How much more could Germany achieve through non-state action?

Quantifying the impact of subnational and international cooperative initiatives on the future greenhouse gas emissions of Germany

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Summary

Key messages

- **Non-state action and commitments help to drive ambition**. Activities by cities, regions, business and sectors to reduce greenhouse gas emissions are numerous and their implementation helps to fulfil national emission reductions targets and support the implementation of national policies. For the first time, this study quantifies whether and to which extent these activities go beyond what governments have already agreed to do with their national policies.
- **For Germany, the impact of the commitments of non-state actors on emissions - additional to the effect of implemented policies - is small but not insignificant.** Germany's climate and energy policy framework is in many cases more ambitious than the commitments by non-state actors. But some initiatives such as the state-level targets of North Rhine Westphalia and Bavaria, some city level targets, as well as the European Wind initiative and efforts to increase renovation rate of buildings are more ambitious than current German national policy. In quantitative terms: Commitments by non-state actors would reduce emissions in 2020 by around 14 to 32 $MtCO_2e$/year in addition to the implemented policies in 2020, which is 0.8 to 1.7 % of 1990's emissions, narrowing the implementation gap towards the 40% reduction target (currently 85$MtCO_2e$ in 2020) by a quarter.
- **These additional emission reductions from non-state actors can be enough to raise Germany's ambition level**. If Germany were to fulfil its 40% target in 2020 as currently planned, the commitments of non-state actors, in particular from North Rhine Westphalia and Bavaria would add another reduction of 9 to 18 $MtCO_2e$/year in 2020 (0.5 to 1.0% of 1990's emissions).
- **For Germany ambition can be increase by supporting national policy or ambitious non-state action.** To raise ambition in Germany, the particularly ambitious initiatives would need to be strengthened. Alternatively, national policies will have to be the major driver of ambition in Germany.
- **When developing national climate goals, governments need to take into account non-state action.** The impact of commitments by non-state actors is likely to be higher in other countries, e.g. in the USA with significant corporate level targets or China and India where many economic activities are covered by global initiatives. The impact is also likely to be higher in the future as more and more non-state actors are proposing targets to reduce greenhouse gas emissions.

Introduction

Many "non-state actors" —e.g. regions, cities, companies and whole sectors—have committed to reduce their greenhouse gas (GHG) emissions. These activities become increasingly important next to nationally driven actions under the United Nations Framework Convention on Climate Change (UNFCCC).

The exact impact of these efforts on current and future emissions is unknown and under-researched. Mitigation activities of regions, cities and companies that are independent of national action are currently not comprehensively reflected in the projection of greenhouse gas emissions of Germany, which form the basis for its greenhouse gas targets.

The aim of this study is to quantify the potential impact of a selected number of actions by non-state actors and partnerships on Germany's greenhouse gas emissions. We focus chiefly on the impact of such initiatives on the 2020 emissions gap, although our analysis also extends to longer-term targets (2030 to 2050) wherever such pledges exist.

Results

The contribution of non-state initiatives to the projected emissions of Germany is twofold. Firstly, initiatives with a similar level of ambition to currently implemented or planned policies on emission reductions will support the achievement of these policies. Secondly, some initiatives go beyond the ambition of currently implemented or planned policies, and would therefore result in additional emission reductions beyond the scope of what could be achieved under such policies.

Impact of non-state initiatives

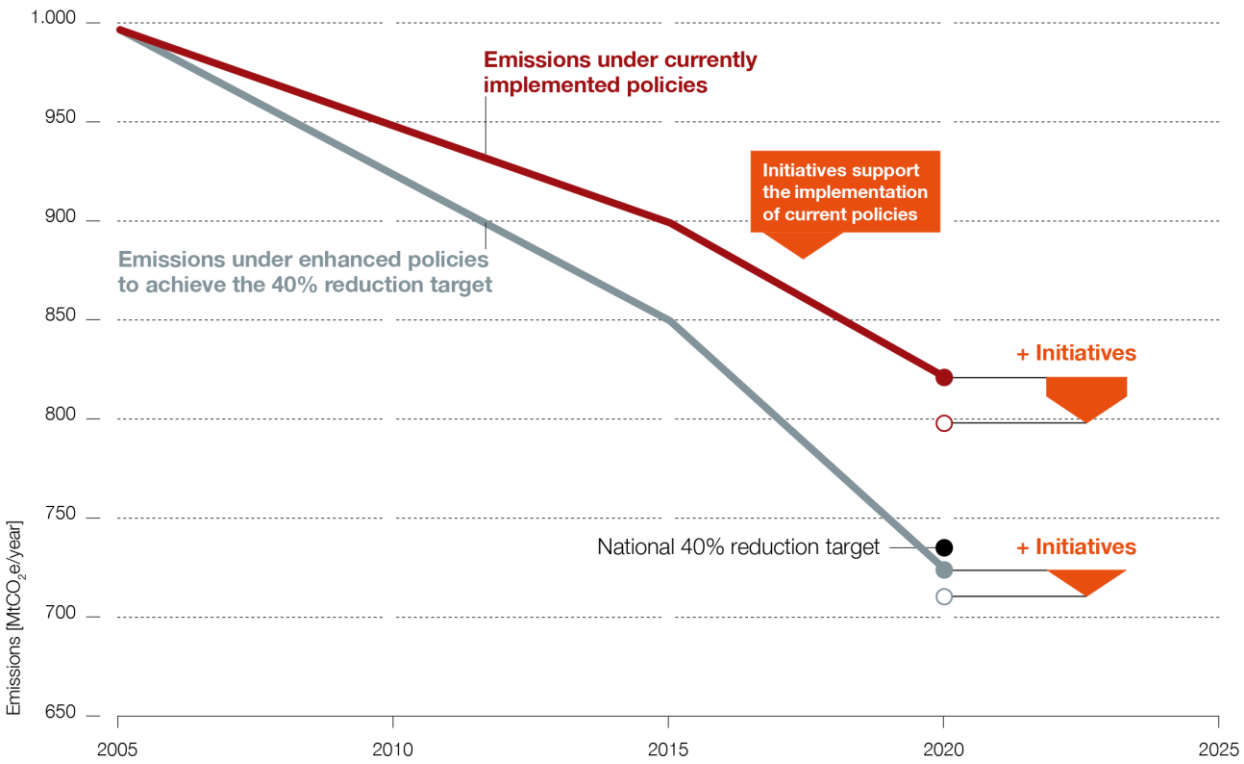

Figure 1: Absolute emission levels in Germany under current and enhanced policy scenarios (Matthes, Hansen, Diekmann, & Eichhammer, 2013), and the emission levels that would result if the selection of initiatives analysed in this report were to be fully implemented (indicated by downward arrows).

Non-state initiatives that have set quantifiable goals up to 2020 could result in additional greenhouse gas emission reductions in Germany of roughly **14 to 32 $MtCO_2e$/year** compared to the effect of currently implemented policies, the current policy scenarios (CPS), closing the gap towards the national target of reducing emissions by 40% in 2020 compared to 1990 by about one fourth.

If Germany were to fulfil its 40% target in 2020 as currently planned, the commitments of non-state actors, in particular from North Rhine Westphalia and Bavaria would result in additional reduction. We estimate that under successful implementation of such enhanced policies to meet the nation 40% target (the

Energiewende-Szenario or Energy Transformation Scenario/ETRS), the initiatives still have the potential to result in additional reductions of roughly **9 to 18 $MtCO_2e$/year** beyond that scenario (Figure 1).

Therefore, taking ambitious non-state emission reduction initiatives into account could make the current policy scenarios of Germany significantly more ambitious, as these initiatives add substantial emission reductions to what is already projected to being achieved without them.

The results depend on several considered factors such as which kinds of renewable energy are used, how the population size develops, and to what degree the initiatives overlap. For the analysis we have selected the initiatives most relevant for Germany and most ambitious within their thematic area. Typical reduction potentials of initiatives of this scope and ambition were found to be of the orders 1-10 $MtCO_2$/year by the period 2020-2030 (Figure 2).

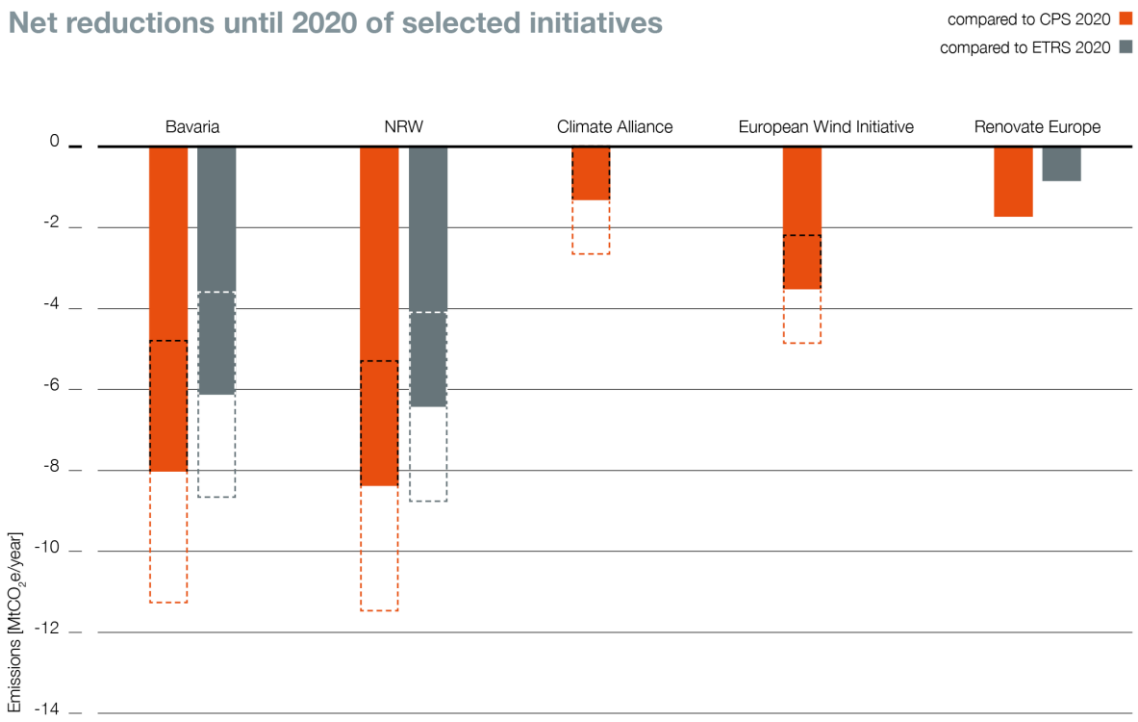

Figure 2: Graphical representation of the emission reductions (including sectoral overlaps) of the illustrative selection of initiatives. The dashed lines indicate the overall range of reduction calculated in our analysis, centred on the mean value in this range.

We find the approach used in this study can be rolled out and applied to other countries, and to quantify the global impact of non-state initiatives compared to government actions and/or pledges. The assessment framework developed under this project can be used to assess emission reductions targets of other countries made in preparation, or after agreement, of a new international climate agreement to be finalised in December 2015.

Table of contents

List of figures

List of tables

1. Introduction

1.1 Background

Besides national governments, many other actors—e.g. regions, cities, and companies—have committed to reducing their greenhouse gas (GHG) emissions. Next to nationally driven actions under the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol, actions and initiatives by non-state actors are increasingly important. Such initiatives bring together a variety of actors and can incentivise action on climate change. Particularly, a new wave of over thirty new initiatives was started at the UN Climate Leaders Summit in September 2014.

It is likely that the impact of at least some of these activities on emissions is significant at the global scale, but also on emissions of individual countries. For instance, new activities in the area of energy efficiency in buildings and transport, as well as extending the installed capacity of renewable energies, could be relevant for Germany. Mitigation activities of regions, cities and companies that are independent of national action are currently not comprehensively reflected in the projection of greenhouse gas emissions of Germany, which form the basis for its greenhouse gas targets. Germany might be able to consider more ambitious greenhouse gas reduction targets if these activities were taken into account.

However, the exact impact of these efforts on current and future emissions is unknown and under-researched. First efforts—e.g. by the UNFCCC—have been made to catalogue commitments and actions by non-state actors[1]. Various research groups have quantified the global impact of individual initiatives and some applied rough assumptions to determine the overlap with national policies and pledges (Hsu, Moffat, Weinfurter, & Schwartz, 2015; Roelfsema, Olivier, & Harmsen, 2015), but no integrated analysis is available on the aggregated effect of these actions today or in the future, nor does analysis on a country level exist. The overlap among these actions, and between these actions and those undertaken by governments poses a particular methodological challenge.

The development of a new quantitative analytical framework would be essential for the assessment of actions proposed under a new international climate agreement scheduled to be finalised in December 2015. The variety of actions by national governments, regions, cities and companies will have to be comprehensively evaluated and the overall impact will have to be assessed, taking into account the overlaps between all of these actions.

1.2 Objective of this project

In this report, we quantify the potential impact of a selected number of actions by non-state actors and partnerships on Germany's greenhouse gas emissions. We focus chiefly on the impact of such initiatives on the 2020 emissions gap, although our analysis also extends to longer-term targets (2030 to 2050) wherever such pledges exist. It is found that the impact of these activities on Germany's national emissions is significant and can lead to additional emission reductions to those that are currently expected in national studies, such as in the "Integrated Energy and Climate Program" (BMUB, 2007), laying out Germany's current policies, and the "Action Program Climate 2020" (BMUB, 2014), which concerns additional actions to be taken to ensure the emissions gap for reaching the pledge of 40% reduction below 1990 levels by 2020 is closed. Thus, the inclusion of non-state activities could ultimately lead to a more ambitious greenhouse gas reduction target for Germany than currently proposed, assuming that the ambition of non-state initiatives would not *replace* any state-level ambition.

[1] http://climateaction.unfccc.int

After the successful piloting of the approach outlined in this study, it can be rolled out and applied to other countries, and to quantify the global impact of non-state initiatives compared to government actions and/or pledges. The assessment framework developed under this project can be used to assess emission reductions targets of other countries made in preparation, or after agreement, of a new international climate agreement to be finalised in December 2015.

