICAT *Technical Review Guidance* for more information on the technical review process.

3.3 Assessment principles

This section outlines key principles for the identification, quantification and integration of impacts of non-state and subnational actions and commitments.[12] These principles underlie the step-by-step approach presented in the following chapters. It is a *key recommendation* to base the assessment of non-state and subnational action impacts on the principles of relevance, completeness, consistency, accuracy, comparability and transparency.

[12] Adapted from WRI 2014.

- **Relevance**: Ensure that the assessment appropriately reflects the incremental (additional) GHG impacts of non-state and subnational action and serves the decision-making needs of policymakers. Users should apply this principle when selecting the desired level of accuracy and completeness among a range of methodological options.
- **Completeness**: Include all significant non-state and subnational mitigation impacts in the mitigation assessment boundary. Disclose and justify any specific exclusions. To support users with the analysis, especially as data availability can represent a significant challenge for many countries, this guidance provides an overview of the principal international databases for non-state and subnational action (Appendix A).
- **Consistency**: The step-by-step approach provides recommendations on how to overcome the many differences in accounting approaches for non-state and subnational action, as well as data collection and calculation methods. It is recommended to consistently use this approach to allow for meaningful performance tracking over time. Eventually this may lead to more consistent accounting approaches, data collection and calculation methods of non-state and subnational action itself. Users should transparently document any changes to the data, assessment boundary, methods, or any other relevant factors in the time series.
- **Accuracy**: Given the constraints of non-state and subnational action (often voluntary commitments and with limited accountability), it is important to achieve sufficient accuracy to enable users and stakeholders to make appropriate and informed decisions with reasonable confidence as to the integrity of the reported information. Accuracy should be pursued as far as needed for the objectives.
- **Comparability**: Current non-state and subnational action and initiatives are very difficult to compare, owing to different methodologies, data sources, assumptions, objectives and reporting formats. This document offers guidance to enhance comparability. Users should exercise caution when comparing the results of non-state and subnational action. Differences in reported emissions impacts may be a result of differences in methodology or GHG accounting rather than real-world differences. Additional measures are necessary to enable valid comparisons, such as consistency in the timeframe of the assessments, the types of impacts included in the assessment boundary, baseline assumptions, calculation methodologies, methods for assessing policy interactions, and data sources. Additional consistency can be provided through GHG reporting programmes or more detailed sector-specific guidance. To understand whether comparisons are valid, all methodologies, assumptions and data sources used must be transparently documented.
- **Transparency**: Users should provide clear and complete information for internal reviewers to assess the credibility and reliability of the results. Users should also document data sources, calculations, assumptions and uncertainties. Similarly, to the extent possible, they should also document the processes, procedures and limitations of the assessment in a clear, factual, neutral and understandable manner (detailed further in Part III).

Given the often voluntary and sometimes uncertain nature of non-state and subnational action, users should also consider being conservative (cautious) about their estimates. Just how cautious estimates should be depends on the objectives and the intended use of the results as well as on data/information

availability. This document provides further guidance on what approach to use and when to be cautious in the step approach outlined in part II of this guidance.

In practice, users of this guidance may encounter trade-offs between principles when developing an assessment of non-state and subnational action. For example, governments may find that achieving the most complete assessment requires using less accurate data for a portion of the assessment, which would trade off overall accuracy. Conversely, achieving the most accurate assessment may require excluding sources or effects with low accuracy, compromising overall completeness. Users should balance trade-offs between principles depending on their objectives. Over time, as the accuracy and completeness of data increases, the trade-off between these accounting principles will likely diminish.[13]

3.4 Common challenges around quantification and integration

Users may encounter multiple challenges when trying to identify, quantify and integrate the impact of non-state and subnational action into national or sectoral policies and emissions planning. The approach described in this guidance takes account of these challenges by integrating them in the steps laid out in Part II. Where such a challenge may occur in the steps, the guidance points to it, provides an example, and describes how to address it.

Table 3.1 lists some of the most frequently encountered challenges and where guidance can be found to resolve them.

Table 3.1: Common challenges around the quantification of non-state and subnational action

Challenge	Description	Chapters with guidance on how to address the challenge
Lack of clarity regarding non-state and subnational action targets	Some non-state and subnational targets are very vague, contain no quantitative information and therefore may be difficult to translate in terms of expected mitigation impact. The ambiguity can lead to uncertainty about the actual impact of non-state and subnational mitigation action.	Chapters 3 and 6
Overlaps, double counting and additionality of actions14	Overlap with other non-state and subnational mitigation actions and with national policies can lead to double counting of emission reduction efforts in a system where multiple actors work towards the same goal. In addition, the use of sectors and subsectors at different levels (national and subnational) could lead to overlaps as some actions may have been covered already at the national level. As a result, the combined effect of those actions could be less than the sum of the individual effects of implementing them separately. National government and subnational/non-state actors may also take credit for the same reductions and count them as progress toward the goals/targets. Further, for non-state and subnational action to contribute	Chapters 8, 9 and 10

[13] WRI 2014.

[14] Overlaps, double counting and additionality are different but closely related topics. For example, overlaps can be caused by a lack of additionality which can lead to double counting.

	to exceeding existing national mitigation efforts or closing the “emissions gap”15, the impact of non-state and subnational action needs to be additional. Often non-state and subnational actors formulate their actions in response to climate policy, but state them together with a package of other things as ‘commitment to climate action’. This can again result in double-counting.	
Differences in baselines, timeframes and reference scenarios	Users may find that non-state and subnational action use different baselines, timeframes and reference scenarios from national policies and actions.	Chapters 3 and 9
Data availability	Users may want to calculate the impact of non-state and subnational action on a certain national sector when insufficient or no data is available or the data is not accurate enough to quantify the impact.	Chapter 5, 7 and 8
Inaccuracy of results	Inaccuracy can be caused by a lack of data and opaque underlying assumptions. Together with the often voluntary nature of non-state and subnational action, this can lead to high uncertainty in results.	Chapters 3, 6 and 9
Scope 3 and other indirect emissions	Scope 3 emissions for subnational actors, defined as ‘all other GHG emissions that occur outside the city boundary as a result of activities taking place within the city boundary’16 or, in the case of non-state actors as ‘indirect emissions that occur in the value chain of the business, including both upstream and downstream emissions’17 can be a very significant source of GHG emissions for non-state and subnational actors, but are currently insufficiently accounted for by a majority of non-state and subnational actors and difficult to attribute to specific countries. In addition, as national governments account for emissions at the source where they occur, they will often not be familiar with indirect emissions accounting18 and may face difficulties when trying to attribute the impact of non-state and subnational actions (which may include indirect emissions) to specific sectors.	Chapters 4 and 5

1

[15] The “emissions gap” here refers to the difference between the emission reduction needed to stay well below 2°C and pursing efforts to limit the temperature increase to 1.5°C and the estimated emission pathway if the country fulfills its current NDC (IVM 2015).

[16] For more information on scope 3 emissions of cities, see the Global Protocol for Community-Scale GHG Emissions Inventories (GPC): https://issuu.com/ghgprotocol/docs/gpc

[17] For more information on scope 3 emissions of businesses, see the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard : http://www.ghgprotocol.org/standards/scope-3-standard

[18] This interpretation of indirect emissions is different from the IPCC guidance for national GHG inventories which refers to emissions of precursor GHGs, such as carbon monoxide, as indirect emissions.

PART II: DEFINING THE ASSESSMENT

4. DEFINING ASSESSMENT BOUNDARY

This chapter provides guidance on defining the assessment boundary in terms of sectors and GHG emissions included in the analysis.

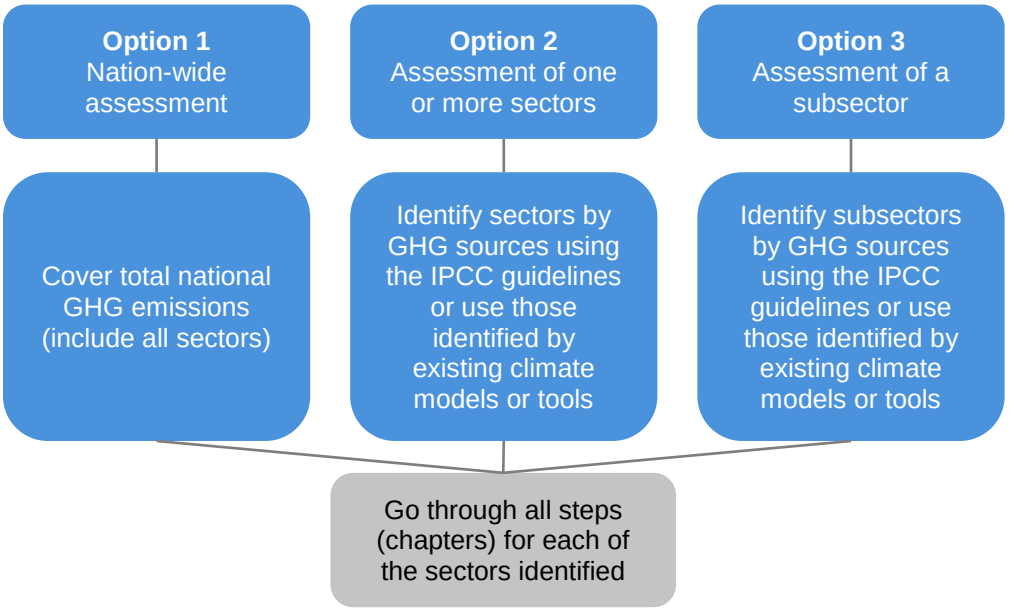
Checklist of key recommendations

- Define the sectors and subsectors included in the assessment
- Define the GHG emissions covered (direct and indirect) of the identified (sub)sector(s)

4.1 Define the assessment boundary

Once the objective(s) of the assessment has been determined (Chapter 2), users should define the assessment boundary in terms of sectors and GHG emissions included in the analysis. It is a *key recommendation* to define the sectors and subsectors included in the assessment. To do this, there are three options, outlined in Figure 4.1.[19] Users should note that targeted assessments usually fall under option 2 or 3, while comprehensive assessments usually fall under option 1. Users wishing to carry out a nationwide assessment (option 1) should cover sectors and subsectors contributing to at least 95% of total national emissions or removals, or 95% of projected national emissions or removals.

Figure 4.1: Options for defining the assessment boundary



[19] For users not familiar with IPCC main categories, see: http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/0_Overview/V0_1_Overview.pdf (p.6). To identify emission sources, see: http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/1_Volume1/V1_8_Ch8_Reporting_Guidance.pdf

It is also a *key recommendation* to define the GHG emissions covered (direct and indirect) of the identified (sub)sector(s). This is necessary to prevent double counting. National emissions accounting and GHG inventories often differ from non-state and subnational emissions accounting and inventories. A corporate inventory (example of a non-state inventory) classifies emissions under scopes (scopes 1, 2, and 3).[20] In addition to their direct (scope 1) emissions, companies often take into account indirect emissions, which includes emissions related to the generation of acquired and consumed electricity - known as scope 2 emissions, and all other emissions occurring in a company's value chain – known as scope 3 emissions.

At subnational level, a city might account as scope 3 all GHG emissions that occur outside the city boundary as a result of activities taking place within the city boundary. In contrast, national inventories categorise emissions by source. For example, emissions from fossil fuel combustion across sectors (e.g., the cement, iron and steel, and aluminum sectors) are listed under a single category. Similarly, industrial process emissions are aggregated and reported in a single category, though totals are often available for process emissions from major-emitting industries (e.g., cement, and iron and steel). Therefore emissions from purchased electricity used in iron and steel industry is accounted under electricity generation in national inventories whereas the iron and steel company will account these as scope 2 emissions.

These differences in emissions accounting present a challenge. For the sake of simplicity, this guidance therefore suggests to follow the IPCC main categories which lists GHG emissions by (direct) sources of emissions and removals by sinks (Figure 4.2 which links back to the options in Figure 4.1),[21] but to carefully consider the effect of mitigation actions on reducing electricity use and related (indirect) emissions. For example, international collaborative actions from companies in the industry sector should be accounted for in the industrial processes and product use sector, while the effect of those actions on electricity generation should be accounted for in the energy supply sector. Some examples are further illustrated in Box 4.1. Users may also want to carefully note any details related to direct and indirect emissions of a given non-state or subnational action, if provided by those actors, as this may be valuable information for use in later steps to determine any gaps or overlap.

Box 4.1: Examples of determining the assessment boundary based on the objective of the assessment

Objective of assessment: Identify, quantify and integrate the impact of non-state and subnational action to revise overall national emissions projections for 2030. This falls under option 1 and users should go through the steps for all relevant sectors and subsectors identified in the 2006 IPCC guidelines for national greenhouse gas inventories.

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[20] Scope 1 (direct emissions): These are emissions that occur from sources owned or controlled by the company. For example, emissions from stationary fuel combustion, mobile fuel combustion in company-owned vehicles, and process-related emissions such as from calcination in the cement industry.

Indirect emissions result from the company's activities, but they are from sources not owned or controlled by the company. These are further divided into Scope 2 and Scope 3 emissions.

Scope 2: These are indirect emissions resulting from the use of purchased electricity, heat, or steam.

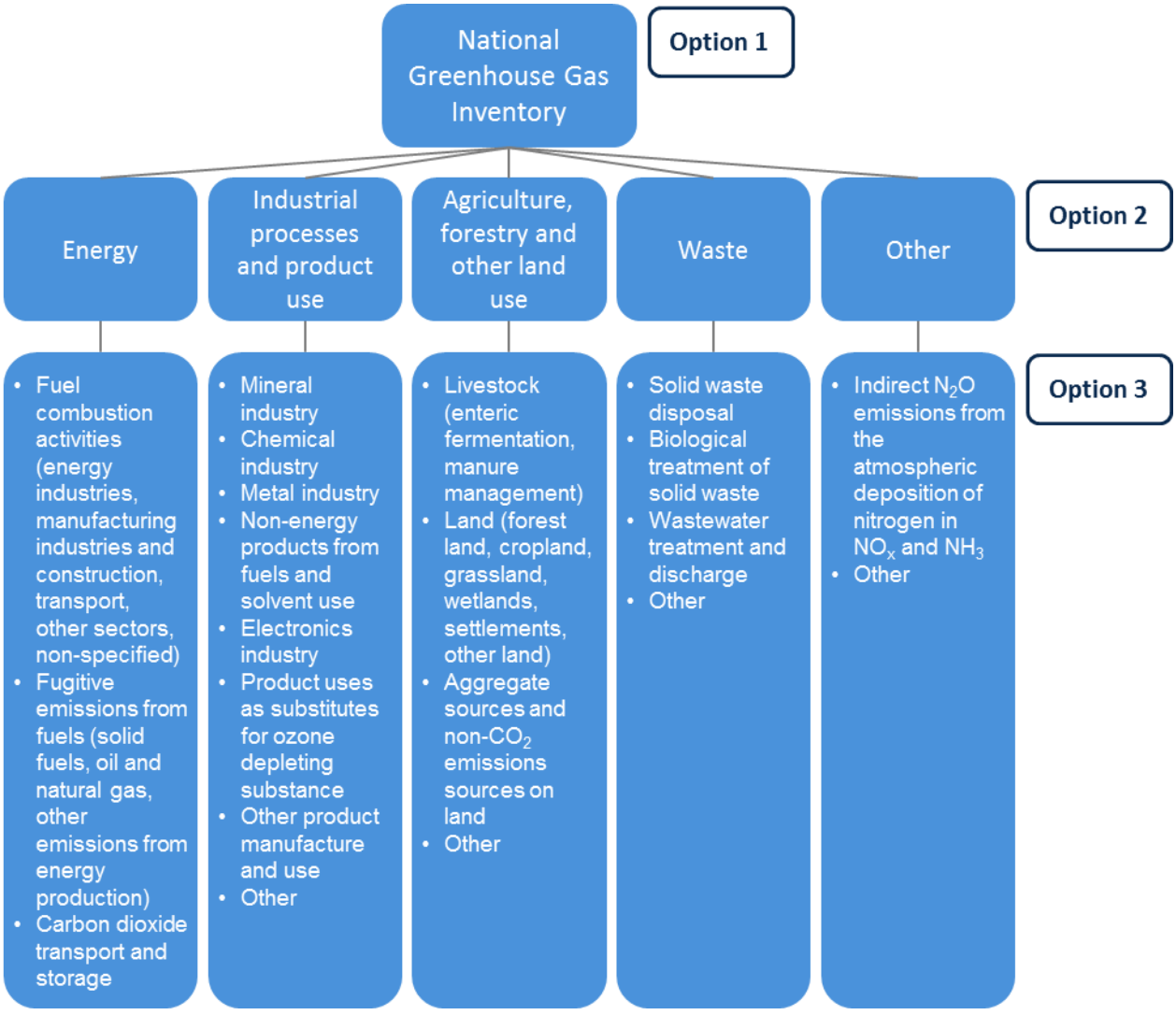
Scope 3 emissions: These include all other indirect emissions (e.g., employee commuting, outsourced production activities) (WRI and WBCSD, 2004).

[21] IPCC 2006a.

Objective of assessment: Identify, quantify and integrate the impact of non-state and subnational action when designing a roadmap to decarbonise the national transport sector by 2050. This falls under option 2 and users should apply the steps for the transport sector (direct emissions) and the energy supply sector (indirect emissions resulting from the production of electricity consumed by electric vehicles).

Objective of assessment: Identify, quantify and integrate the impact of non-state and subnational action on energy efficiency of passenger cars sold nationally by 2030. This falls under option 3 and users should apply the steps only to this specific subsector (road transportation).

Figure 4.2: Main categories of GHG emissions by sources and removals by sinks



Source: IPCC 2006b.

5. Creating A List of All Relevant Non-State and Subnational Actions

This chapter describes how to develop a list of non-state and subnational actions considered relevant for the assessment.

Checklist of key recommendations

- Compile a list of all relevant non-state and subnational actions occurring within the country or that affect the country

5.1 Create a list of all relevant non-state and subnational actions

It is a *key recommendation* to compile a list of all relevant non-state and subnational actions occurring within the country or that affect the country. This list should reflect the data needs of the assessment. For example, a comprehensive assessment with an objective to determine the impact of non-state and subnational action on the country's overall emissions pathway will require information on base year emissions of those non-state and subnational actions. These can also be estimated if no information is provided directly by non-state and subnational actors (see Box 5.1).

Box 5.1: Quantifying base year emissions

When non-state and subnational actors do not provide base year GHG emissions data but users need those for their assessment, there are a number of ways to estimate it.

For example, when the base year for actor A, operating only in country X, is 2005 and the historical emissions data for 2008 (10 $MtCO_2$) is available, users may be able to use the 10 $MtCO_2$ directly as a proxy for 2005 emissions. Alternatively, users can apply an adjustment factor to account for the likely changes in emission levels between 2005 and 2008. If it can be assumed that the actor A's business operations expanded at a similar rate observed for the entire financial sector, an example of adjustment factors could be the change rate of financial sector's total CO_2 emissions in country X (800 $MtCO_2$ in 2005 and 1000 $MtCO_2$ in 2008) during the same period. The estimated base year emission level for actor A would thus be: 10 * (800/1000) = 8 $MtCO_2$.

The base year emissions data can also be calculated when the base year energy consumption data for non-state and subnational actors are available. For the same actor A, which consumed 100 GWh of electricity, 200 TJ of oil and 100 TJ of natural gas in 2005, the total CO_2 emissions would be:

[Total CO_2 emissions for actor A in 2005]

= [100 GWh] * [600 tCO_2/GWh emission factor for grid electricity in country X]

+ [200 TJ] * [75 tCO_2/TJ emission factor for oil]

+ [100 TJ] * [56 tCO_2/TJ emission factor for natural gas]

= 60,000 + 15,000 + 5,600 = 80,600 tCO_2.

The emission factor values for fuels can be taken from national and international energy statistical databases, including the IPCC's emissions factor database (EFDB).

At a minimum, users should collect information on actors, sectors targeted, the geographic coverage of actions, and targets in their list of relevant non-state and subnational actions.

If the users' objective is to perform a comprehensive assessment, they might want to separate non-state and subnational energy supply targets ("end-use" targets) from non-energy supply targets ("production-related" targets) to support the overlap analysis in Chapter 9.

Table 5.1 provides a template for organising the collected information. To create the list, users should start with available data. To support users with this task, a list of the most widely and internationally-

accepted data sources for non-state and subnational action currently available can be found in Appendix A. Most of these are regularly updated and therefore users may want to periodically update their list of related non-state and subnational actions that will feed into the national assessment. Box 5.2 provides tips for collecting information on non-state and subnational action, including how to organise the data collection process and where to look for information. The identification of non-state action is an iterative process and should be updated with each ex-ante assessment. Therefore, it is recommended that users also include information on where and how the information has been collected. Finally, users should keep in mind that the column "Action retained for further analysis" in Table 5.1 is included as a placeholder for further analysis and is to be filled in subsequent steps.

Table 5.1: Template for information gathering on non-state and subnational action

Actor	Sector(s) targeted (based on IPCC main categories or existing climate models or tools)	Geographic coverage (global, national, regional, city)	Commitment or action?	Target (incl. base/ target year; assumptions if available/ needed)	Is progress monitored? (Optional)	Data sources	Action retained for further analysis?
Example: City of Amsterdam	Energy	City level	Commitment	Install 75,000 MW of renewable energy capacity by 2020	Unclear	NAZCA	To be filled after completing the next step (see next chapter)
Safran (French multinat. company)	Industrial process and product use	Global	Commitment	Reduce operational CO2e emissions by 5% from 2015 to 2018; base year emissions: 18,920 tCO2e	Yes	CDP	To be filled after completing the next step (see next chapter)

In some cases, users may find that international sources provide insufficient information. Options on how to address these situations include the following:

- Using national sources for multilevel information exchange, for example the National Environmental Information Exchange Network[22] in the United States or Fossil Free Sweden)
- Conducting extended stakeholder consultations to fill information gaps. For example, users can consult industry associations for non-state action within a given sector. These also offer additional opportunities for engagement with the private sector.

