

LOCAL PLANS TO PRIORITIZE INTERVENTIONS

DT1.4.2

Version 1
08/2018

Tatabánya Industrial Park





The aim of the present document is to finalize the data collections and analysis built in DT1.3.2 (Report of the quantity of industrial waste in the CIRCE2020 industrial areas), DT1.3.3 (Report of the present destinations of industrial waste) and DT1.3.4 (M-scale analysis of the physical flows at local industrial system level). In a short way, this document summarizes the process that leads to pilot cases identification, from the recognition of waste production & destination to the physical flows maps. The present process to prioritize the interventions is also supported by a permanent consultation with the local stakeholders (administrations located in the pilot regions, trade and industrial associations, environmental authorities etc.) to come to a shared hierarchy of waste flows to optimize and/or to close (in DT1.1.3 and DT1.4.1).

Waste flows analysis

Pilot area description

Tatabánya Industrial Park (<http://www.iph.hu/industrialpark.html>) is located in Tatabánya, which is a City of Country Rank with approximately 66 000 inhabitants and the capital of Komárom-Esztergom County. The long term vision of the city is to become a dynamically developing center of the region by 2030.

There are currently almost 1000 manufacturing companies operating in the city, which is at the top of the microregional level, but it is the highest value at county level as well. Tatabánya Industrial Park is characterized by the diverse variety of companies which are operating in the area. The most relevant economic sectors by number of enterprises are: manufacturers/producers (52%) - different kind of products, from wooden till health care products, wide range, building contractors (12%), all the others have its own special operation from electronic development till surface treatment including also logistics services and distributors. Most of the companies located in Tatabánya industrial park are automotive, plastic and rubber industry, electronics, healthcare and logistics companies.

The Industrial Park is approximately 450 ha, out of which one third belongs to the public administration of Tatabánya and two thirds to Környe. At the moment the area of around 150 ha is available for green field investors. However, in case of a larger demand it is possible to expand the industrial park by a further 350 ha. Based on its area it is one of the largest industrial parks in Hungary.

Source/ quality of data



The quantities of the produced industrial waste in the industrial park have been determined with the help of the National Environmental Information System, (from the Hungarian name the acronym is OKIR). This is a central database operated by the Ministry of Agriculture. The waste management data are uploaded to the system through the Environment Protection and Nature Conservation Inspectorates, who perform the related measurements and process all the reported data transmitting them directly to this online database.

The data initially come from the waste producers (companies) directly through self-declaration - with a limited authority control. However, this is the most accurate database publically available. Companies have to report also their waste treatment based on self-declaration. Out of these figures, only the generation statistics are publically available. Now the data from 2016 are the most recent ones.

Overview of the industrial waste quantities and their main treatment operation

Total waste generated in the pilot area (20 manufacturing companies) is 54 125 tons/year (2016 data from the National Environmental Information System, OKIR). Out of this, 88% of waste consists of 8 waste streams, which are the following: glass (16 01 20), technical plastic waste (07 02 13), waste not clearly identified originating from the transformation or surface treatment of metals and plastics (12 01 99), waste not clearly identified originating from the organic chemical industry (07 02 99), paper packaging waste (15 01 01), wood packaging waste (15 05 03), iron and iron cuts (12 01 01), and rubber tires (16 01 03).

Table 1: Reported amount of generated industrial waste

Reported amount of generated industrial waste			
Year	Non-hazardous (t)	Hazardous (t)	Total (t)
2016	51 527	2 598	54 125

Source: OKIR, 2016

The companies in the Tatabánya Industrial Park have access to quite a diverse waste management infrastructure: waste sorting and selection, compacting, granulation, and transport for further processing, recycling, incineration, and landfill.

