Saudi Arabia study on the regulatory framework of Waste Management, Industrial Waste

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Agenda

- Background
- Industrial waste current situation
- Enablers for sector improvement
Four questions that were asked during the study:

1. What are the main gaps in the sector and how can we compare them to global waste management regulations?
2. How can we develop a legal and regulatory framework that supports the sector and is aligned with best practices?
3. How can we activate the investment track in the sector?
4. What is the expected environmental, social and economical impact?

Royal decree to study the sector:

The Royal decree to study the sector was issued on 31st December 1994. The decree states that the purpose of the study is to identify the main gaps in the sector and to compare them with global waste management regulations. Additionally, the decree aims to assess the environmental, social and economical impact of the sector, and to develop a legal and regulatory framework that supports the sector and is aligned with best practices.
A current situational analysis of the whole waste sector

SWOT analysis

**Strengths**
- The existence of an evolved waste management systems at some entities/regions (e.g. RCJY)
- The commitment of government entities to improving the current state of waste management in the Kingdom.
- The existence of treatment facilities for electronic and tire waste with large capacities

**Weaknesses**
- Complicated licensing procedures (multiple issuing authorities) with responsibility overlaps between the government entities
- Disposal of most of the waste in landfills (low percentage of landfill diversion) and no application of global standards
- Lack of environmental awareness among citizens and producers of waste and the spread of illegal dumping
- Lack of accurate and reliable data of the waste market and the quantities of waste produced

**Opportunities**
- Diversifying sources of revenue through new sources of income such as recycling
- Growing interest of some international companies in the waste management field to invest in the Kingdom
- Removing the financial burden from the government

**Threats**
- Citizens have seen a rise in the prices of several "commodities" (water, fuel and electricity) and may not be willing to accept additional budgetary burdens
- Low energy prices may limit the attractiveness of investing in "energy recovery" for major waste-to-energy projects
- Lack of improving waste management in the Kingdom may lead to long-term environmental impacts

Sources: Interviews with relevant entities
Industrial waste current situation

Industrial waste is divided into two different types

- Non-hazardous industrial waste:
  - Wastes from industrial activity from factories, crushers and mining operations that do not pose a threat to public health or the environment, these include:
    - Carton
    - Plastics
    - Metals
    - Glass
    - Organic material

- Hazardous Industrial Waste:
  - Residues from industrial activity that pose a threat to public health or the environment, these include:
    - High flammable materials
    - Corrosive materials
    - Active Materials
    - Toxic materials
## Production of non-hazardous industrial waste

<table>
<thead>
<tr>
<th>Areas</th>
<th>The fate of waste</th>
</tr>
</thead>
<tbody>
<tr>
<td>MODON</td>
<td>MODON provides non-hazardous waste collection services from factories through its own contractor. This cost is considered as part of the lease agreement. These wastes are disposed of as municipal solid waste in municipal landfills. There is no data on the quantities of non-hazardous industrial waste produced as it is calculated in the total municipal solid waste.</td>
</tr>
<tr>
<td>Royal Commission for Jubail and Yanbu</td>
<td>RCJY encourages the recycling of industrial waste by stimulating the private sector investment for the establishment of recycling plants or reuse of these wastes. The remaining industrial waste is disposed of in RCJY landfills.</td>
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<td>Other Areas</td>
<td>These wastes are disposed of as municipal solid waste in municipal landfills. There is no data on the quantities of non-hazardous industrial waste produced as it is calculated in the total municipal solid waste.</td>
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Sources: Interviews with relevant entities
Hazardous Industrial Waste Management (2016)

1. Production
   - Production

2. Collection and transport
   - Separation at the source
   - Collection by a licensed contractor in specialized trucks

3. Treatment
   - Incineration or thermal treatment
   - Physical/chemical/biological treatment
   - Material recovery

4. Final Disposal
   - Illegal Dumping
   - Burial
   - Landfill

Source: Interview and report from the General Authority of Meteorology and Environmental Protection
Industrial waste current situation

Industrial waste is divided into two different types:

1. **Production of hazardous industrial waste**
   - Hazardous Waste Production in Saudi Arabia (tonnes)
   - Examples of producers:
     - Factories
     - Power plants for electricity production
     - Car Garages
     - Dry cleaning
     - Printers
   - Graph showing percentage change from 2015 to 2016.

2. **Details on hazardous industrial waste**
   - Type of risk:
     - Highly flammable materials
     - Interactive Materials
     - Toxic materials
     - Corrosive materials
   - Activities on site:
     - Separation at the site
     - Burial at the source
   - Import and export:
     - Export allowed
     - Import not allowed
   - The separation takes place within the premises of the establishments according to the appropriate specifications and the type of danger.

3. **Current efforts**
   - General Authority of Meteorology and Environmental Protection initiatives:
     1. Studying the current situation of industrial and hazardous waste.
     2. Establishing a center for industrial and hazardous waste management.
     3. Building expertise for the Center's employees.
     4. Procedures for dealing with industrial and hazardous wastes and working on the guidelines.
     5. Applying of treaties and conventions on industrial and hazardous wastes.

