T.C. MINISTRY OF ENVIRONMENT AND URBANIZATION

Wastewater Management inTURKEY



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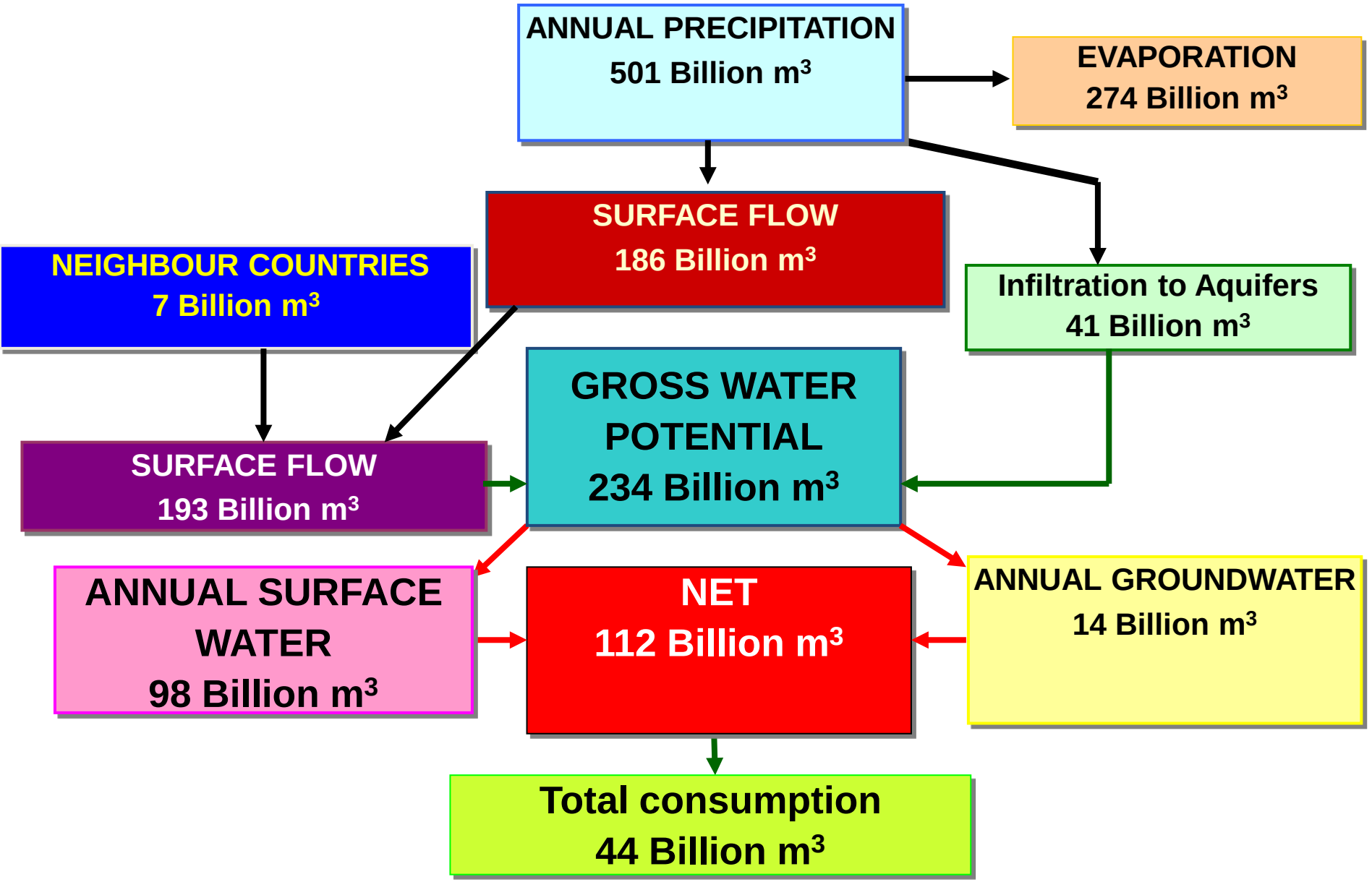
OUTLINE

- Information about Turkey
- Legislation and Current Situation
- Developments in Wastewater Treatment
- Innovative Approaches To Wastewater Management
- Water and Wastewater Monitoring
- Environmental Inspection

