WASTE MANAGEMENT and ENVIRONMENTAL PROTECTION ACTIVITIES IN ISTANBUL

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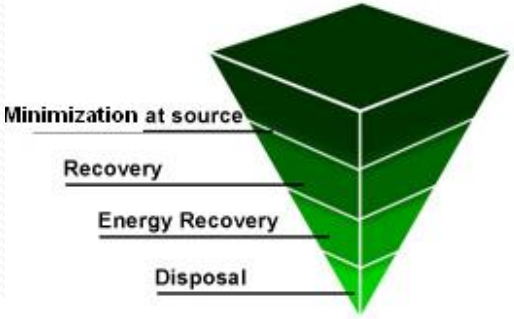
Content of Presentation

- Integrated Solid Waste Management
- Legal Status
- Waste Management in Istanbul
- Marine Pollution Control in Istanbul
- Air Pollution Control in Istanbul
- Noise Pollution Control in Istanbul

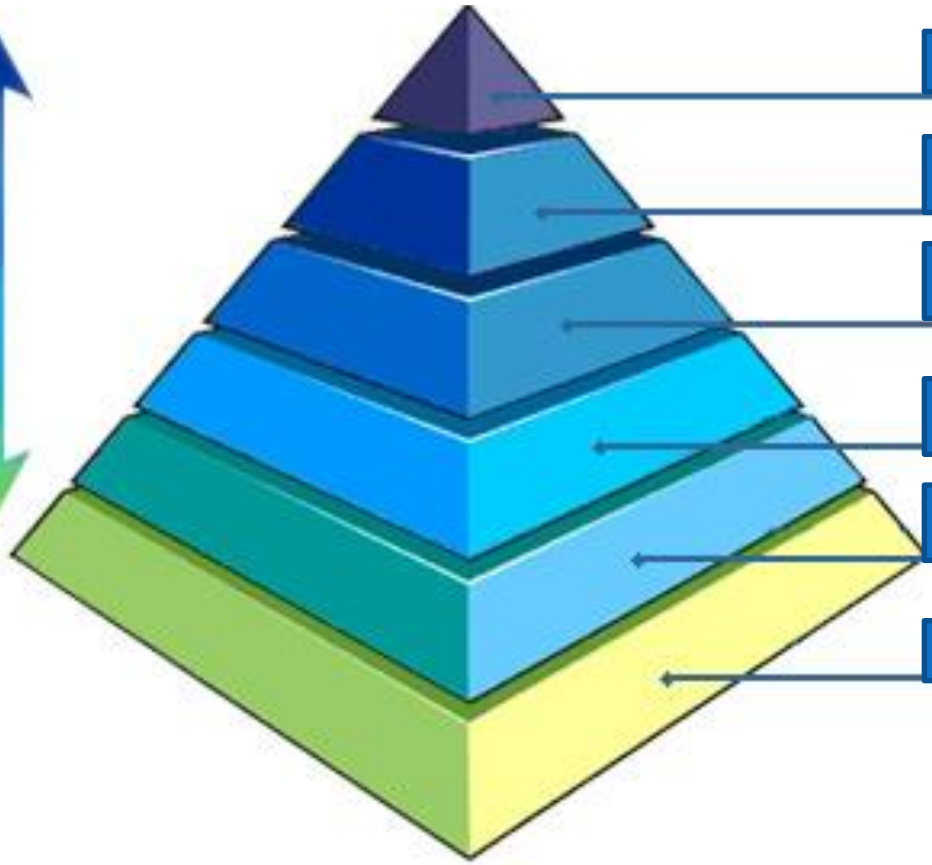
INTEGRATED SOLID WASTE MANAGEMENT

Integrated Solid Waste Management - Hierarchy



Most preferable

Less preferable



Prevention

Minimization

Reuse

Recycle

Energy Recovery

Disposal

Integrated Solid Waste Management - Properties

1) It must be an integrated system

It must contain all types of wastes and production sources

2) It must obtain an economic value

There must be material and energy recovery

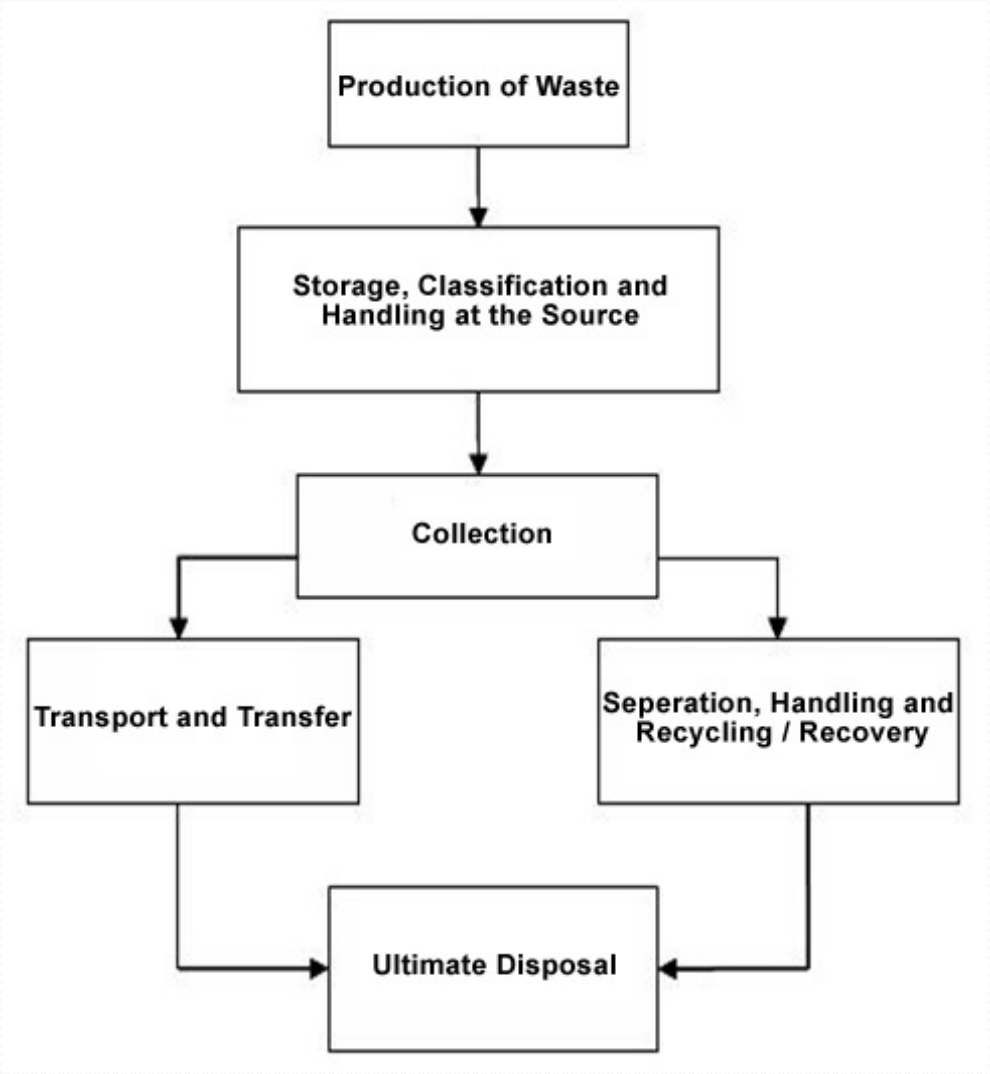
3) It must be flexible

It must be open to the changes occurring in time

4) It must rely on the basis of regional planning

The understanding of regional management must be internalized for the usage of sources efficiently

Integrated Solid Waste Management



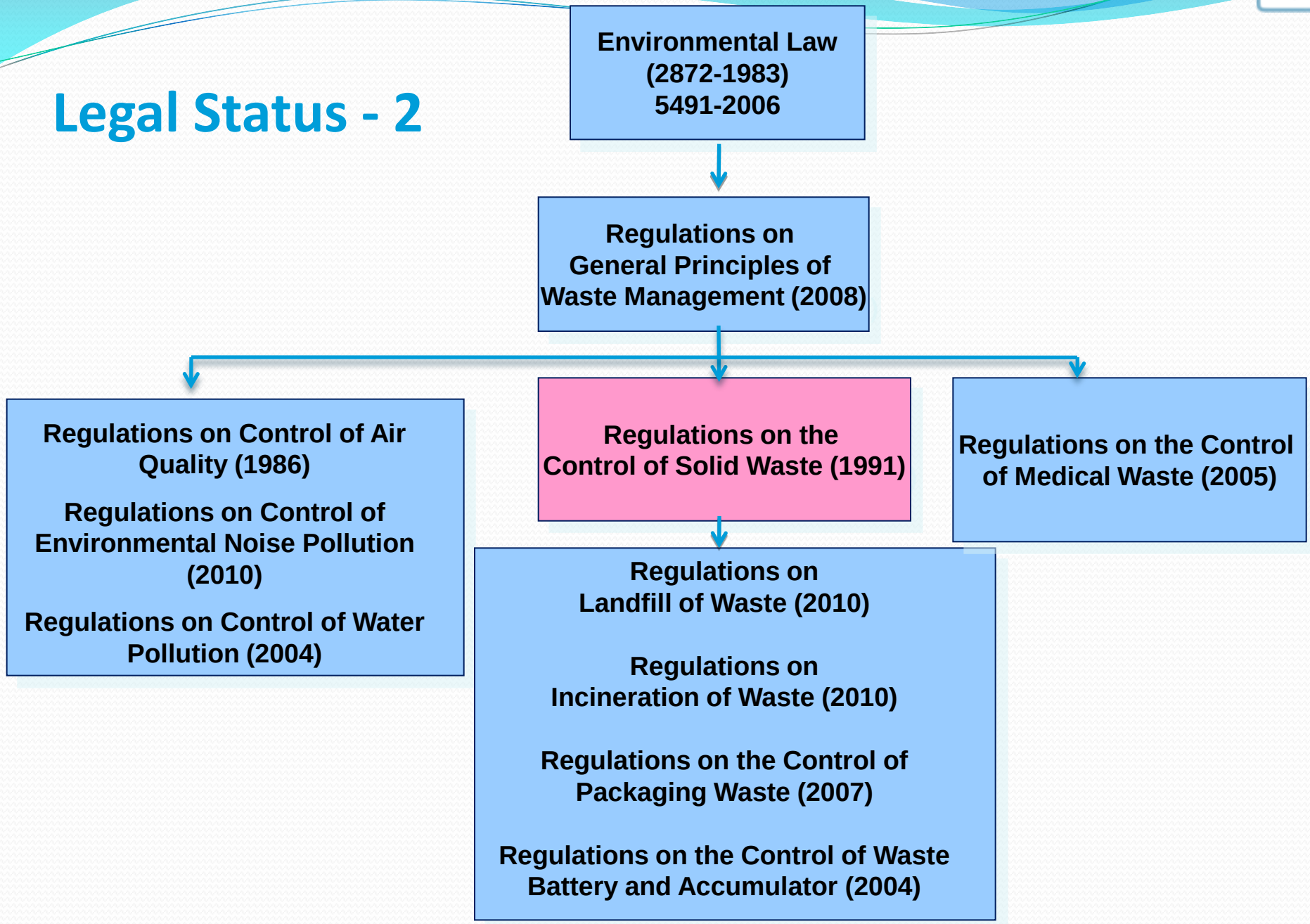
LEGAL STATUS

Legal Status - 1

Year	Law
1981	Law on Municipal Revenues (No 2464)
1983 - (2006)	Environmental Law (No 2872) (Amendment with the law numbered 5491)
2003	Foundation Law of Ministry of Environment and Forestry (No:4856)
2004	Metropolitan Municipal Law (No 5216)
2004	Turkish Criminal Law (No 5237)
2005	Municipal Law (No 5393)

