Re-Value

D6.6 Detailed Roadmap for the Waterfront Pilot in Izmir

Re-Value Deliverable D6.6

Report information

Deliverable: D6.6: Detailed Roadmap for the Waterfront Pilot in İzmir

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Executive Summary

This report outlines the City of İzmir's engagement in the Re-Value Horizon Europe project, with a focus on the Alsancak Waterfront Pilot as a key intervention site. It traces how İzmir's activities align with the Re-Value Impact Pathway, maps the city's progress across three innovation cycles, and highlights its contributions toward climate neutrality and public sector innovation.

The Re-Value project directly aligns with the core objectives of the İzmir Green City Action Plan and integrates seamlessly with its strategic goals, supporting urban sustainability. The Action Plan provides a framework for addressing İzmir's most pressing environmental challenges, focusing particularly on 47 strategic actions. Create connected green corridors to enhance carbon capture capacity.

As part of Re-Value,

İzmir has adopted an integrated approach to climate action, aiming not only for climate neutrality but also for climate adaptation, social inclusion, and urban resilience. Through measurable KPIs, existing planning tools, and enabling conditions such as stakeholder engagement and technological capacity, the city links its pilot efforts to local challenges, opportunities and ambitions to generate benefits for various stakeholders.. The process is framed through three innovation cycles: story-building, data-driven co-creation, and partnership building—each fostering ideation, validation, and implementation.

Alsancak Waterfront Pilot area represents both a symbolic and strategic location in İzmir's urban landscape. Its mixed-use character, cultural heritage, and exposure to climate risks make it ideal for testing integrated, community-driven solutions, testing the Sustainable Green Zones concept. Several ongoing projects, described in this report, align with such an ambition. The pilot includes greening initiatives, microclimate mitigation strategies, and the co-design of public spaces. Enhancing inclusive and safe access to the waterfront for both residents and visitors is a central design principle of the pilot.

The pilot leverages a cross-sectoral collaboration structure within the municipality, further supported by the İzmir Planning Agency (IZPA) and the Mission City Action Lab, to foster integrated, participatory, and adaptive approaches to climate resilience.

The roadmap developed within the Re-Value project is expected to serve as a guiding tool that aligns with the municipality's existing operational structure, facilitating the integration of innovative practices into routine workflows. Additionally, the pilot will emphasize the multi-dimensional value of green infrastructure in terms of social, environmental, and functional benefits.

A Local Impact Model Workshop helped uncover key challenges and opportunities and generated thematic scenarios such as "Cooling the City" and "Co-designing public spaces". These insights are expected to inform the municipality's planning tools and adaptation strategies.

Looking ahead, İzmir will enter an intensive phase of experimentation from mid-2025 to mid-2026. Specific actions include developing community-based narratives with innovation cycles:

- Roadmap activities and workshops for testing and refining the climate-responsive urban design scenarios through active involvement with Citizen Design Science (IC1).

- The pilot supports the development of a Digital Twin roadmap, with a focus on targeted, scenario-based applications that remain user-friendly and are informed by real-time urban data (IC2).
- Establishing institutional partnerships with the İzmir Planning Agency to anchor implementation and funding efforts (IC3)

These activities not only support climate neutrality but also reflect the principles of the New European Bauhaus (NEB)—beauty, sustainability, and inclusion. The outcomes will serve as blueprints for mainstreaming innovation within İzmir's long-term urban transformation agenda.

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1 İzmir Pathway and Connection with Re-Value

1.1 The Overview of İzmir

İzmir is Türkiye's third-largest city by population, following İstanbul and Ankara, with a total population of 4,462,056—comprising 2,215,716 males and 2,246,340 females. The city accounts for approximately 5.23% of the national population and is administratively divided into 30 districts. Located along the Aegean coast, İzmir is known for its rich historical heritage and dynamic urban life. It serves as a cultural and economic hub where ancient traditions blend seamlessly with contemporary urban development, reflecting the city's diverse demographic and socio-cultural fabric.

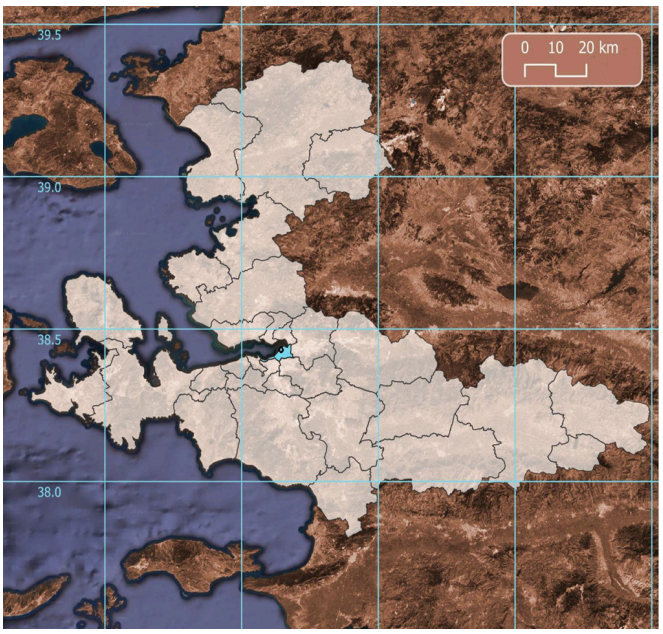


Figure 1. İzmir and its 30 Districts Map, Scale: 1/800.000, CRS: WGS84. Prepared with the dataset acquired from Directorate of Geographic Information Systems, İzmir Metropolitan Municipality (Image credit: IMM).

1.2 The CityVision

In recent years, İzmir has taken ambitious steps toward climate neutrality and sustainable urban development. Following its commitment to the Covenant of Mayors, the city prepared its Sustainable Energy and Climate Action Plan (SECAP) in 2020, outlining clear strategies for climate mitigation and adaptation. Building on this, İzmir also developed its Green City Action Plan (2021) in cooperation with international partners, aiming to align local planning with the goals of the EU Green Deal. Furthermore, İzmir was selected on April 28, 2022, as one of the 112 cities participating in the EU Mission for Climate-Neutral and Smart Cities, recognizing its commitment to achieving climate neutrality by 2030. This designation acknowledged the city's proactive governance and strategic vision for sustainable urban

transformation. In March 2024, İzmir was officially awarded the EU Mission Label, confirming that it has a credible action plan in place to reach its ambitious climate goals.

Table 1. Key Plans Reflecting İzmir's City Vision.

Reports	Year	Content	Emphasis
Strategies			
IMM Strategic Plan	**2020-2024**	- To determine basic management and development strategies in line with the Sustainable Development Goals - Strengthening the natural, physical and social wealth of the city	*Sustainable management of urban services *Natural resource efficiency *Sustainability of energy resources *Sustainable urban development
İzmir Strategy for Living in Harmony with Nature	**2021-2030**	- Harmony of urban and ecological layers - Improving ecological continuity and biodiversity - Rebuilding the urban-rural relationship - Nature-Culture association	*Biodiversity preservation *Ecological continuity *Resilience to natural disasters *Circularity
İzmir Green Infrastructure Strategy	**2017**	- Strengthening green infrastructure with new generation parks and recreation areas and sustainable transportation infrastructure	*Rehabilitation of urban green and blue areas *Green Continuity *Waste and Water Cycle
Action Plans			
Sustainable Energy Action Plan	**2016-2020**	- 20% emission reduction by 2020	*Reduction in energy use *Greenhouse gas emission reduction
Sustainable Energy and Climate Action Plan	**2020-2030**	- Collection and analysis of climate change mitigation and adaptation data - 40% emission reduction by 2030	*Mitigation and Adaptation *Greenhouse gas emission reduction
İzmir Green City Action Plan	**2021**	- Identification of immediate environmental challenges - Creating a green future vision	*Low Carbon Emission *Green Continuity *Biodiversity *Waste and Water Cycle
Territorial Plans			
IMM 1/25.000 İzmir Urban Region Master Plan	**2012**	- Strengthening the natural, physical and social wealth of the city	*Sustainable management of urban services *Natural resource

			efficiency
IDA İzmir Regional Plan	**2014-2023**	- To produce knowledge, design and innovation - Being the attraction centre of the Mediterranean w/ * Strong Economy * High Quality of Life * Strong Society	*Sustainable Production *Entrepreneurship ecosystem *Sustainable Environment *Quality Urban Life *Accessibility *Social Cohesion *Good governance
IMM 1/25.000 İzmir Urban Region Master Plan	**2012**	- Strengthening the natural, physical and social wealth of the city	*Sustainable management of urban services *Natural resource efficiency

To provide a focused understanding of İzmir's overarching climate and sustainability objectives, the following section highlights three key strategic documents: the Green City Action Plan (GCAP), the Sustainable Energy and Climate Action Plan (SECAP), and the İzmir Strategic Plan. These plans have been selected due to their direct relevance to the Re-Value project's goals and their foundational role in shaping the city's approach to climate neutrality, resilience, and integrated urban transformation. While İzmir has developed a broader range of policy frameworks, these three represent the most critical and actionable roadmaps that align with and inform the Re-Value implementation process.

1.2.1 Green City Action Plan of İzmir

İzmir's Green City Action Plan (GCAP), developed as part of the city's commitment under the Covenant of Mayors, outlines a comprehensive framework for addressing climate change and environmental challenges through integrated urban action. The plan sets forth a wide range of measures aimed at enhancing sustainability, resilience, and quality of life across sectors.

A major pillar of the GCAP is urban climate adaptation. The adaptation measures include urban greening strategies, a green and blue infrastructure plan, and actions to address the urban heat island effect. The natural environment is also prioritized through the protection and restoration of wetlands, lagoons, and marine ecosystems, with a particular focus on the sustainability of fishing operations in the Gulf of İzmir.

To ensure effective implementation and monitoring, the GCAP calls for a dedicated administrative structure aligned with the SECAP framework (İzmir Sustainable Energy and Climate Action Plan). It also highlights the importance of raising public awareness, especially around the health impacts of climate change, and understanding sectoral vulnerabilities such as tourism, through targeted studies and resilience-building actions.

GECAP also promotes sustainable mobility, including improvements in mass transit and local mobility systems. Efforts include expanding low-carbon transport infrastructure and encouraging energy-efficient technologies in public transport. Parallel to this, the Municipality is leading an ambitious program to install solar energy systems on publicly owned buildings and land, expected to reduce greenhouse gas emissions by 16 million kilograms and save over 320 million litres of water over 23 years. Public lighting systems are also being upgraded through a citywide LED replacement initiative (İzmir Green City Action Plan).

To support evidence-based policymaking, the GCAP prioritizes a number of strategic assessments and studies, including circular economy assessments in construction projects, feasibility studies for geothermal energy networks, a local renewable energy options study, and the development of a citywide bio-economy strategy and action plan. Additionally, environmental labelling mechanisms are being explored to incentivize sustainability in the private sector.

The Municipality is also working to create financial mechanisms such as subsidy schemes and grant programs to support energy-efficient retrofitting of residential buildings and promote urban transformation in designated renewal zones. Complementing these actions are initiatives for waste management reform, including mandatory separation of recyclable materials at the district level and accelerated investments in composting and materials recovery facilities, aligned with İzmir's 2018 Integrated Solid Waste Management Plan.

Water cycle management is addressed both at the infrastructure and building levels. Planned investments include separating wastewater and stormwater lines, expanding water transmission networks, and integrating sponge city principles into urban design. At the building scale, retrofitting of municipal structures to incorporate sustainable drainage systems (SuDS/WSUD) and green stormwater storage is encouraged.

Policy and regulatory frameworks are also being revisited to align with İzmir's climate ambitions. This includes updates to planning regulations to ensure energy efficiency, climate resilience, and efficient water and waste management in new developments. Furthermore, the plan supports multi-stakeholder collaboration across utility companies, private sector actors, and civil society, especially for transforming risk-prone urban areas under national legislation (Law 6306).

1.2.2 Sustainable Energy and Climate Action Plan (SECAP)

By joining the Covenant of Mayors (CoM), İzmir Metropolitan Municipality (IMM) has committed to an ambitious climate and energy agenda: reducing greenhouse gas (GHG) emissions by at least 40% per capita by 2030 (compared to the 2018 baseline), increasing climate resilience, and ensuring secure, sustainable, and affordable energy access. Developed in close alignment with the Green City Action Plan (GCAP), İzmir's SECAP complements the city's broader vision of a nature-compatible, livable urban future, as embedded in the IMM Strategic Plan and İzmir's engagement with the EBRD Green Cities Framework since 2019 (İzmir Sustainable Energy and Climate Action Plan).

SECAP Development Process

The SECAP was developed according to the Covenant of Mayors (CoM) methodology, including the preparation of a Baseline Emissions Inventory (BEI) and a Risk and Vulnerability Assessment (RVA), which informed the design of targeted mitigation and adaptation measures. The process involved extensive stakeholder engagement—over 100 participants, including municipal departments, civil society, and experts, contributed through workshops and consultations initiated in December 2019.

Key Emissions Findings

In 2018, İzmir's total GHG emissions stood at 25.06 million tCO_2e. The industrial sector accounted for the largest share (31.4%), followed by transportation (23%), residential buildings (14.3%), and non-residential buildings (8.8%). Emissions from the Municipality buildings itself made up only 0.8% of the total.

Mitigation Priorities

The SECAP mitigation actions were formulated based on existing policy frameworks such as the İzmir Transportation Master Plan (2019), the Integrated Solid Waste Management Plan, and the IMM Strategic Plan (2020–2024). Key measures include:

- Deployment of intelligent transportation systems and electric buses (20 e-buses in service)
- Enhancement of energy efficiency in buildings via national regulations and urban transformation projects
- Expansion of renewable energy use, especially small-scale solar installations planned after 2025
- Initiatives for biogas production from landfills, manure management, and efficient irrigation

Adaptation Strategy

The climate risk assessment identified impacts across 12 sectors and 9 climate hazards, focusing on agriculture, energy, health, water, biodiversity, and infrastructure resilience. In response, 30 adaptation actions were designed to address vulnerabilities, improve emergency preparedness, and ensure long-term urban resilience.

SECAP Implementation and Purpose

The final SECAP report outlines 34 mitigation and 30 adaptation actions, spanning infrastructure investment, regulatory reforms, emergency management, capacity building, and advocacy. These actions aim to decarbonize İzmir's urban systems while enhancing adaptive capacity. İzmir's SECAP represents a foundational step toward a sustainable, climate-resilient city, reinforcing its leadership in local climate action within both national and international frameworks.

1.2.3 İzmir Metropolitan Municipality Strategic Plan of 2020-2024

İzmir's Strategic Plan draws inspiration from the city's rich historical heritage and positions İzmir as a dynamic hub connecting East and West, revitalizing ties in the Mediterranean and Eastern regions. The goal is to align the city's development with its inherent natural characteristics while fostering global integration.

The plan is built around 7 Strategic Targets and 26 Strategic Objectives. These objectives align with the UN Sustainable Development Goals (SDGs), with 16 directly derived from the SDGs, and 10 tailored to İzmir's local context, ensuring a balance between local needs and global development trends.

Key Strategic Targets includes:

1. **Infrastructure**

   The plan focuses on urban transformation and green infrastructure. Urban transformation aims for inclusive, in-situ regeneration without displacing communities. Green infrastructure will create a network of parks and ecological corridors linking urban areas to rural spaces, offering citizens access to green spaces and clean air.

2. **Quality of Life**

   Improving the public transportation system, expanding smart traffic systems, and enhancing access to healthcare, sports, and clean energy are key priorities. These measures aim to make İzmir more sustainable and livable for all residents.

3. **Economy**

   The strategic objective is to create a vibrant, innovative economy that attracts global investors and innovators, while addressing poverty, inequality, and unemployment. İzmir will become a global tourism hub and a center for innovation in various industries.

4. **Democracy**

   This target aims to expand the concept of democracy beyond elections to include participatory governance, where citizens, especially women, youth, and disadvantaged groups, actively contribute to decision-making. Platforms like İzmir Meetings will ensure diverse voices are heard.

5. **Nature**

   İzmir strives to create an urban environment where humans live in harmony with nature, emphasizing the protection of biodiversity, climate action, and sustainable resource management. The city will focus on aquatic and terrestrial life conservation to ensure a healthy ecosystem.

6. **Learning by Living**

   A strong focus on human capital development is key to achieving the plan's goals. İzmir will transform into a living campus, where education, innovation, and capacity building happen continuously, enabling residents to actively participate in shaping the city's future.

7. **Culture and Art**

   İzmir aims to foster a thriving cultural and artistic environment, supporting creative expression and cultural innovation. The city will become a center for artistic production, with a focus on visual arts, music, and sculpture, contributing to the creative economy.

Strategic Linkages Between the Re-Value Project and the İzmir Metropolitan Municipality's 2025–2029 Plan

The proposed project is in direct alignment with the principles outlined in the İzmir Metropolitan Municipality 2025–2029 Strategic Plan, particularly those emphasizing sustainability, inclusivity, culture and

the arts, and participatory governance. Through its environmental, social, and cultural dimensions, the project contributes holistically to the overarching objective of creating a sustainable and livable city.

Strategic Goal 2: Enhancing Social and Economic Development with a Sustainability Approach to Strengthen Community Resilience in an Innovative İzmir

Objective 2.1: Ensuring Adaptation to Climate Change through Sustainable Environmental and Energy Management

Re-Value makes a direct contribution to the municipality's efforts to combat climate change and promote sustainable environmental and energy practices. In particular:

- Nature-based solutions and green infrastructure are employed to support urban ecosystems;
- Expansion of open and green spaces increases carbon sink areas;
- Spatial strategies are developed to mitigate the urban heat island effect.

These elements demonstrate the project's strong alignment with the climate adaptation and sustainability objectives specified under Strategic Goal 2.

Strategic Goal 3: Creating a Dynamic City through Participatory, Transparent, and Digitally-Driven Democratic Governance and Culture-Art Activities by Strengthening Institutional Capacity

Objective 3.3: Promoting Cultural and Artistic Activities, Supporting Lifelong Learning Opportunities, and Building Global Connections to Foster the Emergence of a Global İzmir

The Re-Value project integrates spatial design and implementation strategies aimed at enriching the city's cultural fabric and enhancing public life. It contributes to urban identity formation and strengthens the sense of belonging. Specifically:

- Public spaces are designed or restructured to host cultural and artistic events, encouraging cultural interaction;
- Urban aesthetics and collective memory are prioritized in the re-functioning of spaces;
- Practices that support civic awareness and social cohesion are embedded within the project framework.

Furthermore, the project incorporates:

- Participatory and inclusive design methodologies,
- Actions promoting social equity and inclusivity,
- Holistic, user-centered public space arrangements,
- A governance model rooted in active citizen participation.

Accordingly, the project is closely related to the strategic action areas of Urban Design and Aesthetic Services, Public Space Redevelopment, and Culture and Art Events and Promotional Activities.

1.2.4 Mission City İzmir

In 2021, İzmir decided to take a place on a path that produces radical solutions to global climate change with an innovation and governance system seeking to improve the life of the city and of the people who live there. Therefore, İzmir has made an application with great devotion, which supports the transformation of cities into climate neutral cities by 2030. IMM authorized İZENERJİ to carry out the application and the process. According to the official statement made by the European Commission on April 28, 2022, İzmir has been qualified to be one of the 112 cities selected for the Mission.

After the announcement of İzmir's election as the Mission City, İzmir started to work with great ambition to establish a city alliance with an innovative, fair, transparent, participatory governance model. Under the coordination of IZENERJI (İzmir Metropolitan Municipality Energy Generation, Storage, Transmission, Distribution, Import, Export and Trade Joint Stock Company), a major initiative has been attempted to create a platform with broad participation, which includes many sectors such as energy, transportation, circular economy, industry, and includes public, private sector, academia, and non-governmental organizations. It is aimed to successfully follow this innovative path presented by the European Commission, together with the citizens of İzmir, for a climate-neutral future and a more liveable city.

Global Climate Community (GCC) was established for the purpose of planning and coordinating İzmir's Climate Neutral and Smart Cities Mission Journey. This will carry out the process that will enable İzmir to gain the "Mission" label. Aiming to be climate neutral in 2030, it will prepare a Climate City Contract.

After the announcement as one of the Mission Cities, İzmir organized awareness meetings by bringing together many different sectors as a first step to create a city-wide alliance. The aim of the awareness meetings was to provide information about the EU Cities Mission concept and to invite the city's stakeholders for a participatory process.

Awareness raising meetings were held with many organizations such as İzmir Governorship, İzmir District Municipalities, IMM subsidiary companies, İzmir Development Agency, chambers of commerce, industry and professions, academics, electricity distribution company, non-governmental and media organizations and banks, etc.

Following the awareness raising meetings, the GCC İzmir Launch was held on May 5, 2023 and the first Steering Committee meeting was held on August 3, 2023. İzmir's Climate City Contract (CCC) preparations were completed with the support of the organizations in the Steering Committee.

In September 2023, 27 Cities (including İzmir) submitted their Climate City Contract applications to the NetZeroCities Platform. According to the official statement made by the NetZeroCities Platform, it was announced that İzmir passed the eligibility check, which is the first qualifying step to earn the Mission label. After İzmir submitted the first version of CCC, a total of 12 meetings have been organized so far with 6 working groups for a stronger CCC. An environment for comprehensive discussion was provided with the Working Group representatives about İzmir's current situation towards the net zero target, their expectations, opinions and suggestions regarding the process were received.

Following the 2024 local elections, certain institutional adjustments were made within the governance structure of İzmir's Climate-Neutral and Smart Cities Mission. As part of this restructuring, the responsibility

for coordinating İzmir's Mission City activities was transferred in 2025 to the Mission Action Lab, a newly established entity within the İzmir Planning Agency (IZPA).

The İzmir Planning Agency (IZPA) is a strategic urban planning and design institution established by the İzmir Metropolitan Municipality to guide the city's sustainable transformation. Operating at the intersection of research, policy, and practice, IZPA develops integrated solutions in areas such as climate resilience, mobility, land use, and participatory urban governance. Within the scope of the İzmir part of the Re-Value project, joint studies have been initiated in collaboration with the agency.

The Mission Action Lab serves as a collaborative and cross-sectoral platform designed to guide, implement, and monitor mission-oriented urban transformation processes. Positioned within the strategic ecosystem of IZPA, the Lab brings together public institutions, academia, private sector actors, civil society, and citizens to co-create inclusive, sustainable, and data-informed solutions in line with İzmir's mission goals and international climate commitments.

One of the Lab's primary areas of focus is Financing Models and Access to Finance, aiming to explore diverse and innovative funding strategies that will ensure the financial feasibility and long-term sustainability of climate actions. This includes identifying mechanisms to leverage public and private resources, EU funding instruments, and place-based investment models to support İzmir's net-zero transition.