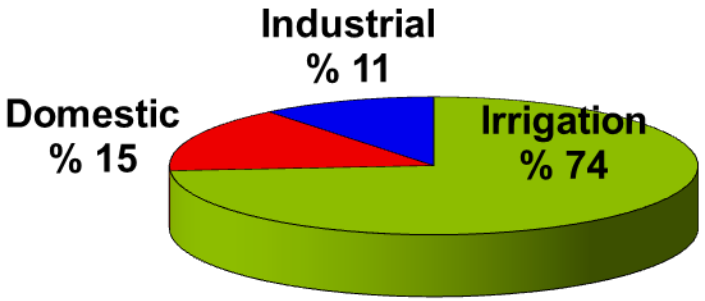
INFORMATION ABOUT TURKEY

WATER POTENTIAL IN TURKEY



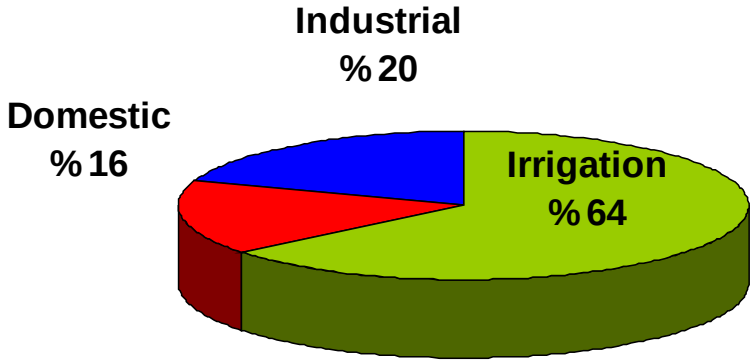
WATER CONSUMPTION IN TURKEY

Year 2010



Irrigation	: 32 billion m^3 (%74)
Domestic	: 6 billion m^3 (%15)
Industrial	: 5 billion m^3 (%11)
TOTAL	: 43 billion m^3

Year 2023



Irrigation	: 72 billion m^3 (%64)
Domestic	: 18 billion m^3 (%16)
Industrial	: 22 billion m^3 (%20)
TOTAL	: 112 billion m^3

WATER SUPPLY AND CONSUMPTION IN TURKEY

- **Total Available Water Volume : 112 Billion m^3**
- **Turkey's Population : >76 Million**
- **Water Availability Per Capita : <1.500 m^3/year**

These values indicate that Turkey is regarded as a "water stress" country.

For that reason;

- **To use water cautiously,**
- **To avoid using water excessively,**
- **To use less water consuming technologies in irrigation and in daily life is important.**

Besides, it is necessary

- **To avoid polluting water resources.**

LEGISLATION
and
CURRENT SITUATION

WASTE WATER LEGISLATION

ENVIRONMENTAL LAW (2006)

By-Law on Water Pollution Control (2004)

By-Law on Urban Wastewater Treatment (2006)

Sensitive and Less-Sensitive Water Areas Communiqué concerning Urban Wastewater Treatment Regulation

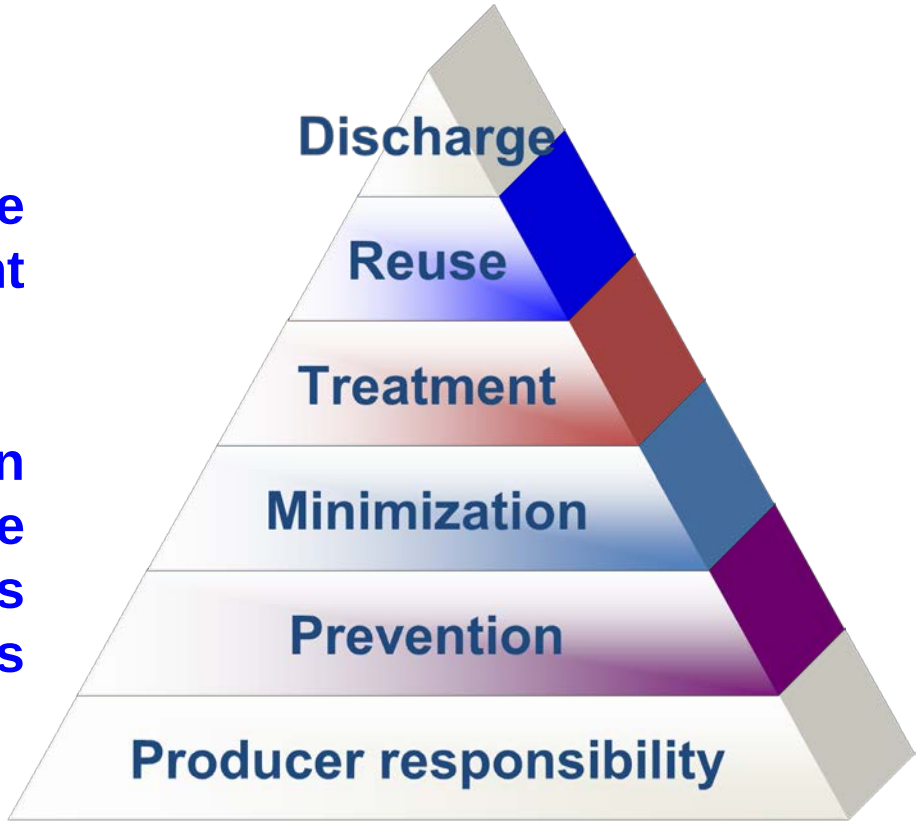
- Communiqué of Sampling and Analyses
- Communiqué of Wastewater Treatment Plants Technical Methods
- Communiqué of Administrative Methods

- By-Law on Control of Pollution Grown out of Dangerous Materials in the Water and Environment (2005)
- By-Law on Determination of Tariff of Wastewater Infrastructure (2010)
- By-Law on principles and procedures to on incentive measures for WWTP (2010)

