Cities in Germany and their climate commitments: More hype than substance?

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Abstract

While nation states debate climate policy at an international scale, on a local level, cities across the globe have committed to emission targets and mitigation activities. This study analyses the actual performance of municipal climate action against their targets. Official information material from large cities in Germany was collected and complemented with questionnaires from officials in 40 municipalities.

While 77% of cities have adopted emission targets in a voluntary act, and 80% of these cities are engaged in at least basic emission reporting, only a quarter of them are on course to reach their targets. All of these 'successful' cities are situated in Eastern Germany – and their emission reductions can mainly be explained by the industrial decline in the 1990s after the German Reunification. Not a single city in Western Germany is on course to reach its reduction commitment. Cities average mitigation performance is slightly worse than the German average, and the effect of city networks on cities is not very clear. It can be concluded that cities are currently not living up to their ambitions. The practice of urban emission reporting does in many cases not allow for proper quality management of greenhouse gas policies.

For a more meaningful contribution to the battle against climate change, cities could follow a double strategy: Firstly they could report emissions regularly and adopt realistic and city-specific targets and action plans based on their emission patterns. Secondly, they could complement their targets with a visionary approach: This would include pilot projects that demonstrate how low carbon cities could look like, as well as a more ambitious target which they would be able to reach – provided that optimal framework conditions for local mitigation activities would be put in place by other policy levels.

Keywords: Cities; climate policy; mitigation; emission inventories; emission reporting; targets

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1. Introduction

Climate change is a phenomenon with global scope requiring global action. However, the local level, and urban areas in particular, play an important role for the implementation of many mitigation activities. Today, half of the world population live in cities, and cities are a major driver for global carbon emissions by urban processes like energy use, transport, industrial processes or waste management (Satterthwaite 2008). Over the last decades, many cities have become engaged in climate protection activities. Similar to the international arena with its UNFCCC and Kyoto Protocol, reporting of emissions and the adoption of emission targets play an important role in local mitigation efforts. This article analyses the actual performance of cities' climate action against their targets. It focuses on the following research questions:

- Have cities adopted targets, and what type of targets?
- Do cities control their performance against targets?
- How do cities perform in terms of emission reductions and target achievement?

The remainder of the article is structured as follows: (2) describes the research design and (3) presents the findings. (4) discusses the results and presents some conclusions.

2. Research Design

The study focuses on cities in Germany with more than 100,000 inhabitants. As a first step, information was collected in a web-based research on cities' greenhouse gas targets, emission inventories, and municipal climate protection activities in general. However, there was often limited information on these topics available in the public domain. Therefore, as a next step, cities were contacted directly with a questionnaire. The questionnaire was addressed to the municipal climate officer, if such a person existed. Alternatively, the questionnaire was sent to the environmental department.

The results presented in this article are based on an analysis of data from 40 cities who answered to the questionnaire. The size of these cities ranges from 103.392 (City of Jena) to 1.770.381 (City of Hamburg) inhabitants. The cities are also representative in that they spread across 13 of Germany's 16 federal states ('Laender'). Together, these cities represent ~16% of the German population. Annex 1 provides an overview of the cities. Information gathered from the questionnaire was complemented with information from the internet research.

3. Results

The following presents findings on cities' emission targets, their practice of calculating greenhouse gas emissions, and their performance regarding emission reductions.

3.1 Greenhouse Gas Emission Reduction Targets

Greenhouse gas emissions are a key indicator for mitigation activities: In order to prevent "dangerous anthropogenic interference with the climate system", the UNFCCC defines climate protection as a reduction of atmospheric greenhouse gas emissions (UNFCCC 1992). Targets for emission pathways are the basis for quality control and management of climate protection activities. The Kyoto Protocol requires industrialized countries (Annex I) to take on quantified emission limitation and reduction objectives (UNFCCC 1998). The adoption of concrete reduction targets does not only show the commitment to the climate issue, it also allows to measure and verify the success of activities taken.

Many cities have adopted greenhouse gas emission targets. The Cities Climate Catalogue lists 2,867 communities worldwide and their targets (ICLEI, City of Copenhagen, 2010). Like in most countries, greenhouse gas emission targets adopted by municipalities in Germany are voluntary targets as German national legislation does not require cities to take action on climate change.[1]

Table 1: Reduction Targets in Stuttgart

Target	**Base Year**	**Target year**	**Required yearly reduction** (% of base year)	**Date of target setting**	**Process of target setting**
-30%	1994	2005	2,73%	1994	Adoption by city council
-50%	1987	2010	2,17%	1995	By joining Climate Alliance
-10%	2000	2010	1,00%	2004	Correction of former target by city council (because original target not realistic)
-40%	1990	2020	1,33%	2008	By fulfilling funding requirement under the 'Energieeffiziente Stadt Programm' of the German Ministry of Education and Research