[22] For more information, please consult: http://www.exchangenetwork.net/

- Conducting literature reviews (national and international)
- Reviewing existing programmes by multilateral development organisations, such as the World Bank, UN or multilateral development banks which all work with subnational and non-state actors and can provide valuable data. One example is the World Bank's recently established City Climate Planner Certificate Programme training which aims to help city practitioners develop the skills to design, plan and implement green growth initiatives in their cities. Each of those future initiatives could feed into the analysis or a database.[23]
- For initiatives, consulting the initiative's secretariat
- For NAZCA, consulting individual data providers

Some countries may wish to create their own national database for non-state and subnational actions, covering all sectors. This can be especially relevant for policymakers aiming to carry out comprehensive assessments. In addition, such a database could serve to further motivate non-state and subnational actors to set (more ambitious) climate mitigation goals. It is also helpful for policymakers who aim to idenfity opportunities for future engagement with those actors. Establishing a database could require significant effort, time and capacity but could be highly valuble if users plan to repeat assessments over time.

One such example of a national database is "Fossil Free Sweden" (FFS), established by the Swedish government as a national replica of the international movement formalised in the Lima Paris Action Agenda (LPAA). Similarly, rather than a purely data gathering undertaking, it represents an attempt to gather a critical mass of non-state and subnational stakeholders (bottom-up movement) around a common goal and eventually help the government to make more ambitious decisions. It has, however, more relaxed requirements for signing up compared to NAZCA and other major international databases on non-state and subnational action (non-state and subnational actors sign up themselves).[24] Although the initial purpose of the FFS is wider than creating a list of non-state and subnational actions and integrate the impact of those actions in national emissions planning, a database of this kind could help national policymakers find a way around data gaps in existing international databases.

Users may also be able to liaise with UNEP, UNFCCC or individual data providers to get a starting point for their own database and by doing so avoid duplicating effort. However, users should take into account that the more loosely defined such a national database is, the less useful it might be as a source for the quantification and integration of mitigation actions into national GHG planning and processes.

By contrast, the creation and maintenance of an ICAT-aligned global climate action database containing preanalysed and harmonised data could be another option. Such a database could significantly streamline the use of this guidance by gathering relevant climate actions from all major international sources in one place, organising them geographically and sectorally for easy user access, and preanalysing them for suitability, impact, likelihood, and overlap. Furthermore, the application of a consistent methodology for gathering and analysing actions, as well as for distributing impact from

[23] For more information, see: http://www.worldbank.org/en/topic/climatechange/brief/city-climate-planner-certificate-program

[24] Stenson & Widerberg 2016.

international cooperative actions and multinational corporate actions to user countries, could serve as a solid foundation for any further data collection, while improving the overall accuracy of the analysis and increasing the value of user assessments. Nevertheless, there remain significant challenges to the creation of a truly global climate action database, including the accessibility of all necessary data, gaps in coverage (especially in the developing world), and complex database management to ensure comprehensiveness, currentness, and usability. Appendix C provides more insights on this topic.

If there is insufficient information, users might want to redefine the objectives and/or scope of the analysis (going back to Chapter 4), or, if this is not possible, pay close attention to the impact such instances will have on the wider uncertainty considerations of non-state and subnational action.

Lastly, while this guidance focuses on mitigation action, the data collection process might also be an opportunity to collect information around adaptation, resilience, and finance activities as well, if that is a goal of the user, since many data providers are likely to work across mitigation, adaptation and development activities.

Box 5.2: Tips for collecting information on non-state and subnational action

Clarify data needs. Users should decide which data is required for the analysis they wish to conduct, based on the objectives for conducting the assessment. Standards, methodologies, verification systems and data quality vary widely among existing international databases. In addition to data published on those platforms, users may want to consider capturing further details regarding how data was generated or collected to support judgements throughout the assessment process regarding how likely a non-state or subnational action is to have an impact or overlap with other actions, including those at the national level..

Build on existing data. Users should leverage existing databases and networks and build from what has already been collected to avoid duplicating existing data collection efforts.

Prepare any necessary tables, spreadsheets and other tools to organise information. Users may want to tailor tables and templates to the national circumstances and the objectives of their assessment. Over the long-run, users may want to consider ways of automating data collection. While this would require a heavy initial effort, it could prove useful to replicate or repeat assessments over a given time period.

Take time initially to set up a clear process for collecting information. Data gathering can be time-consuming and complex as different non-state and subnational actors follow different methodologies and produce diverse information. Establishing a system, creating clear timelines and providing sufficient lead time to collect and process the data, will facilitate a smoother process.

Consider any legal or privacy concerns from collecting data or information from third-party providers or directly from non-state and subnational actors. In order to build or maintain trust with non-state and subnational actors, it may be useful to prepare a statement of intent outlining how collected data or information might be used to alleviate any potential concerns. Alternatively, confidentiality agreements, memorandum of understanding, or other more formal arrangements may be considered.

Develop a running list of contact information to gather additional details as needed. Once an initial set of information is collected, users may need to contact specific national and other actors or networks for further details.

6. Selecting Non-State and Subnational Actions for Inclusion in the Analysis

This chapter provides criteria that will help users decide which of the actions identified in Chapter 5 to include in the assessment, in line with the assessment principles. It provides guidance on how to determine the suitability of each non-state and subnational action based on the availability of information and the likelihood of the action achieiving its target(s). The chapter also discusses the distribution of international collaborative actions among countries. In practice, this chapter serves to fill the "Action retained for further analysis" column in Table 5.1 that was illustrated in Chapter 5.

Checklist of key recommendations

- Determine suitability of non-state and subnational action for further analysis
- Determine the likelihood that non-state and subnational action targets will be achieved
- Determine whether the collaborative action is already covered by an individual non-state and subnational action before distributing international collaborative actions to countries

6.1 Check against criteria for suitability

Not all commitments and actions are equally suitable for inclusion into the users' analysis. It is therefore a *key recommendation* to determine the suitability of non-state and subnational actions for further analysis.

Table 6.1 provides criteria to help users determine the suitability of actions. These critieria also include those referenced by the Marrakesh Partnership for Global Climate Action. Users should examine each of the different non-state and subnational actions and commitments in the their initial list of relevant non-state and subnational actions and exclude those which do not fulfill the criteria listed in the table. Users should also document which criteria and assumptions were used to assess each non-state and subnational action. This will also help users to easily modify the analysis when information changes over time or when additional data or information becomes available. Box 6.1 provides some examples of suitable or unsuitable non-state and subnational actions.

Table 6.1: Criteria for determining suitability

Criteria	Comment/explanation
Availability of quantitative information	Key requirement in order to quantify non-state and subnational actions and commitments in subsequent steps. Information need not necessarily be GHG- or energy-metric related, but it should be measurable and convertible to energy- or emission-related metrics. Metrics are defined as a standard of measurement. Targets should represent specific, clear and quantifiable forward-looking outcomes related to an energy and/or emission impact. Questions to determine whether enough quantitiative information is available include: • Is a timeframe/target year specified? • Does the action aim for a specific outcome? • Is the target energy or emission related?

	• Is it a numerical target? • If not, it is still reasonably possible to convert the target into a numerical one?
Likelihood of achievement (see Section 6.2 for more detailed guidance)	Another requirement is a high likelihood (very likely, likely) that the non-state or subnational action target will be achieved. Commitments can also be included if there is reasonable confidence that these will materialise into actions. Additional questions that can help determine if/which commitments should be considered, include: • Is there clear ownership behind the commitment? • Are there any plans for the monitoring of targets? For example, NAZCA primarily lists "commitments to action" and one of its listing criteria is that the action will be monitored. • Have some (partial) results already been achieved? • Do non-state and subnational actors have the technical capacity to deliver on their commitments? • Are sufficient funds being allocated to initiate and then implement the activity? • Are there regular political cycles or particular political events that could undermine a subnational commitment? • Are there indications on the financial health of a company that could undermine its commitment? • Is there regulatory support for the action?

Box 6.1: Examples of suitable and non-suitable non-state and subnational actions

A subnational action which targets energy efficiency of appliances by increasing energy efficiency up to the level of current best practice can meet the criteria because even if there is no direct quantitative target, the user can deduct quantitative targets (given the availability of studies applying best-practices with regards to energy efficiency of appliances).

A non-state action focusing on information sharing through distribution of awareness material on why certain land use practices are harmful for the climate does not meet the criteria. This action should not be considered by users as it is not impact- or results-oriented and has no quantitative target, unless behavioral studies of that action can be linked to mitigation impacts. This does not mean that such intiatives could not have an important impact on climate change mitigation; however, their impact is very difficult to attribute and quantify.

6.2 Determine the likelihood of achieving non-state and subnational action targets

In addition to determining the suitability of non-state and subnational action, considering their likelihood to achieve the targeted outcome is also important. It is a *key recommendation* to determine the likelihood that non-state and subnational action targets will be achieved. This assessment should be based on available information and facts, such as literature, prior experience, modeling results, risk management

methods, consultation with experts and stakeholders, or other methods. If relevant evidence does not exist, users should use their own expert judgment.

Table 6.2 provides guidance on how to determine likelihood and which level of likelihood to consider. The colour coding provides recommendations on whether or not to include the non-state and/or subnational target *(green = include, orange = include under some conditions, red = do not include).* Box 6.2 illustrates how to determine likelihood using examples.

Table 6.2: Assessing the likelihood of non-state and subnational action targets

Likelihood	Description
Very likely	Very strong reason to believe the non-state or subnational action's target will be achieved. This may be determined based on indications such as: action is already at an advanced stage, funding is available, clear ownership and responsibilities exist (clear ownership with overall responsibility to deliver results, including mobilising the necessary capacity and resources), action is results/impact oriented, (internal) incentives system exists, strong monitoring system is in place, GHG inventory data has shown progress is underway, non-state/subnational actions are embedded in a public policy or planning instrument, and/or the action has a clear implementation period.
Likely	Good reason to believe the non-state or subnational action's target will be achieved. This can also include situations in which a non-state or subnational action has set an overambitious target and therefore there is a low chance of meeting it. In general, if the indications are that the actions are being implemented and the sum of various activities under those actions are likely to achieve a good part of the target, then the likely assessment can be made.
Possible	Some reason to believe the non-state or subnational action's target will be achieved. Cases where the likelihood is unknown or cannot be determined should be considered possible. The final decision of whether or not to include a possible non-state or subnational action depends on the level of accuracy and conservativeness (caution) users aim for in their assessment.
Unlikely	Few reasons to believe the non-state or subnational action's target will be achieved. This may be determined based on indications such as: action is not (yet) underway, overambitious target, somewhat unclear ownership or assigned responsibility, and/or there is limited funding available. However, overambition by itself should not be a disqualifying reason.
Very unlikely	Very few reasons to believe the non-state or subnational action's target will be achieved. This may be determined based on indications such as: Unclear ownership (structure), unrealistic targets, no monitoring system in place, no funding available

Source: Adapted from WRI 2014, based on IPCC 2010.

Box 6.2: Example of determining likelihood

Company A has consistently set and achieved 5-year emission reduction targets since 2005. Its most recent reporting indicates it is on-track to achieve its 2020 target and it has committed to setting a science-based target in the near-term. It has an incentive scheme attached to the achievement of its

targets, which are agreed upon at board-level. Company A is *very likely* to achieve its target and the reductions should be included in the assessment.

In 2012, City B set its first ever emission reduction target, which is a 75% reduction from a 2010 base year by 2050. There are no interim targets or milestones despite the long period over which the target is to be achieved. It currently has no renewables in its electricity generation portfolio and is home to major cement operations. Over the past 5 years, there has been little planning to ensure the target is met even though the mayor had committed $5 million in 2012 to make some progress. There has been no coherent strategy to take deep actons in major emitting sectors. Based on the information available, it is *unlikely* that City B will achieve its target.

An additional filter which users may want to use is a function-output-fit (FOF) approach which measures whether climate actions produce outputs that are consistent with their targets.[25] According to the FOF approach, an impact is likely to occur if non-state or subnational action produces a fitting, attributable output such as product development, technical "on the ground" implementation or infrastructure. Underlying this approach is the assumption that an action's output is consistent with its intended impacts. For example, an international collaborative initiative action that declares stopping deforestation in supply chain as its objective (function) could be expected to engage with companies and their supply chains (output). If the initiative however only produces knowledge (and nothing else), it may be considered active, but its output would not fit its declared objective and it would be less likely to result in impact. This kind of analysis provides an additional tool to determine likelihood of mitigation impact.

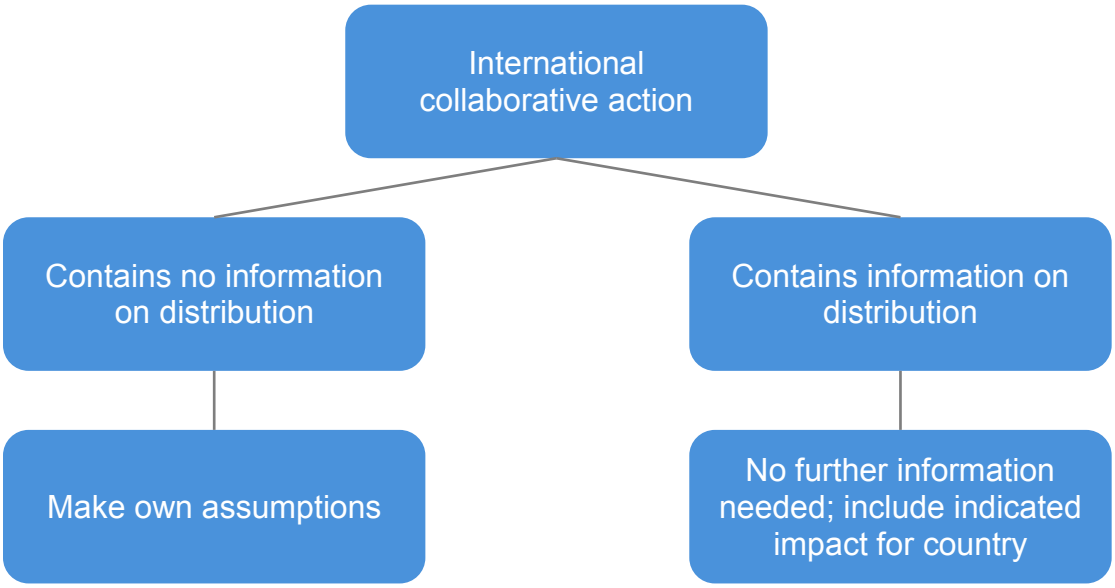
6.3 For international collaborative actions, distribute impact to countries

To determine the impact of international collaborative actions from the users' list for the relevant country, users will need to break down the anticipated effect of the collaborative action to the country level. To do so, users have several options which are detailed in Figure 6.1. In practice, many collaborative actions will also be covered under individual non-state or subnational actions and can therefore be dismissed. Often the individual action will be more specific than the collaborative's target.[26] It is a *key recommendation* to determine whether the collaborative action is already covered by an individual non-state and subnational action, before distributing international collaborative actions to countries. This chapter provides a list of assumptions users might use to distribute impacts to countries when no detailed information is provided by the initiative. However, users are advised to exercise caution when using those assumptions. In case of doubt, it is suggested to exclude the international collaborative action until further information becomes available.

[25] Chan et al. 2016; Chan et al. 2015.

[26] For example, Credit Agricole, a French financial institution, has signed up to the RE100 initiative aiming to procure 100% of electricity from renewable sources. At the same time, its commitment to the collaborative action is also covered under individual actions, as "Supply 100% of total electricity consumption from renewables by 2016 from 46% in 2015."

Figure 6.1: Distribute aggregated impact to countries



Assumptions may vary, depending on whether the international collaborative action focuses on non-state or subnational action.

- For international collaborative actions that bring together *non-state* actors, assumptions include:
- Via number of installations/facilities
- Asset value
- Volume of production or value added
- Relevancy of the (sub)sector compared to the users's national emissions inventory

Assumptions that may used to distribute the impact of international collaborative actions that bring together multiple *subnational* actors include:

- Equal distribution across countries (e.g., same amount of additional renewable energy)
- Distribution relative to size of country (e.g., via population or GDP)
- Distribution relative to size of indicator within country (e.g., rate of deforestation)

In many cases however, international subnational collaborative initiatives already contain information on the distribution to countries. Users may also want to look at UNEP's Cities and Regions Pipeline which brings together information on international collaborative mitigation initiatives by cities and regions and lists them per country. This pipeline also features information on cities and regions' quantified GHG reduction commitments for 2020, 2025, 2030 etc up to 2050.[27]

Box 6.3 provides examples on how apply these assumptions in practice.

[27] UNEP DTU Partnership publishes a continually updated pipeline, available at: http://web.unep.org/climatechange/resources/climate-initiatives-platform.

Box 6.3: Examples of distributing impact of international collaborative action to country

An international subnational collaborative action has the objective to install 50 GW of solar PV capacity by 2020 globally and meets the suitability criteria for inclusion outlined in Chapter 6.1. The action includes 50 cities with a projected total number of inhabitants equal to 100 million by 2020, out of which 10 million inhabitants are projected to be in country A. The potential impact in country A would thus be 5 GW.

An international cooperative action aims to restore 20 million hectares of degraded land and deforested lands by 2020. To distribute the impact among countries, the user could split the potential impact of the initiative by using historical FAO data on afforestation and reforestation. Specifically, the user could calculate the share of afforestation or reforestation rates (in Mha/year) in the global total afforested/ reforested area and use it to split the total target of the initiative (in Mha to be afforested/reforested). For example, looking at China its afforestation rate was 1.497 Mha/year and 0.29 Mha/year for reforestation.[28] In comparision, the world's afforestation rate was 5.622 Mha/year and its reforestation rate 5.348 Mha/year.[29] The share of global afforestation rate for China is thus 26.6% and for reforestation 5.4%. Applying this to the international cooperative action, the estimated impact for China would be 5.32 million hectares of afforestated land and 1.08 million hectares of reforestated land by 2020.

Companies operating globally

A special case are targets from multinational companies that lack distribution-specific details. Users should keep in mind that most large businesses operate cross-border and many do not specify targets per sector/country which can create difficulties when wanting to determine the specific impact of those actions per country. In this respect, company targets can be similar to international collaborative actions. If no more detailed information is provided (e.g., at facility level), can be obtained directly from companies, or can reasonably be deducted (e.g., a company aims to reduce emissions from a specific product which is only produced/sold in one specific country), users should either exclude these targets at this stage due to a lack of information or be cautious when adding up targets in Chapter 8. Box 6.4 illustrates some further examples.

Box 6.4: Examples of distributing impact of individual multinational company action to country

Multinational company A has a company-wide target to improve energy efficiency by 40% across its operations. In this case, users could request or collect information on energy use in the particular country they are interested in, given company A has operations in this country and apply the 40% improvement for its operations within the country (assuming equal distribution across all countries).

Multinational company B with operations across the world has committed to decrease its scope 1 emissions in Europe by 30% by 2020 compared to today's emissions. A user interested in conducting the assessment for European country C could determine the total emissions of company B in country C and then assume a 30% reduction of the current emissions of company B by 2020.

[28] FAO 2015.

[29] FAO 2010.

7. LISTING RELEVANT NATIONAL CLIMATE MITIGATION POLICIES AND ACTIONS

This chapter explains how to develop a list of relevant national mitigation policies and actions depending on the objectives of the assessment.

Checklist of key recommendations

- List all relevant national climate mitigation policies and actions that relate to the objectives of the assessment

7.1 List all relevant national climate mitigation policies and actions

Having determined the suitability for each non-state and subnational action and commitment in the country, it is a *key recommendation* to list all relevant national climate mitigation policies and actions that relate to the objectives of the assessment.

Going through this step might not be necessary for all types of assessments users may want to carry out. For example, for users carrying out a targeted assessment which aims to test a hypothesis or revise a specific sector/subsector target, putting together a list of national climate mitigation policies and actions may be not be necessary. In fact, in these cases, users would only have one national action to consider and therefore there would be no need to pull together an additional list.

For assessment objectives that require the identification and analysis of several national climate mitigation policies and actions, this list should build on the previous assessment steps and reflect the data needs of the assessment. Table 7.1 presents recommendations on what information users should gather at a minimum. Users should list all sectors and/or subsectors targeted by the identified national policies and actions, based on the IPCC main categories, as well as specific targets including reference levels/target years and metrics used. Users should also apply the same suitability criteria used for determining whether non-state and subnational actions should be included in the analysis (Chapter 6.1).

In addition, comprehensive assessments with an objective to determine the impact of non-state and subnational action on overall emissions projections may require information on the effect of climate mitigation policies and actions on a country's emission pathway, which can also be modelled if no information can be obtained; see Box 7.1. Alternatively users can consult other ICAT GHG guidance on how to calculate the GHG emission impacts of various policies.