WASTEWATER POLICY

To protect water supplies

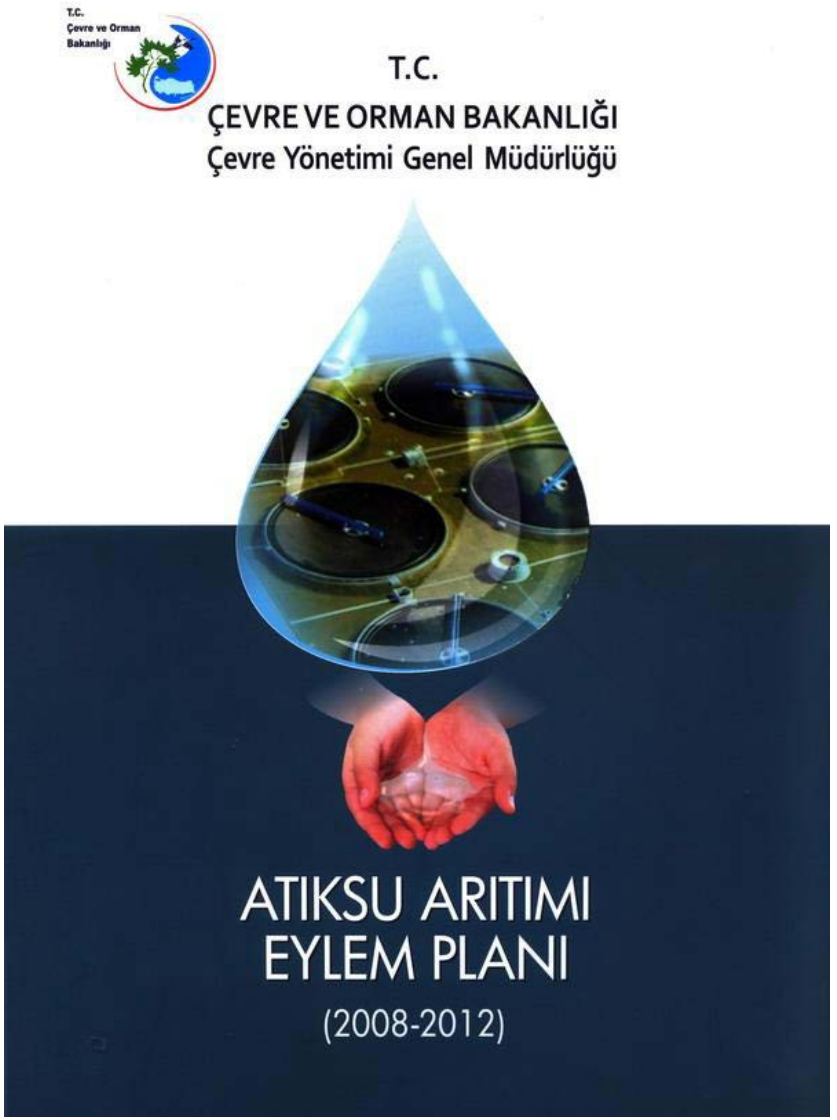
- Ministry is enjoined to approve and guide the environment protection projects.
- Ministry has the main responsibility about the determination of the technologies of wastewater treatment plants and their implementation.