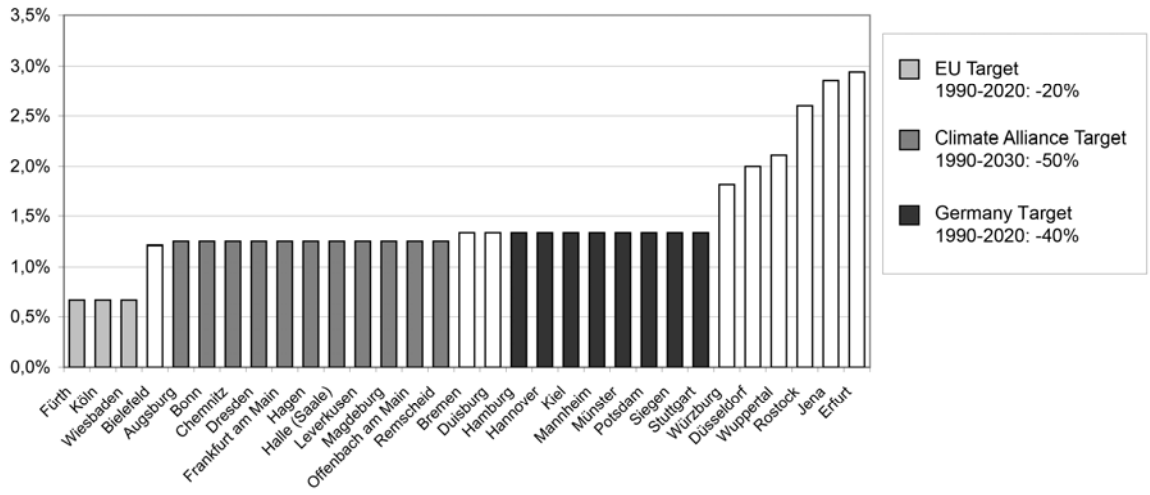
Source: Wuppertal Institute 2009

[1] Rather climate protection ranges behind 'obligatory' municipal tasks such as development planning, water supply and waste water management, or fire protection. Furthermore it competes with other 'voluntary' tasks such as public transport, kindergartens and schools, hospitals and cultural facilities.

Some cities in the survey have a combination of long-term, medium-term and short-term targets. In these cases, the long-term target was considered for the analysis. For other cities, internet research and questionnaire produced a variety of targets adopted in different years (e.g. see Table 1 for the City of Stuttgart). In these cases, the questionnaire target served as a basis for the analysis, as it was assumed that questionnaire information was more accurate and up-to-date than website information.

According to the survey, 77% of cities have adopted emission targets, and further 10% are in preparation of an emission target. This leaves 13% of cities without a target. 1990 is the common base year for 25 out of 31 cities that do have adopted emission targets. By referring to 1990, cities follow international and national practice in climate target setting: The United Nations Framework Convention on Climate Change, the Kyoto Protocol, the European 20/20/20 targets and several German emission targets all choose 1990 as base year (EU 2008, Michaelowa 2003, UNFCCC 1998).

Figure 1: Cities' Emission Reduction Targets – Resulting Annual Reduction Requirements



Source: Own analysis based on survey data

Figure 1 shows an overview of annual emission reduction requirements that result from cities' targets.[2] The most popular among cities' targets is the one promoted by the international city network Climate Alliance. Decided by the Climate Alliance's General Assembly in 2006, it requires cities to reduce emissions by 50% by 2030 as compared to 1990 levels (Climate Alliance 2006). A quarter of cities' emission targets equal the current German target of 40% emission reductions by 2020 as compared to 1990 levels. One reason for many cities having adopted this target may be that some

[2] Assumed that cities follow a linear reduction pathway from base year emissions to target year emissions, and yearly reduction requirement calculated as percentage of base year emissions.

recent federal funding lines for municipal climate protection programs were conditional on cities adopting the German emission target (Wuppertal Institute 2009). On average, cities' reduction target is -1.44% per year – and thereby in line with IPCC recommendations for Annex I countries of 25-40% reduction until 2020 (-0.83% to -1.33%) and 80-95% reduction until 2050 (-1.33% to -1,58%) – all as compared to 1990 levels (IPCC 2007, box 13.7). Cities' average target is more ambitious than the German target (-1.33%).

3.2 Greenhouse Gas Emission Inventories

Emission inventories provide an overview of relevant greenhouse gas emissions and their sources. Based on the knowledge of urban emission patterns, mitigation potentials can be calculated. This enables municipalities to develop city-specific mitigation action plans and to set priorities accordingly. Furthermore, measuring and monitoring are essential components of any quality management process and local reporting of greenhouse gas emissions is a precondition for the evaluation of a city's mitigation policies. Consequently, reporting of greenhouse gas emissions is recommended and facilitated by city networks like ICLEI or Climate Alliance as well as by subnational, national or international supporting policies.[3] Nevertheless, greenhouse gas emission reporting is a voluntary task for German cities.

All cities in the survey have either conducted emission inventories or are under preparation of an inventory: 30 out of 40 cities in the survey have already done emission inventories. The remaining 25% of cities which have not already been reporting emissions noted that they were currently preparing emission inventories.

