Appendix A: Overview of databases and studies

This appendix provides an overview of the most comprehensive global databases on non-state and subnational actions. It also provides an overview of literature (methodologies) on the quantification of non-state and subnational actions, including approaches to overlaps, that users may want to consult in support of applying the methodology.

TABLE **A.1**

Overview of databases for non-state and subnational actions

Name of data source	Type of actors covered	Geographic focus	Sectors covered	Targets covered	Data sources	Is action tracked, and how?	Frequency of updating	Link to database
Global Climate Action Portal	Companies, cities, regions, investors, CSOs, cooperative initiatives	World	All sectors and major themes	Broad (emissions reductions, energy access and efficiency, renewable energy, resilience, use of carbon price, private finance, transport, buildings, forests, SLCPs, innovation, agriculture, other – 12,000+ commitments/ actions)	CDP, carbon*n* 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. The portal considers itself a platform that tracks non-state and subnational action.	Ongoing basis, frequency unclear	http://climateaction.unfccc.int/
Global Covenant of Mayors for Climate & Energy action plans	Cities	World	All sectors	Broad (emissions reductions; adaptation; secure, sustainable and affordable energy to implement European Union climate and energy objectives)	Covenant of Mayors Monitoring and Reporting Framework	Cities need to report every 2 years on implementation progress to the Covenant of Mayors	Ongoing basis, frequency unclear	https://www.globalcovenantofmayors.org/our-cities
Climate Initiatives Platform	ICIs	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, 200+ initiatives, >70 of which are on the Global Climate Action portal)	UNEP/UNEP DTU	Specific monitoring and reporting section (self-reported), although often information is not (yet) available	Ongoing basis, continuously (ICI focal points able to update information themselves)	https://climateinitiativesplatform.org/index.php/Welcome

TABLE **A.1,** continued

Overview of databases for non-state and subnational actions

Name of data source	Type of actors covered	Geographic focus	Sectors covered	Targets covered	Data sources	Is action tracked, and how?	Frequency of updating	Link to database
Portal on cooperative initiatives	ICIs	World	Agriculture, buildings, cities, energy efficiency, energy supply, finance, forestry, industry, international aviation, international maritime transport, land use, SLCPs, transport, waste, other	Broad (capacity-building, research, technology 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 (reduced emissions, people affected, knowledge dissemination, fundraising); almost 200 initiatives or climate actions and initiatives (e.g. those launched at the 2014 United Nations Climate Summit, and mobilized under the Lima–Paris Action Agenda)	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, addressing both mitigation and adaptation.	www.die-gdi.de/uploads/media/Working-Paper-216-Chan-et-al.pdf www.tandfonline.com/doi/pdf/10.1080/14693062.2016.1248343

TABLE **A.1,** continued

Overview of databases for non-state and subnational actions

Name of data source	Type of actors covered	Geographic focus	Sectors covered	Targets covered	Data sources	Is action tracked, and how?	Frequency of updating	Link to database
The Investor Agenda	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 Climate Change	Not directly on the database, although many of the actions track progress	Unclear	http://theinvestoragenda.org
CDP website	Companies, cities	World	Consumer discretionary, consumer staples, energy, financials, health care, industrials, IT, materials, telecoms, utilities	Absolute and intensity emissions reduction targets	Self-reported data from companies and cities; CDP reporting frameworks	Not directly in the database, but often included in single responses from cities/ companies and in CDP-specific reports	Regularly (depending on programme/ initiative)	https://data.cdp.net/ and https://cdp.net
carbon*n* Climate registry (unified reporting platform with CDP, beginning April 2019)	Cities, states, regions	World	Renewable energy, transport, green infrastructure, buildings, waste	Broad (environmental education, emissions reductions, energy intensity improvements; 600+ reporting entities)	ICLEI, local government climate roadmap, Durban Adaptation Charter, Plan de Acción Climática Municipal, carbon*n* Japan Project, EcoMobility Alliance, Earth Hour City Challenge	Reporting entities are encouraged to submit status updates on their mitigation and adaptation actions	Regularly, frequency unclear	http://carbonn.org/

Abbreviations: CSO, civil society organization; DIE, Deutsches Institut für Entwicklungspolitik (German Development Institute); ICI, international cooperative initiative; ICLEI, Local Governments for Sustainability; IGCC, Investor Group on Climate Change; IIGCC, Institutional Investors Group on Climate Change; INCR, Investor Network on Climate Risk; LSE, London School of Economics; PRI, Principles for Responsible Investment; SLCP, short-lived climate pollutant

Note: There may be overlaps between the databases in terms of coverage of non-state and subnational actors and actions. For example, the carbon*n* Climate Registry and the CDP cities data now have a unified reporting platform, and the Global Covenant of Mayors data set will also include data on some of the same cities.