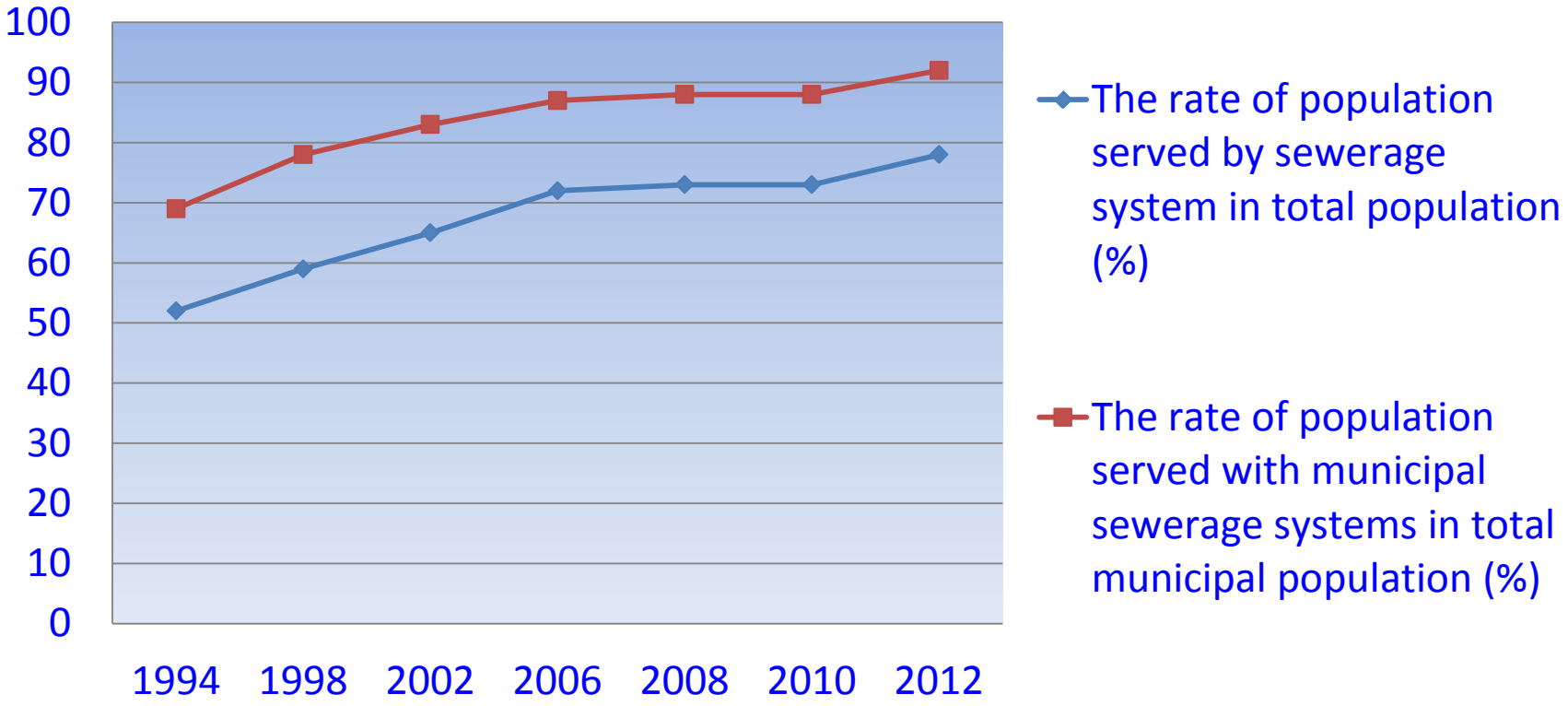
WASTEWATER TREATMENT ACTION PLAN

- **Prioritization in 25 River basins has been done by taking into account pollution, pressure and impacts, drinking water and protected areas.**