Box 7.1: How to quantify a country's emission pathway under mitigation policies and actions

For a country with the relative target below a certain reference or baseline, such as 25% below business-as-usual (BAU) levels in 2030 for country A, the first step is to quantify the BAU emissions in 2030. For NDCs, some countries report the estimated BAU emission levels in the submitted (I)NDCs or other submissions to the UNFCCC (Biennial Reports, Biennial Update Reports and National Communictions). If country A reports its BAU emission level in 2030 to be 500 $MtCO_2e$, then the target emission level would be 500 $MtCO_2e$ * (1 – 25%) = 375 $MtCO_2e$.

When a country does not report its BAU emission levels, the definition of its BAU needs to be looked at to calculate the BAU emission levels. If a BAU scenario assumes a constant GHG emission intensity per GDP, the BAU emission level in 2030 can be calculated as: [BAU GHG emissions in 2030] = [GHG

emissions in the base year (as per defined in the NDC document] * [GDP growth rate between the base year and 2030].

The GDP growth projections can be taken from both national sources as well as from international sources such as the International Monetary Fund.

Table 7.1: Template for information gathering on national climate mitigation policies and actions

Relevant national policies and actions	(Sub)sector(s) targeted	Target (incl base/ target year and metrics used, if available)	Is this an NDC target (included in the NDC)? *	Is the policy NDC specific/ does it contribute to achieving the NDC?*	Impact on national emission projections	Data sources
Example: Reduce emissions from coal power plants	Energy	Reduce GHG emissions from coal power plants by 30% by 2030	yes	yes	n.a.	Environment Ministry

* If users have chosen assessment objectives which are not directly related to the country's NDC, they do not need to fill this column

To fill the list, users first need to gather information on national climate mitigation policies and actions. Table 7.2 provides an overview of options on how to gather that information. Users should list all data sources used to compile the data.

Table 7.2: Options for gathering information on national climate mitigation policies and targets

Option	Applicable for which assessment objective	Resource requirements and process
Consult existing relevant national registries	All	Some countries might have databases that list climate mitigation policies that could be checked first. The 'Climate Change Laws of the World' database30 might also be a useful tool, covering climate and climate-related laws in 164 countries and available online. Not resource intensive.
Look at most recent and relevant national climate reports such as Biennial Reports (BRs)/Biennial	All	Many national climate reports under the UNFCCC such as BRs/BURs, national communications or NAMAs include information on climate policies that could be used. In many cases, a country's NDC might also provide

[30] Further information on the '*Climate Change Laws of the World*' database is available at: http://www.lse.ac.uk/GranthamInstitute/climate-change-laws-of-the-world/.

Update Reports (BURs), NDCs if applicable31		information on GHG emission reduction targets at national and/or sector level. Not resource intensive.
Consult dedicated national body (if applicable)	All comprehensive assessments; Targeted assessment resources permitting	Some countries have an (inter-) ministerial body or similar body with oversight on climate mitigation (and who might also steer the NDC process in the country), which could be approached. Not resource intensive.
Consult relevant line ministries	All relevant ministries for comprehensive assessments; One specific ministry for targeted assessment, resources permitting	For more accurate results, users could consult relevant ministries (depending on exact objective/scope of the assessment) to verify if information contained in BRs or BURs is up-to-date or whether there are any important policies in the pipeline. Government departmental road maps can also be a relevant source of possible mitigation action, especially in developing countries. Resource intensive.
Literature review and/or consultation with (local) consultancies and research organisations	Possibly for all, depending on resources	Literature reviews can provide some additional information and analysis which might be difficult to obtain by discussing with ministries alone. In addition, more and more organisations collect and provide information on national climate mitigation policies and actions and their effect on national emission pathways. One such example is the Climate Action Tracker which might constitute another valuable source of information.32 Resource intensive.
Other stakeholder consultations (e.g., sector experts, UNFCCC focal points, NAZCA data providers)	Possibly for all, depending on resources	To fill remaining data gaps, users could consult with (sector specific) experts. One challenge here is that they first have to be identified. Resource intensive. For less resource intensive options, users could consult the country's UNFCCC focal point.33

1

[31] BRs and BURs are submitted by Annex I and non-Annex I countries respectively to the UNFCCC secretariat and contain information about national climate mitigation policies. Submitted BRs and BURs are available at: http://unfccc.int/national_reports/biennial_reports_and_iar/submitted_biennial_reports/items/7550.php and http://unfccc.int/national_reports/non-annex_i_natcom/reporting_on_climate_change/items/8722.php; the interim NDC registry is available at: http://www4.unfccc.int/ndcregistry/Pages/Home.aspx

[32] Further information is available at: http://climateactiontracker.org/

[33] UNFCCC focal points for each country is available at: http://unfccc.int/parties_observers/parties/national_focal_points/items/9336.php

PART III: IMPACT ASSESSMENT

8. CONVERTING NON-STATE AND SUBNATIONAL ACTIONS AND NATIONAL POLICIES TO SUITABLE METRICS

This chapter explains how to convert the diverse range of non-state and subnational climate mitigation targets to suitable metrics for comparison to national policies or inclusion into existing climate models. Options are also provided to determine emission reduction potentials. By doing so, users will be able to determine the impact of non-state and subnational actions.

In addition, the chapter discusses relevant metrics, detailed guidance for each IPCC sector (description and conversion tables, including examples) and how to proceed for comprehensive assessments.

Checklist of key recommendations

- Identify suitable metrics and convert non-state and subnational actions to those metrics
- Identify metrics that work for existing climate mitigation models and/or scenarios and check whether non-state and subnational actions need to be converted to emission reduction potentials

8.1 Identifying suitable metrics

Non-state and subnational climate actions may use different metrics compared to national policies or climate models. Thus, they are not all equally suited for a comparison to national policies, inclusion into existing climate models, or the calculation of emission reduction potentials. It is therefore a *key recommendation* to identify suitable metrics and convert non-state and subnational actions to those metrics.

To quantify the impact of non-state and/or subnational actions, many users conducting targeted assessments will not need to translate non-state and subnational actions to GHG emission reduction potentials, especially if their primary interest (objective of assessment) is to revise specific sector or subsector-level targets which is not expressed as emission reduction. In fact, in some cases, users can compare the impact of non-state and subnational actions and national policies at the level of a non-emissions based metric, for example, the share of renewable energy or energy efficiency improvements in a certain sector. In other cases, users can take non-emissions based metrics as a result of the analysis conducted with this guidance and integrate them in climate mitigation models or scenarios which are already being used in the country, including those under development. It is therefore a *key recommendation* to identify metrics that work for existing climate mitigation models and/or scenarios and check whether non-state and subnational actions need to be converted to emission reduction potentials.

Characteristics of suitable metrics for users aiming to determine emission reduction potentials include:

- Absolute values (e.g., decrease emissions to under 2 tonnes CO_2e per capita by 2050)
- Energy or emissions related (e.g., procure 5 MW of energy consumption from renewable energy sources by 2030)

In practice, users might want to revisit any list they put together in Chapters 5-7 and check against the characteristics detailed above to determine which targets are already in the form of a suitable metric and

which ones need to be converted. Energy or emissions related metrics, in addition to absolute values are critical to determine emission reductions against a certain base year or target year.

8.2 Examples of suitable metric by sector

This section provides examples of metrics for various sectors.

8.2.1 Agriculture, forestry and other land use

Non-state actors, including private sector entities, are playing an increasingly large role for climate change mitigation and adaptation in many sectors, including in the agriculture, forestry and other land use (AFOLU) sector.[34] Across international cooperative initiatives agriculture was the third most frequently covered sector in 2015, after energy supply and transport, and is also covered under many more forestry oriented collaborative actions.[35]

A general challenge for the sector when quantifying mitigation action is the time delay between the action (e.g., planting a tree) and its impact on emissions. Users need to keep this in mind when aiming to quantify the emission reduction potential and comparing it to the NDC or existing climate efforts.

Table 8.1 provides an overview of some common non-state and subnational targets in this sector, their conversion to suitable metrics, and a few options to calculate emission reduction potentials including necessary data points and assumptions. In addition, Box 8.1 provides an overview of data sources which can be consulted for specific data points users might need for the analysis, if national data is not available. Box 8.2 descibes an example of determing the emission reduction potential of an international cooperative action in the agriculture sector.

Table 8.1: Example of metrics for the agriculture, forestry and other land use sector

Agriculture, forestry and other land use sector		
Examples of non-state/subnational climate mitigation targets	**Suitable metrics for comparison to national policies or inclusion into existing climate mitigation models/ scenarios**	**Options for the conversion to emission reduction/ sequestration potential**
Restore X ha of forests	Total forest area (ha); Afforestation/reforestation rate (kha/year) Assumptions: • Density of restored forest (equal to average)	Look up the CO_2 emission reduction potential of one ha of forest (how much CO_2 domestic forests sequester annually) and multiply by the amount of ha forest to be restored (simplistic approach). Data needs (use FAO resources): • Total CO_2 emission/ha • CO_2 emissions sequestered/ha;

[34] UNFCCC 2016; Hsu et al. 2016.

[35] UNEP 2016b.

		• Forest density (m^2/ha) • Carbon stock per type of forest (tC/ha) *For a more sophisticated approach, users should follow the IPCC guidelines on forest land.*[36]
Stop deforestation (from supply chains)	Put deforestation rate to zero; all other variables remain unaffected	*Stopping deforestation means zero emissions and no further conversion is needed at this point.*
Zero degradation	Put degradation to zero; all other variables remain unaffected	*Zero degradation means zero emissions and no further conversion is needed at this point.*
Reduction of X% CO_2 emissions from deforestation	Total CO_2e emissions from deforestation ($MtCO_2e$); Assumptions: • Base year	Convert by looking at total CO_2e emissions from deforestation domestically. Assumptions: • Base year
Decrease CO_2e emissions from agriculture by X% compared to base/target year reference	Total CO_2e emissions in base year and projected CO_2e emissions in target year Assumptions: • Specific sources of CO_2e reductions (if applicable)	Convert from relative reduction to absolute target by looking at total CO_2e emissions from agriculture and projected emission growth rates Data points needed (use national emissions projections, or if not available World Bank Data, US EPA global anthropogenic GHGs): • Emissions growth rate for agriculture ($GtCO_2e$) • CO2e emissions from agricultural processes and products
Increase sustainable food production by X%	Total food production (tonne/person); total sustainable food production (tonne/person) Assumptions: • Definition of sustainable food production (e.g., certified food; certified production only; type of certification)	Look at the emissions caused by agriculture destined to food production. Then look at the share of sustainable food production and its CO_2e impact. Users should then translate the relative target into an absolute one, calculate the estimated CO_2e emissions and compare to CO_2e of estimated non-sustainable food production. Assumptions: • Definition of sustainable food production (e.g., certified food; certified production only; type of certification) Data points needed (use World Bank, UN World Populations Prospects if no national data is available): • Food production per person (tonne/person) • Demographic development • Share of sustainable food production in country (x%) and its CO_2e impact (tCO_2e/person)

[36] A tool to calculate emissions removals from reforestation is available at: http://www.environment.gov.au/climate-change/emissions-reduction-fund/cfi/reforestation-tools; another method is described here, although it has a limited geographical coverage: http://calfire.ca.gov/Grants/downloads/Methods_for_Evaluating_GHG_Emission_Reductions.pdf;

Box 8.1: Relevant international sources of information

FAO database (FAOSTAT). Available at: http://www.fao.org/faostat/en/#home

Other relevant FAO resources to get information among others on forest cover, forest carbon stock, reforestation/afforestation and deforestation rates:

- Global Forest Resources Assessment 2015. Available at: http://www.fao.org/3/a-i4808e.pdf
- State of the World's Forests 2016. Available at: /www.fao.org/3/a-i5588e.pdf

World Bank open data covering several metrics including forest cover, agriculture, food production). Available at: http://data.worldbank.org/indicator

US EPA global GHG emissions data covering emissions by gas, sector, country as well as trends. Available at: https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data

UN World Population Prospects. Available at https://esa.un.org/unpd/wpp/

Additional information on methods and tools:

IPCC Guidelines on Forest Land, provides methods for estimating carbon stock changes and greenhouse gas emissions and removals associated with changes in biomass and soil organic carbon on forest lands and lands converted to forest land. Available at: www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf_files/Chp3/Chp3_2_Forest_Land.pdf

Tools to calculate emission reductions from reforestation. Available at: www.environment.gov.au/climate-change/emissions-reduction-fund/cfi/reforestation-tools and http://calfire.ca.gov/Grants/downloads/Methods_for_Evaluating_GHG_Emission_Reductions.pdf

Box 8.2: Example of how to determine the emission reduction potential of an international cooperative action in the agriculture sector

An international cooperative action aims to mobilise 100 million USD for sustainable forestry, out of which 5 million would be mobilised in the user's country. Assuming the user wants to look at the effect of non-state and subnational action on the overall forest volume content domestically, the area of forest restored is the suitable metric for comparison with national policies here.

Users can convert the 5 million USD mobilised into ha of forests restored. This could be done by using domestic data, if available, on the average amount of investment needed to restore 1 ha of forest or, if no data is readily available, using international sources that provide such data while acknowledging that it may not be the most accurate data for their context. For example, users could check restoration projects financed by developments banks, assuming that efficiency of resources remains unvaried or from surveys of companies and non-profits engaged in restoration. So for instance, 100 USD is needed to restore a hectare of forest in the country, 5mn USD can restore 5000,000/100= 50,000 ha.

8.2.2 Energy

In line with IPCC guidance, this non-state and subnational action guidance considers energy-related emissions by sector: energy supply, industry, buildings and transport. The following sub-chapters look at each of those sectors separately and provide specific guidance on how to convert energy related non-state and subnational action targets to suitable metrics and illustrates some options on how to estimate their emission reduction potentials.

Energy supply

Accounting for approximately 35% of global GHG emissions in 2010, the energy supply sector is the largest contributor to global GHG emissions among all sectors.[37] The energy supply sector, together with the transport sector, is one of the most frequently targeted by subnational and non-state mitigation action.[38] In some instances, these targets are energy demand or consumption specific but can be translated into energy supply targets (which need to be met for consumption targets to be achieved). A range of suitable metrics in the energy supply sector exists to compare them to national policies, include them into existing climate mitigation models or convert them to emission reduction potentials (Table 8.2). Box 8.3 provides an overview of data sources which can be consulted if national data is not available. Box 8.4 descibes an example of determing the emission reduction potential of a non-state initiative in the energy supply sector.

Table 8.2: Examples of metrics for the energy supply sector

Energy supply		
Examples of non-state/ subnational climate change mitigation targets	**Suitable metrics for comparison to national policies or inclusion into existing climate mitigation models/ scenarios**	**Options for the conversion to emission reduction potential**

Increase the share of electricity generated from RE to X (% or absolute amount in MW) /
 	
Procure X amount or % of total energy supply by renewables
	RE electricity generation capacity installed (MW), share of RE electricity in national grid;
	
	Assumptions:
	
	• Potential RE electricity generation from additional capacities installed is equal to additional RE electricity consumed (no idle capacities)
	
	Data points needed:
	
	• To convert % to MW or the other way round:
	  ○ full load hours, either average over all technologies or technology specific, if available
	  ○ total electricity generation
		If capacity (MW) target, convert to generation (TWh) using full load hours. If % target, convert to generation (TWh) using total electricity generation in target year. To calculate the emission reduction potential, users can derive different estimates of emission impacts depending on whether RE electricity displaces natural gas first, then oil and then coal (low estimation39) or coal first, then oil and then gas (high estimation)
		
		Assumptions:
		
		• RE electricity installed is equal to RE electricity generated
		
		• National fuel mix remains unvaried (once the change in RE has been accounted for)
		
		Data points needed (use IEA World Economic Outlook/Statistics if no national data is available)
		
		• Projected electricity generation and fuel mix
		
		• Emission factors for fossil fuels

Drive down the cost of RE and/or its generation by X	Cost of one unit of RE generated (USD/MWh) Assumptions:	Recommended to use an existing model if available due to the many complex assumptions needed to calculate realistic emission reduction potentials.

[37] Bruckner et al 2014.

[38] Yale University 2015.

[39] This is due to their different carbon contents.

amount (USD/MWh)	• Linear cost trend (costs do not change if more RE capacity is installed)	
Reduce electricity consumption by X% compared to base/target year reference	Total electricity demand (MWh) Assumptions: • Consumption is equal to supply	Look at total projected electricity consumption and convert relative target to an absolute one. To calculate the emission reduction potential, please follow the process detailed in the earlier examples. Assumptions: • Consumption is equal to supply • National fuel mix remains unvaried Data points needed (Use IEA resources if no national data is available): • Projected demand for electricity (in MW) • Total CO_2 emissions from generated electricity ($MtCO_2$) • National fuel mix • Emission factor for fossil fuels

Box 8.3: Relevant international sources of information

- IEA statistics which include indicators such as carbon intensity of electricity generated with oil, gas and coal. Available at http://www.iea.org/statistics/
- IEA's World Energy Outlook 2016 including estimates about energy demand, renewable energy under the New Policies and 450 scenarios. Available at http://www.iea.org/newsroom/news/2016/november/world-energy-outlook-2016.html
- IEA's Energy Technology Perspectives 2016 detailing energy transition pathways including relevant data about energy demand and projected CO_2 emissions. Available at http://www.iea.org/etp/
- IRENA Roadmap for a Renewable Energy Future. Available at http://www.irena.org/DocumentDownloads/Publications/IRENA_REmap_2016_edition_report.pdf
- IPCC emission factor database. Available at http://www.ipcc-nggip.iges.or.jp/EFDB/main.php
- World Bank Open Data covering several metrics including renewable energy consumption and renewable electricity output. Available at http://data.worldbank.org/indicator
- Local and national utilities
- IPCC Guidelines on 'Energy'. Available at http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html

Box 8.4: Example of how to calculate emission reduction potential of a non-state initiative in the energy supply sector

A non-state initiative aims to engage 100 companies to procure 100% of their energy demand by RE. Four of these companies will be mobilised in the user's country (both the company offices and the utility from which the company sources its power are physically located in the user's country). Assuming the user wants to look at the effect of non

state and subnational action on the overall necessary RE capacity installed (in MW) to cater to this additional demand (and/or whether it can be met by current RE generation capacity) and the associated emission reduction potential, the user could look at current RE generation capacities, convert the companies' targets into (additional) RE generation capacity requirements (difference of how much they already procure through RE and the 100% target, compare and, in case, add this to domestic RE generation capacity requirements).

To calculate the emission reduction potential for this difference, the user can derive different estimates of emission impacts depending on whether RE displace natural gas first, then oil and then coal (low estimation) or coal first, then oil and then gas (high estimation) using emission factors for example from the IEA's World Economic Outlook (WEO) data. More location-specific information on the marginal grid mix can be collected and applied in this assessment for improved accuracy.

Industry

The industry sector is very diverse and emissions-intense. At the same time, non-state and subnational actions targeting the sector are rather rare, but growing.

The sector contributed to approximately 21% of GHG emissions in 2010 with one of the biggest contribution coming from the production of steel and cement. Industry here includes the energy-related emissions as well as the non-energy emissions from industrial processes and product use.[40]

Table 8.3 provides information on how to convert common non-state and subnational mitigation targets into suitable metrics for comparison to national policies or inclusions into existing climate mitigation models and outlines options for calculating emission reduction potentials. Box 8.5 provides an overview of data sources which can be consulted if national data is not available.

Table 8.3: Examples of metrics for the industry sector

Industry sector		
Examples of non-state/ subnational climate change mitigation targets	**Suitable metrics for comparison to national policies or inclusion into existing climate mitigation models/scenarios**	**Options for conversion to emission reduction potential**
Decrease CO_2e intensity per tonne of steel/cement produced	Absolute values from the reduction of CO_2e intensity per tonne of steel/cement produced	Look at projected CO_2e intensity per tonne of steel/cement produced and target values (% or fixed reduction). On this basis and using emission factors, the emission reduction potential can be calculated per tonne (or unit of industry product) first and, by multiplying with projected production levels, for the entire sector. Data points needed: • Projected growth for steel/ cement production (in tonnes or per capita income/population) • Projected steel or cement intensity (CO_2e per tonne per capita etc)

[40] IPCC 2014a.

		• Emission factors • If applicable, population trends
Adopt best practice industry standards	Specific steel/cement intensity per tonne (or capita income/population) Assumptions: • All steel/cement production could reasonly be compliant with best practice industry standards Data points needed: • Best practice industry standard specific information • If applicable, population trends	Look at what best practice standards actually mean for a specific industry sector (translate into CO_2e emissions per tonne or other unit of product) and compare to projected CO_2e emissions per tonne produced following non-best practice industry standards. To determine emission reduction potentials, multiply the amount of CO_2e saved per unit of product with total amount of projected production. Data points needed: • Best practice industry standard specific information • Projected growth for steel/ cement production (in tonnes or per capita income/population) • Projected steel or cement intensity (CO_2e per tonne per capita etc) • Emission factors • If applicable, population trends
Decrease total CO_2e emissions from steel/cement production by X amount, X%	Total reduction in CO_2e emissions per tonne of steel/cement produced	Look at projected CO2e emissions per tonne of steel/cement produced. Then multiply by projected total amount of production and substract the targeted decrease (% or fixed reduction). Data points needed: • Steel or cement CO_2e emissions • Projected growth for steel/ cement production (in tonnes or per capita income/population)

Box 8.5: Relevant international sources of information

- IPCC emission factor database. Available at http://www.ipcc-nggip.iges.or.jp/EFDB/main.php
- IEA's *technology roadmap for the chemistry industry*. Available at https://www.iea.org/publications/freepublications/publication/TechnologyRoadmapEnergyandGHGReductionsintheChemicalIndustryviaCatalyticProcesses.pdf
- UN World Population Prospects. Available at https://esa.un.org/unpd/wpp/

Additional information on methods and tools:

- IPCC *guidelines on 'Industrial Processes and Product Use'*. Available at http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol3.html
- WBCSD Cement Sustainability Initiative *containing data on cement and a detailed roadmap for the sector*. Available at http://wbcsdcement.org/

Buildings

Several non-state actor and subnational actions are increasingly targeting the building sector which represents one of the key sectors for climate mitigation. The building sector accounts for 32% of global energy consumption, half of global electricity consumption and around 18% of GHG emissions, making it a key sector for GHG mitigation.[41]

Table 8.4 provides information on how to convert common non-state and subnational mitigation targets into suitable metrics for comparison to national policies or inclusions into existing climate mitigation models and outlines options for calculating emission reduction potentials. Box 8.6 provides an overview of data sources which can be consulted if national data is not available.