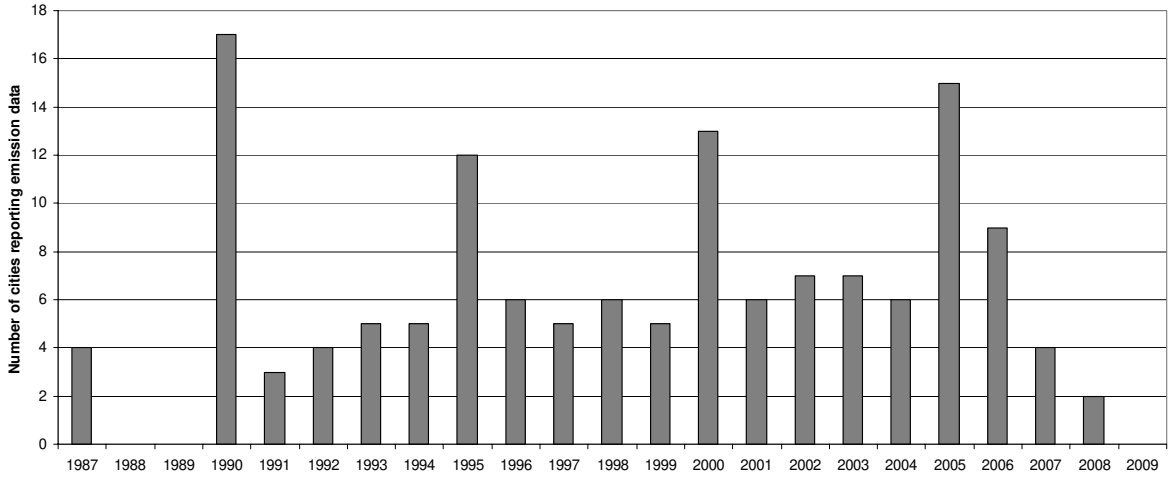
23 out of the 30 cities who have been doing emission inventories, have reported emissions in three or more years, which indicates that there is some regularity to the habit. Figure 2 presents the number of cities that have reported emissions in each year. Notably, there is a cluster of reporting activity in 1990, 1995, 2000, and 2005. For 1990 one may doubt if all cities reporting emissions have really conducted emission inventories for the same year – cities may also have calculated back emissions from emission inventories based on later data.

The frequency of emission reporting is city-specific. In many cities, there seems to be no stringent pattern for reporting activities. Nevertheless, a group of cities is reporting emissions in intervals of about 5 to 8 years. Another group of cities has been reporting emissions on an annual basis. As detailed emission inventories are rather resource intensive, some of these cities may have chosen to base their reporting on readily

[3] Examples are guidelines for emission reporting in the 'Land' Baden-Wurttemberg (Hertle et al. 2009), the ICLEI milestone plan (ICLEI 2010) or the German Environmental Ministry's funding line for municipal energy and climate concepts – although the latter has recently been suspended because of budget constraints (BMU 2010).

available, but less city-specific emission data which is provided e.g. by the statistical bureaus of the 'Laender'.[4]

Figure 2: Year of Emission Inventories



Source: Own analysis based on survey data

Cities that have adopted emission targets seem to be more likely to perform emission inventories (or vice versa): While only a quarter of cities without emission targets have been reporting emissions at least twice, 80% of cities that do have adopted emission targets have conducted emission inventories for at least two years. Nevertheless, this leaves 20% of cities with emission targets, but without even basic emission reporting.

Reporting of base year emissions is particularly important. Without emission data from the base year, cities cannot properly evaluate their performance against their target. Out of cities that have emission targets and do conduct emission inventories, a small majority present emission data for their base year. Almost half of these cities present emission inventories only for years after (31%) or before (17%) their base year. From an analysis of information provided for 386 German cities in the Cities Climate Catalogue, the overwhelming majority of cities that do have adopted emission targets do not conduct GHG emission inventories (ICLEI, City of Copenhagen 2010).[5]

[4] This data may be less accurate, because it relies on average CO2 emission factors (e.g. federal data for electricity emission factors) (Statistisches Landesamt Baden-Württemberg 2010).

[5] This may be due to the fact that there are a lot of small and medium cities among these cities, which presumably adopted their emission target quasi automatically by joining the Climate Alliance network. Furthermore, existing reporting activities may not have entered the catalogue, as was found for several cities analysed both in the survey underlying this article and the catalogue.

From previous research it was assumed, that comparability of cities' emission data may be limited (e.g. Bader, Bleischwitz 2009). Up to now, there is no universally accepted definition of which emissions should be attributed to a city: Some inventories report emissions from urban production and others report emissions from urban consumption (Dodman 2009). Emission inventories based on urban production calculate emissions at their place of origin, i.e. at the location of the emission source. This excludes emissions linked to imported electricity or exported waste, while it includes emissions from production of export electricity. Emission inventories based on urban consumption attribute emissions to end users. To a differing degree, cities in the international context have included emissions from imported electricity or district heating, from exported waste, or in some cases even from the production processes of fuels, building materials or food (Kennedy et al. 2009b).