- **Short, medium, and long term targets have been identified**

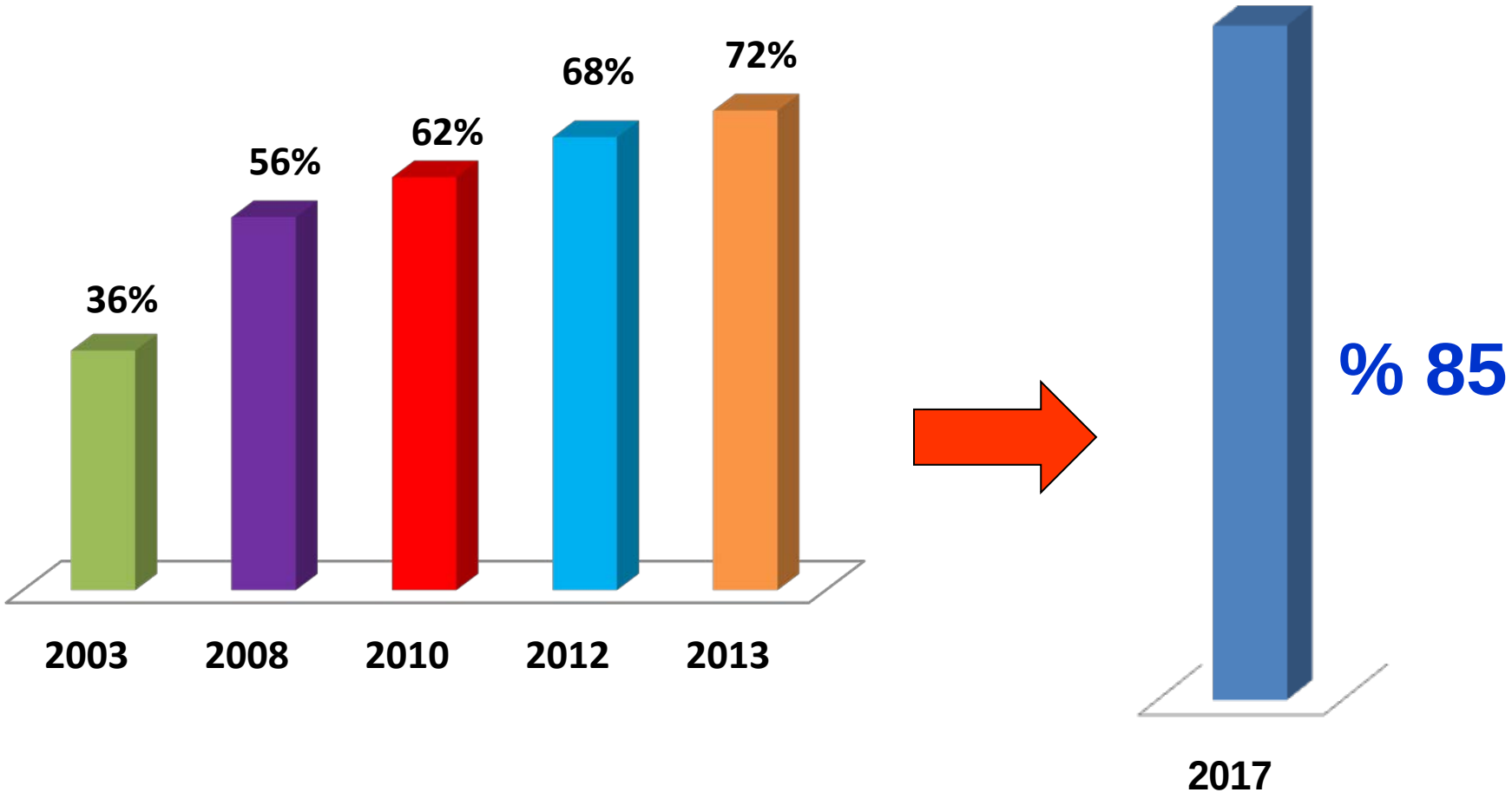


EXISTING SITUATION IN TURKEY

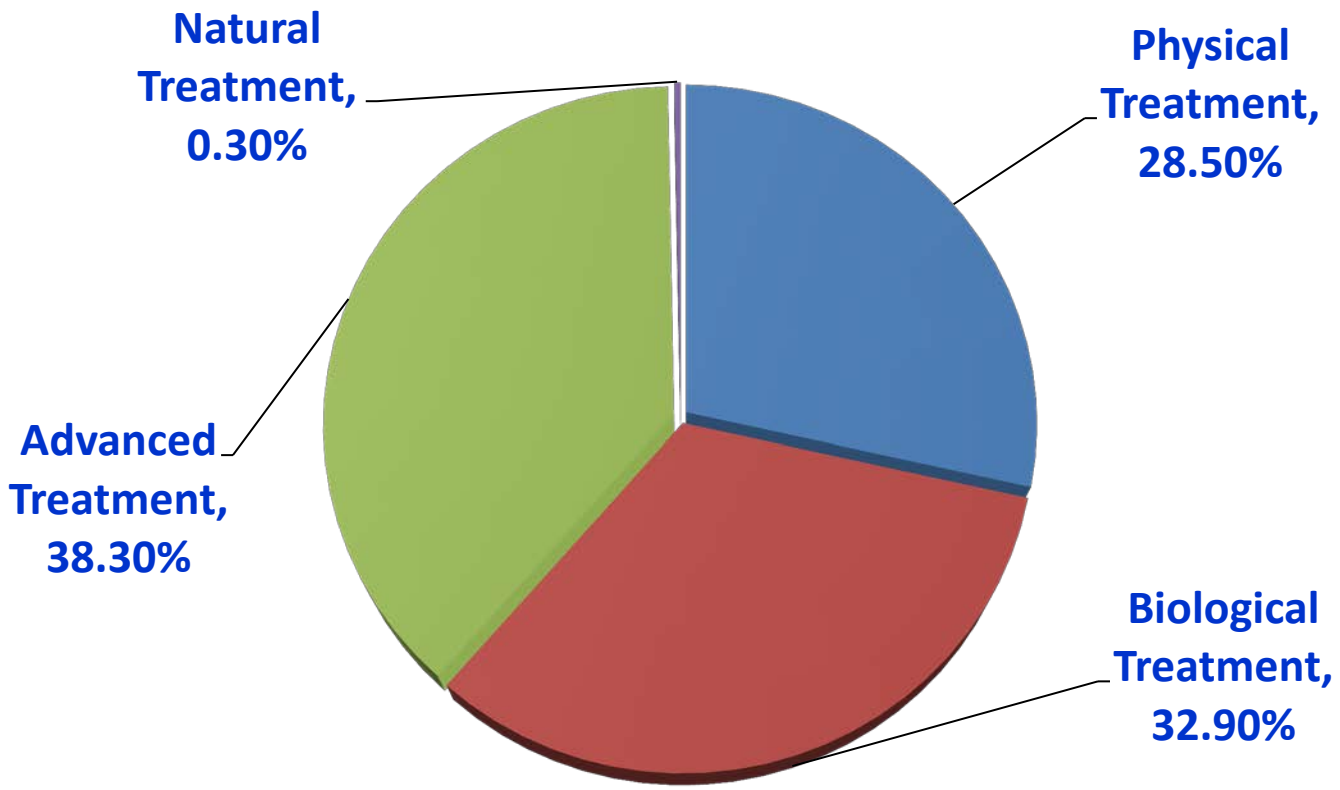


FUTURE PERSPECTIVES FOR WASTEWATER TREATMENT

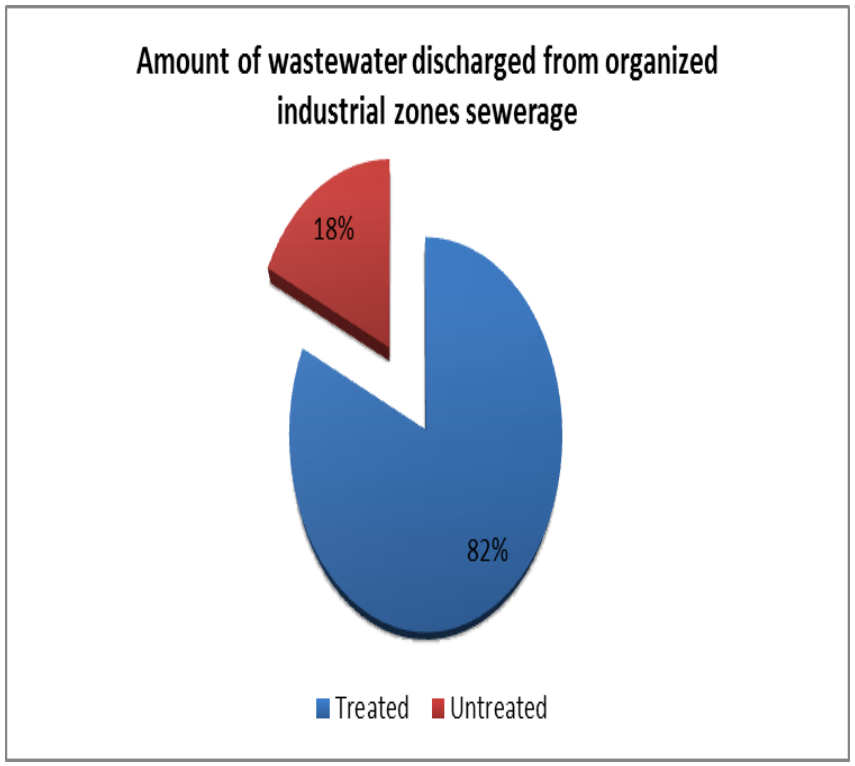
The Rate of Population Served by WWTP in total Municipal Population

