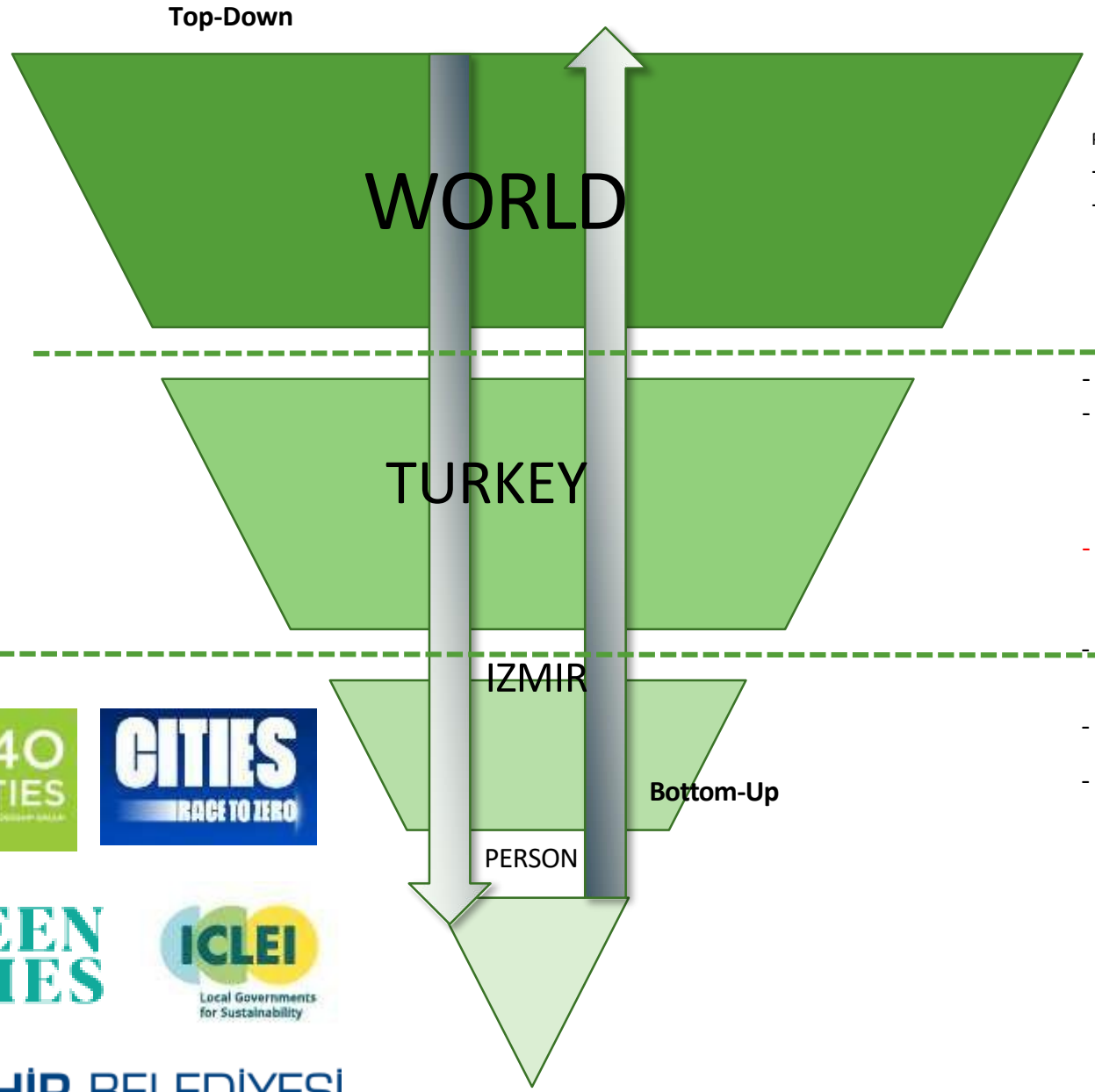
Studies on Climate Adaptation and Resilience

Department of Climate Change and Zero Waste Department of
Climate Change and Clean Energy Directorate

18/02/2025

İZMİR BÜYÜKŞEHİR BELEDİYESİ

Climate Change Studies



Paris Climate Agreement

- Keeping the temperature **below 1.5 C**
- Greenhouse gases:

  To be reduced **by 50 per cent by 2030**,

  Reduced **to zero by 2050**.

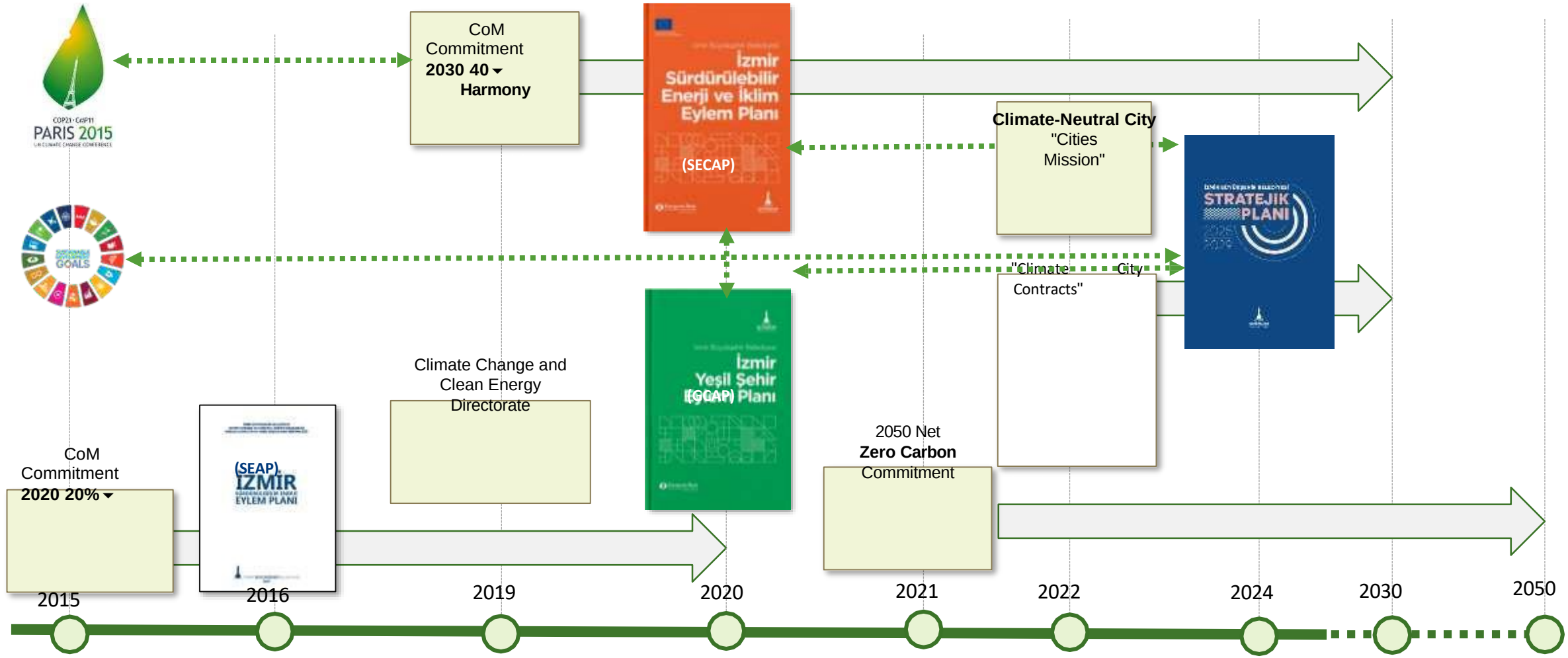
- Turkey signed the Paris Climate Agreement
- On 20 September 2015, the year 2030

  projected to be realised as of
  The "Intended Nationally Determined Contribution" (INDC) was announced as **up to 21 per cent incremental mitigation**, later updated to **41 per cent**.
- **Net zero carbon** target **for 2053**

- All greenhouse gases except for the industrial and aviation sectors
  40% reduction by 2030 compared to 2018
- **"net zero carbon" for 2050 with the Assembly Decision dated 09/08/2021**
- Climate Adaptation Plan

İZMİR BÜYÜKŞEHİR BELEDİYESİ

IBB Climate Change Studies Roadmap

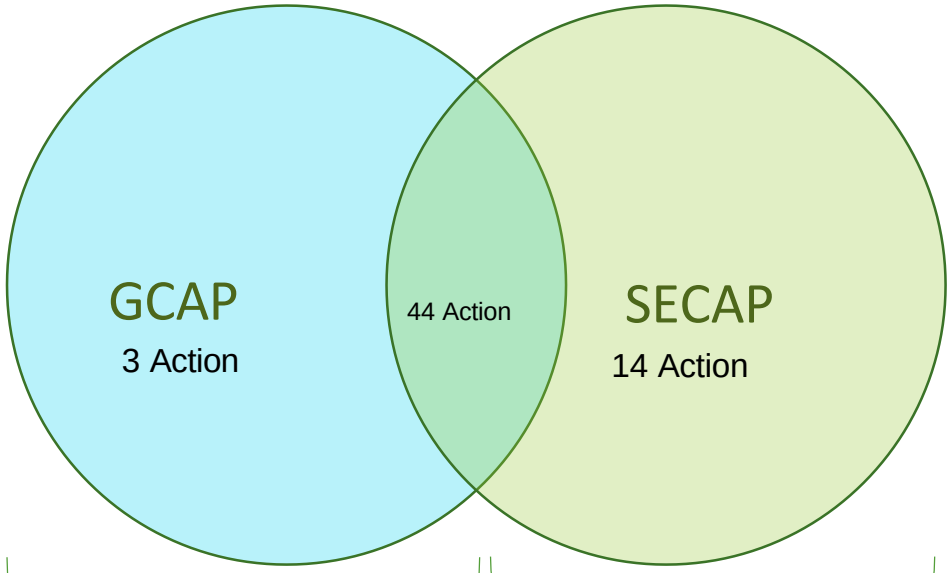


İZMİR BÜYÜKŞEHİR BELEDİYESİ

GCAP & SECAP Actions

GCAP Sectors

1. Buildings
2. Energy
3. Transport
4. Waste Management
5. Water Management
6. Land Use
7. Health
8. Industry
9. Managerial Organisation



SECAP Sectors

1. Buildings
2. Energy
3. Transport
4. Waste Management
5. Water Management
6. Land Use
7. Health
8. Environment and Biodiversity
9. Agriculture and Livestock
10. Civil Defence and Emergency
11. Tourism

Mitigation = 28 Actions
Mitigation/Compliance = 6 Actions
Compliance= 24 Action

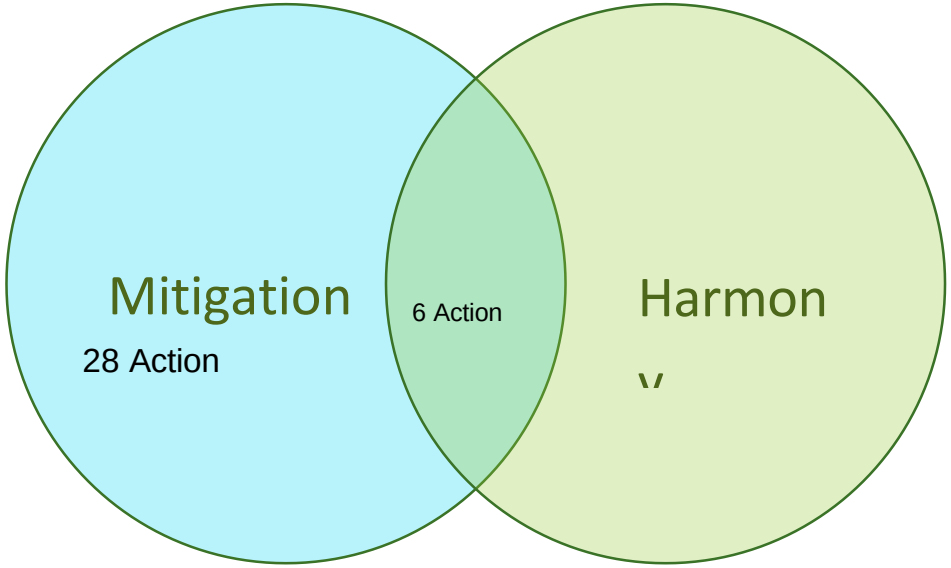
- +GCAP SECAP
  Total 61 Actions

GCAP/SECAP Sectors

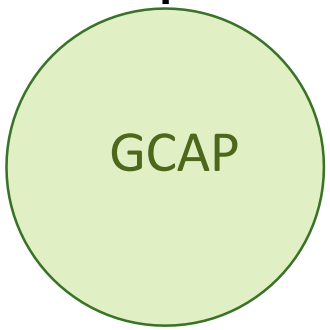
1. Buildings
2. Energy
3. Transport
4. Waste Management
5. Water Management
6. Land Use
7. Environment and Biodiversity
8. Agriculture and Forestry
9. Health
10. Tourism
11. Governance

