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Summary

An abstract **summarizes the content** of the 2030 Climate Neutrality Action Plan (Action Plan) that is developed jointly by local authorities, local businesses, and other stakeholders.

Textual element
…

List of figures

The list of figures **identifies the titles and locations** (page numbers) of **all visual elements:** figures, drawings, photos, maps, etc. used in the Action Plan.

Figure №	Figure title	Page №
Figure 1	…	…

List of tables

The list of tables **identifies the titles and locations** (page numbers) of **all tables** used in the Action Plan.

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Abbreviations and acronyms

The list of abbreviations and acronyms **identifies the abbreviations** (a shortened form of a word used in place of the full word) **and acronyms** (a word formed from the first letters of each of the words in a phrase of name) used in the Action Plan.

Abbreviations and acronyms	Definition
…	…

1 Introduction

The introduction should outline the local policy context in which the Action Plan is being developed and describe the gap it is addressing in broad terms.

With its climate protection concept adopted in 1992, the city of Heidelberg was one of the first cities in Germany to have a systematic plan for climate protection at the local level, backed up by measures. Under the motto "think globally - act locally," decisive steps were taken in the 1990s to set the course for municipal climate protection. In 1997, this also included the establishment of a local energy consulting service, which today has expanded its sphere of activity as the Heidelberg and Rhine-Neckar District Climate Protection Agency and supports municipalities and the citizens of the entire region in their climate protection efforts.
Influenced by the international sustainability debate, the Enquete Commission of the German Bundestag, and the conferences in Aalborg and Rio, the goals of Heidelberg's climate protection and CO2 reduction were also incorporated into the city's sustainability strategy, the Urban Development Plan, in 1997.
Supplemented by the energy concept and the transport development plan, as well as numerous updates, Heidelberg has succeeded in anchoring climate protection programmatically and financially in many of the city's departments, as well as motivating external actors to actively protect the climate. Most recently, the establishment of a separate department for climate protection, the environment and mobility in 2020 strengthened the organizational anchoring of climate protection in the administration.
An important milestone in Heidelberg's climate protection process is the "100 % Climate Protection Master Plan" adopted by the municipal council in 2014 and updated in 2019. In this approach to climate neutrality 2050, which was funded by the German Federal Ministry for the Environment and developed in exchange with 40 municipalities, Heidelberg was able to adopt climate protection strategies as a model municipality, which had previously been developed in a comprehensive participation process.
Other innovative approaches and bundles of measures complement Heidelberg's efforts towards climate protection and sustainability. These include, for example, the Sustainable Business Network with its focus on small and medium-sized enterprises, the city administration's energy concept for its own properties, the heat transformation path, and green district heating.

In 2019, the climate emergency was declared and the Climate Action Plan 2020 was adopted. This accelerated the implementation of measures and politicians set the financial course for consistent climate protection.
Heidelberg started the process of "Green recovery" as part of the C40 network 2020.

Heidelberg's brought-forward climate neutrality target arose from the target debate surrounding the Paris Climate Agreement of 2015 and the updated neutrality targets of the German federal government and the state of Baden-Württemberg. The climate protection law of the Federal Republic of Germany was brought forward to the year 2045 with the decision in June 2021. The climate protection law in Baden-Württemberg aims to achieve net greenhouse gas neutrality gradually by 2040.
In July 2022, the Heidelberg City Council passed the following resolution: The City of Heidelberg undertakes to work consistently towards the goal of climate neutrality by 2030 in all fields of action and to give priority to climate protection in line with its participation in the EU mission "climate-neutral and smart cities". Complete climate neutrality according to the municipal BISKO accounting is to be achieved by 2040 at the latest. For the city administration, in particular the municipal properties, the aim is to achieve the greatest possible climate neutrality by 2030.
Heidelberg's climate neutrality policy is embedded in the historical and environmental policy context described here, on which the membership and activities in the EU mission project "100 climate-neutral and smart cities" are based.
The decision of the municipal council to participate in the EU-Mission project leads to an acceleration of the implementation of measures in the municipality, the closing of ranks of local actors, the linking of fields of action and thus a restructured and systematic approach to the transformation of society combined with the reduction of greenhouse gas emissions.

2 Work Process

This section should list the working steps carried out, for example along the NZC Climate Transition Map, or related steps planned as well as outline timeline and milestones for future iterations for the continuous development of the Action Plan.