1.3. The Re-Value Pilot and the Integration with Key Strategic Documents

The Re-Value project directly aligns with the core objectives of the İzmir Green City Action Plan (GCAP) and progresses in an integrated manner with the strategic targets supporting urban sustainability. The Green City Action Plan identifies İzmir's environmental challenges and presents a strategic framework for addressing the most urgent areas requiring intervention. Among the 47 actions identified in this framework, particularly Group 13: Addressing the Urban Heat Island Effect and Group 14: Implementing Urban Greening Strategies are directly related to our project. Detailed explanation for each group is given below:

Group 13: Reducing the Urban Heat Island Effect

The Re-Value project is directly aligned with actions aimed at reducing the urban heat island effect in urban areas. The main actions within the GCAP, which have important insights for the Re-Value Project is as follows:

- Increasing the number of trees and plants,
- Implementing cooling and reflective roof-pavement applications,
- Developing shading strategies for urban areas,
- Preserving biodiversity and enhancing ecosystem services,
- Utilizing water-efficient solutions in public open spaces.

These actions form the core components of the Re-Value project for the Waterfront Pilot in İzmir.

Group 14: Implementing Urban Greening Strategies

The Re-Value project aims to strengthen green infrastructure, regulate microclimates, and enhance carbon sequestration capacity. In this regard, the following actions in the GCAP are targeted:

- Creating interconnected and compatible urban green spaces,
- Supporting blue infrastructure (water features, rain gardens, etc.) for microclimate cooling,
- Preserving and enhancing urban biodiversity,
- Ensuring rainwater management and conserving water resources,
- Improving air quality,
- Creating green public spaces that enhance social interaction.

These objectives also form the ground for the main focus points of the Re-Value Pilot.

Through this integration, the environmental sustainability goals of the İzmir Green City Action Plan and the climate-neutral solutions developed in our project complement each other. The integration of green and blue infrastructure will contribute to ecological continuity within the city while supporting İzmir's goal of becoming a more livable, resilient, and healthy city.

Another important topic is the project's relationship with the İzmir Sustainable Energy and Climate Action Plan (SECAP), which presents a comprehensive roadmap aimed at reducing greenhouse gas emissions and increasing the city's resilience to climate change. Our project supports the reduction and adaptation strategies outlined in this action plan by promoting solutions that facilitate access to green and blue infrastructure.

Within the framework of İzmir's Sustainable Energy and Climate Action Plan (SECAP), a total of 58 actions have been developed in coordination with the İzmir Green City Action Plan. These actions are categorized based on their thematic areas, each assigned a unique action code. The action code "LU" pertains to the land use category, focusing on sustainable land management and urban planning strategies. This category aims to guide İzmir towards environmentally conscious land utilization, contributing to the city's overarching climate resilience and sustainability objectives.

Action: Reducing the Urban Heat Island Effect

This action identified in SECAP involves determining and implementing techniques to reduce the urban heat island effect. Our project, in alignment with this goal, includes:

- Increasing the number of trees and plants to provide more shading throughout the city,
- Promoting green roofs to enhance building insulation capacity,
- Reducing urban heat accumulation through the use of reflective surfaces for roofs and pavements,
- Enhancing biodiversity in urban areas to strengthen ecosystem services.

Actions: Developing Green and Blue Infrastructure Strategies

These actions in SECAP aim to create a climate-friendly green space network across İzmir and integrate these spaces with water management. In this context, our project:

- Develops green infrastructure to reduce the urban heat island effect,
- Integrates blue infrastructure (rain gardens, water retention areas, etc.) to strengthen rainwater management,
- Creates connected green spaces to enhance carbon sequestration capacity,
- Contributes to İzmir's sustainability vision by supporting Nature-based Solutions that enhance urban ecosystems.

Through these actions, our project aligns directly with the goals of developing climate-neutral solutions, creating nature-based designs, and strengthening green connections as outlined in the İzmir Sustainable Energy and Climate Action Plan. The integration of green and blue infrastructure not only reduces carbon emissions but also contributes to making İzmir a climate-resilient and livable city.

2 The Re-Value Waterfront Pilot

2.1 Project Overview and Conceptual Area

The Re-Value project for İzmir aims to accelerate the implementation of climate-neutral, inclusive and nature-based urban transformation by advancing the concept of Sustainable Green Zones (SGZs). Targeting the city's dense urban fabric and the waterfront surrounding İzmir Bay, the project aligns with principles of the New European Bauhaus (NEB) by promoting interventions that are sustainable, aesthetically enriching and socially inclusive. These principles contribute to İzmir's broader vision of becoming a resilient and climate-adaptive city.

İzmir currently faces a series of systemic urban and environmental challenges resulting from high-density urban development along its waterfront. These challenges include the urban heat island effect driven by rising surface temperatures, as well as marine pollution, sea-level rise, soil salinity, and increased vulnerability to flooding. In addition to these environmental pressures, limited social accessibility to the waterfront and public spaces at the urban scale remains a significant issue, affecting equitable use and livability in coastal and inner-city areas. These complex issues have been highlighted in the city's key strategic planning documents, including the İzmir Green City Action Plan (GCAP), Sustainable Energy and Climate Action Plan (SECAP), and the İzmir Strategic Plan, as described in the previous chapter.

A core objective of the Re-Value project is to address these multifaceted urban and environmental challenges by fostering the development of integrated, site-specific, and scalable solutions that harmonize urban and ecological layers, with a particular emphasis on the green public spaces and waterfront connections. A key objective is for each city to develop a comprehensive roadmap that guides the implementation of climate-neutral strategies through participatory, adaptive, and place-based planning methodologies.

At the heart of the Re-Value project lies a conceptual framework structured around three interlinked spatial zones along İzmir Bay:

- Waterfront Zone: The inner bay coastal strip, where public accessibility, climate resilience, and ecological restoration are prioritized.
- Urban Zone: Dense built-up areas adjacent to the coastline, characterized by high levels of impervious surfaces and increased vulnerability to climate-related impacts.
- Urban Green Zone: Existing and potential green public spaces embedded within the urban fabric, envisioned as ecological connectors and catalysts for sustainable urban transformation.

Figure 2. Designated priority areas for action along the coastal–urban interface in central İzmir (Image credit: IZTECH & IMM).

The Re-Value project in İzmir addresses key urban and environmental challenges that hinder the city's path toward a climate-resilient future. Identified collaboratively with local stakeholders during an Impact Model Workshop, these challenges include the Urban Heat Island effect—driven by dense development and limited green cover—and the widespread presence of impervious surfaces, which exacerbate flood risks and reduce environmental comfort (See Sections 2.3 & 2.4).

By strengthening green connectivity across these identified zones, İzmir's ambition within Re-Value project is to mitigate critical urban risks such as heat stress and flooding, while simultaneously improving the water permeability and reducing the surface temperatures. These measures contribute directly to İzmir's broader strategies for climate resilience, urban livability, and ecological restoration. Design solutions within these zones will prioritize low-carbon, nature-based approaches, supporting both environmental performance and social well-being.

A cornerstone of the project is its commitment to participatory design processes, especially through the application of Citizen Design Science (CDS) methods. These approaches enable the co-creation of site-specific solutions by involving local residents in the design and implementation of climate-neutral interventions in public spaces. This participatory design approach ensures the inclusion of local urban stakeholders in shaping climate-neutral interventions in public spaces, fostering ownership and long-term impact. The knowledge and practices developed through these participatory processes will inform the creation of a city-wide Sustainable Green Zone (SGZ), designed to be adaptable and replicable across other urban districts in İzmir and beyond.

The Re-Value project is fully aligned with İzmir's existing sustainability agendas, including the Green City Action Plan (GCAP), Sustainable Energy and Climate Action Plan (SECAP), and the İzmir Strategic Plan, as described in the previous chapter of the present report. It also works in close collaboration with the İzmir Climate-Neutral and Smart Cities Mission team, ensuring coherence with the city's long-term environmental and climate objectives.

Ultimately, the ambition for İzmir is to deliver a scalable SGZ model that integrates Nature-based Solutions, digital tools, and inclusive governance mechanisms, positioning the city as a forward-looking, climate-adaptive, and resilient urban center. With the project, İzmir committed to go beyond the state of art against 6 systemic challenges:

Ongoing/Existing Projects

Several ongoing projects in İzmir form a critical foundation for testing and scaling the SGZ concept across the city. These initiatives contribute to İzmir's climate-neutral and low-carbon urban transformation goals:

- Waterfront Project (The İzmirSea-İzmirDeniz Project): Focuses on enhancing the quality of life and public use of the coastline with an innovative design approach.

The İzmirSea Project (İzmirDeniz) is a strategic urban design initiative launched by the İzmir Metropolitan Municipality in 2009 (2009-2018), with the aim of enhancing the quality of public life by fostering stronger connections between residents and the sea, while promoting sustainable and inclusive urban development. As articulated by Professor İlhan Tekeli, the project is envisioned as a transformative effort that is egalitarian, multi-voiced, and deeply integrated into the urban fabric rather than imposed upon it.

The objectives of the İzmirSea Project are broad and multifaceted, encompassing the enhancement of residents' engagement with the sea, the preservation of the Mediterranean coastal lifestyle, and the promotion of a sense of urban "wholeness." The project also seeks to improve site-specific parks, recreational areas, and public spaces, creating inclusive environments where people from diverse socioeconomic backgrounds can interact. An emphasis is placed on increasing public awareness of design and fostering a collaborative approach to urban design, bringing together a wide range of designers to contribute to the city's evolution.

The municipality facilitated a series of collaborative, interdisciplinary workshops and public surveys aimed at developing a design and cultural strategy for the city. The outcome of these efforts was the creation of the İzmirSea project, which was rolled out across five distinct waterfront regions. Each region was addressed by multidisciplinary design teams, which collaborated to produce proposals for a series of projects, large and small, implemented in phases.

Following the survey results, it was identified that the Bayraklı region exhibited a complex socio-economic profile, characterized by low income levels, high migration rates, and a fragmented connection between its coastal and residential areas. This led to the development of the 'Bayraklı Waterfront Urban Design Project,' which has now been completed. The success of the project is evident in the revitalized public spaces, marked by popular amenities such as mobile phone charging stations, food kiosks, and increased usage by youth, cyclists, and families. Public spaces such as picnic areas, playgrounds, and public art installations have become focal points for community interaction. Spanning a 40-kilometer shoreline, it has significantly enhanced public accessibility, created pedestrian and cycling routes, and democratized coastal spaces. By

integrating citizen input through forums and design workshops, the project fostered transparency, inclusiveness, and local ownership. It also prioritized ecological resilience with nature-based solutions like soft shoreline interventions and green buffers. Beyond physical transformation, İzmirDeniz has enriched social life with cultural and recreational activities, while boosting İzmir's image as a livable coastal city with strong tourism potential. Overall, the project serves as a replicable model of public-oriented and adaptive coastal management for other urban contexts.

Figure 3. Bostanlı, Karşıyaka Stage of the İzmirSea Project-1 (Image credit: IMM, Directorate of Urban Design and Aesthetics).

Figure 4. Bostanlı, Karşıyaka Stage of the İzmirSea Project-2 (Image credit: IMM, Directorate of Urban Design and Aesthetics).

- Bostanlı Axis (Cemal Gürsel – Climate-Adaptive Street Project): Includes sustainable design solutions at the street scale to mitigate climate change impacts[1].

Cemal Gürsel Street, located in the Bostanlı district of İzmir's Karşıyaka Municipality, serves as a key urban artery due to its proximity to various public transportation modes, including ferry, tram, and bus systems. Within the framework of Karşıyaka Municipality's participatory urban design initiative, the "Climate-Adaptive Urban Area: Cemal Gürsel Street" project was developed in collaboration with İzmir Metropolitan Municipality. The project aimed to mitigate the effects of climate change and improve urban environmental quality through Nature-based Solutions on a street-scale intervention area of approximately 18,100 m².

Figure 5. Cemal Gürsel Street, Karşıyaka, İzmir (Image credit: IMM, Pelin Özden's archive).

Adopting the Citizen Design Science (CDS) methodology, the project engaged 153 participants including local residents, business owners, and visitors. Participants were invited to share their observations, needs, and spatial experiences through analogue design tools, such as 3D models, mapping exercises, and participatory surveys. The co-design process emphasized transparency, inclusiveness, and data-driven governance, involving the community at every stage; diagnosis, design, decision-making, and implementation.

[1] Özden, P., Velibeyoğlu, K. (2023). Co-Design of a Public Space and the Implementation: Atakent (Car) Park. Mimarlik Bilimleri ve Uygulamalari Dergisi, 8(2), 897-910., Doi: 10.30785/mbud.1378848.

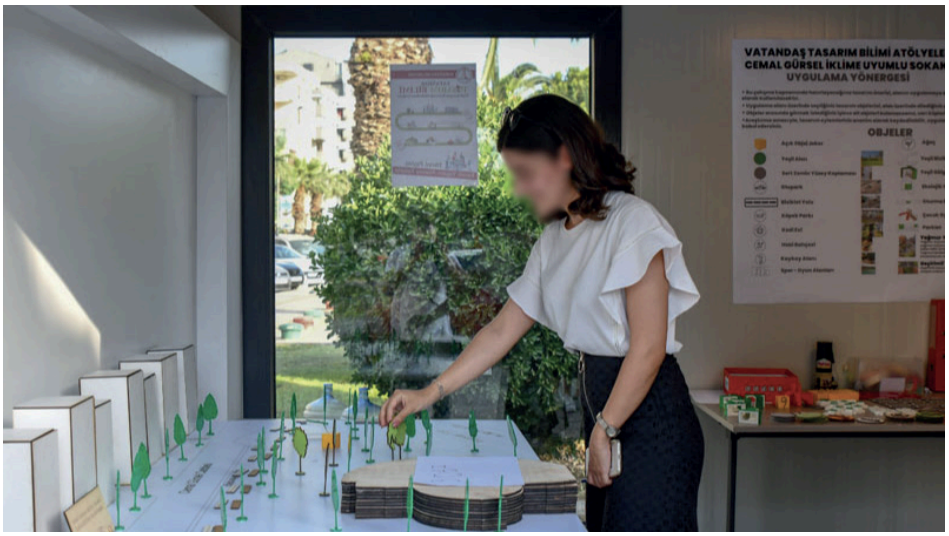


Figure 6. Co-design process of Cemal Gürsel Street (CDS) (Photo credit: IMM, Pelin Özden's archive).

The design approach of the Cemal Gürsel Street project was grounded in climate-sensitive strategies aimed at transforming the area into a resilient and livable public corridor. The project focused on reducing the urban heat island effect by introducing shaded public spaces, enhancing green infrastructure and biodiversity, and encouraging walkability through the use of eco-friendly and permeable surface materials. Additionally, rainwater harvesting systems were integrated into the design to improve water management, and the spatial program was developed to support multifunctional public uses in line with the expressed needs of local residents. Collectively, these interventions aimed to reclaim a previously car-dominated axis as an inclusive and ecologically responsive urban environment (Figure 5).

Figure 7. Cemal Gürsel Street Concept Design (Image credit: IMM, Özden, P.).

The Cemal Gürsel Street project stands as a model of urban transformation through participatory and ecologically responsible design. Beyond its spatial improvements, it demonstrates how citizen knowledge and local insights can be integrated into professional planning frameworks to enhance public trust and urban resilience. The project exemplifies a bottom-up, inclusive approach to sustainable urban governance and climate adaptation at the neighborhood scale.

Figure 8. Cemal Gürsel Street Concept Design (Image credit: IMM, Özden, P.).

- Polygon Axis (İnciraltı CDS Studies): Aims to develop Nature-based Solutions and green infrastructure that contribute to climate-neutral urban transformation processes.

Located within the İnciraltı Urban Forest in Balçova, İzmir, the Polygon Axis project aims to enhance the quality, inclusivity, and climate adaptability of one of the city's most significant public green spaces.

The project was implemented as part of the Re-Value framework through the Citizen Design Science (CDS) methodology, coordinated by IZPA Active Citizenship Office. The focus was on co-producing spatial data and user-driven insights to guide future interventions in İnciraltı's urban ecosystem (Figure 9).

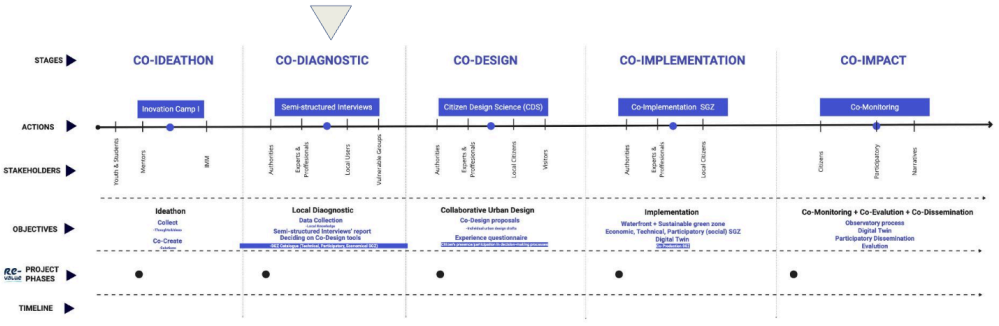


Figure 9. Co-Creation schema (Image credit: Özden, P.).

The co-diagnostic phase combined observational studies, surveys, and face-to-face interviews with diverse user groups over a seven-day period between February and March 2025. A total of 9,185 individuals were observed, 158 citizens responded to the analogue and digital surveys, and 26 participants engaged in in-depth interviews. These methods were grounded in tools adapted from[2], addressing themes such as demographic diversity, user mobility, inclusiveness, safety, and public space satisfaction (Figure 10).

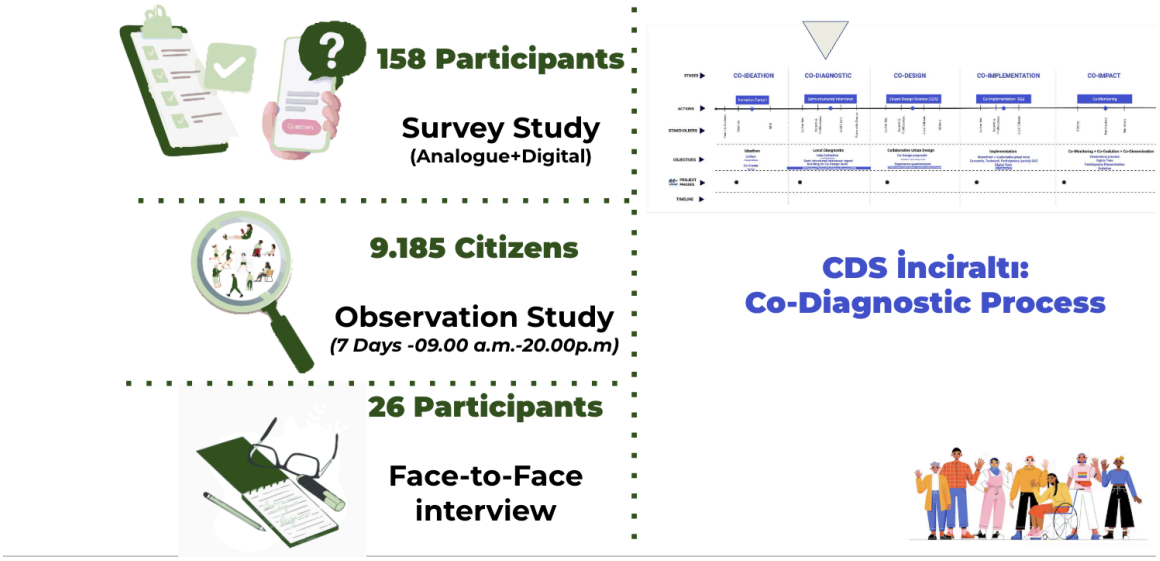


Figure 10. Co-diagnostic process in İnciraltı, İzmir (Image credit: Özden, P.).

The fieldwork revealed major physical, social, and climatic barriers in İnciraltı. Participants emphasized the lack of accessible urban furniture, public toilets, drinking fountains, shade structures, safety mechanisms, inclusive playgrounds, and adequate lighting. Observations also indicated that upper coverings were insufficient for protection against both summer heat and rain, while pavement conditions posed challenges for parents with strollers, elderly citizens, and persons with disabilities.

The project uncovered specific spatial and social challenges:

- High presence of vulnerable groups (e.g., elderly, women, children, people with disabilities) during specific time slots, with uneven distribution of amenities.
- Climate exposure risks due to impermeable surfaces and lack of shaded areas.
- Security concerns arising from limited surveillance, inadequate lighting, and reports of substance use and uncontrolled animals.
- Accessibility inequalities, including limited public transportation options and infrastructure gaps for users with mobility aids.

User feedback highlighted the desire for more event-based activation of the open-air theatre, better signage systems, expanded bike infrastructure, and affordable public services like social cafes and water refill

[2] 1. Gehl & Partners. (2023). People & Public Spaces – Usage Patterns of Public Spaces in Munich.

stations. Insights from the participatory process will feed into the co-design and co-implementation phases of the Re-Value project.

The İnciraltı CDS study represents an innovative approach to rethinking green urban spaces through localized knowledge and collaborative diagnostics. It showcases how integrating citizen-led data with professional planning tools can lead to spatial justice, resilience, and civic empowerment. The findings form a replicable model for participatory public space development in climate-sensitive urban regions. These projects provide valuable insights for the implementation of climate-neutral design tools and reinforce the city's commitment to expanding the Sustainable Green Zone model in diverse urban contexts.

2.2. The Waterfront Pilot: Alsancak

In line with the overall objective, Alsancak has been selected as the pilot area for the Re-Value project due to its significant urban characteristics and environmental challenges. Located along the northern coastline of İzmir Bay, Alsancak is a densely developed district. It is characterized by dense urban development, high population density, and strategic proximity to key transportation routes. This centrality makes Alsancak a major hub for residential, commercial, and recreational activities.

The district is notable for its waterfront, which offers opportunities for public engagement with the sea, although access to these areas remains limited due to urbanization. Alsancak also faces a range of environmental challenges, including the urban heat island effect caused by increased surface temperatures, flood risks, and soil salinity. The impermeability within Alsancak, caused by dense urbanization resulting in stormwater runoff, further reducing the region’s natural capacity for water absorption.

Given these challenges, Alsancak was chosen as the ideal location for the Sustainable Green Zone (SGZ) concept implementation within the Re-Value project. The project aims to address these issues by introducing green infrastructure and Nature-based Solutions, developed through participatory methods. These solutions are designed to reduce the surface temperatures, mitigate impermeability and flood risks, and enhance both the climate resilience and livability of public spaces.

By implementing participatory design methods, the project will integrate ecological and urban layers to strengthen the district’s resilience to climate change while improving the quality of life for its residents. Alsancak serves as an exemplary area for the Re-Value project, representing the urban and environmental challenges faced by İzmir, and is well-suited for the implementation of sustainable, Nature-based Solutions.

Figure 11. Pilot study area boundaries in İzmir, covering the neighborhoods of Alsancak, Mimar Sinan, and Kültür (Image credit: IMM).

Alsancak, like other focus areas studied through the SGZ concept, is structured around three main spatial zones:

- The Waterfront Zone, including the Alsancak Promenade (Kordon), is a coastal strip that is socially significant, offering unique opportunities for public engagement with the waterfront.
- The Urban Zone, including the dense urban fabric and a network of streets such as Dominik Caddesi that offer potential for strengthening green and public space connections; and
- The Urban Green Zone, anchored by Kültürpark, one of the city's largest green spaces, serves as ecological anchors but also faces challenges such as biodiversity loss and limited integration with the surrounding urban tissue.