İZMİR BÜYÜKŞEHİR BELEDİYESİ

GCAP & SECAP Actions



+



=SECAP+GCAP 61 Action

=SECAP 58 Action

44 Actions common with GCAP 14
Actions specific to SECAP

=GCAP 47 Action

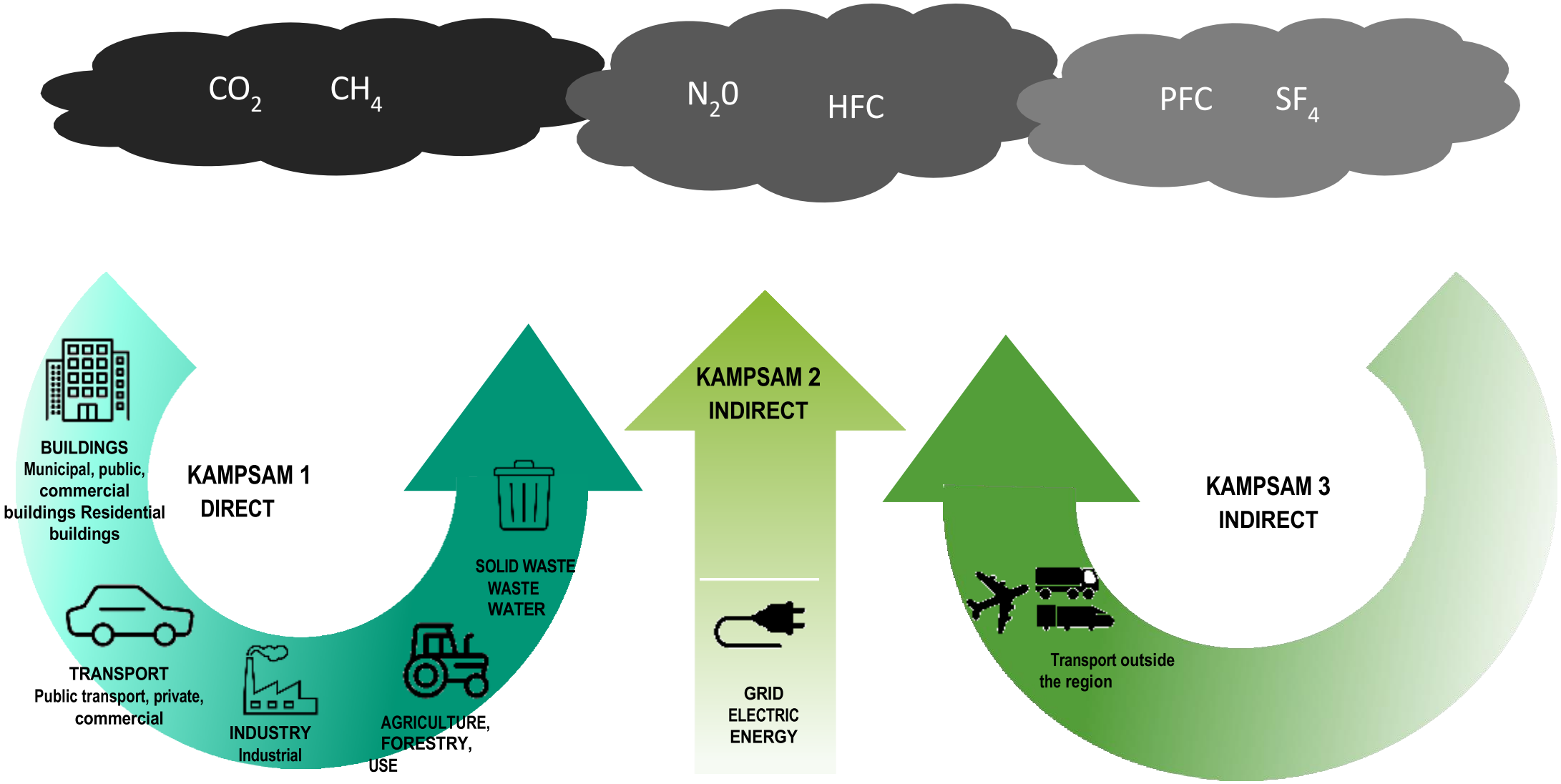
44 Actions joint with SECAP 3 Actions specific to GCAP

GCAP/SECAP Sectors

1. Buildings
2. Energy
3. Transport
4. Waste Management
5. Water Management
6. Land Use
7. Environment and Biodiversity
8. Agriculture and Forestry
9. Health
10. Tourism
11. Governance

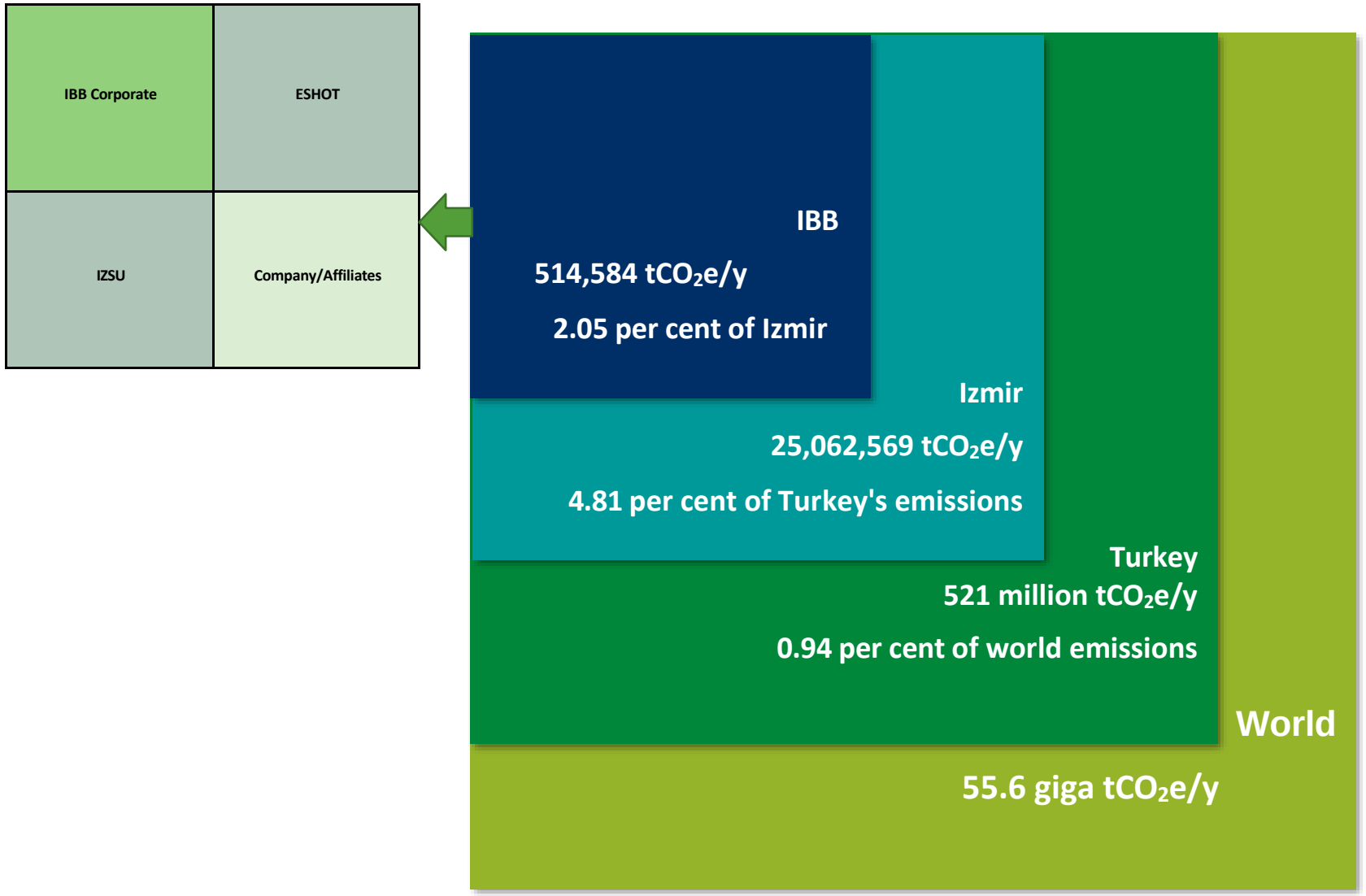
İZMİR BÜYÜKŞEHİR BELEDİYESİ

Urban Emission Sources



İZMİR BÜYÜKŞEHİR BELEDİYESİ

Izmir's Carbon Footprint

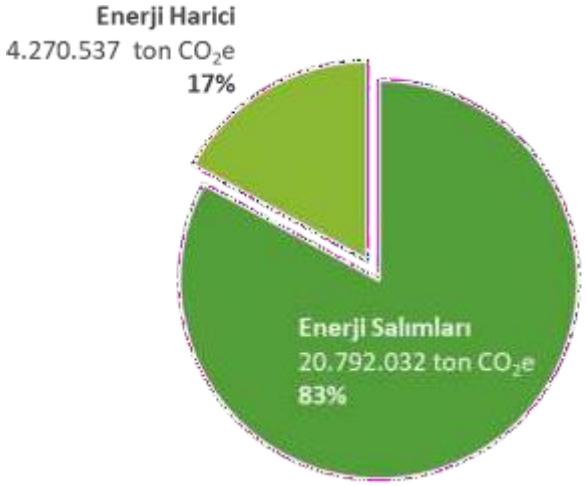


Source: TurkStatIzmir SECAP 2020

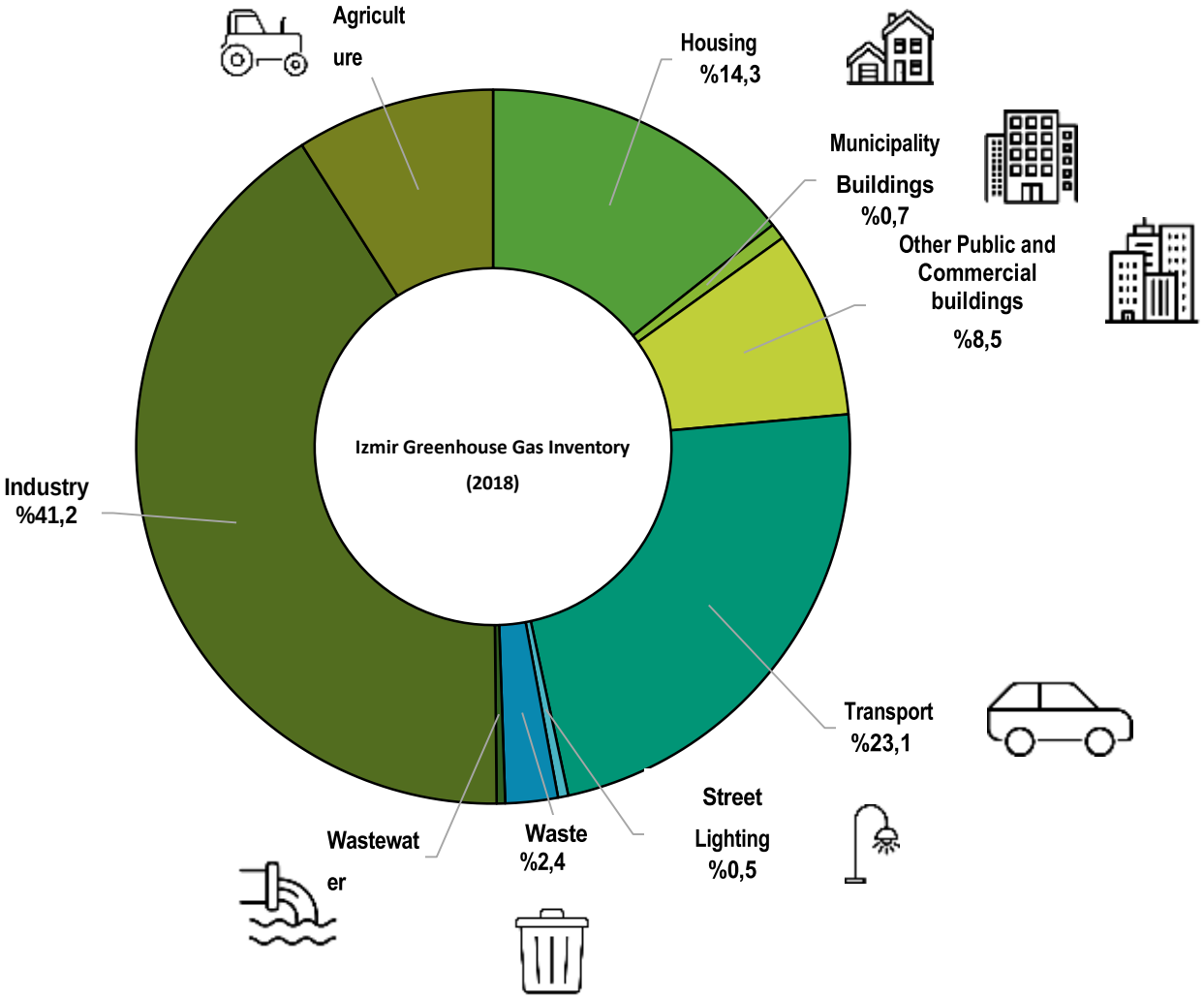
Izmir Greenhouse Gas Distribution by Sector