Table 8.4: Examples of metrics for the building sector

Buildings		
Examples of non-state/ subnational climate change mitigation targets	**Suitable metrics for comparison to national policies or inclusion into existing climate mitigation models/scenarios**	**Options for conversion to emission reduction potential**
Improve energy performance of buildings by X%	Energy performance of buildings (kWh/ m^2) Assumptions: • Linear trend in the energy consumption per m^2 • Linear trend in the share between commercial and residential buildings Data points needed: • Total (projected) national floor area	Look at projected average energy consumption of residential and commercial buildings and divide by total floor area to determine estimated future energy performance of buildings. Where available, otherwise users could consult international sources such at the IAE's World Economic Outlook. In addition, the data availability for commercial and public buildings is usually better and so the user could start with those.To determine the emission reduction potential users need to look at the country's projected energy fuel mix and from that information derive the potential GHG impact. Assumptions: • Linear trend in the energy consumption per m^2 • National fuel mix remains unvaried • Linear trend in the share between commercial and residential buildings Data points needed (use IEA's Energy Technology Perspective or other IEA resources if no national data is available): • Projected growth in floor area • Total (projected) energy consumption from commercial and residential buildings (kWh/m^2) • National fuel mix • Emission factors for oil, gas, coal
Increase the renovation rate of	Renovation rate of buildings (%)	Look at the average buildings intensity of new built vs reftrofitted buildings. Determine the CO_2 emission savings for

[41] IEA 2016a.

buildings by X%	Data points needed: • Current renovation rate (%)	a renovated buildings compared to a non- renovated one, based on the difference in the buildings intensity and calculating for how the energy was produced (taking into account the national fuel mix and emission factors). Then determine the additional number of projected renovated buildings by converting the relative renovation target to an absolute number. Users should then assume that additional renovations will proportionally reduce the CO_2 emissions. Assumptions: • Additional renovations will proportionally reduce CO_2 emissions • Linear trend in the buildings' intensity • Number of buildings remains unchanged • National fuel mix remains unvaried Data points needed (use IEA's Energy Technology Perspective or other IEA resources if no national data is available): • Total (projected) buildings' intensity (kWh/m^2) • National fuel mix • Emission factors

Box 8.6: Relevant international sources of information

- IEA's *World Energy Outlook 2016 with data trends on buildings emissions by fuel and final energy consumption by end-use*. Available at http://www.iea.org/newsroom/news/2016/november/world-energy-outlook-2016.html
- IEA's *Energy Technology Perspectives 2016 including estimates about floor area growth and floor area per household and buildings' energy consumption*. Available at http://www.iea.org/etp/
- IRENA *Roadmap for a Renewable Energy Future with data on share of modern renewable energy in building energy use.* Available at http://www.irena.org/DocumentDownloads/Publications/IRENA_REmap_2016_edition_report.pdf
- IPCC emission factor database. Available at http://www.ipcc-nggip.iges.or.jp/EFDB/main.php
- IPCC Guidelines on 'Energy'. Available at http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html

Transport

The transport sector is a popular target for both subnational and non-state actors. Together with the energy supply sector, it represents the sector most often targeted by non-state actions.[42]

The sector accounted for approximately 14.3% of global GHG emissions in 2010.[43] Approximately 15% of transport emissions in 2014 were associated with bunkers i.e., emissions from fuels used for international

[42] Yale University 2015.

[43] Sims et al. 2014.

aviation and maritime transport which are therefore beyond the scope of this guidance which focuses on national emissions.[44]

Table 8.5 provides information on how to convert common non-state and subnational mitigation targets into suitable metrics for comparison to national policies or inclusions into existing climate mitigation models and outlines options for calculating emission reduction potentials.

Table 8.5: Examples of metrics for the transport sector

Transport sector		
Examples of non-state/ subnational climate mitigation targets	**Suitable metrics for comparison to national policies or inclusion into existing climate mitigation models/scenarios**	**Options for conversion to emission reduction potential**
X% reduction in average car fuel consumption	Average fuel consumption by cars (in km/l) Data points needed: • Current average fuel consumption by cars (km/l)	Look at the projected fuel consumption of an average car. Calculate the relative % reduction of fuel consumption and the corresponding fuel consumption avoided. Then determine the corresponding CO_2 emission reduction potential, taking into account projected fuel mix and emission factors; and multiply by the projected number of cars on the road and the average distance driven. Assumptions: • Average km travelled by car remain unvaried Data points needed (use resources from the list of information sources in Box 8.7 if no national data available): • Projected fuel consumption of average car (km/l) • Numer of projected cars on road • National fuel mix • Emission factors
Increase the number of EV domestically to X%	Number of EVs (in thousand) Data points needed: • Current number of EVs • Averge final energy consumption of EVs (kJ/pkm)	Look at projected number of domestic vehicles on the road and their projected average final energy consumption. Then look at the average final energy consumption of EVs and determine the difference to traditional cars. Then convert the relative EV taget to an absolute one, multiply the difference in final energy consumption with the number of EVs and converting to CO2e emissions, by using emission factors, to determine potential savings from fossil fuels. Users should then calculate additional electricity demand from the increase in EVs, and multiply this with the grid emission factor, and hold this against the savings from fossil fuel to determine the overall emission reduction potential. Assumptions: • Distance travelled by traditional and EV cars are equal • Distance travelled remains unchanged or follows linear growth trend

[44] IEA 2016b.

		Data points needed (use resources from the list of information sources in Box 8.7 if no national data available): • Projected number of vehicles sold (incl EVs) • Average projected final energy consumption of traditional cars and EVs • National fuel mix • Emission factors
Increase rail share of freight land transport to X%	Share of rail freight land transport Data points needed: • Current rail share of freight land transport • Total freigt land transport traffic volume	Look at current share of freight land transport and the average freight rail distance ridden (as well as average CO_2 emissions per unit distance). The user should then look at road freight transport, average distance and average CO_2 emissions per unit distance. Finally, look at projections about freight transport and on this basis calculate and compare emissions to determine emissions savings potential. Data points needed (use resources from the list of information sources in Box 8.7 if no national data available): • Average final energy consumption from train operations (kJ/tkm) • Total freight land transport traffic volume • Fuel mix • Emission factors
Increase rail share of passenger travel to X%	Share of rail passenger travel Data points needed: • Current share of rail passenger travel • Total rail traffic volume	Look at existing rail share of passenger travel and train distance travelled (as well as average CO_2 emissions per unit distance). The user should then look at road passenger travel, average distance and average CO_2 emissions per unit distance. Finally, look at projections about passenger travel and on this basis calculate and compare emissions to determine emissions savings potential. Data points needed (use resources from the list of information sources in Box 8.7 if no national data available): • Average final energy consumption from train and road operations (kJ/tkm and pkm) • Total rail traffic volume • Fuel mix • Emission factors
Increase public transport by X amount or X%	Modal split (as share of bus/train etc in public transport)	Look at existing share of public transport, relative to total passenger transport and distance travelled (as well as average CO_2 emissions per unit distance). The user should then look other passenger travel transport, average distance and average CO_2 emissions per unit distance. Finally, look at projections about public transport travel and on this basis calculate and compare emissions to determine emissions savings potential. Data points needed (use resources from the list of information sources in Box 8.7 if no national data available): • Average final energy consumption from public

		transport and other forms of transport • Currrent share of public transport • Fuel mix • Emission factors For more sophisticated calculations, users should proceed per technology due to different efficiencies of different public transport modes.

Box 8.7: Relevant international sources of information

- IEA's World Energy Outlook 2016 *which provides information on trends in energy demand by source in the transport sector and the renewable energy outlook for the transport sector*. Available at http://www.iea.org/newsroom/news/2016/november/world-energy-outlook-2016.html
- IEA's Energy Technology Perspectives 2016 *which contains, among others, information on trends in energy demand from the transport sector, emissions intensity of new EVs and developments in passenger and freight transport*. Available at http://www.iea.org/etp/
- IRENA Roadmap for a Renewable Energy Future *with information on renewable energy share in transport for key countries*. Available at http://www.irena.org/DocumentDownloads/Publications/IRENA_REmap_2016_edition_report.pdf
- IPCC emission factor database. Available at http://www.ipcc-nggip.iges.or.jp/EFDB/main.php
- World Bank Open Data covering several metrics. Available at http://data.worldbank.org/indicator

Additional information on methods and tools:

- IPCC Guidelines on 'Energy'. Available at http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html
- ICCT Transport Roadmap 2012 *provides an excel-based tool to assess emissions from transport and and estimates changes in actual transportation activity by country and region, based on changes in forecasts of population, GDP and relative fuel*. Available at http://www.theicct.org/global-transportation-roadmap-model
- SloCat *Transport Greenhouse Gas Emissions Research Briefs*. Available at http://slocat.net/node/1538
- Paris Process on Mobility and Climate *An Actionable Vision of Transport Decarbonization Implementing the Paris Agreement in a Global Macro-Roadmap Aiming at Net-zero Emission Transport*. Available at http://www.ppmc-transport.org/wp-content/uploads/2016/04/Global-Macro-Roadmap-Consultation-Draft-March-2017.pdf

8.2.3 Waste

The waste sector is of particular important to subnational actors, in particular cities as they are ultimately the actors who have to deal with waste-related issues. Non-state actors can be an important source of waste on the other hand. Looking at existing databases on non-state and subnational action, few non-

state and subnational actors and intiatives currently target the waster sector. In 2010, the sector contributed to approximately 3% of global GHG emissions, due mainly to wastewater handling (54%) and solid waste disposal on land (43%) and followed by waste incineration.[45]

Table 8.6 provides an overview of suitable metrics for inclusion into existing national models that look at waste as well as the conversion of non-state and subnational action targets into emission reduction potentials. Box 8.8 provides an overview of data sources which can be consulted if national data is not available.

Table 8.6: Examples of metrics for the waste sector

Waste sector		
Examples of non-state/subnational climate change mitigation targets	**Suitable metrics for comparison to national policies or inclusion into existing climate mitigation models/scenarios**	**Options for conversion to emission reduction potential**
Recover methane emissions from waste	Eliminate methane emissions. Assumptions: • All methane emissions from waste can technically be recovered	If all methane emissions from waste can be recovered, then methane emissions from waste would be equal to zero. The emissions reduction potential can be calculated by looking at the projected amount of waste and the projected waste intensity (CO_2e/kt). By multiplying both, users have the potential emission reduction potential. Users also need to take into account previous years' wastes (using a 1st order decay equation)[46] Assumptions: • Linear growth trend in waste intensity (composition of waste remains unvaried) • The decrease in X amount of waste will proportionally reduce CO_2e emissions Data points needed (use UN or IPCC resources if no national data is available): • Waste intensity
Decrease amount of waste by X tonne (decrease GHG emissions from waste by X amount/X %)	Remaining amount of waste (in kt)	First calculate the CO_2e emissions of 1 kt of waste, by multiplying it with the waste intensity. To determine the emission savings potential from the decrease in waste, multiply the absolute reduction in waste (in kt) with projected CO_2e emissions of 1 kt of waste. Assumptions: • Linear growth trend in waste intensity (composition of waste remains unvaried)

[45] IPCC 2014a.

[46] For more information on how to calculate emissions reduction potential from waste, please see the IPCC guidelines on waste.

		• The decrease in X amount of waste will proportionally reduce CO_2e emissions • Ignore emissions from decay of waste on landfills from previous years Data points needed (use UN or IPCC resources if no national data is available): • Waste intensity

Box 8.8: Relevant international sources of information

- UN Environment/International Solid Waste Association's *Global Waste Management Outlook.* Available at: http://www.iswa.org/nc/home/news/news-detail/browse/1/article/press-release-global-waste-management-outlook-gwmo/109/
- IPCC *report on waste management*. Available at https://www.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4-wg3-chapter10.pdf
- IPCC emission factor database. Available at http://www.ipcc-nggip.iges.or.jp/EFDB/main.php

Additional information on methods and tools:

- IPCC *guidelines on 'Waste'*. Available at http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol5.html
- California's landfill methane emissions calculation tool. Available at https://www.arb.ca.gov/cc/protocols/localgov/localgov.htm

8.3 Comprehensive assessments

Users aiming for a comprehensive assessment will need to go through all identified sectors in Chapter 4 (define assessment boundary) and perform the steps outlined above. Comprehensive assessments are likely to focus on emission reduction potentials from non-state and subnational action. Box 8.9 provides an example on how this assessment might look like in practice.

Box 8.9: Determining emission reduction potentials in a comprehensive assessment

The objective of the assessment is to quantify the emission reduction potential from all non-state actors on the emission pathway of country X. In this step, the user should quantify the earlier identified suitable non-state actions. In the example below, the user has identified one major suitable industry company target and another in the energy sector. The user should proceed with the calculation by sector. Users should bear in mind that at this stage, base years and target years are not harmonised and overlaps have not been checked for, therefore users will *not* yet be able to add up emission reduction potentials

Actor	(Sub)sector(s)	Target (including reference levels, target year and assumption(s) if available)	Base year emissions in user country's boundary (tCO_2e)	Estimated emissions in target year in user country's boundary (tCO_2e)	Estimated emission reduction potential in user country's boundary (tCO_2e) for stated target	Notes

					year	
Information provided	*Identified by user*	*Information provided*	*Information provided*	*Information calculated by user*	*Information calculated by user*	*Assumptions made by user*
Company A	Energy supply	25% renewable electricity excl. large hydro in 2030 (10% renewables in 2005 base year)	9,000,000 (in 2005)	In year 2005, 90% of electricity is generated by fossil fuel, accounting for 9,000,000 tCO_2e in total. In 2030, 75% is generated by fossil fuel. To calculate the emissions in 2030: x= 0.75*9,000,000= 6,750,000 tCO_2e	2,250,000 (in 2030)	Between 2005 and 2030 no changes assumed in total electricity generation levels and the fuel mix for electricity generation from non-renewables.

In the above example of Company A, the user calculates the emissions in the target year, 7,500,000 tCO_2e in 2030. However, users should note that the result is sensitive to the assumptions taken ("Notes" column). For example, if the user assumed a 20% increase in total electricity generation by the target year, the target GHG emission level would be 6,750,000 * (1 + 20%) = 8,100,000 tCO_2e, meaning that the absolute emissions reduction impact compared to the base year would be much smaller (900,000 tCO_2e compared to 2,250,000 tCO_2e). Similarly, if the user assumed a 10% reduction in emission intensity for electricity generated from non-renewable sources by 2030 due to the renewables mainly replacing coal, the target GHG emission level would be 6,750,000 * (1 – 10%) = 6,682,500 tCO_2e and the resulting absolute emissions reduction impact would be 2,317,500 tCO_2e compared to the base year.

In the example below, the user has information about the target and base year emissions in the user country's boundary. To calculate the emissions in the the target year and associated emission reduction potential, the user needs to determine the share of operational emissions as part of total emissions. To do so, users should check the datasource to see if the company has provided that information if they had not noted that down previously. In case no information has been detailed, users can assume that a company's operational emissions covers its total scope 1 and 2 emissions Again, the estimated target year emissions and emission reduction potential are sensitive to assumptions, in this case that the non-operational emissions remain unvaried ("Notes" column).

Actor	(Sub)sector(s)	Target (including reference levels, target year and assumption(s) if available)	Base year emissions in user country's boundary (tCO_2e)	Estimated emissions in target year in user country's boundary (tCO_2e)	Estimated emission reduction potential in user country's boundary (tCO_2e) for stated target year	Notes
Information provided	*Identified by user*	*Information provided*	*Information provided*	*Information calculated by user*	*Information calculated by user*	*Assumptions made by user*
Company B	Industry	Reduce operational CO_2e emissions by 100% from 2015 to 2021	4,580,000	Scope 1+2 emissions cover 70% of emissions and account for 4,580,000 tCO_2e. Operational emissions in base year are thus 0.7*4,580,000= 3,206,000 tCO_2e Emissions in the target year will thus be 4,580,000-3,206,000= 1,374,000 tCO_2e	3,206,000	Operational emissions cover a company's total scope 1 and 2 emissions; non-operational emissions remain unvaried

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9. Assessing Overlaps, Adding Impacts and Comparing Ambition

This chapter provides guidance on how to add non-state, subnational and national climate mitigation actions, while avoiding double counting, and how to compare their respective ambition level and impact on emission pathways.

Checklist of key recommendations

- Check for potential overlaps between various non-state and subnational actions in the same sector, across sectors and between non-state/subnational actions and national policies to avoid double counting
- Harmonise the target year with the non-state and subnational target years when comparing ambition

9.1 Relationship and interactions between actions

Based on the converted (or suitable) metrics identified and/or the emission reduction potentials calculated in Chapter 8, users should check for overlaps to avoid double counting of impacts. Users should assess the relationships and interactions between actions to understand where these actions reinforce each other to achieve the same outcome and to not count their effect at metric or emission reduction potential level twice. It is a *key recommendation* to check for potential overlaps between various non-state and subnational actions in the same sector,[47] across sectors and between non-state/subnational actions and national policies to avoid double counting.

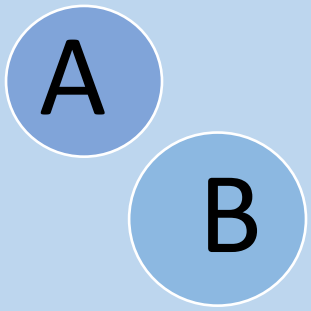
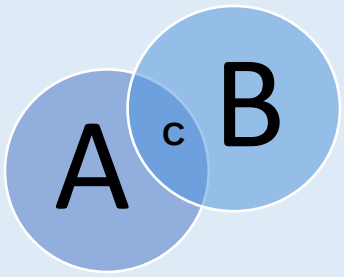
Table 9.1 specifies types of relationships between national policies and non-state/subnational actions with a specific focus on cases of double counting and how users can avoid it *(A and B stand for different non-state, subnational and/or national policies/actions, C stands for their overlap and D for the combined effect of A and B together).* Overlaps do not necessarily always constitute a problem, in some cases actions can work in the same direction and reinforce each other rather than decrease the overall impact. It should be noted that some double counting may be inevitable when actions pull in the same direction. There is no one size fits all approach to determine overlaps and the analysis should be carried out on a case by case basis, in the form of a qualitative assessment.

Users should also consult with relevant stakeholders on how the different actions and policies qualify, that is, if they are independent, overlapping, reinforcing or overlapping and reinforcing. Depending on resource availability, they might also want to have a look at the studies in the Annex that quantify non-state and subnational action and how they handle this issue. In general, the more diverse the different targets (use of different metrics, discussed in Chapter 8) and the sector, the lesser the chances for overlap between the different targets. The more overlaps users identify, the more cautious they should be when adding impacts. Box 9.1 and Box 9.2 provides examples for addressing overlaps and for calculating emissions coverage overlaps among actors.

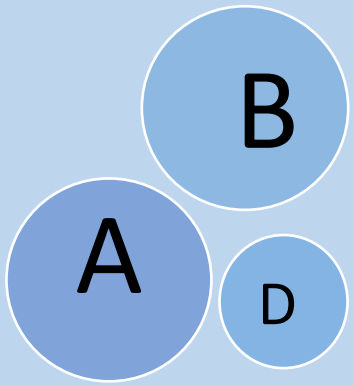
[47] This can include checking for overlaps at collaborative action level

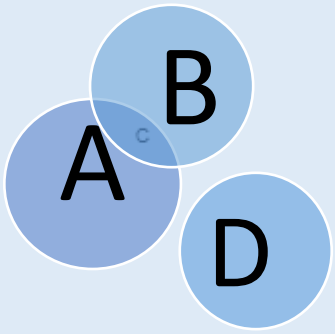
Users should also document results as well as the approach used to determine overlaps.

Table 9.1: Type of relationshpis between policies and non-state and subnational actions[48]

Type	Description	What to do
Independent 	Multiple national policies/actions do not interact with the non-state and subnational action being assessed. The combined effect of implementing the policies and non-state and subnational action together is equal to the sum of the individual effects of implementing them separately (A + B). In practice, users will encounter this situation in a very limited number of cases.	No further action required. Users will be able to compare actions once data is harmonised (all targets are harmonised against a specific target year/base year if applicable).
Overlapping 	Multiple national policies and non-state and subnational actions interact, and the combined effect of implementing the policies and non-state and subnational action together is less than the sum of the individual effects of implementing them separately (A + B – C). This includes policies/actions that have the same or complementary goals (for example national energy efficiency standards for buildings and non-state action aimed at reducing the GHG impact of buildings), as well as actions that have different or opposing goals (such as a national fuel subsidy and a non-state initiative calling for a price on carbon) and actions/initiatives that replace the same emissions	Overlap should be determined and subtracted from overall assessment. Carefully check if the potential combined impact is realistic/possible. Never include an impact which could not be realistic. If in doubt, users should consult with sector experts. In case of overlaps between regional and city-level actions, it can be recommended that the actions of cities that are located in regions with action should entirely be excluded to avoid double-counting, unless those city-level actions are significantly more ambitious than the actions of the regions they are located in.

