CLIMATE CHANGE MONITORING REPORT

2024

ISTANBUL METROPOLITAN MUNICIPALITY

DEPARTMENT OF ENVIRONMENTAL PROTECTION AND DEVELOPMENT

CLIMATE CHANGE DIRECTORATE

CONTEXT

LIST OF CHARTS

LIST OF TABLES

LIST OF ABBREVIATIONS

AL	Albania
API	Application Programming Interface
B40	Balkan Cities Network
BAU	Bahçeşehir University
BAU-COP	Bahçeşehir University Career Development Application and Research Center
BEI	Baseline Emission Inventory
BG	Bulgaria
BiH	Bosnia and Herzegovina
BIMTAS	Boğaziçi Landscape Construction Consultancy Technical Services Industry and Trade Inc.
BPP	Biomass Power Plant (Originally: BES)
C40	Cities 40 / C40 Cities Climate Leadership Group
CCAP	Climate Change Action Plan (Originally: IDEP)
CDP	Carbon Disclosure Project
CO2	Carbon Dioxide
COP28	28th Conference of the Parties
CPMA	Central Project Management Agency
DCC	Disaster Coordination Center (Originally: AKOM)
DIMIS	Disaster Information Management System (Originally: AKOMAYS)
DMA	District Metered Area
EBRD	European Bank for Reconstruction and Development
EIT	European Institute of Innovation and Technology
ELBD	Energy Management and Lighting Branch Directorate (Originally: EYAM)
EPC	Energy Performance Certificate (Originally: EKB)
ESG	Environmental, Social, and Governance
EU	European Union (Originally: AB)
FEWS	Flood Early Warning System (Originally: TEUS)
GCAP	Green Cities Action Plan (Originally: YŞEP)
GCoM	Global Covenant of Mayors
GEH	Green Energy Hub (GREEN DEAL-TURKLIT)
GHG	Greenhouse Gas Emissions
GPC	Global Protocol for Community-Scale Greenhouse Gas Emission Inventories
GR	Greece
HR	Croatia
HVAC	Heating, Ventilating, and Air Conditioning
ICLEI	Local Governments for Sustainability
ICP	Istanbul Climate Platform (Originally: IIP)

IETT	General Directorate of Istanbul Electric Tramway and Tunnel Operations
IFSAK	Istanbul Association of Amateur Photography and Cinema
IGDAS	Istanbul Gas Distribution Industry and Trade Inc.
IHE	Istanbul Halk Ekmek (Public Bread) Inc.
IMM	Istanbul Metropolitan Municipality (Originally: IBB)
IPA	Istanbul Planning Agency
IPCC	International Panel on Climate Change
IRENA	International Renewable Energy Agency
ISCOM	Istanbul Water and Control Automation Center (Originally: ISKOM)
ISKI	Istanbul Water and Sewerage Administration
ISPARK	Istanbul Parking Operations Trade Inc.
ISTAC	Istanbul Environmental Protection and Waste Recycling Industry and Trade Inc.
ISTON	Istanbul Concrete Elements and Ready-Mixed Concrete Factories Industry and Trade Inc.
ISWA	International Solid Waste Association
KIPTAS	Istanbul Housing Construction Management and Trade Inc.
KO	Kosovo
kWp	Kilowatt Peak
LED	Light-Emitting Diode
LFG	Landfill Gas
METU	Middle East Technical University (Originally: ODTU)
METU-GUNAM	METU Solar Energy Research and Application Center
MGM	Meteorological General Directorate
MK	North Macedonia
MN	Montenegro
NGO	Non-Governmental Organizations (Originally: STK)
NLP	Natural Language Processing
OLAC	Philips & Signify Outdoor Lighting Application Center
OPCC	One Planet City Challenge
PCED	Positive Clean Energy Zones
PoC	Proof of Concept
PV	Photovoltaic
RMS	Regulating and Metering Station
RS	Serbia
RVA	Risk and Vulnerability Assessment
SaaS	Software as a Service
SCADA	Supervisory Control and Data Acquisition
SDG	Sustainable Development Goals

SECAP	Sustainable Energy and Climate Action Plan
SMTC	Sustainable Mobility Training Center (Originally: SUHA)
SPP	Solar Power Plant (Originally: GES)
SUMP	Sustainable Urban Mobility Plan (Originally: SKHP)
tCO2e	Tonnes of Carbon Dioxide Equivalent
TGBC	Turkish Green Building Council (Originally: CEDBIK)
TOE	Tonne of Oil Equivalent (Originally: TEP)
TR	Türkiye
TURKAK	Turkish Accreditation Agency
UCLG MEWA	United Cities and Local Governments, Middle East and West Asia Regional Organization
UNEP	United Nations Environment Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UTM	Urban Transitions Mission
VAP	Vision Action Plan (Originally: VEP)
VRF	Variable Refrigerant Flow
WMO	World Meteorological Organization
WRI	World Resources Institute
WUF	World Urban Forum
WWF	World Wide Fund for Nature

TECHNICAL TEAM

Department of Environmental Protection and Development | Directorate of Climate Change

- Ece ÖZÖN – Director
- Berfin KAHRAMAN – Deputy Director
- Ayşe Berrin BEKEM – Chief of Climate Change Monitoring Studies
- Afet ÜNLÜ – Urban Planner, MSc.
- Ahmet URUN – Environmental Engineer
- Aybüke KAYA – Environmental Engineer
- Dr. Ali TUNÇ – Geomatics Engineer
- Dr. Mustafa KESGİN – Economist
- Ebru GÖCEN – Environmental Engineer, MSc.
- Elvin ÖKSÜZ BAYAZIT – Environmental Engineer, MSc.
- Ezgi YILDIZ – Civil Engineer
- Funda SAĞIRKAYA– Environmental Engineer
- Necdet Cem AYLA – Environmental Engineer, MSc.
- Nilüfer ÖRNEK – Environmental Engineer
- Pınar ÖZTÜRK TEZER – Environmental Engineer, MSc.

Contributors

Directorates

- Waste Management
- Environmental Protection
- Marine Services
- Smart City
- Agriculture and Aquaculture
- Green Areas and Complex Construction
- Parks, Gardens and Green Areas (Asian/European)
- Rail Systems (Asian/European)
- Transportation Planning
- Public Transportation Services
- Transportation Projects
- Municipal Facilities
- Health and Sanitation

Subsidiaries

- ISKI
- IETT
- IGDAS
- IHE
- ISFALT
- ISPARK
- ISTAC
- ISTON
- AĞAÇ A.S.
- METRO ISTANBUL
- BELTUR

PREFACE BY THE HEAD OF DEPARTMENT

The ancient city of Istanbul has hosted many civilizations throughout history and, with its unique culture and geography, is a living heritage entrusted to all of us. As Istanbul Metropolitan Municipality, we take our steps with full awareness of our responsibilities toward this city. We continue our work by considering its natural assets, cultural heritage, and urban dynamics.

In today's conditions, the climate crisis has moved beyond being a global issue and has become a disaster that requires urgent action. Taking measures against the climate crisis is among our top priorities. In addition to making our city resilient to changing climate conditions, reducing current greenhouse gas emissions to a minimum is of utmost importance. In this regard, it is highly valuable for us to work in full coordination with you, our citizens, who are the most important stakeholders of local governments.

In this document, where we compiled our efforts regarding climate change, we aimed to ensure that the Climate Change Action Plan — in which we defined our strategies, targets, and actions across four main sectors (stationary energy, transportation, water/wastewater, and waste) — remains a dynamic, living document. For this reason, we placed great emphasis on tracking the progress achieved in the actions. In this year's issue of the Climate Change Monitoring Report, which was published for the second time last year, I would like to highlight some key developments.

Since 2021, we have focused on reducing stationary energy emissions — which constitute the largest share of the city's greenhouse gas inventory — and developed specific actions for our subsidiaries and affiliates with the highest energy consumption. As a result, the **Istanbul Sustainable Energy and Climate Action Plan (Istanbul SECAP)** was completed and publicly announced during a launch event attended by our Mayor, Mr. Ekrem İmamoğlu. Our current focus is monitoring the implementation of the Istanbul SECAP actions, for which we have developed the **"Istanbul SECAP Monitoring Portal".** Through this portal, actions, responsible units, and progress achieved will be digitally recorded and soon made accessible to the public.

The **Istanbul Green City Action Plan**, whose preparation began in May 2023 and was launched with the participation of our Mayor in November 2023. It was completed in January 2025 and approved by Istanbul Metropolitan Municipality Council in February 2025. The plan includes a total of 52 actions, consisting of 17 investments and 35 policy (non-investment) measures, all designed through comprehensive work to support implementation.

Our city was accepted into the **Mission Innovation: Urban Transitions Mission** at the beginning of 2024 — a mission that supports cities in becoming net-zero by helping them identify their potential. Throughout the year, we participated in trainings directly relevant to local governments such as sustainability, energy efficiency, and efficient lighting. Additionally, we had the opportunity to represent our city at the

Global Innovation Summit held in Brussels. Our work and collaborations within the scope of the mission continue rapidly.

With the documents we prepared — Commitments, the 2030 Action Plan, and the 2030 Investment Plan — our **Climate City Contract** was approved by the European Commission, and Istanbul received the **"EU Mission Label".** Through this agreement, our carbon-neutral target of 2050 updated to 2030 with a declaration of intent.

In addition to these plans, projects, and documentation processes, our municipal units continue to work actively in the field. As of the end of 2024, the number of renewable energy (solar power plant) installations reached **75**, with a total installed capacity of **8,240 kWp**.

Thanks to the intensive efforts of ISKI, the water loss-leakage rate — measured as 22.32% in 2019 — decreased to **18.63%**, resulting in significant savings in both water and energy.

In 2024, we treated approximately **18,000 tons** of waste daily across Istanbul. On an annual basis, roughly **1.8 million tons** of waste were processed in recycling facilities. Our recycling rate reached **26%** and continues to increase rapidly.

Full Speed Ahead in Serving Istanbul!

Sincerely,

Prof. Dr. Ayşen ERDİNÇLER

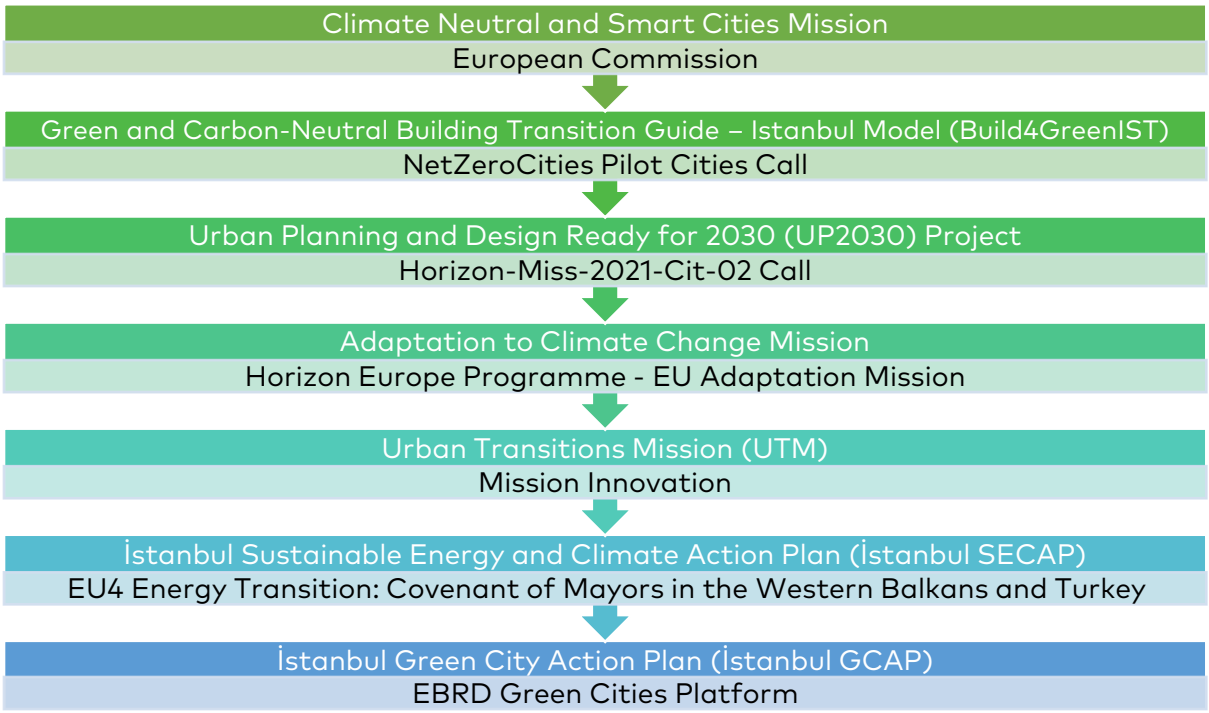
Head of Environmental Protection and Development Department

PLANS, PROJECTS AND MISSIONS

Within the Climate Change Directorate, action plans are prepared to mitigate the impacts of climate change and to enhance the resilience of our city against these impacts. In addition, various projects are carried out in collaboration with universities, academia, and non-governmental organizations.

In 2024, "11" international project applications were submitted by the Climate Change Directorate.

The list of these plans and projects is presented in the graphic below.



Climate Neutral and Smart Cities Mission

Within the scope of the Horizon Europe Programme, an application was submitted on behalf of Istanbul Metropolitan Municipality to the European Commission's "Expression of Interest Call for the Climate-Neutral and Smart Cities Mission" on 31 January 2022.

Istanbul successfully completed the evaluation process—during which the climate adaptation capacity, policies, projects and commitments of cities were assessed—and qualified as one of the 100+12 pioneer cities (100 from EU Member States and 12 from other countries within the Horizon Europe framework). With this outcome, Istanbul earned the title of **Mission City**.

The Mission aims to support 100 (100+12) European cities in becoming climate-neutral by 2030. It is envisioned that all participating cities will become hubs for experimentation and innovation.

Visual prepared for Istanbul within the scope of the EU Missions: Climate-Neutral and Smart Cities Mission

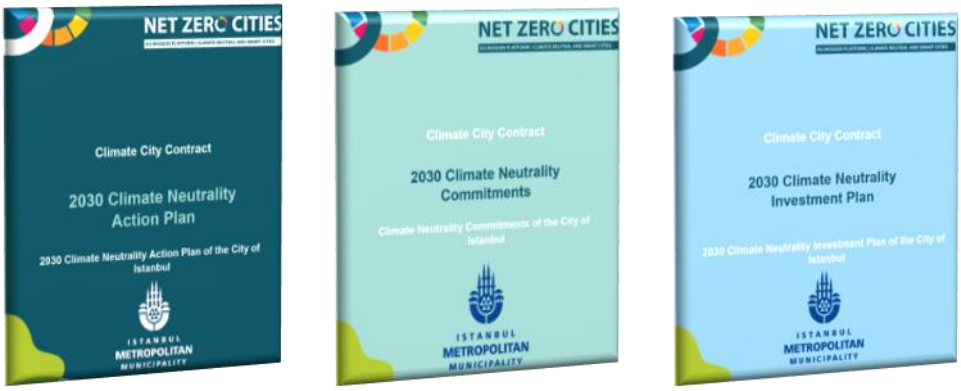
As a significant step toward becoming a climate-neutral and smart city, selected cities will lead rapid local transformations in climate action. Participating in the Mission not only provides the advantage of sharing knowledge and experience within a network of leading European cities, but also increases the visibility and credibility of our city in European Union project applications.

Within the Mission, coordinated by the Climate Change Directorate on behalf of Istanbul Metropolitan Municipality, a **"Climate City Contract"** was prepared and submitted first to NetZeroCities experts and then to the European Commission for evaluation.

This contract—designed to identify the key stakeholders, actions, and financial plans necessary for Istanbul to become climate-neutral by 2030—consists of three components: Commitments, Action Plan, and Investment Plan. The methodology was shaped with the technical support of city advisors assigned to Istanbul by NetZeroCities.

The Climate City Contract is a comprehensive document containing **Commitments, Action Plan, and Investment Plan**. The Action Plan presents the necessary actions to meet the 2030 target, while the Investment Plan outlines the investments and financial resources required for these actions. The commitment document presents the city stakeholders' goodwill support for this goal in the form of a signed text, demonstrating a comprehensive approach.A total of 56 signatories from district municipalities, civil society organizations, professional chambers, and the private sector endorsed the prepared Commitments document. The Istanbul Climate City

Contract was prepared in compliance with the EU Mission format and tailored specifically to the city of Istanbul.



Sections of the Climate City Contract (Action Plan, Commitments and Investment Plan)

On 16 September 2024, the Istanbul Climate City Contract was uploaded to the NetZeroCities portal. Following the evaluations of the European Commission, Istanbul was awarded the ***"EU Mission Label"*** in May 2025. The official ceremony took place at the 2025 Mission Cities Conference in Vilnius, Lithuania.

Official visual announcing that Istanbul received the European Mission Label

The EU Mission Label presented to Prof. Dr. Ayşen Erdinçler during the Mission Cities Conference in Vilnius

NetZeroCities Pilot Cities Call – Build4GreenIST Project

Within the scope of the Climate-Neutral and Smart Cities Mission, a "NetZeroCities Pilot Cities Programme" was launched to support cities in becoming climate-neutral by 2030 and to test innovative approaches.

Istanbul Metropolitan Municipality applied to this call with the project titled ***"Green and Carbon-Neutral Building Transition Guide – Istanbul Model (Build4GreenIST)"*** and was selected to receive technical and financial support for a period of two years. Istanbul became the **first pilot city** selected from Türkiye.

Visual representation of our Build4GreenIST project

The project stems from the fact that stationary energy accounts for the largest share (64%) of Istanbul's greenhouse gas emissions. Therefore, the objective was to prepare a guiding handbook to ensure that buildings renewed within the scope of urban transformation are green and carbon-neutral.

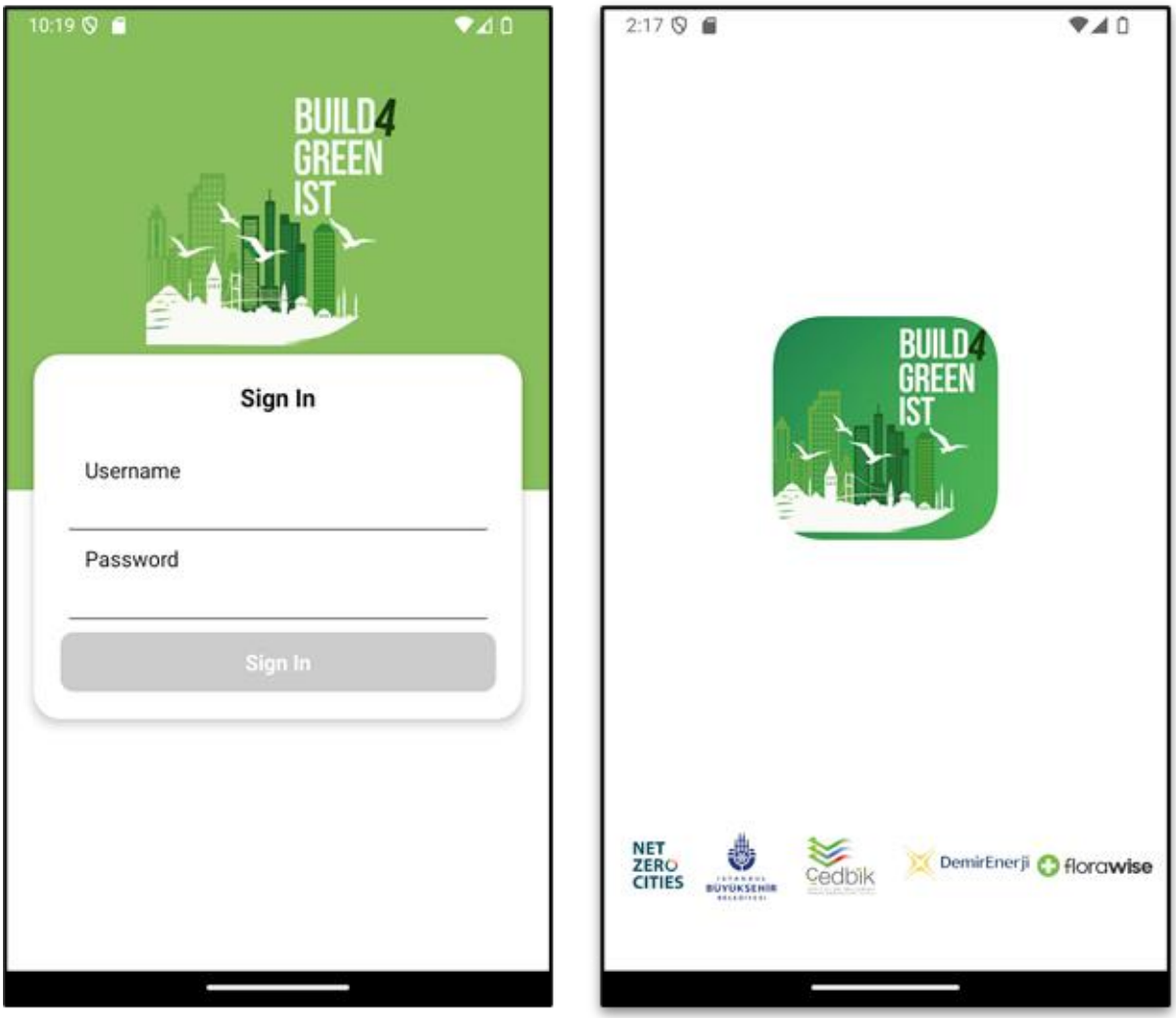
Additionally, another objective was to monitor energy consumption in residential units within the selected pilot area using sensors to promote behavioral change toward efficient energy use.

Beykoz–Cubuklu was selected as the urban transformation pilot area. To enable comprehensive assessment, data collection activities were carried out for current situation analysis (Data Analysis – Building Modelling – Energy Simulation – Result Analysis). Through scenario development and modelling studies, the environmental gains achievable through the implementation of different renewable energy systems in the region were analyzed.

Economic analyses of these scenarios were also conducted, including cost assessments and evaluations of return on investment, supported by expert reviews. Social benefits were also considered to examine how green building transformation contributes to households and the city.

For the energy monitoring component of the project (GreenIST Mobile Application), KIPTAS Bayrampaşa Housing Units were selected as the pilot area.

Sensors were installed in 75 residential units to monitor household energy consumption. Household occupants were provided the ability to monitor their consumption levels through the mobile application, both in real-time and periodically. Notifications sent through the application and remote automation applied upon consent demonstrated the potential savings that behavioral change in energy consumption could achieve.



The screenshot shows a mobile application that allows households to monitor their energy consumption in KIPTAS Bayrampaşa housing, one of the pilot areas of the Build4GreenIST project

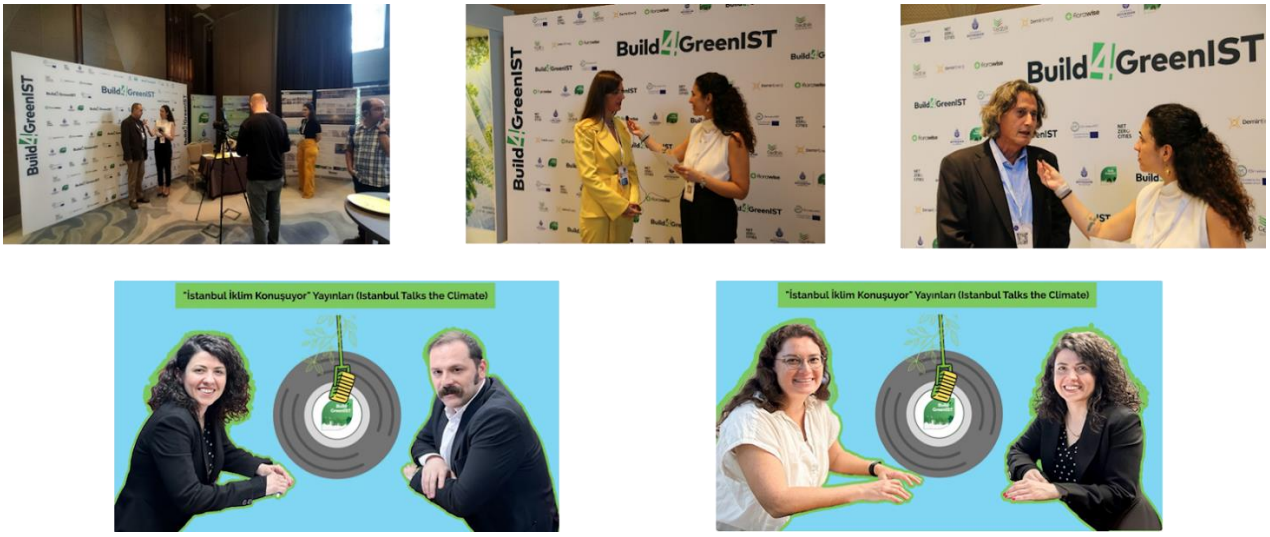
All project studies were documented in Turkish and English as the main output "Build4GreenIST – Guide for the Transition to Green and Carbon-Neutral Buildings". Additionally, capacity-building materials such as trainings, podcasts, blog articles, and news content were prepared and published on the dedicated project website (https://build4greenist.ibb.istanbul).

The Turkish and English covers of the "Green and Carbon Neutral Building Transition Guide," an output of the Build4GreenIST project

A screenshot from the website created for the Build4GreenIST project

Istanbul Climate Talks

As part of the dissemination package, a series of **"Istanbul Climate Talks"** podcasts and interviews were carried out with sectoral experts and civil society representatives. Discussions covered topics such as green transformation in cities, sustainable urban planning, green buildings and renewable energy, nature-based solutions, and financing the construction of a new sustainable Istanbul.



Istanbul Climate Talks interviews and podcasts

Interview and podcast series discussing climate change have been published on the Build4GreenIST website (https://build4greenist.ibb.istanbul/istanbul-talks).

B40 Cities Technical Visits

For project dissemination under the **B40 Balkan Cities Network**, the first technical visit was conducted to Sarajevo, Bosnia and Herzegovina between 18–20 December 2023.

In 2024, this was followed by a visit to Zagreb, Croatia, and in 2025 by visits to the Metropolitan Municipalities of İzmir and Muğla in Türkiye.

During these visits, information exchange was carried out regarding municipal climate and environmental approaches, the implementation stages of the pilot city project, potential impacts on cities, risks and obstacles encountered, and the viability of similar green and carbon-neutral transformations in other cities.

Saraybosna

Zagreb

İzmir

Muğla

Technical visits were conducted to member cities of the B40 Balkan Cities Network with the aim of disseminating the Build4GreenIST project

Green Buildings, Cities and Energy Efficiency Training

Within the scope of the "Capacity Building" work package of the project, trainings were organized in cooperation with Enstitü Istanbul at IMM ISMEK Centers.

In collaboration with IMM and CEDBİK, trainings on ***"Green Buildings, Cities and Energy Efficiency"*** were delivered to trainees at the following Enstitü İstanbul ISMEK centers: Bahçelievler, Üsküdar Aziz Mahmut Hüdayi, Ümraniye Atatürk, Sultangazi İsmetpaşa, Sultangazi Sultançiftliği, Kağıthane Hamidiye and Kağıthane Seyrantepe.

A total of 255 citizens were reached through these trainings. The aim was to raise awareness among citizens about green buildings, energy efficiency and sustainable cities.

Participants were informed about energy-saving measures in daily life, environmentally friendly habits and efficient use of resources. The increased awareness is expected to support individual-led green transformation and contribute to the formation of a broader social movement.

Green Buildings, Cities and Energy Efficiency Training in Enstitü Istanbul ISMEK

In addition to public-oriented trainings, 165 participants from relevant units of IMM, district municipalities and NGOs attended thematic trainings titled "Green Buildings and Renewable Energy", "Green Cities and Participatory Transition" and "Green Finance".

These trainings presented how cities can transform in a sustainable, energy-efficient and environmentally friendly manner, through both literature-based knowledge and good practice examples.

Alongside the trainings, 68 participants also attended workshops focused on capacity development, enabling exchange between practitioners and experts.

Build4GreenIST practitioner trainings

Mid Conference was held to present project progress to key stakeholders in the city, followed by discussion panels enabling active knowledge exchange.

In May 2025, the Final Conference was organized with participation from public authorities, leading industry representatives, academics and civil society organizations.

During the Final Conference, all project activities were evaluated in detail. In addition to sessions on sustainable construction and environmental sustainability, financial analyses related to the project were also presented.

These financial assessments demonstrated the economic feasibility and long-term impacts of green transformation processes, providing a valuable discussion platform.

By concluding with the Final Conference, the Build4GreenIST project successfully **completed** its mission of pioneering green transformation, promoting sustainable buildings and supporting environmentally friendly cities.

Build4GreenIST Final Conference

Twinning Learning Programme

The "NetZeroCities Twinning Learning Programme" is a peer-learning initiative of 12 to 20 months, facilitated by the Mission Platform managed by NetZeroCities within the framework of the EU Cities Mission.

The programme encourages knowledge sharing, experience exchange and the dissemination of good practices between selected Twinning Cities and Mission/Pilot Cities participating in the Climate-Neutral and Smart Cities Mission.

In September 2023, September 2024 and January 2025, a total of 78 Twinning Cities (37 in the first round, 18 in the second round and 23 in the third round) came together to engage in structured learning and collaboration activities with cities included in the Pilot Cities Programme.

As one of the Pilot Cities under the Climate-Neutral and Smart Cities Mission, Istanbul joined the programme in the first round and was paired—on a project basis—with the city of Lesvos (Greece). For a period of 20 months, Lesvos benefited from Istanbul's experience, technical expertise and project-based guidance, particularly related to the Build4GreenIST project and climate-focused urban transformation.

Mutual city visits were conducted, and the programme enabled both cities—sharing similar cultural contexts—to exchange perspectives on implementation challenges, policy approaches and citizen involvement.

The programme concluded successfully, strengthening cooperation between the two cities and contributing to the broader knowledge ecosystem of the Mission.

Photos from the visit of Mytilene Municipality representatives to Istanbul as part of the Twinning Learning Programme

Urban Planning and Design Ready for 2030 Project

In relation to the Climate-Neutral and Smart Cities Mission, the European Commission supported the HORIZON-MISS-2021-CIT-02 call aimed at defining urban planning and design principles to build fair, sustainable, resilient and climate-neutral cities by 2030.

Istanbul Metropolitan Municipality, together with Middle East Technical University (METU) and METU-GÜNAM, applied to this call with the project titled "Urban Planning and Design Ready for 2030 (UP2030)", which was accepted in July 2022.

UP2030 Logo

This large-scale consortium project, which began in 2023 and spans 3 years, includes 46 participants, including Istanbul Metropolitan Municipality. Within the project, solar energy (PV) potential of a selected pilot area is calculated, and simulation studies are carried out to explore the use of clean energy for buildings and public lighting, with remaining energy transferred to lightweight electric mobility systems using digital twin technology.

Another outcome of the project involves designing a PV-integrated urban furniture prototype to highlight the role of solar energy in meeting daily energy needs.

On 3–4 June 2024, Istanbul representatives attended the "City Knowledge Exchange" meeting in Rotterdam to share experiences and discuss challenges toward becoming climate-neutral and resilient cities.

The "Information Exchange Between Cities" meeting was held in Rotterdam as part of the UP2030 project

In October 2024, the 2nd General Assembly Meeting of the project took place in Zagreb, Croatia, with participation from all project partners.

The 2nd General Assembly meeting of the UP2030 project took place in Zagreb, the capital of Croatia

On 5 November 2024, "UP2030 Istanbul Action Workshop" was held at Müze Gazhane with the participation of relevant municipal units, subsidiaries and Kadıköy City Council representatives.

UP2030 Action Workshop, Istanbul

On June 26, 2025, a workshop was held at the Müze Gazhane to contribute to the UP2030 project and evaluate the progress made. During the workshop, participants engaged in productive discussions on the city-wide implementation of the project, sustainable urban planning, and innovative urban designs.