Industrial Emissions

- Process Emissions %6,1
- Energy: 31.4
- Energy Production : 3.7

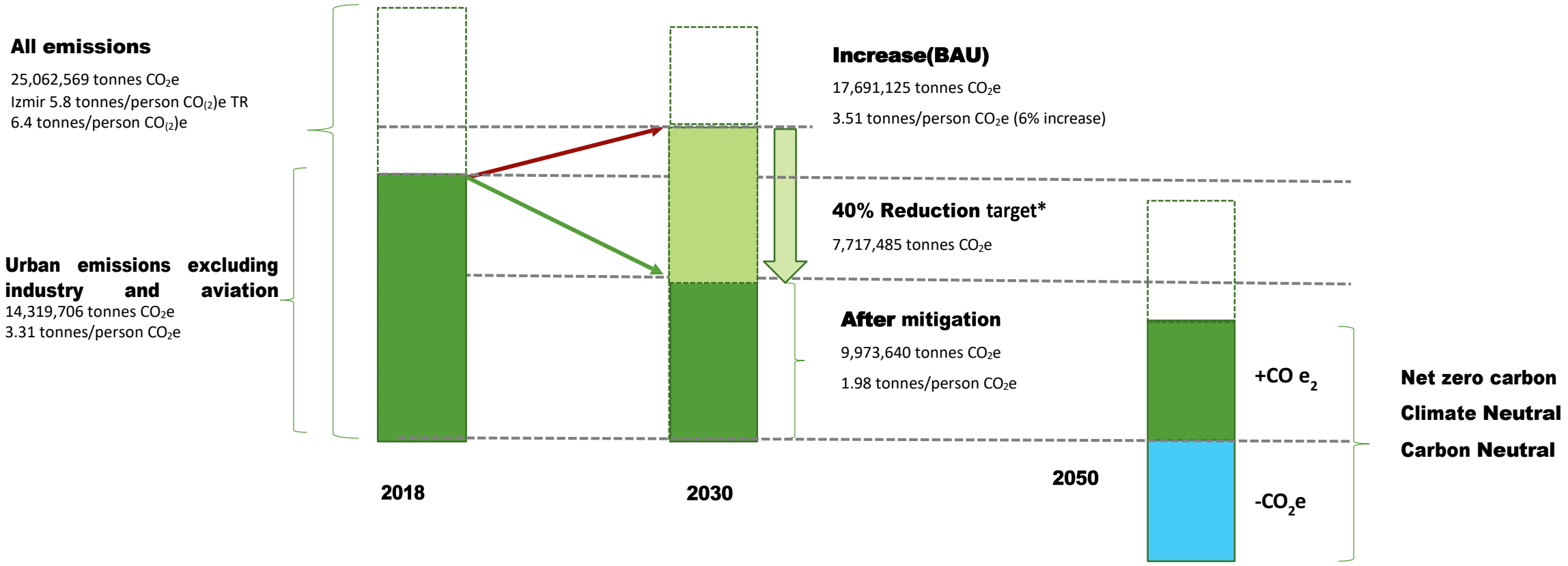


Enerji Kaynaklı Salımlar



İZMİR BÜYÜKŞEHİR BELEDİYESİ

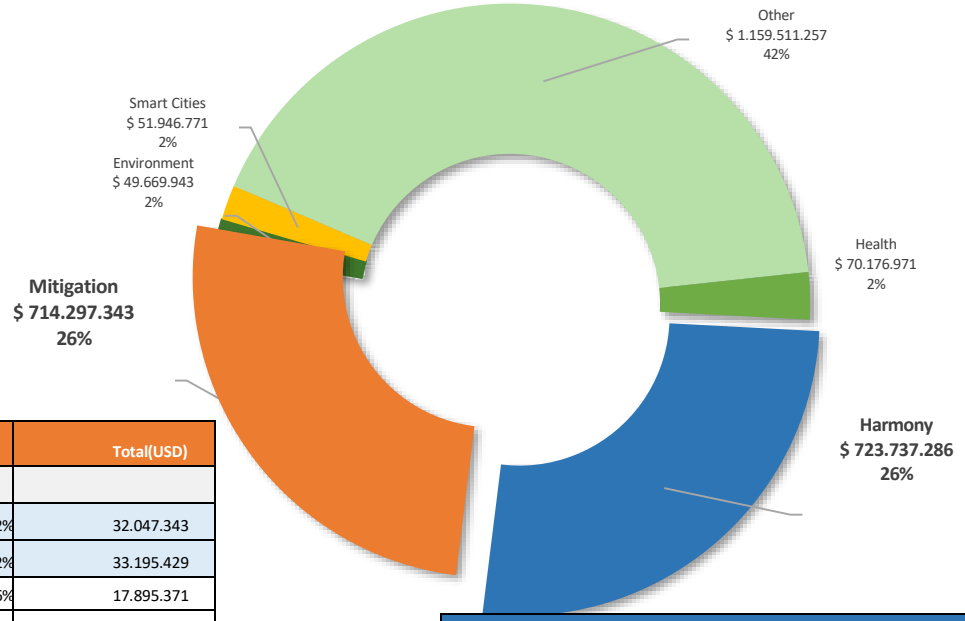
Greenhouse Gas Reduction Scenario



İZMİR BÜYÜKŞEHİR BELEDİYESİ

* 40% Emission reduction is calculated per capita

2025 IBB Budget



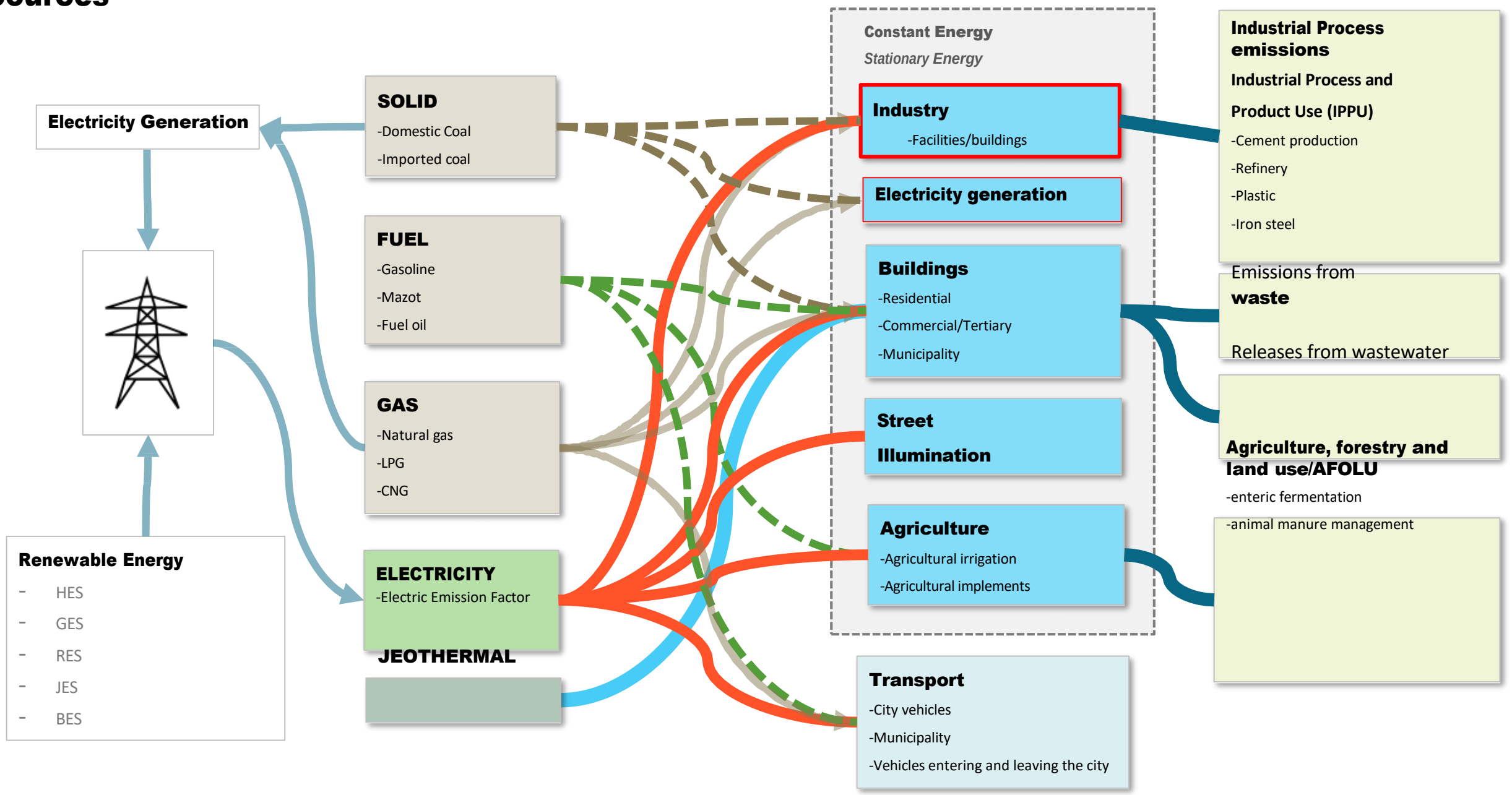
Mitigation	Total Total(TL)	%	Total(USD)
Buildings	1.121.657.000	1,2%	32.047.343
Energy	1.161.840.000	1,2%	33.195.429
Energy Efficiency	626.338.000	0,6%	17.895.371
Renewable Energy	535.502.000	0,6%	15.300.057
Agriculture	1.000.000	0,0%	28.571
Livestock breeding	1.000.000	0,0%	28.571
Transport	18.955.096.000	19,6%	541.574.171
Rail Systems	12.337.073.000	12,7%	352.487.800
Low Emission Car hire	2.434.253.000	2,5%	69.550.086
Public Transport Integration	1.908.540.000	2,0%	54.529.714
Low Emission Vehicle	1.880.965.000	1,9%	53.741.857
SUMP	200.000.000	0,2%	5.714.286
Intelligent Traffic System	102.400.000	0,1%	2.925.714
Municipality Service Vehicles	48.865.000	0,1%	1.396.143
Electric Vehicle	40.000.000	0,0%	1.142.857
Pedestrianisation	3.000.000	0,0%	85.714
Waste	3.760.814.000	3,9%	107.451.829
Waste Management	3.760.814.000	3,9%	107.451.829

Harmony	Total Total(TL)	%	Total(USD)
Buildings	25.000.000	0,0%	714.286
Water Management	21.906.186.000	22,6%	625.891.029
Waste water	10.082.321.000	10,4%	288.066.314
Drinking water	6.934.834.000	7,2%	198.138.114
Rain Water Line	2.271.825.000	2,3%	64.909.286
Business Activities	1.931.883.000	2,0%	55.196.657
Gulf Works	501.502.000	0,5%	14.328.629
Streams	183.821.000	0,2%	5.252.029
Agriculture	54.250.000	0,1%	1.550.000
Agricultural irrigation	54.250.000	0,1%	1.550.000
Land Use	2.454.148.000	2,5%	70.118.514
Green Areas	2.450.908.000	2,5%	70.025.943
Plan Studies	3.240.000	0,0%	92.571
Governance	2.823.104.000	2,9%	80.660.114
Disaster Management	2.822.704.000	2,9%	80.648.686
Plan Studies	400.000	0,0%	11.429

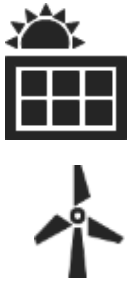
IBB/2025 Performance Programme
https://www.izmir.bel.tr/tr/Dokumanlar/23/42

İZMİR BÜYÜKŞEHİR BELEDİYESİ

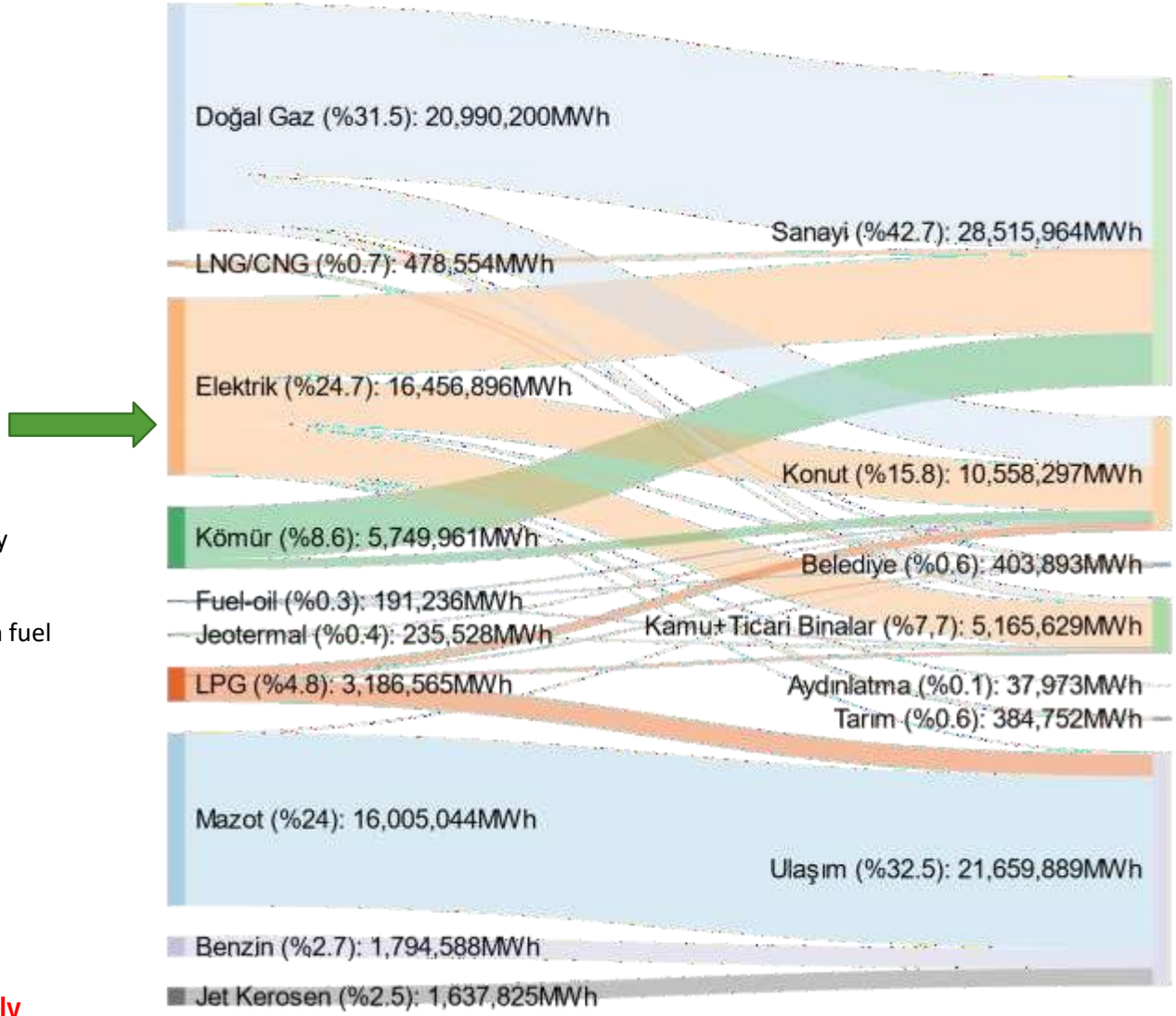
Urban GHG Emissions Sources

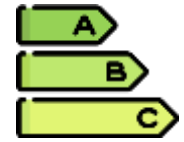


Izmir City Energy Flow



- Renewable Energy
- Energy Storage
- Low carbon clean fuel conversion
- Landfill gas





- Energy efficiency
- Circular economy
- Electrification
- Electric vehicles
- Waste heat

