SUSTAINABLE ENERGY AND CLIMATE ACTION PLAN (SECAP)

Diyarbakır Metropolitan Municipality

2025

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ABBREVIATIONS

ADNKS	Address Based Population Registration System
BEP	Regulation on Energy Performance in Buildings
CDD	Number of Cooling Days in the Reference Year
CDP-ICLEI	CDP (Formerly Carbon Disclosure Project) and ICLEI (Local Governments for Sustainability)
CBS	Geographic Information System
CoM	Covenant of Mayors for Climate and Energy Initiative
CO_2	Carbon dioxide
CO2e	Carbon Dioxide Equivalent
CPMA	Central Project Management Agency
MOEU	Ministry of Environment, Urbanization and Climate Change
DBB	Diyarbakır Metropolitan Municipality
DDÜ	Diyarbakır Dicle University
DEDAŞ	Dicle Electricity Distribution Inc.
DIDEP	Diyarbakır Climate Change Action Plan
DISKI	Diyarbakır Water and Sewerage Administration
DIYARGAZ	Diyarbakır Natural Gas Distribution Co.
EU	European Union
EU4ETTR	EU4 Energy Transition in the Western Balkans and Turkey
EMRA	Turkish Energy Market Regulatory Authority
EPC	Energy Performance Contract
ESCO	Energy Service Contract
MENR	Ministry of Energy and Natural Resources
GCoM	Global Covenant of Mayors for Energy and Climate

GD	General Directorate
GDP	Gross Domestic Product
GHG	Greenhouse Gas Emission
GPC	Global Protocol for Greenhouse Gas Emission Inventories
GWP	Global Warming Potential
HDD	Number of Heating Days in the Reference Year
HMI	Heat Reduction Index
HVAC	Heating, Ventilation and Air Conditioning
HRL	High Resolution Layer
IEA	International Energy Agency
IPA	EU Instrument for Pre-Accession Assistance
IPCC	Intergovernmental Panel on Climate Change
IDEP	Istanbul Climate Change Action Plan
JRC	European Commission Joint Research Center
LULC	Land Use and Land Organization
MONE	Ministry of National Education
MEI	Monitoring Emission Inventory
MWh	Megawatt Hour
MWhe	Billion Tonnes of Oil Equivalent
NDC	Declaration of National Contribution
NZEB	Nearly Zero Energy Buildings
OBA	Important Plant Area
SDA	Important Nature Area
ÖKA	Important Bird Area
PV	Photovoltaic
RCPs	Representative Concentration Pathways

SECAP	Sustainable Energy and Climate Action Plan
SUMP	Sustainable Urban Mobility Plan
STB	Ministry of Industry and Technology
NGO	Civil Society Organization
TEE	Basic Emission Inventory
TEP	Tons of Oil Equivalent
TMMOBOB	Union of Chambers of Turkish Engineers and Architects
TMGM	Turkish Directorate General of Meteorology
TOB	Ministry of Agriculture and Forestry
TUIK	Turkish Statistical Institute
UAB	Ministry of Transport and Infrastructure
UCLG-MEWA	United Cities and Local Governments Middle East and West Asia Regional Organization
UHI	Urban Heat Island
USDA	United States Department of Agriculture
YY (LG)	Local Governments
WBCSD	World Council for Sustainable Development
WRI	World Resources Institute

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This report has been prepared under the coordination of the Department of Climate Change and Zero Waste of Diyarbakır Metropolitan Municipality, in partnership with the Department of Environmental Protection and Control, with technical assistance from the Central Project Management (CPMAfrom Lithuania.

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FOREWORD BY THE PRESIDENT

Diyarbakır Metropolitan Municipality (DMM) is the public institution responsible for municipal services in our city. As a signatory to the Global Covenant of Mayors (GCoM), Diyarbakır Metropolitan Municipality is well aware of the vulnerability to climate change in its jurisdiction and is committed to reduce its greenhouse gas emissions by 40% by 2030 compared to 2019 levels and to prepare and implement a Sustainable Energy and Climate Action Plan (SECAP) in line with this target. The SECAP defines the activities and measures to achieve this target and focuses on the main target sectors for tackling climate change: buildings, equipment/facilities, urban transport and waste.

The European Union Global Declaration of Mayors for Climate and Energy a platform of mayors who have adopted the EU Climate and Energy targets. As Diyarbakır Metropolitan Municipality, in this declaration signed in 2021, we committed to take various measures to reduce the impacts of climate change and adapt to these changes by 2030. In this direction, our SECAP preparation team initiated the process of preparing the Sustainable Energy and Climate Action Plan with the ideas, information and documents received from all our stakeholders throughout Diyarbakır, and this process has adopted other relevant public institutions and NGOs as stakeholders throughout the city and has progressed more decisively by organizing various climate-related workshops. This report will be our city guide for the implementation of action plans against the climate crisis within Diyarbakır.

Diyarbakır Metropolitan Municipality continues to work in line with Turkey's Paris Agreement commitments and the vision of "2053 Net Zero Goal". Considering the population density and climate vulnerabilities in our city, this action plan will make a major contribution to reducing the annual per capita emission rate and positively changing the carbon footprint. In addition, it is planned to provide not only environmental but also economic and social benefits by protecting local ecosystems and securing public health, while preventing many negative impacts, especially biodiversity loss, forest fires, heat waves and health problems caused by the climate crisis.

This study aims to develop effective international cooperation in Diyarbakır's climate action, combat climate change, and protect natural life and ecological balances.

Mayor of XXX Municipality

EXECUTIVE SUMMARY

The adverse effects of Climate Change have started to be clearly felt today and there has been an increase in the occurrence of extreme climate and weather events such as extreme heat waves, sudden and heavy rainfall, floods and droughts both regionally and globally. The main reason for this situation is seen as the rapid increase in greenhouse gas emissions released into the atmosphere as a result of the increasing use of fossil fuels with the industrial revolution. Accordingly, the average global temperature increased by approximately 1.1°C from 1850 to 2020, and if this trend continues, the global temperature increase is expected to reach 3°C by the end of this century. In order to mitigate the impacts of climate change and ensure sustainable development in the city, a comprehensive GHG mitigation projection needs to be developed. This projection covers a wide range of areas from energy consumption to transportation, waste management to industrial activities and aims to reduce emissions by 40% by 2030. Mitigation efforts include strategies to both minimize environmental impacts and address the economic and social sustainability of the city.

As Diyarbakır is located in the Southeastern Anatolia Region of Turkey, it is significantly exposed to the impacts of climate change. In addition, according to the previously published climate change action plan report for the province of Diyarbakır, the impacts of climate change on the city were presented in different scenarios. In this Sustainable Energy and Climate Action Plan (SECAPthe consequences of the negative impacts of climate change on our city have been compiled in more detail, and emission mitigation action plansrisk and vulnerability analyses and adaptation strategies have been determined comprehensively taking into account the calculated Basic Emission Inventories (BIE) outputs.

Diyarbakır Metropolitan Municipality has created its corporate GHG emission inventory within the scope of energy consumption data from all activities of the municipality. The corporate GHG emission inventory includes municipal administrative buildings and activities, as well as the activities of subsidiaries/affiliated organizations. The SECAP report targets energy efficiency measures for the residential, industrial, transportation and waste sectors.

Diyarbakır Metropolitan Municipality's areas of responsibility public transportation, waste management, water supply, urban and zoning planning, sewerage system and wastewater treatment, recreational areas and road arrangement. Part of the SECAP study is municipalities and local governments to develop monitoring and action plans to reduce GHG emissions and reduce final energy consumption. The urban emission mitigation part of this study aims to establish a Baseline Emission Inventory and develop emission mitigation strategies compared to the current scenario. The Baseline Emission Inventory quantifies the amount of carbon dioxide (CO_2) emissions from activities such as energy production and consumption, fuel/electricity use in transportation, waste and wastewater management in the region under local government responsibility as of the baseline year. The Baseline Emissions Inventory identifies the main sources of anthropogenic CO_2 emissions in the region and focuses on priorities to reduce them. Within the scope of the SECAP, methane (CH_4) and nitrous oxide (N_2O) emissions are also included in the inventory when calculating the CO_2 equivalent, and actions for GHG emission mitigation are identified. These inventories will serve not only to improve the SECAP targets, but also as a powerful motivational tool for all parties.

The Greenhouse Gas Emission Inventory of Diyarbakır Metropolitan Municipality provides an important source of data for monitoring and reducing the city's carbon emissions. This study enables the monitoring of the city's GHG emissions through its main activities such as energy consumption, transportation, waste management, etc., and the formulation of a more sustainable urban policy. The GHG Emission Inventory of Diyarbakır for 2023 was calculated based on the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC) Baseline Standard. The City Inventory Reporting and Information System (CIRIS) tool was used as emission accounting software. CIRIS is a tool prepared in accordance with IPCC's emission source categories and provides a standardization setting for local governments' inventories. As a result of the calculations based on Stationary Energy, Transportation and Waste sectors; **Stationary energy sector** accounts for approximately **54.2% of** Diyarbakır's total emissions with **2,350,268 MtCO2e**, **Transportation sector accounts** for approximately **28.4%** of total emissions with **1,229,749 MtCO2e**, **Waste sector accounts for** approximately **17.4%** of total emissions with **754,605 tCO_2e**.

Based on 2023 calculations, the Baseline Emission Inventory is determined as **4,334,622 MtCO2e**. The GHG emission per capita in the population projection **is 2.38 tCO_2e**. According to the current population projection of Diyarbakır, the city population is expected to reach **1,892,662** people in 2030. If the current emission rate remains constant, total GHG emissions will increase to **4,512,307 tCO_2e** in 2030. However, it is possible to control emissions through the effective implementation of sustainable urbanization policies within the framework of the action plan we have created. In a 40% mitigation target projection targeted within the scope of the SECAP study, total greenhouse gas emissions in 2030

2,707,384 tCO_2e. When this scenario is realized, the annual amount of emissions per capita is calculated as **1.43 tCO_2e**. This means a significant reduction in the carbon footprint per capita.

If we evaluate the current greenhouse gas emission emissions in terms of many areas, especially agricultural production areas in Diyarbakır; temperature increases, drought and extreme weather events affect the region negatively. This situation also causes problems in water supply and energy production. Due to the aforementioned reasons, adaptation strategies in terms of adaptation to climate change are evaluated as **Agricultural Adaptation, Water Management, Settlement and Infrastructure Planning, Early Warning Systems**.

The climate crisis, which has seriously affected many parts of the world globally, is also affecting our country. Especially cities like Diyarbakır, which are located in the Southeastern Anatolia Region and experience a very intense dry climate, are affected by many vulnerabilities. One of these vulnerabilities energy poverty. Energy poverty a significant problem due to heating difficulties, especially during the cold winter months, and difficulties in accessing energy for low-income households. In order to address this problem and create a more sustainable energy management that provides access to energy, DBB is promoting **energy efficiency improvement projects, promotion of renewable energy sources, expansion of social support programs, social awareness and education, green infrastructure and climate resilience projectsthe establishment of local energy cooperatives**, as well as preventive action plans.

Climate change adaptation action plan studies are extremely important for making cities resilient to climate change. The current GHG inventory calculations of Diyarbakır Metropolitan Municipality, presented in the mitigation section, is one of the most important steps in the development of mitigation scenarios and commitments. In addition, the issue of developing adaptation actions by reconsidering cities and increasing the social, economic and environmental resilience of the city through these actions should be kept on the agenda against the inevitable situations and impacts that will arise due to climate change. In this context, Diyarbakır Metropolitan Municipality's climate change adaptation actions are evaluated together with the city's other strategic plans and put forward as a solution proposal. These actions are presented under certain main headings in parallel with the climate change adaptation plans prepared by Turkey on a national scale. These headings are **infrastructure systems, green infrastructure, water management, public health** and **disaster management, and water management,** taking into account the results of Diyarbakır Metropolitan Municipality's risk and vulnerability analysis.

the population density and climate vulnerabilities in our city, this action plan will make a major contribution to reducing the annual per capita emission rate and positively changing the carbon footprint. It is also planned to provide not only environmental but also economic and social benefits by protecting local ecosystems and securing public health, while preventing many negative impacts, especially biodiversity loss, forest fires, heat waves and health problems caused by the climate crisis. With this study, it is aimed to develop effective international cooperation in Diyarbakır's climate action, combat climate change, and protect natural life and ecological balances.

Against the impacts of climate change, Diyarbakır will strive for the implementation of local mitigation and ecological contribution policies within the framework of the actions determined within the scope of SECAP, and we will continue our work that we have initiated on this occasion with determination. I would like to thank everyone who contributed to the execution and finalization of the study from the beginning to the end.

1.INTRODUCTION

1.1. Introducing SECAP and the EU Project for Energy Transition

The Covenant of Mayors (CoM) is an EU-based initiative launched in 2008. In 2015, it was expanded to the *Covenant of Mayors for Climate and Energy*. With this transformation, adaptation and energy access were added to the targets to reduce CO_2 emissions by 20% by 2020 and 40% by 2030.

In 2017, the Covenant of Mayors was restructured as the Global Covenant of Mayors (GCoM), a global initiative that brings together the EU Covenant of Mayors and the US Covenant of Mayors.

The Global Covenant of Mayors (GCoM) is an international alliance of cities and local governments promoting voluntary action to combat climate change and transition to a low-emission, resilient society. Local authorities that sign the GCoM and the EU Covenant of Mayors commit to submit a *Sustainable Energy and Climate Action (SECAP*, which sets out their sustainable energy and climate goals. The SECAP is a strategic plan that includes the objectives of the city's energy policy, actions, measures, timelines and responsibilities to achieve these objectives.

EU for the Energy Transition: Covenant of Mayors in the Western Balkans and Turkey is co-financed by the European Union and the German Federal Ministry for Economic Cooperation and Development and implemented by the German Society for International Cooperation (GIZ) and the Central Project Management Agency (CPMA). Under this project, municipalities in the Western Balkans and Turkey aim to create cities with access to safe, sustainable and affordable energy, resilience to climate change impacts and low carbon emissions. It is planned to reduce emissions and increase climate resilience in cities in line with the European Union's 2030 CO_2 reduction target of 40% or more. This vision will be aligned with the goals of clean energy transition, GHG emission reduction and cleaner air in the urban context.

In a nutshell, this compact together thousands of cities and regions that are voluntarily committed to implementing climate and energy targets. This initiative brings together local and regional authorities, building on the strength of a multi-stakeholder movement and technical and methodological support from specialized offices. These cities and regions voluntarily contribute to the initiative by achieving targets set at regional or national level within the framework of sustainability, preparing sustainable energy action plans subject to an oversight process. Cities and regions signing the Compact encourage cities to work together with regions, states and central government. Signatories have endorsed a shared vision for 2053;

- Accelerate the decarbonization of its regions,
- Strengthen their capacity to adapt to the inevitable impacts of climate change,
- It aims to allow its citizens access to secure, sustainable and affordable energy.

Within the framework of the Memorandum of Understanding signed with the Metropolitan Municipality of Diyarbakır (DMM) in 2021, the CPMA has supported the DMM through the project to prepare a SECAP in line with the requirements of the Covenant of Mayors and the GCoM, and DMM aims to complete this report in 2025.

The Diyarbakır Climate Change Action Plan (DCCAP) was published by the Diyarbakır Metropolitan Municipality between 2021-2022. The outlines the steps that the entire city should take to combat climate

The Sustainable Energy and Climate Action (SECAP) being prepared within Diyarbakır Metropolitan Municipality is designed to complement NCCAP focuses on sustainable energy and climate actions specific to Diyarbakır, with a focus on measures related to transportation, DMM buildings, facilities and subsidiaries/companies. The GHG emission inventory, risk and vulnerability assessment and targets are designed in relation to local conditions. These targets reflect the activities, capacity and legal context of DMM.

1.2. Main Objectives of Diyarbakır Metropolitan Municipality under SECAP

- **Reducing Carbon Emissions:** By 2030, Diyarbakır aims to reduce its carbon emissions by 40%. To this end, energy efficiency will be increased across the city, greenhouse gas emissions will be reduced, and the share of renewable energy sources will be increased to replace fossil fuel use.
- **Resilience to Climate Change:** One of the main objectives is to strengthen Diyarbakır's resilience to the impacts of climate change. It is planned to adapt the city's infrastructure systems and social structure to climate change, reduce risks and increase resilience to crisis situations, as well as contribute to the protection of biodiversity by strengthening local ecosystems.
- **Sustainable and Accessible Energy:** Access to sustainable, affordable and reliable energy will be ensured in Diyarbakır by integrating energy mitigation and adaptation strategies. In this framework, energy efficiency projects will be implemented, renewable energy investments will be supported and effective energy management strategies will be implemented.

The SECAP is an important document for implementing the goals and vision of the city's energy policy, defining the actions and measures to achieve the goals, together with the assigned responsibilities. The general principle adopted by the Diyarbakır Metropolitan Municipality in this report is that Sustainable Energy and Climate Action Plans should mainly cover the following sectors:

- **Built Environment:** The design of new and renovation of existing buildings will be carried out in accordance with energy efficiency and environmental sustainability standards. Insulation, energy-efficient materials and renewable energy integration will be prioritized in this area.
- **Municipal Infrastructures:** Municipality-managed infrastructure projects will be retrofitted with technologies such as central heating systems, energy-efficient public lighting solutions and smart grids. These infrastructures will focus on reducing carbon emissions and increasing energy efficiency.

- **Land Use and Urban Planning:** Increasing green areas, developing sustainable transportation networks and adopting energy efficient construction models will be ensured in urban planning. It is aimed to use resources more efficiently by implementing smart city planning strategies.
- **Decentralized Renewable Energy Sources:** The use of solar, wind and other renewable energy sources in individual and collective energy production will be encouraged. Local energy production will be supported through off-grid energy solutions.
- **Public and Private Transportation Policies and Urban Mobility:** Sustainable transportation policies will be implemented through steps such as modernizing public transport systems, expanding the use of electric and low-emission vehicles, and increasing bicycle and pedestrian routes.
- **Waste Management and Environment:** The amount of waste will be reduced and environmental impacts minimized through practices such as waste recycling, composting projects and energy recovery. Zero waste policies will be supported.
- **Citizen and Civil Society Participation:** Active participation of all segments of society in climate action plans will be ensured. Community support will be strengthened through training programs, awareness campaigns and cooperation projects.
- **Smart Energy Movement:** Awareness of citizens, businesses and consumers on energy saving and renewable energy use will be raised. Energy efficiency will be increased through smart energy management systems and digital solutions.

2.OVERVI
DIYARBA

2.1. Diyarbakir: The Meeting Point of History, Culture and Natural Riches

Diyarbakır is an ancient city located in the fertile lands of Mesopotamia, which has hosted many civilizations throughout history with its deep-rooted history and rich cultural heritage. Bearing the traces of great civilizations such as the Assyrians, Persians, Romans, Byzantines, Umayyads, Abbasids, Seljuks and Ottomans, the city an important trade, cultural and strategic center throughout history. With the legacy of these civilizations, Diyarbakır is not only a city but also an open-air museum.

With the Republican era, Diyarbakır entered the modernization process and grew rapidly thanks to infrastructure and superstructure investments, becoming one of Turkey's most important cities. Investments in many areas such as education, health, transportation and industry have contributed greatly to the economic and social development of the city. Agriculture-based industry and trade constitute the economic dynamics of the city.

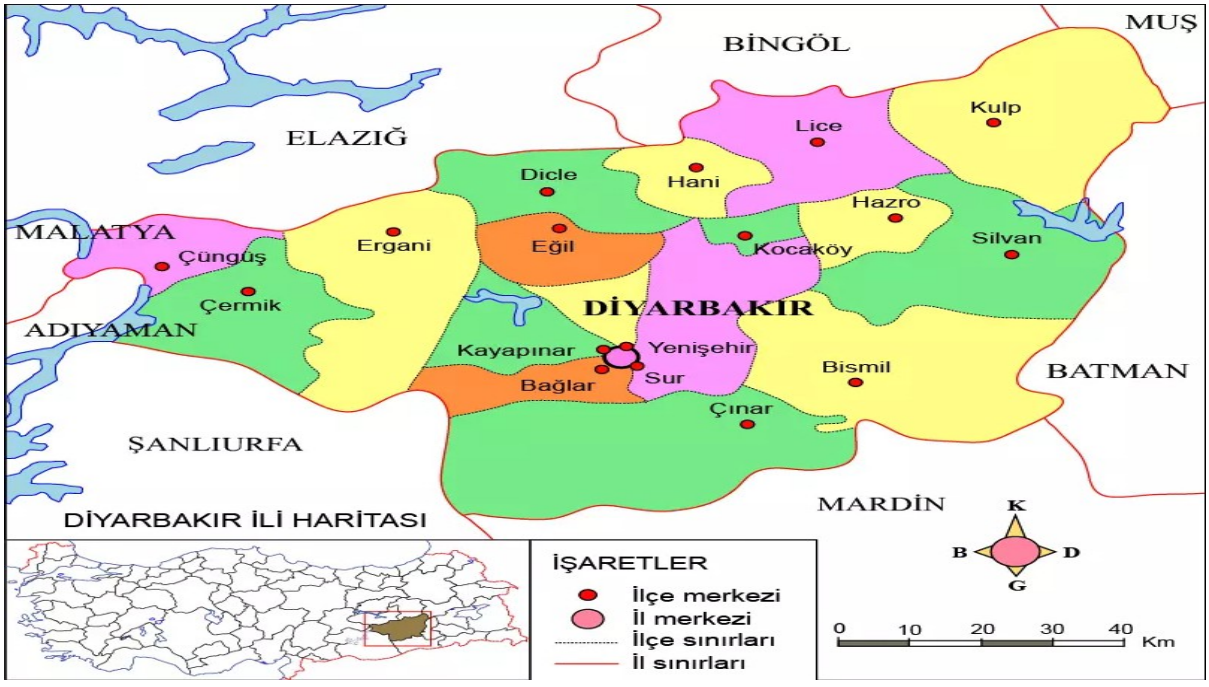

Figure 1: Diyarbakir Province and Districts Map

Diyarbakır is located on the eastern edge of the vast basalt plateau stretching between Karacadağ and the Tigris River. The city is built on a horizon above the Tigris Valley and at the top of the river bend. These geographical features make Diyarbakır a city of unique landscapes and natural beauty.

Diyarbakır is a city that blends historical and modern structures. The city is divided into 17 districts with different cultural structures, languages and social lifestyles. Kayapınar and Yenişehir districts in particular have become regions where modern urbanization has spread rapidly and attracted attention with their wide avenues and modern living spaces. These districts are residential areas with modern housing projects and social areas where people with high economic status are concentrated. Diyarbakır is also a regional center for education and health services. With its universities, educational institutions and health infrastructure, the city serves the provinces in the region.

On the other hand, Bağlar and Sur districts are home to neighborhoods that reflect the historical and cultural texture of the city. Sur district is considered to be the heart of Diyarbakır and stands out with its historical city walls and Hevsel Gardens, which are included in the UNESCO World Heritage List. Bağlar is an important social center in the city with its old residential areas and large population density.

Diyarbakır has carried the cultural and architectural heritage of many civilizations throughout history. The city walls and Hevsel Gardens, which are on the UNESCO World Heritage Listare among the most important examples of this heritage. **Diyarbakır Walls**, one of the symbolic structures of the city, is known as one of the best preserved and longest defense walls in the world. **The Grand Mosque** is one of the oldest mosques in Anatolia and attracts attention with its architecture.

Karacadağ, located in the southwest of the province and the highest mountain in the regionis an old volcanic mountain. The basalt plateaus of Karacadağ extend eastward to the Tigris Valley. These plateaus turn into fertile agricultural lands and contribute significantly to the agricultural production of the region[1]

[1] https://diyarbakir.ktb.gov.tr/TR-56881/cografya.html

2.2. Population

According to the census results of the Address Based Population Registration System (ABPRS) prepared by the Turkish Statistical Institute (TurkStat), the population of Diyarbakır in 2023 is 1,818,133. Compared to the previous year's data, the population increased by 13,253 people. The 2023 population distribution consists of 918,980 males and 899,153 females. Considering its surface area, Diyarbakır has 117 people per km. The population development data of Diyarbakır for the last 5 (2019-2023) years are presented in **Table 1**.

YIL	TOPLAM NÜFUS	ERKEK NÜFUS	KADIN NÜFUS
2023	1.818.133	918.980	899.153
2022	1.804.880	910.472	894.408
2021	1.791.373	904.188	887.185
2020	1.783.431	899.516	883.915
2019	1.756.353	886.190	870.163

Table 1: Total Population of Diyarbakır Province for the Last 5 Years

According to the 2023 census data shared in Table **2**, **Kayapınar** is the most populous district, while **Çüngüş** has the least population.