TABLE **A.2**

Overview of literature on quantification of non-state and subnational actions, including approach to overlaps

Source	Approach	Type of actors covered	Type of sectors covered	Impact on emissions ($MtCO_2e$)	Target year	Approach to overlaps	Reference scenario/ baseline	Geographic focus	Link to source
Data-Driven Yale, New Climate Institute and PBL (2018a)	Collected individual commitments in 9 key countries and the EU; collected and selected 21 ICIs; quantified emissions reduction impact of both	Regions, cities, businesses, ICIs	All, except forestry, waste and non-CO_2 sectors	Individual commitments: 1550–2200 for current policies scenario, 200–700 for NDC scenario; ICIs: 15–21 $GtCO_2e$	2030	Calculated. Individual commitments: geographic overlap between regions and cities, between energy end use and subnational actors, between electricity-generating companies and all other actors with targets; ICIs: actors with target in more than one initiative, ICIs targeting same emissions, targets that are not sector-specific	Current national policies and NDC scenario	Global (and additional focus on 9 key countries + EU)	http://bit.ly/yale-nci-pbl-global-climate-action
Global Covenant of Mayors for Climate & Energy (2018)	Considered all reporting cities; estimated economy-wide emissions reductions	Cities	All	1,400 (2030), 2,800 (2050)	2030 and 2050	Calculated	No policy scenario	Global	https://www.globalcovenantofmayors.org/impact2018

TABLE **A.2,** continued

Overview of literature on quantification of non-state and subnational actions, including approach to overlaps

Source	Approach	Type of actors covered	Type of sectors covered	Impact on emissions ($MtCO_2e$)	Target year	Approach to overlaps	Reference scenario/ baseline	Geographic focus	Link to source
America's Pledge (2018b)	Considered individual commitments in the US; estimated economy-wide GHG emissions impact of the 3 scenarios	States, cities, businesses	All	500 (cities and regions in US) by 2025	2025	Calculated (both at sector level between actions, and between non-state/ subnational and national/federal level)	Current measures, climate action strategies and enhanced engagement scenarios	US	www.bbhub.io/dotorg/sites/28/2018/09/Fulfilling-Americas-Pledge-2018.pdf
Roelfsema (2017)	Analysed the aggregated impact of the 25 largest US cities and scaled up results to the 200 largest US cities. This is compared with reductions under the national US NDC target.	Cities	All	5–30	2025	Calculated	Current national policies and NDC scenario	US	www.pbl.nl/en/publications/assessment-of-us-city-reduction-commitments-from-a-country-perspective
Kuramochi et al. (2017)	Collected initiatives from cities, regions and businesses in the US; calculated emissions reductions compared with a current administration scenario; calculated overlaps	Cities, regions, companies	All, except forestry, waste and non-CO_2 sectors	340–540 (12–14% below 2005) by 2025	2025	Calculated (first between states and cities, second between companies and electricity utilities, lastly between electricity utilities and all other actors)	Relative to a current administration scenario	US	https://newclimate.org/wp-content/uploads/2017/09/states-cities-and-regions-leading-the-way.pdf

TABLE **A.2,** continued

Overview of literature on quantification of non-state and subnational actions, including approach to overlaps

Source	Approach	Type of actors covered	Type of sectors covered	Impact on emissions ($MtCO_2e$)	Target year	Approach to overlaps	Reference scenario/ baseline	Geographic focus	Link to source
UNEP (2015)	Selected most ambitious initiatives and calculated emissions reductions that they will deliver; considered overlap between initiatives and with pledges made by national governments	Cities, regions, companies	EE, efficient cook stoves, methane and other SLCPs, reduced deforestation and afforestation, agriculture	2,500–3,300	2020	Calculated (between different initiatives, both between sectors and within sectors)	Relative to a BAU 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
Hsu et al. (2015a)	Looked at individual commitments; tailored methodology to calculate emissions reduction impact; estimated double counting; compared with BAU from IPCC	Cities, regions, companies, NGOs, IOs, CSOs	EE, renewable energy, reduced deforestation and afforestation	2,540	2020	Not calculated (exclude ICIs because of concerns about double counting; otherwise case-by-case basis)	Relative to BAU from IPCC Fifth Assessment Report (2014)	World (drawing on commitments made at the New York Climate Summit 2014)	www.nature.com/nclimate/journal/v5/n6/full/nclimate2594.html

