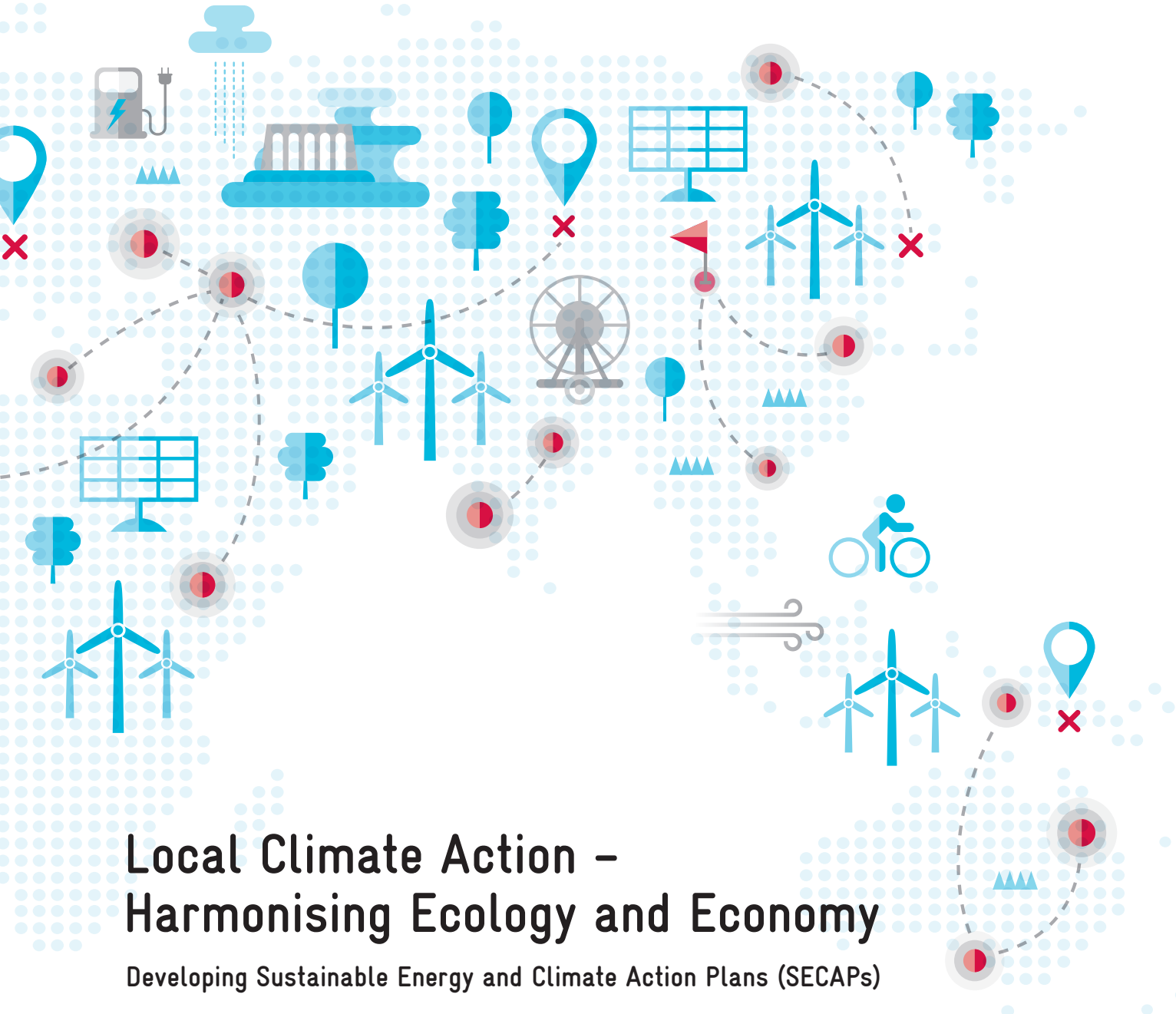


Local Climate Action – Harmonising Ecology and Economy

Developing Sustainable Energy and Climate Action Plans (SECAPs)

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

On behalf of:
Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
of the Federal Republic of Germany

LEGAL NOTICE

Title:

Local Climate Action – Harmonising Ecology and Economy – Developing Sustainable Energy and Climate Action Plans (SECAPs)

Legal Notice:

The local climate action guidelines are published as part of the "Sino-German Climate Partnership" (Energy Component) and the "Sino-German Urbanisation Partnership". As part of the International Climate Initiative (IKI), the projects are commissioned by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) and implemented by the Deutsche Gesellschaft für internationale Zusammenarbeit (GIZ) GmbH.

As a federal company, GIZ supports the German Federal Government in achieving its goals in international cooperation for sustainable development.

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Published by:

Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH
Headquarters
Bonn and Eschborn

Sunflower Tower
Maizidian Str. 37, Chaoyang District
100125 China, Beijing
T +86 10 85275180 **F** +86 10 85275185
E giz-china@giz.de **I** www.giz.de/china

Project partners:

National Energy Administration (NEA)

Energy Research Institute of NDRC (ERI)

Main authors:

ifeu – Benjamin Gugel, Vanessa Herhoffer, Bernd Franke
iGDP – Li Ang, Li Shaoxin, Liu Xueye

Technical control and coordination:

Deutsche Gesellschaft für Internationale
Zusammenarbeit (GIZ) GmbH
Ma Qiongying, Peter Sailer, Philipp Geres

Technical consulting:

ifeu INSTITUT FÜR ENERGIE- UND UMWELTFORSCHUNG HEIDELBERG

Institut für Energie – und Umweltforschung Heidelberg GmbH (ifeu)

绿色创新发展中心 Innovative Green Development Program

Innovative Green Development Program (iGDP)

Klaus Hoppe Consulting – Klaus Hoppe

Editing, layout, information graphics:

flow.asia

flow.asia, Beijing

Exclusion of liability:

GIZ and the authors assume that the information and information contained in this work is complete and correct at the time of publication. Neither GIZ nor the authors assume, expressly or implicitly, any guarantee for the content of the work, any errors or remarks. The cartographic representations are for informational purposes only and do not constitute international recognition of boundaries and areas. GIZ assumes no responsibility for the topicality, correctness or completeness of the provided maps. Any liability for damages resulting directly or indirectly from use is excluded. The respective provider is always responsible for the content of external sites referred to here.

Gefördert durch:

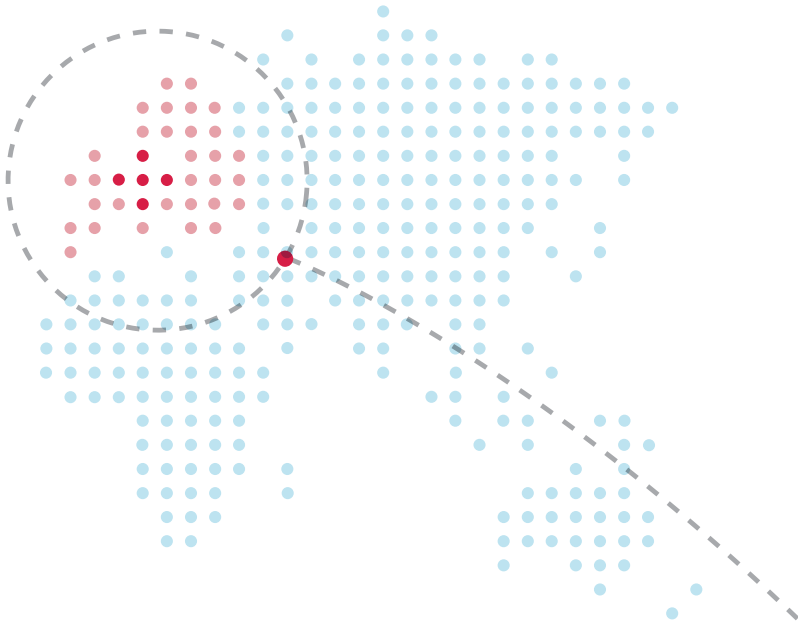
Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit

aufgrund eines Beschlusses des Deutschen Bundestages

On behalf of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)

CONTENTS

EXECUTIVE SUMMARY



Municipalities as a central level: a transformation of energy systems

Climate action is becoming one of the central global tasks for politics and society. A transformation of energy systems and lifestyles will be necessary in the coming years.

Cities and municipalities play a special role in this process.

1. Worldwide, most people already live in cities;
2. Cities are the level at which definite climate measures are implemented;
3. The energy system transformation faces major challenges and opportunities especially on local energy supply level.

Administrations and policymakers are faced with an essential task: climate action is a cross-cutting task that affects all policy areas. This makes it all the more important to develop an overarching plan for this transformation. For this reason, Sustainable Energy and Climate Action Plans (SECAP) have been and are still being developed in Germany and throughout Europe. This instrument will form the strategic basis for climate action in the coming years and decades. It is therefore all the more important that the creation of a SECAP is structured and that sufficient time is given to the creation process.

SECAPs as a new planning instrument for cities

This guideline is intended to present to local political and administrative bodies in China the experiences and opportunities arising from SECAP creation processes in Germany over the last ten to fifteen years. It then explains how these experiences can be adapted to Chinese conditions.

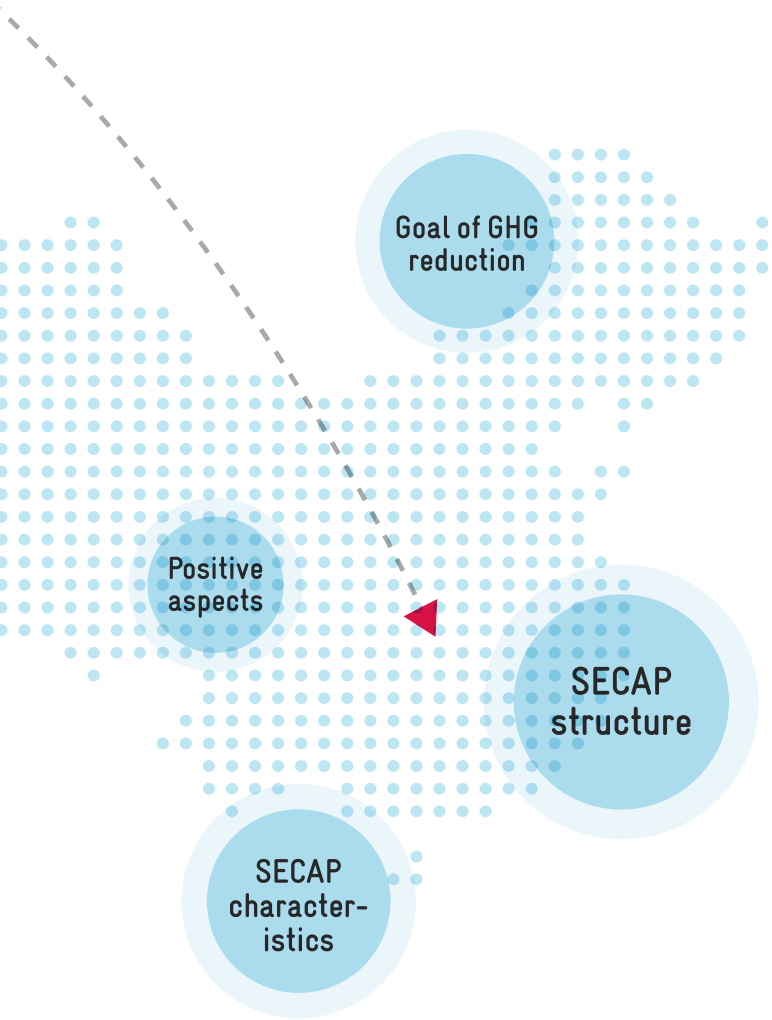
The guideline first shows the characteristics and structure of SECAPs (chapter 2). It is explained that in addition to the goal of reducing Greenhouse Gas (GHG) emissions, other positive aspects of climate action can also be pursued. Climate strategies could also include:

1. Air pollution control and noise reduction;
2. Sustainable and innovative urban planning;
3. Innovative ideas and strengthening of the regional economy;
4. Sustainable, integrated and clean energy systems;
5. Cost savings for all actors (including the city itself).

SECAPs therefore not only form the strategic basis for climate action, but also take a new look at the overall actions of cities in various fields.

Strategic and coordinated approach - already included in SECAPs

In Germany and Europe, various standards have been established for the preparation of SECAPs. SECAPs combine technical and scientific aspects with a definite political planning basis in the form of a catalog of measures. The guideline explains the experience gained in Germany with the three essential elements of a SECAP:



1. Status quo analysis (chapter 3)

A SECAP is the starting point for a structured approach to local climate action. But before climate action can start it is important to know the current situation in detail. There are several instruments for such an analysis in a SECAP.

There are two ways to see where a municipality stands in climate action. Hard facts are provided with figures on local energy consumption and the related greenhouse gas emissions: the local energy and GHG balance. This provides a very good overview of who the main emitters are and which energy sources are used the most. There are also management-oriented tools (qualitative status quo analysis). With these tools it is possible to measure the depth of the local climate action. For example, it can be checked whether important aspects and measures have already been implemented locally.

2. Target setting (chapter 4)

After analyzing what the local climate action situation is like, the next step is to examine what is possible in the future or what the local climate targets should be. Based on these targets, the necessary measures can be oriented.

Climate targets are a very common and useful tool for German municipalities. Political goals and scientific potential analyses and climate protection scenarios should therefore be closely interlinked. There are two different ways of formulating climate targets.

a) Formulation of political targets and a subsequent scientific analysis of how these targets can be achieved and which measures must be implemented to achieve them (so-called backcasting scenarios).

b) Calculation of all local climate potentials in a scenario (forecasting) and, based on the results, the formulation of local political targets for climate action.

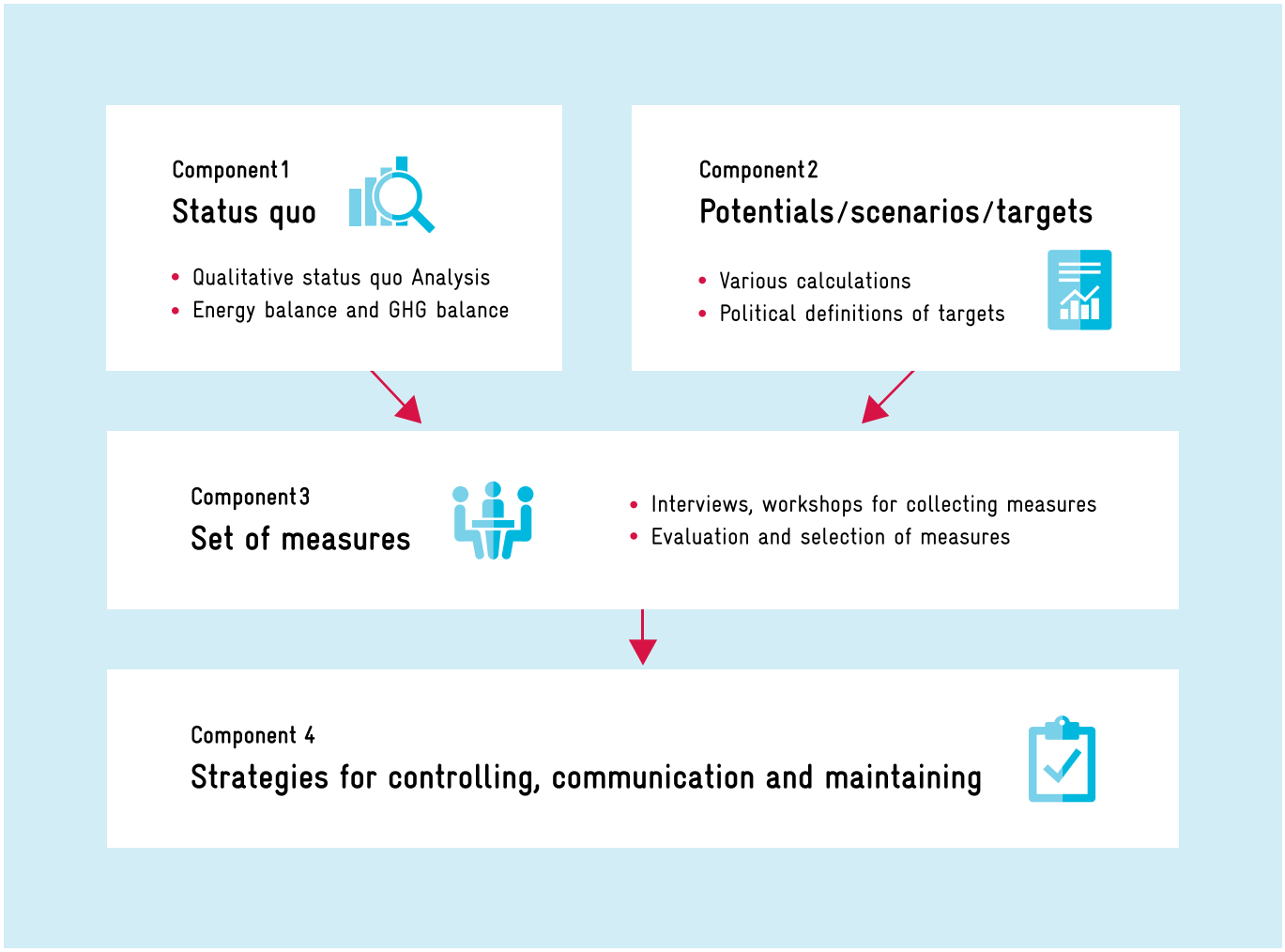
Both methods have a climate target at the end. Forecasting has the advantage, however, that realistic climate targets can be formulated on the basis of specific calculations of the local situation.

3. The central element of each SECAP: the creation and development of local measures to achieve the targets set (chapter 5)

Based on the potential analyses, measures are developed and compiled into a set of measures. The measures are adapted to the specific needs and potentials of a municipality. Municipalities have the possibility to reduce GHG emissions by a variety of of measures. In addition to technical measures (e.g. renovation of municipal buildings), so-called "soft" measures (e.g. energy consulting) and administrative measures (e.g. urban planning) offer the possibility to reach broader groups of local stakeholders. The final selection of measures can be based on various principles with clear and definitive GHG reduction playing the essential role. Other issues, such as costs, acceptance or otherwise positive side effects should be considered as well.

In Germany, it has proven to be a good idea to involve important stakeholders (e.g. energy suppliers) in the development of measures. This increases the chances of effective implementation of the measures.

In the following sections, possibilities of cities for different fields of action are described and successful examples from German cities are presented.



Local politics as a central driver for successful SECAPs

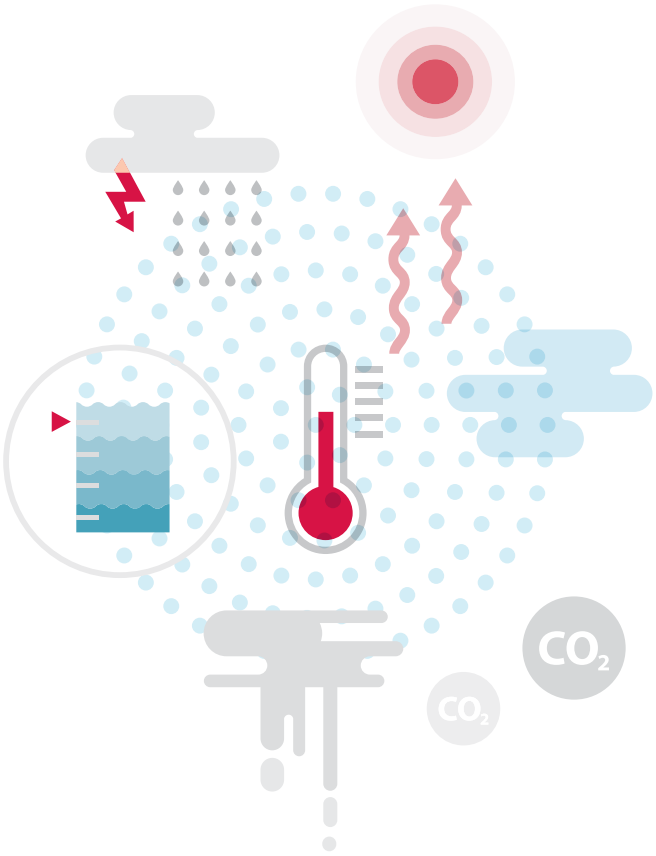
Local politicians and the city's top management play a central role in the preparation and success of a SECAP. SECAPs cover sectors such as transport, waste, urban planning, economic development, buildings and all energy infrastructure. These sectors were previously handled separately by individual departments. A SECAP takes an overall view of these sectors and examines where synergies and opportunities for cooperation could be found. Without the approval and support of decision-makers, the integration of the results of a SECAP in a city would be ineffective.

Another key role is played by local decision-makers in planning the implementation of the SECAP. They are the link to important local actors who have to be integrated in the creation and implementation of a SECAP. In addition, the course for optimal implementation by the local administration could already be set during the SECAP creation process. A central climate management is a new body that could tackle the cross-cutting task of climate action across all offices. Chapter 6 explains which actors are to be involved and how climate management works within the administration in Germany.

In the different chapters, the role and possibilities of politics and administration of a city is described. At the end, general advice from German experiences for both policy-makers and administration staff is given. These can be found in the chapters 3.1.3 and 3.2.5 (Implementation of status quo analysis), 4.3 (Developing targets), 5.2 (Developing measures) and 6.4 (Implementation of stakeholder involvement).

Experiences with SECAPs in Chinese cities

For the preparation of SECAPs, various instruments and advice are given specifically for Chinese cities in chapter 7. Commonalities and similarities in the preparation of SECAPs in Germany and China are listed. Finally, it is explained which elements from the German experiences presented here may be of interest for the future development of SECAPs in China.



01. Introduction: Municipalities and Climate Action

1.1 Experiences of municipalities in climate action and the role of Sustainable Energy and Climate Action Plans (SECAPs)

In December 2015, 195 countries agreed for the first time to a generalized, legally binding and global climate action plan: the Paris Agreement. In order to counteract dangerous climate change, this agreement included a global action plan which aimed to limit global warming to well below 2°C by the year 2100. Furthermore, the participating countries acknowledged that apart from the respective states there are other actors important for future climate action: i.e. cities, regional and local authorities, civil society, and the private sector.

Currently 54% of the global population lives in settlements with more than 10,000 inhabitants (urbanization rate), and the numbers are still rising. 77% of the German population lives in urban areas, making Germany one of the most densely populated countries in the world. The United Nations estimated the global urban population will increase to 68% by 2050 with around 90% of the increase taking place in developing regions. As one of the two largest economies in the world, China is in the midst of the largest wave of urbanization – with 770 million people currently living in cities, up from 190 million in 1980. China is forecasted to have more than 1 billion urban inhabitants by 2030, which will represent 70% of China's population, and 11% of the global population living in Chinese cities at that time.

City residents currently consume over two-thirds of the world's energy . As a result, there is a growing international drive to support the development of resilient, smart and low carbon cities. It is widely acknowledged that engagement and action at subnational level is vital to the successful delivery of internationally

Individual climate action concepts and SECAPs make up a total of

2,333 projects.

75.52 million Euros

funded by the NKI

5 million tons of GHG reduction

The initiated measures already resulted in

agreed climate targets and efforts to limit global temperature rise to 2°C, even to 1.5°C.In municipalities, energy is produced and used within a very small space. Moreover, the traffic density is very high within cities due to local transports, commuters, delivery vehicles etc. As a result, greenhouse gases (GHG) are emitted and there are other disadvantages such as noise, air pollution, and accidents. With the help of local climate action these can be reduced as well, improving urban life in general.

It is important to keep in mind that each municipality is different. National objectives for climate action rarely suit the very specific challenges faced by each municipality. Therefore, the advantage of practicing climate action on a local level is that each municipality can focus on their individually relevant issues (i.e. traffic, renewable energy, expanding district heating, etc.).

Throughout Germany there are several local authorities concerned with climate action. Individual municipalities discuss objectives for climate action, draw up voluntary commitments to reduce GHG emissions, and develop climate action concepts. As early as the 1990s, individual Sustainable Energy and Climate Action Plans (SECAP) were developed by the first municipalities in Germany. In a SECAP, climate targets and local measures for reaching these targets are defined. It serves as a fundamental document to the local governments to make political decisions.

In Europe, the Covenant of Mayors was founded in 2008, in which by now more than 6,000 cities in Europe have committed themselves to ambitious climate targets. The measures with which they intend to achieve these targets have been documented in SECAPs. In 2015, the initiative merged with the Compact of Mayors to form the Global Covenant of Mayors. More than 7,000 member municipalities worldwide have by now committed themselves to climate action on the basis of a SECAP. The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (Federal Ministry for the Environment) in Germany has been funding local climate actions since 2008. Local authorities receive special subsidies within the framework of the Nationale Klimaschutzinitiative (National Climate Initiative, NKI). Municipalities receive financial support to develop their own action plans for climate action, to recruit staff as coordinators for implementing SECAPs and to invest in specific technologies.

To this day, this funding has supported almost 900 SECAPs in Germany. SECAPs focus on all administrative or geographic areas, i.e. small municipalities (e.g. Birkenfeld with 10,000 inhabitants), large cities (e.g. Berlin with 3.7 million inhabitants) or rural districts. In addition to SECAPs, there are individual climate action concepts focusing on specific topics, e.g. traffic or renewable energy. Together, these concepts and SECAPs make up a total of 2,333 projects funded with a total amount of 75.52 million euros by the NKI (information from 31.12.2017). These projects make a significant contribution to reducing greenhouse gas (GHG) emissions. The measures initiated have already resulted in an overall reduction of 5 million tons of GHG, which works out at GHG reduction costs of only 15 euros per ton[1].

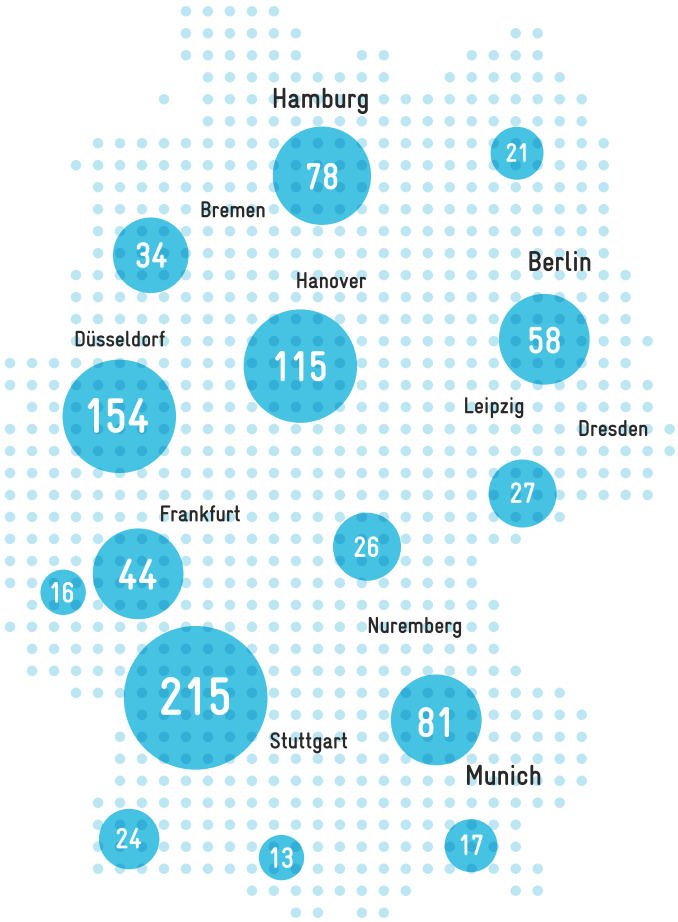


Figure 1:
Funded SECAPs in Germany 2008–2018 (Source: German Federal Ministry for the Environment (Source: German Federal Ministry of Environment (www.klimaschutz.de))

The success of the NKI shows that municipalities are prepared to take responsibility for climate action. However, it has also become clear that developing a SECAP or another concept is only the beginning of climate action. In order to meet current requirements, it is crucial to adapt SECAPs or other con-cepts continuously. As a rule of thumb, there should be an update or even a new SECAP at least every ten years. Currently, 40 municipalities in Germany are in the process of creating long-term SECAPs. These "Masterplan 100% Climate Mitigation" SECAPs have developed targets that are to be reached by 2050, mainly to reduce GHG emission by 95% and to decrease energy consumption by 50%. The "Masterplan" municipalities are therefore concentrating on the national climate targets and want to show what contribution they can make at a local level.

SECAPs have proven to be an important instrument in climate action for a number of reasons:

- They represent a long-term strategy of climate action and energy transition based on a holistic and scientific analysis of all sectors;
- Definite measures show the necessary steps for the first few years;
- They are a source for making political decisions and policies;
- They ensure a stable policy framework and investment environment;
- They define the role and possibilities of municipalities in a national energy transition process;
- The measures that are agreed on within a SECAP can help to steer future work for climate action in the right direction.

[1] https://www.klimaschutz.de/zahlen-und-fakten

1.2 Aim and overview of this publication

Each municipality has to face its own challenges regarding climate action. Thus, developing a SECAP or a concept must be adapted to the specific circumstances and possibilities of local authorities. However, the experience of the past years has been that there are some steps that are generally applicable. These steps are taken from the Plan-Do-Check-Act cycle (PDCA) of business studies: first, a status quo is defined. Then, targets are formulated. Next, measures that are needed in order to reach these targets are outlined. During the process of implementing the SECAP, regular monitoring and checks are carried out to ensure that these measures are still successful and to guarantee that the defined targets can still be reached through these measures. If necessary, these measures can be adapted.

The main goal of this guideline is to show the steps, methodology and experiences gathered during the last decade by developing SECAPs in Germany. At the end, a conclusion by Chinese experts shows similarities, differences and starting points for Chinese municipalities. The guideline is structured as follows:

Chapter 02. describes the general characteristics of a SECAP, how it is structured and how it can be included in policies.

Chapter 03. shows how the status quo regarding climate action can be assessed qualitatively and quantitatively.

Chapter 04. elaborates how to define specific goals on the basis of the status quo assessment.

Chapter 05. introduces different sectors in which climate action may take place. Furthermore, it provides examples of respective measures and explains how these measures are organized and prioritized within a SECAP.

Chapter 06. explains how local actors can be included in the development of SECAPs.

Chapter 07. gives an idea of how German experiences can be used in Chinese cities.

This guideline is relevant to all officials within municipalities who are responsible for climate, energy or other fields with relevance to climate action in different sectors. Moreover, this guideline also addresses officials from departments that are indirectly involved in this process of climate action, i.e. within the fields of mobility or urban planning. When reading the guideline, they can think about how their field of expertise is connected to the process of creating a SECAP.

The guideline gives step-by-step recommendations for the entire process of creating an integrated SECAP. It depicts local government experiences in the process of developing and implementing a SECAP for German cities. For illustration, examples from German cities are included.

With this guideline, we would like to point out the opportunities for local climate action, with the goal to reduce the threat of climate change by saving energy, increasing energy efficiency and introducing renewable energies.

02. Sustainable Energy and Climate Action Plan (SECAP) – Characteristics and Structure

This chapter introduces the general characteristics of a SECAP on a local level. We describe the purpose of a SECAP and exemplify how a SECAP might serve as a tool to fight climate change and to set long-term energy strategy. Moreover, we illustrate the different stages in the process of developing a SECAP.

2.1 Needs and benefits of a SECAP

Currently, climate action in municipalities in Germany is not compulsory; the creation of a SECAP is voluntary. However, national funding has already motivated 900 of about 12,000 municipalities to prepare a SECAP and to benefit from the associated advantages.

SECAPs are prepared on the basis of political decisions by the administration with the support of external service providers. Local policy can contribute in various ways to the development process. The completed SECAP is presented to the policy and adopted by it.

Developing a SECAP provides cities with new opportunities. Climate action is a wide topic and in order to gain a holistic impression, different perspectives are important. Besides that, a holistic approach forces different actors to collaborate. Discussing dfferent viewpoints creates new ideas. In many cities, collaborations concerning climate action already exist, however, those collaborations are mostly organized as individual projects. Our experiences show that a SECAP provides the opportunity to develop new projects and integrate current projects in order to create a sensible overall strategy.

In Germany, a SECAP is an option for taking a holistic view of urban politics. The collaboration of different actors further boosts regional climate action. The green transformation of local energy systems provides a chance to decouple economic growth from carbon emissions, creating a new green deal on a local level.

Developing a SECAP means that a municipality enrols for the long-term process of climate action and energy transition. This can be perceived as a circular or even as a spiraling process (see Figure 2). After monitoring and revising interim results, the next steps may be adjusted so that the long-term goals can be reached in the defined scope and timeframe. One cycle is two or three years in which measures are taken: after each cycle, the next cycle continues on a “higher level”. This means that certain steps have been successfully managed.