In the survey, slightly less than a quarter of reporting cities noted they report emissions from urban production, while the remaining 76% report emissions from urban consumption. A clear distinction between these two methodologies may however be misleading, as the definitions offered by city officials for production or consumption based inventories vary significantly and are sometimes overlapping. Some cities also explained that they have at some point in time changed or are about to change the methodology of their emission reporting. While a more sophisticated reporting methodology may provide more accurate emission data, a change of the monitoring methodology may also delude a city's emission pathway, and thereby render performance evaluation difficult.

The variety of different methodologies in urban emission reporting also relates to the different sectors which are included under reporting. 33 out of 34 cities that do or prepare emission inventories include energy (97.1%), 31 include transport (91.2%), 13 waste (38.2%) and 5 land use (14.7%). Furthermore, cities also use differing methodologies for different sectors. While energy emissions are calculated on a consumption basis, a territorial approach is often used for transport emissions, and emissions from aviation are frequently not considered.

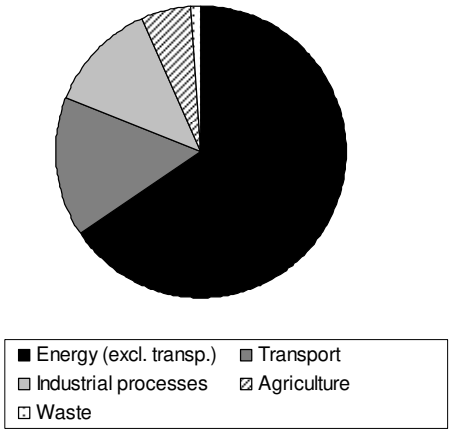
By including emissions from energy and transport, cities cover the two most important source categories of ghg emissions in Germany (see Figure 3). Often there is little agricultural activity in cities, and in this case, cities may not be leaking too many emissions, when they neglect direct emissions from this sector.[6] Depending on the prevalence of certain types of industries in a city, emissions from industrial processes can be significant (Carney et al. 2009) and their exclusion from urban inventories may be misleading. Greenhouse gas emissions from waste are clearly linked to cities and their inhabitants, but rarely included in local emission reporting.

[6] Though under a wholistic consumption based emission reporting, emissions originating from the production of food for a city's inhabitants would also enter the emission balance (Kennedy et al. 2009b).

While this practice leads to reporting of smaller emission levels than reality emissions, it also neglects historic emission reductions that have been achieved in the waste sector in Germany (though these were due to national climate policies).[7]

As a subcategory of emissions from energy, 88% of cities include emissions from municipal buildings in their inventories. This is probably due to the fact that firstly, city administrations can access this data easily and secondly, municipal energy use is often controlled for, as it is linked to direct costs for the municipal budget. The annex provides an overview of cities and the sectors they include in their emission inventories.

Figure 3: Source categories for ghg emissions in Germany (2007)



Source: UBA 2009

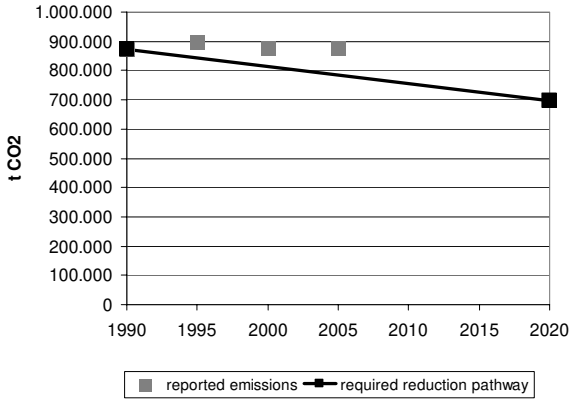
3.3. Achievement of Targets

The study analysed whether cities are on course to reach their greenhouse gas emission reduction targets. Based on the most recent emission reporting data available, it was controlled whether a city's current emission levels are in line with what would be a linear reduction pathway from base year emissions to target year emissions.

Figure 4 illustrates this approach for the City of Fürth. The city has first reported emissions for 1990, which is also the base year of its emission target. From the emission target (-20% until 2020), target year emissions were calculated. The diagram shows that the actual emissions of Fürth as from the latest emission reporting in 2005 lie above the required emission pathway. As a conclusion, Fürth is considered to be not on course to reach its emission target.

[7] The German Technical Instructions on Waste from Human Settlements ('TA Siedlungsabfall') from 1993 limited the amount of organic waste disposed to landfill sites and includes measures to recover landfill gas. It has led to significant emission reductions in the sector (Schleich et al. 2001).