Following the workshop, the ***"PV Panel Integrated Urban Furniture Prototype",*** designed and manufactured within the scope of the project and placed in Moda İnciburnu Park, was inaugurated. This urban furniture, which generates energy to meet daily needs such as charging phones and laptops, has been paid attention with its aesthetic and functional design.

PV panel integrated urban furniture is one of the UP2030 project outputs

Urban Transitions Mission

The Urban Transitions Mission (UTM) is a mission launched at COP26 in November 2021 with the aim of supporting cities on their path to achieving net-zero emission targets and increasing their capacity through solid knowledge and strong communication channels.

Thanks to increased capacity and access to knowledge, cities will be able to mobilize their own inherent strengths and the potential of their communities and develop their own customized solutions for an effective transition to net-zero emissions.

The mission aims to close the gap between research, development and deployment in systemic transition methods aimed at net-zero-emission, climate-resilient and human-centered cities through multi-level, multi-sector and results-oriented partnerships. The Urban Transitions Mission draws attention not only to systemic urban strategies but also to climate resilience and the social dimensions of the impacts of climate change. Successful urban transitions will strengthen innovative policies, technologies, financial instruments, business models and collaborative approaches. These aspects need to be integrated in order to meet the needs of citizens, to be built upon renewable energy resources and circular-economy principles, and to increase resilience toward a globally human-centered urban transition.

The activities of the Urban Transitions Mission are carried out by Mission Innovation, a global initiative that aims to mobilize actions and investments for research, development and demonstration to make clean energy affordable, attractive and accessible for everyone.

An application to the Urban Transitions Mission was submitted on behalf of Istanbul in August 2023, and Istanbul was officially accepted into the mission at the beginning of 2024.

As of **October 2025**, there are **100 cities** included in the UTM.

Urban Transitions Mission (UTM) Logo

Urban Transitions Mission – Global Innovation Summit 2024

The Urban Transitions Mission organizes a "Global Innovation Summit" every year with participants from member cities. After being accepted into the mission, participation on behalf of Istanbul Metropolitan Municipality was ensured for the first time in the summit held in Brussels, the capital of Belgium, on 7–8 October 2024.

Innovative approaches that help cities around the world move toward a net-zero-emission and resilient future by prioritizing resource efficiency, human-centered design and digital connectivity were discussed.

On the first day of the event, sessions titled "Financing Urban Transitions" and "Human-Centered City Designs with Examples from Around the World" were attended.

On the last day of the event, active participation was ensured in sessions titled "Climate Actions: Human-Centered Design", "UTM in Action: Smart and Connected Cities" and "Designing Participatory Budgeting Processes".

Financing Urban Transitions

During the session on financing urban transitions, it was emphasised that global investment needs range from USD 1.9 to 6.9 trillion and that infrastructure choices must align with nature and ecological sustainability. It was highlighted that cities struggle to convert climate visions into investment plans and that insufficient financing partly stems from limited investor interest.

It was also stressed that administrations face challenges in sustaining climate-related projects and must successfully manage the three phases of Lending, Blending and Advisory in their financing preparation process.

Photo from Thematic Meetings from UTM Global Innovation Summit 2024

Human Centred Urban Design with Examples from Around the World

In the human-centred design session, excerpts from IPCC's 6th Assessment Report were discussed, proposing technical solutions such as walkable cities and electric vehicles, and explaining how these align with Sustainable Development Goals (SDGs). The session also covered the 112 Climate City Contracts under preparation and the

sectoral transitions of mitigation strategies (energy, infrastructure, agriculture, industry and social systems).

The lack of communication between investors and policymakers and the failure to provide adequate financing have been criticized. Information was given about the supporting roles of the ELENA and JASPER programs supported by the European Investment Bank (EIB) in climate projects.

Climate Actions: Human Centred Design

- *The city of Cascais in Portugal* has undertaken remarkable practices towards becoming carbon neutral. In this city, kitchen waste is used as biodiesel and water bottles are recycled. These practices have stood out as important steps towards increasing public participation.
- *The Swedish city of Umea* has made significant progress in urban planning with projects based on gender equality. In order to promote open communication, the "Open Talk" platform, which enables interaction with the public, was launched.
- *Sekondi Takoradi in Ghana* is another notable example with its transition to renewable energy and SECAP plans. The transition of all corporate buildings to renewable energy and plans to meet the energy needs of the public with solar energy have come to the fore.

UTM in Action: Smart and Connected Cities

The city of *Baguio, Philippines*, has launched a project integrating gender data into smart city systems. Additionally, the importance of climate-related emergency management strategies such as India's *"Heatwaves Action Plan"* was emphasized. It has been stated that in Moldova, banks offer low-interest loan opportunities for energy efficiency. Information was given about *Mumbai's Climate Action Plan* for 2022 and India's general strategies.

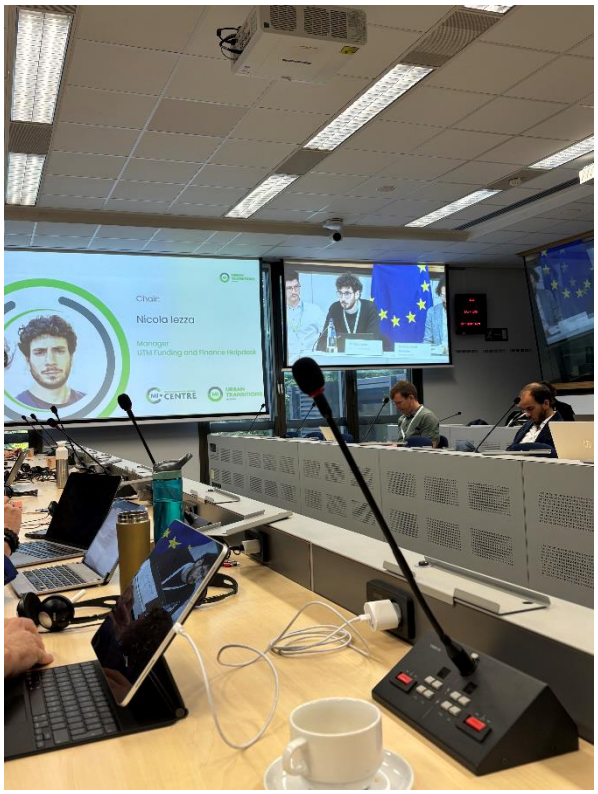


Photo from Thematic Meetings from UTM Global Innovation Summit 2024

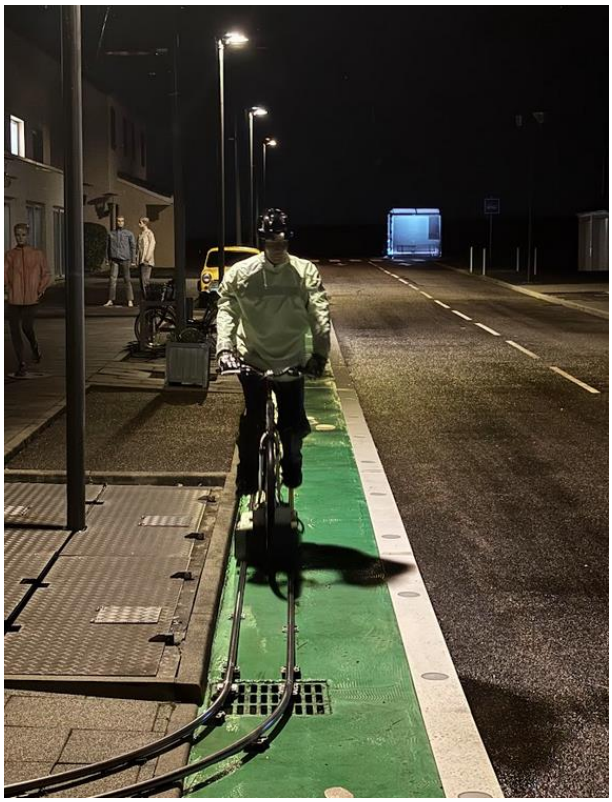
Participatory Budgeting Design Process

Helsinki, just like Istanbul Metropolitan Municipality, successfully implements a participatory budgeting scheme. The voting and proposal processes carried out in the city ensure the active involvement of residents in projects. The example provided by Helsinki shows how cities can make their participatory budgeting processes more effective.

Photo from Thematic Meetings from UTM Global Innovation Summit 2024

OLAC Technical Tour within the Context of UTM Global Innovation Summit

Twelve city representatives, selected according to certain criteria among the participants of the 2024 Global Innovation Summit of the Urban Transitions Mission, held a technical visit — immediately after the summit held in Brussels (8–9 October 2024) — to the "Philips & Signify Outdoor Lighting Application Center (OLAC)", which is located in Lyon, France and serves as a design and experimentation space for outdoor lighting. Istanbul was also among the participants of this technical visit.



Bicycle path lighting simulation available in Philips & Signify OLAC

A frame from the presentation about lighting and energy efficiency given by experts at Philips & Signify OLAC

EU Mission on Adaptation to Climate Change

In 2022, Istanbul earned the right to join the Mission on Adaptation to Climate Change (the European Union's Adaptation Mission), which was established to support cities in becoming climate-resilient by 2030, becoming one of its 215 signatories. While 202 of the 215 signatory municipalities in 2022 were selected from regional and local authorities in 24 EU member states, 13 regional and local authorities, including Istanbul, were included in the programme under Horizon Europe.

As of **November 2025**, the Mission has **326 signatories**, among which there are not only cities but also regional authorities. In addition to Istanbul, the Turkish signatories of the Mission include the metropolitan municipalities of Izmir, Bursa, Eskisehir and Sanliurfa, as well as the district municipalities of Bodrum, Izmit and Karatay.

Promotional visual of the European Missions: Mission on Adaptation to Climate Change

The aim of the Adaptation Mission is to take action so that cities and regions can prepare for and adapt to both the current and anticipated impacts of climate change. To this end, the Mission provides opportunities to cooperate with municipalities that are working towards the same goal, to test innovative solutions and to access potential future joint efforts and financial opportunities.

The Mission's active work began with the Kick-off Meeting held in Brussels on 26 January 2023. The "Forum Mission on Adaptation to Climate Change" meeting, held between 11–14 June 2023 in Ronneby, Sweden, was also attended.

Within the scope of the Adaptation Mission, the "MIP4Adapt Technical Assistance Programme" was established with the aim of providing technical assistance to mission cities under three different thematic headings. Since September 2023, Istanbul Metropolitan Municipality Directorate of Climate Change has been receiving technical assistance under the first thematic heading, "Support to Adaptation Pathways".

Within this scope, experts from the Technical Assistance Programme have reviewed and analysed Istanbul's Climate Change Action Plan and its Sustainable Energy and Climate Action Plan, and have conveyed their analyses and recommendations to us. Work under the Adaptation Mission is ongoing.

Forum of the Mission on Adaptation to Climate Change

Istanbul Metropolitan Municipality actively participates in meetings related to the Mission on Adaptation to Climate Change; carefully examines project calls opened within the framework of the Mission and submits the necessary applications.

Istanbul Green City Action Plan (Istanbul GCAP)

In May 2021, Istanbul Metropolitan Municipality joined the **"Green Cities Framework Programme"** of the European Bank for Reconstruction and Development (EBRD). The **Istanbul Green City Action Plan (GCAP)**, which was carried out with EBRD's technical support and over a period of two years, was launched on 17 May 2023 with a kick-off meeting attended by representatives of the project preparation team.

Istanbul GCAP Launching Event

On 1 November 2023, the project's launch event was held at the Haliç Congress Centre with the participation of our Mayor, Mr. Ekrem İmamoğlu.

Istanbul GCAP Launching Event

Within the scope of the project, the **"Lay the Groundwork: Climate Officers Data and Stakeholder Mapping Workshop"** was held on 16 June 2023 to share the roadmap of the action plan with IMM representatives from key sectors related to the data sets.

The Istanbul GCAP process, financed by the EBRD, consists of the following six main stages:

1. The inception stage, which includes the official kick-off meeting and launch event,
2. Collection and assessment of current data and relevant information,
3. Prioritisation of environmental challenges,
4. Definition of the city vision and strategic objectives,
5. Development of the Istanbul GCAP actions,
6. Preparation and adoption of the Final GCAP document, which includes an investment plan for the Istanbul GCAP actions.

"Lay the Groundwork" Workshop

Within the scope of the Istanbul GCAP, four internal reports have been prepared and finalised with inputs from IMM departments;

i. Inception Report,

ii. Stakeholder Engagement Report,

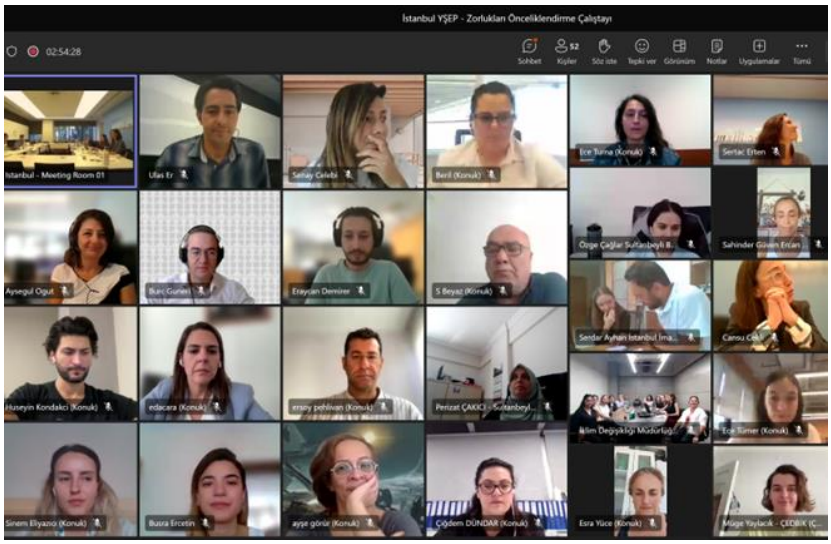
iii. Smart Maturity Report ve

iv. Risk and Vulnerability Assessment Reports

On 8 August 2023, the **"Explore and Identify Workshop"** was held with the participation of public institutions, academia, the private sector, NGOs and professional chambers in order to identify the environmental challenges in 20 sectors specific to Istanbul.

Explore and Identify Workshop

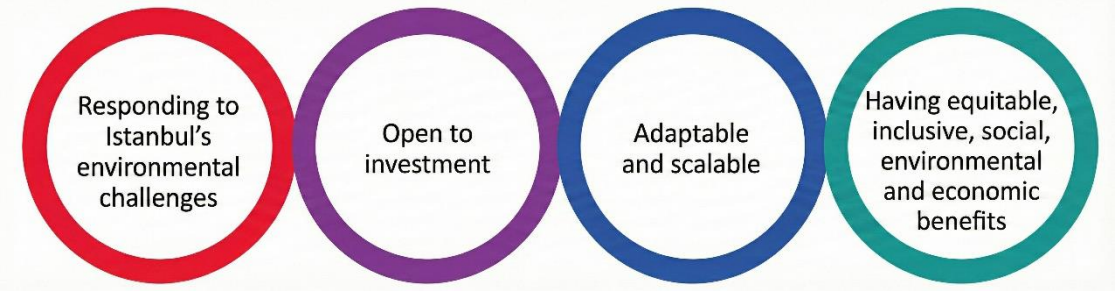
To prioritise the identified environmental challenges together with all internal and external stakeholders of IMM, the **"Environmental Challenges Prioritisation Workshop"** was held online on 14 September 2023.



Environmental Challenges Prioritisation Workshop

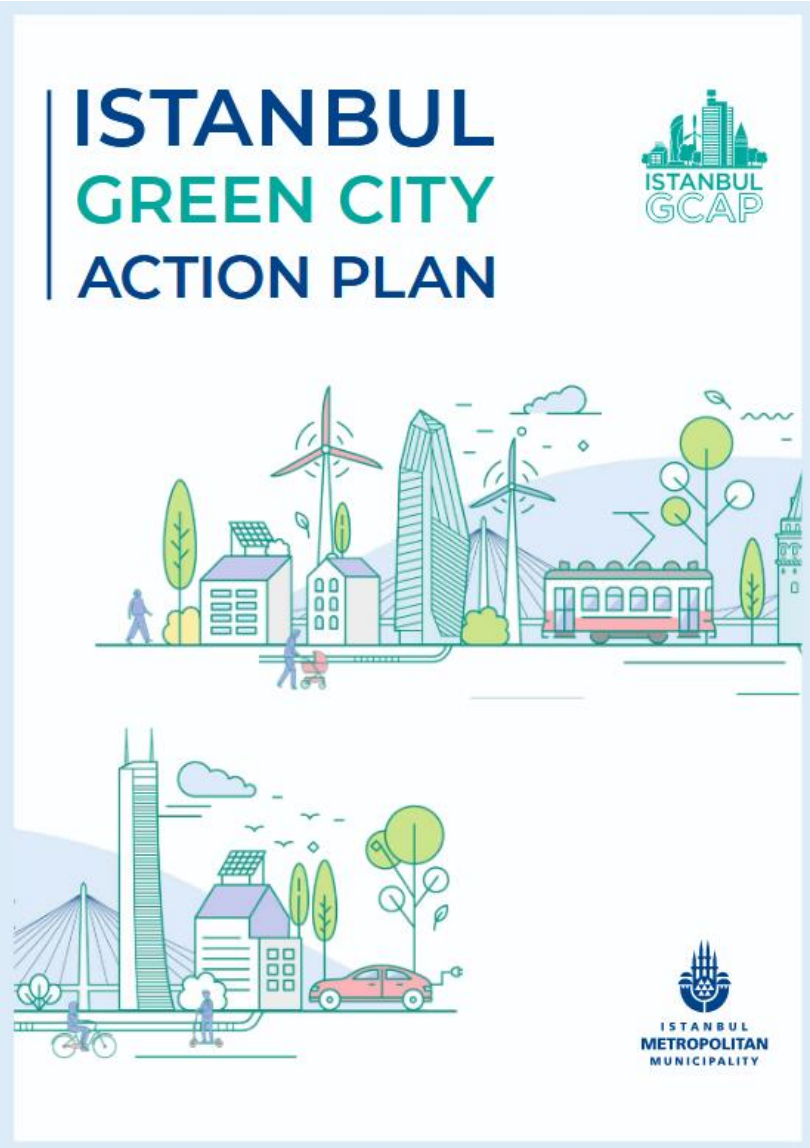
Following the prioritisation of environmental challenges, efforts were undertaken together with IMM's internal departments, affiliates and related entities to develop the Istanbul GCAP actions. In order to further elaborate the actions and to assess ongoing work within the scope of mandates and responsibilities in the context of the action plan, various sectoral meetings were held with the participation of relevant experts, and focus group meetings were carried out with approximately 135 participants from 44 different units.

Process for determining the actions



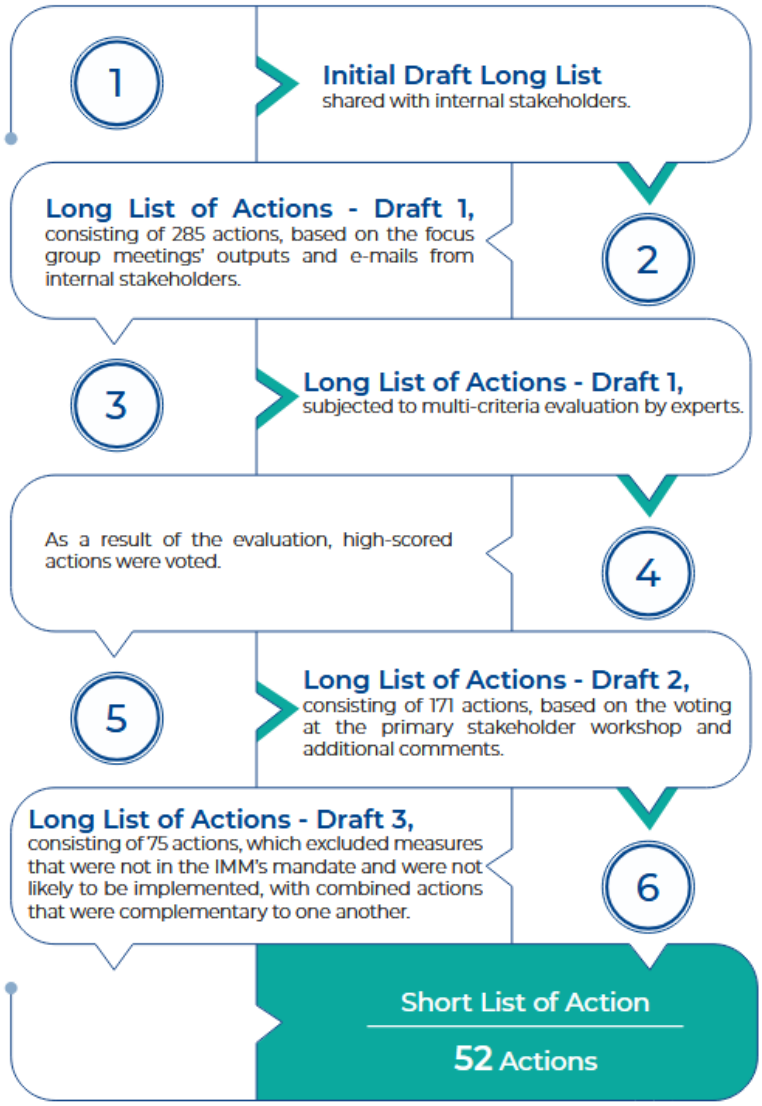
Criteria for determining the actions

All work for the Istanbul Green City Action Plan was completed as of **January 2025**, and the Plan was approved at the ***Istanbul Metropolitan Municipal Council Meeting*** held in **February 2025**. Following approval by the Council, the Istanbul GCAP was published on the website https://iklim.ibb.istanbul.



Istanbul (GCAP) English Cover

In Istanbul GCAP, a total of 52 actions have been defined, of which **17 are investment actions and 35 are policy (non-investment) actions**, and all the steps required for implementation of these actions have been studied in detail.



Stages for determining the short list of Istanbul GCAP actions

Investment actions include measures focusing on capital expenditures to improve the environmental performance of the city's infrastructure.

Non-investment actions include legislative, regulatory or standard-setting measures, partnerships with other organisations, social outreach, education and awareness campaigns, and other initiatives that contribute to IMM's strategic objectives.

Action No	Action Title	Category	Capital Cost (EUR)	Projected Emission Reduction (tCO_2e/year)	Related Sectors
T.1	Implementation of Low Emission Zone (LEZ) in the Historical Peninsula	Investment	16,000,000	7,630	#transport #landuse #airquality #culturalheritage&landscape #gesi #mitigation
E.5	Lighting Design Regulations/ Guidelines for General Use and Biodiversity Sensitive Green Spaces Lighting Plan	Non-Investment	300,000	-	#landuse #energy #buildings #mitigation #adaptation

As can be seen in the visuals, the actions have been categorised by sector, numbered, their capital costs calculated, and their environmental impacts determined together with the expected emission reductions. The capital cost for implementation of these **52 actions** is estimated at **12,678,848,000 Euros**, and the corresponding emission reduction at **1,614,770 tCO_{2e} per year**.

Samples of detailed action cards prepared in the Istanbul GCAP for each action, indicating the environmental challenges addressed, contribution to the city's policy objectives, action process and financing, relevant stakeholders and steps for implementation

Istanbul Sustainable Energy and Climate Action Plan (Istanbul SECAP)

Technical support was provided for the preparation of the "Istanbul Sustainable Energy and Climate Action Plan (Istanbul SECAP)" within the project "EU for Energy Transition: Covenant of Mayors in the Western Balkans and Türkiye", in order to help Istanbul Metropolitan Municipality, a signatory to the Global Covenant of Mayors for Climate and Energy, to achieve its energy and climate targets and to align with the Sustainable Development Goals, which include objectives to reduce greenhouse gas emissions through the use of renewable energy sources.

The project duration is 48 months in total (1 March 2021 – 28 February 2025) and consists of two phases: ***"SECAP Preparation"*** and ***"SECAP Implementation and Monitoring"***.

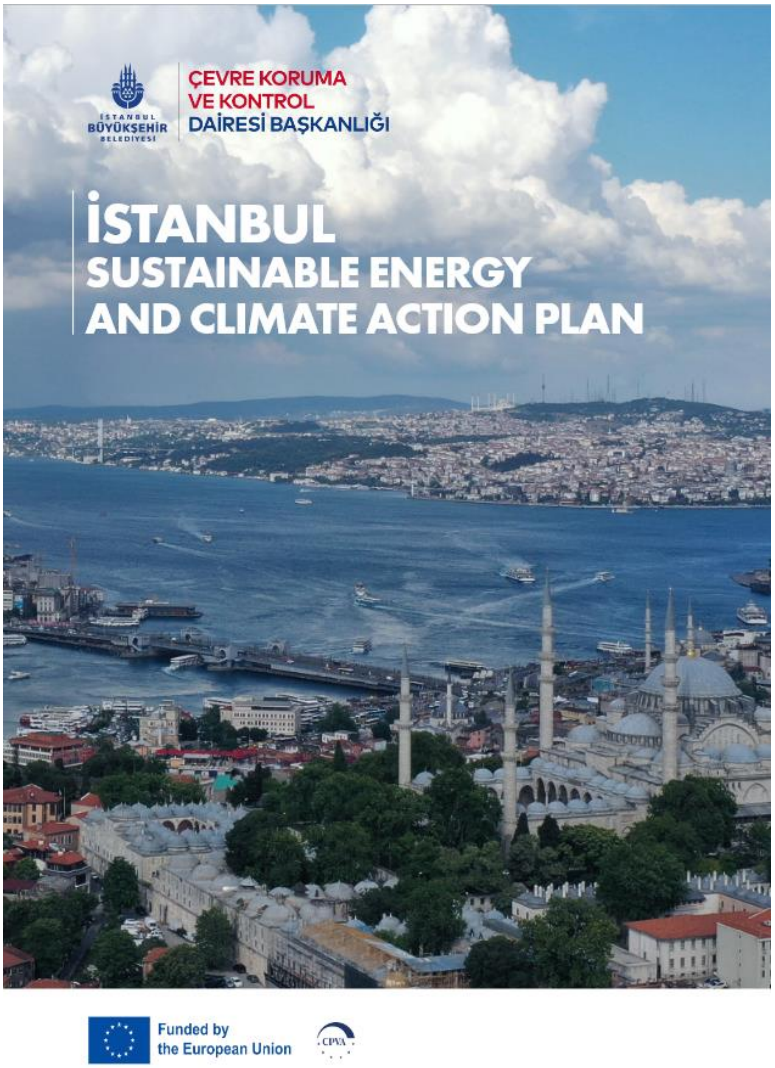
The project is jointly financed by the European Union and Germany's Federal Ministry for Economic Cooperation and Development, and is coordinated by the IMM Climate Change Directorate in cooperation with the Energy Management and Lighting Directorate, with support from our relevant departments. Within the scope of the project, the "Istanbul Sustainable Energy and Climate Action Plan (Istanbul SECAP)" was prepared and approved by the Metropolitan Municipal Council through decision no. 1362 dated 27 November 2023.

Istanbul SECAP, which was shared with the public in 2024 via the website https://iklim.ibb.istanbul, covers the following topics:

- Introduction to SECAP and the "EU for Energy Transition: Covenant of Mayors in the Western Balkans and Türkiye" project
- General overview of the city of Istanbul
- General overview of IMM's climate-related activities
- City-wide Greenhouse Gas Emissions Inventory for Istanbul (Base Year 2019)
- Corporate Greenhouse Gas Emissions Inventory of Istanbul Metropolitan Municipality (Base Year 2019)
- Risk and Vulnerability Assessment
- Adaptation actions
- Energy action and mitigation plans for IMM's corporate buildings, facilities, affiliates and subsidiaries
- Sectoral actions and mitigation planning
- Greenhouse gas emissions projections
- SECAP monitoring system and methodology

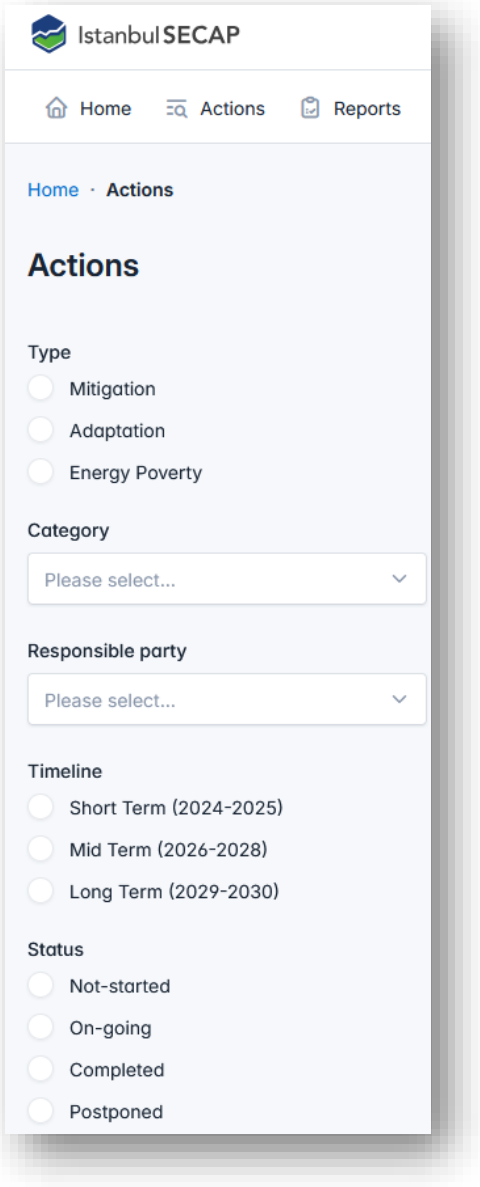
ALL IMM	ENERGY CONSUMPTION IN 2019 (MWh)	% SHARE	% SHARE IN 40% ENERGY REDUCTION TARGET	REDUCTION AMOUNT IN 2030 ACCORDING TO 40% REDUCTION TARGET (MWh)
İBB DEPT.S	463.194,44	10,93	4,37	185.277,77
İSKİ	1.359.821,96	32,09	12,84	543.928,79
İETT	1.305.962,49	30,82	12,33	522.385,00
İSTANBUL AĞAÇ VE PEYZAJ	10.219,19	0,24	0,10	4.087,67
BELBİM	1.877,90	0,04	0,02	751,16

Example of analyses on energy consumption and emission reductions towards 2030 targets included in Istanbul SECAP



Istanbul SECAP English cover

In order to carry out "action monitoring", which constitutes the final phase of the Istanbul SECAP, an "Istanbul SECAP Monitoring Portal" has been developed within the scope of the project by software developers. Information such as SECAP actions, targets, target years and responsible entities is being entered into this system, which will soon be made available to the public. Through the portal, graphical reporting outputs on the progress of SECAP actions can be generated.



A screenshot from the Istanbul SECAP Monitoring Portal

AWARENESS AND TRAINING ACTIVITIES

Combating climate change is a process that can only succeed not just through urban and industrial transformation, but also by raising social awareness. For this reason, the IMM Climate Change Directorate attaches importance to awareness and training activities that involve all segments of society in the process.

Institutional Capacity Building – Climate Responsibles Information Meeting

On 26 February 2025, an "Information Meeting for Climate Responsibles" on calculating corporate greenhouse gas emission inventories in accordance with the ISO 14064-1 standard was held for climate responsibles from all IMM departments, affiliates and subsidiaries.

Held in two separate sessions, the meeting was attended by approximately 300 Climate Responsibles.

Information meeting for Climate Responsibles on the ISO 14064-1 Corporate Greenhouse Gas Emission Inventory

Meetings, Site Visits and Events

Throughout the year, in addition to participation in various meetings, site visits were carried out and a variety of events were attended.

United Nations Conference of the Parties (COP28)

The Head of the IMM Department of Environmental Protection and Development, Prof. Dr. Ayşen Erdinçler, attended the 28th United Nations Climate Change Conference (COP28), held in Dubai, as an invited speaker. She delivered a presentation on Istanbul's goal of becoming a carbon-neutral and resilient city, its Waste Management Plan and IMM's Integrated Waste Facilities at the panel titled "Waste Management in the Global Stocktake: Harnessing Mitigation Potential from National Strategies to Local Solutions", organised at the "Waste & Resources" pavilion by the International Solid Waste Association (ISWA).