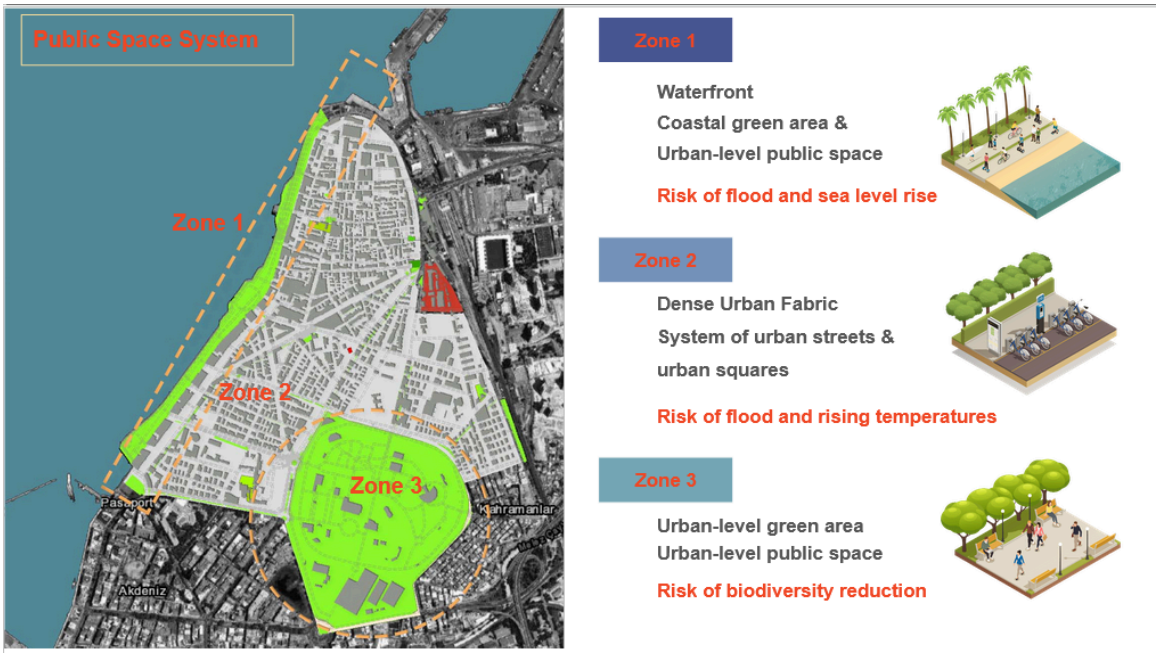


Figure 12. Three defined zones identified within the İzmir pilot study area (Image credit: IZTECH & IMM).

The overarching goal in Alsancak is to develop a roadmap and action plan that supports the district's transition toward climate neutrality, by focusing on the climate-neutral transition of these three major zones. Following, a key focus is to enhance green connectivity across the district's three main zones by integrating climate-neutral interventions, particularly within the dense urban fabric. Streets and squares in this second zone will serve as vital corridors, linking fragmented green and public spaces and enabling a more continuous green infrastructure network. Strengthening these spatial connections will help reduce surface temperatures, alleviate heat stress, and improve overall environmental quality and urban comfort.

In the project, each zone will be addressed with tailored strategies: improving water permeability and addressing flood risks along the waterfront; implementing nature-based interventions within dense urban areas to mitigate the urban heat island effect; and increasing biodiversity in large urban-scale green spaces such as Kültürpark. These combined efforts aim to boost Alsancak's environmental performance and livability.

The resulting action plan will be closely aligned with İzmir's broader planning frameworks to ensure coherence and scalability. In doing so, the project aims to position Alsancak as a key demonstration site, contributing meaningfully to the city's long-term climate resilience and sustainability goals.

Solution Proposals:

In the Waterfront Zone, proposed interventions include nature-based solutions that address coastal flood risks, improve ecological functions, and enhance public accessibility. These measures aim to strengthen the interface between the urban edge and the coastline to increase citizen's interaction with the waterfront while responding to growing environmental pressures such as sea-level rise and stormwater runoff.

In the Urban Zone, strategies are centered on enhancing green connectivity between Kültürpark and the coastline. This will be achieved through a network of climate-neutral interventions—such as greening

streets, squares, and intersections—that function as ecological and social corridors. These corridors will not only connect fragmented green and public spaces but also play a key role in reducing urban heat and improving overall environmental quality.

The Urban Green Zone, anchored by Kültürpark, offers opportunities for biodiversity enhancement at the urban scale. Proposed actions aim to conserve current ecological richness and support ongoing habitat health. These efforts will be complemented by awareness-raising activities designed to foster public understanding and engagement with urban biodiversity.

Cross-cutting design solutions across all zones may include:

- Increasing permeable surfaces along roads, sidewalks, and parking areas to improve water absorption and reduce runoff
- Expanding green corridors and reinforcing connections through strategic tree planting, and improving pedestrian accessibility
- Promoting natural landscaping to provide shade, enhance urban comfort, and counteract the urban heat island effect
- Redesigning existing green spaces to foster active social use
- Ensuring that public green spaces are accessible and inclusive for all social groups

Collectively, these nature-based approaches aim to increase the availability and quality of green space, reduce environmental vulnerabilities, and improve the overall livability of Alsancak. The integrated strategy contributes to a climate-resilient urban model that aligns with İzmir's broader sustainability and climate neutrality objectives.

The interventions planned for Alsancak will be further developed through climate-neutral scenario-building processes. To ensure inclusive participation, the Citizen Design Science (CDS) method will be applied, engaging youth, residents, experts, and local authorities in co-producing solutions. This participatory framework will be complemented by a data-driven approach, enabling the integration of scientifically informed digital tools into scenario development.

A key component of this process is the application of the Digital Twin methodology, which will facilitate the analysis of climate-related risks and support scenario-based urban planning. The Digital Twin Roadmap, developed within this framework, will guide the implementation of climate-neutral interventions and contribute to a more integrated and adaptive urban planning process aligned with İzmir's broader development goals. The proposal of İzmir included the development of an online environmental dashboard for monitoring issues such as urban flood management and ecosystem vulnerability, which has since evolved. Instead, the city is now prioritizing a more comprehensive and integrated approach through the development of a Digital Twin Roadmap under the data-driven scenario-building phase.

Throughout this process, the İzmir team will continue to collect and integrate data in collaboration with relevant municipal institutions and organizations, including the İzmir Planning Agency. Key datasets—such as urban heat island assessments, impervious surface maps, green space inventories, climatic data (temperature and precipitation), and mobility network analyses. The roadmap will utilize the same data

inputs to support dynamic scenario planning, enhance spatial analysis, and guide climate-neutral interventions, offering a more robust tool for strategic urban planning.

2.3 Pilot Opportunities and Challenges

2.3.1 Opportunities

Alsancak presents several strategic and spatial opportunities as a pilot area for testing and demonstrating climate-neutral interventions within the scope of the Re-Value project:

- High Public Visibility and Symbolic Value: Alsancak's strategic location along İzmir's prominent waterfront and its historical-cultural significance contribute to strong public recognition. The area's visibility enhances its potential to serve as a demonstration site for innovative climate-neutral interventions and as a reference model for other urban districts.
- Diverse Urban Functions and Lively Social Life: The pilot area integrates a wide range of functions, including cultural, recreational, commercial, and transportation uses. This mixed-use character supports high user density throughout the day and night, offering a dynamic urban environment that is well-suited for testing inclusive and community-oriented planning solutions.
- Existing Transportation and Accessibility Assets: The area is supported by multimodal transportation infrastructure, including metro stations (Çankaya, Basmane, Hilal), İZBAN (Alsancak Station), tram lines, ferry terminals (Alsancak and Pasaport), and pedestrian-oriented connections. This facilitates accessibility and enhances the feasibility of sustainable mobility strategies.
- Green Anchors and Potential for Green Connectivity: Kültürpark, as a major urban green space, and the Alsancak Promenade, as a linear waterfront open space, serve as ecological and recreational anchors. Their presence allows the development of green corridors and public space linkages that can improve climate resilience and urban comfort.
- Youth and Community Engagement Potential: Alsancak hosts a socially diverse population with active civil society participation. The area's vibrancy provides fertile ground for citizen engagement processes, particularly for involving youth and community members in co-designing urban climate solutions through participatory methods such as Citizen Design Science (CDS).
- Cultural Heritage and Identity: The historical significance of Alsancak and its architectural and spatial qualities add value to climate-neutral development, especially through interventions that preserve and reinterpret cultural assets while enhancing environmental performance.
- Potential Synergies with Ongoing Projects: The İzmirSea initiative and other municipal strategies aimed at revitalizing coastal areas offer strategic alignment with the goals of the Re-Value project. These synergies can support integrated planning, co-financing, and long-term implementation.

This set of opportunities highlights the area's capacity not only for piloting innovative solutions, but also for acting as a catalyst for broader city-wide transformations in İzmir's path to climate neutrality.

2.3.2 Challenges

Despite its strong potential, the Alsancak pilot area faces a number of spatial, environmental, and governance-related challenges that may affect the implementation and scaling of climate-neutral interventions:

- Fragmentation of Green and Public Spaces: Although Kültürpark and the Alsancak Promenade serve as key green and open spaces, the lack of continuous and well-integrated green corridors limits ecological connectivity and reduces the potential for coherent green infrastructure development.
- Climate Vulnerabilities: The area is exposed to various climate-related risks, including increasing surface temperatures due to dense urban fabric and impervious surfaces, as well as flood risks in low-lying coastal zones. These vulnerabilities require targeted, multi-scale adaptation strategies.
- High Urban Density and Limited Available Space: The dense built environment and limited vacant land make it challenging to implement large-scale Nature-based Solutions. Interventions must be carefully integrated within existing urban form, often requiring reallocation or transformation of existing uses.
- Pressure from Economic and Touristic Activities: The district's central location and high touristic value create pressures for commercial development and real estate speculation, which may compete with goals for environmental improvement and social inclusion.
- Maintenance and Management Capacity: Ensuring the long-term success of nature-based interventions and public space improvements requires dedicated resources for operation, maintenance, and adaptive management—areas that often face institutional or financial constraints.
- Complex Stakeholder Landscape: The presence of multiple public institutions, private actors, and civic groups within the area can complicate decision-making processes. Effective coordination and collaboration mechanisms will be essential to align diverse interests toward shared climate goals.
- Risk of Social Inequality: Without inclusive planning and implementation, improvements in public space and environmental quality may contribute to gentrification, potentially displacing vulnerable communities or limiting their access to new benefits.
- Need for Data Integration and Monitoring: While various datasets exist, integrating them into a cohesive system for decision-making remains a challenge. Strengthening the link between scientific data, digital tools (e.g. Digital Twin), and urban planning processes is critical for evidence-based policy development.

These challenges underline the importance of context-sensitive, participatory, and cross-sectoral approaches to ensure that climate-neutral strategies in Alsancak are both effective and equitable. Addressing these barriers is central to unlocking the area's full potential and ensuring the long-term impact of the Re-Value project.

2.3.3 Proposed Future Adjustments Aligned with the İzmir Re-Value Roadmap for the Pilot Area

- Strengthening Green Connectivity and Continuity
    - Developing integrated green corridors that link Kültürpark, the Alsancak Promenade, and smaller green pockets through pedestrian-priority pathways, pocket parks, and nature-based stormwater infrastructure.
    - Prioritizing micro-scale green interventions (e.g.,vertical gardens, permeable pavements) to overcome spatial limitations and reduce urban heat island effects.
- Climate Adaptation at Micro and Meso Scales
    - Implementing multi-level adaptation strategies tailored to the area's specific vulnerabilities—such as green shading structures in high-heat zones and nature-based flood management in low-lying coastal edges.
    - Utilizing urban morphology tools and data analytics (e.g., solar radiation maps, flood risk models) to target critical areas and guide design decisions.
- Adaptive Reuse and Space Reallocation
    - Promoting the transformation of underused public assets (e.g., parking lots, vacant plots, or underutilized edges of infrastructure corridors) into multifunctional climate-resilient spaces.
    - Encouraging temporary and modular solutions (e.g., pop-up parks, mobile green units) that offer flexibility in densely built areas.
- Inclusive and Equitable Urban Interventions
    - Designing all interventions using inclusive design principles and co-creation methods, with a focus on maintaining accessibility and affordability for existing residents.
- Data Integration and Use of Digital Tools
    - Accelerating the development of a Digital Twin framework for the pilot area by integrating urban, environmental, and socio-economic datasets.
    - Using digital simulations and participatory mapping tools in Citizen Design Science (CDS) processes to make urban data more accessible and actionable for the public.

2.4. Impact Model Insights

The Impact Model Workshop, conducted on November 25, 2024, in İzmir, was jointly organized under the leadership of NTNU, the İzmir Metropolitan Municipality (IMM) and the İzmir Institute of Technology (IZTECH) within the framework of the Re-Value Horizon Europe Project. The workshop operationalized the

Re-Value Impact Model methodology in İzmir's designated pilot area, the Alsancak region of the Konak District, encompassing three historically and spatially interlinked neighborhoods: Alsancak, Kültür, and Mimar Sinan.




Figures 13 to 16. Photos of the Impact Model Workshop (Photo credit: IZTECH & IMM).

The session aimed to explore interconnections between ecological, cultural, and socio-spatial dynamics within the urban fabric of the Alsancak Waterfront and Kültürpark, treating them as integrated systems rather than isolated assets. A stakeholder group of 25 participants was formed, comprising representatives from local administrations, professional chambers, academic institutions, NGOs, and neighborhood-based associations. The group was intentionally structured to ensure balanced representation across internal (institutional-professional) and external (community and civil society) actors for each neighborhood.

The workshop structure was designed to foster collaborative scenario development using the Re-Value Impact Model. Participants engaged in thematic discussions and co-creation exercises, which included predefined thematic cards as well as blank cards that enabled the articulation of context-specific concerns and aspirations. Stakeholders widely acknowledged the utility of the model in capturing multi-dimensional urban challenges and in enabling an integrated assessment of co-benefits and trade-offs across ecological, cultural, and social domains. Furthermore, there was a strong consensus on the need to institutionalize such participatory processes to ensure continuity and accountability in urban planning practices.

Emerging Themes and Key Findings:

Several cross-cutting themes emerged from the workshop discussions:

- Environmental and Infrastructural Concerns: Key challenges identified in the pilot area included surface water control issues during rainfall, localized flood risks, environmental degradation, noise pollution from entertainment venues, insufficient waste management, and a lack of both green spaces and accessible parking solutions. The deteriorating housing stock and the need for comprehensive urban renewal were also emphasized.
- Socio-cultural Dimensions: Participants underlined the ongoing erosion of cultural and historical values in the area, alongside a perceived weakening of community identity and sense of belonging. Strengthening local social networks and enhancing governance structures were viewed as essential to reversing these trends.
- Spatial Scenarios and Narrative Building: Three main scenario clusters were developed through group work:
    1. Cooling the City – focusing on climate adaptation measures, particularly addressing urban heat island effects through nature-based solutions and increased vegetation.
    2. Heritage and Habitat – integrating the protection of cultural heritage with ecological restoration strategies to maintain regional identity.
    3. Co-governed Urban Commons – emphasizing participatory governance, inclusive public space design, and innovative use of common urban assets.
- Strategic Alignment and Planning Gaps: The process revealed critical gaps between grassroots community visions and existing regulatory or planning frameworks. Participants stressed the importance of creating holistic, flexible, and adaptive policy instruments that can mediate between top-down and bottom-up planning efforts.
- Recommendations for Future Action: The workshop concluded with a strong call for the integration of spatial and architectural strategies with social innovation and sustainable tourism planning. Nature-based and locally embedded solutions were prioritized as key enablers of long-term urban resilience and quality of life in the area.

Results:

Building on the multi-dimensional insights and collaboratively developed scenarios from the Impact Model Workshop, the next phase of the Re-Value pilot in Alsancak has focused on translating these narratives into actionable strategies—particularly around climate resilience and public space quality. Among the workshop's highlighted priorities, mitigating the urban heat island effect and enhancing ecological connectivity emerged as critical areas for intervention. In response, a scenario-driven, participatory planning process has been initiated to elaborate a Sustainable Green Zone concept that aligns with the workshop's "Cooling the City" and "Co-governed Urban Commons" themes. This initiative emphasizes the use of Nature-based Solutions and data-informed design to strengthen green infrastructure, improve urban microclimates, and foster inclusive, adaptive, and resilient public spaces throughout the Alsancak, Kültür, and Mimar Sinan Neighbourhoods. Through Citizen Design Science and Data-Driven Scenario Building, low-carbon designs and nature-based solutions tailored to the region will be developed. Stakeholder

meetings and workshops under Innovation Cycle I (See section 3 below) will provide more information and solutions to enhance green connectivity and climate resilience in Alsancak.

2.5. Engagement

Stakeholder and citizen engagement is a core component of the Re-Value approach. Therefore, engagement is embedded throughout all phases of the Alsancak pilot activities. Engagement is ensured through active experimentation in innovation cycles of the Re-Value project, together with participatory design methods, and inclusive workshops that foster co-creation and collaborative urban transformation. The process aims to integrate a diverse range of actors—including youth, local communities, experts, municipal departments, and civic organizations—into the climate-neutral planning of the Pilot area.

Key engagement tools employed throughout the pilot include:

- Innovation Camps
- Impact Model Workshop
- Citizen Design Science (CDS) methodology
- Digital Twin Workshops (DTW)
- World Café meetings
- Local thematic and stakeholder meetings

The **Impact Model Workshop**, held on 25 November 2024, marked the starting point of structured stakeholder engagement for the Alsancak pilot. This workshop focused on collaboratively identifying key urban and climate-related challenges in the area. It served as a foundation for co-defining the scope and priorities of subsequent interventions by gathering diverse insights from local actors, professionals, and municipal representatives.

The Citizen Design Science (CDS) methodology and Digital Twin (DT) workshops further support participatory scenario-building. In particular, CDS activities and local meetings contribute to collecting place-based knowledge, mapping community needs, and validating climate-neutral interventions. The World Café format and smaller thematic workshops will ensure broad and meaningful participation throughout the roadmap process.

Besides this, the Innovation Camp series serves as a key tool for engaging young people—especially university students—in climate action within the pilot area. These camps encourage participants to identify local climate challenges and co-develop spatial and design ideas using innovative digital tools. Guided by the New European Bauhaus (NEB) values—climate neutral (sustainable), aesthetics (beautiful), and inclusiveness (together)—the camps promote interdisciplinary collaboration and creativity. The camps foster ownership and awareness, while integrating fresh perspectives into the broader vision of a resilient and inclusive transformation toward a Sustainable Green Zone in Alsancak.

Table 6. Engagement Activities in Detail.

Activity Type	Date	Location / Focus Area	Target Group
Innovation Camp I	November 2023	Pilot Zone Alsancak	University students (general)
Innovation Camp II	October 2024	Pilot Zone Alsancak	Youth, design students
Innovation Camp III	December 2025	Dominik St.	Youth, design students
Impact Model Workshop	November 2024	Pilot Zone Alsancak	Local community, NGOs, Experts
CDS Workshop	May 2025	Dominik St. & surroundings	Local community; Residents, shopkeepers
Digital Twin Workshop I	May 2025	Pilot Zone Alsancak/ Dominik St.	Local community, NGOs
Digital Twin Workshop II	October 2025	Pilot Zone Alsancak/ Dominik St.	Experts, Municipalities, NGOs
Digital Twin Round Table Meeting	November 2025	Pilot Zone Alsancak/ Dominik St.	Experts, Municipalities
World Café Meetings (12 total)	Ongoing 2024–2025	Different locations	Local community, NGOs, Experts

Local Thematic Meetings	Ongoing 2024–2025	Pilot Zone Alsancak/ Dominik St. / Kültürpark	Local community, NGOs, Experts

Table 7. Timetable of the past and future engagement activities.

M./ Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
2023											InoC	
2024										InoC	IMW	
2025				CDS	DTW					DTW	DTW	InoC
2026	WC	WC	WC	WC	WC	WC						

InoC: innovation camp, IMW: Impact Model Workshop; CDS: Citizen Design Science; DTW: Digital Twin Workshop; WC: World Café,

A diverse range of stakeholders -defined by stakeholder mapping for the Re-Value pilot, are involved in the engagement processes of the Re-Value project in Alsancak. These stakeholders contribute to shaping a shared vision and co-developing interventions for climate neutrality through various participatory tools and activities.

Stakeholders include:

- Municipal departments within İzmir Metropolitan Municipality (e.g., urban planning, parks and gardens, transportation)
- District municipalities
- Local universities and technical experts
- Civil society organizations and NGOs
- Local communities, including residents, local businesses, and other neighborhood actors
- Youth networks, especially student groups from universities and design programs and through JAE
- Re-Value project partners

Further engagement strategies are tailored to each stakeholder group, and detailed in the following chapter.

3 Towards Active Experimentation

İzmir undertakes active experimentation across all three innovation cycles of the Re-Value project, with an emphasis on citizen participation, data-driven design, and stakeholder collaboration. These cycles collectively guide the co-creation of climate-neutral strategies in the Alsancak pilot area by integrating citizen input, technical expertise, and innovative tools to generate context-sensitive and climate-responsive solutions.

The ongoing key activities per each innovation cycle are presented in the following, together with a description of how they will be followed-up in the next Re-Value period in İzmir Pilot.

3.1 Innovation Cycle 1

Innovation Cycle 1 (Story-building): Developing three narrative frameworks through co-design events.

The first innovation cycle represents a key phase in the implementation of the Re-Value project within the Alsancak pilot zone. This cycle aims to build collective understanding and shared visions through participatory methods such as storytelling, spatial exploration, and creative co-design to further enhance the Sustainable Green Zone implementation within the pilot zone.

The primary method used is Citizen Design Science (CDS)[3], which frames all engagement activities under this cycle, along with the Impact Model Workshop and the Artistic Mission. Key activities such as the Innovation Camps, Local meetings, CDS workshops have all been conducted within the CDS methodology developed specifically for the Re-Value project.

Insights derived from the Impact Model Workshop have played a foundational role in shaping the direction of the Re-Value project for İzmir Pilot. The challenges identified during this workshop helped define the core focus areas of Innovation Cycle I and continue to guide the overall project vision. These insights serve as the basis for prioritizing climate-responsive and participatory strategies in the Alsancak pilot area. Insights derived from the Impact Model Workshop helped define the main urban challenges that guide this innovation cycle:

- Reducing surface temperature to mitigate the urban heat island effect
- Decreasing impervious surfaces and improving permeability to reduce flood and sea level rise risks
- Enhancing active citizen participation through social innovation

These priorities inform the CDS process, linking spatial strategies with community needs and values. Through these participatory tools, Innovation Cycle I contributes to shaping a climate-responsive, inclusive, and locally grounded vision for the Alsancak pilot area.