Yıl	İlçe	Toplam Nüfus	Erkek Nüfusu	Kadın Nüfusu	Erkek %	Kadın %
2023	Kayapınar	**425.143**	214.415	210.728	%50,43	%49,57
2023	Bağlar	**394.338**	197.193	197.145	%50,01	%49,99
2023	Yenişehir	**223.446**	112.130	111.316	%50,18	%49,82
2023	Ergani	**137.492**	69.645	67.847	%50,65	%49,35
2023	Bismil	**119.972**	60.284	59.688	%50,25	%49,75
2023	Sur	**98.938**	50.241	48.697	%50,78	%49,22
2023	Silvan	**87.707**	44.687	43.020	%50,95	%49,05
2023	Çınar	**78.351**	39.503	38.848	%50,42	%49,58
2023	Çermik	**49.900**	25.155	24.745	%50,41	%49,59
2023	Dicle	**38.533**	19.733	18.800	%51,21	%48,79
2023	Kulp	**37.576**	19.905	17.671	%52,97	%47,03
2023	Hani	**32.777**	16.735	16.042	%51,06	%48,94
2023	Lice	**26.168**	13.810	12.358	%52,77	%47,23
2023	Eğil	**23.712**	12.620	11.092	%53,22	%46,78
2023	Hazro	**17.772**	9.524	8.248	%53,59	%46,41
2023	Kocaköy	**15.537**	7.955	7.582	%51,20	%48,80
2023	Çüngüş	**10.771**	5.445	5.326	%50,55	%49,45

Table 2: Total Population Data of Diyarbakır Province by Districts for the Year 2023


OTEL DİVANE
ALGIDA
SUR BÜFE

2.3. Climate

The region both a Mediterranean climate and a continental climate. Summers are hot and dry and winters are cold and rainy. The temperature differences between day and night are high and the climate is mild compared to the Eastern Anatolia Region. The main reason for this is that the Southeastern Taurus Mountains cut the cold winds coming from the north. Artificial lakes formed by the dams built in recent years (Karakaya, Atatürk, Batman, Silvan Dams) create large evaporation surfaces. Therefore, there has been an increase in the relative humidity of the dry air of the Diyarbakır Basin. Average relative humidity highest in December and January. During these months
The relative humidity value, which rises to 77%, drops to 20% in July and August.

The highest temperature average is 31 degrees, while the coldest temperature average is 1.8 degrees. The highest temperature measured until today was 46.2 degrees July 21, 1937 and the lowest temperature was -24.2 degrees on January 11, 1933.

Number of Heating Days (HDD) for the Reference Year: The warm season is 3.2 months long and starts on June 10 and lasts until September 17, with an average daily high temperature above 32°C. The hottest month in Diyarbakır is July, with an average high temperature of 38°C and a low temperature of 22°C.

Number of Cooling Days (CDD) for the Reference Year: The cold season is 3.5 months long, starting on November 25 and lasting until March 11, with an average daily high temperature below 13°C. The coldest month in Diyarbakır is January, with an average low temperature of - 2°C and a high temperature of 7°C.

The rainy season lasts for 7.2 months from October 17 to May 23, with a 14% chance that any given day will be rainy. The month with the most rainy days in Diyarbakır is with an average of 7.5 days. The dry season lasts 4.8 months, starting on May 23 and lasting until October 17. The month with the least rainy days in Diyarbakır is August with an average of 0.2 days.

Annual precipitation in Diyarbakır decreases from the north to the south of the province. The annual rainfall of 800-1250 mm over the Southeastern Taurus Mountains drops to 450-500 mm in the south. Steppe plants, which flourish in springare affected by extremely unfavorable climatic conditions due to the severe drought that lasts from May to November.

DIYARBAKIR	Ocak	Şubat	Mart	Nisan	Mayıs	Haziran	Temmuz	Ağustos	Eylül	Ekim	Kasım	Aralık	Yıllık
	Ölçüm Periyodu (1929 - 2023)												
Ortalama Sıcaklık (°C)	1,8	3,7	8,3	13,8	19,3	26,1	31,0	30,5	25,1	17,6	9,8	4,1	15.9
Ortalama En Yüksek Sıcaklık (°C)	6,8	9,2	14,5	20,5	26,6	33,6	38,4	38,3	33,4	25,4	16,4	9,2	22.7
Ortalama En Düşük Sıcaklık (°C)	-2,2	-1,0	2,5	7,0	11,3	16,6	21,7	21,1	16,0	10,1	4,2	-0,1	8.9
Ortalama Güneşlenme Süresi (saat)	3,9	4,9	5,6	7,2	9,6	12,1	12,4	11,6	10,0	7,5	5,5	3,9	7.9
Ortalama Yağışlı Gün Sayısı	12,25	11,32	11,82	11,21	8,73	2,63	0,46	0,32	1,07	5,74	8,19	11,49	85.2
Aylık Toplam Yağış Miktarı Ortalaması (mm)	69,7	67,2	67,2	68,3	44,4	8,6	1,3	1,0	5,3	32,5	55,9	71,2	492.6
	Ölçüm Periyodu (1929 - 2023)												
En Yüksek Sıcaklık (°C)	16,9	21,8	28,3	35,3	39,8	42,0	46,2	45,9	42,2	35,7	28,4	22,5	46.2
En Düşük Sıcaklık (°C)	-24,2	-21,0	-14,0	-6,1	0,8	1,8	9,9	11,4	4,0	-1,8	-12,9	-23,4	-24.2

Table 3: Diyarbakır Annual Average Temperature, Trend and Anomaly, 1929-2023

Günlük Toplam En Yüksek Yağış Miktarı		Günlük En Hızlı Rüzgar		En Yüksek Kar	
20.03.1976	**71.6 mm**	01.06.1987	**35.0 m/sn**	30.01.2022	**91 cm**

2.4. Ecosystem and Biodiversity

Due to its geographical location, geomorphological structure, the influence of different climate types and the presence of a wide variety of habitats, Turkey has a rich flora and fauna with very different vegetation types. Diyarbakır, which is located in the transition zone of steppe and mountainous areas where the Eastern and Southeastern Anatolia regions meet, exhibits an interesting and rich floristic structure. Its location at the crossroads of different geographical regions, associated variable geographical and ecological factors, and habitat richness are among the reasons for this diversity. Southeastern Anatolia, the smallest geographical region of Turkey, is bordered by the Taurus Mountains to the north and the Syria-Iraq arid zone to the south. Southeastern Anatolia has large steppe areas created by climate and soil conditions. The eastern and western borders of the region are defined by the Tigris and Euphrates rivers. The Karacadağ volcanic mass separates the two drainage basins. The Southeastern Anatolia Region is the gene center of plants such as wheat (Triticum), barley (Hordeum), wheatgrass (Aegilops), lentil (Lens), chickpea (Cicer), pea (Pisum), broad bean (Vicia), pistachio (Pistacia). Apart from these plants, onion (Allium), cereal and legume crops, which feed a large part of humanity today, have been derived from wild species growing in this region as a result of age-long efforts.

Studies conducted by the Nature Association have identified four Important Nature Areas (KBAs) within Diyarbakır provincial borders. Southeastern Taurus Threshold, Karacadağ, Devegeçidi Dam and Bismil Plain. In addition, Karacadağ, located between Diyarbakır and Şanlıurfa provinces, was identified as an Important Plant Area (IPA).

2.4.1. Flora of Diyarbakır

According to recent studies and literature data, in Diyarbakır province, **1200**
It is estimated that there are around a dozen natural plant species growing in the region.

- **Ferns** There are 6 fern species growing in Diyarbakır.
- **Open-seeded**: There is 1 open-seeded species of conifers growing in Diyarbakır province.
- **Flowering Plants:** There are about 1200 flowering plants growing in Diyarbakır province, 80-100 of which are endemic. These include Ajuga xyllorhiza, Astragalus diyarbakirensis, Isatis demiriziana and

Plants such as Onobrychis silvanensis, Rosularia blepharophylla are endemic plants that grow only in Diyarbakır province. Ajuga vestita, Cicer, Crocus leichtlinii, Hesperis hedgei, Lathyrus trachycarpus, Medicago shepardii, Nepeta baytopii, Ophrys carduchorum, Paracaryum kurdistanicum, Rosularia haussknechtii, Salvia ballsiana, Scrophularia mesopotamica and Symphytum aintabicum are endemic species growing only in Diyarbakır and neighboring provinces.

2.4.2. Fauna of Diyarbakır

Approximately **130** fauna species have been identified in Diyarbakır province.

- **Fishes** There are 42 fish species, 12 of which are endemic, living in inland waters within the borders of Diyarbakır province.
- **Amphibians** There are 5 amphibian species, 2 of which are endemic, living within the borders of Diyarbakır province.
- **Reptiles** There are 32 reptile species living in Diyarbakır province. Of the reptiles, 3 to the turtles group, 11 to lizards and 18 to snakes. The Euphrates turtle is a globally endangered turtle species that lives in the Tigris and Euphrates rivers.
- **Mammals** Approximately 40 mammal species live in Diyarbakır province. Of these, the Anatolian leopard (Panthera pardus tulliana) and the mountain goat (Capra aegagrus) are globally species.

Since Diyarbakır has a harsh continental and subtropical highland climate, the lack of rainfall causes summers to be very dry and hot. The harshness of the climate and the scarcity of precipitation cause obstacles to the development of natural vegetation and forest areas.

The number of species and taxa identified in the inventory studies carried out within the scope of the National Biological Diversity Inventory and Monitoring Project in Diyarbakır is given in the table below.[2]

DIYARBAKIR	Biodiversity Inventory Project				Number of Endemic Taxa Added by the Project	Number of Taxa Added by the Project
	Number of Endemic Taxa	Number of Taxa	Number of Endemic Taxa	Number of Taxa		
Flora	37	740	66	1,051	29	311
Seedless Plants	0	110	0	110	0	0
Fauna	17	321	19	324	2	3
Invertebrate Animals	0	343	0	586	0	243
TOTAL Live Type	54	1,514	85	2,071	31	557

Table 4: Number of Species and Taxa Found Previously and Subsequently in the Inventory

2 https://bolge15.tarimorman.gov.tr/Menu/69/Diyarbakir-Ili-Ulusal-Biyolojik-Cesitlilik-Envanter-Ve-Izleme- Study

2.5. Tourism and Culture

Anatolia is a region that has been home to many civilizations throughout history and stands out with its cultural and historical richness. Diyarbakır is one of the most important cities of our country with its rich cultural heritage and historical buildings, as it is the intersection point of these civilizations. The city offers a unique experience to its visitors with its historical artifacts, unique cultural structure and natural beauties.

Diyarbakır has carried the traces of different civilizations throughout its thousands of years of history and has preserved and transmitted these traces to the present day. Mounds, ancient settlements, castles, caravanserais, bridges, inns, mosques and tombs are the most tangible indicators of the city's historical richness. The city walls and Hevsel Gardens, a UNESCO World Heritage Site, are among Diyarbakır's cultural assets recognized worldwide.

The Walls of Diyarbakır are known as one of the longest and best-preserved defensive walls in the world and are one of the symbolic structures of the city. The Grand Mosque is one of the oldest mosques in Anatolia and stands with its architecture and history. The Four Pillar Minaret, Mardin Gate, Tigris River, Hz. Süleyman Mosque, Ziya Gökalp Museum, and the Ten Eyed Bridge are also important elements of the city's historical and cultural heritage.

Diyarbakır attracts attention with its multicultural structure. Religious buildings such as Surp Giragos Armenian Church, Virgin Mary Assyrian Ancient Church and Mar Petyun Chaldean Church reveal the city's tolerance and multicultural identity.

The people of Diyarbakır a rich cultural structure with their unique customs, traditions and beliefs. Local folk dances, handicrafts, traditional cuisine and wedding customs are important elements of the region's cultural richness. Diyarbakır cuisine has a great potential for gastronomy tourism with its unique flavors such as stuffed ribs, liver kebab, licorice sherbet and kadayif dessert.

In addition to cultural and historical tourism, Diyarbakır also has significant potential for alternative forms of tourism:

- **Congress and Tourism:** The city has a suitable infrastructure for congress and business tourism thanks to hosting an important academic institution such as Dicle University.
- **Cave Tourism:** Rich cave structures are important areas waiting to be explored for nature lovers and adventure tourism enthusiasts.
- **Thermal Tourism:** Çermik Thermal Springs has a great importance in terms of health and thermal tourism and welcomes thousands of visitors every year.
- **Nature Tourism:** The Tigris River and the natural areas around it are suitable for activities such as nature walks, camping and photography.

Diyarbakır's UNESCO World Heritage Site, the city walls and Hevsel Gardens are the most important symbols of the region's historical and natural richness. The historical buildings and narrow streets in the city walls give visitors a sense of time travel. The Hevsel Gardens, on the other hand, stand out with their fertile agricultural lands on the banks of the Tigris River and are home to many bird species.


ONUR ECZANESİ
MAHMOOD TEA
Şek yoğurt

2.6. Industry and Trade

With a history dating back more than 10,000 years, Diyarbakır has been home to many cultures that shed light not only on the history of the region but also on the history of world civilization. On the other hand, Diyarbakır has also been a geography where many intellectuals, artists and scientists have been nurtured and raised by these cultures and civilizations. As the center of attraction in the Southeastern Anatolia Region and its center of attraction, Diyarbakır's trade and industry history has been based on agriculture and animal husbandry and the industry based on these. In recent years, however, migration from rural areas to the city has led to a decline in the population subsisting on agriculture and animal husbandry. The labor force that has left agriculture has largely shifted to the services sector. The services sector has the largest share in Diyarbakır's economy. Diyarbakır's industry has developed mainly on the basis of the city's raw material resources, agricultural production and human resources.

Investments in the industrial sector are concentrated in textiles, metal and machinery, construction materials, furniture, food, plastic products, stone and soil based industry, marble and quarrying.

There are 4 organized industrial zones in the province: Diyarbakır Organized Industrial Zone, Diyarbakır Textile Specialized Organized Industrial Zone, Diyarbakır Karacadağ Organized Industrial Zone and Agriculture Based Fattening Specialized Organized Industrial Zone.

In 7 industrial sites in the province, there are small manufacturers and service providers in the fields of automotivefurniture metal.

The 579 enterprises registered in the Industrial Registry Information System in Diyarbakır Province according to scale, sector and number of employees 43.05% micro, 46.01% small, 9.79% medium and 0.91% large-scale enterprises.(3)

[3] https://www.sanayi.gov.tr/assets/pdf/plan-program/21_DIYARBAKIR_ISDR_2019.pdf

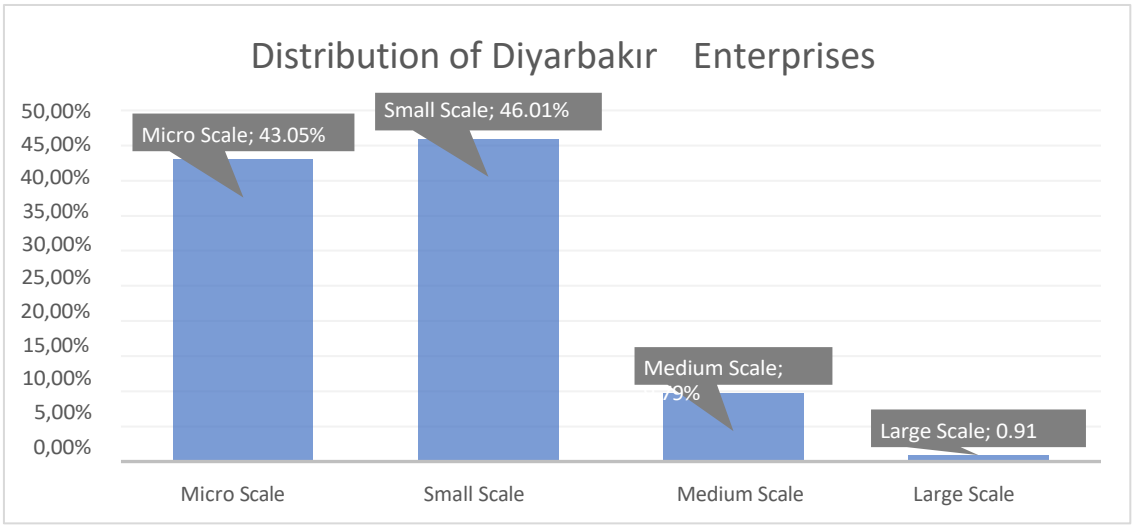

Table 5: Diyarbakır Province Industry Scale Distribution

When the sectoral distribution of industrial enterprises in the province of Diyarbakır is analyzed; first place food products with 20.73%, other mining and quarrying with 10.93% in second place, other mining and quarrying with 10.93% in third place

Non-metallic mineral products sectors with 10.71%.

In Diyarbakır province, 18.60% of people employed in the industrial sector are employed in food products, 12.51% for apparel and 12.04% for non-metallic mineral products.

Sector Name	Number of Employees	Province Share
Food Products	2014	18.6%
Clothing	1354	12.51%
Non-Metallic Mineral Products	1304	12.04%
Metal Products	830	7.67%
Textile Products	731	6.75%
Base Metal	704	6.50%
Other Mining and Quarrying	546	5.04%
Electricity, Gas, Steam	498	4.60%
Furniture	488	4.51%
Rubber and Plastic	364	3.36%

Table 6: Distribution of Employment in the Industrial Sector in Diyarbakır Province (10 sectors)

2.6.1. Industrial Zones in Diyarbakır Province

Diyarbakır province has a total of 4 organized industrial zones, one of which is an agriculture-based OIZ, and no industrial zone.

• Diyarbakır Organized Industrial Zone

The predominant sector groups are food products manufacturing, mining activities (marble), furniture manufacturing, metal products manufacturing, textile products manufacturing, construction materials, construction chemicals and rubber-plastic products manufacturing.

• Diyarbakır Agriculture Based Organized Industrial Zone

The predominant sector group is livestock breeding.

• Diyarbakır Textile Specialized Organized Industrial Zone

In Diyarbakır's Textile Organized Industrial Zone, 120 companies are active in the garment and apparel sector.

• Diyarbakır Karacadağ Organized Industrial Zone

The construction of the main infrastructure was started in May 2023 in an area of 3000 decares at the foothills of Karacadağ, at the 30th km of Diyarbakır-Şanlıurfa highway, and the works are ongoing.[4,5]

[4] https://dtso.org.tr/tr/index

[5] Source: Diyarbakır Provincial Industry Status Report (2019)

2.6.2. Diyarbakır's Relationship between Agriculture and Industry

The scarcity of irrigated land in Diyarbakır has a negative impact on vegetable-fruit and vineyard-garden production. The existing vegetable gardens and orchards are only in small quantities around the Tigris River. In terms of land-human relationship, 44% of Diyarbakır's land is suitable for agricultural activities. As is the case in Turkey in general, agricultural enterprises in the province of Diyarbakır have gradually shrunk due to rapid population growth and the necessity to employ the increasing population in non-agricultural sectors, while increasing the labor demand in these sectors in line with the population growth, the insufficiency of the development rate of agriculture to meet the population growth, and the division of land through inheritance. This situation plays an inhibiting role in agricultural activities and the development of our region.

In sum, diversifying investments, strengthening the integration of industry and agriculture, and making incentive policies sustainable are crucial for more effective use of Diyarbakır's industrial and agricultural potential. Successful management of these dynamics will play a key role in Diyarbakır's economic development in the future.

3.INTRODUCTION TO CLIMATE STUDIES OF DIYARBAKIR

3.1. National and International Framework

The most prominent institutions in Turkey on energy efficiency and climate change action are the Ministry of Energy and Natural Resources (MENR) and the Climate Change Directorate under the Ministry of Environment, Urbanization and Climate Change (MoEUCC). MENR has the obligation to prepare draft legislation, strategies and action plans on energy efficiency, as well as regulatory impact analyses, monitor and evaluate implementation, and plan remedial measures. It is also responsible for identifying energy saving potentials across the country and by sectors, developing alternative fuels, conducting necessary studies including district heating and heat markets, and conducting or commissioning energy audits.

Within the scope of Turkey's climate change mitigation and adaptation efforts at national and international level, the Climate Change Directorate is responsible for determining policies, strategies and actions, conducting negotiation processes, and ensuring coordination with institutions and organizations. Within the scope of Turkey's emission reduction and green development targets towards net zero by 2053, the Presidency is responsible for carrying out all necessary work for climate change adaptation and mitigation and raising awareness on climate change in all segments of society with a human and nature-friendly approach.[6]

Strategies and plans that are closely related to the content of our SECAP report, which has many regulations in areas such as renewable energy generation, energy efficiency, greenhouse gas measurement and reporting in our city as well as in Turkey, and almost all of which are prepared in line with the EU acquis, are summarized below.

[6] source :https://iklim.gov.tr/en/hakkimizda-i-75

National Energy Efficiency Action Plan

Within the scope of the National Energy Efficiency Action Plan to be implemented between 2017-2023, it is aimed to reduce Turkey's primary energy consumption by 14% in 2023 with 55 actions defined in 6 categories: buildings and services, energy, transportation, industry and technology, agriculture and horizontal issues. By 2023, a cumulative saving of 23.9 Mtoe and an investment of USD 10.9 billion is envisaged. At 2017 prices, cumulative savings by 2033 will amount to USD 30.2 billion, and the impact of some actions will continue until 2040.[7]

Turkey National Energy Plan

Turkey's National Energy Plan includes the steps to be taken until 2035 in line with Turkey's goal of achieving net zero emissions by 20, which Turkey has committed to in the context of the climate crisis. According to this plan, Turkey's energy consumption will increase from 147.2 million tons of oil equivalent in 2020 to 205.3 million tons of oil equivalent in 2035, an increase of 39.5%, taking into account Turkey's growth targets.

The share of renewable energy sources, which accounted for 16.7% of primary energy consumption in 2020, is to rise to 23.7% in 2035, while the country's installed electricity capacity is expected to reach 189,700 MW, up from 95,900 MW in 2020. This capacity increase is expected to 74.3% is planned to come from renewable energy sources, primarily solar and wind.

In 2035, the installed capacity of solar energy, one of these renewable energy sources, is targeted to reach 52,900 MW, while this number is to reach 29,600 MW for wind energy. In addition, for hydroelectric energy, which is one of the other energy sources
35,100 MW and 5,100 MW for geothermal and biomass energy.[8]

[7] Source: 2030 Strategy and II. National Energy Efficiency Action Plan

[8] Source:https://enerji.gov.tr/haber-detay?id=21111

Ministry of Energy and Natural Resources (MENR 2019-2023) Strategic Plan

According to the Strategic Plan of the Ministry of Energy and Natural Resources covering the period 2024-2028, it is planned to increase the amount of electricity generated from domestic resources to 270 billion kWh (kilowatt-hours) per year in 2028, the share of domestic resources in electricity generation to 63%, the installed capacity of solar power plants to 33,100 MW (megawatts) and wind power plants to 19,300 MW. It is also aimed to commission 4,800 MW of nuclear energy capacity.[9]

To prioritize and increase energy efficiency in this context;

- Ensuring sustainable energy supply security,
- Increasing net zero carbon-oriented energy transition practices,
- Ensuring grid flexibility to increase renewable energy capacity,
- Continuing efforts to raise public awareness on energy efficiency,
- Energy system planning for electric vehicles
- It is aimed to continue efforts to increase energy efficiency.

National Climate Change Action Plan (CCAP)

The Climate Change Action Plan 2011-2023 is the main central government strategy document guiding national climate change policies. The National Climate Change Action Plan aims to increase energy efficiency and reduce greenhouse gas emissions in key areas, particularly in the housing, industry, transportation and energy sectors.(9)

In the NCCAP, it is emphasized that "in order to combat climate change more effectively at the local level and to strengthen adaptation capacity, it is important for local governments to integrate this issue into their strategic plans and programs and to prepare local action plans on climate change".

[9] https://iklim.gov.tr/en/action-plans-i-121

National Climate Change Adaptation Strategy and Action Plan

The National Climate Change Adaptation Strategy and Action (2011-2023focuses on key areas:(10)

- Public Health
- Agriculture Sector and Food Security
- Water Resources Management
- Ecosystem Services, Biodiversity and Forestry
- Natural Disaster Risk Management

Declaration of National Contribution to the Paris Agreement

Within the scope of the Paris Agreement, which Turkey signed on April 22, 2016 and ratified on October 7, 2021, the Environment, Urbanization and Climate Change (MoEUCCannounced that the National Contribution Declaration for the target of up to 21% reduction in emission increase by 2030 has been updated and increased to 41% and that there will be an emission reduction of approximately 500 million tons by 2030. In addition, Turkey's zero emission target for 2053 has also been declared.[11]

[10] https://iklim.gov.tr/en/action-plans-i-121

[11] https://iklim.gov.tr/turkiye-ulusal-katki-bey

WE PARTICIPATED IN THE WORD URBAN FORUM (WUF) IN EGYPT TO INTRODUCE OUR SECAP PROCESS

3.2. SECAP in Diyarbakır Metropolitan Municipality

Diyarbakır Metropolitan Municipality has declared its mission to provide fair, accessible and transparent municipal services by prioritizing the history, cultural values and identity of the city with a pioneering approach in municipalism, and its vision to ensure quality living conditions with its services. Within the framework of this mission and vision, the main purpose of the Sustainable Energy and Climate Action Plan (SECAP) prepared by Diyarbakır Metropolitan Municipality is to guide the determination of activities to reduce greenhouse gas emissions that cause climate change, and therefore energy fuel expenditures in the ***Stationary Energy, Transportation and Waste*** sectors, which are the source of these emissions. For this purpose, a prioritized greenhouse gas inventory and greenhouse gas emissions in the city are calculated within the framework of this inventory.

A greenhouse gas inventory for the province of Diyarbakır and greenhouse gas emissions in the city have been calculated within the framework of this inventory. These calculations have been made on the basis of vulnerable issues such as Agriculture and Forestry, Industry and Trade, especially in the areas of Stationary Energy, Transportation, Waste.