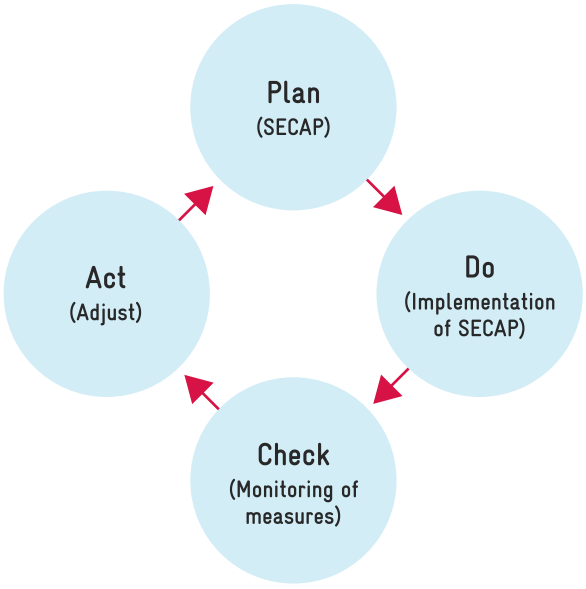


Figure 2:
Role of SECAPs in the PDCA process

Primary benefits of climate-friendly actions do not only arise in different fields or sectors during implementation of the action plan, but also on different time scales, from short term to long term. This requires endurance and commitment on the local governmental level as well as on the local political level towards overall time frames of 20 years and more.

In addition, secondary benefits related to other municipal tasks and targets emerge. For example, the improvement of energy systems, including replacement of fossil fuels or the reduction of motorized individual traffic in districts by means of speed limitations or parking regulation, leads to measurably less consumption (= energy and climate benefits) while reducing air pollution and noise. Citizens experience an improved quality of life and safety.

The following table shows examples of observed benefits that can be obtained by SECAPs on different sectoral and area-related levels.

Local Actors

Benefits

- City-wide reduction of energy consumption and reduction of GHG emissions;
- Strengthening of regional cost-competitiveness through lower energy costs and the use of local renewable energy sources;
- Improvement of energy-related infrastructures and reduction of energy losses;
- Increasing in local energy production using renewable energies;
- Employment and regional added value benefits (craftsmen, regional companies);
- Opportunity to link local energy system transformation with social improvements (e.g. low energy costs for socially weaker households);
- Opportunity to use the local energy system transition as a growth engine for local companies (e.g. new sales markets for innovative companies);
- Improvement of well-being, health and quality of life of citizens through reduced traffic and air pollution;
- Attracting clean and innovative businesses.

Local Government

Benefits

- Strengthening of cross-sectional processes within the municipal government;
- Energy savings regarding the city's "energy bill" (heating, street lighting etc.);
- Freeing-up of financial resources for future climate-friendly actions or similar citizen-related improvements and necessary future adaptation measures by reinvesting the energy cost savings;
- Proactive, holistic cross-sectoral planning processes, including climate action, have GHG reduction effects
- Optimization of internal processes in urban land management towards low-carbon development
- Better access to funding and support from regional and national bodies (better access is provided to German and EU cities that develop SECAPs)

Table 1: Benefits of a SECAP – for local actors and for local government

2.2 Components of a SECAP

The individual project steps and components of the project have to be clarified in advance. In order to receive funding from the Federal Ministry for the Environment, specific components must be included. The preparation of a SECAP is based on four components (see Figure 3):

Status quo analysis

Defining a path and targets without knowing where one stands is difficult. That is why every SECAP starts with an inventory of the local climate situation (climate policy, energy balance and GHG emission inventory). In this, not only quantitative surveys are carried out but also qualitative tests are conducted to determine which activities are already taking place in a municipality and where there is still potential. Chapter 3 explains the options available to municipalities.

Potential and scenario determination or target setting

Based on the information from the status quo analysis (energy balance and GHG inventory) a potential analysis is prepared for the sectors considered. The technically and economically feasible potential within the individual sectors is presented, namely in the areas of energy saving, efficiency increase, expansion of combined heat and power generation (CHP), district heating networks and the use of renewable energies. As an option, scenarios can also be developed that help a municipality to define its climate targets more precisely. Chapter 4 describes how municipalities in Germany define their climate and energy targets.

Set of measures

The central component of a SECAP is the set of measures. Municipal instruments for the promotion of techniques and structures that reduce GHG are taken into account. The measures to be implemented in the municipality in the short, medium and long term are determined by balance, qualitative status quo analysis and potential analysis, and also by the information collected from interviews and discussions with the local actors. The focus of the measures ranges from definite measures for the administration itself to activities with other actors. The development of the set of measures is described in chapter 5.

Strategies for controlling, communications and maintaining

The Federal Ministry for the Environment in Germany has defined further requirements for SECAP funding on the basis of the experience of recent years[2]. These include various strategies that have to be explained within the SECAPs. This is intended to give municipalities a view of a successful implementation process right from the concept stage. The implementation of SECAPs must be efficient and effective, since climate action is still a voluntary task for municipalities. In addition, the financial burden on German municipalities has steadily increased in recent years. This requires the establishment of a procedure to check at regular intervals whether the formulated climate targets have been achieved. A document that records successes and shows how countermeasures can be taken is part of every SECAP.

[2] A large part of the SECAPs in Germany have been funded and therefore meet the required criteria.

In addition, the Federal Ministry for the Environment in Germany would like to include a public relation concept in funded SECAPs, which will be promoted. Structured public relations work and communication with external actors is becoming increasingly important. In addition, a strategy is called for to ensure the sustainability of climate action. This strategy demonstrates how climate action can be permanently anchored as an issue as soon as a SECAP has been prepared.

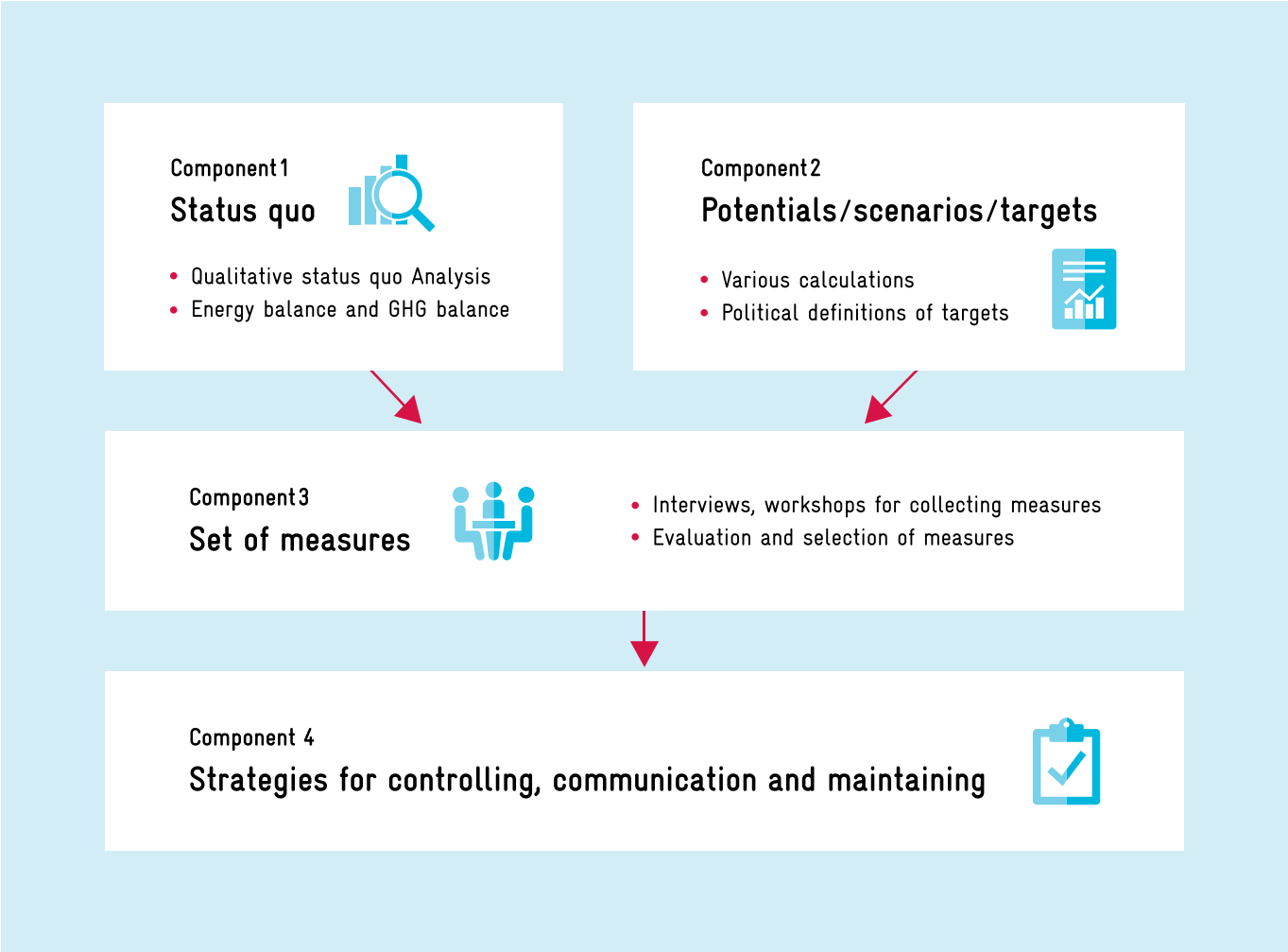


Figure 3:
Components of a SECAP

2.3 Principles of a SECAP

The Federal Ministry for the Environment has set various requirements for promoting SECAPs. In addition to being definite elements in the procedure (see next point), these are also essential requirements. They are intended to improve the quality and results of SECAPs:

Cross-sector approach

Climate action affects many sectors. Accordingly, as many sectors as possible should be taken into account. The focus of previous SECAPs was on potential savings in the following energy consumption sectors:

- Municipal facilities;
- Business (trade, services and small consumption);
- Industry/processing industry;
- Private households;
- Mobility.

Energy supply with renewable energies or climate-friendly district heating is considered in all SECAPs. In recent years, climate issues such as agriculture, waste and wastewater have increasingly been addressed as well.

Target and action orientation

Municipalities in Germany should set targets for themselves in subsidized SECAPs and show in definite terms how these are to be achieved. Chapter 4 explains how municipalities set climate targets for themselves. By specifically defining who is responsible for the implementation, what the costs associated with it are and what the next steps to be achieved are in measure sheets, the action orientation can be ensured.

Participative development

Municipal climate action should not and cannot be planned and implemented solely by the administration. For this reason, great importance is attached to the involvement of local actors when drawing up SECAPs in Germany. Local ideas are brought into the process through participatory preparation. When collecting ideas, initial implementation steps can also be taken, and it can be clarified who should cooperate with whom. There are different concepts of who should be involved in the process. The idea behind the following two approaches is to increase acceptance for implementation through participation and to collect ideas. The first approach involves local stakeholders in the process. Stakeholders are important local climate actors. By involving stakeholders, the chances of implementation increase, since many issues lie within their sphere of influence.

Another approach is based on broad citizen participation. For this, local knowledge is collected in an idea-finding process. This kind of involvement can either be very targeted or very broad. For this process, for example, all citizens are invited to a large meeting via different media (newspaper, internet). After a central overview, citizens are given the opportunity to name and discuss ideas in specific sub-workshops. At the end of the event, the ideas collected are presented and prioritized by the participants. The result is important for the municipality to evaluate the interest of the citizens and to consider their suggestions in the SECAP.

2.4 Considering the different roles of municipalities in developing a SECAP

During the process of developing a SECAP, municipalities may take on different perspectives. In Germany, these different roles are discussed within a SECAP. In this context, municipalities often become aware of their possible courses of action. These roles are reflected in the selection of measures within a SECAP.

Thus, municipalities can apply different approaches of measures in different roles. Besides playing the classic part of planning and regulating, a municipality can also take on other roles which are depicted in Figure 4. In the development and implementation of a SECAP, the municipality will basically have to take on these roles at the same time. Common roles in SECAPs are:

Role of regulating and planning:

There are many areas in which climate action can be incorporated into a community. This becomes evident when a municipality plays the classic part of devising regulations and planning steps for climate action. Typical areas in which SECAPs create important starting points for municipalities could be, for instance, new development areas, traffic planning (cycle path extension) as well as waste and wastewater policies.

Municipalities as consumers:

In Germany, municipal buildings consume about 2-3% of all energy. A study conducted by the city of Cologne shows that a city can influence up to 10% of the regional energy consumption when municipal operations are taken into account. SECAPs should therefore consider improving the energy efficiency of public buildings and areas, i.e. by enhancing street lighting. Here, authorities can act as role models, e.g. when initiating projects such as an energy-efficient city hall.

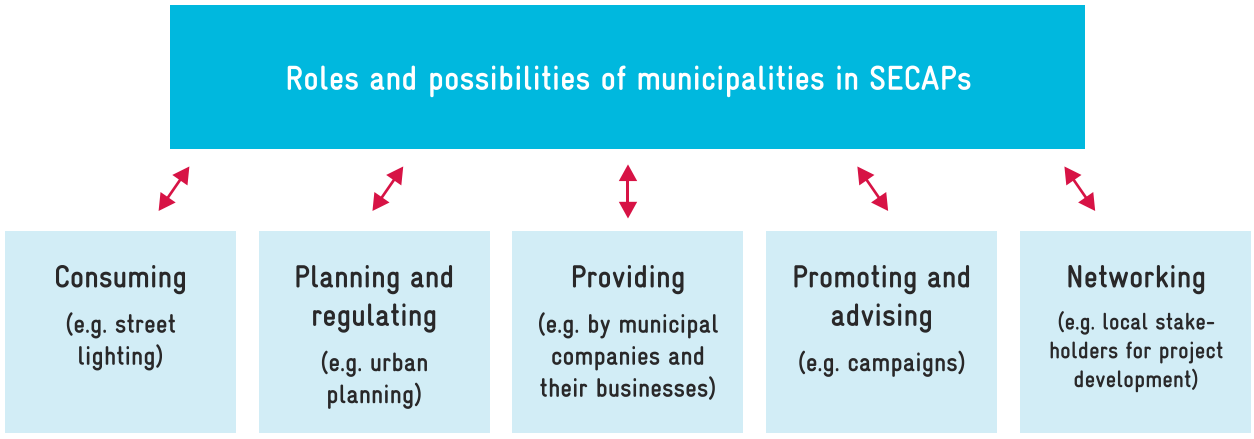
Role as a provider:

A municipality has an impact on other companies in Germany, e.g. when acting as a service provider. Often transport companies, local energy suppliers and housing associations are run by municipalities. Therefore, the municipality can directly impact climate action by asking these companies to provide climate-friendly residential buildings, expand public transport, or increase the production of renewable energies in a municipality.

Two new roles have become increasingly important in SECAPs:

- The role of a municipality as a promoter and advisor, initiating awareness-raising campaigns, training courses, or subsidy programs for renewable energies, i.e. solar thermal installations.
- The role of a municipality as a coordinator and networker: Municipalities are neutral institutions and thus provide a good context for local players to connect. Hereby, municipalities can initiate and coordinate projects. This exchange between municipalities on the one hand and local players on the other hand, reaching beyond typical administrative activities, is relatively new in Germany. There is still potential for expanding this role.

Figure 4:
Different roles of municipalities in climate action



2.5 Operational aspects of developing a SECAP

Suitable size of municipalities for a SECAP

First of all, the important question is, what kind of municipalities need a SECAP? In Germany, all municipalities (counties, cities, small municipalities) can have a SECAP. It is recommended that municipalities with 20,000 inhabitants or more should have a SECAP. Smaller municipalities can also join together to develop a SECAP or a county concept. For all counties (associations of 10 or more municipalities) and cities, a SECAP makes sense. In that case, there are enough people involved to implement such a concept.

Main responsibility for the SECAP development

From 2008 to 2018 almost all SECAPs were developed entirely by external service providers (scientific institutes, engineering companies, universities, energy agencies, business consultancies). The expertise and experience were a great advantage during the developing process. Since 2019, city administration have hired staff directly.

With this support, a SECAP can be developed (Figure 5). Municipalities draw directly on local experience and tailor the plan to the municipality. Lack of knowledge and experience was addressed by funding of professional support, e.g, GHG balance, scenario preparation and the moderation of work-shops. The municipality itself has to organize the overall process (e.g. engage external experts), setting guidelines for the moderation of events and drawing up the catalog of measures.

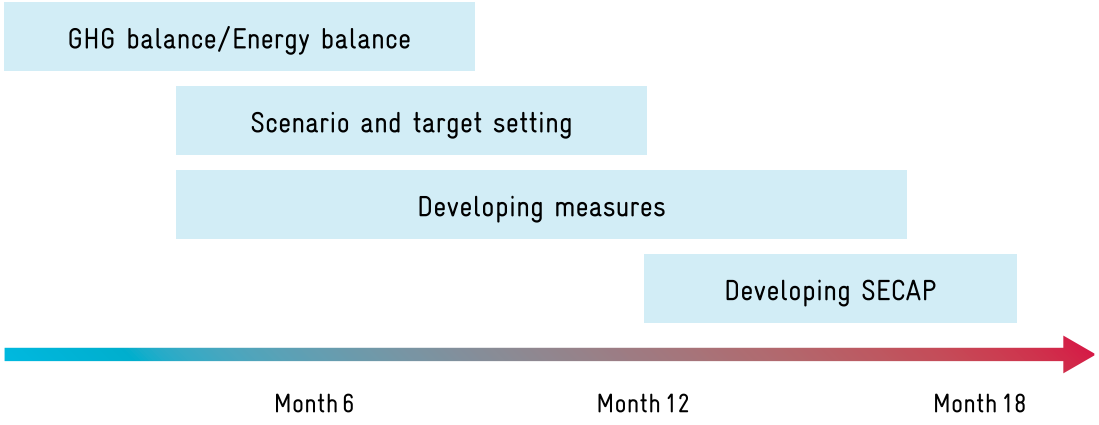
Figure 5:
Different actors in SECAP development

Policy	Responsible administration unit	External experts
• SECAP assignment • Specification of climate targets • Accompaniment of SECAP preparation • Determination of the level of ambition of the SECAP strategy • Provision of personnel and financial capacities • Adoption of SECAP measures	• Commissioning of external experts and contact persons • Exchange with politics • Organization of the status quo analysis • Organization of workshops with politicians and local actors • Specifications for scenario calculation • Proposal of different strategies • Collection of measures • Selection of measures • Preparation of the measure sheets • Preparation of the SECAP report	• Engineering services (preparation of GHG balance sheet, calculation of scenarios) • Moderation of workshops • Advice on the selection and evaluation of measures

Duration of the development of a SECAP

The common period for drawing up a SECAP is 1 to 1.5 years (see Figure 6). During this period, data for the GHG balance and the scenarios will be collected, discussions with local actors initiated, workshops held, measures drawn up and the SECAP prepared.

Figure 6:
Duration of the development of a SECAP



Time horizon of a SECAP

The framework conditions for climate action are constantly changing. The measures defined in a SECAP are ususally developed for the next 5-10 years. After this period at the latest, a SECAP must be updated. Successful measures can then be continued in the new SECAP. For measures that have not been implemented, the reasons should be analyzed and the measures adapted accordingly. In addition, new measures can be developed.

A SECAP also offers the opportunity to take a long-term view of the future. 40 municipalities in Germany have developed their SECAPs for the target year 2050 as part of the "100% Masterplan Climate Mitigation". These SECAPs differ in that they are already developing a long-term climate strategy for the municipalities. For these strategies, measures are developed for the first few years. These measures must also be regularly evaluated, developed further and supplemented.

Costs of a SECAP

The costs of a SECAP mainly depend on how much external assistance is needed to create it. The costs for municipalities of different sizes are also very different. Table 2 lists examples of the costs for two SECAP types (short/medium-term time horizon and long-term time horizon 2050) for an external service provider in Germany.

Table 2: Costs for different types of municipalities and SECAPs

SECAP		SECAP 2050	
Small municipalities with fewer than 20,000 inhabitants	>3 euro/inhabitant	Small municipalities with fewer than 30,000 inhabitants	>3–8 euro/inhabitant
Municipalities with fewer than 100,000 inhabitants	1.5–3 euro/inhabitant	Municipalities with fewer than 100,000 inhabitants	2–5 euro/inhabitant
Municipalities with more than 100,000 inhabitants	1–1.5 euro/inhabitant	Municipalities with more than 100,000 inhabitants	1–2 euro/inhabitant

03. Status Quo Analysis – Assessing the Baseline

This chapter is about the status quo when beginning the SECAP process. It starts with the general and leads to the specific, or in other words, goes from the qualitative to the quantitative. First, it offers insights about what already exists and what does not exist so far.

In 2008, municipalities did not yet have standard instruments at hand to quickly creating a status quo analysis. Since tha variety of instruments and a certain routines in their usage have been developed. Based on the experiences of German municipalities, a range of instruments are presented below, with an explanation as to how to deal with them.

A first step on this path is the self-assessment. A qualitative examination in the different sectors of a SECAP provides a first overview and starting points for future actions, which are visualized in a spider diagram. Additional qualitative tools further help to specify and deepen the knowledge on this "basic" level.

The second step, the quantitative analysis, leads to a baseline emission inventory (BEI), providing data on the current local energy supply and demand as well as on the GHG emissions. This chapter describes how to get such a BEI and how to use it.

3.1 Qualitative assessment

A self-assessment forms the basis to get a first overview about what has already been done regarding energy transition and climate action. It is the starting point of every concept and helps to answer the following questions:

- What has been achieved already?
- To what extent have concepts - related to energy and climate action - been implemented?
- Who is and is not involved in this process?

The first step of a self-assessment is the generation of an "activity profile", which represents and visualizes a qualitative and rough analysis of climate action (see Figure 7). With its help, potential activities for the future can be identified at this early stage. In a second step and in addition to this basic analysis, it is important to look at all relevant stakeholders and players. Both analyses help to quickly understand and show in which areas a municipality has already been active and what else a city could do in the future. They provide starting points for the development of measures in the different sectors, for example type of measure and players to be involved.

3.1.1 Developing an activity profile

Municipalities are complex systems that sometimes have conflicting policies, plans, objectives and/or targets. Therefore, it is important to find out which existing policies, plans, measures, structures and processes exist that have an influence on climate-friendly action with an activity profile. At the same time, this provides an understanding of the integrated approach of a SECAP and a foundation for a dialogue to identify overlapping or conflicting areas.

As part of the "German Coaching Municipal Climate Action Project"[3] – an initiative to support municipalities to start climate-action processes – a free and transparent "Activity Profile" tool has been developed for this recording of administrative activities.

[3] www.coaching-kommunaler-klimaschutz.de (only in German)

The "Activity Profile" has several benefits, including:

1. Getting an overview on what is already going on;
2. Getting an overview on potential fields of action;
3. Insights on sub-topics like targets, strategies, responsibilities and project development;
4. Starting point for cross-departmental dialogue.

With the activity profile tool, structured analysis and evaluation of climate actions is carried out based on checklists. A checklist is provided for each field of action. Here, objectives and activities are queried with the help of weighted yes/no questions. Points are awarded accordingly, so a maximum of 100 points can be achieved in each field (see Figure 7). In addition, by completing the questionnaire, the municipality receives information about which activities already contribute to climate action and which activities need to be improved or developed.

Checklist Buildings

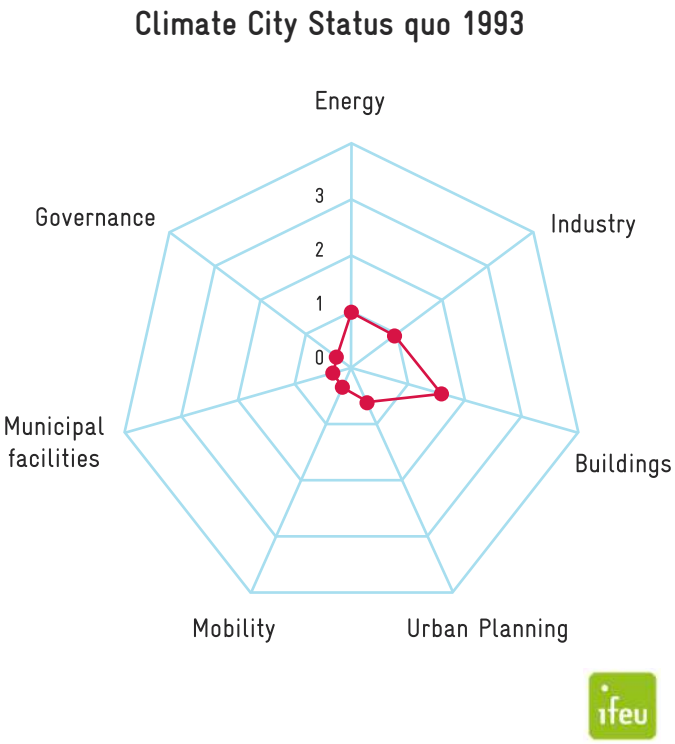
Yes	Questions/topics	Rating
	Targets/strategies	**25%**
	Targets	
☑	Existing targets for energy use of buildings for a target year	8%
☑	Energy-efficiency targets for building constructions	4%
	Strategies	
☐	Renovation roadmap for building stock	8%
☐	Renovation roadmap for building stock of single districts	5%
	Organisation/controlling	**10%**
	Responsibilities	
☑	Central organisation of local activities for renovation building stock and standard for new building	4%
☐	Renovation management for single city districts	3%
	Controlling	
☐	Regulary controlling of development of heat and electricity demand in building stock (absolute and specific indicators (kWh/m²))	1%
☑	Regulary quality controlling of building construction	2%
	Municipal measurements	**65%**
	Planning	
☑	Ecologic and energetic standards in urban land-use planning (e.g. maximum of heat demand/m²)	5%
☐	Prioritised integrated energy use plan for new city districts	5%
☐	Integrated planning of future heat and cooling demand and different heat supply options for building stock	5%
☐	Analysis of efficiency potentials for existing building stock in different district (compared to alternative like new construction)	5%

Figure 7:
Example of an "Activity profile" checklist

For this guideline, the checklist has been adapted to Chinese municipal framework conditions[4]. Seven fields of action where local governments can act for climate action are examined in this activity profile. The categories are related to the sectors of the SECAP (Energy, Mobility, Industry, Buildings and Urban Planning).

Two additional categories have been added, helping to understand management aspects and particular municipal action fields at this point. The category "Governance" shows the possibilities for action of a municipality in climate management according to the PDCA cycle. The category "Municipal facilities" focuses on the possibilities of a municipality in its own buildings.

After filling in the checklists, the results are summarized automatically and shown in the form of an activity profile in a spider diagram. The further away the blue dot on the line of a sector is from the center (0), the more active the municipality is in that sector. Roughly, the numbers in the scale can be interpreted as follows: 0 = not active, 1 = fairly active, 2 = active, 3 = very active, 4 = highly active (pioneer).



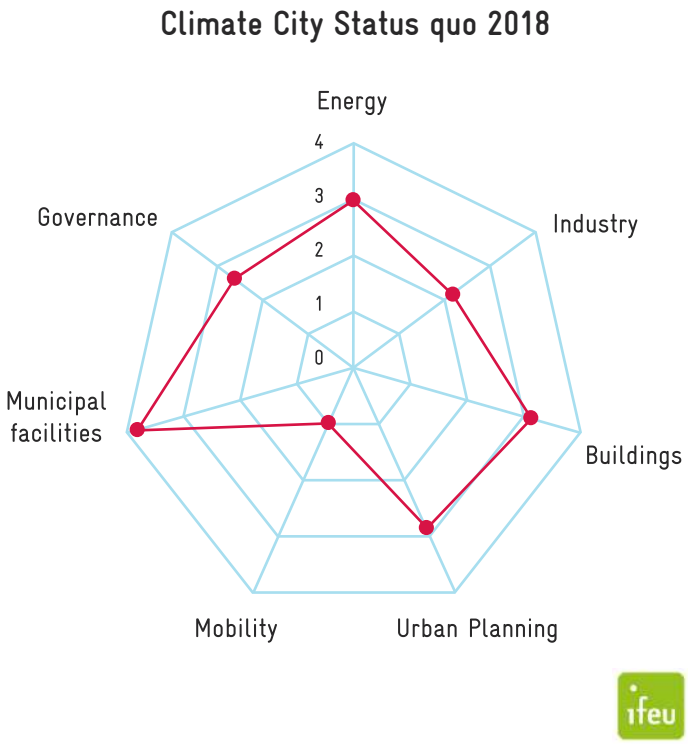


Figure 8 and 9:
Example of an activity profile comparison 1993–2018

The profile above shows a municipality that already started action in the field of climate-mitigation in all sectors. Urban planning procedures towards higher density are partially applied. However, public transport and alternative means of transport need further regard.

The resulting activity profile should be processed within the administration and presented and discussed in a working group or in a workshop. It is advisable to complete the checklists together with an external consultant to ensure additional objectivity and a calibration of the results.

[4] Available on the internet under www.ifeu.de

3.1.2 Dealing with the results of a qualitative assessment

Once the qualitative assessment has been drawn up, the results can be interpreted both at the political level (basis for suggested strategies) and at the operational level (basis for development of measures).

In the example in the first SECAP was drawn up in the city in 1993. For this purpose, a status quo analysis was established. Besides a support program for the refurbishment of residential buildings, not many activities had been initiated.

The example depicts the activity profile of a city at the beginning (left) of its engagement for climate-friendly action and today (right). The picture on the right shows the results of 25 years of climate action. Over the past 25 years the city has increased its efforts significantly. The city has set ambitious climate targets for 2030 and 2050. Within the framework of regular monitoring, the city's strategies and SECAP are updated and measures are developed and improved for each sector as a cooperation between the different departments and stakeholders involved. Today, for example, the municipality runs an energy management scheme for public buildings, which forms the basis for a 50% reduction in energy consumption compared to 1993, and it has developed energy standards for new residential buildings.

3.1.3 Suggestions for the qualitative assessment from experience in Germany

Policy makers for SECAP accompaniment

- Regular commissioning of the status quo analysis as an important instrument of climate monitoring (about every 3 years)
- Clarification of who is responsible for the survey and who should support it;
- Invitation of all relevant heads of office for discussing the results
- Participation in the first workshop on the status quo assessment
- Determine reasons and factors leading to poor results/developments
- Discussing whether there are structural operational problems or problems in the implementation of measures and looking for solutions;
- Derivation of municipal weaknesses/ strengths in climate action
- Definition of priorities/fields of action for the further SECAP process (strategy and measure development).

Administration staff for SECAP development

The responsible unit for SECAP development prepares the process to elaborate an activity profile, including the summary of results, the drawing of conclusions and the preparation of the next steps. The following advice helps to get municipalities started with the activity profile:

- Fill in the checklists or parts of the checklist for which you have information or experiences.
- Identify who could or should fill out the remaining checklist questions; explain the background and ask them to do so (be available for comprehensive questions).
- Check received checklists for plausibility and merge checklists into one activity profile. Generate a first evaluation: achievements, options, ideas for action, additional questions to be clarified.
- Invite the relevant and responsible departments and policy makers for a meeting to discuss the assessment results and future steps.
- Include external advice (for moderation, additional input and conclusions) to concentrate on your own tasks and standpoint, if necessary.
- Prepare the meeting for discussion of the results thoroughly and according to the expected goals and outcome - be prepared for questions regarding SECAP and climate action in general.

3.2 Quantitative analysis to get a data-based assessment

The SECAP should be checked with regard to the objectives and as to whether the municipality is on the right path. This requires a starting point for SECAPs: the setting of the baseline. Besides all qualitative analyses, local energy data should be summarized in a local "Baseline Emission Inventory" (BEI), which is based on local energy data. With this quantitative analysis, Greenhouse Gas (GHG) emissions can be allocated according to their sources.

A GHG balance is not necessary for the preparation of measures and the implementation of a SECAP. The effort involved in creating BEIs and collecting data is very time-consuming. However, the advantages (see below) of a GHG balance are very significant for identifying the status quo and monitoring the implementation of the SECAP. In Germany, most BEIs are created by external experts.

3.2.1 Opportunities and limitations of GHG balances

A BEI serves the following purposes:

- Description of the local emissions status quo and identification of the major emitters;
- Comparison with similar cities in terms of emission trajectory and causes;
- Prediction of the future emission trend based on the baseline and checking of current actions.

The effort that is required to conduct a GHG inventory for a municipality is often underestimated. Often it is assumed that there are fixed standards and easily available data. In practice, however, municipal administrations are faced with a lot of problems when starting to collect data. For example, inconsistency and the sheer difficulty to get data in the first place are common issues.