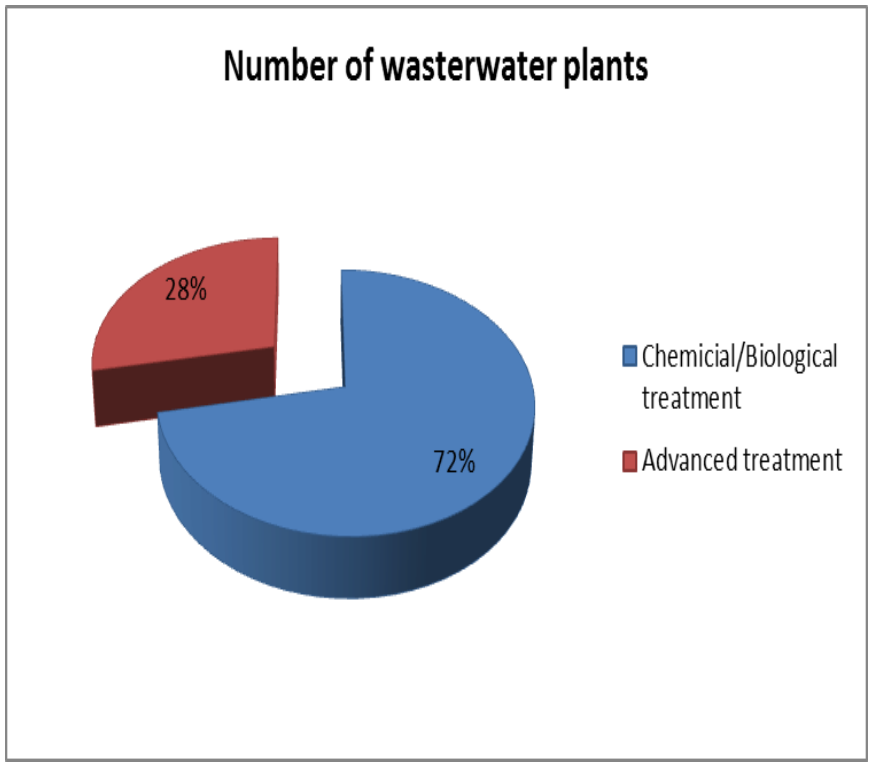


CURRENT DOMESTİC WASTEWATER TREATMENT PLANT TYPES



WASTE WATER TREATMENT PLANTS in ORGANIZED INDUSTRIAL ZONES





TurkStat, Organized Industrial Zones Water Wastewater and Waste Statistics, 2012

DEVELOPMENTS
IN
WASTEWATER TREATMENT

DEVELOPMENTS FOR WASTEWATER TREATMENT IN TURKEY - 1988

Name	Aydın Belediyesi Atıksu Arıtma Tesisi
Operation Year	1988
Type of the Treatment	*Aerobic / Anaerobic Stabilization Pond*

AYDIN

DEVELOPMENTS FOR WASTEWATER TREATMENT IN TURKEY - 1996

PLANT NAME	Afyonkarahisar Municipality WWTP
Operation Year	1996
Capacity (m^3/day)	46.600
Type of the Treatment	***Trickling Filter***

AFYON

DEVELOPMENTS FOR WASTEWATER TREATMENT IN TURKEY - 2006

PLANT NAME	BURSA WWTP
Operation Year	2006
Capacity (m^3/day)	87.500
Type of the Treatment	*Tertiary Treatment*

BURSA

DEVELOPMENTS FOR WASTEWATER TREATMENT IN TURKEY - 2012

PLANT NAME	Afyonkarahisar Municipality WWTP
Operation Year	2012
Capacity (m^3/day)	44.000
Type of the Treatment	***Tertiary Treatment***

INNOVATIVE APPROACHES TO WASTEWATER MANAGEMENT

WHY WASTEWATER REUSE?

- To use the limited amount of water resources for more crucial purposes,

- To prevent environmental pollution problems caused by wastewater discharges,

- Water demand is concentrated in certain places due to population increase,

- Since urban wastewater contains 99.9 % pure water, it is easy to accept wastewater as water supply.