3.2.1. Field Studies on Climate Monitored in Diyarbakır

It will be possible to reach clear solutions to the climate problem, to put forward realistic actions and to determine adaptation strategies against possible dangers by revealing the exposure of the people of the region. In this context, in the field study conducted within the framework of the "Climate Change Perspective" of the inhabitants of Diyarbakır, questions about the climate of Diyarbakır were asked to segments of society at all levels of education and This study, which was conducted by paying attention to the fact that individuals had lived in Diyarbakır for a long time, took place in cafes in the city center, at the university, in places of worship and at the airport.

In the survey conducted with 1581 people in the city center of Diyarbakır, the participants were first asked the question "Is the climate of Diyarbakır changing?" and approximately 88.5% of the participants "YES". The percentage of "YES" was very close to each other for all four age groups.

is observed. In this case, it can be said that the change in climate is felt by the public, in other words, by the people on the street.[12]

Secondlythose who answered "YESin the first question were asked "What are these changes?While most of the individuals cited the 'shifting of the seasons' as the reason, a considerable number of them attributed it to the 'warming of the weather'. In addition, some of the respondents also attributed these changes to the 'cooling of the weather', 'increase in precipitation', 'decrease in precipitation' and 'increase in abnormal weather events'.

When asked about the reasons for the changes in climate, the majority of the participants answered "Global climate change". In addition, since the province of Diyarbakır is within the scope of GAP, some of the respondents commented that this also has an impact. While some of the participants cite GAP, that is, the irrigation and the installation of dams, some of them think that both have an impact.

In addition to all these, the participants also had different ideas other than the answers presented. They stated that these are examples such as damage to nature, unconscious production and consumption, air pollution, chemicals, plastic waste, tree cutting, etc.

In summary, approximately 64% of the participants think that the cause of the changes is human-induced. The majority of those who think it is human-induced have argued that the reason is the increase in dams and irrigation areas or the reflection of global climate change on Diyarbakır. In addition, some participants, although not a large number, attribute the climate change to the increase in the use of fossil fuels such as oil and coal. Contrary to these views, are also those who argue that the change is not human-induced. Their justification is the periodic occurrence of thermal and ice ages or the fact that the changes are short-term meteorological events.

[12] 2021-2022 Diyarbakır Climate Change Action (DCCAP)

As another question, individuals were asked whether they were worried about the future due to changes in the climate. It was observed that the majority of them were worried about the future.

The reasons for their concerns are generally the belief that desertification will occur and that spring water will gradually run out. In addition, Diyarbakır's continental climate increases this concern.

On the other hand, it was observed that the participants also had other concerns. least triggering issue for individuals regarding climate change is the cessation of technological progress. Since technological advances are the most followed issue on the world agenda, it is unlikely that progress will stop. The majority of those who were not concerned expressed the opinion that the issue was exaggerated more than necessary. However, they also expressed the opinion that the issue should be put on the agenda of scientists more frequently. This was interpreted as trust in science being at the forefront. In addition to all these, among those who are not concerned, there are also those who do not believe in climate change. They argued that a decrease in the frequency of the use of fossil-based energy sources and an increase in the use of clean and renewable energy sources would be a sufficient step to eliminate these concerns.

In the light of these evaluations, it can be said that the majority of people living in Diyarbakır city center are of the opinion that the climate has changed. As with scientists, there is no consensus on the causes and of the change in climate. Those who thinksee this situation as a natural event. It can be concluded that most of the participants are concerned about the future. In response to the question "where do you hear or see the definition of "global climate crisis" the most?", the participants said visual and auditory sources. This shows that the measures and precautions to be taken in the future regarding global climate change can be explained to the public through visual and written media.


NOKTA CİĞER
NOKTA
HAMLET

4.BASELINE EMISSION INVENTORY

4.1. Introduction

Part of the Sustainable Energy and Climate Action Plan (SECAP) is for municipalities and local governments to establish a monitoring and action plan to reduce greenhouse gas emissions (GHGand reduce final energy consumption. The commitments under the Compact cover the entire geographical area of the local government (town, city, region). In the city emission mitigation part of this study, it is important to establish a Baseline Emission Inventory (BIE) and identify emission mitigation strategies compared to the current scenario.

The Baseline Emissions Inventory (BIE) quantifies the baseline year of carbon dioxide (CO_2) emissions from activities such as energy production and consumption, transportation fuel/electricity use, waste and wastewater management in the territory under local government responsibility. This inventory is required for Global Covenant of Mayors (GCoM) and Covenant of Mayors (CoM) members to define emission reduction targets by baseline year, beyond the targets set at national level.

The preparation of the TEI is of great importance because it is a tool that allows local governments to measure the impact of their actions to combat climate change. The TEI shows where the local government is by establishing the baseline, and the follow-up emission inventories prepared afterwards provide the opportunity to monitor the progress made towards achieving the target. These inventories are a source of motivation for all stakeholders who want to contribute to local governments' CO_2 reduction targets and allow them to see the results of their efforts.

The TEE identifies the major sources of anthropogenic CO_2 emissions in the region and prioritizes their mitigation. If actions to reduce CO_2-equivalent greenhouse gas (GHG) emissions be addressed under the SECAP, the inventory should also include methane (CH_4) and nitrous oxide (N_2O) emissions. These inventories serve not only to develop SECAP targets, but also as a powerful motivational tool for all parties to prove the impact of their efforts.

The three main scopes of GHG emissions included in the inventory are:

- **Direct Emissions from Final Energy Consumption:** Emissions resulting from energy consumption in facilities/buildings (stationary combustion) or transportation vehicles (mobile combustion) as a result of direct use of fuels such as coal, natural gas, diesel within the boundaries of the local area.

- **Indirect Emissions:** Emissions resulting from the consumption of grid-supplied energy (electricity and heating/cooling) within local boundaries. These emissions are calculated using local electricity and heating/cooling emission factors.

- **Non-Energy Emissions:** Emissions released from waste and other non-energy sources within the region. Such emissions must be included in the inventory.

4.2. Selection of Included Sectors

The GHG Emission Inventory of the Municipality of Diyarbakır is an important study that aims to comprehensively calculate the GHG emissions in the city, identify the main emission intensive categories in light of the findings, and develop an action plan based on these results. The inventory includes data from both the municipal administration and various sectors (housing sector, transportation, waste, etc.) across the city. The inventory allows us to understand the city's carbon footprint by identifying GHG emissions in key sectors such as energy consumption, fuel expenditures, waste management and transportation.

The sectors and categories included in the Baseline Emissions Inventory are listed in **Table 7**. The main categories of the inventory include **stationary combustion**, **mobile combustion and waste management**;

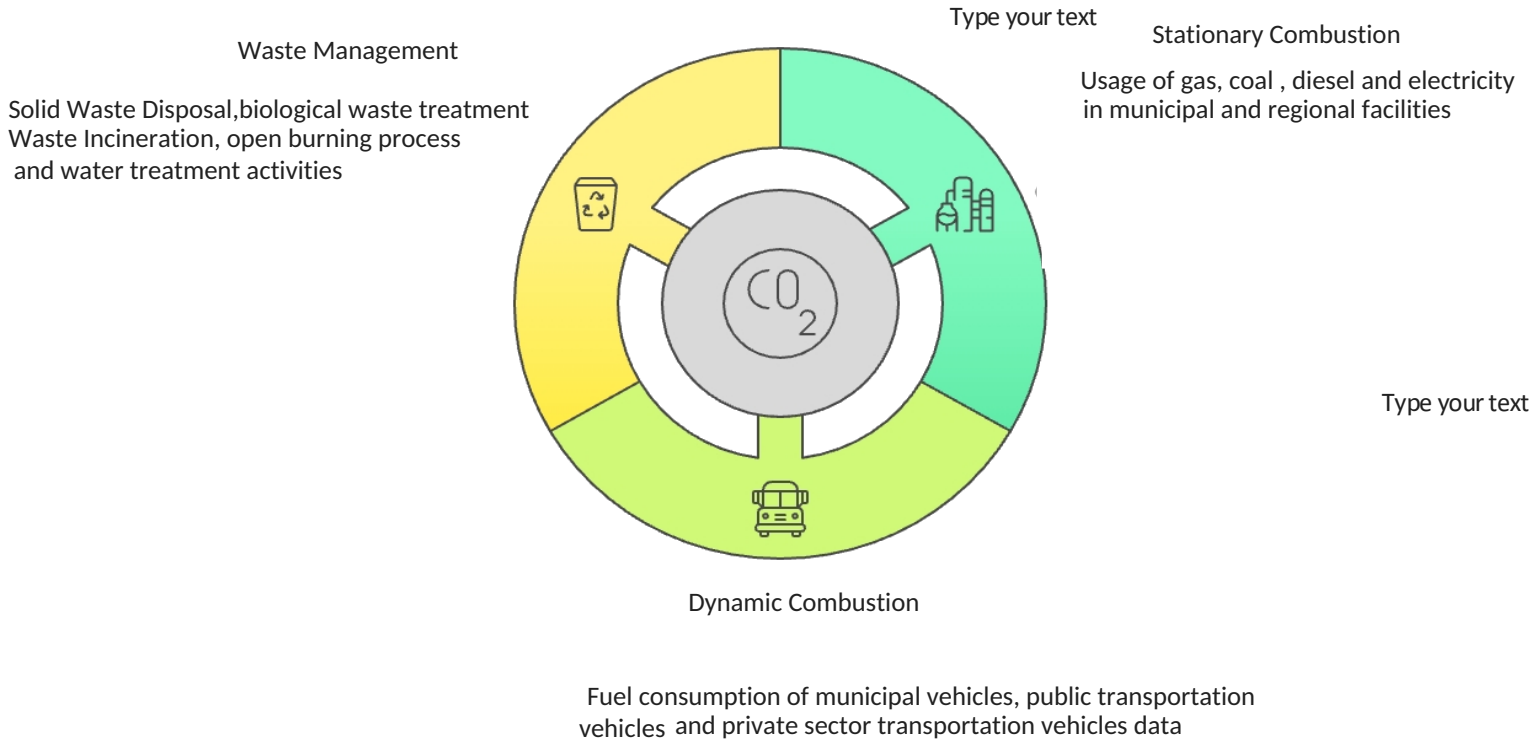

Figure 2: Categorical Distribution of Inventories

Stationary Combustion Inventory includes data on fuels used in municipal facilities and electricity consumption. In all municipal facilities; fuels such as natural gas, coal, diesel and electricity consumption were regularly monitored. The energy data used in these facilities obtained from invoices or meters and included in the inventory. In addition, electricity generation from waste through solar energy and biogas plants owned by the municipality was also calculated and in the emission inventory. **At the city scale**, energy consumption of various buildings such as residences, commercial and public buildings were reported. Natural gas and electricity consumption in residential buildings and similarly fuel and electricity use in commercial and public buildings are detailed. In , fuel expenditures from **industrial and industrial activities** in the city are also included in the emission calculations. **The lighting** system and electricity consumption in the city are also reflected in the report, and the energy consumption of lighting activities in the city has been analyzed with this data.

The Mobile Combustion Inventory covers the fuel consumption of municipal vehicle fleets. These road public transportation vehicles provided by the municipality and vehicles used by the municipality for operational services. Detailed inventories by vehicle type (passenger cars, heavy vehicles, etc.) and fuel type (gasoline, diesel, electric, etc.) were conducted and reported. Fuel consumption of public transportation vehicles belonging to private subsidiaries was also obtained and reported in the same way. However, some sectors are not included in the emission inventory. For example, since there are no **rail systems** (tram, metro, etc.) in Diyarbakır, data on such transportation vehicles are not included in the report. Emissions from maritime transportation are also excluded as there is no **maritime transportation line** in the city. addition, **aviation activities** and **off-road vehicle** sectors are not included in the emission inventory as they are not under the direct responsibility of the municipality and are not included in the action plan.

Waste Management Activities are included in the report as an important sector in terms of GHG emissions. Activities such as solid waste disposal, biological waste treatment, waste incineration and open burning operations in the city have been reported in detail and emissions from these processes have been calculated.

The Greenhouse Gas Emission Inventory of Diyarbakır Metropolitan Municipality provides an important source of data for monitoring and reducing the city's carbon emissions. This study enables the monitoring of GHG emissions through the city's main activities such as energy consumption, transportation, waste management, etc., and the formulation of a more sustainable urban policy.

Detailed analysis and scope details of all these inventories are shown in the tables below.

Table 7: Sectors and Categories Included in the Baseline Emission Inventory

1. Stationary Incineration Inventory		**Scope Requirement**
1.1 Stationary Incinerator Inventory of Municipality Management		
Fuel Expenditures of Municipal Facilities	Consumption of fuels such as natural gas, coal, diesel used in the combustion process in the facilities belonging to the municipal administration. All municipal facilities have been provided with invoices or inventory work and reported.	Mandatory
Electricity Consumption of Municipal Facilities	This is the electricity consumption used in the facilities belonging to the municipal administration. Electricity consumption of all municipal facilities from invoices or from electricity meters were obtained and reported.	Mandatory
Municipal Government Owned Power Generation Plants Data	Electricity generated from solar energy facilities owned by the municipality and electricity generated from wastes in biogas plants calculated and reported.	Mandatory
1.2 Inventory of Stationary Incineration at City Scale		**Scope Obligation**
Fuel Expenditures Housing Stock	Housing stock incineration process for used natural gas, tube consumption Provide has been and reported.	Mandatory
Electricity Consumption Housing Stock	Residential/residential used Electricity consumption has been ensured by considering the loss of distribution system and reported.	Mandatory
Commercial and Public Fuel expenditures for their buildings	Fuels such as natural gas etc. used for combustion in commercial and public buildings were obtained and reported.	Mandatory
Electricity for Commercial and Public Buildings consumption	Distribution system for electricity consumption of commercial and public buildings loss of with due consideration Provide has been and reported.	Mandatory
Electricity consumption in lighting	Electricity consumption used in city lighting was obtained and reported.	Mandatory

Industrial and industrial fuel expenditure	Various fuel consumptions of the industrial sector were obtained and reported.	Optional

2. Mobile Incineration Inventory		Scope Requirement
2.1. Movable Combustion Inventory of Municipal Government		
Fuel expenditures of the municipal vehicle fleet	Inventory of the entire fleet of vehicles owned or leased by the Municipality, allocated to civil servants or used in operational services such as garbage collection, etc. The fleet is organized by vehicle type (passenger cars, heavy vehicles, etc.) and fuel type (gasoline, diesel, natural gas , electricity, etc) inventory was prepared and reported.	Mandatory
The municipality offers road public transport expenditures on means of transportation	Fuel types and quantities of public transportation buses and minibuses provided by the Municipality were obtained and reported.	Mandatory
The rail system offered by the municipality expenditures on vehicles	Since there are no rail systems such as tram and metro operated by the municipality, they are not included.	Mandatory
Municipality sea transportation expenditures	In the region any sea transportation is not included as it does not exist	Mandatory
Expenditure on off-road vehicles	No measures are planned as the sector is outside the responsibility of the municipality.	Optional
2.2. Moving Combustion Inventory at City Scale		**Scope Requirement**
Total fuel consumption of personal and commercial vehicles in the city expenditure	Fuel consumption of vehicles used by city residents for personal and commercial activities was obtained and reported.	Mandatory
Private subsidiaries in the city fuel public land transportation expenditure	Fuel consumption of minibuses and private public buses belonging to private subsidiaries providing public transportation services were obtained and reported.	Mandatory
Private subsidiaries in the city have public sea transportatio n fuel expenditure	In the region any one sea transportation line is not included as it does not exist.	Mandatory

Aviation activities fuel expenditure	Sector belonging to SECAP in his work excluded as no action will be taken.	Optional
Expenditure on off-road vehicles	No measures are planned as the sector is outside the responsibility of the municipality and scope .	Optional

3. Emissions from Agriculture & Forestry & Fishing and Livestock Activities		Scope Requirement
Emissions from Agriculture and Forestry	Excluded from scope.	Optional
Emissions from Fisheries	Excluded from scope.	Optional
Emissions from Livestock	Excluded from scope.	Optional
4. Emissions from Waste Management		**Scope Requirement**
Solid Waste Disposal	How much of the solid waste generated throughout the city is disposed of is listed in detail.	Mandatory
Biological Waste Treatment	Information was given about biological waste facilities and waste quantities were shared.	Mandatory
Waste Incineration and Open Burning	Detailed information on open or closed incineration processes should be shared and total waste incinerated amount should be shared.	Mandatory
Waste Water Treatment and Discharge	Waste water treatment plants and their total treatment capacity amount should be shared.	Mandatory


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4.3. Data Collection and Emission Inventory

The Baseline Emission Inventory (BIE) and Monitoring Emission Inventory (MEI) studies prepared under the Sustainable Energy and Climate Action Plan (SECAP) play a critical role in determining GHG emissions and monitoring mitigation targets. In this context, the following key concepts stand out in the process of data collection and emission inventory preparation:

4.3.1. Reference Year

2030 is the year in which targeted emission reduction achievements are compared. The European Union has committed to reduce its emissions by 40% by 2030 compared to 1990. In line with this target, the recommended reference year for TEE is 1990. However, since local governments do not have access to comprehensive and reliable data sets for 1990, the closest year for which the most comprehensive and reliable data can be collected should be chosen as the reference year. In this respect, **2023** has been adopted as the baseline year for Diyarbakır's GHG emissions and mitigation targets. This year will be the base year for collecting emission data and determining future mitigation strategies.

4.3.2. Activity Data

It consists of data that quantitatively describe human activities that take place within local government boundaries. Activity data is a key input for the calculation of GHG emissions. Example activity data are:

- Amount of natural gas used for heating in residential buildings
- Amount of electricity consumed in municipal buildings
- Amount of fuel consumed in transportation vehicles
- Amount of waste generated across the city

Accurate and reliable collection of this data is crucial for the reliability of the emission inventory. In Diyarbakır, the cooperation between the local government and relevant stakeholders for the collection of such data has the efficiency of the data collection process.

4.3.3. Emission Factors

These are coefficients that define the amount of greenhouse gases emitted per unit of activity. Emission factors are multiplied by activity data to calculate the total amount of GHG emissions. Example emission factors are as follows:

- CO_2 emitted per natural gas consumed (kg CO_2/Sm3)
- CO_2 emitted per electricity consumed (kg CO_2/MWh)
- Amount of CO_2 emitted per fuel consumed (kg CO_2/liter or kg CO_2/ton)
- Amount of CO_2 emitted per waste consumed (kg CO_2/m^3 or kg CO_2/ton)

Data collection and emission inventory processes are carried out in accordance with international standards and methodologies, ensuring consistency in the monitoring and reporting of emission reduction targets. This structure established for Diyarbakır paves the way for the effective realization of the strategic targets set under SECAP.

The data collection process was carried out with local governments, relevant public institutions and NGOs within the boundaries of Diyarbakır Metropolitan Municipality.

4.3.4. Municipal Government Data

The data used in the report is collected directly from the areas that the municipality is responsible for and manages, and **focuses on activities within the boundaries of the municipal administration**. These data generally relate to the services provided by the municipality and are related to services that are under the direct control of the local government. For example, data on energy used in municipal buildings, fuel consumption of municipal transportation vehicles and waste management facilities operated by the municipality are collected **in the municipality's own service areas**.

4.3.5. City Scale Data

City-scale data not only the responsibility of the municipality, but includes the activities of all stakeholders that make up the city. These data cover the overall environmental and economic activities in Diyarbakır and **represent all emission sources across the city**. For example, energy consumption of all buildings in the city covers a larger area, including privately owned buildings, while data such as fuel consumption of private transport, commercial transport and public transport in the city covers **all transportation activities in the city**.

In the process ofour Municipality's Sustainable Energy and Climate Action Plan, the aim is to bring together internal and external stakeholders in local government, which is one of the most important stages for our organization, to inform them about the climate change process and to determine the risks and actions for adaptation through common sense. In this context, the participants involved in the climate action workshop with our stakeholders and some data have been compiled.

Table 8 shows the data we have collected for the sectors in our basic emission inventory study and the stakeholder institutions and affiliates that supported the study. As can be seen in the table, in addition to the relevant directorates serving within the Diyarbakır Metropolitan Municipality, stakeholder organizations such as **DEDAŞ, DİYARGAZ, EMRA, DİSKİ and TÜİK,** which are important for data transfer, were provided and the requested information was obtained from the relevant institutions. In addition, data on the electrical energy consumed and fuel types used by municipal facilities, other public institution buildings in the city and other residences were used in the emission inventory calculations. While making the emission calculations of this report, data inventory creation studies with relevant stakeholders were very important.

During the preparation of the report, the data flow on fuel consumption was provided by Diyarbakır Metropolitan Municipality **Support Services Department**, while the data flow on electricity consumption across the city was provided by **DEDAŞ**. The city-wide heating data inventory was obtained from **DİYARGAZ.**

Data on municipal solid waste included in emission calculations and data on electricity generated from biogas generated from waste were obtained from **the Department of Environmental Protection and Control**. Fuel consumption data of the vehicles belonging to the DMM fleet used in public transportation were obtained from **the Department of Transportation**. In addition, data on city-wide energy consumption from stationary energy was obtained from EMRA.

Table 8: Stakeholder Institutions in the Basic Emission Inventory Calculation

Sources		Direct emissions	Data sources	Indirect emissions	Data sources
Final Energy Consumption in Buildings					
Municipality	Municipal buildings, equipment and facilities	Fuel consumption	Support Services Md.	Electricity consumptionof municipal buildings	Support Services Md.
	Municipality general lighting			Electricity	Support Services Md.
City	Non-municipal buildings (commercial and services)	Fuel consumption	EMRA DIYARGAZ	Electricity	DEDAŞ
	Public buildings	Fuel consumption		Electricity	
Housing		Fuel consumption	EMRA DIYARGAZ	Electricity	DEDAŞ
Final Energy Consumption in Transportation					
Municipality / City	Road transport, municipal fleet	Fuel consumption	Transportation Department Directorate	Electric car consumption	-

	Special and commercial transportation (road)	Fuel consumption	EMRA	Electric car consumption	-

Energy Supply					
Municipality	Local electricity generatio (<20 ty MW) - except for own consumption	Biogas Electrici Generation	Department of Environmental Protection and Control	Renewable energy self-consumption of facilities	Department of Environmental Protection and Control
Waste Management					
City	Solid Waste Disposal		Department of Environmental Protection and Control	Amount of waste in Solid Waste Disposal Facility	Department of Environmental Protection and Control
	Biological Waste Water Treatment		DISKI	Amount of water coming to Treatment Plants	DISKI

4.4. Applied Greenhouse Gas Calculation Principles

GHG inventory calculations are based on the GHG Protocol developed by the World Resources Institute (WRI) and the World Council for Sustainable Development (WBCSD). In the GHG Protocol, greenhouse gas emission categories are classified as follows:

Scope 1 - Direct greenhouse gas emissions: Emissions from all stationary and mobile emission sources owned, directly controlled and controlled by the Metropolitan Municipality of Diyarbakır.

Scope 2 - GHG emissions from indirect energy sources: Emissions from energy purchased for Diyarbakır Metropolitan Municipality's operations, in particular electricity purchased from the grid and other forms of energy used for heating/cooling.

Scope 3 - Other indirect greenhouse gas emissions: GHG emissions from activities other than those of Diyarbakır Metropolitan Municipality, but under the control of the municipality.

Direct and indirect GHG emissions are calculated by multiplying the final energy consumption for each energy carrier by the relevant emission factor. In addition, methane (CH_4) and nitrous oxide (N_2O) emissions related to waste, wastewater treatment, agriculture and animal husbandry are calculated and converted to CO_2 equivalent (CO_2e).

The activity-based approach, one of the most widely used methods for calculation, was used to determine the baseline emissions inventory for Diyarbakır. In this approach, all CO_2 (or GHG) emissions from energy consumption within Diyarbakır are accounted for, either directly (through fuel combustion) or indirectly (through electricity consumption). While CO_2 emissions are the largest GHG emissions, CH_4 and N2O emissions from fuel combustion processes in the residential and transportation sectors are of secondary importance.

has. All CO_2, CH_4 and N_2O emissions were calculated for each type of fuel along with their global warming potential (GWP) using the IPCC's Fifth Assessment Report (AR5)[13] emission factors. One of the reasons for including emissions other than CO_2 is that Diyarbakır also calculates emissions from waste (CH_4), wastewater (CH_4, N_2O), enteric fermentation in livestock (CH_4) and chemical fertilizers used in agriculture (N_2O).

The calculation of GHG emissions for Diyarbakır is based on a "calculation methodology" since no direct measurements are made. This methodology is based on multiplying GHG activity data by GHG emission factors, taking into account oxidation factors and global warming potential (GWP).

The formula used to calculate greenhouse gas emissions within the scope of the Diyarbakır Metropolitan Municipality Greenhouse Gas Inventory is as follows:

Greenhouse Gas Emission Amount (tons) = Greenhouse Gas Activity Data x Greenhouse Gas Emission Factor (tons greenhouse gas/activity data) x Oxidation Factor x Global Warming Potential

Table 9 includes emission factors for various fuel types. This table presents emission factors that quantify each fuel's contribution to greenhouse gas emissions and global warming potential. The columns include emission values for carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and total CO_2 equivalent (CO_2e) for each fuel type. These data are provided with emission factors from different sources (e.g. TurkStat and IPCC reports).