[48] Adapted from WRI 2014 and based on Boonekamp 2006.

	(eg the targets of a solar and a wind initiative both striving for a certain share of electricity generation could together account for a higher share of generation than there are non-renewables to replace). This also includes actions that are counted twice, i.e., when the same company/city/etc.is subscribed to two different initiatives with a similar target; or listed both as singular action and within one initiative. An indication for a potential overlap is the use of the same metric for different targets.	In case of overlaps between company-level and region/city-level actions, the share of company emissions generated in cities/regions with action needs to be quantified. If cities/regions with action account for x% of national total GHG emissions, a simplified approach would be to assume that x% of the impact from company-level actions are overlapping.
Reinforcing  	Multiple national policies and non-state and subnational actions interact, and the combined effect of implementing the policies and non-state and subnational actions together is greater than the sum of the individual effects of implementing them separately (A + B + D). An example could be a business initiative aimed at decreasing deforestation and a national policy aiming to discourage the use of uncertified forest-risk commodities. Both the initiative and the policy pull in the same direction and might mutually reinforce each other.	The combined effect should be calculated and added to the overall impact.
Overlapping and reinforcing	Multiple policies and non-state and subnational actions interact, and have both overlapping and reinforcing interactions. The combined effect of implementing the policies and non-state and subnational actions together may	Overlap should be calculated and added or subtracted from the overall impact, combined effect should also be calculated and added.

	be greater than or less than the sum of the individual effects of implementing them separately. An example could be a non-state target to increase the amount of RE procured and a national policy aimed at increasing the amount of RE generated within the country. Both the non-state action and the national policy pull in the same direction, while their combined effect could either be greater than the sum of the individual effects or less.	

1 *Box 9.1: Example of how to address overlaps*

Province A has committed to a 30% target share of RE in their total final energy consumption by 2020, but A could use electricity imported from other provinces to meet its commitment. Province B has a renewable electricity generation goal of 30%, and they sell most of their renewables to Province A. Although Provinces A and C both meet their commitments in real and measureable ways, at the national level the amount of renewable electricity generation may be smaller than they appear on the surface and the risk of double counting is high. To parse out this kind of double counting, additional qualitative analysis is recommended. To solve this case, the national government would need detailed data on electricity sales between the Provinces. Many regional governments now document their yearly electricity imports and exports. In the absence of data, it is recommended to provide a realistic range of RE generation.

2 *Box 9.2: Example calculation of emissions coverage overlaps among actors*

In Country A, 8 regions, 84 cities and 297 companies from different sectors have set targets to reduce overall GHG emissions. These three actor groups accounted for 940 $MtCO_2e$, 690 $MtCO_2e$ and 680 $MtCO_2e$ in 2016. The overlap estimation can be done in a number of steps.

First, there are overlaps between regions and cities. 33 cities that accounted for 570 $MtCO_2e$, or 83% of emissions from the 84 cities, were located in one of the above eight regions and none of the 33 had targets that are significantly more ambitous than their region-level targets. It is recommended that these 33 cities' targets are excluded, meaning that the remaining 51 city targets would be counted as additional to regional targets.

Second, there are overlaps between company targets and subnational (regional and cities) targets. Users could first look into non-energy supply companies, which are energy end-users. Because companies usually do not provide information on the emissions per office or factory location, users could assume that the GHG emissions from non-energy supply companies are distributed proportionately to region- and city-level emissions. The GHG emissions from the above 8 regions and 51 cities accounted for 16% of current national total GHG emissions (excluding LULUCF). It can therefore be assumed that 16% of non-energy supply companies' targets is overlapping.

Following this, users could look into the overlaps between the direct emissions from energy supply companies and indirect emissions from regions, cities and non-energy supply companies. The 8 regions, 51 cities and the non-energy supply companies were found to account for 20% of the country's total CO_2 emissions from the energy supply sector. It can therefore be assumed that the 20% of the energy supply company targets are overlapping.

9.2 Add impacts and compare ambition

Once overlaps have been determined, users can compare the impact (ambition[49]) of non-state and/or subnational action at either metric level or emission reduction level against the national or sectoral target, policy, scenario or projection by adding the earlier determined impacts. It is a *key recommendation* to harmonise the target year with the non-state and subnational target years when comparing ambition. For the sake of simplicity, in the absence of data, this guidance recommends to not assume any additional impact of the actions after they have reached their goals. In other words, if an action aims to achieve a certain emission reduction in 2020, but the user is looking for the action's emission reduction potential in 2030, the user should assume that the reduction potential achieved in 2030 is equal to the one of 2020, under the condition that the baseline remains unvaried. Users should bear in mind however that some 'autonomous' improvement', due to market developments for example , in certain sectors might take place even without the non-state or subnational action being implemented.

For comprehensive assessments where users aim to compare the overall emission reduction potential from non-state and subnational action at national level to the current national policy scenario, the NDC and/or the national emission pathway, or for targeted assessments focussing on how non-state/subnational action compares to the current policy scenario and/or sectoral emission pathways, users require information on national/sectoral emission projections and/or GHG implications of national policy scenarios or the NDC. If there is currently no such information available or has been gathered as part of Chapter 7, users could consult international scientific analysis for reference and which tracks the effects of current policies on national emissions relative to an NDC scenario, such as being developed by the Climate Action Tracker for some selected countries.[50]

In addition, this guidance suggests to put together a list to clearly indicate the difference in ambition levels (Table 9.2). This can be done by looking at specific metrics, such as in the example below, or for emission reduction projections (Table 9.3). The tables also indicate which comparison in ambition is relevant for which assessment objective.

Table 9.2: Compare ambition at metric level

(Sub)Sector/ National Level	Potential of non-state/ subnational action without overlap in a specific (sub)sector or	Corresponding current (sub)sector or national policy scenario (B)	Combined effect of non-state/ subnational action and (sub)sector or national policy	Additional impact (or gap) from non-state action at (sub)sector or national level	National or (sub)sector requirements under NDC (E)	Gap between NDC requirements and combined impact of all actions (E-C)

[49] Ambition level is used a benchmark relative to climate change mitigation goals (such as those expressed in NDCs for example).

[50] Further information is available at: http://climateactiontracker.org/

	at national level (A)		incl overlap (C = maximum of A and B)	(D)		
Relevant for which objective of assessment	All	All	Determine how non-state and subnational action contribute to the (sub)sectoral or national climate change plan; Determine opportunities for engagement; Improve climate mitigation projections or revise target(s);		For all assessments that relate to the NDC	Determine opportunities for engagement; Improve climate mitigation projections or revise target(s);
Example: Renewable energy	10 GW added by 2020	7 GW added by 2020	10 GW added by 2020	3 GW added by 2020	12 GW added by 2020	2 GW by 2020

Table 9.3: Compare ambition at emission level

(Sub)Sector/ National Level	Emission reduction potential of non-state/ subnational action without overlap (A)	GHG emission reductions resulting from current sectoral/ national policy scenario (B)	Combined effect of non-state/ subnational action and (sub)sector or national policy incl overlaps (C = maximum of A and B)	Additional impact (or gap) from non-state action at (sub)sector or national level (D)	National or (sub)sector requirements under NDC (E)	Gap between NDC requirements and combined impact of all actions (E-C)
Relevance for which assessment objectives	All	All	Determine how non-state and subnational action contribute to the (sub)sectoral or national climate change plan; Determine emissions gap at the (sub)sector or national level; Determine opportunities for engagement; Improve climate mitigation projections or revise target(s); Determine untapped (sub)sector or nationwide emission reduction potential to decide how to meet national climate change targets		For all assessments that relate to the NDC	Determine emissions gap at the (sub)sector or national level; Determine opportunities for engagement; Revise NDC; Determine untapped (sub)sector or nationwide emission reduction potential to decide how to meet the NDC
Example: Electric Vehicles	20 MtCO2e by 2030	60 MtCO2e by 2030 (sectoral/ transport sector)	70 MtCO2e by 2030	10 MtCO2e by 2030	80 MtCO2e by 2030	10 MtCO2e by 2030

PART IV: DOCUMENTING RESULTS

10. DOCUMENTING RESULTS

Documenting the results, methodology, and assumptions used is important to ensure the impact assessment is transparent and gives decision-makers and stakeholders the information they need to properly interpret the results. This chapter presents a list of information that is recommended to be documented based on the steps in previous chapters.

Checklist of key recommendations

- Document information about the assessment process and the non-state and subnational impacts (including the information listed in Section 10.1)

10.1 Recommended information to document

It is important that users carefully document their input data, analysis methods and results. By doing so, they will have the opportunity to reassess results over time, given that non-state and subnational actions are expected to accelerate in the future and that more and better data is likely to become available.

The detail and breadth of documenting should depend on the objectives and resources available to users carrying out the assessment. More complex and comprehensive assessments will thus require more documenting. Throughout the different chapters, this guidance has provided explanation on which information users should be collecting in an assessment report. The recommended information to document is listed below.

Chapter 2: Objectives

- The objective(s) of the assessment

Chapter 4: Define assessment boundary

- Which (sub)sector(s) were identified
- Which direct and indirect GHG emissions those (sub)sectors cover

Chapter 5: Create a list of all relevant non-state and subnational actions

- A list of all relevant non-state and subnational actions identified, and relevant data needed for further analysis (dependent on the objectives of the assessment)
- The method used for data collection

Chapter 6: Select non-state and subnational actions for inclusion in analysis

- Which non-state and subnational actions from the list in Chapter 5 were found to be suitable for further inclusion into the assessment
- The likelihood for non-state and subnational action targets to be achieved

- How aggregated collaborative actions were distributed to the country while ensuring that the collaborative action is not already covered by an individual non-state and subnational action
- The criteria and assumptions used to assess suitability and likelihood of each non-state and subnational action

Chapter 7: List relevant national climate mitigation policies and actions

- A list of relevant national climate mitigation policies and actions that relate to the objectives of the assessment
- All data sources used to compile the data

Chapter 8: Convert non-state and subnational actions and national policies to suitable metrics

- Which metrics were used for non-state and subnational actions and national policies
- For each of the non-state and subnational actions, whether actions were included into existing models/tools (and which ones) and/or whether emission reduction potentials were calculated (and the approach used for calculating those)

Chapter 9: Assess overlaps, add impacts and compare ambition

- The approach to determine overlaps between various non-state and subnational actions in the same sector, across sectors and between non-state/subnational actions and national policies to avoid double counting
- The results from the overlap analysis
- Combined projected impact of non-state/subnational action (at metric and/or emission reduction level)

10.2 Additional information to document, if relevant

Other information, depending on the objective of the analysis, may include:

- The impact of non-state and subnational action on the national/sectoral emission pathway (based on current policy scenarios)
- The impact of non-state and subnational action on the national/sectoral emission pathway required under the NDC
- The emissions gap between the combined impact of non-state/subnational action and the NDC
- Additional CO_2e savings potential of non-state/subnational action
- Any challenges faced during the assessment

Table 10.1 provides an example which can serve as a template for users for documentation on the different steps outlined in this guidance. The template is designed for the most comprehensive assessment users might want to conduct. Users can remove the rows which are not applicable to their assessment and tailor the template to their specific country context.

Table 10.1: Template to document assessment results

Example: Assessment #1	
Objective(s)	
Assessment boundary	
Method for data collection	
Link to list of retained non-state and subnational action	
Link to list of relevant national policies	
Which common metrics were chosen	
Approach to determine overlaps	
Combined projected impact of non-state/subnational action	
Impact on national/sectoral emission pathway (current policy scenario)	
Impact on national/sectoral emission pathway required under the NDC	
Emissions gap between combined impact of non-state/subnational action and NDC	
Additional CO_2e savings potential of non-state/subnational action	

PART V: DECISION MAKING AND USING RESULTS

11. USE RESULTS FOR DECISION-MAKING AND PLANNING

This chapter discusses how assessment results may be interpreted, linking those back to the objectives set in Chapter 2. In addition, the specific use for decision-making will likely depend on the results obtained in Chapters 8 and 9.

Users should consider both the objectives and assessment results to inform decision-making. For example, if non-state and subnational mitigation actions are found to be less ambitious than existing national climate mitigation targets, and the user's objective was to understand the potential impact of non-state and subnational mitigation action nationally, users could determine the gap in ambition level, revise policy design and/or engage with relevant non-state and subnational actors. In contrast, if non-state and subnational action targets are found to be more ambitous, the assessment could support an upward revision in national mitigation targets. Table 11.1 illustrates how results could be used for each of the objectives identified in Chapter 2.

Table 11.1: Examples of how to use results for decision-making

Assessment type	Assessment objective	Options for using results
Comprehensive assessment	Determine untapped nationwide emission reduction potential to decide how to meet national climate change targets, i.e., how much additional mitigation potential do non-state and subnational action have which can help go beyond existing national climate mitigation targets?	If an untapped nationwide emission reduction potential has been found, users could: • Revise national climate change targets • Identify leading sectors (and non-state actors/ subnational actors) • Identify lagging sectors (and non-state actors/ subnational acors) • Engage with non-state and subnational actors, for example, with a view to design targeted policy interventions
	Determine how non-state and subnational action contribute to the national climate change plan or the NDC	• Check first the impact of non-state and subnational action on the national climate change plan or NDC. The results could be used for: • Discussions and planning on whether non-state and subnational action is supporting national climate change plans or the NDC • Future policy design • Possibly, revision of climate policy targets • Inclusion into future NDC cycle • Enhancement of (inter)national credibility of national climate mitigation targets
	Help determine the emissions gap at the national level, i.e., taking into account subnational and non-state action, how much more national action	If an emissions gap has been determined, users could: • Compile evidence on how much additional national action is necessary to achieve the NDC target • Contribute to discussions on where (in which sectors) more regulation and/or incentive setting could yield best results

	is needed to achieve the NDC target?	based on an analysis of leading vs lagging sectors (and non-state actors/subnational actors)
	Improve climate mitigation projections or revise economy-wide target(s), e.g., revise an economy-wide emission reduction target	If the impact of non-state and subnational action for an economy-wide target has been found to be more ambitious than current policies, users could: • Revise climate change target • Include into future NDC cycle • Enhance (inter)national credibility of targets
Targeted assessment	Determine how non-state and subnational action contribute to a sectoral climate change plan or scenario	Check first the impact of non-state and subnational action on the (sub)sectoral climate change plan or scenario. The results can be used for: • Discussions and planning on whether non-state and subnational action is supporting sectoral climate change plan or scenario • Future policy design • Possibly, revision of sectoral climate policy targets
	Improve climate mitigation projections or revise target(s), e.g., revise a renewable energy target	If the impact of non-state and subnational action for a specific indicator has been found to be more ambitious than current policies, users could: • Revise climate change target • Include into future NDC cycle • Enhance (inter)national credibility of indicator specific climate mitigation targets
	Determine untapped sector-wide or subsector-wide emission reduction potential; i.e., how much more can emissions be reduced at the sector level taking into account non-state and subnational action?	If an untapped sector-wide or subsector-wide emission reduction potential has been found, users could: • Revise sectoral climate change targets • Identify leading non-state actors/subnational actors within the sector
	Determine how non-state and subnational action impacts the ambition set out in one particular policy instrument, e.g., to what extent can non-state and subnational action contribute to national policies to phase out HFCs	If non-state and subnational action was found to be more ambitous, users could: • Determine at what point in time non-state and subnational action is expected to go beyond the ambition set out in one particular policy instrument • Determine which sectors contribute most to the rise in ambition • Revise sectoral climate change targets If non-state and subnational action was found to be less ambitous, the user could: • Determine gap in ambition level • Revise policy design • Engage with relevant non-state and subnational actors

	Help determine the emissions gap at the sector level, i.e., taking into account subnational and non-state action, how much more sector-level action is needed to achieve the sector NDC target?	If an emissions gap at the sector level has been determined, users could: • Compile evidence on how much additional national action is necessary to achieve the sectoral policy target/NDC target • Contribute to discussions on whether more regulation and/or incentive setting could yield better results
	Determine opportunities for engagement with non-state and/or subnational actors, i.e., identify sectors where engagement would significantly promote more non-state and subnational action	Check in which (sub)sectors non-state and subnational action leads to comparatively low impact and/or where the number of non-state and subnational actors is comparatively low. Based on this analysis, users could: • Engage with non-state and subnational actors in those sectors where there is comparatively low impact from their actions • Engage with non-state and subnational actors in sectors which are key for NDC implementation/to meet current national climate policy targets • Further incentivise non-state and subnational action in key sectorsEngage with non-state and subnational actors in those sectors where there is comparatively high impact from their action to understand their motivation and factors of success

In addition, it will be important that users share the results of their assessment with the relevant stakeholders to ensure that they can be integrated into decision-making. Which steps to take to ensure this is being done will be dependent on who is carrying out the assessment and for which purpose. One option to increase the likelihood that the results reach the right people is to involve the targeted audience from the very beginning of the assessment.

Users should also bear in mind that policymakers may be hesitant to revise climate mitigation targets because often they can only partly control non-state and subnational action. However, in some cases the commitments may already be robust enough to include and in future it is likely that the robustness of the data used and therefore the expected impact will improve. Through incentive settings and other regulatory means, policymakers may have significant influence on non-state and subnational actors, or the other way round and which should be seen as an opportunity rather than a risk.

At the same time, it is important to underline that the integration of non-state and subnational action should not be used by policymakers to scale back on government-led action. Rather, the positive reinforcing relationship between non-state/subnational and national actions should be further emphasised. The opportunities linked to tapping into these potentials, e.g., more competitive economies, signalling transformation and giving positive inputs on the international stage, should be taken into account when considering how to use the results of the assessment.

APPENDIX A – OVERVIEW OF DATABASES AND STUDIES

The appendix provides an overview of the most comprehensive global databases on non-state and subnational action as well as an overview of literature (methodologies) on the quantification of non-state and subnational action, including their approach to overlaps that users may want to consult in support of applying the guidance.