TABLE **A.2,** continued

Overview of literature on quantification of non-state and subnational actions, including approach to overlaps

Source	Approach	Type of actors covered	Type of sectors covered	Impact on emissions ($MtCO_2e$)	Target year	Approach to overlaps	Reference scenario/ baseline	Geographic focus	Link to source
CISL and Ecofys (2015)	Selected 5 ICIs; applied 3 scenarios to analyse potential impact; carried out interviews with stakeholders from the initiatives to support analysis	Companies	EE, fluorinated gases	No total	2020	Not calculated (because of case study approach)	Tailored to initiative	World (drawing on Climate Initiatives Platform)	www.cisl.cam.ac.uk/resources/low-carbon-transformation-publications/better-partnerships-understanding-and-increasing-the-impact-of-private-sector-cooperative-initiatives
Roelfsema et al. (2015)	Selected ICIs; calculated emissions reductions using a tailored methodology for each initiative; compared projected emissions of the initiatives with the emissions levels pledged by parties under UNFCCC	Cities, companies	Transport, methane and other SLCPs, fluorinated gases, shipping and 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 (completed by the International Institute for Applied Systems Analysis in 2015), and harmonized to the 2010 global emissions level from the UNEP Gap Report	World (international initiatives)	www.pbl.nl/en/publications/climate-action-outside-the-unfccc

TABLE **A.2,** continued

Overview of literature on quantification of non-state and subnational actions, including approach to overlaps

Source	Approach	Type of actors covered	Type of sectors covered	Impact on emissions ($MtCO_2e$)	Target year	Approach to overlaps	Reference scenario/ baseline	Geographic focus	Link to source
Graichen et al. (2016)	Screened 174 initiatives, and selected those suitable for further quantitative and qualitative analysis; assessed mitigation impact of selected initiatives and broke down impact on a national level; added impact of initiatives to estimate emissions reductions beyond current pledges	Cities, regions, companies	EE, efficient cook stoves, renewable energy, 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)	www.umweltbundesamt.de/sites/default/files/medien/1968/publikationen/2016-11-29_discussion_paper_clean_version_final.pdf
CDP and We Mean Business (2016)	Based on 5 international initiatives (chosen on a set of predefined criteria), estimated impact of each; calculated overlaps	Companies	All sectors covered by the 5 initiatives	3,200–4,200	2030	Calculated (overlap across the 5 initiatives)	IPCC Fifth Assessment Report (2014)	World (global initiatives)	https://newclimateinstitute.files.wordpress.com/2016/06/business-end-of-climate-change.pdf

TABLE **A.2,** continued

Overview of literature on quantification of non-state and subnational actions, including approach to overlaps

Source	Approach	Type of actors covered	Type of sectors covered	Impact on emissions ($MtCO_2e$)	Target year	Approach to overlaps	Reference scenario/ baseline	Geographic focus	Link to source
Arup and C40 Cities (2014)	Looked at 228 cities; established rules for standardizing reporting of GHG reductions; collected GHG emissions target and inventory data, where available; combined 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 (from the set of predefined cities)	www.c40.org/researches/global-aggregation-of-city-climate-commitments-methodology
Compact of Mayors (2015)	Based on self-reported data by 360 Compact of Mayors cities, calculated the difference between BAU scenario and target scenario in a given year	Cities	Overall emissions reductions per year	500 per year (2020); 740 per year (2030); 950 per year (2050)	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

TABLE **A.2,** continued

Overview of literature on quantification of non-state and subnational actions, including approach to overlaps

Source	Approach	Type of actors covered	Type of sectors covered	Impact on emissions ($MtCO_2e$)	Target year	Approach to overlaps	Reference scenario/ baseline	Geographic focus	Link to source
The Climate Group (2015)	Based on self-reported data by 44 regions to the Compact of States and Regions, projected "target" GHG emissions based on GHG targets reported up to 2050; included actual GHG emissions and interim targets, where available; calculated the cumulative difference between BAU emissions and "target" emissions for each reporting government from 2010 to the date indicated (i.e. 2020 and 2030)	Regions	Overall emissions	1,200	2030	Not calculated	Relative to BAU – based on per capita GHG emissions (2010) and 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.	World (joined the Compact of States and Regions)	www.theclimategroup.org/sites/default/files/archive/files/Compact-of-States-and-Regions-Disclosure-Report-2015.pdf