2. Approach

In the first step, we scanned two databases of climate initiatives in order to identify those initiatives that were deemed relevant for the current analysis. The criteria for relevance were:

- That the initiative be applicable to Germany. This can include worldwide, Europe-wide or nationwide initiatives, but excludes, for example, initiatives aimed at preservation of rainforests;
- That the initiative included a quantified or quantifiable impact on greenhouse gas emissions as pledge, goal or mission statement;
- That its ambition was roughly comparable in scope to that of corresponding projections of climate policies and goals of Germany as a nation – for example, climate policies of a town with 10,000 inhabitants would not be considered because any emission reductions would be insignificant compared to what nationwide initiatives or policies could achieve;
- That its chances of being fully implemented were not deemed unrealistic based on current developments.

We scanned the Climate Initiatives Platform (a collaborative project of the Nordic Council of Ministers, Ecofys, the University of Cambridge and the World Resources Institute), containing close to 200 initiatives (Climate Initiatives Database, n.d.), as well as the more extensive, but less detailed, NAZCA database of the UNFCCC, containing close to 3,000 climate commitments and initiatives worldwide (UNFCCC, 2015). These include initiatives by governmental and non-governmental bodies, international agencies, consortia of companies, individual companies, research institutes, and combinations of those. Nearly all initiatives (those focusing on implementation as opposed to only dialogue) from the Climate Initiatives Platform, and about 50 initiatives from the NAZCA database focusing on corporate action by companies in Germany, were scanned. The full list of scanned initiatives has been included in the Annex, in Table 16, Table 17 and Table 18.

From the initiatives that were deemed relevant according to the above-mentioned criteria, a categorization was made based on a division of the initiatives into thematic areas. A more stringent selection was made based on the estimated ambition of the initiative compared to other initiatives in the same thematic area. A list of the selected thematic areas, along with at least one initiative for each representing that thematic area, is given below:

- Decrease of carbon intensity of the electricity sector
  - European Wind Initiative
- Energy efficiency in buildings
  - Renovate Europe
- Energy efficiency in industry
  - Ultra-Low CO_2 Steelmaking
- Fuel-efficient vehicles
  - “30-by-30”-resolution
  - Urban Electric Mobility Initiative
- Cities
  - Climate Alliance
- Regions
  - Bavaria
  - Baden-Württemberg
  - North Rhine-Westphalia
- Business initiatives
  - E.ON SE decarbonisation initiative

For each selected initiative, we determined its key performance indicator(s) to quantify its intended impact, and compared these to the nationally set climate goals or policies of Germany. The relevant material for comparison originates from various sources, but mainly from the current policies projections of Germany until 2030 (Matthes et al., 2013).

The quantitative comparison assumes that the initiatives would fully implement their stated goals. We made quantitative assumptions wherever needed, i.e. if the time frame of an initiative differed from that of Germany's national policy in the same sector, or if certain variables impacting the performance indicator of an initiative were missing for the relevant time frame (e.g. extrapolation from literature values).

The quantitative analysis of emission reductions leads to the discussion regarding how much the selected initiatives could contribute towards closing the emissions gap between current policy projections and Germany's target of 40% GHG emission reduction by 2020 compared to 1990 levels. A current estimates for this gap is at 85 $MtCO_2e$ (Fekete, Petersdorff, & Höhne, 2014; Germanwatch & WWF, 2014); thus, if an initiative could have the potential of achieving an emission reduction in the same order of magnitude by 2020, this would contribute significantly to closing the emissions gap.

3. Results

3.1 Initiative pledges and comparison: sub-national versus national

In this section, we analyze a number of selected sub-national initiatives aimed at reduction of CO_2 emissions and increasing the share of sustainable sources in the energy mix. Based on the quantitatively stated goals, we perform calculations to estimate whether, and by how much, these initiatives could reduce CO_2 (equivalent) emissions additionally to the projections under Germany's current policy (BAU) and enhanced policy scenario.

A major challenge to the analysis is that the German "Politikszenarien" report does not include data on a state level. Moving towards the national goal can, however, affect indicators in the regions differently, depending on their current situation and potentials. For example, a region with a high potential for renewables (e.g. northern Germany), will play a role above average in reducing emissions from the power sector. The choice of indicators for comparison of the ambition addresses this problem to the extent possible.

3.1.1 Regional initiatives: Bavaria

Summary

Of the goals stated in the Bavarian climate plan, only the goal of the share of renewables in the electricity sector is more ambitious than the current policy and energy transformation scenarios. It can lead to additional reductions of 4 to 12 $MtCO_2e$ in 2020.

Table 1 below summarizes the decarbonization initiatives of Bavaria and how they compare with the current and enhanced policy scenarios of Germany with regard to ambition. The columns "Qualitative goal" and "Quantitative goal" state the ambition of each initiative accordingly. The columns "CPS" (Current Policy Scenario) summarizes the projections for the same quantitative indicator according to the projections from current policies; the same goes for the column "ETRS" in the context of the Energy Transformation Scenario. The column "Ambition" shows whether the targets of the initiative go beyond the scenarios projected in Politikszenarien, with a minus (-) and (+) indicating that they are less and more ambitious, respectively, and a zero (0) indicating roughly equal levels of ambition. The rightmost column indicates how much additional emission of CO_2e is estimated to be avoided, if Germany incorporated the initiative pledge into its future emission scenarios.

Table 1: Summary of the comparison of the Bavarian climate plan and the CPS and ETRS scenarios

Qualitative goal	*Quantitative goal*	*CPS*	*ETRS*	*Ambition over CPS and ETRS*	*Additional CO_2 emission savings*
Reduce CO_2 emissions	Emission level at 6 tons/capita in 2020; 3% below 2013 level	Emission level at 10.1 tons/capita in 2020; 8.7% below 2015 level	8.9 tons/capita in 2020; 15.2% below 2015 level	-	n.a.
Reduce CO_2 emissions	Emission level at 2 tons/capita in 2050; 68% below 2013 level	Emission level at 6.4-6.7 tons/capita in 2050; 41% below 2015 level	1.1-1.2 tons/capita in 2050; 90% below 2015 level	+ (CPS) - (ETRS)	not assessed since not relevant for 2020-2030 scenarios
Increase electric mobility	200.000 electric cars in 2020; 1 out of 37 cars electric in Bavaria	1.000.000 electric cars in 2020; 1 out of 50 cars electric	n.a.	+	~ 1 $ktCO_2e$/year
Extend renewable energies	20% share of renewable energy in primary energy consumption in 2021	19.5% share of renewable energy in primary energy supply in 2020	23% share of renewable energy in primary energy supply in 2020	0	n.a.
Extend renewable energies	50% share of renewable energy in electricity consumption by 2021	37% share of renewable energy in gross electricity consumption by 2020	40% share of renewable energy in gross electricity consumption by 2020	+	5.0 – 11.8 $MtCO_2e$/year (CPS 2020) 3.8 – 9.1 $MtCO_2e$/year (ETRS 2020)

CPS: Current policy scenario, ETRS: Energy Transformation Scenario (Enhanced Policy Scenario), as in the Politikszenarien.

Full analysis

The state of Bavaria has set itself the following climate goals (The Climate Group, 2013):

- To reduce per capita CO_2e emissions to at most **6 tons per person** by 2020 and at most **2 tons per person** by 2050;
- To have **200.000 electric cars** on the road by 2020;
- To increase the share of renewable energy in primary energy consumption to **20% by 2021**;
- To increase the share of renewable energy in electricity consumption to **50% by 2021**.

Current (2013) GHG per capita emissions in Bavaria are given as 6.2 tCO_2e per year (The Climate Group, 2013). A reduction to 6 tons by 2020 is equivalent to a **relative decline of 3%** compared to 2013 levels. Similarly, the goal for 2050 is equivalent to a **relative decline of 68%** compared to 2013 levels.

The current policies projections state that the complete GHG emissions of Germany will decrease from 899.0 $MtCO_2e$ in 2015 to 820.9 $MtCO_2e$ in 2020 (Matthes et al., 2013). If we assume that Germany's (and Bavaria's) population will not change by a significant amount from 2015 to 2020, this corresponds to an **8.7% reduction** in specific emissions, from 11.1 to 10.1 tons/capita. It is thus clear that these projections forecast a much stronger reduction than what is stated in Bavaria's goal. It must be noted here that the current specific emission levels of Germany (2015) stand at more than 10 ton CO_2/capita/year (assuming a current population size of 81 million individuals), significantly higher than those of Bavaria; thus, a higher relative reduction goal for Germany as a whole would help it to "catch up" with Bavaria.

Under the enhanced policy scenario, the absolute reduction is even stronger, from 10.5 to 8.9 tCO_2e/capita between 2015 and 2020, a relative change of **15.2%**.

No projections exist in the current policy scenario beyond 2030. To compare Bavaria's 2050 goal with Germany's policy projections, we assume that the emission reductions under both current as well as the enhanced policies of Germany continue up to 2050 on the same average linear trend that applies between 2000 and 2030 (for current policies) or between 2015 and 2030 (for enhanced policies); see Figure 3:

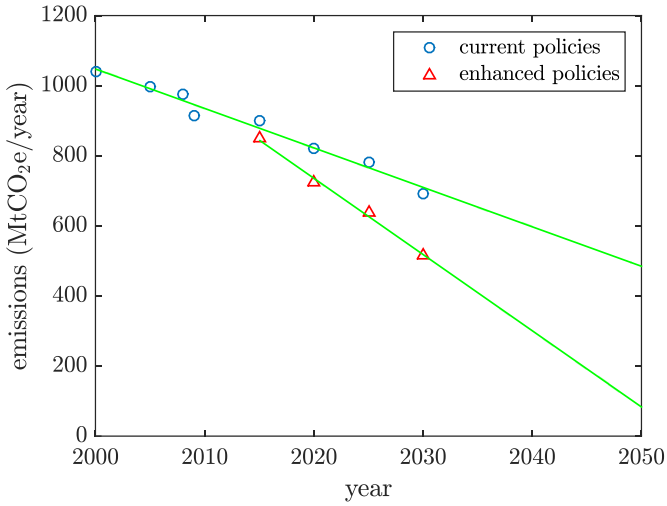

Figure 3: The total GHG emissions of Germany, historical data as well as future projections according to current policies (blue circles) and enhanced policies (red triangles). Green lines denote the development up to 2050 according to the average linear trends from 2000 and 2015, respectively, to 2030. Own illustration with data from table 5.2 in the Politikszenarien VI (2014).

This linear fit predicts a yearly emission level of 485 $MtCO_2e$/year under current policies by 2050, and of 83 $MtCO_2e$/year under enhanced policies. According to projections of the German Federal Statistical Office, Germany's population is forecast to decrease to between 72 and 76 million individuals by 2050 (Statistisches Bundesamt, 2015). With Germany's current population estimated at 81 million, our linear projection for Germany's total emissions by 2050 translates roughly to a **41% reduction** in per-capita-emissions from 2015 levels under current policies, to a level of 6.4 - 6.7 ton CO_2/capita/year, and to a **90% reduction** under enhanced policies, to a level of 1.1 to 1.2 ton CO_2/capita/year. Thus, Bavarian plans for reductions until 2050 would lead to reductions beyond what German current policies could do, but are not more ambitious than the ETRS.

Bavaria's plan of having 200.000 electric cars on the road by 2020 corresponds (under the assumption that Bavarian population will not change significantly in the next years) to increasing the number of electric cars to an average of **1 out of 37 cars (2.7%)** being electric (Statista, 2015). The plans regarding electrification of passenger traffic of the German government are expressed in the Electric Mobility Strategy (Strategie Elektromobilität), which has the stated objective of having 1 million electric vehicles on the road in Germany by 2020 (Matthes et al., 2013); this would correspond to approximately **1 out of 50 cars (2%)** being electric (Rodt et al., 2010). In this sense, the Bavarian plans are slightly more ambitious, by 0.7 percentage points of total Bavarian car stock, than the Electric Mobility Strategy.

Bavaria plans significant extension of renewable energy in terms of total energy supply and for electricity generation. Current policy projections forecast a national share of renewable energy of **19.5% in primary energy supply by 2020**, and enhanced policy projections forecast a **share of 23%** (Matthes et al., 2013)**.** These are therefore very close to Bavaria's pledge. Furthermore, measured by gross electricity consumption, renewable energies are forecast to constitute **37% of Germany's electricity production by 2020 under current policies and 40% under enhanced policies** (Matthes et al., 2013), which makes Bavaria's pledge of 50% more ambitious compared to both scenarios.

CO_2 emissions avoided

For those initiatives of Bavaria that are more ambitious than the projections from the policy scenarios, we analyse here how much reduction in CO_2 they would correspond to, if successfully implemented. This leads to an estimate of how much Germany could strengthen the ambition of its greenhouse gas emission targets if such initiatives were taken into account.

The initiative of having 200.000 electric cars on the road, though more ambitious, in relative terms, than Germany's national goal, would not lead to a substantial reduction in CO_2 emissions by 2020. Already the national goal itself would lead to less than 1 $MtCO_2$ emissions avoided (Rodt et al., 2010) under the assumption that all the required electricity would be generated by renewable sources. Since Bavarian car stock accounts for about 15% of cars in Germany (Statista, 2015), and the Bavarian plans are to have an additional 0.7% of Bavarian car stock electrified by 2020 as compared to Germany's current policies, the corresponding additional avoided amount of CO_2 emissions is in the order of 1 $ktCO_2e$/year, a negligible amount on a national level.

The effect of Bavaria's goal of increasing renewable energy to 50% of the total electricity consumption is significant. The total production of electricity of Bavaria in 2013 is given as 90.8 TWh (Agentur für Erneuerbare Energien, 2015). We make the assumption that this total production does not significantly change until 2021. The current policy projection (for whole Germany, now applied in the same proportions to Bavaria) is that renewables will have a share of 37% (33.6 TWh in Bavaria) of electricity production by 2020; under enhanced policies, this number is 40% (36.3 TWh in Bavaria). We assume that this number would be roughly applicable to 2021 as well. Bavaria's target is to have a 50% share, or 45.4 TWh, by 2021. Thus, Bavaria aims to have 11.8 TWh more than what current policies project, and 9.1 TWh more than what enhanced policies project.

To calculate how many emissions would be avoided if 11.8 TWh and 9.1 TWh, respectively, were obtained from renewables instead of fossil fuels, we estimate the emission reductions for the "worst case" scenario in which solar PV (the renewable with the highest carbon footprint at approximately 48 g CO_2e/kWh) would be used for the electricity generation instead of natural gas (the fossil fuel with the lowest footprint, at 469 CO_2e/kWh); and the "best case" in which hydropower (the renewable with the lowest footprint at 4 CO_2e/kWh) would be used instead of coal (the fossil fuel with the highest footprint, at 1001 gCO_2e/kWh) (Moomaw et al., 2011). Table 2 summarises the minimum and maximum emission saving under current as well as enhanced policy scenarios, resulting from these estimates.

