REPAiR

REsource Management in Peri-urban AReas: Going Beyond Urban Metabolism

D6.2 Governance and Decision-Making Processes in Follow-up Cases

Version 2.1

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Acronyms and Abbreviations

CA	Consortium Agreement
CFS	Certificate on the Financial Statement
DMP	Data Management Plan
DoA	Description of Action
EB	Executive Board
EC	European Commission
ECA	European Court of Auditors
ECAS	European Commission Authentication Service
EU	European Union
FSIGN	Project Financial Signatory
GA	Grant Agreement
GDSE	Geodesign Decision Support Environment
GF	Guarantee Fund
LEAR	Legal Entity Appointed Representative
LSIGN	Project Legal Signatory
OLAF	European Anti-Fraud Office
PaCo	Participant Contact
PM	Person Month
PO	Project Officer
PULL	Peri-Urban Living Labs
SC	Steering Committee
SP	SharePoint
UB	User Board
UoR	Use of Resources
VFG	Vegetable/Fruit/Garden Waste
WP	Work Package

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Publishable Summary

REPAiR develops, tests, and implements strategies for improved urban metabolisms in six peri-urban living labs (PULLs) in the case study areas of Amsterdam, Ghent, Hamburg, Łódź, Naples, and Pécs. In the frame of REPAiR a geodesign decision support environment (GDSE) will be developed and first tested in the PULLs.

In REPAiR's Work Package 6 "Developing and implementing decision models" decision making processes will be analysed and decision models for all six case studies will be developed in order to be implemented in cooperation with stakeholders in the six case study areas feeding into the GDSE.

The deliverable D6.2 "Governance and Decision-Making Processes in Follow-up Cases" is focused on the definition and clarification of governance and decision-making structures in the four follow-up pilot cases of the REPAiR project: Ghent (Belgium), Hamburg (Germany), Łódź (Poland) and Pécs (Hungary). The deliverable is divided into 6 chapters.

Chapter 1 gives a brief introduction to the work done for the drafting of this document. Deliverable D6.2 uses the theoretical background on governance and stakeholder analysis that was used in the Deliverable D6.1., the experience that was made in the conduction of the analysis of the pilot cases was used to improve the empirical research on the follow-up cases.

The second to fifth Chapters report a description of the four follower caseworks. They include an overview on the governance setting, a timeline of the development of the waste governance and the decision-making framework. This is followed by descriptions of the stakeholder identification and interviews conducted in the follower cases.

Although all four cases used the same interview and key stakeholder analysis method originally described in D6.1, the unique realities of each location mean the results and their representation will differ from one case to the other. In Ghent and Hamburg the governance system of waste management is rather stable. The cases therefore focus more on concrete waste flows and how to optimise them in the sense of an improved circularity. In Łódź and Pécs the waste management has undergone profound changes. In both cases the topic of governance of waste management in general is more important. Nonetheless certain waste flows are chosen to be further examined, as the specific flow decisions are necessary for the LCA and MFA modelling as part of D3.1, and the stakeholders are necessary components of creating and managing the PULLs as described in more detail in D5.1-5.3.

The sixth chapter gives an outlook on the upcoming deliverables in WP6, and how the steps taken in D6.1 and D6.2 contribute to the ongoing work.

1. Introduction

The Horizon 2020 project REPAiR – REsource Management in Peri-urban Areas: Going Beyond Urban Metabolism aims at extending the concept of urban metabolism in three ways: (1) by exploring the roles of governance, territorial and sociocultural characteristics; (2) by strengthening the relationship between resource management and design, not only of products, but also of space; and (3) by including participatory and science-based decision-making processes.

In order to complete these research goals, REPAiR will develop, test, and implement strategies for improved urban metabolisms in six peri-urban living labs (›PULLs‹) in the case study areas of Amsterdam, Ghent, Hamburg, Łódź, Naples, and Pécs. In the frame of REPAiR a geodesign decision support environment (GDSE) will be developed and first tested in the PULLs. The GDSE will facilitate the development of integrative spatial development strategies that comprehend waste and related treatment processes as a resource. One essential principle of the transdisciplinary PULLs is the combination of scientific and practical knowledge. Therefore, REPAiR involves a variety of stakeholders: universities, research institutes, public private waste management companies, regional and local public authorities, and small as well as medium-sized enterprises from the fields of planning and geodesign – either as partners in the consortium or as members of a user board. Additionally, further public, private, and intermediate stakeholders as well as citizens participate in the project throughout the PULLs.

In the frame of REPAiR's Work Package 6 "Developing and implementing decision models" an analysis of the decision-making landscape (stakeholders, processes, legal framework) of the six case study areas will be conducted. Based on this analysis and outputs of further work packages (WP3-5), decision models for all six case studies will be developed. These decision models will then be implemented in cooperation with stakeholders in the six case study areas feeding into the GDSE.

This deliverable (D6.2) is the second part of the analysis of the decision making landscape in the four REPAiR pilot cases of Ghent, Hamburg, Łódź, and Pécs. It contains background information on governance and stakeholder analysis methodology and an overview on relevant policies on EU level. This is followed by the governance analysis of the four case studies.

2. Case: Ghent

2.1 Description

The definition of the Ghent focus area has been done by the local partners in accordance with the user board members for Ghent (i.e. Ugent, OVAM, IVAGO, local authority). The focus area has been defined as the city of Ghent and the neighbouring municipality of Destelbergen (see figure 2.1).

This area offers opportunities to improve collection and treatment strategies for biowaste and residual waste streams in particular from households at city level, both inner city centre and more suburban areas, and its relation with the neighbouring municipality Destelbergen.

Figure 2.1: Region and Focus Area of the REPAiR case study in Belgium (source: OVAM)

The area covers two municipalities, each legally responsible for the implementation of its municipal waste policy. However, they both delegate power to the inter-municipal organisation IVAGO as far as the collection and treatment of waste is concerned. This gives the project a real insight in the way waste collection is organised in Flanders. Most municipalities cooperate in an inter-municipal organisation for the collection and treatment of their waste. For REPAiR, it also means that we can rely on transparent and comparable data on waste collection for the entire area.

The focus area covers both urban, peri-urban and more rural areas. Based on the typology used by *OVAM* (Openbare Vlaamse Afvalstoffenmaatschappij, [Public Waste Agency Flanders]), Ghent is considered to be a large and regional city, while Destelbergen is considered as a more rural, medium sized municipality with industrial activity. This classification determines the maximum amount of residual waste per inhabitant per year for each city. Since 2016, Flanders' Implementation Plan for Household Waste and Comparable Industrial Waste (Flemish Government 2016a: 20-21) does no longer maintain one single residual waste target for the entirety of Flanders. It adopts a tailor-made approach with sixteen clusters of municipalities that are similar from a socio-

economic point of view[1]. For Ghent there's a maximum quantity of residual waste of 197 kg a year per inhabitant, for Destelbergen there's a maximum of 139 kg a year per inhabitant (Flemish Government 2016a: 20-21). Since biowaste still represents a substantial amount (> 20%) of the residual waste, this is an important waste stream to avoid or at least treat separately in order to decrease the amount of residual waste (OVAM 2015b: 38). Less biowaste fraction in residual waste also has its consequences for the further treatment, as moisture content will be lower, and e.g. incineration parameters could be adjusted towards a more energy-efficient operation.