Source: Interview and report from the General Authority of Meteorology and Environmental Protection
## Regulatory Authorities for Hazardous Industrial Wastes

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<td>- The General Authority for Meteorology and Environmental Protection is the environmental authority in the Kingdom that issues many environmental protection laws and regulations.</td>
<td>- The Authority operates four industrial cities in the Kingdom: Jubail, Yanbu, Jazan and Ras Al Khair. It regulates the hazardous industrial waste sector within these cities independently through the development of regulations, standards and inspections.</td>
</tr>
<tr>
<td>- The environmental regulations, created in October 2001, serves as the general guidelines for all public and private institutions in Saudi Arabia</td>
<td></td>
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<tr>
<td>- MODON was established in 2001, currently supervising 35 industrial cities that are either in operation or under development.</td>
<td></td>
</tr>
<tr>
<td>- The authority applies the environmental laws and regulations set by GAMEP, which is implemented through leases, penalties and inspection</td>
<td>- Although Aramco is a private company, it applies its own internal standards and special requirements for hazardous waste management that are applied because of the company’s large size and its control over a large geographical area.</td>
</tr>
</tbody>
</table>

**Overview of hazardous waste regulators in Saudi Arabia**

- Saudi Industrial Property Authority
- Saudi Aramco

Source: Interviews with relevant entities
Industrial waste current situation

Industrial waste is divided into two different types

1. Collection of hazardous waste
   - The responsibility for the collection of hazardous industrial waste is the responsibility of private companies licensed by GAMEP
   - Qualified companies:
     - GEMS
     - EDCO
     - SEPCO
     - Awtad
     - Environmental Horizons

2. Details of collection
   - Collection Price Details:
     - It is the responsibility of the waste producer to contract with and manage the hazardous waste management company
     - It is often the same companies that collect and handle hazardous waste, so the prices are combined
     - Prices vary greatly depending on transport distances and types of treatment
   - Technologies Used:
     - Companies sort waste at the source
     - Tracking technologies are not used in all areas and the decision to use them is taken by the contractor
     - GAMEP imposes on hazardous waste transporters the use of the transport waste manifest

3. Challenges of collection
   - Mixing the hazardous waste with municipal waste leading to improper disposal
   - Lack of geographical coverage of treatment facilities leads to increased transportation distances and high costs of hazardous waste management (e.g. Riyadh city, which lacks a special treatment and burial facility currently transports its waste to the Eastern or Western Region)
   - Illegal dumping in vacant lands due to lack of awareness, regulatory control and high cost of legal disposal, especially in areas outside industrial cities

Source: Interview with GAMEP
Industrial waste is divided into two different types

1. Treatment of hazardous waste
   - Some companies in the field:
     - GEMS
     - EDCO
     - SEPCO
     - Awtad
     - Environmental Horizons
   - Key competitive factors for market players include licensing, registration with authorities and relevant entities, technical solutions, and service reliability.

2. Details on chemical/physical/biologic treatment
   - Description:
     - Hazardous waste treatment techniques aim at changing the physical and chemical nature or organic contamination of wastes in order to reduce their size and/or remove their hazardous properties (to make them non-hazardous). Types of treatment:
       - **Chemical treatment**: Its goal is to remove hazardous chemical properties such as acidity and alkalinity. The techniques used include ion exchange systems or oxidation and reduction.
       - **Heat treatment**: is the techniques that use heat or fire to remove hazardous waste and may be used on most types of waste. The technologies used include all types of incinerators.
       - **Bioremediation**: is the techniques that use bacteria as a hazardous waste disposal agent and may be used on organic waste (e.g., petrochemical waste).
       - **Physical therapy**: is the techniques that aim to concentrate, harden, or reduce the volume of waste. The techniques used include evaporation, sedimentation, flotation, and filtration. Another process is hardening, which is achieved by packaging waste in cement, asphalt, or plastic.
       - A common technique in the Kingdom is evaporation ponds that reduce water content in hazardous wastes, which greatly reduces their weight and size and allows for easy transport and reduces the cost of final disposal.

Source: Interviews with relevant entities
Industrial waste is divided into two different types

1. Dumping of hazardous industrial wastes

Hazardous industrial waste is buried in the Class 1 landfills:

- Class I landfills are dedicated to the disposal of hazardous solid waste
- It consists of a double liner and includes:
  - Secondary liner system and primary liner system
  - Leachate collection and recovery system
  - Leachate detection system

2. Challenges of the burial process

- These landfills are often provided by the waste treatment company and therefore the cost of the landfills is included in the price paid for transportation and treatment
- Some hazardous waste is dumped at municipal waste landfills (Class 2 or 3)
- Private facilities are permitted to be built and managed by the producer. For example CRISTAL, which has established its own landfill in Yanbu for the disposal of titanium oxide waste in order to avoid the high cost of disposal of such waste through a contractor.