Number of industrial waste treatment plants available:

- 3 landfills (2 for hazardous and industrial waste and 1 for non-hazardous waste)
- 3 collection, sorting, pre-treatment site for plastics
- 1 paper recycling plant (95% of all paper waste collected is sent to this sole plant in Hungary, the other is transported to abroad)
- 8 incinerator (including 1 only for tires)

Landfilling - landfilling of industrial and hazardous wastes:



- Dubnik-völgyi regional landfill site, Tatabánya mainly for municipal or similar industrial waste with Biogas Facility built for fermentation of agricultural processing byproducts, sewage sludge, and sugars from corn
- Saubermacher-Magyarország Kft. - Aszód-Galgamácsa and Marcali

Map 1: Landfills “used” by the pilot area



Hazardous waste and industrial waste incineration plants as destination of the industrial park’s waste:

- SARPI Dorog Kft. (Dorog)
- Győri Hulladékégető Kft. (Győr)
- Megoldás Környezetvédelmi és Kereskedelmi Kft. (Szombathely)
- Fűzfői Hulladékégető Szolgáltató Kft (Királyszentistván)
- SEPTOX Kft. (Budapest XIV)
- Huntsman Corporation Hungary Vegyipari Termelő-Fejlesztő Zrt. (Pétfürdő) combustion of distillation residues
- Oroszlány - for waste oils and paint residues

Incineration of tires for energy production:

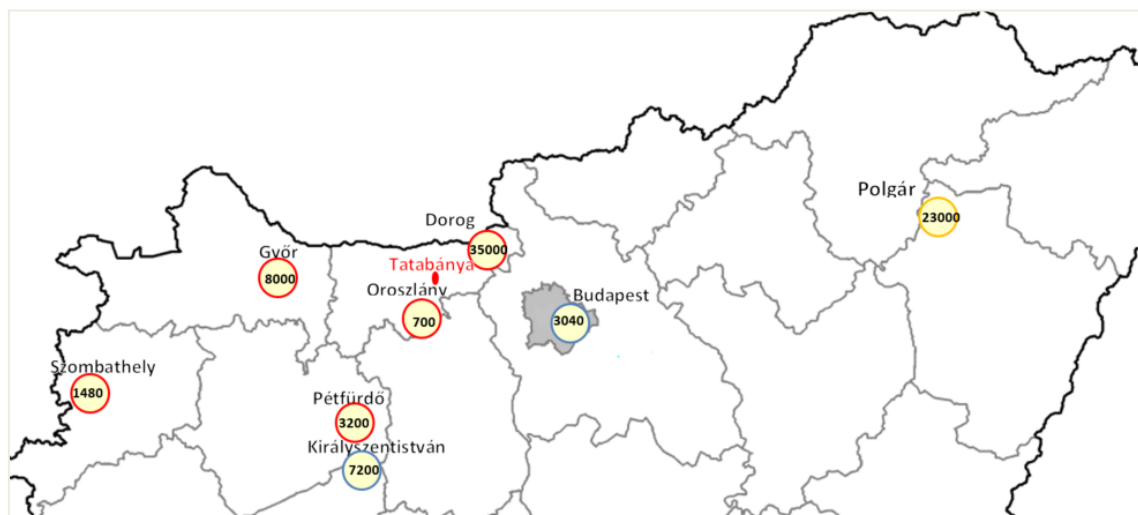


Red
hazardous &
industrial waste

Blue
hazardous &
non-hazardous
waste

Yellow
incineration for
tyres

Quantities:
licensed t/year
capacity



- Polgár plant

Map 2: Incineration plants “used” by the pilot area

Industrial waste treatment tendencies in the Tatabánya Industrial Park pilot area