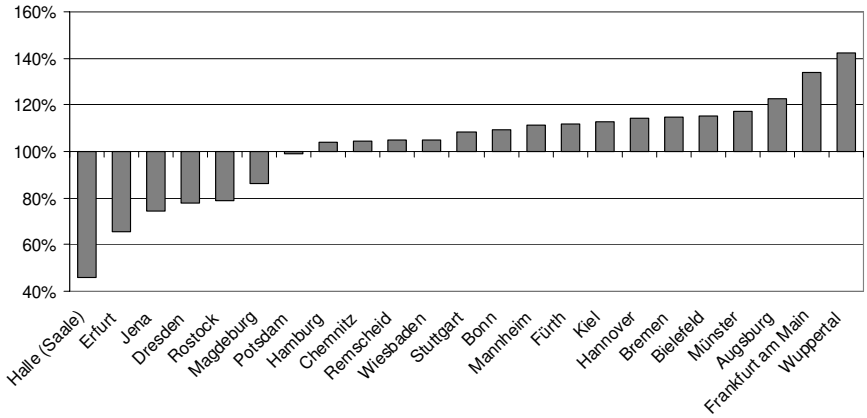
Figure 4: Target Achievement – City of Fürth



Source: Own analysis based on survey data

As mentioned above, some cities do not report emissions for their base year. In these cases, emissions from later years were calculated back to the base year. It was assumed that during the interpolating period city emissions developed in the same way as average emissions in the according 'Land'. This process was necessary for seven cities and for six of them not more than five years had to be interpolated. For other cities, the available emission reporting data was not sufficient to analyse emission performance in terms of target achievement, and they were thus not included in the analysis. After all, evaluation was possible for 23 out of 31 cities that do have emission targets – and the latest emission reporting was usually not older than 2005.

Figure 5: Current Emission Levels in Relation to Target Reduction Pathway



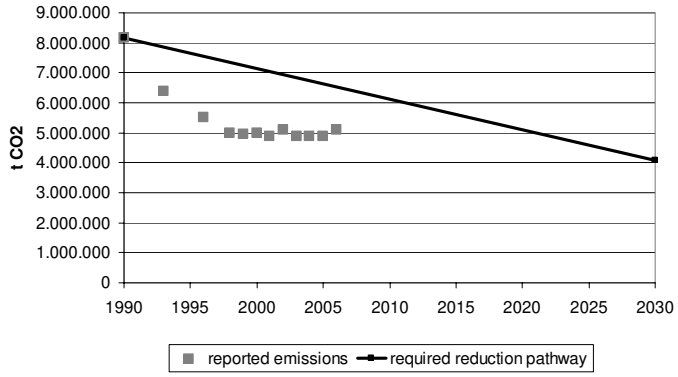
Source: Own analysis based on survey data

Out of these 23 cities, seven are on course to reach their target. Interestingly, all seven cities are located in the new 'Laender' in Eastern Germany. In Western Germany, not

a single city is on course to reach its emission target (see Figure 5). No clear link could be found between the ambitiousness of a target (in terms of required annual emission reductions) and target achievement.

There seems to be a simple explanation for the seemingly good performance of Eastern German cities. Earlier studies on German mitigation performance came to the conclusion that in the 1990s, Germany benefited from so-called 'wall fall profits' (e.g. Schleich et al. 2001). The German reunification caused a breakdown and restructuring of the Eastern German economy, which resulted in remarkable emission reductions. Thus emission reductions in Eastern Germany in the 1990s were mainly a result of the special circumstances after reunification, and not of climate policies and measures. Figure 6 presents a reduction curve typical for the Eastern German cities analysed. Current emission levels in Dresden are well below the emission reduction pathway towards 2030, due to significant emission reductions in the 1990s. According to the definition used for this analysis, Dresden is currently in line to reach its emission target. However, emission levels have been stagnating since the late 1990s, and if this trend continues, Dresden will still fail to meet its reduction target.

Figure 6: Target Achievement – City of Dresden



Source: Own analysis based on survey data

3.4 Mitigation Performance

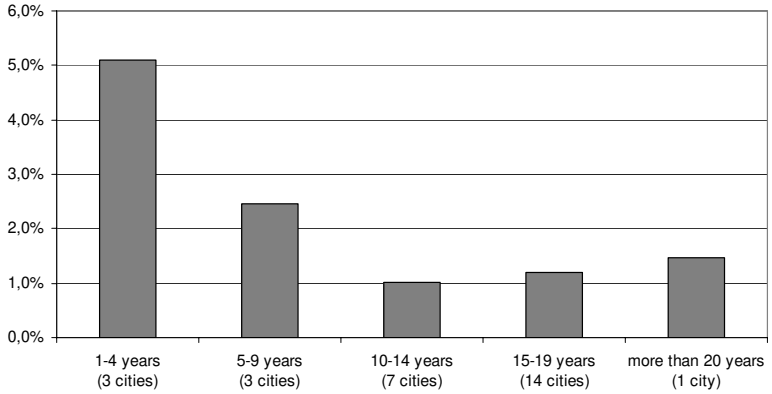
Based on available greenhouse gas emission data, cities' mitigation performance was evaluated. By assuming a linear emission pathway between the earliest and the latest emission data available, average annual emission development for the time period covered by emission reporting was calculated. Emission reductions were calculated as a percentage of emission levels in the first reporting year.