In recent years, a voluntary balancing standard has been introduced in Germany, which lays down clear calculation rules (Bilanzierungsystematik Kommunal "BISKO"). This standard is more accurate than international standards (e.g. Greenhouse Gas Protocol) and can reflect the situation of municipalities in Germany very well. More and more municipalities are using this standard for their GHG balances.

However, data is still a sensitive issue: everything depends on the willingness of those having providing data. Thus, establishing good relationships and data providers having a good understanding of the SECAP task or commitment to it is very helpful.

In addition to the data problem, it should be noted that GHG balances can only represent the effect of individual measures to a limited extent. For example, the refurbishment of a town hall will not be reflected in the GHG balance. A balance can only reflect the trend over the years for the whole municipality (see above).

The preparation process of a BEI takes at least half a year, considering the tasks of asking owners of data to provide data, data gathering, data verification and overcoming of data gaps, data analysis and conclusions. The methodological aspects of correct allocation and calculation require solid experience. For this reason, the energy balance and GHG balance are best prepared by external experts or experienced institutions. For this cooperation it is recommended to support the external consultants in data collection and to clarify various methodical questions with them. The most important ones are explained below.

3.2.2 Identifying the right methodology for a quantitative analysis

The basis for the GHG inventory is the recording of the entire energy consumption within the municipality. Before the actual balancing starts, it has to be clarified which energy consumption should be taken into account and how (balancing approach). In Germany, two accounting principles are commonly used: the Activity-Based approach (Scope 1, see Figure 11) and the Life Cycle Analysis (LCA) approach.

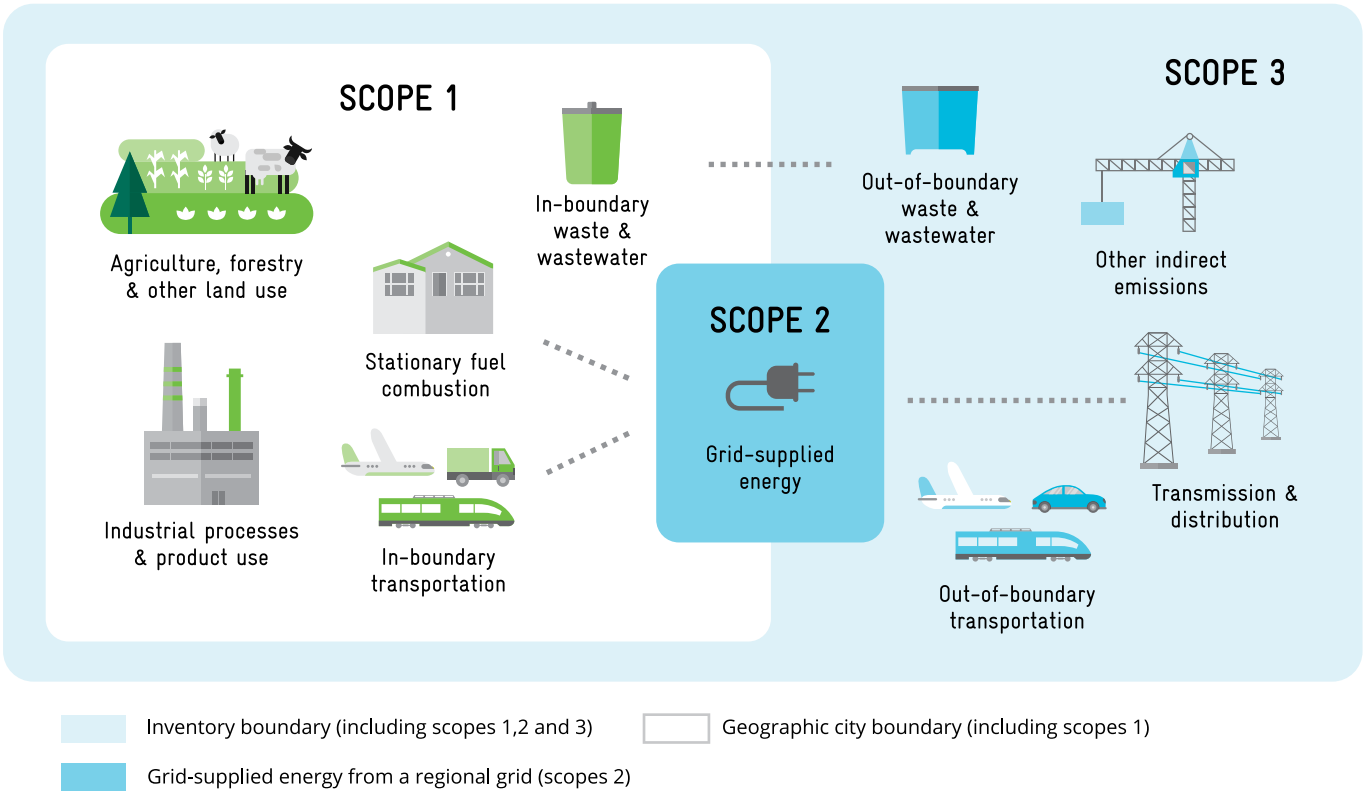
As a basis for a SECAP, the LCA approach has proven to be more practicable and is recommended in the national standard BISKO. The entire energy consumption occurring in the defined territory of the city is taken into account. Specific emission factors (see Figure 10) are used to calculate the GHG emissions associated with the final energy consumption (regardless of whether these emissions occur within the territory itself or stem from production outside of it, like electricity from power plants).

Energy consumption: Natural gas		Emission factor Natural gas		GHG Emission caused by burning natural gas
200 MWh	x	0.247 t GHG/MWh	=	49.4 t GHG
		GHG emissions per unit energy consumption (includes GHG emissions in upstream chain)		

Figure 10:
Example of using the emissions factor for GHG balancing

This inventory attempts to identify and quantify all direct emissions associated with energy consumption (Scope 1), as well as indirect emissions associated with electricity or steam (Scope 2) that enters into the territory from outside production (see Figure 11).

Figure 11:
Territorial approach, including all emissions of Scope 1 and 2



Furthermore, some methodological aspects need to be clarified:

- Should the local electricity consumption be calculated with the national, provincial or local electricity mix? For SECAPs in Germany, the national electricity mix is recommended by BISKO so that cities can be compared with each other. Municipalities can separately report balance sheets with a local electricity mix as well. Rural municipalities with a focus on renewable energies can thus show their efforts in expansion of clean electricity production. In China, the provincial energy mix or even the local energy mix is likely more appropriate because of the very different composition among regions and because power flows between regions are lower than in Germany.
- Should only CO2 or all greenhouse gases be considered? In Germany, with BISKO it has become established that all greenhouse gases are recorded as CO2 equivalents.
- Should only the direct emissions from energy use on-site be recorded or should the upstream process emissions be included? In Germany, LCA emissions are used for municipal balancing. This means that all emissions associated with energy consumption are taken into account.

3.2.3 Collecting data

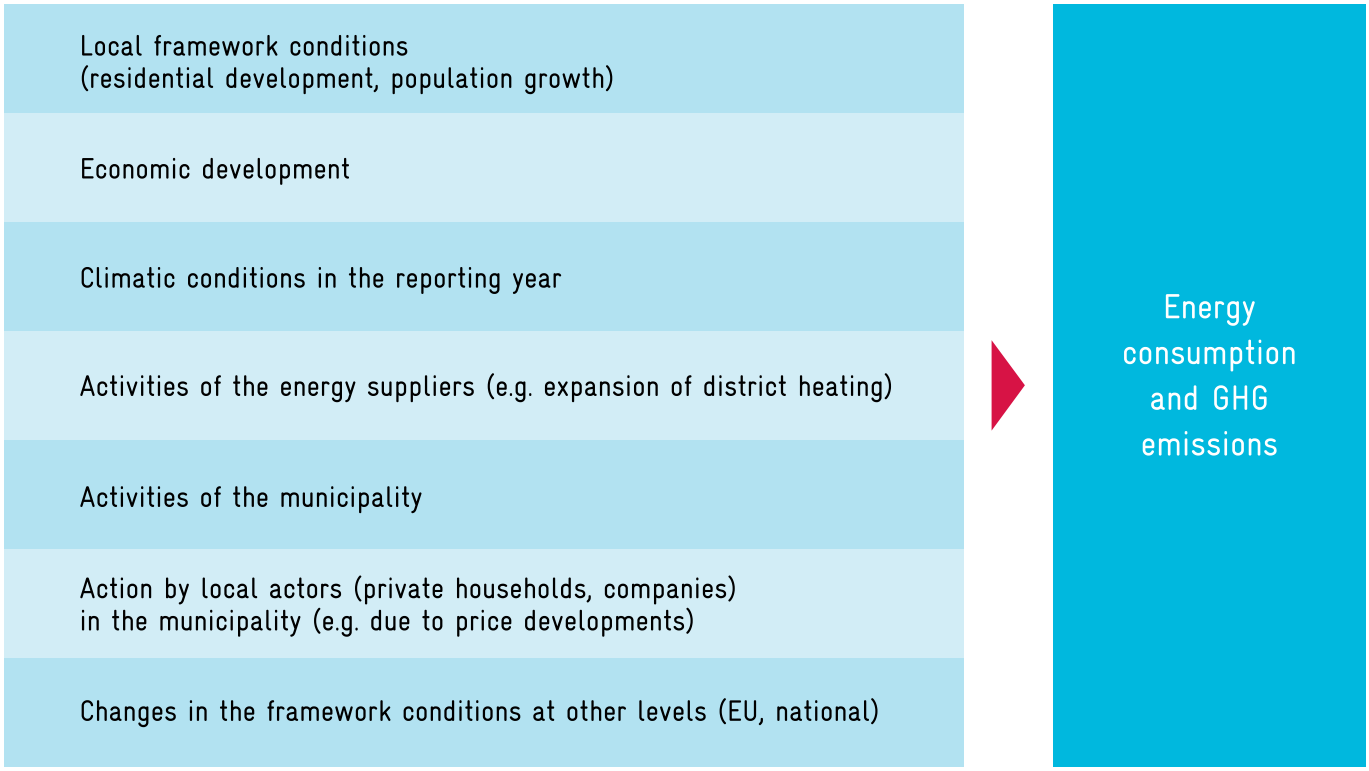
The data for a balance originates from many sources. The consumption of grid-bound energy sources (electricity, natural gas, district heating) is relatively easy to obtain from energy supply companies. Energy supply data (electricity generation) are also easy to obtain from energy suppliers. The situation becomes more difficult with off-grid energy sources (coal, biomass, heating oil, solar thermal energy). Statistics, independent surveys and counts as well as projections are frequently used here. As already mentioned, experienced experts should be consulted for clarification and support.

For the interpretation of GHG balances, grid-bound energy sources are more meaningful. Changes in consumption are attributable to original data and can be interpreted accordingly. However, developments in the consumption of off-grid energy sources should be interpreted with caution. The term "data quality" was therefore introduced in Germany through BISKO for balancing purposes. Grid-bound energy sources, for example, have a high data quality. In general, GHG balances with a high data quality are more meaningful and robust than balances with a low data quality.

3.2.4 Interpreting the results of a BEI

The interpretation of the GHG development over several years is associated with various challenges. Decreasing or rising GHG emissions are not only caused by local climate actions. A number of parameters can significantly change the results of a balance and cover up reduction effects through local measures. Figure 12 gives an overview.

Figure 12:
Different paramenters changing GHG balances



Local climate activities that have an impact on the municipal energy consumption:

- Activities of energy supply companies;
- Municipal administration measures;
- Actions of the local actors themselves.

However, these activities can also be influenced by circumstances beyond their control. Among others these include:

- Weather and climatic conditions;
- Economic situation, including migration and immigration of companies;
- Population decline and increase and other structural developments;
- Changes in the general consumption behavior (e.g. new applications, trend towards increasing living space);
- Changes in conditions at higher levels (e.g. national level due to a new legislation).

Once the details of the current situation and/or the development have been defined, decisions will be made on the basis of this information. When preparing or updating a SECAP, there is an opportunity to see what can or should be more strongly influenced by municipal climate activities.

Analysing a GHG balance by indicators

A further step is to evaluate the GHG inventory in detail by combining GHG emission data with statistical indicators (e.g. population growth, economic development, modal split of transport).

A rapidly growing city will see an increase in absolute GHG emissions despite efforts to combat the increase. For that, an indicator of GHG emissions per capita will be better suited to monitor successes. Likewise, setting emissions in relation to economic growth is helpful.

In Germany, municipalities typically use existing indicator systems provided by Climate Alliance, European Energy Award and other institutions: e.g. the share of renewable energies in total consumption, GHG emissions per inhabitant, transport-related emissions per inhabitant, energy consumption per employee or the share of combined heat and power in total heat consumption. This allows municipalities to estimate the overall results for various sectors. Although municipalities can choose their own indicators, these should be carefully selected and combined.

A suitable example of Key Performance Indicators (KPI), successfully tested with the BEST benchmarking software tool for Low-Carbon City development in China, are shown in the Appendix. Further guidance is provided in the "BEST Cities Tool User Guide and the Low Carbon Policy Databook".[5]

Example city of Heidelberg: analysis of the development of GHG emissions by sectors

Analysis requires visualization of GHG emissions over time and by sector, allowing to monitor trends, e.g. changes in population, energy efficiency or energy carrier. Figure 13 shows the example of Heidelberg, Germany, between 1987 and 2015.

In 2015, GHG emissions from city-owned buildings (white bars) were reduced by 49% compared to the baseline year 1987. Even though the share of GHG emissions from city-owned buildings was relatively small in 1987 (3.6%), the municipal building energy management became a role

[5] https://china.lbl.gov/tools/benchmarking-and-energy-saving-tool-low - in English or Chinese

model for other players. GHG emissions from other public buildings (blue bars) remained the same despite the major expansion of the university (from 22,000 students in 1987 to 31,000 students in 2015).

GHG emissions from private households (green bars) were reduced from 362,000 Mg (Megagram; 1 Mg = 1 ton) per year (1987) to 285,000 Mg per year (2015). Despite an increase of 12% in the number of residents and of 29% in the per-capita living space, this decrease is visible. The reduction is dominated by a switch to fuels with a lower carbon footprint (from oil to natural gas or renewables). A subsidy program for energy retrofit of existing buildings was carried out by the regional energy agency. A new zero-GHG district "Bahnstadt" with space for 6,800 residents and 6,000 jobs is being built. The buildings are constructed with an extra low energy "passive house" standard in which heat and electricity supply comes from renewable sources (see chapter 5.3.3).

Heidelberg's industrial sector (red bars) is rather small. In this sector, GHG emissions were reduced by 26% compared to 1987. There, the decline in GHG emissions is a result of a fuel switch and increase in energy efficiency.

Transportation data were only available for the years 1987 and 2010 and are not shown in the Figure. The data indicated no change in GHG emissions. An increase in transportation was offset by more fuel-efficient cars and the increase in public transportation and bicycle use.

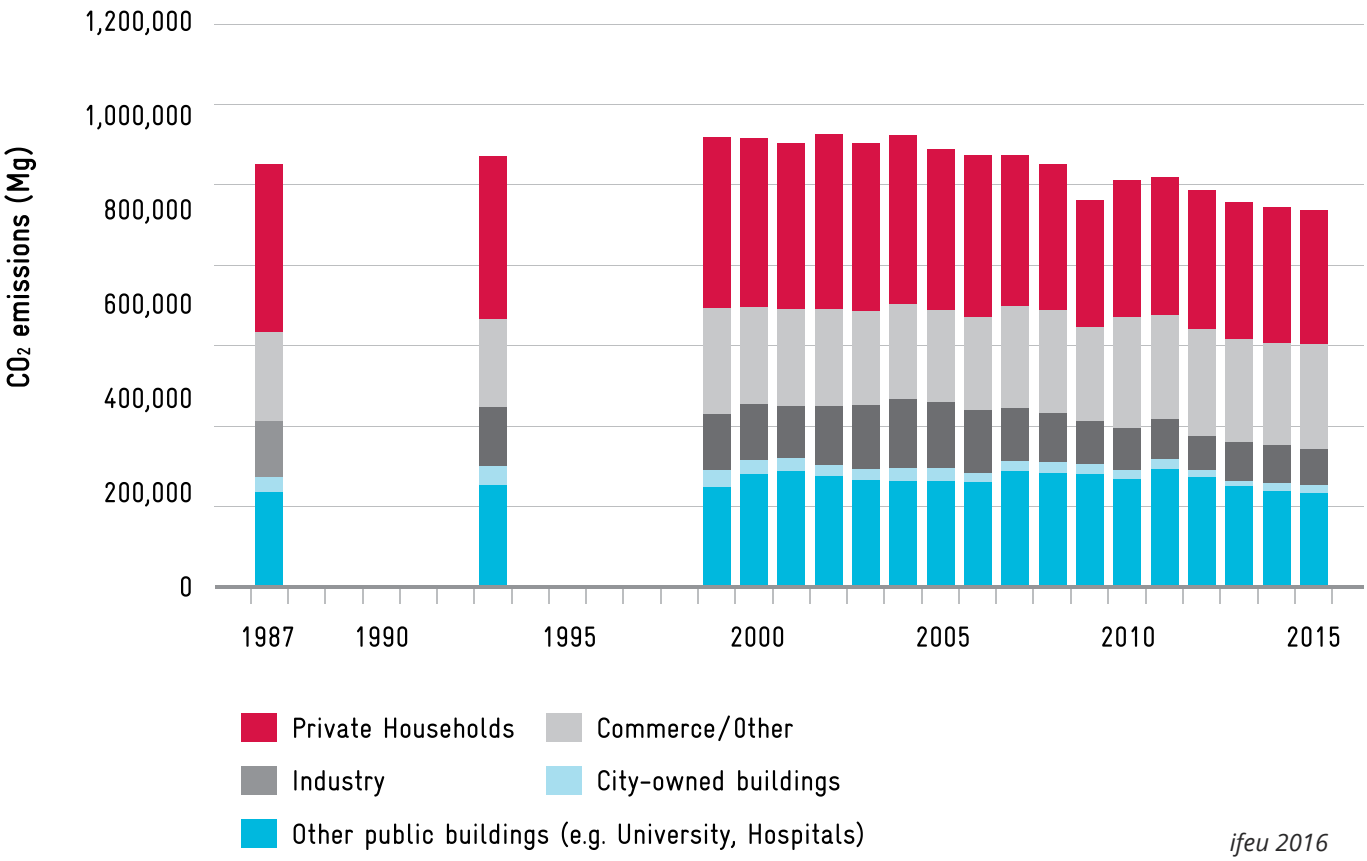


Figure 13:
GHG emissions by sector (1987 to 2015) – City of Heidelberg

3.2.5 Operational advice from German experiences for quantitative assessment

Policy makers for SECAP accompaniment

Regular commissioning (about every three years) of the GHG monitoring as a supplementary instrument to climate monitoring;

Clarification of who is responsible for the survey and who should support it;

Organizing of a meeting with an administration core group for discussion of the results;

Starting the analysis of the results: clarification of the role of municipal activities in development and which external factors have which effects;

Focus of the analysis on indicators for a better detailed analysis rather than on the overall development;

In addition to GHG balance: demand and promotion of bottom-up monitoring of measures (How much GHG can be saved in definite terms through single measures of the SECAP?);

For external communication: presentation of the development, focus on municipal spheres of influence (indicators), presentation of measure monitoring and parallel presentation of qualitative analysis.

Administration staff for SECAP development

Establish a BEI schedule to indicate a realistic start and end date of all data collection activities.

Discuss the required methodology with the hired external expert so that it fulfils the city's needs.

Identify the most important indicators and detect where to get the related data.

Support the expert in collecting baseline data and in making contact and contracts if necessary.

Compile the GHG baseline emission inventory, analyze the results with the expert and municipal core group and draw conclusions:

- Which sectors consume the most energy and emit the most GHG?
- Which energy source is used most frequently?
- How did the emissions develop over time in the various sectors and how did the overall shares change, e.g. due to renewables?
- Which indicators and sources of data must be improved for the next monitoring or for the development of an energy flow diagram?

Write a BEI report that reflects the real situation; identify challenges, uncertainties and failures, if any.

04. Climate targets as part of a SECAP

Before developing definite objectives and targets, it is important to have a look at the guiding principle of our action: the vision.

The vision comprises a joint idea of what the future of the city will look like. The vision for a climate-friendly city should meet and exceed international and national targets, such as aiming for a carbon-neutral and fossil-free future. A separate process for vision development may accompany or precede the process of the specific SECAP elaboration (including visionary aspects from existing city strategies). The vision should be achievable, add new values, and be understandable for stakeholders and citizens. Once the vision has been established, it has to be transformed into targets. Climate targets link daily climate action with this vision and should be consistent with it.

As cities have different starting points, questions have to be answered before formulating definite targets (See Figure 14):

- Should climate targets be based on national or provincial climate targets?
- To what extent do (international and national) targets need to be adjusted on the basis of local conditions (see BEI chapter)?
- What is our possible influence on the energy consumption and GHG emissions in our city and how can this be measured (e.g. BEI)?
- How ambitious should our targets be?
- What time horizon should targets have (short, medium or long term)?
- Should only GHG targets be formulated or also targets for energy savings or renewable energies?

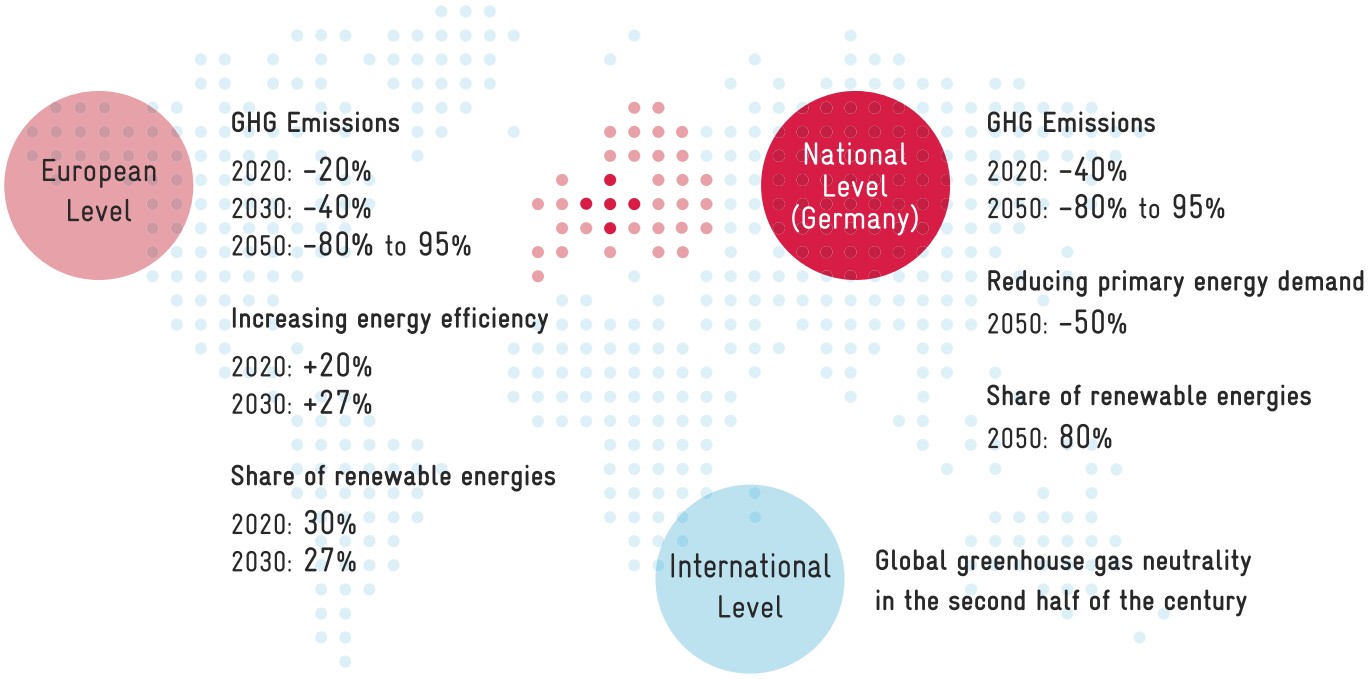
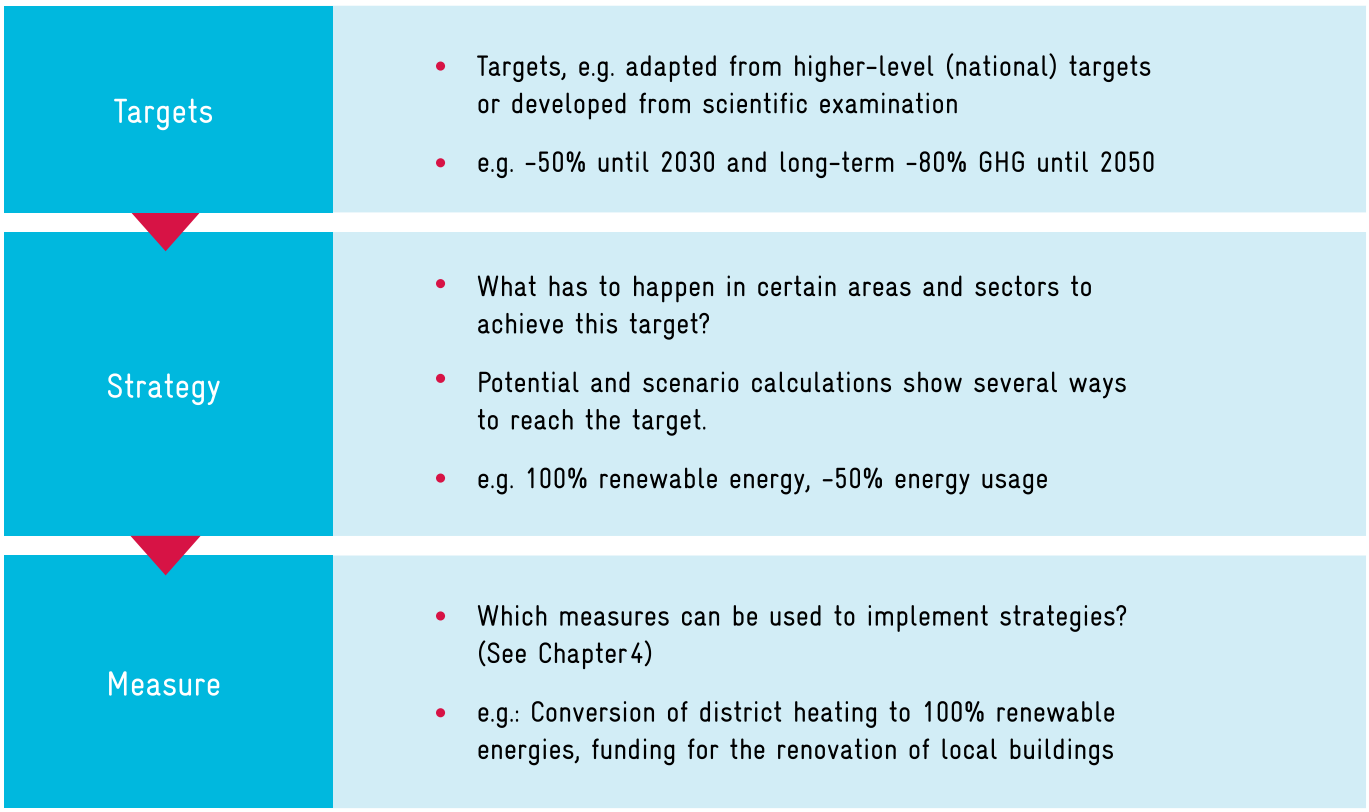


Figure 14:
Overview of International, European and German Targets to limit global warming to below 2 degrees Celsius; Base line year 1990 (based on German Federal Ministry for the Environment)

Targets are the basis for the strategy and measure development of a SECAP. Without targets, it is not clear how ambitious the strategy and the corresponding measures must be (see Figure 15 below).

Figure 15:
Interrelations between targets, strategy and measure



The following chapter presents different possibilities as to how to develop targets for a municipality. In addition, it provides information on how the target values can further be specified in the future. It is important to mention that monitoring and analysis of these targets on a regular basis is crucial. Otherwise it will be difficult to justify climate activities.

4.1 Setting targets

Many municipalities in Germany have set a target for GHG savings for the year 2025 or 2030. Some have gone even further and have set long-term targets for 2050. The process of target setting is possible in different ways, as presented below:

1. Politics-based targets

Political targets are oriented towards higher level national targets (e.g. in Germany -55% GHG emissions by 2030 relative to 1990). Municipalities adapt these targets to the local level. Afterwards, scenarios will be developed on the basis of an analysis of potentials to decide how these goals can be achieved.

2. Calculation-based targets

Calculated targets are based on an analysis of potentials followed by a scenario analysis. They are accurate and related to local circumstances. For example, the city council of Bremen adopted GHG reduction targets of 40% by 2020 (based on 1990 level) calculated in such a scenario analysis.

Scenario analyses based on the evaluation of the status quo and reduction potentials are best prepared by experienced external experts. The scenarios reflect the potentials in energy savings, improvements in energy efficiency and share of renewable energies, with differences in the level of ambition. Three basic scenario types are conceivable and should be discussed with the experts:

- In the "Business as usual" (BAU) scenario, the activities are continued with the same effort and intensity as before. It shows what happens if there is no additional climate action in the municipality.
- A climate scenario shows what the maximal possible savings would be if all potentials were implemented optimally. The range between the BAU scenario and the climate scenario shows the municipality's scope for action.
- A scenario showing which GHG savings are possible if specific measures are implemented in the municipality. It ranges between the BAU scenario and the climate scenario.

Scenarios and targets lead a strategic approach towards measure and action plan development, which will be described in the next chapter.

Potential analysis and scenario analysis help to:

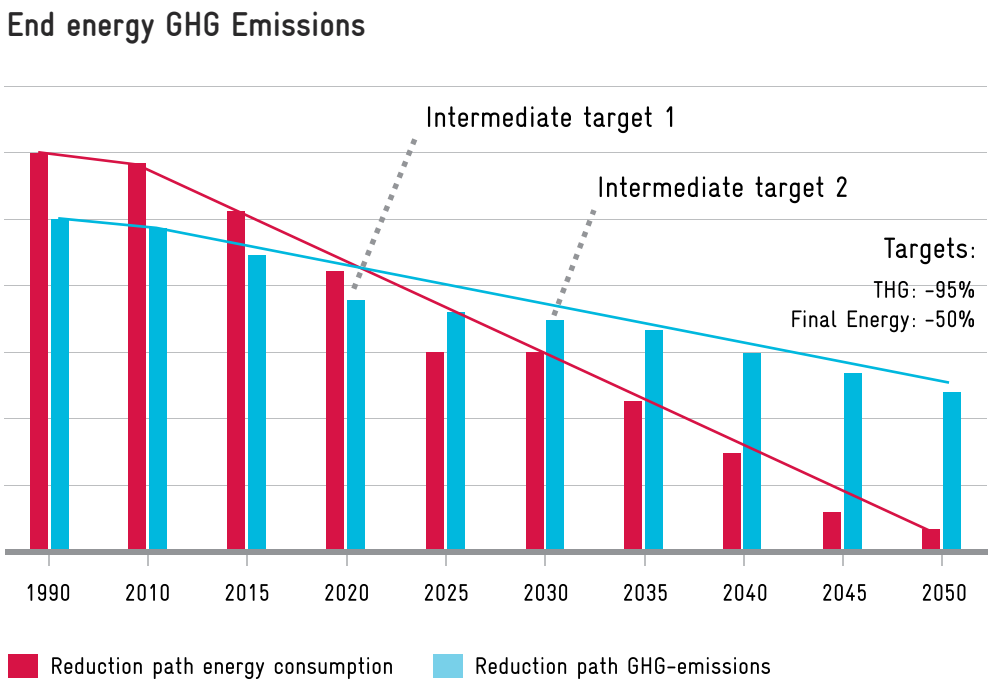
- Set targets for individual areas and the communities as a whole;
- Identify areas and sectors with high GHG reduction potentials;
- Define strategies and priorities for determining climate measures;
- Gain an insight into available technical developments and their effects on the energy and GHG balance;
- Evaluate individual measures with regard to reduction potentials and economic efficiency;
- Create suitable conditions for long-term controlling.

4.1.1 Political target setting – from targets to measures

Today, almost all long-term targets in municipal climate action in Germany are based on a political declaration of intent. In Germany, municipal targets are based on the countries' commitment to improve the energy efficiency and to lower greenhouse gas emissions by 80% by 2050, relative to 1990 levels (see Figure 16).

Many cities are aiming for climate targets at higher levels. As of 2019, a total of 40 cities in Germany with a combined population of 8 million residents (about 10% of Germany's population) have committed to the targets of the "Masterplan 100% Climate Mitigation" with an even more ambitious target: 95% GHG emission reduction by 2050 and 50% reduction of energy consumption, relative to 1990.