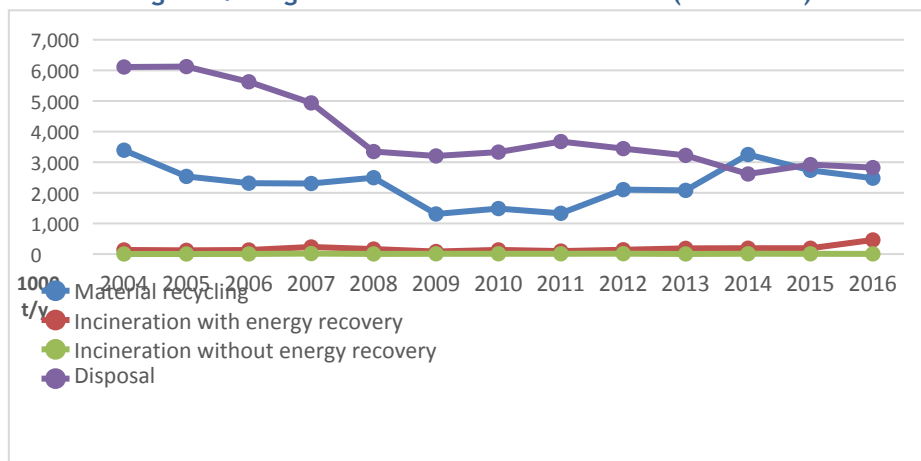


Apart from national statistics no aggregated statistics were available only for the industrial park, but from the company interviews some information could be gained. Since mainly international companies operating in the pilot area, in some cases the generated waste quantities are not treated within the borders of Hungary, but it is delivered to a central plant outside Hungary. E.g.: Aluminium waste of company is sent to Denmark for remelting. In addition to that, generally speaking due to the lack of recycling capacities, the recycling process of plastics mainly happened abroad, but pre-treatment is done within the borders.

However, generally we could say that the companies tend to take into consideration the proximity principle and try to avoid the long transport of waste.

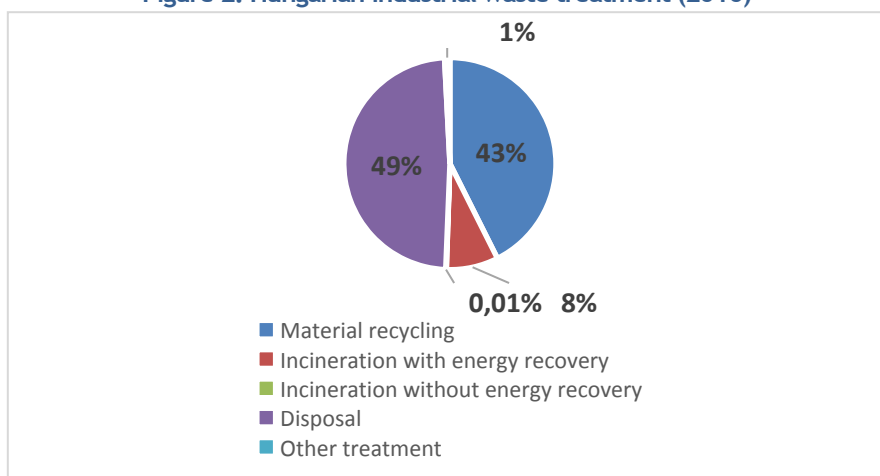
Taking a look at the industrial waste treatment tendencies in Hungary, it could be seen that in the last almost 15 years there is a decrease in disposal. 2014 was the year when material recycling could overcome the amount of waste landfilled, however there is also a slight decrease in material recycling after that - however in the meantime also a slight increase could be detected in energy recovery. The level of incineration without energy recovery seems to be quite stable during the last 12 years.

Figure 1: Hungarian industrial waste treatment (2004-2016)



Data source: KSH (Hungarian Central Statistical Office)

Figure 2: Hungarian industrial waste treatment (2016)



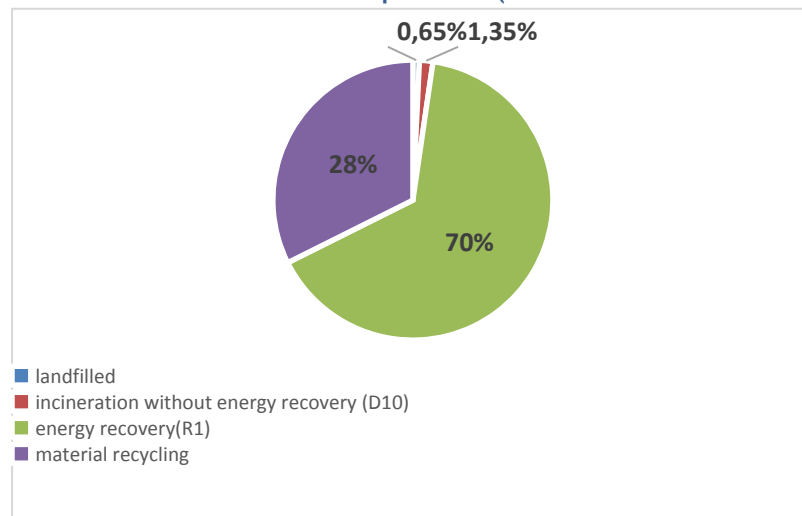


Data source: KSH (Hungarian Central Statistical Office)

From Figure 2 the proportion of the treatment methods could be found in case of the generated industrial waste amount in Hungary in 2016. In order to determine the tendencies in the pilot area - compared to the nationwide statistics we interviewed 8 companies - who intend to cooperate with us - to get to know the destination of their most typical production waste streams.