[13] https://www.ipcc.ch/assessment-report/ar5/

Table 9: Emission Factors for Fuel Types

Fuel Type or Activity	CO_2 (kg)	CH_4 (kg)	N_2O (kg)	CO_2e (kg)	Source
Natural Gas	55.400	0.100	0.265	555.665	TUIK - Turkish GHG Inventory Report 1990-2021
Coal (Bituminous or Black Coal)	93.640	0.150	0.398	943.175	TUIK - Turkish GHG Inventory Report 1990-2021
Electricity	0.475	0.000	0.000	0.479	Turkey Electricity Generation and Electricity Consumption Point Emission Factors Information Form
Residual Fuel Oil	77.000	0.600	1.590	77.439	TUIK - Turkish GHG Inventory Report 1990-2021
Diesel Oil	72.300	0.600	1.590	72.739	IPCC - Chapter 3 - Mobile Combustion
Engine Gasoline (Gasoline)	69.300	0.600	1.590	69.739	IPCC - Chapter 3 - Mobile Combustion
Liquefied Petroleum Gas (LPG)	63.100	0.100	0.265	632.665	TUIK - Turkish GHG Inventory Report 1990-2021
Kerosene (Paraffin)	71.900	0.600	1.590	72.339	TUIK - Turkish GHG Inventory Report 1990-2021
Other Liquid Biofuels	70.800	0.600	1.590	71.239	IPCC - Chapter 3 - Mobile Combustion
Compressed Natural Gas (CNG)	56.100	0.300	0.795	562.635	TUIK - Turkish GHG Inventory Report 1990-2021
Liquefied Natural Gas (LNG)	64.200	0.600	1.590	64.639	TUIK - Turkish GHG Inventory Report 1990-2021

Table 10 presents the global warming potential (GWP) values of greenhouse gases and their GWP values in different IPCC assessment reports (5AR, 4AR, 3AR, 2AR). These values show how much each GHG contributes to global warming when released into the atmosphere. ***Table 10 shows*** the GWP values of carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) in different years. These data are consistent with the 5th Assessment Report (5AR) values used in the GHG inventory calculations of the Municipality of Diyarbakır and were used to accurately reflect the impacts of emissions on global warming.

Table 10: References for Global Warming Potential (GWP):

Greenhouse gas		**IPCC Assessment Report**			
Formula	**Name**	**5AR**	**4AR**	**3AR**	**2AR**
CO2	Carbon Dioxide	1	1	1	1
CH4	Methane	28	25	23	21
N2O	Nitrous Oxide	265	298	296	310

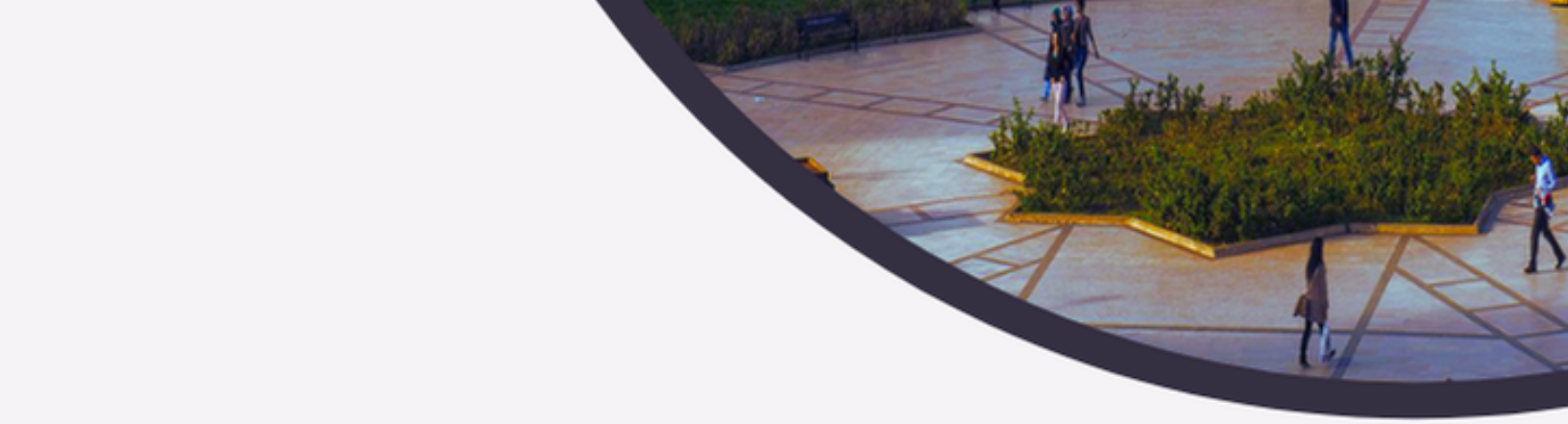
This formula for calculating GHG emissions was also to calculate GHG emissions from various activities in Diyarbakır. These activities include energy consumption of municipal buildings, transportation sector, waste management and industrial activities. The types of fuels used in emission calculations and their thermal power values are also important in the calculations.

***Table* 11** presents the density and calorific power values of the fuel types included in the Diyarbakır inventory. GHG emissions calculated based on fuel types are determined by multiplying the density and thermal power values of each fuel. The data in this table are taken from national and international sources (IPCC 2006 Global and EMRA) and reflect the energy generating capacity of each fuel. The energy content of fuels such as gasoline, diesel, natural gas and lignite is one of the factors used in emission calculations.

Table 11: Fuels and Thermal Power Values:

Fuel Type	Density	Thermal Power	Source
Gasoline	0.7475 kg/L	44.3 TJ/Gg	IPCC 2006 Global
Diesel (Diesel)	0.83 kg/L	43 TJ/Gg	IPCC 2006 Global
Natural Gas	0.67 kg/m³	48 TJ/Gg	EPDK, IPCC 2006 Global
Lignite	-	11.9 TJ/Gg	IPCC 2006 Global

These calculations are among the basic data used to determine Diyarbakır's GHG emissions. The density and thermal power of fuels are directly related to energy consumption and GHG emissions in the city.



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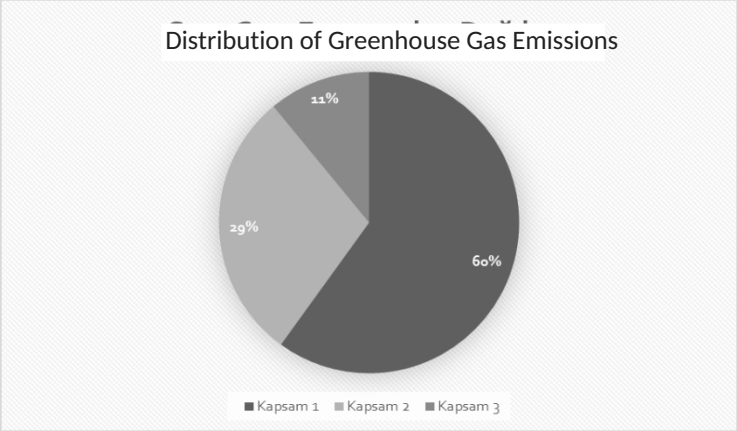
5.BASELINE EMISSION INVENTORY OF DIYARBAKIR Y

The baseline GHG emission inventory for the city of Diyarbakır covers the stationary energy, transportation and waste sectors, including both city-wide and municipal (institutional) control areas. The GHG Emission Inventory of Diyarbakır for 2023 is calculated based on **the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC) 'BASIC' Standard**. The emissions accounting software used was the **City Inventory Reporting and Information System (CIRIS)**. CIRIS is a tool prepared in accordance with the IPCC's categories of emission sources and provides a standardization setting for local governments' inventories.

Overall calculations of GHG emissions by sector at the city level are presented in ***Table 12***. This table shows that Diyarbakır's total GHG emissions are **4,334,622 MtCO2e**.

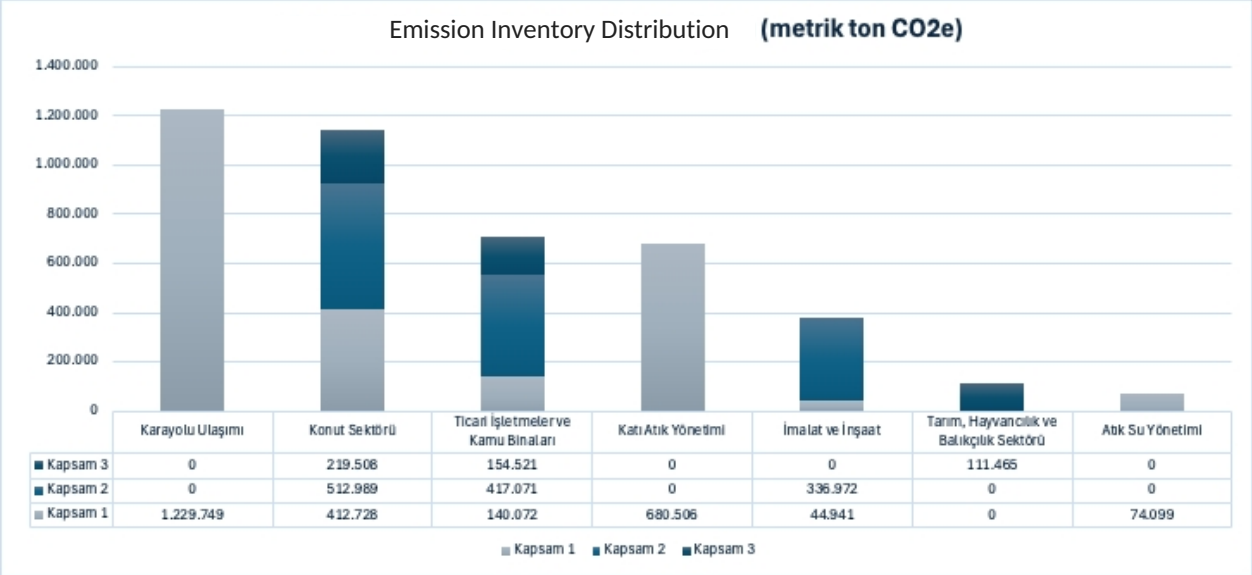
Table 12: Breakdown of Greenhouse Gas Emissions by Sector at City Level



Scope	Total Greenhouse Gas Emissions (Metric tons CO2e)
Scope 1	2.582.095
Scope 2	1.267.033
Scope 3	485.494

General sectoral calculations of these GHG emissions are presented in detail in ***Table 13***.

Table 13: Emission Inventory Distribution Table for Sectors



The stationary energy sector accounts for **2,350,268 MtCO2e**, approximately **54.2% of** Diyarbakır's total emissions. Emissions from residential buildings in this sector are **1,145,225 MtCO2e**, mainly from natural gas used for cooking, hot water supply and heating. Commercial buildings and manufacturing industry account for **21.4%** and **12.9%** of total GHG emissions in the stationary energy sector, respectively.

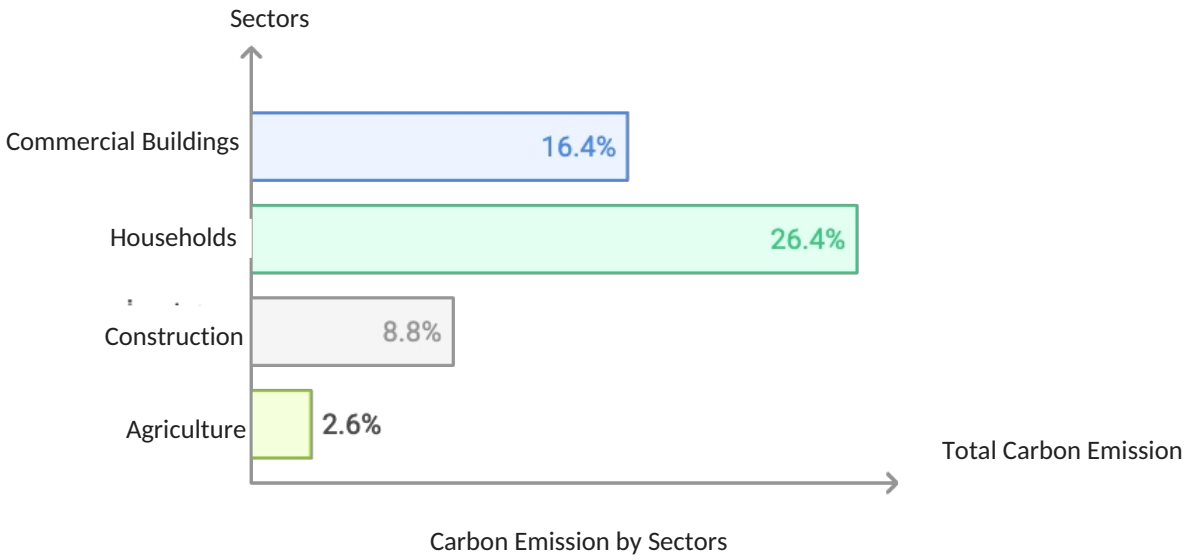
The stationary energy sector approximately **54.2%** to Diyarbakır's total GHG inventory. According to the data in the table, the total amount of emissions generated by this sector **2,350,268 tCO_2e**, of which **597,741 tCO_2e** is **Scope 1** and **1,267,033 tCO_2e** is **Scope 2**, **485,494 tCO_2e** is from **Scope 3**. These emissions arising from the direct use of fuels such as natural gas, coal or fuel oil within the city boundaries (Scope 1) and electricity consumption (Scope 2) are considered as a priority target in the city's climate policies. Emissions from distribution losses are included in (Scope 3).

The share of residential buildings in the stationary energy sector is quite remarkable. The total amount of residential emissions is **1,145,225 tCO_2e**, accounting **for 26.4%** of total emissions. Natural gas and other fuels used especially for **cooking**, **hot water supply** and **heating** increase the direct (Scope 1) emissions of dwellings. Residential electricity use (heating, cooling, lighting, etc.) creates a very high Scope 2 share with **512,989 tCO_2e**.

Commercial and institutional buildings emit **711,665 tCO_2e**, representing around **16.4%** of total emissions within the stationary energy sector. Scope 2 emissions are more heavily weighted in these areas due to electricity consumption of **417,071 tCO_2e**. Energy-intensive activities such as heating, cooling, office equipment and lighting are among the main sources of GHG emissions in commercial buildings.

Manufacturing industry and construction activities have about **8.8%** share in the stationary energy sector with a total emission value of **381,913 tCO_2e.** Scope 1 emissions of **44,941 tCO_2e** are mainly from fossil fuels used in manufacturing processes, while Scope 2 emissions of **336,972 tCO_2e** are associated with electricity consumption.

When the data is analyzed, the importance of energy efficiency and transition to clean energy sources in residential and commercial/institutional buildings stands out in the city's emission reduction strategy. Residential emissions, which are largely caused by the use of natural gas and electricity, can be reduced through both infrastructural improvements and the widespread use of insulation, renewable energy systems (solar panels, heat pumps, etc.) and efficient appliances in buildings. In the case of commercial buildings and the manufacturing industry, it is possible to reduce emissions in the stationary energy sector with improvements such as shifting electricity use towards clean sources, process efficiency and resource management.



In the transportation sector, only road transportation (private, commercial and municipal vehicles) included as the source of GHG emissions across the city. The main reason for this is that there are no alternative means of transportation such as rail systems or maritime transportation in Diyarbakır. The transportation sector represents **28.4%** of the total emissions of **1,229,749 MtCO2e**. The largest source of emissions in this sector is private and commercial transportation. Therefore, both measures to reduce the use of individual vehicles and improving public transportation are critical for emission reduction in transportation.

A total of **754,605 tCO_2e** of emissions were recorded in the **waste sector** category, for approximately **17.4%** of the city's overall GHG inventory. Within waste management **680,506 tCO_2e of** solid waste generated in the city, and this sub-item alone accounts **for 15.7%**. These emissions from the management of solid waste generated in the city in Diyarbakır are associated with irregular landfilling, sanitary landfilling, management of landfill leachate gases and methane emissions from the decomposition of organic waste. Wastewater generated in the city generates **74,099 tCO_2e** of emissions, bringing its share in the waste sector to **1.7%**. Treatment processes in wastewater treatment plants and sludge management are the main emission sources here.

Table 14: Sectoral Breakdown of Emission Calculation

BUILDINGSEQUIPMENT/FACILITIES AND INDUSTRIES			
	MWh	**tCO2e**	**%**
Commercial and corporate buildings/facilities	1.774.930	711.665	16,4
Housing	3.897.835	1.145.225	26,4
Manufacturing and construction	970.745	381.913	8,8
Agriculture	776.528	111.465	2,6
Subtotal	**7.420.038**	**2.350.268**	**54,2**
TRANSPORTATION			
	MWh	**tCO2e**	**%**
Road transportation	3.975.004	1.229.749	28,4
Rail systems	-	-	0,1
Sea transportation	-	-	0,1
Subtotal	**3.975.004**	**1.229.749**	**28,4**
OTHER NON-ENERGY			
	MWh	**tCO2e**	**%**
Solid waste	-	680.506	15,7
Waste water	-	74.099	1,7
Subtotal	**-**	**754.605**	**17,4**
TOTAL	**221.463.348**	**50.888.653**	**100**

6.GREENHO
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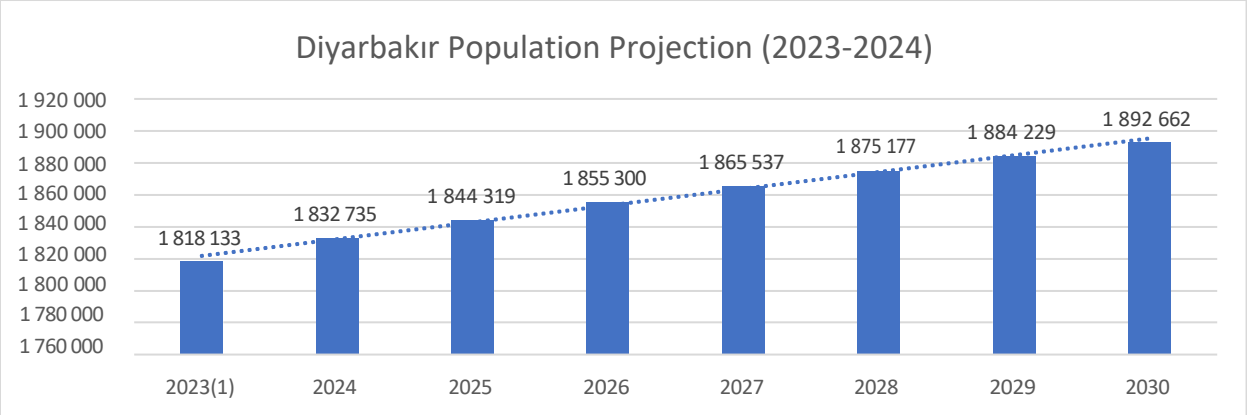
With its growing population and increasing energy demand, Diyarbakır is undergoing an important assessment process in terms of greenhouse gas emissions. In order to mitigate the impacts of climate change and ensure sustainable development in the city, a comprehensive GHG mitigation projection needs to be developed. This projection covers a wide range from energy consumption to transportation, waste management to industrial activities and aims to reduce emissions by 40% by 2030. Mitigation efforts strategies to both minimize environmental impacts and support the city's economic and social sustainability. In this context, Diyarbakır's current GHG inventory and mitigation scenarios are detailed below.

6.1. Population Projection

According to the 2023-2030 population projections for Diyarbakır shared by TurkStat, the population is projected to increase from 1,818,133 to 1,892,662. This implies a growth rate of approximately 5.7%. This trend indicates that the economic, social and demographic dynamics in the city point to sustainable growth. While planning, it important to develop services such as infrastructure, transportation, health and education in accordance with this growth.[14]

Table 15 Diyarbakir Population Projection



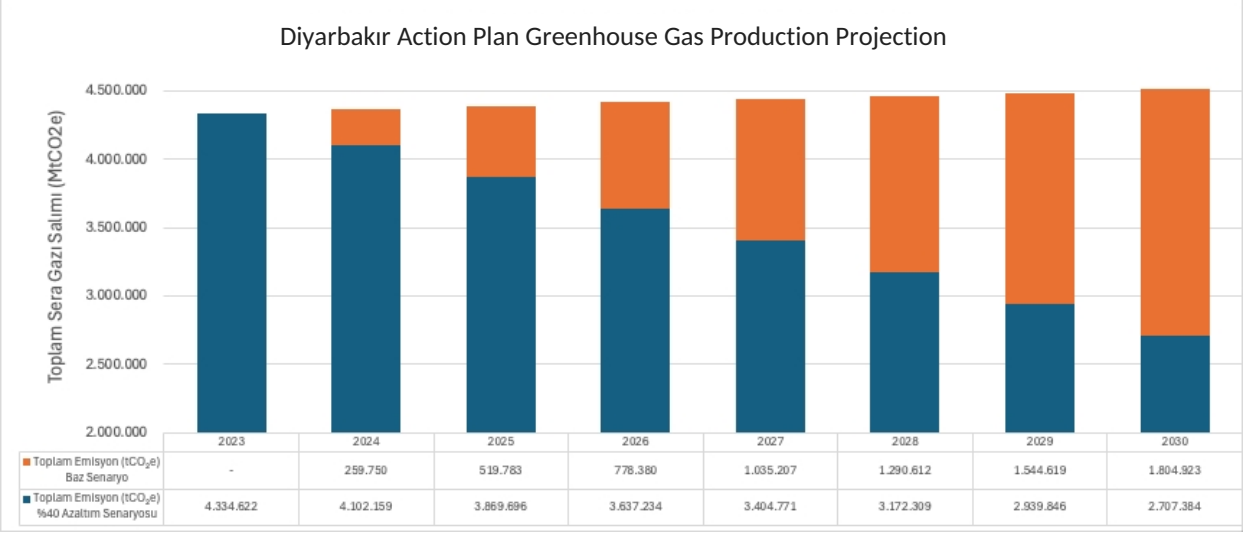
[14] https://data.tuik.gov.tr/Bulten/Index?p=Nufus-Projeksiyonlari-2018-2080-30567

6.2. Greenhouse Gas Emission Projection by Population

According to 2023 calculations, the total amount of emissions as a result of the Basic Emission Inventory **is 4,334,622 MtCO2e.** In the population projection, the greenhouse gas emission per capita is determined as **2.38 tCO_2e**. According to the current population projection of Diyarbakır, the city population is expected to reach **1,892,662** people in 2030. If the current emission rate remains constant, total GHG emissions will increase to **4,512,307 tCO_2e** in 2030.

However, it is possible to control emissions through the effective implementation of sustainable urbanization policies within the framework of the action plan we have created. In the projection of a 40% reduction target target targeted within the scope of the SECAP study, total greenhouse gas emissions will decrease to **2,707,384 tCO_2e** in 2030. When this scenario is realized, the annual amount of emissions per capita is calculated as **1.43 tCO_2e**. This means a significant reduction in the carbon footprint per capita.

Table 16 Diyarbakır Action Plan Greenhouse Gas Reduction Projection



	2023	2024	2025	2026	2027	2028	2029	2030
Toplam Emisyon (tCO_2e) Baz Senaryo	-	259.750	519.783	778.380	1.035.207	1.290.612	1.544.619	1.804.923
Toplam Emisyon (tCO_2e) %40 Azaltım Senaryosu	4.334.622	4.102.159	3.869.696	3.637.234	3.404.771	3.172.309	2.939.846	2.707.384

7. RISK AND VULNERABILITY ASSESSMENT

7.1. Risk and Vulnerability Assessment for Diyarbakır Province and Adaptation to Climate Change

Climate change, which is a major problem on a global scale, also has serious impacts at the local level. Human activities trigger global warming by increasing the concentration of greenhouse gases in the atmosphere through uncontrolled consumption of natural resources, rapidly expanding urbanization, industrial activities and increased greenhouse gas emissions. This situation reveals the vulnerability of cities, in particular, in the climate change-induced disasters experienced in the world in recent years (**Figure 3**).[15]

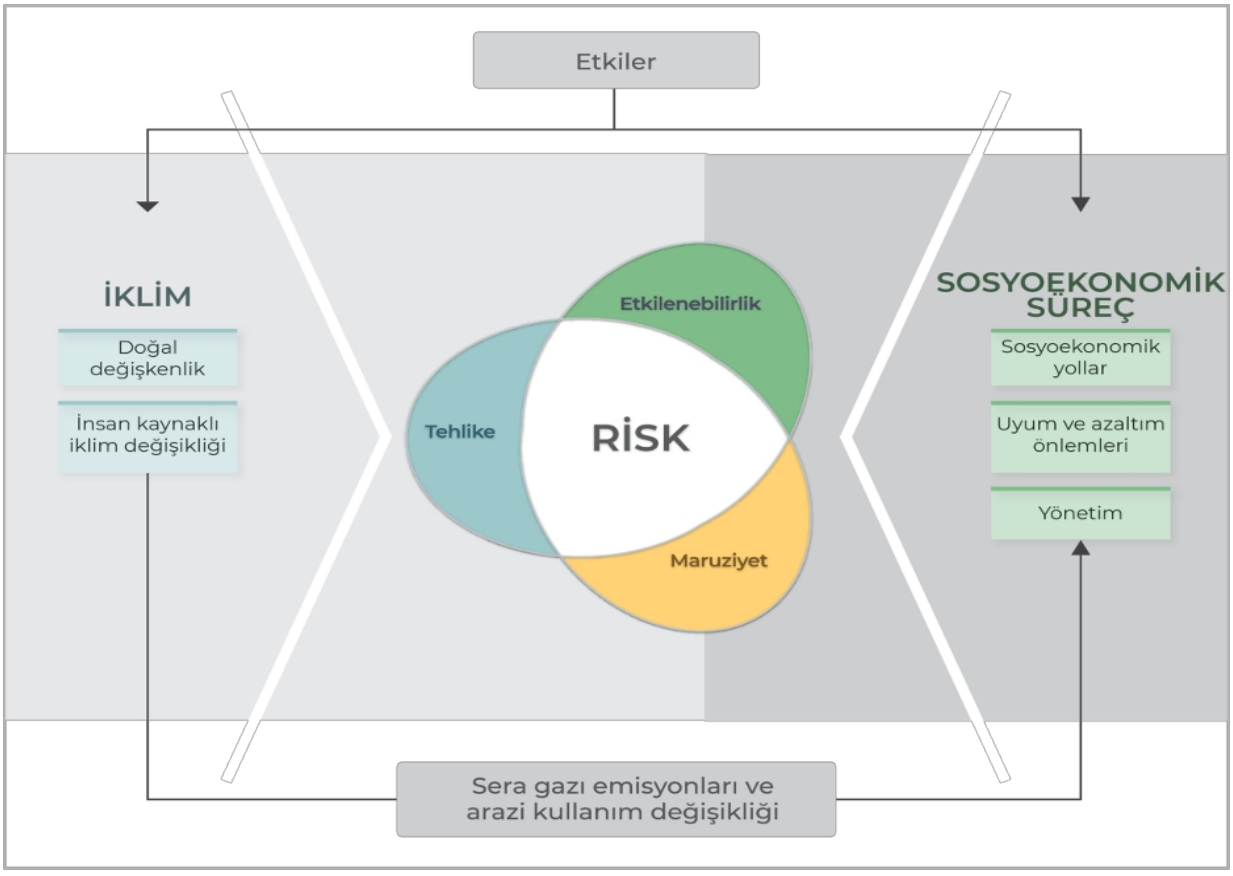


Figure 3: Process of Climate RiskHazardExposure and Vulnerability

[15] *IPCC, Managing The Risks of Extreme Events and Disasters To Advance Climate Change Adaptation, 2012.*

Cities are densely populated areas that host about 75% of human activities and are responsible for 80% of global greenhouse gas emissions. With these characteristics, they have a central role in combating climate change and adaptation processes. The increasing world population and urbanization rate make it essential to develop sustainable urban planning and environmentally sensitive management policies. The ability of cities to produce effective solutions in this process is critical for the success of the measures to be taken against the global climate crisis.