Figure 16:
Climate targets for "Masterplan 100% Climate Mitigation" cities



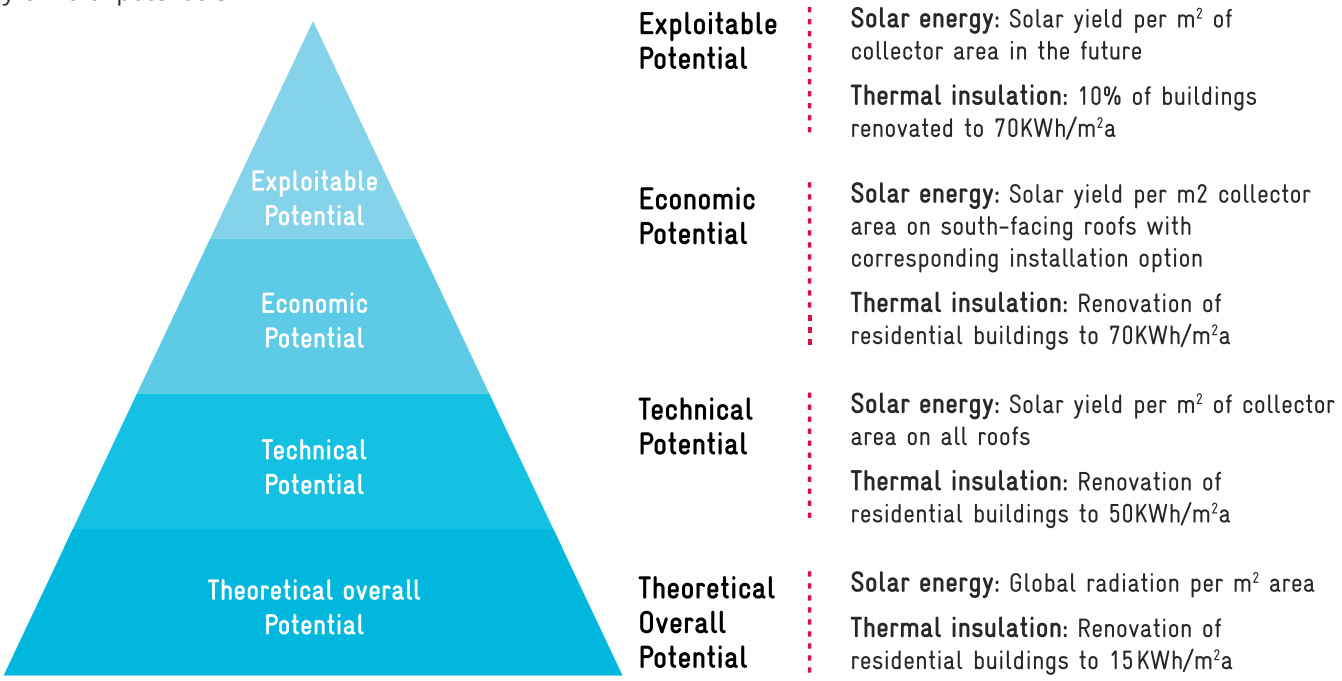
If the targets are set before the SECAP is developed, back-casting scenarios provide a possible option to describe different pathways towards the fixed goals. The back-casting approach starts in the future (= targets that have already been set at one point in time in the future; 2050 in the example) and examines how these targets can be achieved starting from the present situation. For this backcasting scenario, external experts are usually hired in Germany to examine the extent to which the targeted goals can be achieved.

4.1.2 Setting targets as a result of scenario analysis - from measures to targets

Another option to set targets is to develop objectives on the basis of scenarios that were built upon status quo (BEI) and potential analysis. The "forecasting" scenario analysis shows - up to a certain degree - which GHG reductions can be achieved through additional or improved measures in the fields of energy saving, energy efficiency and renewable energies.

A potential is defined as the ability to develop untapped opportunity. In the field of energy technologies, this is related to a specific measure. It is important to clarify which potentials should be calculated, as each potential leads to different conclusions (see Figure 17). For example, the theoretical potential gives an overview of both possibilities (what might be the case?), but also of restrictions, cost-benefit calculations and so on.

Figure 17:
Pyramid of potentials



The scientific determination of municipal scenarios and subsequent targets have to be based on assumptions that are as realistic as possible. Therefore, together with an external service provider, it must be decided strategically which of the described potential levels are used and what the advantages and disadvantages are in the context of a SECAP.

Moreover, it is also necessary to assess how realistic the identified potentials and the underlying scenarios are regarding implementation opportunities in a particular city. For example, political engagement and commitment, budget availability, staff capacities and the level of stakeholder participation all influence the type and the amount of potential, besides technical availability. They determine the way how a municipality can achieve its climate targets.

Based on a scenario analysis for the year 2020, the city of Karlsruhe has formulated the 2-2-2 target. Its aim is to save 2% CO2 emissions and 2% final energy consumption annually and to increase the share of renewable energies by 2% per year. Due to the growth of the city (population and business sector) the city will likely not achieve all goals. In particular, the expansion of renewable energy generation in a large city was more limited than expected. Also energy consumption has not decreased to the extent envisaged. The CO2 targets will probably be achieved through environmentally-friendlier district heating and an improved electricity mix.

4.2 Sub-targets for supply and sectors

In the case of the "100% Masterplan Climate Mitigation" for municipalities, the energy saving targets are mentioned in addition to the GHG saving targets. In order to comprehensively pursue climate targets, it is necessary that the municipalities also set themselves a target for final energy savings and review this regularly. An example for different forms of climate targets is presented in Figure 18 below.

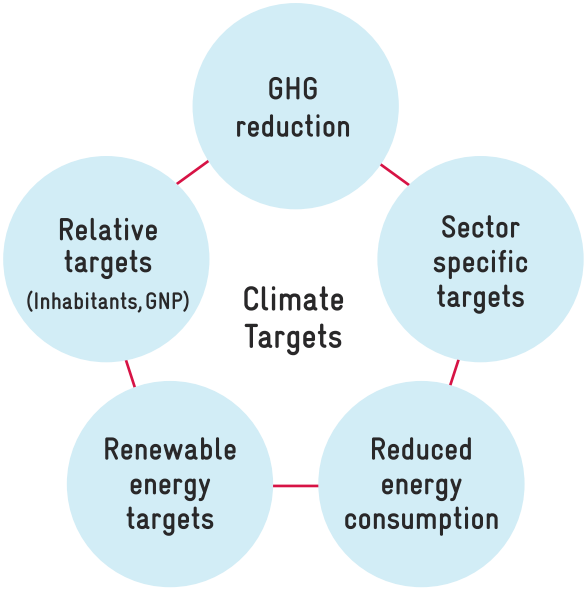


Figure 18:
Different types of climate targets

Supply targets

It is recommended that supply targets should be set, such as increasing the share of electricity and heat from combined heat and power plants or the share of renewable energies. Whereas in the past the focus was primarily on the generation of regenerative electricity ("Energiewende" = Energy Transition), in the future the focus will be more and more on environmentally-friendly heat generation ("Wärmewende" = Thermal Energy Transition) in Germany.

Absolute and relative targets

Currently, many German cities are confronted with population growth and an increase of commuter traffic. Absolute GHG targets are therefore difficult to achieve. Fast-growing metropolises tend to formulate climate targets not in absolute but in relative terms. GHG emissions and climate targets are set in relation to economic growth or population development. Thus, despite the growth of cities, climate efforts can be mapped.

Sector targets

In Germany, the focus has also been increasingly on sector targets. In this case a local authority determines what shares the sectors can have in the individual climate targets. This can be done for energy consumption sectors (households, transport, industry, commerce) or for the energy production sector (reduction of GHG emissions per kWh of heat and electricity produced).

One advantage of sector targets is that they address each sector precisely and so their contribution to the overarching climate targets is clearly visible. Moreover, the city can see in which sectors there is potential and whether it has any influence on emission reduction at all. A city can never achieve the targets of the municipality and the individual sectors on its own. These targets can only be achieved through multi-level cooperation with local actors and companies.

The advantages of sector targets on the one hand are that they address each sector precisely and so its contribution to the overarching climate targets is clearly visible. On the other hand, the city can see in which sectors there is potential and whether it has any influence on emission reduction at all. A city can never achieve the targets of the municipality and the individual sectors on its own. These targets can only be achieved through multi-level cooperation with local actors and companies.

4.3 Operational advice from experiences in Germany for setting climate targets

Policy makers for SECAP accompaniment

Giving the target setting process sufficient room for discussion and time;

Understanding external framework conditions for the targets (e.g. details and background of climate targets, of climate networks for municipalities and of national targets);

Setting of targets based on expert calculations: when choosing the level of ambition a mix of realistic and ambitious targets is required;

Ideally, setting of a long-term target and intermediate targets, including for individual sectors;

Regular monitoring, checking of target achievement and taking of countermeasures if necessary

Administration staff for SECAP development

When setting targets, the responsible unit has to clarify the following aspects in advance:

Does the city already have a climate target?

If YES

- Further differentiation of targets, if possible (sectoral targets, relative targets);
- Integration of policy into the process (substantiate climate target);
- Developing of indicators and intermediate targets for target achievement (monitoring);
- Measures and scenarios within the context of the SECAP with set implementation steps.

If NO

1. Consult with political leaders as to whether a political target is desired in advance (name various options e.g. national targets, targets of other cities or climate networks);
2. If no target is intended, present results of the forecast scenarios;
3. Start discussion process within relevant committees and political decision-makers (identify alternatives/possibilities);
4. Discuss political commitment to climate target on the basis of the documents provided;
5. Develop indicators and intermediate targets for the achievement of objectives (monitoring).

Following advice for both options for work with external experts

Assign an external expert as support to clarify whether a back-cast scenario (if target is available or desired) or a forecast scenario (without climate target) is required;

Clarify the basic parameters for the target calculation with the expert (e.g. general conditions such as population development and economic development, planning of new development areas, information on redevelopment areas, traffic planning, new industrial areas);

Develop a joint understanding between unit and experts (how to work with the calculation parameters and how to evaluate results with the expert).

05. Climate Action Measures – Core Element of the SECAP

The preparation of the set of measures is the core element of a SECAP. It contains implementation-oriented measures in various fields of action. Where possible, these measures are based on existing experiences within the municipality.

There are two types of measures:

1. Measures for the municipality's own sphere of influence (municipal buildings, utilities, employees, housing associations). These measures can have a direct effect and success can be measured immediately.

2. Measures to support local actors in achieving their climate potential where the local authority can only have an indirect impact. The different impact approaches are shown in Table 3. No single impact approach can achieve the intended results; a mix and interaction of different combined approaches can achieve the necessary changes in the respective target groups.

Table 3:
Overview of impact approaches of measures

Measures in the direct sphere of influence of the municipality	
Approach of action/Type of measure	Goal/Main focus
Technical measures	Implementation in municipal buildings and facilities
Measures to motivate and support local actors to implement individual climate potentials	
Approach of action/Type of measure	Goal/Main focus
Structuring measures (Clarification of responsibilities and financing)	Basis for the implementation of climate action in the municipality; allocation of human and financial resources; definition of responsibilities
Regulatory Law / Politics	Definition of standards/framework conditions
Flanking (including networking)	Synergies through networking of actors with the municipality as an independent moderator
Funding	Direct promotion of technical measures
Public Relations and Information	Awareness raising and information

5.1 Elements for developing measures

5.1.1 Collection of measures

Municipalities cannot achieve climate targets by themselves; they depend on the general conditions and the measures at higher levels (e.g. federal state, state). Municipal measures often complement measures at a higher level (e.g. by providing local funding guidance).

Proposals for measures can be successfully implemented if they are adapted to the specific conditions on the local level. This includes the local actor structure, the local potential, the size of the municipality, the location of the municipality (urban or rural) and the available human and financial resources. It is advisable to adapt ideas for measures from other municipalities.

The collection and evaluation of measures is an interactive process. No author of a SECAP should propose measures in a SECAP that have not been discussed and agreed on with the local actors. After the SECAP has been established, the local actors will implement the relevant parts of the SECAP. This will only succeed if the actors find their own ideas in the plan and support them. Thus, there should be a sufficient amount of time to identify the measures. In Germany, approximately 6-9 months are scheduled for the preparation of a set of measures.

The collection of measures can take place at three levels (see Figure 19):

1. Existing plans and activities of the municipality as well as implemented and non-implemented measures are analyzed as results of the qualitative status quo analysis. Successful measures should be expanded and the less successful ones should be improved.
2. Within the framework of the participatory SECAP preparation, ideas and definite proposals for measures are collected from important municipal actors. This can take the form of workshops and interviews. Important stakeholders include local energy supply companies, housing associations, private initiatives, industrial companies and public transport operators.
3. The author's experience and research will be used to compile a collection of measures. If the concept is drawn up by external experts, they can contribute their experience from other municipalities.

The result is a variety of measures that have to be sorted, evaluated and prioritized.

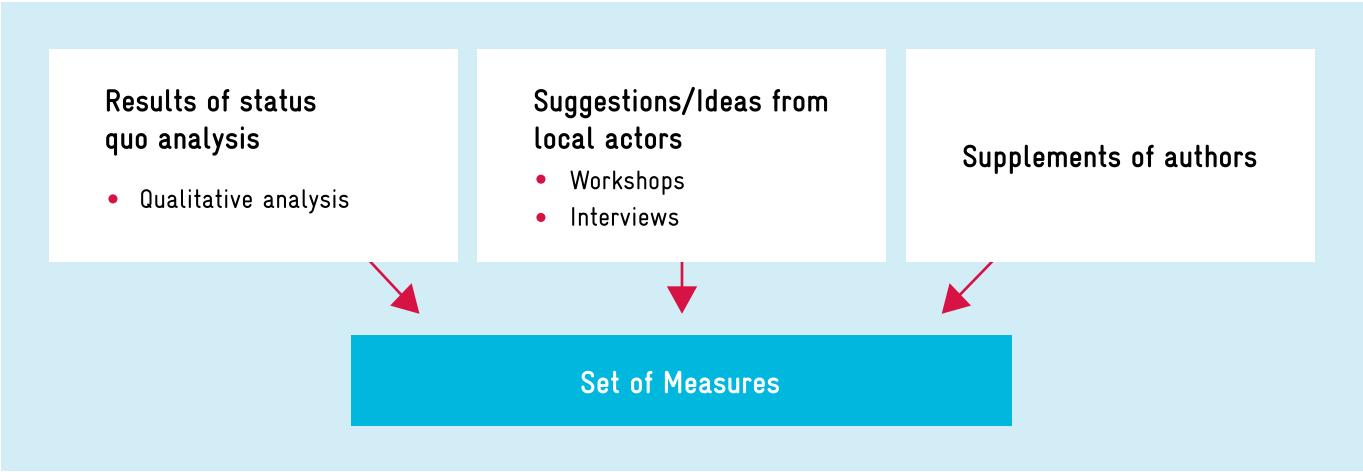


Figure 19: Sources to identify measures

5.1.2 Selection and evaluation of measures

Due to the limited resources of the municipality for implementation, a selection process already starts during the collection and development of measures. In principle, the measures do not only represent themselves, they are interrelated and interact with each other. The various impact approaches, the duration of the impact and the actors influenced must be taken into account.

Many measures only can be effective as a combination of various coordinated activities ("instrument mix"). For example, the provision of information and the networking of relevant actors can contribute to the successful implementation of a municipal funding program.

There are a number of possibilities for evaluating climate measures. In addition to economic criteria (e.g. level of investment costs, operational or economic viability or GHG avoidance costs), the level of GHG reduction over the duration of the measure and the degree to which specified targets have been achieved also play a role. In addition, the social compatibility is important (acceptance by politicians, administration, external actors and the population in general). Last but not least, it should also be taken into account whether measures contribute to the implementation of strategies and make use of the municipal room for action.

To improve the manageability, some factors are listed below as core elements (see Table 4) and can be supplemented by further criteria. The evaluations can be presented graphically for an overview.

Table 4: Different factors to evaluate climate action measures

Factors \ Level	High ← → Low
Priority	Subjective/political evaluation in consultation with local actors and on the basis of success factors (see next subsection).
Depth of effect	Duration (how long does a measure help) and intensity (how many actors are reached) of the impact of a measure.
GHG savings	Savings potential (absolute) or compared to the total savings potential.
GHG avoidance costs	The lower the cost of a measure the higher the valuation.
Investment cost	The lower the cost of a measure the higher the evaluation.
Valuation of side effects	The more positive side effects (air pollution control) the higher the rating.
Acceptance by the target group	The acceptance of the target group addressed (e.g. private homeowners)

The assessment of the priority of actions is highly subjective. In Germany it has proved successful to determine the priority on the basis of different success factors. Individual measures contain one or two of the following factors. A balanced set of measures contains measures that take all factors into account:

Rapid success

The implementation of the measure promises rapid and communicable success within one year. On the basis of these instances of success it will then be possible to develop measures where the effects only become visible in the medium and/or long term.

Visible success

The success of these measures can be presented to the public. In addition, this success also entails cost savings that can be communicated.

Broad impact

The more actors are affected positively by a measure, the more accepted the measure is (depth of impact).

Added value

Measures should be included where local actors have a direct personal added value. This makes climate action attractive for local actors.

In all, about 40 to 100 measures are commonly available for municipalities. The number of measures depends on the implementation capacities of the municipality. The smaller the municipality, the fewer measures are recommended. The essential characteristics of the individual measures are collected in a measure sheet. Measure sheets have proven to be advantageous and manageable. They summarize the essential elements on about half a page to a full page. These include at least the evaluations from above, a brief description, the actors involved, costs and the next steps (see Figure 20).

Figure 20:
Example of a measure sheet

Energy management and renovation roadmaps S1

Description of measure							
The previous intention to refurbish up to 8 more buildings per year in the future is not sufficient to achieve the ambitious climate targets. The focus will increasingly be on buildings with high energy values and high consumption, and the refurbishment rate will be increased to at least 20 buildings per year. As part of the measure, energy figures will be generated for at least 50% of all municipal buildings and building renovation schedules will be drawn up. Based on this, an implementation plan is drawn up for the 150 most urgent refurbishments within a timeframe of max. 8 years. Every year, this plan is supplemented by the number of further buildings that were renovated the year before. In addition to this long-term planning, consumption is constantly monitored. All data are evaluated annually and presented in an energy report (every 2 to 3 years). In the medium term, four positions should be provided for municipal energy management, as the energy costs saved are demonstrably about three times as high as the personnel costs.							
Start	From 2018		**Duration**	Permanently			
Costs (one-off)	0 €	Municipal administration, energy management					
Costs (yearly)	240,000 €	Local energy supplier					
Actor / Initiator	Municipal administration, energy management						
Further actors	Local energy supplier						
Rating	Priority	●	●	●	●	●	
	Depth of effect	●	●	●	●	●	
	GHG reduction potential of the measure	●	●	●	–	–	
	Efficiency in terms of start-up costs	–	–	–	–	–	
	Economic viability of the measure	●	●	●	–	–	

Once the catalogue of measures has been selected, evaluated and summarized in the form of sheets, a priority plan and timetable for a the coming years should be developed, outlining which financial and human resources are needed within the administration in the short and medium term for local climate action. In addition, the overview can be used to better coordinate the overall SECAP package. For policy-makers, this plan provides a rough idea of whether additional funding is required in the future and when it is time to create new staff positions, if possible.

5.2 Operational advices from German experiences for developing measures

Policy makers for SECAP accompaniment

Clarification based on objectives: what are the local climate action strategies → Definition of the overarching strategies and action priorities (e.g. climate friendly mobility or 100% renewable energies for the city) for the SECAP developers;

Start a new way of thinking in the government: enabling the development of interagency measures (climate action as a cross-cutting task) in SECAP preparation;

Clear specifications for the development of measures (level of ambition, priorities, financial framework);

Regular examination of the strategy and measure proposals by the administration;

Invitation of important local stakeholders (companies, energy suppliers) to develop measures. This increases the chances of implementing SECAP measures;

Regular discussion of draft measures in expert committees to increase the chances of implementation;

Two-part adoption of SECAP:

- Adoption of the overriding long-term strategy as a central theme;
- Adoption of the timetable of the catalog of measures (the implementation of the measures is usually checked individually when they are due).

Administration staff for SECAP development

The following aspects have proven successful in the development of measures in Germany:

Sufficient time is approved for the collection of measures for prioritization (at least 6 months);

Focus on municipal options for action also takes into account measures from other levels;

Lessons learnt from previous actions (see qualitative analysis) will be taken into account;

Experiences of external experts from other municipalities will be included;

Important local stakeholders will be involved (through interviews and workshops);

Selection of measures according to several criteria;

The set of measures contains a mix of different approaches to actions;

Description of the measures on a maximum of one page;

The description of the measures sets out the next steps and the responsible actors (the actors have been involved in the preparation of the measures);

Overview of measures with a schedule and cost plan;

Policy approves objectives of the municipality and catalog of measures separately from each other.

5.3 Measures and local actions for different sectors

There are many ways to divide sectors and fields of action into SECAPs. Whether those sectors or fields of action are technology-based (electricity, buildings) or stakeholder-based (private households, industry) is irrelevant as long as all aspects of climate action are taken into account. In the following, various fields of action are presented according to the subsequent system:

Energy consumption

mobility, buildings, industry

Energy supply

Cross-sectional sectors + fields of action

urban planning and awareness raising

This division attempts to fully reflect both the energy consumption and supplier side and it takes into account the aspect of considering climate action as a cross-cutting task.

5.3.1 Urban planning - integrated planning for local climate action

Introduction (opportunities and links to other fields of action)

Like climate action, urban planning is a cross-sectional topic as well. In urban planning several energy consumption sectors and the energy supply are affected (see following overview). Urban planning and the creation of a SECAP are two different processes in a municipality. When creating a SECAP it is important to consider the parallel processes in urban planning.

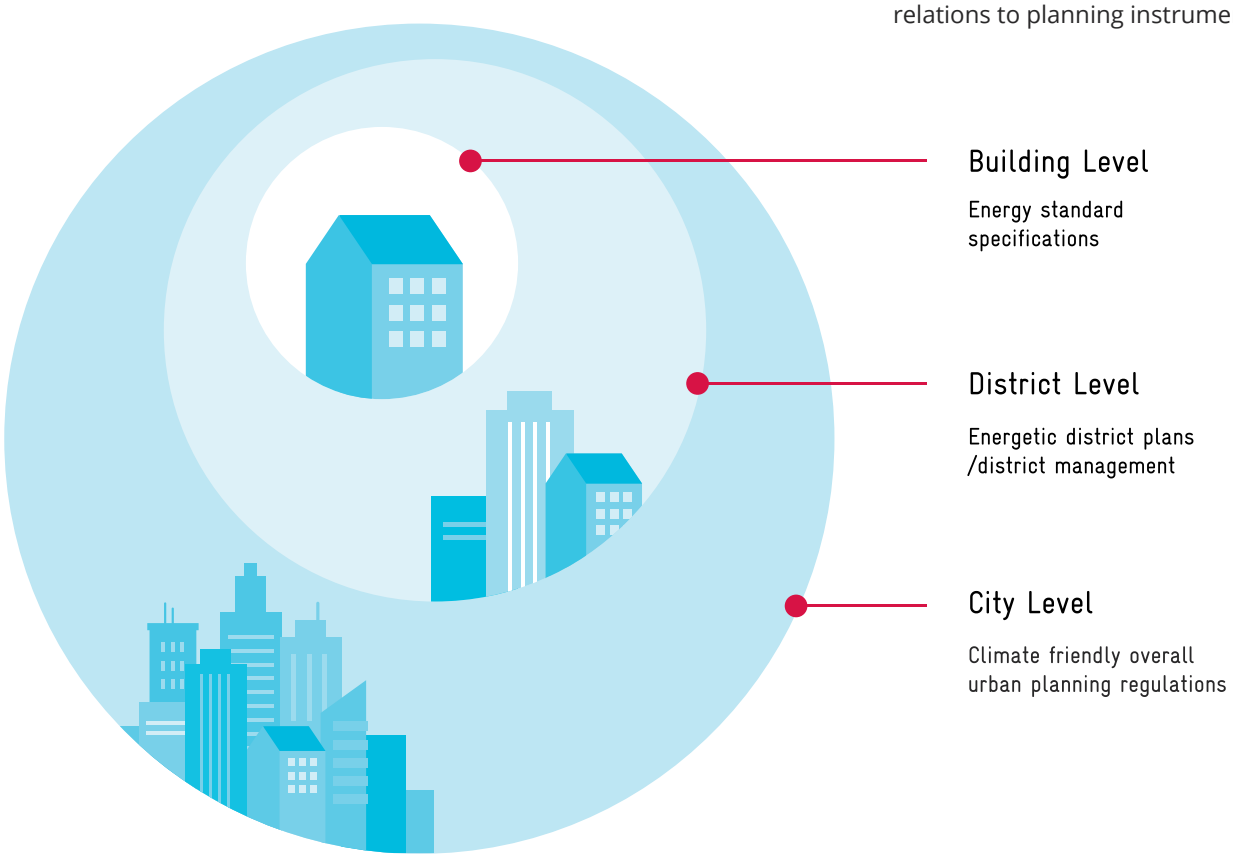
Table 5:
Levels of influence in urban planning (based on ebök (https://www.energieatlas.bayern.de/file/pdf/782/Leitfaden_Klima-schutzundstadtplanung_Augsburg.pdf))

Impact	Measure	
Very big	Energy Supply Urban density Orientation of buildings Mutual shadowing Wind shield	
Big	Energy-efficiency building standards Building compactness Thermal insulation	
Big (Mostly project planning)	Thermal bridging Shadowing by trees Ventilation strategy Building tightness Water and electricity demand	
Little	User behavior	

Direct and indirect effects of urban planning, climate and energy-friendly actions appear are visible at three spatial levels (see Figure 21):

- Macro level and the overall urban perspective;
- Meso level with the district and neighborhood perspective;
- Micro level representing the level of a building itself (elaborated in chapter 5.3.3).

Figure 21: Three spatial levels and relations to planning instruments



A successful SECAP should consider the following aspects in the field of urban planning:

- Current plans are taken into account and taken up in the SECAP;
- There are measures that complement urban planning (preliminary planning) and focus on climate action;
- Different sectors and fields of action are taken into account;
- Urban planners are involved in the creation process and different interests are taken into account.

Possible actions of the municipality

Urban planning in Germany is mainly regulated by the National Building Code. The regulatory possibilities of a municipality are usually limited by this. However, the development of a SECAP should not only take these types of measures into account, but also support regulatory measures with a mix of further measures (e.g. public relations work, accompanying funding programs and networking of actors promote the acceptance of measures).

The different possibilities will be presented in the following Tables 6-10 on the basis of the different roles and types of measures of municipalities in Germany. They are only examples for the possibilities of municipalities.

Table 6: Planning and Regulating

Type of measure	Measure	Target/Description
Planning/regulating	Energy-efficient building	Within the framework of new construction planning, higher energy standards can be demanded on land in municipal ownership.
Regulating	Energy-efficient development of areas	Definition of the orientation and compactness of the buildings as well as the building density.
Regulating	Provision of land for renewable energies	In land use planning, various open areas are provided for renewable energies.
Regulating/planning	Linking with adaptation strategies	Adaptation strategies are also already incorporated into land use planning (e.g. across green belts).
Flanking	Integrated planning	The specialist departments are supported in their planning by taking into account the needs of various actors (industry, housing, public transport) and the interlinking of energy consumption, mobility and erngy supply.

Table 7: Promoting and Advising

Type of measure	Measure	Target/Description
Flanking	Quarter/district management	A district management ensures intricate climate action measures (energy production, energy consumption, traffic) within districts. The measures are adapted to the respective districts and residents.
Flanking	Energetic quarter/ district plan	An energetic district plan is a SECAP at district level. An analysis and investigation of the potential is linked to measures. These are specifically tailored to the district and the local actors.
Flanking	Prioritization of quarters for energetic redevelopment	Investigation of different districts in the city. Indicators are used to prioritize districts that are particularly important for climate action.
Flanking	Development of an urban planning vision	Together with important local actors, a planning vision for the city is developed (e.g. city of short distances, city of green spaces). This forms the basis for the decisions of the city and for the implementation of definite projects.
Funding	Promotion of climate-friendly elements of land development	Climate activities that go beyond the specifications of urban planning are promoted. For example, the reduction of parking spaces per residential unit, implementation of particularly high building standards in buildings.
Funding	Flexible living and reduction of living space	Promotion of new and innovative forms of housing that decline the consumption of land (e.g. multi-generational houses, tiny houses).

Table 8: Networking

Type of measure	Measure	Target/Description
Flanking	Exchange meetings between important urban actors	Urban planning, traffic management and energy suppliers have a format in which they can regularly exchange ideas on a cross-cutting basis and on special projects.
Flanking	Regular district meetings	Organization of regular meetings at district level in order to improve the implementation of measures from the district concept and to take into account the needs of local actors.

Table 9: Consuming

Type of measure	Measure	Target/Description
Technical	Using the climate action opportunities of public buildings	Testing how far public building stocks serve as the nucleus of climate-friendly neighborhoods (e.g. via CHPs).

Table 10: Providing

Type of measure	Measure	Target / Description
Planning	Integration of local housing companies	Local housing companies will propose particularly climate-friendly solutions for new construction projects. They are exemplary when it comes to district refurbishments.
Planning	Integration of local energy supply companies	Local energy supply companies are required to introduce the most climate-friendly solutions into the planning process when developing new buildings. GHG-free solutions should also be integrated into district refurbishment.

When a SECAP is set up, relevant technical planning and other local issues should be addressed and continuously reviewed. A climate-friendly vision of urban development for a city as a whole should be developed jointly in this cycle. It should also include the basic principles and specifications for all future spatial planning.

On the basis of this vision, new quarters will have to be developed in the future. The necessity of a district concept for different districts should be examined on the basis of set indicators (e.g. age and energy consumption of the existing building stock). Climate adaptation strategies should also be integrated in today's planning.

Best Practice Example

Freiburg - integrating energy aspects in urban planning

Background

Based on the city council decisions in the early 1990s, Freiburg developed two new pilot districts for up to 20,000 inhabitants, piloting reduced energy demand of all buildings and connecting them to district heating based on co-generation. Unfortunately, the local administration did not apply these standards regularly for further new developments, as there was no procedure in urban planning processes. A joint responsibility of urban planning and energy departments was defined to develop the project.

Procedure

The outcome of several negotiation rounds, involving energy experts and the local energy agency, called the "instruments for climate action in land use planning" is based on three pillars:

- Within the development plan, passive-solar aspects have to be considered at the design stage and provision has to be made for solar installations.
- The "Freiburg building standards" are to be implemented when selling urban land as well as in all new development plans. – Residential and Office buildings
- In the context of energy concepts, variants of the energy supply (inter alia decentralized – central) are examined. In addition to CO2 emissions and air pollutants, the economic aspects are taken into account (total annual costs: investment, energy and operating costs). The most ecological variant is to be implemented, provided that it is not more than 10% more expensive than the respective basic variant.

Focus

In 2004, with the amendment of the German building code, it was decided that land use plans could and should integrate measures in order to mitigate climate change. Because fighting climate change was part of the SECAP of Freiburg, the mayor (in agreement with the city council) commissioned the local administration not only to assess the impact of this amendment but also to suggest how the intention of the new code could be translated into urban planning procedures in Freiburg. For this purpose, a task force – including urban planning, real estate and energy departments – was put together.

The task force also suggested integration of these basic aspects early on in urban planning processes and fixing the results of the procedure in the context of purchase contracts or urban contracts with investors or property owners.

Both the mayor and the city council adopted the proposal unanimously as an integrated part of Climate Cities "urban planning policy principles", a catalog of requirements to be considered for all new construction areas.

Results

Since then, the members of the task force have been meeting regularly to discuss all new district plans and developments concerning the integration of energy aspects into the early planning stages; this includes urban competitions.

New district developments will only be approved by the city council if they contain statements and suggestions for climate action.

The procedure has been successfully integrated without allowing the planning process to take up more time.

5.3.2 Energy supply - connecting local demand and supply

Opportunities and links to other fields of action

The concept of a climate-friendly regional energy supply system is based on the local energy consumption structure. In order to achieve security of supply, energy generation plants must be planned in a way that makes them economically viable not only today, but also in the future. Therefore, future energy consumption must also play a role in a SECAP. To this end, attempts will be made to model where (mapping) and when (load profiles) electricity, heat and cool consumption will occur. Ideally this will be done for several years into future (5, 10, 15 years), to estimate future developments of energy consumption.