Summarizing the results - also from Figure 3. - it could be seen that disposal hardly reaches 1 % in case of the interviewed companies operating in the Tatabánya Industrial Park. Energy recovery is the dominant waste treatment option (70%). Material recycling is only 28 %.

Figure 3: Industrial waste treatment in the pilot area (hazardous & non-hazardous together)



Data source: Questionnaires filled-in by companies operating in the pilot area

So the main challenge will be to analyse the incinerated, energetically recovered waste streams that might have the potential to be either recycled or to be reused internally or by other partners.



Most promising waste flows

Analysing the non-hazardous industrial waste streams separately based on the answers of the interviewed 8 companies the following table could be prepared:

Year	EWC	Waste description	Quantity (kg/year)	Destination			
				disposal	incineration without energy recovery (D10)	energy recovery(R1)	material recycling
2016	70213	waste plastics	4 049 502	0,01%		99,9%	
2016	80410	waste adhesives and sealants other than those mentioned in 08 04 09	36 926		8%	92%	
2016	120101	ferrous metal filings and turnings	307 080				100%
2016	120199	wastes not otherwise specified	823 841				100%
2016	150101	paper and cardboard packaging	772 987			55%	45%
2016	150102	plastic packaging	280 435				100%
2016	150103	wooden packaging	361 983				100%
2016	150106	mixed packaging	57 596			97%	
2016	160103	waste tyres	1 095 490			100%	
2016	160306	organic wastes other than those mentioned in 16 03 05	11 738			100%	
2016	190814	sludges from other treatment of industrial waste water other than those mentioned in 19 08 13	68 750		100%		
2016	200101	paper and cardboard	102 803				100%

Taking into consideration the most typical non hazardous waste flows it could be those streams were examined further where energy recovery is almost 100 %. Referring back to the challenge identified above - these materials should be examined further in order to

a; decrease the generated waste quantities

- by reintroducing the materials to the production circle;
- by taking a look at the production and TQM processes to minimize the product/waste ratio
- by reusing them by other company via industrial symbiosis.

b; move up the waste hierarchy towards material recycling

The criteria leading the choice

Each cooperating company (8) was visited and their whole manufacturing process were analysed including waste management issues. Based on the interviews with the relevant experts within the



industrial park, the most critical flows were identified; mainly those offering a challenge to be recycled.

Three CE indicators were applied to quantify the opportunities and results that could be realized with a more conscious waste management regarding the identified waste flows listed below:

- waste hierarchy indicator (A),
- recycling target (B)
- generation of industrial waste (C).

Plastic waste - EWC 70213:

A special waste stream was identified resulting from the production of medical tools and materials - ostomy products.

It is a composite plastic containing for instance

- PE
- PP
- PET, aPET
- PVC
- EVA
- Poliamid

Due to the production lines and the quality control mechanisms of the given company this is the biggest amount of homogenous waste - 4200 tonnes - generated by the cooperating companies. The waste now transported to an incinerator - Dorog and Budapest (see Map 2 above). As all of their production sites around the globe send this waste stream for waste incineration, it would be a major breakthrough if the project could find a way to recycle this kind of composite material.

Because of the quantity and thanks to the willingness of the company to change there is a high potential in finding new CE alternatives. In addition to that, the identified solution would offer a global impact as it could widespread used by the Company - so there is a replicability potential, as well.

The realistic initial material recycling target could be 20%. But this could be increased gradually further if the “test” could work properly.



Organic wastes other than those mentioned in 16 03 05 (cooler block)- EWC 160306

These cooler blocks - artificial ice - are used only at the delivery of the raw materials for production. These blocks do not have any direct contact with the chemicals transported, they meet only with the packaging of these materials. As the quality and safety regulations are very strict, the given company cannot reuse these cooler blocks again. So after their first use, they shall be handled as waste, which then is delivered to an incineration plant.

