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REGULATION OF SOLID WASTE DISPOSAL SERVICE IN LATVIA

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Abstract

In order to implement and manage centralized waste management system in Latvia during the first waste management planning period 2006-2012, all territory was divided into ten waste management regions (WMR), and each one has its own regional sanitary landfill. In the common waste management system only solid waste disposal service is a public service, therefore all landfills' operators are public service providers.

The Public Utilities Commission (Regulator) is institutionally and functionally independent, autonomous body governed by public law. It carries out regulation of public services in the five sectors, including waste management in accordance with the law On Regulators of Public Utilities and special legal acts of the regulated sectors. The public service provider for the provision of solid waste disposal service at a landfill for solid waste shall calculate tariff in accordance with the Methodology for the Calculation of Solid Waste Disposal Service Tariff.

In order to evaluate the comparability of the accumulated and technical indicators within the merchant supervision, the Regulator elaborated benchmarking approach for comparing the costs, technical and social parameters included in the waste disposal service tariff. The benchmarking for waste disposal service consists of four steps: General characteristics of the regulated service and WMR; Direct production costs and parameters; Other operating costs and parameters and Monitoring and supervision.

In this study only the first step is analyzed, which includes the characteristics of the infrastructure used by the merchant, information on the essential differences in the provision of the regulated service among the merchants, which make an influence of the tariff formation costs and revenue from recovery and recycling materials.

Keywords: solid waste disposal service, regulation, benchmarking, government, authority

1. INTRODUCTION

Latvia is a country in the Baltic region of Northern Europe. The country has 1,96 million inhabitants and a territory of 64,6 thousand km^2. The government system is quite decentralized in Latvia, there are 119 local governments (9 cities and 110 municipalities).

During the first waste management planning period all the territory of Latvia was divided into ten WMR (see Figure 1) according to the state waste management plan 2006-2012. These WMR are determined to organize efficient waste management service provision all around the country. The new waste management system allows to close more than five hundred

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dump sites and to build one sanitary landfill in each WMR, except Zemgale WMR where are two small landfills for solid waste disposal.

The landfill operators are public service providers for solid waste disposal service. In most cases the shareholders of these enterprises are municipalities of the respective WMR. In order to become a public service provider, the enterprise must be authorized and registered the Regulator [1].

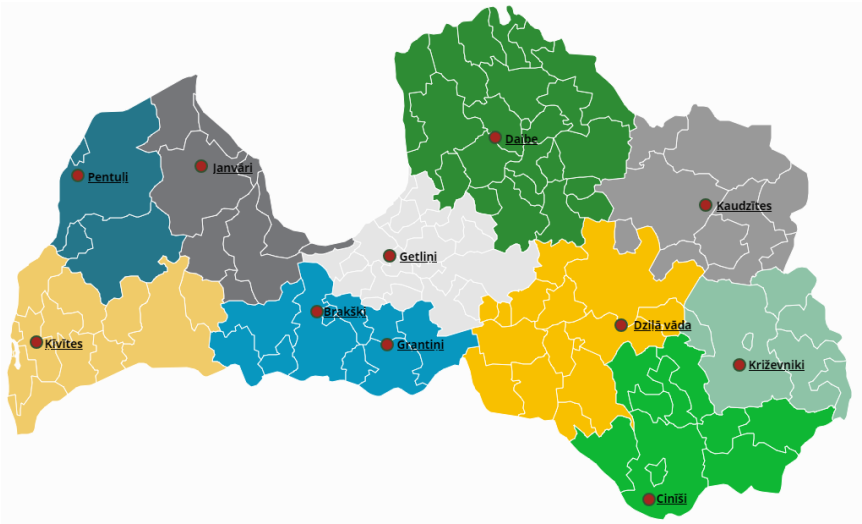

Figure 1. Waste management regions and landfills for solid waste disposal

In the municipal waste management sector, the Regulator regulates only the solid waste disposal service at landfill. Other activities related to the organization and supervision of municipal solid waste management (MSW) is the responsibility of local municipality. Therefore, the payment for MSW management costs for waste producer or waste holder consists of two components: MSW collecting costs, including separate waste collecting costs (approved by local municipality), and a tariff for the provision of solid waste disposal service at a landfill for solid waste (approved by the Regulator). The third component is Natural resource tax (NRT), which is applied since 1st January of 2018 as the costs of tariff. It should be noted that in the tariff only NRT for disposed amount of waste is included, although the polluter shall pay a full charge of NRT for accepted amount of waste at the landfill.

The Regulator performs its functions in accordance with the law On Regulators of Public Utilities [2]. The authority shall independently perform the functions delegated to it by law and, within the scope of its competence, shall take decisions independently and issue administrative acts binding upon specific providers and users of public utilities.