IVAGO also differentiates different zones for the collection of residual and vegetable/fruit/garden waste (VFG) in the focus area, indicated in the figure below.

- Z-zone, or 'zakken'-zone, referred to dense populated areas, where the separate collection of VFG is voluntarily;
- C-zone, or 'container'-zone, referred to less densely populated areas, where the separate collection is obligatory. A cheaper rate than for mixed waste encourages people to participate to the separate collection.
- Sorting areas: separate collection is obligatory, mostly for high building blocks, using an underground system.

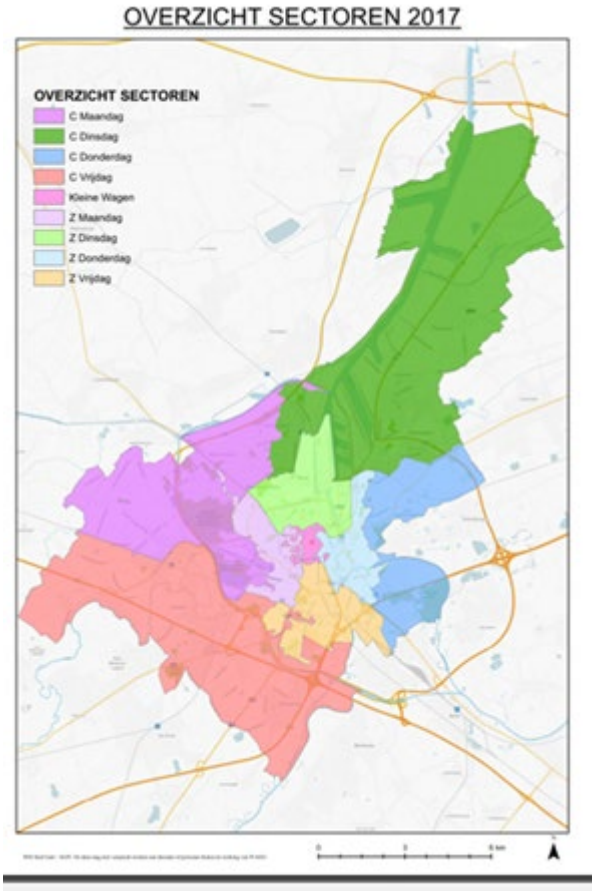


Figure 2.2: Overview of different collection zones in Ghent (source: IVAGO)

The differentiation between the different zones is a consequence of the structure of the

[1] The cluster are based on a broad range (150) of socio-economic variables.

city. The inner city center with its medieval urban plan and small streets, as well as the 19th century suburban belt with limited free public space and rather few private gardens, is more challenging for the separate collection of VFG and other waste streams than the more rural areas in Destelbergen.

The Flemish Implementation Plan for Household Waste and Similar Industrial Waste (Flemish Government 2016a: 8) identifies some social trends that need to be considered while looking at future waste collection and treatment schemes. Many waste streams are collected separately, by kerbside collection, on the recycling park or through other channels (e.g. distribution). However, those systems are under pressure by various spatial developments (OVAM 2015c: 17-19). There are more and more houses built and public space is increasingly scarce. The single family detached house with a garden remains the dominant housing type for families. Suburbanisation continues, but there is a growing interest in compact living. The number of high-rise buildings and smaller homes increases again (OVAM 2015c: 18). These more compact living forms make it practically more difficult for residents to store different waste fractions for a long term.

Secondly, the reality that mobility congestion, especially in dense urban areas, is a growing issue. Waste collection should be as efficient as possible to reduce its impact on traffic congestion. Moreover, inhabitants of urban areas less often have a car, making the use of the existing recycling parks not as accessible to everyone (OVAM 2015c: 24). In peripheral regions, ribbon building and housing estates, car ownership is much higher (OVAM 2015c: 24-26). In these situations transport of waste can be combined with other trips or errands: going to the store, the sports hall, etc. Those spatial and mobility trends create a need for other collection methods than the classic set of kerbside collection, neighbourhood bins, and collection in recycling parks (OVAM 2015c: 175-176).

A third stumbling block is the composition of the Flemish population, which changes at a quick pace. The Flemish population is not a homogeneous group. Citizens have a variety of different sorting behaviours and produce different quantities and types of waste depending on their income, age, family structures, socio-cultural background, education, among other factors. They react differently to incentives to avoid waste and sorting. Some future demographic trends will have a negative impact on the waste management in Flanders (OVAM 2015a: 9-18):

- Within the population, ageing leads to a decreasing amount of families with children and middle-aged (30-50 year olds) double-income couples. This age group is characterized by a proper waste separation and collection attitude.
- Ageing also leads to an increasing representation of 65 – 80 year olds. Elderly (especially +80) often encounter physical constraints which results in a less good source-separated collection. Ageing occurs everywhere in Flanders, but even more in more peripheral areas.
- A decreasing proportion of young people, which will occur even more in the suburbs of large cities than in the large cities themselves, creates an additional risk for waste collection, given the lower environmental awareness and thus a less responsibility-oriented attitude in waste collection of young couples and single people (often with low incomes).

Table 2.1: Demographic evolution in Destelbergen, arrondissement Ghent, province East

Flanders and Flemish region, in percent per age category between 2011 and 2013 (Municipality of Destelbergen 2016a: 13).

Age category	Destelbergen			Arrond. Gent		
	2001 (%)	2013 (%)	Development (%)	2001 (%)	2013 (%)	Development (%)
0-17	19,9	18,9	-1,1	20,01	19,41	-0,6
18-26	10,4	10,2	-0,2	11,25	11,24	-0,01
27-40	19,9	16	-3,9	21,63	19,58	-2,05
41-60	28,3	29,5	1,2	25,6	27,27	1,68
60+	21,5	25,4	3,9	21,52	22,5	0,98
Age category	**Oost-Vlaanderen**			**Vlaams Gewest**		
	2001 (%)	**2013 (%)**	**Development (%)**	**2001 (%)**	**2013 (%)**	**Development (%)**
0-17	19,88	19,56	-0,32	20,4	19,47	-0,92
18-26	11,1	10,56	-0,54	10,96	10,7	-0,26
27-40	21,31	18,29	-3,02	20,94	17,57	-3,36
41-60	26,11	28,34	2,23	26,42	28,72	2,29
60+	21,61	23,25	1,65	21,29	23,54	2,26

In recent years, Ghent has faced a large population growth, both of the registered population and of students. This puts pressure on the housing market and space in general in Ghent. In general, the challenges are as follows: The demographics at the top and bottom end are growing (a fifth is nineteen or younger), the households are diluting further (70% of households with one or 2 persons), the number of large families is increasing, more students (some 30.000) are staying in Ghent, and the city is becoming more diverse (Municipality of Ghent 2017: 30-31).

Although there is a decrease of transport by car in the city since 2012 and especially since 2017 with the Circulation Plan which excludes traffic from the city centre, mobility remains an important challenge due to traffic from the larger urban region: car transport from neighbouring municipalities continues to increase due to a continuing growth of these areas for housing and employment (Municipality of Ghent 2017: 32-33).