B40 Balkan Cities Network

The B40 Balkan Cities Network is a platform established under the leadership of Istanbul Metropolitan Municipality, with the participation of mayors from 23 cities in 11 countries, to launch a new process of cooperation among Balkan cities. Although Balkan cities share a common geography and cultural values, they lacked a leading network of cooperation in economic, technological and cultural terms; this was the motivation for establishing the B40 network. Through B40, it is planned to develop innovative solutions by facilitating the exchange of technology and experience on common problems and shared goals in member cities, such as the climate crisis, migration, urban poverty, income inequality, local democracy and digital transformation.

Official logo of B40 Balkan Cities Network

The permanent secretariat of the B40 Balkan Cities Network is hosted by Istanbul Metropolitan Municipality, and each year the term presidency is handed over to a different member city. The term presidency for 2024 was held by **Tirana**, the capital of Albania.

In 2025, the term presidency will be assumed by **Sofia**, the capital of Bulgaria; and in 2026 by **Zagreb**, the capital of Croatia.

The B40 Balkan Cities Network was founded in **November 2021** with **23** municipal members; as of **October 2025**, the number of member cities has reached **74**. Of these 74 members, 4 are observer organisations:

- **ICLEI** Local Governments for Sustainability
- Shoqata Per Autonomine Vendore – **Association of Albanian Municipalities**
- **National Association of Municipalities in the Republic of Bulgaria**
- **Union of Municipalities of Türkiye**

Table 1. *B40 Balkan Cities Network Current list of member cities (June 2024)*

Aharnes, GR	Alexandroupolis, GR	Athens, GR	Belgrade, RS	Belitsa, BG
Bijeljina, BiH	Burgas, BG	Çanakkale, TR	Chania, GR	Constanța, RO
Dimitrovgrad, BG	Durrës, AL	Edirne, TR	Fierbinți-Târg, RO	Galați, RO
Gjirokastër, AL	İstanbul, TR	İzmir, TR	Karditsa, GR	Kardzhali, BG
Karlovo, BG	Karnobat, BG	Kilkis, GR	Kisela Voda, MK	Kırklareli, TR
Korçë, AL	Kotor, MN	Laktaši, BiH	Larissa, GR	Lefkada, GR
Lezhë, AL	Lushnje, AL	Muğla, TR	Mytilene, GR	Nikšić, MN
Niš, RS	Novo Mesto, SL	Orestiada, GR	Patras, GR	Pella, GR
Plovdiv, BG	Podgorica, MN	Prilep, MK	Pristine, KO	Prizren, KO
Pula, HR	Rakovski, BG	Roskovec, AL	Saraj, MK	Sarajevo, BiH
Saranda, AL	Shkodër, AL	Shumen, BG	Skopje, MK	Sliven, BG
Sofia, BG	Split, HR	Stora Zagora, BG	Tekirdağ, TR	Tetovo, MK
Thessaloniki, GR	Tirana, AL	Troyan, BG	Tuzi, MN	Varna, BG
Veliko Tarnovo, BG	Vratsa, BG	Yambol, BG	Zagreb, HR	Zenica, BiH

The distribution of member cities by country is as follows:

- Bulgaria *(BG)* 17,
- Greece *(GR)* 13,
- Albania *(AL)* 9,
- Türkiye *(TR)* 7,
- North Macedonia *(MK)* 5,
- Montenegro *(MN)* 4,
- Bosnia and Herzegovina *(BiH)* 4,
- Croatia *(HR)* 3,
- Romania *(RO)* 3,

- Serbia *(RS)* 2,
- Kosovo *(KO)* 2
- Slovenia (SL) 1.

As Istanbul Metropolitan Municipality Climate Change Directorate, we carry out our work within the scope of the **"Local Climate Action Working Group"**, which is one of the thematic areas of B40.

In-person meeting of the B40 Balkan Cities Network Thematic Working Groups

One of the most important annual activities of the B40 Balkan Cities Network (B40) is the in-person meetings of its working groups. On **21–22 May 2024**, the in-person meetings of the ***"Local Climate Action"*** and ***"Smart Cities and Digital Transformation"*** working groups were held in Tirana, hosted by the Municipality of Tirana, with the participation of representatives from member cities. The working group meetings, which brought together ***35 participants from 10 cities***, started with a technical visit to the iconic ***Tirana Pyramid***. The first day concluded with a welcome dinner hosted by the Municipality of Tirana on the evening of 21 May 2024.

On the final day of the programme, a panel titled **"Use of Technology to Reduce Climate Change"**, organised by **ICLEI** and the Municipality of Tirana and opened by the B40 Network President and Mayor of Tirana, Mr. Erion Veliaj, was held. At this panel, Tirana, Istanbul and Pristina presented their best practices on carbon mitigation and climate change adaptation. Following the panel, separate workshops were held for the two working groups.

At the in-person meeting of the B40 Local Climate Action Working Group in Tirana, the Head of the IMM Department of Environmental Protection and Development, Prof. Dr. Ayşen Erdinçler, and the Director of the Climate Change Directorate, Ms. Ece Özön, shared their knowledge and experience with the participants.

At the in-person meeting of the ***Smart Cities and Digital Transformation Working Group***, the B40 Best Practices Portal, which was proposed as the 2024 working group project by the Municipality of Tirana, was discussed. In the later part of the in-person meeting, Istanbul Metropolitan Municipality's Department of Information Technologies delivered a detailed presentation on the projects **"İstanbul Senin"** (Istanbul Is Yours), **"Digital Twin"** and **"Bill-On-The-Hook"**.

IMM delegation at the B40 in-person meetings in Tirana

At the in-person meeting of the Local Climate Action Working Group, participants from B40 member cities took part alongside ICLEI. At the meeting, the ICLEI team delivered presentations on information and communication technologies, sustainable energy, sustainable mobility, and water and wastewater. Afterwards, the city of Pristina shared its planned steps and best practice examples in these areas.

In the subsequent workshop session, participants were divided into two groups. The first group focused on ***sustainable mobility and sustainable energy***, while the second group addressed ***information and communication technologies and water and wastewater***.

ISTANBUL'S GREENHOUSE GAS EMISSION INVENTORY

Results of the 2023 City-wide Greenhouse Gas Emissions Inventory for Istanbul and Comparison with Previous Years

In the annual city-wide greenhouse gas emissions inventories for Istanbul, the standard known as the "Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC) – GHG Protocol (Basic version)" is used. This standard was jointly developed by WRI, the C40 Cities Climate Leadership Group and ICLEI – Local Governments for Sustainability.

For 2023, in line with this standard, the total greenhouse gas emissions for Istanbul were calculated as **50,894,956 tCO_{2e}**. The change in city-wide greenhouse gas emissions for Istanbul by year is shown in Chart 2.

Table 2. Details of the 2023 city-wide greenhouse gas emissions inventory

Sector	GHG Emission Amount (tCO_2e)
Stationary Energy	31,960,030
Transportation	15,275,314
Waste	3,659,613
Total GHG Emission Amount	50,894,956 tCO_{2e}
Per Capita GHG Emissions	3.3 tCO_{2e}/person

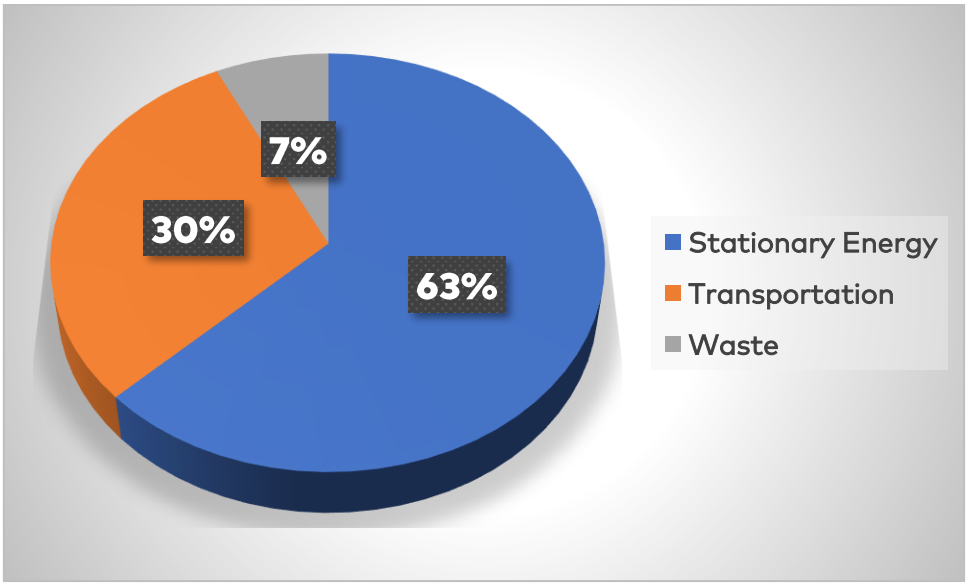


Chart 1. Sectoral distribution of Istanbul's city-wide greenhouse gas emissions for 2023

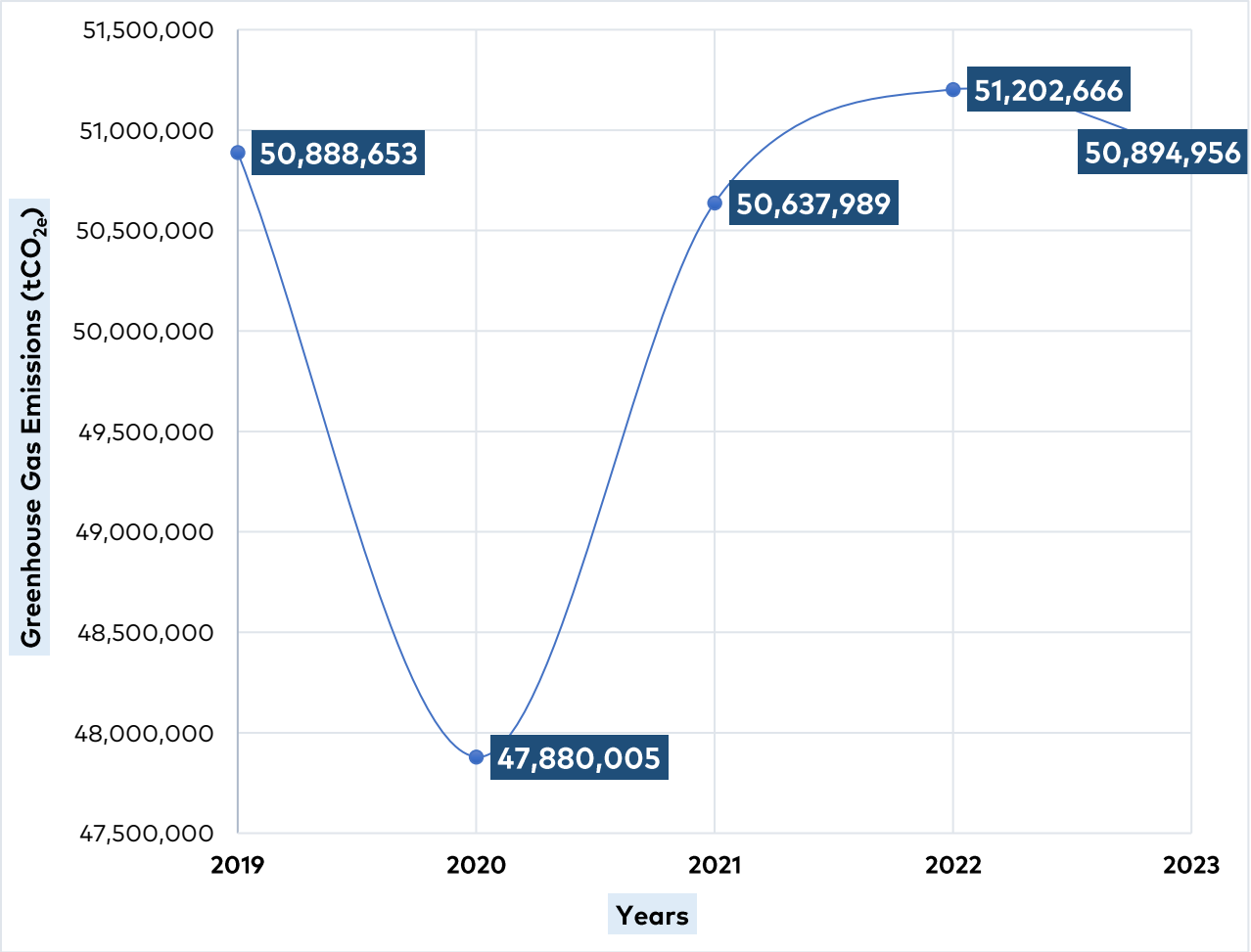


Chart 2. Comparison of total city-wide greenhouse gas emissions for Istanbul between 2019 and 2023

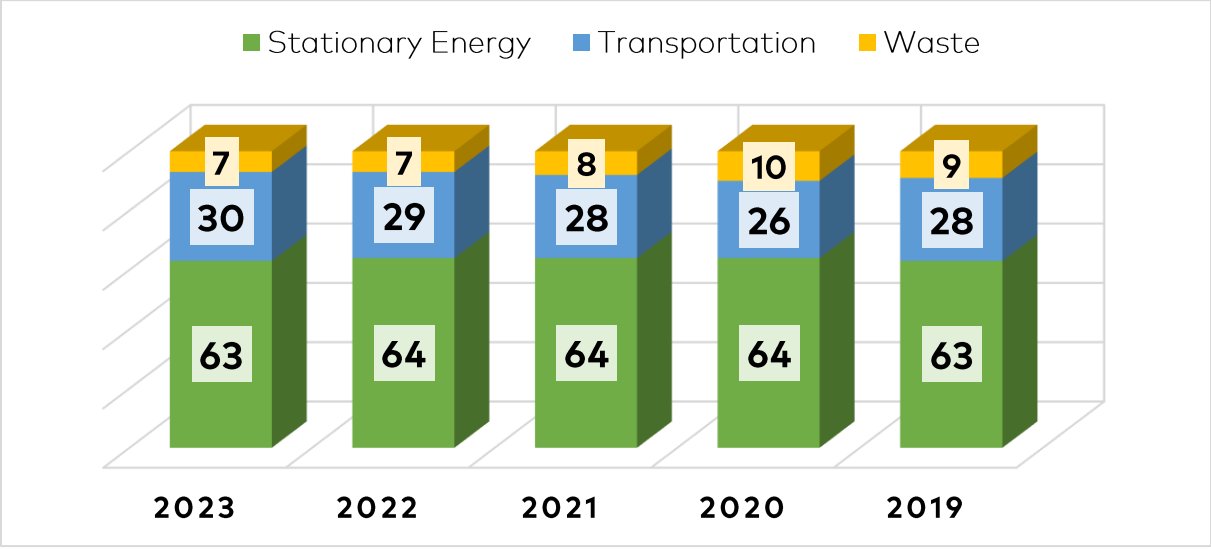


Chart 3. Comparison of the percentage sectoral shares in Istanbul's city-wide greenhouse gas emissions inventory between 2019 and 2023

Reporting of the City-wide Greenhouse Gas Emissions Inventory to CDP

The greenhouse gas emissions inventory calculations, which are carried out regularly every year, are reported to CDP Cities (Carbon Disclosure Project), which is one of the official reporting platforms of the Global Covenant of Mayors (GCoM).

In 2024, Istanbul once again received an **"A"** score as a result of the assessments carried out by the CDP Cities Network under the heading "Work Carried Out by IMM in 2023 that Contributed to Combating Climate Change and the 2023 City-wide Greenhouse Gas Emissions Inventory", which was submitted to the system.

Cities on the A List implement four times as many climate mitigation and adaptation measures as cities that are not on the A List, thus driving climate momentum. In 2024, only **15%** of the cities scored for their climate actions by CDP managed to reach the A score.

To achieve an A score, a city must have a **city-wide greenhouse gas emissions inventory**, publish a **climate action plan**, complete a **climate risk and vulnerability assessment**, **have climate adaptation targets** and disclose these **publicly** via the CDP platform. Istanbul was one of **112** cities that received the top score and was included on the "CDP Cities A List". For 2023 and 2024, Istanbul Metropolitan Municipality was the **only** metropolitan municipality in Türkiye to achieve this success.

Visual showing that Istanbul was included in the CDP A List of Cities for 2023 and 2024

National Climate Champion: Istanbul

WWF's One Planet City Challenge (OPCC) is a global initiative that invites local governments to take the path towards a climate-safe future. Over the past 12 years, nearly 900 municipalities from six continents have participated in the competition.

OPCC award ceremony

In the 2023–2024 cycle of WWF's One Planet City Challenge (OPCC), which is held every two years, more than 350 local governments from 50 countries, including 13 from Türkiye, competed to become global climate leaders. Following the jury evaluation, the three cities from Türkiye that qualified as **"Climate Leaders"** and reached the finals were Antalya, Istanbul and Kadıköy. Among the finalists, Istanbul Metropolitan Municipality was declared the **National Champion** for 2023–2024.

At the award ceremony held on 2 June in Özgürlük Park in Göztepe (Kadıköy), the National Champion Award was presented to Istanbul Metropolitan Municipality team.

Istanbul, the national champion of the OPCC 2023–2024 cycle, at the award ceremony

Cities that are selected as national champions qualify to compete for international championship from every continent of the world.

The 2024 global finalists consist of 22 cities. Following the jury evaluations, it was decided that **Istanbul** would be one of the two cities (the other being Sunderland from the United Kingdom) to share **first place** in the **global** competition.

Istanbul received its **OPCC Global Winner** award at the World Urban Forum (WUF12) held in Egypt, as one of this year's global winners of WWF's One Planet City Challenge (OPCC). Istanbul is the **first city from Türkiye** to win the global title in the OPCC competition.

Istanbul's 2024 OPCC Global Champion award was presented to the Head of the Environmental Protection and Control Department, Prof. Dr. Ayşen ERDİNÇLER

The "2024 OPCC Global Champion: Istanbul" plaque presented to Istanbul by WWF

Institutional Greenhouse Gas Emissions Inventory of Istanbul Metropolitan Municipality

Istanbul Metropolitan Municipality, together with its affiliated administrations and subsidiary companies, carried out its first institutional greenhouse gas emissions inventory based solely on its institutional activities for the base year 2019. The second inventory was calculated for 2022, and the results are presented below.

IMM's corporate greenhouse gas emissions for 2022 were measured as **1,710,795 tCO_{2e}**, and the details are provided in Table 3 and Chart 4.

Table 3. Details of the 2022 IMM Institutional Greenhouse Gas Emissions Inventory

Sector	Total GHG Emission Amount (tCO_2e)
Stationary Energy	916,148
Transportation	726,431
Waste	68,216
Total Emission Amount	1,710,795 tCO_{2e}
Emission Per Capita	19.3 tCO_2e/personnel

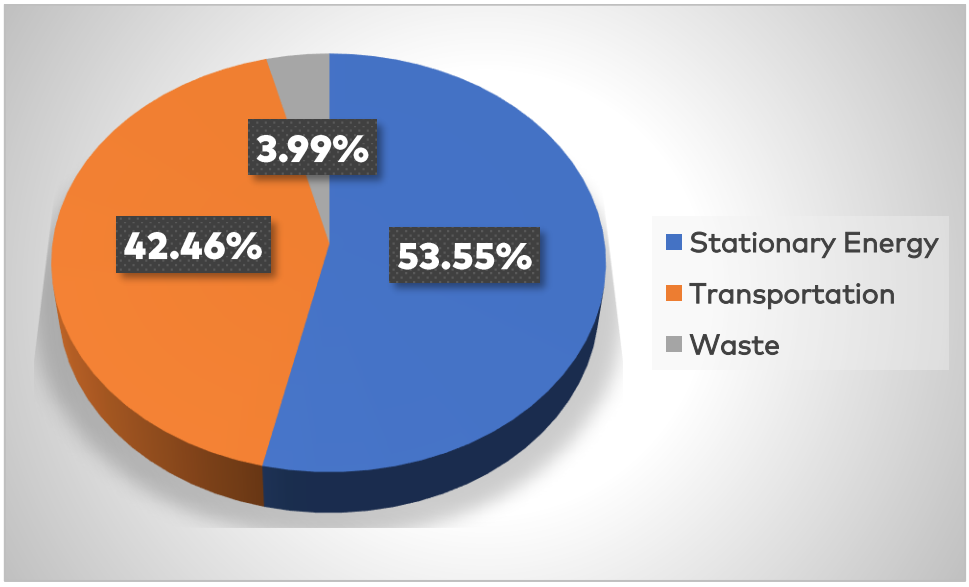


Chart 4. Sectoral distribution of IMM's 2022 base year institutional greenhouse gas emissions inventory

When the corporate greenhouse gas emissions inventory figures for 2022 are examined, it is seen that, as in our city-wide greenhouse gas emissions inventory, the highest level of emissions again comes from stationary energy sources.

MONITORING OF SECTORAL ACTIONS IN ISTANBUL CLIMATE CHANGE ACTION PLAN

Stationary Energy Sector

According to the 2023 Türkiye Greenhouse Gas Emission Inventory Report, Türkiye's total greenhouse gas emissions for the year 2021 were realized as **564.4 Mt CO_{2e}**. Accordingly, the total greenhouse gas emissions, which were **524.00 Mt CO_{2e}** in 2020, increased by **7.7%** compared to the previous year. In 2021, the ***largest*** share of total greenhouse gas emissions in terms of CO_{2e} was ***energy-related emissions*** with **71.3%**, followed by industrial processes and product use with 13.3 percent, agriculture with 12.8 percent, and the waste sector with 2.6 percent (Ministry of Environment, Urbanization and Climate Change, Presidency of Climate Change).

The stationary energy sector, which has the largest share in the Istanbul Greenhouse Gas Emission Inventory, covers the electricity spent and fuel consumed in residential and commercial buildings.

- **Promotion of measures to increase energy efficiency in all buildings**

Installation of Solar Power Plants (SPP)

Istanbul Metropolitan Municipality (IMM) aims to primarily meet its electricity consumption from renewable energy sources; in this context:

It installs Solar Power Plants (SPP) on the roofs of sports facilities, cultural centers, and service buildings, and aims to reduce energy use by conducting energy audit studies in service buildings. Among renewable energy sources, ***"solar energy"*** stands out due to its advantages of easy construction process and low operating/maintenance costs. Energy expenses are reduced by installing solar power plants on idle building roofs.

In this context, ***45 solar energy systems*** were installed in 2024, and 3,800 kWp of energy power was obtained. As IMM, a total of 8,240 kWp of energy power is obtained from 75 SPPs.

Table 4. List of IMM installed solar power plants (Only 2024)

No	SPP Projects	Installed Capacity (kWp)	Construction Year
1	Ataşehir IMM Fire Station Building Roof SPP	28	2024
2	Ataşehir Deniz Gezmiş Park SPP	5	2024
3	Bağcılar Azerbaijan Friendship Park SPP	9	2024
4	Bahçelievler Dr. Enver Ören Cultural Center Roof SPP	180	2024
5	Bakırköy IMM Service Building Roof SPP	313	2024
6	Bakırköy Florya Atatürk Urban Forest SPP	7	2024
7	Beykoz IMM Bozhane Fire Station Building Roof SPP	29	2024
8	Beykoz IMM Çavuşbaşı Fire Station Building Roof SPP	33	2024
9	Büyükçekmece IMM Büyükçekmece Fire Station Building Roof SPP	20	2024
10	Büyükçekmece IMM Kumburgaz Fire Station Building Roof SPP	106	2024
11	Büyükçekmece IMM Mimar Sinan Fire Station Building Roof SPP	23	2024
12	Çekmeköy IMM Ömerli Fire Station Building Roof SPP Phase 1	29	2024
13	Çekmeköy Rahmi Demir City Forest SPP	3	2024
14	Çekmeköy IMM Ömerli Fire Station Building Roof SPP Phase 2	25	2024
15	Esenyurt IMM Kıraç Fire Station Building Roof SPP	28	2024
16	Eyüpsultan Tevfik Aydeniz Sports Complex Roof SPP	78	2024
17	Eyüpsultan Yeşilpınar Indoor Swimming Pool Roof SPP	78	2024
18	Eyüpsultan Edirnekapı Municipal Police Department Building Roof SPP	100	2024
19	Fatih Ali Emiri Cultural Center Roof SPP	85	2024
20	Gaziosmanpaşa Enstitü Istanbul ISMEK Building Center Roof SPP	88	2024
21	Kartal Bülent Ecevit Cultural Center Roof SPP Phase 2	92	2024
22	Kartal IMM Yakacık Fire Station Building Roof SPP	33	2024
23	Kartal Soğanlık Gasilhane (Funeral Home) Building Roof SPP	29	2024
24	Küçükçekmece IMM Fire Station Building Roof SPP	30	2024
25	Küçükçekmece Sefaköy Swimming Pool Roof SPP	118	2024
26	Küçükçekmece Menekşe Stream Park SPP	5	2024

27	Maltepe Orhangazi City Park-Athletics Track Roof SPP	39	2024
28	Maltepe Orhangazi City Park-Above Water Reservoir (1) SPP	70	2024
29	Maltepe Orhangazi City Park-Above Water Reservoir (2) SPP	78	2024
30	Maltepe Orhangazi City Park-Above Water Reservoir (3) SPP	59	2024
31	Maltepe Orhangazi City Park-Administration Building Roof SPP	20	2024
32	Maltepe Orhangazi City Park-Tennis Area Roof SPP	60	2024
33	Sancaktepe Hearing Impaired Building Roof SPP	89	2024
34	Sancaktepe Taha Akgül Sports Complex Roof SPP	118	2024
35	Sancaktepe Safa Hill Park SPP	5	2024
36	Sancaktepe Yenidoğan Swimming Pool Roof SPP	118	2024
37	Sultanbeyli Pond Park SPP	6	2024
38	Sultangazi Cebeci Logistics and Inventory Management Center Roof SPP	484	2024
39	Sultangazi IMM Habipler Fire Station Building Roof SPP	29	2024
40	Sultangazi Cebeci Park SPP	7	2024
41	Şile Cultural Center Roof SPP	157	2024
42	Şile Sports Complex Roof SPP	226	2024
43	Şişli Muhsin Ertuğrul Theatre Roof SPP	196	2024
44	Tuzla Bahar Center Roof SPP	458	2024
45	Üsküdar Büyük Çamlıca Grove SPP	7	2024
Total Installation of 45 SPPs		**3800 kWp**	**2024**

Table 5. *List of IMM installed solar power plants (Pre-2024)*

No	SPP Projects	Installed Capacity (kWp)
1	Ataşehir Kayışdağı IMM Darülaceze Main Campus Roof	48
2	Arnavutköy Cemetery Service and Gasilhane Building Roof	28
3	Avcılar Coastal Toilet Roof	9
4	Bahçelievler Swimming Pool Roof	63
5	Bakırköy IPA Florya City Forest	20
6	Bakırköy Ataköy Social Services Department Building Roof (Phase 2)	211
7	Başakşehir Hoşdere Park Area (National Garden)	120
8	Başakşehir Disabled Center Building Roof (Phase 2)	179
9	Başakşehir IMM Fire Station Building Roof	28

10	Bayrampaşa Hidayet Türkoğlu Sports Complex Roof	169
11	Bayrampaşa EYAM Directorate Administrative Building and Garage Roof	106
12	Çatalca IMM Kaleçi Fire Station Building Roof	64
13	Esenler Kemer Sports Complex Roof	106
14	Esenler IMM Turgut Reis Fire Station Building Roof	28
15	Eyüpsultan IMM Kemerburgaz Fire Station Building Roof	28
16	Fatih Sports Complex Roof	550
17	Fatih Silivrikapı Ice Rink Roof	574
18	Güngören Invitation and Meeting Hall Roof	305
19	Kağıthane Cemal Kamacı Sports Complex Roof	412
20	Kartal Bülent Ecevit Cultural Center Phase 1	57
21	Küçükçekmece Social Facilities (Tracker) Roof	10
22	Pendik Tepeören Animal Shelter	452
23	Silivri Cemetery Service and Gasilhane Building Roof	95
24	Silivri IMM Selimpaşa Fire Station Building Roof	28
25	Sultangazi 75. Yıl Sports Hall Roof	106
26	Sultangazi Hoca Ahmet Yesevi Cultural Center Roof	303
27	Şile Disabled Summer Camp	215
28	Şişli Maçka Earthquake Park Toilet Roof	7
29	Ümraniye Çakmak Swimming Pool Roof	112
30	Zeytinburnu Topkapı Earthquake (Culture) Park Toilet Roof	7
Pre-2024 – Installation of 30 SPPs		**4440 kWp**

Sancaktepe Yenidoğan swimming pool roof SPP

Table 6. List of solar power plants installed in ISKI campuses

No	SPP Projects	Installed Capacity (kWp)	Construction Year
1	ISKOM Rooftop Solar Power Plant	19,8	2019
2	Ikitelli Water Treatment Plant Rooftop Solar Power Plant	1193,1	2019
3	Büyükçekmece Water Treatment Plant Solar Power Plant	679,5	2019 (I) 2020 (II)
4	Kağıthane Service Building Rooftop Solar Power Plant	2528,9	2019 (I) 2024 (II)
5	Ferhatpaşa Pumping Station Rooftop Solar Power Plant	514,6	2020
6	Kartal Pumping Station Rooftop Solar Power Plant	359,6	2020
7	Eşrefbitlis Pumping Station Rooftop Solar Power Plant	257,3	2020
8	Battalgazi Pumping Station Rooftop Solar Power Plant	238,7	2020
9	Esenyalı Pumping Station Rooftop Solar Power Plant	127,1	2020
10	Headquarters Garden Tracker SPP	6,2	2019
11	Şile Water Treatment Rooftop Solar Power Plant	200	2022
12	Dudullu Pumping Station Rooftop Solar Power Plant	1003,2	2024
13	Bahçelievler Pumping Station Rooftop Solar Power Plant	683,1	2024
14	Mahmutbey Pumping Station Rooftop Solar Power Plant	630,3	2024
15	Malkoçoğlu Pumping Station Rooftop Solar Power Plant	732,6	2024
16	Yakuplu Pumping Station Rooftop Solar Power Plant	359,7	2024

Installation of Biomass Energy Plants (BEP)

The Silivri Seymen Biomass Energy Facility, which Istanbul Enerji Inc. opened in September 2020 with an installed capacity of 17 MW, has reached a capacity of 25 MW in December 2020, 37 MW in October 2021, and 44 MW with 31 gas engines as of April 2024 through year-by-year capacity increases.

With its installed capacity of 44 MW, the Seymen Biomass Energy Production Facility has the capacity to meet the **annual electricity needs of 150,000 households**. In addition, it provides an environmental benefit equivalent to the emissions created by **336,000 vehicles** in traffic by performing methane disposal equivalent to **1,310,000 tons of CO_2 emissions** annually.

In 2024, while **238,949 MWh of electricity** was produced at the facility, total electricity production since September 2020 has reached 1 million MWh.

Furthermore, *the Gold Standard certification process*, which has international validity for carbon reduction projects, is planned to be completed soon for the Silivri Seymen Biomass Energy Plant.