According to **the 6th Assessment Report**[16] published by the IPCC in 2022, the Mediterranean Basin, including Turkey, is highly vulnerable to the impacts of climate change. This report comprehensively assesses the impacts of climate change on ecosystems, the water cycle, agriculture, cities, health, poverty and sustainable development. It also addresses adaptation options and resilient development pathways.[17]

As Diyarbakır is located in the Southeastern Anatolia Region of Turkey, it can be significantly exposed to the impacts of climate change. In addition, according to the climate change action plan report published for the province of Diyarbakır, different scenarios are presented on how climate change may affect the city. Due to the large share of agricultural production in Diyarbakır, temperature increases, droughts and extreme weather events have a negative impact on the region. This situation also problems in water supply and energy production. Due to the aforementioned reasons, adaptation strategies in terms of adaptation to climate change can be evaluated in the following scopes:

(i) Agricultural Adaptation: Dissemination of drought-resistant plant species against the risk of heat and drought and irrigation methods that increase water efficiency can be encouraged,

(ii) Water Management: Sustainable management plans should be developed to protect the region's water reserves. Thus, climate change pressure on water resources can be reduced,

[16] **"Climate Change 2022: Impacts, Adaptation and Vulnerability"**

[17] https://www.ipcc.ch/report/ar6/wg2/

(iii) Settlement and Infrastructure Planning: Infrastructure resilience against floods and flooding can be improved and settlements in risk areas can be reviewed,

(iv) Early Warning Systems: Effective early warning systems can be established for floods, inundation and extreme weather events,

Risk and vulnerability analysis plays a vital role in combating climate change. Cities such as Diyarbakır are exposed to climate change-related hazards and earthquake risk as it is a Grade 1 earthquake zone. Northern districts of Diyarbakır are located in the 1st degree earthquake zone in the "Turkey Earthquake Zones Map" determined by the Council of Ministers Decree No. 96/8109 dated 18.04.1996. These districts are: Çüngüş, Çermik, Ergani, Eğil, Dicle, Hani, Kocaköy, Lice, Hazro, Silvan and Kulp. The Central and Southern Districts (Bismil, Çınar) are located in the 2nd degree earthquake zone. In this context, a comprehensive risk and vulnerability analysis is needed to increase the city's capacity to cope climate change impacts. This analysis for Diyarbakır critical for identifying the risks and impact areas that climate change may pose in the future. Such an analysis will both form the basis of adaptation action plans and the development of a strategic roadmap on the climate risks the city may face in the future. In order to be successful in combating climate , it is essential to examine the hazard and risk profiles of the regions in detail in order to make these regions more resilient.

Diyarbakır's geographical location, natural and cultural values, development structure, spatial layout, infrastructure systems, environmental conditions, socio-economic dynamics and institutional capacities are important factors that determine the city's level of vulnerability to climate change impacts. For these reasons, it can be said that risk and vulnerability analyses play a primary role in shaping the city's climate change adaptation strategies. Thanks to these analyses, Diyarbakır can achieve a more resilient and adaptive structure against the adverse effects of climate change.

Climate risk is a combination of hazardexposure and vulnerability. In highly vulnerable regions such as Diyarbakır, to climate change-induced hazards can make the city vulnerable to risks. Therefore, cities' climate adaptation action plans play a critical role in combating such risks and making society more resilient. An assessment of Diyarbakır's unique risks (such the impacts of extreme temperatures, drought, water scarcity and heavy rainfall) is necessary. Such an assessment will enable the development of adaptation strategies for the city, focusing on both the primary impacts and the secondary consequences they may cause.

7.2. Methodology

Climate change risk and vulnerability assessment methodologies have been developed based on the approaches in the Compact of Presidents (CoMand the Ireland - Fingal Climate Change Action Plan 2019-2024.

The first step in the analysis of climate change in Diyarbakır is to determine the projections of possible climatic disasters. Accordingly, climate events such as extreme heat waves, drought, soil erosion and flooding have been selected considering the risks that Diyarbakır may be exposed to. In addition, given Diyarbakır's dependence on water resources, the risk of water scarcity has been added as an important topic.

Sectors that may be affected by the assessed climate events include infrastructure systems, transportation, green infrastructure, water management, waste management, public health and disaster management. These sectors also action areas that need to be addressed within the framework of the climate change action plan. The results of this risk and vulnerability analysis will identify priority risks for Diyarbakır and enable the creation of emergency response areas. At this stage, an analysis of the level of risk will be conducted to identify risky situations by assessing the likelihood of each hazard occurring and the region's exposure to these hazards. These assessments will guide the development of effective measures to address the climatic threats that Diyarbakır may face.

7.2.1. Risk Level Identification Study

Diyarbakır's current risk and vulnerability status was identified through a preliminary analysis conducted by the Diyarbakır SECAP working team and CoM experts, and a first version was developed. A workshop was organized on **13.12.2024** in order to finalize the results together with environmental stakeholders. During the workshop, the first versions of the climate change risk and vulnerability analysis tables were determined.

Risk is a function of the probability of a hazard impact and the overall consequence of exposure (Risk= Exposure x Probability). This ensures prioritization of the systems, assets and groups most at risk, with a focus on the most vulnerable.

Exposure Score	x	Probability Score	=	Risk Level

The scoring matrix of this formulation is as follows;

Table 17: Exposure Score Matrix

İklimsel bir olayın meydana getireceği hasarın ve/veya risklerin sonuçları:			*Risklerin gelecekte meydana gelme olasılığı:*			*Acilen ele alınması gerektiği anlamına gelen risk düzeyi:*	
Maruziyet Puanı			**Olasılık Puanı**			**Risk Düzeyi**	
Kritik	5		Neredeyse kesin	5		Neredeyse kesin	[15-25]
Önemli	4	x	Büyük ihtimal	4	=	Büyük ihtimal	[7-14]
Orta	3		Mümkün	3		Mümkün	[1-6]
Az	2		Pek mümkün değil	2			
İhmal edilebilir	1		Nadir	1			

The level of risk is assessed by multiplying the exposure and probability states scored from 1 to 5, with score ranges of 1-6, 7-14 and 15-25.

Table 18: Climate Risk Matrix to Identify Future Risks

	CONCLUSION				
	Asset Damage/Engineering Losses of property	Health & Safety	Environment	Service Priority	Reputation
Critical (5)	A disaster that causes the closure or collapse of an asset or property.	Single or multiple deaths and permanent injuries occur.	Critical and significant damage caused by widespread impact. In this case, recovery takes more than a year and full recovery is unlikely.	It results in failure to deliver priority services.	It has national and long-term implications with the potential to affect the stability of the government.
Important(4)	A critical incident is one in which only extraordinary or emergency activities can be sustained.	Major and multiple significant injuries occur, resulting in long-term disability.	Significant damage caused by local impact. In this case, recovery takes more than one year and adaptation to the environment cannot be ensured.	It has a major impact on the provision of priority services.	It receives negative in the national press and has a bad impact on public opinion.
Medium (3)	It is a serious event where continuity can be ensured in activities requiring emergency.	Moderate injuries or multiple minor injuries requiring professional intervention .	Moderate damage caused by moderate impact, in which case recovery is achieved in one year.	Moderate impact on the provision of priority services (positive or negative)	It is reported in the national press and has an adverse effect on public opinion.
Az(2)	It is the negative event where activities can be made to work.	Minor injuries occur that require minimal intervention or treatment.	Events that have an impact within certain limits. In this case, measurable improvement is achieved within one month of the impact.	It has a small impact on the provision of priority services (Positive or negative)	It has a short-term impact on public opinion for a certain segment.
Negligible	It affects the ability to continue activities at a normal level.	Only minimal injuries requiring first aid occur.	The environment no impact on the key findings. Point source uses are present and need improvement is inaudible.	It has a positive impact on the service or priority service.	It has a temporary effect on public opinion for a certain segment.

7.2.2. Workshop Methodology and Scope

One of the most important stages in the preparation of the Diyarbakır Metropolitan Municipality Sustainable Energy and Climate Action Plan is to bring together internal and external stakeholders in the local government to inform them about the climate change process and to identify risks and actions for adaptation through common sense. In this context, on **13.12.2024**, the Climate Adaptation Workshop was organized by CoM experts in cooperation with Diyarbakır Metropolitan Municipality Climate Change and Zero Waste Department and Environmental Protection and Control Department. This workshop was held in 2 sessions and the conclusions reached after the exchange of ideas are evaluated in writing below.

Workshop Session 1:

Within the scope of the workshop, informative presentations on climate change, climate change adaptation process, and climate change risks and vulnerability were made to the participants. Following this, the action areas identified to eliminate the risks and impacts of climate change and the current situation of Diyarbakır in these areas were presented. The action areas identified within the scope of the workshop were determined in line with the content of the report as follows: **Infrastructure systems, transportation, green infrastructure, water management, public health, disaster management and waste management.**

During the workshop, participants were divided into three groups to receive their ideas. One group represented infrastructure systems, transportation and waste management, the second group represented water management and green infrastructure, and the last group represented disaster management and public health.

After the briefing presentations were completed, the second part of the workshop began. The second part of the workshop focused on identifying Diyarbakır Metropolitan Municipality's risks and vulnerabilities to climate change and selecting actions to mitigate these risks;

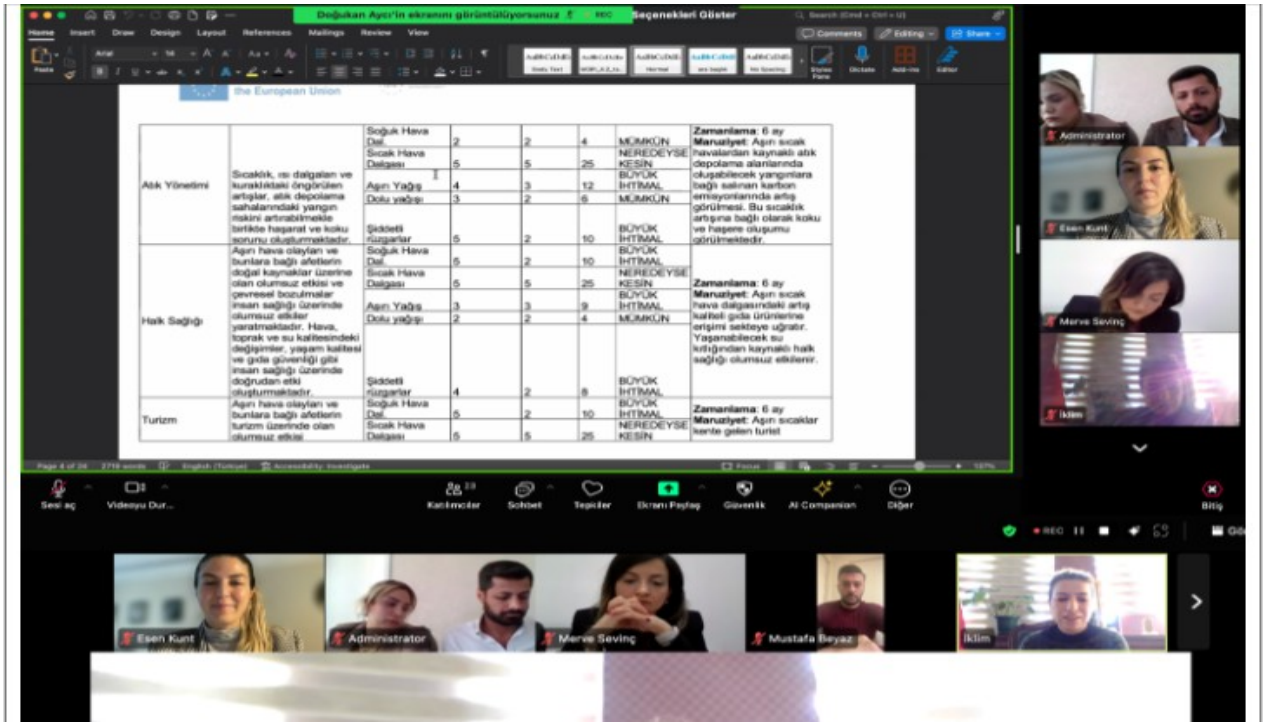
A visual workshop was then designed to identify actions to eliminate these risks.

Workshop Session 2:

For the workshop, a 1/4000 scale map is planned to be prepared to show the urban density, green areas, neighborhood and district boundaries and transportation axes of Diyarbakır. For the map, it is planned to use digital data provided by the Municipality on existing and proposed green areas, buildings, water areas, road areas and neighborhood boundaries within the boundaries of Diyarbakır Metropolitan Municipality. The workshop results of the Risk and Vulnerability Assessment phase are discussed in detail in the risk and vulnerability assessment results section of this report.

On the other hand, in the preliminary study conducted by the Municipality SECAP working team and CoM experts, actions to prevent and mitigate risks and vulnerabilities are listed in **Table** 17, taking into account the implementation capacity and level of importance for climate change adaptation.

In the second part of the workshop, the list of actions to address the risks and vulnerabilities assessed in the first part was reviewed and consulted with all participants. Participants exchanged ideas on actions to eliminate risks. Thus, it was possible to identify the neighborhoods that require priority intervention in the context of the risks and actions needed within the scope of the workshop and to enable the participants to exchange ideas.



FROM THE WORKSHOP ZOOM MEETING

FROM 2ND SESSION OF SECAP STAKEHOLDER ENGAGEMENT WORKSHOP

7.3. Weaknesses of the Region

Considering the main findings and risk table results of Diyarbakır Metropolitan Municipality, it is possible to say that the city is in a critical position in terms of climate risks in general.

As one of the most populous districts of Diyarbakır, **Bağlar** district, which has a migration problem, has very few green areas, which creates a serious problem. The lack of green areas, population density, unplanned urbanization in the district lead to high levels of air and water pollution.

However, **Ben u Sen** and **Çarıklı neighborhoods** of **Yenişehir** and **Sur** districts are very risky in terms of flooding and inundation. Since groundwater flow is intense in areas of the districts with sloping terrain, there is a risk of groundwater flooding, especially in Çarıklı Neighborhood. In addition, the risk of sudden surface floods is high in both neighborhoods. The fact that a stream bed passes through the boundaries of Çarıklı necessitates the need to prioritize this region in the context of climate adaptation. In areas where there are streams and stream beds that are not active today but existed in the past, adaptation studies for infrastructure also be carried out. In addition to the risk of floods and overflows, the risk of water contamination is also noteworthy in Çarıklı and Ben u Sen neighborhoods.

While the risk of drought poses a very serious risk for the whole of Diyarbakır, **Bağlar** and **Sur** districts more risky in terms of drought.

Extreme weather events such as heavy rainfall, strong winds, heat and cold waves also pose a risk for Diyarbakır. Strong winds most intense in the Karacadağ region. Many neighborhoods in the Karacadağ region are also affected by strong winds. The heat wave affects **Sur** and **Bağlar** regions due to their narrow streets and dense construction. The cold wave also poses a serious risk for certain parts of the Karacadağ Region and Kayapınar Neighborhood, where frost is common. Dense construction and the high concentration of migrants also pose a risk of cold waves for the districts in general.

effects of extreme weather events are risky. As a result, neighborhoods with dense urban populations and low socio-economic development levels may be most affected by extreme weather events.

As a result, the severity of risks and vulnerability to climatic events is determined by the spatial density and socio-economic status of the region. The socio-economic development status of Diyarbakır city as a whole is below average, with C and D scores. The main neighborhoods in Kayapınar and Yenişehir districts have a socio-economic status of C, while all other neighborhoods have a status of D. Accordingly, neighborhoods with status D, which are predicted to be at high risk for any climatic event and are less socio-economically developed, are more risky. In this respect, 5 Nisan and Kaynartepe neighborhoods in **Bağlar** district, where immigrants are concentrated, are more risky. However, considering the current situation and shortcomings of the entire district, it is possible to conclude that climatic risks and vulnerability are valid for the entire district, but may be higher in some neighborhoods.

Climate risks and affected sectors were explained in **Table 19**. In this context, the risk and vulnerability matrix prepared for the whole province is presented **in Table 20** within **the risk and vulnerability matrix of the Municipality in the context of areas and climatic hazards**.

MARUZİYET	POSSIBILITY				
	Nadir	Olası değil	Mümkün	Büyük ihtimal	Nerdeyse kesin
Kritik	5	10	15	20	25
Önemli	4	8	12	16	20
Orta	3	6	9	12	15
Az	2	4	6	8	10
İhmal edilebilir	1	2	3	4	5

Table 19: Climate Hazards, Risks and Affected Sectors in Diyarbakır

Climate Hazards	Climate Risks	Affected Sectors	Affected Vulnerable Sectors of Society
Floods and Floods	Infrastructure damage, flooding of residential areas and agricultural land, transportation disruptions	Settlements, Agriculture, Transportation, Waste-Wastewater	Poor, Small Producers, Students
Storm	Damage to roofs of buildings damage to agricultural crops (e.g. seedlings)	Buildings, Transportation Agriculture	Small Producers, Disabled, Elderly
Earthquake Risk	Structural damage, destruction of residential areas, transportation and energy outages	Settlements, Health, Energy and Water Supply, Agriculture	All Cuts
Heat Wave / Heat Island Effect	Risks of chronic diseases, forest fires, reduced agricultural and animal production	Agriculture, Forestry, Energy and Water Supply, Public Health	Elderly, Chronically Ill, Small Producers, Poor people
Drought	Decline in agricultural yields, energy and water reserves	Agriculture, Food, Energy and Water Supply	Small Producers, the Poor
Insect Infestation	Decrease in agricultural yields due to pests	Agriculture, Forestry, Food	Small Producers, the Poor
Airborne and Waterborne Diseases	Air/waterborne diseases, risk, especially for the elderly and chronically ill	Public Health, Agriculture, Education	Elderly, Chronically Ill, Students
Vector-borne Diseases	Spread of insect/fly-borne diseases	Public Health, Agriculture	Chronically Ill, Elderly
Fires	Declining forest cover, threat to settlements	Forest, Settlement, Energy and Water Supply	Small Producers, Disabled, Elderly
Hail	Damage to agricultural crops and vehicles	Agriculture, Transportation	Small Producers
Sis	Air and road transportation interruption	Transportation	All Cuts
Landslide	Damage to buildings and roads due to landslides	Buildings, Settlements	All Cuts

Table 20: Risk and Vulnerability Matrix of the Municipality in terms of Areas and Climatic Hazards

Climatic Hazards		Infrastructure systems	Transportation	Green infrastructure	Water management	Waste management	Public health and disaster management	
								
Flood and flood risk Extreme weather events	Cold wave							
	Heat wave							
	Excessive rainfall							
	Snowfall							
	Hailstorm							
	Strong winds							
	Sudden surface floods							
	Groundwater floods							
Drought	Water scarcity							
	Pollution of water							

7.4. Key Findings

The current risk and vulnerability status of the Province of Diyarbakır was determined by the preliminary analysis carried out by the Diyarbakır Metropolitan Municipality SECAP working team and CoM experts prior to the workshop and the first version was revealed. In order to finalize the results together with the surrounding stakeholders, these first versions of the climate change risk and vulnerability analysis tables were determined at the workshop held on 13.12.2024.

During the workshop, the methodology was explained in detail and participants identified risk and impact areas for Diyarbakır. In this context, the SECAP prepared by Diyarbakır Metropolitan Municipality aims to provide a comprehensive action plan for the reduction of greenhouse gas emissions and transition to a low carbon economy. In this way, the steps to be taken by Diyarbakır Metropolitan Municipality to reduce city-wide emissions in areas such as energy efficiency, renewable energy and climate-friendly transportation are summarized.