Build a strong mandate

The City of Heidelberg has a long history of climate action since its first climate protection concept in 1992. However, being part of the EU Mission "100 climate neutral and intelligent cities" is of great importance for the City to accelerate climate action. The first step was the council's decision in June 2022 to work consistently towards the goal of climate neutrality by 2030 in all fields of action and to give priority to climate protection. After that, the municipality was in a position to start. The first step was to set up a steering committee within the city administration to ensure that climate protection is mainstreamed across key departments. The steering committee now meets on a regular basis. Secondly, the already existing Mayor's Climate Action Group, which includes some of Heidelberg's key stakeholders, was informed and involved in the mission's process. In addition, a broader range of companies and organisations are planned to be involved in the mission's process. Therefore, the city offered the opportunity to sign a cooperation agreement to be part of the mission and to signal the will to pull together.

The City of Heidelberg is active in many networks on regional, national and international levels, such as for example Städtetag Baden-Württemberg, deutscher Städtetag, Klimabündnis, C40, GCM or Energy Cities (https://www.heidelberg.de/hd/HD/Leben/Netzwerke.html). The exchange between these cities is important to learn from each other and to have a political representation at different levels of government. The EU Mission is another essential network that allows Heidelberg to build strong relations with other European and German lead cities, especially on the Mission Platform and at personal meetings. The nine German cities have set up a bi-weekly call in order to share their experiences and progresses in the mission. Moreover, there is an exchange between the German mission cities and the German Government.

Understand the system

The City of Heidelberg monitors its GHG emissions on a regular basis by a BISKO CO2-balance. For the Climate City Contract, Heidelberg uses the data from 2019 to not take advantage of the outlier Corona-years. The CO2-balance shows the gap of the different sectors to reach climate neutrality.

As climate protection had been a major topic in Heidelberg since the 1990s many connections and relationships have been made across administration departments and other stakeholders. However, there still exist some systemic barriers that need to be unveiled. This is what the climate city contract is helpful for. Furthermore, Heidelberg will identify within the contract the most important levers of change to reach climate neutrality by 2030. The contract also unpacks the strategy for financing the actions needed.