[3] Related Projects on CDS:
1. Özden, P., Velibeyoğlu, K. (2023). Co-Design of a Public Space and the Implementation: Atakent (Car) Park. Mimarlik Bilimleri ve Uygulamalari Dergisi, 8(2), 897-910., Doi: 10.30785/mbud.1378848.
2. Özden, P. VVelibeyoğlu, K. (2023). Citizen science projects in the context of participatory approaches: The case of İzmir. Journal of Design for Resilience in Architecture & Planning, 4(1), 31-46., Doi: 10.47818/DRArch.2023.v4i1081.

Citizen Science[4] refers to the systematic involvement of non-professional scientists in the processes of scientific research, ranging from data collection and analysis to hypothesis formulation and dissemination of results. Rooted in principles of openness, transparency, and public engagement, it aims to democratize science by enabling citizens to contribute to knowledge production across disciplines such as ecology, astronomy, public health, and urban studies. Citizen Science not only enhances scientific literacy and public trust in science but also generates large-scale datasets and context-specific insights that might otherwise be inaccessible to traditional research methods. Citizen Design Science is an emerging interdisciplinary field that merges the participatory principles of citizen science with the creative and problem-solving approaches of design thinking. It empowers non-experts to actively engage in design processes, particularly in urban and environmental planning, through digital tools and collaborative platforms. By integrating people's local knowledge with professional expertise, Citizen Design Science democratizes decision-making, enhances the relevance of design outcomes, and fosters inclusive innovation. This approach not only expands the epistemological foundations of design research but also contributes to more socially responsive and context-sensitive solutions.

To address the urban heat island (UHI) effect, a multi-phase co-creation process will be implemented, integrating Citizen Science and Citizen Design Science (CDS) methodologies.

The Citizen Design Science (CDS) framework developed for the Re-Value project structures participatory activities into five interrelated phases: Co-Ideathon, Co-Diagnostic, Co-Design, Co-Implementation, and Co-Impact.

The process begins with a **Co-Ideathon** phase, where youth and students engage in ideation activities to gather preliminary insights and thematic focus areas. This is followed by a **Co-Diagnostic** stage, utilizing semi-structured interviews with local users, authorities, and vulnerable groups to collect contextual data and establish a participatory diagnostic. Citizen Science methods here support localized data generation, particularly related to thermal discomfort and microclimate variations. In the **Co-Design** phase, CDS methods facilitate collaborative urban design sessions, where citizens, professionals, and experts co-develop spatial interventions—such as sustainable green zones and shading strategies—based on both scientific findings and experiential knowledge. **Co-Implementation** involves the realization of these interventions, supported by digital twin technologies to model technical and social performance. Finally, the **Co-Impact** phase ensures continued engagement through participatory monitoring, co-evaluation, and dissemination, reinforcing transparency and iterative feedback loops. This integrated framework ensures that the resulting urban design solutions are not only technically sound but also socially embedded and environmentally responsive (Fig. 17).

[4] Bonney, R., Cooper, C. B., Dickinson, J., Kelling, S., Phillips, T., Rosenberg, K. V., & Shirk, J. (2009). Citizen science: a developing tool for expanding science knowledge and scientific literacy. *BioScience*, *59*(11), 977-984;
Irwin, A. (2002). *Citizen science: A study of people, expertise and sustainable development*. Routledge.

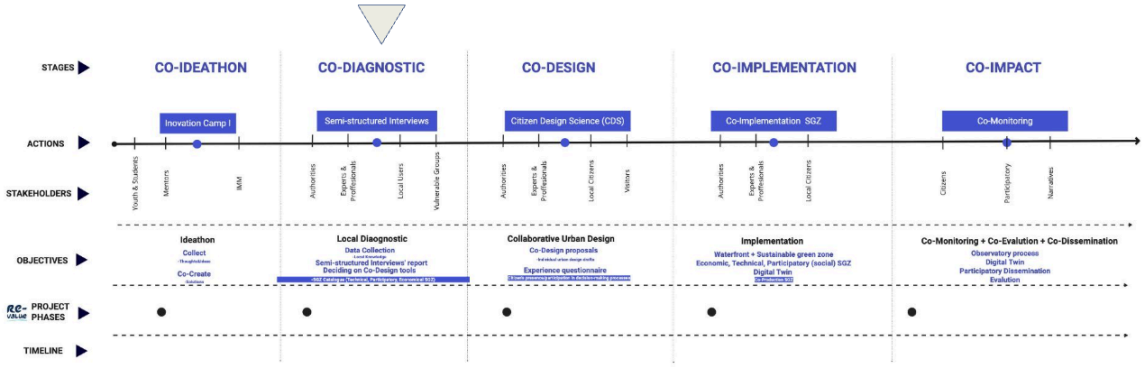


Figure 17. Five interrelated phases in CDS Framework (Image credit: Pelin Özden).

All engagement activities in the Alsancak Pilot area are planned and implemented in alignment with these phases, ensuring continuity and coherence across the innovation process.

To support this framework, a Stakeholder Mapping has been conducted. The identified stakeholders—ranging from municipal departments to local communities and youth groups—form the backbone of active participation. These stakeholders are consistently engaged throughout the innovation cycles and are invited to contribute to each phase of the CDS process. Their roles and relationships are outlined in the stakeholder scheme presented below:

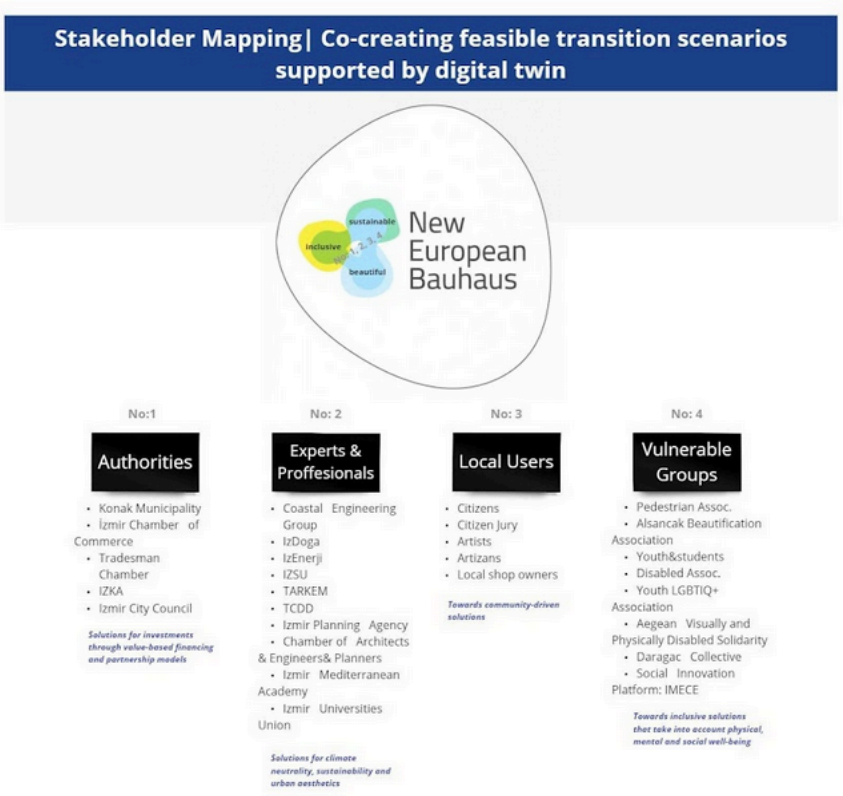


Figure 18. The stakeholder scheme based on the identification of highly engaged stakeholders (Image credit: Pelin Özden).

3.1.1 The phases and related activities

3.1.1.1 Co-Ideathon

1st Innovation Camp - Reframe – Explore and analyze your city

Figure 19. Student groups in the Innovation Camp 1 working on the JA Canvas (Photo credit: IMM).

The **Innovation Camp series** became a central tool for engaging especially younger generations in climate action. These events encouraged participants to co-create ideas and spatial strategies. The Camps, as the essential tool of the Re-Value Project, aim to actively involve young people in identifying climate-related challenges in the pilot area and generating new spatial and design ideas in response. These camps provide a creative platform for youth to co-develop proposals that address climate neutrality at the neighbourhood scale, while fostering awareness and ownership of sustainability transitions. Within this process, the use of innovative digital tools is prioritized to support idea generation and scenario development. The **New European Bauhaus (NEB)** model guides the thematic structure of the camps, with a focus on the three core NEB values: **climate neutrality (sustainable)**, **aesthetics (beautiful)**, and **inclusiveness (together)**. Participants, composed majorly of university students, are encouraged to explore these themes through interdisciplinary and collaborative approaches, contributing to the development of nature-based, context-sensitive interventions that reflect both ecological needs and community aspirations. Ongoing engagement with youth through these camps not only brings fresh perspectives into the Re-Value design process but also strengthens the long-term vision of a resilient and inclusive pilot area transformation towards Sustainable Green Zone.

Figure 20. Innovation Camp 1 participants (Photo credit: IMM).

3.1.1.2 Co-Diagnostic

Co-Diagnose the biodiversity potential of Kültürpark with Artistic Mission

This interactive art project within the Re-Value framework explores sustainability, aesthetics, and participation in İzmir Kültürpark. Participants will photograph spatial elements during a guided tour, connecting urban experiences with visual art practice. Their collected images will be transformed into an interactive art object using digital projection and multi-layered reproduction techniques. This initiative aims to reinforce Kültürpark's historical, ecological, and public significance while fostering a collective visual memory.

Project Curator: Korkut Ünal (Department of Graphic Design, Yaşar University, İzmir).

Figure 21. Explanation of the exhibition and the activity by the curator (Photo credit: IMM).

The Root 'KÖK' Exhibition

Following the Great Fire of İzmir in 1922, the question of how to repurpose the affected area became a pressing issue. As part of the republican vision for economic independence and public service, Kültürpark was developed into its present form. The park became home to rare plant species from around the world, enhancing its botanical diversity while also creating a new habitat for local wildlife.

Today, often referred to as the "lungs of İzmir," Kültürpark serves not only as a green space but also as a symbol of historical memory and cultural diversity. The KÖK (ROOT) exhibition, currently on display, explores Kültürpark's historical evolution, the spatial experiences it offers, and the stories of the flora and fauna within it. These elements highlight both the richness of İzmir's natural environment and the city's deep-rooted cultural diversity.

Prepared by the IMM , Department of Urban History and Promotion .

Figure 22. Kültürpark flora and fauna tour with university students (Photo credit: IMM).

Description of the Activity

Participants, guided by students from various universities in İzmir, will explore Kültürpark's flora and fauna as presented in the KÖK exhibition at the Pakistan Pavilion. They will engage in photography activities under themes such as "Discover Symbols" and "Collect a Color Palette" , as outlined in the Motivation and Observation Guide mentioned above.

The activity was held on Wednesday, April 9, 2025, between 13:30 and 17:30, with the participation of university students, İzmir Institute of Technology, and İzmir Metropolitan Municipality. The photographs have been archived, and the Artistic Mission work is ongoing. As a follow-up to this activity, a selection of the photographs will be projected onto various surfaces within the pilot area and re-photographed in context with the urban fabric. This experimental visual process will explore and reinterpret the project's core concepts—such as memory, identity, and transformation—through the interplay of image, space, and time.

Figure 23. Students taking photographs during the Kültürpark tour (Photo credit: IMM).

Artistic Mission 2 – Second Activity (16 th of June, 2025): Nature, Memory, and Participation in Kültürpark

As part of the İzmir Re-Value Project, the Urban Design and City Aesthetics Branch of the İzmir Metropolitan Municipality organized the second activity of the "Artistic Mission" series in 16th of June 2025.

The event highlighted Kültürpark as a central cultural and ecological landmark within the project scope. The activity invited primary school students and their teachers to engage with the natural and historical richness of Kültürpark through an interactive, educational program designed to foster environmental awareness and collective memory from an early age.

All materials were provided by the municipality, and participation was free of charge, with the event limited to 30 3rd grade students from the Alsancak, Melih Özakat Primary School and 5 accompanying teachers and guardians.

The 2.5–3 hour program included, a brief introductory session at the Pakistan Pavilion, a guided nature walk within Kültürpark and an interactive creative workshop emphasizing the Kültürpark's flora and fauna held back at the pavilion.

Figures 24 to 28. *A collage activity was carried out with primary school students following a short and informative tour of Kültürpark, during which its flora and fauna were narrated by Olya Deniz Ergüçlü from the IMM Department of Agricultural R&D (Photo credit: IMM).*

After the guided walk through the park—during which children collected natural elements such as fallen leaves, twigs, and petals—they used these along with pre-cut colored paper figures representing local fauna (e.g., cats, squirrels, butterflies) to create their own imagined scenes of Kültürpark. Each collage served as a child's unique interpretation of the park, representing their ideas of comfort, play, and co-existence with nature. Through this activity, children not only enhanced their spatial awareness and fine motor skills, but also engaged with the concept of urban biodiversity and the shared use of public space.

By involving children, this activity not only supported intergenerational learning and engagement but also contributed to the Re-Value vision of inclusive, community-driven urban transformation through art, nature, and participation.

3.1.1.3 Co-Diagnostic with CDS Study in Alsancak Pilot Area

Measuring the Quality of Public Life on Şevket Özçelik Street

As part of the initial stages of the Citizen Design Science (CDS) process, the Co-Diagnostic phase aims to establish a comprehensive and participatory understanding of how public spaces are used, perceived, and experienced by local communities, particularly in relation to urban heat and thermal comfort. This phase is fundamental for informing context-sensitive, evidence-based, and citizen-informed design proposals.

As part of these efforts, a field study was conducted between May 5 and May 11, 2025 to assess the quality of public life on Şevket Özçelik Street. The study included a survey with 158 participants, face-to-face interviews with 19 users, and observational data covering 9,245 users. To ensure a more effective and manageable data collection process, the field study focused on the segment of Şevket Özçelik Street located between Dr. Mustafa Enver Bey Street, Talatpaşa Boulevard, and Nevvar Salih İşgören Street in İzmir. The study spanned seven consecutive days to allow for observations of different user and visitor profiles on different days of the week. A dedicated field team of 10 members from the İzmir Metropolitan Municipality and İzmir Planning Agency conducted observations and surveys on-site daily between 09:00 and 19:00 throughout the week.

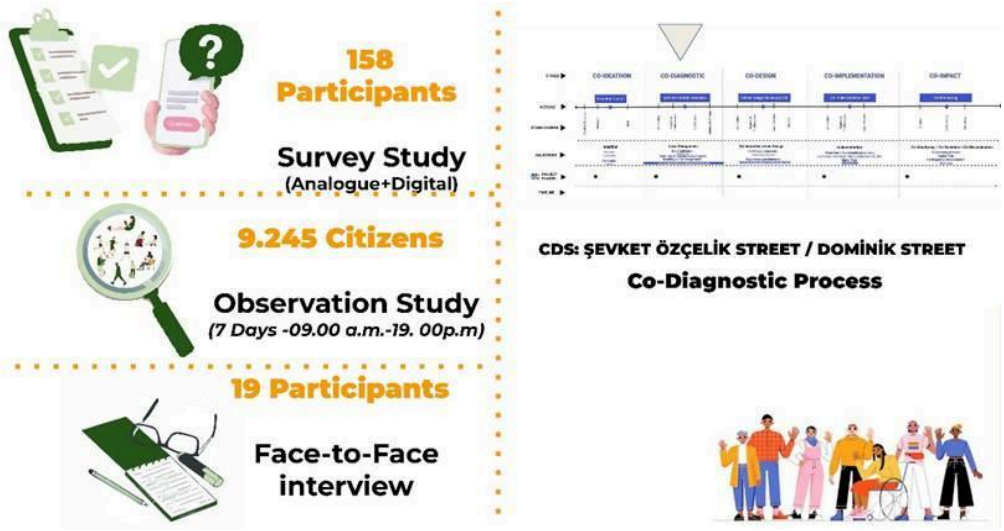


Figure 29. Field Study (Image credit: Özden, P. and Tikik M., IZPA).

Located in the Kültür Neighborhood of İzmir's Konak district, Şevket Özçelik Street, commonly known among local residents as Dominik Street, is one of the city center's key pedestrian-oriented urban corridors. Situated near major urban nodes such as Alsancak Ferry Terminal, Alsancak Train Station, Kıbrıs Şehitleri Street, and the coastal promenade, Dominik Street functions as a vital connector that is heavily used by both local residents and visitors. The area includes several important urban functions such as Gazi Middle School, a neighborhood headman's office (muhtarlık), and various commercial units (see Figure 39).

Figure 30. Şevket Özçelik Street (Image credit: Özden, P. and Tikik M., IZPA).

The Konak District, characterized by a hot climate, can experience temperatures reaching up to 45°C during the summer months (see Figure 40). In July 2024, surface temperatures on Şevket Özçelik Street were recorded at approximately 40°C. The absence of shading elements in the area significantly reduces thermal comfort, particularly in the summer, thus limiting the potential usability and livability of the street.

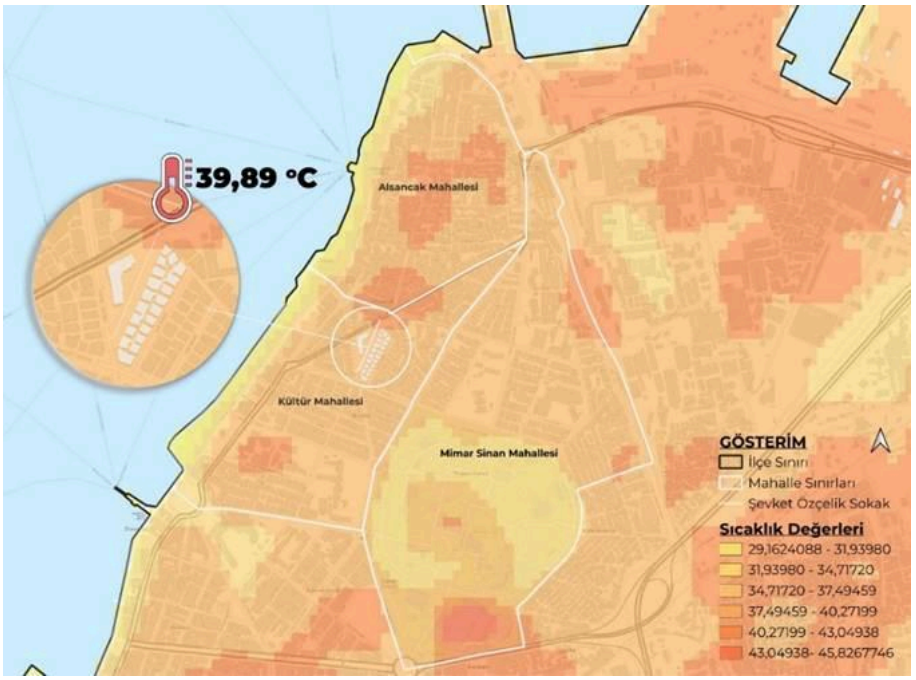


Figure 31. Surface Temperature Map of Konak District (Source: Created in QGIS using Landsat 8 Satellite Imagery Data from July 2024 (Image credit: Özden, P. and Tikik M., IZPA).

Survey Study

The second phase of the field study consisted of a user survey, which was developed based on the study titled "People & Public Spaces – Usage Patterns of Public Spaces in Munich" published by Gehl Web and Partners[5]. This reference framework, previously applied in over 1,000 public space assessments, served as the basis for designing the questionnaire.

The survey aimed to evaluate the quality of the public space and was structured around six main categories:

1. Demographic profiles of users,
2. Usage and user profiles,
3. Mobility and transportation patterns,
4. Public space experience and needs,
5. Inclusivity and comfort,
6. Public space safety and Digital Twin considerations.

Comprising a total of 36 questions, the survey was designed to enable a multidimensional and in-depth analysis of user experiences and to gather suggestions for improving the public space.

[5] Gehl and Partners (2021). *People & Public Spaces – Usage Patterns of Public Spaces in Munich.*

A non-probability (convenience) sampling method was employed, taking into account the visitor profile of the area. The survey was conducted through both face-to-face field interviews and online (digital) formats, reaching a total of 158 participants (See Fig. 41-42).

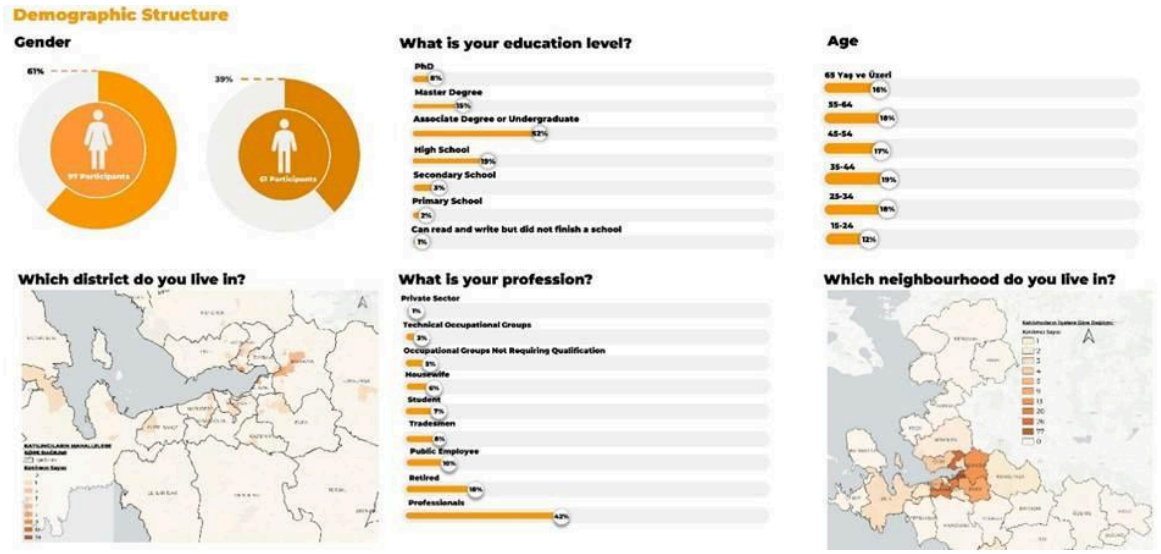


Figure 32. Demographic Structure (Image credit: Özden, P. and Tikik M., IZPA).