Table 2: Emission reductions of Bavaria's plans of covering 50% of electricity consumption with renewable energy in 2020.

	Minimum ($MtCO_2$/year)	*Maximum ($MtCO_2$/year)*
Reduction (CPS)	5.0	11.8
Reduction (ETS)	3.8	9.1

3.1.2 Regional initiatives: Baden-Württemberg

Summary

The climate plan of Baden-Württemberg does not add additional reductions over those already included in the CPS and ETRS scenarios (Table 3). The three quantitative commitments are below the average ambition level resulting from these scenarios.

Table 3. Summary of the reductions of the climate plan of Baden-Württemberg over the CPS and ETRS scenarios

	Initiative goal	*National goal*	*CPS*	*ETRS*	*Ambition*	*Additional CO_2 emission savings*
Reduce CO_2 emissions	Total emissions 25% below 1990 level by 2020	Total emissions 40% below 1990 level by 2020	Total emissions 34% below 1990 level by 2020	Total emissions 41.8% below 1990 level by 2020	-	n.a.
Reduce CO_2 emissions	Total emissions 90% below 1990 level by 2050	Total emissions 80-95% below 1990 level by 2050	Total emissions 61% below 1990 level by 2050	Total emissions 93% below 1990 level by 2050	0 (NG) + (CPS) 0 (ETRS)	not relevant for 2020-2030 scenarios
Extend renewable energies	20% share of renewables in electricity production by 2020		37% share of renewables in gross electricity consumption by 2020	40% share of renewables in gross electricity consumption by 2020	-	n.a.

Full analysis

The German state of Baden-Württemberg (BW) has also set itself climate change mitigation goals. The specific goals are (The Climate Group, 2012a)

- Reducing GHG emissions by **25% below 1990 levels** by 2020;
- Reducing GHG emissions by **90% below 1990 levels** by 2050;
- An increase in the share of renewable energy in electricity production to **20% by 2020**.

The current policies of Germany predict that **GHG emissions will be reduced by 34.0% compared to 1990 levels in 2020** (Matthes et al., 2013). If this scenario plays out, therefore, Germany will not be on track to meet its stated goal of a 40% reduction from 1990 levels in all GHG emissions by 2020. Under the Energy Transformation Scenario, however, Germany would be able to meet this goal according to the predictions, which **forecast a 41.8% reduction by 2020 compared to 1990**. In any case, both predictions as well as Germany's nationally intended goal are more ambitious than BW's goal.

Furthermore, referring back to Figure 3, the emission level estimated until 2050 under current policies corresponds to a **61% reduction** from 1990 levels (1244 $MtCO_2e$) , and the level estimated under enhanced policies corresponds to a **93% reduction**. Thus, relatively speaking, BW's ambition of reducing GHG emission levels by 90% by 2050 is more ambitious than what current policies would produce, and approximately on the same level of ambition as Germany's enhanced policy scenario. Also, only the enhanced policy trajectory is in accordance with Germany's stated goal of reducing emissions by 80-95% by 2050 from 1990 levels.

As current policy scenarios are only explicitly given until 2030, let us also compare the level of ambition between these policies and BW's targets by 2030 using interpolation. We assume that BW's pledge of 25%

by 2020 is achieved and that a linear reduction trajectory is followed until 90% reduction is achieved in 2050. This would result in a reduction of 46.7% by 2030. Current policy projections give a 44.4% reduction in GHG emissions by 2030 as compared to 1990, making the prediction for Germany as a whole for 2030 **roughly equal in ambition** to the pledge of BW. The projection is 58.5% reduction by 2030 under enhanced policies, significantly more ambitious.

The prognosis regarding the extension of renewable energies is, that they will constitute **37% of the gross electricity consumption** in Germany by 2020 under current policies, and ca**. 40% under the Energy Transformation Scenario** (Matthes et al., 2013). This is significantly higher than the share for renewable energies intended by BW, and Germany's national policies are thus more ambitious. However, it must also be noted that BW likely already achieved its goal of 20% share for renewables and is on track for higher numbers (Agentur für Erneuerbare Energien, 2015).

3.1.3 Regional initiatives: North Rhine-Westphalia

Summary

Of the climate plans of North Rhine-Westphalia (NRW) for emission reduction, only the plan for extending the share of wind energy in electricity production is more ambitious than current and enhanced policies in the time frame until 2020. This plan, if fully implemented, could lead to emission reductions in the range from 4 to 12 $MtCO_2$/year. An overview of the climate plans of NRW and a comparison to current and enhanced policies is given in Table 4.

Table 4. Summary of the reductions of the climate plan of North Rhine-Westphalia over the CPS and ETRS scenarios

	Initiative goal	*National goal*	*CPS*	*ETRS*	*Ambition*	*Additional CO_2 emission savings*
Reduce CO_2 emissions	Total emissions 25% below 1990 level by 2020	Total emissions 40% below 1990 level by 2020	Total emissions 34% below 1990 level by 2020	Total emissions 41% below 1990 level by 2020	-	n.a.
Reduce CO_2 emissions	Total emissions 80% below 1990 level by 2050	Total emissions 80-95% below 1990 level by 2050	Total emissions 61% below 1990 level by 2050	Total emissions 93% below 1990 level by 2050	0 (NG) + (CPS) - (ETRS)	not relevant for 2020-2030 scenarios
Extend renewable energies	15% share of wind energy in total electricity production by 2020, from 2.9% in 2012.		Wind energy meets 19% of final electricity demand by 2020, from 8.6% in 2014.	Wind energy meets 23.6% of final electricity demand by 2020, from 8.6% in 2014.	+	5.6 – 12.1 $MtCO_2e$/year (CPS) 4.3 – 9.3 $MtCO_2e$/year (ETRS)

Full analysis

The German state of North Rhine-Westphalia has set its own climate goals that partly differ from the national ambitions of Germany (The Climate Group, 2012b):

- Reducing GHG emissions by **25% below 1990 levels** by 2020;
- Reducing GHG emissions by **80% below 1990 levels** by 2050;
- Increasing wind energy production to **15% of the energy mix** by 2020.

Regarding plans for emission reductions, NRW's goal for 2020 is identical to that of Baden-Württemberg (less ambitious than current policies). Again using the linear projections from Figure 3 to estimate emission reductions by 2050 under current and enhanced policies, we see that NRW's 2050 plan is more ambitious than Germany's current policy scenario (**61% estimated reduction**), but less than the Energiewende-Szenario (**93% estimated reduction**). Furthermore, we can also make an interpolation between NRW's pledges for 2020 and 2050 to estimate what the decrease in emission level would be in 2030, namely 43.3% reduction compared to 1990 levels, almost equal to the 44.4% reduction from 1990 levels that is predicted in the Politikszenarien under current policies (58.8% under enhanced policies).

As of 2012, the total share of wind power in the electricity sector in NRW, measured by gross electricity consumption, was 2.9%, compared to 8.6% for Germany as a whole (Agentur für Erneuerbare Energien, 2014); wind energy production from NRW accounted for 10% of Germany's total wind energy production (Agentur für Erneuerbare Energien, n.d.; The Climate Group, 2012b). Furthermore, the electricity

consumption from NRW accounted for 31% of Germany's total in 2012 (Statistische Ämter der Länder, 2015). We assume that these shares will not change significantly until 2020[2]. Then, using the current and enhanced policy projections (Matthes et al., 2013) for final energy demand, we can estimate the share that wind energy will have in overall electricity demand in NRW in 2020 and 2030, respectively. We find that the estimated share of wind energy in total electricity demand in NRW would become 6.1% under current policies by 2020, and 7.6% by 2030. We summarize the relevant data in the first four columns of Table 5:

Table 5: Calculation of the additional emission reductions resulting from a full implementation of NRW's plans on generating 15% of electricity from wind energy, compared to current and enhanced policies in 2020.

	National electricity demand (PJ)	*Estimated electricity demand in NRW (PJ)*	*Share of wind energy in national primary demand (PJ)*	*Estimated share of wind energy in electricity demand in NRW (PJ)*	*Difference of projected wind energy share with NRW pledge*	*Emission savings ($MtCO_2e$/year)*
CPS 2020	1.790	555 (31% of national demand)	340 (19% of national total)	34 (6.1% of NRW total)	8.9 p.p.	**5.6 – 12.1**
ETRS 2020	1.650	512 (31% of national demand)	390 (23.6% of national total)	39 (7.6% of NRW total)	7.4 p.p.	**4.3 – 9.3**

For conversion from wind energy share in primary demand to final (end-user) electricity demand, we have assumed a conversion factor of 1.00. Numbers in the rightmost column have been rounded to one $MtCO_2e$/year. Data in first and third columns taken from the Politikszenarien. Data in the second and fourth column estimated using the percentages mentioned in the main text.

The fifth column indicates the relative difference, in percentage points, between the NRW pledge of 15% wind energy by 2020, and the policy scenarios. The effect on CO_2 emission reductions is then estimated as follows. We assume that any additional wind energy production would replace energy from fossil fuel sources. Then, we can calculate a possible range of emission reductions under successful implementation of NRW's goals, compared to the current and enhanced policies in 2020, respectively, with minimum reduction being achieved if wind energy replaces the relatively low-carbon-intensity natural gas, and maximum reduction being achieved if wind energy replaces the high-carbon intensity coal (Moomaw et al., 2011). The resulting range of avoided CO_2 emissions is **5.6 – 12.1 $MtCO_2$/year** by 2020 under current policies, **and 4.3 – 9.3 $MtCO_2$/year** by 2020 under enhanced policies.

[2] This contains the implicit fact that the regional goals of NRW have not been taken into account already in the Politikszenarien. It is worth to mention in this context that the increase in installed wind energy capacity is projected to be more than five-fold for offshore installations under current policies from 2015 to 2020 (1.3 to 6.7 GW), whereas onshore capacity is only projected to increase by a factor of 1.06, from 33.6 GW to 35.8 GW. Since NRW cannot have any offshore installations, this implies that the current policy scenario foresees very little to no increase in wind energy capacity in NRW. The same applies to the projections of the enhanced policy scenario.

3.1.4 Climate Alliance

Summary

The plans of the Climate Alliance to reduce both net GHG emissions as well as per capita GHG emissions, if implemented, would result in a range of emission reductions compared to current policies in the order of 1 to 10 $MtCO_2e$/year.

Table 6: Summary of the reductions of the Climate Alliance aims over the CPS and ETRS scenarios

	Initiative goal	*CPS*	*ETRS*	*Ambition*	*Additional CO_2 emission savings*
Reduce CO_2 emissions	10% reduction of per capita emissions every 5 years	Reduction of per capita emissions of 4%-11% every 5 years	More than 10% reduction of per capita emissions every 5 years	+ (CPS) - (ETRS)	Ranging from 1.4 – 2.7 $MtCO_2e$/year (2020) to 12.6 – 15.0 $MtCO_2e$/year (2025).
Reduce CO_2 emissions	50% reduction of GHG emissions below 1990 level by 2030	44.4% reduction of GHG emissions below 1990 level by 2030	58.5% reduction of GHG emissions below 1990 level by 2030	+ (CPS) - (ETRS)	17.4 $MtCO_2e$/year (2030)
Reduce CO_2 emissions	2.5 tons CO_2e/capita/year "in the long run"	6.5 to 7.0 tons CO_2e/capita/year by 2050	1.1 to 1.2 tons CO_2e/capita/year by 2050	+ (CPS) - (ETRS)	Hard to quantify

Full analysis

The Climate Alliance is a network of close to 2000 cities and towns across Europe, including 469 in Germany alone, that have set themselves the following goals:

- Reducing per capita CO_2e emissions by 10% every five years;
- Halving per capita greenhouse gas (GHG) emissions by 2030 (from a 1990 baseline).

In the long-term, Climate Alliance members also aim at a sustainable level of **2.5 tons CO_2-equivalent emissions per capita and per year**, through advances in energy saving, energy efficiency and the use of renewable energy sources. The Climate Alliance includes all German cities in the top 30 by population except one (Duisburg) and many smaller cities and towns. Altogether, these cities easily represent a population of more than 20 million people, about one-fourth of Germany's total population (Climate Alliance, 2015).

Germany's Current Policies Scenario predicts that GHG emissions will be **reduced by 44.4% by 2030** as compared to 1990 (Matthes et al., 2013). Assuming near-zero population growth in the towns/cities involved in the Climate Alliance, as well as in Germany as a whole, in the time period leading up to 2030, we see that the Climate Alliance goal is more ambitious than what emerges from current policies, a significant fact given that its members represent a large share of the German population. However, under the Energy Transformation Scenario, **the prediction for reductions by 2030 becomes 58.5%** (Matthes et al., 2013). Therefore, depending on which of the two targets is adopted by Germany, the Climate Alliance initiative could either help to achieve it, or result in emission reductions that go beyond it.

Regarding the long-term goal of 2.5 tons CO_2-equivalent stated by the Climate Alliance members, this is given in rather vague terms as no definition of "long-term" is given. What can be said, however, is that Germany's projections up to 2030, at least, are less ambitious than this. Current policies are projected to lead to a total emission level of 691.9 Mto CO_2-equivalent per year by 2030 (Matthes et al., 2013), a 23%

reduction as compared to 2015; in combination with population projections for 2030 (Statistisches Bundesamt, 2015), this translates to **8.6 to 8.7 tons CO_2e/capita/year**. The enhanced policy scenario trajectory leads to a total emission level of 516.1 Mto CO_2-equivalent per year by 2030; this would still translate to **6.4 to 6.5 tons CO_2/capita/year**.

Our estimates for yearly CO_2 emissions up to 2050 (see Figure 3) have already been calculated to correspond to an emissions intensity of **6.4 to 6.7 tons CO_2/capita under current policies**, and to **1.1 to 1.2 tons CO_2/capita under enhanced policies**. The former is less ambitious than the Climate Alliance pledge while the latter is more ambitious, although one must be cautious in interpreting this data since the numbers represent long-term extrapolations from policy predictions and are thus subject to high uncertainty.