Destelbergen is characterized as a municipality with a strong urbanized centre in combination with a lot of open space. The vicinity of Ghent has an important impact on its demographic evolution, mobility and spatial development. Part of its territory is considered as part of the larger 'urban region of Ghent'. As a separate municipality Destelbergen wants to safeguard its 'dual' identity, with due consideration for dynamic living, work and mobility combined with preservation of nature, landscape and environment (Municipality of Destelbergen 2016a: 66).

2.2 Governance Background

Waste legislation and policy in Belgium is determined by the European Framework Directive (EC) 2008/98. Since Belgium is a federal state in which waste/resource management is regionally determined, the Flemish government independently exercises its authority in the domain of waste/resources management in Flanders. It also has the power to establish and maintain foreign relations and to act internationally for its own competencies. Flanders has its own foreign policy on waste management and is active at international and European level.

In Flanders, the OVAM is responsible to establish and control the implementation of the waste-, soil- and materials policy. The municipalities are legally responsible for the implementation of the policy regarding municipal waste and to ensure that the citizens can easily carry out the outlined municipal (solid) waste policy. They have a 'duty of care' for the collection of household waste. This 'duty of care' does not apply for industrial waste. Very often municipalities delegate their authority for the collection and treatment of household waste to an inter-municipal organisation (see following paragraph).

Flanders has a long history of Waste Management. As of 1981, with the adoption of the Waste Decree (Flemish Government 1981), a number of instruments have been used to move waste management further up in the waste hierarchy, promoting prevention and material recovery. This includes obligatory source separated waste collection in urban and rural areas, subsidies for reuse centres, pay-as-you-throw schemes, producer responsibility, landfill and incineration taxes as well as selective bans, quotas on waste production per person, and communication such as public campaigns.

With the entry into force of the ***Material Decree*** (Flemish Government 2011) and the implementing order '***Flemish regulations for the sustainable management of material cycles and waste***' (Flemish Government 2012) (VLAREMA) in June 2012, Flanders made the transition from a waste-centric to a materials-centric policy. The Material Decree and its implementing order implement the European Framework Directive (EC) 2008/98 which sets the basic concepts and definitions related to waste management. They replace the former Waste Decree and Flemish Regulation for Waste management from 1981.

The Materials Decree assumes a complete view on the material chain which is essential to find a lasting solution to the waste problem. It also determines responsibilities of different actors along the whole life cycles of materials: from designers over producers, distributors, consumers, waste companies to the government. The VLAREMA contains more detailed implementation rules on (special) waste categories, materials, selective source-separated collection, transport, the obligation to register and the extended producer responsibility.

Within this legal framework, implementation plans set the priorities, targets and general strategies to organise the waste management in the region over several years. In September 2016 the Flemish Government approved a new ***Implementation Plan for Household Waste and Similar Industrial Waste (***Flemish Government 2016a). This implementation plan replaces the previous implementation plan and contains the main

policy measures, targets and actions in order to further decrease the quantity of residual waste from households and similar waste from companies. The Plan runs from 2016 until 2022 and contains concrete actions to meet this objective by 2022.

The new plan has been worked out in close cooperation with the umbrella federations (e.g. VVSG (municipalities), Interafval (Federation of inter-municipal organisations for waste collection and treatment), Go4Circle (private waste collectors and treatment centres), KOMOSIE (re-use centres)) and other actors in the waste and materials sector. The European directives, the evaluations of previous plans, and scientific research were also taken into account.

The plan translates the Flemish waste and materials policy for the coming years into specific implementation actions, both for households and for companies, with a focus on the local level. It gives ideas and tools for the municipalities to make use of related to waste prevention and re-use, an improved source-separated collection and recycling, and less street litter; naturally in collaboration with the citizens, associations and companies.

The implementation plan is aimed at the following types of waste:

Table 2.2: Definition household and similar industrial waste (Flemish Government 2016: 5)

Household waste:
- Source-separated collected waste: e.g. glass, textile, re-usable articles, plastic bottles and flacks, metal packaging and drink cartons, paper and cardboard, …
- Residual waste
- Bulky waste
- Street and sweeping waste, litter and waste from street bins.
Industrial waste
- Industrial waste similar to household waste: this refers to waste from businesses that is of a nature, composition, and quantity similar to household waste. It is mainly collected by municipalities.
- Comparable industrial waste: this refers to waste from business that is of a nature and composition, similar to household waste. This involves quantities larger than those of household waste, and such waste is mainly collected by private waste collectors.

The implementation plan should be read together with the ***Action Plan for the Sustainable Management of (Residual) Biomass Streams 2015-2020*** Flemish Government 2015) which aims at providing a guiding framework for the sustainable and efficient use of biomass streams and residues. It focuses on the collection and the treatment of biowaste and takes into account the European developments. It is an important forum[2] to coordinate different policy objectives and initiatives which have an impact on the use of (residual) biomass streams[3] and to bring all parties involved in the

[2] A broad group of stakeholders, representing governmental departments, municipalities, research institutes and companies through their sector federations, were involved in the development of the Action Plan. Until today they monitor the progress of the plan and the contributions of the different partners in the realisation of the objectives and actions (Flemisch Government 2015: 31).

[3] Biomass comprises the biodegradable fraction of products, waste and residues of biological origin from agriculture (including plant and animal substances), forestry and related industries, including fisheries and

implementation of the sustainable management of (residual) biomass flows in Flanders together.

The action plan deals with three material cycles: the cycle of residual organic waste streams from the agriculture-food-consumer chain; the cycle of residual streams from green and open space management; the cycle of residual wood streams from the industry and households.

The prevention of food losses, the selective collection and the sustainable management of biomass residues are paramount. As far as the separate collection of VFG waste, green waste, and residual biowaste from households, hotels, catering industry, distribution and canteens are concerned, it refers to the Implementation plan for Household Waste and Similar Industrial Waste (Flemish Government 2016a: 56).

The Implementation Plan for Household Waste responds to new social trends and offers local authorities more customisation. It takes into account the changing local context and the differences between municipalities. The plan provides the outlines, but the municipalities have autonomy in implementation. For example, the Implementation Plan determines the waste fractions that each local authority is mandatory to collect separately, the method and the minimal frequency. Municipalities keep control on the waste management: raising awareness, collect source-separated waste the correct way, ensure cleanliness, etc. They can also decide to introduce additional measures for the separate collection of certain waste streams. As such municipalities in green-zones can decide to collect VFG-waste separately (Flemish Government 2016: 33, 60-61).

Table 2.3: Mandatory (bio-)waste stream to collect source-separated (Flemish Government 2016a: 33)

Flow	Kerbside collection or bring method	Large recycling yard
Household waste	Every two weeks or bring method	
Prunings	On demand, minimum 4 times a year (in green region)	mandatory
Vegetable, Fruit and Garden waste (VFG) - kitchen waste (organic waste)	Every two weeks or bring method (in VFG region)	
Frying fats and oils		mandatory
Fine garden waste		mandatory
Tree trunks		mandatory

The implementation plan also abandoned the manda-tory kerbside collection for residual

aquaculture, as well as the biodegradable fraction of industrial and household waste.
Residual biomass streams comprise waste and residual fractions of biomass which 1) are not used for the purpose for which the biomass was originally intended or produced, 2) are released and can be mobilised, and 3) for which recovery is desirable; e.g. unsold vegetables/fruit, residual waste streams from the food industry, animal by-products, VFG (Vegetable, Fruit and Garden) waste, wood waste, residual waste streams from the wood industry or streams generated by the management of gardens, parks, verges and banks, nature and landscapes (Flemish Government 2015: 13).

waste and vegetable, fruit and garden waste (VFG). For those streams municipalities have a choice between a kerbside collection, a nearby bring system, or a combination of both systems.