TABLE **A.2,** continued

Overview of literature on quantification of non-state and subnational actions, including approach to overlaps

Source	Approach	Type of actors covered	Type of sectors covered	Impact on emissions ($MtCO_2e$)	Target year	Approach to overlaps	Reference scenario/ baseline	Geographic focus	Link to source
The Climate Group and 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 IEA *Energy Technology Perspectives 2014* (ETP 2014) report. The ETP 2014's 4 Degrees Scenario (4DS) reflects pre-2012 intentions by countries to cut GHG emissions and boost energy efficiency.	Cumulative savings are estimated by adopting a common base year (2010) and projecting the GHG emissions savings that could be achieved by the disclosing governments (Compact Target Scenario) against 2 reference scenarios. Scenarios are calculated using data and analysis from the ETP 2014 report that refers to the 4DS and the 6 Degrees Scenario (6DS).	World (joined the Compact of States and Regions)	www.theclimategroup.org/sites/default/files/downloads/compact_report_2016stet.pdf

TABLE **A.2,** continued

Overview of literature on quantification of non-state and subnational actions, including approach to overlaps

Source	Approach	Type of actors covered	Type of sectors covered	Impact on emissions ($MtCO_2e$)	Target year	Approach to overlaps	Reference scenario/ baseline	Geographic focus	Link to source
Annual Disclosure – 2017 update	Based on self-reported data from 101 states, provinces and regions around the world	Regions	Overall emissions	2,190	2050	Calculated (between neighbouring states)	Calculated – compared with the IEA's 2017 Reference Technology Scenario (RTS). The RTS considers current commitments by countries to limit emissions, including NDCs.	World	www.theclimategroup.org/sites/default/files/disclosure_update_2017_digital.pdf
Hsu et al. (2015b)	Using 9 city and regional climate action case studies, estimated impact for each and compared with BAU model of the country where the specific city/ region is located	Cities, regions	Carbon tax, industry, transport, forestry and land use, EE, waste, renewable energy, emissions trading	1,090	2020	Calculated (none)	Relative to BAU emissions pathway (assuming linear pathway) of the relevant country	Canada, Brazil, US, South Africa, Germany, China, India, Algeria	www.stanleyfoundation.org/publications/report/WhitePaperScalingUp12-2015.pdf
CDP and 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	Not calculated	IPCC Fifth Assessment Report (2014)	World (global initiatives)	https://newclimateinstitute.files.wordpress.com/2016/06/business-end-of-climate-change.pdf

TABLE **A.2,** continued

Overview of literature on quantification of non-state and subnational actions, including approach to overlaps

Source	Approach	Type of actors covered	Type of sectors covered	Impact on emissions ($MtCO_2e$)	Target year	Approach to overlaps	Reference scenario/ baseline	Geographic focus	Link to source
Erickson and Tempest (2014)	Selected all cities considered by the United Nations World Urbanization Prospects; calculated abatement potential in each year as difference in emissions between reference scenario and urban action scenario	Cities	All, systemic impacts	3,700	2030	Not calculated	Relative to reference scenario (RS), based on IEA's 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. transport).	World	www.sei-international.org/mediamanager/documents/Publications/Climate/SEI-WP-2014-06-C40-Cities-mitigation.pdf
Circle Economy and Ecofys (2016)	No information	All	Circular economy, systemic	6,500–7,500	2030	Not calculated	Relative to BAU if all INDCs are implemented	World	https://assets.website-files.com/5d26d80e8836af2d12ed1269/5dea481576d89489dff8782e_ircle-economy-ecofys-2016-implementing-circular-economy-globally-makes-paris-targets-achievable.pdf.pdf

Abbreviations: COP21, 2015 United Nations Climate Change Conference; CSO, civil society organization; EE, energy efficiency; EU, European Union; ICI, international cooperative initiative; INDC, intended nationally determined contribution; IO, international organization; PBL, Netherlands Environmental Assessment Agency; SLCP, short-lived climate pollutant; US, United States