Table A.1: Overview of databases for non-state and subnational action

Name of data source	Type of actors covered	Geographic focus	Sectors covered	Targets covered	Data sources	Is action tracked/how?	Frequency of updating	Link to database
Non-state Action Zone for Climate Action (NAZCA)	Companies, cities, regions, investors, CSOs, cooperative initiatives	World	All sectors and major themes	Broad (Emissions reduction, energy access & efficiency, renewable energy, resilience, use of carbon price, private finance, transport, buildings, forest, short term pollutants, innovation, agriculture, other - 12,000+ commitments/actions)	CDP, carbonn Climate Registry, The Climate Group, Covenant of Mayors, UN Global Compact, Investors on Climate Change, Climate Bonds Initiative, Climate Initiatives Platform	Actors are encouraged to report on progress themselves through voluntary disclosure. NAZCA considers itself a platform that tracks non-state and subnational action.	Ongoing basis, frequency unclear	http://climateaction.unfccc.int/
Covenant of Mayors Action plans	Cities	Europe	All sectors	Broad (Emissions reduction, adaptation, secure and sustainable and affordable energy to implement EU climate and energy	Covenant of Mayors Monitoring and Reporting Framework	Cities need to report every two years on implementation progress to the Covenant of Mayors	Ongoing basis, frequency unclear	http://www.covenantofmayors.eu/actions/monitoring-action-plans_en.html

				objectives)				
Climate Initiatives Platform	International Climate Initiatives (ICI)	World	Finance, Transport, Agriculture and Forestry, Cities and Regions, Waste, Industry, Emissions, Energy, Adaptation, Other	Broad (from specific emissions reductions to implementation/capacity building initiatives, in total 20+ initiatives, over 70 of which are on NAZCA)	UNEP/UNEP DTU	Specific monitoring and reporting section (self-reported) – though often information is (not yet) available	Ongoing basis, continuously (ICI focal points able to update information themselves)	http://climateinitiativesplatform.org/index.php/Welcome
Portal on Cooperative Initiatives	International Cooperative Initiatives	World	Agriculture, Buildings, Cities, EE, Energy Supply, Finance, Forestry, Industry, Int. Aviation, Int. Mar. Transport, Land Use, SLCP, Transport, Waste, other	Broad (from capacity building, to research, to technological transfer)	UNFCCC	No	Ongoing basis, frequency unclear	http://unfccc.int/focus/mitigation/items/7785.php
Global Aggregator for Climate Actions (GAFCA)	Non-state and subnational	World (most are global initiatives)	Agriculture, Cities, Energy Finance, Forests, Industry, Resilience, Transport	Broad (from reduced emissions, to people affected, knowledge dissemination to fundraising) Almost 200 initiatives or climate actions and initiatives, e.g., those launched at the 2014 UN Climate Summit,	DIE, LSE	Ex-post output effectiveness: analysis of “function-output-fit” to measure whether produced outputs are consistent with (self-) declared functions.	Ongoing project– GAFCA is designed to be extendable to a large range of climate actions, both addressing	https://www.die-gdi.de/uploads/media/Working-Paper-216-Chan-et-al.pdf http://www.tandfonline.com/d

				and mobilised under the Lima-Paris Action Agenda)			mitigation and adaptation.	oi/pdf/10.1080/14693062.2016.1248343
Investor platform for climate action	Investors	World	Finance	Broad but along the following themes: Measure, engage, reallocate, reinforce	PRI, IIGCC, CDP, INCR (Ceres), IGCC, UNEP FI, Asia Investor Group on CC	Not directly on the database although many of the actions track progress	Unclear	http://investorsonclimatechange.org/initiatives/
CDP website	Companies, cities	World	Consumer discretionary, consumer staples, energy, financials, health care, industrials, IT, materials, telecoms, utilities	Absolute and intensity emission reduction targets	Self-reported data from companies and cities; CDP reporting frameworks	Not directly in the database, but often incl in single responses from cities/ companies and in CDP specific reports	Regularly (depending on programme/ initiative)	https://data.cdp.net/ and https://cdp.net
Carbonn Climate registry	Cities, States and Regions	World	Renewable Energy, Transportation, Green Infrastructure, Buildings, Waste,	Broad (from environmental education, to emissions reductions to energy intensity improvements (600+ reporting entities)	ICLEI, Local government climate roadmap, dac, Plan de Accion Climatica Municipal, carbonn Japan Project, EcoMobility Alliance, Earth Hour City Challenge	Reporting entities are encouraged to submit 'Status' updates on their mitigation & adaptations actions	Regularly, frequency unclear	http://carbonn.org/
RegionsAdapt	States and regions	World (joined Regions Adapt)	All	Adaptation	RegionsAdapt	Reporting entities are encouraged to report on progress	Ongoing basis, frequency unclear	No database but cover data in annual reports, http://www.nrg4sd.org/wp-content/upload

								s/2017/01/RA2016REPORT_FINAL-1.pdf

Table A.2: Overview of literature on the quantification of non-state and subnational action, including approach to overlaps

Source	Approach	Type of actors covered	Types of sectors covered	Impact on emissions ($MtCO_2e$)	Target year	Approach to overlaps	Reference Scenario/baseline	Geographic focus	Link to source
Climate commitments of subnational actors and businesses (UNEP 2015)	Select most ambitious initiatives, calculate emissions reductions that they will deliver, consider overlap between initiatives and with pledges made by nat. governments	Cities, regions, companies	EE, efficient cook stoves, methane and other SLCPs, reduced deforestation & afforestation, agriculture	2,500 – 3,300	2020	Calculated (between different initiatives, both between sectors and within same sectors)	Relative to a business-as-usual scenario that takes account of current government policies	World (focusing on major initiatives)	http://apps.unep.org/redirect.php?file=/publications/pmtdocuments/-Climate_Commitments_of_Subnational_Actors_and_Business-2015CCSA_2015.pdf.pdf
Towards a new climate diplomacy (Hsu, Moffat, et al. 2015)	Look at individual commitments; tailor methodology to calculate emissions reduction impact, estimate double counting; compare with BAU from IPCC	Cities, regions, companies, NGOs, IOs and CSOs	EE, RE, reduced deforestation and afforestation	2,540	2020	Not calculated (exclude international cooperative initiatives because of concerns about double counting; otherwise case-by-case basis)	Relative to BAU from 5th assessment report of IPCC	World (drawing on commitments made at the New York Climate Summit 2014)	http://www.nature.com/nclimate/journal/v5/n6/full/nclimate2594.html
Better partnerships (CISL & Ecofys 2015)	Select five international cooperative initiatives; apply three different scenarios to analyse potential	Companies	EE, fluorinated gases	No total	2020	Not calculated (because of case study approach)	Tailored to initiative	World (drawing on Climate Initiatives Platform)	http://www.ecofys.com/files/files/ecofys-cisl-2015-wtg-better-partnerships.pdf

	impact and carry out interviews with stakeholders from the different initiatives to support analysis.								
Climate action outside the UNFCCC (Roelfsema et al. 2015)	Select international cooperative initiatives, calculate emissions reduction using a tailored methodology for each initiative; Comparing projected emissions of the initiatives to the emission levels pledged by parties under the UNFCCC	Cities, companies	Transport, methane and other SLCPs, fluorinated gases, shipping & aviation	2,500 (2020), 5,500 (2030)	2020/2030	Calculated (between initiatives, which is assumed to occur with initiatives aimed at the same sector in the same country)	IMAGE 3.0 (PBL) baseline scenario, based on population and GDP assumptions from the SSP2 scenario (IIASA, 2015), and harmonised to the 2010 global emission level from the UNEP Gap Report	World (international initiatives)	http://www.pbl.nl/sites/default/files/cms/pbl-2015-climate-action-outside-the-unfccc_01188.pdf
International climate initiatives – A way forward to close the emission gap? (Graichen et al. 2016)	Screen 174 initiatives, select those suitable for further quantitative & qualitative analysis. Assess mitigation impact of selected initiatives and break down impact on a nat. level; add impact of initiatives to estimate emission reduction beyond current pledges	Cities, regions, companies	EE, Efficient cook stoves, RE, transport, methane and other SLCPs, fluorinated gases, reduced deforestation and afforestation	5,000 – 11,000	2020/2030	Calculated (overlaps with other initiatives in the same sector, across sectors, and any specific policy or INDC elements in the country not considered in the global INDC scenarios before)	Reference scenario based on the full implementation of all INDCs	World (international initiatives)	https://www.umweltbundesamt.de/sites/default/files/medien/1968/publikationen/2016-11-29_discussion_paper_clean_version_final.pdf

The business end of climate change (CDP & We Mean Business 2016)	Based on five international initiatives (chosen on a set of predefined criteria), estimate impact of each of those, calculate overlaps	Companies	All sectors covered by the five initiatives	3,200 – 4,200	2030	Calculated (overlap across the five different initiatives)	IPCC Fifth Assessment Report (2014)	World (global initiatives)	https://newclimateinstitute.files.wordpress.com/2016/06/business-end-of-climate-change.pdf
Global Aggregation of City Climate Commitments (ARUP & C40 Cities 2014)	Look at 228 cities. Establish rules for standardising reporting of GHG reductions; collect GHG emission target and inventory data where available; Combine the results for all cities to provide an estimate of total city committed reduction	Cities	Overall emissions	454 (2020) – 402 (2030)	2020/2030	Not calculated	Relative to BAU (align emissions with population growth, assume emissions per capita remain constant after the study baseline year, allocate emissions equally per person as the population increases)	World (drawing from the set of predefined cities)	http://www.c40.org/researches/global-aggregation-of-city-climate-commitments-methodology
Climate Leadership at the Local Level: Global Impact of the Compact of Mayors (Compact of Mayors 2015)	Based on self-reported data by 360 Compact of Mayors cities, calculate the difference between BAU scenario and target scenario in a given year.	Cities	Overall emissions reduction per year	500 (2020) – 740 (2030) – 950 (2050) per year	2020/2030	Not calculated	Relative to INDCs published in advance of COP21	World (member of Compact of Mayors)	https://data.bloomberglp.com/mayors/sites/14/2016/01/BR_AggregationReport_Final_SinglePages-FINAL-2016.pdf
Compact of States and Regions Disclosure Report 2015	Based on self-reported data by 44 regions to the Compact of States and	Regions	Overall emissions	1,200	2030	Not calculated	Relative to BAU – based on per capita GHG emission (2010) and	World (joined the Compact of States and Regions)	https://www.theclimategroup.org/sites/default/files/archive/files/Compact-of-States-

(The Climate Group, CDP 2015)	Regions. 'Target' GHG emissions were projected based on reported GHG targets reported up to 2050. Actual GHG emissions and interim targets were included where available. Then calculate the cumulative difference between BAU emissions and 'target' emissions for each reporting government from 2010 to the date indicated (i.e., 2020 and 2030).						official population projections to 2050. For years where population projections were not available, population was estimated using a compound annual growth for the related period.		and-Regions-Disclosure-Report-2015.pdf
Compact of States and Regions Disclosure Report 2016 (The Climate Group & CDP 2016)	Based on self-reported data from 62 states, provinces and regions around the world	Regions	Overall emissions	210 (2020) 760 (2030) 2,510 (2050)	2020/2030/2050	Calculated using data and analysis from the International Energy Agency's (IEA) Energy Technologies Perspectives 2014 (ETP 2014) report. The ETP 2014's 4 Degrees Scenario (4DS) reflects pre-2012 intentions by countries to cut GHG	Cumulative savings are estimated by adopting a common base year, in this case 2010, and by projecting the level of GHG emissions savings that could be achieved by the disclosing governments (Compact Target Scenario) against two reference	World (joined the Compact of States and Regions)	https://www.theclimategroup.org/sites/default/files/downloads/compact_report_2016_.pdf

						emissions and boost energy efficiency	scenarios. Scenarios are calculated using data and analysis from the IEA's Energy Technologies Perspectives 2014 (ETP 2014) report that refers to the 4 Degrees Scenario (4DS) and 6 Degrees Scenario (6DS).		
Scaling up: From local to global action. (Hsu, Xu, et al. 2015)	Nine city and regional climate action case studies; estimate impact for each of the cases and compare to BAU model of the country where the specific city/ region sits in.	Cities & Region	Carbon tax, industry, transportation, forestry and land use, EE, waste, RE, emission trading	1,090	2020	Calculated (None)	Relative to BAU emission pathway (assuming linear pathway) of the relevant country	Canada, Brazil, US, South Africa, Germany, China, India, Algeria	http://www.stanleyfoundation.org/publications/report/WhitePaperScalingUp12-2015.pdf
The business end of climate change (CDP & We Mean Business 2016)	Same as above, but calculating what would happen if every relevant business that could join in these initiatives actually did so.	Businesses	Economy wide, systemic	10,000	2030	Considering but not calculated	IPCC Fifth Assessment Report (2014)	World (global initiatives)	https://newclimateinstitute.files.wordpress.com/2016/06/business-end-of-climate-change.pdf
Advancing Climate Ambition: How city-scale actions can	Select all cities considered by the UN's World Urbanization	Cities	All, systemic impact	3,700	2030	Not calculated	Relative to reference scenario (RS), based on IEA's Energy	World	https://www.sei-international.org/mediamanager/documents/Publications/Climate/S

contribute to global climate goals (Erickson & Tempest 2014)	Prospects. Calculate abatement potential in each year as difference in emissions between reference scenario and urban action scenario.						Technology Perspectives 4DS scenario/ New Policies Scenario. RS: multiply urban population by activity drivers by energy-intensity by GHG-intensity of energy. From this scenario, the urban action scenario departs: apply technologies and practices in urban areas to reduce GHG emissions, e.g. transportation.		EI-WP-2014-06-C40-Cities-mitigation.pdf
Implementing circular economy globally makes Paris targets achievable. (Circle Economy & Ecofys 2016)	No information	All	Circular economy, systemic	6,500 – 7,500	2030	Not calculated	Relative to BAU if all INDCs are implemented	World	http://www.ecofys.com/files/files/circle-economy-ecofys-2016-circular-economy-white-paper.pdf

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APPENDIX B – STAKEHOLDER PARTICIPATION DURING THE ASSESSMENT PROCESS

This appendix provides an overview of the ways that stakeholder participation can enhance the impact assessment process and the contribution of non-state and subnational actions to national/sectoral scenarios and policy development. Table B.1 provides a summary of the steps in the assessment process where stakeholder participation is recommended and why it is important, explaining where relevant guidance can be found in the ICAT *Stakeholder Participation Guidance*.

Table B.1: List of steps where stakeholder participation is recommended in the impact assessment

Step of non-state and subnational impact assessment	Why stakeholder participation is important at this step	Relevant chapters in Stakeholder Participation Guidance
Chapter 2– Objectives of assessing sustainable development impacts	• Ensure that the objectives of the assessment respond to the needs and interests of the stakeholders	Chapter 5 – Identifying and analysing stakeholders
Chapter 3 – Key concepts, steps and assessment principles • 3.2.1 Planning the assessment	• Build understanding, participation and support for the national or sectoral target/policy/projection among stakeholders • Ensure conformity with national and international laws and norms, as well as donor requirements related to stakeholder participation • Identify and plan how to engage stakeholder groups who may be affected or may influence the policy or action • Coordinate participation at multiple steps for this assessment along with participation in subsequent decision making using assessment results	Chapter 4 – Planning effective stakeholder participation Chapter 5 – Identifying and analysing stakeholders Chapter 6 – Establishing multi-stakeholder bodies/structures Chapter 9 – Establishing grievance redress mechanisms
Chapter 5 – Create a list of all relevant non-state and subnational actions	• Ensure a complete list of relevant non-state and subnational actions from a diverse range of stakeholders • Fill information gaps where they exist to develop a rich database • Identify credible sources of information for engagement in subsequent steps	Chapter 5 – Identifying and analysing stakeholders Chapter 8 – Designing and conducting consultations
Chapter 6 – Select non-state and subnational actions for inclusion in the analysis	• Ensure a more credible determination of likelihood of achieving targets specified under non-state and subnational actions • Fill information gaps where they exist to develop a rich database • Identify credible sources of information for engagement in subsequent steps	Chapter 8 – Designing and conducting consultations
Chapter 7 – List relevant national climate mitigation policies and actions	• Enhance completeness by developing a list of relevant national policies and actions with inputs from a diverse range of stakeholders depending on resources	Chapter 5 – Identifying and analysing stakeholders

		Chapter 8 – Designing and conducting consultations
Chapter 0 – Assess overlaps, add impacts and compare ambition	• Ensure that stakeholder inputs are sought on interactions between different actions in the same sector, across sectors, as well as between non-state and subnational actions and national policies • Integrate stakeholder insights on magnitude of impacts, and the ambition of national or sectoral target or policy or projection with regards to the impact	Chapter 5 – Identifying and analysing stakeholders Chapter 8 – Designing and conducting consultations
Chapter 10 – Documenting results	• Raise awareness around the assessment results for transparency and thereby credibility of the assessment • Inform decision makers and other stakeholders about impacts and contribution of non-state and subnational actions towards national or sectoral mitigation scenarios/targets or policies and build support for these	Chapter 7 – Providing information
Chapter 11 – Use results for decision-making and planning	• Share assessment results with stakeholders to allow them to be a part of decision making and to enhance transparency • Ensure diverse perspectives are considered when planning and designing future course of action based on assessment results	Chapter 7 – Providing information Chapter 8 – Designing and conducting consultations

APPENDIX C – SCOPING A GLOBAL CLIMATE ACTION DATASET

This appendix[51] provides an overview of the possibilities and challenges of creating a global climate action dataset (GCAD) of non-state and subnational actions. This is based on the experience of creating two sample datasets for Morocco and the United States. It describes what is possible, what key data are currently available, main challenges of data collection, maintenance and use, and possible solutions for future development and application of GCAD. The appendix also discusses the process used to create the sample datasets and analyzes existing data collection efforts for targets and commitments.

C.1 Possibilities and challenges of creating a global climate action dataset of non-state and subnational actions

National policymakers are often unaware of the many non-state and subnational climate change mitigation actions undertaken within their borders and, therefore, unsure of the potential impact such actions have on their own national climate targets, projections, and planning. By following the steps for integrating this impact in ICAT *Non-State and Subnational Action Guidance*, national policymakers can better understand and anticipate the relevant actions of non-state and subnational climate actors and make more informed policy decisions and GHG emissions projections. With greater understanding, there is more opportunity to increase the ambition of national determined contributions (NDCs), leading to faster progress on the goals of the Paris Agreement. While few policymakers would discount the benefits of such insight into non-state and subnational action, some may feel overwhelmed by the prospect of collecting, interpreting, and maintaining long lists of accurate, comparable, and up-to-date climate action data. Thus, the creation and maintenance of a global climate action dataset would help promote and facilitate use of this ICAT guidance by national policymakers around the world, providing valuable insight that can inform more ambitious action.

C.1.1 A valuable supplement to the guidance

The construction of a GCAD can effectively supplement the guidance by streamlining the process for policymakers, ensuring consistency and accuracy of data, and removing tedious analyses by performing data standardization in advance. For policymakers following the guidance, the added value of a GCAD will be to:

- **Remove the obstacles of gathering and formatting climate action data** from a wide variety of sources. This task may prove quite difficult for national policymakers with limited time and/or resources, as the construction of a complete dataset requires the careful consolidation of disparate data from multiple sources. By gathering and formatting data in advance, the GCAD would collectively save a substantial amount of time for policymakers following the guidance.
- **Ensure data are accurate and up-to-date.** With annual updates, a GCAD could remain current, while year-on-year comparisons of climate action data could help spot inconsistencies and improve the overall accuracy of the dataset.

[51] This appendix has been prepared by CDP with contributions from World Resources Institute, NewClimate Institute and The Climate Group.

- **Provide essential and contextualizing information.** While many publicly available data sources provide basic features of climate actions, it is not always easy to find the essential and contextualizing information (e.g. base year emissions, scope of emissions reductions, grid emission factors, industry classification, population, etc.) required to derive meaningful insights via the guidance. By providing all necessary information, a GCAD could save policymakers additional time, allowing them to focus resources on achieving the objectives of the assessment and interpreting the results, while ensuring the maximum number of climate actions are available to inform analysis.
- **Simplify the most challenging aspects** of the guidance. As demonstrated in the sample dataset, it is possible to integrate some aspects of the guidance directly into a GCAD, which could significantly streamline policymakers' assessments. Aspects that could be integrated in full or in part include evaluations of **suitability** for inclusion, **likelihood** of completion, and **overlap** of reductions. By providing consistent and transparent evaluations of these aspects of the guidance, a GCAD allows policymakers to focus more on analysis of the impact of climate actions, as opposed to their categorization, while still giving them the final say on what is included in the assessment. Consistent evaluation of these aspects would also help to standardize the application of the guidance by different policymakers.
- **Project and aggregate likely impact of climate actions** to target year and future key milestone years. With adequate data, it is possible to make informed projections of what the impact of completed climate actions will be in their target year. It is also possible to estimate the impact in key milestone years (e.g. 2030, 2050), while offering insight into various scenarios on the level of ambition moving forward. These projections can then be aggregated in accordance with the objectives of policymakers using the guidance. Including some of these basic calculations in a GCAD can greatly reduce the time spent by policymakers quantifying the impact of individual actions.

Each added value is already demonstrated in the sample dataset and could be taken to a global scale with sufficient resources. Additionally, there would be ample opportunity to develop and further refine the GCAD to provide greater value to policymakers, and potentially others, as discussed below.

C.1.2 Description of the sample dataset

The sample dataset was constructed to better understand the processes, challenges, and possibilities of creating an effective GCAD. Two contrasting examples – Morocco and the United States – were selected to demonstrate the potential value of a GCAD for a range of national policymakers. As a developing economy with limited non-state and subnational climate action data, Morocco provided an example of looking beyond what was readily available and developing alternative means to quantify the non-state climate action underway within its borders. It also provided an interesting case study given its current role in international climate affairs and its future ambitions. By contrast, the developed economy of the United States presented a wealth of non-state and subnational climate action data, which was challenging to sort and review, but allowed development of procedures for processing and evaluating climate action data *en masse*.

In both cases, the sample dataset is aligned with the guidance, which focuses exclusively on non-state and subnational mitigation actions. That said, future development of a GCAD could also include relevant climate finance and adaptation action as well.

Constructing the dataset

While the construction of a GCAD would rely on climate action data from multiple sources (including disclosure platforms, cooperative initiatives, and even CSR reports), the sample dataset primarily relies on data collected through CDP's disclosure platform and TCG/CDP's Compact of States and Regions for reasons of data access and expedience. There are other relevant sources of climate action data (see Section C.3 for an overview), but in most cases, the key data points required to calculate the impact of actions—though likely collected—are not made publicly available. Similar difficulties were encountered in trying to calculate the impact of cooperative initiatives that might be relevant to the sample countries.

Once the available climate action data were gathered and input to the dataset, analysis was performed to determine which actions would be the focus of further investigation and which would be excluded from the ICAT sample. This was carried out in accordance with the *suitability* standards of the guidance, with an understanding of the idiosyncrasies of the data reported to CDP. Next, all suitable climate actions were categorized by type (i.e. commitment/action, emissions reduction/renewable energy, etc.) and by coverage (i.e. geographic and IPCC sectoral), as prescribed in the guidance. Then, calculations were made to determine the anticipated impact of various types of actions in their target year, and for targets with geographic coverage beyond national borders (e.g. those made by multinational corporations), additional calculations were made to estimate the disaggregated impact within the sample countries. Finally, linear projections were drawn to key milestones, such as 2020 and 2030, assuming the same level of ambition moving forward. Several additional aspects of the guidance were integrated into the sample dataset, including evaluating the *progress monitoring*, *accuracy*, *likelihood*, and *overlap* of climate actions.

For a detailed breakdown of the methodology used to construct the sample dataset, refer to Section C.2.

Key data points and gaps

On a fundamental level, the sample dataset is consistent with *Table 5.1: Template for information gathering* in the guidance, in which each row includes a description of the action being taken and some basic contextualizing information, including geographical and IPCC sectorial coverage. For actions to be suitable for further calculation and analysis, however, their descriptions must include some essential information: base year, baseline emissions or renewable energy use, and target year. This information is organized into a table and serves as the foundation for building out the rest of the dataset.

In some cases, it was possible to calculate the anticipated impact of an action within the sample country based on just this information; however, in most cases, and especially for multinational corporations, additional information to make more accurate estimates of an action's impact within the sample country's border was needed.