The law On Regulators of Public Utilities specifies the model of financing of the Regulator's operations which is independent from the state budget. The Regulator's operations are financed by revenues from state fees for public service regulation. These fees are paid by all public service providers from all regulated sectors [3].

2. METHODOLOGY

Each landfill operator which is a public service provider of solid waste disposal service at a landfill for solid waste, shall calculate tariff in accordance with the Methodology for the Calculation of Solid Waste Disposal Service Tariff (Methodology) [4]. Also, the merchant shall calculate the draft tariff in accordance with the rates of the natural resources tax for the disposal

of solid waste determined by the Natural Resources Tax Law [5]. The process of the draft tariff evaluation, approval and monitoring is shown in Figure 2.

The draft tariff submitting process. An initiator for the new draft tariff submitting can be the public service provider or it can be re-calculated on the request of the Regulator.

The evaluation and approval process. The draft tariff evaluation period is 90 days. During the evaluation process, the Regulator organizes public hearing meetings in the respective WMR, where the new tariff will be applicable. The draft tariff evaluation time can be stopped in case the Regulator has requested supplementary information from the public service provider, and the time is renewed when the public service provider will submit the supplementary information and specify the draft tariff.

The Regulator's Board approves the new tariff within 30 days from the end of the evaluation period. After the tariff has been approved, the Board decision within 10 days shall be publicized on the official gazette "Latvijas Vēstnesis". The new tariff shall come to effect 30 days after the publication in the official gazette.

Monitoring process. The public service provider has to submit an annual report about their costs related to service provision (the report contains the same structure as in tariff calculation). If a certain parameter, e.g. waste disposal costs per tonne, accepted waste tonnes at landfill per year or profit, do not meet the requirements of the Methodology, the Regulator may request the tariff re-calculation.

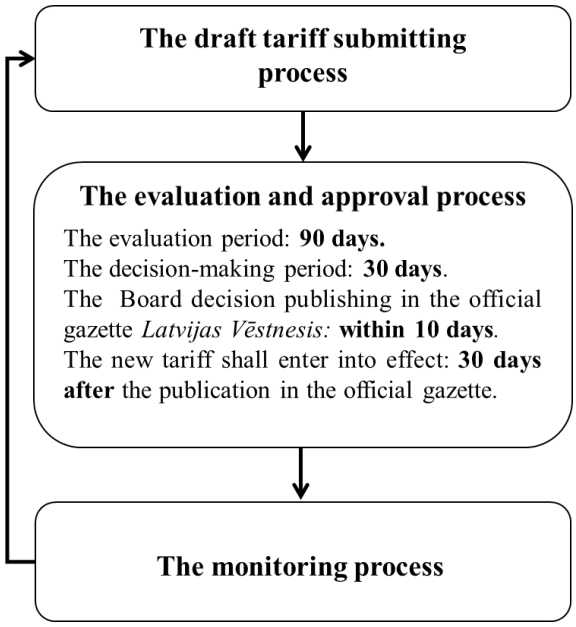

Figure 2. The process of the draft tariff evaluation, approval and monitoring

Since the beginning of 2017, the merchants have to submit draft tariff not only in accordance with the Methodology, but they also have to fulfill the technical tables for benchmarking, which allow all waste disposal service costs and most important parameters to be split by each technological process, which gives an opportunity to compare provided services effectiveness among merchants.

The process of draft tariff evaluation, benchmarking and monitoring is divided into four steps (see Figure 3).

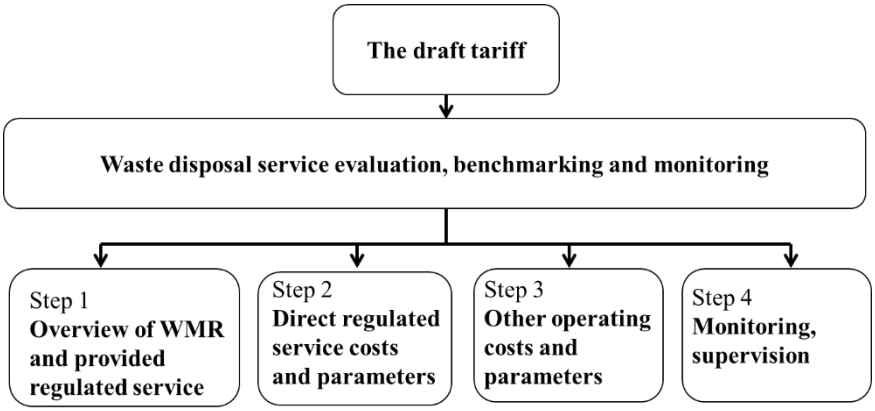

Figure 3. The process of draft tariff evaluation, comparing and supervision

In this study only first step is analyzed. The first step involves a general comparison of the WMR and the service provided at respected landfill, which consists of:

1) characteristic of the infrastructure used by the merchant for provision of the regulated service; the essential differences in the provision of the solid waste disposal service among the merchants, and an influence to the tariff formation costs, e.g. merchants who provide mechanical-biological pre-treatment (MBT) of mixed municipal solid waste; receive revenues from provided service (e.g. incomes from production of energy from landfill gas, recycling and recovery materials); management of landfill leachate; transfer stations the operating costs of which are included in the landfill infrastructure;
2) geographic and socio-economic parameters of the WMR. In these characteristics the Central Statistical Bureau's data are used:
    - total area of WMR, km²;
    - number of inhabitants in WMR, capita;
    - households' disposable income in Latvian statistical regions, EUR/year/member;
3) current tariff/draft tariff and the socio-economic sustainability of the WMR:
    - solid waste disposal service tariff (incl. NRT), EUR/t;
    - amount of the solid waste accepted at the landfill, t/year;
    - amount of the waste accepted at the landfill per capita, kg/year;
    - amount of the waste disposed at the landfill per capita, kg/year;
    - share of the payment for solid waste disposal service per household member incomes per year, %.

The main principle of the next steps (Step 2-4) of the process of draft tariff calculation, evaluation, comparing, and supervising must comply with the requirements of the Methodology [2].

3. RESULTS

In general, the waste management scenarios at landfills are similar in the all WMR, and they are in accordance with the legal acts [6;7]. However, there are significant differences among the landfill operators in they ways how they provide solid waste disposal service and this makes an impact on the tariff calculation costs, e.g. chosen MBT technologies, technical solutions for landfill leachate treatment, the way of preparation of recycling and recovery materials or utilization of by-product after mechanical pre-treatment (see Table 1). Mainly, all these solid waste treatment technologic and economic solutions are chosen by the local municipalities of the respective WMR, as landfill operator’s shareholders.

The amount of solid waste accepted for disposal at landfills is reduced annually – the total accepted amount of municipal solid waste were 518 thousand tonnes in 2017, which is 2% less than in 2016. The largest solid waste landfill is landfill "Getliņi", where 55% of the total municipal solid waste is delivered from Riga city and Riga agglomeration (see Table 2; Table 3).

Parameters/ landfill		Pentuļi	Cīnīši	Brakšķi II	Daibe	Ķīvītes	Križevņiki	Getliņi	Kaudzītes	Janvāri	Dziļā vāda	Grantiņi
WMR		Ventspils	Dienvidlatgale	Zemgale	Ziemeļvidzeme	Liepāja	Austrumlatgale	Riga, Riga agglomeration	Maliena	Piejura	Vidusdaugava	Zemgale
Costs/revenues that have a significant impact on tariff calculation	MBT	x	x	x	x	x	x	x	x	x		
	Energy from landfill gas				x	x		x				
	Recycling and recovery materials		x	x			x		x	x	x	
	Transfer stations									x	x	
Landfill leachate treatment		WTP	RO	WTP	RO	RO	RO	WTP	RO	RO	RO	WTP

WTP - Wastewater treatment plant
RO - Reverse osmosis

Table 1. Characteristics of the infrastructure used by the merchant for provision of the regulated service

The decrease of the accepted municipal solid waste amount is caused by the reduction of the number of inhabitants, especially in rural areas, development of waste recycling and recovery technologies and options as well as the expansion of separate waste collection systems in municipalities, increasing of tariff for solid waste disposal service and NRT for waste disposal. But there are some WMR, where the amount of accepted municipal solid waste has slightly increased, because of development of regional waste management system and administrative control.

In 2017, the total amount of solid waste accepted for disposal at landfill from regulated waste stream were 159 thousand tonnes, which is 22% less than in 2016. The reason of the waste amount reduction is implementation of the unsorted municipal waste pre-treatment technology, which is provided in the nine of eleven landfills currently (see Table 1).

Parameters/ landfill	Pentuļi	Cīnīši	Brakšķi II	Daibe	Ķīvītes	Križevņiki	Getliņi	Kaudzītes	Janvāri	Dziļā vāda	Grantiņi

Area, thousand km² [8]	4,5	6,9	4,7	10,6	6,4	5,2	4,9	7,0	5,3	8,1	0,8
Number of inhabitants in the WMR, thousand capita [8]	70	163	161	150	136	82	878	63	131	101	23
Households' disposable income in the WMR, thousand EUR/year/ capita [9]	4,8	3,6	4,6	5,0	4,8	3,6	6,0	3,9	5,2	4,5	4,6

Table 2. Geographic and socio-economic parameters

The proportion of the amount of solid waste disposed and accepted at the landfill is one of the parameters for calculating of NRT amount for the disposed waste in the total tariff costs. This proportion varies considerably among public service providers and it depends directly on the technical and economic solutions mentioned before.