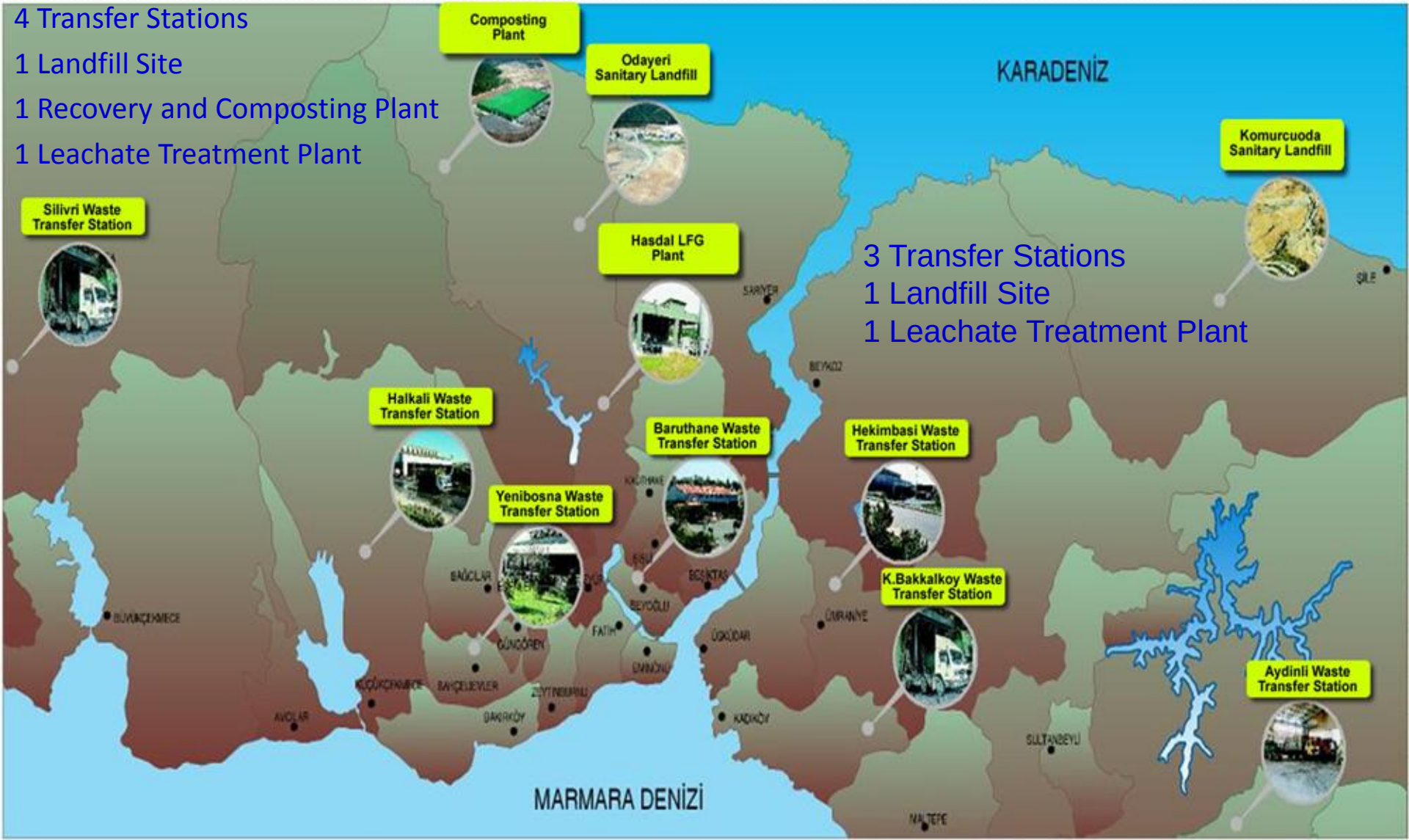
Year	Uluslar arası sözleşme
1994	Basel Convention

Legal Status - 2



WASTE MANAGEMENT IN ISTANBUL

Waste Management Facilities in Istanbul



Transfer Stations

The wastes collected from houses and working places by district municipalities are then transported to seven transfer stations belonging to Istanbul Metropolitan Municipality.

14.000 tons waste produced daily in Istanbul requires **1.900 runs** to transport to landfill sites however **500 runs** are enough owing to transfer stations.

Transfer stations provide;

- To decrease traffic load,
- To retrench fuel, manpower and time,
- To decrease environmental pollution,
- To decrease transfer costs in the ratio of **65 %.**

Transfer Stations and Waste Amounts

Transfer Stations in European Side	Actual Capacity (ton/day)	Distance from Landfill Site (km)
Baruthane Transfer Station	2.000	25
Yenibosna Transfer Station	2.650	40
Halkalı Transfer Station	3.300	40
Silivri Transfer Station	300	99
TOTAL	**8.250**	

Transfer Stations in Asian Side	Actual Capacity (ton/day)	Distance from Landfill Site (km)
Hekimbaşı Transfer Station	1.700	44
K.Bakkalköy Transfer Station	1.500	46
Aydınlı Transfer Station	1.500	53
TOTAL	**4.700**	

Landfilling

Landfill areas are isolated from groundwater by using clay, geomembrane, geotextile and gravel for filtration. By the way waste can not harm to the environment.

Landfilling;

- The most economic method used in waste treatment,
- Acceptable and safe method in terms of environment,
- No energy need,
- Possible to produce electric energy from methane gas.

Landfill Sites

Landfill Site in European Side
Odayeri - EYÜP

- Odayeri/Göktürk
- Area;112 ha
- Amount of Waste Landfilled Daily; 9.800 tons.
- Amount of Waste Landfilled Wherefrom 15 years; about 38 million tons.

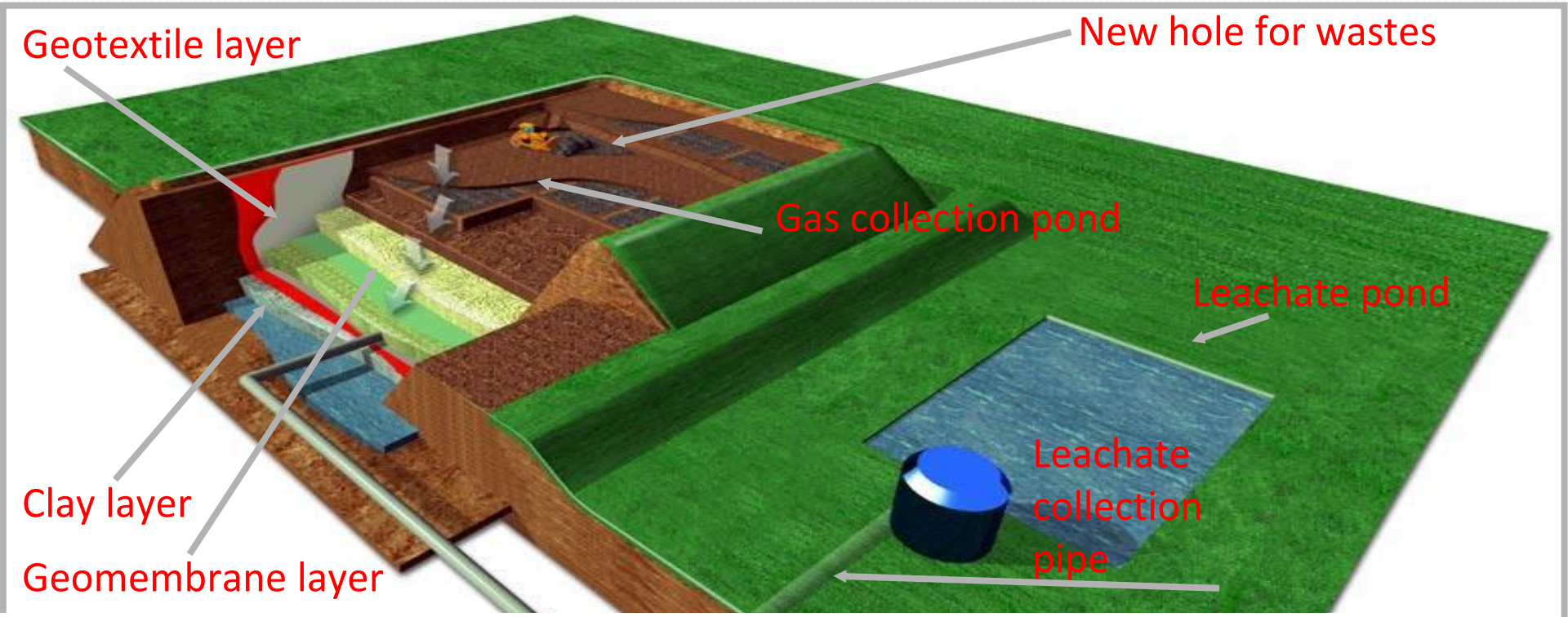
Landfill Site in Asian Side
Kömürcüoda - ŞİLE

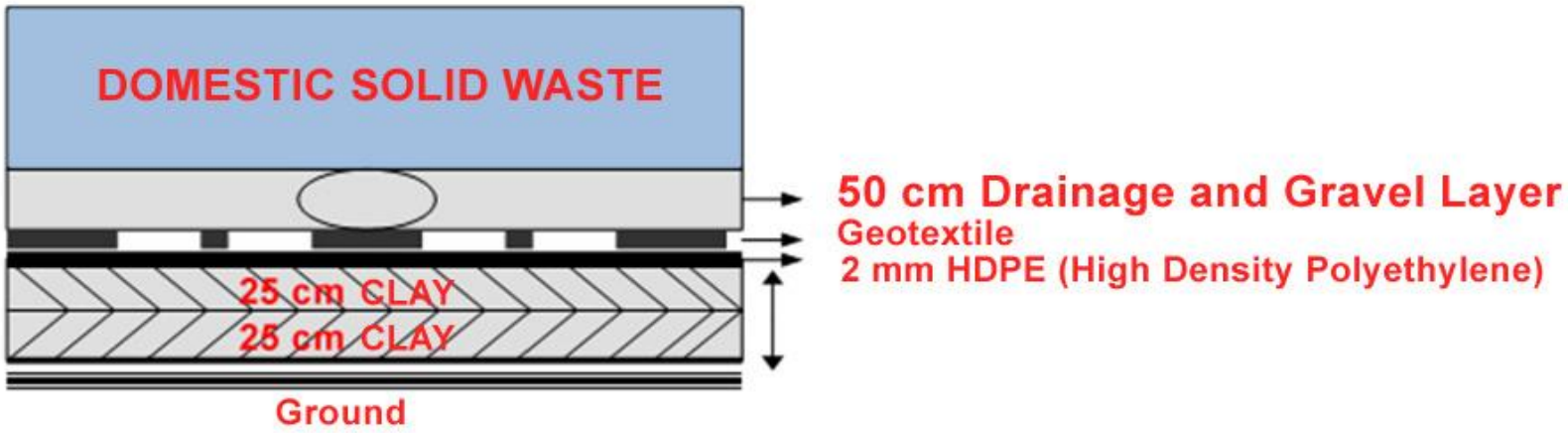
- Kömürcüoda/ Karakiraz Köyü
- Area; 89 ha
- Amount of Landfilled Waste Daily; 4.500 tons
- Amount of Landfilled Waste Wherefrom 15 years; about 17 million tons.