Issues such as heat and cold waves, extreme weather events, water scarcity, direct and indirect impacts on public health, and sea level rise were also evaluated as climatic hazards. As a result of this study and the main findings, the results of the risk and vulnerability assessment of Diyarbakır are presented and scored in the tables below:

Table 21 - Risk and Vulnerability Analysis Table in the Context of Extreme Weather Events

***Table 22* - Risk and Vulnerability Analysis Table in the Context of Floods and Floods**

***Table 23* - Risk and Vulnerability Analysis Table in the Context of Drought and Water Scarcity**

Table 21: Risk and Vulnerability Analysis Table in the Context of Extreme Weather Events

SPHERE OF INFLUENCE	EXPLANATION	VARIABLES	EXPOSURE	POSSIBILITY	RISK LEVEL	
Infrastructure Systems	Projected increases in temperature, wind speeds, cold weather and precipitation are particularly stressful on the environment. Critical infrastructure systems (such as electricity, communication networks) and residential areas (especially the living areas of vulnerable populations) are areas of impact.	Cold Weather Dal.	3	2	6	LOW
		Heat Wave	2	5	10	MEDIUM
		Heavy Rainfall	5	3	15	HIGH
		Hailstorm	4	2	8	MEDIUM
		Strong winds	1	2	2	LOW
Transportation	Increases in wind speeds, cold temperatures and precipitation put pressure on transportation networks, which lead to disruption of transportation services and material damage during extreme weather events.	Cold Weather Dal.	3	2	6	LOW
		Heat Wave	3	5	15	HIGH
		Heavy Rainfall	5	3	15	HIGH
		Hailstorm	5	2	10	MEDIUM
		Strong winds	3	2	6	LOW
Green Infrastructure	Projected increases in temperature, wind speeds, cold waves and precipitation lead to damage, habitat loss and increased prevalence of invasive species, putting further pressure on biodiversity.	Cold Weather Dal.	5	2	10	MEDIUM
		Heat Wave	5	5	25	HIGH
		Heavy Rainfall	5	3	15	HIGH
		Hailstorm	5	2	10	MEDIUM
		Strong winds	3	2	6	LOW

Water Management	Projected increases in temperature, cold waves and precipitation affect the flow and quality of water resources. Temperature increases and dry days can lead to reduced water resource availability, while cold waves can cause disruption of water services.	Cold Weather Dal.	5	2	10	MEDIUM
		Heat Wave	5	5	25	HIGH
		Heavy Rainfall	5	3	15	HIGH
		Hailstorm	4	2	8	MEDIUM
		Strong winds	2	2	4	LOW
Waste Management	Projected increases in temperature, heat waves and drought can increase the risk of fire in landfills, as well as pest and odor problems.	Cold Weather Dal.	2	2	4	LOW
		Heat Wave	5	5	25	HIGH
		Heavy Rainfall	4	3	12	MEDIUM
		Hailstorm	3	2	6	LOW
		Strong winds	5	2	10	MEDIUM
Public Health	The negative impact of extreme weather events and related disasters on natural resources and environmental degradation have negative impacts on human health. Changes in air, soil and water quality have a direct impact on human health, such as quality of life and food security.	Cold Weather Dal.	5	2	10	MEDIUM
		Heat Wave	5	5	25	HIGH
		Heavy Rainfall	3	3	9	MEDIUM
		Hailstorm	2	2	4	LOW
		Strong winds	4	2	8	MEDIUM

Tourism	The negative impact of extreme weather events and related disasters on tourism	Cold Weather Dal.	5	2	10	MEDIUM
		Heat Wave	5	5	25	HIGH
		Heavy Rainfall	5	3	15	HIGH
		Hailstorm	5	2	10	MEDIUM
		Strong winds	4	2	8	MEDIUM
Agriculture and Livestock	Unseasonal and fluctuating weather and precipitation due to Climate Change have a significant impact on agriculture and animal husbandry.	Cold Weather Dal.	5	2	10	MEDIUM
		Heat Wave	5	5	25	HIGH
		Heavy Rainfall	5	3	15	HIGH
		Hailstorm	5	2	10	MEDIUM
		Strong winds	3	2	6	LOW

Table 22: Risk and Vulnerability Analysis Table in the Context of Floods and Floods

SPHERE OF INFLUENCE/SECTOR	EXPLANATION	VARIABLES	EXPOSURE	POSSIBILITY	RISK LEVEL	
Infrastructure Systems	Flooding from coastal, river and rainfall sources brings additional stress and risk to the built environment. This additional risk causes damage to businesses, residences, critical infrastructure, etc. in the built environment.	Sudden Surface Floods	5	3	15	HIGH
		Groundwater Floods	5	1	5	LOW
Transportation	Increases in coastal, river and rainfall-induced flooding cause road damage and disruptions to all transportation services.	Sudden Surface Floods	5	3	15	HIGH
		Groundwater Floods	5	1	5	LOW
Green Infrastructure	Impervious surfaces in green areas increase the risk of flooding. In addition, an increase in extreme flood events can lead to loss of habitats and damage to ecosystems.	Sudden Surface Floods	5	3	15	HIGH
		Groundwater Floods	5	1	5	LOW
Water Management	Increases in flooding events put more pressure on water systems, which are often located at lower altitudes and therefore at higher risk of flooding.	Sudden Surface Floods	5	3	15	HIGH
		Groundwater Floods	5	1	5	LOW
Waste Management	Floodwater affecting landfills, disrupting the storage and disposal of waste in surface and groundwater	Sudden Surface Floods	5	3	15	HIGH
		Groundwater Floods	5	1	5	LOW

Public Health	Increased pollution of surface and groundwater due to flooding poses risks to human health, such as the spread of water-borne infectious diseases. In addition, flood waters pose a vital risk to society.	Sudden Surface Floods	5	3	15	HIGH
		Groundwater Floods	5	1	5	LOW
Tourism	The negative impact of floods and flood events on tourism	Sudden Surface Floods	3	3	9	MEDIUM
		Groundwater Floods	2	1	2	LOW
Agriculture and Livestock	Floods and floods can lead to reduced yields in agricultural activities, increased risk of disease in livestock breeding and livestock .	Sudden Surface Floods	5	3	15	HIGH
		Groundwater Floods	5	1	5	LOW

SPHERE OF INFLUENCE/ SECTOR	EXPLANATION	VARIABLES	EXPOSURE	POSSIBILITY	RISK LEVEL	
Infrastructure Systems	Drought-induced water scarcity poses a serious risk to the supply of clean water to urban environments.	Water scarcity	5	5	25	HIGH
		Pollution of water	5	4	20	HIGH
Green Infrastructure	Scarcity of water, which is the source of life for living things, negatively affects biodiversity. Declining biodiversity has negative impacts on ecosystem services.	Water scarcity	5	5	25	HIGH
		Pollution of water	5	4	20	HIGH
Water Management	Drought affects the ground and surface water system, leading to a decrease in water resources. This situation poses a risk for the sustainability of water resources.	Water scarcity	5	5	25	HIGH
		Pollution of water	5	4	20	HIGH
Waste Management	Drought-induced water scarcity makes it essential to recycle wastewater and repurpose it for different uses. This increases the need for technology and the need to adapt the infrastructure of waste systems.	Water scarcity	5	5	25	HIGH
		Pollution of water	4	4	16	HIGH
Public Health	Water scarcity makes it difficult to access clean water, the source of life. Difficulty in accessing clean water jeopardizes the sustainability of life, and worsening hygiene conditions increase the risk of health problems.	Water scarcity	5	5	25	HIGH
		Pollution of water	5	4	20	HIGH

Tourism	Drought and water scarcity interrupt tourism activities in the city. This situation negatively affects the economy by reducing the added value to the city.	Water scarcity	5	5	25	HIGH
		Pollution of water	5	4	20	HIGH
Agriculture and Livestock	Drought and water scarcity lead to reduced yields in agricultural activities, increased risk of disease in livestock and difficult access to water for livestock.	Water scarcity	5	5	25	HIGH
		Pollution of water	5	4	20	HIGH

Table 23: Risk and Vulnerability Analysis Table in the Context of Drought and Water Scarcity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7.5. Identified Action Areas

Climate change adaptation action plan studies are extremely important for making cities resilient to climate change. The current GHG inventory calculations of Diyarbakır Metropolitan Municipality, presented in the mitigation section, is one of the most important steps in the development of mitigation scenarios and commitments. In addition, the issue of developing adaptation actions by reconsidering cities and increasing the social, economic and environmental resilience of the city through these actions should be kept on the agenda against the inevitable situations and impacts that will arise due to climate change. In this context, Diyarbakır Metropolitan Municipality's climate change adaptation actions are evaluated together with the city's other strategic plans and put forward as a solution proposal. These actions are presented under certain main headings in parallel with the climate change adaptation plans prepared by Turkey on a national scale. These headings infrastructure systems, green infrastructure, water management, public health and disaster management, and water management, taking into account the results of Diyarbakır Metropolitan Municipality's risk and vulnerability analysis. In the previous section, the risk and vulnerability analysis for Diyarbakır was completed by presenting information on the current situation of Diyarbakır under the topics.

Taking into account Diyarbakır's **current situation and the risk and vulnerability analysis,** actions have been identified to address the city's needs in the climatic context and to eliminate or minimize the risks faced in light of the feedback received at the workshop. These actions were consulted and finalized within the scope of the workshop where internal and external stakeholders of Diyarbakır came together to ensure public awareness.

In the workshop held within the scope of the Diyarbakır Metropolitan Municipality Sustainable Energy and Climate Action Plan, participants were divided into three groups and identified actions. These groups are;

(i) infrastructure systems, transportation and waste management,

(ii) green infrastructure and water management,

(iii) public health and disaster management,

represents.

The actions identified by area are shown in detail under each area heading. These tables show the details of the action, the priority level of the action, the capacity to implement the action, the duration of the action, the impact areas of the action, and the regions where the action should be prioritized. The general opinion of the participants regarding the implementation of the actions that the selected actions should not only be prioritized in certain neighborhoods or regions, but should also be scaled up across the entire province of **Diyarbakır**.

(i) Infrastructure Systems, Transportation and Waste

For **Diyarbakır Province**, infrastructure, built environment and transportation issues need to meticulously addressed together with upper scale decisions and implementations. The severity of hazards predicted to occur as a result of climatic events is directly related to infrastructure capacity. Although climatic events, such as extreme weather events and floods, indirectly put public health at risk, the severity of the impact of the events can be determined according to the infrastructure capacity of the district.

On the other hand, in a city like Diyarbakır, which is on its way to becoming a metropolis and is growing day by day in line with its increasing population, although district and neighborhood boundaries are determined, solutions to climatic risks are expected to be supported by upper scale decisions. In particular, action decisions related to infrastructure systems, built environment and transportation areas, which are directly related to urban planning, need to be reinforced with upper scale and central government decisions.

It was emphasized that the need for road, wastewater, sewerage, natural gas, electricity and communication infrastructures has increased with the rapid increase in the number of housing units, especially in the central districts. In this context, it was stated that climate change risks should also be evaluated in the investment process of infrastructures.

In addition to these, the actions identified as priorities for ensuring Diyarbakır's adaptation to climate change in the field of infrastructure systems are shown in ***Table 24*****.** Accordingly**, 9** different actions were prioritized from the action pool. It is emphasized that the actions should generally be implemented within the borders of the entire **Diyarbakır Metropolitan Municipality**. The actions for climate adaptation of infrastructure systems and the use of light colored materials in floor coverings, which are recommended to be implemented to reduce the risk of urban heat islands, should be implemented especially for the whole of **Diyarbakır**.

Table 24: Actions Identified for Infrastructure Systems

		ACTION CODE	AY1	AY2	AY3
INFRASTRUCTURE SYSTEMS	Action Impact Areas	Action	Identifying critical infrastructure elements (intersections, tunnels, bridges, underpasses and overpasses, etc.) in terms of earthquake safety, conducting earthquake resistance checks of these structures and initiating necessary retrofitting or renovation works for risky ones.	Increasing coordination between institutions and using a common database in excavation planning processes to prevent damage to other infrastructure systems during infrastructure works.	Renewal of sewerage and storm water lines throughout the province to have sufficient capacity even during the heaviest rainfall and capacity increase in necessary areas.
		Implementation Duration	Medium term	Short	Long term
		Importance Level	High	High	High
		Level of Applicability	Middle	High	Middle
		Harmony		X	
		Mitigation			X
		Resilience	X		X
		Social Awareness	X		
		Environment	X		X
		Economic	X	X	X
		Social	X	X	X
		Priority Application Area	Province-wide	Districts in general	Province-wide

		ACTION CODE	AY4	AY5	AY6
INFRASTRUCTURE SYSTEMS	Action Impact Areas	Action	Regular inspection of storm water drains and construction of new drainage systems where needed to prevent floods caused by blockage of bridges and culverts during heavy rains.	Creation of rainwater storage areas for needs such as garden and agricultural irrigation and fire extinguishing during dry periods and development of infrastructure for collective use.	Regular maintenance and inspection of ditches and drainage systems to prevent water accumulation on highways, urban transportation roads and railway networks within the provincial borders.
		Implementation Period	Short term	Medium term	Long term
		Importance Level	High	High	High
		Level of Applicability	High	High	Middle
		Harmony		X	
		Mitigation	X	X	X
		Resilience	X		
		Social Awareness		X	
		Environment	X	X	
		Economic	X	X	X
		Social		X	
		Priority Application Area	Province-wide	Rural areas and Districts in general	Province-wide

	ACTION CODE	AY7	AY8	AY9
INFRASTRUCTURE SYSTEMS / Action Impact Areas	Action	Maintenancerenovation and improvement works of old sewage and treatment plants throughout the province to be carried out at regular intervals.	In case of excessive rainfall, instead of asphalt, road paving materials with high permeability and suitable for local conditions should be preferred.	Implement landscaping solutions that support water retention capacity on roadsides and other suitable areas to enhance urban green infrastructure.
	Implementation Duration	Long Term	Long Term	Medium Term
	Importance Level	High	High	High
	Level of Applicability	High	Low	Middle
	Harmony	X		X
	Mitigation		X	
	Resilience	X	X	
	Social Awareness			
	Environment	X	X	X
	Economic	X	X	X
	Social		X	X
	Priority Application Area	Citywide Facilities	Risky district borders across the province	Province-wide

Secondly, during the workshop, the main focus was on transportation for **the Diyarbakır Metropolitan Municipality**:

- It was emphasized that the solution to Diyarbakır's transportation problems should be addressed with a top-scale approach.

- In the context of climate change, it was stated that traffic calming practices should be expanded in the district and pedestrian paths should be integrated with green.

to these;

The actions that need to be taken for Diyarbakır are shown in ***Table 25.*** Accordingly**, 10** different actions were prioritized from the action pool. Encouraging the use of electric, hybrid and CNG vehicles and training public drivers on eco-driving practices, which are selected to mitigate climate change impactsalso important in terms of climate adaptation ifthroughout Diyarbakır.

During the workshop, it was also stated that all public institutions, especially **Diyarbakır Metropolitan Municipality**, and the central government should cooperate in the implementation of the actions related to transportation. First of all, actions such as increasing traffic calming practices, smart traffic systems, installation of renewable energy-based systems such as directional signs and lights, and ensuring the integration of pedestrian paths with green were selected for **Diyarbakır**. It is seen that bicycle lanes have started to be widespread in areas of new urbanization in Diyarbakır and it is stated that this is aimed to be increased.

Table 25: Actions Identified in the Transportation Area

		ACTION CODE	UL1	UL2	UL3
TRANSPORTATION	Action Impact Areas	Action	Increasing the accessibility and efficiency of public transportation services and carrying out maintenance, renewal and improvement works at regular intervals.	Improving the resilience of transportation systems to floods, storms and heat waves.	Setting targets to reduce greenhouse gas emissions in the transportation sector
		Implement ation Duration	Short Term	Long Term	Short Term
		Importance Level	High	High	High
		Level of Applicability	High	High	High
		Harmony	X	X	
		Mitigation	X		X
		Resilience		X	X
		Social Awareness	X		X
		Environment	X	X	X
		Economic	X		
		Social	X	X	X
		Priority Applicatio n Area	Province-wide	Districts with high population density	Province-wide

		ACTION CODE	UL4	UL5	UL6
TRANSPORTATION	Action Impact Areas	Action	Sharing urban adaptation strategies and best practices	Strengthening infrastructure against climate hazards such as floods, landslides and extreme temperatures	Adopting planning approaches that prioritize public transport, pedestrian and bicycle transportation
		Implement ation Duration	Long Term	Short Term	Short Term
		Importance Level	High	High	High
		Level of Applicability	High	High	High
		Harmony	X	X	X
		Mitigation		X	X
		Resilience	X	X	X
		Social Awareness	X		X
		Environment	X	X	X
		Economic			X
		Social	X		X
		Priority Applicatio n Area	province-wide	Province-wide	Province-wide

		ACTION CODE	UL7	UL8	UL9	UL10
TRANSPORTATION	Action Impact Areas	Action	Establishment of early warning systems for extreme weather events	Expansion of electric, autonomous and shared transportation systems	Training transportation workers on climate adaptation	Conducting awareness-raising activities for citizens to adopt climate-friendly transportation options
		Implementation Duration	Short Term	Short Term	Short Term	Short Term
		Importance Level	High	High	High	High
		Level of Applicability	High	High	High	High
		Harmony		X		
		Mitigation	X	X		
		Resilience				
		Social Awareness		X	X	X
		Environment	X	X	X	X
		Economic	X			
		Social	X		X	X
		Priority Application Area	Province-wide		priority units	priority units

Stakeholders envisaged to be involved in the cooperation required to implement the actions identified in the area of infrastructure systems and transport:

- Diyarbakır Metropolitan Municipality-DBB
- Ministry of Transport and Infrastructure
- Ministry of Environment, Urbanization and Climate Change
- State Hydraulic Works-DSİ
- Diyarbakır Water and Sewerage Administration-DİSKİ
- Universities
- Civil society organizations
- Private sector
- City councils
- District Municipalities

Waste management is a line of business where all district municipalities work under their jurisdiction in coordination with the metropolitan municipality. Government agencies, municipalities and civil society groups should cooperate to improve the environment and promote recycling operations through public awareness. Government and companies should launch campaigns to promote recycling, consumption behavior, reuse of packaging waste, etc. It is obvious that education and publicity campaigns will help to increase public awareness and understanding of recycling. The most effective way to reduce environmental impact is to reduce the consumption of convenience foods, to focus more on organic fruits and vegetables, and to avoid the use of airborne products, both individually and corporately. In this context, raising public awareness can mitigate the effects of climate change with a minimum waste approach, and it is important to support this issue with various campaigns. Considering the socio-economic status of Bağlar, one of the most populous districts, it is obvious that increasing awareness-raising activities on waste will be of great importance. In addition, wastewater is an issue that needs to be addressed separately for Diyarbakır as a whole.

To summarize, during the workshop, in the field of waste management, mainly;

- People in Bağlar, one of the most populous districts of Diyarbakır, should be made aware of waste,
- Water saving methods and practices should be applied throughout Diyarbakır against the risk of drought,
- It has been stated that it is essential that the wastes of commercial units such as restaurants cafes within the district are collected and sorted separately.

In line with these discussions, the actions on waste management for Diyarbakır are shown in ***Table 26 - Prioritized actions in the area of waste management***. Accordingly**, 10** different actions were prioritized from the action pool.

Stakeholders envisaged to be involved in the cooperation required to implement the actions identified in the Waste Management area;

- Diyarbakır Metropolitan Municipality - DBB
- Ministry of Environment, Urbanization and Climate Change
- Education institutions
- Universities
- Civil society organizations
- Private sector
- City councils
- District Municipalities

Table 26: Actions identified in the area of waste management

		ACTION CODE	AT1	AT2	AT3
WASTE MANAGEMENT	Action domains	Action	In order to strengthen the recycling infrastructure throughout the province, organizing awareness campaigns to encourage separation of waste at source and placing recycling bins in public areas such as parks, schools and public buildings.	Conducting regular risk assessments of landfills and transforming them into modern landfills to minimize fire hazards and impacts on groundwater.	Raising awareness on waste management among households and businesses to reduce food waste and utilizing food waste through local initiatives such as composting.
		Implementation Duration	Long Term	Short Term	Long Term
		Importance Level	High	High	High
		Level of Applicability	Middle	Middle	Middle
		Harmony	X	X	X
		Mitigation	X	X	X
		Resilience		X	
		Social Awareness	X		X
		Environment	X	X	X
		Economic	X	X	
		Social	X		
		Priority Application Area	Province-wide	Districts and Central Storage Facilities	All Province

		ACTION CODE	AT4	AT5	AT6
WASTE MANAGEMENT	Action domains	Action	Developing cooperation between municipalities and providing logistics infrastructure to ensure separate collection of organic and recyclable waste by restaurants, cafes, etc.	Financing to incentivize the establishment and expansion of biogas, waste incineration or other innovative energy production facilities for energy production from waste development of models.	practices to reduce wastewater to increase water savings in buildings and facilities and raising public awareness on this issue.
		Implementation Duration	Long Term	Medium Term	Long Term
		Importance Level	High	High	High
		Level of Applicability	High	High	Middle
		Harmony	X	X	
		Mitigation	X	X	X
		Resilience			
		Social Awareness	X	X	X
		Environment	X	X	X
		Economic	X	X	X
		Social			X

		Priority Application Area	All Province	All Province	Province-wide

		ACTION CODE	AT7	AT8	AT9
WASTE MANAGEMENT	Action domains	Action	Organizing information seminars in schools and public education centers to raise public awareness on waste, and developing programs that encourage waste management and recycling practices.	Establishing special collection points to ensure separate collection of electronic and hazardous waste to prevent environmental damage and developing processes for the proper of such waste.	reusable alternatives in businesses to reduce single-use plastics and enforce local regulations to limit the amount of plastic waste.
		Implement ation Duration	Medium Term	Medium Term	Short Term
		Importance Level	High	High	High
		Level of Applicabilit y	High	High	High
		Harmony	X	X	
		Mitigation	X	X	X
		Resilience			X
		Social Awareness	X	X	X
		Environment	X	X	X
		Economic		X	
		Social	X	X	X
		Priority Application Area	Province-wide	Industrial Organizations	Province-wide

(ii) Green Infrastructure and Water Management

Green infrastructure is a climatologically highly functional practice, especially for crowded cities and densely urbanized regions. Looking at Diyarbakır's green space capacity and urbanization density, it can be seen that Diyarbakır is not very rich in terms of active green areas, but is densely urbanized. Increasing the use of green spaces by citizens living in Diyarbakır is crucial for both public health and climate adaptation. In this way, it is envisaged that Diyarbakır's social and physical resilience in terms of climate will increase.

In this context, during the workshop, the green infrastructure for the province of Diyarbakir will be discussed follows;

● The amount of green areas is quite low compared to the population and building density, therefore active green areas should be increased,

● Urban heat island effect is high in the whole district due to dense construction, therefore urban heat island vulnerability maps should be made,

● It is of utmost importance that nature-based solutions for the built environment and buildings are implemented in the entire city, especially in many neighborhoods Bağlar and Sur districts,

● The area around the Tigris River passing through Sur district should be afforested against the risk of flooding and flooding,

● Integration of transportation axes with green infrastructure should be ensured throughout the city, especially in Yenişehir, Kayapınar and Bağlar, where new housing construction is dense,

● All central districts should plant both fruit trees and tree species that are good for soil structure, prevent floods and overflows, erosion and act as carbon traps and sequester harmful emissions within their borders,

● It was stated that there are no air corridors in many neighborhoods of the city, especially in Sur District, which have narrow settlements due to old settlements, and that green areas in these neighborhoods should be connected to each other.

In line with these discussions and recommendations, the actions identified in the workshop on green infrastructure are presented *in* ***Table 27.*** A total of 3 actions were selected from the action pool related to green infrastructure. In general, it is considered that green infrastructure actions should be implemented throughout Diyarbakır. However, it was emphasized that some actions should first be implemented in a few neighborhoods and then expanded to the whole district.

Stakeholders foreseen to be involved in the cooperation required for the implementation of the actions identified in the field of green infrastructure:

● Diyarbakır Metropolitan Municipality - DBB

● Directorate of Environment, Urbanization and Climate Change

● Provincial Directorate of National Education

● DISKI

● Provincial Directorate of Agriculture and Forestry

● Education institutions

● DSI

● Highways

● Universities

● Civil society organizations

● Private sector

● City councils

Table 27: Actions Identified for the Green Infrastructure Area

		ACTION CODE	YE1	YE2	YE3
GREEN INFRASTRUCTURE	Action domains	Action	A consequence of climate change as the emerging land Awareness raising to prevent natural disasters such as landslides, avalanches, floods and storms and for early diagnosis to carry out studies	Especially new construction in regions where smart compatible with the construction of sidewalks to prevent heavy rains from turning into floods and overflows to build sidewalks.	Development of natural water management systems such as ecochannels and green roofs
		Implementation Duration	Long Term	Short Term	Long Term
		Importance Level	High	High	High
		Applicability Level	Middle	Middle	Middle
		Harmony	X	X	X
		Mitigation	X	X	X
		Resilience		X	X
		Social Awareness	X		X
		Environment	X	X	X
		Economic	X	X	
		Social	X		
		Priority Application Area	Province-wide	Districts and central storage facilities	All province-wide

In terms of **water management,** protecting water resources and using them in a climate-compatible manner is of utmost importance for the city of Diyarbakır. As revealed in the risk and vulnerability assessment, the risk of drought is quite high for Diyarbakır in the near future. Therefore, measures to address drought and water scarcity need to be increased in all parts of Diyarbakır without exception. Therefore, it is essential to develop climate compatible water management policies and new practices to ensure water transformation.

In this context, during the workshop, the main issues in the field of water management for the province of Diyarbakır are as follows

● Rain catchment ponds should be constructed in certain areas, especially in Sur and Bağlar districts, which have lower socio-economic income levels and face water supply problems,

● It was stated that measures against the risk of floods and overflows should be increased in settlements close to the Dicle River, especially in Çarıklı Neighborhood.

In line with these discussions and recommendations, the actions identified in the workshop on water management are given *in* ***Table 28***. A total of **9** actions were selected from the pool of actions related to water management. The importance levels of the selected actions related to water management were determined to be high. It is clear that the risk of drought poses a serious threat to public health and that the protection of water resources in Diyarbakır should be carefully studied and actions should be implemented rapidly.

Stakeholders envisaged to be involved in the cooperation required for the implementation of the actions identified in the field of water management:

● Diyarbakır Metropolitan Municipality - DBB

● Directorate of Environment, Urbanization and Climate Change

● Provincial Directorate of Agriculture and Forestry

● State Hydraulic Works - DSI

- Diyarbakır Water and Sewerage Administration - DISKI
- Universities
- Civil society organizations
- Private sector
- City councils
- District Municipalities

Table 28: Actions Identified in the Water Management Area

		ACTION CODE	SU1	SU2	SU3
WATER MANAGEMENT	Action domains	Action	bridges and culverts throughout the province at regular intervals and making necessary infrastructure arrangements to prevent blockages.	Increasing green areas, strengthening afforestation activities and growing deep-rooted trees to support groundwater levels and reduce surface water runoff.	Preparation of guidelines and awareness raising campaigns to promote the use of water saving mechanisms in households, commercial buildings and public buildings.
		Implementation Duration	Short Term	Medium Term	Short Term
		Importance Level	High	High	High
		Level of Applicability	High	High	High
		Harmony		X	
		Mitigation	X		X
		Resilience	X	X	
		Social Awareness		X	X
		Environment	X	X	X
		Economic	X		X
		Social		X	X
		Priority Application Area	Province-wide	Province-wide	Province-wide

		ACTION CODE	SU4	SU5	SU6
WATER MANAGEMENT	Action domains	Action	Accelerating awareness raising efforts to optimize water use during dry periods and informing local people about water conservation.	Develop and implement a management mechanism that includes penal sanctions and incentive systems to protect water resources.	Establish guidelines for water conservation in commercial buildings and businesses and ensure that these guidelines are implemented in cooperation with local authorities.
		Implementation Duration	Short Term	Short Term	Short Term
		Importance Level	High	High	High
		Level of Applicability	High	High	High
		Harmony		X	X
		Mitigation	X	X	X
		Resilience			X
		Social Awareness	X	X	X
		Environment	X	X	X
		Economic	X	X	X
		Social	X		X
		Priority Application Area	Province-wide	Province-wide	Province-wide

		ACTION CODE	SU7	SU8	SU9
WATER MANAGEMENT	Action domains	Action	Reassessment and capacity building of sewerage and storm water infrastructure to increase resilience climate change impacts.	Increase water permeable surfaces (pavements, roads, materials used in parks) and encourage such projects.	Organizing trainings in order to eliminate the deficiencies in the practices of Architects and Engineers working in flood structure and warning systems
		Implementation Duration	Medium Term	Medium Term	Short Term
		Importance Level	High	High	High
		Level of Applicability	High	High	High
		Harmony			X
		Mitigation	X	X	
		Resilience	X	X	
		Social Awareness			X
		Environment	X	X	
		Economic	X	X	X
		Social			X
		Priority Application Area	Province-wide	Province-wide	Related Segments

(iii) Public Health and Disaster Management

With a population of nearly two million, Diyarbakır is in a risky situation in terms of public health due to climate change. In a city with such a high population density and construction, the problem of air pollution also draws attention. In this context, it is very important to minimize the direct harmful effects of air pollution on human health and to raise public awareness on this issue. On the other hand, it is predicted that epidemics such as the coronavirus pandemic, which started at the beginning of 2020 and continues as of 2022, will become more widespread with the risks of climate change, and will affect cities growing towards metropolitanization like Diyarbakır more. For this reason, accelerating public health data collection processes, conducting scientific studies and raising public awareness are some of the most important means of struggle.