Parameters/ landfill	Pentuļi	Cinīši	Brakšķi II	Daibe	Ķīvītes	Krīževņiki	Getliņi	Kaudzītes	Janvāri	Dziļā vāda	Grantiņi
Tariff/draft tariff (incl. NRT[2)], EUR/t	42,75 [1)]	43,64	45,26	48,55 [1)]	49,25 [1)]	50,26 [1)]	55,33	55,52 [1)]	60,63	63,22	63,75 [3)]
Solid waste accepted at landfill, thousand t/year	17,0	35,4	40,6	28,1	26,8	16,7	282,5	7,4	29,2	19,5	4,2
Waste accepted at landfill per capita, kg/year	253	218	228	188	200	203	327	116	286	193	182
Waste disposed at landfill per capita, kg/year.	2	119	101	93	77	94	49	56	123	193	182
Share of the payment for solid waste disposal service per household member incomes per year, %.	0,23	0,26	0,22	0,18	0,21	0,28	0,30	0,16	0,33	0,27	0,23

[1)] Merchants whose tariffs are approved by Regulator in accordance with the Methodology in 2018.
[2)] Natural Resource Tax for disposed waste amount (35 EUR/t in 2018).
[3)] Applicable tariff is from former landfill operator.

Table 3. Current tariff/draft tariff and the socio-economic sustainability

The common problem is the use of biodegradable waste (BW), separated in the pre-treatment process from the unsorted MSW. There are no technical or legislative solutions for the BW because of it contamination by 30% of solid waste. Mainly, the landfill operators produce technical compost and use it as a daily covering material at landfill cell, but at landfill "Ķīvītes" and landfill "Getliņi" operators for stabilization of BW use bio-cells, where anaerobic treatment process allows to produce biogas and convert it into energy. In the landfill "Daibe" biogas is collected from the recultivated landfill cells. All mentioned landfill operators which produce energy from the biogas and offer to the market with support of Subsidised Electricity Tax [10] reduce solid waste disposal costs by gained revenue.

Waste transfer stations are facilities where MSW is unloaded from collection vehicles and reloaded into long-distance transport vehicles for delivery to landfills. The cost of the regulated service provision is higher in landfills where infrastructure includes transfer stations. Due to low population density in rural areas of WMR, landfill "Janvāri" and landfill "Dziļā vāda" operators have the waste transfer stations and the operating costs of these structures are included in the tariff of the solid waste disposal service (see Table 1).

Collected leachate can be treated on-site or transported off-site to treatment facilities. Some landfills recirculate a portion of leachate collected to increase the amount of moisture within the waste mass for biogas production or to limit waste self-ignition. The four landfills' operators which are located nearby big cities for the landfill leachate treatment use wastewater treatment plant. However, this option is not possible for the other seven landfills, and here the reverse osmoses technology as a local leachate treatment method is used (see Table 1).

Scheinberg claims that sustainable waste management systems must be affordable, and sustainable tariffs are between 0,03% and 2% of household income [11]. The payment for the waste management depends on demands of environmental protection, the level of the development of waste management system, the kind of technologies used for waste treatment, recycling and utilization.

The share of the payment for solid waste disposal service per household member incomes per year varies in each WMR, e.g. from 0,16% at landfill "Kaudzītes" to 0,33% at landfill "Janvāri". The optimal share of total waste management payment for the waste management for waste producer or waste holder per household member incomes per year in Latvia could be around 1%.

CONCLUSIONS

In overall the landfills have been developed in accordance with the requirements of the European Union (EU) waste management sector demands, state legislation and State Waste Management Plan 2014-2020. According to the investment attraction policy for waste management sector for 2014-2020 of the Ministry of Environmental Protection and Regional Development, the investments with EU co-financing will be planned for the development of separate waste collection system, recycling and recovery technologies. In turn, the public service provides will more invest in the renewal or replacement of fixed assets and infrastructure objects.

The increase of waste disposal service tariffs in the future will be caused by both, increasing rates of NRT for waste disposal (2018 - 35 EUR/t; 2019 - 43 EUR/t, and 2020 – 50 EUR/t), and the decreasing amount of solid waste to be accepted at the landfill in connection with the development of the separate waste collecting system and waste recycling opportunities.

There is a tendency that landfill operators, which have been operating mainly with landfill sites and the infrastructure facilities of which extend their business activities, e.g. have started to provide waste collection services in WMR or are planning to start service provision of waste recovery for heat production. In this situation, the Regulator pays attention to the

reorganization of the accounting system of the public service providers in accordance with the requirements of the law On Public Service Regulators and the requirements specified in the Methodology.

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