Source: Interviews with relevant entities
A current situational analysis of all the waste sector

**SWOT analysis of industrial waste sector**

**Threats**
- The possibility of negative environmental and health effects due to random illegal dumpsites.
- Financial burden on the industrial sector due to the costs of disposal of hazardous waste.

**Weaknesses**
- Widespread illegal dumpsites.
- Lack of control over industrial factories and shops outside the industrial cities controlled by MODON.
- Lack of geographical coverage of treatment facilities, leading to a sharp rise in prices.

**Strengths**
- An example within the Kingdom of best practices (Royal Commission for Jubail and Yanbu).
- High control of waste produced within the private industrial cities.

**Opportunities**
- The potential for stimulating economic growth, private sector participation and employment in this sector.
- The implementation of the proven successes of RCJY at the national level.
- The presence of human capacities within the Kingdom due to the initiatives of concerned entities.

**Threats**
- Financial burden on the industrial sector due to the costs of disposal of hazardous waste.

Source MEP consultant analysis
A current situational analysis of all the waste sector

The overall assessment of the hazardous waste management sector is average, given the lack of adequate control and enforcement.

<table>
<thead>
<tr>
<th>Current status of waste production</th>
<th>Current status of collection and transfer of waste</th>
<th>Current status of waste treatment</th>
<th>Status of final disposal</th>
<th>Overall assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
</tr>
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</table>

Source: MEP consultant analysis
## Appropriate enablers for its implementation

<table>
<thead>
<tr>
<th>Number</th>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Finance</td>
<td>The mechanism of financing the waste sector, which may be borne by the producer, polluter or government</td>
</tr>
<tr>
<td>2</td>
<td>Regulations</td>
<td>Regulatory tools for sector management that may be requirements for licenses or controls on the techniques used</td>
</tr>
<tr>
<td>3</td>
<td>Monitoring</td>
<td>Tools and techniques to enable monitoring, which may be a sanctions system or a truck tracking system or inspection</td>
</tr>
<tr>
<td>4</td>
<td>Data management system</td>
<td>It could be, for example, a central database and a forecasting and planning system</td>
</tr>
<tr>
<td>5</td>
<td>Define goals and Responsibilities</td>
<td>Identifying the responsibility of the relevant government entities and establish performance targets and indicators</td>
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<tr>
<td>6</td>
<td>Communication and awareness</td>
<td>Communication and awareness tools, which may be advertising campaigns and educational programs</td>
</tr>
<tr>
<td>7</td>
<td>Import and Export</td>
<td>Review import and export requirements (allow or deny)</td>
</tr>
<tr>
<td>8</td>
<td>Energy Recovery</td>
<td>Waste to Energy</td>
</tr>
<tr>
<td>9</td>
<td>Infrastructure</td>
<td>The infrastructure needed to implement the best direction may be transit stations or specialized containers ... Etc.</td>
</tr>
</tbody>
</table>

Source: MEP consultant analysis
The study recommends the establishment of a national waste management database that will enable a high degree of accuracy in the measurement of waste information.

- **Attracting investment opportunities**: Including the development of a new waste management infrastructure.
- **Support in the planning**: For supply and demand and the necessary infrastructure and provide the sector with this information.
- **Increase public awareness**: Of waste management issues and support waste reduction initiatives.
- **Assessing the effectiveness of policies**: And to assist the Kingdom in making decisions by providing accurate data and indicators.
- **Measuring the performance**: Of waste producers and assisting them in waste management through comparison with others.
- **Monitor progress**: Towards achieving sector objectives that are in line with the Kingdom's vision and international conventions.

Global best practices have been considered to create the main objectives.
The fourth enabler: Data management system

The database will contain accurate industry information that will help attract investment

For example, the database will collect and analyze the following data:
- Quantity of waste produced and its components
- Number and capacity of current and projected transport stations
- The current and future capacity of each part of the value chain (collection, transport, treatment, and final disposal)
- Quantity of treated waste by type of treatment
- Quantities and types of output from treatment processes (e.g. energy, recycled materials, compost)
- Final disposal sites in quantities
- Data on the drivers of waste (e.g. population)

The National Waste Management Database aims to provide accurate, up-to-date and comprehensive information on the sector in the Kingdom to provide reliable information to all stakeholders in the sector.

For example, it supports investors by:
- Understanding the current and expected market size
- Defining the work area of the value chain
- Determine the capacity of establishments that are suitable for investment
- Identify the most suitable cities for each type of investment
- Identify the most appropriate techniques

Source MEP consultant analysis
The fourth enabler: Data management system

The rate of diversion from landfills is the most appropriate criterion for environmental impact assessment

Explanation of environmental impact criterion:
- Burial is considered at the bottom of the waste management hierarchy
- In order to minimize the negative impact on the environment, the amount of landfilling should be reduced.
- Therefore, the percentage of diversion from landfills was adopted as the basic criterion for the environmental impact assessment

Source: EU waste regulations
Thank you

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