Landfill Sites

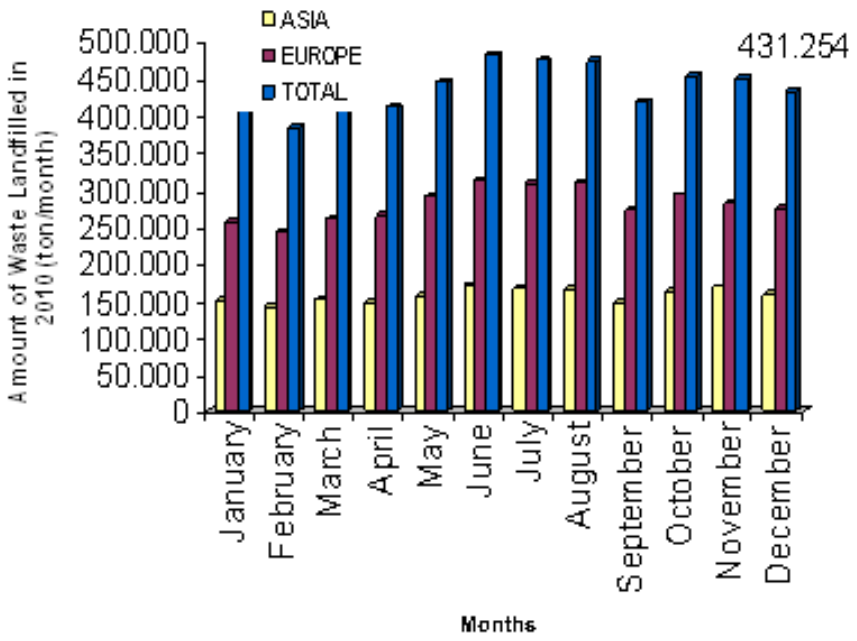
	ODAYERİ (European Side)	KÖMÜRCÜODA (Anatolian Side)
Total Area	112 ha	89 ha
Laid Area	88 ha	47 ha
Total Storage	38 megaton	17 megaton
Predicted Life Span	2011	2030

Landfill Site - Zone Cross Section





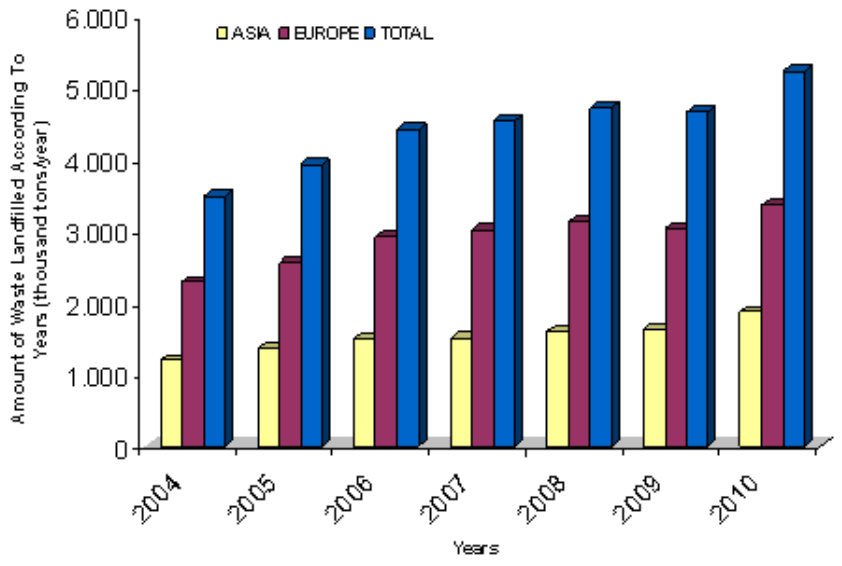
Landfill Sites – Waste Amounts



	ASIAN SIDE (ton/day)	EUROPEAN SIDE (ton/day)	TOTAL (ton/day)
2009	4.850	8.740	13.590
2010	5.136	9.300	14.436

Wastes coming to the landfill sites;

- 75 % from transfer stations,
- 16 % from household wastes from distrcits
- 5 % from treatment sludge,
- 3 % from annihilation process and special household wastes.



Composting and Recovery Plant

Composting plant which is situated in Kemerburgaz is the **second largest** plant of the Europe. Capacity of the plant is **1.000 tons/day**. Wastes are transformed into economic value in the plant.

Aerobic Compost

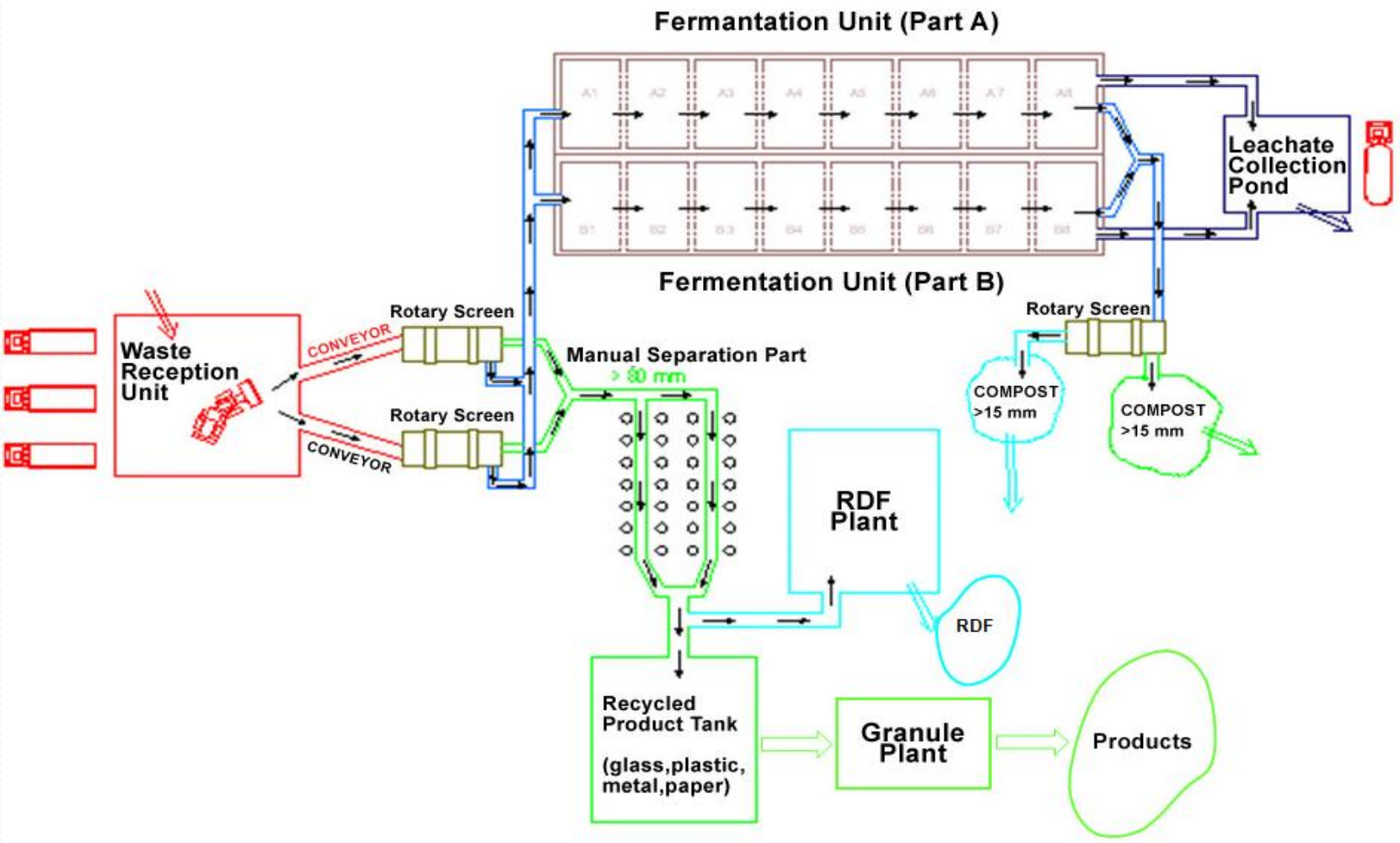
Area; 32.000 m^2

Capacity; 1.000 tons/day

Product; Minimum 20.000 tons/year

Place of Use; Parks and gardens of Istanbul

Composting and Recovery Plant Flow Diagram



RDF (Refused Derived Fuel) ve Granule Plant

This Project is supported by TUBITAK. The wastes originated from Composting and Recovery Plant are processed in these plants.

- **In Granule Plant**; recyclable plastics are transformed into granule and the capacity of the plant is **5 tons/day.**

- **In RDF Plant;** non-recyclable wastes are used in cement factories as alternative fuel and the capacity of the plant is **20-25 tons/hour.**

Leachate Treatment Plants

Landfilling is an economic method but the cost of treatment of leachate is high. The units of the plant;

- Collecting basin – equalisation basin
- Biological treatment (nitrification-denitrification)
- Ultrafiltration Membranes
- Nanofiltration Membranes
- Discharge to creek or channel according to discharging standards.

