TURKISH NATIONAL STUDY: COLLECT AND TREATMENT SUPPLY IN BURSA

Prof. Dr. Kahraman Ünlü

Middle East Technical University
Environmental Engineering Department
Ankara, Turkey
OUTLINE

- CITY of BURSA
- INSTITUTIONAL ASPECTS
  - Roles and responsibilities
- HISTORY of the DEVELOPMENT of MWM
- ROLE of PRIVATE SECTOR
- MUNICIPAL WASTE ARISING
- STRUCTURE of the SUPPLY of WASTE MANAGEMENT SERVICES
CITY of BURSA

Bursa is one of the major cities, which faced serious waste management problems due to rapid industrial and population growth.

It is one of the pioneering cities in Turkey in developing a comprehensive waste management system.
Currently, Bursa is one of the most industrialized and populated metropolitan cities in Turkey. It ranks fourth in the country in terms of population (2.5 % of the national population) and contribution to national economy (about 4% of the national GDP). Within its economic structure, textile-confection, construction, food and automotive industries constitute the main industrial sectors.

The province of Bursa is administratively divided into 17 counties, each having its own municipality. Among these county municipalities, seven of them operate under BMM.

The population of BMM increased from 1,070,336 in 1997 to 1,755,782 in 2007, which corresponds to about 64 % growth over the last 10 years.
Together with BMM, the major actors of waste management in Bursa are the seven county municipalities operating under BMM, Bursa Provincial Directorate of the MoEU and recovery/recycling industry and foundations as representatives of the private sector.

The roles and responsibilities of waste management are undertaken mainly by the DEPC through the division of Environmental Protection.

Institutional framework of solid waste management in BMM
INTITUTIONAL ASPECTS

Roles and responsibilities

The DEPC of BMM, is responsible to establish and implement the Solid Waste Management Plan within the boundaries of the metropolitan municipality.

- solid waste collection, sorting, recycle, reused and disposal
- establishment of appropriate waste management facilities
- coordination of the private sector for the implementation of management plans for special wastes
- fee and tax collection, and private sector services contracting

The county municipalities operating under BMM are only responsible to provide services regarding collection, transportation and treatment of household and medical wastes.

Private sector and their foundations or associations are involved in collection, recovery and recycling of packing and special wastes.
HISTORY of the DEVELOPMENT of MWM

- For management of the domestic solid waste services in Bursa, the main driver was the development of ‘Bursa Water and Sanitation Project’ in 1992.
- For the solid waste component of this project, a loan agreement of 12.5 million US Dollar was signed between Republic of Turkey and the World Bank.
- Solid waste part of the Project included the following major components:
  - rehabilitation of existing Demirtaş dumpsite,
  - construction of new sanitary landfill site at Hamitler,
  - purchasing the necessary equipment for the operation of the new sanitary landfill and sorting plant for recyclable waste, and
  - provision of consulting services for existing site rehabilitation, detailed design of the new landfill and leachate treatment plant
- BMM successfully completed major environmental investments under the scope of the Project in eight years.
HISTORY of the DEVELOPMENT of MWM

- The new sanitary landfill site covers 77 ha area with a capacity of 20 million m³ of solid waste. The site is expected to serve until 2025.

- The new site provided an integrated approach through sanitary landfills, sorting plant, packaging waste recovery facility, and allows disposal of demolition and medical wastes.

- BMM has been applying sanitary landfilling since August 1995 for the disposal of household wastes generated from residential areas and nonhazardous wastes generated by the industry.

- Later between 2003 and 2004, a leachate treatment facility was construction BMM sanitary landfill site and its operation started.

- Medical waste sterilization facility was constructed within the BMM sanitary landfill site and started operation in July 2008.

- The facility has a treatment capacity of 900 kg/hour, serving all the heath facilities within the Province of Bursa. Sterilized medical wastes are disposed of at the BMM sanitary landfill.
ROLE of PRIVATE SECTOR

- The private sector is involved in door-to-door collection of municipal wastes, collection and separation of the packing wastes, as well as collection, recycle and disposal of special wastes.
- There is only one sanitary landfill operated by a private firm through a contract made with BMM and no associated transfer stations or treatment facilities.
- There is no privately or publicly owned/operated uncontrolled landfill site in BMM.
# ROLE of PRIVATE SECTOR

Licensed waste collection and recycle facilities within the boundaries of BMM

<table>
<thead>
<tr>
<th>Waste Type</th>
<th>Number of Licensed Waste Collection Firms</th>
<th>Number of Trucks used for Waste Collection</th>
<th>Number of Licensed Recycle Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packaging Waste</td>
<td>10&lt;sup&gt;a&lt;/sup&gt;</td>
<td>189&lt;sup&gt;b&lt;/sup&gt;</td>
<td>5</td>
</tr>
<tr>
<td>Waste Vegetable Oil</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Used Batteries</td>
<td>-</td>
<td>1</td>
<td>No recycle</td>
</tr>
<tr>
<td>Used Accumulators</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Waste Mineral Oils</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>End-of-Life Tires</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Medical Waste</td>
<td>5</td>
<td>7</td>
<td>1&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Hazardous Waste</td>
<td>14</td>
<td>27</td>
<td>1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>32</td>
<td>227</td>
<td>8</td>
</tr>
</tbody>
</table>