Regarding the Climate Alliance pledge of reducing per capita emissions by 10% every 5 years, the following can be said. Using a combination of emission projection data (Matthes et al., 2013) and population forecast statistics (Statistisches Bundesamt, 2015), in the period 2015-2030, it is found that the emission levels are reduced by between 4% and 11% under current policies. However, the reductions would be increased to between 11% and 18% every five years under the enhanced policy scenario. The large spreading is partly due to a non-linear trajectory of emission reductions, and partly due to uncertainties within the population statistics that have been taken into account in these calculations. Table 7 and Table 8 present these results succinctly.

Table 7: Emission reductions of the Climate Alliance per-capita emission intensity goal, compared to current policies

Current policies				
Year	**2015**	**2020**	**2025**	**2030**
Emissions (tCO_2e/capita)	11.1	10.0 - 10.1	9.6 - 9.7	8.6 - 8.7
% reduction from 5 years ago	*n.a.*	8.8 – 9.4	3.8 – 4.5	9.9 – 10.6
Emissions saved through Climate Alliance target over the CPS ($MtCO_2e$/year)		1.4 – 2.7	12.6 – 15.0	10.0 – 13.4

Sources of data for calculation of emissions per capita: Table 5-1 (Matthes et al., 2013); Table 9 (Statistisches Bundesamt, 2015). Uncertainties in emissions and reduction percentages result from spreadings in the population forecast statistics.

Table 8: Emission reductions of the Climate Alliance per-capita emission intensity goal, compared to enhanced policies

Enhanced policies				
Year	**2015**	**2020**	**2025**	**2030**
Emissions (tCO_2e/capita)	10.4	8.8 - 8.9	7.8 - 7.9	6.4 - 6.5
% reduction from 5 years ago	*n.a.*	14.9 – 15.4	11.1 – 11.7	17.6 – 18.2

Sources of data for calculation of emissions per capita: Table 5-1 (Matthes et al., 2013); Table 9 (Statistisches Bundesamt, 2015). Uncertainties in emissions and reduction percentages result from spreadings in the population forecast statistics.

CO_2 emissions avoided

The additional CO_2 emissions that would be avoided if the Climate Alliance members in Germany successfully implemented their strategies are rather straightforward to estimate, given certain assumptions. We assume here that the goal of reducing GHG emissions by 10% every five years is implemented from 2015 to 2030, and that it applies to approximately one-fourth of the population of Germany; furthermore,

we assume that the proportion of German population living in a town or city that is a member of Climate Alliance will stay approximately constant.

Since emissions projections (Matthes et al., 2013) are given for 2015, and population projections (Statistisches Bundesamt, 2015) are known from 2015 to 2030, it is easy to calculate the total emissions for 2020, 2025 and 2030 given a 10% reduction in per capita emissions every 5 years, applied to 25% of the population of Germany. We subsequently calculate the difference between these emissions and those implied by the current policy scenario. Results are given in the last row of Table 7. No additional reduction is predicted compared to enhanced policies.

Even more straightforward to quantify is the goal of 50% reduction of GHG emission reduction. From 1990 levels, a 50% reduction for 25% of the German population and a 44.4% reduction (current policies) for the rest results in **17.4 $MtCO_2e$ avoided emissions** per year by 2030, compared to a current policy trajectory with 44.4% reduction for the entire population.

3.2 Initiative pledges and comparison: sectoral versus national

In this section, we analyze a number of selected sectoral and/or business initiatives aimed at reduction of CO_2 emissions, increasing the share of sustainable sources in the energy mix, or other goals that contribute to mitigating climate change. Based on the quantitatively stated goals, we again estimate whether, and by how much, these initiatives could reduce emissions additionally to the projections under Germany's current and enhanced policy scenarios.

Summary

The initiatives that have been analyzed in this study represent, respectively, the wind, buildings, steelmaking, traffic (2x), and power sector. Table 9 illustrates the differences between these initiatives and current/enhanced policies, and the estimated emission savings that resulting from successful implementation of the initiatives. Every initiative, apart from one, could contribute roughly 1-10 $MtCO_2$/year in reductions.

Table 9: An overview of the industry and sectoral initiatives analysed in this study, including a comparison with current and enhanced energy policies of Germany and an estimation of their potential additional emission reductions over those policies.

Initiative/ Actor	*Initiative goal*	*CPS*	*ETRS*	*Ambition*	*Additional CO_2 emission savings*
European Wind Initiative	Wind energy resp. meets 20%, 30% and 50% by 2020, 2030 and 2050 of EU electricity consumption.	Wind energy meets 8.5% and 16.2% of final electricity demand by 2020 and 2030, respectively.	Wind energy meets 10.6% and 18.7% of final electricity demand by 2020 and 2030, respectively.	+	2.2 – 4.9 $MtCO_2e$/year (CPS 2020)
Renovate Europe	Tripling the annual renovation rate of the EU building stock by 2020, 80% reduction of the EU building stock's energy demand by 2050.	The current renovation rate of 1% is maintained until 2030.	80% reduction in energy demand in renovated buildings from 2020 on; doubling of renovation rate by 2020.	+	0.9 $MtCO_2e$/year (CPS 2020) 1.8 $MtCO_2e$/year (ETRS 2020)
Ultra-Low CO_2 Steelmaking	Reduction of at least 50% in specific CO_2 emissions in steelmaking.	No reduction.	Reduction of 19.7% in specific CO_2 emissions by implementation of CCS programs by 2030.	+	5.6 – 8.1 $MtCO_2e$/year (CPS 2030) 1.8 – 4.4 $MtCO_2e$/year (ETRS 2030)
"30-by-30" resolution	Reduce specific CO_2 emissions from road traffic by 30% by 2030 from 2007 levels.	Reduction of 37% of specific CO_2 emissions from passenger cars in new fleet.	Reduction of 53% of specific CO_2 emissions from passenger cars in new fleet.	-	n.a.
Urban Electric Mobility Initiative	Electric vehicles make up 30% of urban traffic by 2030, or about 15% of total vehicle stock.	1 million electric cars on the road by 2020, 6 million cars on the road by 2030.	n.a.	+	3.8 – 5.9 $MtCO_2e$/year (2030)
E.ON SE	Reduce direct CO_2e emissions intensity of electricity generation in Europe by 50% per MWh from 1990 to 2025.	Reduction of 40% CO_2e emissions intensity of electricity generation from 1990 to 2025.	Reduction of 50% CO_2e emissions intensity of electricity generation from 1990 to 2025.	+ (CPS) 0 (ETRS)	7.7 $MtCO_2e$/year (CPS 2025) 4.1 $MtCO_2e$/year (ETRS 2025)

3.2.1 European Wind Initiative

The European Wind Initiative (EWI) is a Research & Development programme by the European wind industry, represented by the European Wind Energy Association (EWEA), in collaboration with the European Commission and EU member states. The pledge of the EWI is for wind energy to meet 20%, 30% and 50% of EU electricity consumption by 2020, 2030 and 2050, respectively (EWEA, 2013).

According to the Current Policies Scenarios (Matthes et al., 2013), the share of installed wind energy capacity in Germany is not projected to change by much in the next 15 years, from 43% of the total renewable energy mix in 2015 to 39% in 2020 and 41% by 2030. Its absolute share in the energy mix is, however, projected to increase, from 34.9 GW in 2015 to 42.5 GW in 2020 and 59.8 GW in 2030. The increase will be due mainly to extension of offshore wind energy facilities. In the same scenario, renewable energy is projected to constitute 37% and 64% of Germany's total energy capacity by 2020 and 2030, respectively. Thus, wind energy would account for about **14% and 26% of total energy capacity** in Germany by 2020 and 2030, respectively.

According to the more ambitious Energy Transformation Scenario (Energiewende-Szenario), wind energy capacity is projected to be extended to 52.5 GW by 2020 and to 79.5 GW by 2030, equivalent to 43.8% and 42% of the renewable energy capacity, respectively. Similarly, renewable energy is assumed to constitute 40% and 72% of total energy capacity by 2020 and 2030, respectively, meaning that, in this scenario, wind energy would account for **18% of total energy capacity by 2020, and 30% of total energy capacity by 2030**.

If one looks at this in terms of the *electricity demand* rather than the *installed capacity* (which represents the maximum sustained output of a power plant – something that, especially in the case of wind turbines, can be very different from actual power supply, due to e.g. fluctuations in wind speed and direction as well as due to time-dependent customer demand), the picture is very different. Using the current and enhanced policy projections (Matthes et al., 2013) for final energy demand, we can calculate the share that wind energy will have in overall electricity demand in Germany in 2020 and 2030, respectively. Relevant data on total electricity demand and the share of wind energy therein are indicated in the first four columns of Table 10.

Table 10: Calculation of the emission savings assuming full proportional implementation of the European Wind Initiative in Germany, compared to current and enhanced policies in 2020 and 2030.

	Total electricity demand (PJ)	*Share of wind energy in primary demand (PJ)*	*Share of wind energy in final electricity demand*	*Difference with EWI pledge*	*Emission savings ($MtCO_2e$/year)*
Current policies 2020	1.790	340	19.0%	1.0 p.p.	2.2 – 4.9
Current policies 2030	1.670	600	35.9%	-5.9 p.p.	-
Enhanced policies 2020	1.650	390	23.6%	-3.6 p.p.	-
Enhanced policies 2030	1.470	610	41.5%	-11.5 p.p.	-

For conversion from wind energy share in primary demand to final (end-user) electricity demand, we have assumed a conversion factor of 1.00. Numbers in the rightmost column have been rounded to one $MtCO_2e$/year.

CO_2 emissions avoided

The difference in ambition between the pledge of the EWI and Germany's policy scenarios can be estimated quantitatively in the context of Germany. The last column of Table 10 shows the difference in percentage points between the projected share of wind energy under the policy scenarios and the pledge of the EWI. In our comparison, we assume that the goals of the EWI are achieved within Germany in the same

proportions; furthermore, we assume that the additional wind energy production would replace energy from fossil fuel sources. Then, we can calculate a possible range of emission reductions under successful implementation of the EWI compared to the current and enhanced policies in 2020 and 2030, respectively, with minimum reduction being achieved if wind energy replaces the relatively low-carbon-intensity natural gas, and maximum reduction being achieved if wind energy replaces the high-carbon intensity coal (Moomaw et al., 2011). These ranges are indicated in the rightmost column of table Table 10. An emission reduction would only be achieved under current policies by 2020; in all other cases, the projected share of wind energy has already reached the marks set by the EWI.

3.2.2 Renovate Europe

The Renovate Europe initiative, launched in 2011, is a campaign of the European Alliance of Companies for Energy Efficiency in Buildings (EuroACE). Its stated goal is to **triple the annual renovation rate** of the EU building stock from its current rate of 1% to 3% by 2020 and maintaining that rate long-term, as well as to ensure an **80% reduction of the EU building stock's energy demand by 2050** (with 2005 as baseline year). On a national level in Germany, the initiative is supported by the Deutsche Unternehmensinitiative Energieeffizienz (DENEFF) (*Renovate Europe: Ambition & Objectives*, n.d.).

The current policies do not foresee an increase in renovation rate until 2030. However, the Energy Transformation Scenario states that, assuming full implementation of intended policies, the renovation rate in Germany could be **doubled to 2%** from its current rate of 1% by 2020 (Matthes et al., 2013). In this regard, therefore, the German government's policies are less ambitious than the EU-wide ambitions proposed by the Renovate Europe initiative.

According to the Energy Transformation Scenario, the goal of the German government regarding building energy efficiency is to achieve, in the long-term – starting from 2020 - an **80% reduction in energy demand in *renovated buildings***, using 1990 as baseline year. Projections on the short-term are a 60% reduction in energy demand of renovated buildings from 2009 to 2025, and a 67% reduction in energy demand of newly constructed buildings in the same time frame (Matthes et al., 2013).

CO_2 emissions avoided

The Politikszenarien directly provide results of calculations on the emission reduction potential of current and enhanced policies in the buildings sector. The relevant law here is the "Energieeinsparverordnung" (Energy Saving Act), which stipulates energy-efficient building standards. The enhanced policy scenarios foresee a staged implementation of more stringent renovation measures than the current Energy Saving Act. One of these is setting the stage for a 2% renovation rate to be achieved from 2020 onwards.

The avoided yearly total emissions from having this enhanced renovation rate in place are estimated in the Politikszenarien to be **0.88 $MtCO_2e$/year** in 2020. We make the simple estimation that additional renovations will proportionally reduce the CO_2 emissions (in old buildings). Thus, with a 2% renovation rate (double the current rate) under the ETRS resulting in 0.88 $MtCO_2$ avoided emissions compared to current policies, a renovation rate of 3% (another percentage point increase) would result in roughly the same amount of avoided emissions compared to ETRS, and double this amount - approximately **1.76 $MtCO_2$/year** – compared to current policies. In reality, it is likely that the emission savings would be somewhat lower, since a point might be reached where the increased renovation rate could only be kept up by re-renovating buildings already renovated earlier, which would of course result in fewer emission savings.

3.2.3 Ultra-Low CO_2 Steelmaking (ULCOS)

This is a Research & Development initiative by a consortium of 48 European steel companies, coordinated by the largest steel producer in the world, ArcelorMittal, and including several other important steel producers, such as Germany's largest, ThyssenKrupp. The objective of the initiative is to disseminate new technologies in steelmaking that ensure a reduction in CO_2 emissions intensity beyond the limit of current technologies, with the ambition that these technologies lead to a **reduction of at least 50%** in specific CO_2 emissions in steelmaking (Ultra-Low CO_2 Steelmaking, n.d.)

Germany's current policy-based scenarios state that the expected yearly emissions from the iron and steel industry will increase slightly in the next 15 years, from 15.2 $MtCO_2$ in 2015 to 15.9 $MtCO_2$ in 2030 (Matthes et al., 2013); no data on future projections of steel production is given. Apart from a dip in 2009, probably due to adverse economic circumstances, steel production in Germany has remained roughly constant in the last decade or so (Wirtschaftsvereinigung Stahl, 2015); thus, no significant specific emissions reduction is assumed to happen under current policies. Any reductions in net CO_2 emissions from steelmaking in the more ambitious Energy Transformation Scenario are due to the proposed implementation of Carbon Capture & Storage (CCS) facilities. These are projected to lead to a **reduction of 19.7%** in emissions from the steel industry, down to 12.1 $MtCO_2$ per year, by 2030 (Matthes et al., 2013). Assuming that the roughly constant trend of steel production continues in the next 15 years too, the reduction of specific CO_2 emissions in steelmaking under the enhanced policy scenario in which CCS is used to lower emissions would correspond to 19.7% as well.