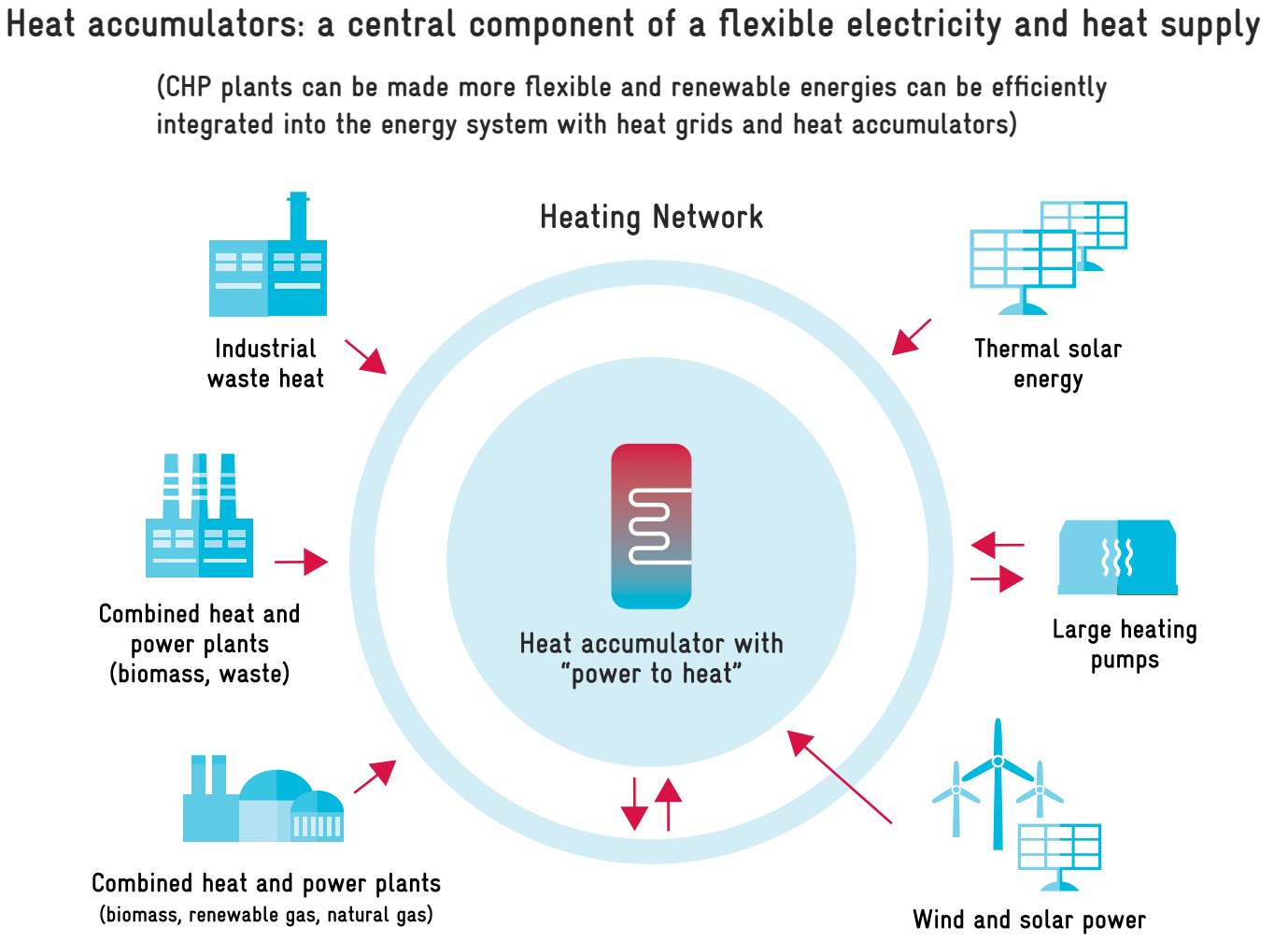
Planning of the future energy supply required a decision of the balance between a decentralized (e.g. solar thermal) and centralized (district heating) energy supply. In Germany, the main challenge is increasing decentralized power generation, feed-in management and grid utilization. Most of these problems have to be solved primarily at the federal level. The focus of energy supply in SECAPs is, above all, on the local cooling and heat supply.

Impact	Measure	
Very big	Energy supply in public buildings Energy demand of new development areas (urban planning; e.g. urban density) District heating in new development areas (connection and compulsory use) Expansion of renewable energies (designation of areas)	
Big	Overal heating and cooling strategies (heat utilization plans) Decentralized energy supply (e.g. supporting CHP-plants)	
Little	Strategic planning of local energy suppliers Energy demand and supply of local stakeholders (e.g. companies)	

Table 11:
Levels of influence for municipalities in the energy supply

SECAPs must also take into account aspects of sector coupling. In particular, heat storage offers municipalities the opportunity to combine electricity and heat generation optimally at the local level (see Figure 22). This sector coupling will become more important in the future with the increased use of renewable energies.

Figure 22: Relevant aspects and interaction of an integrated heating supply system (Based on Agentur für erneuerbare Energien e.V.)



A successful SECAP should consider the following aspects in the field of energy supply:

- All local energy suppliers are involved in the process of creating measures;
- Decisions are substantiated in a heat utilization plans;
- Current plans (e.g. for grid expansion) are taken into account;
- Decentralized and centralized supply options are investigated and, if necessary, combined;
- Far-reaching view and link with (future) energy consumption;
- In addition to economic efficiency, climate aspects are also included in the evaluation (which energy generation is linked to the lowest GHG emissions?);
- Inclusion of larger industrial companies or operators of industrial parks (waste heat);
- The local heating and cooling supply is provided for the entire municipality. Heat storage tanks are included in the planning accordingly.

Possible actions of the municipality

In Germany, policies regarding electricity generation and energy storage are developed on the national leve while the measures have to be supported and implemented on a municipal level. In particular, for the expansion of decentralized renewable energies (wind and solar energy), municipalities have an important role to play (especially in land use planning and the provision of sites). In addition, it is planned by the Federal Government that municipalities in Germany have more control over the planning of renewable energy plants and can also directly profit from these plants financially in the future.

Heat consumption and heat generation are local plans on which municipalities have a direct influence. The implementation, however, resides in the local energy consumers and energy suppliers. The essential role of the municipality is to bring these actors together and use the approaches of the municipalities to encourage climate-friendly action. To this end, the municipalities draw up specific plans (heat utilization plans). These include current, medium and long-term planning for heating and cooling supply. For this purpose, all relevant actors are involved and the municipality is involved in various districts.

The different measures will be presented in the following Tables 11-15 on the basis of the different roles and types of measures of municipalities in Germany. They are important examples for the possibilities of municipalities.

Table 12: Planning and Regulating

Type of measure	Measure	Target/Description
Planning	Existing and new buildings: preparation of heat utilization plans	Overview of (future) energy consumption and production for the entire municipality and specific quarters.
Regulating	New construction: obligation to use district heating (compulsory connection)	Improving environmentally-friendly solutions and economics of scale via legally binding land use plans within the process of land use planning.
Regulating	New construction: orientation of the buildings to the south for the use of solar energy	Increasing use of solar energy through a development plan. The orientation of the building can be consistently oriented towards the south. This enables both passive and active solar use.
Regulating/planning	Climate friendly land use planning	Designation of areas for wind power, surface solar plants, biomass plants.
Regulating	New and existing buildings: prohibition of certain heating systems (e.g. heating oil)	Priority over conventional generation is possible. Reducing the use of fossil fuels (also to improve local air quality).

Table 13: Promoting and Advising

Type of measure	Measure	Target/Description
Information	Advisory services for private investors of decentralized plants	Support of operators of decentralized plants (promotion, planning support, identification of plant constructors). The advisory services can have different depths of information.
Public relations	Public campaigns for promoting renewable energies	Public campaigns over different time periods can be combined with other approaches.
Flanking	Training/education for engineers and craftsmen	The training of service providers as well as the appointment of planners and tradesmen serves quality assurance in plant construction. The service providers can also be trained to advise private owners.
Flanking/ information	Provision of central information for potential investors	The development of a solar atlas or heat density maps make it easier for small investors to make investment decisions.
Funding	Promotion of plants and networks	The municipality pays some of the investment costs for decentralized plants and local heating. Trans-regional support programmes can be supplemented. This reduces the economic risks for small private investors.

Table 14: Networking

Type of measure	Measure	Target / Description
Structuring measure	Central contact person and organization of networks	The office creates the basis for all further measures, has an overview of all relevant energy supply planning within the municipality and is the contact person for local actors.
Flanking	Regular exchange on planning between different actors	Exchange of private actors on planning (possibilities of cooperation for synergy effects) as well as municipal planning.
Flanking	Integration of all relevant heat generators in local planning	In (municipal) planning, round tables (collection of ideas) guarantee the exchange with local actors. During the implementation of definite projects, small group meetings are organized for optimal exchange.

Table 15: Consuming/Generation (of climate-friendly energy)

Type of measure	Measure	Target/Description
Technical	Installation of renewable energy systems in public buildings	Increasing renewable energies secured by consistent use of renewable energies in public buildings; improving image of local government.
Technical	Use of municipal buildings as a connection point for local heating networks	Expansion of local heating networks. Mixed areas with residential buildings as a centre for a local heating network. The economic efficiency of CHP units can be achieved more quickly by varying the load curves of the different consumers.
Public relations	Use of green electricity	Promotion of the development of renewable energies outside the city limits. The municipality serves as a model for the purchase of renewable energies.

Table 16: Providing

Type of measure	Measure	Target/Description
Accompanying and funding	Focus on expansion of renewable energies at local municipal companies (e.g. housing construction companies, energy suppliers)	Exploiting the municipality's climate action opportunities by investing in municipal companies. Municipal companies are obliged to give preference to renewable energies in new buildings. Municipal energy suppliers are obliged by politicians to guarantee local energy production with a high proportion of renewable energies.
Accompanying and funding	Focus on expansion of renewable energies in investments by municipal companies outside the municipality	Securing a consistent climate action strategy of the municipalities beyond the city limits.
Accompanying and funding	Developing public-private partnerships for focusing on a climate-friendly energy supply	Involving private partners in local climate-friendly projects. Need of local government leadership to ensure long-term cooperation, involving local and regional stakeholders.

A municipality has great potential for energy supply by accompanying networking and informative measures.

When setting priorities in SECAPs, caution is advised to ensure that the planning basis for the future is in place (heat utilization plan). The relevant local actors should also be identified and involved.

It is recommended that the development of the plan should be initiated by a central contact person who is permanently involved in the local administration. This person can then support and connect actors in the implementation of projects and promote various measures in the administration.

A relatively new approach in Germany is to focus on municipal companies. In these, political representatives who are on the supervisory boards of these companies are obliged to demand climate actions in these companies. Thus, the climate-friendly actions of companies affect the entire direct area of responsibility of a municipality.

Best Practice Example

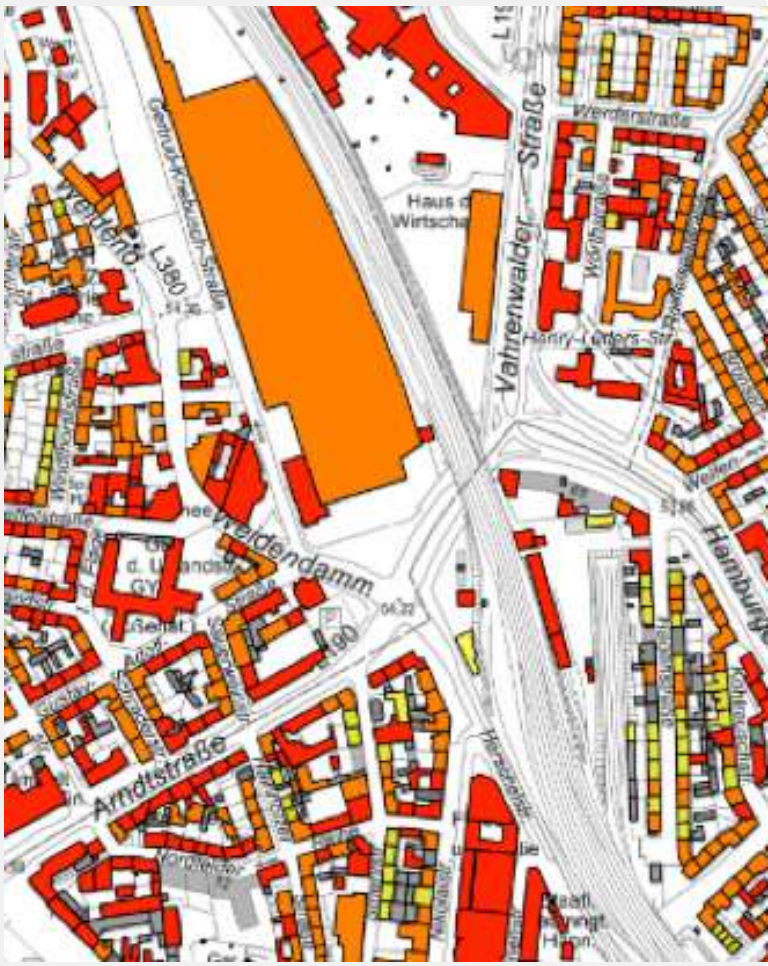
Promotion of solar energy in Hannover

Background

The city of Hannover is currently setting the new target for 2050, reducing 95% of greenhouse gas emissions and saving 50% of energy consumption, based on 1990 figures. For these ambitious goals, the city developed the "Masterplan 100% Climate Mitigation". The plan was adopted by the Regional Assembly and the Council of the City of Hannover across party lines.

Focus

As early as in 2011, the city of Hannover started a solar campaign to significantly increase the proportion of renewable energies in the city. The goal is to install one million square meters of solar modules by 2020. With the new target of climate neutrality, the generation of renewable energy became an additional focus, because it is intended that 44% of the electricity demand is covered by solar energy by 2050. This is based on the assumption that high-performance storage systems will be available to safeguard supply reliability and intelligently steer energy flows.



Source:
City of Hannover (https://www.hannover-gis.de/GIS/?thema=36)

Procedure

First, to provide adequate information about the general appropriateness of buildings, the city elaborated a solar atlas. Citizens and enterprises can easily access the atlas on the city's home page for a first general check and to see if their building(s) fit for solar generation (red=high potential, orange=potential, yellow=low potential). With this website, the city addresses and motivates owners of buildings with big flat roof areas to invest in solar energy.
In a second step, the city offers "solar checks", which are free of charge consultation sessions for residential and commercial buildings and areas. Within each check, the first assessment is specified and static conditions of the roof are examined.

Third, the city advises and consults interested investors on financial aspects and calculates figures including loans and subsidies, providing an eight step approach to implementation.

Moreover, the regional climate fund "proKlima", financed by the city of Hannover, several regional cities and the regional energy supply company (yearly budget for different measures to save energy or produce environmentally-friendly-energy: nearly 4 million euros in 2018), provides subsidies for installation of photovoltaic and solar thermal appliances.

Special events accompany the program. In 2018, in cooperation with the chamber of industry, a specific workshop for enterprises was organized, providing information for economic solutions for businesses, as costs for PV modules dropped significantly over the years.
A large number of photovoltaic systems are operated on urban roofs. In addition to city-owned systems, Hannover offers city-owned roofs to private investors for photovoltaic use. So far, 17 school roofs have been made available for usage. As a rule, the facilities were financed through citizen participation funds. Furthermore, a "solar-roof-exchange-platform" brings together private investors and private providers of roofs who are not able or willing to invest themselves.

New development plans include solar optimization aspects. Thus, buildings are best orientated towards the sun, improving solar gains from solar installations and defining requirements for the use of solar energy.

Finally, and to find ways to exploit all possible options, the city commissioned a study to determine options for vertical solar facades.

Results

The combination of different instruments to motivate citizens to invest in solar energy (information, advice, consultancy and incentives) has proved to be useful.

Nevertheless, changing frameworks and experiences have to be integrated flexibly. Based on the background of consulting experience, as investment in solar energy depends on the quality of the roof and improvement of roofs should be combined with saving measures, for 2019 the "proKlima" fund offers combined subsidies "roof retrofit and solar".

Experience shows that especially local craftsmen, banks and energy suppliers benefit from the initiative as part of the regional value chain.

Link

www.hannover-auf-sonnenfang.de

5.3.3 Buildings – energy efficiency in the local building stock

Introduction
(opportunities and links to other fields of action)

Heat consumption in buildings accounts for almost 40% of total energy consumption in Germany. In addition, there is the electricity consumption within the buildings. Consequently, the reduction of final energy consumption in the building sector contributes to fighting climate change and to reducing the dependence on fossil energy sources.

Most of the building stock in German municipalities was built between 1945 and the end of the 1970s. There were no building energy standards at that time, meaning that a large part of the heat consumption is seen in these building types.

In Germany, the yearly energy consumption of buildings has decreased from approximately 300 kWh/m²a in the 1960s to 15 kWh/m²a today (see Figure 23). Although the passive-house standard or similar energy standards require higher investments (including existing supporting framework in Germany) of about 10-15%, the reduced energy demand will pay for itself in the first third of a building's life span.

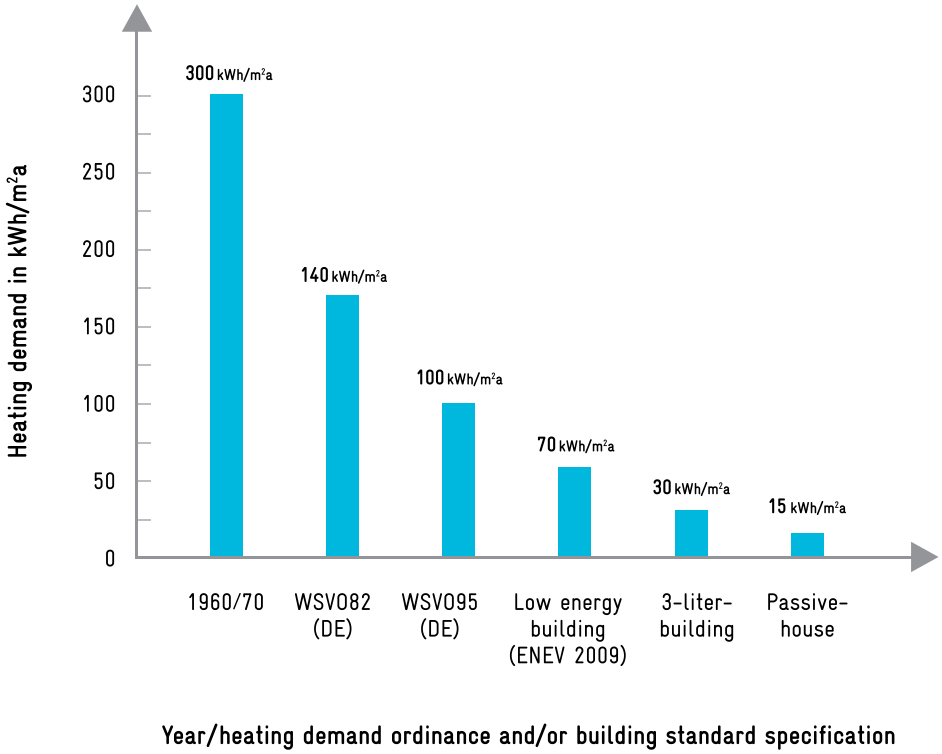


Figure 23: Development of new building standards in Germany since 1960

Building standards and major support programs are defined and developed at the national level. However, municipalities have access to local building stock and can support the reduction of energy consumption in the building sector in different ways.

Initially, these include measures to support the technical implementation of new construction and refurbishment. Here, measures can be developed which motivate the building owners to build or renovate in an energy-efficient way through various approaches. Refurbishment issues and developments in energy consumption should be closely coordinated with energy supply issues. Here, municipalities can act as networkers for the respective actors (see previous chapter).

In addition, close coordination with urban planning is particularly important in new development areas. Urban

planning has an influence on the energy demand. Here, questions about the orientation of buildings or their compactness can minimize future energy consumption. The foreseeable energy demand and energy supply must also be considered when developing larger areas.

Table 17: Influenceable factors in the building sector

Impact	Measure	
Very big	Energy efficiency in public buildings Demonstration projects	
Big	Strengthening of the supply side for energy efficiency (craftsmen, planners, architects) Promotion of quality and acceptance in new buildings and renovations Advanced local energy standards High energy standards in new development areas	
Little	User behavior Purchase and use of energy-efficient products Refurbishment of buildings of different stakeholders	

In addition to technical aspects, the energy consumption of buildings ultimately also depends on the user behavior of the residents. In the chapter Awareness raising, possibilities for municipalities within the framework of SECAPs are shown.

A successful SECAP should consider the following aspects in the field of building:

- Analysis of the building stock and development of a renovation roadmap for the local building stock;
- Consideration of high (individual, local) building standards in the construction of buildings;
- Meaningful additions (incentives) to national measures/support programs;
- Combination of measures and approaches for motivated end users;
- The municipality as a role model: demonstration objects for (ambitious) and high individual energetic building standards;
- Inclusion of the supply side (trades, construction companies, planners, architects);
- Inclusion of important actors (e.g. municipal housing companies).

Possible actions of the municipality

The municipal level has two important advantages compared to higher levels in the field of buildings: the local building stock is known and the executing actors are on site. Therefore, the focus of the measures of a SECAP should be on these aspects and the focus should be on measures that are tailored to the local situation.

Both the demand side (house owners, housing associations) and the supply side should be motivated with appropriate measures to make the building stock more energy-efficient. The different possibilities will be presented in the following Tables 16-20 on the basis of the different roles and types of measures of municipalities in Germany. They are only important examples for the possibilities of municipalities.

Table 18: Planning and Regulating

Type of measure	Measure	Target/Description
Planning/ regulating	Energy-efficient buildings	Within the framework of new construction planning, higher energy standards can be demanded on municipal land.
Regulating	Energy-efficient development of areas	Definition of the orientation and compactness of the buildings as well as the building density.

Table 19: Promoting and Advising

Type of measure	Measure	Target/Description
Information / Accompanying	Different information formats	Clients receive different levels of energy advice at different stages. From the first ideas to implementation, we can rely on free external expertise. Central coordination of energy consulting for various clients. If possible, all aspects of energy consulting are taken into account (new construction, refurbishment, new purchase of equipment).
Technical	Local building standard	Definition of an ambitious local building standard with definite stipulations, which all local actors can fit in with. Together with local actors, a local energy standard for buildings will be developed. In addition to energy aspects, the focus will be on quality and optimized transfer between the different crafts.

Table 19 (Continued)**:** Promoting and Advising

Type of measure	Measure	Target/Description
Public relations	Campaigns for energy efficiency	The local standard is advertised regularly. Owners receive information about the local standard from the beginning and advertising is made for actors who implement the standard. Local actions draw attention to inefficient local councils (e.g. search for the oldest refrigerator).
Accompanying	Technical Assessments	Promote and support energy audits for existing buildings to identify and plan retrofitting actions
Accompanying/ information	Technical trainings	Organization of technical training sessions for experts (architects, craftsmen, engineers, caretakers) on all levels including responsible public officials; not just in theory but demonstration on real objects during e.g. insulation process.
Funding	Local building promotion programme	Useful local supplementation of national funding programs (e.g. to promote local standards) in order to promote the local standard, technical elements (e.g. windows) or process elements (e.g. quality assurance) and promotion by the municipality.
Funding	Local funds	Reduction of up-front payments for better standards local governments may liaise with local financial institutions, so that low-interest loans are available for energy efficiency and renewable energies.

Table 20: Networking

Type of measure	Measure	Target/Description
Structuring measure	Central coordination of measures and actors	A central contact person ensures the exchange of actors as well as the initiation and further development of measures in terms of content.
Accompanying	Energy consultant network	An energy consultant network exchanges information on new aspects and problems and develops standards.
Accompanying	Exchange formats for actors	Different local groups of craftsmen, planners, architects and builders coordinate themselves better in exchange formats.

Table 21: Consuming

Type of measure	Measure	Target/Description
Structuring measure	Municipal (buildings) energy management (MEM)	Establish standards for monitoring and management of energy to improve efficiency in a systematic and sustainable way.
Technical	Demonstration projects	Showcase of ambitious new energy-efficient buildings and retrofitting of existing buildings with high standards.
Public relations and information	Presenting successes in public buildings	City as role model; Information for different actors (craftsmen, planners, homeowners, builders); image improvement across city borders.

Table 22: Providing

Type of measure	Measure	Target / Description
Accompanying and funding	Energy standards at municipal housing company	Both new construction and renovation of residential buildings are carried out to the highest standards (exemplary effect).

A central contact person is also very important in this field of measures. This person develops a rough renovation schedule for the buildings in a municipality. Further measures can be developed on the basis of the renovation timetable.

In this field of action, many measures build on each other or complement each other. For example, a municipal funding program is not very effective if it is not well-known and the users have no clear added value. If, however, the support program is presented at the right time during an energy consultation and higher (local) standards are thereby achieved, then it becomes significantly more effective. At the same time, the implementation of high energy standards can also become more attractive through an associated funding program.

Best Practice Example

Implementing passive house standard in a new city quarter in Heidelberg

Background

As Heidelberg is a growing city, the need for a new district was obvious. When the German Railway abandoned a former freight area in the late 1990s, the city took the window of opportunity to plan a new district "Bahnstadt", which is close to the city center (the historic city center is only two kilometers away). A development agency was founded especially to purchase the whole area, so the city was in a position to determine and develop the area according to an area-based development concept and of course according to its climate goals. The mixed-use area, which is residential, commercial and scientific, provides space for nearly 7,000 inhabitants and 6,000 work places.

Focus

In the new "Bahnstadt" district, the buildings are spread over a total of 116 hectares have a particularly high efficiency standard (passive house standard). The buildings only consume a quarter of the amount of energy set as legal standard. Energy is supplied by a renewable district heating network. Through the combination of efficiency and supply, the district becomes a zero-emission settlement based on passive house standard.

Procedure

Several factors played a role in the successful implementation of the passive house standard. A first step was the political decision for an ambitious efficiency standard in the newly designated district. This was the logical consequence of the first Heidelberg SECAP, which was passed in 1992, followed by several updates (last update in 2014). A technical energy concept for the area was an essential basis for success. In addition to the technical implementation possibilities, this also included the definition of soft measures. For example, constant accompanying public relations work (events, flyers, guided tours) created a positive image for interested customers, residents, craftsmen and planners. Financial incentives provided by the city further increased the attractiveness of the new building standard. Furthermore, an energy consultation of the building owners and planners before and during the construction phase by the municipal environmental office as well as the local energy agency guaranteed good information for all participants. A differentiated quality management system for all construction phases reduces typical implementation errors. In addition, the implementation of the structural and technical measures during the construction phase is checked on site. The energy requirement was determined at an early stage of the building application process and the actual consumption checked. Consumption today corresponds to the planned consumption.

Source: City of Heidelberg
(https://www.heidelberg.de/868070 (c) Buck)

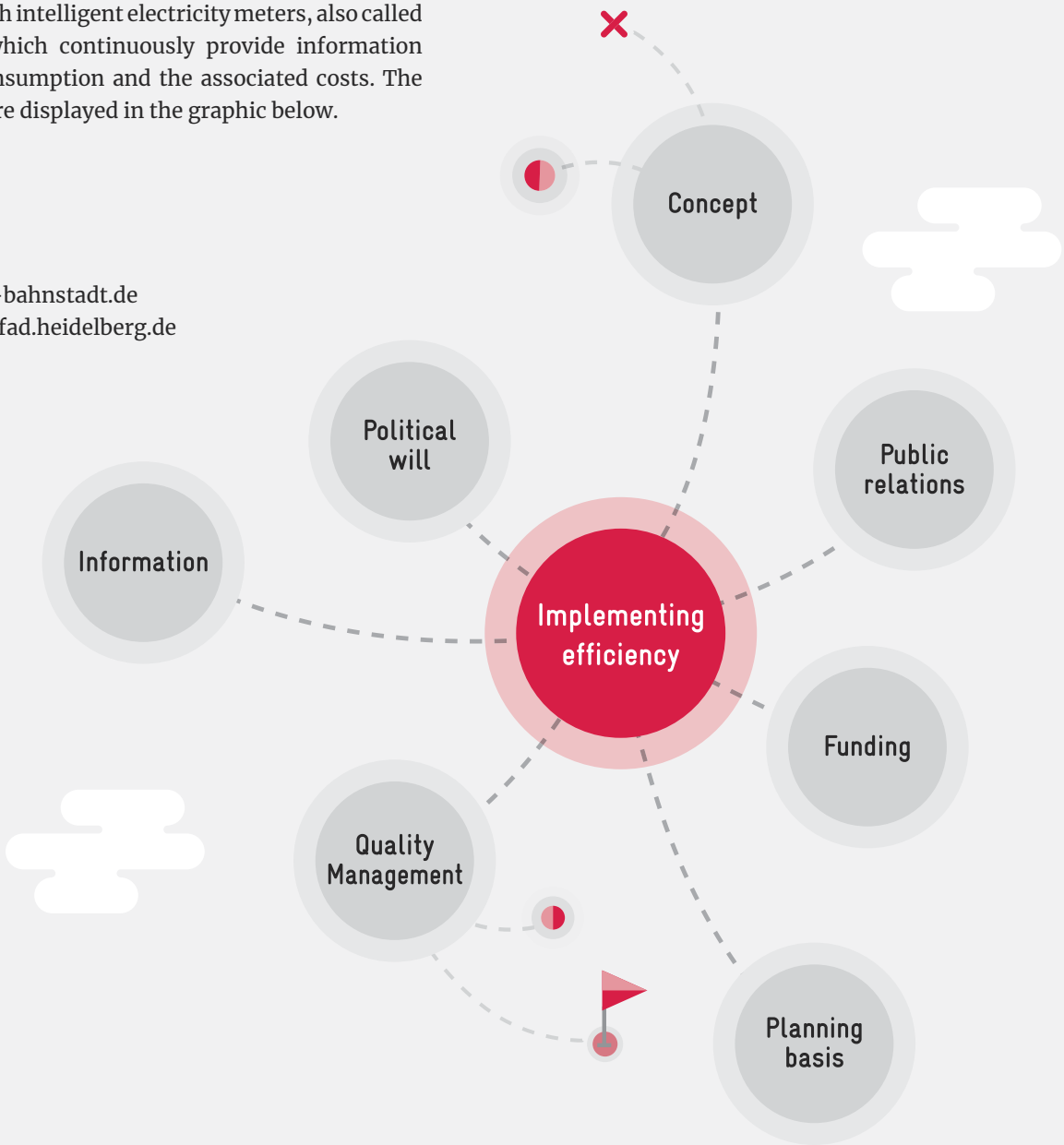
Results

An independent institute monitored the heat consumption of the residential buildings in the first construction phase. It was found that the heat consumption in practice matches with the objectives of the passive house standard. The average consumption of heating energy in the houses is around 15 kilowatt hours per year and square meter of living space. This corresponds to an energy saving of over 80% compared to existing buildings in Germany. The first residents also gave positive feed-back in a survey. Three out of four residents are satisfied with life in a passive house.

In terms of energy efficiency, Bahnstadt's households are also equipped with intelligent electricity meters, also called smart meters, which continuously provide information about energy consumption and the associated costs. The success factors are displayed in the graphic below.

Link

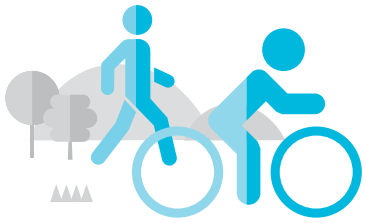
www.heidelberg-bahnstadt.de
www.bahnstadtpfad.heidelberg.de



5.3.4 Mobility

Introduction
(opportunities and links to other fields of action)

The transportation sector is the second largest global source of GHG emissions. It currently causes about 21% of greenhouse gas emissions in Germany, 95% of which are caused by road traffic. Especially in growing cities, the current infrastructure is reaching its limits. For reasons of climate action, German municipalities are currently seeking alternatives . At the same time, traffic is a very emotionally charged issue, since basically every citizen is affected in some way. The measures of a SECAP has to take this into account. Local authorities can support the three principles for climate-friendly mobility:



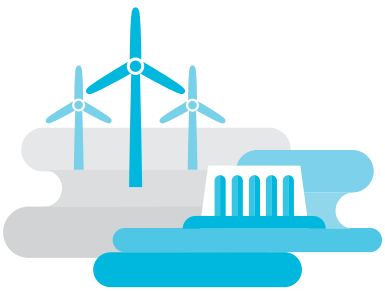
1. Avoiding and optimizing traffic

Reducing distances covered by motorized transport directly leads to a reduction of the associated energy consumption and GHG emissions. This offers the greatest reduction potential in the long term.