At the municipal level, the **police regulations** points out more specifically the responsibilities of the citizens within the waste regulation: what (not) to bring to the civic amenity sites, what are the opening hours of the civic amenity site, how does the payment at the civic amenity site takes place, how to use the civic amenity site, when does the selective collection takes place, what (not) to present during the selective collection, how to use the containers, what to do with bulky waste, what in case of infringements, fines, etc. (Municipality of Ghent 2011; 2014; 2016a; Municipality of Destelbergen 2013; 2014a; 2014b). Municipalities also determine the charges for waste collection, within the fork determined in the VLAREMA by the Flemish government (Municipality of Ghent 2016b; Municipality of Destelbergen 2016c). Although the Flemish government does not impose fixed waste rates, it tries to harmonize municipal waste rates in an indirect way as to avoid 'waste tourism'.

Table 2.4: Price differentiation in € for the collection of residual waste and VFG in different quarters of the focus area (IVAGO.com 2016)

		Ghent				Destelbergen	
	Volume	**Z-zone**	**c-zone**	**Underground sorting areas**	**High building blocks**	**Kerbside collection**	**Underground sorting areas**
Residual	30 l	0,88		0,88	0,88		0,75
	40 l		1,17			1,00	
	60 l	1,75	1,75	1,75	1,75		1,50
	120 l		3,50			3,00	
	240 l		7,00			5,00	
VFG	10 l			0,13			0,17
	40 l	0,53	0,53		0,53	0,70	
	60 l	0,80	0,80		0,80		1,00
	120 l	1,60	1,60		1,60	2,00	
	240 l	3,20	3,20		3,20		

For the implementation of the waste collection and waste treatment municipalities often rely on inter-municipal organisations, as is the case in Ghent. In the broader region of Ghent and its neighbouring municipalities 4 inter-municipal organisations are active in waste management (See Figure 2.3 below: map inter-municipal organisation for waste management in Flanders). In the focus area IVAGO (Intercommunale Vereniging voor Afvalbeheer in Gent en Omstreken) was created in June '94 as the cooperation between the municipalities of Ghent and Destelbergen and the private partner ECOV, for duration of 30 years (IVAGO 1994). It takes up the responsibility for waste collection, waste treatment, raising awareness, public cleanliness in Ghent and Destelbergen. However, since price-setting for waste collection remains a municipal competence, different rates

are applied for the collection of residual waste and VFG waste (Municipality of Ghent 2016b: 3).

A revision of the Flemish legislation on inter-municipal cooperation limits the duration of the current and future cooperation agreement to 18 years (Flemish Government 2001: 35, 79)[4]. The agreement between IVAGO, Ghent and Destelbergen needs to be reviewed by November 2019.

IVAGO's policy paper 2014-2019 determines the following objectives in relation to residual and biowaste.

Table 2.5: Policy papers of IVAGO 2014-2019 (IVAGO 2014)

Policy paper IVAGO, 2014-2019	
Residual waste	The maximal amount of residual household waste in the focus area (Ghent and Destelbergen) remains below 150 kg/resident/year and is below the Flemish average. Additional efforts for prevention, re-use and separate waste collection lead to a decrease of residual household waste.
Organic waste	The amount of household VFG-waste collected in Ghent increases by: - increasing the tariff differentiation for the collection VFG and residual waste, - enlarging the 'rural area' (c-zone: see above), - intensifying the awareness and information to households on home and neighbourhood composting The amount of households actively participating in separate VFG-collection in the urban area doubles
Energy production	Explore the possibilities for an optimal and integrated VFG-collection and treatment with digestion as pre-treatment and composting after digestion, to establish a sustainable and economic viable production of renewable energy.

The ***Implementation Plan for Household Waste and Similar Industrial Waste*** (Flemish Government 2016a) defines some new and specific actions concerning the collection of biowaste, which might impact the collection and treatment of VFG in the focus area.

- Extend the separate collection of VFG from household to kitchen waste containing animal by-products. This way more biowaste could be collected in the focus area. At the same time this could provide a clearer sorting message to citizens. However, the Implementation Plan notes the need for additional research to look into the European legislation on animal by-products, additional/different requirements for treatment installations of biowaste, the feasibility for the entire region, etc. (Flemish Government 2016a: 62).
- For small organic and biological waste producers the implementation plan examines the feasibility to make the separate collections of organic

[4] Inter-municipal organisations are created to achieve objectives that belong to one or more policy areas of municipalities. Although private partners can join the cooperation under specific circumstances, the municipalities maintain a majority participation.

and biowaste compulsory. Until now the separate collection of biowaste is voluntary for companies (with the exception of some specific flows such as vegetable and animal oil and fat). Pending the results of a pilot project, the VFG and kitchens waste of small producers could be collected with the household waste (as similar industrial waste5)(Flemish Government 2016a: 66).

- For companies that produce a lot of biowaste (such as schools with more than 1000 pupils, hospitals, penitentiary institution...6), the source-separated collection of bio-organic waste will become mandatory starting from 2021 (Flemish Government 2016a: 65, 131-134).

2.3 Stakeholder Identification

2.3.1 Process

Once the project area was defined, individual key stakeholders with a direct link to or interest in the focus area were identified. The focus of the case study in Ghent is on bio- and residual waste. For this reason, the interviewees were invited to look into challenges and opportunities related to these waste flows.

Due consideration was given to get feedback from a diverse audience, involved at different stages in the value chain, and with a variety of interests and involvement. We questioned representatives from the public and private sector, at different levels of decision making, with different roles in waste management (from customers, to collection and treatment companies). We also endeavoured to collect a balanced gender perspective. Successively, other actors have been identified through snowball sampling.

In a first phase, the key stakeholders were interviewed individually. Interviews are semi-structured: following a ladder of questions with the aim of having a conversational meeting, the conversation can be enriched by spontaneous information given by interviewees. The interviews will be used as starting point for the living lab, where the stakeholders will be asked as a group to comment and complete the initial findings.

2.3.2 Results

Table 2.6 below gives an overview of the first round of stakeholders interviews in the area Ghent-Destelbergen that have been conducted in terms of their institutional characteristics, goal orientation and goal description.

Table 2.6: List of key stakeholders involved in Ghent follow-up case with their priorities (OVAM team 2017).

Title institution (Level, Sector)	Goal	Goal Description
WP6_6.2_1G intermunicipal, public	Content and Process related	Remove biowaste from residual waste and increase collection. Improve economic and ecological performance of waste collection. Optimize heat production from waste

[5] See above for definition of similar industrial waste.