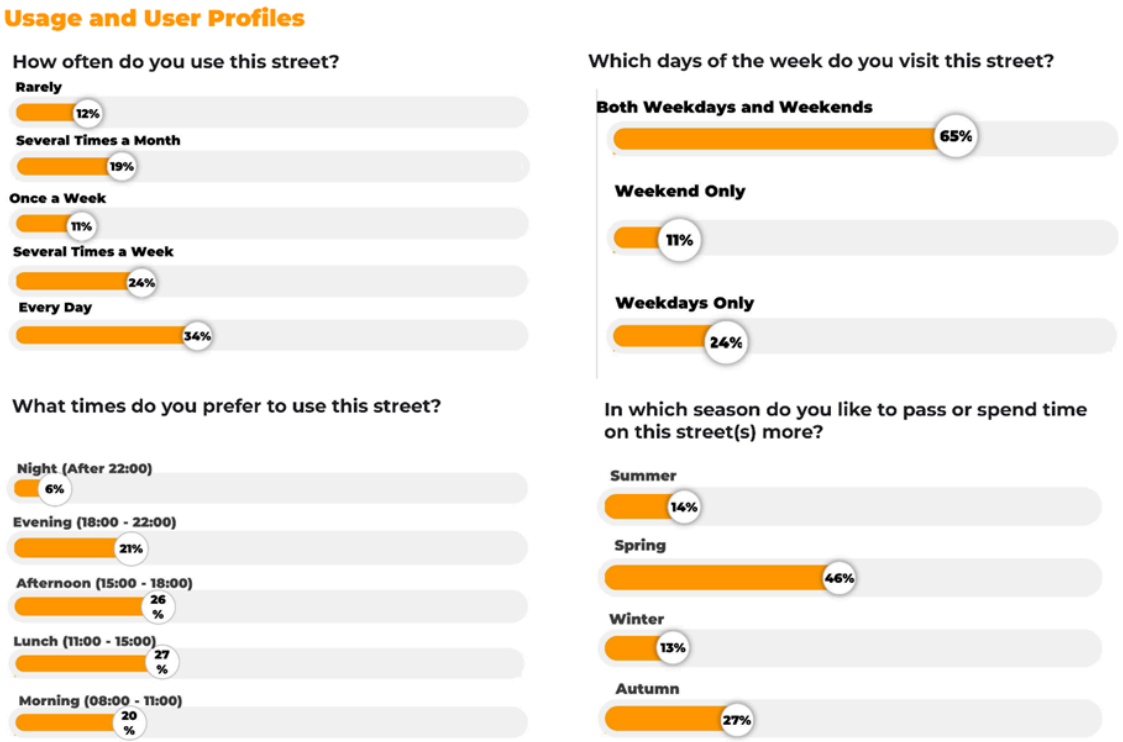


Figure 33. Usage and User Profiles (Image credit: Özden, P. and Tikik M., IZPA).

Participants reported that Dominik Street is most frequently used during both weekdays and weekends, particularly during midday and afternoon hours. Many noted that the street functions primarily as a thoroughfare, especially during lunch hours, predominantly by people working in the area. Additionally, a significant number of participants expressed that they particularly enjoy spending time in the area during the spring season.

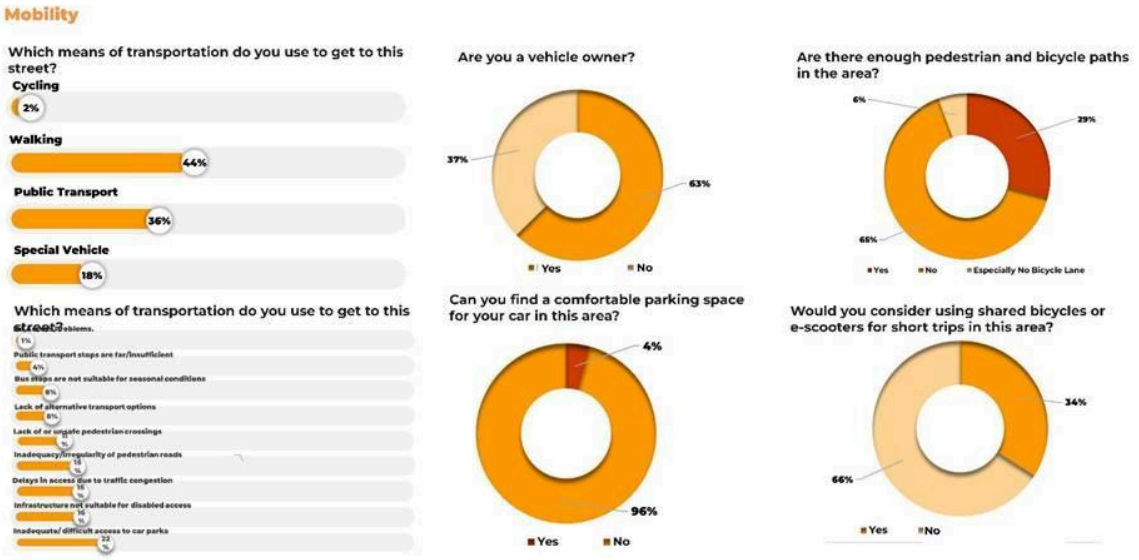


Figure 34. Transportation (Image credit: Özden, P. and Tikik M., IZPA).

Participants predominantly reported accessing the area on foot or via public transportation. Despite this, the rate of car ownership among users was high, and 112 participants stated that they were unable to find parking. While 105 participants indicated that they would not consider using bicycles or e-scooters for short-distance travel, 103 participants noted the lack of dedicated bicycle and pedestrian infrastructure, and 9 participants specifically emphasized the absence of a bicycle lane.

The three most frequently mentioned accessibility issues observed by participants were:

1. Inadequate parking facilities / difficult vehicular access,
2. Infrastructure not suitable for persons with disabilities,
3. Traffic congestion causing delays in access.

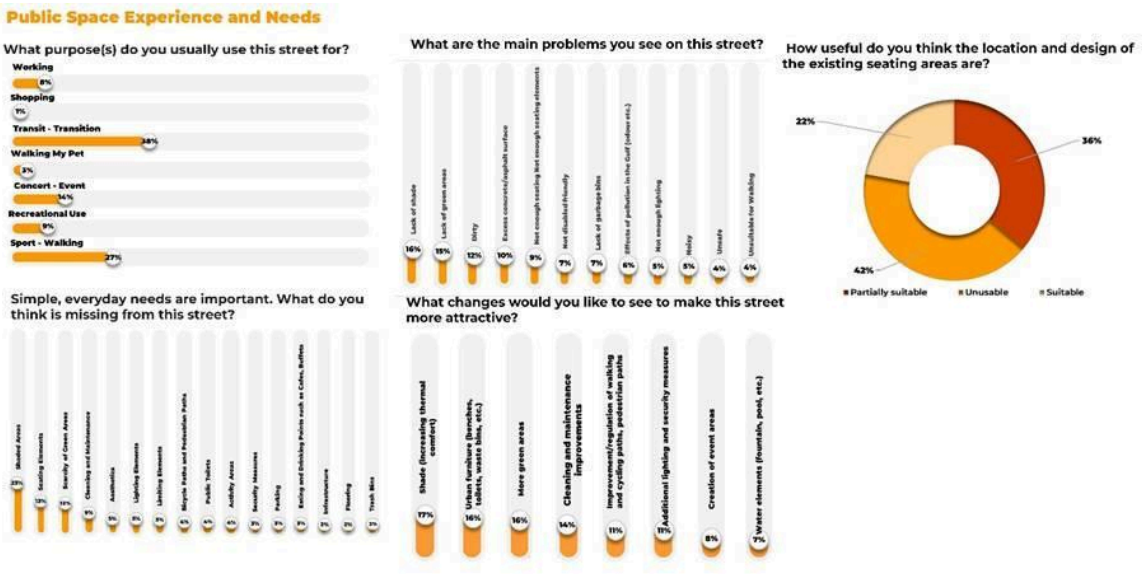


Figure 35. Public Space Needs and Experiences (Image credit: Özden, P. and Tikik M., IZPA).

Participants reported using the area primarily for transit and recreational purposes, such as walking or exercising. Users most frequently highlighted the lack of shaded areas, seating elements, and green spaces as major deficiencies. The most commonly observed problems include insufficient shading, limited green areas and waste and pollution problems. The most requested improvements to make the space more attractive include shaded resting areas, benches and urban furniture, public toilets, and increased green spaces.

Regarding existing seating in the area, 66 participants found them unusable, while 57 participants considered them only partially adequate.

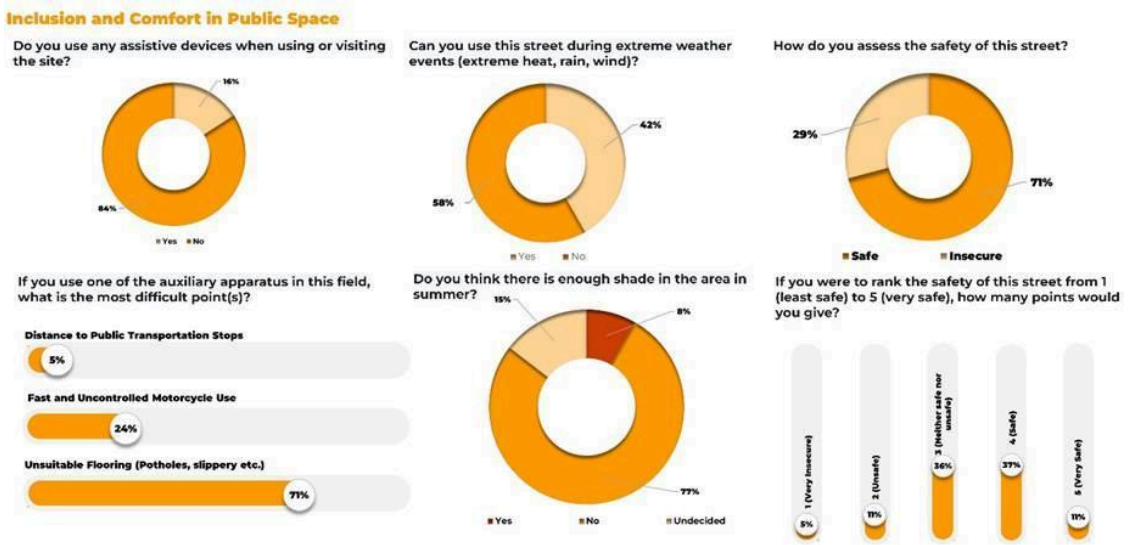


Figure 50. Inclusivity and Public Space Comfort (Image credit: Özden, P. and Tikik M., IZPA).

16% of participants reported using assistive devices such as strollers, canes, wheelchairs, or leg prosthetics. These participants primarily encountered difficulties due to inadequate ground surface conditions. Additionally, 92 participants stated that they could not use the space comfortably during extreme weather conditions. The most frequently mentioned issues related to weather included the lack of overhead coverings and water accumulation due to heavy rainfall. 77% of participants expressed that the number of shaded areas in the space should be increased. The most frequently requested locations for new shading structures included the areas with seating elements, along the main pedestrian axis, spots without existing tree cover.

While 71% of respondents considered the area safe, the most commonly cited concerns regarding safety were the lack of enforcement or monitoring mechanisms and the presence of a high number of unhoused individuals in the area.

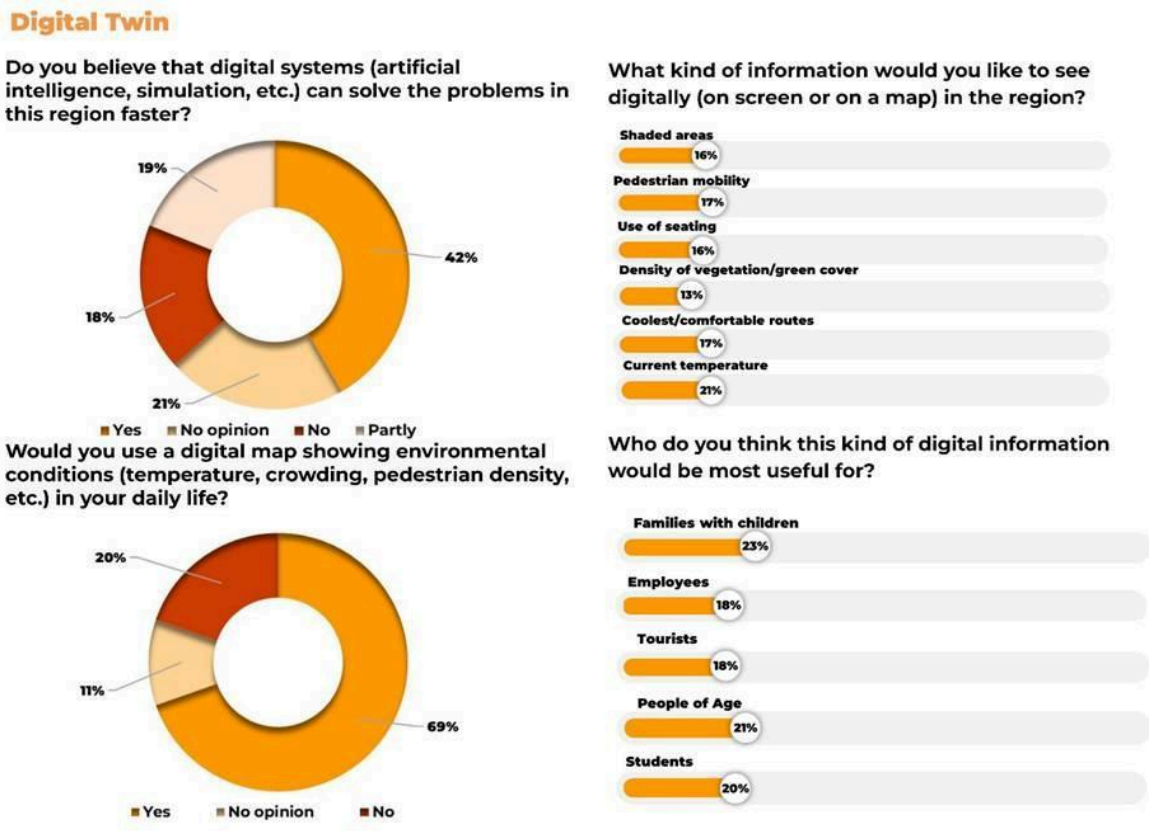


Figure 36. Digital Systems (Image credit: Özden, P. and Tikik M., IZPA).

42% of participants believe that digital systems could facilitate faster solutions to the problems identified along Dominik Street. In order to make the street more livable and comfortable, participants most frequently suggested the collection of data on temperature, shade availability, and seating areas. 110 participants expressed that they would use a digital map if available in the area. The most requested real-time data types were current temperature levels, cool and thermally comfortable walking routes and pedestrian activity and mobility patterns.

Participants highlighted that such digital systems would be especially useful for families with children and elderly individuals.

Observation Study

The user count study was conducted between 09:00 and 19:00, covering various time intervals throughout the day. The observations focused on different user profiles, including women, men, children, youth, elderly individuals, cyclists, and people with special needs, accounting for both active (moving) and passive (sitting) users.

Over the course of 7 consecutive days, a total of 9,245 users were observed along the selected segment of the street.

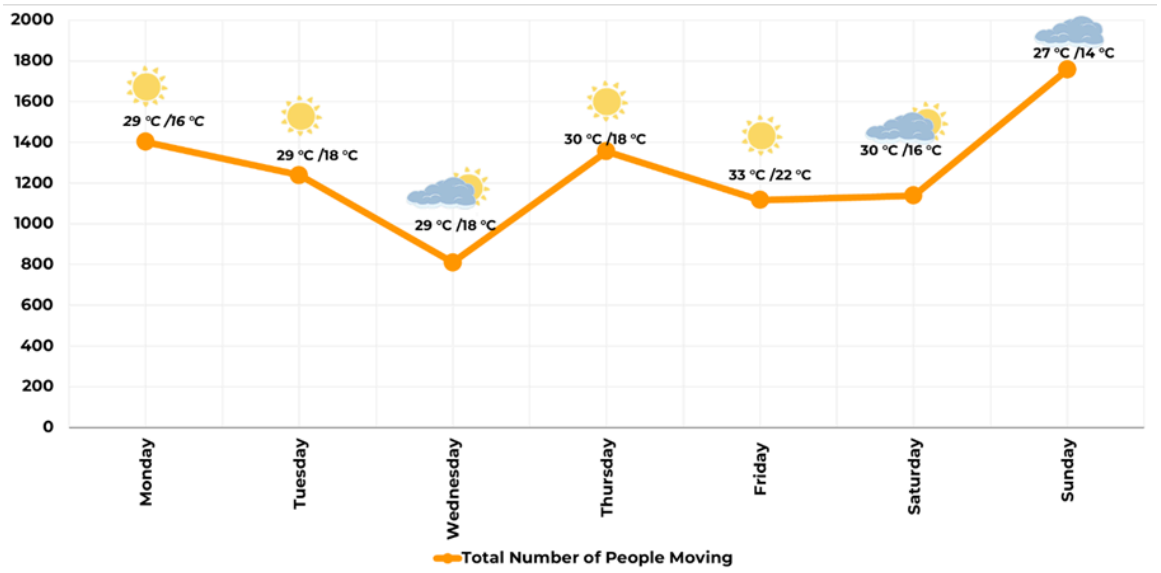


Figure 37. Total number of people moving (Image credit: Özden, P. and Tikik M., IZPA).

As a result of the 7-day observation study, a total of 8,821 moving individuals were recorded. On Wednesday, due to a scheduled on-site event, observations could only be conducted during specific time slots; nevertheless, weekday mobility levels remained consistent. By the weekend, a notable increase in foot traffic was observed, peaking at 1,757 moving individuals on Sunday.

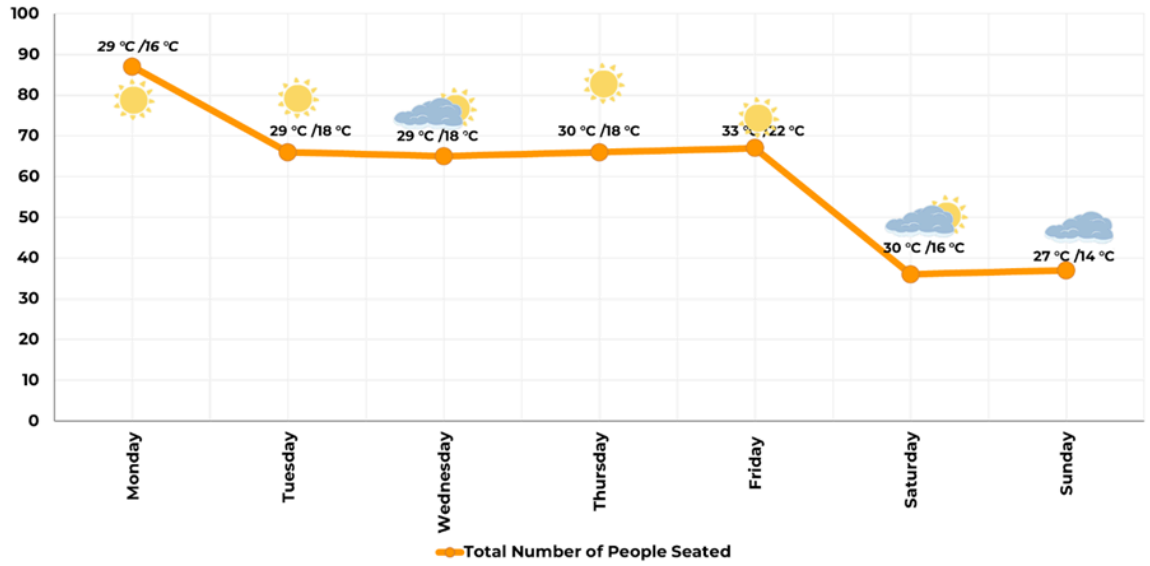
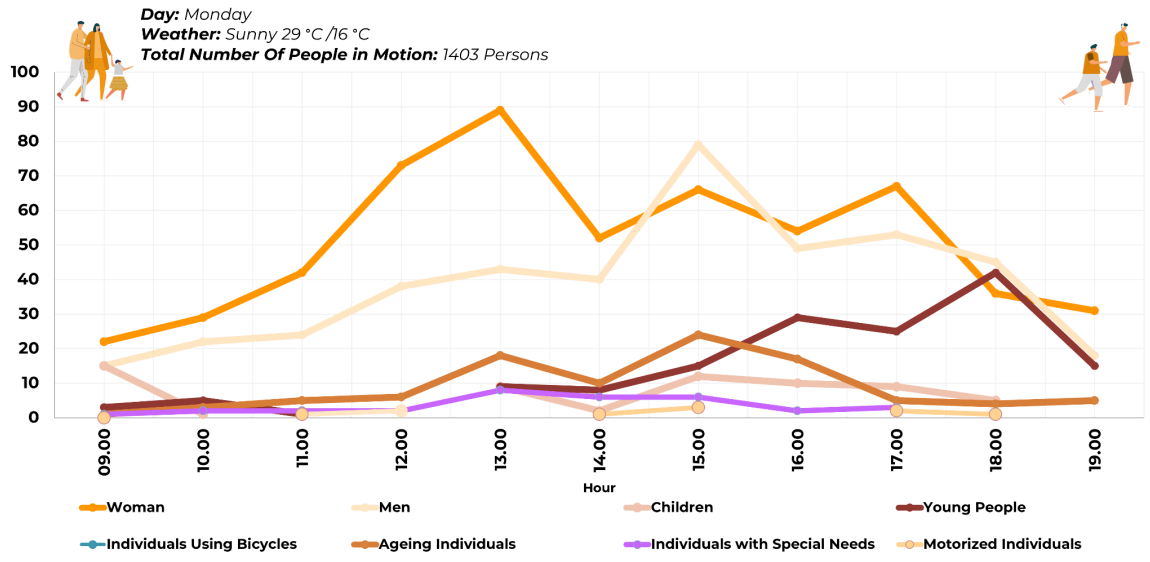
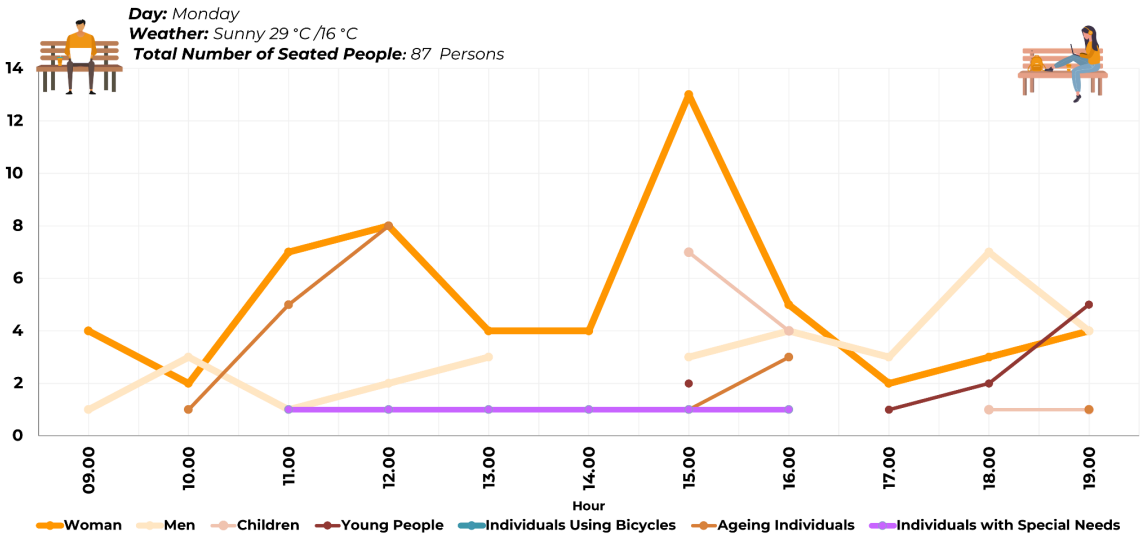
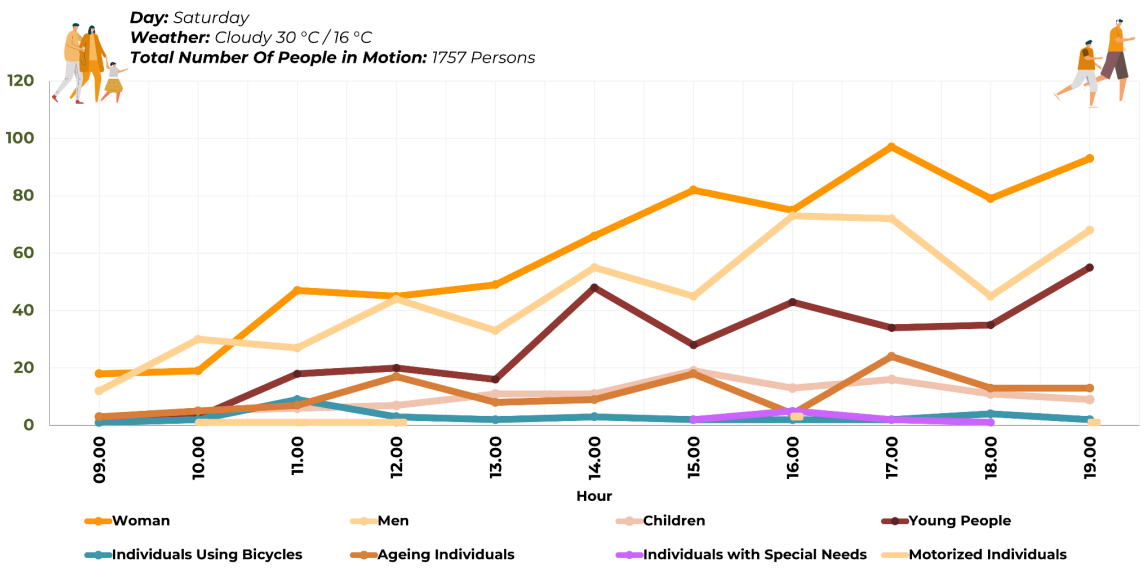