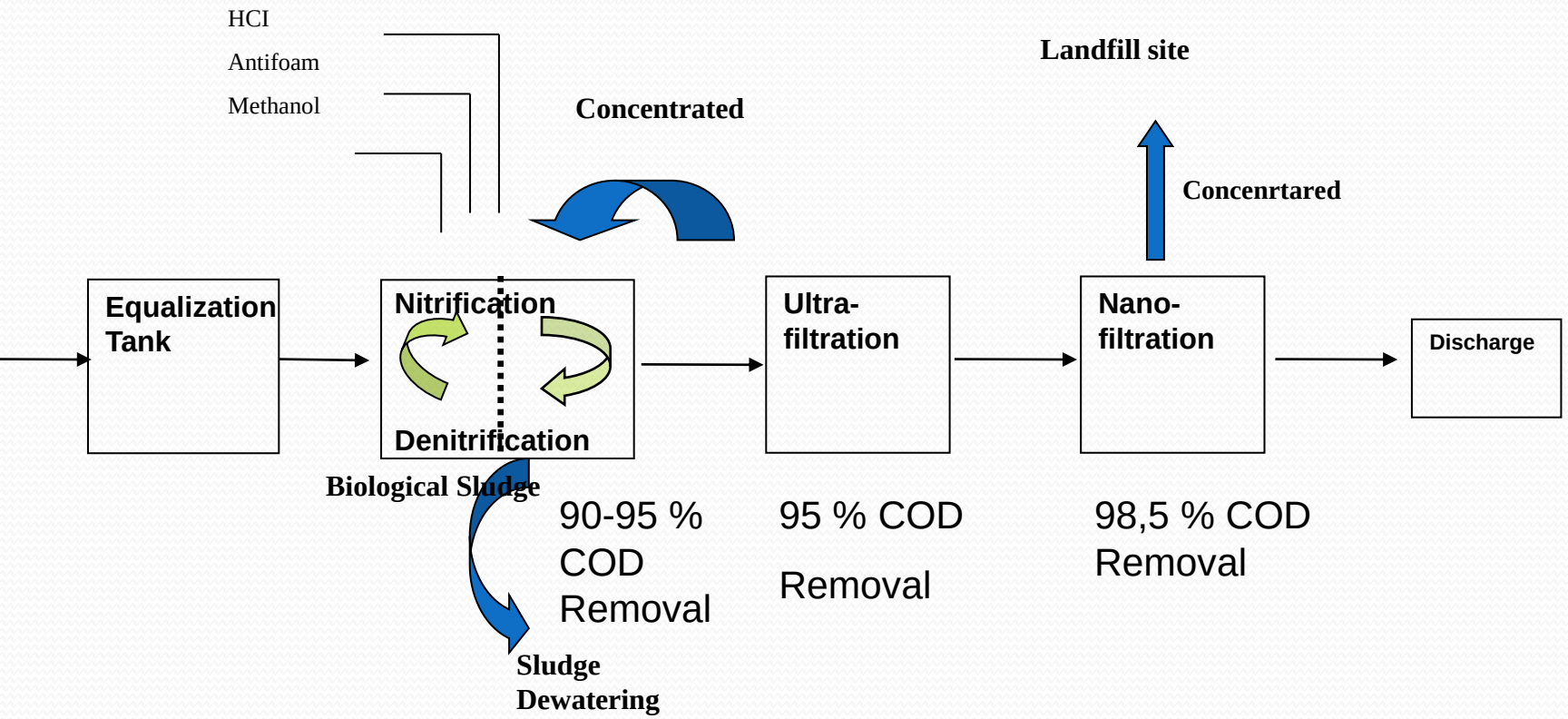
There are **two** leachate treatment plants in Istanbul.
Capacity of **Odayeri** Leachate Treatment Plant : **2.000 m^3/day**
Capacity of **Kömürcüoda** Leachate Treatment Plant : **1.200 m^3/day**

Leachate Data (m^3)

Plant	2008	2009	2010	Total
Odayeri (m^3)	101.326	220.772	507.550	829.648
Kömürcüoda (m^3)	39.628	260.045	257.651	557.324

Leachate is then sent to **I.S.K.I Treatment Facility** by tankers for further treatment in European Side and to **receiving media** in Asian Side.

Leachate Treatment Plant Flow Diagram



Leachate Treatment Plant – Plant Outlet

Bioreactor Outlet

Ultrafilration Outlet

Nanofiltration Outlet

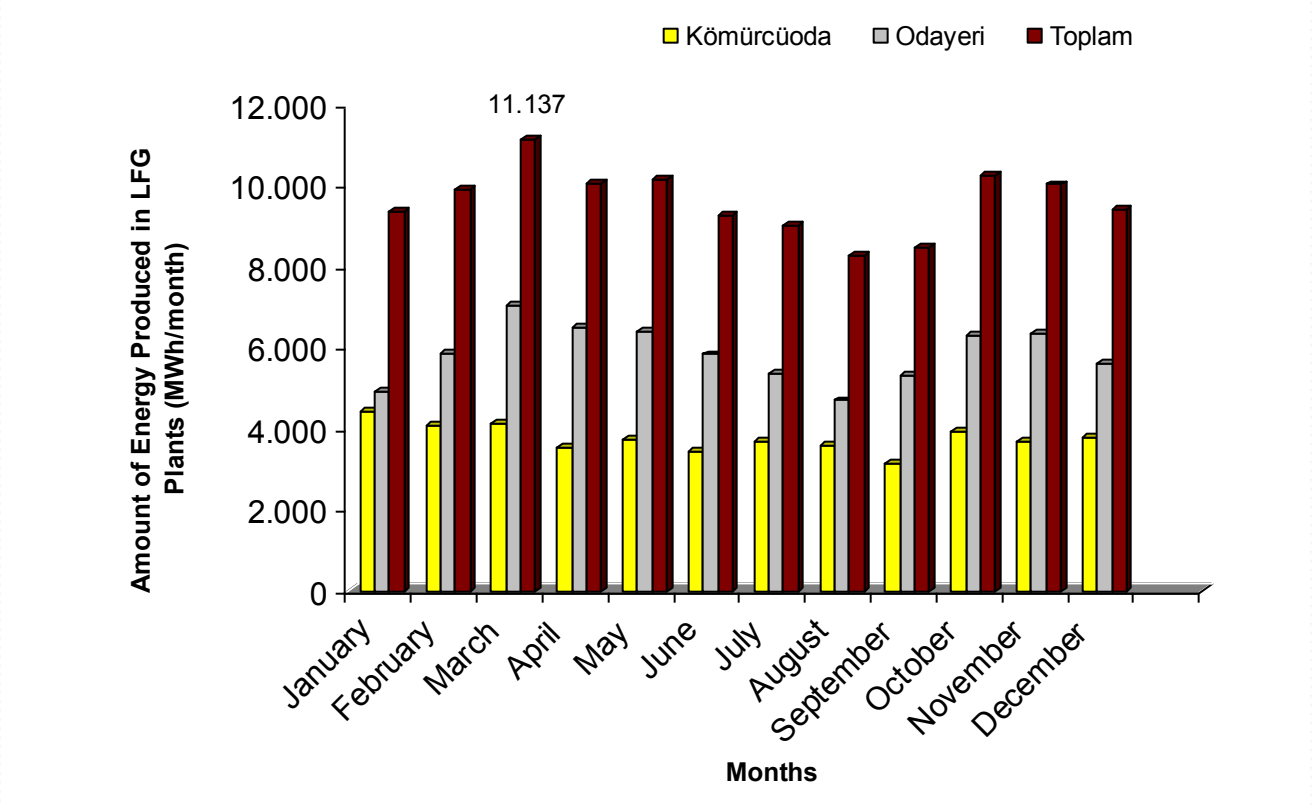
Landfill Gas (LFG) Plant

To transform the landfill gas into heat energy in **Odayeri and Kömürcüoda Landfill Sites**, systems with an actual capacity of **24 MW** are installed. These systems will produce **2.800 GWh** electrical energy until 2030.

By this project nearly **1.000.000** tons of carbon dioxide is prevented from emitting to atmosphere.

This project is in **the first 10 of United Nations (UN) Climate Change Projects**.

Amount of Produced Energy in LFG Plants in 2010



117 million kwh electric energy was produced in 2010.

This amount equals approximately **15.250.000 TL** economically.

Monthly energy need of **775.000** houses was provided by this energy.

Medical Waste Incineration Plant

- Since 1995, IMM has collected and transferred medical waste of approximately **245 medical entities** that have 20 and more beds. Medical wastes of healthcare entities are collected by means of **16 special-equipped vehicles** on a daily basis.

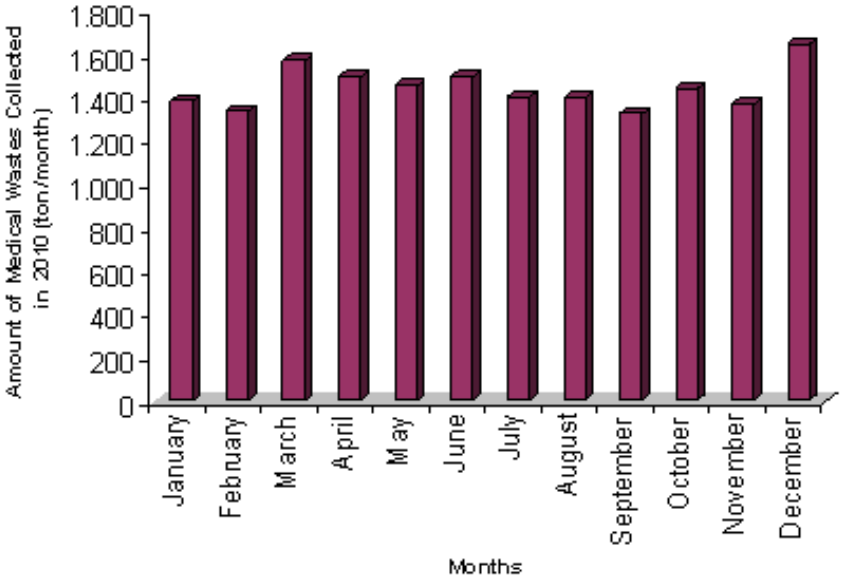
- Medical wastes are incinerated at 1.200 ^{o}C at the plant that has a capacity of **24 tons/day** in Istanbul.

- Volume and weight of wastes are reduced by **95%** and **75%,** respectively, while generating electric power by means of a generator turbine with approx. 0,5 MW output.

- There is a treatment system to decrease pollutant gaseous emissions from the chimney of incineration plant. Emissions are given to the atmosphere after acid neutralization. There is also Carbon Filter System that is eligible to EU Standards.

- Ash of the wastes are disposed in sanitary landfills separately.

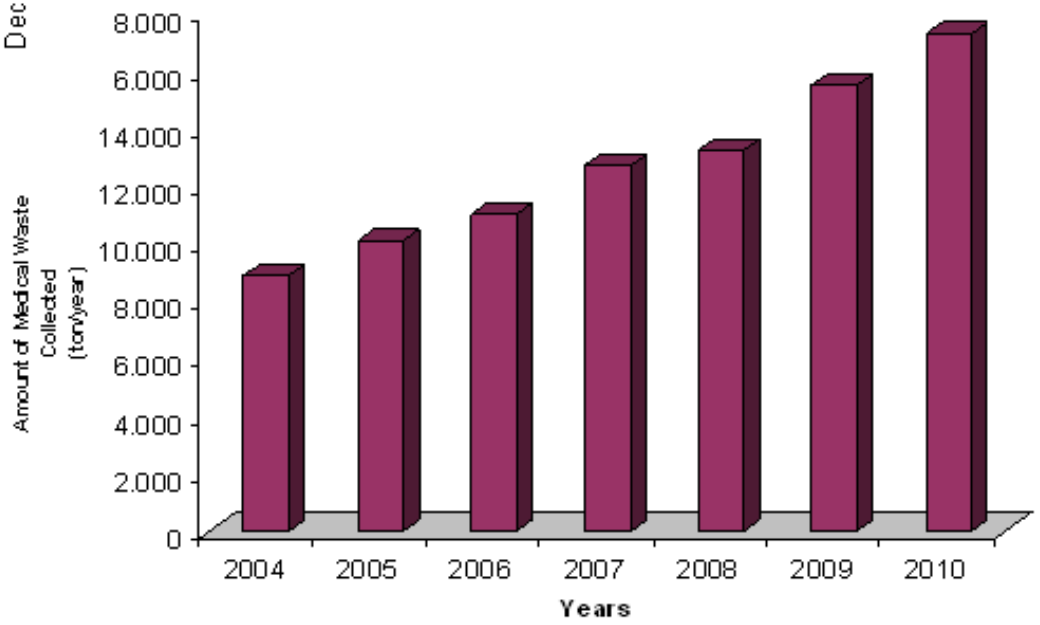
Amount of Medical Wastes



	Asian Side (ton/day)	European Side (ton/day)	Total (ton/day)
2009	16	27	43
2010	17	30	47

Annual amount of medical waste is approximately **17.300 tons,**

It is thought that amount of medical waste will exceed **24.000 tons in 2025.**



Urban Cleaning

Number of Sweeping Vehicles	**160**
Number of Cleaning Vehicles	**63**
Number of Workers in Mobile Team	**498**

4 million m² area is daily cleaned by sweeping in Istanbul.

