

# DEVELOPING INTEGRATED AND GREEN SOLUTIONS FOR MUNICIPAL SOLID WASTE MANAGEMENT IN KAZAKHSTAN

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# The World Bank and Solid Waste Management Program in Kazakhstan



Waste management is an area highlighted in the Partnership Framework Agreement (PFA) between the Government of Kazakhstan and the World Bank.



Through consultation and agreement between the Ministry of Energy and prospective local governments, three cities – Atyrau, Kostanay and Kokshetau – have been selected for developing innovative financing and technical solutions in order to achieve sustainable SWM that would benefit society, and the economy and environment in the long term.

# KAZAKHSTAN: CURRENT SITUATION OF SOLID WASTE MANAGEMENT (SWM)

Kazakhstan's major issues around MSW management include:

- Increasing generation and accumulation of MSW
- Inefficient waste collection and transportation
- Inadequate environmental management of landfill (open dump sites)
- Lack of waste separation
- Low recycling rate of municipal wastes

According to the Ministry of Energy (MoE), Kazakhstan has **accumulated 103.4 million tons of MSW**, with an **annual accumulated increase of around 5-6 million tons**, and a **future projection of 8 million tons annually by 2025**.

Waste generation in **urban areas** is approximately **330 kg/inhabitant per year**, and with economic growth, it is likely to double by 2025.

As MSW services do not cover the entire population (just 70% according to the Green Economy Report), **actual waste generation is higher** than the reported amounts.

# KAZAKHSTAN: CURRENT SITUATION

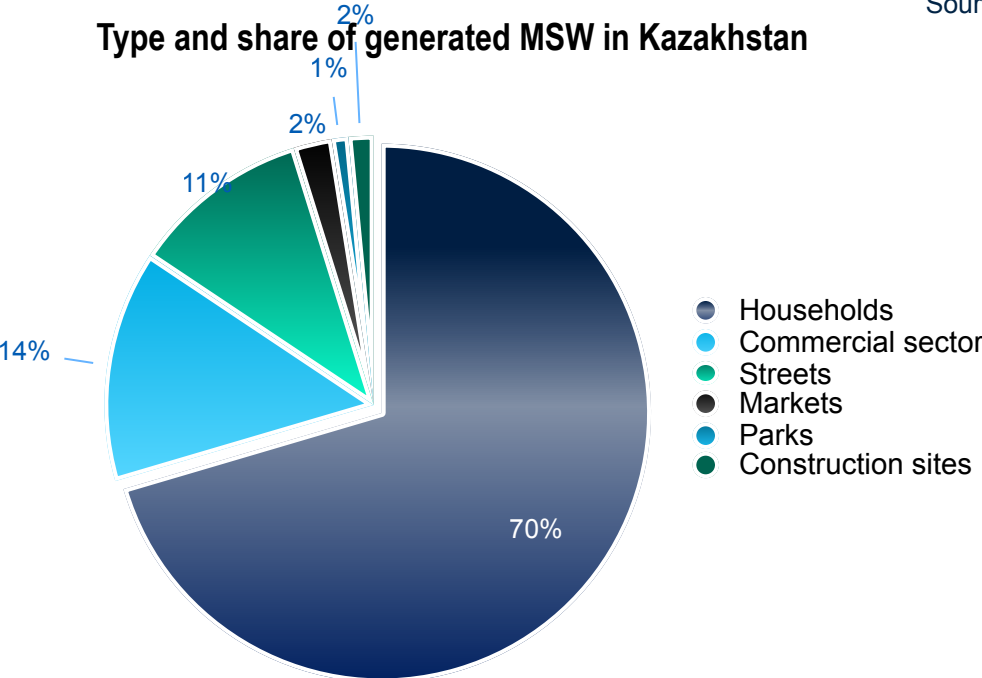
Currently, **about 97% of MSW is being landfilled** without proper processing or recycling.

**Most landfills do not meet sanitation requirements**, and need remediation.

Waste Component Ratio (%)					
Paper and cardboard	Plastics	Metal	Glass	Organics	Others
27-30%	8-13%	3-4%	5-7%	30-34%	8-14%

Source: Feasibility Study Reports (2011-12) for nine cities of Kazakhstan

Type and share of generated MSW in Kazakhstan



The volume of **recycled materials: less than 5%** of the total MSW

Each year, about **500,000 tons of paper and cardboard, 300,000 tons of glass, 200,000 tons of metal and 500,000 tons of plastic** are disposed of as trash.