Table 7. *Istanbul Enerji Seymen Biomass Energy Plant annual energy productions*

Yıl	Gross Production (MWh)	Net Production (MWh)
2021	219,698	38,186.92
2022	256,934	207,277.28
2023	256,940	241,640.59
2024	240,472	238,949

Photos from Istanbul Enerji Silivri Seymen Biomass Energy Plant

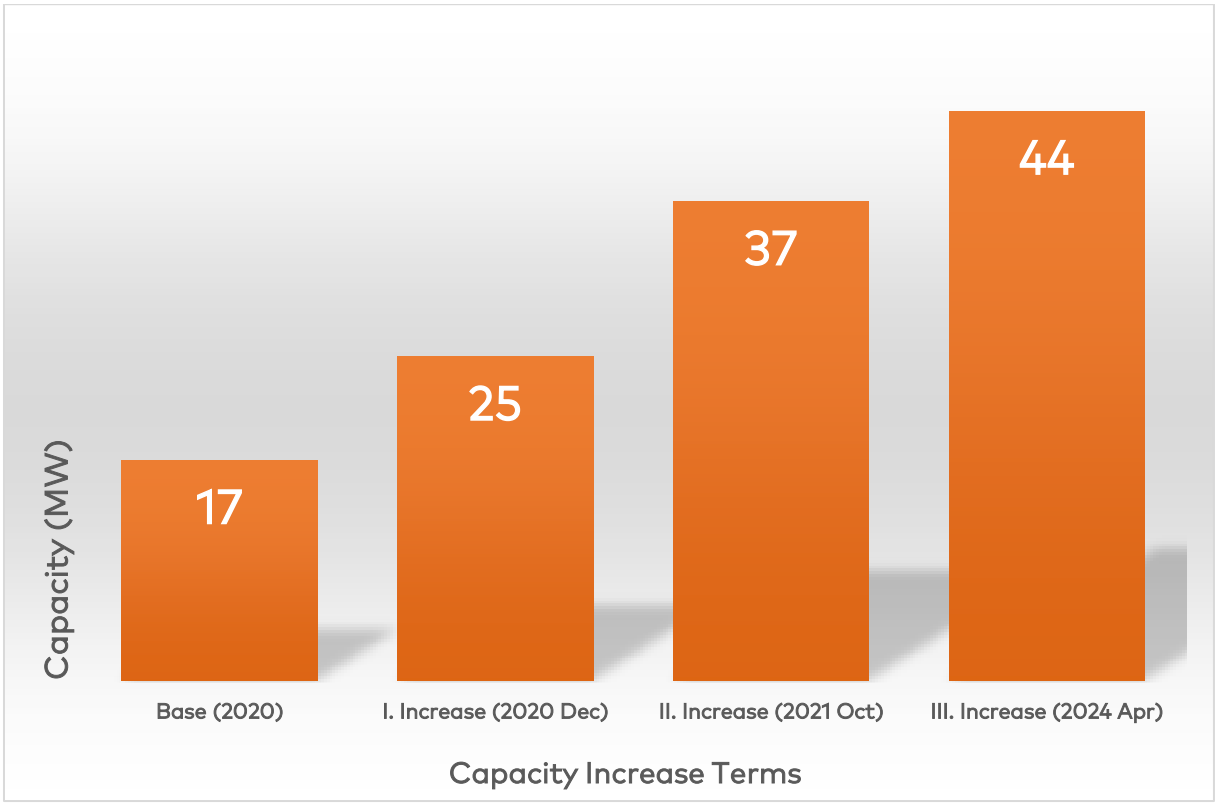


Chart 5. Seymen Biomass Energy Plant - capacity increasings

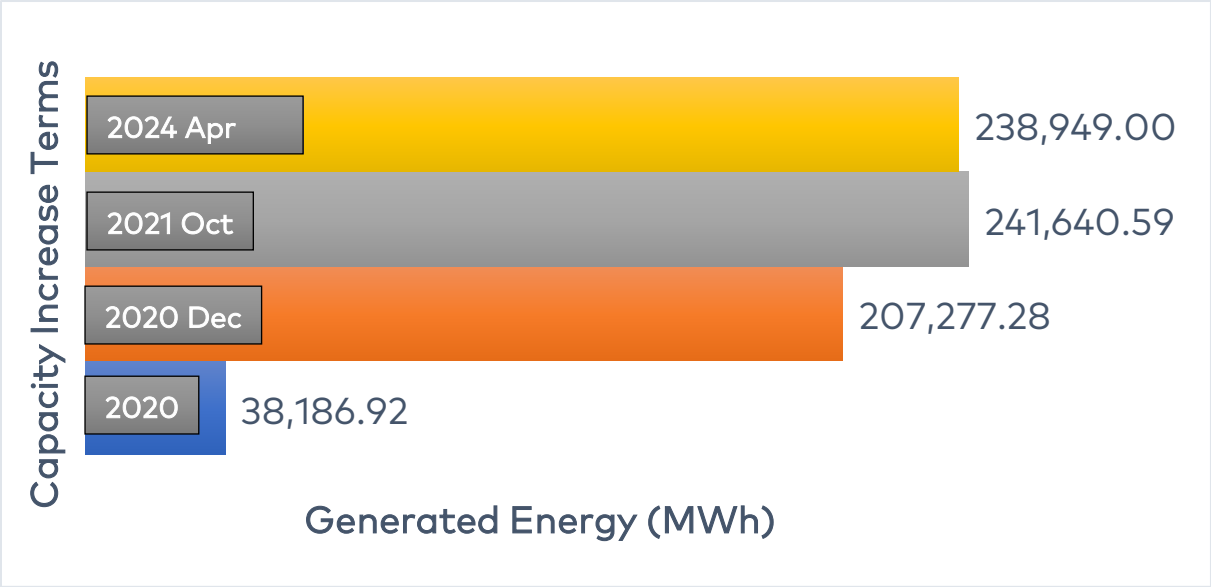


Chart 6. Seymen Biomass Energy Plant - produced energy amount by years (MWh)

Biogas Production in Wastewater Treatment Plants

Following the biological treatment process, excess sludge obtained from the final settling tanks is sent to thickening units, while primary sludge obtained from the primary settling tanks is sent to mechanical thickeners to increase the dry matter content of the sludge. The sludge obtained after the thickening process is directed to anaerobic digesters for stabilisation.

The biogas formed as a result of the biological processes occurring in the sludge digestion tanks is used as ***fuel*** in energy production systems and contributes to meeting the energy needs of the facilities.

Biogas production has been achieved in our three advanced biological wastewater treatment plants. Details are presented in Table 8.

Table 8. *Amounts of biogas produced at ISKI wastewater treatment plants in 2024*

Name of the Facility	Generated Biogas (m^3/year)
Ambarlı Advanced Biological Wastewater Treatment Plant	5,693,513
Ataköy Advanced Biological Wastewater Treatment Plant	2,302,897
Tuzla Advanced Biological Wastewater Treatment Plant	1,173,039
Total	**9,169,449**

As part of energy efficiency initiatives, a total of **27 energy audits** were conducted to reduce energy consumption and identify energy saving potential in buildings and facilities owned by Istanbul Metropolitan Municipality.

As part of the energy audit, the lighting, heating, cooling, pool systems, flue gas analyses, maintenance activities, electrical characteristics, bill analysis, ventilation system, carbon dioxide emission measurement and other elements of the buildings were analysed, and the energy saving opportunities for 27 buildings belonging to Istanbul Metropolitan Municipality were identified.

Table 9. *Istanbul Metropolitan Municipality buildings where energy audits were conducted*

Number	District	Type	Location
1	Fatih	Administrative Building	Saraçhane Main Building
2	Bakırköy	Administrative Building	Bakırköy Service Building
3	Sultangazi	Sport	Cebeci Sports Complex
4	Şişli	Culture	Cemal Reşit Rey Concert Hall
5	Ataşehir	Service	Ataşehir Nursing Home Building
6	Silivri	Sport	Silivri Kapı Ice Rink
7	Bayrampaşa	Sport	Hidayet Türkoğlu Sports Complex
8	Avcılar	Sport	İÜ Avcılar Sports Complex
9	Fatih	Sport	Fatih Sports Complex
10	Sultangazi	Sport	Hamza Yerlikaya Sports Complex
11	Ümraniye	Sport	Çakmak Swimming Pool
12	Bahçelievler	Culture	Yenibosna Dr. Enver Ören Cultural Centre
13	Bahçelievler	Sport	Bahçelievler Hasan Doğan Sports Complex
14	Sultangazi	Culture	Hoca Ahmet Yesevi Cultural Centre
15	Kartal	Culture	Bülent Ecevit Cultural Centre
16	Güngören	Culture	Erdem Beyazıt Cultural Centre
17	Çekmeköy	Sport	Çekmeköy Sports Complex
18	Pendik	Sport	Pendik Kurtköy Sports Complex
19	Eyüpsultan	Administrative Building	Alibeyköy Logistics Support Centre
20	Esenler	Education	ISMEK Davutpaşa Pastry and Baking Training Centre
21	Şişli	Culture	Muhsin Ertuğrul Theatre Stage
22	Esenler	Sport	Hakkı Başar Sports Complex
23	Küçükçekmece	Sport	Halkalı Swimming Pool
24	Beyoğlu	Administrative Building	Kasımpaşa Service Building
25	Küçükçekmece	Sport	Sefaköy Swimming Pool
26	Eyüp	Sport	Yeşilpınar Swimming Pool

27	Kartal	Administrative Building	Kartal Service Building

Apart from Istanbul Metropolitan Municipality buildings, energy audits have been carried out in the buildings and facilities of affiliated companies, other public institutions and the private sector, with the consultancy of Istanbul Energy. Details on this subject are shared in Table 10.

Table 10. Other buildings where energy audits were conducted

Number	District	Public/Private	Type	Location
1	Bağcılar	Public	Factory	ISFALT Mahmutbey
2	Sultangazi	Public	Factory	ISFALT Habibler
3	Ümraniye	Public	Factory	ISFALT Ümraniye
4	Tuzla	Public	Factory	ISFALT Aydınlı
5	Ataşehir	Public	Garage	IETT Anadolu Garage
6	Avcılar	Public	Garage	IETT Avcılar Garage
7	Sarıyer	Public	Garage	IETT Ayazağa Garage
8	Beylikdüzü	Public	Garage	IETT Beylikdüzü Garage
9	Eyüpsultan	Public	Garage	IETT Edirnekapı Garage
10	Esenler	Public	Service Building	IETT Esenler Building
11	Beyoğlu	Public	Service Building	IETT Gümüşsuyu Building
12	Kadıköy	Public	Garage	IETT Hasanpaşa Garage
13	Küçükçekmece	Public	Garage	IETT İkitelli Garage
14	Kağıthane	Public	Garage	IETT Kağıthane Garage
15	Beyoğlu	Public	Service Building	IETT Karaköy Building
16	Kartal	Public	Garage	IETT Kartal Garage
17	Pendik	Public	Garage	IETT Kurtköy Garage
18	Beyoğlu	Public	Service Building	IETT Metrohan Building
19	Sancaktepe	Public	Garage	IETT Sancaktepe Garage
20	Sancaktepe	Public	Garage	IETT Sarıgazi Garage
21	Beykoz	Public	Garage	IETT Şahinkaya Garage
22	Fatih	Public	Garage	IETT Topkapı Garage
23	Kartal	Public	Garage	IETT Yunus Garage
24	Şişli	Public	Service Building	Muhsin Ertuğrul Theatre Stage

25	Şişli	Public	Service Building	ISTAC Head Office Building
26	Eyüpsultan	Public	Factory	ISTAC Wastewater Treatment Plant for Leachate
27	Eyüpsultan	Public	Factory	ISTAC Composting Plant
28	Eyüpsultan	Public	Factory	ISTAC Sterilisation Facility
29	Eyüpsultan	Public	Factory	ISTAC Medical Waste Incineration Plant
30	Esenler	Public	Service Building	ISTON Head Office Building
31	Tuzla	Public	Factory	ISTON Tuzla Factory
32	Arnavutköy	Public	Factory	ISTON Hadımköy Factory
33	Eyüpsultan	Public	Service Building	IGDAS Head Office Building
34	Avcılar	Public	Factory	IGDAS Ambarlı EUAS Campus
35	Esenyurt	Public	Factory	IGDAS Esenyurt Rms-4 Campus
36	Esenyurt	Public	Factory	IGDAS Esenyurt Rms-1 2 3 Campus
37	Pendik	Public	Factory	IGDAS Pendik Dolayoba Rms Station Campus
38	Sultangazi	Public	Service Building	IGDAS Sultangazi Service Building Campus
39	Fatih	Public	Sports Complex	Fatih Sports Complex (Report Update)
40	Bayrampaşa	Public	Sports Complex	Hidayet Türkoğlu Sports Complex (Report Update)
41	Şişli	Public	Factory	ISTAC

According to Article 7/–(2) of the 'Regulation on Increasing Efficiency in the Use of Energy Resources and Energy' published in the Official Gazette on 25 January 2020; Public buildings, commercial and service buildings, electricity generation facilities, and industrial enterprises that are required to appoint an energy manager, as well as organised industrial zones and industrial enterprises that are required to establish an energy management unit, shall establish and certify the 'TS EN ISO 50001 Energy Management System'. The relevant institutions, organisations, and businesses are responsible for keeping the energy management system up to date.

During the year, the ISO 50001 Energy Management System was established for 24 Istanbul Metropolitan Municipality buildings and 54 ISKI buildings/facilities with a usage area of 10,000 m² or an annual energy consumption of 250 Tonnes of Oil Equivalent (TOE) within the scope of the regulation. External audit and certification were conducted by an organisation accredited by TURKAK for audit and certification.

As a result of the external audit, **24 Istanbul Metropolitan Municipality buildings** received the **ISO 50001 Energy Management System** certificate.

Table 11. Istanbul Metropolitan Municipality buildings that have obtained ISO 50001:2018 Energy Management System certification

Number	District	Building Type	Location
1	Bakırköy	Administrative Building	Bakırköy Service Building
2	Eyüpsultan	Administrative Building	Alibeyköy Logistics Support Centre
3	Sultangazi	Sport	Cebeci Sports Complex
4	Şişli	Culture	Cemal Reşit Rey Concert Hall
5	Ataşehir	Service	Ataşehir Nursing Home Building
6	Bahçelievler	Culture	Yenibosna Dr. Enver Ören Cultural Centre
7	Eyüpsultan	Sport	Yeşilpınar Swimming Pool
8	Sultangazi	Sport	Hamza Yerlikaya Sports Complex
9	Bayrampaşa	Sport	Hidayet Türkoğlu Sports Complex
10	Sultangazi	Culture	Hoca Ahmet Yesevi Cultural Centre
11	Beyoğlu	Administrative Building	Kasımpaşa Service Building
12	Küçükçekmece	Sport	Halkalı Swimming Pool
13	Fatih	Administrative Building	Saraçhane Main Building
14	Fatih	Sport	Silivrikapı Ice Rink
15	Şişli	Culture	Cemal Reşit Rey Concert Hall
16	Güngören	Culture	Erdem Beyazıt Cultural Centre
17	Fatih	Sport	Fatih Sports Complex
18	Kartal	Culture	Bülent Ecevit Cultural Centre
19	Kartal	Sport	Hasan Doğan Sports Complex
20	Pendik	Sport	Pendik Kurtköy Sports Complex
21	Ümraniye	Sport	Çakmak Swimming Pool
22	Çekmeköy	Sport	Çekmeköy Sports Complex
23	Esenler	Sport	Hakkı Başar Sports Complex
24	Küçükçekmece	Sport	Sefaköy Swimming Pool

Istanbul Metropolitan Municipality (left) and Istanbul Water and Sewerage Administration (right) ISO 50001 Energy Management Certificate

Furthermore, ISO 50001 Energy Management Systems have also been established at IMM subsidiaries ISFALT, ISTON A.S., IGDAS and Istanbul Halk Ekmek A.S.

Table 12. *Istanbul Metropolitan Municipality subsidiary buildings that have obtained ISO 50001:2018 Energy Management System certification*

Number	District	Building Type	Location	Year of Establishment
1	Üsküdar	Administrative Building	ISFALT Head Office Building	2021
2	Bağcılar	Factory	ISFALT Mahmutbey Factory	2021
3	Sultangazi	Factory	ISFALT Sultangazi Factory	2021
4	Ümraniye	Factory	ISFALT Ümraniye Factory	2021
5	Tuzla	Fabrika	ISFALT Aydınlı Factory	2021
6	Esenler	Administrative Building	ISTON Head Office Building	2022
7	Arnavutköy	Factory	ISTON Hadımöy Factory	2022
8	Tuzla	Factory	ISTON Tuzla Factory	2022
9	Eyüpsultan	Administrative Building	IGDAS Provincial Directorate Building	2023
10	Sultangazi	Hizmet	IGDAS Sultangazi Service Building	2023
11	Esenyurt	Industry	IGDAS Esenyurt RMS Station 1-2-3	2023
12	Esenyurt	Industry	IGDAS Esenyurt RMS Station 4	2023

13	Pendik	Industry	IGDAS Pendik Dolayoba RMS Station	2023
14	Avcılar	Industry	IGDAS Ambarlı EUAS RMS Station	2023
15	Eyüpsultan	Factory	Halk Ekmek Edirnekapı Factory	2024
16	Sultangazi	Factory	Halk Ekmek Sultangazi Factory	2024
17	Kartal	Factory	Halk Ekmek Kartal Factory	2024
18	Arnavutköy	Factory	Halk Ekmek Ahmet İsvan Factory	2024

Energy Performance Certificate Studies

The Energy Performance Certificate (EPC) is a tool used to measure and improve a building's energy performance, thereby helping building owners achieve their sustainability goals. The EPC contributes to the promotion of policies and practices aimed at reducing energy consumption by increasing building energy efficiency. EPCs organised under the guidance of Istanbul Energy are presented in Table 13.

Table 13. Buildings with energy performance certificates organised by Istanbul Energy

Number	District	Location	Year of Establishment
1	Bayrampaşa	Hidayet Türkoğlu Sports Complex	2017
2	Fatih	Fatih Sports Complex	2018
3	Pendik	Pendik-Kurtköy Sports Complex	2018
4	Fatih	Silivrikapı Ice Rink	2018
5	Avcılar	Avcılar Sports Complex	2018
6	Bahçelievler	Dr. Enver Ören Cultural Centre	2018
7	Sultangazi	Hoca Ahmet Yesevi Cultural Centre	2018
8	Güngören	Erdem Beyazıt Cultural Centre	2018
9	Şişli	Cemal Reşit Rey Concert Hall	2018
10	Ümraniye	Çakmak Swimming Pool	2018
11	Kadıköy	Istanbul Energy Bostancı Construction Site Building	2018
12	Fatih	Istanbul Energy Yenikapı Petrol Station	2018
13	Üsküdar	Istanbul Energy Selimiye Petrol Station	2018
14	Fatih	IMM Saraçhane Main Service Building	2020
15	Esenler	IMM Davutpaşa ISMEK Building	2021
16	Şişli	IMM Muhsin Ertuğrul Stage	2021
17	Eyüpsultan	ISKI Headquarters Buildings	2020
18	Esenler	ISKI Esenler Branch Directorate	2020

Renewable energy initiatives in buildings continue to be implemented in the sites constructed by KIPTAS.

The Bayrampaşa Urban Transformation Project was designed in line with energy efficiency and sustainability principles and completed in December 2021. ***Solar panels*** installed on the block roofs ensure that the energy consumed is supplied by the sun. In addition to solar panels, the project also features innovative technologies such as ***smart waste collection systems***, ***smart water meters***, ***smart building monitoring*** and ***lighting sensors***, ***smart emergency systems***, and ***electric vehicle and bicycle charging stations***.

Other KIPTAS projects, which are being constructed in line with energy-efficient, sustainable and environmentally friendly principles, include Pendik Arkatlı Evler and Tuzla Aydınlık Evler, Güngören Doğakent Evleri, Bağcılar Kiraz Houses, Eyüpsultan Yeşilpınar Houses, Gaziosmanpaşa and Haliç Urban Transformation Project.

Other Works Done in the Stationary Energy Sector Regarding Climate Change

Energy Efficiency Awareness and Education training has been provided to staff and citizens.

Number of Staff and Students Reached in the 2024-2025 Academic Year: 750 (3rd Quarter of 2025)

Number of Staff and Students Reached in the 2023-2024 Academic Year: 2,060

Number of Staff and Students Reached in the 2022-2023 Academic Year: 800

Number of Staff and Students Reached in the 2021-2022 Academic Year: 1,500

Number of Staff Reached in the 2020-2021 Academic Year: 500

Number of Students Reached in the 2019-2020 Academic Year: 6,300.

Istanbul Yenileniyor Platform

Istanbul Yenileniyor *(A special project name in Turkish meaning "Istanbul is being renewed".)* is an online information and support platform aimed at transforming Istanbul's at-risk housing stock into safe, earthquake-resistant, environmentally friendly buildings. It is a joint venture between Istanbul Metropolitan Municipality subsidiaries KIPTAS, Istanbul İmar A.S. and BIMTAS. This platform aims to assist and guide the process of renovating structures deemed vulnerable to a potential Istanbul earthquake.

Criteria related to the parcel applied for in order for the applications to be evaluated positively in the first stage:

- It must be privately owned,
- These structures must have been built before 1999.

Applications made through the platform by the real estate owner regarding the parcel that meets these criteria are evaluated by KIPTAS. Projects are prepared in areas where 100% agreement is reached and submitted to the IMM Istanbul Urbanism Workshop Directorate. After the projects examined within the scope of the legislation are deemed appropriate, a new building permit is issued and the transformation process begins under the control of KIPTAS.

In areas where the process will be implemented, asbestos analyses of the existing structure are carried out in accordance with the procedures described above. If asbestos is detected, the asbestos removal process is carried out under the supervision of relevant experts to prevent harm to the environment and human health. All documents indicating that the building is ready for demolition are checked, and a demolition permit compliant with the applicable regulations is issued. Following the demolition permit process, the building is demolished in an environmentally sensitive manner and in accordance with the regulations.

The 'Bakırköy İş Bankası Blocks', 'Demircioğlu Apartment Building' and 'Kadıköy Ferah Apartment Building' renovated with the Istanbul Yenileniyor Platform

Istanbul Yenileniyor Platform – Disctrict Municipalities' Protocols

Starting in June 2024, KIPTAS, a subsidiary of the Istanbul Metropolitan Municipality, is signing cooperation protocols within the scope of the Istanbul Yenileniyor platform to ensure that district municipalities play an active role, coordination is provided among stakeholders, district municipalities are supported in establishing their own infrastructure in the field of urban transformation, direct communication with citizens is ensured, and citizens are treated as stakeholders in all processes. The district municipalities that have signed cooperation protocols are:

- Şişli Municipality
- Üsküdar Municipality
- Kartal Municipality
- Küçükçekmece Municipality
- Çatalca Municipality
- Avcılar Municipality
- Bakırköy Municipality
- Ataşehir Municipality
- Tuzla Municipality.

Citizens (residents) from the district municipalities that have signed the protocol who apply and wish to proceed to the tender stage will be able to obtain the required documents (other than the mandatory application authorisation document and application sketch) free of charge, namely the construction direction survey, the drawn zoning status, the title deed extract and the permit project.

Financial Support for Urban Transformation from Istanbul Metropolitan Municipality

Within the scope of Istanbul Yenileniyor, ***low-income citizens*** are provided with **up to 65%** construction support to ensure the transformation of buildings constructed in 1999 and earlier, in collaboration with KIPTAS.

The initial phase aims to renovate 50,000 high-risk buildings in Istanbul, with Istanbul Metropolitan Municipality covering up to 65% of the construction costs. Low-income citizens who wish to renovate their homes but lack the financial means will be able to do so through the **Urban Transformation Financial Support Package**, created with the aim of preventing potential loss of life in the event of an earthquake in Istanbul.

Energy Sector EU Projects

Neutralpath Project: Research and Innovative Actions to Support the Implementation of the Climate Neutral and Smart Cities Mission

Istanbul Metropolitan Municipality has participated in the Research and Innovation Actions (HORIZON-MISS-2021-CIT-02) Call for Proposals under the European Commission's Horizon Europe Programme, "Positive Clean Energy Regions (PCED)" [HORIZON-MISS-2021-CIT-02-04], which supports the implementation of the Climate Neutral and Smart Cities Mission, with its "NEUTRALPATH" project proposal.

It is anticipated that the PCEDs designed and implemented with participatory and people-centred principles through the 'NEUTRALPATH' project will significantly contribute to the transition to climate neutrality in cities. The project will contribute to accelerating the process of reaching the emission level targeted for 2030 with cost-effective and feasible solutions.

Within the scope of the European Union NeutralPath project, the establishment of the Istanbul Climate Neutral Laboratory is planned;

- An implementable PCED plan will be developed for the Kadıköy Gazhane area,

- The institutional capacities of stakeholders will be developed, citizens' awareness will be raised, and mutual understanding and commitment will be fostered,

- Support will be provided for the process towards a climate-neutral Istanbul through the Climate City Contract.

In urban transformation projects, Dresden/Germany and Zaragoza/Spain, which have strong experience and attach great importance to the goal of becoming climate-neutral by 2030, will play a role as "Lighthouse Cities" from the design phase to the implementation and evaluation phases. Both cities aim to act as pioneers in this process by establishing Climate Neutral Laboratories, designed as Innovation Centres to encourage faster scaling and replicability at the European Union level, and to ensure the direct participation of the three twin cities (Istanbul/Türkiye, Ghent/Belgium, and Vantaa/Finland) in this process and enabling them to become key actors through their own PCED designs and implementations after the project.

Through its collaboration agreement with the EU's main initiative, the H2020 SCC Lighthouse projects, and the 'Cities Mission Platform' focused on knowledge and experience sharing, 'NEUTRALPATH' will make a strong contribution to the European Union's climate goals.

Participating cities aim to increase their capacity through new pilot projects that will support their transition to climate neutrality, as they aim to make their cities more liveable, healthy, resource-efficient and climate neutral by 2030. The Positive and Clean Energy District (PCED) is a crucial element of the urban transformation process, which should be at the heart of cities' decarbonisation strategies, and aims to shorten the timeframe for achieving climate neutrality.

Circular PSP Project: Public Service Platforms for Municipalities that are Circular, Innovative, Adapt to Conditions Quickly and Renew themselves through Pre-Commercial Procurement

Istanbul Metropolitan Municipality applied to the call for "Public Service Platforms for Circular, Innovative, Rapidly Adapting to Conditions and Self-Renewable Municipalities through Pre-Commercialization Procurement (HORIZON-CL4-2022-RESILIENCE-02-01-PCP)" under the title of "European Commission Horizon Europe Program - HORIZON-CL4-2022-RESILIENCE-02-01-PCP" for the project whose details are given below.

The Circular PSP Project, funded by the European Union's Horizon Europe Programme, in which Istanbul Metropolitan Municipality Parks, Gardens and Green Areas Department is participating as a project partner for the ***first time*** in a **leading** role, commenced on 01.01.2023 and will last for ***40 months*** with the participation of ***12 stakeholders from 9 countries***. The total budget for the project is **€9 million**. Istanbul Metropolitan Municipality's share of the Circular PSP project budget is **€5.8 million**.

The CircularPSP Project, which will last a total of 40 months, is a PCP (Pre-Commercial Procurement) project involving 12 partners from 9 EU member states, Türkiye and the United Kingdom. Within the scope of the project, in which Istanbul

Metropolitan Municipality and TAGES Technology Research and Development Industrial Products Information Technologies Industry and Trade Inc. are participating as partners, An investment of approximately €9 million, of which €5.8 million belongs to Istanbul, will be made to develop green and digital public services in the transition to a circular economy with a shared vision for seven cities representing a population of 45 million: ***Istanbul, Berlin, Sandyford, Maribor, London, Gulmaraes*** and ***Stockholm.***

The project aims to support business processes and flows in order to plan, procure and implement innovative circular economy solutions more quickly and comprehensively across Europe. In this context, the project aims to overcome the following three main needs that require the use of existing and new digital technologies as a public service:

- Digital tools to improve organisational and operational performance
- Data analytics using taxonomies for information and data exchange in the circular economy
- Eliminating language barriers and creating knowledge across the EU

In line with the requirements of cities, suppliers are expected to produce solutions in the following areas using innovative existing and new digital technologies, according to frameworks determined by the cities themselves:

- Scalable platforms for city and SME users
- Circular economy data analytics using EU classification, artificial intelligence with open-linked data
- Natural language processing (NLP) to overcome language barriers across the EU

The envisaged solutions are aimed at all European authorities, including cities, ministries and agencies. The project will increase the circular economy supply volume, expand commercialisation opportunities for green digital companies, and pave the way for EU leadership in the circular economy.

The following activities are planned to be carried out by Istanbul Metropolitan Municipality (IMM) within the scope of the project:

- Making IMM buildings energy-efficient, implementing a green certification system for buildings, (YES-TR) application for buildings and implementation and monitoring of energy efficiency policies with energy consumption data,
- Focusing on data management in the water cycle; producing solutions to problems related to ensuring sustainable water management in all areas in response to emerging issues and using valuable resources found in unused and waste water that are recovered for sustainable resource efficiency,
- Integrating and implementing ISO 50001 Standards into buildings in the Turkish public sector, and in this context, keeping an up-to-date list of electronic and energy-using goods. The aim is to implement the proposed solutions.

Procure Project: Procurement of Innovative Solutions for 100% Renewable Energy Use in Buildings

Supported under the European Commission's H2020 PCP call and implemented in Türkiye through a partnership between Istanbul Metropolitan Municipality and Özyeğin University, the 'Procurement of Innovative Solutions for 100% Renewable Energy Use in Buildings' project is part of the 'Climate Resilient Future' initiative. Climate Resilient Future continues under the heading 'Safe, Clean and Efficient Energy" with 9 partners from 7 countries (Slovenia, Spain, Germany, Portugal, Israel, Türkiye, Italy). Within the scope of the project, it is aimed to meet the energy needs of existing ***public buildings*** selected from 6 different cities, including Istanbul, with 100% ***renewable energy*** by applying innovative technologies and original solutions.

Istanbul Metropolitan Municipality, one of the project partners, has selected the **ISMEK Baking and Pastry School building** located in Esenler-Davutpaşa for the project. Currently in the final phase of the Procure Project, innovative solution packages have been developed for the ISMEK Baking and Pastry School building to increase energy efficiency and effectiveness within 2024. The aim is to establish a renewable energy system infrastructure for the ISMEK building and to produce improvement solutions for the building's mechanical, electrical and lighting systems.

In the Procure project so far:

- ✓ Changes have been made to the building's mechanical systems, and the installation work for the VRF system related to the HVAC system has been completed.
- ✓ The steel structure construction for the installation of photovoltaic panels for the solar energy system on the ISMEK building roof and terrace has been completed***. 316 Solar Energy System (SES) PV panels, 4 inverters and 1 resistance meter system*** have been installed on the building's roof and terrace. The necessary connection permits and approval process for commissioning the Solar Energy System (SPPs) are pending. In addition, the installation work for the ***Building Management System (BMS)*** for the ISMEK building is ongoing. With the BMS, the building's electricity production and consumption, mechanical and lighting systems will be monitored and analysed. As the BMS work is being carried out remotely, VPN requests have been made to access the institution. In addition, it has been decided to use the remaining budget allocated to the IMM for the ISMEK building from EU funds to completely renovate the building's lighting system.

The Procure project will monitor the building's energy performance for approximately six months after the entire system is installed by 31 May 2025, followed by a

maintenance and repair period of approximately two years after the project's completion.

During the monitoring process of the IMM ISMEK building, the consumption of the heating, cooling and lighting systems in the building and the energy produced by the SPP system will be tracked. This will allow for a comparison between the energy produced and the building's energy consumption, as well as monitoring the energy performance and efficiency provided to the building by the installed electrical and mechanical systems.

Other Application Projects in the Energy Sector

Smart Automation System: SCADA Operation

Istanbul Metropolitan Municipality has areas of responsibility in many areas throughout Istanbul. Information is required on the characteristics, locations, physical conditions, affiliated units, numbers, etc. of these areas. Under the responsibility of the Energy Management and Lighting Directorate, we remotely manage environmental and architectural lighting areas *(parks, gardens, green spaces, cemeteries, metrobus lines, metro entrances and exits, mosques, towers, fountains, monuments, etc.)* and the maintenance and repair of generators, compensation panels, transformers, elevators, escalators, disabled platforms, and renewable energy systems, etc., are remotely managed from a single centre using the ***SCADA Smart Automation System***.