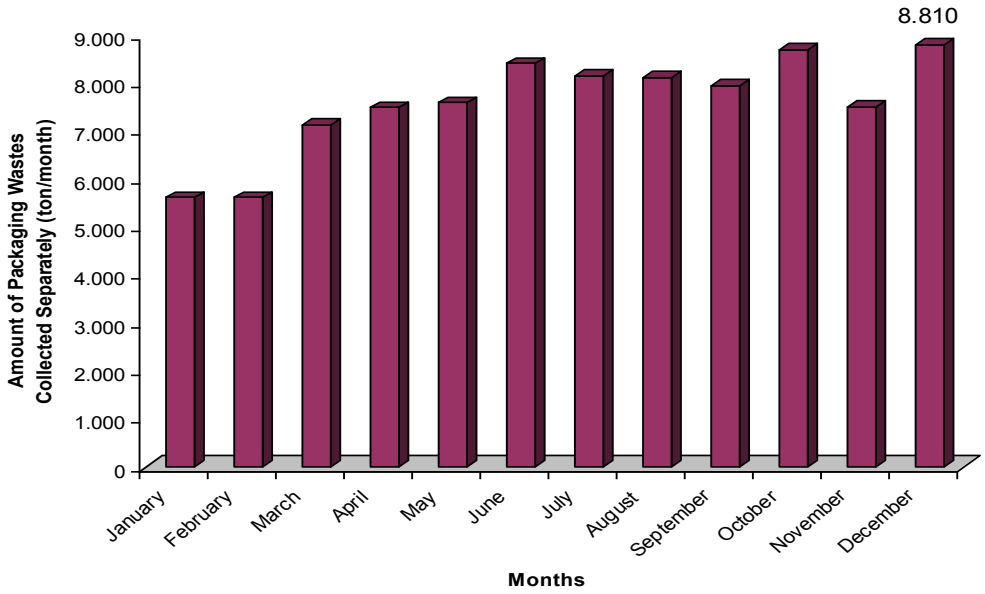
Management of Packaging Wastes

According to "***Regulations on Control of Packaging Wastes***", packaging wastes are collected separately.

- **26** district municipalities work together with ISTAC Inc. Co.,
- **13** district municipalities work themselves or together with CEVKO.

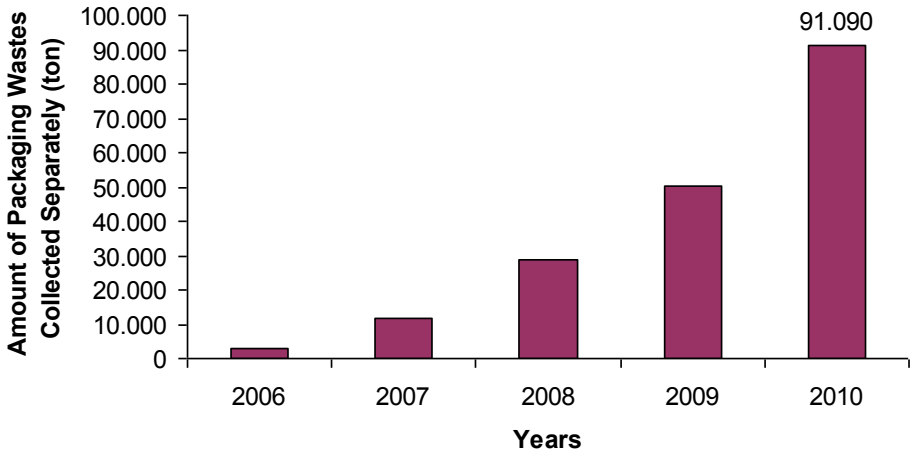
	Districts That Signed Protocol With ISTAC	Districts That Didn't Sign Protocol With ISTAC
	Districts That Started Implementation	**Districts That Are Working Themselves**
1	Silivri	Beşiktaş
2	Kağıthane	Zeytinburnu
3	Tuzla	Bakırköy
4	Bayrampaşa	Kadıköy
5	Beykoz	Pendik
6	Sultanbeyli	Şile
7	Bağcılar	Avcılar
8	Üsküdar	Adalar
9	Küçükçekmece	Ataşehir
10	Şişli	Arnavutköy
11	Sarıyer	Esenyurt
12	Büyükçekmece	Maltepe
13	Gaziosmanpaşa	Kartal
14	Beyoğlu	
15	Fatih	
16	Güngören	
17	Çatalca	
18	Esenler	
19	Beylikdüzü	
20	Bahçelievler	
21	Ümraniye	
22	Çekmeköy	
23	Başakşehir	
24	Sultangazi	
25	Sancaktepe	
26	Eyüp	

Amount of Packaging Wastes

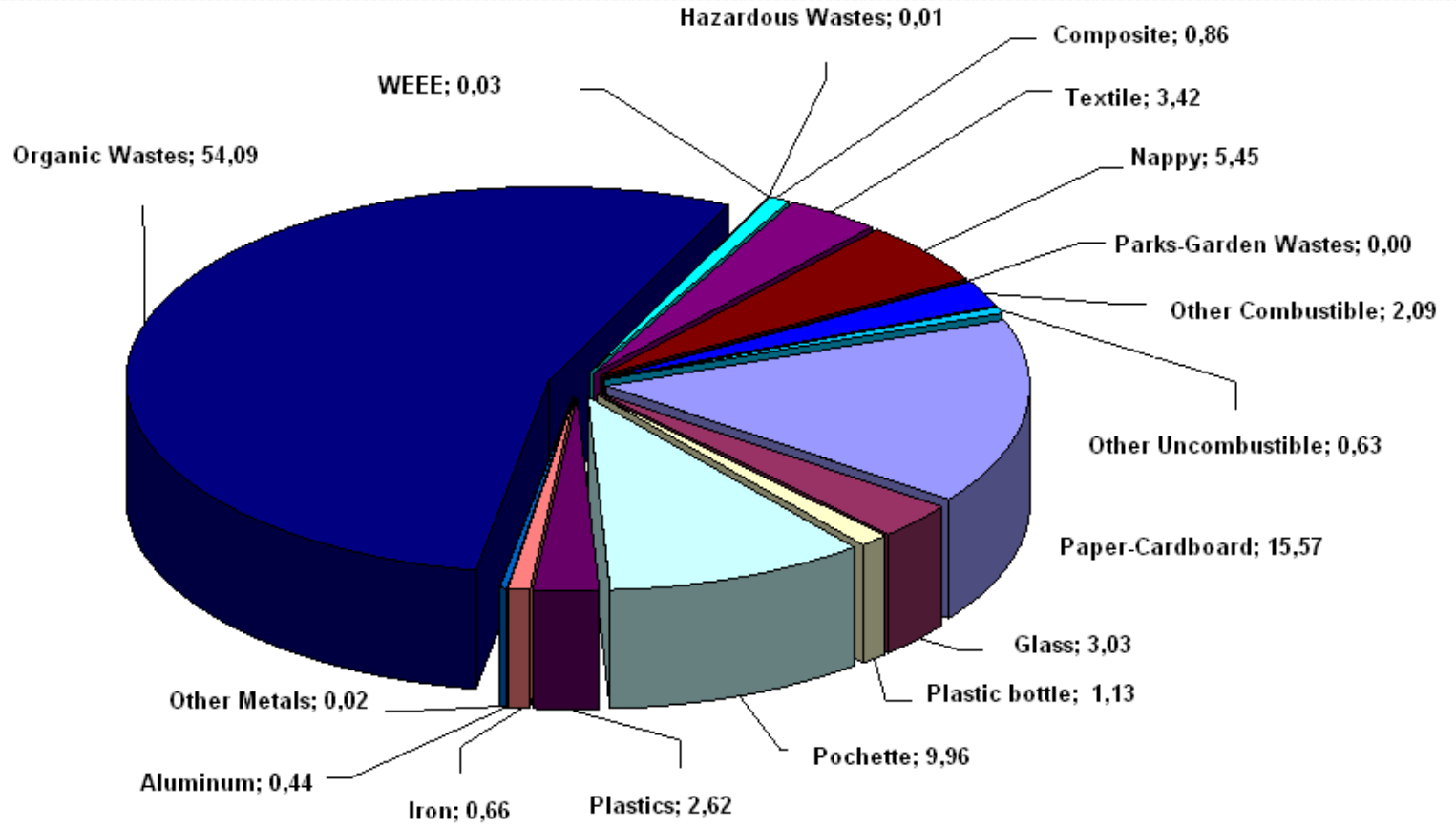


Amount of packaging wastes collected separately in 2010 is about **8.000 tons/month.**

In 2010, the amount of packaging wastes collected separately is **91.090 tons/year**.



General Waste Characterization in Istanbul



Percentage by weight;

54.09 % Organic waste

15,57 % Paper and Cardboard

9,96 % Pochette

5,45 % Nappy

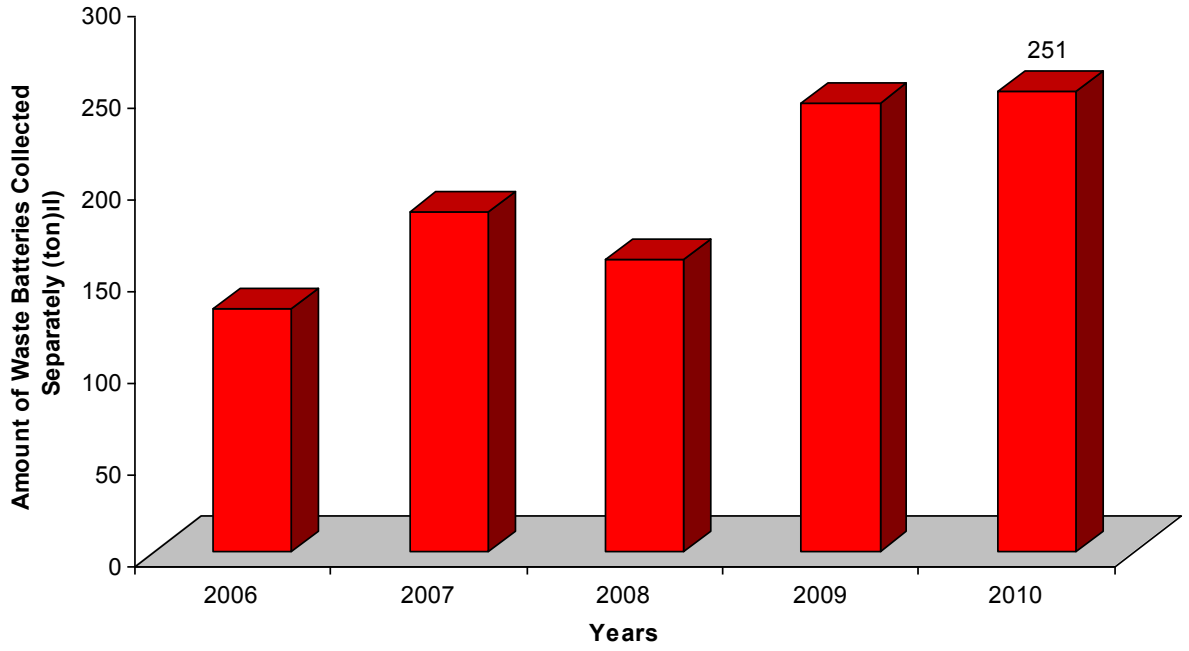
Management of Wastes Batteries

The responsibility of collection of waste batteries was given to **TAP Association** by Ministry of Environment and Forestry.