[6] See for definition of large and medium size organic and biowaste producers: annex 6 of the Implementation Plan for Household Waste and Similar Industrial Waste. (Flemish Government 2016a: 131-134)

		treatment
WP6_6.2_2G municipal, public	Content and Process related	Remove VFG from residual (household) waste, increase collection of VFG in inner city centre, and optimise heat recuperation from anaerobic digestion processes to reduce CO2 emissions.
WP6_6.2_3G OVAM regional, public	Content and Process related	Reduce residual waste, focus on prevention and stimulating initiatives. Consider biowaste collection from catering, Café-Hotel-Restaurants, distribution and canteens.
WP6_6.2_4G local, private	Content related	Realise a zero-waste approach and high valorisation of food losses. Reclaim empty space in the city.
WP6_6.2_5G municipal, public	Content and Process related	Reduce residual waste from households by separate collection of VFG
WP6_6.2_6G International, private	Content related	To become more involved in the treatment and commercialization of secondary raw materials by creating added value to 'waste'.

On the basis of the interviews, one can estimate the attitude towards the project, and an opinion about the necessity of their involvement during the next phases of the project (see Table 2.7 below).

However, there are dissenting opinions about the level of influence of the different stakeholders, varying from medium to high. During the interviews, some of the stakeholders clearly qualify their role and impact as less important compared to others.

Table 2.7: List of key stakeholders involved in Ghent follow-up case with judgements on their influence, attitude and need for involvement (OVAM team 2017).

Actor	Influence	Attitude	Need for Involvement
WP6_6.2_01G	Medium/high	Positive	High
WP6_6.2_02G	Medium/high	Positive	High
WP6_6.2_03G	High	Positive	High
WP6_6.2_04G	Low	Positive	Medium
WP6_6.2_05G	Medium	Neutral	Medium
WP6_6.2_06G	Medium/high	Neutral	Medium

The interviewed stakeholders proposed a number of additional stakeholders that might be worthwhile talking to in the following stages of the research, which are subdivided here in various organisation categories.

Local government:

- Horeca-coach city of Ghent (hotel, restaurant and café)
- Other municipal administrations such as urban planning
- Author of study on Ghent's Food Strategy
- Good practices from other centre cities in Flanders such as Antwerp

Waste treatment:

- VLACO: Flemish organization defending the interests of the biological cycle
- IVVO: inter-municipal organisation for waste collection and treatment

Urban Planning:

- BUUR: private urban development office
- Urban planning city of Ghent and of Destelbergen
- Authors publication 'Over de Rand. Onderzoek naar een toekomst voor de stadsrand' (On the edge. Research on the future of the suburban area)
- UGhent: Department of Architecture and Urban Planning
- Sogent: Autonomous Urban Development Company Ghent

2.4 Decision-Making Framework

Since the eighties the Flemish society made a transition from waste management to materials management and now encounters the transition to a circular economy. The introduction of landfill/incineration bans, landfill/incineration taxes and an obligatory source separate waste collection played an important role in the adoption and acceptance of the waste and resource management. The need to reduce the amount of residual waste is a generally accepted objective for all concerned stakeholders: it is one of the key objectives of the Flemish Implementation plan (Flemish Government 2016a: 19-24) and has been confirmed by the interviews conducted in the context of this project. However, the opinions on a method to realize this objective very much differ, depending on the approach and insights of individual stakeholders. Nowadays, still too much emphasis is put on separate waste collection and valorisation of selective waste flows, especially those flows which offer opportunities to develop an interesting and viable business model. While there is an increasing interest to look at opportunities to valorise waste flows, less emphasis is put on the prevention and re-use of waste. Increasing emphasis on these goals will require cooperation and collaboration among a wide range of (different) stakeholders.

Today, the concept of circular economy is still very much at its infancy. The increasing amount of initiatives that consider the entire value chain, including the prevention and re-use of waste, often remains small scale and locally embedded, notwithstanding a supportive environment and favourable government policy – both at local and regional level[7]. There remains an important gap to bridge between local citizen initiatives on the one hand and commercial waste producers and the waste treatment industry on the other

[7] In March 2016 the Flemish Government adopted the transversal policy paper 'Vision 2050, a long term strategy for Flanders'. This paper confirms the transition to a circular economy. It enlarges the scope of the concept of circular economy from materials to water, energy, land and food (Flemish Government 2016b). As of 2014 the Flemish government also provides funding opportunities for local governments for innovative projects, reducing the use of materials or consumption (Flemish government 2014: 24).

hand. Also, the up-scaling and replicability of locally embedded initiatives remains challenging.

A more intense and concerted cooperation among partners at different phases in the value chain offers opportunities for eco-innovative solutions. At the same time, it opens opportunities to introduce a more interdisciplinary approach to waste/resources management. Although there is cooperation and coordination between urban development departments and waste treatment companies at the operational level, this is much less obvious when policy making is considered.

The waste treatment sector in Flanders is a very vast sector, offering limited room for change. Municipalities have a 'duty of care' for household waste. In order to fulfil this obligation most municipalities established inter-municipal organisations, dealing with waste collection and treatment. These long-term agreements (up to 30 years) between municipalities were often the result of political alliances between neighbouring municipalities. Although the duration of the agreements has been limited to 18 years (Flemish Government 2011: 35), up to today they have a determining influence on the waste management landscape. The long duration and mixed composition of private and public partners (who are often accountable to different municipalities) turns the possible revision of the existing agreements into challenging negotiations where both political and commercial interests are at stake.

Flanders' waste landscape is also a very fragmented landscape; today Flanders counts 26 inter-municipal organisations. Three municipalities still manage the collection and treatment of household waste themselves. Each inter-municipal organisation very much focuses and depends on its own geographic sector, both for collection and treatment. Decisions for the realisation of new waste treatment installations are based on the available amount of waste for the concerned area.

The separate management of industrial waste, by the private sector, reinforces this fragmentation of the waste landscape.

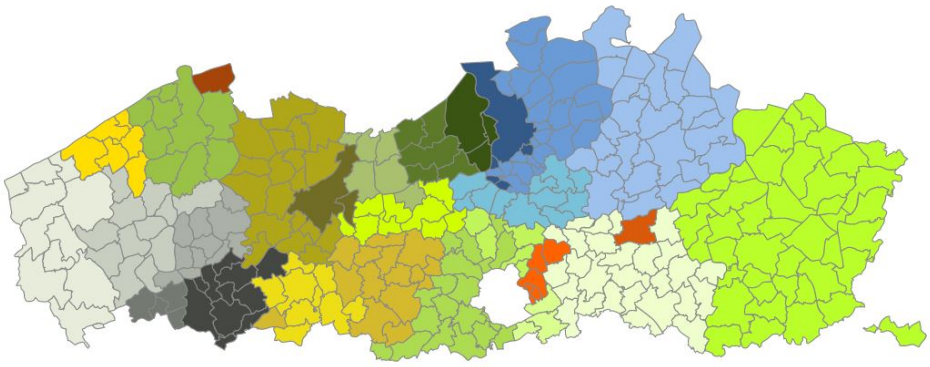


Figure 2.3: Inter-municipal waste management organisations in Flanders (OVAM 2017)

Different decision-making levels are involved in the development and implementation of waste regulations. While the Flemish region is responsible for the general policy framework of waste and materials, municipalities are legally responsible for its implementation. The Materials Decree (Flemish Government 2011) and its Implementing

Order VLAREMA (Flemish government 2012) determine the legal base to close the materials loop in Flanders. It sets a long-term vision for waste management and guarantees uniformity of the local policies. However, VLAREMA also recognizes the key role and autonomy of local governments. More than in the past, it offers the opportunity for local governments to tailor their implementation plans to specific, local situations.