CO_2 emissions avoided

No baseline year is given in the ULCOS ambition of 50% reduction of specific emissions, nor any target year. We assume for simplicity that the baseline year is part of the period 2005-2015; we then calculate specific emissions from the steel sector to be between 0.47 $kgCO_2$ / kg steel (2005) and 0.35 $kgCO_2$ / kg steel (2015) (Matthes et al., 2013; Wirtschaftsvereinigung Stahl, 2015). Thus, the ULCOS ambition should correspond to bringing specific emissions down to the range 0.18 – 0.24 $kgCO_2$ / kg steel. Once again using the assumption that steel production will remain roughly constant in the near future, at about 44 Mto steel/ year (Wirtschaftsvereinigung Stahl, 2015), if the ULCOS target were to be reached, yearly emissions would stand at approximately 7.9 – 10.6 $MtoCO_2$/year. For lack of a target year of the ULCOS initiative, we will compare these results with 2030 data from the Politikszenarien here. The 50% reduction then corresponds to **5.6 – 8.1 $MtoCO_2$ total avoided emissions** when compared to projected 2030 emissions from the steel industry under current policies, and **1.8 – 4.4 $MtCO_2$** avoided emissions under enhanced policies.

3.2.4 "30 by 30"-resolution

This resolution is led by members of the International Road Transport Union (IRU). In order to achieve fuel efficient road transport, the Union made a voluntary commitment **to reduce specific CO_2 emissions by 30% by 2030** from 2007 levels, calculated as emissions per tonne-km or person-km, through improved engine and vehicle technologies, logistical concepts and driver training (International Road Transport Union, 2009).

The current policies of the German government concerning emission reductions in road traffic are expressed in amount of CO_2 per kilometer, as opposed to tonne-km or person-km. The scenarios based on Germany's current policies only refer to the "Neuwagenflotte", the newly-bought car fleet. Here, the prediction is a **reduction of 37%** in the specific yearly emissions of this fleet from 2008 (approximately 150 gCO_2/km, Deutsche Bank Research, 2014) to 2030 (95 gCO_2/km, Matthes et al., 2013). Furthermore, under

the Energiewende-scenario, the goal for specific CO_2 emissions of new cars by 2030 is reduced to 70 gCO_2/km, corresponding to a **53% reduction** compared to 2008.

The Politikszenarien provide predictions for total road traffic by 2030 in person-km for personal vehicles and in tonne-km for cargo traffic. Furthermore, average emission levels in Germany per person-km and tonne-km in the baseline year 2007 are given by the Federal Environmental Agency (Umweltbundesamt, 2012). Reducing these numbers by 30% and subsequently multiplying them by the projections for total road traffic in 2030 results in the hypothetical emission levels resulting from road traffic in Germany in 2030 if the objective of the "30-by-30"-resolution were to be achieved. These data are displayed in Table 11.

Table 11: Calculation of hypothetical emission levels from road traffic in Germany in 2030 assuming full implementation of the 30-by-30 initiative ambition.

	Personal vehicles	*Cargo vehicles*	*Total*
Total traffic (2030)	1667.5 billion pkm	1080.3 billion tkm	-
Average emission levels (2007, baseline)	128.68 gCO_2/pkm	88.19 gCO_2/tkm	-
Total emissions (2030) under 30-by-30 ambition	150 $MtoCO_2$/year	67 $MtoCO_2$/year	**217 $MtCO_2e$/year**

Looking at the predictions provided in the Politikszenarien, this level of emissions is significantly higher than what is predicted under current as well as enhanced policies for Germany. Under current policies, the CO_2 emissions from all traffic excluding international air transport in 2030 are projected at 122 $MtCO_2$, 20% reduced from 2010 levels. Under enhanced policies, the projection is 103 $MtCO_2$, a 32% reduction from 2010.

It is an example how the fact that a reduction in specific emissions does not target overall emissions, may look ambitious at first sight whereas it does not necessarily result in any CO_2 emission reductions for Germany. A reduction in specific emissions does not have to mean any actual emission reductions if total traffic goes up by an (over)-compensating amount.

3.2.5 Urban Electric Mobility Initiative (UEMI)

This initiative, developed by UN-HABITAT and comprising partners from politics, industry and research, aims to increase the worldwide adoption of electric vehicles, setting a target of **electric vehicles making up 30% of urban traffic by the year 2030, or about 15% of total vehicle stock**, from a current stock of 0.02% as of 2014 (UN-HABITAT, 2014).

The plans regarding electrification of passenger traffic of the German government are expressed in the Electric Mobility Strategy (Strategie Elektromobilität), which has the stated objective of having 6 million electric vehicles on the road in Germany by 2030 (Bundesministerium für Verkehr, 2011). In 2014, the number of registered cars in Germany was 61.5 million (Bekker, 2014). Assuming that this number would stay roughly constant until 2030, having 6 million electric vehicles on the road by 2030 translates to approximately **9.8% of total vehicle stock**.

CO_2 emissions avoided

We can quantify the intended impact of the UEMI compared to Germany's national strategies as follows. For the emissions intensity of the average car in Germany, we use a range of realistic values between 100 and 150 gCO_2/km (International Council on Clean Transportation, 2012). We can then estimate how much

CO_2 emission could be avoided by replacing a certain percentage of the cars by electric ones. Whether or not the UEMI strategy would result in actual emission reductions would depend on whether the source of energy for the electric cars is a sustainable one or not. We assume here, under a simplified "most realistic" scenario, that the energy would come from 100% renewables, equally distributed between the two most common renewable energy sources in Germany, wind and solar power.[3] We use the energy intensity of the Tesla Roadster as a reference value for electric cars, estimated at 0.24 kWh/km (Eberhard, Tarpenning, & Sadoway, 2006). Furthermore, we assume that the average electric car in Germany will cover the same average distance per year as the average fuel car. We calculate the total emission reductions that would result from the production of sustainable energies for powering electric cars making up 9.8% and 15% of total vehicle stock, respectively; the difference between these two numbers is a rough estimate of the CO_2 emission that would be avoided if the UEMI goal were to be reached Germany-wide, compared to Germany's policies. This difference lies in the range **3.8 - 5.9 $MtCO_2$/year by 2030**.

3.2.6 E.ON SE Initiative

The electric utility provider E.ON SE has made the individual pledge to reduce direct CO_2e emissions intensity of electricity generation of its installations in Europe by **50% per MWh from 1990 to 2025,** from a 1990 baseline of 0.63 to 0.32 metric tons of CO_2 per MWh, through increased energy efficiency and a transition from coal power plants to renewable energy sources (E.ON, 2014).

Through a combination of historical data from the Politikszenarien and the Arbeitsgemeinschaft Energiebilanzen, as well as future projections from the Politikszenarien, we are able to estimate the emissions intensity reduction of Germany from 1990 to 2025 under current and enhanced policies (AG Energiebilanzen, 2011; Matthes et al., 2013). The following table provides an overview of relevant data:

Table 12: Calculation of projected emission intensities from the electricity sector in Germany by 2025 under current and enhanced policies.

Year	GHG emissions (ktCO2e)	Net electricity production (TWh)	Calculated intensity (tCO_2e/MWh)
1990	$4.56 \cdot 10^6$	508.4	0.90
2025	$2.90 \cdot 10^6$ (CPS) $2.19 \cdot 10^6$ (ETRS)	540 (CPS) 486 (ETRS)	0.54 (CPS) 0.45 (ETRS)

It is clear that whereas the current policy scenarios are less ambitious than a 50% reduction (**40%**), the Energiewende-Szenario predicts a reduction in intensity that, in relative terms, is equal to E.ON's pledge, at **50%**. However, in absolute terms, E.ON's pledge is more ambitious than both, aiming for an average intensity of 0.32 tCO_2/MWh by 2025; this is 41% less than what is forecast under current policies, and 29% less than under enhanced policies.

CO_2 emissions avoided

It is estimated that, currently, E.ON serves about 5.26 million customers, corresponding to 6.5% of the German population (Appunn & Russell, 2015). We assume that this share will not change significantly in the coming decade. Then, it is straightforward to calculate the emission reduction resulting from a successful implementation of E.ON's pledge to reduce CO_2e emissions to 0.32 tCO_2/MWh. Assuming

[3] As of 2030, according to the Politikszenarien, the installed capacities of wind energy (off- and onshore total) and solar energy would account for 41% and 43% of renewable energy capacity, respectively, under current policies, and for 42% and 46%, respectively, under enhanced policies.

current policies, an additional emissions amount of **7.7 $MtCO_2$** would be avoided (2025); under enhanced policies, it would be **4.1 $MtCO_2$**.

It must be mentioned in this context that E.ON SE plans to spin-off many of its non-renewable energy sources in Germany, all of which account for 92% of its generated power (Appunn & Russell, 2015), into a new company, as part of a new corporate strategy. This would include all nuclear, coal-fired and gas-fired power stations in Europe and Russia (Reed, 2014). Such a move would make it rather easy for E.ON as a company to reach its goal of halving emission intensity.

3.3 Overlaps between initiatives

It is clear that the initiatives are not mutually exclusive, and that some of them could help to achieve the targets set by another. Therefore, if the initiatives are aggregated, the total emission reductions that could be achieved assuming full implementation of the initiatives would be less than the sum of the individual emission reductions calculated for each initiative in this report.

This section gives a short overview of the most important overlaps between those initiatives that have been calculated to result in emission reductions:

- Full achievement of the EWI plans for wind energy coverage of 20% of electricity consumption by 2020, would mean that the ambition of Bavaria to have 50% of its electricity provided by renewable sources by 2021 might be achieved partly by the EWI.
  We assume that the share of Bavaria in the total of Germany's wind energy production would remain at the current level of approximately 3% (Agentur für Erneuerbare Energien, n.d., and Agentur für Erneuerbare Energien, 2015) under implementation of the EWI goal; this would correspond to a total production of 10.7 PJ from wind energy by 2020 (3% of 20% of Germany's projected energy demand in 2020 under current policies). Current electricity production from wind energy in Bavaria already stands at approximately 4.9 PJ (Agentur für Erneuerbare Energien, n.d.); thus, reaching 10.7 PJ in wind energy production would require 5.8 PJ additionally, or roughly 2% of total Bavarian electricity consumption (assuming the share of Bavaria in Germany's total electricity consumption does not significantly change from the 2012 level of 15%, which would correspond to approximately 270 PJ in 2020 (Statistische Ämter der Länder, 2015)). **This would cover 4% of Bavaria's ambition of having 50% renewables in electricity generation by 2020.**
- Full achievement of the EWI goals would, furthermore, overlap to a small part with the ambition of North Rhine-Westphalia to achieve a 15% share of wind energy in total electricity production by 2020. We assume that the share of NRW in the total of Germany's wind energy production would remain at the current level of approximately 10% (Agentur für Erneuerbare Energien, n.d.) under implementation of the EWI goal; this would correspond to a total production of 35.8 PJ by 2020 (10% of 20% of Germany's projected energy demand in 2020 under current policies). This is 0.4% of total energy demand more than what current policies could achieve for wind energy in NRW by 2020; we calculate that **this corresponds to the EWI goals covering about 5% of what NRW plans to achieve beyond current policies.**
- Since the Climate Alliance goals are formulated in terms of GHG emission reductions, and not in terms of a specific *means* of achieving those reductions, it is **ambiguous** whether or not these goals would overlap with sectoral initiatives, such as EWI, Renovate Europe, et cetera. At "best", they would be mutually independent and achieve their emission reductions separately; at "worst", the Climate Alliance goals could be achieved completely by "freeriding" on the efforts of other initiatives.
- The Climate Alliance is estimated to cover about 25% of the population of Germany through the membership of major cities and towns. Judging by those member cities that are in the top 30 by population in Germany, about 17% of Bavarian population (accounting for 10% of Climate Alliance-covered population in Germany), and 30% of NRW population (accounting for 26% of Climate Alliance-covered population in Germany), live in member towns of Climate Alliance. **Thus, a successful implementation of Bavaria's renewable energy plans could cover about 10% of the envisioned Climate Alliance reductions in Germany, and NRW's plans could cover about 26% thereof.**
- Since the Climate Alliance member cities and towns cover about 25% of Germany (by population), and the total emission reductions expected by 2020 from Renovate Europe are approximately 25% to 50% of those envisioned by Climate Alliance members, **the Renovate Europe campaign could**

contribute between approximately 6% and 13% to Climate Alliance reductions of CO_2 emissions in Germany, assuming that the intended renovations are distributed proportionally across Germany by population.

Here, we analyse the aggregate result in terms of CO_2 emission reductions of the listed initiatives up to 2020 compared to the current policy scenario. We present the mutual overlaps between different initiatives in the following table:

Table 13: Overlaps between the analysed initiatives that result in emission reductions by 2020 compared to current policies.

Overlap with →	Bavaria	NRW	Climate Alliance	EWI	Renovate Europe
Bavaria	No	No	Successful Bavaria goal could cover ca. 10% of Climate Alliance reductions in Germany.	Successful EWI goal covers ca. 4% of Bavarian goal.	No
NRW	No	No	Successful NRW goal could cover ca. 26% of Climate Alliance reductions in Germany.	Successful EWI goal covers ca. 5% of NRW goal.	No
Climate Alliance	-	-	No	Overlap between 0% and 100%, due to the Climate Alliance goals not being stated in terms of any specific technology implementation.	Successful implementation of Renovate Europe goals could cover up to ca. 10% of envisioned Climate Alliance reductions.
European Wind Initiative	-	-	-	No	No
Renovate Europe	-	-	-	-	No

3.4 Closing Germany's emissions gap

In this section, we aggregate the results from the previous section to analyse how much CO_2 emission reductions could be achieved in total under successful implementation of the listed initiatives, and how much this would contribute to closing Germany's "emission gap", corresponding to the additional emission reduction that would be necessary to reach its own target of 40% emission reduction by 2020 compared to current policies.

We have estimates for how much of the ambition could be achieved through overlap with another initiative, except in the case of the Climate Alliance. Thus, we take the possibilities that the Climate Alliance reductions are either completely achieved through other initiatives, or achieved completely independently, along in the uncertainty estimation of the aggregate reduction.

Table 14 and Figure 4 present the results of the initiatives compared to the 2020 goals, since these are nearest in the future and usually the clearest defined. This list does therefore not include those initiatives that have set goals only for years farther in the future than 2020, since their impact by 2020 is not quantified and hard to estimate assuming no further data are available.