The association works in cooperation with Istanbul Metropolitan Municipality and collects waste batteries, carries out awareness activities.

Waste batteries collected separately are stored in specially built and impermeable waste battery storages in **Kemerburgaz.**

Amount of Waste Batteries



- **10.000 tons** batteries were put on the market in 2009 yılı throughout Turkey.
- Amount of waste batteries that have to be collected according to related law is; **3.000 tons**
- Amount of waste batteries collected; **251 tons**

Management of Istanbul Local E-waste Project (SMILE)

Project Code: LIFE 06 TCY/TR/282
Beneficiary: Istanbul Metropolitan Municipality
Project Partners : Environmental and Cultural Heritage Conservation Association (ÇEVKU) from Turkey and Ecological Recycling Society Association from Greece.
Total Project Budget: €739,899
EU Funding: €495,092

The formal duration of the Project has ended but it is being continued by the support of IMM.

Within the Project,

- Unusable computers are collected and decomposed as usable, recyclable and unrecoverable.
- The ones that can be used again are repaired and delivered to the public institutions that are in need.
- The ones that can not be used again are purified from toxic materials and sent to recycling plants.
- The rest of the computers are disposed.

AIR POLLUTION CONTROL IN ISTANBUL

Air Pollution History

In Istanbul, air pollution started to manifest itself as of the year 1985 due to the;

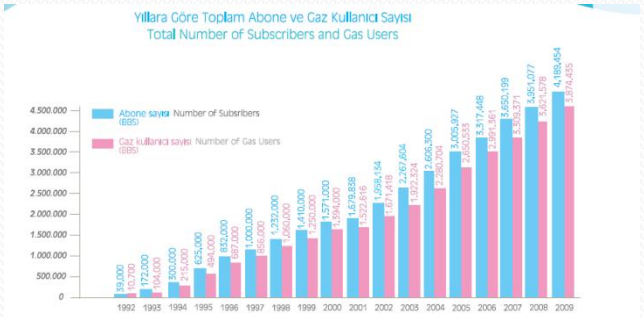
- rapid population increase,
- the use of low quality fuel,
- dense immigration,
- wrong place selection for industry,
- not giving importance enough to heat isolation,
- not enough workings on reducing traffic sourced emissions and
- lack of information on environmental issues.


Cumhuriyet

21 OCAK 1993

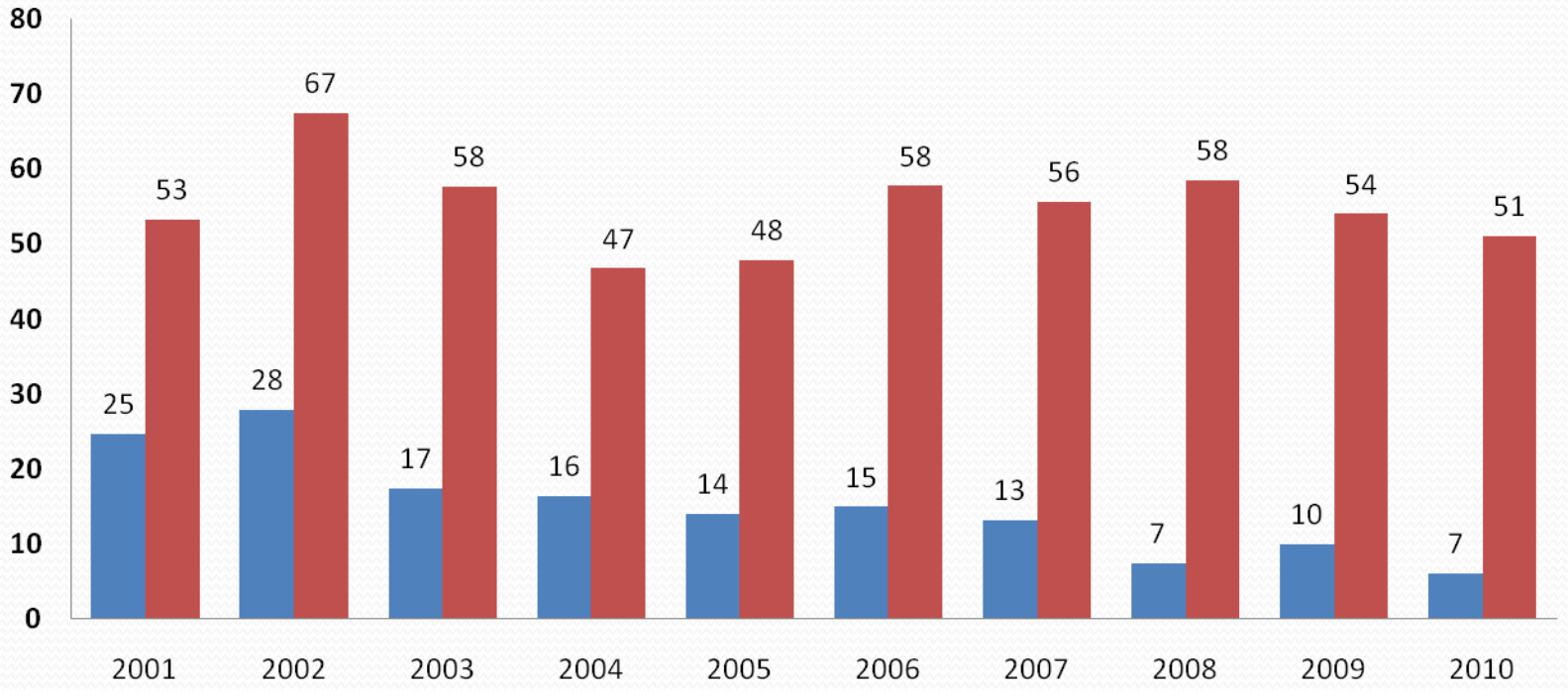
Çocukları evden çıkarmayın

Air Pollution in Istanbul



Thanks to spreading natural gas consumption in settlements and industry, qualified fuel obtaining (qualified coal, qualified fuel-oil, etc.), afforestation, controlling and inspection of industrial sourced emissions, putting in action of heat isolation, improving of public transportation, etc. remarkable improvements recorded on Istanbul's air quality.

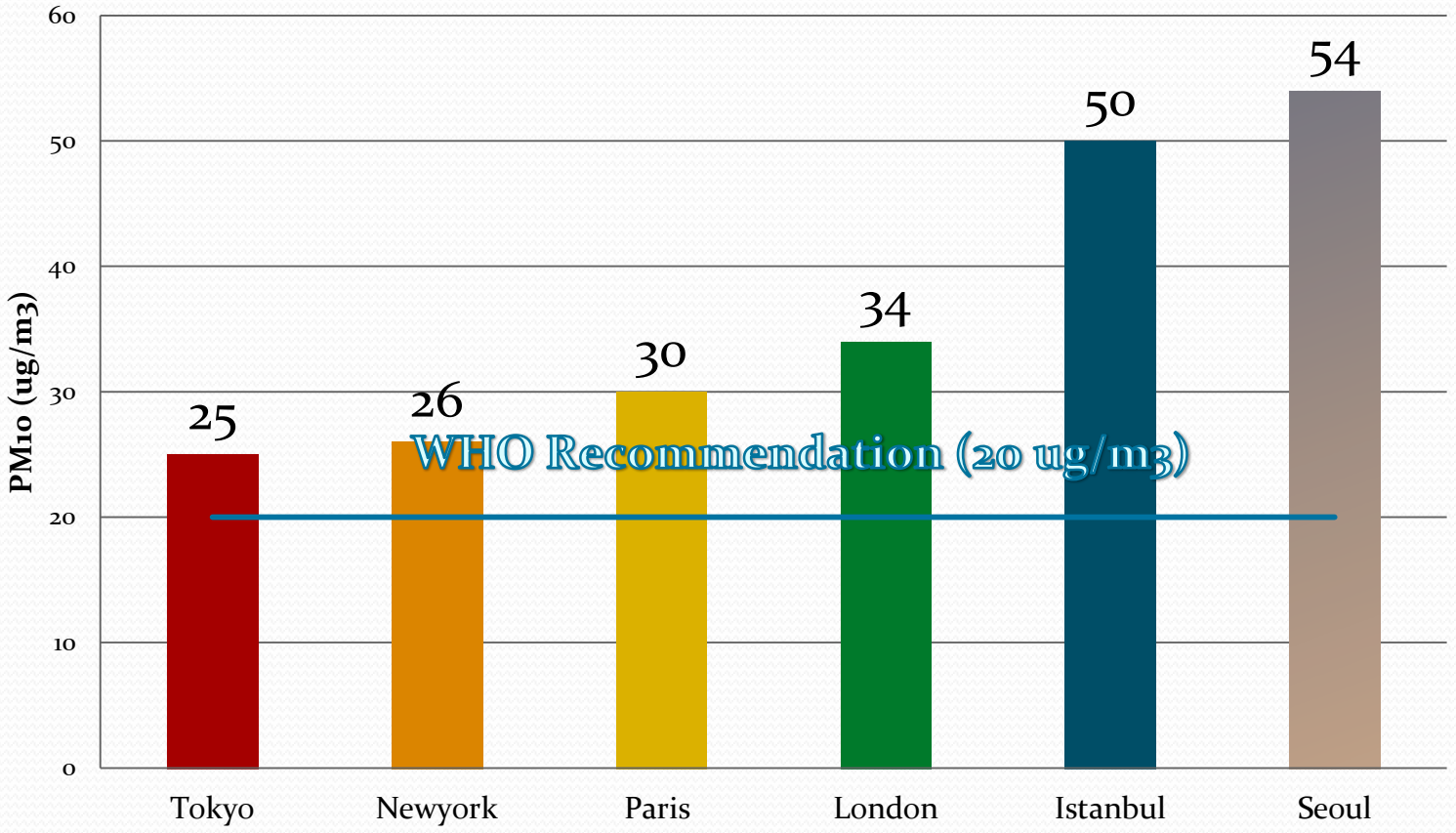
Change in SO_2 and Particulate Matter (PM)



SO_2 (EU Standard 20 mg/m^3)

PM(EU Standard 40 µg/m^3)