ARZ
Energy Supply

REQUEST
Energy Consumption

İZMİR E

Energy Studies

- Establishment of **ISO 50001 Energy Management System** (EMS)
  - Construction area greater than 10,000 m^2 and 250 Tonnes Equivalent It is carried out in 3 buildings with Petroleum Energy Consumption.
- **Energy Monitoring and Management** System
- **Renewable Energy Certified Energy** Supply (IREC/YEG-G)
  - Newly established municipal company IZETAS corporate electricity will provide its needs with renewable energy certificates.
- **Energy Studies**
  - Completed
    - Ahmed Adnan Saygun Art Centre
    - Bornova Ice Sports Hall
  - Ongoing
    - Buca Social Life Campus Buildings
    - Örnekköy Social Projects Campus

Energy Study / Example:

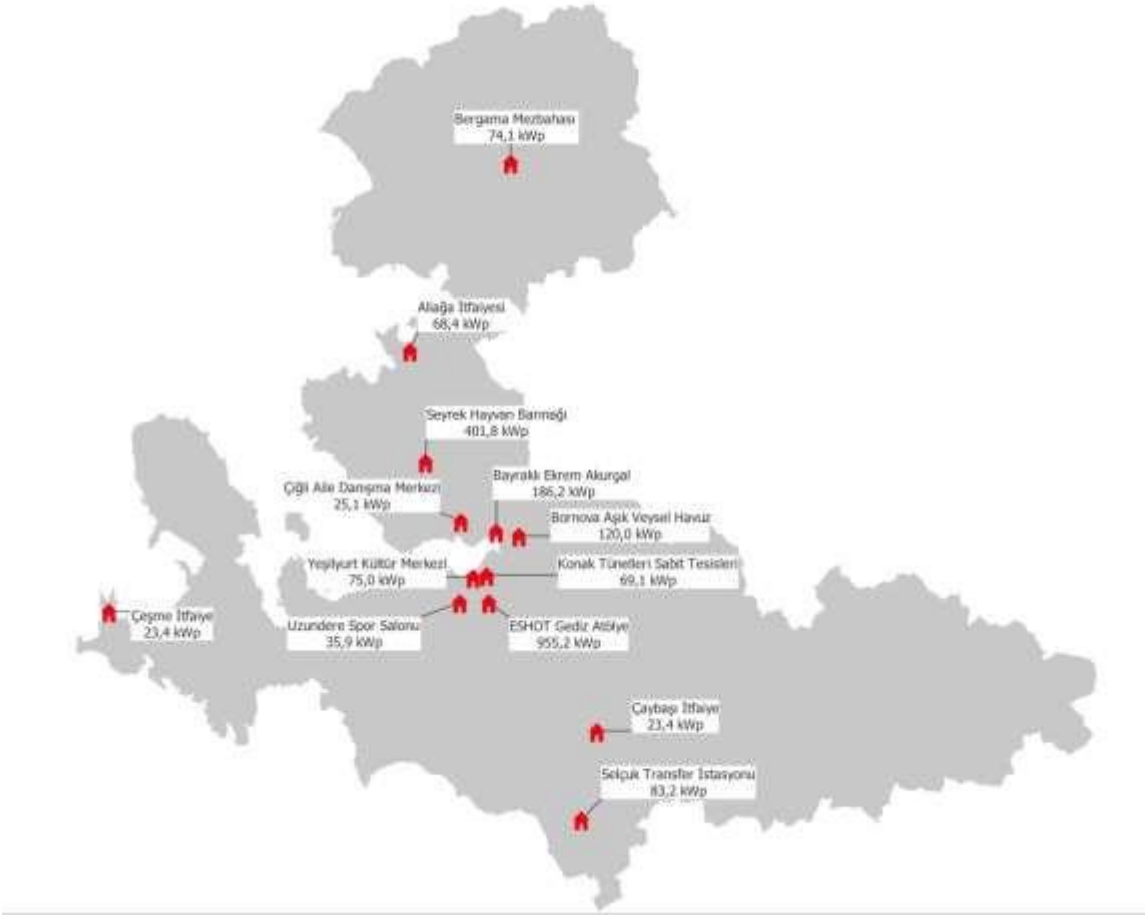
- **Ahmed Adnan Saygun Art Centre**
- In pumps, with LED lighting, with improvements in boilers, with interventions in stand-by positions of devices:
  - **Conclusion:**

  15.63% savings **from electricity and 5.69% savings from natural gas**.
- If these improvements are made, an annual reduction of approximately **126 tonnes of CO_2e** can be achieved.

İZMİR **BÜYÜKŞEHİR** BELEDİYESİ

SPP Installations

	Facility	Capacity (kW)	Annual Production (kWh)	Hane (3000 kWh/year)	CO2e Emission Prevention (tonnes/year)
1	**Bayrakli Ekrem Akurgal**	186,16	279.240	93	140
2	**ESHOT Gediz Workshop**	955,24	1.432.860	478	716
3	**Selcuk Transfer Station**	83,20	124.800	42	62
4	**Seyrek Dog Shelter**	401,76	602.640	201	301
5	**Aliaga Fire Department**	68,40	102.600	34	51
6	**Bergama Slaughterhouse**	74,10	111.150	37	56
7	**Uzundere Sports Hall**	35,91	53.865	18	27
8	**Cigli Family Counselling Centre**	25,11	37.665	13	19
9	**Yesilyurt Culture Centre**	75,00	112.500	38	56
10	**Bornova Aşık Veysel Pool**	120,00	180.000	60	90
11	**Fountain Fire Brigade**	23,40	35.100	12	18
12	**Caybasi Fire Brigade**	23,40	35.100	12	18
13	**Konak Tunnels Stationary Facilities**	69,12	103.680	35	52
	Total	**2.141**	**3.211.200**	**1.070**	**1.606**



İZMİR BÜYÜKŞEHİR BELEDİYESİ

Roof/Parking SPP Applications

Ekrem Akurgal Life Park SPP

- **186** kWp GES on the roof of the sports hall and car park system.
- **Fast charging** station for electric cars
- **Charging station** for disabled vehicles
- It provides all the electricity demand of the facility. The excess electricity produced provides **40%** of the energy requirement of the Historical Havagazı factory.
- **Shade** is provided for cars so that **less air conditioning** is needed.

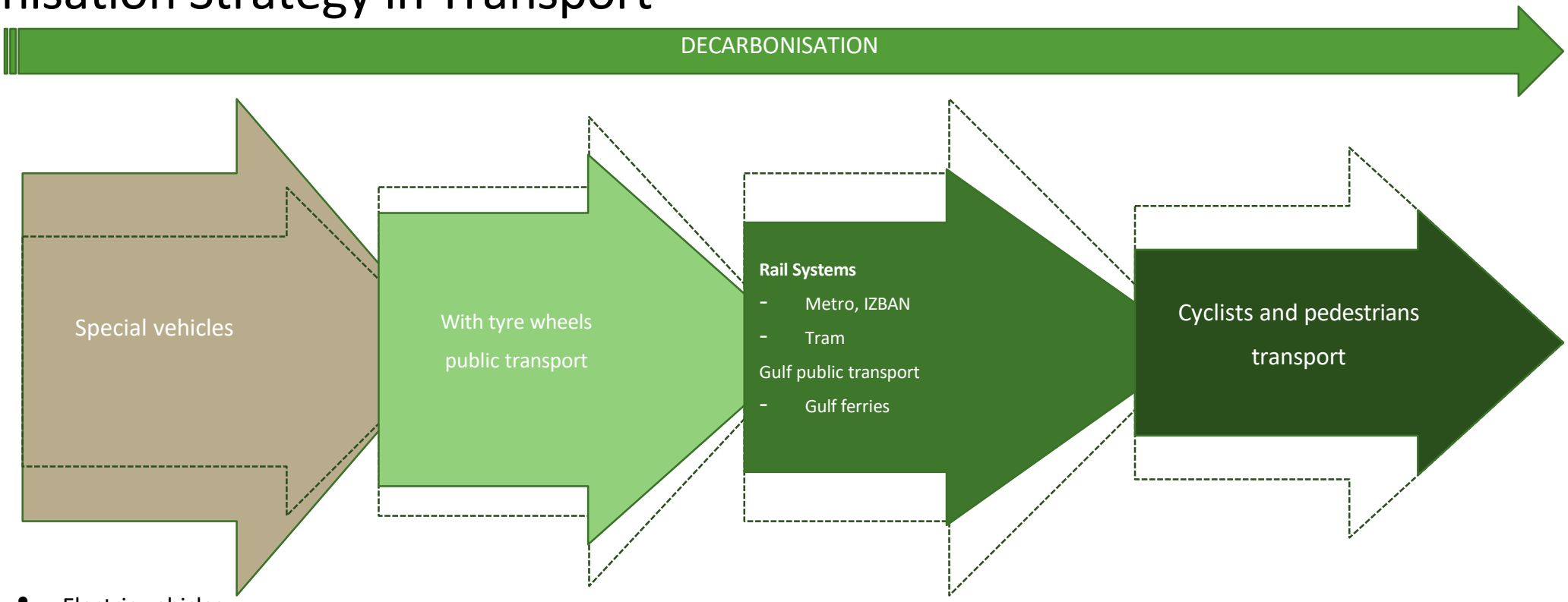
İZMİR BÜYÜKŞEHİR BELEDİYESİ

First Public Energy Performance (ESCOImplementation

- **SPP (Solar Power Plant)** project with an installed capacity of **1,300 kWp** on the roof of **Tire Gazi Mustafa Kemal Atatürk Stadium**
- The first application within the scope of "**Public Energy Performance Contract" (ESCO)** in Turkey
- **1 million 890 thousand kWh** energy will be produced.
- For 15 years by IZGÜNEŞ
  will be operated.
- While Tire Municipality receives **10 per cent discounted** electricity, at the end of the period
  free of charge to Tire Municipality
  will be handed over.
- The power plant will meet **70 per cent** of Tire Municipality's energy needs alone

İZMİR **BÜYÜKŞEHİR** BELEDİYESİ

Decarbonisation Strategy in Transport



- Electric vehicles
- Intelligent traffic system
- Shared vehicle

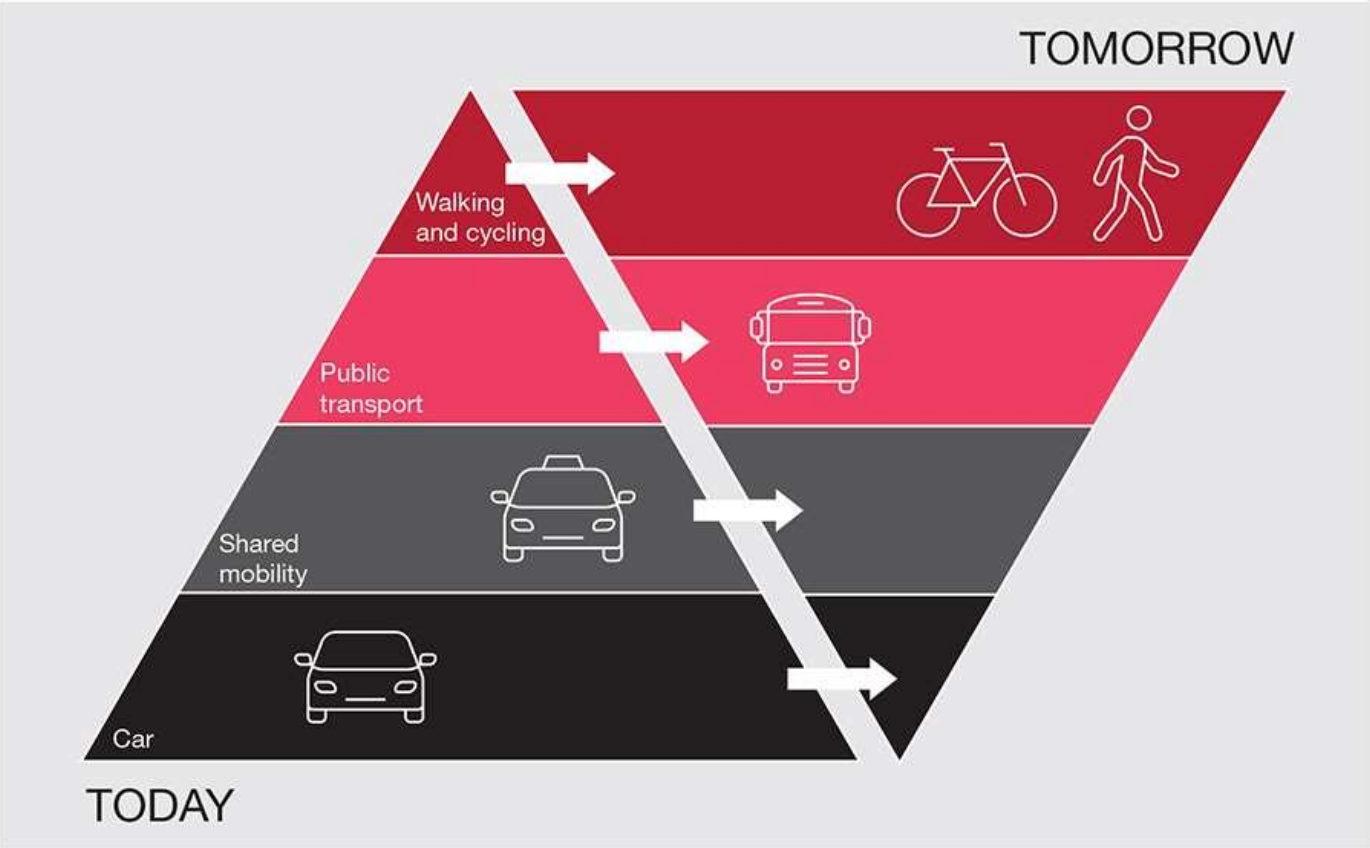
- Electric and low-carbon buses
- Eco driving training