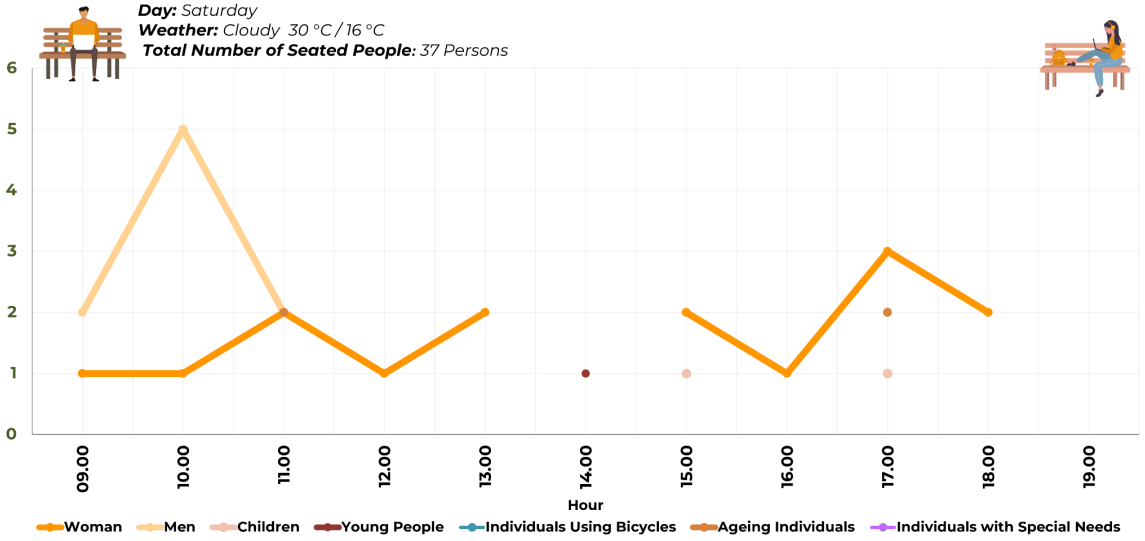
Figure 38. Total number of people seated (Image credit: Özden, P. and Tikik M., IZPA).

Over the course of the 7-day observation study, a total of 424 seated individuals were recorded. The number of seated individuals during weekdays remained relatively consistent, whereas a decline was observed over the weekend. Two key observation days—Monday (weekday) and Saturday (weekend)—were selected as critical days, and observation graphs for these days are presented below.




Day: Monday
Weather: Sunny 29 °C /16 °C
Total Number of Seated People: 87 Persons
14
12
10
8
6
4
2
0
09.00
10.00
11.00
12.00
13.00
14.00
15.00
16.00
17.00
18.00
19.00
Hour
Woman
Men
Children
Young People
Individuals Using Bicycles
Ageing Individuals
Individuals with Special Needs


Day: Saturday
Weather: Cloudy 30 °C / 16 °C
Total Number Of People in Motion: 1757 Persons
120
100
80
60
40
20
0
09.00
10.00
11.00
12.00
13.00
14.00
15.00
16.00
17.00
18.00
19.00
Hour
Woman
Men
Children
Young People
Individuals Using Bicycles
Ageing Individuals
Individuals with Special Needs
Motorized Individuals



Figures 39 to 42. Total numbers from Monday and Saturday (Image credit: Özden, P. and Tikik M., IZPA).

3.1.1.4 Co-Diagnostic with "Local Stakeholder Meetings"

Within the scope of the Re-Value project, the stakeholder engagement process following the fieldwork conducted on Şevket Özçelik Street in Alsancak, İzmir, was structured based on the Stakeholder Ecosystem Matrix developed by IZPA (Active Citizen İzmir Office). This approach aims to foster the co-creation of a climate-adaptive Alsancak through inclusive methods and implementable transition scenarios supported by digital twin technologies, involving a diverse range of actors, such as individuals, institutions, and groups, who play a key role in the project area.

It is widely acknowledged that full inclusivity is rarely achievable in participatory processes. While some participatory models allow open engagement for all willing individuals, others rely on targeted inclusion of key stakeholders. IZPA's Stakeholder Ecosystem is designed as a network comprising all individuals, groups, institutions, and organizations either affected by or capable of influencing a project, program, or policy. This ecosystem supports inclusive and effective decision-making by bringing together various perspectives and experiences. It defines the interaction and relationships between actors, emphasizing the significance of each stakeholder's role and level of involvement for the success of the initiative.

The main actors within this stakeholder ecosystem include citizens, public institutions, private sector actors, civil society organizations (CSOs), academic institutions, media, and other relevant parties. The IZPA Stakeholder Ecosystem Matrix functions as a strategic tool for identifying, evaluating, and managing stakeholders across thematic areas of relevance, mapping their interests and potential influence. It facilitates systematic analysis of who the stakeholders are, how they are affected by or affect the issue at hand, and what roles they play in participatory processes. Additionally, it informs strategic decision-making and supports the development of effective and inclusive engagement mechanisms. The matrix also provides a database for determining which stakeholders should be involved in the design of the participation process and according to which selection criteria. This ensures that diverse views, needs, and concerns are considered, enabling the co-creation of collective decisions. In practice, this ecosystem encourages collaboration and interaction among stakeholders, fostering holistic approaches to shared objectives and contributing to the more sustainable, effective, and equitable implementation of projects and policies.

As part of the methodology, the stakeholder ecosystem matrix was used to identify the groups with the highest level of interaction with the Alsancak area, classifying them under thematic domains. Four main stakeholder categories were defined: (1) Authorities, (2) Experts & Professionals, (3) Local Users, and (4) Vulnerable Groups.

Table 8. Stakeholder Categories (IMM and IZPA).

Stakeholder Group	Authorities	Experts & Professionals	Local Users	Vulnerable Groups
Explanation	Public actors who develop investment solutions based on value-driven financing and partnership models	Actors providing technical and institutional expertise in climate neutrality, sustainability, and urban aesthetics	Individuals and local groups contributing through community-based knowledge and everyday experiences	Communities more affected by inequalities, whose physical, mental, and social well-being require special attention
Stakeholders in Detail	• Konak Municipality • İzmir Chamber of Commerce • Local Artisans' Chambers • İzmir Development Agency (İZKA) • İzmir Metropolitan Municipality	• Coastal Engineering Group • İzDoğa • İzEnerji • İZSU (Water and Sewerage Administration) • TARKEM • Turkish State Railways (TCDD) • İzmir Planning Agency • Chambers of Architects and Urban Planners • İzmir Mediterranean Academy • İzmir University Consortium	• Citizens • Citizens' Jury • Artists • Artisans • Local Shopkeepers	• Pedestrian Association • Alsancak Beautification Association • Youth and Students • Associations for People with Disabilities • LGBTQ+ Youth Association • Solidarity Association for the Visually and Physically Disabled • Daragace Collective • Social Innovation Platform (İMECE)

As part of the fieldwork, face-to-face interviews were conducted with members of the local user group. In total, 19 key individuals—including the neighborhood head (muhtar), the principal of Gazi Middle School, local shopkeepers, building staff, visitors, and residents—were interviewed in person.

Building on these initial findings, online interviews will be conducted and documented with representatives from the remaining three stakeholder groups—authorities, experts, and professionals, and vulnerable groups—within the framework of seven key themes identified during the fieldwork and survey phase. These key themes are:

1. Demographic structure
2. Usage patterns and user profiles
3. Mobility and transportation
4. Public space experience and needs
5. Inclusivity and public space comfort
6. Public space safety
7. Use of digital twins and digital tools.

These structured interviews will further enrich the stakeholder ecosystem analysis and contribute to the development of data-driven, inclusive, and climate-resilient transition scenarios for the Alsancak pilot area.

3.1.1.4 Co-Design

Co-design by Innovation Camps

- 2nd Innovation Camp: Redesign – Generate AI-based climate-neutral design ideas for your city

The second Innovation Camp under the Re-Value Project took place in October 2024, co-organized by İzmir Metropolitan Municipality, İzmir Institute of Technology, and Junior Achievement Türkiye. Building on the foundation of the first camp, this edition gathered 63 students from various universities—including seven winners from the first camp—around the theme: “Re-Value Your City with AI.”

The morning session began with opening speeches outlining the scope of the Re-Value project and the continuity between the two camps. Speakers provided insights into design thinking, the use of artificial intelligence in urbanism, and the importance of effective prompt writing.

Bridging Urban Imagination with AI Tools

- In the afternoon session, students participated in a design thinking workshop on İzmir’s Alsancak district, developing AI-supported urban proposals focused on climate-neutral and sustainable development. They used tools like ChatGPT and MidJourney, guided by mentors throughout the process. The workshop concluded with peer evaluations and a vote for the top three design concepts.

Figure 43 and 44. Teamwork with their mentor (left), AI generated image illustrating a possible solution (right) (Photo credit: JA Türkiye (left), Source: MidJourney (right).

- **3rd Innovation Camp – Re-Value your City: Toward a Smarter, Greener Urban Future**

The third Innovation Camp, tentatively planned for October or November 2025, will focus on developing tangible and site-specific value-based design proposals for the pilot area of Alsancak. The core theme of this edition centers on urban surfaces—including façades, pavements, roofs, and other built elements, with the aim of enhancing microclimate conditions and contributing to the climate neutrality goals of the city.

Participants, primarily university students from art and design, industrial design architecture, and planning disciplines, will work on design solutions for surfaces and small-scale interventions, such as green façades, permeable ground treatments, climate-responsive roofing systems, and innovative urban furniture. The camp will provide opportunities to experiment with both manual and AI-supported design tools, though the emphasis will be on context-aware, applicable strategies rather than purely digital outputs. The outcomes will feed into the scenario development process and support the Sustainable Green Zone vision by offering implementable solutions to mitigate heat, increase permeability, and activate public space.

As with previous camps, the framework will follow the principles of the New European Bauhaus (NEB), encouraging participants to generate ideas that are sustainable, inclusive, and aesthetically meaningful. Outcomes from the camp will directly feed into scenario development efforts within the Re-Value roadmap, contributing to the co-production of a resilient and climate-neutral future for Alsancak.

3.2 Innovation Cycle 2: Data-Driven Co-Creation: Digital Twin Roadmap

The main purpose of this study is to ensure the effective use of digital twin technology at the urban scale and to create a scientific basis for sustainable urbanism decisions. In line with this aim, the study focuses on

surface temperature, urban comfort and climate sensitive designs. Within the scope of this project, the digital twin model itself will not be produced; however, a roadmap for the creation of the digital twin model and its integration into the upper-scale digital twin model planned for the City of İzmir will be developed, and this roadmap will form a basic plan for integration with microclimate conditions in the city, sustainable green space designs and citizen inputs.

Within the scope of the project, the observations and experiences of city dwellers will be integrated into the digital twin model to be developed as versions of climate-sensitive practices through the Citizen Design Science (CDS) method, which is being implemented in different public green spaces. The integration process will be planned in a way that citizens' observations and experiences will provide data for the digital twin model. In this way, it is aimed to create a more inclusive and participatory urban management approach to manage city-specific climate conditions and surface temperature impact.

These components, which will be integrated into the digital twin model, will directly contribute to İzmir's sustainable urban planning processes. The model will be designed to help test different scenarios and help decision-makers develop data-driven policies.

This study will be developed in collaboration with a wide range of users, including city administrators, municipal departments, academics, and citizens. In particular, several key stakeholders will be directly involved at various stages of the process. Among the municipal departments, the Directorate of Transportation, Directorate of Climate Change and Zero Waste, Directorate of Parks and Gardens, Directorate of Survey and Project, Directorate of City History and Promotion, Directorate of Information Technologies, Directorate of Urban Information Systems, and the Directorate of Environmental Protection and Control will actively contribute to the project. Additionally, Konak Municipality, the İzmir Planning Agency (IZPA), and İzmir Technology will play central roles in supporting project outcomes. Researchers and technical experts, particularly academics and professionals specializing in urban digital twin, microclimate, surface temperature, urban comfort, and public green spaces, will provide scientific and technical insights throughout the study. Civil society organizations and citizens will be engaged through feedback mechanisms and participatory tools to ensure inclusive and sustainable urban planning processes. Furthermore, project partners such as Augment City, Ecoten, and VITO will contribute their expertise and technological solutions to support the development and implementation of the digital twin framework.

Two workshops and one roundtable discussion are planned to guide the development of the digital twin roadmap:

3.2.1 Workshop 1: Data Collection and Problem Definition

CDS Implementation:
Before the workshop, a Citizen Design Science (CDS) session was conducted in the Alsancak neighborhood between May 5–11, focusing on surface temperature and light-shadow analysis. Selçuk Özçelik Street is proposed as the pilot area (See “Co-Diagnostic with CDS Study in Alsancak Pilot Area” under Section 3.1.).

Figure 45. Interviews with citizens in the Şevket Özçelik Street, Alsancak (Photo credit: IMM).

As part of the initial stages of the Citizen Design Science (CDS) process, the Co-Diagnostic phase aims to establish a comprehensive and participatory understanding of how public spaces are used, perceived, and experienced by local communities, particularly in relation to urban heat and thermal comfort. This phase is fundamental for informing context-sensitive, evidence-based, and citizen-informed design proposals.

This workshop was held on 20 May 2025 to support the collection of information for integrating the pilot area—comprising Alsancak, Kültür, and Mimar Sinan neighborhoods in the city center of İzmir—into a digital twin roadmap. The workshop focused on themes of urban comfort, microclimate, and pedestrian experience. Its main objectives were:

- To enable participants to share their experiences and observations about the area
- To identify challenges and opportunities related to shading, temperature, seating areas, and pedestrian movement
- To help define data sets, user perspectives, and local priorities for the digital twin model
- To take the first step toward building a common framework for data-driven urban planning

Figure 46. The Digital Twin Roadmap participants in the afternoon session (Photo credit: IMM).

The workshop began with an introduction session that included a brief overview of the Re-Value Project and the purpose of the workshop. The project's general framework and objectives were presented to the participants. Following this, the first discussion session focused on Şevket Özçelik Street. Using area maps and facilitator canvases, participants conducted a situational analysis and discussed current conditions, proposed ideas, needs, and spatial opportunities. The discussions were framed around two main themes:

1. Surface Temperature and Microclimate
   This theme addressed the following topics:
   - Observations related to surface temperature (e.g., heat spots, areas without shade),
   - Microclimate conditions (wind, humidity, heat accumulation, etc.),
   - Experiences of heat-vulnerable groups (such as the elderly, children),
   - Opportunities for natural shading (trees, building shadows, etc.),
   - Future needs and opportunities (e.g., adding shading structures, planting, surface material improvements).
2. Urban Comfort and User Experience
   This theme focused on:
   - Pedestrian use and mobility (walkways, obstacles, safety, etc.)
   - Urban comfort elements (seating areas, resting points, shading structures),
   - User behaviors and habits,
   - Usage density of the area and temporal changes,

- Social interaction opportunities within the area.

Cross-table discussions followed each thematic session. Participants then reviewed and compared findings with the results of the CDS study conducted between 5–11 May on Şevket Özçelik Street. Later, discussions expanded to the sub-character areas within the pilot zone. Participants marked differences and similarities across neighborhoods using updated maps.

The final session aimed to define relevant data needs, spatial scales, and user-based requirements to feed into the digital twin framework. The workshop concluded with a summary of table evaluations and closing discussions.

Results

Within the scope of the Re-Value Project, the workshop held in the pilot area covering the Alsancak, Kültür, and Mimar Sinan neighborhoods in the city center of İzmir aimed to evaluate the current conditions of the area through a multi-stakeholder approach in preparation for its integration into a digital twin model. Structured around the themes of urban comfort, microclimate, and pedestrian experience, the sessions enabled participants to identify needs, challenges, and spatial opportunities based on field observations and user experiences. The workshop process provided a valuable platform for discussing what data should be collected and how it could be integrated into the digital twin system, taking into account the physical characteristics of the area and the priorities of different user groups. Accordingly, the proposals developed from the perspective of data generation, digital tools, and participatory planning contribute to shaping context-specific and applicable solutions.

To provide a clear overview of the discussions and outcomes, the key findings of the workshop have been synthesized under two main themes: *Surface Temperature and Microclimate* and *Urban Comfort and User Experience*. The table below summarizes the common observations, identified challenges, and the corresponding needs and recommendations developed collectively by participants during the sessions. This thematic breakdown serves as a foundation for guiding data-driven interventions and informing the digital twin model.

Theme	Common Observations	Needs and Recommendations
Surface temperature and microclimate	1. Lack of shade (especially near schools, sidewalks, seating areas) 2. High proportion of concrete surfaces 3. Water pooling and impermeable surfaces 4. Blocked wind flow due to high-rise buildings	1. Increase shaded areas (tree planting, temporary shade structures, sun-shading lighting systems) 2. Use drought-resistant plants and green infrastructure 3. Implement permeable ground surfaces 4. Improve stormwater management (grading adjustments, rain gardens)

		5. Generate surface temperature data and simulate shading effects
Urban comfort and user experience	1. Lack of seating areas, wayfinding signs, and social amenities 2. Street vendor and florist encroachments limiting pedestrian movement 3. Safety and cleanliness issues, especially at night 4. Accessibility challenges and sidewalk conditions 5. Unregulated parking of vehicles and motorcycles	1. Install lighting, CCTV, and digital information panels in school surroundings, squares, and parks 2. Design inclusive public spaces (children's play areas, reading corners, exercise zones) 3. Redesign florist stands to improve aesthetics and functionality 4. Improve sidewalks, accessibility features, and signage 5. Incorporate cultural and historical references in street design (e.g., open-air photo exhibits, info boards)

3.2.2 Workshop 2: Technical Assessment and Scenario Analysis

The second workshop, planned to be held in October, 2025, will focus on technical assessments and scenario analysis regarding the impact of surface temperature on ambient air temperature and urban climate sensitivity. The event aims to bring together academics, microclimate experts, digital twin technology professionals, and three Re-Value partners—Ecoten, Augment City, and VITO—who are working on urban retrofit strategies. In addition to these partners, stakeholders from various departments of the İzmir Metropolitan Municipality (such as Transportation, Climate Change, Parks and Gardens, and Urban Information Systems etc.), as well as other relevant institutions including Konak Municipality and IZPA, will be actively involved. Through collaborative discussions and presentations, the workshop is expected to generate integration strategies for combining digital twin models with planning tools to help mitigate surface temperature increases in İzmir. Furthermore, a roadmap will be developed to guide sustainable and climate-resilient urban design, contributing to the creation of more livable urban environments in the face of increasing climate stressors.

As part of the workshop, project partners will deliver focused presentations on key technical topics. Ecoten will present its digital twin studies related to microclimate and their influence on surface temperature. The presentation will explore how microclimate data can support urban planning and how digital twin models can be integrated for detailed microclimate analysis. Augment City will analyze the impact of closing certain areas to traffic during specific hours, evaluating pedestrianization scenarios and the influence of traffic restrictions on surface temperature. VITO will focus on the effect of improving energy efficiency in buildings, discussing how such improvements can help lower surface temperature impacts at the city scale.

In addition to these presentations, the workshop will feature scenario analyses aimed at assessing how various urban interventions can improve microclimate conditions and reduce surface temperatures. Key scenarios to be examined include:

- Pedestrianization Scenarios:
  Evaluating the impacts of time-bound traffic restrictions and the creation of pedestrian-friendly zones, with particular attention to surface temperature, ventilation, shading, and the usability of outdoor spaces.

- Public Green Spaces and Parks:
  Exploring strategies to increase urban green areas as a means to mitigate urban heat, while also considering biodiversity, water management, and the social functionality of these spaces.

- Urban Comfort Applications:
  Assessing urban design strategies aimed at improving comfort in public spaces, including shading structures, water features, diverse vegetation, and sustainable materials, with an emphasis on their aesthetic, functional, and environmental contributions.

These discussions and scenario evaluations will collectively inform the development of actionable strategies to enhance İzmir's urban resilience and climate adaptability.

Roundtable Discussion

This session, planned for November 2025, will focus on strategies for further developing and integrating the digital twin model. Stakeholders will assess the roadmap and discuss opportunities to strengthen inter-institutional cooperation and technical integration. Participants include İzmir Metropolitan Municipality (with relevant departments), Konak Municipality, IZPA, and İzmir Institute of Technology.

The anticipated deliverables begin with the Digital Twin Roadmap, which will provide a structured plan for the development and integration of a city-scale digital twin model for İzmir. Additionally, stakeholder feedback mechanisms will be established to ensure active involvement of citizens and institutions in the planning process.

Urban heat mitigation strategies will be recommended, including interventions such as pedestrianization, expanding green spaces, and improving energy efficiency. Using the digital twin framework, scenario testing will be conducted to evaluate the impacts of green space expansion, enhancements in urban comfort, and other strategies.

Finally, the session will emphasize strengthening collaborative governance and partnerships among stakeholders to guide the integration of the digital twin into urban management processes.