PM_{10} in Metropolis

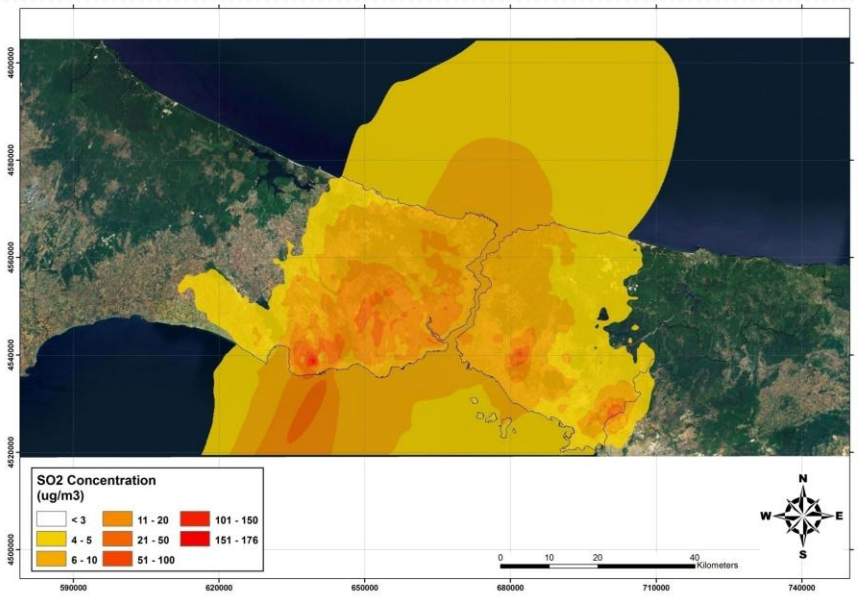


EU Funded GIS Project

- ✓ Decision-Making Suppport System Project for air quality management was funded by EU Commission between the years 2007-2009 in the framework of LIFE-III grant program with 9 Eylül University.
- ✓ Total Budget of the Project: **314.535 €.**
- ✓ Scenario analyses were performed about air quality in the framework of this project.

Air Pollutant Emissions

	Emissions (t/y)				
	PM_{10}	SO_2	NO_X	NMVOC	CO
Industry	7,630	58,468	9,394	117	1,714
Residential heating	13,631	10,983	7,014	18,351	123,510
Traffic	5,200	1,016	138,000	38,500	270,000
TOTAL	26,461	70,467	154,408	56,968	395,224



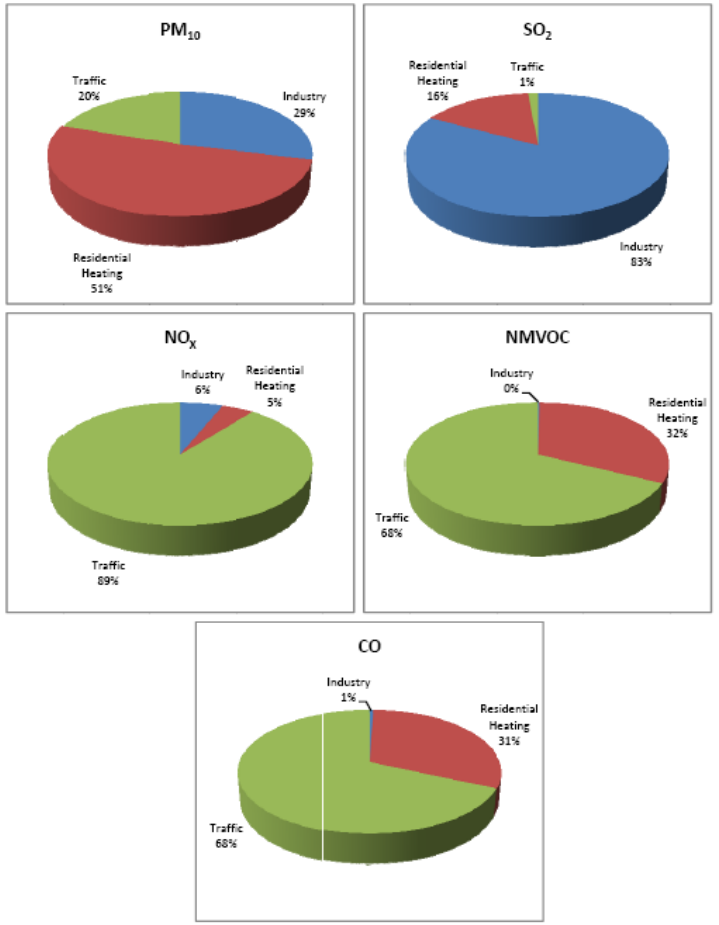
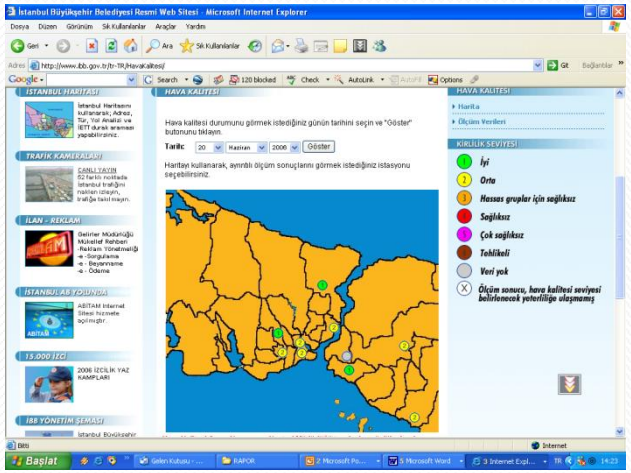
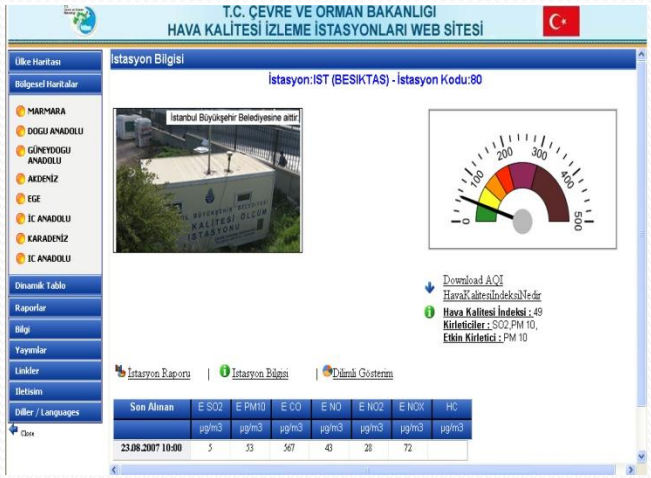


Figure 3.8 Contribution of each source type to total pollutant emissions

Air Quality Monitoring





http://www.ibb.gov.tr/tr-TR/HavaKalitesi/

http://www.havaizleme.com

- 10 fixed +1 mobile monitoring stations
- Online automatic measurement
- SO_2, CO, PM10, NOx, Ozone
- Publicly available

MARINE POLLUTION CONTROL IN ISTANBUL

Wastes Received From Ships

- ✓ According to Metropolitan Municipality Law numbered 5216, IMM receives wastes from ships.

- ✓ It collects products derived from **petrol** (bilge water, mud, polluted ballast, waste oil etc) (Annex-I), **chemicals** (Annex II), **polluted water** (Annex –IV) and **solid wastes** (Annex V) in the content of **MARPOL Agreement**.

- ✓ IMM has 15 ships in total.
  - 4 75-150 DWT (Dead Weight Ton)
  - 4 150-300 DWT
  - 3 300-500 DWT
  - 1 500-750 DWT

Total Amount of Waste Received From Ships

TOTAL AMOUNT OF WASTE RECEIVED FROM SHIPS (2007-2009)									
TYPE OF THE WASTE ACCORDING TO MARPOL 73/78 AGREEMENT	TYPE OF WASTE	2007		2008		2009		2010	
		NUMBER OF SHIPS	AMOUNT OF WASTE (m^3)	NUMBER OF SHIPS	AMOUNT OF WASTE (m^3)	NUMBER OF SHIPS	AMOUNT OF WASTE (m^3)	NUMBER OF SHIPS	AMOUNT OF WASTE (m^3)
ANNEX-I	PETROL LIKE PRODUCTS	3.502	74.225	4.469	107.073	4.239	94.933	4.924	96.693
ANNEX-IV	POLLUTED WATER	174	8.435	371	14.560	327	15.315	414	10.987
ANNEX-V	GARBAGE	909	9.570	1.138	12.855	904	9.189	1.640	9.371
TOTAL		4.585	92.229	5.978	134.487	5.470	119.437	6.978	117.052

The Service of Receiving Waste From Ships

Recycling/Refining Wastes Received From Ships

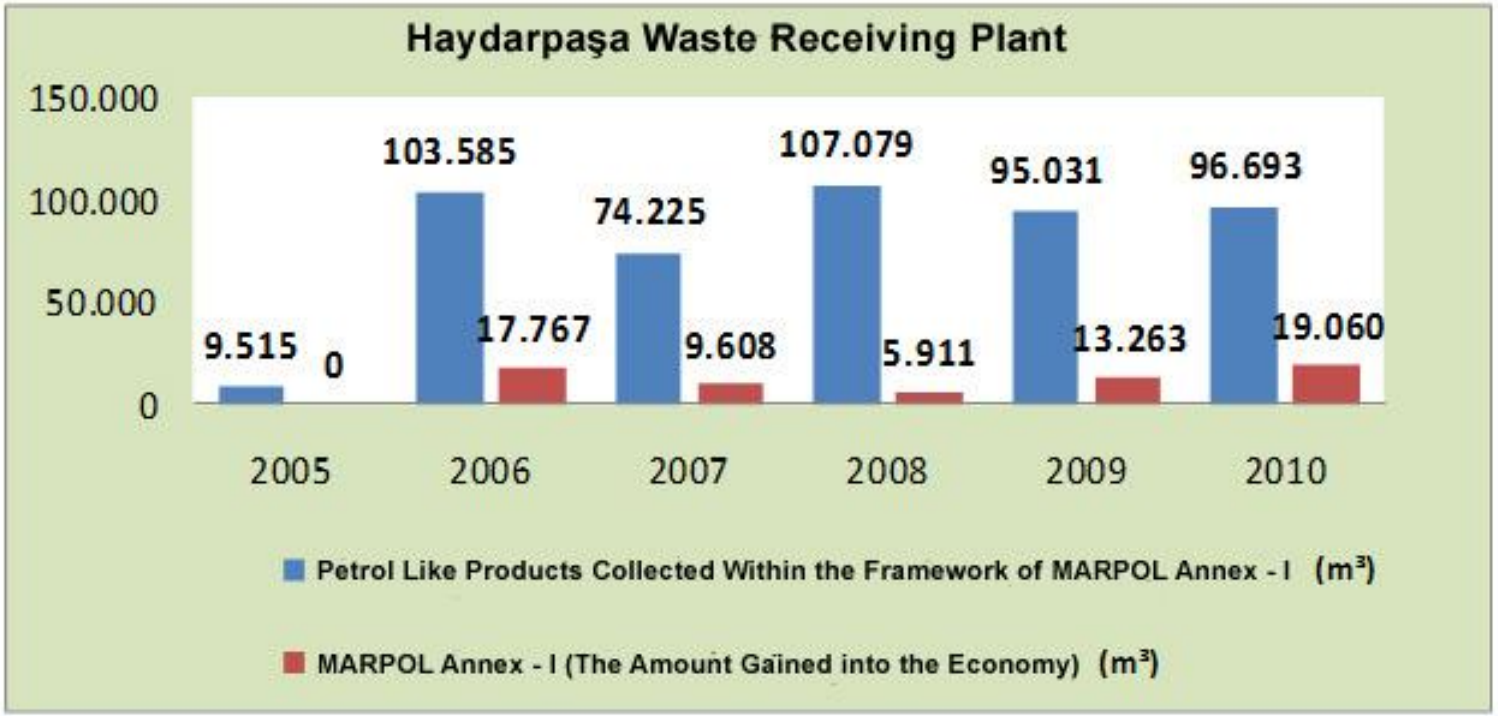
- Haydarpasa Waste Plant was established in 2008 as the first model in its field.
- This plant was established on an area of **1.550 m² in** Haydarpasa Harbour Area.
- In this plant, **petrol and petrol like contaminated wastes** (bilge water, mud, polluted ballast, waste oil etc) in all harbours and pier lands of Istanbul are refined.