Improving the degree of utilization through optimization of traffic steering and coordination of different means of transport. There is a close connection with the field of urban planning. For example, neighborhoods could be planned in such a way that residents can work, shop and spend their leisure time within the quarter. In this way, commuter traffic can be avoided.

2. Shifting traffic

Low-emission and emission-free means of transport of the environmental network has a great potential for reduction, too. With a shift from cars to public transport (bus, train), GHG emissions per trip can be reduced by 40-70%. Cycling and walking is almost completely emission-free. Even GHG emissions of freight transport could be significantly reduced by shifting truck transports to the more climate-friendly possibilities, for example by collecting freight at central locations outside the municipality and then distributing it by climate-friendly transport in the municipality.



3. Improving energy efficiency and use of renewables

Regarding this point there are only limited possibilities at municipal level. In Germany, the development of propulsion and important decisions on the promotion of renewable energies are taken at national level. Nevertheless, the use of certain types of propulsion can be promoted by installing appropriate (charging) infrastructure, which is granted priority. In addition, other incentives can also be created at local level to promote renewable propulsion. In the field of electromobility, many municipalities currently see equal opportunities for interaction with the field of energy supply. Therefore, electric cars are seen as an opportunity for sector coupling with local production. For example, electric cars could serve as storage for excess electricity from renewable energies.

Table 23: Influenceable factors in the mobility sector

Impact	Measure	
Very big	Strategic planning (e.g. mobility concept) Climate-friendly municipal vehicle fleet Urban planning of new development areas Pull meassures (e.g. parking policy)	
Big	Providing climate-friendly services (e.g. car sharing, E-Bikes) Expansion of public transport Providing green infrastructure (mobility hubs, charging possibilities) Coordination of delivery traffic	
Little	User behavior of local stakeholders (e.g. staff of local companies) Commuter flows	

A successful SECAP should consider the following aspects in the field of mobility:

- Analysis of the current traffic volume (volume of vehicles, type of traffic, proportion of commuters or freight traffic);
- Analysis of measures to address the causes of transport;
- Prioritization of measures according to the order of the above principles;
- Bringing together of transport experts, local transport operators and urban planners;
- Determination which type of traffic is prioritized in which neighborhoods (if necessary, consolidation of individual implementation plans);
- Weighing up of the needs of local actors to increase acceptance;
- Developments at national level taken up and supported accordingly with communal possibilities.

Possible actions of the municipality

Municipalities in Germany have many options to control traffic measures on a planning and regulatory level. When selecting measures, a balance should be struck between support and demand (pull and push measures). Ideally, the measures complement each other (e.g. a driving ban in the city center combined with free buses in the city center). The development of goals and overarching strategies together with local actors can help to ensure the balance of the measures. Many experts are already active in municipal administration. It is therefore recommended to include this expertise at an early stage in the development of the SECAP in order to develop realistic measures and possibilities. The different possibilities will be presented in the following Tables 21-25 on the basis of the different roles and types of measures of municipalities in Germany. They are important examples for the possibilities of municipalities.

Table 24: Planning and Regulating

Type of measure	Measure	Target/Description
Regulating	Urban access regulation	Low Emission Zones: urban road tolls/congestion charges
Regulating	Parking Management	Reducing parking spaces for improving inner city quality and as a pull measure to reduce car traffic
Planning	"City of short distances"	Reduced travel distances, improved reachability and accessibility through cross-sectoral planning (urban planning, buildings, energy supply)
Planning	Preference for certain means of mobility	Bus, taxi and bicycle traffic is preferred, e.g. with extra lanes, lower or fewer tolls or when parking. Electric cars or cars with more than two persons can also be preferred.
Planing	Green infrastructure planning	Promotion of cycle paths, car-free accommodation,
Planning and Accompanying	Mobility management	Management towards multi-modality improving intersections between the different modes using synergies and overall optimization of commuting.

Table 25: Promoting and Advising

Type of measure	Measure	Target/Description
Accompanying	Sustainable Urban Mobility Plan	Defining a clear vision of and targets for the future of (sustainable) mobility. Getting a clear understanding of the roles of different stakeholders and their services (service as a means to reach the target and not a means to itself).
Funding	Motivating tariff structure public transport	Reduced or free public transport tickets as a pull measure.
Information	Awareness-raising campaigns	Increasing acceptance and use of alternative modes of transport.

Table 26: Networking

Type of measure	Measure	Target/Description
Accompanying	Network of local authorities	Bringing together all important stakeholders of mobility on a regular basis (e. g. public transport organization, mobility unit).

Table 27: Consuming

Type of measure	Measure	Target/Description
Technical	Optimizing municipal vehicle fleet (fuel sources)	Exchange of the municipal fleet with e.g. electric cars.
Public Relations and Information	Municipality as a role model	The municipal administration serves as a role model. For example, there are service bicycles and the mayor rides a bicycle or drives an electric car.
Funding	Job ticket	All municipal employees receive a low-cost job ticket for public transport

Table 28: Providing

Type of measure	Measure	Target/Description
Accompanying and funding	Public transport infrastructure, operation and vehicles	Offering a cheap and attractive public transport system (clean, comfortable, high frequency, connection to other means of transport) for an easy transition away from the car.
Accompanying and funding	Car sharing	Optimization of car usage; parking space reduction
Accompanying and funding	Mobility hubs	Promotion of multimodality (use of several vehicles), e.g. through park and ride car parks
Funding and planning	Last-Mile-Delivery with e-lorries and cargo-bikes, mobility hubs	Initiation and steering of projects, involving private enterprises

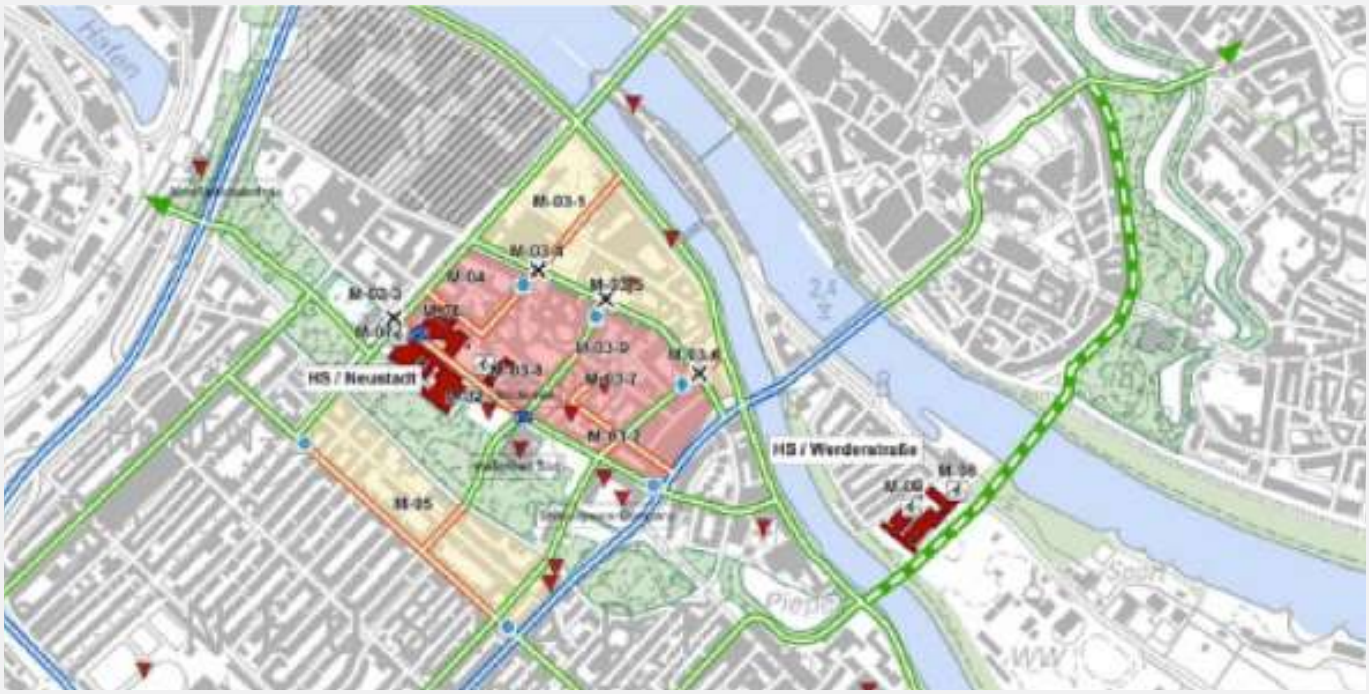
In the context of a SECAP, detailed analyses for the mobility sector are rarely carried out in Germany. However, important basic measures are being developed. A detailed analysis following the SECAP provides the basis for further refining the measures. In this analysis, means of transport should not be considered separately. Instead, the causes of the traffic flows (e.g. commuters, delivery traffic, shopping traffic, tourism, transit traffic) should be examined in detail. The implementation of measures should take into account the above-mentioned principles and focus first and foremost on traffic reduction. Since the causes of traffic flows cannot be changed by a SECAP alone, the various actors must always be offered sufficient alternatives in the event of interventions.

Best Practice Example

Bremen – improvement of local bicycle infrastructure

Background

The SECAP of the city of Bremen 2020 sets targets that make it necessary to increase the share of cycle traffic in the modal split by up to 30% or more. Despite various measures in the past, the city of Bremen has not been able to significantly increase the cycling proportion of 25%, which is already a high share for a German city with more than 500,000 inhabitants. Therefore, the city has decided to develop a bicycle model accommodation as an example and to attach it to higher-ranking bike-priority routes.



Source: City of Bremen (https://radquartier-bremen.de)

Focus

The model quarter "Alte Neustadt" is located near the city center. The main characteristic of the area is the coexistence of living and working. More than 3,500 people work in the core area and in the adjacent production sites. The university alone has more than 9,000 students and is a strong traffic generator. Additional cultural institutions generate more than 5,000 visitors a day, causing traffic to flow into the district. In terms of urban planning, the major traffic routes around the area have a negative effect. Within this quarter, cycling is made difficult by old cobblestones. The model project was awarded the German Bicycle Award 2018.

Process

The following measures are implemented:

- Replacement or improvement of non-cyclable road surfaces;
- Creation of separate cycle lanes and connection to a higher-level cycling network;
- Conversion of all roads into bicycle lanes in order to create a continuous bicycle zone (bicycle roads according to the German Highway Code allow cars a maximum speed of 30 km/h and are often designated as one-way streets or made accessible only to residents, who are allowed to ride side by side).
- Parking facilities are arranged to improve the safety of cyclists, especially at junctions;
- In addition to the improvement of the building infrastructure, a bicycle repair café has been set up, a bike rental system for students and employees and last-mile transport wheels have been established and charging stations for e-bikes have been set up.
- The project is being carried out by the city of Bremen in close cooperation with the University of Bremen; other professionally experienced and affected actors (bicycle club, tradesmen and students) were involved early on.
- A specially designated website documents project implementation and serves as a communication platform.

Result

The measures implemented contribute to the achievement of the urban transport development plan (improvement of the modal split towards alternative modes of transport) as well as to the GHG reduction targets set in the SECAP.

First, positive results are associated with better air quality and noise reduction, and a total deceleration (safety) especially in the residential streets of the quarter. Due to the good experience, another pilot area has already been tackled. The creation of the post of "district manager" as a contact person has a positive effect on the communication and cooperation in the implementation.

Link

https://radquartier-bremen.de

5.3.5 Industry - energy efficiency potential in businesses

Introduction
(opportunities and links to other fields of action)

Industry is generally defined as the commercial production of goods in factory-organized operation and it accounts for 30% of the energy consumption in Germany. In addition, there are small and medium-sized enterprises (SME), accounting for about 15% of the energy consumption in Germany.

Municipalities have limited direct influence on the energy consumption of industries or industrial parks compared to other consumption sectors (buildings, mobility). At the same time, SECAPs allow the industry to examine the extent to which local industrial companies can be integrated into the city's climate strategy.

Above all, industry is linked with the field of energy production. Industrial companies are also large consumers with a high potential for waste heat. At the same time, as large-scale consumers, they are relevant for energy supply companies. In this way, energy-efficient supply solutions could be provided.

Moreover, urban planning offers the possibility of optimally combining possible consumption by industrial companies in a supply strategy right from the planning stage and also takes other aspects (mixed use) into account, for example to enable future commuter flows.

Table 29: Factors in the industry sector that can be influced by municipalities

Impact	Measure	
Big	Providing strategic plans and staff for local companies Energy carrier selection (using air pollution control planning) Settlement of climate-friendly companies	
Little	Energy efficiency in local companies Commuter flows of staff Use of waste heat Use of renewable energies	

A successful SECAP should consider the following aspects in the field of industry:

- Consideration of large and small enterprises;
- Determination of potential in energy generation, e.g. waste heat (incl. clarification of business ideas with energy supply companies);
- Integration of the local industrial companies and initiation of an exchange between the companies;
- Creation of attractive offers for companies for climate-friendly action;
- Networking of relevant actors in this field (companies, energy consultants, energy supply companies).

Possible actions of the municipality

The industry sector is the most difficult sector in SECAPs in Germany. Companies rarely have an interest in climate action and mostly have economic interests. In developing SECAP measures, it is therefore important to develop incentives that are attractive to companies. Often, incentives are presented as a service for companies that they can make use of. To be successful, this service must be professional and promise short-term success. Different possibilities will be presented in the following Tables 26-28 on the basis of the different roles and types of measures of municipalities in Germany. They are important examples for the options that municipalities have.

Table 30: Planning and Regulating

Type of measure	Measure	Target/Description
Regulating/ planning	Building standards for new industrial parks	Definition of high energetic standards (incl. climate-friendly supply) for new industrial plants.
Planning	Solar energy for roofs	Obligation for photovoltaics on roofs through purchase contracts.

Table 31: Promoting and Advising

Type of measure	Measure	Target/Description
Flanking / information	Energy service provision	Subsidies for energy efficiency examination in companies.
Funding	Reduced real estate prices	Reduced real estate prices for environmentally-friendly companies or production; attracting sustainable companies; image gains.
Public relation	Awards	Provision of awards for participants in workshops or exemplary engagement; image gains and motivation to support SECAP.
Information	Energy advisory information	Provision of advice in implementing energy management and auditing in companies.
Accompanying	Eco-profit workshop program	Invitation of various interested companies for a series of energy efficiency workshops and exchange programs.
Information/ Accompanying	Sector-related training	Provision of advisory services for specific businesses, for example in the hotel sector and/or cross-sectoral technologies.
Funding	Job tickets for employees	Reduced job tickets for public transport for company employees.

Table 32: Networking

Type of measure	Measure	Target/Description
Accompanying	Company for climate network	Encouragement of industrial companies or SMEs to commit and act according to SECAP targets in a network with extra information and benefits for the attending companies.
Accompanying/ structural measures	Green industry parks	Several companies are grouped together within an area and measures are developed which increase energy efficiency and ensure an opti-mized supply (see also best practice example).

The implementation of a SECAP could involve the companies that took part in the SECAP creation process. At the same time, these early adaptors can serve as successful role models for other companies. In this field of action, the measures must be tailored to the various industries. Consulting programs should therefore not be kept general and should promise quick savings/success. Networks should again be founded under a long-term aspect and designed efficiently. The meetings should not have an end in themselves but should always a definite and relevant goal for the enterprises involved. The agenda should be adapted to the background of the participants (technical/ economic).

Best Practice Example

Green Industry Park in Freiburg

Background

Industry parks have rarely been addressed when it comes to climate action, although they contribute noticeably to a city's energy consumption and GHG emissions. The oldest and biggest industrial area in Freiburg with more than 300 enterprises and a workforce of 15,000 people consumes nearly 20% of the final energy of the overall city. The city has set high climate action targets for the years to come (-40% in 2030 related to 1990 emissions). To reach these targets, industry and small medium enterprises have to be involved in the joint action towards climate change. In cooperation with the regional energy supply company, Freiburg's business agency, Fraunhofer Institute for Solar Energy Systems and the City of Freiburg initiated the "Green Industry Park" project in 2013.

Focus

The aim is to develop the commercial area into a sustainable, resource-saving and energy-efficient industrial area with a model character. In addition to individual company solutions for energy savings, the aim is also to optimally distribute the energy throughout the entire area. The key to the success of the project lies in the intensive networking of the partners concerning the topics of energy saving potentials as well as cooperation and optimization possibilities in the area of environmental and climate action. The core team now includes 70 companies.

Procedure

The "Green Industry Park" project was developed in a step-by-step process in cooperation between the city and the companies and was therefore successful.

First, an umbrella brand "Green Industry Park" was developed, to arouse interest and unique selling points. The project is also the result of good cooperation between politicians and companies that were already active; together, they were able to attract and win new companies.

A holistic approach was chosen for the project. Thus, a sponsored concept was developed as a basis at the beginning. In this concept, the status quo was determined - as in existing local projects - for researching energy consumption and potential. For example, the potential for electricity supply through photovoltaics is approx. 20%, of which only 2% has been used so far. Furthermore, the concept examined whether energy management systems exist and how appropriate strategies can be developed to improve the situation. When developing the concept, emphasis was placed on early information and involvement of local companies through interviews and workshops. In addition, their needs and expectations were surveyed and proposals for measures developed and prioritized jointly by the companies. The park was inaugurated by the mayor of the city and the board members of the society.

A climate manager provides technical advice and support on specific topics such as waste heat or heat/cooling utilization and solar energy systems. For example, the regional energy supplier supports companies in gaining a quick overview of their own energy consumption with the "Energy Efficiency Quick Check". Regular working meetings are coordinated by the climate unit of the city of Freiburg. Successes are also documented by this unit.

Result

In 2018, the "Green Industry Park" project was awarded the National Climate Initiative (NKI) prize for special commitment to resource and energy efficiency. The prize money is being reinvested by the City of Freiburg in a photovoltaic project in the industrial region.

The implementation of regular and topic-oriented workshops was welcomed and noticed by the local companies in many respects. Last but not least, the integrated on-site visits of exemplary solutions are highly appreciated by the participants. A "snowball effect" through commitment and good examples leads to other companies and projects developing climate-friendly solutions:

The positive experiences made in the Industrial Area North under the motto "Green Industry Park" (GIP) will now be extended to other selected commercial areas within the framework of the future implementation of the SECAP.

Source:
City of Freiburg (https://www.greencity-cluster.de/typo3temp/pics/00a549489b.jpg)

Link

www.greenindustrypark-freiburg.de
https://www.greencity-cluster.de/fileadmin/user_upload/Dateien/Downloads/Faltkarte_Green_Industry_Park.pdf

5.3.6 Awareness raising – information and education for climate change

Introduction

Municipalities have only limited options in several fields of climate action. At the same time, their advantage is that they are directly connnected with local actors. In addition to developing renewable energies and implementing efficiency measures, local actors can also change their behavior. Through their activities, municipalities can support actors in implementing climate-friendly actions in their daily activities. Awareness raising is a long-term process and should be designed accordingly. An awareness-raising campaign should address all fields of action described in this guideline:

Urban planning

Making responsible actors in the administration aware of the issue, in order to integrate climate issues into daily planning;

Power supply

Motivation of local actors to choose a climate-friendly solution when making investment decisions;

Building

Awareness raising of users to (1) learn about energy-saving behavior, (2) build buildings as energy-efficiently as possible and (3) supply heat and electricity in a climate-friendly way;

Mobility

Awareness raising among motorists for climate-friendly behavior and initiation of a change in thinking (if a trip is needed at all, maybe the bicycle can be used instead);

Industry

Implementation of the climate action idea for companies over a longer period of time: climate action decisions are usually long-term decisions, but also often the most economical.

Awareness raising includes measures that are tailored for different local target groups. The measures include many aspects of marketing. Climate action becomes a local brand, which becomes known and identified. In SECAPs in Germany, awareness-raising measures are an important component for spreading climate action and reaching a wide range of stakeholders. They therefore play an important role in the concepts and work of the local administration.

Table 33: Factors in awareness rising that can be influced by municipalities

Impact	Measure	
Very big	Development of a common understanding of climate action Energy consumption of public building users Energy consumption of administration staff	
Big	Energy consumption of households (long-term perspective) Mobility behavior (long-term perspective) Strengthening of local service providers	
Little	Investment decisions by energy suppliers Energy-related decisions by local companies	

A successful SECAP should consider the following aspects in the field of awareness raising:

- The coordination of the activities is done by one person;
- Existing marketing campaigns of the municipality are taken into account and are included in the development of measures;
- An umbrella brand for the entire municipality is developed;
- Important municipal actors are involved in the development of measures and their support in their implementation is ensured;
- It is addressed to different target groups with corresponding activities;
- Awareness raising is initiated in all other fields of action and measures as an important support for the successful implementation of measures;
- Professional actors (agencies, designers) are recommended for the implementation of measures.

Possible actions of the municipality

Municipalities have no legal means in this field of action, awareness-raising measures are therefore called "soft measures". These can be very extensive if they are differentiated according to target groups and area of action. Different possibilities will be presented in the following Tables 29-32 on the basis of the different roles and types of measures of municipalities in Germany. They are important examples for the possibilities of municipalities.

Table 34: Promoting and Advising

Type of measure	Measure	Target/Description
Public relations	Umbrella brand for climate action	Development of a communal umbrella brand for climate action, under which all further activities are carried out.
Information/ public relations	Information offers, energy consulting and campaigns for various users	Various energy consumers are informed about climate-friendly possibilities in their everyday lives (e.g. schoolchildren, commuters, residents).
Accompanying/ Information	Information and training for local service providers	The supplier side is also regularly made aware of climate action aspects (see also other fields of action).
Accompanying	Provision of compensation options	Organization of a municipal pot for compensation payments and organization of reasonable compensation projects.
Accompanying	Energy agency	The agency is a single point of contact for citizens and other local stakeholders on energy and climate issues.

Table 35: Networking

Type of measure	Measure	Target/Description
Accompanying	Climate advisory council	Important local personalities sit on a climate advisory council and exchange views on climate action issues with the highest political officials. The mutual commitment to climate action plays an important role here.

Table 36: Consuming

Type of measure	Measure	Target/Description
Information/ Accompanying	Energy-saving information	Users of municipal buildings receive information on potential savings (direct and at the appropriate locations).
Public Relations	Regular actions and campaigns	Municipal energy management organizes regular campaigns on various topics for municipal employees (e.g. lighting).

Table 37: Providing

Type of measure	Measure	Target/Description
Funding	Motivation campaigns	Users of municipal buildings should benefit directly from these savings by using the energy costs saved (50/50 approach).
Information	Energy counselling services	Residents of municipal housing companies receive regular information and advice on how to save energy.

The implementation of awareness-raising measures has shown that it is successful if important local actors commit themselves to climate action. The development of an umbrella brand at the beginning for which these important players advertise could be an important start in long-term awareness raising.

When developing individual measures, it should be checked at the outset which target group should be addressed and how. Often, it also makes sense to approach the target group in parallel or in several stages (e.g. first a poster/internet campaign and then the offer of free advice in the second step). Since these measures do not bring any direct GHG savings, their success should be evaluated in a different way. A monitoring concept should be considered from the outset in order to evaluate and, if necessary, improve any measures taken.

Best Practice Example

Dortmund – connecting local spirit with awareness raising

Background

Dortmund is the biggest city in the "Ruhr-Region" in Germany.

In 2011, the council of the City of Dortmund adopted the SECAP 2020, which aims at CO2 savings of 40% by 2020 compared to 1990. In order to achieve this goal, numerous projects involving various stakeholders have been developed and are being implemented.

Procedure

- Climate action starts at home, therefore it is a "home game", starting with the use of LED or avoiding stand-by energy loss from technical equipment.
- Like football, climate action is a team game. That is why the city started the campaign by announcing a "home game", where information and advisory services for different topics concerning energy saving and renewable energies were provided at several locations in the city.
- The logo has been used in many different ways since then, including brochures, flyers and the official website, showing that this is a joint task, involving all citizens and stakeholders.
- A special fund supports citizens' and citizen groups' engagement in climate action.

Focus

To gain the necessary attention and awareness of stakeholders and citizens, they cooperated with the technical college, launching a competition amongst students to develop a slogan for the umbrella campaign. Local stakeholders in climate action were invited to vote for the suggestions online.

The first prize was awarded to "Dortmund – Klima ist Heimspiel" ("Dortmund – Home Game Climate Mitigation"), which has therefore become the city's official slogan for climate action. The main reason for the choice was the connection between two important aspects of Dortmund: local climate action and football.

Result

The overall umbrella campaign forms the basis for promoting climate action in general and in all different sectors. Experience shows that citizens recognize climate action better when it is related to a slogan and a continuous umbrella campaign. A successful long-term campaign should not only be supported by the environmental office responsible for climate action, but by all departments and all important actors in the city. Furthermore, the logo and further design material must be easily available. The responsible climate unit should motivate actors and check the utilization of the logo etc. continuously.

Link

www.Klima-ist-heimspiel.de

dortmund Klima ist heimspiel

Source: city of Dortmund
(https://www.dortmund.de/media/bilder/logos_1/kek_1/dortmund_Klima_ist_heimspiel.jpg)

06. Different Stakeholders for Local Climate Action

Municipal administrations take on different roles. The involvement of external actors, especially in the development of measures, was also recommended earlier. It was described that the involvement of actors provides an increased acceptance of SECAPs and a greater probability that SECAPs will be implemented.

In this section, different actors and their roles in the development of SECAPs and the implementation of SECAPs will be presented. Climate management is at the center of the preparation and implementation of the SECAP. If such a position does not yet exist, the establishment of a climate manager in a SECAP should have a high priority as a measure.

6.1 Climate management: coordinating complexity

It is important to officially appoint a "climate manager" or, depending on the size of a city (Germany: 1 manager for 50,000 inhabitants), an appropriate "climate management unit" to do justice to the technical, cross-sectoral and managing tasks and challenges. A climate manager or climate management unit is a new position in the municipal administration. The climate management is responsible for ensuring that SECAP measures are implemented. To this end, it can act relatively freely within the administration. It rarely has comprehensive decision-making rights (staff unit), but can advise other departments as to what measures should be taken.

To meet this challenge, someone has to be assigned to take on this role: a climate manager for smaller municipalities or management unit for bigger cities. The main role of a manager is to have an overview and to steer and coordinate the process of implementation of a SECAP. The definite and most important tasks are:

Integrating climate action aspects into all relevant tasks of a local government (urban planning, traffic planning etc.;

Managing local governments' SECAP process, for example core group meetings etc.;

Monitoring an emission inventory;

Awareness-raising;

Initiation of definite projects in cooperation with stakeholders;

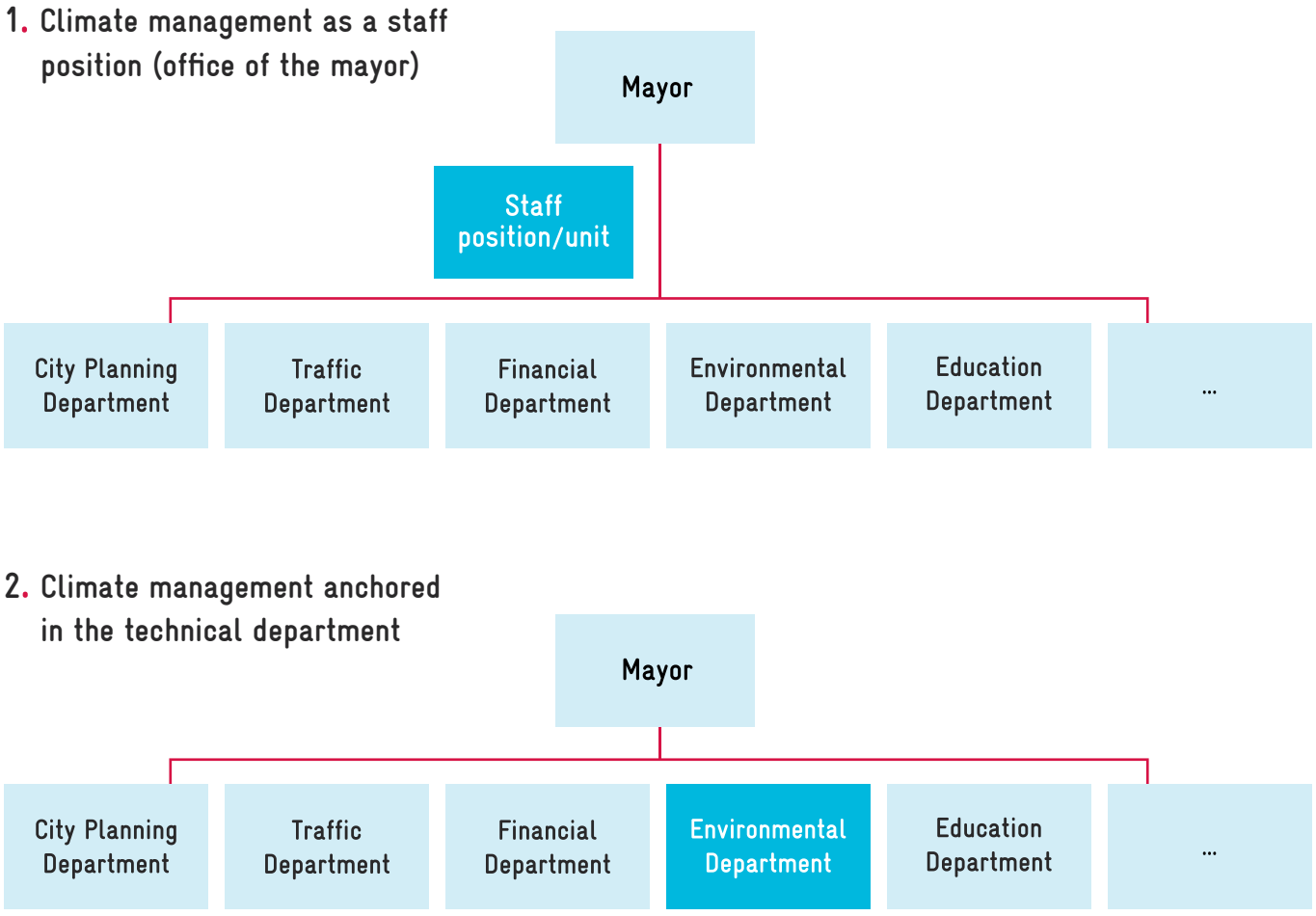
Networking activities between local government and external players and amongst external players.

Integration of the SECAP responsible unit into the organizational hierarchy

It is also very important that the manager or unit has to be integrated into the government's structure and hierarchy. According to the characteristics and importance of the task, a clear definition of competences (legal document) might be necessary.

There are different ways to integrate the climate management and responsibility for the SECAP into an existing hierarchy[6]. In Figure 24, popular options for integration of the climate management in Germany are shown. Even more important than the question about where to localize the unit is the allocation of clear responsibilities of this unit and the tasks of the involved departments to support the climate-related units. From this point of view, the successful implementation of a SECAP is not dependent on a staff position that is directly attached to the highest level, although it comes with some benefits (direct contact to the political decision-making body).