3.3 Innovation Cycle 3: Building Partnerships

3.3.1 Financial and Partnership Models

Participatory Stakeholder Engagement Model – Citizen Design Science (CDS) and Stakeholder Mapping Scheme

The VTB (Value Transfer Board) model serves as a participatory governance mechanism, ensuring inclusive and coordinated stakeholder engagement throughout the project.

It is a well-known fact that in many participatory processes it is impossible to include everyone. Some participatory processes allow for the participation of all volunteers, while others allow for only certain stakeholders to be invited. IZPA Active Citizen İzmir Office has designed a stakeholder ecosystem consisting of a network of all individuals, groups, institutions and organizations that have an impact on the project, program or policy and are affected by the process. This ecosystem brings together different perspectives and experiences to help make inclusive and effective decisions. The stakeholder ecosystem network includes various actors and defines their interactions and relationships with each other. The role and level of engagement of each stakeholder in the stakeholder ecosystem is critical to the success of the project or policy. The main actors in the stakeholder ecosystem are citizens, public institutions, private sector, civil society organizations (CSOs), academic institutions, media and other relevant stakeholders.

It is a stakeholder pool that creates a framework of interests and interests on relevant topics by using the stakeholder analysis matrix tool to identify, assess and manage stakeholders within the scope of participatory processes related to projects, programs or policies. The ecosystem matrix is developed in cooperation with the Active Citizen Office İzmir and the Artificial Intelligence Supported Data Office, Vision 2074 Strategy Office, İzmir Development and Innovation Office. The stakeholder ecosystem matrix helps to systematically analyze who the stakeholders are, their impact on the relevant issue and how they are affected, and their role in the processes. It also enables strategic decisions to be made and effective/efficient participation processes to be developed. It provides a database on which stakeholders should be included in the design of the participation process and with which selection criteria. It helps to develop a shared decision-making process that takes into account the views, needs and concerns of all stakeholders. In practice, this ecosystem encourages stakeholder interaction and collaboration, enabling more holistic approaches to achieve common goals. Projects and policies can then be implemented in a more sustainable, effective and equitable manner (Figure 57).

Stakeholder	Type of Stakeholder	Sector	Scale	Thematic Areas	Intervention Areas
İZBETON A.Ş.	İzBB	Kentleşme	Kent	Altyapı Geliştirme	Ekonomik Kalkınma
TARKEM A.Ş.	Özel Sektör	Kentleşme	Semt	Kültürel Miras	Kentsel Yenileme
İzmir Atatürk Lisesi	Kamu Sektörü	Eğitim	İlçe	Zorunlu Eğitim	Toplumsal Dayanıklılık
İzmir Bornova Anadolu Lisesi	Kamu Sektörü	Eğitim	İlçe	Zorunlu Eğitim	Toplumsal Dayanıklılık
İzmir Fen Lisesi	Kamu Sektörü	Eğitim	İlçe	Zorunlu Eğitim	Toplumsal Dayanıklılık
Marti İleri Teknoloji A.Ş.	Özel Sektör	Ulaşım	Bölge	Dijital Dönüşüm	Akıllı Şehir
Yapıdrom Teknoloji A.Ş.	Özel Sektör	Ulaşım	Ulusal	Dijital Dönüşüm	Akıllı Şehir
Hop Teknoloji A.Ş.	Özel Sektör	Ulaşım	Ulusal	Sürdürülebilirlik	Akıllı Şehir
Superpedestrian Turkey Ulaşım Teknoloji A.Ş.	Özel Sektör	Ulaşım	Ulusal	Dijital Dönüşüm	Akıllı Şehir
Bin Ulaşım Ve Akıllı Şehir Teknolojileri A.Ş.	Özel Sektör	Ulaşım	Ulusal	Dijital Dönüşüm	Akıllı Şehir
Raccoon Teknoloji Taşıtları A.Ş.	Özel Sektör	Ulaşım	Ulusal	Sağlık	Akıllı Şehir
Beam Mobility Turkey Teknoloji A.Ş.	Özel Sektör	Ulaşım	Ulusal	Sağlık	Akıllı Şehir
Gez Teknoloji San. Ve Tic. A.Ş.	Özel Sektör	Ulaşım	Ulusal	Sağlık	Akıllı Şehir
Zorlu Energy Solutions Zes Dijital Ticaret A.Ş.	Özel Sektör	Enerji	Ulusal	Hizmet	Akıllı Şehir
Zebra Elektronik A.Ş./ Voltrun	Özel Sektör	Enerji	Ulusal	Hizmet	Akıllı Şehir
ENERJİSA / EŞARJ	Özel Sektör	Enerji	Ulusal	Hizmet	Akıllı Şehir
T.C. Ziraat Bank	Kamu Sektörü	Finans	Ulusal	Hizmet	Ekonomik Kalkınma
T.C. Vakıfbank	Kamu Sektörü	Finans	Ulusal	Hizmet	Ekonomik Kalkınma
Şekerbank	Kamu Sektörü	Finans	Ulusal	Hizmet	Ekonomik Kalkınma
T.C. Halkbank	Kamu Sektörü	Finans	Ulusal	Hizmet	Ekonomik Kalkınma
Akbank	Özel Sektör	Finans	Ulusal	Hizmet	Ekonomik Kalkınma
Yapikredi Bankası	Özel Sektör	Finans	Ulusal	Hizmet	Ekonomik Kalkınma
Garanti Bankası	Özel Sektör	Finans	Ulusal	Hizmet	Ekonomik Kalkınma
Türkiye Ekonomi Bankası	Özel Sektör	Finans	Ulusal	Hizmet	Ekonomik Kalkınma
HSBC	Özel Sektör	Finans	Ulusal	Hizmet	Ekonomik Kalkınma
Türkiye İş Bankası	Özel Sektör	Finans	Ulusal	Hizmet	Ekonomik Kalkınma
QNB Finansbank	Özel Sektör	Finans	Ulusal	Hizmet	Ekonomik Kalkınma
DenizBank	Özel Sektör	Finans	Ulusal	Hizmet	Ekonomik Kalkınma
Boğaziçi Ventures	Özel Sektör	Finans	Ulusal	Hizmet	Ekonomik Kalkınma
StartupFon	Özel Sektör	Finans	Ulusal	Hizmet	Ekonomik Kalkınma
Gate Inside Ventures	Özel Sektör	Finans	Ulusal	Hizmet	Ekonomik Kalkınma
Intertech IT	Özel Sektör	Finans	Ulusal	Hizmet	Ekonomik Kalkınma
KOSGEB	Kamu Sektörü	Finans	Ulusal	Hizmet	Ekonomik Kalkınma
Türkiye Teknoloji Geliştirme Vakfı (TTGV)	STK	Finans	Ulusal	Hizmet	Ekonomik Kalkınma
StartersHub	Özel Sektör	Finans	Ulusal	Hizmet	Ekonomik Kalkınma
212 Venture Capital	Özel Sektör	Finans	Ulusal	Hizmet	Ekonomik Kalkınma
Aslanoba Capital	Özel Sektör	Finans	Ulusal	Hizmet	Ekonomik Kalkınma

Figure 47. IZPA Stakeholder Ecosystem Matrix, N=1.153 (Image credit: Özden, P., 2025).

A detailed stakeholder mapping scheme will accompany this model to clarify the roles, responsibilities, and levels of involvement of various actors, including public institutions, private entities, academia, and civil society.

This model is accompanied by a detailed stakeholder mapping diagram to clarify the roles, responsibilities and levels of engagement of various actors, including public institutions, private organizations, academia and civil society. The stakeholder map is based on the identification of highly engaged stakeholders in the stakeholder Ecosystem Matrix through the NEB sub-themes.

Determination of Financial Models – Support from Lead Cities Required

An essential component of the process involves identifying feasible and context-specific financial models. In this regard, it is recommended that guidance and support be sought from lead cities within the consortium that have prior experience in developing and implementing such models.

Mission Action Lab – Financing Models and Access to Finance

Mission Action Lab is a collaborative platform established within İzmir Planning Agency (IZPA) to support the design, implementation, and monitoring of mission-oriented urban transformation processes. It aims to bring together diverse stakeholders—including public institutions, academia, civil society, and citizens—to co-create data-driven, inclusive, and sustainable solutions aligned with İzmir's strategic goals and international commitments, such as the EU Mission for Climate-Neutral and Smart Cities.

The Mission Action Lab will address both participatory mechanisms and financial sustainability. This component will focus on the exploration of diverse financing models and strategies to improve access to funding, in alignment with climate action goals and urban transformation targets. The Lab will act as a

bridge between a commission to be established within the İzmir Metropolitan Municipality, the İzmir Economic Development and Coordination Board (İEKKK) founded on July 6, 2009, and the İzmir City Council. It will focus on stakeholder coordination and the co-development of financial models. Aligned with the city's strategic plans, the Re-Value project will offer methodologies that can also inform future financial models.

Supporting Analytical Studies

To inform the strategic planning and design process, the following analyses will be conducted:

- **Urban Heat Island Analysis** (to be potentially carried out by IZPA)
- **Land Use Analysis**
- **Mobility and Transportation Analysis**
- **Surface Material Analysis**
- **Analysis of Potential Implementation Areas**
- **Collaboration with IZSU Infrastructure Data**

Further technical studies may be conducted by leveraging IZSU's infrastructure data, with analytical and academic support from IZPA and İzmir Institute of Technology (IZTECH). These datasets will support the identification of spatial priorities and inform intervention strategies.

3.3.2 Final Deliverables and Way Forward

This roadmap outlines a comprehensive, long-term framework to guide İzmir's Re-Value project pilot for climate-neutral urban transformation through a mission-oriented approach. While the previous chapters have demonstrated the context, methodology, and co-created vision for the Alsancak pilot area, this final section connects the Re-Value project's proposed future adjustments with its strategic path forward.

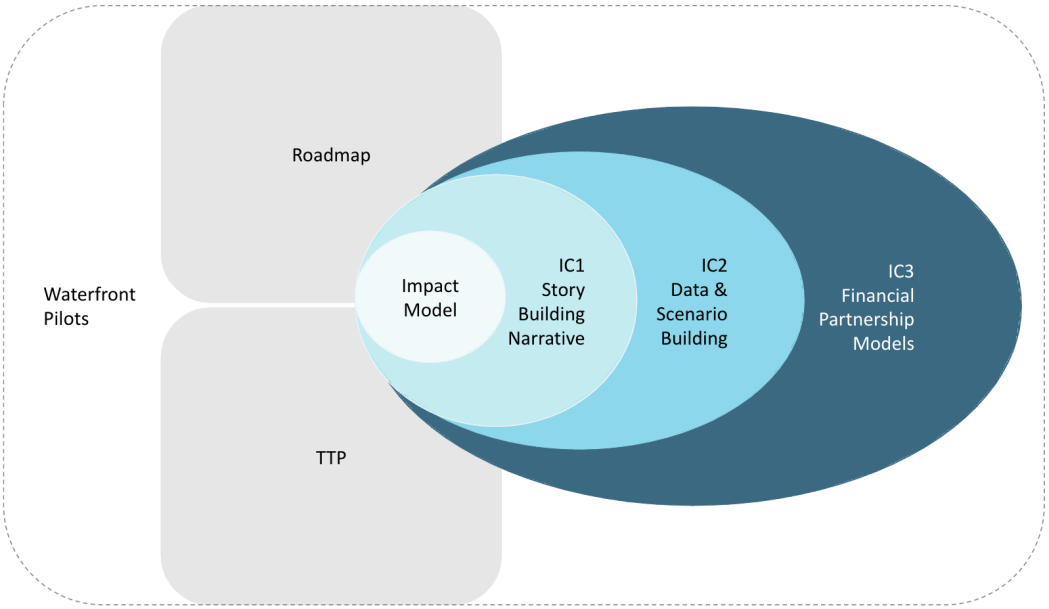


Figure 48. Integration of Re-Value Impact Model Components with the Roadmap and Territorial Transformation Plans (TTPs) (Image credit: Re-Value).

How This Work Supports Our Roadmap and TTP

The design processes, spatial analyses, and co-creation actions described in Chapter 3 lay the groundwork for implementing the long-term vision. These actions help us build toward a more integrated Territorial Transformation Plan (TTP) by:

- Demonstrating the feasibility of micro and meso-scale climate adaptation strategies through the Re-Value pilot.
- Testing citizen engagement methods such as Citizen Design Science and participatory mapping.
- Identifying potential for nature-based solutions and adaptive reuse in highly urbanized contexts.
- Exploring the applicability of digital tools (e.g., urban data dashboards, Digital Twins) for participatory and data-driven planning.

Key Outputs and Planned Activities

Based on the above, the following deliverables and next steps will be central to İzmir's mission-aligned roadmap:

- Annual Planning Framework: A phased action plan detailing milestones and responsibilities for the upcoming year.
- Green and Inclusive Urban Design Guidelines: A design framework developed through Re-Value activities aligned with the New European Bauhaus, emphasizing sustainability, inclusivity, and aesthetics.
- Digital Twin Development: Integration of urban, environmental, and social data to support scenario modeling and citizen engagement.
- Integration into TTPs: Embedding the roadmap's principles and actions into city-wide Territorial Transformation Plans and strategic urban policies.
- Academic Publications: Joint academic articles in collaboration with IZPA, IZTECH, and municipal departments to disseminate findings and contribute to scientific dialogue.
- Budget Oversight and Reporting: Continuous monitoring and transparent financial reporting to national and EU authorities.

Long-Term Vision

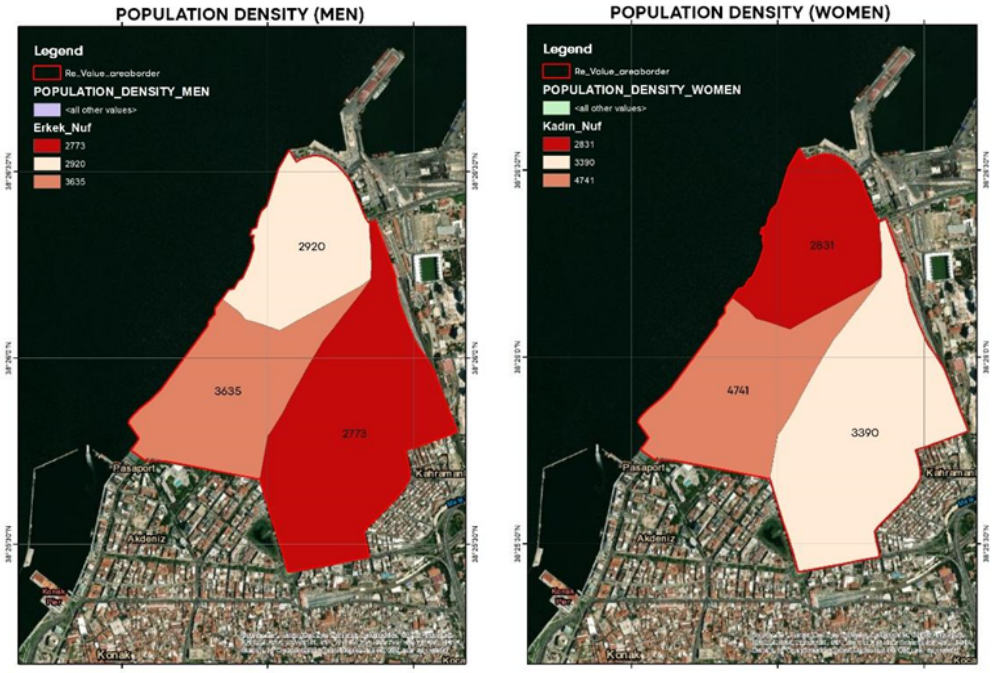
Ultimately, the work developed here is not a static plan but a living framework designed to evolve with feedback, data, and community engagement. It demonstrates a model for how cities like İzmir can move toward climate neutrality while preserving identity, supporting equity, and enhancing public life.

ACRONYMS & ABBREVIATIONS

CCC	Climate City Contract
CDS	Citizen Design Science
CoM	Covenant of Mayors
DTW	Digital Twin Workshop
EU	European Union
GCAP	İzmir Green City Action Plan
GCC	Global Climate Community
IMM	İzmir Metropolitan Municipality
IMW	Impact Model Workshop
InoC	Innovation camps
IZENERJI	İzmir Metropolitan Municipality Energy Generation, Storage, Transmission, Distribution, Import, Export and Trade Joint Stock Company
IZPA	İzmir Planning Agency
IZSU	İzmir Water and Sewage Management Company
IZTECH	İzmir Institute of Technology
NEB	New European Bauhaus
SDG	Sustainable Development Goal
SGZ:	Sustainable Green Zone
SECAP	İzmir Sustainable Energy and Climate Action Plan
TTP	Territorial Transformation Plan
WCM	World Cafe Meetings

APPENDIX A - Detailed Analysis of Alsancak Pilot Area

Analysis Maps of the Waterfront Pilot Area



Figures A1 and A2. Population density men and women (Image credit: IMM).

The study area consists of the Alsancak, Kültür, and Mimar Sinan neighborhoods. The total population is 20.293 people. The female population consists of 10.962 people and the male population consists of 9.328 people.

Table A1. Population by neighbourhoods within the waterfront pilot area.

Neighbourhood	2008	2010	2012	2014	2016	2019
Alsancak	5.869	6.123	6.219	6.035	5.978	6.068
Kültür	9.225	9.370	9.199	9.051	9.072	8.820
Mimar Sinan	6.426	6.273	6.295	6.189	6.454	6.489
TOTAL	**21.520**	**21.766**	**21.713**	**21.275**	**21.504**	**21.377**

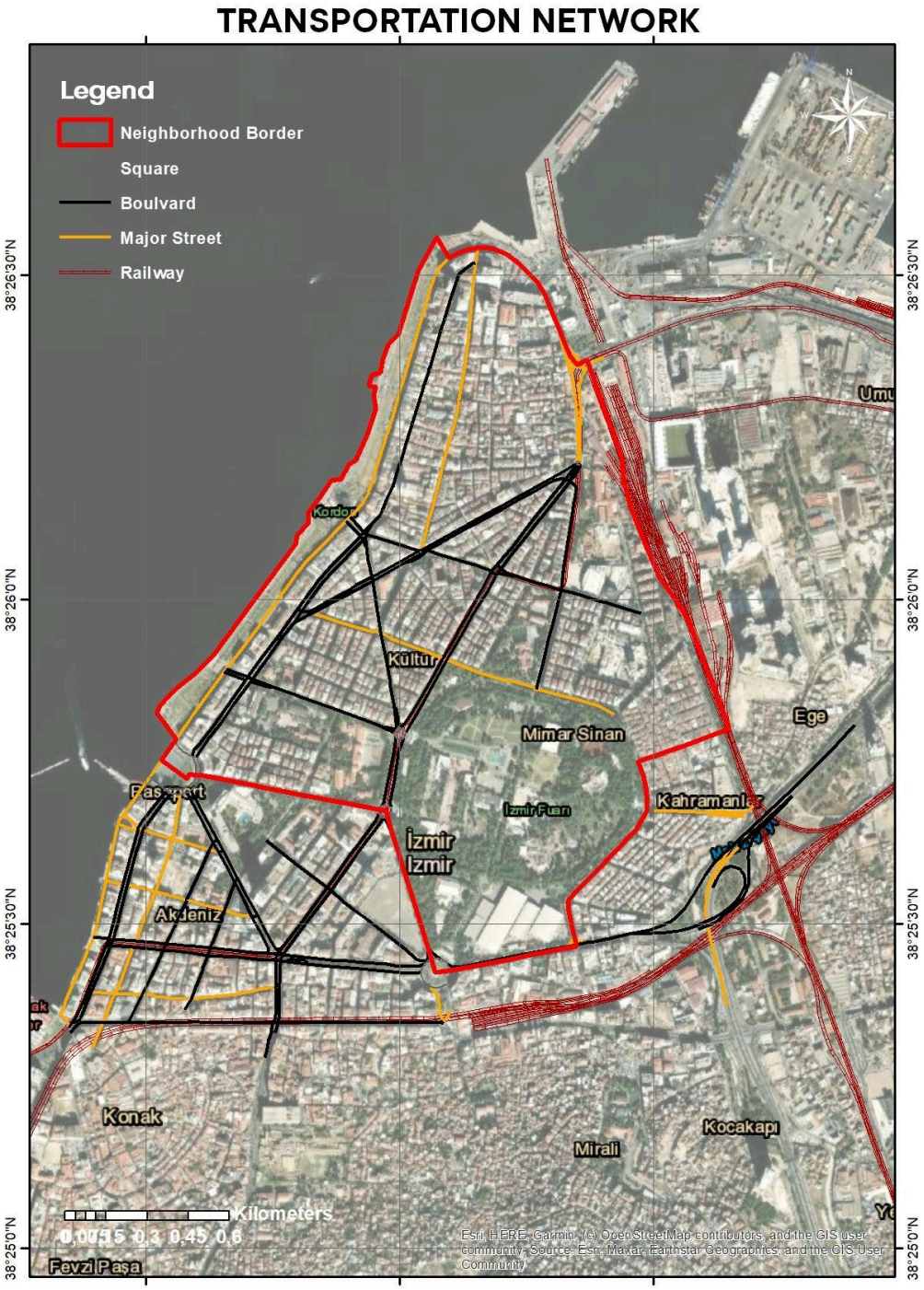


Figure A3. Vehicle Roads Analysis Map, Scale: 1/10.000, CRS: TUREF / TM27. Prepared with the dataset acquired from Directorate of Geographic Information Systems, İzmir Metropolitan Municipality (Image credit.