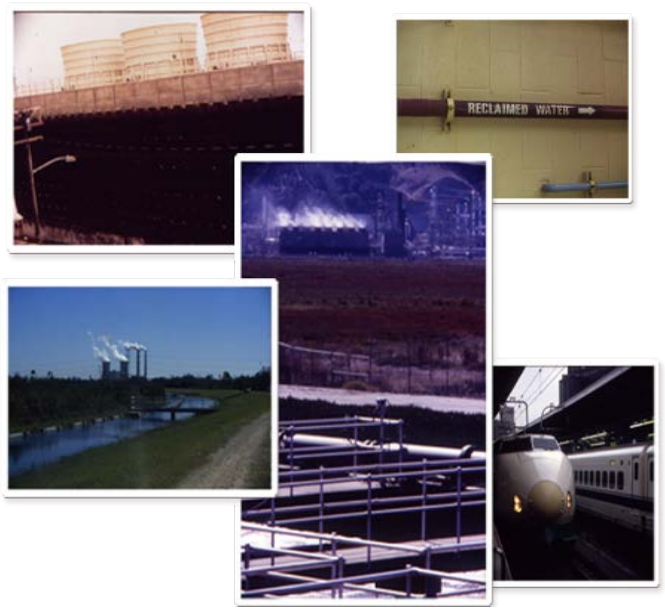
PLACE OF WASTEWATER REUSE IN OUR WASTEWATER POLICY

- Increase in water demand and requirement of good quality due to increase in population,
- Improvements in industry,
- High prices of natural water resources,
- Improvements in reuse and recovery technologies,

make wastewater reuse more attractive.

REUSE OPTIONS OF TREATED WASTEWATER

- Irrigation,
- Industrial,
- Injection to groundwater for feeding,
- Recreational areas formation,
- Indirect usage as fire water,
- Reuse in toilettes,
- Direct reuse as drinking water,



LEGISLATION: COMMUNIQUE OF WASTEWATER TREATMENT PLANTS TECHNICAL METHODS

This communiqué has been prepared in order to regularize the technical methods and implementations of;

- **Technology selection for wastewater treatment plants**
- **Design criteria**
- **Disinfection of treated wastewaters**
- **Reuse**
- **Deep sea discharge**
- **Sludge disposal**

DOMESTIC WASTEWATER TREATMENT AND REUSE

REUSE OF DOMESTIC WASTEWATER FOR IRRIGATIONAL PURPOSES-BELEK REGION

ANTALYA

- There are regional wastewater treatment plants in Belek, Antalya, serving group of hotels.
- Reclaimed wastewater is being used for irrigation of the golf courses.
- The capacity of the treatment plant is about 10000 people.

REUSE OF DOMESTIC WASTEWATER FOR IRRIGATIONAL PURPOSES-KONYA

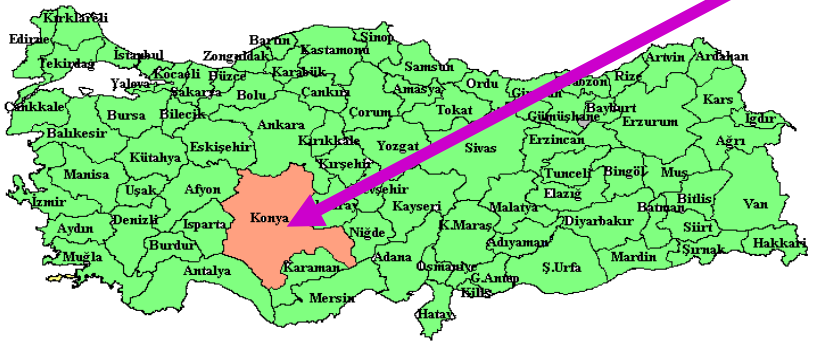
- Konya Municipality Wastewater Treatment Plant has been designed for carbon and partial N removal. It has been designed with a 1.000.000 population equivalent and 200.000 m^3/day of flowrate.

- After open flow channel disinfection process of treated wastewater, it is planned to be used for irrigation.

- 400 m^3/day of this treated amount is thought to be used in the median strips of the plant for irrigation.

- 1000 m^3/day of pilot study - Purple network for reused water to irrigate green areas

KONYA



REUSE OF DOMESTIC WASTEWATER FOR INDUSTRIAL PURPOSES-ISTANBUL-PASAKOY

- Q= 100,000 m^3/day
- Advanced Wastewater Treatment Plant (N ve P Removal)
- After final sedimentation tank, treated wastewater is first filtered by sand filters and then it goes through UV disinfection.
- UV disinfected effluent is used for industrial process water (Tannery industries located in Tuzla) and irrigation purposes.

INDUSTRIAL WASTEWATER TREATMENT AND REUSE

USE OF INDUSTRIAL WASTEWATERS

- Significant increase in water pollution due to industrial wastewaters

- Since the water supply prices are increasing, treated wastewater can be used as process water in the industry

- In the case of insufficient water quality, it is more economical to recover wastewater instead of treat the water to be supplied

- The objection of good water quality in the basin

As a result of these,

it becomes important to reuse industrial wastewaters, and membrane technologies are wide-spreadly used.