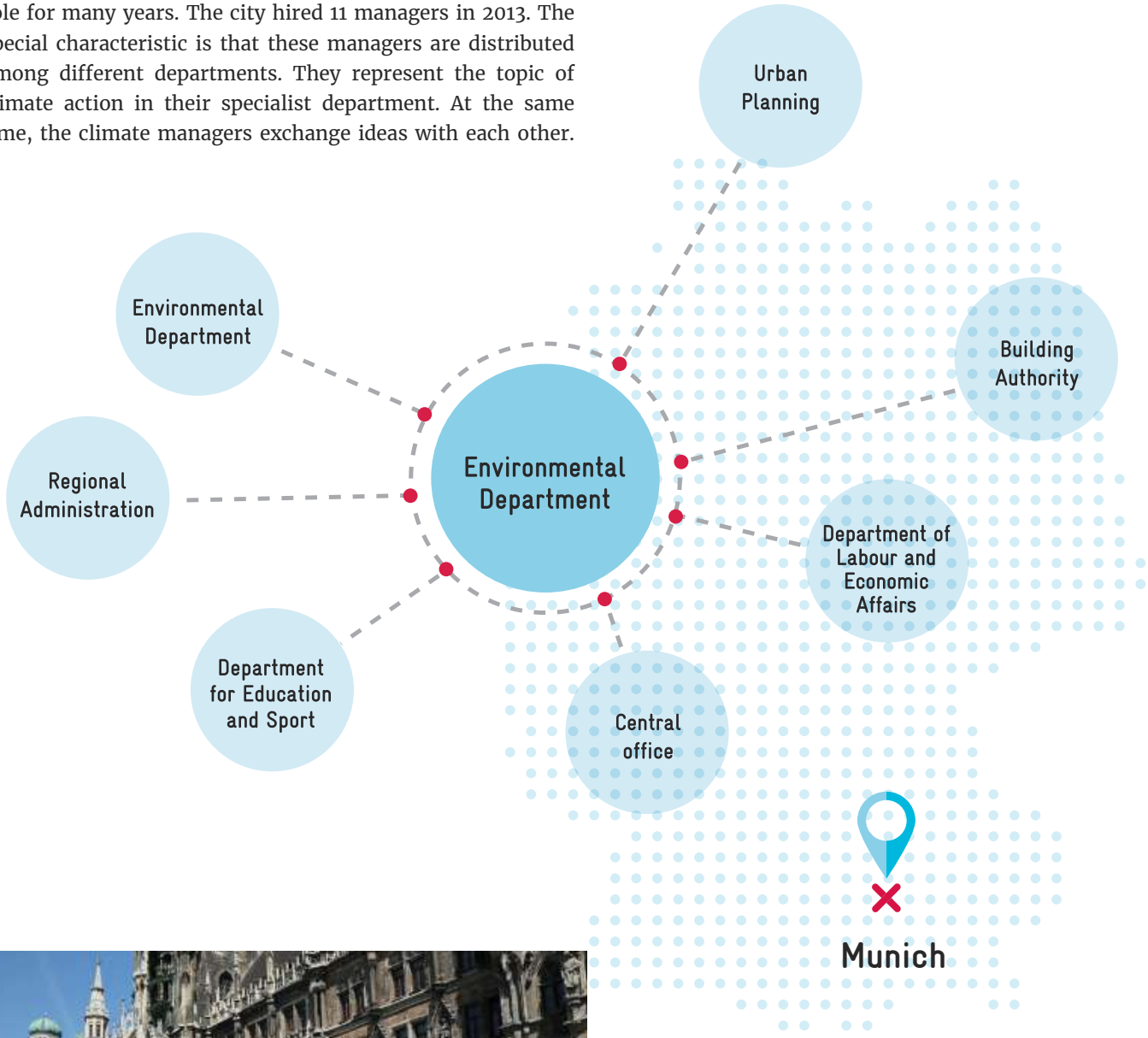
Figure 24: Municipal climate management in administrative structures



[6] In some cases, climate management is shared with external institutions when financial resources are scarce. For example, the climate management also partly works for the local energy supplier or the local energy agency.

Example

In the city of Munich, climate action has played an important role for many years. The city hired 11 managers in 2013. The special characteristic is that these managers are distributed among different departments. They represent the topic of climate action in their specialist department. At the same time, the climate managers exchange ideas with each other.



The management in the environmental office is responsible for this coordination and organizes regular meetings. Thus, the cross-cutting topic of climate action is optimally anchored within the administration.

Source:
City of Munich (https://www.muenchen.de/rathaus/dam/jcr:0526e24e-5dfb-4b6f-8cb1-d605752027c7/broschuere_ks_management.pdf
(C) Michael Nagy))

Further ways to integrate SECAPs in administration processes and climate action

1. Create a municipal SECAP core group.

With the support of the manager or unit, a small core group within administration should be established (and invited for a first meeting), involving all related departments (city and traffic planning, economic departments etc.). The participation of the mayor or high-level political official responsible is recommended at least for the first meeting.

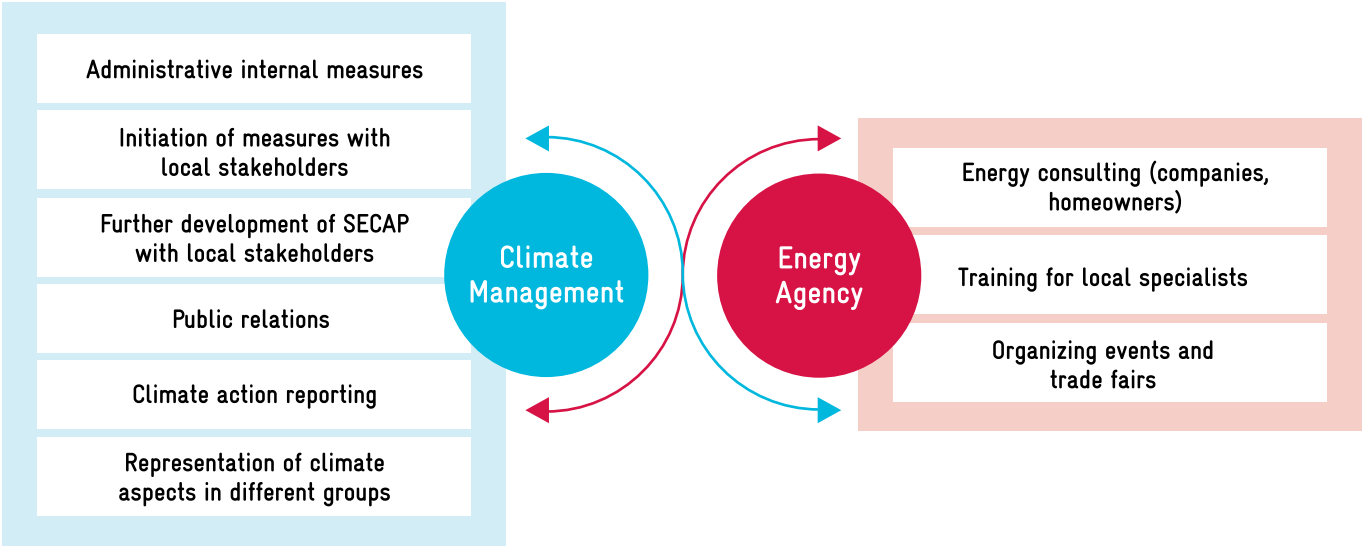
2. Membership of the climate manager in existing working groups.

Moreover, the manager or unit itself should have membership in working groups related to city's concepts and plans, to assure the consideration of energy and climate action (e.g. Masterplan, detailed and regulatory plans, transport development plan etc.)

3. Advanced measure: Establishment of an energy agency as an independent cooperation partner for local government.

Local governments steer the process of energy policy development. Nevertheless, they need support in the implementation process on various levels, especially in the technical field. The establishment of an energy agency helps to foster implementation of SECAP projects as well as capacity building in the fields of energy on a local and regional level. More and more local energy agencies are being established in Germany. They are service providers for various actors in the municipality. Their focus is mostly on advising and supporting citizens, companies and the local administration itself with measures. Their financing is very different, but in most cases it is a non-profit model. In most cases, basic financing is provided by the municipality. Other local partners can also be partners of the agency and may finance it (e.g. local banks, Chamber of Crafts). In addition, the energy agencies finance themselves through their range of services. As the process of initiating and establishing an energy agency takes time, the municipal responsible unit can – on an interim basis – adopt first tasks or support the establishment in general.

Figure 25: Cooperation and tasks for climate management and energy agency



6.2 Different roles and opportunities/options for local stakeholders

The municipal administration has limited possibilities to implement climate action in a municipality. For this reason, the involvement of local stakeholders is all the more important when establishing a SECAP. Important actors addressed in a SECAP in Germany are listed in. Their role is mainly to contribute ideas from their field. In addition, they ideally declare themselves willing to take on important aspects during implementation. The last column shows how the actors interact with each other.

Table 38: Different local stakeholders, their field of action and possible cooperation

Local stakeholder	Field of action, recommendation of involvement	Stakeholders for integrated cooperation
(Local) energy supplier	Urban planning, energy supply (district heating, renewable energies)	Climate management, urban planing unit, home builder, big local players
Housing companies	Buildings, urban planning	Energy supplier, craftsmen and architects, climate management, urban planning units
Public transport supplier	Mobility, urban planning	Urban planning units, urban mobility units, companies, big local players
Companies (business associations)	Industry, urban planing, energy supply	Energy suppliers, public transport suppliers
Craftsmen, planners and architects	Buildings, urban planning	Climate management, urban planing unit, housing companies,
Energy consulting institutions	Awareness raising, buildings and energy supply	Climate management
Big local players (e.g. university, hospitals, banks)	Awareness-raising, buildings, urban planning, energy supply	Climate management, urban planing unit, mobility unit

Understanding the benefit-related motivation is crucial for addressing and involving stakeholders. In most cases, various interests and characteristics are part of the logic behind actions. Some benefit-related interests are:

- Material gain – project saves costs or provides business opportunities;
- Appreciation – public image and recognition, e.g. certificate etc.;
- Self-efficacy – implement, create, achieve;
- Social gain – sense of belonging;
- Intrinsic motivation – belief in necessity and importance.

Some stakeholders can have conflicting interests. In this case, it could be advisable to choose an appropriate facilitator/moderator or organize workshops for each particular group separately to understand the conflicting interests before bringing them together.

In Germany, the participation of the general public in the preparation of SECAPs is also very popular. This is mostly used to collect ideas for measures. The advantage is that new ideas can be found outside the institutions that are already active.

6.3 Integration of local stakeholders in SECAP developing processes

During the creation of a SECAP, it is important to carefully set up the processes and procedures. This must be done carefully because it has to be taken into account that this is a new topic, which is adding to the tasks that already exist. Therefore, it has to be integrated with the least additional effort for everybody, but not less! The process runs on different levels, which are:

1. Political level;
2. Local administration level;
3. Stakeholder involvement level;
4. Supporting experts level.

Thus, the development of a SECAP involves a wide range of people during the development process. Much of the project work is typically outsourced to experienced external consultants. Local governments appoint these experts in order to coordinate the process of plan elaboration, including technical analysis like energy flow diagrams, measure development and calculation of costs and impacts, preparation of stakeholder workshops and support in concept drafting.

The internal project manager or management unit "pulls the strings" within the local government and with stakeholders and the hired experts. This requires well-informed knowledge about the local government itself, the local community of stakeholders and most importantly the ability to communicate with different people on different levels. Direct contact, regular exchange, meetings with the external service providers and a close cooperation are crucial for successful project management.

According to the intensity of cooperation and the degree of involvement, we can distinguish at least between pure information, motivation, real involvement or consulting and empowerment of stakeholders (see Table 39: Conception steps and responsibilities in preparation and elaboration of a SECAP), which also determines the question of when different players should or have to be involved.

Table 39: Conception steps and responsibilities in preparation and elaboration of a SECAP

Concept steps	Target group	Responsible body	Preparation
Assessment of status quo analysis and potentials		Core unit	Hired experts
Development of measures	Local government and administration	Hired experts	Hired experts core unit
One-to-one interviews with stakeholders for developing measures	Stakeholders	Core unit	Hired experts
Workshops involving local stakeholders for developing measures	Stakeholders	Core unit	Hired experts
Administrative kick-off meeting	Local Government	Core unit	Core unit/Hired experts
Coordination within local government	Local Government	Core unit	Core unit
Additional input; suggestions		Hired experts	Hired experts
Measure selection and prioritization		Core unit	Core unit/Hired expertes
Decision on action plan and measures; approval	Political responsible unit	Core unit	Core unit

6.4 Operational advice from experience in Germany for stakeholder involvement

Policy makers for SECAP accompaniment

- Within the administration, clarification of responsibilities for the SECAP process
- Regular close exchange with SECAP developers and provision of required financial and personnel capacities
- Clarification with administration as to which stakeholders are to be involved or supported in the process
- Personal invitation to an internal leadership round with local stakeholders. The goal is a common endorsement for climate action
- Building on this: clarification of specifications and possibilities for the operational level for strategy and measure development
- Clarification at an early stage of how stakeholders should also be involved in the implementation
- Clarification at an early stage of how the SECAP will be implemented by the administration. Who should assume which role, who needs the appropriate capacities --> Raise awareness during the SECAP developing process
- Final workshop with a group of leaders and solemn implementation decision of the SECAP

Administration staff for SECAP development

- Workshops with stakeholders should be moderated by external experts
- Get decision-makers on board and involve highest political and administrative bodies when inviting for a first meeting (signature) and in the first meeting (participation at the beginning to show importance)
- Successive meetings are conducted on the working level; only in case of conflicting projects the top management has to be involved again
- Engage different groups of stakeholders at different stages that suit their needs and interests
- Start the dialogue with stakeholders, one-to-one interviews are basic to get them on board; utilize personal contacts or recommendations
- If necessary or meaningful, sectoral sub-groups can be agreed, especially in the initiation phase or to set up new cross-sectoral projects (district energy supply solution)
- For the integration of new technologies and solutions, it is recommended to establish a local or regional high-level advisory board (led by the mayor or similar position), involving technical universities, energy companies etc.; thus to prepare new activities from the top level
- Always consider the particular skills and resources that key stakeholders can offer
- Be innovative in your communications approaches – this may involve adopting new channels of communication or using existing communication channels in new ways. Keep stakeholders informed on a regular basis
- Bear in mind potential sensitivities of stakeholder prioritization (likes and dislikes, trustworthiness, supportive blocking)

07. Conclusion for Chinese Cities

National Context for Climate Change Actions

As one of the two largest economies in the world, China is forecasted to have more than 1 billion urban inhabitants by 2030, which will represent 70% of China's population, and 11% of the global population living in Chinese cities at that time.[7]

City residents currently consume over two-thirds of the world's energy[8]. As a result, there is a growing international drive to support the development of resilient, smart and low carbon cities. It is widely acknowledged that engagement and action at subnational level is vital to the successful delivery of internationally agreed climate targets and efforts to limit global temperature rise to 2°C, even to 1.5°C.

China's national government and an increasing number of local leaders recognize the importance of the low-carbon development alternative.

At the national level, in 2006, China issued the 11th Five-Year Plan (2006 – 2010), firstly set specific national targets that China will lower the energy use per unit GDP by 20% from 2005 to 2010. In the next Five-Year Plan (2011 – 2015), China explicitly announced the goal of carbon intensity reduction by 17%. In the most recent National Plan, China aims to reduce carbon dioxide emissions per unit of GDP by 18% from 2015 level by 2020.

Furthermore, China has committed to four principal climate goals in its NDC[9]:

- Achieve peak carbon emissions by 2030 with best effort to achieve earlier
- Reduce 60% – 65% of the carbon emission intensity (relative to GDP) by 2030 (based on 2005 levels)
- Increase the use of non-fossil fuels to 20% among primary energy consumption by 2030
- Increase the forest stock volume in 2005 by around 4.5 billion cubic meters by 2030

These national goals are implemented through a top-down process from national Five-Year Plans, guidance documents or regulations to province-level or city-level of Five-Year Plans, allocating specific emission targets for provinces and cities.

[7] HU M, YANG L, CANNAN A, 等. Progress and Prospects: China's Cities Transitioning toward Energy Sustainability, and Pursuing Early Peaking of Carbon Emissions[R]. 2018.

[8] C40.org. (2019). C40. [online] Available at: https://www.c40.org/why_cities [Accessed 27 Dec. 2019].

[9] Scio.gov.cn. (2019). 强化应对气候变化行动——中国国家自主贡献. [online] Available at: http://www.scio.gov.cn/xwfbh/xwbfbh/wqf-bh/35861/37265/xgzc37271/Document/1603661/1603661.htm [Ac-cessed 27 Dec. 2019].

City Level Action on Climate Change and Low-carbon Transition:

With 70% of China's carbon emissions coming from cities, low carbon city development is critical for China to achieve its national goal of peaking carbon emissions by 2030.[10] Efforts have been undertaken since 1997 by different government authorities. The Ministry of Environment Protection (MEP) named 63 cities and five districts as National Environment Protection Model Cities/Districts. Ten years after, in 2007, MEP updated new qualifications for Eco-City, which requires cities to meet stricter standards on energy consumption, water consumption and pollutant emissions. As described by the policy, only qualified Model Cities can be upgraded to Eco-city. During the 11th Five Year Plan (FYP), China's Ministry of Housing and Urban/Rural Development (MOHURD) launched an eco-city pilot program to promote urban sustainability.

Since 2010, China's National Development and Reform Commission (NDRC) has launched three batches of low-carbon city pilots in 79 cities, 6 provinces and 2 counties[11]. There are six tasks assigned by the central government to low-carbon city pilots, namely:

1. Identify the overall principles and strategies
2. Develop Low-Carbon Develop Plans
3. Establish low-carbon industries
4. Establish carbon statistics and management system
5. Establish target accountability mechanism
6. Advocate low-carbon lifestyle and consumption model

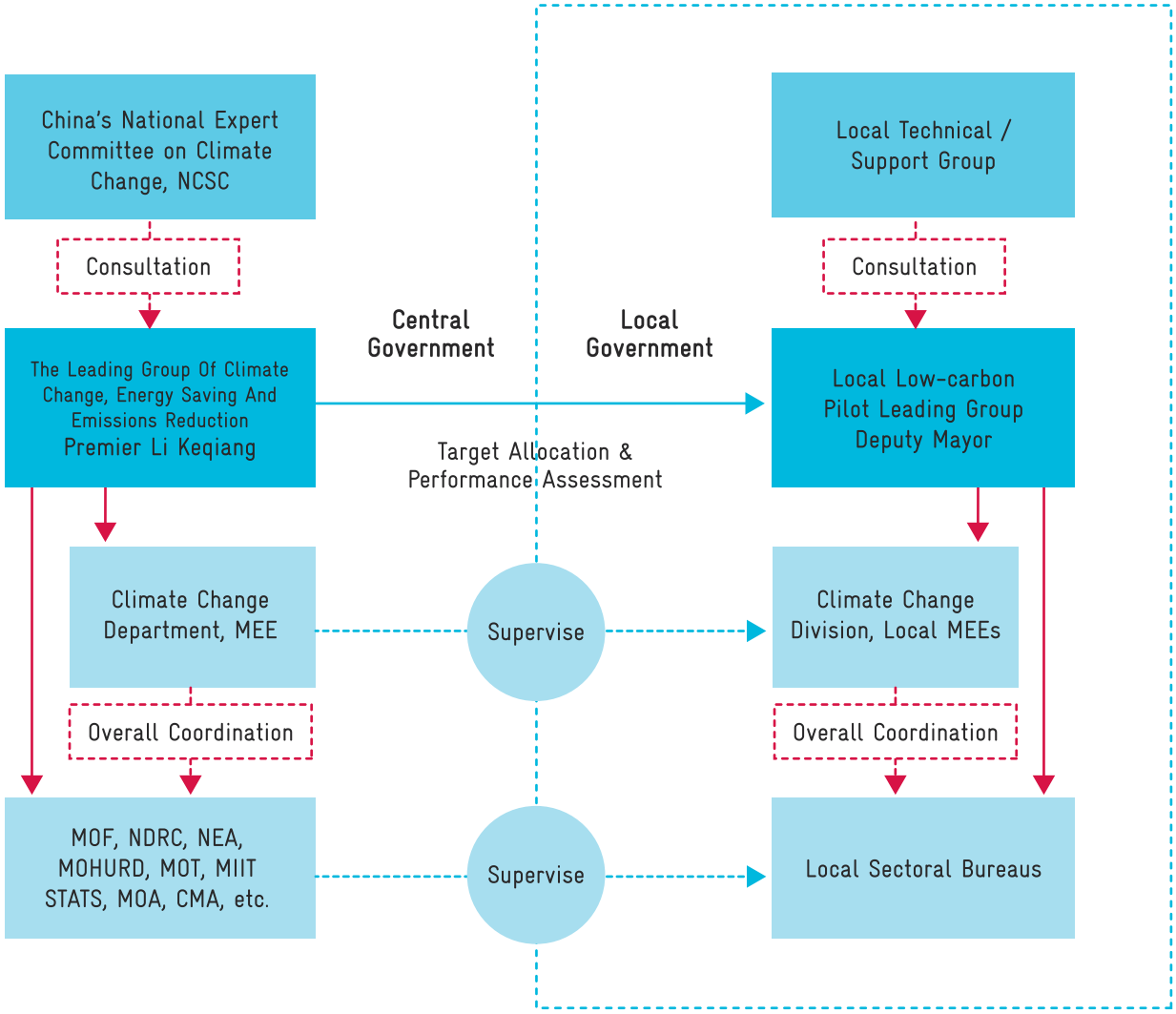
The Low-Carbon Development Plan is one of the key components and a guiding document for China's low-carbon pilots to achieve climate goals. Though not compulsory for all cities, it is encouraged to create the low-carbon development plans in the "Work Plan for GHG Emissions Control during the 13th Five-Year-Plan" issued by the State Council. A concrete plan serves as to establish a low-carbon development concept and determine the principles, goals, and specific tasks in low-carbon pilots. The plan should be based on the city context, incorporating the requirements and targets assigned by national and/or provincial governments within a certain time frame.

[10] Alliance of Peaking Pioneer Cities of China, City Peaking and Decarbonization Best Practices, 2016. [online] Available at: http://appc.ccchina.org.cn/archiver/APPC/UpFile/Files/Default/20160707172605704491.pdf [Ac-cessed 27 Dec. 2019].

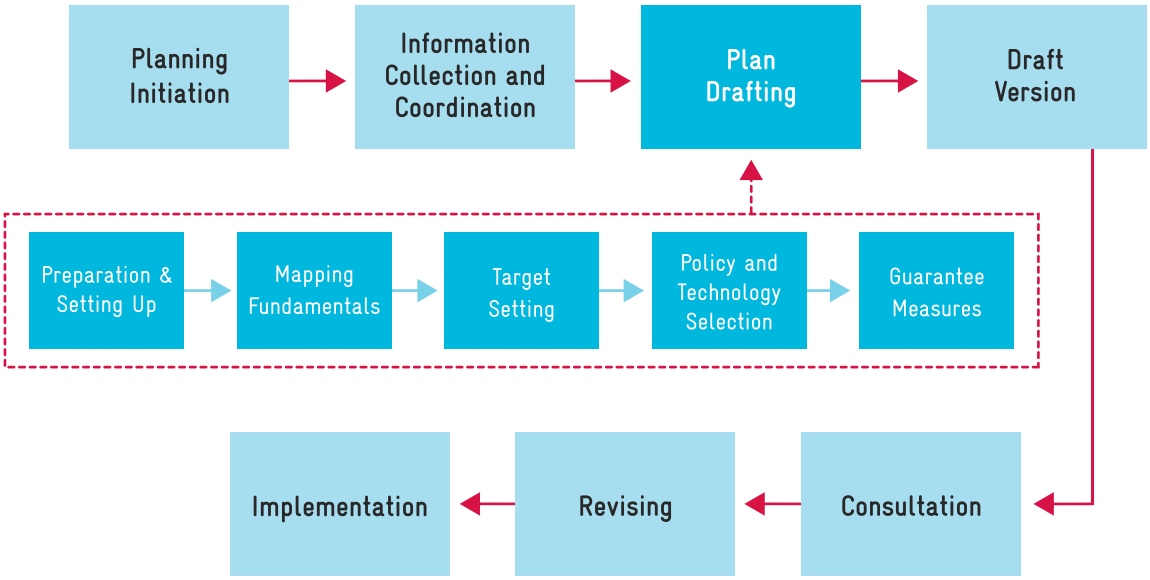
[11] LI A, YANG L, TIAN Z. Suggestions on the Principles and Objective-Setting for Low-Carbon Pilots[R]. iGDP, 2017.

Based on the existing work for the past 10 years, a city level low-carbon transition pattern has been established with the following key aspects:

1. A governance structure with the leading role from the Local Low-Carbon Pilot Leading Group. The Climate Change Division in the local Bureau of Ecology and Environment is the implementation authority, who is coordinating with other sectoral Bureaus for climate change issues. Local technical groups, normally from research institutes or universities, provide technical support in terms of inventories, GHG emissions modelling, plan drafting and stakeholder engagement, etc.



2. A comprehensive low-carbon development plan consisted of emission peaking targets and other policy measures to curb the GHG emissions, such as absolute carbon cap, zero-emission demonstration projects, carbon data platform and carbon emission impact assessment, etc. The procedures for creating the plan can be categorized in seven steps.

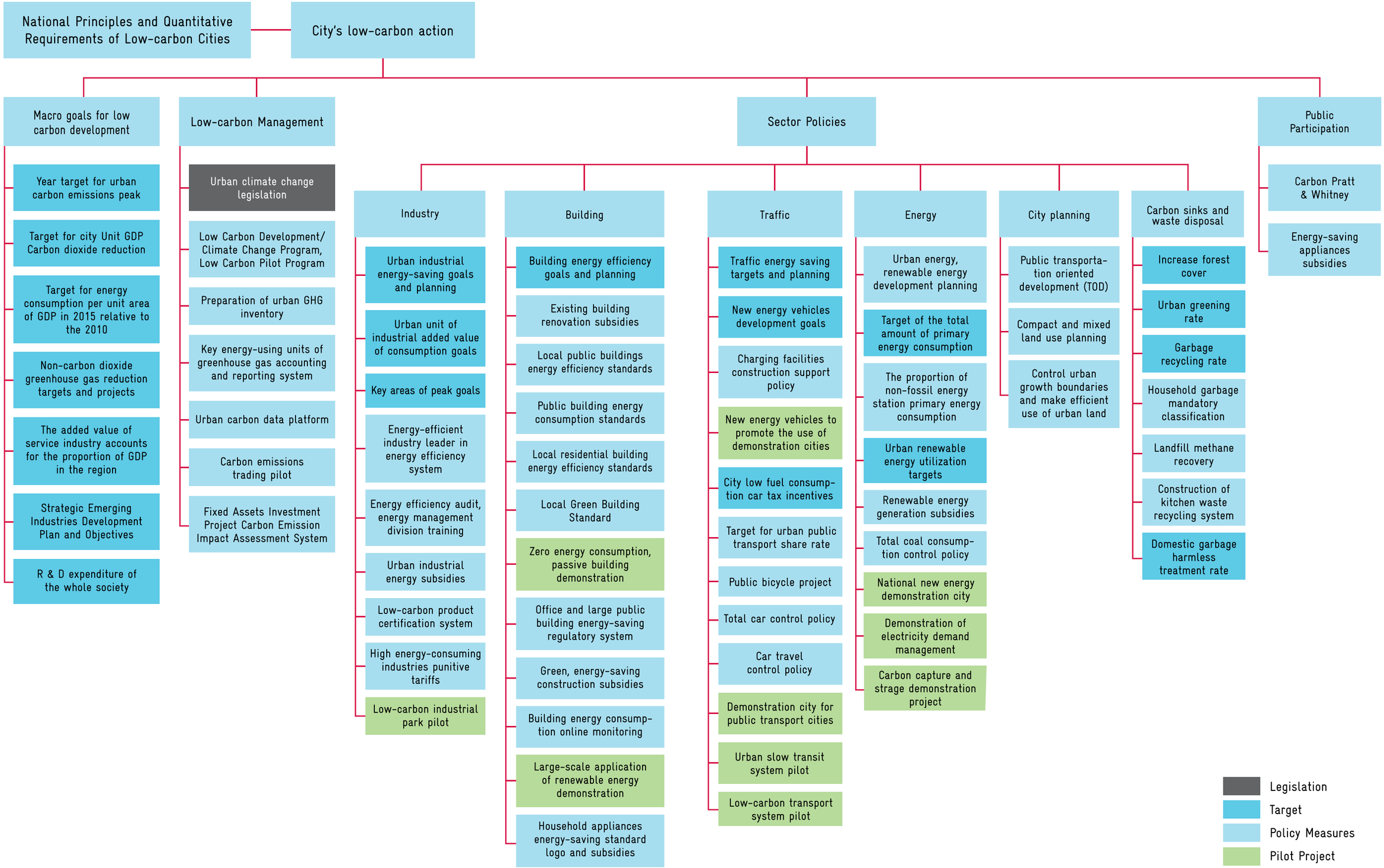


3. Methodologies have been applied in cities for GHG inventories, emission scenarios and target setting. Scientific-based planning is improving, IPCC methodology, provincial level GHG inventory format and GPC Protocol have been adjusted to Chinese cities; LEAP model[12] is widely applied for emission scenario analysis.

4. As guided and supervised by the central government, a policy framework covering major emission sectors-Industry, Building, Energy, Transportation, Urban Form, carbon sink and waste management-with legislation, targets and pilot projects has been established in pilot cities. Added with macro-level cross-cutting policies and low-carbon management measure, this framework is the foundation for the city to implement low-carbon development plans.

   The low-carbon targets are consistent with social and economic development goals and also in line with sectoral development standards. Some demonstration projects are initiated by national government with support from central and local governments.

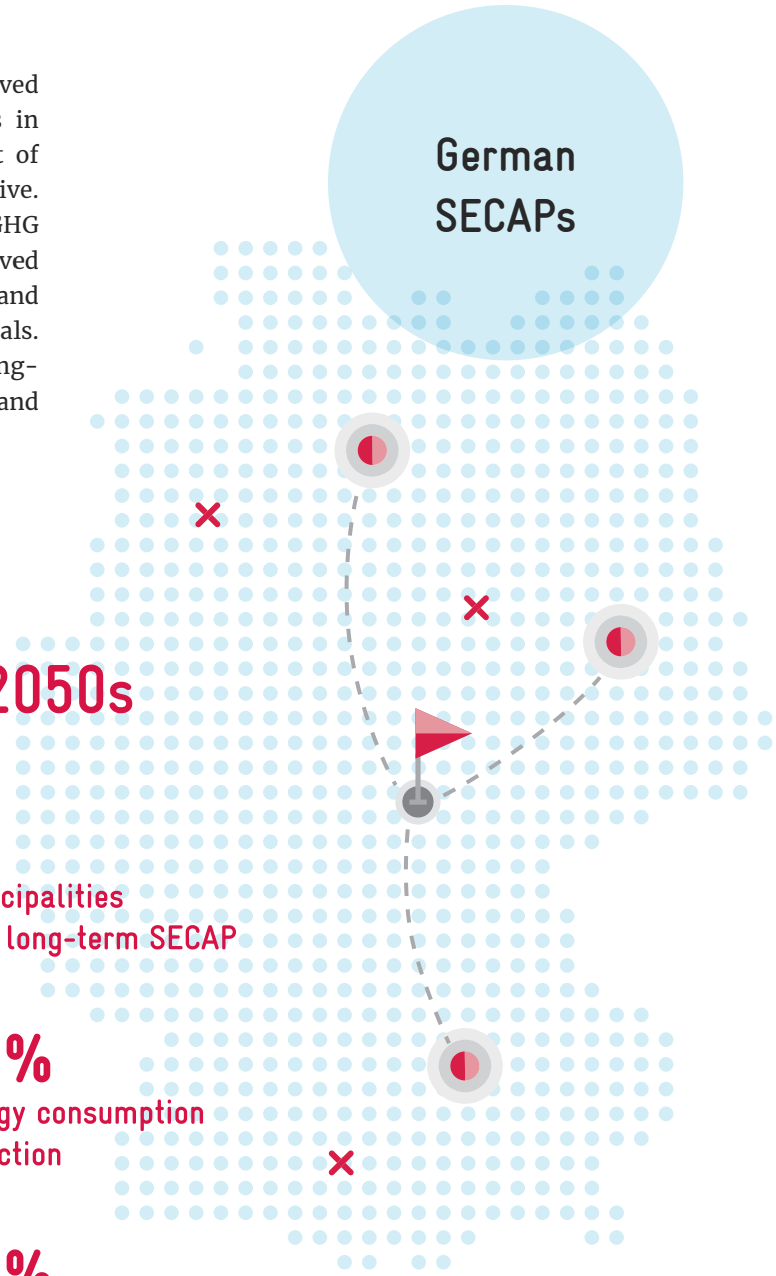
[12] LEAP, the Long-range Energy Alternatives Planning System, is a widely-used software tool for energy policy analysis and climate change mitigation assessment developed at the Stockholm Environment Institute.