With the SCADA system, lighting areas are monitored remotely to identify where lighting faults occur and which lights are not working, ensuring that lighting areas are kept in continuous working order. With the developed lighting scenarios, the lighting system can be controlled remotely or the lighting level can be adjusted on specific days, at specific times and in specific locations, ensuring energy savings and sustainability through the efficient and effective use of energy.

With the SCADA System, faults can be observed instantly, enabling faster intervention and increasing citizen satisfaction.

Locations monitored with the SCADA System:

- Parks (153 locations) (5429 poles) (7527 luminaires)
- Architectural Lighting (4 locations)
- Elevators (107)
- Escalators (42)
- Transformers (42)
- Renewable Energy Production Systems (52 GES)

- Underpasses and Overpasses (39)
- Compensation (227)
- Generator (1)

Conversion of Lighting Areas to LED

LED conversion work is continuing on the outdoor lighting systems in the parks, underpasses, overpasses and municipal service buildings within our area of responsibility. In existing parks, work is being carried out to convert conventional lighting products to LED, starting with the most frequently used areas. Newly constructed parks are being designed and implemented using LED luminaires. These works have reduced light pollution and decreased energy consumption, thereby lowering utility bills. Furthermore, within the scope of the SCADA system, monitoring applications are being implemented using controllable drivers within the luminaires, and lighting scenarios are being realised with LED lighting products.

The lighting fixtures in the neighbourhoods within the jurisdiction of Istanbul Metropolitan Municipality are being converted to LED, both to save energy and to integrate them into the automation system. In this context, the conversion of lighting fixtures in neighbourhoods to LED has reached **80% as of 2024**.

Waste Sector

In accordance with the Metropolitan Municipality Law No. 5216, the recovery and disposal of all mixed waste collected by district municipalities in Istanbul and brought to transfer stations is carried out at facilities operated by Istanbul Metropolitan Municipality.

The waste characterisation for Istanbul for 2023 is shown in Figure 7.

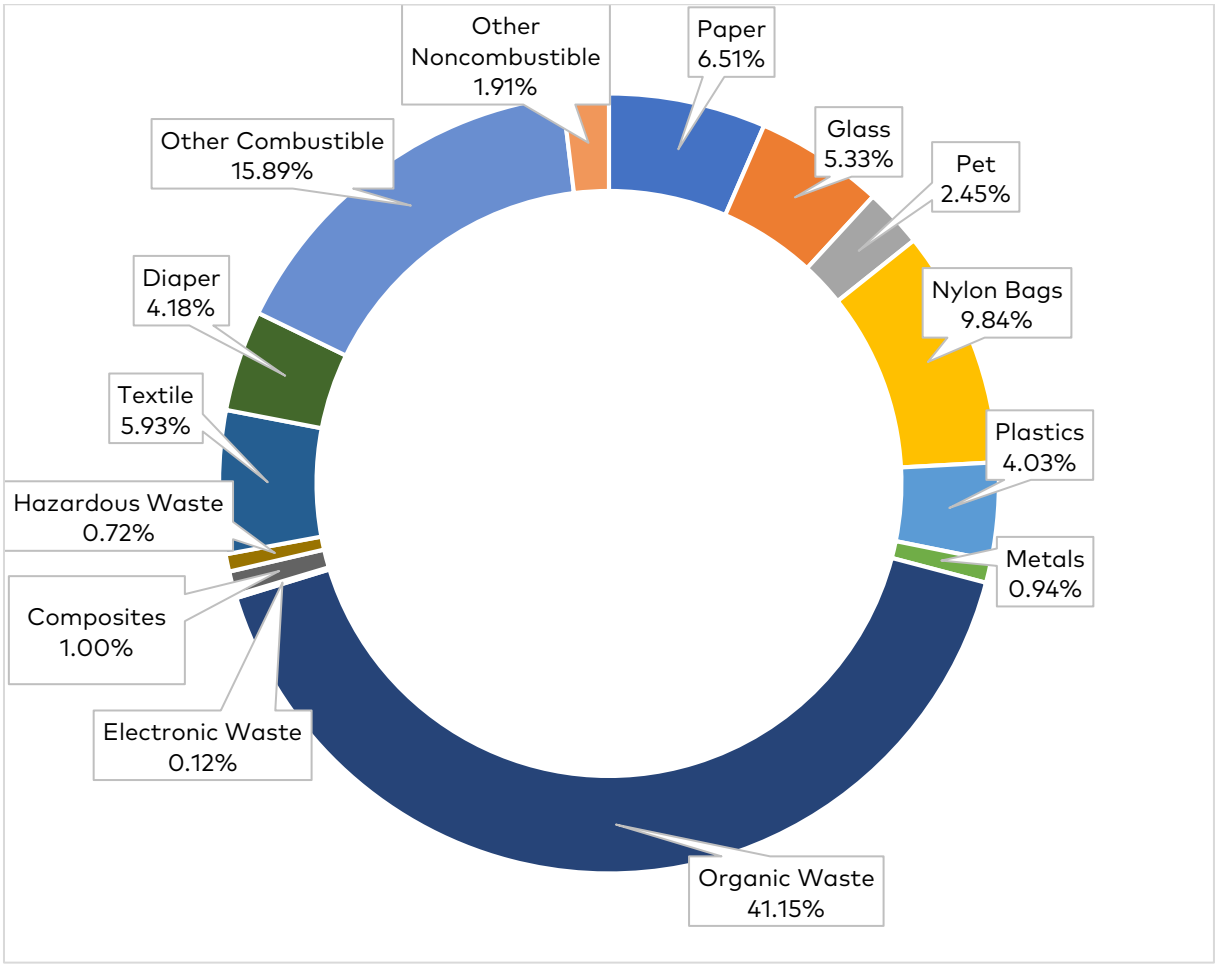


Chart 7. Istanbul's 2023 waste characterisation graph

The total amount of waste delivered to Recovery Facilities in 2024 is **1,799,138 tonnes**, and the waste processing rate at Recovery Facilities during the year is **26%**. Detailed numerical data on recycling facilities is provided in Table 11. Waste not sent to recycling facilities is disposed of in landfills located in Anatolia and Europe.

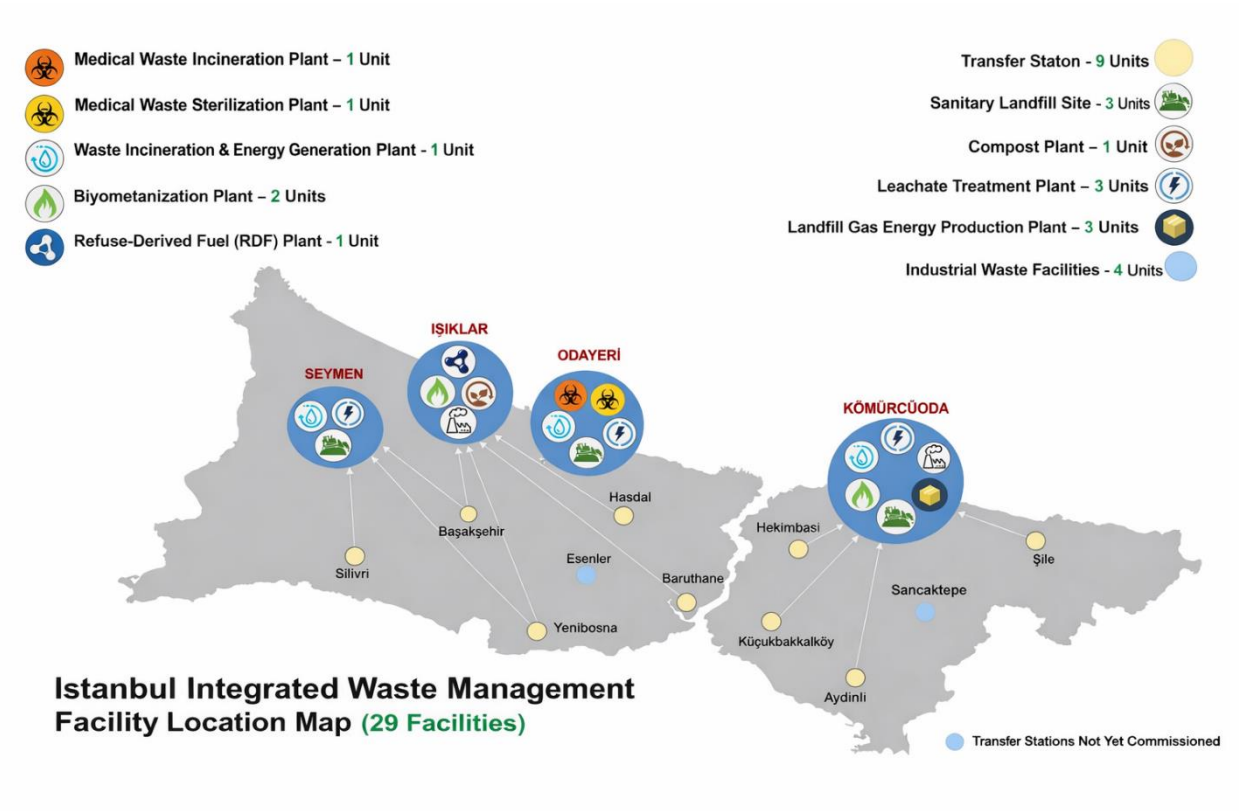
The total amount of waste sent to Landfills in 2024 was determined to be **5,945,723 tonnes**, and **74%** of waste management was carried out using the landfill method. Detailed numerical data on the waste sent to landfills is provided in Table 14.

Table 14. Amounts of waste delivered to recovery facilities

Facility	Daily Waste Amount (t)	Annual Waste Amount (t)
Kemerburgaz Recycling and Composting Facility	424	155,147
Kemerburgaz Biomethanisation Facility	43	15,774
Kömürcüoda Biomethanisation Facility	904	330,998
Waste Incineration and Energy Production Facility	3,041	1,112,918
Refuse-Derived Fuel (RDF) Facility	504	184,301

Table 15. Amounts of waste brought to landfills

Landfills	Daily Waste Amount (t)	Annual Waste Amount (t)
Asian Side Landfill	7,252	2,654,211
European Side Landfill	8,993	3,291,512



IMM Integrated Waste Management Points – Map

The Istanbul Climate Change Action Plan outlines the prioritised actions to reduce greenhouse gas emissions from the waste sector and the progress made on these actions, as detailed below.

- **Developing programmes to reduce or completely prevent the disposal of any foodstuffs during the processing, use, storage, sale, preparation, cooking and serving of food.**

Within the scope of Zero Waste Awareness activities, training and awareness-raising activities are organised for different target groups on waste reduction, waste prevention, reuse, recycling and recovery.

According to waste characterisation, **41.15%** of municipal waste is ***biodegradable (organic) waste***. Accordingly, one of the important issues in waste reduction and recovery is the management of biodegradable waste.

Until 2021, packaging waste was collected separately at source by district municipalities, but biodegradable waste could not be collected separately and was therefore brought to solid waste facilities together with other waste.

As of 2021, biodegradable waste generated by hospitals, universities, hotels, restaurants, social facilities, and public institution canteens, which are major producers of biodegradable waste outside households in Istanbul, has begun to be collected separately by Istanbul Metropolitan Municipality under protocols signed with district municipalities. The collected biodegradable waste is processed at the *Kemerburgaz Biomethanisation Facility*, which began operations in 2021, and **electricity** is generated from the biogas produced after anaerobic digestion.

- **Capturing landfill gas from solid waste disposal sites and using it for electricity, heating or transport fuel to prevent direct methane emissions into the atmosphere**

With integrated waste management in Istanbul, electricity production sufficient to meet the energy needs of **2.6 million people** is achieved at Landfill Gas Energy Production (LFG) Plants, Biomethanisation Plants, and Waste Incineration and Energy Production Plants located in landfill sites, contributing to renewable energy production.

Gases formed from solid waste at landfill sites are collected using an active collection system, with the help of specially installed pipes. Energy production from landfill gas ensures that uncontrolled gases are disposed of without harming the environment and also reduces the risk of explosion.

There are **three LFG plants** with an active installed capacity of **23 MW** at the Odayeri Landfill Site, **55.2 MW** at the Kömürcüoda Landfill Site, and **44 MW** at the Seymen Landfill Site.

In 2021, the Kemerburgaz Waste Incineration and Energy Production Facility, the **only** facility in Türkiye where mixed municipal waste is incinerated, was commissioned in the European side of Istanbul. The facility processes an average of **3,000 tonnes** of household waste per day, which is disposed of directly by thermal methods (incineration), generating **85 MWh** of electrical energy from the heat of combustion. The electricity produced at the facility is equivalent to the electricity needs of approximately **1.4 million people**, and the facility **reduces CO_2 emissions by 1.38 million tonnes** annually. This amount is equivalent to removing **700,000 vehicles** from traffic per year, or in other words, it provides a reduction equivalent to the greenhouse gas emission reduction provided by **850,000 trees**, playing an important role in reducing Istanbul's carbon footprint.

As a result, waste-to-energy plants have an electricity production capacity equivalent to the energy needs of approximately **3.5 million people** per year and reduce emissions by **3 million tonnes of CO_{2e}**.

- **Optimisation of waste collection operations (routes of waste collection vehicles, waste collection times) to reduce environmental impacts and total greenhouse gas emissions**

In Istanbul, the process from separate collection of waste at source to its delivery to solid waste transfer stations is carried out by 39 district municipalities. Waste arriving at solid waste transfer stations is then transferred to the management of Istanbul Metropolitan Municipality. Waste brought to transfer stations is transferred from district municipalities' waste collection vehicles to larger trucks and transported to recycling facilities and landfill sites.

Transfer stations reduce the number of vehicle trips and traffic load, thereby reducing **fuel-related CO_2 emissions**.

In addition to the existing transfer stations, the Başakşehir and Hasdal Transfer Stations were put into operation in Europe in 2022. This has optimised the waste collection routes of district municipalities and reduced waiting times at transfer stations.

- **The action of removing discarded materials from solid waste landfill sites through recovery and conversion into new products**

In 2019, with Horizon support, the **Pop Machina** project was launched to evaluate and recover institutional waste from Istanbul Metropolitan Municipality buildings and facilities as part of the 'Zero Waste' initiative, reduce the amount of waste sent to disposal facilities, and support advanced recycling business ideas in the city. Within this scope, the ***Circular Works Workshop*** was established in 2021.

Thanks to the Circular Works Workshop, institutional waste is recycled and converted into reusable materials without being sent directly to landfills. At the same time, the workshop organises training and events on converting recyclable waste such as wood and plastic into products and designs, with the aim of raising public awareness on zero waste and advanced recycling.

Other Activities

BELTUR A.S. Zero Waste Activities and Responsible Restaurant Movement

Beltur A.S., an affiliate company of Istanbul Metropolitan Municipality, joined the ***'Responsible Restaurant Movement'*** in 2024 to prevent food waste and support the circular economy model. This project is based on the principle of separating food waste generated in restaurants and cafes on site and sending it for recycling, and obtaining value-added products (organic fertiliser and animal feed) from this waste. The climate change mitigation and adaptation activities carried out by Beltur A.S. in 2024 are summarised below.

BELTUR A.S. - Recycling of Organic Waste and Compost Production

In the pilot Beltur establishments where the project was implemented (Caddebostan Sahil, Suadiye Alan, Şaşkınbakkal and Bostancı Mini), a total of **4,781.11 kg of organic waste** was separately collected at source between August and December 2024. All of this waste (100%) was sent to facilities for compost (organic fertiliser) production and thus recovered.

Table 16. *Amounts of waste collected from BELTUR A.S. branches, members of the Responsible Restaurant Movement, and sent for compost production during the August-December 2024 period*

Point	Aug	Sep	Oct	Nov	Dec	Total (kg)
Beltur Cafe Caddebostan Beach	232.3	313.6	602	524.5	368	**2040.4**
Beltur Cafe Suadiye Alan	112.6	169	255	375.5	257	**1169.1**
Beltur Cafe Şaşkınbakkal	98.31	118.5	396	290.9	275	**1178.71**
Beltur Mini Bostancı Square	41.5	54	119	98.4	80	**392.9**
Total (kg)	**484.71**	**655.1**	**1372**	**1289.3**	**980**	**4781.11**

BELTUR A.S. – Distribution of Recycled Products

Products produced at the end of the recycling process were sent back to Beltur Cafes and distributed to citizens free of charge. In line with this, a total of **443.1 kg of organic fertiliser** and **177.4 kg of animal feed** were delivered to Beltur outlets in 2024. This practice prevented waste from going to regular storage areas and created a circular system.

Table 17. Quantities of products delivered to BELTUR Cafes

Point	Total Animal Feed (unit)	Total Fertiliser (unit)
Beltur Feshane	55	44
Beltur Cafe Caddebostan Beach	441	353
Beltur Cafe Suadiye Beach	426	360
Beltur Cafe Şaşkınbakkal Beach	426	360
Beltur Mini Bostancı Area	426	360
Total	**1774**	**1477**

BELTUR A.S. – Other Waste Management Activities

Beltur A.S. has also taken significant steps in managing other types of waste within the scope of the project:

Vegetable Waste Oil

Between June and December 2024, **940 kg of vegetable waste oil** was collected from BELTUR facilities and sent to licensed facilities for ***biodiesel production***, thereby preventing the pollution of water resources.

Table 18. Quantities of vegetable waste oil collected from BELTUR A.S. branches (members of the Responsible Restaurant Movement) and sent to licensed facilities for biodiesel production

Point	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total (kg)
Beltur Cafe Caddebostan Beach	0	130	100	0	0	140	0	**370**
Beltur Cafe Suadiye Alan	0	0	100	0	80	90	85	**355**
Beltur Cafe Şaşkınbakkal	0	80	0	75	25	0	35	**215**
Total (kg)	**0**	**210**	**200**	**75**	**105**	**230**	**120**	**940**

Packaging Waste

During the August–December 2024 period, **965 kg of mixed packaging waste** (glass, metal, paper, plastic) was collected from Beltur facilities, recycled, and contributed to the preservation of natural resources.

Table 19. Amounts of mixed packaging waste collected from BELTUR A.S. branches

Point	Aug	Sep	Oct	Nov	Dec	Total (kg)
Beltur Cafe Caddebostan Beach	0	220	0	56	0	**276**
Beltur Cafe Suadiye Alan	0	0	50	93	48	**191**
Beltur Cafe Şaşkınbakkal	60	120	122	0	196	**498**
Total (kg)	**60**	**340**	**172**	**149**	**244**	**965**

In addition, in order to ensure the sustainability of the project and increase staff awareness, a total of 29 hours and 45 minutes of training was given to 65 Beltur personnel in 2024, in line with the Responsible Restaurant Movement targets.

Water and Wastewater Sector

According to United Nations data, more than 2 billion people worldwide live in countries experiencing high water stress. In the list published by the World Resources Institute in 2019, Türkiye was also classified as a high water-stress country.

In Istanbul, water and wastewater management is carried out by the ISKI. According to the data shared by ISKI, Istanbul's total water consumption increased in parallel with the continuously growing urban population, rising by **4%** compared to 2023 and reaching **1 billion 161 million m³** in 2024.

İkitelli Water Treatment Plant

- **Action on supporting wastewater reuse and recovery**

The annual amount of water supplied to the city of Istanbul is **1,161,020,209 m³**, and the annual amount of wastewater treated is **1,657,559,948 m³**.

Given the high population density and high water consumption levels in Istanbul, efficient treatment and recovery of wastewater is of critical importance for sustainable water management.

ISKI continuously improves the city's wastewater treatment capacity using advanced treatment technologies and modern operational methods; and contributes to environmental sustainability through projects that promote the reuse of treated water. Through these activities, ISKI not only ensures the safe discharge of treated

water into the environment, but also aims to supply water for park-irrigation and industrial purposes through recovery processes.

Ambarlı Advanced Biological Wastewater Treatment Plant

At advanced biological wastewater treatment plants, treated wastewater is rendered harmless to the environment and then passed through filtration and ultraviolet processes to make it suitable for reuse. Water reused for park-garden irrigation and industrial applications contributes to both efficient water resource management and cost savings.

The recovery rates of advanced treated wastewater over the years are shown in Chart 8. The annual amount of recovered wastewater for 2024 is **31,615,818 m³**.

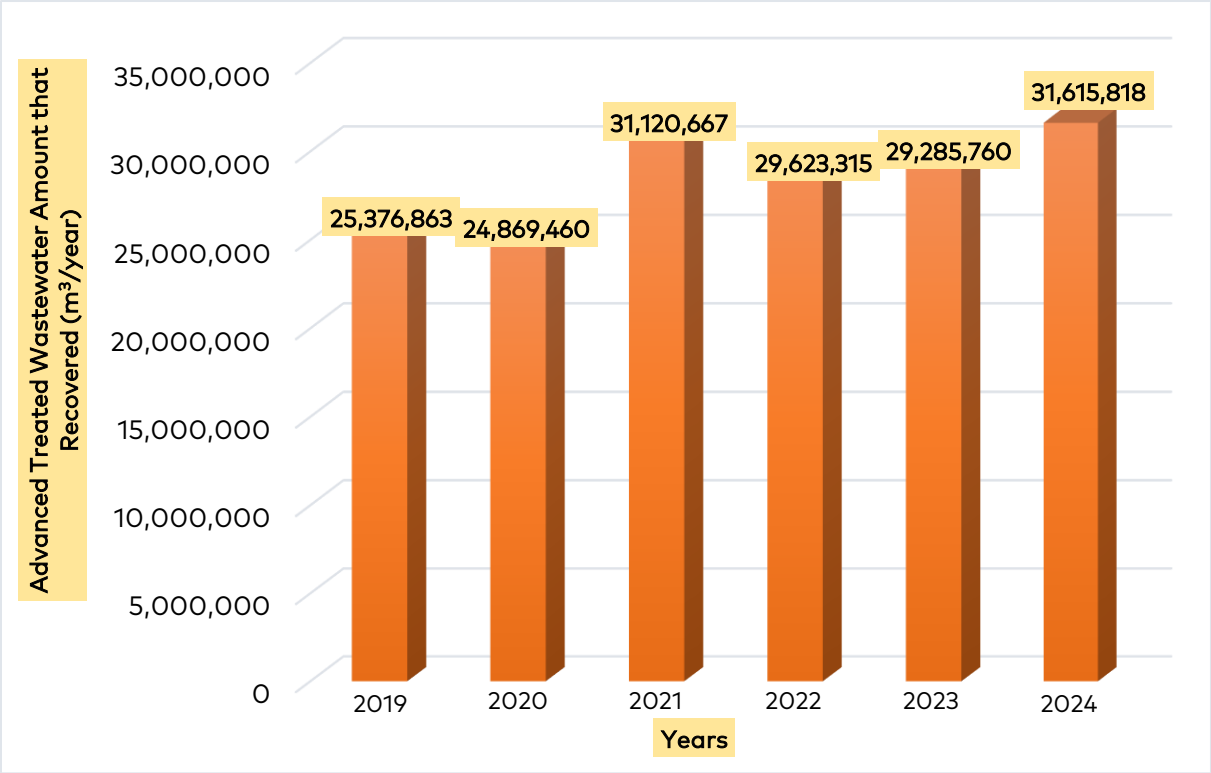


Chart 8. Change in recovery amounts of advanced treated wastewater over the years

- **Action on managing transmission lines and drinking water networks with smart systems**

The Istanbul Water Control and Automation Center (ISKOM), which provides central coordination and control of the entire water cycle—from extraction and treatment to pumping, distribution to end users, and collection and treatment after becoming wastewater—has been in operation since 2019.

Within this scope, the following smart network applications have been carried out:

- the use of smart meters in isolated sub-zones,
- the establishment and operation of the Drinking Water Information Management System (ISKABIS),
- training on operational critical issues,
- integration of SCADA-supported pressure control with hydraulic modelling, and
- micro-scale water loss analysis studies through isolated sub-networks (DMA).

- **Action on reviewing municipal and building regulations to reduce water use, promote local water reuse and recycling**

According to Article 49 of the ISKI Subscriber Services Tariff and Implementation Regulation, the installation of grey/purple water reservoirs and sanitary systems is mandatory in buildings with a total construction area exceeding **30,000 m²**. During

the building project inspection and approval phase, ISKI separately approves rainwater harvesting cistern projects and grey/purple water reservoir and sanitary system projects. Well water cannot be connected to grey/purple water reservoirs, and grey/purple water usage is free of charge.

In addition, Article 54 of the ISKI Subscriber Services Implementation Directive sets out provisions for greywater use: greywater sources are defined as domestic water originating from showers, bathtubs, and washbasins, while other sources (kitchens, washing machines, dishwashers, etc.) should not be included in greywater harvesting. Recovered greywater is primarily intended for toilet cisterns, urinals, and—if present—cooling tower supply.

- **Action on implementing sustainable rainwater solutions (rain gardens, permeable surfaces, storage, etc.)**

Increasing the number of independent clean water sources and underground rainwater storage solutions separate from the drinking water network is one of the key priorities.

According to Article 51 of the ISKI Subscriber Services Tariff and Implementation Regulation, a regulation was introduced to protect buildings from groundwater and harvest rainwater on parcels larger than **1,000 m²**. As of 01.03.2021, obtaining approval for rainwater harvesting projects became mandatory, and full implementation is targeted for buildings that meet the regulatory conditions.

In relation to rainwater harvesting, amendments made to the Planned Areas Zoning Regulation on 11 July 2021 require that mechanical installation projects for buildings on parcels larger than **2,000 m²** include rainwater collection systems—where rainwater collected from roof surfaces is filtered if necessary, stored in tanks and used for flushing toilet cisterns. ISKI takes this requirement into account in licensing and new connection procedures, and full implementation is targeted under these regulatory conditions.

Water Management Strategies Against Drought and Flood Risks

ISKI carries out studies to predict the impacts of climate change on water resources through drought and flooding, adapt water resources to climate change, and reduce their vulnerability. Within the scope of the Istanbul Drinking Water and Sewerage Master Plan:

• Compilation of past studies on climate change and drought specific to Istanbul,

• Trend analyses,

• Drought severity analyses and risk assessments,

• Identification of potential impacts of climate change and drought on existing and potential drinking water resources

• Identification of action and solution proposals for climate change adaptation and drought mitigation

have been conducted.

Accordingly, the Istanbul Climate Change Action Plan includes prioritized actions and related plans for reducing greenhouse gas emissions originating from the water and wastewater sector.

Other Climate-Related Studies in the Water and Wastewater Sector

Efforts to Reduce Water Loss and Leakage Rates

Rapid increases in water consumption damage ecological balance. Under these conditions, protecting existing water resources and preventing losses during transmission becomes more important. One of the challenges of reducing water loss and leakage in Istanbul, known as the "city of seven hills," is the significant differences in elevation within short distances. These elevation differences necessitate high-pressure systems in water transmission and distribution networks. There are **170 pumping stations** in Istanbul to supply water to higher-altitude settlements.

The "Water Loss and Pressure Management Project" has been implemented to manage the existing system more efficiently. The project aims to create a digital twin of the drinking water distribution system, ensure optimal pressure management, ensure the system can be measured and remotely controlled, deploy DMA (district metered area) zones in the field, and make valve control unmanned through machine learning. Additionally, through hydraulic modelling and water management software, installation of a SCADA system and optimal management via data mining are targeted.

Given the limited availability of potable water and increasing water access and network operation costs in large cities, monitoring and controlling water loss and leakage in drinking water networks has become increasingly important.

The water loss and leakage rate, which was 22.32% in 2019 and 20.68% in 2020, decreased to 20.52% at the end of 2021, 19.45% at the end of 2022, 18.94% in 2023, and **18.63%** in 2024 (Chart 9).

Sustainable management of water resources is critical both environmentally and economically. Preventing water losses and applying effective pressure management are two key components that directly contribute to water and energy efficiency.

Preventing Water Losses: Reducing physical and administrative losses in networks enables more efficient use of existing water resources. Preventing leaks and bursts also reduces the energy spent on treating and transporting water, lowering operating costs and protecting natural resources.

Pressure Management: Controlling network pressure helps prevent failures and bursts in pipelines. Lower pressure levels prevent unnecessary water loss and reduce energy

used for pressurization, thus improving energy efficiency and reducing carbon footprint.

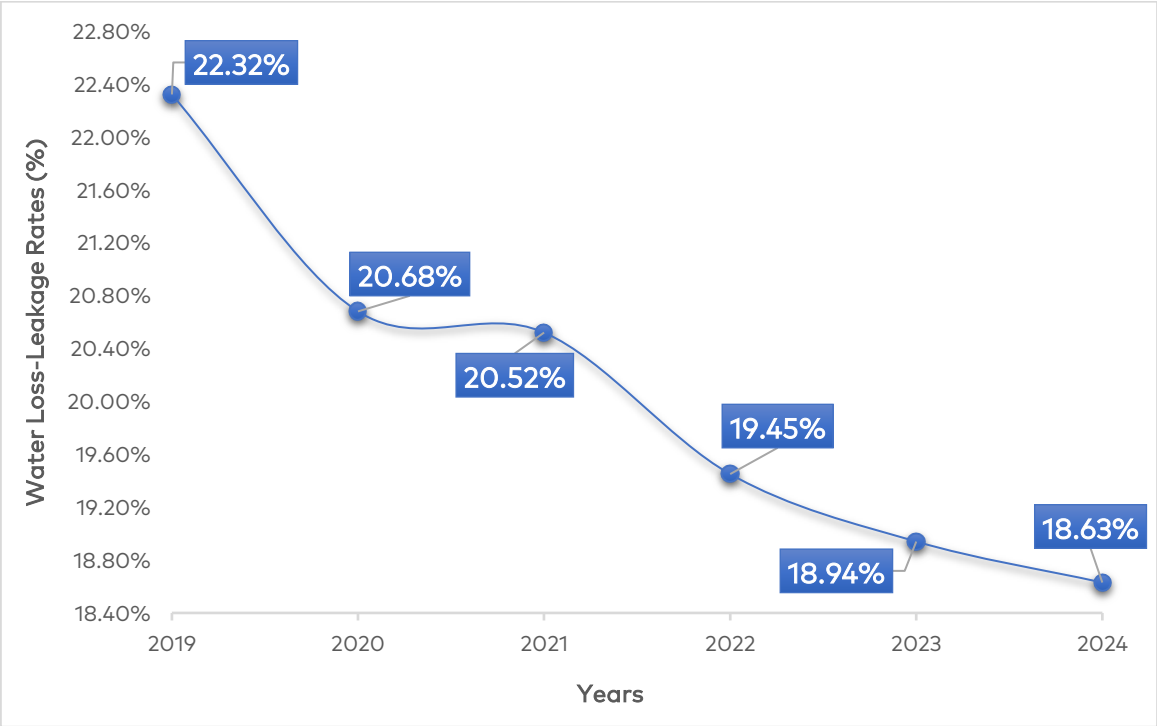
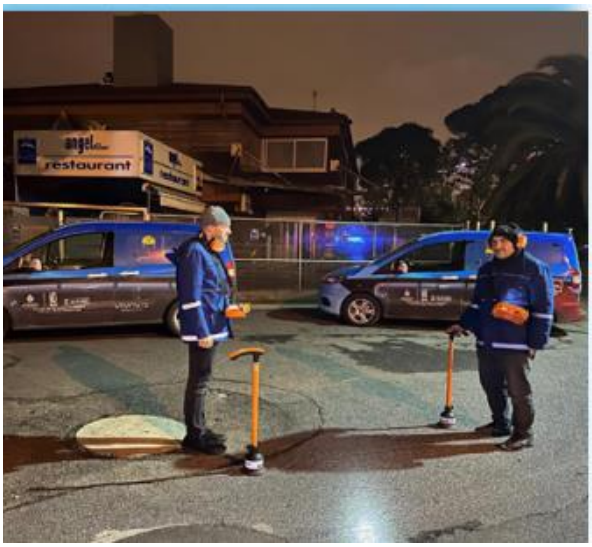


Chart 9. Change in water loss-leakage rates over the years



Efforts on reducing water loss and leakage

Afforestation Activities in Water Basins

A total of **7,972 trees** were planted in 2024 within the strict protection zones (0–300 m) of drinking water basins. Chart 10 and photographs below show the number of trees planted by ISKI between 2019 and 2024.