- Electric ships

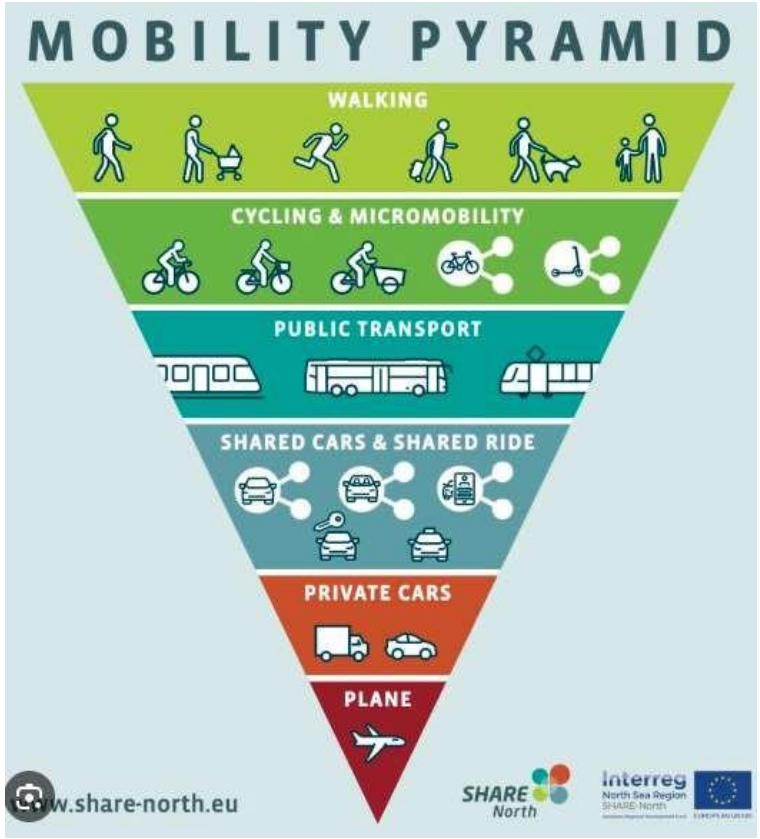
Reversing the Urban Mobility Triangle

EXHIBIT 1

Inverting the transport pyramid in the GCC



Source: Strategy&



https://www.strategyand.pwc.com/m1/en/reports/2021/sustainable-mobility.html

Google EIE-Izmir and Metropolitan Area Transport Emissions

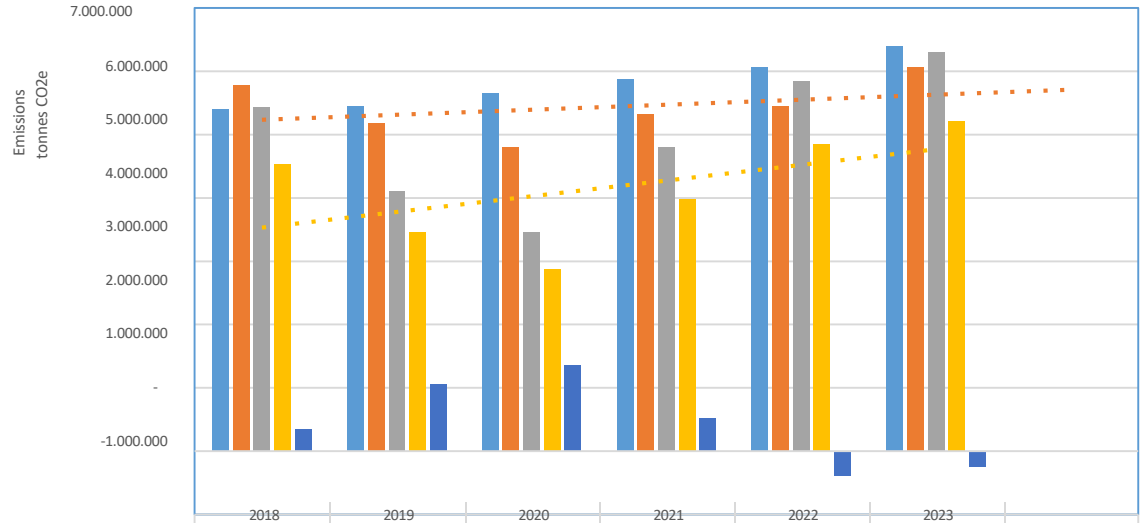
		
	Izmir	**IzmirMetropolitan Area**
Area (km2)	11.986	236
Population (2020)	4.198.677	2.281.000
Transport Emissions (2023) (Total tCO2e/year)	5.530.000	2.240.000

	Izmir	IzmirMetropolitan Area
2018	4,530,000	2,100,000
2019	3,460,000 ↓ 24%	1,580,000 ↓ 25%
2020	2,870,000 ↓ 17%	1,380,000 ↓ 12%
2021	3,980,000 ↑ 39%	1,840,000 ↑ 33%
2022	4,850,000 ↑ 22%	2,110,000 ↑ 15%
2023	**5,210,000** ↑ 7%	**2,240,000** ↑ 6%

Greenhouse Gas Emissions from Transport

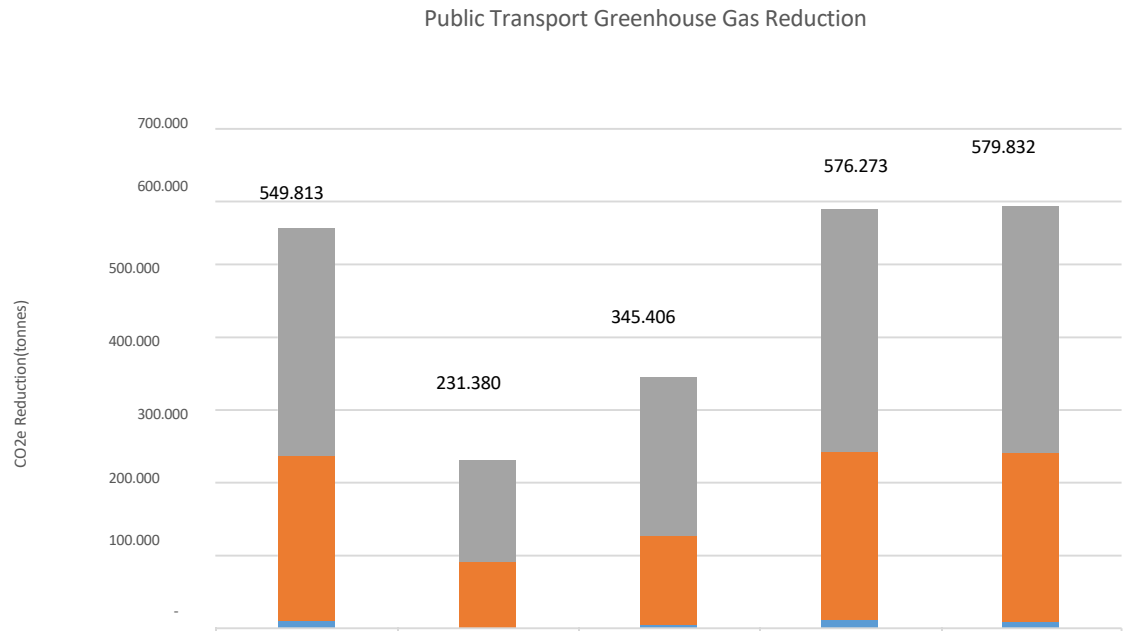
Comparison of Transport Emissions

Calculation of transport emissions based on registered vehicles, fuel sales and Google EIE



	2018	2019	2020	2021	2022	2023
Registered Vehicle Method	5.401.571	5.455.507	5.652.877	5.875.290	6.062.580	6.387.885
Fuel Sales Method	5.779.055	5.170.856	4.799.477	5.314.964	5.451.740	6.061.718
Google EIE Calculation(Full)	5.427.596	4.111.001	3.449.996	4.795.274	5.839.616	6.302.375
Google EIE Calculation (GPC)	4.531.950	3.462.809	2.865.595	3.978.889	4.852.112	5.212.183
Fuel Oil Sales Method-Google EIE Difference	351.460	1.059.855	1.349.481	519.690	-387.876	-240.658

SGS Reduction in Public Transport



	2019	2020	2021	2022	2023
Municipality Buses	312.451	139.683	217.810	333.542	338.929
Rail Systems	226.150	90.959	123.648	231.110	231.536
Sea Transport	11.212	738	3.947	11.621	9.367

Rail Systems

Existing Rail Systems

- The total length of the 6 existing rail system lines is **195.6 km and** consists **of 111 stations**.
- In 2023, a total of **209,885,509** passengers were transported on these lines and rail system vehicles travelled a total of **11,825,440 km.**
- Approximately **231,536 tonnes of CO2e** reduction in 2023 by our citizens preferring the rail system

Provided.

Planned (Projected) Rail Systems

- Karabağlar-Gaziemir Metro Line, whose project work is ongoing, will a length of 32.5 km, 24 stations and an annual passenger transport capacity of 256.036.185.

is planned.

- Örnekköy-New Kyrenia Tram line 5,15 km.

length and have 9 stations. Annual
It is planned to carry 23.406.355 passengers. The project is in the approval stage at the Strategy and Budget Department.

Izmir Metro Project IIIBuca - Ucyol

- The 13.5 km long Izmir Metro Project III, which is under construction, will have a total of 11 stations when completed and will have an estimated 106,768,356 passengers per year.

will carry it.

Existing Rail Systems

Line Name	Line	Line Length	Number of Stations	Opening Year
Metro Ucyol-EVKA3	Ucyol-EVKA3	20	17	2000
IZBAN	Selcuk-Aliaga	136	40	2010
Konak Tram	Halkapinar - Ucyol	12,6	19	2018
Karsiyaka Tram	Alaybey-Bostanlı	8,8	14	2017
Izmir Metro Project II,	F.Altay - Narlidere	7,2	7	2024
Cigli Tram line	Cigli	11	14	2024
Total		**195,6**	**111**	

Built/Planned Rail System Projects

Project Name	Length (km)	Number of Stations	Planned Annual Passenger capacity	Planned finish History	Cost(TL)	Cost (Euro)
Izmir Metro Project IIIBuca - Ucyol	13,5	11	106.768.356	31.12.2025	₺3.921.498.000	109.600.028
Karabağlar-Gaziemir Metro Line	32,5	24	256.036.185	13.10.2024		2.105.000.000
Örnekköy-New Kyrenia Tramway line	5,15	9	23.406.355			90.000.000
Total	**51,15**		**386.210.896**			**2.304.600.027**

Electric Buses / Service Vehicles / Charging Stations

Electric buses

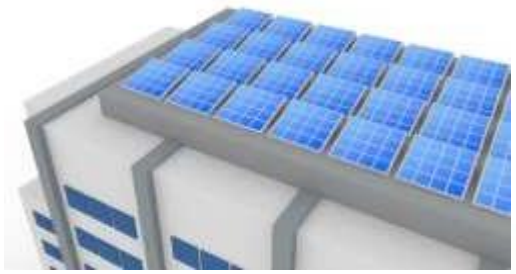
- **20 100 per cent** electric buses approx. 5 has been working on the roads for years.
- All infrastructure with charging stations is already in place.
  - 12 full charges / 10 intermediate charges unit
- Turkey's **first and largest electric bus fleet**. It is also one of the first in Europe.
- Buses are different in Izmir geography and climate conditions are being trialled.
- IBB has a plan **to increase** the fleet **to 500 buses** by 2024, 100 in 2022.

Electric Utility Vehicles/Charging stations

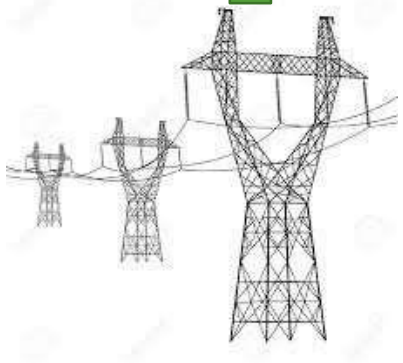
- 76 electric cars were put into service in 2020.
- A total of 24 car parks in 14 car parks within IZELMAN station has been set up.