In this context, during the workshop, the main focus for Diyarbakir in the field of public health will be

- Identifying neighborhoods and areas with high concentrations of vulnerable populations important,

- The need to create healthy public spaces in terms of public health due to the high concentration of vulnerable populations in Diyarbakır,

- The importance of raising citizen awareness on the prevention of infectious diseases and water and food borne diseases was emphasized.

In line with the issues and recommendations discussed at the workshop, nine actions were identified for Diyarbakır in the area of public health. eworthy that all of the actions have a high level of importance. It is very important to expand social awareness-raising activities in all districts, starting from the neighborhoods with lower socio-economic status. At the same , measures should be taken against the risk of a possible epidemic disease throughout the districts where unplanned urbanization is intense. Implementation of all actions on public health in all districts and even throughout the province, starting from more vulnerable population groups, is important for the creation of an urban and social resilience network against climate change.

In line with these discussions and recommendations, the actions identified for public health at the workshop were

29. A total of 4 actions were selected from the action pool related to public health.

Table 29: Identified Actions Related to Public Health

		ACTION CODE	HA1	HA2	HA3	HA4
PUBLIC HEALTH	Action domains	Action	Increasing day by day across the province depending on population density new settlements created will be needed in the areas to identify gathering areas and the existing ones by updating for their digitization conducting studies	Determining the capacities of communication lines by identifying the places with high population density throughout the province and planning the capacity increases needed for the inadequate ones	Greenhouse gas emissions reduction and air Improving quality necessary for conducting studies	Water and foodborne disease prevention and that's what raising awareness
		Implementation Duration	Medium Term	Short Term	Long Term	Medium Term
		Importance Level	High	High	High	High
		Applicability Level	Middle	High	Middle	High
		Harmony	X	X	X	X
		Mitigation		X	X	X
		Resilience	X			X
		Social Awareness	X		X	X
		Environment			X	X
		Economic				
		Social	X	X		X
		Priority Application Area	Province-wide	District-wide	Province-wide	Province-wide

Climatic directly and indirectly affect public health negatively. In case of a possible flood, inundation or storm event, inadequate infrastructure and built environment can put human health at risk. For example, constructions in flood zones can lead to loss of life and property in a possible flood disaster, and building objects such as roofs and awnings flying in a storm can harm people. In order to increase the resilience of critical infrastructures against hazards arising from climate change, necessary measures will be put in place by taking into account long-term disaster risks during planningconstruction and operation phases.

In order to ensure resilience against disasters, investments will be made to reduce disaster risk and resilient infrastructure systems will be established.

It has been revealed that the risk in terms of climatic events is high, especially in Bağlar and Sur districts, which are the most populous districts of Diyarbakır. In this context, it was emphasized that the geographical information systems-based risk maps, which have been created and expanded throughout the city, need to be further developed and that the solutions to be developed against these identified risks should be put into practice rapidly. In line with these discussions and recommendations, the actions determined in the workshop regarding disaster management are given in ***Table 30***. In line with the issues and recommendations discussed at the workshop, a total of **7** actions have been identified for Diyarbakır in the field of disaster management. Just like in the areas of public health and water management, all of these actions identified in the field of disaster management have a high level of importance. In order to minimize or even eliminate climatic risks, it is very important to develop disaster management policies and ensure inter-institutional cooperation. For this reason, it is very important to implement and disseminate all of the actions for the whole province, starting from the regions with vulnerable populations.

Table 30: Actions Identified in the Field of Disaster Management

		ACTION CODE	AF1	AF2	AF3
DISASTER MANAGEMENT	Action domains	Action	Identifying risky areas in terms of construction and ground throughout the province and carrying out works to move these areas to areas without risk within the scope of the urban transformation law	Carrying out studies for island-based implementation of urban transformation works by taking into account the environmental conditions of the building	Conducting periodic inspections by the relevant forest management directorate and district municipalities in nature parks, promenades and picnic areas close to forested areas, especially in Recreation Areas and Nature Parks; keeping teams ready to intervene in fires during risky months.
		Implementation Duration	Medium Term	Short Term	Short Term
		Importance Level	High	High	High
		Level of Applicability	High	High	High
		Harmony	X	X	X
		Mitigation	X		X
		Resilience	X	X	X
		Social Awareness	X		X
		Environment	X	X	X
		Economic	X	X	X
		Social	X	X	X
		Priority Application Area	Province-wide	Province-wide	province-wide

		ACTION CODE	AF4	AF5	AF6	AF7
DISASTER MANAGEMENT	Action domains	Action	Identification of vulnerability to precipitation, cold extreme heat	Explaining climatic disaster risks to society	Public institutions and organizations and private sector (especially industry organizations) structures evacuation and the first related to the intervention plans and teams creation and supervision	Initiating studies to prohibit construction and residence in areas designated as unsuitable for settlement due to disaster risk and ground conditions in settlement suitability map of existing zoning plans across the province
		Application Duration	Short Term	Short Term	Short Term	Long Term
		Importance Level	High	High	High	High
		Applicability Level	High	High	High	High
		Harmony		X	X	X
		Mitigation		X		
		Resilience	X	X	X	X
		Social Awareness		X		X
		Environment	X	X	X	X
		Economic				
		Social	X	X	X	X
		Priority Application	Province-wide	District	All stakeholders	Province-wide

		Area		Wide		

Stakeholders envisaged to be involved in the cooperation required for the implementation of the actions identified in the field of public health and disaster management:

- Diyarbakır Metropolitan Municipality - DBB
- Disaster and Emergency Management Presidency - AFAD
- Search and Rescue Association - AKUD
- Fire Departments
- Ministry of Environment, Urbanization and Climate Change
- Ministry of Agriculture and Forestry
- State Hydraulic Works - DSI
- Diyarbakır Water and Sewerage Administration - DISKI
- Universities
- Hospitals
- Civil society organizations
- Private sector
- City councils
- District Municipalities

7.6. Social Awareness

In recent years, it has been widely recognized internationally that climate change poses a major threat to both human health and ecological order. According to the scientific data and studies obtained by the IPCC, it is an urgent necessity to define and disseminate social responsibilities in the context of climate change risks. Governments, the business world and other institutions and organizations have started to cooperate in mitigating the impacts of climate change and adapting to climate change.

One of the most important criteria for mitigating the impacts of climate change and adapting to climate change is to change individual behavior and personal preferences in the social context. This sensitive change is possible by creating public awareness. For this, institutions and organizations such as city councils, local governments, NGOs, business world, chambers of commerce should be in cooperation. Apart from public institutions, the role of the business world in combating climate change should not be underestimated. For this reason, incentive systems should be developed for the entire business world to participate in the work carried out within the scope of combating climate change and they should be ensured to take part as stakeholders in the work carried out.

On the other hand, technological developments and innovations, which have increased rapidly in recent years to cover large scales, also increased greenhouse gas emission rates with the need for energy use increasing at the same rate. Therefore, sustainable energy use becomes more important in order to mitigate the effects of climate change, which is the first part of this study. In this respect, public support provided according to criteria set by laws and regulations is of the most important tools in combating climate change. Some policies can be determined in such a way as to commit to provide direct public support. Activities such as information campaigns on climate change, efforts to determine economic policies by consensus, and climate change workshops contribute to raising public awareness and individual change. For example, if a citizen who has taken part in information campaigns is more careful about the energy consumption in his/her home as a result of this work, this means that information and awareness raising efforts have had an impact.

In this context and within the scope of this study, a workshop was organized with the participation of various public institutions and organizations, NGOs, ecological associations, local governments and experts who have conducted academic studies, together with a detailed information meeting to ensure public awareness and to identify risks and actions through common sense.[18]

[18] https://books.google.com.tr/books?id=lgRry63mfZMC&printsec=frontcover&hl=en&source=gbs_ge_summary_r&redir_esc=y#v=onepage&q&f=false

8. ENERGY F

8.1. Definition and Analysis of Energy Poverty

Energy poverty is defined by the United Nations Development Program as "the inability to cook with modern cooking fuels, to have a minimum level of electric lighting to read at sunset or to carry out other household and productive activities". Another definition refers to situation where individuals or households do not have access to sufficient resources to meet their basic energy needs. For example, not being able to provide adequate heating in winter, not being able to use cooling devices in summer, or being deprived of energy services due to inability to pay electricity bills are examples of such situations. This includes the inability to meet basic needs such as adequate heating in winter and cooling in summer. While energy poverty is closely related to economic poverty, it has a broader framework.

Energy poverty is defined by the International Energy Agency (IEA) as households' difficulties in accessing reliable, affordable and clean energy solutions. This definition is considered in the context of the UN Sustainable Development Goals goal of "clean and affordable energy for all by 2030" and provides a global framework for addressing this problem. In this framework, the following criteria are generally considered in analyzing energy poverty:

1. **Energy Expenditure Ratio:** Energy poverty is generally defined as a household's total energy expenditures (electricity, water, natural gas) exceeding 25% of its monthly or annual budget. In the electricity sector, households that consume less than 100 kWh of electricity per month or 1200 kWh per year, or that allocate more than 10% of their total budget to electricity expenditures are characterized as "electricity poor". Similarly, while the poverty line for water poverty status is generally 3% in developed countries, this rate is set at 5-6% in developing and poor countries. According to these criteria, water expenditures exceeding 5-6% of the total budget indicates that households are experiencing water poverty. For example, while this rate is generally between 10% and 20% in Europe, it is observed to be over 25% for households in Turkey. In the UK, the definition of energy poverty "heatinglighting and other

"10% of household income is spent to meet energy needs". Similarly, there are studies in Spain that classify situations where total energy expenditure is above 15% as energy poverty.

2. **Electricity Consumption:** Electricity consumption of a household is an important criterion in energy poverty assessment. Households that consume less than 100 kWh of electricity per month or 1200 kWh per year can be defined as "electricity poor" due to low energy consumption. In this case, households may not be able to ensure sufficient electricity use to meet their energy needs. In addition, if a household spends more than 10% of its total budget on electricity, this that the household is struggling to benefit from electricity services. that the household has to pay electricity bills that are high relative to its income and therefore struggles to meet basic living needs. Electricity poverty is often a more prevalent problem for low-income households and is exacerbated by factors such as low energy efficiency appliances and poor insulation.

Energy poverty is a multifaceted problem that includes economic, social and environmental dimensions. The economic dimension includes the challenges of low-income households coping with high energy costs; the social dimension includes the impact of inequalities in access to energy on education, health and quality of life; and the environmental dimension includes increased carbon emissions due to low energy efficiency.

Between these dimensions;

The economic dimension: high energy costs make it difficult for low-income households to meet other basic needs, while **the social dimension:** inadequate energy access can lead to social exclusion and educational disadvantage. **On** the **environmental dimension,** households living in buildings with low energy efficiency consume more energy and release carbon emissions.

8.2. Causes of Energy Poverty

Considering the increasing population density statistics in our country, some of our cities are experiencing significant problems in accessing clean energy, especially with the increase in the proportion of people living in energy poverty. It is possible to list the following reasons at the beginning of the problems experienced in Diyarbakır, one of these cities, and in many other cities.

- **Income Inequality:** Income inequalities are one of the root causes of energy poverty. While low-income households struggle to pay their energy bills, they also lack the means to invest in highly energy efficient appliances or insulated housing. This perpetuates energy poverty.
- **High Energy Prices:** Rising energy prices are a greater burden, especially for low-income households. Structural changes, such as fossil fuel price fluctuations and liberalization of energy markets, further increase energy costs and deepen energy poverty.
- **Low Energy Efficient Housing:** Households living in old and uninsulated dwellings forced to consume more energy. Factors such as inadequate insulation, old window systems and inefficient heating appliances lead to high energy bills. This accelerates the spread of energy poverty.
- **Energy Infrastructure Deficiencies:** Lack of energy infrastructure in rural areas can cause instability in energy supply. This makes it difficult for households to meet their energy needs and increases energy costs in some areas.
- **Political and Structural Factors:** The failure of energy policies to adequately protect low-income households is one of the main causes of energy poverty. Inadequate energy subsidies or lack of regulations to support these groups exacerbate this problem.
- **Climate Change:** Climate change causes increases and fluctuations in energy demand. For example, an extreme drop in temperatures increases the need for heating, while the demand for cooling systems increases during the summer months when temperatures rise even higher. to higher energy bills and further strain on low-income households. This increased demand and need for heating/cooling triggers energy poverty.

8.3. Energy Poverty in Turkey and Diyarbakır

Energy poverty particularly important in low-income areas and regions with insufficient electricity consumption. Energy poverty in Turkey can be defined as the inability of households to obtain the necessary energy to meet their basic needs. This problem particularly pronounced in the Southeastern Anatolia region of Turkey. Access to electricity poses a quality of life issue for households that cannot use sufficient energy.

As of our reference year 2023, Turkey's per capita electricity consumption is 2989 kWh per year. However, this figure is not homogeneously distributed across the country. Especially in provinces such as Şırnak, Hakkâri, Muş and Van, electricity consumption remains below certain thresholds, increasing the challenges of access to energy. For Diyarbakır, the ratio of electricity consumption in 2023 to the total population of Diyarbakır is **1725 kWh per capita per year**. This figure is well below Turkey's average. This leaves households without access to the energy they need to meet their basic needs.

The highest loss and theft rates in Turkey are also concentrated in these regions. In 2023, in the Dicle Elektrik Dağıtım A.Ş. region, which covers the provinces of Diyarbakır, Batman, Siirt, Şırnak, Mardin and Şanlıurfa, the loss and illegal use of electricity reached the highest level of **42.79%**. This rate means that the loss and illegal use of electricity is very high, and this situation the electricity costs of legal consumers to increase.[19]

Energy poverty in Turkey stems from economic inequalities on the one hand and structural problems in the energy sector on the other. Loss and leakage rates in Turkey's electricity distribution system lead to both higher costs and higher charges for low-income households.[20]

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19 https://www.epdk.gov.tr/Detay/Icerik/3-0-24-3/elektrikyillik-sektor-raporu

20 www.researchgate.net/publication/330024216_Turkiye%27de_Elektrik_Enerjisi_Sektorunun_Enerji_Yoksull https://ugu_Acisindan_Degerlendirilmesi

8.4. Strategies and Solutions to Combat Energy Poverty

Various strategies and solutions can be implemented to tackle energy poverty. These solutions should be both economically and environmentally sustainable and should aim to ensure fairness in access to energy. Proposed strategies to reduce energy poverty include a long-term solution-oriented approach and innovative solutions. They should be built on principles of social, economic and environmental sustainability. Based on these sustainability principles, some solution strategies that can be effective in combating energy poverty can be listed as follows.

- **Dissemination of Energy Efficiency Projects:** By developing projects to increase the energy efficiency of dwellings, basic energy needs such heating and cooling be met at lower costs. These projects can be supported by innovative technologies such as insulation, energy-efficient appliances and solar energy.
- **Encouraging Renewable Energy Sources:** The use of renewable energy sources such as solar and wind should be increased. These sources have the potential to reduce energy costs, especially for low-income households. The installation of solar panels for households can be incentivized.
- **Increase Social Assistance and Support Programs:** More social support programs should be offered to households struggling to pay their energy bills. These programs can facilitate access to energy for low-income families.
- **Education and Awareness Campaigns:** It is important to raise public awareness on energy conservation, energy efficiency and renewable energy sources. Such campaigns can change society's energy use habits and play an important role in preventing energy poverty.

8.5. Strategic Approach of the Municipality of Diyarbakır

Energy poverty is a significant problem in Diyarbakır, especially in the cold winter months due to heating difficulties and difficulties in accessing energy for low-income households.

Diyarbakır Metropolitan Municipality is developing the following strategic approaches to address this issue and create a more sustainable energy management that provides access to energy:

- **Energy Efficiency Improvement Projects:** Projects will be implemented to increase the energy efficiency of old buildings in Diyarbakır. Insulation of buildings will be strengthened and the use of energy-efficient appliances will be encouraged. In addition, financial support will be provided to households on energy efficiency to make these projects more widespread.
- **Promotion of Renewable Energy Sources:** Diyarbakır is a region with a high solar energy potential, and it is aimed to popularize solar panels. Government incentives and financial support, especially for low-income households, can increase the use of solar energy. In addition, wind energy potential is another resource that can be utilized.
- **Expansion of Social Support Programs:** Another important strategy is to increase energy subsidies for households in Diyarbakır. Direct support and subsidies can be provided for low-income households to help them cover their energy bills. In addition, appropriate payment schemes for households at certain income levels could be established to cover energy costs.
- **Social Awareness and Education:** Large-scale education and awareness campaigns on energy saving and efficient energy use will be organized in Diyarbakır. These campaigns will both raise awareness on energy efficiency and encourage citizens to use renewable energy.
- **Green Infrastructure and Climate Resilience Projects:** The aim is to create an infrastructure in Diyarbakır that is resilient to climate change. These projects include both energy efficiency

and provide easier access to energy for the local population. In addition, efforts will be made to create a city structure that is prepared against natural disasters.

- **Establishment of Local Energy Cooperatives**: Local cooperatives can be established in Diyarbakır to help energy-poor communities meet their energy needs more affordably and access cleaner energy. These cooperatives can play an important role in reducing energy poverty by providing both economic and environmental benefits.

This strategic approach of the Municipality of Diyarbakır aims to reduce energy poverty, ensure equality of access to energy and Diyarbakır a city recognized for its sustainable energy management.

9.ACTION PLANS

9.1. Energy Efficiency Action Plans for Buildings and Facilities

Action 9.1.1	SAVING IN RESIDENTIAL BUILDINGS
Current Status/Purpose	Energy caused by the existence of housing estate managements that do not have sufficient knowledge, infrastructure and experience, the old housing stock, the lack of efficient lighting systems, and the lack of systems that control all the conditions required for air flow, heat, humidity and climate in buildings low productivity.
Relationship with Existing Plans	National Energy Improvement Action 2024-2030National Climate Change Action Plan 2011-2023, NCCAP
Priority Level	High
Action Steps	1. Incentives for insulation of buildings 2. Improving thermal insulation standards in newly built houses 3. Replacing Lighting with LED and Automation Systems 4. Launching LED conversion campaigns
Action Type	Energy Audit and Finance
Impact Amount	40% savings in residential energy consumption
Responsible	Diyarbakır Metropolitan Municipality
Stakeholders	Ministry of Transport and Infrastructure, Ministry of Energy and Natural Resources, Ministry of Environment, Urbanization and Climate ChangeDistrict Municipalities, DEDAŞ
Municipality Contribution	Supervision, implementation and additional financing.
Cost	Not calculated.
Timing	2024-2030
Risks	High Cost

Action 9.1.2	AWARENESS RAISING ACTIVITIES IN RESIDENTIAL BUILDINGS
Current Status/Purpose	The share of residential buildings in Diyarbakır's greenhouse gas emissions is 27.8%, while the share of Commercial and Institutional Buildings/Facilities is 21.4%. Implementation of necessary insulation measures, unconscious use of LED devices, with lighting and similar measures , significant reductions in electricity and fuel consumption can be achieved with the right awareness .
Relationship with Existing Plans	Diyarbakır Climate Change Action 2021-2022
Priority Level	High
Action Steps	1. Organizing campaigns and activities for energy efficiency in schools and educational institutions 2. Organizing seminars on Renewable Energy, energy efficient lighting, energy efficient devices, insulation, etc. and carrying out advertising activities. 3. Joint plans with relevant stakeholders 4. Identification of pilot schools
Action Type	Awareness Raising and Education
Impact Amount	40% savings in residential energy consumption
Responsible	Diyarbakır Metropolitan Municipality
Stakeholders	Ministry of National Education, District Municipalities, Directorate of National Education and School Administrators.
Municipality Contribution	In cooperation with NGOs, consumer awareness on relevant issues awareness can be raised.
Cost	Annual cost of 500,000 to 1,500,000 TL for training, brochure preparation and activities within the scope of awareness-raising activities of DMM is foreseen.
Timing	2024-2030
Risks	Inadequate awareness raising activities.

Action 9.1.3	DEVELOPMENT OF SYSTEM IN THE
Current Status/Purpose	To reduce energy consumption in municipal buildings in accordance with the communiqué sent to municipalities on 22.09.2020 by the General Local Governments of the Ministry of Environment, Urbanization and Climate Change, and to minimize greenhouse gas emissions emitted by this system.
Relationship with Existing Plans	National Energy Efficiency Improvement Action 2024-2030Energy Efficiency Law No. 5627
Priority Level	High
Action Steps	1. Conducting Energy Audit 2. Monitoring and reporting of annual developments 3. Making management system installation mandatory 4. Employment of technically qualified personnel 5. Establishment of relevant units
Action Type	Finance and implementation
Impact Amount	20% savings in residential energy consumption
Responsible	Diyarbakır Metropolitan Municipality
Stakeholders	Energy Audit Firms.
Municipality's Contribution	Preparation of Energy Audits and Action Plans. Establishment, maintenance and certification of ISO 50001 Energy Management System.
Cost	TL 1.500.000,00
Timing	2024-2030
Risks	Insufficient technical staff Lack of sufficient demand for trainings

Action 9.1.4	ENSURING ENERGY EFFICIENCY IN FACILITIES
Current Status/Purpose	Obligation for Energy Performance Certificate in new buildings. Construction of new buildings in accordance with energy efficiency techniques
Relationship with Existing Plans	National Energy Efficiency Improvement Action Plan 2024-2030, Energy Efficiency Law 5627Diyarbakır Climate Change Action Plan 2021-2022
Priority Level	High
Action Steps	1. Carrying out the project phase of the new buildings within the framework of the relevant principles in the Public Buildings Standards Guide 2. Design and implementation of new municipal facilities in green building concept 3. Construction of new facilities adapted to renewable energy sources.
Action Type	Finance and implementation
Impact Amount	30% savings in energy consumption in new municipal facilities
Responsible	Diyarbakır Metropolitan Municipality
Stakeholders	Project companies and contractors.
Municipality Contribution	Implementer
Cost	Building construction costs are expected to increase by around 10%.
Timing	2024-2030
Risks	High cost

Action 9.1.5	INCREASING THE USE OF ENERGY IN
Current Status/Purpose	To popularize the use of clean energy with the SPP system to be installed on the roofs of residences, commercial areas and public buildings throughout the province due to the lack of solar power plants in our province, although the average annual number of sunny days is high.
Relationship with Existing Plans	National Energy Efficiency Improvement Action 2024-2030, Diyarbakır Climate Change Action Plan 2021-2022
Priority Level	High
Action Steps	1. Determination of the locations where SPP will be applied in residential, commercial and public buildings and preparation of feasibility studies 2. Designing and implementing the projects of the feasible locations. 3. Periodic maintenance of existing solar power plants
Action Type	Finance and implementation
Impact Amount	20% savings in energy consumption
Responsible	Public Institutions
Stakeholders	Site managements, Chamber of Commerce and Industry
Municipality Contribution	Implementation, supervision, incentives
Cost	Not calculated.
Timing	2024-2030
Risks	High cost

Action 9.1.6	REPLACING WITH ALTERNATIVES
Current Status/Purpose	Natural gas and other fossil fuels used in residential, commercial and public buildings are used more than electric heating systems.
Relationship with Existing Plans	National Energy Efficiency Improvement Action 2024-2030National Climate Change Action Plan 2011-2023
Priority Level	High
Action Steps	1. Mapping of low socioeconomic regions using fossil fuels. 2. Initiating incentives for the installation of solar energy systems on the roofs of houses. 3. Increasing the use of alternative clean energy fuels instead of fuels with high greenhouse gas emissions
Action Type	Finance and implementation
Impact Amount	20% savings in energy consumption
Responsible	Public Institutions
Stakeholders	Site administrations, Chamber of Commerce and Industry
Municipality Contribution	Implementation, supervision, incentives
Cost	Not calculated.
Timing	2024-2030
Risks	High cost