<sup>a</sup>Packaging waste collection and separation facility;  
<sup>b</sup>Municipal waste;  
<sup>c</sup>Medical waste sterilization facility
MUNICIPAL WASTE ARISING

The total collected amounts of wastes are categorized as

- **household waste** → about 95 percent of the total municipal wastes
- **institutional-commercial waste** → about 5 percent
- **medical waste** → less than 1 percent

Total annual amounts of collected municipal wastes and its components
Recyclable packing wastes are separately collected from houses, institutions, commercial and industrial work places by the licensed private firms.

The separate collection of packaging waste was started in 1995 in selected pilot areas (with a population equal to 10% of BMM population), although the regulation became legally active in June 2004 upon activation of the regulation.

As of 2008, services for the collection of packaging wastes has been expanded to 36 % of the population within the boundaries of BMM with an annual total amount of packaging waste collected reaching about 16 thousand tons.
MUNICIPAL WASTE ARISING

The potential (target) and actual recovery rates of packaging waste in BMM over the years.

<table>
<thead>
<tr>
<th>Years</th>
<th>Collected Waste (tons)</th>
<th>Potentially Recoverable (tons)</th>
<th>Actually Recovered (tons)</th>
<th>Actual Recovery (%)</th>
<th>Target Recovery (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>288000</td>
<td>36000</td>
<td>354</td>
<td>1.0</td>
<td>-</td>
</tr>
<tr>
<td>1998</td>
<td>321000</td>
<td>40125</td>
<td>456</td>
<td>1.1</td>
<td>-</td>
</tr>
<tr>
<td>1999</td>
<td>348000</td>
<td>43500</td>
<td>604</td>
<td>1.4</td>
<td>-</td>
</tr>
<tr>
<td>2000</td>
<td>376000</td>
<td>47000</td>
<td>854</td>
<td>1.8</td>
<td>-</td>
</tr>
<tr>
<td>2001</td>
<td>364000</td>
<td>45500</td>
<td>1361</td>
<td>3.0</td>
<td>-</td>
</tr>
<tr>
<td>2002</td>
<td>389000</td>
<td>48625</td>
<td>1594</td>
<td>3.3</td>
<td>-</td>
</tr>
<tr>
<td>2003</td>
<td>413000</td>
<td>51625</td>
<td>2201</td>
<td>4.3</td>
<td>-</td>
</tr>
<tr>
<td>2004</td>
<td>475000</td>
<td>59375</td>
<td>3208</td>
<td>5.4</td>
<td>-</td>
</tr>
<tr>
<td>2005</td>
<td>522000</td>
<td>65250</td>
<td>3571</td>
<td>5.5</td>
<td>29</td>
</tr>
<tr>
<td>2006</td>
<td>557000</td>
<td>69625</td>
<td>6286</td>
<td>9.0</td>
<td>33</td>
</tr>
<tr>
<td>2007</td>
<td>673000</td>
<td>84125</td>
<td>9225</td>
<td>11.0</td>
<td>35</td>
</tr>
<tr>
<td>2008</td>
<td>598000</td>
<td>74750</td>
<td>16039</td>
<td>21.5</td>
<td>35</td>
</tr>
<tr>
<td>2009</td>
<td>611000</td>
<td>76375</td>
<td>28546</td>
<td>37.4</td>
<td>36</td>
</tr>
</tbody>
</table>

Actual annual recovery rates converge to the regulatory target recovery rates gradually over the years; and finally satisfy 36% recovery rate set for 2009.
Summary of available data on household solid waste composition in Bursa

- Large fraction of household waste is organic in nature
- Slight decrease in the fraction of organics (from 53% to 51%) and recyclables (from 36% to 30%) content
- Increase in the fraction of others (from 11% to 19%); attributed mainly to the contribution of construction and demolition debris, nonhazardous waste, and waste household equipment in addition to slug and ash.
- The rate of municipal waste generation is ranging between 0.8 and 1.1 kg/capita-day with an average of 1.0 kg/capita-day.
MUNICIPAL WASTE ARISING

Average composition of municipal waste in Bursa as of 2009

- about 40 percent of the municipal waste is composed of readily degradable food wastes.
- despite separate collection of packaging wastes paper/cardboard, plastic, glass and metals makeup about 30 percent of the municipal waste.
QUESTIONS??

THANKS!!