When considering the actions of subnational governments, it is relatively straightforward to define the geographical coverage of most actions. However, for large multinational corporations, it can be significantly more challenging to assess where their commitments will be realized. This is due to the nature of most corporate target setting: targets are reported at the entity-level and information on divisional or geographical actions are generally not disclosed. It was also found that certain types of climate actions, primarily those of corporate actors, required additional information. For instance, to estimate the impact of corporate emission reduction intensity targets, additional information supplied to CDP to estimate impact in absolute terms was used. Additional information was also necessary when removing scope 3 emissions from impact calculations (scope 3 was excluded because the impact of

indirect value chain activities cannot be easily localized), converting renewable energy actions to associated emission reductions, and disaggregating multinational corporate actions to our sample countries' boundaries (see Section C.2 for more details).

In constructing the sample dataset, several limiting characteristics of the currently available climate action data become obvious. The first is that there is much more data directly available for countries with more developed economies. At present, cities and states in developing economies are not as well represented as their counterparts in more developed economies, though there are efforts underway to increase data availability in developing economies, which is likely to improve this situation over time. Geographical coverage is somewhat less of an issue for corporations as many have international operations. As such, information on the climate actions of multinational corporations headquartered in developed economies can still provide insight about impacts in less developed economies, though due to limited data availability on the exact geographic distribution of these climate actions within a company's global operations, calculations are assumption dependent.

The second limitation relates to IPCC sectoral coverage. In the sample dataset, most actions relate to energy use, with fewer relating to transport, buildings, waste, land use, and forestry, which could pose a problem for guidance users interested in targeted assessments of these sectors. With further integration of additional data sources and cooperative initiatives, it may be possible to increase the sectoral coverage. As with localizing emissions of multinational climate actions, it can also be challenging to determine the exact IPCC sectors targeted by a community-wide or company-wide climate action, as well as the appropriate allocation of impacts when multiple sectors are indicated, which could make it more challenging to complete a targeted assessment following the guidance. For example, a community-wide emissions reduction target made by a city or state is likely to have impacts in multiple IPCC sectors, but without a detailed breakdown of the associated base year emissions, it would be difficult to say with certainty what portion of the impact would affect transport as opposed to buildings, for example. With further development of a GCAD, it may be possible to use corresponding emissions inventories to estimate the impact across relevant IPCC sectors, in the absence of more specific reporting on the anticipated impact across sectors. While this level of detail is less relevant to comprehensive assessments, it could greatly increase the functionality of the guidance for users interested in more targeted sectoral assessments.

Suitability of climate actions

At the most basic level, for a climate action to be considered for inclusion in the sample dataset, it must be forward-looking, quantifiable, and provide sufficient information to estimate its anticipated target year impact in terms of emissions reduced. Thus, most of the actions included in the sample dataset are emission reduction or renewable energy targets. As mentioned above, the analysis relied primarily on available CDP data for this exercise because the necessary baseline emissions or renewable energy use figures required for basic estimation of the overall impact of an action are disclosed directly. Please note, this is not to suggest that other data sources for individual or cooperative climate actions do not collect this information, just that it is not made publicly available and, therefore, could not be reasonably acquired for the purposes of this sample dataset. Furthermore, calculation of more robust estimates for the impact of renewable energy targets is likely to require further development of a methodology that more clearly considers the additionality the target represents within energy systems. In its current construction, however, policymakers wishing to forecast national renewable energy supply can compare the available

renewable energy consumption/ production targets with their own national data in order to identify net impacts that these commitments may have.

Once all available climate actions were collected, it was necessary to further review their suitability for inclusion in the dataset. For actors with multiple, overlapping commitments, the most relevant action was identified, which was generally the one covering the largest scope of emissions over the longest period. However, in cases where an actor had a more (or less) ambitious mid-term target as well, this was factored into the projected impact of the climate action in 2020, 2030, etc. For actors that reported multiple action types (i.e. absolute emissions reduction, intensity emissions reductions, renewable energy, etc.), it was necessary to exclude those that overlap, with a preference for absolute emissions reduction targets, which do not require additional conversion or estimation to reach an impact value in terms of GHG emissions. It was also necessary to exclude corporate emission reduction targets that only cover scope 3 emissions, which cannot as easily be localized within national boundaries, as well as those that explicitly define their scope outside the targeted national boundary.

Additional analysis and calculation

For all suitable climate actions, further analysis was conducted to determine their anticipated impact if achieved and to project their impact to 2020, 2030, and beyond. This analysis and calculation included:

- **Removing scope 3 emissions** from corporate emission reduction targets to focus on emissions that could be more accurately localized within national boundaries (i.e. scope 1 and 2 emissions);
- **Converting renewable electricity targets** to a basic metric ton of CO_2-equivalent (tCO2e) impact figure by using local electricity grid emission factors (to be replaced by a more robust methodology in future iterations of the GCAD);
- **Geographical disaggregation** of multinational corporate climate actions using current scope 1 and 2 emissions reported by location; and
- **Projecting impact of actions** to 2020, 2030, etc., with decreasing accuracy beyond the target year.

For more details, see Section C.2.

C.1.3 Challenges and potential solutions

Through work on the sample dataset, several challenges were identified that would need to be addressed in constructing a GCAD relating to the collection of data, maintenance of the dataset, and its eventual use by national policymakers. What follows is an elaboration of these challenges, as well as some potential solutions that could inform the future development of a GCAD.

Gathering climate action data

The first challenge is the collection of enough climate action data to justify calling it a *Global* Climate Action Dataset. While there are a number of available resources that aggregate non-state and subnational climate actions (see Section C.3), there are some limitations to their geographic coverage, as well as the availability and comparability of disparate data. Furthermore, where there are significant gaps in the available climate action data, it may be necessary to use more advanced modelling and supplementary data to provide insight to policymakers.

- ***Sourcing relevant data:*** A wealth of information is already publicly available; however, identifying where to look and unlocking the data from often non-machine readable formats (e.g. PDFs) are key barriers to categorizing and including these data in this dataset. However, there are methods that currently exist that can support in this effort. Primarily on the corporate side, there exist databases of corporate sustainability reports (CSR) reports (e.g. from Global Reporting Initiative (GRI), Corporate Register) from companies that would traditionally fall outside of the scope of analysis due to their size (e.g. SMEs) or ownership type (e.g. privately held). Applying technologies and a lexicon to crawl these reports and pin-point pertinent disclosures can assist in scraping the data to extend coverage of the database. Additionally, as more organizations become active in this space, one can expect a growing number of aggregate databases containing potentially important details. By identifying and targeting these sources through machine-run web crawls, new developments and data sources can be sourced for data expansion.

  Another future development is in the form of machine-readable reporting, e.g. following the eXtensible Business Reporting Language (XBRL) standard. While fully integrated into financial reporting, little headway has been made in the adoption of these reporting formats for non-financial data. However, as uptake increases, this will solve many of the current difficulties of data scraping.

  Collecting relevant information about cooperative initiatives and campaigns is also challenging due to their heterogeneous characteristics and the lack of quantitative data made publicly available. Full integration of cooperative climate actions into a GCAD would likely require case by case consultations with each initiative or campaign to better understand any available data and to make arrangements for data sharing.

- ***Ensuring comparability of data:*** During the collection process, it should be ensured that adequate information is collected or available elsewhere to compare data from various sources. For action types that are already well established (e.g. cities emission reduction targets), different sources are more likely to collect comparable data. However, for less common action types, additional work will be required to make them easier to compare. This will be especially challenging for cooperative actions, as well as corporate actions that are not clearly defined or easily localized within a national border. In these cases, it may be necessary to convert data to common terms for integration into a GCAD; while in cases where sufficient quantitative data is not available, the impact of the actions may need to be modeled by other means.

- ***Covering data gaps:*** In instances where sufficient quantitative details are not available to fully describe a cooperative or corporate action, it may be necessary to model the corresponding emissions or to rely on supplemental data.

  Through the use of modeling techniques, emissions estimates can be developed in order to fill in gaps in the existing dataset. These estimates can help to establish base year emission values when undisclosed or current level of emissions in order to better assess trajectories. CDP currently has a fully transparent methodology for estimating corporate emissions using key business data like annual revenue: https://www.cdp.net/en/investor/ghg-emissions-dataset. It will also explore modeling for cities in 2017/18 in order to be able to provide reasonable estimates for

non-reporting cities; these methods can likely be extended to states and regions using macro-level population, economic and other related variables. The results can potentially work to minimize some of the data gap implications by offering a more complete dataset. Data users will always have visibility into which values have been estimated and how, in order to determine for themselves whether to include them in their analyses.

For countries where there is not a significant amount of commitment data available, it would still be possible to provide national governments with key insights through additional analysis of asset-level data from key industries.

One of the principal characteristics of an asset-level database is its universal coverage. Two primary applications can be envisaged for the utilization of these data: techno-economic improvement potential and locked-in emissions forecasting. The former relates to the classification of the types of technologies employed and potential emissions savings through the deployment of best available technologies (BATs) or step-change upgrades. This type of analysis, coupled with economic detail pertaining to associated costs (for instance, using data reported to CDP through its corporate climate change questionnaire under the question related to initiatives for emission reductions), could support policymakers in targeting emission reduction options based on asset improvements and be a stepping stone to more complicated modelling of asset data.

In addition, many market-intelligence providers currently supplying asset-level data collect information about future constructions, planned closures, and other related business developments that can be integrated into national-level emissions forecasting. Taking the example of electric utilities, a view of the plants coming online with details around capacity, technologies, fuel types, etc. and those going offline can be used to model currently “locked-in” emissions (i.e. the guaranteed emissions stemming from currently producing assets) and future changes due to new constructions and plant closures.

Maintaining the dataset

Once constructed, maintaining and updating a GCAD would present unique challenges requiring careful consideration, thorough planning, and dedicated staffing. Keeping targets and commitments up-to-date would require dedicated staff to manage the dataset, as well as clear communication channels between different data sources, initiatives, and campaigns to ensure periodic updates of relevant data. It should also be ensured that entities and actions are easily identifiable to avoid redundant entry and double counting. This could be especially challenging for companies, whose names often appear differently due to differences in legal and public name or due to mergers and acquisitions. Readily available corporate identifiers are also most often at the securities level, applicable only to public companies. Similarly, ensuring that changes to existing climate actions are reflected in the dataset would require annual verification that already included actions are still valid to spot discrepancies and remove expired actions. Whether organized around an annual process or on a rolling basis, ensuring a complete GCAD is up to date would require sound data management practices and persistent verification of data accuracy.

The user experience

Proper use of a GCAD could be facilitated through thoughtful design of the user interface that provides an engaging, transparent, and flexible presentation of the data.

- ***Future user accessibility:*** Application of the guidance and therefore improved emissions forecasting and more ambitious national emissions reduction target setting is dependent upon a transparent, structured, and accessible database. Transparency will be ensured throughout the development process by documenting data sources, methods for collection and analytical assumptions. The end-user should therefore have the ability to understand what data are included in the database and make informed decisions about whether they wish to use certain data or not.

  A clear data structure will be imposed to ensure that this transparency is preserved and that the database is as usable as possible for application of the guidance. To this end, use cases of the data will help to assert the final structure, including relationships between data points as well as the data points themselves. These will need to be vetted with data users to ensure applicability and accuracy, requiring several consultative engagements.

  Finally, barriers must be removed to ensure the database is accessible to national policymakers, analysts and other decision-makers tasked with reducing national GHG emissions. This entails removing costs, in as much as possible, to the source data. It also requires an online database be made available in order for users to efficiently access the data, with exportable functionality in order to support offline analyses. Our experience in this sample dataset construction indicates that there is little willingness from data providers to make their data public. As a result, issue of data ownership and hosting will need to be addressed, and any solution will likely require in-depth negotiations to be realized.

- ***Database and front-end architecture:*** To this end, an online platform should be developed supported by a relational database for housing the emissions and commitment data as well as user details. The platform should be accessible via login, provided at little to no cost to national government representatives. In order to establish a business-model supportive of continued upkeep and maintenance, access may be charged for other non-state stakeholders that wish to analyze the information available.

  Online business intelligence/ analytical functionality should be embedded to offer users easy analysis of the data using charts and graphs. Optimally these could be saved locally or to an online workspace for later review. Additional to that, users should be able to export pre-filtered portions of the database (i.e. data relevant to their country) to Excel in order to facilitate offline analysis.

  Depending on the funding available, networking capabilities can also be constructed to share best practices and learn from others' experiences. In this way, the platform can serve as a hub for national government representatives and provide a safe space to share and discuss.

C.1.4 Conclusions and further possibilities

With further development and sufficient resources, a GCAD could streamline the use and increase the impact of the guidance, enabling policymakers to better inform their planning and increase the ambition of national climate goals without substantial extra work. Furthermore, the construction of a robust GCAD would benefit a number of additional stakeholders at a time when climate actions and progress tracking are of crucial importance to the global response represented by the Paris Agreement. Maintenance of a GCAD could directly inform the UNFCCC's NAZCA platform, streamlining the process of data collection

from multiple sources, ensuring prompt upload of new and updated information, improving the accuracy of the climate action data, and increasing the overall functionality of the platform. A rich GCAD could even be made available to other interested audiences, including investors, researchers, and academics, providing relevant insight into the transition to a green and sustainable economy. With adequate maintenance and continued development, a GCAD would serve as *the* foundation for understanding how to track, measure, and rate the impacts of non-state and subnational action in the coming years.

C.2 Process guide for construction of ICAT sample dataset

C.2.1 Gather and input data

For the purposes of the sample dataset, climate action data was gathered with two end users in mind: Morocco and the United States. Data were gathered or evaluated from the following sources:

- **CDP corporate data –** Beginning with CDP's 2016 corporate response data, all US-based and Morocco-based companies were first identified for inclusion. Then all companies that reported emissions in the US or in Morocco, regardless of where their headquarters are located, were identified and any of their emissions reduction and renewable energy targets were included.
- **CDP cities data –** All relevant local government/community-wide emissions reduction and renewable energy commitments from CDP's 2016 cities response data were added.
- **CDP/TCG states and regions data –** All relevant emissions reduction, renewable energy, and energy efficiency targets reported through the states and regions platform were added.
- **Covenant of Mayors –** All relevant commitments collected by the Covenant of Mayors were included for which an absolute base year emissions figure could be determined.
- **carbon*n* Climate Registry –** All relevant commitments available through the cCR were evaluated, but it was not possible to determine absolute base year emissions figures based on publicly available information.
- **Climate Initiatives Platform and Portal on Cooperative Initiatives –** Cooperative initiatives that focused on implementation and reported participation or membership of the US and Morocco were identified. Unfortunately, the initiatives examined did not provide sufficient information to include concrete climate actions in the sample dataset. More effort will be required to meaningfully integrate cooperative initiatives in the global dataset.

C.2.2. Determine suitability

Once all raw climate action data were entered, it was determined which actions would be the focus of further analysis. Actions were excluded from further consideration for the following reasons:

- **Evaluate all actions by actor and exclude superseded actions –** For actors with multiple climate actions, near-term actions were excluded if a longer-term action was available. However, if there was a mid-term action that was not merely a linear extrapolation of the long-term action, both mid-term and long-term actions were used to present more accurate impact projections.

  For actors with multiple action types—for example, an absolute emissions reduction, an intensity emissions reduction, and a renewable energy commitment—the focus was generally on the absolute emissions reduction target that covered the greatest scope of emissions and had the

longest term. When no absolute emissions reduction target was available, an estimated absolute impact for intensity targets or the tCO2e impact of renewable energy and electricity commitments was calculated, depending on the information available.

In some cases, multiple targets were kept if there seemed to be a significant difference in the coverage described by the targets.

- **Coverage relevant to user –** All actions whose coverage is not relevant to the user's country were excluded. This is not always obvious in the quantitative information provided, instead requiring evaluation of the qualitative responses provided in the various comment fields provided in the CDP corporate questionnaire.
- **Exclude non-localized actions (i.e. scope 3) –** As there is too much uncertainty in the location of most scope 3 activities, the analysis is limited to scope 1 and scope 2 emissions reductions. As such, any actions that are limited to a scope 3 emissions categories have been excluded. Those that cover scope 3 emissions in addition to scope 1 and 2 emissions have been included, but require additional calculation to remove the impact of scope 3 emissions (see below).
- **Incomplete/incorrect information –** This primarily refers to instances where it is not possible to calculate an absolute emissions figure. It may also include emissions reduction targets that cover less than 100% of scope but do not specify where the action applies, or other instances where the information provided is unclear or seems incorrect.
- **Remove non-US-based companies (applicable to the US dataset only) –** For purposes of the sample dataset, it was necessary to remove non-US-based companies from the US dataset, as disaggregating the global impact of all actions from companies that disclose emissions in the US would have required evaluation of over 1700 actions. As this was not feasible in the time allotted, the analysis was limited to US-based companies. However, in the future, the integration of non-USA companies can be envisaged as well, provided sufficient information is available to do it robustly.

C.2.3 Categorize climate actions

Once all suitable actions were identified, the actions were categorized by the following fields referenced in the guidance:

- **Commitment or Action –** As most of the data was collected through CDP disclosure platforms, which asks about active targets, all items were defined as actions.
- **Geographic coverage –** For cities and regions, these are defined by whether an action is city- or region-wide, or limited to their local or regional government. For companies, actions were listed as covering global corporate operations, unless more specific coverage is identified.
- **IPCC (Sub)sector(s) targeted –** The default sector for most emissions reduction or renewable energy actions is "Energy," unless buildings or transport is explicitly mentioned in comments for the target. The analysis separately assigned actions reported by companies engaged in certain GRI business activities to the "Industrial processes and product use" sector. Deforestation actions are assigned the "Agriculture, forestry, and other land use" sector, and waste diversion is assigned the "Waste" sector.

- **Action Type –** The sample dataset includes:
    - Absolute emissions reduction
    - Intensity emissions reduction
    - Renewable energy
    - Deforestation
    - Emissions reduction relative to BAU

C.2.4 Calculate target year emissions and impact

Next, anticipated target year emissions and impact were calculated. Each action type required its own method for calculation:

- **Target year emissions and impact for absolute emissions reduction targets –** Anticipated target year emissions for absolute reductions were calculated using the provided base year emissions and the target % reduction. Impact was calculated by subtracting the target year emissions from base year emissions.
- **Absolute emissions impact for intensity emissions reduction targets –** The anticipated target year emissions could only be estimated for intensity targets that provided additional information in the comments that allow an absolute value to be calculated. Additionally, for companies that report their intensity target will likely result in an increase of absolute emissions, the target year emissions/impact have been adjusted to reflect this anticipated result.
- **Convert renewable energy actions to mtCO2 impact figure –** Impact for renewable energy targets is calculated by converting the anticipated increase in renewable electricity (MWh) to tCO_2 using a current grid emission factor based on IEA data for each country. This assumption, however, is not conservative and further work should be done to supplement it. As currently done, purchase of renewable electricity (RE) can result in no additional RE being brought to the grid, but simply in a re-allocation of existent RE to certain consumers. Although providing a market signal, this is still considered incipient in face of other costs to significantly impact on new RE capacity. As such, the current method provides figures that have to be considered as the most optimistic emission reductions that can be achieved by given commitments. A different method needs to be devised to provide the lower-bound, conservative estimate of emission reductions from corporate renewable energy targets. A methodology for including and calculating the impact of renewable fuel use and subnational renewable targets, which were not included in the sample dataset also needs to be developed.
- **Remove estimated proportion of Scope 3 emissions from impact –** For corporate targets that include some scope 3 emissions, these emissions must be removed from the anticipated target year emissions before the impact can be calculated. This is done by determining the percent scope 3 emissions represent of the current emissions covered by the target. This percentage is then removed from the corresponding anticipated impact figure.
- **Zero deforestation commitments –** Following the guidance, zero deforestation commitments do not result in any emissions and does not require conversion to tCO_2e.

C.2.5 Disaggregate impact

Next, the local impact of global targets was estimated by using the distribution of current reported emissions:

- **Calculate proportion of associated scope in user's country –** Using current scope 1 and scope 2 (location-based and market-based) emissions by country, it was possible to determine the current percentage of a company's emissions that are reported within the borders of the user country.
- **Multiply global impact of target by corresponding percentage of emissions in user's country –** By applying this percentage to the anticipated global impact, it was possible to estimate the localize impact in the user's country, assuming the emissions reduction is proportionally distributed.

C.2.6 Project linear impact to 2020, 2030 and beyond

Projecting the impact of actions past their target year in line with a variety of potential scenarios (e.g., no additional action, same level of ambition moving forward, more/less ambition), it was possible to estimate future global and local impacts for continued action, with the caveat that the farther projections go beyond the target year the less accurate they are likely to be. For actors with mid-term and long-term targets, impacts are split across the two targets in a "best-fit" progression.

C.2.7 Additional information

- **Information on progress monitoring –** The progress monitoring policy of the data provider is noted.
- **Accuracy indication –** If many assumptions were made to calculate the anticipated impact, it was noted with a brief explanation.
- **Likelihood –** The likelihood of corporate climate actions was calculated by reviewing the currently reported progress of an action as well as the past performance of similar actions by the same actors. These two indicators were analyzed independently and then combine with equal weight to assign a likelihood score to the action.

  Current progress is reported to CDP as % of the target achieved over the % of time complete, and this ratio was used to indicate the likelihood that the target will be completed on time. For example, let's consider a target that has reached its halfway point, i.e. 50% of time complete. If this target was also 50% complete in terms of its emissions reduction or renewable energy goal, the ratio would be 50/50 and one point would be added to its likelihood score. By contrast if it were only 25% complete, the ratio would be 25/50 and a half point would be added to its likelihood score. Targets with ratios higher than one (e.g. 75/50) are capped at one. This approach simplifies emission reductions to a linear pathway, which may not be the case in reality, however insufficient granularity of data is available to make more specific assessments.