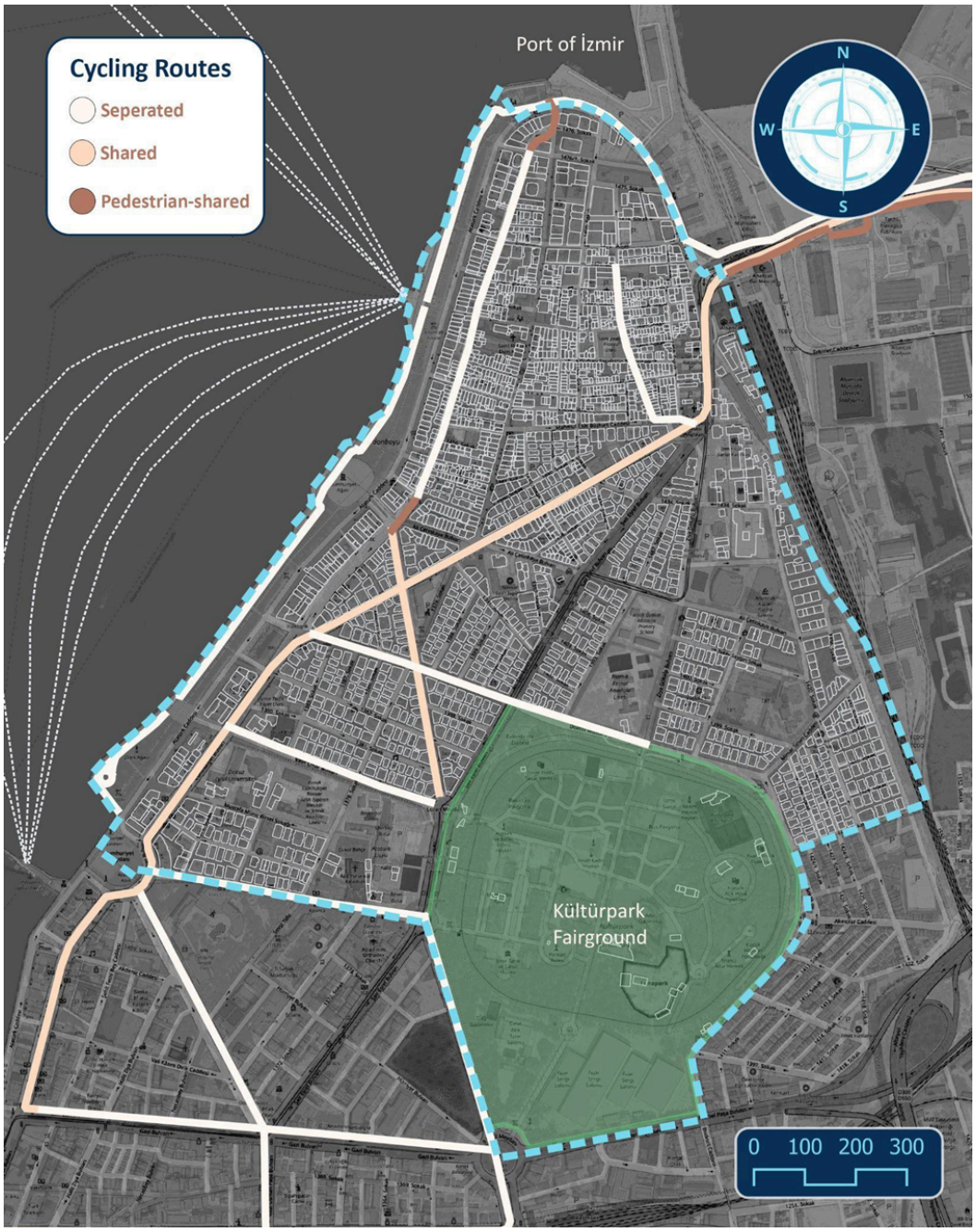
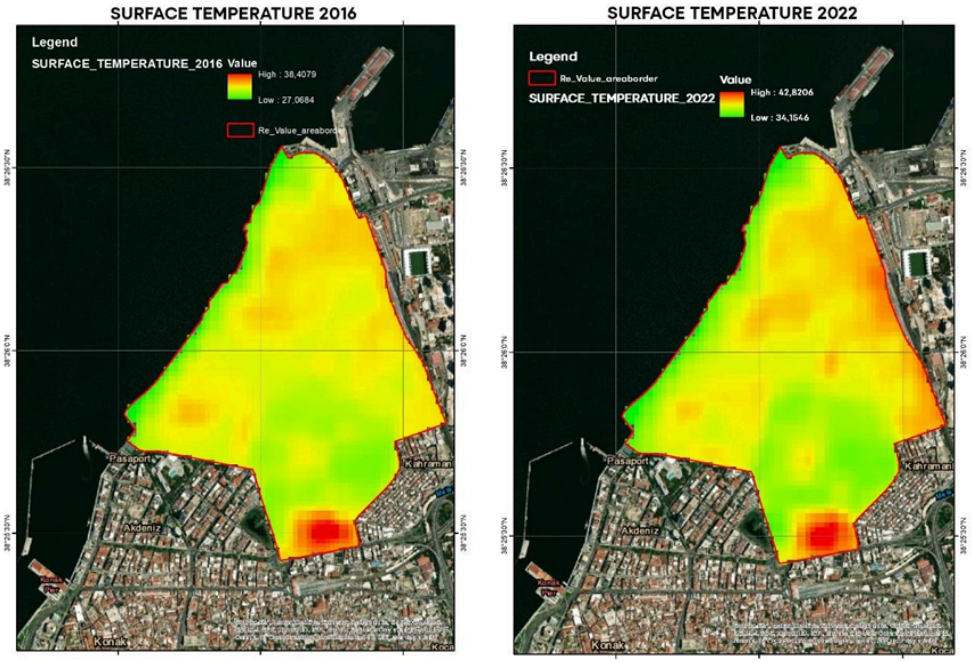


Figure A4. Cycling Routes Analysis Map, Scale: 1/10.000, CRS: TUREF / TM27. Prepared with the dataset acquired from Directorate of Geographic Information Systems, İzmir Metropolitan Municipality (Image credit: IMM).

Figure A5. Green Areas Analysis Map, Scale: 1/10.000, CRS: TUREF / TM27. Prepared with the dataset acquired from Directorate of Geographic Information Systems, İzmir Metropolitan Municipality (Image credit: IMM).

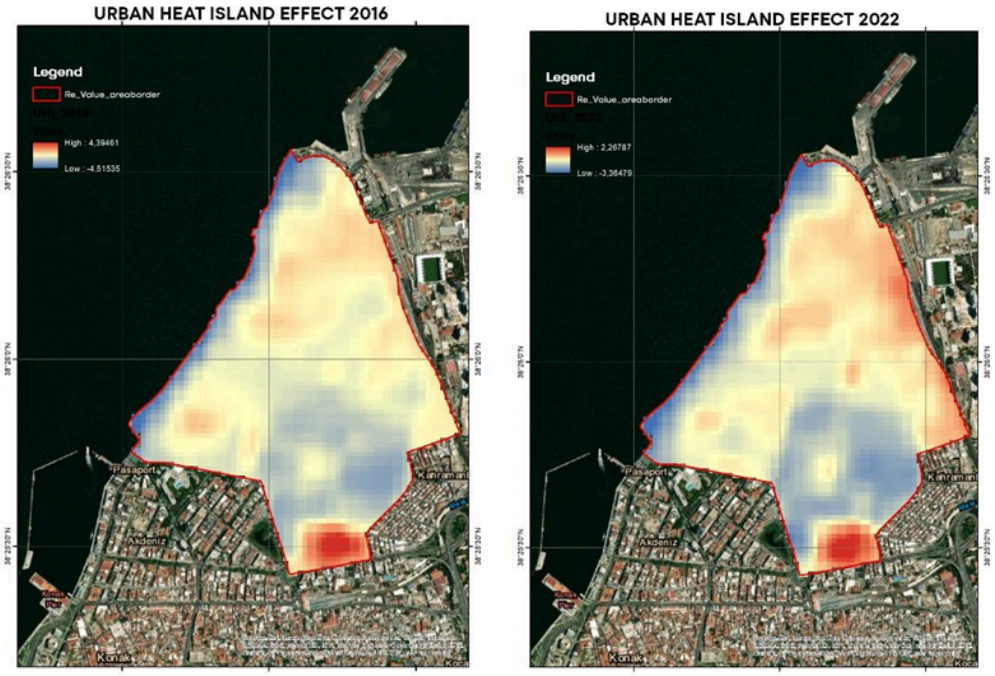
Analysis Maps on Urban Heat Island Effect, Biodiversity and Surface Temperature



Figures A6 and A7. Surface temperature maps (Image credit: IMM).

Surface Temperature Map Summary

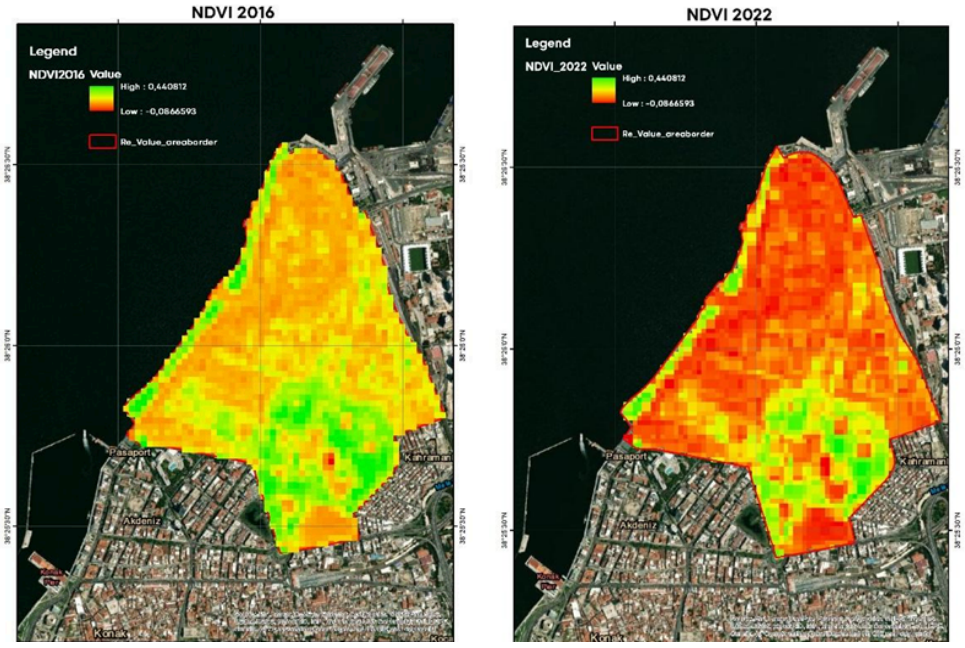
- **Overview**:
  The surface temperature analysis reveals a significant increase in urban heat over recent years, particularly in high-density built-up areas. Zones dominated by buildings and transportation infrastructure experience consistently elevated temperatures.
- **Temporal Comparison**:
  Comparative satellite data from **2016 and 2022** indicate a clear upward trend in surface temperatures, illustrating the intensification of the **Urban Heat Island (UHI)** effect.
- **Primary Drivers**:
  - Expansion of **impervious surfaces** (e.g., concrete, asphalt)
  - Reduction in **vegetative cover and green space**
  - Dense **urbanization and land-use change**
- **Impacts**:
  These rising temperatures pose growing risks to urban ecosystem stability, public health, and climate resilience, particularly in the face of anthropogenic climate change.
- **Relevance to Re-Value**:
  The findings guide climate-sensitive design interventions—such as **increasing shaded areas, planting trees, and implementing permeable surfaces**—to mitigate heat risks in the Alsancak pilot area.



Figures A8 and A9. Urban Heat Island Analyses (Image credit: IMM).

Heatwave Map Summary

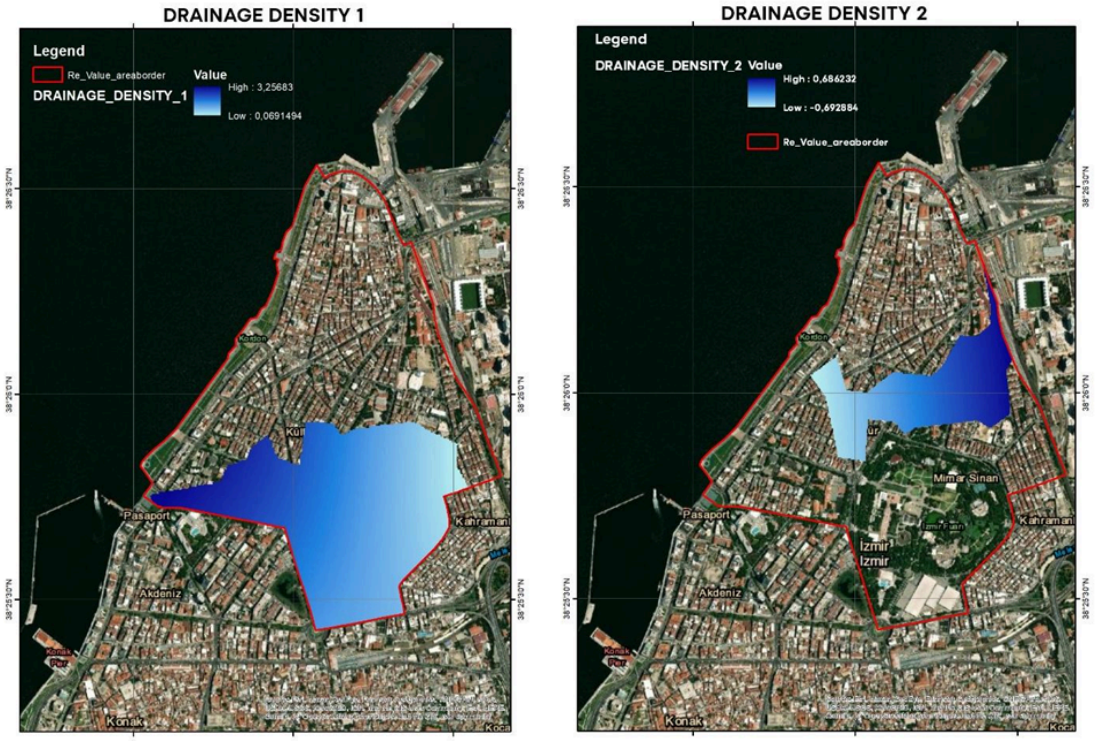
- **Overview**
  The frequency and intensity of heatwaves have significantly increased in recent years, closely tied to rising surface temperatures and altered urban microclimates.
- **Key Drivers**
  - Decline in green spaces, reducing shading and evapotranspiration
  - Expansion of impervious surfaces (asphalt, concrete), intensifying heat absorption
  - Resulting Urban Heat Island (UHI) effect, where city centers are much hotter than rural surroundings
- **Impacts**
  - Disruption of urban ecological balance
  - Stress on biodiversity and vegetation
  - Increased health risks and reduced urban resilience
- **Relevance for Re-Value**
  This analysis highlights the importance of green infrastructure and climate-adaptive design in mitigating UHI impacts and improving thermal comfort in dense urban areas like Alsancak.



Figures A10 and A11. NVDI Images (Image credit: IMM).

Vegetation Map Summary

- **Overview**
  Normalized Difference Vegetation Index (NDVI) data from 2016 to 2022 indicates a decline in vegetation cover across the study area, reflecting a progressive loss of urban biodiversity.
- **Key Findings**
  - Significant reduction in vegetation vitality and extent, linked to rising surface temperatures.
  - Loss of ecological functions of green spaces, including cooling and habitat support.
  - Urban Heat Island (UHI) effect has intensified due to decreased vegetation, further stressing ecosystems.
  - Habitat fragmentation and biodiversity loss have become more evident.
- **Implications**
  These findings emphasize the need for restorative green infrastructure and ecologically connected urban planning to sustain biodiversity and urban resilience.



Figures A12 and A13. Drainage density analyses (Image credit: IMM).

Drainage Map Summary

- **Overview**
  Drainage density, measured as the total length of streams per unit area, was analyzed across micro basins within the study area to understand hydrological and geomorphological dynamics.

- **Key Findings**

  - Higher drainage density observed in low-lying areas where subsurface water converges and streamflow initiates, supporting extensive stream networks.

  - Lower drainage density found in steep slope regions due to rapid runoff limiting channel formation.

  - Spatial variation in drainage density reflects the influence of topography and hydrological processes on landscape evolution.

- **Implications**
  Understanding drainage density is essential for effective stormwater management and urban flood risk mitigation in planning interventions.

Flood Risk Overview in İzmir

Flooding is a major hazard in İzmir, driven by rising sea levels, overflowing streams, and intense rainfall. Historical events, such as the 1995 flood in Karşıyaka and Çiğli, caused significant casualties and damage[6]. In densely urbanized areas with reduced streambed slopes, incomplete drainage exacerbates flood risks. Additionally, strong southwest winds increase vulnerability near the coast[7].

Three main factors contribute to İzmir's flood risk:

1. Sudden heavy rainfall linked to climate change,
2. Topographical and soil characteristics combined with irregular urban development,
3. Social factors influencing vulnerability.

Alsancak, the Re-Value pilot area, is especially prone to flooding due to its soil texture, proximity to streams, and marine influences. Recent heavy rains have caused significant flooding, damaging buildings and public spaces.

A 1-meter sea-level rise combined with extreme weather events threatens coastal and inland areas, notably Alsancak-Kordon, Karşıyaka, and Mavişehir[8]. The increasing flood frequency highlights the tangible effects of climate change, as seen in the devastating November 2023 flood in Alsancak-Konak.

Historical land use changes since the Industrial Revolution, including deforestation and fossil fuel use, have disrupted ecological balances and intensified urban climate vulnerabilities[9]. Growing construction density in culturally significant Alsancak further heightens flood risk[10].

The Gediz, Küçük Menderes, and Bakırçay river basins, flowing toward the Aegean Sea, are also flood-prone due to natural and human factors, with climate change amplifying recent flood events[11].

Flooding negatively impacts biodiversity, fragments natural habitats, and degrades urban ecosystems. Protecting the ecological, historical, and cultural values of vulnerable areas like Alsancak-Konak is crucial for sustainable urban resilience.

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[6] Koçman, A. (1996). İzmir'de 3-4 Kasım 1995 Karşıyaka Sel Felaketi. *Ege Üniversitesi İzmir Araştırma ve Uygulama Merkezi*, pp. 1-30.
[7] Gümüş, N. (2013). İzmir'de Kentsel Büyüme ve Doğal Afetler. pp. 555-562.
[8] Ekşi, A., & Kantarlı, İ. C. (2018). Su Taşkınlarına Karşı Risk Yönetimi İzmir İliği Örneği. *Ege Üniversitesi Atatürk Sağlık Hizmetleri Meslek Yüksekokulu*, pp. 472-480.
[9] Ercanlı, Ç., & Savaşır, G. (2022). Kentsel kıyı alanlarında taşkın riskine yönelik uyum stratejilerini İzmir Karşıyaka kıyı bandı örneği ile değerlendirmek. Megaron, s. 274–291, DOI: https://doi.org/10.14744/MEGARON.2022.46666.
[10] Türkiye Planlama Okulları Birliği. (2023). Türkiye Planlama Okulları Birliği Şehir ve Bölge Planlama Bölümü Öğrencileri Bitirme Projesi Yarışması 2023.
[11] İzmir Metropolitan Municipality . (2023). *Competition Agreement.* İzmir Metropolitan Municipality Sustainable Center, retrieved from: https://surdurulebilirlikmerkezi.İzmir.bel.tr/tr/YarismaSartnamesi/Index

APPENDIX B - Digital Twin Details

Detailed Results of the Workshop

1. Surface Temperature and Microclimate

- Lack of shaded areas is a common issue, especially in high-footfall areas like schools, seating zones, and sidewalks.
- Insufficient green cover and dominance of impervious surfaces contribute to elevated surface temperatures and stormwater accumulation.
- Wind flow is obstructed by tall buildings, negatively impacting natural ventilation and local microclimate.
- Proposed solutions include tree planting, shade structures, permeable surfaces, rain gardens, and surface grading.
  Developing surface temperature datasets and simulating shading effects digitally were also recommended.

2. Urban Comfort and User Experience

- Urban comfort features like seating, signage, lighting, and social amenities are lacking, reducing usability for diverse user groups.
- Informal uses of public space (e.g., florists, street vendors) disrupt pedestrian flow and reduce spatial order.
- Poor lighting and lack of security at night lead to safety concerns, particularly for vulnerable groups.
- Irregular vehicle and motorcycle parking impairs access and diminishes the visual quality of public areas.
- Suggested interventions include improved lighting and surveillance, inclusive space design (play areas, reading corners), better sidewalk surfaces, clear signage, and cultural elements like photo exhibitions to enhance neighborhood identity.

Detailed Explanation of Data and Digital Tools

1. Data Types

a) Environmental Data

- Surface temperature maps to assess heat island zones, shading deficiencies, and hard surface intensity (e.g., around Şevket Özçelik Street).
  Mapping of existing and potential natural shading elements (trees, buildings, temporary structures).
  Permeability data to determine ratios of hard, green, and permeable surfaces.
- Microclimatic data including wind direction/speed, humidity, and stormwater accumulation zones.
- Tree inventory detailing species, location, and canopy coverage for shading simulations.

b) Spatial and Physical Data

- Walkability and accessibility assessments: sidewalk width/height, barrier-free design.
- Inventory of pedestrian paths, seating units, lighting points, and street furniture (e.g., benches, bins, signage).
  Parking pressure and vehicle/motorcycle traffic flow data.
- Condition mapping of pavements and drainage infrastructure.
- Mapping of dark zones and existing lighting infrastructure for nighttime safety improvements.

c) Socio-Cultural and User-Based Data

- Temporal user density patterns (day/night, weekday/weekend).
- User group needs analysis (children, elderly, disabled individuals, tourists).
  Behavioral mapping: social interaction hotspots, littering, maintenance demand.
- Documentation of street animal presence and related hygiene/odor concerns.

d) Administrative and Infrastructure Data

- Clarification of institutional responsibilities (cleaning, maintenance, repair).
- Mapping of safety infrastructure (CCTV, incident zones).
- Urban elements: signage, public art, heritage landmarks.
- Technical infrastructure data: sewer lines, stormwater systems, energy grids.

2. Digital Tools, Platforms, and Modeling Proposals

a) Simulation and Modeling Tools

- Green infrastructure impact simulation: tree shading, permeability, cooling effects.

- Surface temperature and stormwater accumulation modeling.
- Pedestrian density and thermal comfort simulations for high-traffic areas.
- Urban heat island projections under future climate scenarios.

b) Participatory and Community-Based Digital Platforms

- Mobile apps for photo-based citizen reporting and location-tagged feedback.
- Gamified engagement tools to incentivize neighborhood participation in data collection.
- Digital tracking of community-led initiatives (e.g., recycling, beautification efforts).

c) Digital Wayfinding and Information Systems

- Real-time digital signage for local updates, traffic, and weather alerts.
- QR code system for historical/cultural information access.
- Smart mobility screens at stops to show live arrivals, lighting levels, and area usage.

d) Monitoring and Regulatory Systems

- Barcode-enabled waste separation system for tracking and incentives.
- Smart parking solutions to reduce traffic and guide drivers.
- Digitally linked lighting and surveillance systems for safety optimization in dark/high-risk zone

About Re-Value – Re-Valuing Urban Quality & Climate Neutrality in European Waterfront Cities

The Re-Value partnership consists of nine European waterfront cities and selected European organisations that work to make the urban transition irresistible for everyone. This is done by demonstrating how climate neutrality and urban quality can be aligned, by re-valuing the cities' connection to their waterfronts, strengthening co-benefits and mitigating potential adverse impacts.

Ålesund (Norway), Bruges (Belgium), Burgas (Bulgaria), and Rimini (Italy) demonstrate how integrated urban planning and design can be optimally deployed to achieve climate neutrality and significantly reduce GHG emissions by 2030. In addition, Cascais (Portugal), Constanța (Romania), İzmir (Türkiye), Písek (Czechia), and Rijeka (Croatia) learn, replicate and develop their own participatory story-building, data-driven scenarios, and financial and partnership models on integrated urban planning and design to accelerate their journeys to climate neutrality.

The partnership is coordinated by the Norwegian University of Science and Technology (NTNU) and is funded by the European Union's Research and Innovation funding programme Horizon Europe under grant agreement 101096943.

Learn more about the partnership and the outcomes on re-value-cities.eu.

Partners

Funded by the European Union

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