This combination of different competences, with the aim of maintaining a degree of uniformity and respecting the principle of equality while leaving room for local needs, requires open communication and collaboration between different decision-making levels. The expectations at the different levels are very much motivated by the local context. Major cities such as Ghent have more means and are often more proactive in this area than municipalities such as Destelbergen. This turns the debate on innovation and the review of regulations into a delicate balance between the different levels of decision making.

The costs of waste collection and treatment are determining factors in the debate on waste management and circular economy. While the realization of a circular economy has a positive impact on the environment, it also comes at a cost. A far reaching separate waste collection and treatment brings additional costs for municipalities, their citizens and waste collection companies. The benefits, due to the recuperation of valuable materials, do not necessarily flow back directly to municipalities and their residents. This seemingly imbalanced cost-benefits model is one of the real political challenges to actualize a circular economy.

The debate on waste/resources management and circular economy should not be limited to the traditional decision makers and municipal waste treatment companies. From an early start it should also involve other actors: the private sector, as far as the production and prevention of waste is concerned, and consumers who play a part in sorting at the source of waste, re-use and prevention. The city of Ghent also has a strong tradition of participatory processes, involving its citizens in the debate on the climate pact, mobility or urban development (Municipality of Ghent 2016c: 14).

Traditionally, waste and resources management is considered as part of the environment policy, although there are obvious links with climate policies and urban planning. '*Ruimte voor Gent'*, (Municipality of Ghent 2017) the vision for the city in 2030, aims to be a human-oriented spatial structure plan. It looks at housing, green public spaces, mobility, energy, employment opportunities and economy.

Linking the REPAiR project to these ongoing processes could prove to be a real added value, both in terms of content (keeping in mind the impact of waste/resource management on the use of space and mobility) and of process (citizens participation).

3. Case: Hamburg

3.1 Description

The focus area in the sense of REPAiR is the Pinneberg County in the federal state of Schleswig-Holstein and the city-district Hamburg-Altona within the federal state Free and Hanseatic City of Hamburg. The Pinneberg County has a population of 307.471 inhabitants (31. Dez. 2015) and covers an area of 664 km², the city-district Hamburg-Altona has 270.263 inhabitants (31. Dez. 2016) and covers an area of 77,4 km² (Statistikamt Nord 2017). The focus area Hamburg-Altona and County of Pinneberg is characterized by a very diverse structure of built areas (e.g. villages centers, detached house areas, social housing, retail, logistic) and open spaces (agricultural land, largest European area of tree nurseries, garden plant production, recreation areas, and natural preservation areas). It comprises urban, peri-urban and rural areas. The selection and delimitation of the focus area has been made already in the proposal phase for REPAiR together with key stakeholders such as Stadtreinigung Hamburg, the City of Hamburg and the county of Pinneberg.

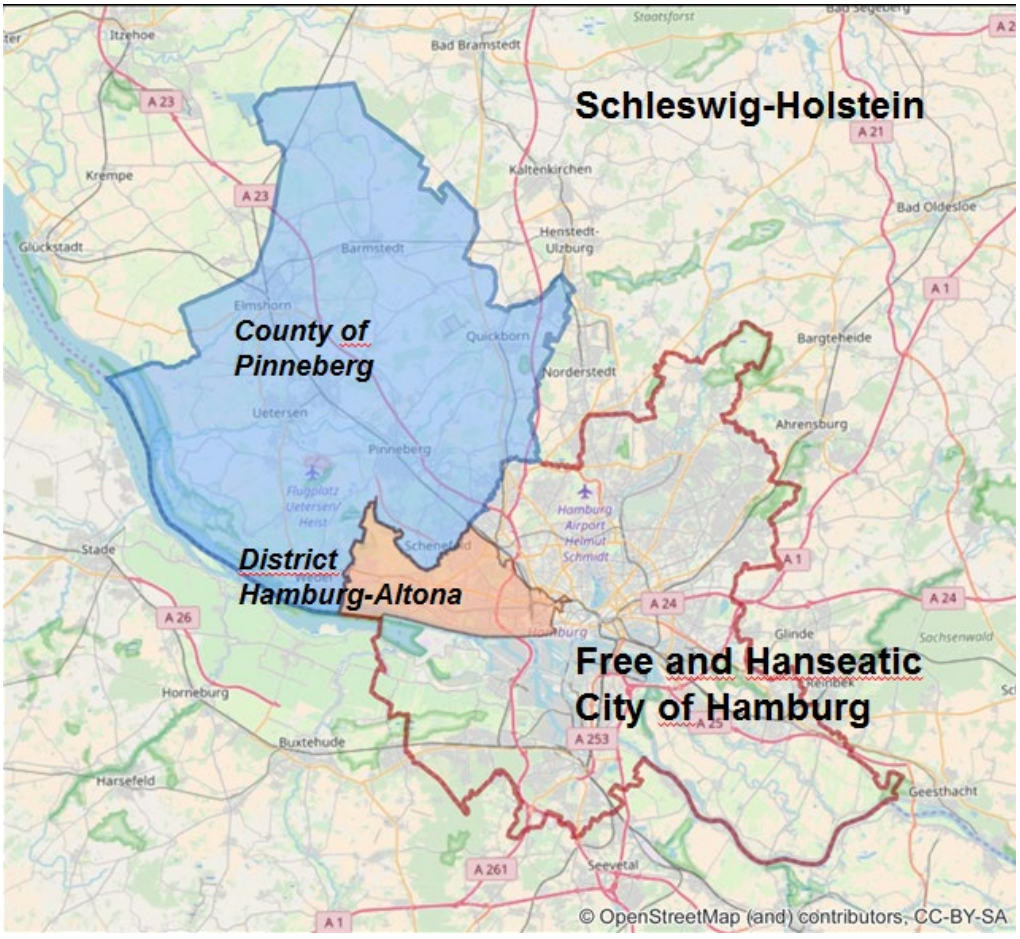


Figure 3.1: Focus area County of Pinneberg and District Hamburg-Altona (HCU 2017)

3.2 Governance Background

Germany is a federal republic composed by 16 rather independent federal states (Bundesländer). The responsibility regarding waste management and environmental protection is shared between the national government, the federal states and the local authorities. Duty of the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit BMUB) is to set priorities, to participate in laws actualisation and to oversee strategic planning, information and public relations, as well as define requirements for waste facilities (EEA 2009; Fischer 2013). Simply speaking, the federal government sets the rules and regulations to deal with waste and leaves the implementation decisions to the states (Bundesländer).

Each federal state has the possibility to adopt its own waste management act (Abfallwirtschaftsplan), which contains supplementary and more detailed information to the national law (e.g. more severe norms on certain facilities and regional waste management concepts). Hence, each state has its own waste management plan (the plan for Hamburg is presented later). In Germany the extended producer responsibility introduced in 1991 (Fischer 2013) is the core of German waste legislation, but still today it is applied to certain waste fractions such as packaging and electronic equipment (EEA 2009).