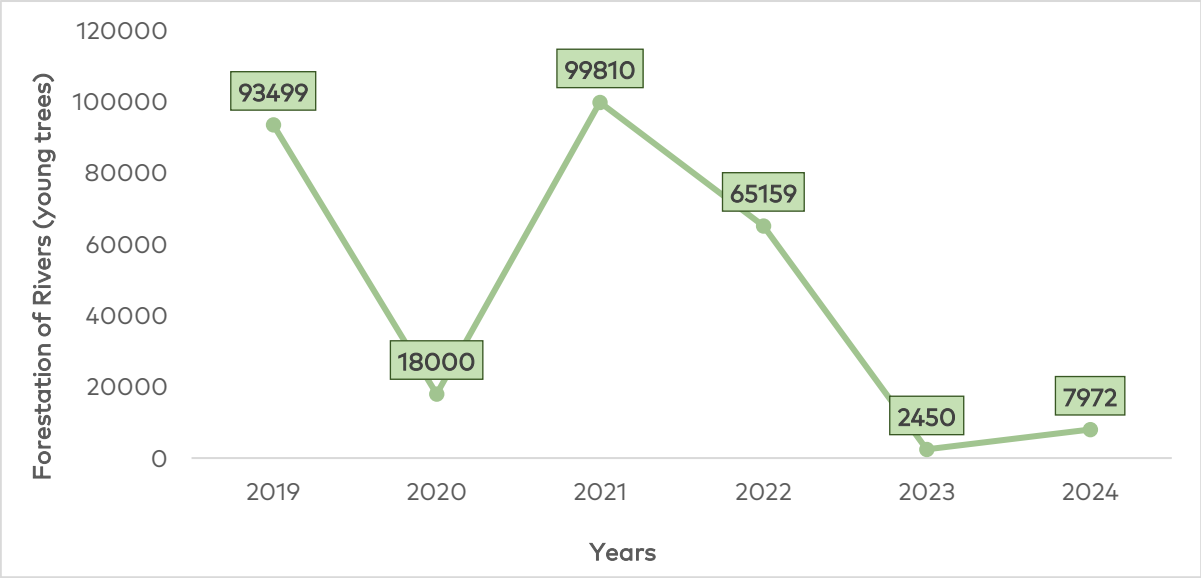


Chart 10. Number of trees planted in drinking water basins by ISKI

Afforestation activities carried out in drinking water basins by ISKI

Establishment of IETT Water Efficiency Unit

In order to ensure climate adaptation in our country, protect water resources in terms of quality and quantity, and contribute to sustainable management; the Istanbul Provincial Directorate of Agriculture and Forestry launched the **"National Water Efficiency Campaign"** on 31 January 2023, with the participation of all social water user groups.

Within IETT, a dedicated team was established to ensure effective implementation, monitoring, information flow and reporting of water efficiency targets. Personnel received training on planned water efficiency efforts. Posters were placed in treatment facilities, garages and administrative buildings—such as restrooms, kitchens and elevators—to raise awareness.

Wastewater Recovery Activities of the IETT

The IETT treats wastewater generated during vehicle maintenance and washing activities in physical and chemical treatment plants and reuses the recovered portion. Wastewater that cannot be recovered is discharged into the network in accordance with the parameters specified in ISKI's "Regulation on the Discharge of Wastewater into Sewerage Systems."

While **58,698 m³** of wastewater was recovered in **2023**, this figure was measured as **45,650 m³** in **2024**.

Analyses of influent and effluent water from vehicle-washing wastewater are performed at garages where treatment facilities operate. Results are reported monthly.

Other Activities

"Istanbul Historical Water Structures" Cultural Tours

ISKI is the custodian of Istanbul's rich water heritage dating back to the Roman, Byzantine and Ottoman periods. Historical water structures such as aqueducts, fountains, dams and maksems not only supplied water but also represented a harmony of architecture, engineering, art and storytelling. ISKI has preserved this heritage through restoration and renovation efforts and, where necessary, repurposed structures for public use.

To increase the number of visits and public awareness of historical water structures, guided tours have been organized to sites under ISKI's responsibility. Through these tours, participants witnessed Istanbul's historic water culture first-hand and developed greater awareness of water conservation.

In 2024, a total of **85 tours** were organized with participants from different groups, attended by **1,144 individuals**.

"Istanbul Historical Water Structures" cultural tours, 2024

"ISKI Memory of Water" Short Film Competition

To raise awareness on water and environmental issues and encourage artistic production, the first short film competition was organized in 2023 for university students, with the aim of increasing environmental awareness through diverse perspectives. The jury—chaired by Ahmet Mümtaz Taylan and including several prominent figures—selected three winning short films.

Following 2023, the second "Memory of Water Short Film Competition" was held in 2024 under the theme "Make Peace with Water for Your Future" and an award ceremony took place.

Preparations for the 3rd Memory of Water Short Film Competition are ongoing.

Second Memory of Water Short Film Competition (ISKI) award ceremony, 2024

ISKI Water Awareness Activities and Collaborations

As part of ISKI activities, workshop sessions were held on 18 November 2024 with 39 students from the "Group Environmentalist" youth group within the Erasmus Program under the "Environment and Climate Change Mitigation" category.

Project workshop "Water is Life, Treat it Right!" under the ISKI–Erasmus Program

Additionally, a Corporate Cooperation Project was initiated with Bahçeşehir University (BAU) to connect the water sector with academia. Through cooperation between ISKI and BAU's CO-OP Center (Career Development Application and

Research Center), the course ***"Urban Water Management and Infrastructure"*** was added as a branded course for BAU Faculty of Engineering and Natural Sciences students in the spring semester of 2023–2024, following its initial implementation in the 2022–2023 academic year. Through collaborations and project-based learning, environmental awareness was enhanced.

Scene from the "Urban Water Management and Infrastructure" course delivered at BAU under ISKI's Institutional Cooperation Projects

22 March – World Water Day Events

Due to rapid population growth, environmental pollution and climate change, water resources are increasingly becoming scarce or polluted. To emphasize water conservation and raise awareness among students regarding responsible water use, a painting competition titled ***"Make Peace with Water for Your Future"*** was organized among middle and high schools across Istanbul as part of 22 March World Water Day events. There were 160 submissions from high school students and 368 from secondary school students.

At the award ceremony held on 22 March 2024 at the Yusuf Ziya ERDEM Conference Hall, 60 selected works were exhibited and published as a book.

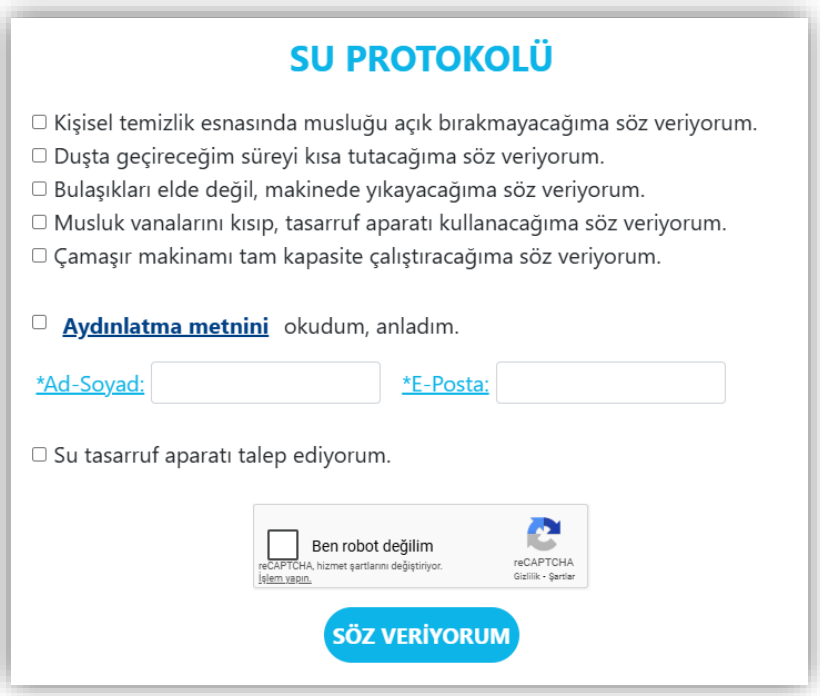
Award ceremony of the "Make Peace with Water for Your Future" painting competition under the 22 March World Water Day

ISKI Water Protocol

ISKI launched the "Water Protocol" in 2024 to reduce water consumption and raise awareness on the matter. Under the Water Saving Social Responsibility Campaign, the Water Protocol reminds residents that water is a limited resource and invites all Istanbul residents to take active roles in saving water. Contribution to the sustainability of water resources can be made by complying with the water saving commitments and suggestions given in the digital environment.

After participating in the Water Protocol, citizens may share their certificate of appreciation on social media to raise public awareness. While completing the Water Protocol on the ISKI website, citizens can calculate their water footprint using the "Water Footprint Calculation Tool" and may request water-saving devices from ISKI. The protocol can be accessed at https://suprotokolu.iski.gov.tr/

"Water Footprint Calculation Tool" available on the ISKI Water Protocol web site



ISKI Water Protocol Form

ISKI – Memory of Water: Istanbul's Historical Water Routes Photography Book

To draw attention from various sectors to water-related issues and strengthen the relationship between water and art, a photography project was carried out in cooperation between ISKI and IFSAD (Istanbul Amateur Photography and Cinema Association) as one of the goals of a project that started in 2019. The visual memory of Istanbul's water, shaped by architectural diversity over centuries, was documented through photography.

Through an agreement with IFSAD, ISKI obtained the right to use archived photographs of historical water structures free of charge. The book includes photos of dams, aqueducts, pools, fountains, water scales and the Istanbul Water Civilizations Museum, photographed by 63 amateur photographers across four seasons. A total of 500 copies of the "Memory of Water – Istanbul Historical Water Routes" photography book were printed.

"Istanbul Historical Water Routes" photography book

ISKI – Water Saving Poster Campaigns

Rapid population growth and prolonged dry periods linked to climate change have led to inevitable increases in water consumption in Istanbul. Increased water use especially during long and dry periods threatens the volume of drinking water resources. In such situations, the most important action is conservation. ISKI frequently organizes awareness campaigns and activities encouraging water conservation.

Awareness-raising posters on water saving prepared by ISKI

Transportation Sector

Istanbul Metropolitan Municipality, with its vision of a 'People-Centred Accessible Istanbul', is implementing an integrated, environmentally friendly transport management system with the goal of becoming a carbon-neutral world city by 2050. According to the 2021 Istanbul Metropolitan Municipality Activity Report, approximately 7.5 million people use public transport in Istanbul everyday.

The length of rail systems, which play a significant role in environmentally friendly integrated transport systems, reached **244.31 kilometres** by 2024. The target is to increase the total length of rail system lines to **622.15 kilometres** by 2029. In this context, thanks to the work carried out so far, Istanbul has become the only city in the world to build *10 metro lines simultaneously*.

Istanbul Sustainable Urban Transport Mobility Plan (Istanbul SUMP), prepared with a vision for a human- and environment-focused, innovative and inclusive transport system for a sustainable and resilient future, was completed at the end of 2021.

Istanbul SUMP covers a range of issues, including the environment, quality of life, social inclusion, accessibility and mobility. Not only is this Türkiye's first Sustainable Urban Mobility Plan, it is also the first time such a plan has been implemented for a city of this size anywhere in the world.

A key objective of the Istanbul SUMP is to establish an environmentally sustainable transport system.

Istanbul SUMP's main theme, ***'Transition to Low Carbon'***, will play an important role in achieving Istanbul's commitment to becoming a carbon-neutral city by 2050. This theme aims to make Istanbul's transport networks environmentally friendly and encourage individuals to adopt sustainable, active and healthy lifestyles.

Istanbul SUMP Phase II Implementation Plan Project, consistent with and building upon the Istanbul SUMP Phase I project, began on 23 June 2023. This project primarily involves preparing pilot projects focused on transport systems, with the aim of reducing long-term air pollution caused by transport and its effects on citizens' health.

Within the scope of Istanbul SUMP Phase II Implementation Plan Project;

- Implementation of a **'Low Emission Zone'** in central areas to increase energy efficiency in urban transport, reduce greenhouse gas emissions from transport, and improve urban air quality.
- Measures to increase the **share of maritime transport** in public transport.
- Reorganising roads to encourage active modes of transport such as **walking and cycling**,
- Conducting research on establishing **'Bus Priority Lanes,'** which are widely used around the world to encourage public transport, and **'Healthy Streets,'** which is a sustainable transport and people-centred approach,
- The aim is to develop roadmaps for establishing urban transport that is **resilient to disasters**, with priority given to the anticipated Istanbul earthquake and climate change-induced floods, as well as to future potential pandemics.

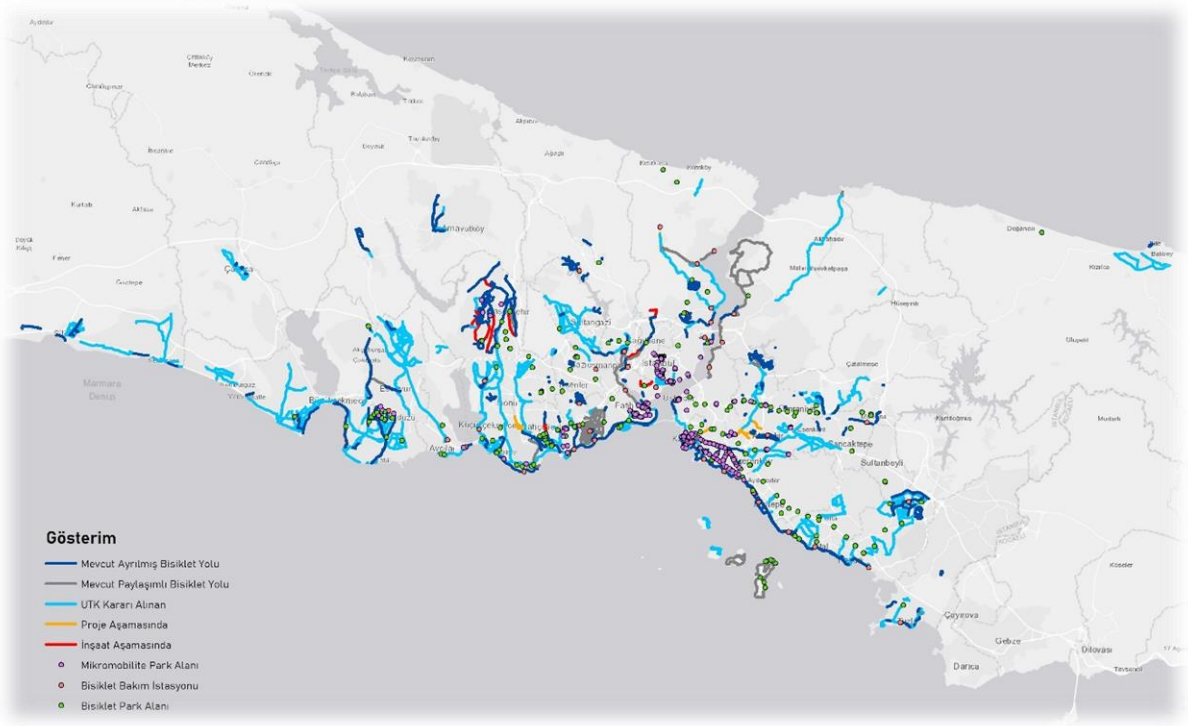
- **The action of purchasing new electric buses to enable all buses to be electric**

IETT provides public transport services using electric vehicles on Büyükada, Heybeliada, Burgazada and Kınalıada.

60 SGMS MASTIFF M4 brand electric taxis (3+1 capacity), 20 Green Car brand taxis (3+1 capacity), 40 Green Car brand buses (13+1 capacity), 60 Cleanvac brand electric taxis (3+1), 60 Karsan brand buses (12+9 passenger capacity), and 10 Pilotcar brand electric taxis (3+1) have been purchased.

- **The action of making existing roads suitable for cyclists and creating new dedicated cycle lanes**

In order to promote cycling throughout Istanbul and increase its accessibility, existing roads are being adapted for cyclists and new dedicated cycle lanes are being created as part of planning and project development work. By the end of 2024, our cycle lane network reached a total length of **531.33 kilometres**.



Current density of dedicated and shared cycle lanes in Istanbul

- **The action of charging for the use of specific areas with high traffic density**

The 'Low Emission Zone' initiative is one of the medium-term projects proposed in the Istanbul Sustainable Urban Mobility Plan (SUMP), the preparations for which were completed between September 2019 and March 2022.

This scheme aims to improve air quality by designating an area where access is restricted for vehicles that contribute to air pollution. In this context, work is ongoing to implement the scheme in the Eminönü area of the Historic Peninsula.

- **The action of increasing Park-and-Ride Points**

In light of the increase in private vehicle journeys resulting from the 2020 pandemic, the aim is to reduce traffic and congestion in public areas and make room for sustainable modes of transport. This objective is to be achieved through the 'Procurement of Services for the Development of the Park and Ride System throughout Istanbul' tender, held on 16 May 2023. The tender seeks to develop urban services centred on the needs of city residents, in line with the objectives, goals and strategies of the **Istanbul Parking Master Plan** and in accordance with the 'Istanbul Sustainable Urban Mobility Plan'. This includes determining the location selection criteria for the Park and Ride System across Istanbul and developing parking demand management applications.

In line with the Parking Master Plan objectives and strategies, which were revised in 2022, Park and Ride areas are being planned to reduce traffic volumes and congestion,

and to encourage private vehicle users to switch to public transport. Work is also being carried out to improve the efficiency of existing areas.

Existing Park and Ride car parks across Istanbul are operated by ISPARK.

In line with the work carried out as part of the project to develop the Park and Ride system across Istanbul, **8,096-capacity Park and Ride points at 10 locations** will continue to operate by the end of 2024.

Çekmeköy metro station Park-and-Ride carpark

In this context, a campaign was launched in August 2023 to reduce private vehicle traffic in the Historic Peninsula. With the first application, vehicle drivers who parked their vehicles in the Yenikapı ISPARK area and paid with their Istanbulkart were provided with **free transport** to the centre of the Historic Peninsula via the newly opened PD1 line.

Following on from the pilot study, the campaign was extended to include the following car parks on 19 March 2024: Feshane Open Car Park, Merter Metro Open Car Park, Kirazlı Metro Open Car Park, Büyükçekmece Metrobüs Side Car Park, Çekmeköy Metro Closed Car Park, Soğanlık Metro Open Car Park, 4. Levent P+D Open Car Park, Dudullu Underground P+D Car Park and Bağcılar City Square Underground Car Park. Drivers who parked their vehicles in these car parks and paid with their Istanbulkart received **discounts of up to 50%.**

As part of this initiative, the pricing policy for the park-and-ride car park will be determined and users will be kept informed through campaigns.

Campaign posters prepared to promote the Park and Ride initiative in Istanbul

Since 2019, Istanbul Metropolitan Municipality has completed the construction of **63** multi-storey underground and above-ground car parks with a total capacity of **21,169** vehicles. Department of Infrastructure & Construction is continuing to construct **25** car parks with a capacity of **8,323** vehicles, and one car park with a capacity of **352** vehicles is currently at the tender stage. Additionally, the Directorates of Infrastructure Projects and the Superstructure Projects are carrying out projects for **23** car parks with a capacity of **7,445** vehicles.

The vehicle capacity of open, closed and on-street car parks operated by ISPARK A.S. was 94,332 in 2019, 101,242 in 2020, 116,440 in 2021, 123,479 in 2022, 123,406 in 2023 and **123,509** in 2024 (Table 20).

Table 20. *Vehicle capacities of parking lots constructed by ISPARK and IMM*

	2019	2020	2021	2022	2023	2024
The capacities of car parks operated by ISPARK	94,332	101,242	116,440	123,479	123,406	123,509
The capacities of the car parks completed by Istanbul Metropolitan Municipality	4,456	3,430	4,708	2,286	2,934	2,607

Table 21. *Current number and capacity of ISPARK car parks at the end of 2024*

Car Park Type	Car Parks (unit)	Capacity (vehicles)
On-Street	339	20,710
Open-Air	358	60,594
Indoor	90	42,505
Total	**787**	**123,509**

Additionally, large-scale planning studies concerning parking areas are being conducted. As part of the 'Master Plan for Parking', which was finalised in 2022, research has been conducted to determine parking requirements across Istanbul using a parking model. The aim is to manage these requirements through policies and actions, and to define parking zones in line with land use and transport plans. The parking problem in Istanbul is therefore being assessed holistically. Efforts to increase parking capacity are ongoing.

Other Studies Conducted in the Transport Sector Regarding Climate Change

Sustainability Initiatives Undertaken by IETT

Environmental Measurements and Analyses Conducted by IETT Under the ISO 14001 Environmental Management System

IETT has established an ISO 14001 Environmental Management System. As part of this work, emissions released into the environment, wastewater quality, waste oils and treatment sludge are analysed periodically in accordance with relevant legal regulations.

Flue gas emission measurements have been taken and reported for heating systems in administrative buildings and garages. These reports show that emissions **meet** the legal requirements.

Calculation and Reporting of Greenhouse Gases by IETT

The greenhouse gas emissions calculation for the four quarters of 2024 was made by evaluating the current data, and IETT's emissions amounted to **432,848.85 tonnes of CO_{2e}**. Based on this value, the CO_2 emissions per passenger kilometre are **0.068 tonnes of CO_{2e}**.

Waste and Energy Recovery/Conservation Initiatives at IETT

- ✓ The annual average of **400,000 kg of waste oil** generated from the maintenance and repair activities of buses registered in the IETT inventory has been **recovered** through refining.

- ✓ In 2024, **2,215,932 kg of waste** generated as a result of IETT activities was sent to disposal and recovery facilities. **The recovery rate** of waste generated as a result of IETT's activities is **99%**, and the disposal rate is 1%.
- ✓ A contribution was made to **saving 749,813.63 kWh of energy** from the **1,167,934 kg of metal waste** delivered to Makine ve Kimya Endüstrisi A.S.
- ✓ Clean electricity was generated from renewable energy sources using the Solar Power Plant (SPP) installed at IETT facilities, **reducing carbon emissions by 72 tonnes of CO2e.**
- ✓ As part of energy efficiency measures, Sarıgazi Garage LED Conversion was completed and put into service.
- ✓ As part of energy efficiency measures, the boiler rooms at Anadolu Garage, Hasanpaşa Garage and Şahinkaya Garage were renovated.
- ✓ As part of energy efficiency measures, air conditioners operating on the metrobus line and in system rooms were replaced with inverter air conditioners.
- ✓ Certification audits for 2024 were conducted to ensure the continued validity of the ISO 50001 Energy Management System certificates.

IETT's Climate Change Awareness Initiatives in the Transport Sector

The Sustainable Mobility Education Centre (SÜHA) Project, completed in June 2023, served as a mini education centre in the schools and squares it visited, providing students, young people, and those who feel young with information on sustainable transport, urban mobility, alternative modes of transport, and pedestrian awareness.

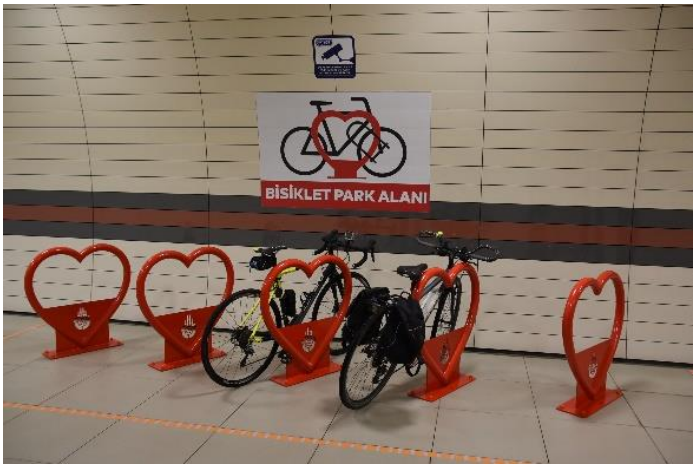
As part of the project, ***an IETT bus was converted into a mobile centre*** featuring experiment kits and visual elements explaining the relationship between public transport and smart cities, energy, the environment, and sustainability.

In 2024, training on energy and environmental management was provided in **50 schools**, reaching **19,555 students**. School visits will continue in 2025 as part of the SÜHA project.

Converted IETT bus under the SÜHA

Works Carried Out Within the Scope of Developing Sustainable Transport and Micromobility

- Within the scope of sustainable transport, a total of **1,287** bicycle racks have been installed in **186** bicycle parking areas



Bicycle racks

- In order to promote the use of micromobility for sustainable transport, a total of **1,424** micromobility parking racks have been made available to citizens across **277** designated parking areas.

Micromobility parking racks

- In order to ensure that bicycles can be serviced and repaired free of charge, there are **60** bicycle maintenance stations in operation across Istanbul.

Bicycle maintenance station

- In order to promote micro-mobility, the Cirpici Bicycle Park, an **indoor bicycle parking area**, has been constructed at the Zeytinburnu public transport interchange in Istanbul.

Indoor bicycle parking area (Cirpici, Zeytinburnu)

- **The Istanbul Bicycle House** organises cycling events and ISBIKE training sessions on the Yenikapı coast.

The Istanbul Bicycle House

Istanbul Pedestrian Stops Study

Istanbul Metropolitan Municipality, in collaboration with WRI Turkey Sustainable Cities, has become a member city of the Partnership for Healthy Cities (PHC), supported by Bloomberg Philanthropies, partnered with the World Health Organisation, and run by Vital Strategies. Within the framework of this partnership, the ***'Pedestrian Stop - Parklet' project***, developed to ensure road safety in urban transport and promote alternatives such as cycling and walking instead of motor vehicles, was deemed suitable by the funding provider "Partnership for Healthy Cities", and Istanbul's first pedestrian stop was opened to the public in June 2022 on Halaskargazi Street in Şişli district. In May 2023, the second Pedestrian Stop was opened on Yıldız Posta Street in Şişli using own resources, and as of 2023, there are two pedestrian stops operating in Istanbul. Citizen requests are being collected via the website http://www.yayaduragi.ibb.istanbul based on variables such as on-street parking, pedestrian density, traffic safety, transport integration, and land use.

Child-Friendly and Safe Streets Programme

Our ongoing efforts to create Child-Friendly Streets in Istanbul aim to change transport behaviour from childhood onwards. Two such projects have been implemented in Yalı Mahallesi in Maltepe and Hürriyet Mahallesi in Büyükçekmece.

The Yalı Neighbourhood Tactical Urbanism Project was launched on 11 October 2021 under the Bernard van Leer Foundation's Urban95 programme, in collaboration with NACTO, Superpool, Istanbul Metropolitan Municipality and Maltepe Municipality. As part of the project, a decision was made to establish Istanbul's first "pedestrian-priority road" with a speed limit of *20 km/h*.

The second phase of the two-stage project was carried out under the TUBITAK Horizon 2020 Programme ERANET project EN-UAC (Urban Accessibility and Connectivity), and a pilot application was conducted in June 2025.

A solution to the pedestrian safety issue in the vicinity of Akçansa Mehmet Akif Ersoy Primary School on Eğitim Street in Büyükçekmece District has been sought, and a street transformation project has been carried out to enable primary school students, who are a disadvantaged group, to walk to school.

The project was implemented under the Marmara Municipalities Union's "Street Transformation Pilot Application Support Programme", in collaboration with the Global Designing Cities Initiative and Superpool. The permanent implementation of the project was completed in September 2024.

Istanbul Metropolitan Municipality has been collaborating with the Partnership for Healthy Cities (PHC) since 2019 to increase road safety and create a walkable Istanbul. Within the scope of this fund, the aim is to develop policies to address accessibility issues, such as the lack of safe, comfortable, and accessible areas and transfer points on students' home-school routes in Istanbul. In this context, the "Safe Primary School Zones Directive", which outlines clear and detailed safety measures based on a data-driven approach to provide safe and walkable roads around primary school areas in Istanbul, has been prepared and entered into force with the UKOME Decision dated 27 February 2025 and numbered 2025/3-17.

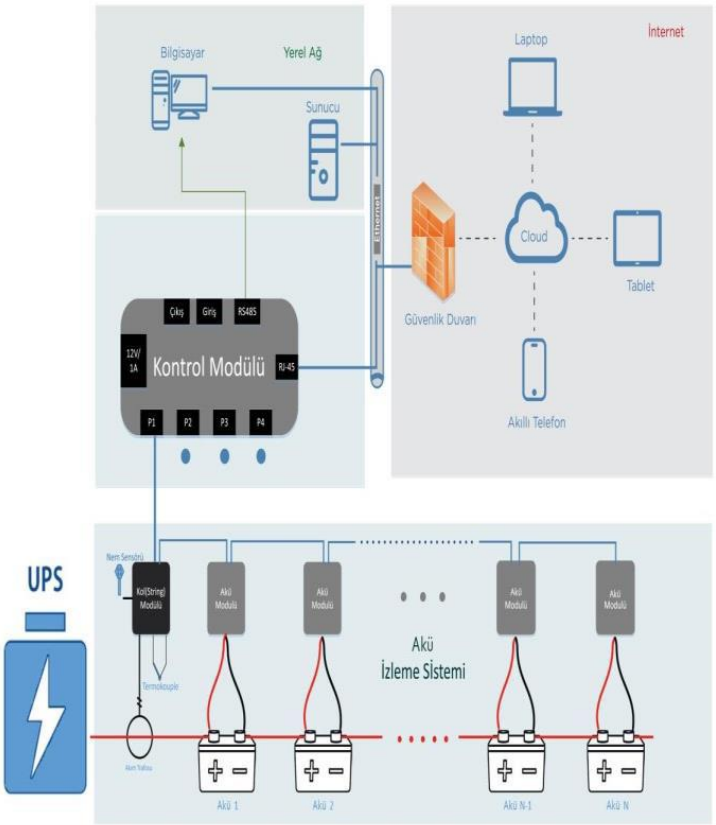
One of the fundamental policies of Istanbul Climate Change Action Plan aimed at achieving the goal of becoming a 'carbon-neutral and climate-resilient city' by 2050 is the Istanbul Sustainable Urban Mobility Plan.

In line with the vision of the Sustainable Urban Mobility Plan, eight schools have been identified and work has begun with the aim of preparing preliminary projects to transform the streets within walking distance of various schools across Istanbul into safe school streets and providing services to meet the needs during the preparation of these projects. Furthermore, work is continuing on designating streets and/or roads as play streets that will include children's play areas on a temporary or permanent basis and preparing preliminary projects in this regard.

Metro Istanbul is undertaking various projects to increase energy efficiency, optimise resource use and improve operational processes through digitalisation. The work carried out throughout 2024 covers a wide range of areas, from energy monitoring and optimisation systems to digital control applications, technical solutions aimed at extending equipment life, and big data and artificial intelligence integration. All these activities have both generated savings in operational processes and contributed to the organisation's carbon reduction targets.

Installation of the M5 Line Energy Monitoring System and Software Integration

The purpose of the activity carried out at 14 stations, including the Üsküdar-Dudullu stations, on the M5 Üsküdar-Samandıra Metro Line is to install analysers on the energy sources that supply CER, internal needs, lighting, ventilation, escalators, and UPS-BCB equipment, and to ensure software integration by introducing the data into the system. This system will enable the Ministry of Energy to generate consumption reports, conduct savings studies, create target reports, verify consumption data, and separate line-based consumption according to load profiles.



Metro Istanbul M5 line energy monitoring system and software

Development of a New Lubrication System Focused on Extending the Service Life of Escalator Chains

In the current brush-type escalator lubrication system, the points that should be lubricated on the step chain links are lubricated indirectly. The oil viscosity used in this model, which causes a decrease in the efficiency ratio, is very high. With the current viscosity, which is susceptible to external dirt accumulation effects, it is difficult for the oil to reach the clogged target points. The project will eliminate such negative situations and provide a more effective model. A patent application has been filed with the Turkish Patent and Trademark Office for this system developed by Metro Istanbul.