Table 14: Calculation of the actual net emission reductions, assuming full implementation of the initiatives leading to emission reductions in Germany compared to current policies by 2020, and taking overlaps between initiatives into account.

Initiative/ Actor	Leftover from overlap (with)	Reductions compared to CPS 2020 ($MtCO_2e$/year)	Leftover reductions compared to CPS 2020 ($MtCO_2e$/year)	Reductions compared to ETRS 2020 ($MtCO_2e$/year)	Leftover reductions compared to ETRS 2020 ($MtCO_2e$/year)
Bavaria	96% (EWI)	5.0 – 11.8	4.8 – 11.3	3.8 – 9.1	3.6 – 8.7
NRW	95% (EWI)	5.6 – 12.1	5.3 – 11.5	4.3 – 9.3	4.1 – 8.8
Climate Alliance	0% - 100% (all)	1.4 – 2.7	0.0 – 2.7	0.0	0.0
European Wind Initiative	100%	2.2 – 4.9	2.2 – 4.9	0.0	0.0
Renovate Europe	100%	1.8	1.8	0.9	0.9
Total	-	-	**14.1 – 32.2**	-	**8.6 – 18.4**

The result is that the initiatives that have set quantifiable goals up to 2020 could result in additional emission reductions of roughly **14 to 32 $MtCO_2e$/year** compared to current policy developments, and roughly **9 to 18 $MtCO_2e$/year** compared to enhanced policies, depending on several factors such as which kinds of renewable energy are used, how the population size develops, and to what degree the initiatives overlap.

The emission gap between current policies and the 40% reduction target that would need to be bridged by 2020 has been estimated as 85-87 $MtCO_2$ (Fekete et al., 2014; Germanwatch & WWF, 2014). The difference with the estimated reductions from the selected initiatives is graphically illustrated in Figure 5.

About one-fourth of the emissions gap could be closed by including the intent of these various initiatives in the emission reduction projections. According to projections from the Politikszenarien, no emissions gap for the 40% goal is envisaged under the Energiewende-scenario; although the initiatives would still result in further lowering of emissions even compared to that scenario.

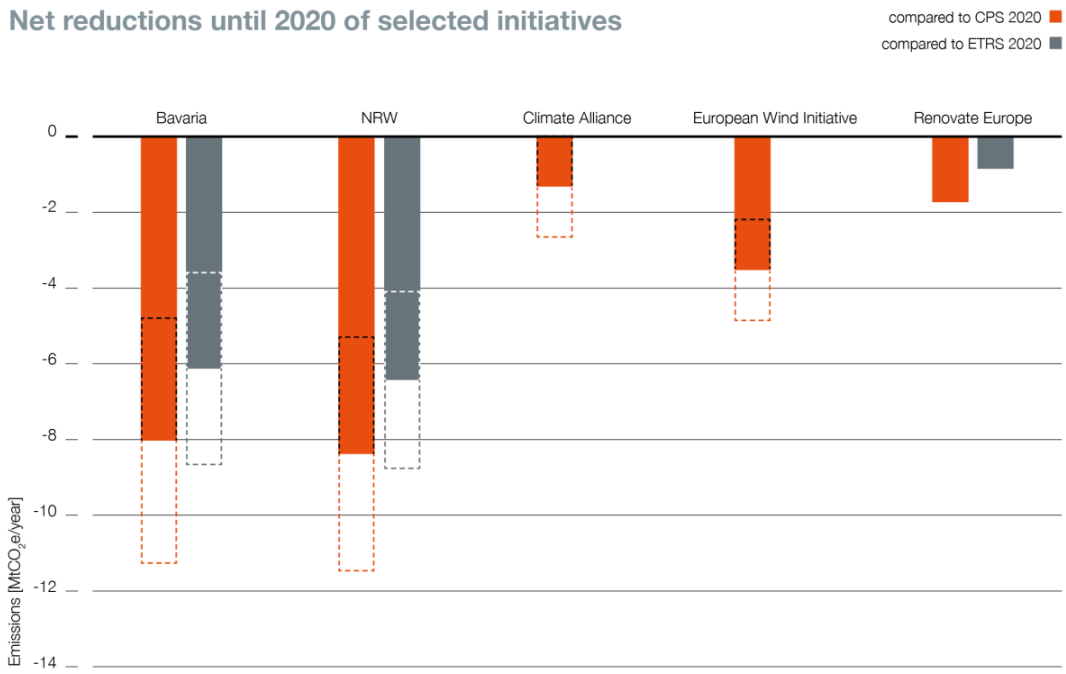

Figure 4: Graphical representation of the emission reductions (including sectoral overlaps) of the illustrative selection of initiatives in Table 14. The dashed lines indicate the overall range of reduction calculated in our analysis, centered on the mean value in this range.

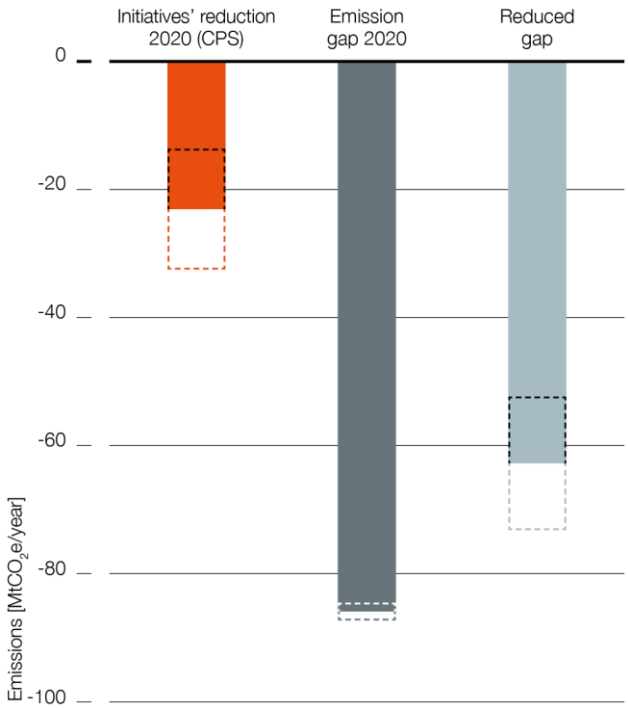

Figure 5: The reduction (additional to current policies) of the selected regional and sectoral initiatives, including mutual overlaps, compared to the estimated emission gap in Germany for 2020. "Reduced gap" refers to the gap that is left if the initiatives' contribution is taken into account. The dashed lines indicate the overall range of reduction calculated in our analysis, centered on the mean value in this range.

4. Conclusions

The aim of this study was to provide a quantitative estimate of the typical CO_2 emission reduction potentials of a number of non-state initiatives representing various sectors in Germany. From established databases of non-state climate initiatives, we have selected the ones judged to be most relevant for Germany and most ambitious within their thematic area. We have used quantitative data sources as well as a number of assumptions to, in each case, make an estimate of how much each initiative could contribute to reducing CO_2 emission in Germany. Typical reduction potentials of initiatives of this scope and ambition were found to be of the orders 1-10 $MtCO_2$/year by the period 2020-2030.

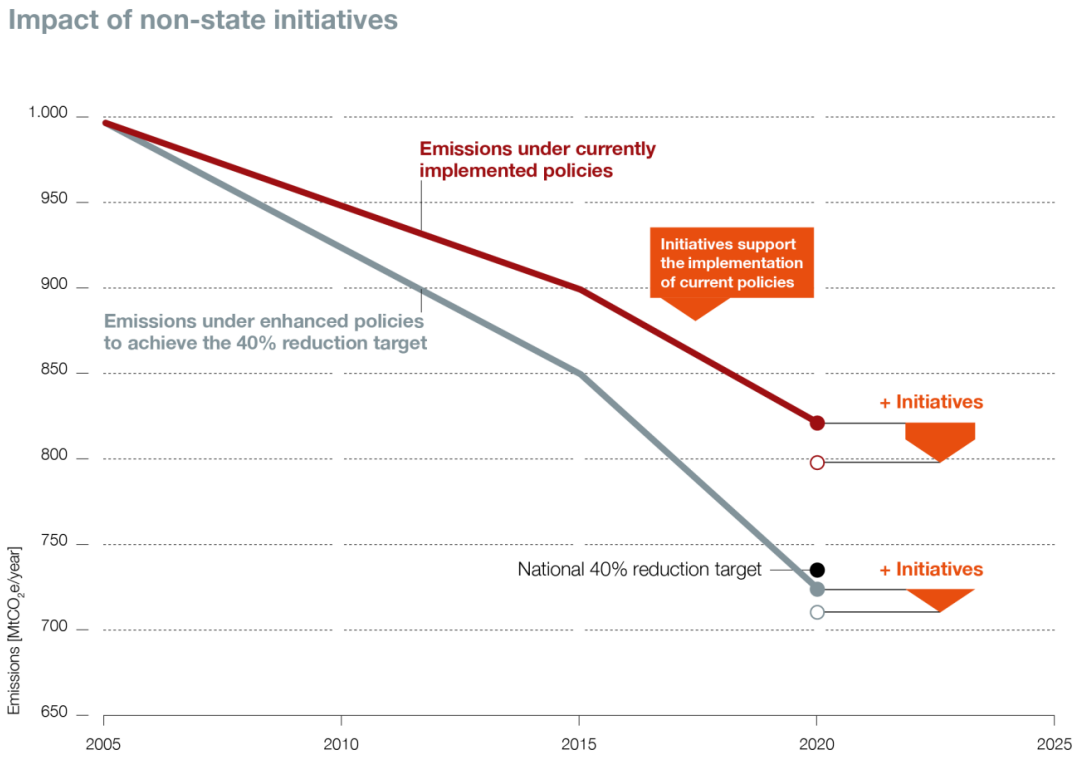

Figure 6: A graphical representation of the absolute emission level in Germany under current and enhanced policy scenarios (Matthes et al., 2013), and the emission levels that would result if the selection of initiatives analysed in this report were to be fully implemented.

To illustrate the combined effect of such emission reduction initiatives, we have taken into account the potential overlap, both geographical and sectoral, between such initiatives, and estimated that those selected for analysis in this report could contribute to closing the 2020 emissions gap of Germany (between current policy projections and the 40% target) by approximately one-fourth of this gap (Figure 6).

Therefore, taking ambitious non-state emission reduction initiatives into account could make the current policy scenarios of Germany significantly more ambitious, as these initiatives add substantial emission reductions to what is already projected to being achieved without them. We note, furthermore, that even under enhanced policy scenarios (Energiewende), the effect of the analysed initiatives, albeit smaller, remains in the same order of magnitude.

We conclude this report by noting that, provided that enough quantitative data is available or can be estimated regarding the developments of various indicators in different sectors, it is straightforward to upscale the approach used in this report to calculating the impact of non-state initiatives on a larger scale, Europe-wide or worldwide.

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Annex I: List of quantities

In Table 15, we present an overview of quantities from external sources that were used in the calculations as indicated.

Table 15: Overview of quanties and associated assumptions for calculations

Quantity	Value	Source	Relevant for
Total energy production in Bavaria (2014)	90852 GWh	(Agentur für Erneuerbare Energien, 2015)	Bavaria
Average yearly road traffic mileage (2020) in Germany	$7{,}75 \cdot 10^{11}$ km	Politikszenarien Table 3-57	Bavaria
Proportion of electric cars in 2020	2%	(Rodt et al., 2010)	Bavaria
Average energy intensity of electric cars	0,24 kWh/km	(Eberhard et al., 2006)	Bavaria
CO_2 emissions from electricity production in CPS (2020)	305132 $ktCO_2e$/year	Politikszenarien Table 3-124	Bavaria
Electricity production in CPS (2020)	554 TWh	Politikszenarien Table 3-117/119	Bavaria
No. of cars in Bavaria in 2015 (assumed constant until 2020)	$7{,}4 \cdot 10^{6}$	(Statista, 2015)	Bavaria
No. of cars in Germany (2020 projection)	$5{,}0 \cdot 10^{7}$	(Rodt et al., 2010)	Bavaria
Share of NRW in Germany's total wind energy production (2012) (assumed constant until 2020)	10%	(Agentur für Erneuerbare Energien, n.d.; The Climate Group, 2012b).	NRW
Share of NRW in Germany's total energy demand (2012) (assumed constant until 2020)	31%	(Statistische Ämter der Länder, 2015)	NRW
Share of NRW in Germany's total energy production (2013) (assumed constant until 2020)	27,8%	(Agentur für Erneuerbare Energien, 2015)	NRW
Total final electricity demand in CPS (2020)	1790 PJ	Politikszenarien p. 187 (estimated from Fig. 3-19)	EWI, NRW
Total final electricity demand in ETRS (2020)	1650 PJ	Politikszenarien p. 189 (estimated from Fig. 3-21)	EWI, NRW
Total final electricity demand in CPS (2030)	1670 PJ	Politikszenarien p. 187 (estimated from Fig. 3-19)	EWI
Total final electricity demand in ETRS (2030)	1470 PJ	Politikszenarien p. 189 (estimated from Fig. 3-21)	EWI
Wind energy primary demand in CPS (2020)	340 PJ	Politikszenarien Fig. 3-16	EWI
Wind energy primary demand in ETRS (2030)	390 PJ	Politikszenarien p. 185	EWI
Wind energy primary demand in CPS (2030)	600 PJ	Politikszenarien p. 185	EWI
Wind energy primary demand in ETRS (2020)	610 PJ	Politikszenarien p. 185	EWI

Production of steel in Germany (2005)	44.5 Mt steel	(Wirtschaftsvereinigung Stahl, 2015)	ULCOS
Emissions from steel production in 2005 in Germany	20,9 $MtCO_2e$	Politikszenarien Table 4.1	ULCOS
Production of steel in Germany (2015)	43,3 Mt	(Wirtschaftsvereinigung Stahl, 2015)	ULCOS
Emissions from steel production in 2015 in Germany	15,2 $MtCO_2e$	Politikszenarien Table 4.1	ULCOS
Customers served by E.ON as share of German population	6%	(Appunn & Russell, 2015)	E.ON SE
Total electricity production in Germany in CPS (2025)	540 TWh	Politikszenarien Table 3-117	E.ON SE
Total electricity production in Germany in ETRS (2025)	486 TWh	Politikszenarien Table 3-119	E.ON SE
Total traffic of personal vehicles 2030	1667,5 billion pkm/year	Politikszenarien Table 3-56	30-by-30
Total truck traffic 2030	1080,3 billion tkm/year	Politikszenarien Table 3-56	30-by-30
2007 emission levels from personal vehicles	128,68 gCO_2/pkm	(Umweltbundesamt, 2012)	30-by-30
2007 emission levels from trucks	88,19 gCO_2/ tkm	(Umweltbundesamt, 2012)	30-by-30
2030 yearly traffic activity	830 billion vehicle-km/year	Politikszenarien Table 3-57	30-by-30 & UEMI
Electric cars in 2030 according to current policies	6 million	(Bundesministerium für Verkehr, 2011)	UEMI
CO_2 emissions from electricity production in CPS (2030)	228122 $ktCO_2$	Politikszenarien Table 3-124	UEMI
CO_2 emissions from electricity production in ETRS (2030)	155722 $ktCO_2$	Politikszenarien Table 3-124	UEMI
Electricity production in Germany in CPS (2030)	532 TWh	Politikszenarien Table 3-117	UEMI
Electricity production in Germany in CPS (2030)	461 TWh	Politikszenarien Table 3-117	UEMI
Natural gas CO_2 intensity	469 gCO_2e/kWh	(Moomaw et al., 2011)	Various
Solar PV CO_2 intensity	48 gCO_2e/kWh	(Moomaw et al., 2011)	Various
Hydropower CO_2 intensity	4 gCO_2e/kWh	(Moomaw et al., 2011)	Various
Wind power CO_2 intensity	12 gCO_2e/kWh	(Moomaw et al., 2011)	Various

Annex II: List of initiatives

In this Annex, we show the full list of initiatives that was scanned and from which the eventually analysed initiatives were selected. Table 16 gives the scanned initiatives from the Climate Initiatives Database; Table 17 gives the initiatives that made it past the first selection and provides detailed information on the final selection; and Table 18 gives the scanned list of corporate initiatives from the NAZCA database.