# KEY FINDINGS: TECHNICAL ANALYSIS

## WASTE COLLECTION

- **Trash containers and bins:** generally, not durable and not compatible with the loading equipment on trash trucks
- Intensive labor required when emptying the trash bins into trucks
- **Waste collection:** mixed waste with low recycling reuse and values
- **No separation at source** except some pilot initiatives

## WASTE TRANSPORTATION SERVICES

- **Plain wagon trucks, side-loading trucks or compactor trucks** with rear loading system
- Practically **no compression of waste**, requiring more trips to the landfill
- Some waste transportation vehicles are **old and not equipped with waste container loading equipment**





# KEY FINDINGS: TECHNICAL ANALYSIS

## LANDFILLS

- **Do not meet sanitation requirements** and, mostly, operate as **open dumping sites**
- **No liner system, no leachate and LFG treatment**
- **Illegal** dumping sites are not uncommon
- Landfills **monitoring and supervision system** lacks proper implementation
- **Consequential problems:** odor, dust, flying waste, and potential hazard of fire accidents originating in the landfill

## MECHANICAL BIOLOGICAL TREATMENT FACILITIES

- MBT facilities exist in a number of cities – e.g. Astana, Almaty and Shymkent (facilities in Almaty and Shymkent were not in operation), but none have an organic waste treatment component.
- MBT would **not be financially viable** as it would yield **low quality outputs out of mixed trash** and create a **high financial burden on investors** that would eventually be passed on to local governments and residents.





# KEY FINDINGS: COST AND FINANCING OF MSW

## TARIFFS

- **Too low and don't cover the full costs of SWM**
- Households pay just **0.33-0.44%** of their average disposable income, while **internationally accepted norm is about 1-1.5%**
- The authorities are **reluctant** to increase the tariffs

## FINANCING

- Closing of dumps and non-sanitary landfills will involve **high costs**.
- Tariffs cannot cover the costs and **the authorities have to finance**.
- **Landfilling is the cheapest cost option** for final disposal and the dominant practice.
- Unless **the gate fees at landfills are substantially increased**, it will be difficult to implement alternative treatment options (except for separation at source)







# KEY FINDINGS: COST AND FINANCING OF MSW

## MUNICIPAL RESPONSIBILITY AND PRIVATE SECTOR INVOLVEMENT

- MSW collection and landfilling in Kazakhstan are mainly handled by **municipal companies** (100% owned by Municipality)
- **Private sector** is represented by **more than 130 companies** operating, primarily, in **waste sorting and recycling**.
- Being **not a Municipal organization**, it will result in **higher costs**, as VAT and profit margin should be included in the tariff calculation of a company.
- There is a **governmental policy to privatize** the municipal waste collection companies to decrease the financial burden on the state budget.

## WASTE TARIFFS COLLECTION

- **Tariffs are collected** (through an intermediary organization) **by the waste collection company**.
- This company is responsible for **contracting, billing and tariff collection**.







# RECOMMENDATIONS

## WASTE COLLECTION & TRANSPORTATION

- **Upgrading waste collection containers, trash bins, and trucks.**
- Containers and old truck fleets should be upgraded or replaced to improve the efficiency of waste collection efforts and save on labor costs.
- The design and material of container should be considered together with the loading equipment of truck for automatic lifting of containers, saving labor forces and increasing lifespan of containers.
- **Adjusting waste collection periods to save transportation costs.**
- The frequency of waste collection should be reviewed to reduce collection costs and labor force

## PILOTING AND PROMOTING WASTE SEPARATION & RECYCLING

- A **recycling facility** will be needed to reduce the volume of transported waste and transportation costs and enhancing efficiency.
- A **waste sorting facility** is needed to separate recyclable wastes.
- **Waste separation** can be introduced more easily in multi-story building areas.
- Market analysis for recyclable waste needed to determine the range of recyclable categories.
- Should be accompanied by strong campaign to enhance **the required public behavioral changes.**



# RECOMMENDATIONS

## CONSTRUCTING SANITARY LANDFILLS

- Essential to prevent environmental pollution from waste and leachate.
- Should be equipped with a liner and leachate collection & treatment system.
- Considering Kazakhstan's climate and low rainfall, leachate circulation system could be an alternative leachate treatment option, reducing treatment plant construction costs and O&M.
- Life Cycle Cost (LCC) assessment or other type of assessment is critical for selecting a leachate treatment system.