  The past performance of an actor was determined by comparing the number of past actions that were completed early or on time to the number of targets that reached their end date plus those completed early. For instance, a company has reported four targets successfully completed, with two of the four completed early. Additionally, they have reported three targets that reached their

target date (i.e. 100% complete in time). This means the ratio of their past performance is four achieved targets to five targets completed early or on time. As a result, 4/5 = .8 point is added to their likelihood score.

The overall likelihood was then calculated by adding the past and present performance scores together. As each score has a maximum value of one, the sum of both scores is divided by two, with the resulting decimal understood as the percentage of likelihood between 0 and 100. Table C.1 gives the scores and corresponding levels of likelihood for individual actions.

Table C.1: Scores and level of likelihood

Score range	Level of Likelihood
100 – 87.5+	Virtually certain
87.5 – 75+	Very likely
75 – 62.5+	Likely
62.5 – 50+	More likely than not
50 – 37.5+	About as likely as not
37.5 – 25+	Unlikely
25 – 12.5+	Very unlikely
12.5 – 0	Exceptionally unlikely
Unable to calculate past or current performance score	Unknown
Target reported 100% achieved	Complete
100% complete in time, but incomplete	Not achieved - ##% complete

- **Overlap –** Used to identify situations where there may be overlap between anticipated impacts. This could be the overlap between the impact of a municipal action on a regional action, or an individual actor that has overlapping commitments that were unique enough to include in the dataset but may not be entirely independent. While the sample dataset only indicates where overlap may be present between individual actions, the guidance provides a more detail approach for interpreting various scenarios where actions overlap. Improving the accuracy of how overlap is calculated and integrating it into a GCAD will be a significant challenge moving forward.

C.3 Analysis of currently target and commitment collections

There are currently several sources for non-state and subnational commitment data. Some pertain to individual commitments made by one type of actor, while other include a wide variety of initiatives relating to either specific actions or vague commitments from all sorts of actors. As each data source was created with a specific purpose in mind, each has its own unique offering in terms of coverage and relevance to the creation of a global commitment dataset. The descriptions below attempt to catalogue available data sources and determine the relevance of their contribution to a global commitment dataset.

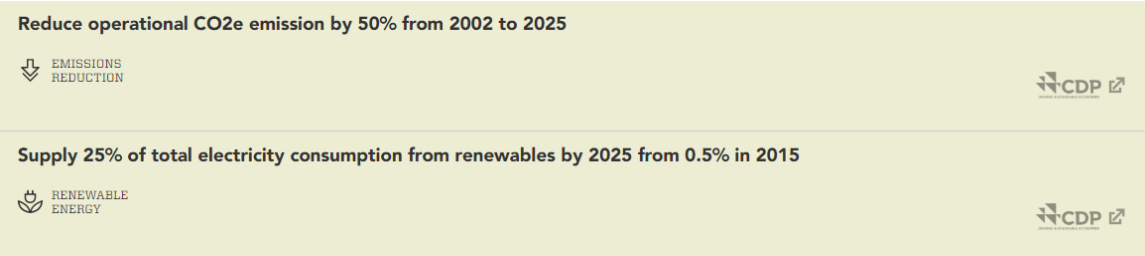
C.3.1 NAZCA (Non-state Action Zone for Climate Action)

The UNFCCC's Non-State Action Zone for Climate Action (NAZCA)[52] platform, which is mentioned[53] in the Paris Decision text[54], aggregates both individual and cooperative climate commitments by non-state and subnational actors. All NAZCA commitments are required to be forward-looking, quantifiable, and trackable, but otherwise fall into a wide range of categories. As a data aggregator, NAZCA draws from multiple[55] sources—including several of those discussed in more detail below—but presents only a very basic, often incomplete, picture of the action being taken.

Data available

Currently, there are over 12,500 commitments on NAZCA from 2,500+ cities, 2,100+ companies, 450+ investors, 200+ regions, and 200+ CSOs civil society organizations. Of the total commitments, over 8,000 are "individual actions" that are unique to their associated actor. Additionally, there are over 4,400 "cooperative actions" from the over 75 initiatives currently showcased on NAZCA.

Each commitment is displayed on an actor's NAZCA page as a brief, descriptive text as shown here:



All commitments are classified under any one (or more) of 13 themes shown in Table C.2.

Table C.2: Commitments classified by themes on NAZCA platform

Theme	Number of associated commitments
Emissions reduction	9047
Energy access & efficiency	4224
Renewable energy	3263
Resilience	970

[52] Available at http://climateaction.unfccc.int/

[53] *"118. Welcomes the efforts of non-Party stakeholders to scale up their climate actions, and encourages the registration of those actions in the Non-State Actor Zone for Climate Action platform […] 135. Invites the non-Party stakeholders referred to in paragraph 134 above to scale up their efforts and support actions to reduce emissions and/or to build resilience and decrease vulnerability to the adverse effects of climate change and demonstrate these efforts via the Non-State Actor Zone for Climate Action platform4 referred to in paragraph 118 above"*

[54] Available at https://unfccc.int/resource/docs/2015/cop21/eng/l09.pdf

[55] CDP, carbon*n* Climate Registry, The Climate Group, the Investors on Climate Change, the UN Global Compact, the Covenant of Mayors, the Climate Bonds Initiative and the UNEP Climate Initiatives Platform.

Use of carbon price	886
Private finance	882
Transport	569
Building	515
Forest	321
Short term pollutants	118
Innovation	24
Agriculture	16
Other	178

* As of March 9, 2017

Geographical coverage

The current geographic distribution of commitments featured on NAZCA heavily favors developed countries, specifically those in North America or Europe. Table C.3 provides a sample of the distribution of commitments across the globe.

Table C.3: Commitments from actors across the world as shown on NAZCA

Country	Region	Number of associated commitments
United States of America	Northern America	1899
Italy	Europe	1523
Spain	Europe	967
United Kingdom	Europe	926
France	Europe	710
Japan	Asia	701
Germany	Europe	364
Canada	Northern America	297
Australia	Oceania	293
South Africa	Africa	245
Belgium	Europe	225
Republic of Korea	Asia	223
Brazil	Latin America and the Caribbean	179

India	Asia	158
Mexico	Latin America and the Caribbean	150
China	Asia	143
Turkey	Asia	100
Indonesia	Asia	41
Russian Federation	Europe	21
Pakistan	Asia	17
Nigeria	Africa	10
Saudi Arabia	Asia	1

* As of March 9, 2017

Relevance

While the NAZCA platform is currently the most comprehensive collection of non-state and subnational commitment data, which is officially recognized as part of the process outline in the Paris Agreement, it provides very basic, second-hand commitment information that is generally available in more detail elsewhere. Furthermore, there can be significant delays in the addition of new commitments to NAZCA, meaning the platform may not be entirely up to date. That said, for the purposes of creating a functional global commitment database, it may still be a useful reference point for understanding global commitment data in aggregate. As well, the Marrackech Partnership for Global Climate Action expresses a desire to integrate some form of commitment tracking to the NAZCA platform, which would be a welcome development.

C.3.2 Climate Initiatives Platform (CIP)

A database of over 200 initiatives, the Climate Initiatives Platform (CIP)[56] is the most wide-ranging and comprehensive collection of international climate initiatives (ICIs) currently available.

Data available

The CIP collects background information on each initiative, which is organized into the following categories:

- General: Includes link to website, geographical structure, type of initiative, lead organization
- Description: Includes description, goals, activities
- Monitoring and Impacts: Includes several questions on objectives, planning, and quantitative progress tracking

[56] Available at http://climateinitiativesplatform.org/index.php/Welcome

- Participants: Includes information on participants, funders, and other involved organizations
- Theme: Categorization of initiatives into 21 themes, including those like NAZCA

The information on each initiative seems to have been submitted voluntarily, meaning not all initiatives are covered in the same depth. This is especially apparent in the Monitoring and Impacts section, where just over a quarter of the initiatives provide any details.

Geographic coverage

Each profile includes a "Geographical coverage" data point, which indicates a global, regional, or more specific level of coverage. In many cases, coverage extends to several different regions.

Relevance

As an index of ICIs, the CIP provides a wealth of information for determining which initiatives warrant further consideration for inclusion in a global commitment dataset. Each initiative will need to be investigated beyond the data provided by the CIP and quantified on its own for impact, location, scale, etc. The most obvious means of obtaining additional information would be scouring the initiatives website for quantifiable outcomes or reports. Otherwise, it may be necessary to reach out directly to promising initiatives to obtain additional information.

Of the 217 initiatives on the CIP, 137 are categorized as "implementation" initiatives that will require a more in-depth assessment for inclusion in the global commitment dataset.

C.3.3 Portal on Cooperative Initiatives

The Portal on Cooperative Initiatives[57] is a smaller collection of 60 climate-related initiatives/organizations hosted by the UNFCCC with basic background information and links to initiative websites.

Data available

The database can be searched using four dropdown menus—Type of initiative, Regional presence, Thematic focus, Participation—which populate a basic table with a brief description of each initiative. Further information is provided on the profile page of each initiative, including Goals, Activities, Mitigation potential and benefits, and Co-benefits.

Geographic coverage

Most of the initiatives are global in scope, with only a handful specifically focused on smaller geographic regions (Table C.4).

[57] Available at http://unfccc.int/focus/mitigation/items/7785.php

Table C.4: Geographic coverage on the Portal on Cooperative Initiatives

Region	Number of associated initatives
Global	50
Europe	3
Asia and the Pacific	2
Africa	1
Africa, Asia and the Pacific, Latin America and the Caribbean	1
Asia and the Pacific, Latin America and the Caribbean, North America, Western Europe	1
Asia and the Pacific, North America, Western Europe	1

Relevance

Of the 60 initiatives/organizations included in the database, 44 include an element of implementation that may warrant inclusion in the sample dataset. Of these 44 initiatives/organizations, 25 are already covered by NAZCA and the CIP (see above), while the remaining 19 are primarily organizations, as opposed to initiatives, that may or may not be relevant to the creation of a global dataset. Those that are relevant will be covered separately below.

Due to its smaller scope, redundant coverage, and basic information, the Portal on Cooperative Initiatives is not expected to be a primary data source for the creation of a global commitment dataset.

C.3.4 Covenant of Mayors

An initiative with over 7,200 signatories, the Covenant of Mayors[58] is a substantial database of European cities' commitments and climate action plans. New signatories pledge to reduce CO2 emissions by at least 40% by 2030 (earlier signatories may have less ambitious targets) and to adopt an integrated approach to tackling mitigation and adaptation in their cities.

Data available

The Covenant aims to collect a wealth of commitment and climate action plan data from its signatory cities, including relevant background information, descriptions of commitments, plans for achieving them, and monitoring of progress made on these plans (Table C.5).

City profiles are presented with the following tabs[59]:

- Overview
    - Population
    - Covenant status

[58] Available at http://www.covenantofmayors.eu/index_en.html

[59] Not all tabs are available for all cities.

- Action Plan
    - Emission reduction (2020, 2030) and adaptation commitments
    - Attached Sustainable Energy Action Plan (SEAP) document(s)
    - Baseline emissions inventory: GHG emissions and final energy consumption per capita (defined by various emissions factors), GHG emissions per sector; Final energy consumption per sector; Final energy consumption per energy carrier
    - Key elements of SEAP: % reduction and tonnes CO2e, estimated GHG reduction per sector, expected evolution of reduction
- Monitoring
    - Submission date and monitoring type
    - Monitoring-related documents
    - SEAP implementation Progress: Status of Implementation of Actions (e.g. "Transport, Industry, Residential Buildings, etc.", as % - broken down by Ongoing, Completed, Not started); Overall budget spent (%); Estimated greenhouse gas emissions reduction (in ktonnes CO2e) according to the implementation status of the actions (overall, and by category indicated in Status)
    - Your performance towards energy sustainability: Greenhouse gas emissions and final energy consumption per capita (by year); Greenhouse gas emissions (influence of the National Electricity Emission Factor) by year; Greenhouse gas emissions per sector by year; Final energy consumption per sector by year; Final energy consumption per energy carrier by year; Local energy production - Share of local energy production to overall final energy consumption
- Benchmarks
    - Benchmarks of Excellence are relevant examples of local initiatives, which Covenant stakeholders have implemented, feel particularly proud of, and endorse as useful actions for other local authorities to replicate.
    - Ex. "100% renewable electricity in Municipal Consumption" - Sector, Implementation timeframe, Area of intervention, Policy instrument, Responsible body, Description, Financing sources, Key Figures: CO2e and Implementation cost, Additional documentation
- Support
    - Covenant Supporters are defined as not-for-profit organizations with the capacity to mobilize and support their members and/or local authorities to reach the Covenant of Mayors' objectives.

Geographic coverage

The Covenant primarily covers European cities, with the greatest number of commitments coming from Italy and Spain. There are a handful of cities reporting from across the Mediterranean in North Africa and the Middle East, as well as in the Caribbean and central Asia.

Relevance

The Covenant of Mayors provides a wealth of European cities commitment and climate action data, which makes it a value data source for the creation of a global commitment dataset.

Table C.5: Kind of information on Covenant of Mayors

Category	Number of associated commitments*
Signatories	7,193
Action plans	5,679
Monitoring reports	1,263
Benchmarks	4,347

***** As of March 13, 2017

C.3.5 carbon*n* Climate Registry

carbon*n* Climate Registry (cCR)[60] is a reporting platform for local and subnational governments run by ICLEI – Local Governments for Sustainability.

Data available

Over 700 cities, towns, states, and regions report through the cCR on four key reporting areas:

- City Information: Local Government Name, Population, Census year, Population forecast, City Budget, Region, Geography, Predominant economy sector, Community type, Location and size, Affiliations, Background information.
- Commitments: City commitments, Boundary, Type, Target value %, Base year, Target year, Target adopted in, Total final energy consumption
- Performances: Inventory year, Administration information, Community information, Emission sectors, Document upload, Confidentiality of data, Scope 3 analysis, Software tool used, Expert, Has the GHG inventory been verified?
- Actions: Measure title, Focus of the action, Type of actions, Boundary, Action sectors, Methods, Finance, Status, Adoption year of project, Anticipated delivery year, Quantified achievements of the action, Summary, Document upload, Co-benefits

Geographic coverage

carbon*n* collects information from over 700 local and subnational governments across the globe, with high concentrations in the United States, Europe, and Japan, as well as Tanzania, Mexico, Thailand, and others.

[60] Available at http://carbonn.org

Relevance

With over 1,400 climate change mitigation and energy targets reported in 2016, the cCR would be a valuable data source for the creation of a global commitment dataset, especially with its global reach and coverage in developing countries.

C.3.6 CDP

Over 5,800 companies, 500 cities, and 100 states and regions (via the Compact of States and Regions, co-run with The Climate Group) disclosed environmental data through CDP[61] in 2016, making CDP's platform one of the richest sources of information globally on how companies and subnational governments are driving environmental change.

Data available

Of the 8,093 individual commitments currently featured on the NAZCA platform, CDP collected 5,225 (over 60%) of them, including close to 90% of the individual corporate commitments. These include emissions reduction, renewable energy, energy efficiency, deforestation, water resilience, and carbon pricing commitments. Additionally, companies, cities, states, and regions report information on their emissions inventory, active climate actions, and long term approach to sustainability through CDP's questionnaires.

Geographic coverage

Non-state and subnational actors from around the world respond to CDP questionnaires. Coverage is greater in developed regions, like the North America, Western Europe, and Japan, and growing stronger under the guidance of offices and operational partners located in Brazil, China, South Korea, India, Turkey, Australia, and South Africa.

Relevance

CDP's non-state and subnational commitment data could serve as a solid foundation for the creation of a global commitment dataset, while its disclosure platform continues to branch into developing geographies.

[61] Available at https://www.cdp.net/en

ABBREVIATIONS

AFOLU	agriculture, forestry and other land use
APPC	Alliance of Peaking Pioneer Cities
BAU	business as usual
BR	Biennial Report
BUR	Biennial Update Report
cCR	carbon*n* Climate Registry
CDKN	The Climate and Development Knowledge Network
CIP	Climate Initiatives Platform
CSR	corporate sustainability report
DIE	Deutsches Institut für Entwicklungspolitik (German Development Institute)
EE	energy efficiency
FAO	Food and Agricultural Organisation of the United Nations
FFS	Fossil Free Sweden
GCAD	global climate action dataset
GDP	gross domestic product
GGBP	Green Growth Best Practice Institute
GHG	greenhouse gas
GPC	Global Protocol for Community-Scale Greenhouse Gas Emissions Inventories
GRI	Global Reporting Initiative
GWP	global warming potential
HFCs	hydrofluorocarbons
ICAT	Initiative for Climate Action Transparency
ICI	International Climate Initiative
IEA	International Energy Agency
IRENA	The International Renewable Energy Agency
IPCC	Intergovernmental Panel on Climate Change
LEDS	low emission development strategy
LULUCF	land use, land use change and forestry

MRV	measuring, reporting and verification
NAMA	nationally appropriate mitigation action
NAZCA	Non-State Action Zone for Climate Action
NDC	Nationally Determined Contribution
OECD	Organisation for Economic Co-Operation and Development
RE	renewable energy
SLCP	short-lived climate pollutants
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
XBRL	eXtensible Business Reporting Language

GLOSSARY

Absolute value	The non-negative value of a number without regard to its sign. For example, the absolute value of 5 is 5, and the absolute value of -5 is also 5.
Assessment boundary	The scope of the assessment in terms of the (sub)sectors and GHG emissions included in the assessment
Assessment report	A report, completed by the user, that documents the assessment process, methods and results related to the impact of non-state and subnational action
Ex-ante assessment	The process of assessing expected future impacts of non-state and subnational actions or of national policies and actions (i.e., a forward-looking assessment)
Expert judgment	A carefully considered, well-documented qualitative or quantitative judgment made in the absence of unequivocal observational evidence by a person or persons who have a demonstrable expertise in the given field (IPCC 2006). The user can apply their own expert judgment or consult experts. Expert judgment can be strengthened through expert elicitation methods to avoid bias.
Ex-post assessment	The process of assessing historical impacts of non-state and subnational actions or or national policies and actions (i.e., a backward-looking assessment)
Impact assessment	The qualitative or quantitative assessment of impacts resulting from non-state and subnational actions or from national policies and actions. This can be conducted either ex-ante or ex-post.
Independent non-state and subnational actions	Non-state and subnational actions that do not interact with each other or with national policies, such that the combined effect of implementing them together is equal to the sum of the individual effects of implementing them separately
Indicator	A metric that can be estimated and monitored over time to understand the impact of non-state and subnational action and track changes towards targeted outcomes.
Intended impacts	Impacts that are intentional based on the original objectives of the policy or action. In some contexts, these are referred to as primary impacts.
Jurisdiction	The geographic area within which an entity's (such as a government's) authority is exercised
Monitoring period	The time over which the non-state and subnational actions are monitored
Negative impacts	Impacts that are perceived as unfavourable from the perspectives of decision makers and stakeholders
Non-state actor	Any actor other than a national and subnational government.

Non-state commitments	Planned non-state action which has been publicly announced but unlike non-state mitigation action, implementation has not yet started.
Non-state mitigation action	Any kind of activity that is directly or indirectly aimed at reducing GHG emissions and that is led by non-state actor(s).
Overlapping non-state and subnational actions	Non-state and subnational actions that interact with each other or with national policies and that, when implemented together, have a combined effect less than the sum of their individual effects when implemented separately. This includes both those that have the same or complementary goals (such as national and subnational energy efficiency standards for appliances), as well as counteracting or countervailing policies that have different or opposing goals (such as a national fuel tax and a subnational fuel subsidy).
National policy or action	An intervention taken or mandated by a national government, which may include laws, regulations and standards; taxes, charges, subsidies and incentives; information instruments; voluntary agreements; implementation of new technologies, processes or practices; and public or private sector financing and investment, among others
Current policy scenario	A scenario that represents the events or conditions most likely to occur in the presence of the current mix of policies or actions.
Positive impacts	Impacts that are perceived as favourable from the perspectives of decision makers and stakeholders
Proxy data	Data from a similar process or activity that are used as a stand-in for the given process or activity
Qualitative assessment	An approach to impact assessment that involves describing the impacts of a policy or action on selected impact categories in numerical terms
Quantitative assessment	An approach to impact assessment that involves estimating the impacts of a policy or action on selected impact categories in quantitative terms
Reinforcing non-state and subnational actions	Non-state and subnational actions that interact with each other or with national policies and that, when implemented together, have a combined effect greater than the sum of their individual effects when implemented separately
Specific impact	A specific change that results from a policy or action
Stakeholders	People, organisations, communities or individuals who are affected by and/or who have influence or power over the policy
Subnational actor	Any form of government which is not a national government..
Subnational commitments	Planned subnational action which has been publicly announced but unlike subnational mitigation action, implementation has not yet started.
Subnational mitigation action	Any kind of activity that is directly or indirectly aimed at reducing GHG emissions and that is led by subnational actor(s).

Sustainable development impacts	Changes in environmental, social or economic conditions that result from a policy or action, such as changes in economic activity, employment, public health, air quality and energy security
Uncertainty	1. Quantitative definition: Measurement that characterises the dispersion of values that could reasonably be attributed to a parameter. 2. Qualitative definition: A general term that refers to the lack of certainty in data and methodological choices, such as the application of non-representative factors or methods, incomplete data, or lack of transparency.

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