This practice shall be revised, as both economically and environmentally it causes a major loss - and not only for the Company. So there is a potential of re-use not already exploited. There are two ways what could be done to avoid this:

1. The goal shall be to find - legal, technical and economic - solution to re-use these cooler blocks several times again within the company avoiding to generate this amount of waste. The expected outcome regarding parameter C (generation of industrial waste) could not be quantified at this stage, what is sure that if the quality policy could be changed this quantity could be reduced radically - close to 0 (only attrition could cause waste).
2. If it is not possible, then to find some external partners who could use them further avoiding to generate waste after only their first use.

With moving away from incineration towards reuse the waste hierarchy indicator could be doubled.

Waste tyres - EWC 160103

All the generated amount within the territory of the pilot area (more than 1000 t) is sent to incineration - the distance between the waste generated and the treatment facility is almost 300 kms. The producer Company would be interested to have a special solution generally for tyre manufacturers, as Hungary hosts the most outstanding tyre manufacturers within its territory generating a huge sum of vulcanized and unvulcanized tyre waste during productions. So analysing the recycling alternatives could also have a multiplying effect.

Mixed packaging waste - EWC 150106

Most of the Companies visited identify their IBC tanks, Big Bags and mostly plastic materials with this code. Further analyses shall assess and determine exact material flows under this code. Taking into account all the 20 manufacturing companies, 334 762 t of mixed packaging waste is generated in the pilot area. Now they are sent to incinerators however there might be some valuable materials for recycling and furthermore even some reuse options could be identified if we further analyse the composition of the flow.

If some reuse options could be identified then there will a decrease in the generated waste amount - but the quantity - the expected outcome of parameter C (generation of industrial waste) - could be determined only after the further analysis of the material composition.



The role of stakeholders

Frequent meetings were organised with the Hungarian partners and the representatives of the different stakeholder groups.

Originally, the chosen pilot area was the Budaörs Industrial Park but after meeting the representative of Central Hungarian Innovation Center and after analysing the waste generation statistics it turned out that there were mainly service provider companies with not enough and specific industrial waste generated.

So in the beginning of 2018 new pilot area had to be identified. As a result of the secondary research together with the other Hungarian partner, Bay Zoltán Nonprofit Ltd. the new target area was located: Tatabánya Industrial Park.

Discussions were organised with external experts, with the manager of the Tatabánya Industrial Park in order to determine the initial situation regarding legislation, general waste management tendencies in Hungary and to get to know the pilot area generally. The industrial waste generation statistics could be acquired with the help of the Ministry of Agriculture who are responsible for uploading and analysing the information reported by the companies to a central online database. The current destination of waste was quite a challenge to determine.

On 10 May 2018 bilateral meeting was held with NHSZ Tatabánya Zrt., one of the waste collector companies of the pilot area. Its headquarters are located in the close vicinity of the Tatabánya Industrial Park, so many companies choose it as their partner. The main objective of the meeting was to get an insight of the destination of the collected industrial waste materials. During the discussion the representatives of the company expressed their willingness to cooperate further within the framework of the project, they do support these initiatives. It was agreed that they will be involved in later stages of the project. They are a relevant information source regarding waste treatment technologies, identifying possible recycling partners.

The 20 manufacturing companies operating in the territory of the Tatabánya Industrial Park were also contacted directly to maintain a direct and interactive contact with them and to know the waste treatment practices and their attitude towards circular economy & industrial symbiosis. Questionnaires were sent out electronically. Finally 8 companies sent them back indicating their interest towards the CIRCE2020 project.

On 6 June 2018 an info day, workshop was organised for these companies. This was a great occasion to introduce the project, the objectives, the team and the MFA experts. Companies introduced themselves and their expectations towards the project. Later, already in June, our experts visited all of





them, discussing the most problematic issues, waste streams in connection with CIRCE 2020 project.

S3 agents were also contacted who directed us toward the municipality of Tatabánya. The meeting was organised on 18 October, 2018. All the city's relevant strategies, plans and the countrywide S3 strategy were analyzed to find the common goals.

The M-scale analysis and the decisions regarding the chosen waste streams were made based on the aforementioned interactions. Of course, secondary researches also helped the final outcome but the most important stakeholders, the companies were deeply involved in the process of analysis.

Based on the identified waste materials, forums and further meetings are going to be organised to connect the demand and supply side and to foster the “demand-led” innovation if necessary.