M5 Line Escalator Matching Process

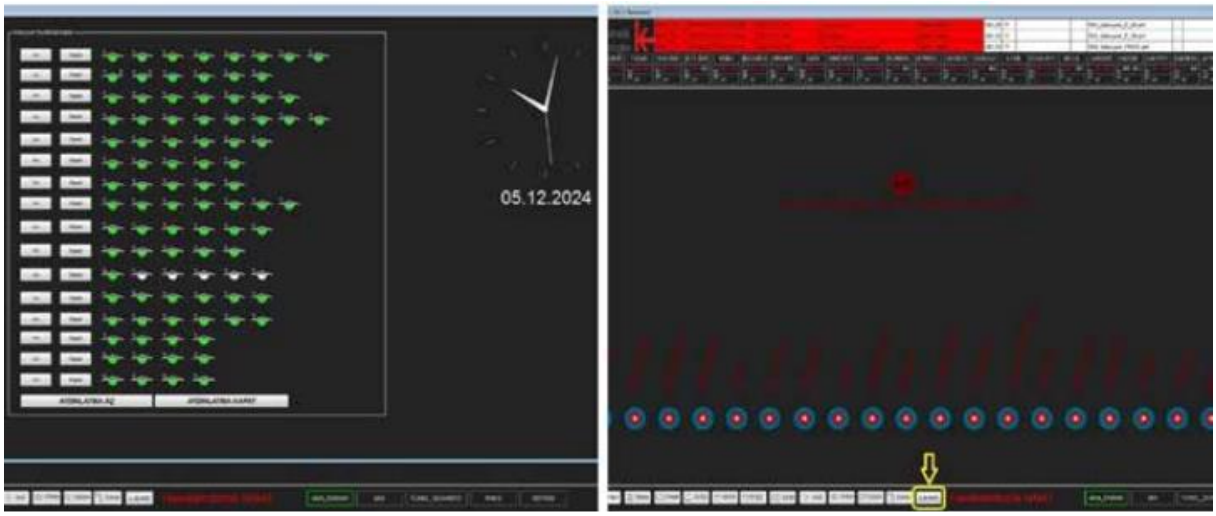
Nine matching operations were performed on the extended stair chains at stations along the M5 Üsküdar-Samandıra Metro Line. These units were put into operation by carrying out chain matching operations, thereby reducing the need for spare chains.

Digital Twin

We have implemented our digital twin project to ensure a seamless transition from construction to operation, maximise operational efficiency, sustain an excellent travel experience by offering proactive solutions, and achieve savings. The three-dimensional modelling of Çırçır Station on our M7 Yıldız-Mahmutbey Metro Line, where we conducted our pilot application, has been completed. Data from SCADA and signalling systems has been integrated into this model. Thanks to the Digital Twin, our stations are managed and analysed on a single plan. We can detect unusual movements in equipment and take preventive action. In the event of a potential malfunction, our maintenance and repair teams can view the malfunction through the system. This allows our teams to arrive at the scene knowing what to do. In this way, we save time, paper, and labour, contributing to our carbon reduction target.

M3 Line Service Optimisation

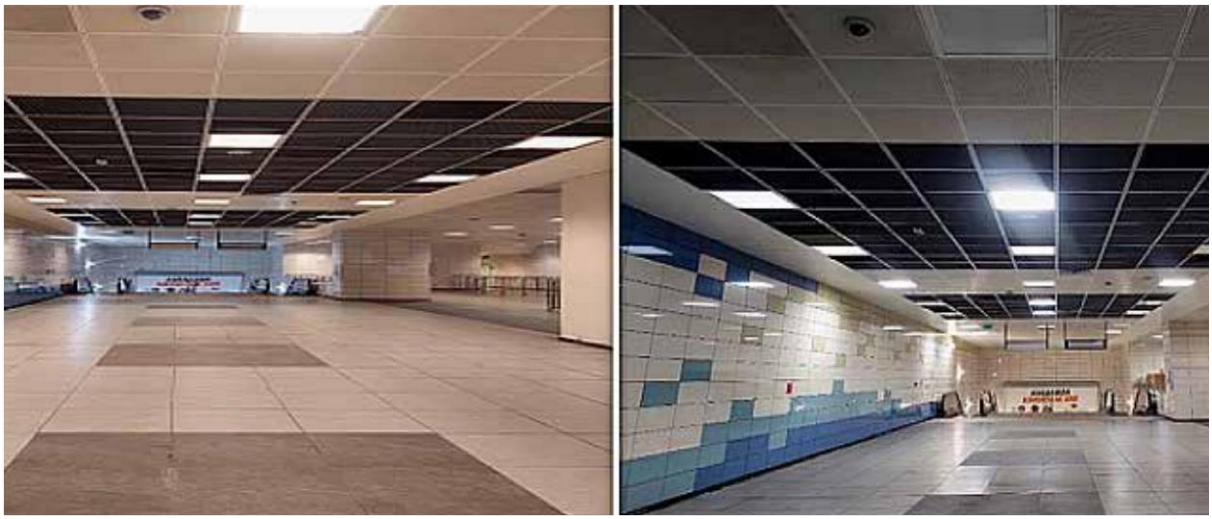
The opening of the third phase of the M3 Bakırköy-Kayaşehir Metro Line has led to an increase in passenger numbers. Following the opening of the new phase, a dual operation structure was implemented to manage the peak hour congestion on the 12-car train services between Kayaşehir Merkez and Bakırköy Sahil stations. Under the new structure, 8 four-car trains began operating between Kayaşehir Merkez and Bakırköy Sahil stations at 11-minute intervals during peak hours. Ring services were established between Kirazlı and Metrokent stations with four-car trains running at 5.5-minute intervals. This optimisation has resulted in energy savings while also increasing passenger satisfaction.



Metro Istanbul M3 line service optimisation software

LED Lighting Conversion

LED technology has replaced fluorescent bulbs in the lighting systems of vehicles operating on the M1, M2, M3, M5, M6, M7, T1 and T4 lines. This has reduced the frequency of faults and lowered energy costs. Automated luminaires that respond to passenger movement have achieved an energy saving of **48%**, and this figure is expected to rise to **70%** with motion-sensor luminaires. This conversion is expected to result in significant energy savings and a reduction in greenhouse gas emissions, thus benefiting the environment.



Examples of LED lighting conversion in metro stations

Metro Istanbul – Use of Renewable Energy

In 2024, a significant portion of Metro Istanbul's electricity consumption was supplied from renewable energy sources. According to data from the Energy Markets Operating Company (EPİAŞ), approximately **42%** of electricity consumption was met by renewable energy sources. This directly contributes to the reduction of greenhouse gas emissions.

Table 22. Electricity consumed by Metro Istanbul from the types of renewable energy sources in 2024

Hydroelectric	~%23
Biomass	~%3
Solar	~%2
Wind	~%11
Geothermal	~%3

Reducing Air Conditioner Startup Time in Areas without Power

On the T5 Eminönü-Alibeyköy line, the air conditioning in vehicles was switching off due to power interruptions in areas without power. With the revision work carried out, the time it takes for the air conditioning to switch back on has been reduced from **180 seconds to 30 seconds**. This has resulted in **energy savings** and increased passenger satisfaction.

Revision works are being carried out on the T5 Eminönü-Alibeyköy line

Communication Based Train Control - CBTC

The train signalling system currently under development on the M1 Line is being optimised to maximise benefits at minimum cost. With new software capable of reducing the service interval to **90 seconds**, the line will be able to reach a passenger capacity of **34,000**, which is double the current transport capacity. The locally developed software, for which a registration application has been submitted, will also eliminate foreign dependency.

Metro Istanbul - Circular Economy Studies in Metro Systems

Circular economy initiatives undertaken to extend the service life of vehicles and equipment, increase resource efficiency, optimise material usage, and improve the performance of rail systems are listed below:

Conversion of Escalators to Chain Drive Systems

The chainless drive systems of 12 long-distance escalators located at the Şişli and Osmanbey stations on the M2 Yenikapı-Seyrantepe-Hacıosman Metro Line have been converted to chain drive systems. Due to the discontinuation of the equipment used, this change involved converting one of the 12 pieces of equipment from the existing chainless drive system to a chain drive system after revision, ensuring that one spare chainless drive system was available for the other 11 pieces of equipment.

T3 Line Vehicle Revision and Renewal Works

Revision works have been carried out on the Gotha vehicle numbered 203, used on the T3 Kadıköy-Moda Tram Line, to meet the requirements of the era without compromising its nostalgic structure. The economic life of the Kadıköy-Moda Tram Line has been extended through the necessary maintenance and revision activities.

T3 Kadıköy-Moda tramline

Transport Sector Other Studies

A 2006 model diesel-powered bus within the IETT has been converted into a **zero-emission, 100% electric bus** to reduce the negative environmental impact of public transport.

The bus can be fully charged in 1 hour and 45 minutes and has a speed of 70 km/h and a range of 250 km. Additionally, the 22 kW batteries on the bus are equipped with technology that can also be used in emergency and disaster situations.

IETT vehicle converted to electric

Works of Adaptation to Climate Change

Green Area Works

Green Area Works Conducted by Green Istanbul (Parks, Gardens and Green Areas Department of IMM)

Under the responsibility of Istanbul Metropolitan Municipality, there are a total of **551 open and green areas**, consisting of:

- 515 Parks (with different functions)
- 22 Recreational Sites
- 14 Groves
- 4 Urban Forests

In 2024, activities were carried out across a total surface of **1,823,431 m²**, including:

- 34 newly constructed parks,
- functional renovations according to need,
- newly created green areas.

Additionally, the total surface area of green spaces maintained and repaired within designated responsibility zones amounted to **60,324,216 m²** in 2024.

Table 23. Green Area Works of Istanbul Metropolitan Municipality (2024)

Measure	2024 Implemented
Newly Created Green Area	1,335,377 m²
Number of Parks Constructed	34
Renovated Green Area	488,054 m²
Maintained Green Area	60,324,216 m²
Number of Trees Planted	104,354
Seasonal Flowers & Bulbous Plants Planted	41,908,223
Number of Trees Maintained	844,620
Ancient Forest Trees	3,300
Shrubs Planted	2,316,799

Göllü Park, Beykoz (Example of urban furnishing)

Cendere Life Valley, Phase 2 & 3

Küçükçekmece Lagoon Park (left) & Sarayburnu Archeopark (right)

Green Area Works Conducted by Ağaç A.S.

Within the framework of the "2050 Vision", Ağaç A.S. aims to protect ecological systems at risk of fragmentation—particularly the Northern Forests—against infrastructures such as highways, airports, settlements and railways, carries out biodiversity inventory and monitoring studies, conducts awareness activities and organises national and international events for the promotion of these species.

Maintenance and arrangement works in parks are carried out continuously, and construction, repair and renovation works were conducted over a total area of **531,908 m².**

To contribute to sustainable development and the local economy, plant and ornamental materials used in landscaping projects are supplied through cooperation with **domestic producers**, with the aim of reducing external dependency and increasing agricultural employment.

As a result of these activities, in 2024 the city was enriched with approximately 42,000 trees, seasonal flowers exceeding 40 million, 1,630,000 roses and shrubs, more than 2 million ground-cover plants and bulbous plant species exceeding 8 varieties.

Throughout 2024, nurseries located in Alibeyköy and Pendik ensured the supply, production, storage, maintenance and logistics of plant materials needed for homes, gardens and the landscaping works of the Municipality. Covering a total of 309,000 m² with a capacity of 835,000 potted plants, they supplied 19,169 root-balled trees and 31,920 potted trees. In total, 62,372 mature trees, 2,606,674 shrubs and 3,913,532 ground cover plants were transported.

Analyses of soil, irrigation water, plants, fertilisers and diseases/pests are carried out by the laboratory affiliated with the Ministry for sustainable landscaping.

Through **Bahçe Market**s (where the last one opened in Bostancı) located at 12 points across the city, high-quality plant materials are offered at affordable prices.

Bahçe Market in Bostancı Çamaşırcıdere Life Valley

In 2024, **122,177 m³ of qualified excavation soil** was recycled and enriched with peat, fertiliser and pumice to produce 181,409 m³ of plant substrate. Of this, ***179,405 m³*** met municipal landscaping needs and ***2,004 m³*** was offered for sale at Bahçe Markets.

Qualified excavated soils converted into fertilizer

Drought Mitigation Works

The activities carried out by Istanbul Metropolitan Municipality Agriculture and Aquaculture Directorate within the scope of combating global climate change and drought are as follows:

- A total of **22 ponds** were transferred to Istanbul Metropolitan Municipality from the General Directorate of Rural Services, which was closed in 2005. 18 of these ponds are for agricultural irrigation purposes and 4 of them are for animal drinking water purposes. Since 4 of the ponds for agricultural irrigation have become idle for various reasons, **14 ponds are used for irrigation**. In these ponds, which are irrigated with an open concrete canal system by the General Directorate of Rural Services, high water losses occur due to the fact that the canals are open canals and are very old. In order to prevent these high water losses, efforts to switch the canals to a closed-circuit pipe system were initiated and the irrigation systems of 9 ponds were converted into a closed-circuit irrigation system. Approximately **50% water savings** have been achieved in these ponds, which have been converted to a closed-circuit pipe system.

Irrigation work with open concrete channel system

Hydrants used in closed circuit irrigation systems

- Free drip irrigation hose support was provided to our farmers to use in their fields and greenhouses. Within the scope of the support, a total of **362 kilometers of drip irrigation hoses** were provided to **282 farmers** in 12 districts and 53 neighborhoods. Thanks to this support, it is aimed to reduce the amount of water used in production.

Free drip irrigation hose support

- To support our Istanbul producers, bread wheat seed support was started in 2021. Local varieties developed by the Agricultural Research Institutes and whose trials yielded high yields were distributed free of charge to farmers within the scope of agricultural support. Within the scope of this support, our farmers' wheat needs for up to **30 decares** were met. Within the scope of the support, **3,079 tons** of bread wheat seeds were given to **3,995** farmers between 2022 and 2024.
- In 2024, our farmers were given **training** both in the field and in meetings in their neighborhoods, and in these trainings, the correct use of water in production was specifically explained.
- In 2024, Public Gardens, consisting of a total of **207 parcels of 16 square meters**, were established in Kartal Karlıktepe, Pendik Harmandere and Yenişehir Neighborhoods, and the gardens were allocated **free of charge for 1 year** to our citizens living in the neighborhoods in order to produce their own vegetables. By planting vegetable seedlings given by the IMM Agriculture and Aquaculture Directorate on these parcels, our citizens not only produced their own vegetables but also had the opportunity to socialize thanks to the orchards.

Public Gardens

- **2,857,000 square meters** of mulch nylon were given free of charge to **1,091 farmers** producing in Istanbul in 2023 and 2024. With this support, it is aimed to expand the use of mulch nylon. The use of mulch nylon will both slow down the loss of water in the soil through evaporation and save water as there will be less need for irrigation.

Mulch Nylon

Studies Conducted within the Scope of Fighting Against Vectors and the Effect of Climate Change on Vectors

- Activities to combat vectors are carried out regularly under the responsibility of Istanbul Metropolitan Municipality, Health Department, Health and Sanitation Directorate.
- Vector control and disinfection services are carried out throughout the year in order to inform our citizens about vectors and the risks they carry, to inform them about the breeding and habitats of vectors, to provide training on ways to protect against vectors and the diseases they carry and the precautions to be taken, and to combat vectors such as mosquitoes, houseflies and mice that transmit diseases. Due to the formation of moist and wetlands in

unpredictable areas as a result of heavy rains and/or groundwater withdrawal as a result of climate change, difficulties arise in the fight against vectors due to the formation of mosquito larvae and herpes. For this purpose, studies on combating vectors are carried out with 4 methods.

  - Eliminating or rehabilitating possible reproductive resources through **physical battle** and joint action with the necessary institutions and organizations or citizens,
  - Controlling or eliminating reproductive resources by raising awareness of our citizens about vectors through **cultural battle**,
  - Controlling mosquitoes with **biological control** by using bactericides or natural predators in their larval stage,
  - **Chemical control** and cold fogging with the ULV method are used to control or eliminate flies, in particular.
- Moreover; Medical wastes generated in medical centers and Home Health Services are disposed of through ISTAC, thus protecting the environment and, indirectly, the climate.

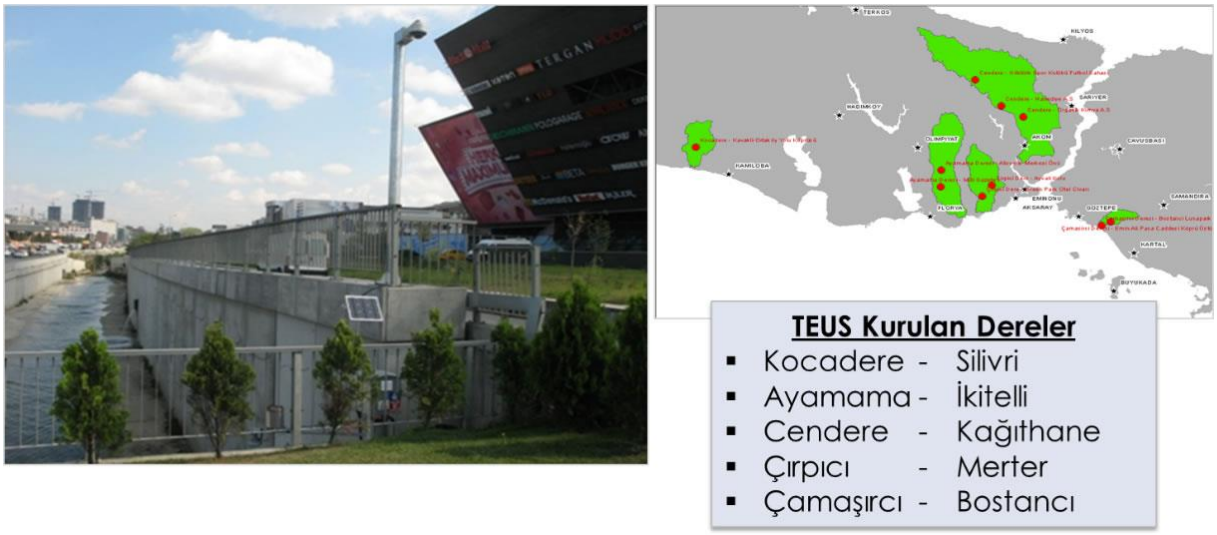
Activities Carried Out within the Scope of Extreme Weather Events Management

Since it has become an inevitable reality that events of a meteorological nature affect daily life more along with global climate change; sensitivity towards issues such as early warning, measures, and intervention against weather events that can negatively affect life, such as floods and overflows, storms, hail, intense lightning and thunderbolt activities, is increasing day by day. In Istanbul, which is one of the world's few most crowded metropolises with a population exceeding 16 million, it is of vital importance to make and implement an intervention plan in which the city's dynamics will be affected to the minimum extent during emergency and disaster moments, as well as the routine flow of life. Towards this goal, the **Disaster Management Information System (AKOMAYS)** has been established by the Disaster Coordination Center (AKOM). With this system, which incorporates many data from different sources and types such as meteorological radar and observation data, remote sensing products like geographical-based maps, as well as vehicle tracking data, camera images, risky points, and unit responsibility areas, it is aimed to ensure the most effective and efficient management of IMM's capacity in disasters and emergencies. Early warning systems, which are operated by AKOM and monitored on a 24/7 basis against icing, flood, and overflow risks, have also been integrated into AKOMAYS.

These systems are:

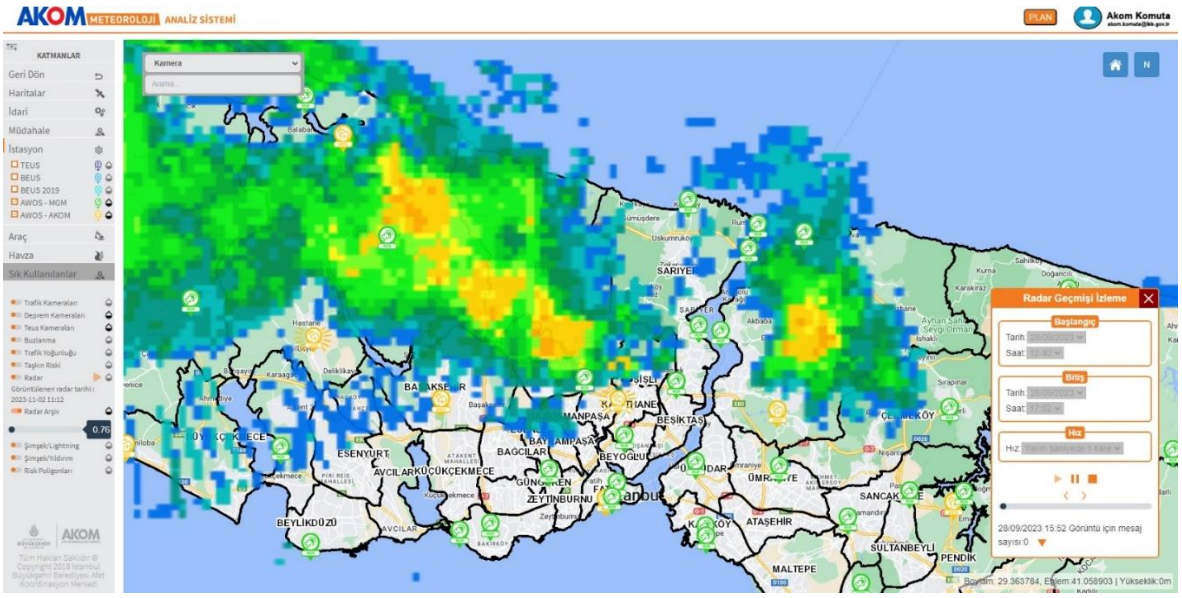
  - **Automatic Weather Observation Stations (AWOS)** established at 10 separate points of Istanbul,
  - **Flood Early Warning System (TEUS)** established at 10 separate points on 5 streams,

- **Icing Early Warning System Stations** established at 60 different points in order to reduce the negative effects of precipitation and icing on the transportation network.



Streams where TEUS has been established in Istanbul and the districts they are connected to

Furthermore, within the framework of the protocol made with the **General Directorate of Meteorology (MGM)**, data from 40 Automatic Weather Observation Stations belonging to MGM within the borders of Istanbul have also been integrated into the system.



AKOMAYS Module of Meteorology

Automatic Meteorological Observation and Early Warning System Stations

Studies Conducted within the Scope of Food Security

With the assurance of Istanbul Metropolitan Municipality (IMM), Istanbulites can access delicious, economical, and healthy meals through City Restaurants (Kent Lokantaları).

Table 24. City Restaurants

Row	Location	Opening Year
1	Arnavutköy	2024
2	Avcılar	2023
3	Bağcılar	2022
4	Çapa (Fatih)	2022
5	Çatalca	2024
6	Hisarüstü (Sarıyer)	2023
7	Küçükçekmece	2023
8	Pendik	2024
9	Sultanahmet (Fatih)	2023
10	Sultanbeyli	2022
11	Sultangazi	2024
12	Tuzla	2024
13	Ümraniye	2022
14	Üsküdar	2022
15	Sancaktepe	2024
16	Esenyurt	2025
17	Silivri	2025
18	Eyüpsultan	2025

Table 25. Some statistics regarding City Restaurants (End of 2024)

City Restaurants in Service	15 *(The 15 restaurants listed in the previous table as of the end of 2024)*
Total Number of Covers Served in City Restaurants	3,016,891
Amount of Food Waste Delivered to the Biomethanization Plant	311,925 kg

Other Works

Smart City Studies

AMIGOS Project

The main objective of the AMIGOS project, carried out with EU fund support, is to co-create, test, evaluate, and scale up inclusive, safe, resilient, and sustainable innovative urban mobility solutions for European cities and beyond. Within the project, **5 cities *(Istanbul, Hamburg, Las Rozas, Lappeenranta, Gabrovo)*** and **10 urban areas** will jointly develop and test technology and policy solutions as a means to increase public transport use, zero-emission, and active mobility modes, as well as improve safety and coexistence between different transport modes.

- **Air and noise quality measurements** are planned before and after a pedestrianization project in a designated area.
- The impact of **pedestrianization** projects on social life will be demonstrated through data-driven measurements and analyses.
- The project also includes works to improve existing **bicycle paths** in the city.
- The aim is to encourage the **integration of bicycles**—a more active and sustainable transport mode—into urban life and make them safer.

A photo from one of the AMIGOS project workshops

- **Maltepe Central Mosque Pedestrianization Area** has recently been used as a pilot, where air and noise measurements were conducted with institutional equipment.
- Data on the impact of air and noise pollution caused by vehicles due to pedestrianization has been collected; it will be shared with the consortium for impact analysis.

A survey was conducted in the relevant region to measure the social impact of pedestrianization. Improvements will be carried out in the Maltepe region in harmony with ongoing bicycle paths and projects.

DECARBOMILE Project

DECARBOMILE, another project supported by EU funds, is a 4-year project where distribution from a consolidation center—created with the help of electric cargo bikes—is planned through a collaborative business model of different private sector stakeholders to reduce carbon emissions and traffic congestion in the city.

The main objective is to develop city-specific solutions and demonstrate the full potential of decarbonized last-mile logistics. The general goal is to make an unprecedented leap toward sustainable urban logistics and ensure the expansion of green last-mile logistics based on previous local experiences. Focus is placed on defining and implementing a collaborative urban consolidation logistics framework, including technological tools and methodology requirements for implementation and monitoring. This will accelerate the adaptation and implementation of similar solutions in Europe and other regions.

DECARBOMILE logo

Currently, the first two Istanbul scenarios for last-mile logistics using electric micro-mobility vehicles have started with a consortium partner firm.

A distribution method featuring green solutions is being implemented in Kadıköy-Bahariye, a central area with heavy traffic and high vehicle-related air pollution.

The third scenario will involve an operation where different firms distribute from a common consolidation center using green solutions.

Tech Istanbul

Tech Istanbul operates under the Smart City Directorate of Istanbul Metropolitan Municipality IT Department. It helps startups grow rapidly and build scalable business models through developed entrepreneurship programs. It supports stakeholders to help Istanbul stand out in the global entrepreneurship ecosystem and provides support mechanisms for entrepreneurs' needs from the idea stage to global expansion. The Pre-Incubation program supports early-stage tech startups, while the Growth program offers PoC (Proof of Concept) opportunities by bringing startups with tech-based products together with IMM and its affiliates. Tech Istanbul Growth is open to startups with ready-to-sell tech products that solve urban problems in mobility, environment & energy, mobile technologies, and digital transformation. Entrepreneurs get the chance to test their products at IMM and present them to 16 million Istanbulites. Across 5 Growth calls, 1,290 applications were received, and 208 startups were introduced to IMM and its affiliates. 58 PoCs have been successfully completed during 8-10 week processes.

Environment & Energy PoCs

• ***Remus Enerji:*** Provides an energy-as-a-service (E-SaaS) software that manages the entire process end-to-end, from appropriate energy procurement to machine energy consumption.

In the PoC study carried out with IETT, it monitored energy consumption efficiency through the electricity subscriptions at the İkitelli garage.

In the PoC study carried out with Istanbul Enerji, work was conducted to track energy consumption efficiency through water, natural gas and electricity subscriptions for Istanbul Enerji. Website: https://lumian.energy/tr

• ***All IoT Teknoloji:*** A smart city solution that measures the fill level of waste containers in real time with IoT sensors and optimises the routes of collection vehicles with artificial intelligence.

In the PoC study carried out with ISTAC, they aimed to increase efficiency by digitalising the institution's medical waste collection processes. Website: www.allsmartwaste.com

• ***airqoon:*** A real-time, data-driven, cost-effective and easy-to-use environmental monitoring and management solution for the public sector and environmentally sensitive private sector organisations.

In the PoC study carried out with the Environmental Protection Branch Directorate, it performed a comparative performance analysis against the data of the Göztepe fixed

reference air quality measurement station using the data it collected and conducted a validation study. Website: https://airqoon.com

• ***ASPOWER:*** Produces electric vehicle charging systems, power electronics equipment, bespoke software solutions and products.

In the PoC study carried out with Istanbul Enerji, within the scope of a project developed for energy in case of disasters, batteries were installed on the backs of vehicles and integrated with solar energy. Website: https://www.aspower.com.tr

• ***Devamapp:*** A super app that facilitates sustainable transport by providing electric vehicle users with integrated charging, parking, repair and route planning services.

In the PoC study carried out with ISPARK, by integrating ISPARK parking locations into the Devamapp platform, electric vehicle users were enabled to access ISPARK locations through the platform. Website: https://www.devamapp.tech

Some of the trainings and events on Climate & Mobility held at Tech Istanbul Entrepreneurship and Technology Centres are listed below.

• ***3pmetrics***: Simplifies ESG analysis as well as carbon and water footprint accounting via its user-friendly SaaS platform and API services, enabling companies to automatically manage their ESG analyses for the entire value chain within just one day.

In the PoC study carried out with Istanbul Enerji, the corporate carbon footprint of Istanbul Enerji was calculated and reported using data obtained from the Istanbul Enerji team by 3pmetrics. Website: https://www.3pmetrics.com

• ***Buluttan Weather Intelligence:*** With its weather intelligence and climate-oriented solutions, it not only increases the financial and operational efficiency of its business partners, but also enables them to take measures against the impacts of the climate crisis, contributing to the safety of people and assets.

In the PoC study carried out with the Smart City Directorate, Buluttan's historical weather forecast data were added to the traffic speed and density prediction algorithms developed by the Smart City Directorate, thereby verifying the impact of weather conditions on traffic and increasing the consistency of the algorithm. In the work carried out with Istanbul Senin, the mini-application of Buluttan was integrated into Istanbul Senin and offered to the use of Istanbul residents. Website: https://www.buluttan.com

• ***Kozalak – ForestGuard:*** A system solution that detects forest and industrial fires in open areas and performs air analysis.

In the PoC study carried out with BIMTAS A.Ş, Kozalak devices were placed on the Istanbul Planning Agency (IPA) Campus to enable park smartening and digital twin data flow.

In the PoC study carried out with Istanbul Enerji, Kozalak devices were installed in the Seymen Energy Production Plant to continuously measure gas emissions within the facility.

In the PoC study carried out jointly by the Smart City Directorate and Boğaziçi Yönetim, Kozalak devices were placed in Kemerburgaz City Forest and a fire detection system was established. Website: https://www.nowildfire.com

Table 26. Tech Istanbul Climate & Mobility themed trainings/events

Program Adı	Tarih	İçerik
"Digital to Green Transformation Webinar"	11.03.2024	In this interactive webinar, the environmentally friendly implementation of digital transformation and the management of green transformation in businesses were addressed in an innovative, practical and inclusive manner.
Upcycling Ideathon	18.04.2023 08.03.2023	Organised in cooperation with Tech Istanbul–Başakşehir, ISTAC A.S. and Döngüsel İşler Atölyesi. The event aimed to create functional and marketable new products from waste materials through the original designs and innovative ideas of young people.
Climate Crisis & Entrepreneurship	20.06.2023	In the programme planned in cooperation between Tech Istanbul–Başakşehir and the Avcılar Municipality Applied Solution and Innovation Centre, the causes of the climate crisis, its implementations in local governments and successful entrepreneurship examples were discussed.
Webinar on Sustainable and Innovative Environmental Technologies Compatible with Local Conditions	27.07.2023	In the webinar held online in cooperation with Tech Istanbul–Başakşehir and Istanbul Technical University Environmental Engineering Club, Prof. Dr. Hayrettin Güçlü İnsel and Res. Asst. Gökşin Özyıldız talked about the "Wastewater Treatment Plants Standardisation Project".
Climate and Mobility Datathon	02.10.2023 14.10.2023	Organised in cooperation with Tech Istanbul–Başakşehir, Özyeğin University and the Sustainable Mobility Initiative.