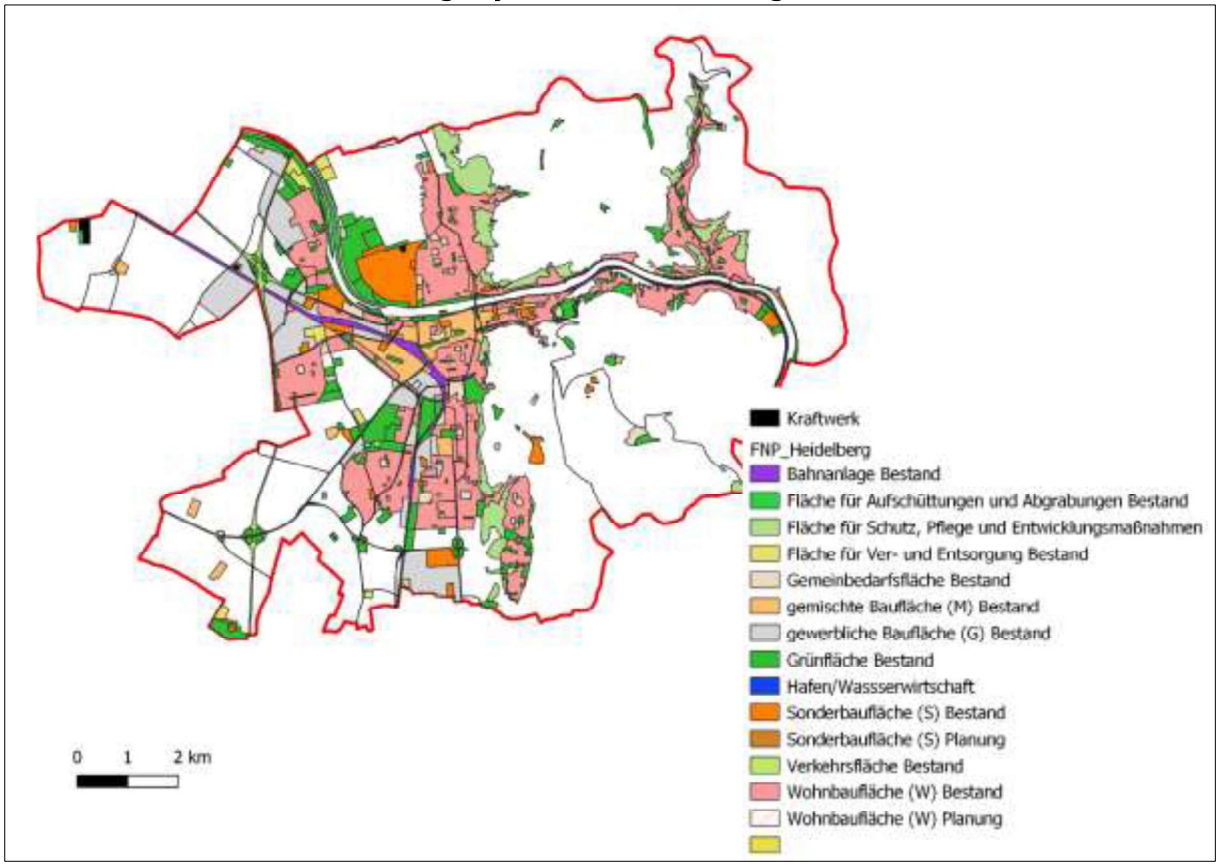
Co-design a portfolio

Cities and municipalities play an important role in the development and implementation of climate protection measures. This applies to their own administrative organisation, but also to other areas within their own sphere of influence.
There are many fields of action that municipalities can influence directly and indirectly, for example in the area of municipal infrastructure or municipal enterprises. Furthermore, municipalities are the interface to citizens, the local economy or social and cultural institutions. In addition to their own climate neutrality, the provision of climate-friendly supply and transport infrastructures, urban development, refurbishments or information and funding offers are possible levers. Overall, municipalities have a great influence on greenhouse gas emissions. They occupy a key position in climate protection.
Within the fields of action in climate protection, a municipality can take on various roles. They can be active as consumers and role models, suppliers and providers, planners and regulators, as well as advisors and promoters. Depending on the role of the municipality, its influence on greenhouse gas reduction potentials differs: as a consumer, for example, it is the cause of greenhouse gas emissions and can exert direct influence on the future consumption of its own properties, while in other areas it can exert influence more through regulation and consultation.

In July 2022, the municipal council passed a resolution for a climate-neutral administration for Heidelberg in 2030.
In the case of city properties such as schools, administrative buildings, day-care centres and other operational facilities such as the professional fire brigade, the positive effects of Heidelberg's climate protection over many years are becoming apparent. Final energy consumption has already been reduced by 65 percent.
The EU Mission is thus not a task only for the municipality but also for all civil stakeholders, organisations and companies in Heidelberg. Therefore, there will be an accompanying transition group with all these stakeholders to start and implement climate protection measures and interventions. The contract shows financing options and allows to estimate co-benefits and impacts. To ensure long-term implementation it is important that Heidelberg simultaneously adapts policies and regulations.
The Climate City Contract is regularly updated so that an iteration process takes place every two years. By regularly renewing the Climate City Contract, new findings, adapted framework conditions and regulations as well as technological developments can be taken into account. In particular, measures from other planning processes, such as the Climate Mobility Plan, are incorporated. In this way, a dynamic plan is created that can be developed together with existing and new actors and citizen participation.

The map below shows Heidelberg's city boundaries, covering around 109 m². This area is addressed by the action plan. Moreover the land use is pictured (subdivided into Power plant, railroad facility (existing), area for fillings and excavations (existing), area for protection, maintenance and development measures, area for supply and disposal (existing), area for public use (existing), mixed construction area (existing), commercial construction area (existing), green area (existing), harbor/water management, special construction area (existing), special construction area (planning), traffic area (existing), residential construction area(existing), residential construction area (planning)).

Heidelberg city boundaries including land use



The following map supplements the land use map. Here it becomes visible where district heating already exists and where gris expansion for district heating is planned until 2030. The figure also shows the existing and planned green energy power plants until 2030.

How can the heating sector become climate neutral?

3 Part A – Current State of Climate Action

Part A "Current State of Climate Action" describes the point of departure of the city towards climate neutrality, including commitments and strategies of key local businesses, and informs the subsequent modules and the outlined pathways to accelerated climate action.

3.1 Module A-1 Greenhouse Gas Emissions Baseline Inventory

Module A-1 "Greenhouse Gas Emissions Baseline Inventory" should detail and describe the city's latest GHG inventory to establish the emission baseline and to establish the emissions gap to 2030 climate neutrality according to the inventory specifications defined in the Cities Mission's *Info Kit for Cities* and the process outlined in the Action Plan Guidance and Explanations.