Table 16: Initiatives that focus on implementation (as opposed to only dialogue) from the Climate Initiatives Database. Initiatives that were deemed relevant to Germany are indicated in colour. Those that were eventually analysed (based on the criteria mentioned in the main text) are indicated in green, the others in red.

IMPLEMENTATION INITIATIVES		
	Thematic focus	**Main organizer**
"30 by 30" Resolution	Transport Energy efficiency	World Transport Organization
300GW/a	Renewable energy	PV magazine, Solarpraxis AG, Hellmann Worldwide Logistics, Coveme.
AgSTAR	Renewable energy Agriculture	US Governmental Bodies
Asia Forest Partnership (AFP)	Agriculture Forestry	CGIAR
Bank of America Catalytic Finance Initiative	Financial institutions	Bank of America
Banking Environment Initiative (BEI)	Financial institutions Companies	10 banks incl. Deutsche Bank
BioCarbon Fund	Agriculture Forestry Financial institutions	Six governments and public entities and 12 private companies
Building Efficiency Accelerator	Buildings	SE4All Initiative
Building Performance Institute Europe (BPIE)	Buildings Energy efficiency Renewable energy	
C40 Cities Climate Leadership Group (C40)	Industry Buildings Transport Waste Cities and subnational governments Renewable energy Energy efficiency Energy supply Adaptation Financial institutions	
CCAC Agriculture Initiative	Agriculture Short lived climate forcers	Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants

CCAC Oil and Gas Methane Partnership	Short lived climate forcers	Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants
Carbon Sequestration Leadership Forum (CSLF)	Energy supply	22 countries and the European Commission
Carbon War Room Shipping Initiative	International maritime transport Energy efficiency	Carbon War Room
Carbonn Cities Climate Registry (cCCR)	Cities and subnational governments	Implementation
Caring for Climate	Industry Buildings Transport International aviation International maritime transport Waste Agriculture Forestry Cities and subnational governments Renewable energy Energy efficiency Companies Energy supply	Global Compact, UNEP, UNFCCC
Cement Sustainability Initiative (CSI)	Industry Companies	Various cement-producing companies
City Creditworthiness Partnership	Cities and subnational governments	C40 Cities Climate Leadership Group, Bloomberg Philanthropies and the World Bank
Clean Air Initiative	Transport	Mainly Asian countries
Clean Energy Ministerial (CEM)	Renewable energy Energy efficiency	US Governmental Bodies
Clean Energy Solutions Centre	Industry Buildings Transport Renewable energy Energy efficiency Energy supply	US Governmental Bodies
Clean by Design	Companies Supply chain emission reductions Energy efficiency	US Natural Resources Defense Council
Climate Alliance	Forestry Cities and subnational governments	Different cities and towns across Europe, many in Germany
Climate Disclosure Standards Board	Companies Financial institutions	

Climate Group States and Regions Alliance	Industry Buildings Transport Renewable energy Energy efficiency Energy supply Cities and subnational governments Adaptation	Corporations, regional governments, cities and other organizations
Climate Technology Initiative PFAN	Financial institutions Renewable energy Energy efficiency Transport	Climate Technology Initiative
Climate and Clean Air Coalition To Reduce Short-Lived Climate Pollutants	Industry Agriculture Forestry Energy supply	
Climate, Community and Biodiversity Alliance (Climate, Community, and Biodiversity Standard)	Forestry Agriculture	CARE – Conservation International – The Nature Conservancy – Rainforest Alliance – Wildlife Conservation Society
Climate-Smart Agriculture Booster	Agriculture	Universities and research bodies in the Netherlands, France, Italy, Switzerland.
ClimateWise	Companies Financial institutions	Over 40 insurance companies
Collaborative Labelling and Appliance Standards Program	Energy efficiency Industry Buildings	
Collaborative Partnership on Forests (CPF)	Agriculture Forestry	14 international organizations and secretariats with substantial programmes on forests
Community Development Carbon Fund	Financial institutions	Public/private initiative by the World Bank
Cooperation on reducing greenhouse gas emissions from deforestation and forest degradation (REDD+) and promote sustainable development in Peru	Forestry	Peruvian government
Covenant of Mayors	Renewable energy Energy efficiency	Local governments throughout Europe
District Energy Accelerator	Energy efficiency Energy supply	SE4All Initiative
EUROCITIES Declaration on Climate Change	Cities and subnational governments	Local governments throughout Europe
Eco Partnerships	Transport Renewable energy Energy efficiency	Cooperative relationships between Chinese and U.S. entities
Efficient Appliances Accelerator	Energy efficiency	SE4All Initiative

Empowering Farmers Organisations on Climate Change Through Better Foresight	Agriculture Adaptation	Global Forum on Agricultural Research (GFAR)
Encouraging the global coffee sector towards climate smart agriculture	Agriculture Adaptation	The International Coffee Organization (ICO)
European Wind Initiative (EWI)	Renewable energy	European Wind Energy Association
FleETRS for Change	Transport	Clinton Global Initiative
Food Companies' Initiative for Climate-Smart Supply Chains	Agriculture	Walmart, McDonald's and Kellogg Company
Forest Carbon Asia (FCA)	Forestry	German Federal Ministry for Economic Cooperation and Development (BMZ)
Forest Carbon Partnership Facility (FCPF)	Forestry	World Bank
Forest Investment Program	Forestry	World Bank, Asian Development Bank, European Bank, Inter-American Bank, African Development bank group, governments, private companies and communities.
Forest Stewardship Council	Forestry	Forest Stewardship Council (FSC)
Global Bioenergy Partnership	Agriculture Forestry Renewable energy Energy supply	FAO
Global Carbon Capture and Storage (CCS)	Energy supply	Global CCS Institute
Global Energy Efficiency Accelerator Platform	Energy efficiency	SE4All Initiative
Global Fuel Economy Initiative (GFEI)	Transport	FIA Foundation
Global Gas Flaring Reduction Partnership	Companies Energy efficiency Industry	World Bank
Global Geothermal Alliance	Renewable energy	Bolivia, Chile, Colombia, Fiji, Iceland, Kenya, Nicaragua, the Philippines, The Inter-American Development Bank, the World Bank Group, The International Renewable Energy Agency
Global Green Freight Action Plan	Short lived climate forcers	Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants
Global Methane Initiative	Industry Agriculture Waste Energy efficiency	US Environmental Protection Agency

Global Research Alliance on Agricultural Greenhouse Gases	Agriculture	
Global Sustainable Finance Network (GSFN)	Companies	
Green Truck Partnership (GTP)	Transport Supply chain emission reductions Companies	NSW Roads and Maritime Services, Australia
Green e (Climate Standards)	Renewable energy Companies	
Greenhouse Gas Protocol	Industry Companies Supply chain emission reductions Cities and subnational governments	WRI
HSBC Climate Partnership	Forestry Companies Cities and subnational governments	The Climate Group, Earthwatch Institute, Smithsonian Tropical Research Institute (STRI) and WWF
Haga Initiative	Companies Supply chain emission reductions	
IATA Carbon Offset Program	International aviation	The International Air Transport Association (IATA)
ICLEI – Local Governments for Sustainability	Buildings Energy efficiency Transport Cities and subnational governments Supply chain emission reductions Renewable energy	Local governments worldwide
Insurance industry's climate-smart investment initiative	Financial institutions	International Cooperative and Mutual Insurance Federation (ICMIF) and the International Insurance Society (IIS)
International Development Finance Club	Financial institutions	
International Energy and Climate Initiative Energy+	Renewable energy Energy efficiency Energy supply Access to energy	Norwegian government

International Partnership on Mitigation and MRV	Industry Buildings Transport Waste Agriculture Forestry Cities and subnational governments Renewable energy Energy efficiency Energy supply	South Africa, the Republic of Korea and Germany
Investment Leaders Group (ILG)	Financial institutions	University of Cambridge
Investor Network on Climate Risk	Financial institutions	Ceres
KOICA – IMO Project	Transport International maritime transport	International Maritime Organisation (IMO)
Lean and Green	Transport Energy efficiency	Connekt (Dutch non-profit network)
Lighting Efficiency Accelerator	Energy efficiency	SE4All Initiative
Logistics Carbon Reduction Scheme (LCRS)	Transport Renewable energy Energy efficiency	Freight Transport Association (FTA)
Low Carbon Vehicle Partnership (LowCVP)	Transport Renewable energy	
Mainstreaming Youth and Persons Living With Disabilities in Climate Smart Agriculture	Agriculture	
Mexico City Pact	Cities and subnational governments	Local governments worldwide
Mitigation of Climate Change in Agriculture (MICCA) Programme	Agriculture	FAO; Finland, Norway & Germany
New Vision for Agriculture	Agriculture	World Economic Forum
Partnership for Procurement and Green Growth	Companies Supply chain emission reductions	IISD
Partnership on Sustainable, Low Carbon Transport (SLoCat)	Transport	
Plan Vivo	Forestry Agriculture	Rural smallholders and communities
Portfolio Decarbonization Coalition	Financial institutions	UNEP FI, AP4, Amundi and CDP
Prince of Wales International Sustainability Unit (PCFISU)	Agriculture Forestry Access to energy Adaptation Financial institutions Companies	
Prototype Carbon Fund	Financial institutions	World Bank

R20	Cities and subnational governments Financial institutions Companies Renewable energy Energy efficiency Waste	Local governments worldwide
REDD+ Partnership	Forestry	UNFCCC
Rainforest Alliance	Forestry Agriculture Companies Adaptation	
Refrigerants, Naturally!	Industry Companies Energy efficiency	PepsiCo, Red Bull, The Coca-Cola Company, and Unilever.
Renewable Energy and Energy Efficiency Partnership (REEEP)	Renewable energy Energy efficiency Companies Energy supply Industry Buildings Transport	
Renovate Europe	Buildings	European Alliance of Companies for Energy Efficiency in Buildings
Responsible Care	Industry	International Council of Chemical Associations (ICCA)
Scaling up CSA for Impact	Agriculture	The World Bank
SmartWay	Transport	US Environmental Protection Agency
SunShot Initiative	Renewable energy	U.S. Department of Energy
Super-efficient Equipment and Appliance Deployment (SEAD) Initiative	Industry Buildings Energy efficiency	
Sustainable Agriculture Initiative (SAI) Platform	Agriculture	Over 60 different companies
Sustainable Agriculture Network (SAN)	Agriculture	
Sustainable Shipping Initiative	Transport	Ship owners, charterers and operators, banks & insurers, etc.
The Africa Climate-Smart Agriculture Alliance	Agriculture	NEPAD
The Africa Union-NEPAD Agriculture Climate Change Programme	Agriculture	African Union and NEPAD
The Cities Climate Finance Leadership Alliance	Cities and subnational governments	
The Clean Revolution	Renewable energy	

The Gold Standard Foundation	Energy supply Cities and subnational governments Forestry	Gold Standard Foundation, a Swiss non-profit foundation
The International Convention for the Prevention of Pollution from Ships (MARPOL)	International maritime transport	International Maritime Organisation (IMO)
The International Partnership for Energy Efficiency Cooperation (IPEEC)	Energy efficiency Energy supply	IEA
The Partnership to Create an EverGreen Agriculture	Agriculture	CGIAR
The Roundtable on Sustainable Biofuels (RSB Standard)	Energy supply Supply chain emission reductions	
Tropical Forest Alliance (TFA)	Agriculture Supply chain emission reductions	
UN Secretary General's Energy for All Initiative (SE4All)	Industry Buildings Transport Renewable energy Energy efficiency Energy supply Access to energy	SE4All Initiative
UN-REDD Programme	Agriculture Forestry	UN
UNEP Finance Initiative (UNEP-FI)	Companies	UNEP
UNEP Partnership for Clean Fuels and Vehicles (PCFV)	Transport	UNEP
UNEP Sustainable Buildings & Climate Initiative (SBCI)	Buildings Renewable energy Energy efficiency	UNEP
UNEP/GEF en.lighten initiative	Industry Buildings Renewable energy	UNEP
Ultra-Low CO_2 Steelmaking (ULCOS)	Industry Companies	48 European companies
Vehicle Fuel Efficiency Accelerator	Transport Energy efficiency	SE4All Initiative
Verified Carbon Standard (formerly the Voluntary Carbon Standard)	Energy supply Transport Waste Agriculture Renewable energy Fluorinated gases Industry Supply chain emission reductions Companies	
Vote Solar Initiative	Renewable energy	

WBCSD Urban Infrastructure Initiative	Industry Buildings Transport Waste Forestry Cities and subnational governments Renewable energy Energy efficiency Companies Energy supply	WBSCD
WBCSD, Energy Efficiency in Buildings projects	Buildings Renewable energy Energy efficiency Companies	WBSCD
WWF Climate Savers	Industry Transport International aviation International maritime transport Forestry Renewable energy Energy efficiency Energy supply	WWF
WWF Earth Hour City Challenge (EHCC)	Others	WWF
We Mean Business	Companies	Coalition of organizations and worldwide organizations
Western Climate Initiative	Others	Governors of several US states
William J Clinton Foundation Climate Initiative	Buildings Forestry Adaptation	Clinton Foundation
Wind Program	Renewable energy	US Department of Energy

Table 17: A more detailed breakdown of the initiatives given in Table 16, including quantitative estimations in order to judge their ambition. Red indicates initiatives rejected at this stage of selection; green indicates those selected for analysis. Note that the "Climate Group States and Regions Alliance" includes the regions of Bavaria, Baden-Württemberg and North-Rhine Westphalia, which have been analysed as three different initiatives in this report.