Annual emission development in the cities analysed varies between an annual increase of +1.09% and a decrease of -6.81%. Three out of 25 cities, where emission reporting covered a period of at least 5 years, have effectively increased their absolute emissions. On average, the 25 cities have reduced emissions at -1.31% each year. This

is slightly less than the average annual reduction for Germany as a whole, which was -1.35% from 1990 to 2005 (UBA 2009). Nevertheless, 75% of cities performed better than their 'Laender' during their reporting period. In general, the mitigation performance of Eastern German cities (-3.01%) is far better than that of Western German cities (-0.65%).

Other factors have been analysed for their potential correlation with mitigation performance. Cities that hold control over local energy utilities perform better (-1.66%), than cities that do not (-0.75%). Neither existence of a mitigation action plan nor institutionalization of climate protection in the city administration were linked to the mitigation performance of a city.

Figure 7: Average annual emission reductions in correlation to reporting period



Source: Own analysis based on survey data

Figure 7 shows that yearly emission reductions are higher in the early phase of emission reporting. There is a significant decrease in mitigation performance during the first decade of emission reporting. This may be due to the fact that upon the introduction of emission reporting, cities are able to realize the potential of so-called 'low hanging fruits' rather quickly. Later emission reductions may need more efforts which may lead to mitigation performance slowing down in the following years.

4. Discussion and Conclusion

To summarize:

- The adoption of emission targets is popular among large cities in Germany (more than three quarters of cities in the survey) and cities' ambitions are high (targets in the range of IPCC recommendations).
- A large part of these cities (80%) is in some ways reporting their greenhouse gas emissions – however methodologies used for emission inventories vary

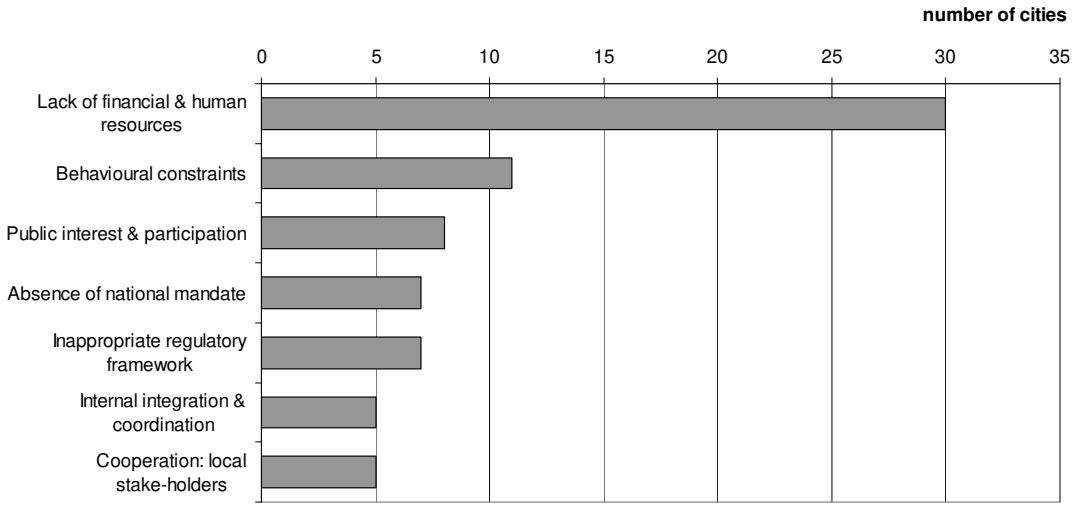
significantly and almost half of the cities which do have targets do not present data for their base year emissions.

- Target achievement is at serious risk in most cities. Not a single Western German city is on course to reach its target. Seven Eastern German cities are on course – however they benefited largely from 'wall fall' profits after German Reunification, in the 1990s.
- Overall mitigation performance of cities is limited. Average emission reduction in Western German cities was -0.65% and thus far from IPCC recommendations.

4.1 Barriers for Cities' Climate Activities

In order to identify the reasons behind cities' limited mitigation achievements, the questionnaire asked cities for the three most important barriers to their mitigation activities. Answers by city officials were grouped according to categories based on Sippel and Jenssen (2010). Figure 8 presents an overview of key barriers prevalent in German cities.

Figure 8: Key barriers for municipal mitigation activities



Source: Own analysis based on survey data

The implementation of climate policies and measures requires staff and money, be it for the preparation of emission inventories, municipal energy management or the organisation of motivation campaigns for other stakeholders on the city level. More than 80% of cities state that their financial and human resources are not sufficient to effectively combat climate change. The financial situation of municipalities in Germany has been described as precarious, and there my be several reasons for this (DStGB 2010): The volume of municipal social spending has increased steadily, while at the same time, the income base for German municipalities has become

smaller – firstly as an effect of the crisis of the financial markets and the economy in general, secondly due to recent changes in German tax law.

As the share of emissions which are caused directly by a municipality is rather small, for meaningful emission reductions, municipalities need to bring other local stakeholders on board. However, the survey showed that many German municipalities find it difficult to get other local stakeholders involved: 'Behavioural constraints', a lack of 'public interest and participation' and insufficient 'cooperation with local stakeholders' are cited frequently by cities as key constraints to their climate activities. Motivation of stakeholders seems to be even more difficult where climate policies touch upon transport issues.