İZMİR BÜYÜKŞEHİR BELEDİYESİ

Solar Energy for Electric Buses



0 CO_2e / kWh



>500g CO_2e / kWh

İZMİR BÜYÜKŞEHİR BELEDİYESİ

Electric Bus Monitoring

https://www.eshot.gov.tr/tr/CevreselSonuclar

İZMİR BÜYÜKŞEHİR BELEDİYESİ

Bicycle Roads and Bicycle Hire

- **111 km of** cycle paths, 361 km targeted by 20
- **2000** shared electric scooters, shared mopeds and

  free parking space for bicycles.
- **BISIM** / Smart Bicycle Hire System
- A total of **990 bicycle capacity** including **adult, tandem** and **children bicycles** at **60** stations in the BISİM fleet
- **There are 55 bicycle repair stations.**
- **2000 shared electric bicycles**
- **Symbolic 5 cent fare** for cyclists **on sea transport**
- Izmir is the first city in Turkey to become a member of the European Cycle Route **EuroVelo**

Cycling on buses, rail and ferries

Bicycle racks on buses

Bicycle transport on ferries and rail systems
Symbolic fare for cyclists on ferries

İZMİR BÜYÜKŞEHİR BELEDİYESİ

Last 6 years

18/08/2019

Forest Fire

15-18/08/2024

Forest Fire

30/10/2020

Earthquake

Tusinami

29/11/2020

Drought

29/11/2021

Heavy Rain

11/02/2021

Storm

Hose

26/11/2023

Storm

Kabama

02/02/2021

Heavy Rain

Water Floods

12/07/2024

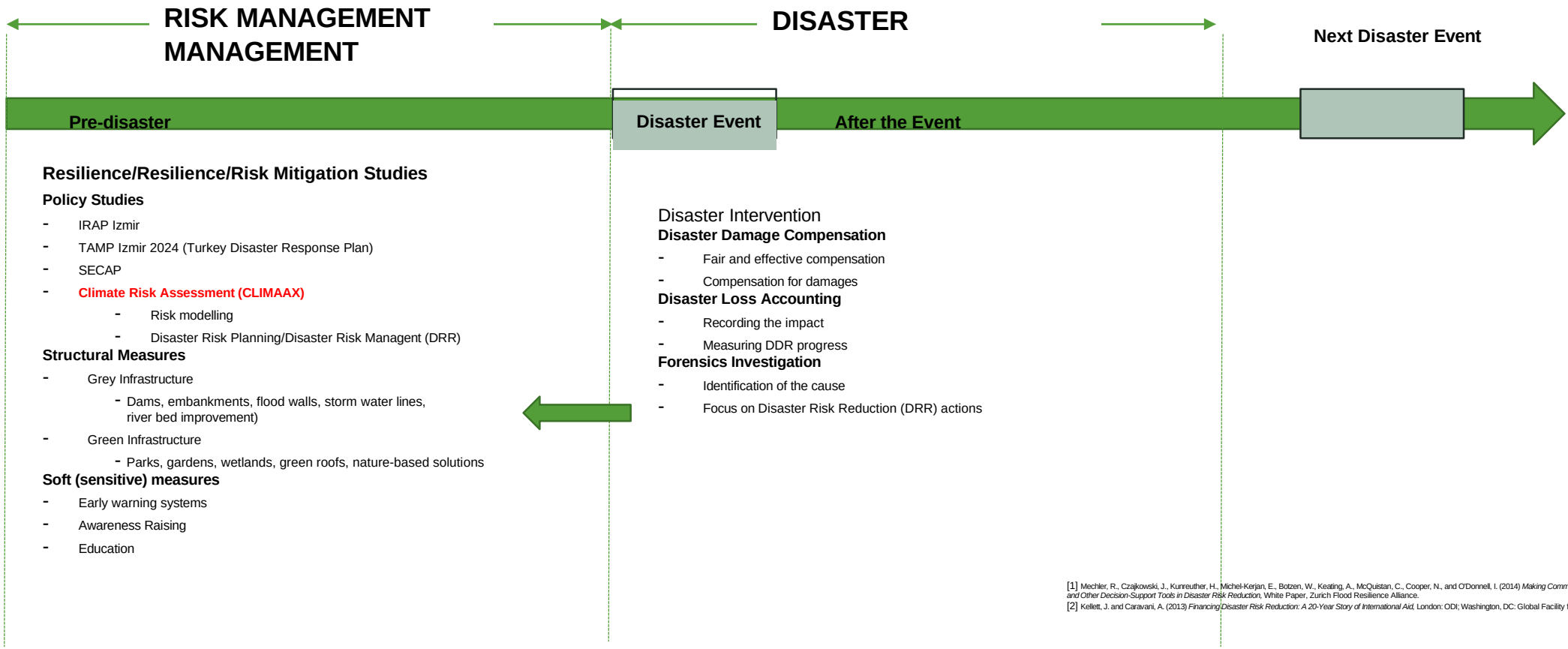
Heavy Rain

İZMİR BÜYÜKŞEHİR BELEDİYESİ

Climate Risk Management

- **$$**Every **1** invested in **risk reduction** saves **5** future losses.[1]
- Only **13 per cent** of financial assistance expenditure goes to **pre-event resilience and risk reduction** and **87 per** cent to post-event assistance. [2]
- Resilience and disaster resilience **is** a **location-specific (spatial)** characteristic. This is because disaster risks **differ from region to region.**

is to exhibit.



[1] Mechler, R., Czajkowski, J., Kunreuther, H., Michel-Kerjan, E., Botzen, W., Keating, A., McQuistan, C., Cooper, N., and O'Donnell, I. (2014) *Making Communities More Flood Resilient: The Role of Cost-Benefit Analysis and Other Decision-Support Tools in Disaster Risk Reduction,* White Paper, Zurich Flood Resilience Alliance.

[2] Kellett, J. and Caravani, A. (2013) *Financing Disaster Risk Reduction: A 20-Year Story of International Aid,* London: ODI; Washington, DC: Global Facility for Disaster Reduction and Recovery at the World Bank

İZMİR BÜYÜKŞEHİR BELEDİYESİ

Climate Hazards / SECAP and CLIMAAX Comparison

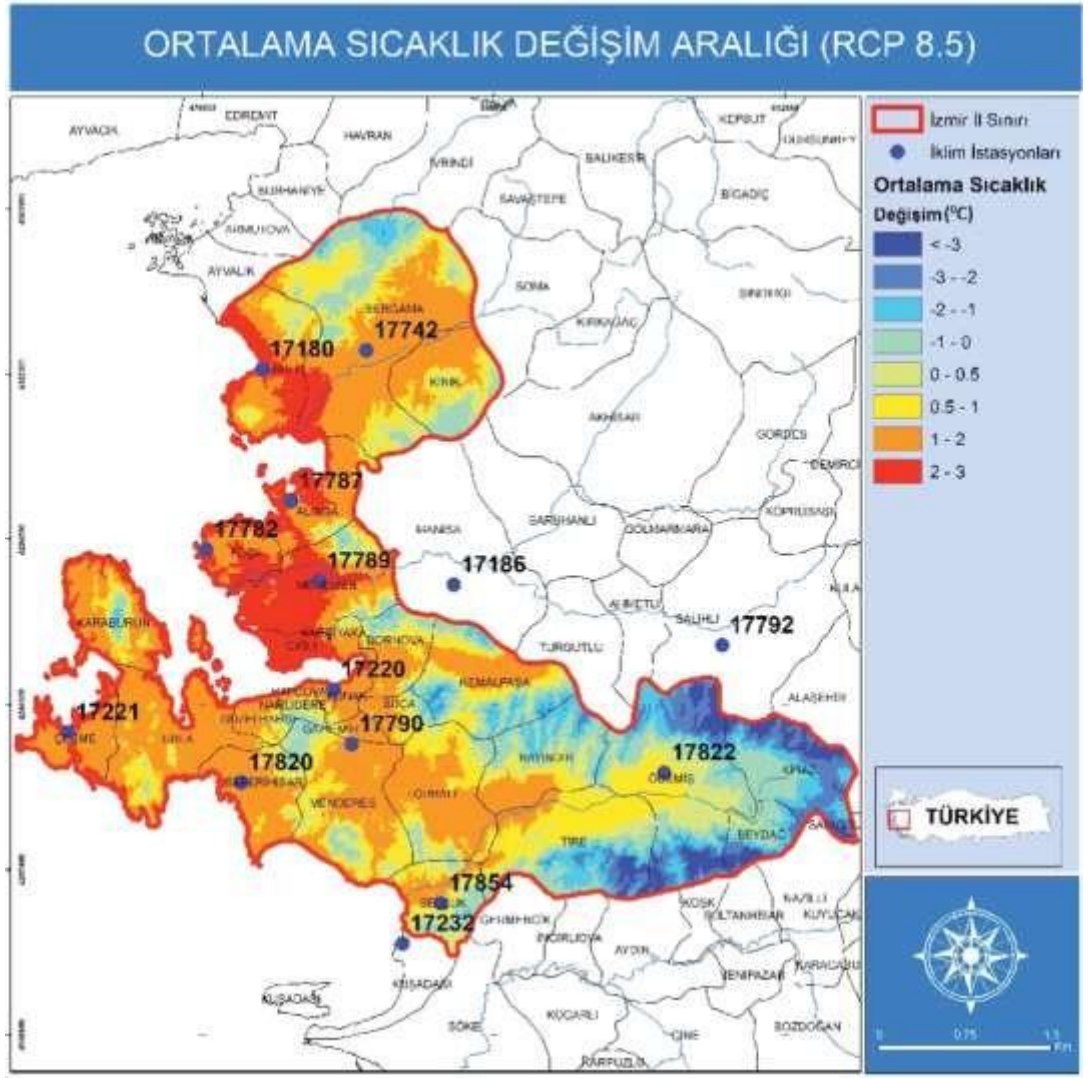
	Hazards Identified by CoM	CLIMAAX Risk Workflows	Current Risk Level
1	Excessive heat *Extreme Heat*	Heat Wave *Heatwaves*	**High**
2	Extreme cold *Exreme Cold*	Snow *Snow*	**Low**
3	Heavy rainfall *Extreme Precipitation*	Heavy Rainfall *Heavy Rainfall-Flash Flood*	**High**
4	Floods (fluvial and urban) *River / fluvial, flash floods, sewer floods and urban / pluvial*	River flooding *River Flooding/Riverine/fluvial floods*	**High**
5	Sea level rise *Sea Level Rise*	Sea swell *Coastal flood*	Centre
6	Drought *Droughts*	Drought *Droughts*	**High**
7	Storms (strong winds) *Storms (high winds)*	Wind *Wind*	Centre
8	Landslides *Landslides*		**High**
9	Forest fires *Forest Fires*	Forest Fire *Wildfire*	**High**

Future scenarios

- **A Framework for the Resilient Cities: Green** Re-vision: A Framework for the Resilient Cities project.
- 2050 and 2100, the increase in the change in basic climate parameters such as **temperature and precipitation** between the years 2050 and 2100

  modelling work
- Annual according to **RCP 8.5 (High Emission Scenario)**

  average temperature increase:
  - **2021-2050 1.7°C**,
  - **4.6°C between 2051-2100**

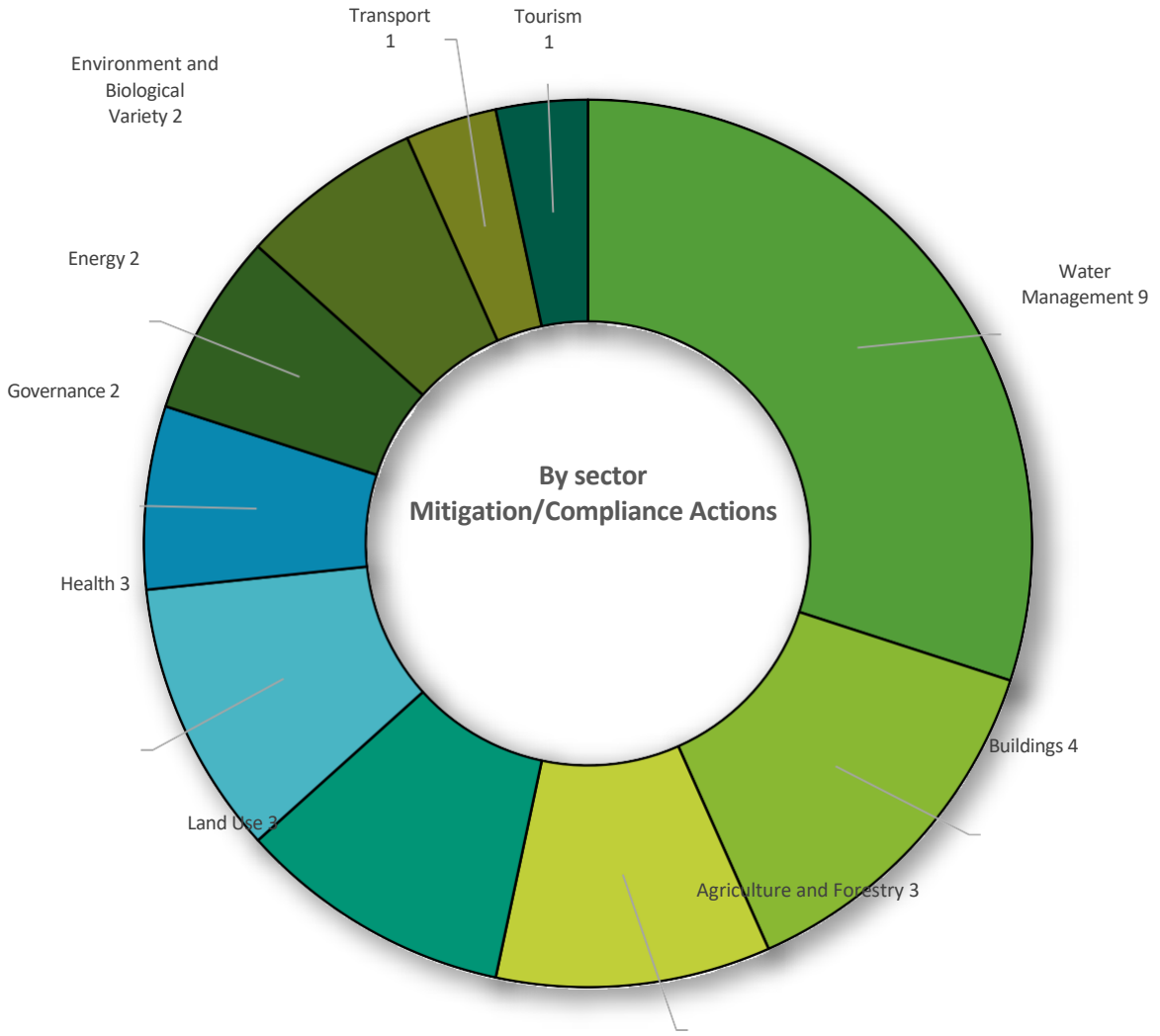


https://direnclikent2019.izmir.bel.tr/tr/Yayinlar/4

İZMİR BÜYÜKŞEHİR BELEDİYESİ

Mitigation/Compliance Actions by Sector

- **10 sectors** within SECAP climate available under the heading total against risks
  - **6 mitigation/adaptation actions**
  - **24 compliance actions** defined.