Upcycling and DİA Webinar	20.11.2023	In the webinar held online by Tech Istanbul, waste management activities carried out within IMM and the concept of upcycling were discussed.
TrANsMIT COST Action Workshop	17.10.2024 18.10.2024	At the "COST Action TrANsMIT (CA21127) Istanbul" Workshop, held on 17–18 September 2024 at Tech Istanbul | Şişhane, organised by the TrANsMIT Community, which aims to create a Europe-wide interdisciplinary network for the techno-economic analysis of carbon capture, utilisation and storage systems, Ece ÖZÖN, Head of the Climate Change Directorate of the Environmental Protection and Development Department, conveyed Istanbul Metropolitan Municipality's climate change mitigation efforts to the participants.
Climathon	23.11.2024	The final day of the Climathon Ideathon, organised by Climate Pioneers with the aim of developing new ideas in the fields of climate and sustainability and increasing participants' awareness of these issues, was held at Tech Istanbul | Şişhane.
Sustainable Strategies Workshop	6.12.2024 7.12.2024	The Sustainable Strategies Workshop, organised by the ITU Environmental Engineering Club, was held on 6–7 December 2024 at Tech Istanbul | Şişhane. Fulya Güray, head of TSKB's Climate Change and Sustainability Management Department, participated as a speaker and it was aimed to develop sustainable projects and generate new ideas in line with environmental, social and governance (ESG) criteria.
Strategic Brainstorming and Cognitive Empathy Event	30.04.2025	In this event, held within the scope of the "Social Responsibility Project" course for 1st-year students of Kadir Has University, students came together with municipal officials, received direct

		information and exchanged ideas; topics such as animal rights, culture–arts and sports activities, environment and climate crisis, youth and employment, and transport were addressed. The event was held at Tech Istanbul | Şişhane.
Screen Free #3	24.05.2025	Screen Free #3, organised by Colspark, is an event that offers a digital detox opportunity, aiming for participants to stay away from technology and interact face to face. In this year's event, awareness workshops for 60 participants were held under the theme of "Green and Sustainable Future". The workshops focused on recycling and upcycling and aimed to raise environmental awareness among participants. The event was held at Tech Istanbul | Şişhane.

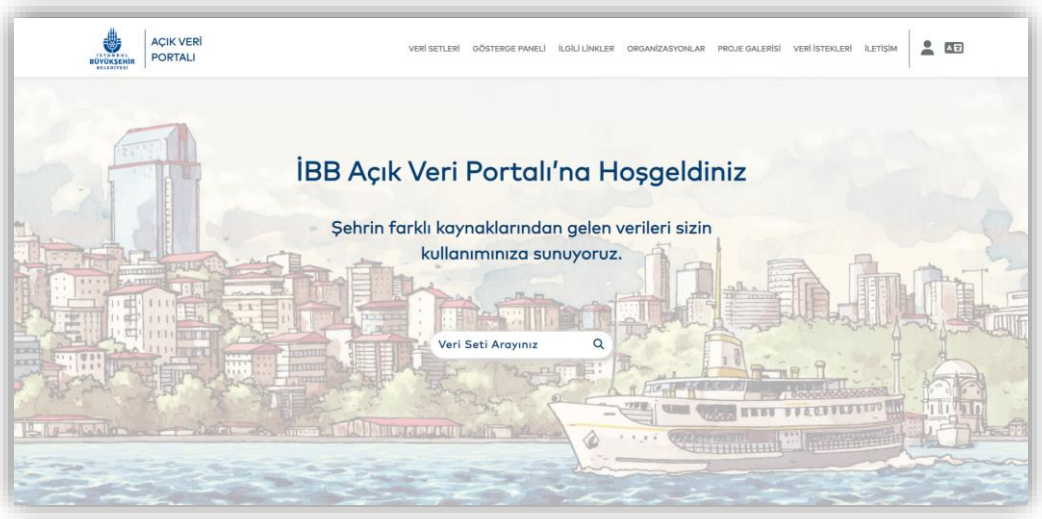
IMM Open Data Portal

The IMM Open Data Portal (https://data.ibb.gov.tr), which acts as a bridge between citizens and the city, was launched on 18.01.2020. Through the portal, anonymous data produced by Istanbul Metropolitan Municipality, environmental organisations and various sources in the city are shared with citizens. There are a total of **515 data sets** under **9 different thematic areas** on the IMM Open Data Portal, and **76 data sets** are included under the **environment theme**.

By evaluating citizen requests received via the relevant platform, analysing global examples and periodically analysing the IMM data pool, both the number and the quality of data sets on the site are increased.

Projects that emerge from the downloading, processing, transforming and evaluation of data shared in different categories such as mobility, environment, energy, life, people and others by citizens create benefits in solving problems in many different areas and provide feedback that will create added value. Climate issues, environmental pollution, transport problems, educational needs and areas for artistic development may be cited as examples of issues within this broad perspective.

Implemented as an outcome of Istanbul Metropolitan Municipality's transparency and accountability policies, the IMM Open Data Portal, in addition to providing many benefits, allows and encourages citizen participation.



IMM Open Data Portal website view

Disaster-Oriented Digital Twin of Istanbul Project

Since January 2023, the Smart City Branch Directorate of the Information Technologies Department of Istanbul Metropolitan Municipality has been carrying out activities on **"Digital Twin of the City"**, one of the current smart city applications in line with technological developments. A review of the global literature shows that each city utilises digital twin technology to produce solutions to its own priority problems. In the case of Istanbul, due to the high risk posed by potential disasters, it was aimed to develop a disaster-oriented digital twin model. In this context, as a result of the evaluation and analysis studies carried out with the Disaster Coordination Centre (AKOM) under the Department of Disaster Affairs of Istanbul Metropolitan Municipality, the Disaster-Oriented Digital Twin of Istanbul Project was launched.

The project aims to increase Istanbul's resilience against disasters and to support rapid, data-driven decision-making processes in times of crisis by creating a smart virtual model of the city. In the first phase, the project focuses on disaster and security themes, with AKOM positioned as the most critical stakeholder and main user. The project is also carried out in cooperation with the Geographic Information Systems Directorate and the Cartography Directorate, both under the Information Technologies Department, and the Earthquake Risk Management and Urban Improvement Department. When the project is completed, access will be provided, according to AKOM's needs, to all spatial and space-related data within IMM, as well as to static and dynamic big data; and a holistic decision-support system suitable for the requirements of the age will be created through simulations for different scenarios.

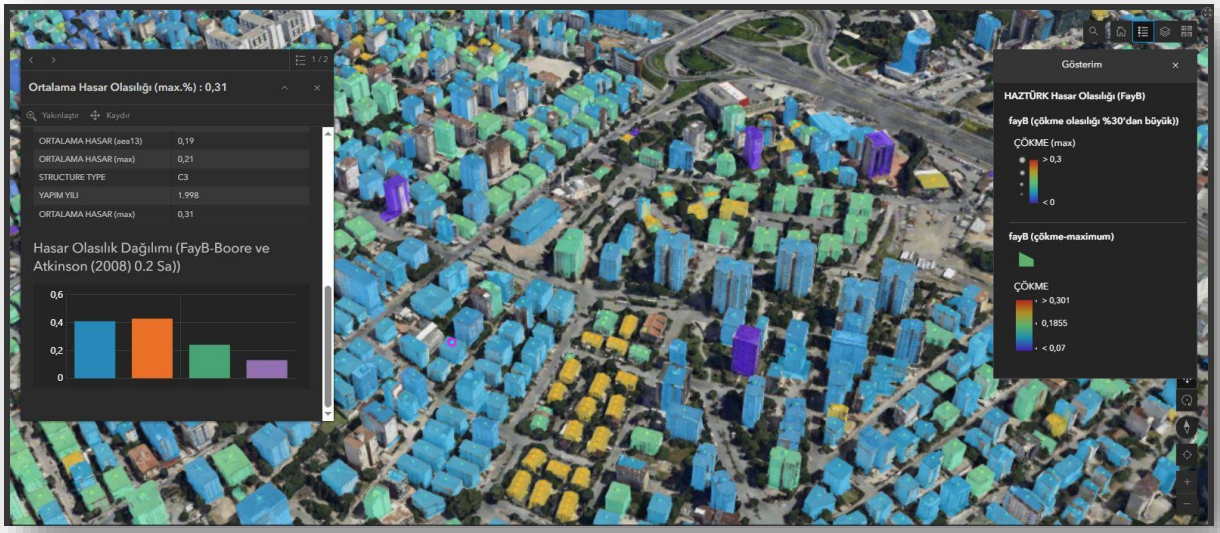
The disaster-oriented digital twin project is not only applicable to Istanbul, but also has the potential to form a scalable and replicable model for other cities in Türkiye

and around the world. This innovative approach, in which smart city technologies are integrated with disaster management, constitutes a pioneering example in terms of increasing cities' resilience against disasters.

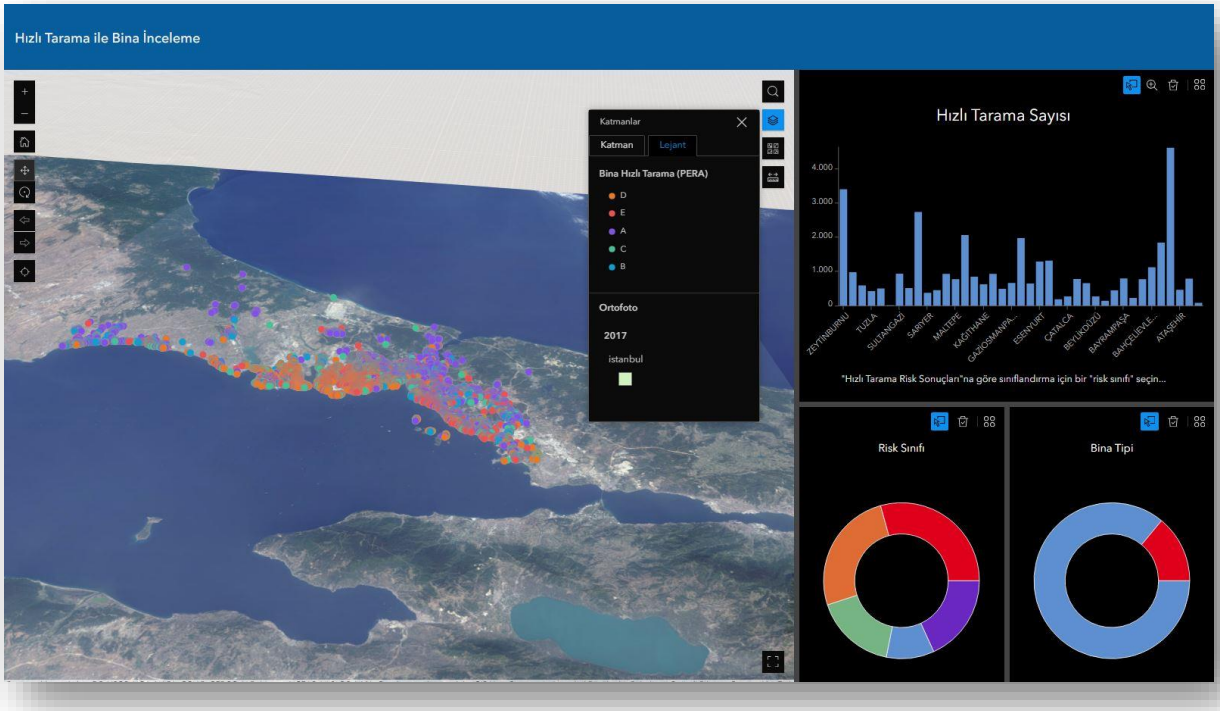
The project offers a holistic disaster management approach that covers pre-disaster preparedness, effective management during disasters and rapid response processes in the aftermath of disasters. In the pre-disaster preparedness phase, it aims to determine the building stock via remote sensing methods, identify risky structures and model potential collapse scenarios. During a disaster, the effects of events such as earthquakes, floods or fires are simulated in a virtual environment, thereby increasing situational awareness, optimising evacuation routes and allowing response plans to be updated in real time. After a disaster, operational decision-making processes such as directing search and rescue teams, analysing transport constraints and ensuring effective allocation of resources are supported rapidly and accurately through the digital twin infrastructure. In this way, a strong support mechanism is provided to city management at all stages of a disaster through data-driven, optimised and effective decision-making processes.

Within the scope of the project, technical development works are being carried out with internal resources. Building Information Modelling (BIM) layers, earthquake analysis results and other data layers have been combined and made visualisable on a web-based three-dimensional map. The requirements for the creation of the city's digital twin have been identified and a draft technical specification has been prepared. Within the scope of the protocol signed with Istanbul Technical University, analyses have been carried out for each fault line by using the ELER earthquake system and the HAZTURK earthquake simulation software, and the results have been visualised graphically on a three-dimensional map.

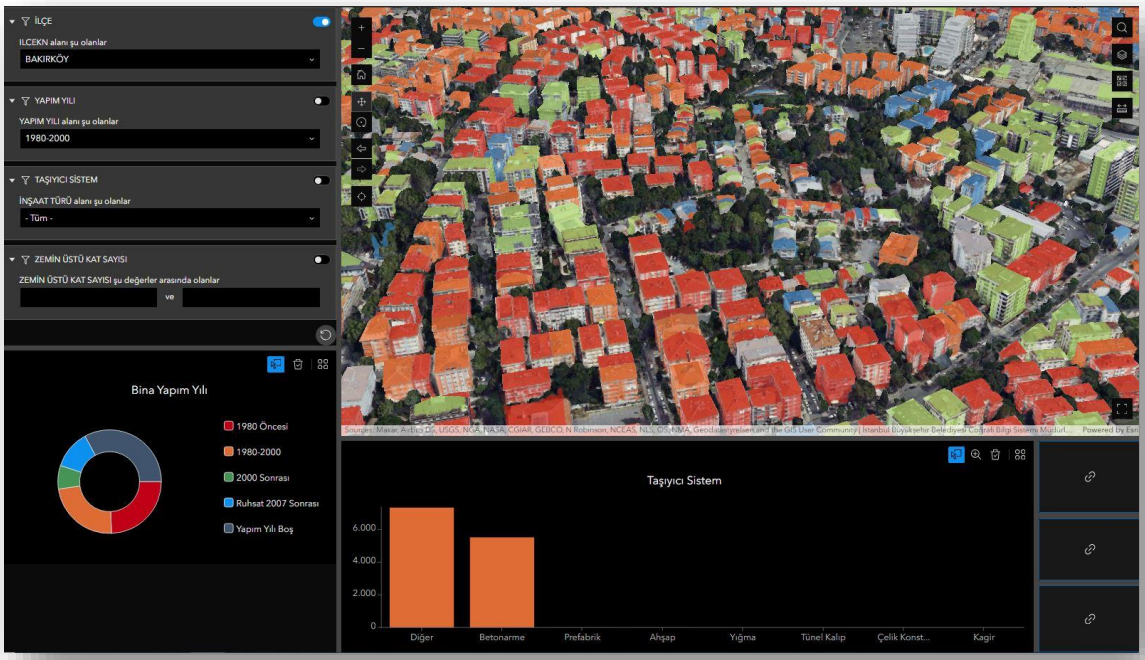
The concept of "Digital Twin of the City" covers eight smart city themes: mobility, environment, energy, security, people, life, governance and economy. After the completion of the disaster-oriented phase, it is planned to launch phases focusing on environment and transport in order to increase societal benefit.



Building damage probability

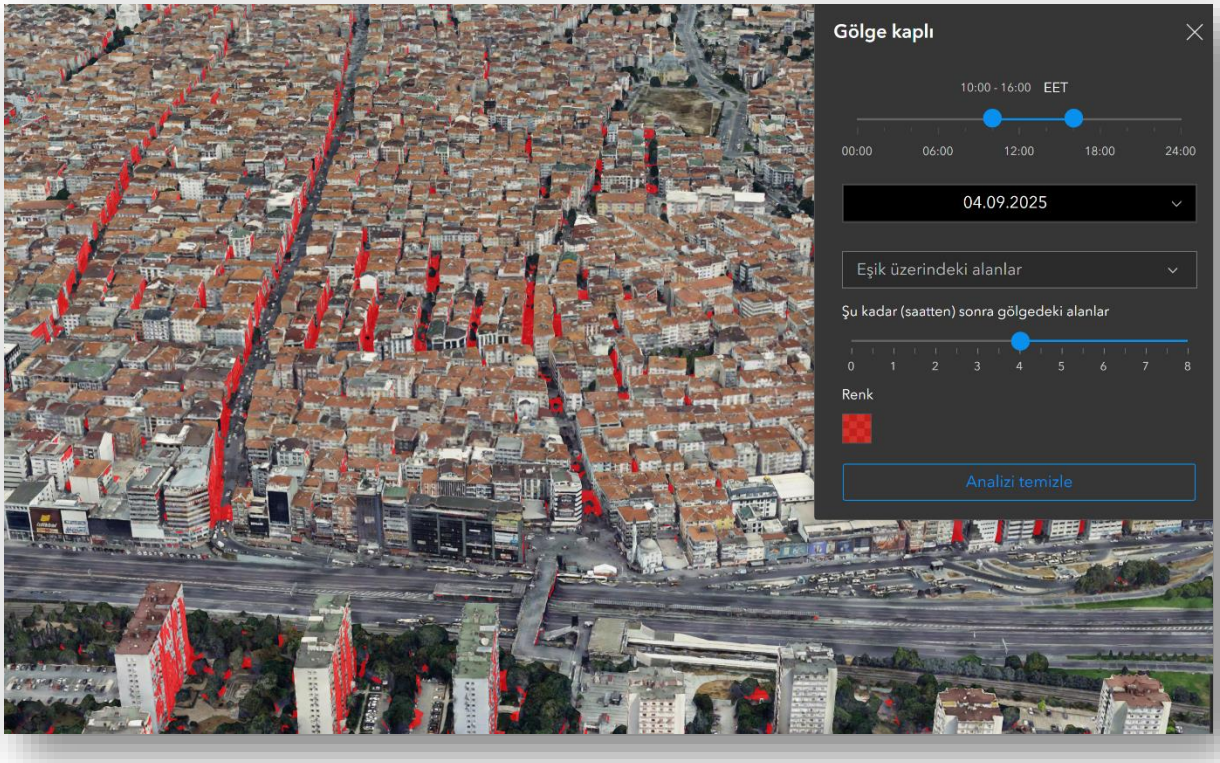


Urban Transformation Implementation Directorate – Rapid Screening (Pera)

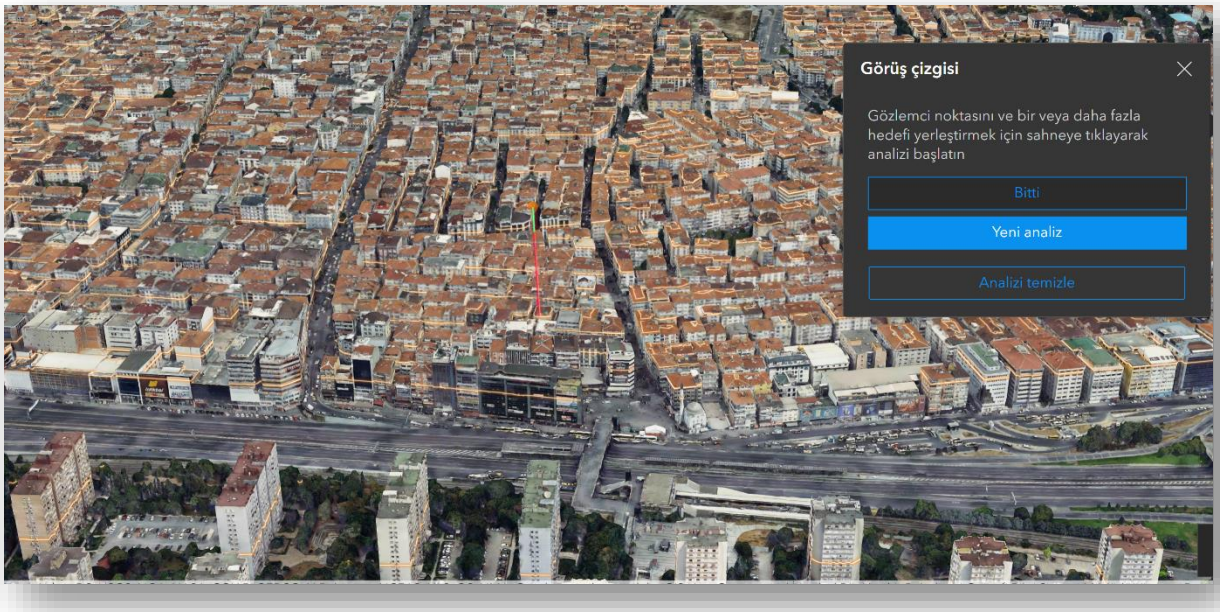


Years of Building construction

Çırçır metro station BIM model



Shadow analysis



Visibility analysis

Use of Geographic Information Systems in Climate Change

Solar Map (Building-Based Solar Energy Potential Project)

The Solar Map project combines GIS and Remote Sensing technologies to make visible the massive solar energy potential hidden on Istanbul's rooftops. The main purpose is to scientifically calculate how much solar energy can be produced on each roof at the building scale. In this comprehensive analysis, digital surface model (DSM) data, meteorological data and roof geometries were used; and for the year 2023, solar radiation coming from 16 different directions at every hour of the day was calculated, creating Istanbul's solar irradiation map.

Solar Map

The project did not remain theoretical only; areas that could be truly efficient were selected, these areas were matched with building data and, for each building, the total usable roof area and annual production amount were calculated. Consequently, this map has become a powerful decision-support tool showing how much energy each building can produce, serving investment and planning processes. In this project, GIS makes energy visible, contributing to reducing Istanbul's carbon footprint and supporting a fairer, more efficient and more sustainable urban life for everyone.

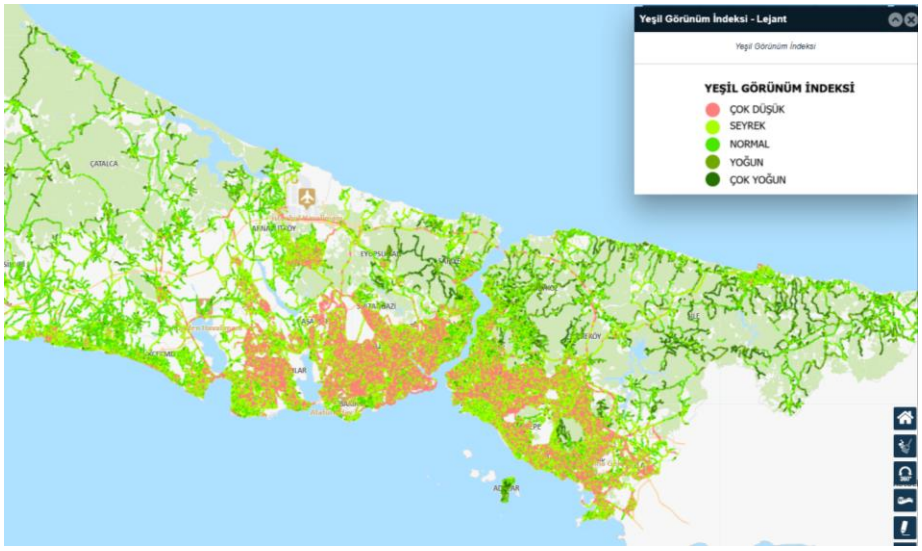
Green View Index

The Green View Index uses an innovative Computer Vision and GIS approach to measure urban greenery. Unlike conventional satellite imaging methods, this system

is based on panoramic images that measure the green ratio as seen at eye level by people living in the city.

Green View Index

Operating from a pedestrian perspective, this system measures tree density and the perception of greenery in the city and, thanks to the data obtained, scientifically reveals which areas are greener and which areas are in need of green spaces.



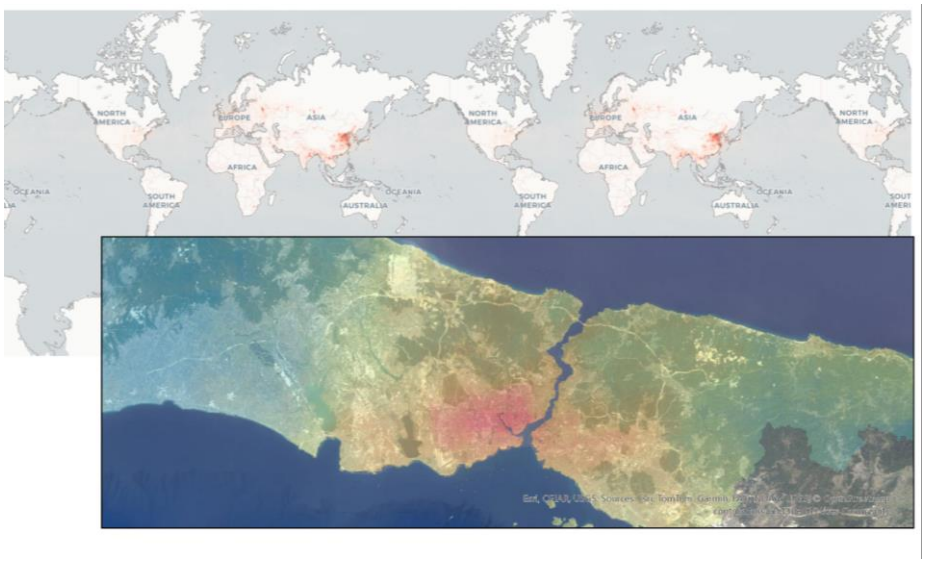
Green View Index

This index has become a direct reference in urban transformation, planning and landscape decisions. Sources indicate that in this project GIS measures nature not only in numbers but as perceived by humans, thereby presenting spatial data as a human-related attribute and aiming to make the city more liveable.

Relationship Between Air Pollution and Traffic (NO_2 Study)

In a city like Istanbul, which has intense traffic, this study was conducted on the premise that it is insufficient to interpret air quality data alone to truly understand air quality; therefore, it aimed to analyse the relationship between traffic density and

meteorological factors and air pollution. This comprehensive analysis was carried out by integrating GIS and Remote Sensing data and methods. A critical point of the study is that in cases where sensor data are spatially or temporally insufficient, satellite images were used to obtain much more precise and comprehensive results.



Study on the relationship between air pollution and traffic

Traffic flow at different hours, vehicle density, meteorological conditions and pollutants such as NO_2 were evaluated in the same analysis environment. The findings clearly and concretely revealed the impact of urban traffic on air quality, contributing to a more balanced understanding of transport planning that considers environmental impacts rather than focusing solely on speed. This study is a pioneering application in terms of spatially and causally examining pollutant sources in Istanbul. In this way, GIS brings together different data sets and transforms city management into a more informed and more sustainable structure.

Table 27. Summary Monitoring Table of Indicators Affecting Climate Change

Category/Sector	Indicator	2024	2023	Change
Demography	Istanbul Population (persons)	15,701,602	15,655,924	▲ 45,678
Greenhouse Gas Emission	Istanbul Greenhouse Gas Emission Amount ($tonCO_{2e}$/year)	50,894,956 (2023)	51,202,666 (2022)	▼ 0.60%
Greenhouse Gas Emission	Greenhouse Gas Emission Amount Per Capita ($tonCO_{2e}$/person.year)	3.3 (2023)	3.2 (2022)	▲ 0.1
Greenhouse Gas Emission	Annual Greenhouse Gas Emission Amount from Stationary Energy Sector ($tonCO_{2e}$)	31,960,030 (2023)	32,793,362 (2022)	▼ 833,332
Greenhouse Gas Emission	Share of Stationary Energy Sector in Istanbul Greenhouse Gas Emission Inventory (%)	62.80 (2023)	64.05 (2022)	▼ 1.25%
Greenhouse Gas Emission	Annual Greenhouse Gas Emission Amount from Transportation Sector ($tonCO_{2e}$)	15,275,314 (2023)	14,928,640 (2022)	▲ 346,674
Greenhouse Gas Emission	Share of Transportation Sector in Istanbul Greenhouse Gas Emission Inventory (%)	30.02 (2023)	29.16 (2022)	▲ 0.86%
Greenhouse Gas Emission	Annual Greenhouse Gas Emission Amount from Waste Sector ($tonCO_{2e}$)	3,659,613 (2023)	3,480,663 (2022)	▲ 178,950
Greenhouse Gas Emission	Share of Waste Sector in Istanbul Greenhouse Gas Emission Inventory (%)	7.18 (2023)	6.79 (2022)	▲ 0.39%
Stationary Energy	Number of IMM Buildings with Certified ISO 50001 Energy Management Systems	24	24	•
Stationary Energy	Number of IMM Affiliate Buildings with Certified ISO 50001 Energy Management Systems	18	13	▲ 5
Stationary Energy	Installed Capacity of Established Solar Power Plants (kWp)	8,24	4,44	▲ 85.59%
Green Space	Number of Parks Built (units)	34	9	▲ 25

Green Space	Amount of Green Space Per Capita (m^2/person)	7.96	7.88	▲ 0.08%
Green Space	Annual Number of Trees Planted (units)	104,354	60,276	▲ 44,078
Green Space	Annual Number of Trees Maintained (units)	844,62	563,667	▲ 49.84%
Green Space	Total Annual New Green Space Amount (m^2)	1,335,377	1,884,241	▼ 29.13%
Green Space	Revised Green Space Amount (m^2)	488,054	510,216	▼ 4.34%
Green Space	Maintained Green Space Amount (m^2)	60,324,216	59,926,197	▲ 0.66%
Solid Waste	Annual Waste Amount Disposed in Sanitary Landfills (tons)	5,945,723	5,424,841	▲520,882
Solid Waste	Rate of Waste Processed in Sanitary Landfills (%)	74	72	▲2%
Solid Waste	Total Waste Amount Sent to Recovery Facilities (tons)	1,799,138	1,797,737	▲ 1401
Solid Waste	Rate of Waste Processed in Recovery Facilities (%)	26	28	▲2%
Solid Waste	Organic (Biodegradable) Fraction of Generated Waste (%)	41.15	44.0	▲6.48%
Water and Wastewater	Number of Drinking Water and Wastewater Treatment Plants (units)	24 and 90	24 and 90	●
Water and Wastewater	Rate of Biologically and Advanced Biologically Treated Wastewater (%)	56.82	56.51	▲ 0.31%
Water and Wastewater	Amount of Biogas Produced in Biological Wastewater Treatment Plants (m^3/year)	9,169,449	11,112,842	▼ 17.49%
Water and Wastewater	Annual Water Supply to the City (Million m^3/year)	1,161	1,117	▲ ~44,000 m^3
Water and Wastewater	Annual Amount of Treated Wastewater (Million m^3/year)	1,658	1,646	▲ ~12,000 m^3

Water and Wastewater	Annual Amount of Recovered Wastewater (m^3/year)	31,615,818	29,285,760	▲ 2,330,058
Water and Wastewater	Rainwater Line Length (km)	5,479	5,425	▲ 54
Water and Wastewater	Drinking Water Network Line Length (km)	20,009	19,978	▲ 31
Water and Wastewater	Wastewater Sewer Network Length (km)	17,125	17,046	▲ 79
Water and Wastewater	Annual Water Consumption Per Capita (m^3/person.year)	73.94	71.35	▲ 2.59
Water and Wastewater	Loss-Leakage Rate (%)	18.63	18.94	▼ 0.31%
Air Quality	Annual Average Levels of PM10 in the Air (µg/m^3)	PM_{10}: 37.6	PM_{10}: 38.6	PM_{10}: ▼ 2.59%
Air Quality	Annual Average Levels of PM2.5 in the Air (µg/m^3)	$PM_{2.5}$: 17.6	$PM_{2.5}$: 19.3	$PM_{2.5}$: ▼ 8.80%
Transportation	Rail System Length (km)	244.31	218.1	▲ 12.02%
Transportation	Total Number of Rail System Lines (Inc. Tram and Funicular)	22	20	▲ 10.00%
Transportation	Bicycle Path Length (km)	531.33	501.15	▲ 6.02%
Transportation	Number of Electric Public Transport Vehicles (units)	250	170	▲ 47.06%

Meaning of Symbols	▲ Increasing	▼ Decreasing	● Stable/Fixed
Meaning of Colours	Positive	Negative	Neutral