Finally, cities are acting in a certain institutional and economic environment. Municipalities feel limited by the 'absence of a national mandate' for cities to mitigate climate change, and 'inappropriate regulatory' frameworks. Furthermore, cities constrained because economic viability of many mitigation activities is highly dependent on the development of energy prices – with the development of energy prices being another factor that cities cannot influence.

4.2 A role for city networks?

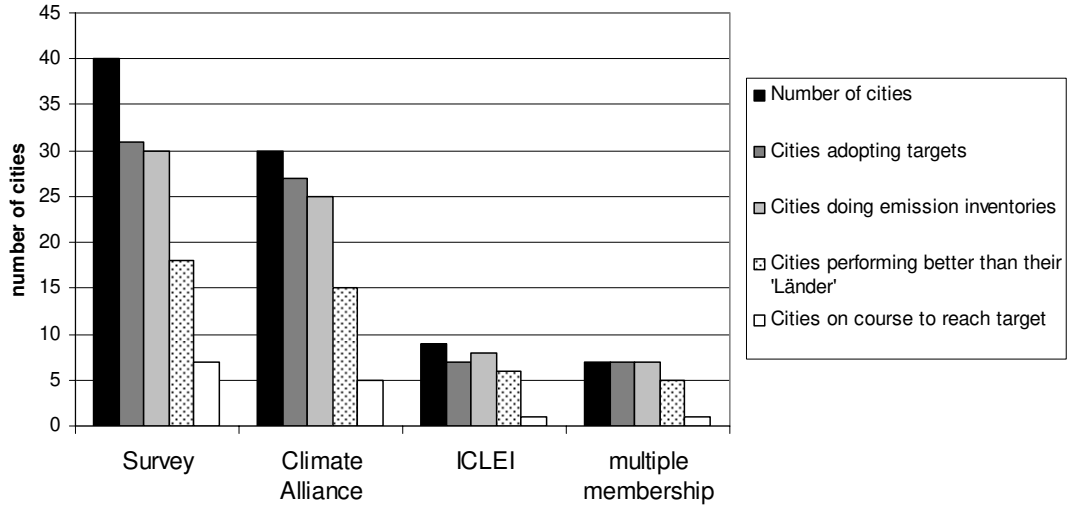
Many cities have organized in city networks on climate change, such as Climate Alliance, ICLEI, Energie Cités or the Covenant of Mayors. Many of these networks do in some way support cities in target setting, emission reporting and implementation of climate activities. For example, the Climate Alliance network has established a common network-wide emission reduction target,[8] developed a software tool for emission reporting (ECORegion) and promotes a benchmark project where cities can compare their mitigation performance to that of other participating German cities (Climate Alliance 2009). Another example is provided by ICLEI, which has set up a mile stone plan for cities that involves both emission reporting and target setting (ICLEI 2010). Furthermore, ICLEI strives to establish a common reporting format for urban emission inventories (ICLEI 2009).

This study analysed whether city networks and their activities as outlined above have an effect on the practice of cities adopting targets, their emission reporting and their achievements in terms of emission reductions. Earlier research by Kern et al. (2004) on municipal climate protection in Germany indicated that cities which are member to more than one climate network (out of the three networks Climate Alliance, ICLEI and Energie Cités) were more successful in their climate activities. Multiple membership was therefore also included in the analysis. Figure 9 illustrates some results.

[8] (although Climate Alliance Cities in the survey proved to have adopted a diversity of targets, also more or less ambitious than the network target)

Cities member to a city network seem to be more probable to have emission targets and also to conduct emission inventories. A larger share of cities in city networks is also performing better than their 'Laender'. However, cities in city networks are not significantly more successful in achieving their emission targets than average cities. Regarding average yearly emission reductions, cities from Climate Alliance (-1.18% per year), ICLEI (-0.98%) and cities member to multiple networks (-0.50%) perform worse than the average of cities in the survey (-1.31%).

Figure 9: Role for City Networks?



Source: Own analysis based on survey data

4.3 Conclusions

It seems that the mitigation potential in cities in Germany is far from being realized. The results of the survey lead to some preliminary policy recommendations.

Firstly, cities should probably revise their emission targets, based on a proper evaluation of their previous mitigation practice. Such an analysis would need to identify city-specific mitigation potentials and constraints to the realization of these potentials. It could then result in realistic emission targets and action plans, including the introduction of sound quality management systems. Such an exercise could benefit cities in that it would confirm their credibility considering their climate commitment. Being in close interaction with both local stakeholders and with higher policy levels, credibility seems to be an essential and indispensable attribute to municipal climate engagement.

Secondly, the realization of the local mitigation potential may need support from other policy levels. In order to allow for comparability of municipal mitigation performance, national policies could promote the adoption of a uniform methodology for emission reporting and make emission reporting obligatory for municipalities.