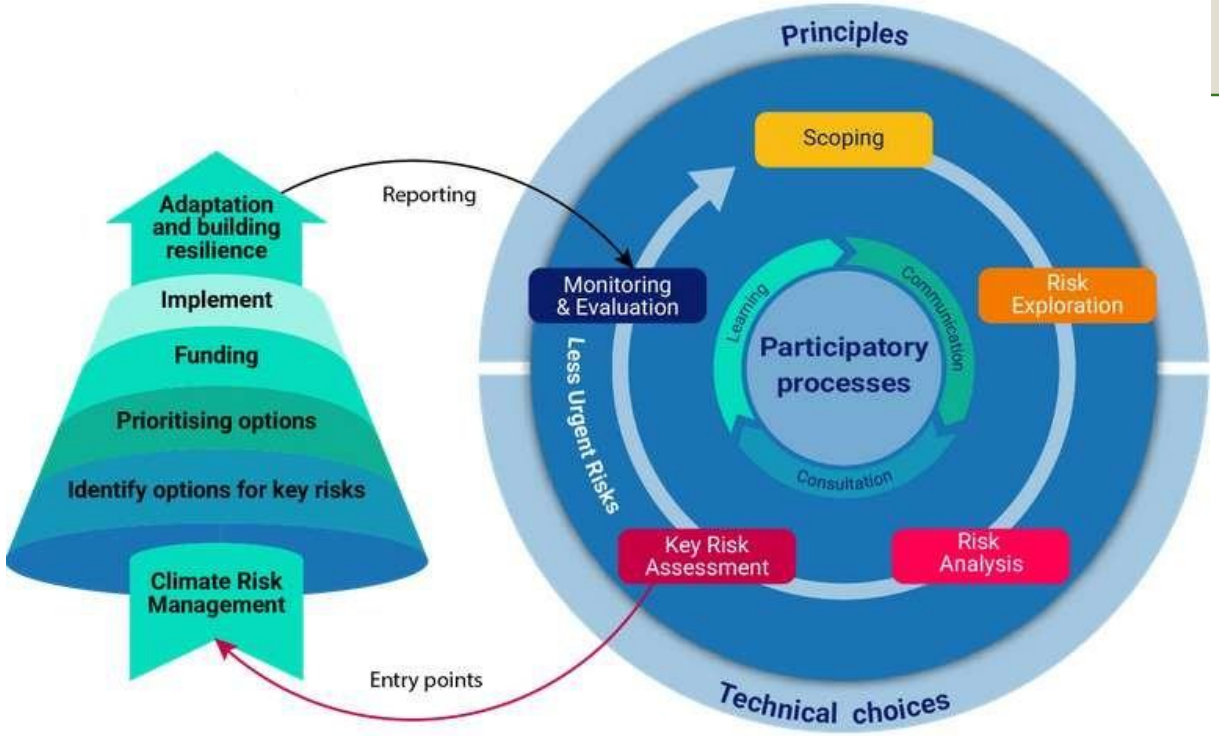


İZMİR BÜYÜKŞEHİR BELEDİYESİ

CLIMAAX Project

- CLIMAAX for the regional Climate Risk Assessment (CRA is a project that provides the necessary tools and datasets.
- CLIMAAX CRA Framework, social justice and equality
  5 studies planned with a participatory approach by taking into consideration step is designed to support "regional climate risk assessment" studies.
- These 5 work steps:
  1. Scoping
     - Objectives
     - Context
  2. Risk Exploration
     - extreme climate events
     - Script selection
  3. Risk Analysis
  4. Key Risk Assessment
  5. Monitoring and Evaluation

Climate Risk Management *Climate Risk Management (CRM)* → **Climate Risk Assessment** *Climate Risk Assesment (CRA)*



https://handbook.climaax.eu/intro.html

İZMİR BÜYÜKŞEHİR BELEDİYESİ

CRIZ-ERS:Climate Ready Izmir: Developing Resilience Strategies

- CRIZ-ERS: Climate-Ready Izmir: Enhancing Resilience Strategies Climate-Ready Izmir: Enhancing Resilience Strategies
  - The project started in October 2024 and is scheduled to be completed in June 2026.
- The project is planned to consist of 3 phases.
  - Phase 1:
    - City-Wide Climate Risk and Vulnerability Assessment (City-Wide RVA)
      - A study will be conducted on the frequency and severity of all climate hazards and their impact areas.
      - Exposure and Vulnerability is more limited than analyses.
      - Spatial Climate hazard analysis weighted.
  - Phase 2:
    - A more sensitive Climate Risk and Vulnerability Assessment (CRA) for Konak district
    - Neighbourhood fragility data will be included.
  - Phase 3:
    - Risk analysis at the neighbourhood scale including socio-economic vulnerabilities in the neighbourhoods to be determined and evaluation
    - Providing solutions that will contribute to compliance strategies and advanced Risk Management Management (CRM) appropriate for the region

This project financed by the European Union.

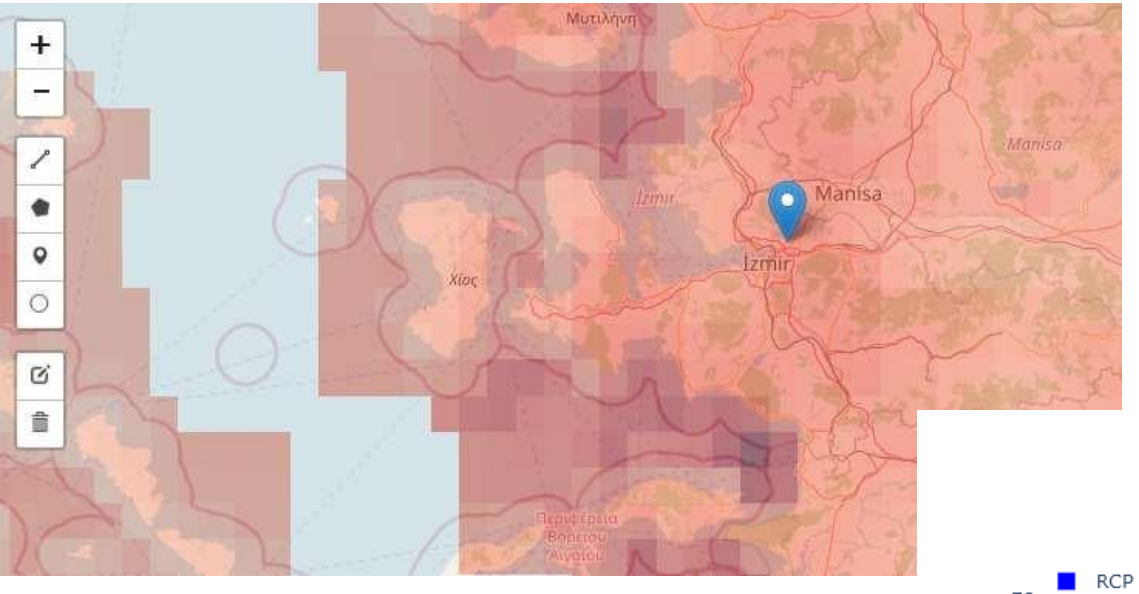
Climate-Ready Izmir: Enhancing Resilience Strategies

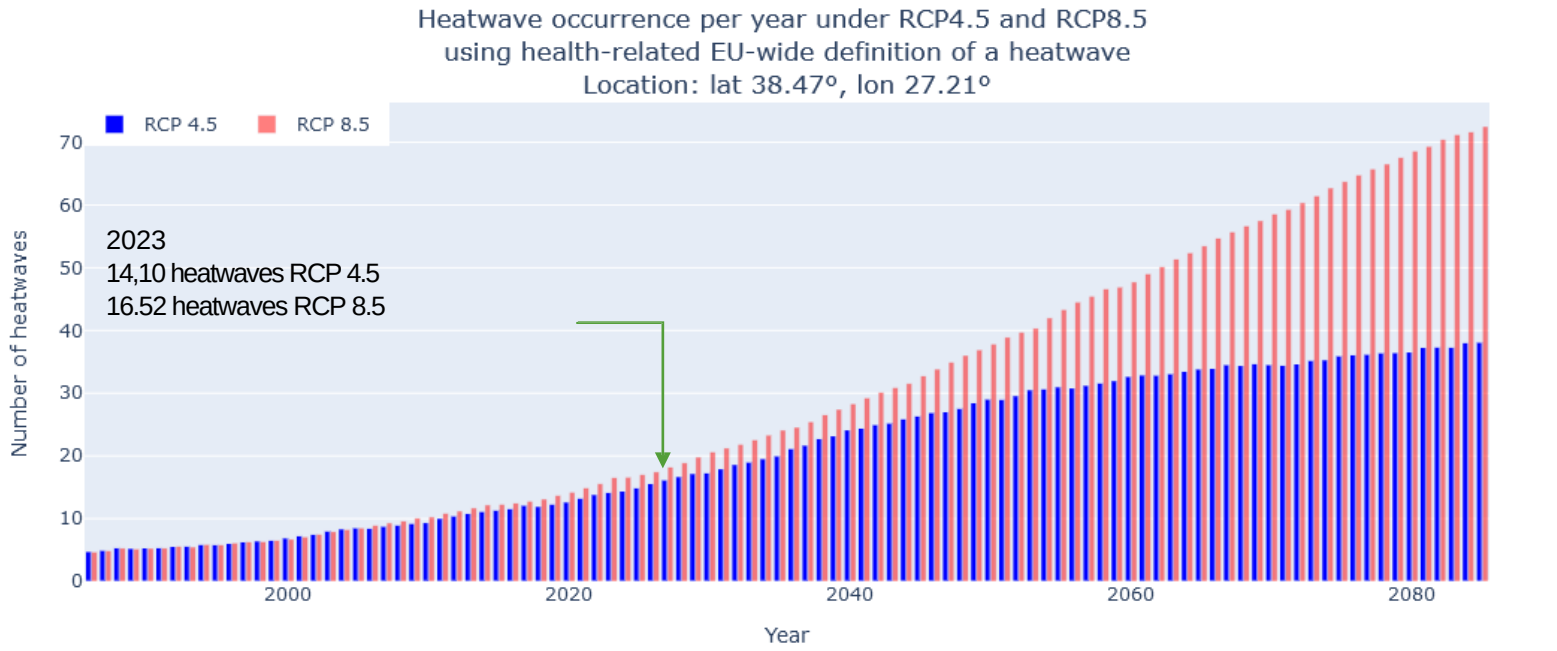
- CRIZ-ERS: Climate-Ready Izmir: Enhancing Resilience Strategies Climate-Ready Izmir: Enhancing Resilience Strategies
  - 22 months
  - The project started in October 2024 and is scheduled to be completed in June 2026.
- The project is planned to consist of 3 phases.
  - Phase 1:
    - Climate Risk and Vulnerability Analysis for Izmir Province (City-Wide RVA)
      - A study on the frequency and severity of all climate hazards and their impact areas will be conducted. Analysis of Exposure and Vulnerability more limited
      - Spatial Climate hazard analysis weighted.
  - Phase 2:
    - A more sensitive risk and vulnerability assessment (CRA) for Konak district
    - Neighbourhood fragility data will be included.
  - Phase 3:
    - Risk analysis and assessment at the neighbourhood scale, including socio-economic vulnerabilities in the neighbourhoods to be determined
    - Solutions to contribute to regionally appropriate compliance strategies and advanced risk management plans (CRM)

      to put forward

İZMİR BÜYÜKŞEHİR BELEDİYESİ

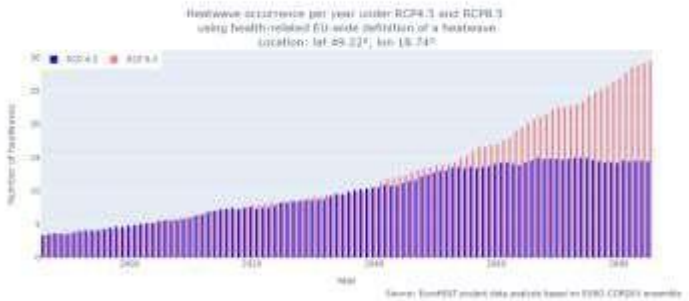
Heat wave occurrence in Izmir for RCP4.5 and RCP8.5 between 1986 and 2086

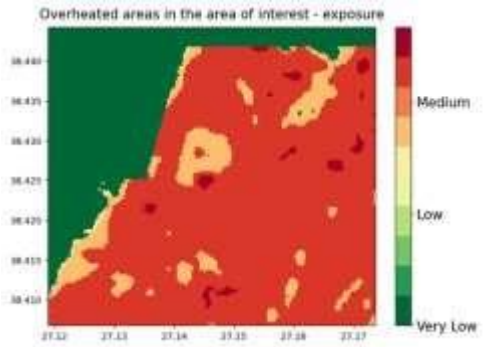


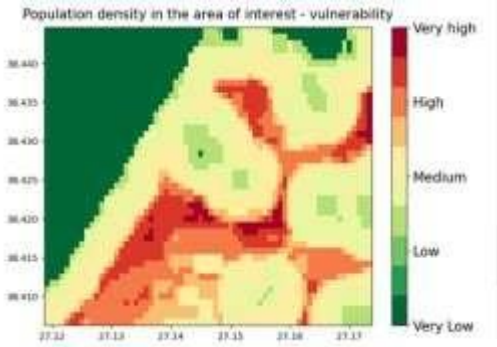


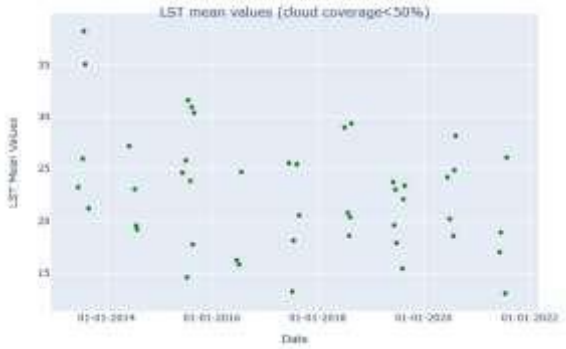
İZMİR BÜYÜKŞEHİR BELEDİYES.