For waste generated by households, the federal 2012 Recycling Management and Waste Act (KrWG) states that the local waste disposal authorities have to deal with this waste: among others, these are in charge of collecting and transporting waste, promoting waste prevention and recovery, planning, construction and operation of waste disposal facilities. Finally, municipalities "have more practical tasks such as providing sites for waste collection" (EEA 2009; Fischer 2013).

3.2.1 Waste management in Germany

Waste Management Context

In the mid-1960s, the national government started to get interested in the waste problem, especially after the substantial increase in industrial production, which has turned in the early 1970s in huge waste generation: at that time, 50 000 small dump sites were present on the territory and the main interest was on the construction of new waste facilities (EEA 2009). This was codified in the 1972 Waste Disposal Act (AbfG, or Abfallbeseitigungsgesetz) with a rudimentary definition of waste as "portable objects that have been abandoned by their owners (Seadon 2006: 1327)." This was updated in 1994 to the Closed Substance Cycle Waste Management Act (KrW-/AbfG - Kreislaufwirtschafts- und Abfallgesetz) which put into law regulations about the avoidance, the recycling, and the disposal of waste, in that order.

In the 1990s, Germany was one of the first European countries to adopt policies with the aim of limiting landfilling (EEA 2009; Fischer 2013). The measures adopted[8] brought to the recycling of a large portion of municipal waste and a reduction of landfilling to 40% by 1995 (EEA 2009). Germany was also the first European country to introduce the

[8] For more information cf. EEA 2009 p.38.

concept of Producer Responsibility in 1991 related to packaging waste, by which is intended to give to the producers the responsibility of the waste packaging generated from their products (Fischer 2013). Additionally, the country has an established culture of recycling. Currently, 14% of the raw materials used in German industry are recovered waste products, and the recycling rates for municipal and commercial waste is ca. 60%. The various measures outlined in this section have contributed to a significant reduction and virtual elimination of landfilling in Germany, as compared to various other EU nations (Nelles et al. 2016: 7-8).

Waste Policy Objectives

Current German waste policy follows the EU waste hierarchy, prioritizing the prevention of waste generation at the source and leaving disposal be the last and final step (Directive 2008/98/EC); moreover, a special attention is focused on contamination avoidance and "ensuring treatment and landfilling of waste that is not recovered" (EEA 2009: 38). The strategy was to reduce the landfilling of the biodegradable waste (biowaste and paper waste), which have been collected separately from households. In addition to including the EU Waste Hierarchy rules, the 2012 Circular Economy Act (KrWG) set a final deadline of 2015 for mandated separate collection of biowaste by waste producers and the assigned waste management authorities. The treatment was also different: paper waste recovery and anaerobic biological treatment for biowaste meanwhile limiting organic content of landfilled waste (EEA 2009). In 1999 the German government decided to prevent completely municipal waste from landfilling by 2020 and it included recovering waste incineration residues and further treatment technologies (EEA 2009: 38). Other than the Packaging Directive in 2004, just few other targets have been established at federal levels, namely paper and cardboard (EEA 2009: 39).

Waste Generation in Germany

According to the European Environmental Agency (2016), Germany is situated at the third place in terms of amount of kilograms of municipal waste generated per capita in 2014 (EEA 2016: 2). On the other hand, the same research results show that Germany is located first for what concerns recycling of municipal waste for the same year (EEA 2016: 3). The value of recycled municipal waste is circa 64% (EEA 2016: 5).

Table 3.1: Waste generation in kg/person in Germany in 2014 (Nelles et al. 2016: 14)

Household waste (kg / person)	**462**
Residual waste	162
Bulky waste	29
Others (hazardous waste)	2
Recycled waste (kg / person)	271
Waste paper	72
Bio waste (bio bin, green waste)	57+64
Waste glass	23
Lightweight packaging (aluminium, plastics, tinplate, composites)	33

Table 3.1 shows the production of waste per households in Germany in 2014, it indicates that the recycling system in Germany is relatively well established; however, some improve can be done, especially in the attempt of reducing the amount of residual waste (see the project idea in Hamburg for biowaste in Section 3.4). One of the most urgent problems concerns the incineration of waste that could potentially be used for recycling, instead (Nelles et al. 2016).

Waste Policy Instruments

Organic to landfill

The first attempt to limit the landfilling was to reduce the amount of organic content in waste. To achieve this target, a landfill ban was introduced in two steps by the means of three different legislations (EEA 2009).

The first step was taken in 1993 with the introduction of an administrative regulation called TASi by which the organic content in waste direct to landfills had to be lower than 3% of the total organic carbon (TOC). To do so, thermal treatment of the waste was necessary: hence, incineration has been decided to be the only pre-treatment method before landfilling. Due to the governance form of Germany (being a federal states republic), each federal state could divert from this decision: in fact, in some states the Mechanical-Biological Treatment (MBT) was investigated. The analysis upon resulted in the decision that MBT might be used as an "alternative disposal route provided certain additional criteria" (EEA 2009: 39), meanwhile thermal treatment was the best possible solution for municipal waste (EEA 2009).

The second step started with the enactment of two ordinances in 2001 and 2002, the Waste Landfilling Ordinance (WLO) and the Ordinance on Landfills and Long-term Storage (OLLS), respectively. The first one was an attempt to close the holes of the 1993 regulation; the second one introduced technical solutions to the Landfill Directive which was not yet implemented in German legislation. The results of this second wave of regulations ended with stricter technical standards for MBT and allowed an organic content above 3% for this technology, making it an attractive alternative to incineration. Moreover, an amendment of the Recycling Management and Waste Act introduced a simplified permit procedure for waste treatment facilities other than landfills in order to allow the federal states to establish pre-treatment facilities faster (EEA 2009).

Separate collection: paper and biowaste

The separate collection of a number of waste streams is also regulated by legislation. "Between 1985 and 1993 the number of inhabitants with a collection system for biowaste increased from 400 000 to 7.6 million" (EEA 2009: 40). In 1993 with TASi the national level intervened directly on the waste separation mechanisms, as extensively explained in the previous paragraph. Packaging waste is then regulated by the Packaging Ordinance of 1991, the same by which the producer responsibility is introduced: this ordinance led to the 'Green dot system' for which Germany is the pioneer. The charges on households for the waste collection have to cover fully the cost of its collection and management. Such tariffs vary between the federal states and municipalities, according to the service offered and the method of management.

The further regulation of biowaste is contained in a set of policy instruments put in place over the past 20 years. Treatment and use regulation was codified in 1998 and then revised in 2012 - the Biowaste Ordinance (BioAbfV) governs what can and cannot be done with biowaste reuse and the treatments required before use or reuse (Schüch et al. 2016: 309).

Observations

The federal states abused of the exceptions permitted by TASi, especially in terms of requirements and of the length of the transition period. The ordinance of 2001 solved partly the problem by introducing MBT as a pretreatment method, not without resistance. However, Germany managed to reach almost 0% of waste to landfill in 2006 in favour of an increase in the MBT pretreatment waste (EEA 2009).

Yet, a 2012 survey noted by Krause et al. (2014: 2) revealed that almost 40 million people (private households) in Germany do not have access to separate biowaste collection;Nelles et al. further pointed out that the national collection of organic waste has still not become a reality yet: “there are significant problems between the municipal and the private waste management companies” (Nelles et al. 2016: 14), especially with the yellow bin (packaging) and still a relative high percentage of the waste goes to thermal recycling processes (incineration), which is considered in the European Union not effective for ecological perspective compared to material recycling.