INITIATIVES IN GERMANY		
	Relevant pledge or action	**Reason not selected**
Carbonn Cities Climate Registry (cCCR)	Bonn: CO_2 reduction target: 20% by 2020 (1990); Carbon intensity target: 20% by 2020 (1990).	Low-ambition and low-scope
Cement Sustainability Initiative (CSI)	See http://www.wbcsdcement.org/index.php/en/key-issues/climate-protection/key-performance-indicators. HeidelbergCement: **23% reduction in specific CO_2 emissions by 2015 from 1990.**	Timeframe for the pledge of the only German company involved already over (2015)
Climate Alliance	To **reduce CO_2 emissions by 10% every five years** and **to halve per capita GHG emissions by 2030** (from a 1990 baseline). In the long-term, Climate Alliance members aim at a sustainable level of **2,5 tons CO_2 equivalent emissions per capita and year** by energy saving, energy efficiency and the use of renewable energy sources.	
Climate Group States and Regions Alliance	Different activities and initiatives in several regions in Germany; includes the analyzed goals for Bavaria, Baden-Württemberg and North Rhine-Westphalia.	
Covenant of Mayors	Covenant of Mayors Signatories undertake to curb CO_2 emissions on their territory by at least 20% by 2020.	Less ambitious than Climate Alliance
Renovate Europe	Calling for an ambitious roadmap to be drawn up on how to triple the annual renovation rate of the EU building stock from the current rate of **1% to 3% by 2020** and to ensure that the aggregate result of those renovations leads to an **80% reduction of the energy demand** of the building stock by 2050 as compared to 2005.	
Ultra-Low CO_2 Steelmaking (ULCOS)	Reduce the CO_2 emissions [intensity] of today's best routes in steelmaking by at least **50 percent.**	
Lean and Green	"Die Non-for-Profit Initiative verfolgt damit das Ziel, die Treibhausgas-Emissionen in den Logistikprozessen der teilnehmenden Unternehmen innerhalb von fünf Jahren um 20 Prozent zu reduzieren." - Criterion: "Das Reduktionsziel wurde festgelegt und beträgt mindestens 20% innerhalb von 5 Jahren im Vergleich zur Nullmessung im Basisjahr."	Criteria differ per subscribed company; not a general pledge/goal

INITIATIVES EUROPE- OR WORLDWIDE

Building Efficiency Accelerator	25-50% reductions in energy demand from new and existing buildings.	All of these are SE4All initiatives, which are rather vaguely-defined and only in very general terms, rather than with specific partners, etc. The only goal with a specified timeline is the Vehicle Fuel Accelerator. We judge its ambition (downscaled to Germany) to be no higher than the aim of the Urban Electric Mobility Initiative and the ''30 by 30'' resolution, which both have set shorter-term goals.
District Energy Accelerator	Avoidance of over 35 GT of CO_2 emissions at low cost; 58% of CO_2 emission reductions through District Heating and Cooling with Combined Heat and Power.	
Lighting Efficiency Accelerator	Reduction of electricity demand for lighting by more than 32%, avoiding 3.5 Gt of CO_2, through global transition to widely available efficient solutions in all lighting sectors.	
Vehicle Fuel Efficiency Accelerator	At least double the efficiency of the global vehicle fleet from an average of 8l/100 km in 2005 to 4l/100 km by 2050.	
Industrial Energy Efficiency	Widespread adoption of energy efficiency measures could reduce industrial energy use by over 25%. This represents 3.92 $GtCO_2$ – an 8% reduction in global energy use and a 12.4% reduction in global CO_2 emissions.	
Global Methane Initiative	When fully implemented, these projects are expected to reduce emissions by more than 60 million $MtCO_2e$ per year.	Few to no projects in Germany involved.
European Wind Initiative (EWI)	In 2020, 2030 and 2050, **wind energy meets 20%, 30% and 50%** of EU electricity consumption, respectively.	
"30 by 30" Resolution	To **reduce CO_2 emissions by 30% by 2030**, calculated as transport performance in tonne km and person km and related to the base year 2007.	
300GW/a	To reach 300 GW installed solar energy capacity worldwide per year by 2025.	Judged to have a vaguely formulated roadmap; regional downscaling almost impossible.
UNEP/GEF en.lighten initiative	Globally phasing-out incandescent lighting by the year 2016, which "globally would save more than $140 billion and reduce CO_2 emissions by 580 million tonnes every year".	Phase-out of incandescent lighting in Germany already implemented.
Refrigerants, Naturally!	"Collectively, member companies of Refrigerants, Naturally! have installed more than 3.5 million units using natural refrigerants – both in developing and industrialised countries. This sums up to around 20 million tonnes of avoided CO_2. This is the equivalent of the emissions of more than 4 million passenger cars over one year."	Includes quantitative results, but mainly qualitative pledges for the future.

Table 18: List of German companies having pledged emission reduction goals either under the umbrella of international corporate initiatives or under individual pledges.

TRANSPORT SECTOR	
Company	**Pledge**
Bodensee-Schiffsbetriebe GmbH (BSB)	Increase efficiency and use to reduce emissions by 50% by 2030 and 75% by 2050 in rail transport
Deutsche Bahn AG	Increase efficiency and use to reduce emissions by 50% by 2030 and 75% by 2050 in rail transport
DHL	Increase sale of electric vehicles by 30% by 2030 to achieve a 30% reduction of CO_2e emissions in urban areas by 2050
Fraport AG	Reduce operational CO_2e emissions by 10% from 2005 to 2020 through increased energy efficiency
	Reduce operational CO_2e emissions intensity by 30% per air traffic unit from 2005 to 2020 through increased energy efficiency
Georg Verkehrsorganisation GmbH (GVG)	Increase efficiency and use to reduce emissions by 50% by 2030 and 75% by 2050 in rail transport
Hamburger Hafen & Logistik AG	Reduce operational CO_2e emissions intensity of sea terminals by 30% per container handled from a base year of 2008 to 2020 through increased energy efficiency and electric vehicles
KNORR-BREMSE	Double the share of public transport by 2025
TRANSPORT SECTOR	
BASF SE	Reduce operational CO_2e emissions intensity by 40% per tonne of product from 2002 to 2020 through increased energy efficiency and CO2, N2O, CH4, HFCs, PFC, and SF6 abatement
Evonik Industries AG	Reduce operational CO_2e emissions intensity by 12% per tonne of product from 2012 to 2020 through increased energy efficiency and use of hydropower plants
HeidelbergCement AG	Reduce operational CO_2e emissions intensity of cement business by 23% per tonne of product from 1990 to 2015 through increased energy efficiency and use of biomass fuels
LANXess AG	Reduce direct CO_2e emissions intensity of Performance Polymers division by 10% per tonne of product sold from 2010 to 2015 through increased energy efficiency
	Reduce direct CO_2e emissions intensity of Advanced Intermediates division by 10% per tonne of product sold from 2010 to 2015 through increased energy efficiency
	Reduce direct CO_2e emissions intensity of Performance Chemicals division by 10% per tonne of product sold from 2010 to 2015 through increased energy efficiency

	Reduce operational CO_2e emissions intensity of Performance Polymers division by 10% per tonne of product sold from 2010 to 2015 through increased energy efficiency
	Reduce operational CO_2e emissions intensity of Advanced Intermediates division by 10% per tonne of product sold from 2010 to 2015 through increased energy efficiency
	Reduce operational CO_2e emissions intensity of Performance Chemicals division by 10% per tonne of product sold from 2010 to 2015 through increased energy efficiency
Linde AG	Reduce direct CO_2e emissions from their HyCO production plants by 9% from 2009 to 2015 through increased energy efficiency
CAPITAL GOODS SECTOR	
Hochtief AG	Reduce direct CO_2e emissions at their Thiess subsidiary by 8% from 2013 to 2017 through increased energy efficiency
MAN SE	Reduce emissions in production sites by 25% by 2020
Osram	Double the global rate of improvement in energy efficiency by 2030
Siemens AG	Increase sale of electric vehicles by 30% by 2030 to achieve a 30% reduction of CO_2 emissions in urban areas by 2050
	Reduce emissions intensity of fleet vehicles in Europe by 33% by 2015
Villeroy & Boch AG	Reduce operational CO_2e emissions intensity by 15% per tonne of product from 2012 to 2024 through increased energy efficiency
UTILITIES SECTOR	
E.ON SE	Reduce direct CO_2e emissions intensity of electricity generation in Europe by 50% per MWh from 1990 to 2025 through increased energy efficiency and a transition from coal power plants to renewable energy sources
EnBW Energie Baden-Württemberg AG	Reduce avoided emissions 65% by 2020 through energy efficiency, expanding renewables and scaling biogas
	Reduce emissions intensity of onsite electricity generation to be less than 450 g/kWh in 2020 (less the national average in Germany) through renewable energy installations
IDEA	Double the global rate of improvement in energy efficiency by 2030
RWE AG	Reduce emissions intensity of direct operations by 20% per megawatt hour by 2020 compared to 2012 through renewable energy purchases
SolarWorld AG	Reduce operational CO_2e emissions intensity by 15% per unit of production from 2012 to 2020 through increased energy efficiency

	Reduce CO_2e emissions intensity of procurement and production activities by 15% from 2012 to 2020 through increased energy efficiency
	Reduce CO_2e emissions intensity of company vehicle pool by 37.5% per kilometer from 2012 to 2020
CONSUMER DURABLES & APPEAL SECTOR	
adidas AG	Reduce operational CO_2e emissions intensity of major office, production, and distribution sites by 30% per square meter from 2008 to 2015 through increased energy efficiency and building retrofits
	Reduce operational CO_2e emissions intensity of recently added office, production, and distribution sites by 21% per square meter from 2010 to 2015 through increased energy efficiency and building retrofits
Bosch-Siemens Hausgeräte	Double the global rate of improvement in energy efficiency by 2030
PUMA SE	Reduce direct CO_2 emissions intensity by 25% per full-time employee from 2010 to 2015 through increased energy efficiency
COMMERCIAL AND PROFESSIONAL SERVICES	
CEWE Stiftung & Co. KGaA	Reduce CO_2e emissions from company cars by 10% from 2013 to 2015 through use of more efficient models
	Reduce operational CO_2e emissions intensity by 10% per unit of revenue from 2013 to 2015 through increased energy efficiency
	Reduce CO_2e emissions intensity of purchased utilities by 10% per tonne of product from 2013 to 2015 through increased energy efficiency
	Reduce operational CO_2e emissions intensity by 10% per tonne of product from 2013 to 2015 through increased energy efficiency
SOFTWARE & SERVICES	
SAP AG	Commit to having a strategy to procure 100% of their electricity from renewable sources
	Reduce emissions from operations, business travel, employee commuting and logistics by 44% by 2020 through energy efficiency and renewable energy procurement
AUTOMOBILES	
BMW AG	Increase sale of electric vehicles by 30% by 2030 to achieve a 30% reduction of CO_2 emissions in urban areas by 2050

	Reduce emissions from the production network by 30% by 2020 through energy efficiency and renewable energy procurement
	Reduce the emissions intensity of fleet tailpipe emissions by 25% per metric tonnes CO2e per kilometer by 2020
Daimler AG	Reduce emissions intensity from production operations to result in 20% lower emissions per vehicle produced by 2015
	Reduce emissions in European production plants by 20% by 2020 through energy efficiency and renewable installation
Volkswagen AG	Reduce CO_2 emissions for the new European car fleet by 30% by 2015 to 120g/km
	Reduce emissions intensity of operations by 25% per vehicle produced by 2018 through increasing the CO_2-efficiency of produced cars
	Reduce CO_2e emissions for the new European car fleet by 45% by 2020 to **95g/km**
	Reduce emissions intensity by 25% per metric tonnes CO_2e per vehicle produced by 2018
OTHER	
Deutsche Telekom AG	Reduce direct CO_2e emissions intensity of vehicle fleet by 25% per kilometer from 2010 to 2015 through purchases of smaller and more efficient vehicles
	Reduce group-wide CO_2e emissions from operations and business travel (excluding T-Mobile USA) by 20% from 2008 to 2020 through increased energy efficiency
	Reduce domestic CO_2e emissions from operations and business travel by 30% from 2008 to 2020 through increased energy efficiency
Bayer AG	Reduce emissions from Bayer HealthCare operations by 10% by 2020 through energy efficiency
	Reduce emissions from Bayer CorpScience operations by 15% by 2020 through energy efficiency
	Reduce emissions intensity for Bayer MaterialScience by 40% per metric tonne of product by 2020
	Reduce emissions intensity for Bayer subgroups by 35% per metric tonne of product by 2020
Merck KGaA	Reduce operational CO_2e emissions by 20% from 2006 to 2020 through increased energy efficiency
TUI AG	Reduce operational CO_2e emissions at their Dorfhotel subsidiary by 30% from 2011 to 2015
	Reduce operational CO_2e emissions intensity of TUI Hotels & Resorts by 15% per guest night from 2011 to 2020

METRO AG	Reduce CO_2e emissions intensity of sales floor-specific emissions by 20% per square meter from 2011 to 2020 through increased energy efficiency
Beiersdorf AG	Reduce CO_2e emissions intensity across entire value chain by 30% per product sold for a base year of 2005 to 2020 through increased energy efficiency, sustainable building design, and renewable energy installations
Henkel AG & Co. KGaA	Reduce operational CO_2e emissions intensity by 15% per tonne of product from 2010 to 2015 through increased energy efficiency and conservation

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