Emission reporting could also be the basis for further climate policies targeting the local level, such as an emission trading scheme addressing municipalities, or the introduction of other federal regulations requiring cities to participate in mitigation efforts. Such a process could be supported by city networks like Climate Alliance and ICLEI. However, national policies should probably not refrain to the instruction of mitigation obligations for cities, but at the same time try to address the barriers cities face. If other policy levels recognize the city level as being important for the implementation of mitigation policies, and with income opportunities for municipalities in Germany being clearly limited, it seems necessary that the local level be equipped with financial resources for mitigation activities.

Finally, one could imagine cities to adopt a 'double strategy' similar to the EU, who committed to a 20% ghg emission reduction until 2020, and made its more ambitious 30% commitment conditional on other major emitters worldwide joining in an international climate agreement. A double strategy for cities could include:

1. The adoption of realistic targets which cities can reach out of their own effort, under given framework conditions.
2. The implementation of pilot projects, by which cities can give an impetus to international climate negotiations because such projects demonstrate that (and how) low carbon infrastructures are possible.
3. 'Optional' commitments to targets in the range of IPCC recommendations – in combination with a vision of how framework conditions would have to change (e.g. funding schemes, higher energy prices) in order to make these targets realistic.

4.4 Future research

This study focused on cities in Germany with more than 100,000 inhabitants. Future research might want to explore, whether and how the situation differs in both smaller cities, and other countries. Furthermore this study analysed the mitigation performance of cities, without looking at the underlying reasons for emission pathways. It might be interesting to isolate the effect of local climate policies and measures on cities' emission pathways. Firstly this could identify successful local climate policies. Secondly this would also shed some light on the question, to what extent local policies can influence local emission pathways, and what is the role of other policy levels and special circumstances.

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Annex

	Reduction target	Base year	Target year	on course to reach target?	Emission inventories?	Energy	Transport	Public buildings	Waste	Land use	Others	per capita CO2-Emissions (tCO2/a)		city performance compared to federal state
Augsburg	50%	1990	2030	no	yes	x	x	x				7.6	(2005)	worse
Bielefeld	40%	1987	2020	no	yes	x	x	x	x	x		5.6	(2005)	better
Bochum	not specified	1990	2020		yes	x	x	x	x	x		10.5	(2005)	better
Bonn	50%	1990	2030	no	yes	x	x	x	x					better
Bottrop					in preparation									
Bremen	40%	1990	2020	no	yes	x	x					21.3	(2005)	better
Chemnitz	50%	1990	2030	no	yes	x	x	x				7.5	(2005)	worse
Dresden	50%	1990	2030	yes	yes	x	x	x				9.9	(2005)	worse
Duisburg	40%	1990	2020		in preparation									
Düsseldorf	10%	2007	2012		yes	x	x	x				10.7	(2005)	better
Erfurt	50%	1993	2010	yes	in preparation	x	x	x						better
Frankfurt am Main	50%	1990	2030	no	yes	x	x	x	x			12.6	(2005)	better
Fürth	20%	1990	2020	no	yes	x	x	x	x			7.7	(2005)	better
Hagen	50%	1990	2030		yes	x	x	x						
Halle (Saale)	50%	1990	2030	yes	yes	x	x	x				4.5	(2006)	better
Hamburg	80%	1990	2050	no	yes	x	x		x	x	indu	10.3	(2005)	better
Hannover	40%	1990	2020	no	yes	x	x	x	x			9.8	(2005)	better
Herne					yes	x	x	x						
Jena	20%	2005	2012	no		x	x	x				7.1	(2005)	
Karlsruhe					yes	x	x	x				11.2	(2007)	better
Kiel	40%	1990	2020	no	yes	x		x						worse
Koblenz					yes	x		x						
Köln	20%	1990	2020		in preparation	x	x	x						
Leverkusen	50%	1990	2030		in preparation									
Lübeck					yes	x	x	x						
Magdeburg	50%	1990	2030	yes	yes	x	x	x	x			7.2	(2005)	worse
Mannheim	40%	1990	2020	no	yes	x	x					10.7	(2005)	better
Münster	40%	1990	2020	no	yes	x	x	x	x			7.7	(2005)	better
Offenbach am Main	50%	1990	2030		yes	x	x	x				10.5	(2005)	
Oldenburg					in preparation									
Pforzheim					in preparation									
Potsdam	20%	2005	2020	no	yes	x	x	x		x		3.3	(2005)	better
Remscheid	50%	1990	2030	no	yes	x	x	x	x	x		10.5	(2006)	
Rostock	52%	1990	2010	yes	yes	x	x	x	x			4.2	(2005)	better
Salzgitter					in preparation			x						
Siegen	40%	1990	2020		in preparation									
Stuttgart	40%	1990	2020	no	yes	x	x	x	x					better
Wiesbaden	20%	1990	2020	no	yes	x	x	x				11.4	(2005)	better
Wuppertal	38%	1992	2010	no	yes	x	x	x	x			8.9	(2005)	worse
Würzburg	40%	1990	2012		yes	x	x							