Recycling/Refining Wastes Received From Ships

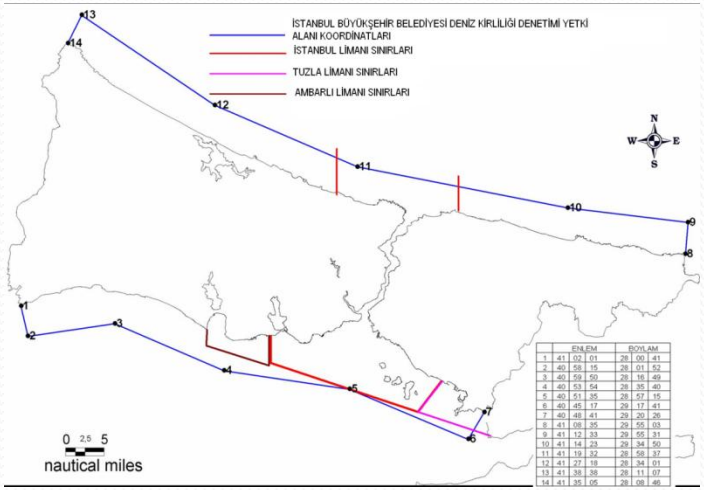
- By controlling the wastes in the plant, marine pollution will be under control and **petrol and petrol like products** acquired as a result of refinement will be used in industry as **secondary fuel.**

- In 2010, **117.052 m³** waste were collected in accordance with the content of **MARPOL** Annex I (bilge water, mud, polluted ballast, waste oil etc), Annex IV (polluted water) and Annex V (garbage); **96.693 m³** waste collected in the content of **MARPOL** Annex-I was sent to Haydarpasa Waste Plant and **19.060 m³** of it was refined and transformed into fuel.

Haydarpaşa Waste Receving Plant



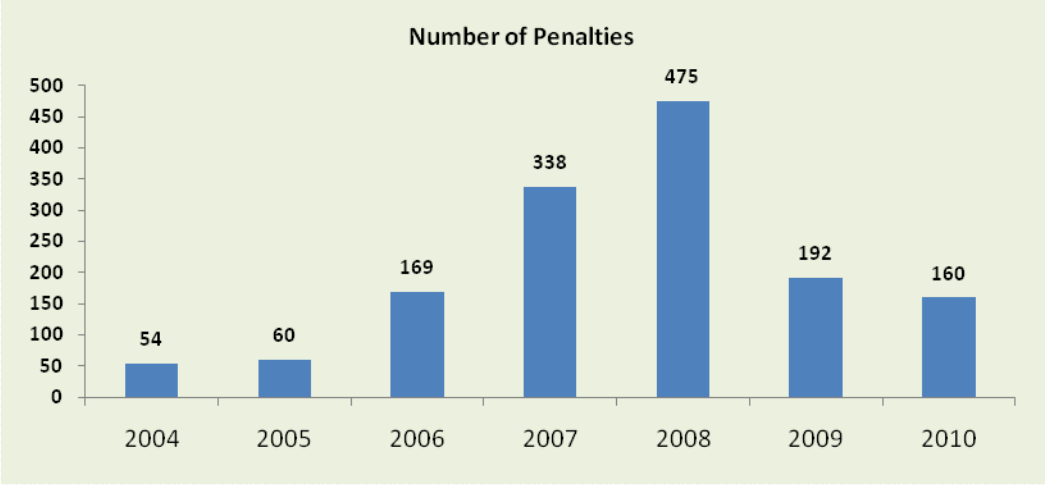
Marine Pollution Control



Local Authority Area of IMM

- 7/24 Control
- 3 Control boats
- Helicopter Control (3 Days, 2 Hours)
- 38.572 sea vessels were controlled in 2010

Marine Pollution Control



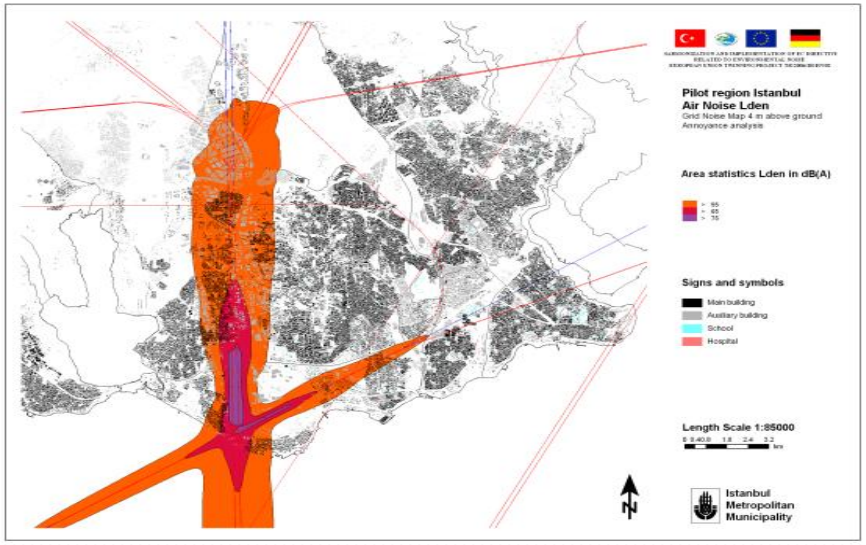
NOISE POLLUTION CONTROL IN ISTANBUL

Noise Pollution

- **Environmental Noise Directive (2002/49/EC)** were adopted to national legislation by MoEF.
- **13** District Municipalities and Istanbul Metropolitan Municipality have the authority on noise pollution control within their authority area.
- With these regulations, noise pollution in constructed areas, parks, residental areas, areas sensitive to noise (hospital, school etc.) and other buildings and areas are controlled.

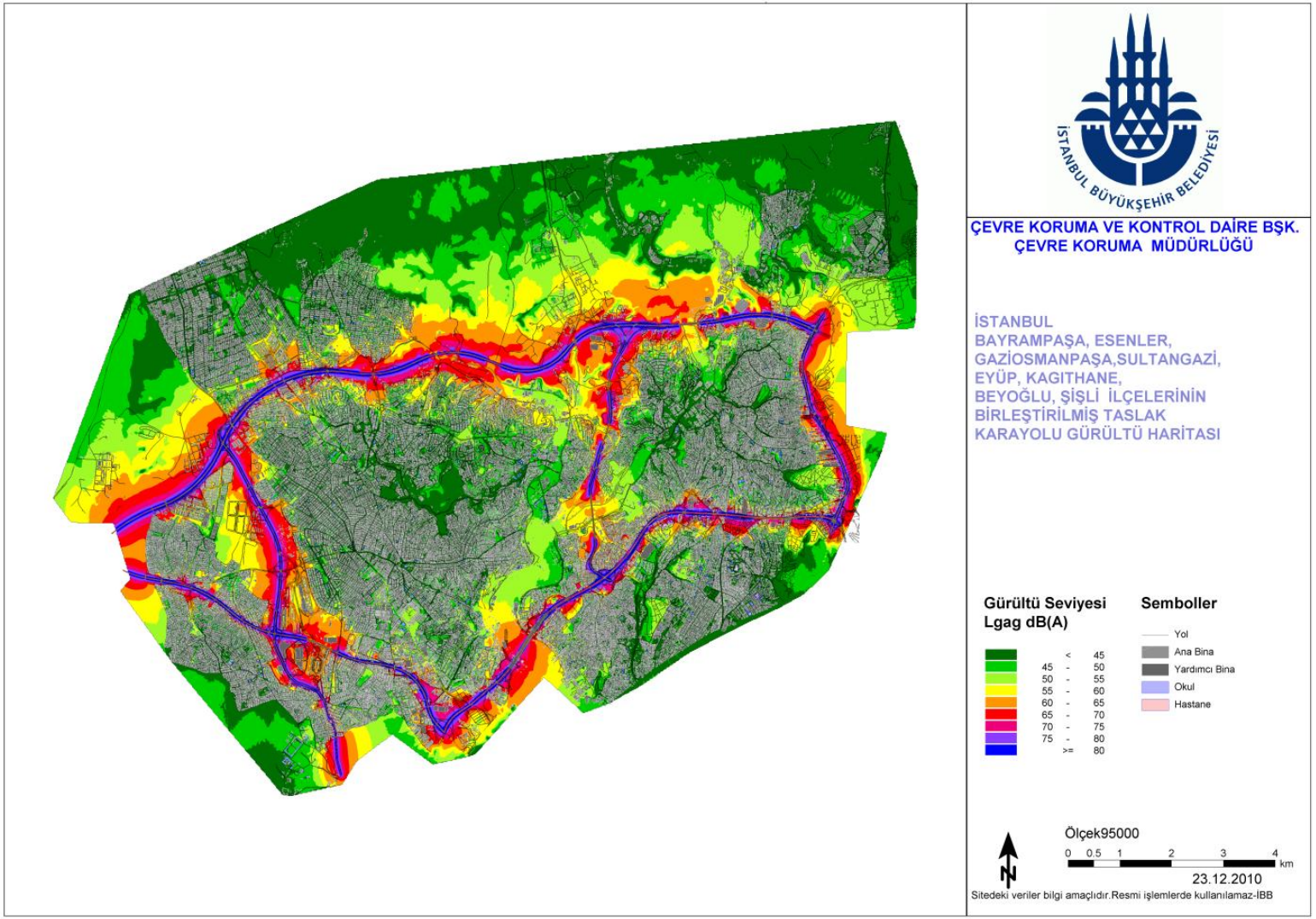
Noise Pollution Implementations

- ✓ **Noise/Acoustics Laboratory** established by IMM **was accredited by Turkish Accreditation Institution.**
- ✓ As a pilot area, **Ataturk Airport's noise map** has been developed.
- ✓ Preparation of noise maps and action plans is still at an early stage in Turkey, but IMM have already started to prepare the draft noise maps in the basis of districts.



NOISE MAP OF ATATURK AIRPORT

Example of Draft Noise Map



THANK YOU…