## CLOSING AND REHABILITATING OLD DUMPSITES

- Closure of the current operating landfills is strongly recommended to secure the safety of airplane operations and prevent an accident due to the concentration of birds.
- This should occur in parallel with the new sanitary landfills construction.
- Drainage capacity and a final covering layer of impervious earth or HDPE sheet are needed to prevent the inflow of rainwater from outside and atop the landfill.
- Consider how to finance the rehabilitation costs incurred at closed landfills.



# RECOMMENDATIONS

## MECHANICAL SEPARATION LINE AND BIOLOGICAL TREATMENT OF MIXED WASTE

- High cost and low efficiency
- Carefully investigating the technical and financial justification.
- MBT would be expensive compared to landfills, and cannot yield outputs suitable for sustained operations.
- Governments should do in-depth financial analysis for the MBT option and consider waste source separation and recycling, which are the cornerstone of modern SWM for reducing waste disposal.

## STRENGTHENING ENVIRONMENTAL INSPECTION FOR LANDFILLS

- A landfill inspection by a public or independent expert institute should be introduced.
- More detailed criteria for sanitary landfills are essential to provide guidelines for local municipalities.



# RECOMMENDATIONS

WASTE COLLECTION FROM HOUSEHOLDS IS PROPOSED TO BE A MUNICIPAL RESPONSIBILITY

- Municipal organization directly under the Department of Public Services operating as an autonomous organization would be legally more attractive.
- The Akimat will collect the tariff from the households and the tariff will be transferred to the general budget and the Akimat will pay the municipal waste collection company or organization for their operational services on basis of an agreement.
- Any shortcoming in cost recovery has to be paid from the general Akimat budget.
- Tariff collection from the Commercial, Institutional and Industrial (CII) sector will be the responsibility of the waste collection organization on basis of individual contracts.
- Local legislation should be developed and introduced to define the responsibilities and tasks of the stakeholders.

PRIVATE SECTOR ROLE

- It is recommended to investigate any role of private sector in waste collection from the CII sector and its effect on the tariff.
- Given environmental impact risks and the landfills. required aftercare after closure it is recommended the public sector to own the municipal



## RECOMMENDATIONS

### WASTE TARIFFS

- Tariffs have to be increased gradually to cover at least the operational costs, eventually up to full cost recovery.
- It is recommended
  - (i) that tariffs for households will be a tax and thus free of VAT and profit margin;
  - (ii) that tariffs for CII sector will be a Service Charge and thus including VAT and a profit margin.
- A preliminary cost estimate was prepared for the improvement of basic collection and disposal services including the purchase of compactor trucks with new containers and the construction of a new landfill. The total investment per city was estimated at approximately EUR 16 million or KZT 6,080 million.



## RECOMMENDATIONS

### FINANCING

- **Financing of the annual operating and amortization costs cannot be covered by the current tariffs**
- **A gradual increase of tariffs in the next 5 years would be an option.**
- **In the worst case scenario, the Municipality has to finance the gap between revenues and costs.**
- **The gap would be the amortization costs as present tariffs would be sufficient to cover the operational costs. The annual gap is estimated at approximately EUR 3 million or KZT 1,140 million.**
- **The capability of the Municipality to finance these costs will depend on its annual budget and its debt position.**



# RECOMMENDATIONS

## PHASED IMPLEMENTATION

- **INITIAL FOCUS**
- Upgrading waste collection and transportation
- Piloting waste source separation for better service efficiency supported by the introduction of EPR schemes to co-finance the system
- Improving cost-effective and environmentally sound waste disposal facilities, especially sanitary landfill as it remains a cheap and affordable solution in Kazakhstan for the next 5-10 years.
- **LONG-TERM**
- Further investment in sorting and recycling facilities will be necessary once Kazakh cities are able to successfully implement waste separation at the source generating sufficient amount of recyclable materials.
- **PUBLIC PARTICIPATION**
- Waste management infrastructure interventions must be complemented by behavioral changes from the general public.



To minimize risks of failure and to create a sustainable system



To meet the affordability-to-pay by the waste generators especially by the households





**THANK YOU  
FOR YOUR ATTENTION!**

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