National Principles and Quantitative Requirements of Low-carbon Cities
City's low-carbon action
Macro goals for low carbon development
Year target for urban carbon emissions peak
Target for city Unit GDP Carbon dioxide reduction
Target for energy consumption per unit area of GDP in 2015 relative to the 2010
Non-carbon dioxide greenhouse gas reduction targets and projects
The added value of service industry accounts for the proportion of GDP in the region
Strategic Emerging Industries Development Plan and Objectives
R & D expenditure of the whole society
Low-carbon Management
Urban climate change legislation
Low Carbon Development/ Climate Change Program, Low Carbon Pilot Program
Preparation of urban GHG inventory
Key energy-using units of greenhouse gas accounting and reporting system
Urban carbon data platform
Carbon emissions trading pilot
Fixed Assets Investment Project Carbon Emission Impact Assessment System
Sector Policies
Industry
Urban industrial energy-saving goals and planning
Urban unit of industrial added value of consumption goals
Key areas of peak goals
Energy-efficient industry leader in energy efficiency system
Energy efficiency audit, energy management division training
Urban industrial energy subsidies
Low-carbon product certification system
High energy-consuming industries punitive tariffs
Low-carbon industrial park pilot
Building
Building energy efficiency goals and planning
Existing building renovation subsidies
Local public buildings energy efficiency standards
Public building energy consumption standards
Local residential building energy efficiency standards
Local Green Building Standard
Zero energy consumption, passive building demonstration
Office and large public building energy-saving regulatory system
Green, energy-saving construction subsidies
Building energy consumption online monitoring
Large-scale application of renewable energy demonstration
Household appliances energy-saving standard logo and subsidies
Traffic
Traffic energy saving targets and planning
New energy vehicles development goals
Charging facilities construction support policy
New energy vehicles to promote the use of demonstration cities
City low fuel consumption car tax incentives
Target for urban public transport share rate
Public bicycle project
Total car control policy
Car travel control policy
Demonstration city for public transport cities
Urban slow transit system pilot
Low-carbon transport system pilot
Energy
Urban energy, renewable energy development planning
Target of the total amount of primary energy consumption
The proportion of non-fossil energy station primary energy consumption
Urban renewable energy utilization targets
Renewable energy generation subsidies
Total coal consumption control policy
National new energy demonstration city
Demonstration of electricity demand management
Carbon capture and strage demonstration project
City planning
Public transportation oriented development (TOD)
Compact and mixed land use planning
Control urban growth boundaries and make efficient use of urban land
Carbon sinks and waste disposal
Increase forest cover
Urban greening rate
Garbage recycling rate
Household garbage mandatory classification
Landfill methane recovery
Construction of kitchen waste recycling system
Domestic garbage harmless treatment rate
Public Participation
Carbon Pratt & Whitney
Energy-saving appliances subsidies
Legislation
Target
Policy Measures
Pilot Project

Key Aspects from German Case:

German Cities have been practicing Sustainable Energy and Climate Action Plans (SECAPs) since the 1990s. Comparable with city level Low-Carbon Development Plans in China, SECAPs define climate targets and local measures, and serve as the fundamental document for the local government to make political decisions.

According to this report, almost 900 SECAPs received funding from national governments; 2333 projects in SECAPs have received funding with a total amount of 75.52 million Euros from the National Climate Initiative. The initiated measures lead to 5 million tons of GHG reduction with the costs of 15 Euros per ton. It is proved by the German case that scientific-based planning and city level actions contribute to national climate goals. There are 40 Municipalities in Germany developing long-term SECAPs in order to reduce 95% GHG emissions and 50% energy consumption by 2050.



Since **1990s**

By **2050s**

900 SECAPs
received funding
from national governments

40
Municipalities
with long-term SECAP

5 million tons
GHG emission reduction

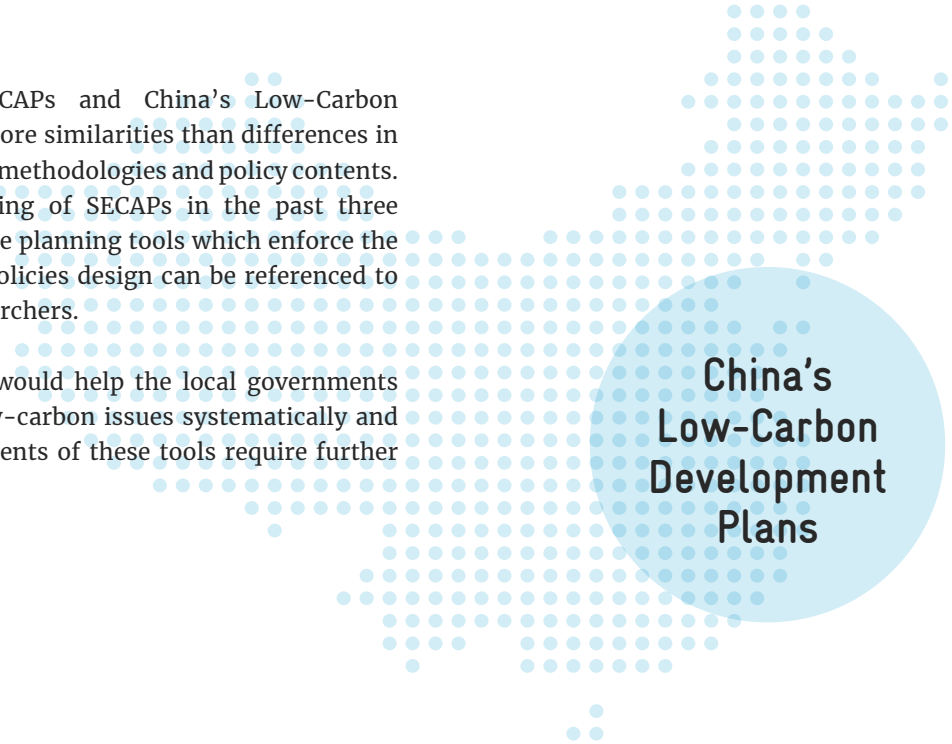
50%
energy consumption
reduction

2333 projects received
€75 million
funding from the National
Climate Initiative

95%
GHG emission
reduction

Comparing with German SECAPs and China's Low-Carbon Development Plans, there are more similarities than differences in terms of principles, procedures, methodologies and policy contents. Remarkably, given the practicing of SECAPs in the past three decades in Germany, some of the planning tools which enforce the understanding of low-carbon policies design can be referenced to Chinese policy makers and researchers.

A collection of planning tools would help the local governments and researchers to consider low-carbon issues systematically and consistently. However, the contents of these tools require further localization to Chinese context.



Similarities:

1. Similar procedure to develop the plans shared by both Chinese and German cities, especially in some key steps. Starting from status quo analysis by producing GHGs inventories, followed by setting-targets, identifying policy measures, implementation and plan update.

2. Target setting is based on backcasting and forecasting approaches. Backcasting is target oriented approach, normally incorporated and consistent with National and provincial targets. It requires to identify the demand for social and economic development, technical innovation and financial needs to achieve these targets. Forecasting approach is based on the existing knowledge to analyse the driving forces for economic growth, population, production and consumption patterns, technological development as well as policy impacts so as to set up scenarios to achieve certain targets.

3. Policy measures covering major emission sectors shared by both Chinese and German cities. All these measures can be categorized into three groups: performance standards[13], economic signals[14] and supporting policies[15]. Though the available approaches in Germany may not be applied in every Chinese city, they may be considered as a reference for action benchmarks.

4. Governance structure for climate change issues. Though with different titles, Chinese low-carbon pilot and German cities set up a leadership role in climate change issues. The main responsibility of this position is to bring the knowledge in cities and coordinate among other related sectors to design and implement the plans. Practices proved that this institutional set-up has effectively improved the capacity and influence on climate change issues.

[13] Quantitative targets at the device, fuel, or sector level—specify levels of performance businesses or equipment must achieve

[14] Economic signals, which include fees or subsidies, are one of the main types of greenhouse gas emissions reduction policy.

[15] Supporting policies may not lead to a mitigation directly but can improve the effectiveness and lower the cost of performance standards, research and development, and economic signals.

	Standards	Incentives/market-oriented Measures	Complementary Measures
Cross-cutting			• Multi-sector coordination mechanism
Industry		• Subsidies for energy service company • Reduce real estate prices for energy efficient companies	• Provide advisory training for specific businesses • Green industry park
Building	• Building codes • Building operational energy efficiency standards	• Reduce the up-front cost for national funding programmes	• Technical training for experts on building energy efficiency • Pilot projects for new or retrofitting projects
Energy		• Renewable energy target in energy supply	• Sufficient information provided to investors
Transport		• Extra lanes or less tolls for public transport and EVs • Free public transport	• Reduce parking space • Low Emission Zones
Urban Planning	• Building density definition		• Integrated Planning

German cities have been exercising SECAPs for almost 30 years, as introduced in this report, SECAPs now are considered as the systematic and comprehensive practice to review, plan and implement climate actions. Though Chinese cities have also pursued huge efforts for low-carbon transition, there is still some space to improve in detailed-oriented considerations. Regarding the political context differences, what we can reference to German cases:

1. Policy prioritization

Given the limited resources faced by most cities, policy/measure prioritization is a must. It is difficult to make a judgement on each policy with multi-sector experts, since one policy may have various effects in different aspects. This report introduced a simplified tool based on the Delphi Method to evaluate the climate policies in some key performance indicators, which is easy to understand and use among different sectors. To further develop this method for Chinese cities, indicators, including priority, depth of the effect, GHG savings and avoidance costs, investment costs and acceptance by the target group, may be weighted respectively and calculated into scores so as to be applied in local context(see Table 4 in chapter 5.1.2 for details).

2. Measure sheet

When the plans come with a selection of measures, policy makers need a less technical and concise introduction of each measure to make policy decisions. The practice of the Measure Sheet introduced in this report is a manageable approach (see Figure 20, Example of a measure sheet in chapter 5.1.2). It summarizes the essential elements for one measure, includes a brief description, actors involved, costs and the next steps. What is more, these documents in different cities may be consistent and comparable, which may generate a large amount of data for national or international policy makers or researchers to understand the cities' low-carbon solutions with different sizes, economic growth stage and industrial structure.

APPENDIX 1

Acitvity profile for local climate action

Funded by:

ifeu INSTITUT FÜR ENERGIE- UND UMWELTFORSCHUNG HEIDELBERG

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Background

This "Activity profile" was developed by the ifeu - Institute for energy and environmental science Heidelberg. It was developed for German cities which want to monitor their climate action progress. The profile was adapted for Chinese cities in the framework of the GIZ-funded project "Local Climate Action - Harmonizing Ecology and Economy - Developing Sustainable Energy and Climate Action Plans (SECAPs)".

The activity profile is designed for municipalities that wish to carry out an analysis of their previous activities in various fields of action with little effort.

Fields of action

Energy
Economy
Buildings
Urban planning
Mobility
Municipal facilites
Governance

Checklists

Existing structures and activities are queried and evaluated using checklists assigned to the different fields of action. If a measure has already been implemented in the municipality, the corresponding field can be "ticked off". Each individual question is stored with a percentage rating. After answering all points of the questions, the marked answers ("yes") are summed up automatically. A maximum of 100% points can be achieved per checklist.

Activity profile (diagram)

On the basis of the filled checklists in the various fields of action, the results are summarised in a further table sheet (Activity_profile), which is depicted as a spider diagram. The achieved percentage points are assigned to a level between 0 and 4. Thus, the chart shows at a glance where the municipality currently stands in municipal climate action. It reveals in which areas the municipality has already been done a lot and which areas should be newly initiated within the framework of an introductory consultation or a quick concept.

Level 0 = 0% ;
Level 1 = 25% ;
Level 2 = 50% ;
Level 3 = 75% ;
Level 4 = 100%

Processing of the checklists

The checklists should be processed within the administration and presented to the climate action working group. If a question cannot be answered with a clear "yes" because the respective activity has only been partially implemented or is currently being planned, then the question should not be checked off. The checklists also serve as guidelines for the next steps. If the checklists will be completed again a year later, the progress achieved in the previous year(s) can easily be seen.

Checklist Energy

Yes	Questions/Topics	Rating
	Targets/Strategies	**25%**
	Targets	
☐	Are there ambitious long-term goals for the development of a climate-friendly energy supply for the municipality (e.g. 100 % renewables)?	6%
☐	Are targets for air pollution connected to climate action goals in energy production?	6%
	Strategy	
☐	Are there strategies available for a regional heat and cooling turnover (e.g. energy saving, renewable heat, heat networks, CHP etc.)?	6%
☐	Are there concrete expansion strategies available for the extensive implementation of regional renewable energy potentials and waste integration in the electricity sector?	4%
☐	Are there strategies for the local electricity grid (e.g. buy-back, expansion, storage capacities, etc.)? Carbon intensity (city-wide, economic)	3%
	Organization/Controlling	**10%**
	Cooperation with local energy supplier	
☐	Is there regular cooperation between the supplier and the municipality for the communal energy system transformation?	4%
☐	Is there a regular exchange with permanent contacts between the supplier and the municipality?	4%
☐	Regular evaluation of proportion of clean energy production	2%
	Municipal Measurements	**65%**
	Potential/Planning	
☐	Is there a small-scale analysis of the heat demand in the municipality (e.g. heat atlas)?	10%
☐	Existence of planning for flexiblilty of the energy-production (e.g. demand, storage)	5%
☐	Does the municipality make use of synergy effects from different sectors when expanding the networks (e.g. heat, electricity, gas, broadband...)?	5%
☐	Is there potential of sector coupling?	5%
☐	Is there a solar registry?	3%
☐	Is there a potential map for near-surface geothermal energy (heat pumps)?	2%
☐	Are locations for wind power plants actively sought for and are appropriate conditions created?	3%
☐	Are locations for biomass/biogas plants actively sought for and are appropriate conditions created?	1%
☐	Are locations for solar thermal fields or storage facilities actively sought for, to integrate them into local heating networks and are appropriate conditions created?	2%
☐	Are locations for waste heat utilisation actively sought for or is the municipality pushing for waste heat utilisation (e.g. by approaching industrial companies)?	5%

	Further actions	
☐	Does the municipality educate the population about the benefits of renewable energies in order to increase their acceptance?	**5%**
☐	Does the municipality promote a climate-friendly heat supply by providing information as well as combine supply and demand?	**5%**
☐	Do municipal buildings serve as the basis for a local heating network with CHP?	**4%**
☐	Are heating networks promoted by compulsory connection and by use or similarly binding instruments?	**4%**
☐	Are there municipal support programmes for renewable energies (e.g. solar thermal)?	**2%**
☐	Does the municipality support pilot projects in the field of renewable energies?	**2%**
☐	Is there a roof area exchange for PV systems or are municipal roofs made available for PV systems of third parties?	**2%**

The evaluation above results in 100%

Checklist Economy

Yes	Questions/Topics	Rating
	Targets/Strategies	**25%**
	Targets	
☐	Energy reduction targets for the economy sector	**8%**
☐	Energy reduction targets for single industries	**4%**
	Strategies	
☐	Energy action plan for single industry parks	**5%**
☐	Climate action plan for small businesses	**4%**
☐	Integrated plan for the interaction of energy flows (demand and supply) within the city (e.g. waste heat)	**4%**
	Organization/Controlling	**10%**
	Responsibilities	
☐	Central managing of energy matters for single industry parks	**4%**
☐	Central contact person for an economy in all energtic matters	**3%**
	Controlling	
☐	Regular inventory and development of energy demand in a local ecomomy (indicators for development of different economic sectors and economic growth)	**2%**
☐	Regular controll of energy balances of single industry parks	**1%**

	Municipal measurements	65%
	Planning	
☐	City wide industrial heat demand and supply planning	6%
☐	Industrial heat demand and supply planning for single industry parks	4%
☐	Energetic planning for new industrial parks	4%
☐	Energy plan for new commercial centres	3%
	Strategy	
☐	Central advisory for energetic issues of the economic sector (e.g. energy agency)	5%
☐	Local support programm for cross sectoral technologies	3%
☐	Local efficiency campaigns for different branches	4%
☐	Efficiency network for small companies	3%
☐	Climate action agreements with local economy	3%
☐	Support of energy managment in companies (e.g. financial, advisory)	5%
☐	Local support program for solar energy production on industrial rooftops	3%
☐	Local support program for using waste heat for discrict heating	4%
☐	Pilot projects for integrated energy use (e.g. Solar heat pump)	4%
☐	Support settlement (of) for a green economy	3%
☐	Reward system for green companies (e.g. public tender)	3%
☐	Banning of coal-fired processes	8%

The evaluation above results in 100%

Checklist Buildings

Yes	Questions/Topics	Rating
	Targets/Strategies	25%
	Targets	
☐	Existing targets for energy use of buildings for a target year (e.g. 2030)	8%
☐	Energy-efficiency targets for building constructions	4%
	Strategy	
☐	Renovation roadmap for building stock	8%
☐	Renovation roadmap for building stock of single districts	5%

	Organization/Controlling	**10%**
	Responsibilities	
☐	Central organisation of local activities for renovation of building stock and standards for new buildings	**4%**
☐	Renovation management for single city districts	**3%**
☐	**Controlling**	
☐	Regular controlling of development of heat and electricity demand in building stock (absolute and specific indicators [kWh/m²])	**1%**
☐	Regular quality controlling of building constructions	**2%**
	Municipal Measurements	**65%**
	Planning	
☐	Ecologic and energetic standards in urban land-use planning (e.g. maximum of heat demand/m²)	**5%**
☐	Priorized integrated energy use plan for new city districts	**5%**
☐	Integrated planing of future heat and cooling demand and different heat supply options for building stock	**5%**
☐	Analysis of efficency potentials for existing building stock in different districts (compared to alternatives like new constructions)	**5%**
☐	Priority setting for renovation activitites in different districts (e.g. date of construction, ownership structure, building types)	**5%**
	Further actions	
☐	Local energy agency for advisory, coordination of action and networking	**8%**
☐	Pilot projects for challenging the renovation of buildings	**4%**
☐	Retrofitting network (e.g. with local craftsmen, housing companies, renovation industry)	**6%**
☐	Sensitisation acitivites for energy reducing in housholds	**5%**
☐	Sensitisation acitivites for energy reducing in small businesses	**3%**
☐	Implemenation of best energetic standards in new districts	**3%**
☐	Smart home pilot projects	**3%**
☐	Local support programme for renovation	**4%**
☐	Preferation of smart homes, high energy standars, integration of efficience and renewable energies within planning of new buildings	**4%**

Checklist Urban planning

Yes	Questions/Topics	Rating
	Targets/Strategies	**25%**
	Targets	
☐	Are there are energy or climate targets in urban planning (e.g. the structure of settlements must be adapted to the requirements of climate action)?	**7%**
☐	Mission statement for integrated planing (e.g. combining issues of traffic and building)?	**5%**
	Strategy	
☐	Are climate action aspects integrated in urban planning strategies (e.g. 5 year plans, city masterplan)?	**5%**
☐	Is there an integrated plan including cross sectoral activities related to climate action?	**4%**
☐	Have districts / neighbourhoods / streets been prioritised with regard to sustainable/ climate mitigagion development?	**4%**
	Organization/Controlling	**10%**
	Responsibilities	
☐	Is there a position for the coordination of simultaneous integrated urban planning in local administration (for whole municipality)?	**5%**
☐	Position for coordination of integrated planning in different city districts (district manager)	**3%**
	Controlling & Documentation	
☐	Is there an audit for compliance with energy standards und climate friendly planning (internal or by external auditors)?	**1%**
☐	Is the achievement of self defined targets in urban planning regularly monitored by means of indicators?	**1%**
	Municipal Measurements	**65%**
	Planning instruments	
☐	Are climate action aspects taken into account in the land use plans of municipalities/ districts? (e.g. urban growth boundaries, small blocks, mixed use)	**10%**
☐	Are aspects such as compactness and space-reduced construction taken into account in the evaluation of urban development designs?	**7%**
☐	Are the use of passive solar energy (e.g. through alignment, freedom from shadows) taken into account in the evaluation of urban development designs?	**3%**
☐	Are cross sectoral issues taken into accout (especially with mobility-questions) in urban planning dicussions (e.g. City of short distances; shared use of infrastructure between different sectors)?	**6%**
☐	Is the active use of renewable and solar energy (e.g. optimisation of the roof area, consideration of heating networks or storage locations) taken into account in development plans?	**5%**

	Further instruments	
☐	Small Block development (stimulate walking experiences, street crossings, reduced use of cars etc.) and reshaping of super-blocks	**5%**
☐	Development of central mobility hubs (public transport and motorized individual traffic) connected to local needs	**5%**
☐	Are energy standards laid down in private law and urban development contracts?	**4%**
☐	Elaborate checklists for planners and investors already for the conception phase in use /e.g. to serve special quality standards in building and conneting different sectors)?	**4%**
☐	Exceptions and releases in case of ecologically improved buildings (height)?	**4%**
☐	Integrated planning guidance for for private district developers	**4%**
☐	Green city cluster network (of local sustainable actors) as supporting structure	**4%**
☐	Integratetd training and education for urban and traffic planning organizes by the municipality	**4%**

The evaluation above results in 100%

Checklist Mobility

Yes	Questions/Topics	Rating
	Targets/Strategies	**25%**
	Targets	
☐	Are there any city-specific targets for increasing cycling and walking?	**5%**
☐	Are there any city-specific targets for increasing public transport use?	**6%**
☐	Are there any political targets for the avoidance of traffic within settlements and in transport planning?	**6%**
☐	Are there climate action related targets for the municipal vehicle fleet (e.g. in vehicle procurement)?	**2%**
☐	**Strategies**	
☐	Are there any concepts or strategies for climate-friendly mobility in the municipality?	**4%**
☐	Are there individual strategies for improving public transport, cycling and walking services?	**2%**
	Organization/Controlling	**10%**
	Responsibilities	
☐	Are there clear personnel responsibilities for transport-related planning and the implementation of municipal transport-related measures (e.g. cycle paths, public transport assignments)?	**4%**

☐	Are persons/departments responsible for traffic-related planning in all municipal planning with possible traffic effects involved (e.g. planning of new development areas, retail trade concept, etc.)?	3%
☐	Is there a regular regional exchange process for sustainable mobility in the region (e.g. regular meetings of responsible persons for city and regional traffic)?	2%
	Controlling	
☐	Is there regular controlling (e.g. traffic censuses, mobility surveys) to measure the effectiveness of different actions carried out?	1%
	Municipal measurements	**65%**
	Planning	
☐	Is the municipality actively represented in traffic-related regional planning (e.g. commuter traffic from the region outside the city) with responsible persons/offices?	5%
☐	Are approaches for traffic avoidance (e.g. short distances, mix of functions) taken into account from the outset in urban planning?	6%
☐	Are public transport, cycling and pedestrian traffic included in urban planning at an early stage?	5%
☐	Are different types of traffic (e.g. domestic traffic, source-to-target traffic) and the associated requirements taken into account in a differentiated way for a climate-friendly traffic design?	4%
☐	Is there planning of multi-modal mobility (e.g. central hubs, coordinations of different traffics)?	6%
	Further actions: public transport	
☐	Are there any activities to expand public transport services in the municipality (e.g. route network, frequency, transport capacities)?	6%
☐	Are there projects to ecourage public transport appliances (e.g. accessibility, ticket purchase, easily understandable and accessible passenger information on the fare system, route network, timetables, "live information" at stops)?	4%
	Further actions: pedestrian and bicycle	
☐	Are the needs of cyclists and pedestrians taken into account in road renewal work (e.g. own lanes, wide sidewalks)?	4%
☐	Are there concrete plans for the expansion of the cycle and footpath network (e.g. a simple footpath and cycle path concept) and a priority plan for its implementation?	6%
☐	Are there pilot projects for traffic-calmed zones for cyclists and pedestrians created in the municipality (e.g. meeting zones)?	4%
	Further actions: motorized individual traffic	
☐	Are there any measures for parking space management/car control (e.g. regulations for resident parking, activities to reduce and increase the price of public parking for non-residents) with the focus on reducing traffic in the city center and/or city-specific districts?	6%
☐	Are there climate-friendly solutions for economic and freight traffic (e.g. alternative urban logistics, truck steering concept)?	3%
☐	Do local measures promote electromobility or other climate-friendly drives (e.g. own lanes)?	3%

	Further actions	
☐	Is there an official mobility management in the municipal administration for the commuter traffic of employees and business trips (e.g. job tickets, business bicycles, car sharing)?	**2%**
☐	Are there climate-friendly procurement guidelines for municipal vehicles (e.g. consumption limits, vehicle sizes, electric car obligation)?	**1%**

The evaluation above results in 100%

Checklist Municipal facilities

Yes	Questions/Topics	Rating
	Targets/Strategies	**25%**
	Targets	
☐	Has the municipality set energy and GHG-reduction targets for own municipal facilities?	**6%**
☐	Creation of decision criteria based on the targets (e.g. evaluation according to the total cost approach for investments, preference of energy sources)?	**4%**
☐	Is the development of the targets based on an ambitious efficiency path for the properties (e.g. 60% reduction in energy consumption)?	**4%**
☐	Are there targets for energy generation from renewable energies or CHP for municipal buildings?	**4%**
	Strategies	
☐	Are there guidelines for the renovation of buildings and heating systems and for an environmental-friendly use?	**5%**
☐	Does an "energy" service/working instruction exist?	**2%**
	Organization/controlling/financing	**35%**
	Responsibilities	
☐	Is there a central coordination of tasks relating to energy (e.g. energy department)?	**8%**
☐	Is there a sufficient amount of staffing levels for the management of your own municipal buildings (at least 1 position up to 50,000 inhabitants) and are their tasks recorded and clearly defined?	**4%**
☐	Is there an internal administrative working group on the subject of energy and are all relevant departments involed?	**2%**
	Controlling and documentation	
☐	Is there a building overview including the most important energetic data (e.g. areas, energy consumption, temperatures)?	**7%**
☐	Is there an annual energy (short) report?	**4%**
☐	Are savings and successes evaluated, documented and published?	**4%**

	Financing	
☐	Are there fixed annual funds in the budget for energy-saving measures?	**4%**
☐	Are contracting or intracting offers for plant renovation checked/used?	**2%**
	Municipal measurements	**40%**
	Building refurbishment and construction	
☐	Is energy optimization guaranteed for refurbishments in existing buildings?	**7%**
☐	Are new projects designed and constructed using the highest energy standards (e.g. pilot projekts)?	**7%**
☐	Do municipal buildings serve as the basis for a local heating network with CHP and/ or renewable energies for neighbouring areas?	**5%**
☐	Is street lighting in need of refurbishment consistently converted to LED?	**3%**
	Operational management	
☐	Are consumption problems (e.g. unusually high power consumption) followed up promptly?	**5%**
☐	Are rough diagnoses available for the properties with the highest consumption?	**4%**
☐	Are building users continuously motivated and informed? (e.g. energy saving information for users)	**3%**
☐	Is there a premium/benefit sharing system for users for saving energy in public buildings? (e.g. "incentive models")	**3%**
☐	Is the operating personnel (caretaker) regularly trained?	**3%**

Checklist Governance

Yes	Questions/Topics	Rating
	Overal targets and strategy	**25%**
	Targets	
☐	Are there GHG-reduction targets for the municipality?	**6%**
☐	Are there already existig energy intensity targets for the municipality?	**3%**
	Are there sector specific climate action targets (e.g. mobility) for the municipality?	**3%**
	Overall Strategy	
☐	Overall strategy to implement the municipal climate action targets (e.g. low-carbon development plan or GHG emissions control plan)?	**8%**
☐	Are there coordinated climate action strategies for specific sectors (e.g. mobility)?	**5%**

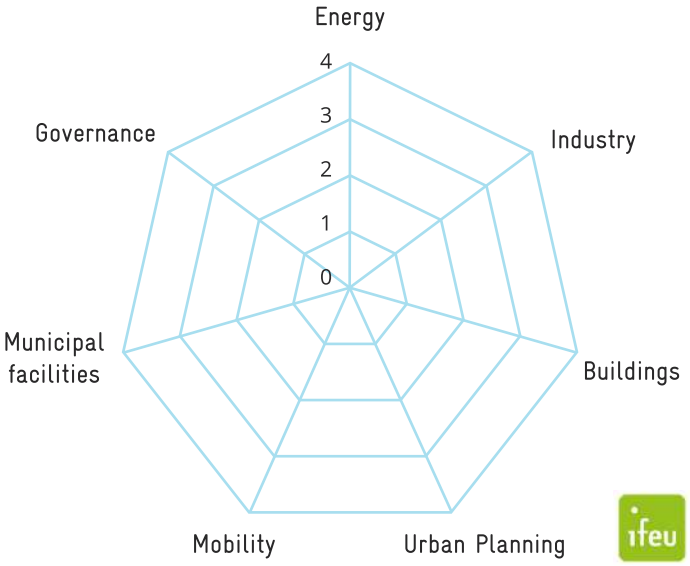
	Organization/Controlling	**50%**
	Responsibilities	
☐	Is there central coordination within the administration that deals with climate action and energy issues (climate-management) and implementation of the climate strategy?	**10%**
☐	Is there allocation of a manager or an unit in governmental structures according to relevance (cross sectoral topic)?	**7%**
☐	Is there core group for the coordiniation of action within the different departments of the administration (e.g. climate change leadership group)?	**6%**
	Controlling & Documentation	
☐	Are there documentation and collection of all municipal climate action measures (e.g. consulting figures, GHG-savings, etc.)?	**4%**
☐	Is a GHG and energy balance (GHG-inventory) drawn up for the municipality on a regular basis (at least every 5 years)?	**3%**
☐	Are there documentation and breakdown of the GHG-inventory by using indicators or activity profiles?	**3%**
☐	Does a climate action report for local policy an the public exist (at least every 3 years)?	**1%**
	Financing (last 5 years)	
☐	Is the administration provided with a fixed annual budget for climate protection tasks?	**7%**
☐	Are new funding programmes regularly researched and evaluated internally?	**2%**
☐	Have subsidies at state or federal level been used for other climate protection measures so far?	**5%**
☐	Have different forms of financing been developed by the administration?	**2%**
	Network and communication	**25%**
	Network	
☐	Is the municipality a member of a city network for climate action?	**2%**
☐	Are there direct cooperations with other municipalities or the region on the topic of energy and climate action?	**3%**
☐	Is there an overview of potential partners (e.g. craftsmen, planners) for energy saving and climate action (e.g. for initiating new climate measures with local partners)?	**2%**
	Communication	
☐	Is there stakeholder involvement strategy to raise local engagement?	**5%**
☐	Is there overview of relevant climate action topics for different stakeholders to link stakeholders' interests with climate activities?	**4%**
☐	Is there regular face to face interviews with regular local stakeholders to stay in touch with their plans and developments that could influence climate activities?	**3%**
☐	Is there stakeholder committee with the most important stakeholders from each sector to advise on the implementation of the local climate strategy and the exchange of climate relevant plans?	**3%**
☐	Is there a contact person in the administration for single citizens on the subject of climate action?	**3%**

The evaluation above results in 100%

Rating of activity

Sector	Checklist results
Energy	0%
Industry	0%
Buildings	0%
Urban planning	0%
Mobility	0%
Municipal facilities	0%
Governance	0%

Status quo of Climate Action



Legal notice

Text:

Benjamin Gugel (ifeu), Vanessa Herhoffer (ifeu)

Editing:

Ma Qiongying (giz), Peter Sailer (giz), Li Ang (iGDP), Li Yang (iGDP)

Published:

December 2019

Contact:

ifeu – Institut für Energie – und Umweltforschung GmbH

Benjamin Gugel
benjamin.gugel@ifeu.de

APPENDIX 2

KPI#	Key Performance Indicator (KPI)	Unit of measure
City-wide		
CW01	Primary energy consumption per capita (city-wide, per year)	tce/person
CW02	GHG emissions per capita (city-wide, per year)	tCO_{2e}/person
CW03	GDP per capita (city-wide, per year)	10^4 RMB/person
CW11	Energy intensity (city-wide, economic)	tce/ 10^4 RMB
CW12	Carbon intensity (city-wide, economic)	tCO_{2e}/ 10^4 RMB
Industry*		
IN01	**Industrial economic energy intensity** (final energy consumption/unit industrial value added)	tce/10^4 RMB
IN02	**Industrial carbon intensity** (GHG emissions/unit of industrial value added)	tCO_{2e} /10^4 RMB
IN03	**Proportion of fossil fuel in industrial energy** (excluding heat and electricity)	%
IN04	**Proportion of electricity use in industrial energy**	%
Public and Commercial Buildings		
BL01	**Public buildings' electricity intensity**	kWh/m^2
BL03	**Proportion of green buildings** (% of city-wide floor space designated as"green" buildings or similarly labeled buildings)	%
Residential Buildings		
BL02	**Residential buildings energy use per capita**	tce/person
BL05	Share of district heating supplied by cogeneration facilities	%

KPI#	Key Performance Indicator (KPI)	Unit of measure
Transportation		
TR01	**Transportation energy use per capita**	tce/person
TR02	**Extent of public transit lines** (length of rail and bus lines in city area)	km/km^2
TR03	**Mode share of non-motorized transport** (% of trips by walking and cycling)	%
TR04	**Mode share of public transit** (% of trips by bus and rail)	%
Power & Heat		
PN01	**Share of renewable energy in local electricity supply**	%
Street Lighting		
SL01	**Electricity intensity of street lighting** (grid-connected electricity consumed per km of lit roads per year)	kWh/km
Solid Waste		
SW01	**Municipal solid waste disposed of per capita** (per year)	kg/person
Water & Wastewater		
WW01	**Water consumption per capita** (per year)	m^3/person
WW02	**Electricity intensity of potable water supply**	kWh/m^3
WW03	**Energy intensity of wastewater treatment**	tce/10^4 m^3
Urban Green Space		
UG01	**Urban green space per capita**	m^2/person

Source: BEST Cities: Benchmarking and energy savings tool for Low Carbon Cities. Software user guide v.1.4