A-1.1: Final energy use by source sectors				
Base year	2019			
Unit	MWh/year			
	Scope 1	Scope 2	Scope 3	Total

Buildings	**767.219**	**1.388.341**	**-**	**2.155.559**
Electricity	-	649.959	-	649.959
Oil	83.538	-	-	83.538
Natural gas	662.363			662.363
District heating		738.381	-	738.381
Coal	29	-	-	29
Heat from renewable sources	21.289	-	-	21.289
Transport	**910.130**	**22.595**	**0**	**932.725**
Gasoline fossil	325.365	-	-	325.365
Gasoline bio	14.031	-	-	14.031
Diesel oil fossil	531.636	-	-	531.636
Diesel oil bio	30.231	-	-	30.231
Natural gas	1.517	-	-	1.517
Biogas	620	-	-	620
LPG	6.731	-	-	6.731
Transport	**910.130**	**22.595**	**0**	**932.725**
Waste	Energy-related activities in waste management (vehicles, grid-supply) are included in the commercial and transport sector			
Industrial Process and Product[1] Use (IPPU)	**-**	**-**	**-**	**-**
Agricultural, Forestry and Land Use[2] (AFOLU)	Energy-related activities in Agriculture, Forestry and Land Use (fuel combustion, vehicles, grid-supply) are included in the commercial and transport sector			

A-1.2: Emission factors applied (from economic model data inputs)		
Base year	2019	
Greenhouse gas emissions from CO2, CH4 and N2O are included (CO2 equivalents)		
Sector	**Primary energy/ energy source**	**Carbon Dioxide and eq. ($CO_{2\text{-eq}}$)**
Transport	Passenger cars + motorcycles (g/km)	188
	Buses (g/km)	260
	Light duty trucks (<3.5 t) (g/km)	261

	Heavy duty trucks (>3.5 t) (g/km)	740
Buildings & Heating	Heat production (district heating) (g/kWh)	130
	Heat production (local heating) (g/kWh)	204
Electricity	Electricity generation (g/kWh)	430

For the year 2030 0.270 t CO2 equivalent per MWh final energy is assumed (https://www.kea-bw.de/waermewende/wissensportal/technikkatalog). Based on historical data and forecasts, assumptions are made about how the energy mix for electricity generation will evolve by 2030. This includes expectations for increased use of renewable energy sources (wind, solar, hydro) and reduced use of fossil fuels (coal, natural gas). Nevertheless, this is accompanied by risks in case the assumption is not being met. If the emission factor remains higher than expected Heidelberg's climate neutrality goals might not be met. Therefore it might become indispensable to reevaluate the city's emission reduction strategies to to still meet the goal. Moreover, if the city relies on country-wide renewable energy sources, a failure to achieve the emissions factor target may require a reassessment of the feasibility of local sufficiency concepts. Consequently, Heidelberg has to reassess its renewable energy potential and consider expanding renewable energy capacity to compensate for higher emissions from grid electricity.

A-1.3: Activity by source sector (from economic model data inputs)			
Base year	2019		
	Scope 1	**Scope 2**	**Scope 3**
Transport			
Transport need - passenger cars + motorcycles (M km/year)	895		
Transport need - buses (M km/year)	4		
Transport need - trains/metro (M km/year)	2		
Transport need - light duty trucks (<3.5 t) (M km/year)	38		
Transport need - heavy duty trucks (>3.5 t) (M km/year)	392		
Buildings & Heating			
Heating demand (space heating + domestic hot water) (GWh/year)	1581		
Electricity			
Electricity demand within city boundaries (GWh/year)		780	
Waste			
Collected waste within city boundaries (tonnes)			71.000
Other			

A-1.4b: GHG emissions by source sector (from economic model inputs)					
Base year	2019				
Unit	t CO_2 equivalent/year				
	Scope 1	**Scope 2**	**Scope 3**	**Total**	**% of Total**
Transport	288.340			288.340	31%
Buildings & Heating	264.010			264.010	29%
Electricity		343.208		343.208	37%
Waste*			20.220	20.220	2%
Agricultural, Forestry and Land Use (AFOLU)	2.500			2.500	0%
Total	554.850	343.208	20.220	918.279	100%

** Includes Scope 1 Waste emissions (produced and processed in the city) and Scope 3 (produced by the city but processed outside the city border)*

A-1.4b: GHG emissions by source sector (from economic case)					
Base year	BAU 2030 (Business as Usual 2030)				
Unit	t CO_2 equivalent/year				
	Scope 1	**Scope 2**	**Scope 3**	**Total**	**% of Total**
Transport	249.041			249.041	26%
Buildings & Heating	263.742			263.742	27%
Electricity		446.949		446.949	46%
Waste*			10.031	10.031	1%
Agricultural, Forestry and Land Use (AFOLU)	2.500			2.500	0%
Total	515.284	446.949	10.031	972.264	100%

** Includes Scope 1 Waste emissions (produced and processed in the city) and Scope 3 (produced by the city but processed outside the city border)*

In table A-1.4b it is not possible to distinguish between Scope 1 and 2 emissions in district heat as well as in emissions from waste as there is no more detailed data available.