9.2. Action Plans for Solid Waste and Waste Water Management

Action 9.2.1	ENSURING THE DISPOSAL OF WASTES WITH HIGH METHODS
Current Status/Purpose	When the greenhouse gas emission inventory of Diyarbakır province is analyzed, it is seen that the share of the waste sector is 3.5%. Based on 2023, the annual amount of household waste collected in Diyarbakır is 504,200 tons. Municipal solid waste collected by district municipalities throughout Diyarbakır is brought to transfer stations (Silvan Solid Waste Transfer Station, Ergani Waste Transfer Station and Central Transfer Station for waste collected from the central districts, Eğil and Çınar) where it is loaded onto large trucks. The domestic solid waste loaded onto trucks is brought to the Integrated Solid Waste Management Facility, where it is disposed of through energy generation and landfilling. With the improvements to be made in these actions in the disposal of solid waste, it is aimed to reduce the rate of emission emissions.
Relationship with Existing Plans	Diyarbakır Climate Change Action Plan Diyarbakır Waste Management Plan
Priority Level	High, long term
Action Steps	1. Carrying out activities reduce the amount of waste in Diyarbakır province 2. Strengthening the Integrated Waste Management Plan and establishing facilities that promote lower emissions 3. Recycling of recyclable wastes by separating the recyclable wastes from the domestic wastes brought to the site 4. Increasing the energy generation capacity of the existing landfill facility
Action Type	Strategy-Plan and Investment
Impact Amount	20% savings in energy consumption
Responsible	Diyarbakır Metropolitan Municipality
Stakeholders	Authorized company awarded the tenderDistrict Municipalities

Municipality Contribution	Implementation and supervision
Cost	Not calculated.
Timing	2024-2030
Risks	Difficulty of implementation and budget constraints, Resistance of businesses and industrial facilities to change their waste management systems Insufficient separation at source

Action 9.2.2	ELECTRICITY GENERATION FROM WASTE
Current Status/Purpose	There is a 4 MW energy generation facility within the scope of the Integrated Solid Waste Management Project, which was tendered through the Build-Operate-Transfer method and started to be constructed in Diyarbakır.
Relationship with Existing Plans	Diyarbakır Waste Management Plan Diyarbakır Climate Change Action Plan
Priority Level	High
Action Steps	1. Separating packaging wastes that can be recycled and bringing them back into the economy 2. Separate collection and disposal of organic wastes through appropriate methods and reuse both in energy production and as fertilizer 3. Realization of full capacity operation of the 4 MW plant installed within the scope of EKAY (Integrated Solid Waste Management) Project and increasing its capacity according to the waste situation
Action Type	Energy, Disposal and Finance
Impact Amount	4 MW contribution to energy production
Responsible	Diyarbakır Metropolitan Municipality
Stakeholders	Tendered company, District municipalities
Municipality's Contribution	Implementation, follow-up of the installation of the plant with the appropriate method and ensuring energy production
Cost	Not calculated.
Timing	2024-2030
Risks	High cost, financial risks arising from the company awarded the tender

Action 9.2.3	EFFECTIVE IMPLEMENTATION OF ZERO WASTE AND SOURCE SEPARATION ACTIVITIES
Current Status/Purpose	Diyarbakır Metropolitan Municipality is a municipality that has initiated separation at source and has received a zero waste certificate. In 2023, the amount of waste collected was approximately 1,255,500 kg. By reducing the amount of waste generated per capita in the province, it is possible to reduce the amount of emissions from both waste and fuel during waste collectionsignificant energy savings will be achieved through waste transformation.
Relationship with Existing Plans	Diyarbakır Waste Management Plan, Diyarbakır Climate Change Action Plan,
Priority Level	High, Long term
Action Steps	1. Increasing the number of organizations receiving zero waste project certificate 2. Ensuring separation at source in all institutions and organizations 3. Carrying out training and awareness-raising activities within the scope of separation at source 4. Establishment of waste collection centers throughout the province 5. Increasing poster and advertisement activities for awareness raising 6. Implementation of QR-coded garbage bags
Action Type	Recycling, Finance
Impact Amount	Reducing greenhouse gas emissions by recycling waste
Responsible	Diyarbakır Metropolitan Municipality, executives of public institutions
Stakeholders	All public institutions, NGOs, Directorates of National Education, Waste processing companies, Citizens, Provincial Directorate of Environment, Urbanization and Climate Change
Municipality's Contribution	Establishment of waste collection centers and information activities
Cost	50.000.000,00
Timing	2024-2030
Risks	Lack of interest of citizens Lack of legal obligation

Action 9.2.4	MORE EFFICIENT USE OF WASTE TRANSPORTATION VEHICLES
Current Status/Purpose	Areas in the city-wide waste collection system (routes, collection schedules) that need to be optimized. It is aimed to determine container occupancy rates with the software tracking system. Routes will be revised to reduce greenhouse gas emissions from collection vehicles.
Relationship with Existing Plans	Diyarbakır Waste Management Plan, Diyarbakır Climate Change Action Plan,
Priority Level	Medium, Long term
Action Steps	1. Determining the occupancy rates of containers by supporting them with software 2. Monitoring fuel consumption of waste collection vehicles 3. Monitoring emissions from waste collection vehicles 4. Electrification of waste collection vehicles 5. Revising the routes and hours of waste collection vehicles
Action Type	Plan and Strategy
Impact Amount	Savings in fuel consumption, reduction in greenhouse gas emissions
Responsible	Diyarbakır Metropolitan Municipality, District Municipalities
Stakeholders	District Municipalities
Municipality Contribution	Guidance and Implementation
Cost	50.000.000,00
Timing	2024-2030
Risks	Ineffective use of vehicle tracking system Inadequate technical infrastructure

Action 9.2.5	OF WASTEWATER TREATMENT AND REUSE OF WASTEWATER
Current Status/Purpose	It is aimed to reduce emissions from wastewater treatment processes and to reuse treated wastewater for reuse and irrigation.
Relationship with Existing Plans	Diyarbakır Waste Management Plan, Diyarbakır Climate Change Action Plan,
Priority Level	Medium, Long term
Action Steps	1. Support wastewater recovery and reuse 2. Conducting preliminary studies for the use of more sustainable and environmentally friendly systems in the entire facility managed by the Metropolitan Municipality, where the wastewater of the district is transmitted. 3. Use of advanced environmental technologies to ensure process efficiency. 4. Conducting R&D studies with universities to develop efficient and emission preventive applications for wastewater treatment plants. 5. Ensuring cooperation with relevant institutions and organizations to improve process emissions for the facility where waste is delivered.
Action Type	Plan and Strategy
Impact Amount	Savings in fuel consumption, reduction in greenhouse gas emissions
Responsible	Diyarbakır Metropolitan Municipality, District Municipalities
Stakeholders	District Municipalities
Municipality Contribution	Guidance and Implementation
Cost	Not calculated.
Timing	2024-2030
Risks	Ineffective use of vehicle tracking system

Action 9.2.6	REUSE OF
Current Status/Purpose	Currently, the recovery rate of park and garden waste is relatively low. remains low. Biodegradable waste (food and kitchen waste) is disposed of together with all waste collected throughout the city. Wastes collected from markets and parks It is aimed to build a composting facility for the effective use of garden waste. The aim of this study is to reduce the amount of solid waste disposed and to ensure its participation in the ecological cycle.
Relationship with Existing Plans	Diyarbakır Waste Management Plan, Diyarbakır Climate Change Action Plan,
Priority Level	Medium, Long term
Action Steps	1. Processing, handling, storage and sale of food 2. Providing trainings on waste treatment 3. Promote and increase separate collection of food waste
Action Type	Investment, Plan and Strategy
Impact Amount	Reduction in the amount of waste landfilled Added value
Responsible	Diyarbakır Metropolitan Municipality, District Municipalities
Stakeholders	District Municipalities,
Municipality's Contribution	Guidance and Implementation
Cost	100.000.000,00
Timing	2024-2030
Risks	Lack of sufficient budget

9.3. Transportation Action Plans

Action 9.3.1	CONVERSION OF PUBLIC TRANSPORT AND VEHICLES TO ELECTRIC MODELS
Current Status/Purpose	As of 2023, there are 150,631 motorized land vehicles in our province, 66,487 of which are automobiles. The number of vehicles used in passenger transportation 3721. Of these, 151 are CNG and 160 are diesel fueled and serve within DMM.
Relationship with Existing Plans	Transportation and Logistics Master Plan 2023-2053, Diyarbakır Transportation Master Plan 2020-2040
Priority Level	High, Medium term
Action Steps	1. Renewal of the municipal and public vehicle fleet with electric or hybrid vehicles 2. Renewal of private service vehicles with electric or hybrid vehicles. 3. Replacing minibuses and taxis with energy efficient vehicles with low fuel consumption. 4. Planning and establishment of charging station areas for electric vehicles
Action Type	Investment, Plan and Strategy
Impact Amount	In case of a 20% change in public transportation vehicles, it is planned to save 20% energy. In addition, the emission rates emitted by diesel and gasoline vehicles throughout the city a decline will be observed.
Responsible	Diyarbakır Metropolitan Municipality, UKOME
Stakeholders	Relevant CooperativesmanufacturersService Operators,
Municipality's Contribution	Transformation of municipal vehicles, initiatives against UKOME decisions.
Cost	Not calculated.
Timing	2024-2030
Risks	Lack of funding for new buses, inadequate charging infrastructure, High cost of electricity.

Action 9.3.2	INCREASING THE NUMBER OF ENVIRONMENTALLY FRIENDLY MOTORIZED AND NON-MOTORIZED VEHICLES AND CREATING APPROPRIATE INFRASTRUCTURE
Current Status/Purpose	There are 66,487 passenger vehicles in our city and the number of personal vehicle use is increasing day by day. In order to prevent the use of personal vehicles, it is planned to increase the Metropolitan Municipality's vehicle fleet and to implement clean energy public transportation projects.
Relationship with Existing Plans	Transportation and Logistics Master Plan 2023-2053, Diyarbakır Transportation Master Plan 2020-2040
Priority Level	High, Medium term
Action Steps	1. Expanding the use of bicycles 2. Installing charging stations for electric vehicles in parking lots, using renewable energy sources to feed the charging stations 3. Implementation of bicycle road network planning and implementation. 4. Providing awareness raising trainings to citizens on the use of bicycles and public transportation. 5. Optimizing public transport routes to reduce fuel consumption 6. Realization of the rail system. 7. Installing bicycle carrying apparatus on public transportation vehicles
Action Type	Investment, Plan and Strategy
Impact Amount	Expanding the use of bicycles, Implementation of the rail system and increasing the demand for public transportation, energy savings of close to 30% are foreseen.
Responsible	Diyarbakır Metropolitan Municipality
Stakeholders	Ministry of Transport and Infrastructure, Ministry of Environment, Urbanization and Climate Change
Municipality Contribution	Construction of the Rail System, revision of Bicycle Lanes.
Cost	Not calculated.
Timing	2024-2030
Risks	Inability to allocate financing for the rail system project, difficulty in changing citizens' transportation habits, A significant portion of existing roads are not suitable for bicycle lanes.

Action 9.3.3	EXPANDING SMART SYSTEMS
Current Status/Purpose	Intelligent transportation and traffic systems are modern application of technology used in public transportation. There are 84 signalized intersections in Diyarbakır. Sixty of these intersections use intelligent traffic systems. Diyarbakır Implementation of the smart stops included in the transportation master plan has started.
Relationship with Existing Plans	Transportation and Logistics Master Plan 2023-2053, Diyarbakır Transportation Master Plan 2020-2040
Priority Level	High, Short term
Action Steps	1. Converting existing bus stops to Smart Stop System and building new bus stops in accordance with this system, 2. Implementation of smart traffic system at all signalized intersections. 3. Design, design and construction of smart intersections 4. Conversion of signalized intersections to solar powered systems
Action Type	Investment, Plan and Strategy
Impact Amount	A 25% emission reduction is foreseen with the use of Smart Intersection Systems. Reduced waiting time in traffic, reducing fuel and greenhouse gas emissions.
Responsible	Diyarbakır Metropolitan Municipality
Stakeholders	Ministry of Transport and Infrastructure, Ministry of Environment, Urbanization and Climate Change, District Municipalities.
Municipality Contribution	Design and construction
Cost	140.000.000,00
Timing	2024-2030
Risks	High cost.

Action 9.3.4	TRANSFORMATION OF AGRICULTURAL VEHICLES INTO EFFICIENT VEHICLES
Current Status/Purpose	Diyarbakır, an important agricultural center, has approximately 27000 tractors in 2023. This number may increase with combine harvesters and other similar vehicles. Therefore, there is a significant fuel consumption. conversion of these existing vehicles to energy efficient vehicles and both emission emission and energy serious steps be taken to save money.
With Existing Plans Relationship	Diyarbakır State of the Environment Report, Diyarbakır Agricultural Production Planned
Priority Level	High, Medium term
Action Steps	1. Replacement of the existing fleet of agricultural vehicles and agricultural machinery with new and more efficient ones 2. New vehicle equipment to be purchased is compatible with energy efficient systems
Action Type	Investment, production
Impact Amount	With this action, 25% fuel savings in agricultural field works In addition to this, it is planned to reduce emission emissions by 10%.
Responsible	Farmers, Provincial Directorate of Agriculture
Stakeholders	Agricultural Vehicle Manufacturers, Karacadağ Development Agency
Municipality Contribution	Information- Awareness raising activities
Cost	500.000,00 TL for training, document preparation and distribution
Timing	2024-2030
Risks	High cost.

Action 9.3.5	CONDUCTING AWARENESS RAISING ACTIVITIES ON
Current Status/Purpose	The aim is to reduce fuel consumption by providing training on economical driving techniques to drivers of public transportation vehicles, taxis, all commercial vehicles and private vehicle owners. Research shows that economical driving techniques can save up to 10% of fuel shows.
With Existing Plans Relationship	Diyarbakır Climate Change Action Plan
Priority Level	High
Action Steps	1. Conducting a preliminary information meeting on economic driving techniques for drivers of municipal public transportation, minibuses, taxis and logistics vehicles 2. Informing district transportation and cargo companies and organizing joint programs with educational institutions 3. Cooperation with metropolitan and neighboring districts
Action Type	Information and Training
Impact Amount	Energy savings and greenhouse gas reductions can be achieved.
Responsible	Diyarbakır Metropolitan Municipality
Stakeholders	Private sector (logistics companies), educational institutions, neighboring districts
Municipality's Contribution	Municipality organizes training programs and awareness raising activities to be
Cost	1.000.000,00 for training costs
Timing	2024-2030
Risks	Lack of time for trainings Lack of citizen interest in the subject

9.4. Adaptation Actions Template

Action A.9.4.1	PROTECTING AND SUPPORTING AGAINST CLIMATE HAZARDS
Climate Hazards	Heat waves, Floods, Drought
Available Compliance Capacity	Limited emergency response systems, existing social support networks, local awareness programs
Key Sectors Affected	Health, Housing, Agriculture, Water Resources, Infrastructure
Sub-Actions and Activities	Establish emergency shelters in flood-prone areas
Time Interval	Short and Medium Term
Responsible Institutions and Organizations	Local government, Ministry of Health, AFAD, NGOs, Community leaders
Effect of Action on Harmony	1. Increasing resilience climate hazards, 2. Reducing health risks, 3. Better disaster response and recovery
Approximate Cost	Not calculated.

Action A.9.4.2	DEVELOPMENT OF EARLY WARNING AND APPLICATIONS
Climate Hazards	Heat waves, Floods, Drought, Hailstorms
Available Compliance Capacity	Limited emergency response systems
Key Sectors Affected	Health, Housing, Agriculture, Water Resources, Infrastructure
Sub-Actions and Activities	Developing remote-controlled and sensor-supported early warning systems, including mobile applications, for extreme weather events such as hailstorms, heavy rains and heat waves to enhance public safety.
Time Interval	Short and Medium Term
Responsible Institutions and Organizations	AFAD, Regional Directorate of Meteorology, Provincial Directorate of Environment, Urbanization and Climate Change, Local Authorities
Effect of Action on Harmony	1. Enhancing resilienceclimate hazards 2. With the implementation of early measures and precautions preventing possible disasters
Approximate Cost	10.000.000,00

Action A.9.4.3	INCREASING THE NUMBER OF TREE AND LANDSCAPE AREAS
Climate Hazards	Heat waves, Floods, Drought, Erosion, Hailstorms
Available Compliance Capacity	Local Awareness Programs
Key Sectors Affected	Agriculture, Water Resources, Infrastructure
Sub-Actions and Activities	1. Improvement of forest areas, 2. Increasing tree planting in urban areas with species adapted to local climatic conditions.
Time Interval	Short-term
Responsible Institutions and Organizations	Forest Management DirectorateLocal AuthoritiesFood, Agriculture and Provincial Directorate of Livestock, Provincial Directorate of Environment, Urbanization and Climate Change
Effect of Action on Harmony	1. Preventing natural disasters (floods, erosion, landslides, etc.) that occur as a result of sudden changes in weather events due to Climate Change 2. Reducing emission emission values in proportion to the number of trees planned to be planted. 3. Preventing drought
Approximate Cost	20.000.000,00

Action A.9.4.4	SEPARATION OF STORM WATER DRAINAGE FROM WASTEWATER TRANSMISSION SYSTEMS
Climate Hazards	Floods and Floods, Hailstorms
Available Compliance Capacity	Preparation of Heavy Rainfall and Flood Urban Planning
Key Sectors Affected	Drinking Water ResourcesInfrastructureSuperstructureAgriculture and Livestock
Sub-Actions and Activities	Preparation of Urban Planning for Heavy Rainfall and Flooding, Separation of mur Water Systems from Waste Water Systems revision of cut coupled systems into discrete systems. Maintenance and repair building systems at regular intervals.
Time Interval	Medium and Long Term
Responsible Institutions and Organizations	Directorate of Environment, Urbanization and Climate Change, Local Authorities, DISKI
Effect of Action on Harmony	1. Reducing the operating load of Wastewater Treatment Plants and reducing costs, 2. Separate gathered rain water again to be put into use, 3. Preventing floods and overflows, 4. Use of separately collected rainwater as irrigation and domestic water in agriculture 5. Preventing depletion of natural water resources

Action A.9.4.5	RAISING ' AWARENESS ON RAINWATER
Climate Hazards	Drought, Extreme Weather Events, Floods
Current Compliance Capacity	Local Awareness Programs
Key Sectors Affected	Agriculture and Livestock
Sub-Actions and Activities	1. Provide training and technical assistance to small-scale farmers on sustainable irrigation methods and rainwater harvesting techniques to increase agricultural resilience to water scarcity. 2. Provide incentives for farmers who receive training and technical assistance.
Time Interval	Medium and Long Term
Responsible Institutions and Organizations	Directorate of Environment, Urbanization and Climate Change, Provincial Directorate of , District Municipalities, Mukhtars
Effect of Action on Harmony	1. Preventing floods and overflows, 2. Use of separately collected rainwater as irrigation and domestic water in agriculture 3. Preventing depletion of natural water resources

Action A.9.4.6	URBAN HEAT ISLAND AND NATURE-BASED SOLUTIONS
Climate Hazards	Drought, Extreme Weather Events, Floods, Hailstorms
Current Compliance Capacity	Revision of Urban Planning
Key Sectors Affected	Infrastructure, Superstructure.
Sub-Actions and Activities	1. Use permeable materials for pavements to reduce heat island effects and improve urban cooling 2. Increasing green recreation areas
Time Interval	Medium and Long Term
Responsible Institutions and Organizations	Directorate of Environment, Urbanization and Climate Change, Regional Directorate of Highways, Local Authorities
Effect of Action on Harmony	1. Prevention of water loss 2. More efficient use of natural water resources 3. Preventing floods and overflows

9.5. Energy Poverty Actions Template

Action E.Y.9.5.1	IMPLEMENTING ENERGY EFFICIENCY PROGRAMS FOR HOUSEHOLDS IN ENERGY POVERTY
Current Status/Target	Identifying the number of neighborhoods and households in energy poverty that have not yet been identified and ensuring that they have access to clean energy ensuring
Action Steps	1. Establish programs to increase energy efficiency and access to renewable energy for low-income households, 2. Installation of individual solar panels and mini wind turbines, 3. Establishment of energy cooperatives 4. Providing direct financial support to low-income households, 5. Establishment of energy monitoring systems, 6. Conducting awareness-raising campaigns, 7. Providing awareness trainings to households experiencing energy poverty, 8. Providing incentives for green technologies, 9. Establishment of an energy desk,
Responsible Institution(s)	Local Authorities, DEDAŞ, Ministry of Energy and Natural Resources
Stakeholders	District MunicipalitiesGovernorship of DiyarbakırCivil Society Organizations
Municipality Contribution	Awareness raising campaigns execution, Mali Support Presentation.
Estimated Cost	50.000.000,00
Timeline	Long Term
Risks	Insufficient Budget, Insufficient Technical Personnel

Action E.Y.9.5.2	ESTABLISHMENT OF DESKS
Current Status/Target	Individuals' energy consumption, energy efficiency and renewable energy to create a platform where they can get information about their resources
Action Steps	1. Accelerating energy efficiency transitions for low-income households, 2. Establishment of energy desks; 3. Training engineering students, 4. Providing technical support to households upon request,
Responsible Institution(s)	Local Authorities, DEDAŞ, Ministry of Energy and Natural Resources
Stakeholders	District Municipalities, Universities
Municipality Contribution	Awareness raising campaigns execution, Finance Provision of support.
Estimated Cost	Not calculated.
Timeline	Medium Term
Risks	Insufficient Budget, Insufficient Technical Personnel

Action E.Y.9.5.3	IMPLEMENTATION OF PROGRAMS
Current Status/Target	The transformation of existing old houses and those experiencing energy poverty needs to be ensured. Increasing energy efficiency, renewable energy based structures design and implement green housing retrofit programs to ensure environmental sustainability
Action Steps	1. Implementation of green housing retrofit programs to increase energy efficiency in housing for low-income groups 2. Establish financing programs for home renovations to ensure energy efficiency (e.g. insulation, installation of energy efficient windows) 3. Conduct free or subsidized energy audits to identify non-conforming and energy-poor housing. 4. Increasing the number of houses with green roofs
Responsible Institution(s)	Local Authorities, Ministry of Family and Social Services, DEDAŞ
Stakeholders	District Municipalities, NGOs
Municipality Contribution	Developing energy poverty maps ensuring local-level coordination and conducting public awareness campaigns.
Estimated Cost	Not calculated.
Timeline	Long Term
Risks	Insufficient Budget, Participation in public awareness trainings social risks, management and coordination risks

Action E.Y.9.5.4	BUILDING SMART GRID AND SYSTEMS
Current Status/Target	Experiencing energy poverty and subject to inequitable energy distribution smart grid systems should be planned and implemented throughout city , especially in the remaining regions
Action Steps	1. Implementation of smart grid and energy management system technologies to optimize energy use 2. Installation of smart meters and energy management systems in low-income urban areas 3. Providing training and tools to help users monitor and reduce energy consumption 4. Preparation of technical infrastructure for the integration of solar energy facilities into the grid system
Responsible Institution(s)	DEDAŞ, District Municipalities,
Stakeholders	NGOs, EMRA
Municipality Contribution	Assisting in the preparation of appropriate infrastructure and supporting local Ensuring coordination at the level
Estimated Cost	Not calculated.
Timeline	Long Term
Risks	Insufficient budget, management and coordination risks

10. RESULTS AND EVALUATIONS

Diyarbakır Metropolitan Municipality has declared its mission to provide fair, accessible and transparent municipal services by prioritizing the history, cultural values and identity of the city with a pioneering approach in municipalism, and its vision to ensure quality living conditions with its services. Within the framework of this mission and vision, the main purpose of the Sustainable Energy and Climate Action Plan (SECAP) prepared by Diyarbakır Metropolitan Municipality is to guide the determination of activities to reduce greenhouse gas emissions that cause climate change, and therefore energy fuel expenditures in the ***Stationary Energy, Transportation and Waste*** sectors, which are the source of these emissions. For this purpose, a prioritized greenhouse gas inventory and greenhouse gas emissions in the city were calculated within the framework of this inventory. When the results of the emission inventory are analyzed within the framework of these calculations; all of the problems that emerged as a result of vulnerability assessments cannot be solved in the short term throughout the city due to technical failures and budget insufficiencies. Through these plans, the regions where the impacts of climate change are felt the most have been identified and the most vulnerable points have been pointed out. Based on these vulnerabilities, potentially feasible adaptation action plans have been identified according to the characteristics of the city.

the population density and climate vulnerabilities in our city, this action plan will make a major contribution to reducing the annual per capita emission rate and positively changing the carbon footprint. In addition, it is planned to provide not only environmental but also economic and social benefits by protecting local ecosystems and securing public health, while preventing many negative impacts, especially biodiversity loss, forest fires, heat waves and health problems caused by the climate crisis.

In addition, multi-criteria analysis and key stakeholder consultations and workshops were conducted to identify adaptation and energy poverty action plans. As a result of the assessments of these workshops and stakeholder consultations, as a summary of the work undertaken for the Risk-Vulnerability Assessment and identification of Adaptation Actions, a series of adaptation actions were prioritized based on the identified vulnerabilities of Diyarbakır province.

As SECAP focused on the actions of the Diyarbakır Metropolitan Municipality, separate mitigation plans were developed for both the city as a whole and the Diyarbakır Metropolitan Municipality (DMM).

In summary; during the preparation of this report, the main sectors identified for emission generation and emission calculations are the stationary energy, transportation and waste sectors. It is clear that the energy efficiency that will increase as a result of the mitigation action plans envisaged to be implemented in these sectors will have economic, social and environmental benefits. Therefore, the Sustainable Energy and Climate Action Plan (SECAP) is an important guide for Diyarbakır to address the regional global climate crisis.

In conclusion, this study aims to develop effective international cooperation in Diyarbakır's climate action, combat climate change, and protect natural life and ecological balances.

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