IZMIR TEKELI INDUSTRIAL ORGANIZED ZONE WASTEWATER TREATMENT PLANT

Membrane Bioreactor technology with a capacity of 8.000 m^3/day

Type : Submerged MBR filter
Capacity : 201,6 m^3/hr

BURSA INDUSTRIAL ORGANIZED ZONE PROCESS WATER and ADVANCED WASTEWATER TREATMENT PLANT

- Year :2007
- Capacity :50.000 m^3/day
- Water Quality: 1st class
- Units:
  - Coagulation
  - Primary filtration
  - Ultrafiltration
  - Reverse osmos

- Treated wastewater is used as process water in the Factories

BURSA

WATER AND WASTEWATER MONITORING ACTİVİTİES

WATER AND WASTEWATER MONITORING

- Domestic and Industrial Pollution Monitoring Programme
- Integrated Marine Pollution Monitoring
- “On-line Wastewater Monitoring”

have been implemented

Domestic and Industrial Pollution Monitoring Programme;

By this prpgramme it is aimed to;

- ❖ **Map heavily polluted areas in geographic information system (GIS)**
- ❖ **Establish infrastructure to determine discharge standards**
- ❖ **Supply data in order to take the necessary measures for the prevention of pollution**

In the river basins;

- **Ergene (13 stations),**
- **Küçük Menderes (4 stations) ,**
- **Gediz (16 stations) and**
- **Kuzey Ege (Bakırçay) (8 stations)**

✓ **seasonal monitoring is carried out in a total of 41 stations. As of 2013, two more river basins; Sakarya and Susurluk have been included in the monitoring programme.**

Integrated Marine Pollution Monitoring

Activities are going on in the scope of the Barcelona and Bucharest Conventions, EU Water Framework and Marine Strategy Framework Directives

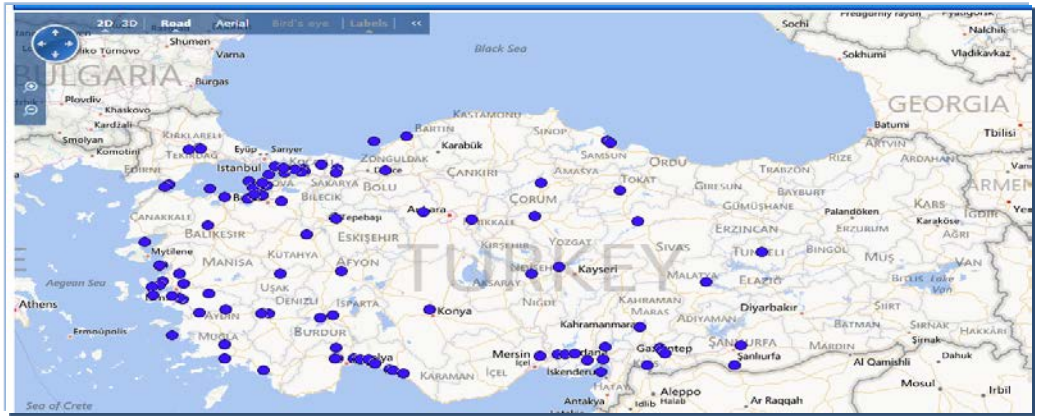
By this programme;

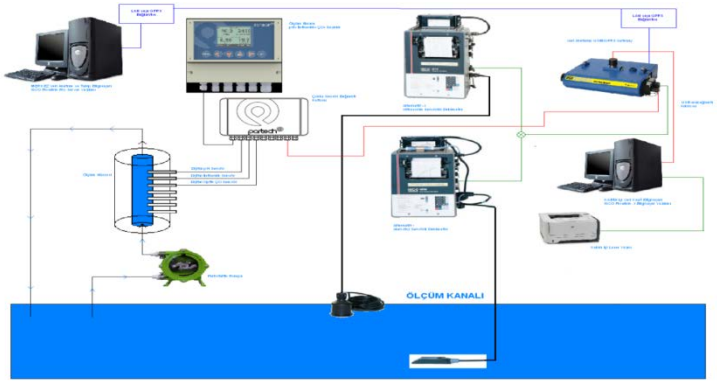
- ✓ **241 stations have been monitored in; coastal, transitional and marine water**

- ✓ **In sediment and biota physico-chemical, chemical and biological monitoring,**
- ✓ **and also microplastic monitoring in 9-stations have been performed**

On-line Waste Water Monitoring

- ✓ **Facilities with wastewater flow rate equal or higher than 10,000 m³/day have been followed by real time monitoring systems. The monitoring parameters are;**
  - ❖ **tempeture**
  - ❖ **pH**
  - ❖ **dissolved oxygen**
  - ❖ **electrical conductivity**
  - ❖ **flow rate**
- ✓ **At the end of 2013 88 facilities were integrated to the central programme of our Ministry. All over the country a total of 154 facilities will be integrated to the system.**





ENVIROMENTAL INSPECTION

Planned, unplanned, combined inspections and monitorings are being done.

- **Existence of EIA Decision and Permit/Licence, the compliance of the existing situation with the EIA Report are inspected on the issues of Air, Water, Soil, Waste, Chemicals, Marine, Noise under the scope of Environmental Law (Law No:2872) and By-Laws.**

- **24 personnel from General Directorate and,**
- **1065 personnel from Provincial Directorates**

are implementing the inspections.

ENVIRONMENTAL INSPECTION

The project on follow up of the sanctions implemented by Ministry
(E-Inspection)

- **E-inspection project which will allow to manage all environmental inspection process by online and web supported software is going on.**

THANK YOU
FOR
YOUR ATTENTION

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