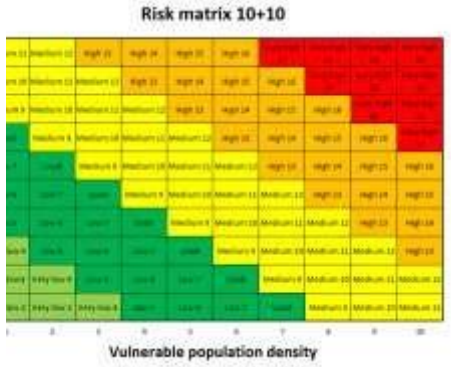
Danger	X	Exposure	X	=	Fragility RISK
1986- for RCP4.5 and RCP8.5 Annual occurrence of heat waves in Konak between 2086 and 2086 (Number of heat waves).		Heat Islands		Fragile Population	Level of potential heat risk for vulnerable populations exposure (level of heat exposure based on land surface temperature data) and vulnerability (vulnerable population groups based on world population data)

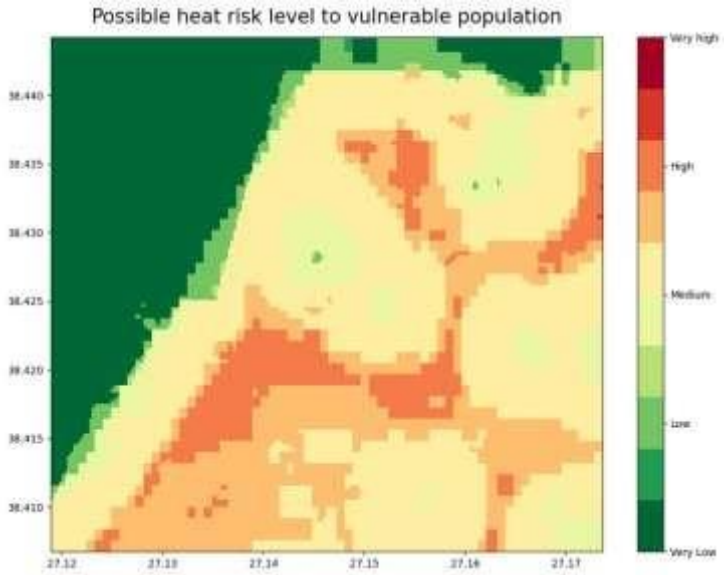












İZMİR BÜYÜKŞEHİR BELEDİYESİ

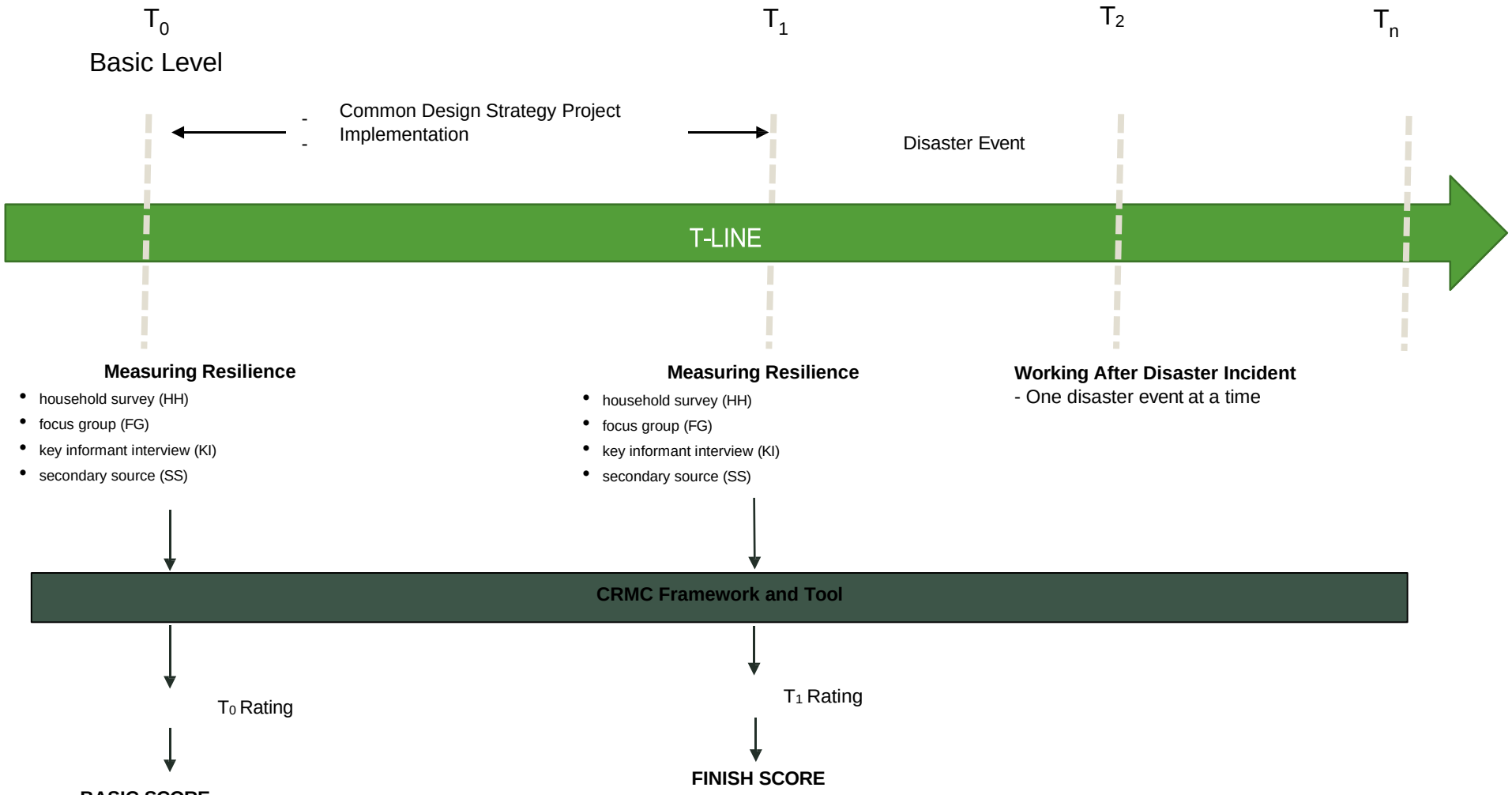
https://handbook.climaax.eu/notebooks/workflows/heatwaves.html

Climate Resilience for Communities Project

- Izmir is part of a new initiative supported by the **Zurich** Foundation under the **Urban Climate Resilience Programme (UCRP**).
  as part of a network of **11 cities** in **9 countries**
  among the group.
- Project Partners
  - Izmir Metropolitan Municipality,
  - ICLEI - Local Governments for Sustainability,
  - Zurich Insurance Group Turkey
  - Zurich Foundation
- 3-year project to end in 2026

İZMİR BÜYÜKŞEHİR BELEDİYESİ

T-Time Studies



İZMİR BÜYÜKŞEHİR BELEDİYESİ

New Zoning Regulation

3 Haziran 2021 PERŞEMBE — Resmî Gazete — Sayı : 31500

YÖNETMELİK

İzmir Büyükşehir Belediyesinden:

İZMİR BÜYÜKŞEHİR BELEDİYESİ İMAR YÖNETMELİĞİ

Article 24 Garden Distances

"(6) In the garden distances of residential, residential + commerce, tourism, education, worship, health and sports parcels, **one tree shall be planted for every 15.00 m2 of the area** outside the area where the building sits on the ground."

Article 24 Chimneys

"In new buildings to be constructed in areas with geothermal or natural gas infrastructure

geothermal or natural gas heating system be selected."

Article 39 Cisterns-rainwater tanks-rainwater harvesting systems

"(1**) In parcels over 1000 m²**; garden irrigation, car wash
and similar works, a drainage system is created to **collect** the roof and ground surface waters in a **cistern / rainwater tank** to be installed under the natural ground and, if necessary, to be treated and **reused**."

ARTICLE 43 Roofs

"(21) The total construction area of new buildings, including public buildings, **is 60.000**

To improve urban ecology **in buildings over m²**, to break the climatic climate effect,
It is obligatory **to apply green roof systems in** order to reduce sudden floods by retaining rainwater, prevent the destruction of green areas by construction, create a natural environment to breathe and provide heat and noise insulation on roofs. Also
In buildings with a total construction area of more than 30,000 m², it is obligatory to apply green roof systems in case of a terrace roof."

https://www.izmir.bel.tr/YuklenenDosyalar/Dokumanlar/1_22092021_10444 4_izmir-buyuksehir-belediyesi-imar-yonetmeligi.pdf.pdf

İZMİR BÜYÜKŞEHİR BELEDİYESİ

Nature Based Solutions - An Ecological Corridor to Reconnect City and Na

- The corridor was created as part of **URBAN GreenUP**, an EU-funded project in which Izmir is one of "leadingcities.
- **41.000** m^2 green belt **Mavişehir Peynircioğlu**

  The opening of the **Stream Ecological Corridor**.
- To make the city and the environment more liveable against climate change **Nature Base Solutions (NBS)** principles were applied as a way to make it resilient
- It creates a model to be replicated in other parts of the city.
- "Healthy Cities Best Practice Competition" won an award in the "Environment" category

Objectives of the project:

✓ Reducing **carbon emissions**

✓ Reducing **the urban heat island effect**

✓ **Increasing biodiversity**

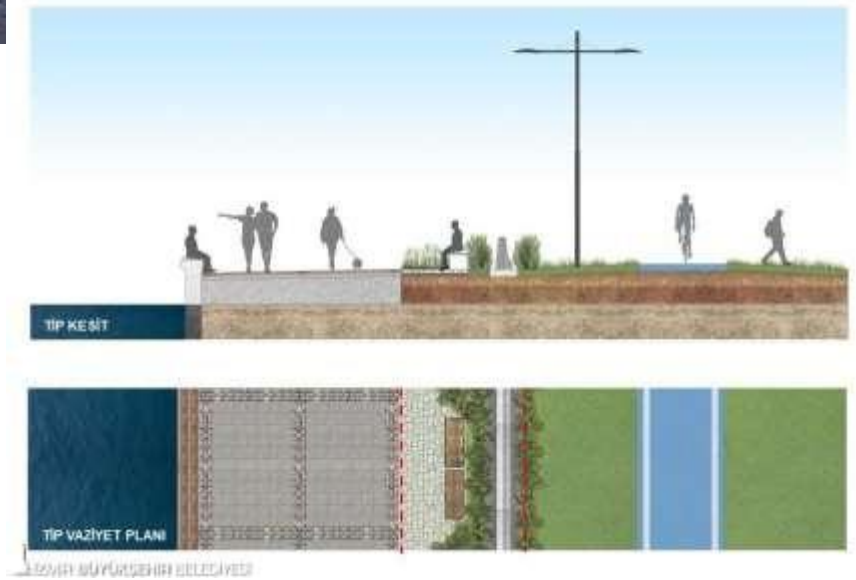
✓ **Creating new green spaces** for citizens, including outdoor activity space, children's playgrounds, sports fields, zen gardens.

https://www.urbangreenup.eu/news--events/news/an-ecological-corridor-to-reunite-the-city-and-nature_1.kl

İZMİR BÜYÜKŞEHİR BELEDİYESİ

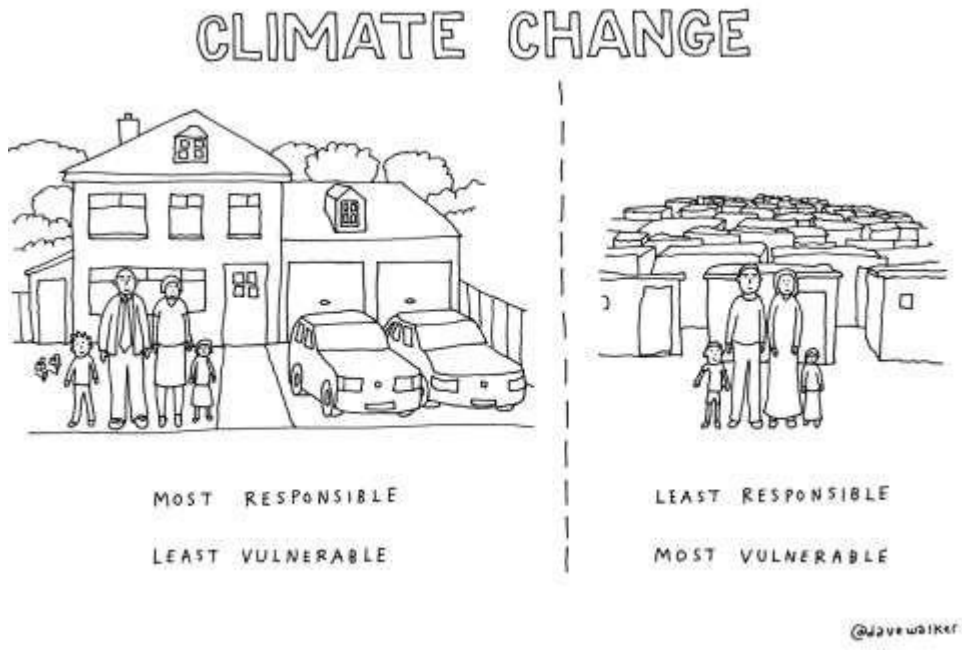
Temporary Storm Wall

- Republic from Alsancak Harbour
  A temporary storm wall is being built parallel to the shore on the 1,700-metre coastline up to the Square.
- The storm wall, 30 emergency
  gated, ground and landscaping arrangements
  includes.
- **600 additional drainage holes** will be drilled on the Kronman wall to speed up the drainage of water from the site.
- In order to prevent flooding as well as to provide water drainage along the promenade, the asphalt surface along the promenade is removed and **a permeable-green area is created.**
  organisation will be made. Water retaining plants will be placed on the promenade



İZMİR **BÜYÜKŞEHİR** BELEDİYESİ

Epilogue.


CLIMATE CHANGE
MOST RESPONSIBLE
LEAST VULNERABLE
LEAST RESPONSIBLE
MOST VULNERABLE
@davewalker


CLIMATE CHANGE
OUR RESPONSE SO FAR...

Climate ChangesResilient Izmir Becomes, Smile... ☺

Dr Çağlar Tükel

Izmir Metropolitan Municipality
Department of Climate Change and Zero Waste Climate Change and Clean Energy Branch Directorate Tel: (232)293 1890

Emailcaglartukel@izmir.bel.tr

linkedln: https://www.linkedin.com/in/caglartukel/

For Action Plans:

http://skpo.izmir.bel.tr/

İZMİR BÜYÜKŞEHİR BELEDİYESİ