3.2.2 Spatial Planning System in Germany

Introduction

The German planning system follows the division and hierarchies embedded in the separation of powers at the federal, state and local levels, while adhering to the principle of countervailing influence that requires coordination and adherence to higher-level rulings and designations (Turowski 2002: 11). Figure 3.2 shows the levels, tasks and various relationships between them.

Table 3.2: The German Planning System (own, reproduced from Turowski 2002: 12)

State Structure	Tiers of Planning	Legal Foundations	Planning Instruments		Material Content
Federation	Spatial planning at Federal level	Spatial Planning Act	-		→ principles of comprehensive spatial planning
Länder	Spatial planning at Land level	Spatial planning Act and Land planning legislation	Comprehensive supra-sectoral plans	→ Spatial structure plan → special and sectoral sub-plans	Aims of comprehensive spatial planning
	Regional planning			→ Regional plan → Regional masterplan	
Municipalities	Urban	Federal	Urban land-	→ Preparatory	Representation

	land use planning	building code	use plans	land-use plan	of land-use type
				→ Local development plan	Designations of urban development

Generally speaking, both the strong instruments and requirements for spatial planning and associated planning elements fall mostly to the states [*Länder*] with the federal level having some oversight and the duty to maintain consistency on a national planning level. This can create a concentration of power in the three city-states of Germany, namely Berlin, Bremen and Hamburg. At the same time, this also creates opportunities for specific problem solving of the same challenges that REPAiR is addressing (Turowski 2002: 28).

Spatial Planning in Hamburg and Schleswig-Holstein

The Free and Hanseatic City of Hamburg is - besides Berlin and Bremen - one of the three so-called federal city-states. The Ministry of Urban Planning and Housing (BSW, Behörde für Stadtentwicklung und Wohnen) is responsible for planning policies and processes on city level. In Hamburg only one planning document, the preparatory land-use plan (Flächennutzungsplan), covers the topic of spatial planning for the whole area of the city. Additionally, there are spatial development concepts (Stadtentwicklungskonzepte) that are not legally binding, but steer development and give input to legal planning.

Below the city-level there are seven districts representing the municipal level within the city of Hamburg. The districts are responsible for the local development plans that need to follow the guidance of the preparatory land-use plan. Under special occasions the City of Hamburg has the right to take over the preparatory land-use planning from the districts, e.g. for projects of importance for the whole city. The districts additionally can produce spatial development concepts or thematic concepts to steer and stimulate processes.

The district of Altona has a development concept for its urban core called Zukunftsplan Altona (BSU 2011; 2013). (Remark: from 01.07.2015 BSW Behörde für Stadtentwicklung und Wohnen and BUE Behörde für Umwelt und Energie are two separated ministries. They were one ministry before called BSU Behörde für Stadtentwicklung und Umwelt). The district of Altona has in its administration a Department for Economy, Building and Environment (Dezernat Wirtschaft, Bauen und Umwelt) with two specialist-departments for the Management of Public Spaces (Fachamt Management des öffentlichen Raumes, MR) and for Urban and Landscape Planning (Fachamt Stadt- und Landschaftsplanung, SL). The first is responsible for the maintenance of public spaces, the second for spatial planning and development (Hamburg.de 2017a).

In Schleswig-Holstein the state development plan (Landesentwicklungsplan) the main planning instrument is on federal state level. The Ministry of the Interior, Rural Areas and Integration is responsible for its development (Landesportal Schleswig-Holstein 2017b).

The Regional Plans are developed by the federal state in cooperation with the municipal level. There are three planning regions. The county of Pinneberg is part of the planning region 1 that covers the counties situated next to Hamburg.

The municipalities develop the preparatory land-use plan that needs to follow the principles of the regional plan. Local development plans are generally developed based on the preparatory land-use plan. Local development plans can be developed, if new developments require a new plan. The counties in Schleswig-Holstein do not play a role in formal spatial planning, but they can set spatial development concepts and they can support inter-municipal cooperation (Landesportal Schleswig-Holstein 2017c).

In addition to the formal planning system, there are informal instruments and organisations that are active in the field of spatial development. The so-called neighbourhood forum is a volunteer cooperation platform between the county of Pinneberg and its municipalities and the districts of Altona (and Eimsbüttel) to discuss current development projects and topics for future cooperation.

The Hamburg Metropolitan Region (HMR) is a volunteer cooperation based on a state contract between the federal states Hamburg, Mecklenburg-Vorpommern, Lower Saxony and Schleswig-Holstein. The cooperation area covers Hamburg and 20 counties and county-free towns with a total population of circa 5,3 million inhabitants. The HMR is mainly a platform with the aims to conduct cooperation projects fully or partly funded by common funds and to support the exchange of experience, it has no formal role in planning (Hamburg.de 2017a).

3.2.3 Waste Governance in Hamburg and Schleswig-Holstein

As mentioned in chapter 3.2, the responsibility for waste management is divided between the national level, the federal states and the municipal level.

The Free and Hanseatic City of Hamburg as a federal state is responsible for waste management. In the Ministry of Environment and Energy (Behörde für Umwelt und Energie), the department for waste management (Abteilung Abfallwirtschaft) is the supreme agency for waste management in Hamburg. It is responsible for all ministerial and administrative duties concerning waste management and for controlling Hamburg's public waste management company Stadtreinigung (BUE 2017). The organisation of waste management in Hamburg is defined in the law on waste management (Stadtreinigungsgesetz). By this law, the city-owned public waste management company Stadtreinigung Hamburg (SRH, Anstalt des öffentlichen Rechts) is responsible for the management of waste of private households, street cleaning, winter service and public toilets; moreover, SRH owns and manages 12 recycling stations all over Hamburg (Hamburg.de 2017a). Stadtreinigung Hamburg (SRH) by law is responsible for the waste collection and treatment of private households precisely for the residual waste and the biowaste (Hamburg.de 2017a). The residual waste is brought to two incinerators, one belongs 100% to SRH, the other one with a share of 45%; here, energy is produced in the form of heat and electricity and sent into the energy supply system for Hamburg and surrounding federal states (SRH 2017). The biowaste fraction from households in Hamburg includes garden and kitchen waste. Once collected door-to-door, it is treated in the compost facilities of Bio- und Kompostwerk Bützberg (BKW), which belongs entirely to SRH, and here it is used to produce Biogas for households' supply and Compost for agricultural purposes (SRH.de 2017). Additionally, SRH has a contract with the dual system (see above producer responsibility) to collect packaging waste (consisting

of plastics, metals) and paper / cardboards through one of its subsidiary companies WERT GmBH (BUE 2017). Waste from private households is therefore collected with a four-tons system separating residual waste, biowaste, paper / cardboards and packaging waste (gray, green, blue and yellow respectively). This follows the Hamburg ordinance on recyclables (Hamburgische Wertstoff-Verordnung) from 2011. However not all households - especially in dense urban areas - have the four-ton system. Therefore, SRH started so-called recycling offensives over the last years to increase the separate collection (SRH 2017: 29-30).

In Schleswig-Holstein the federal state is responsible for the legal frame with the Ministry of Energy, Agriculture, the Environment, Nature and Digitalization (Ministerium für Energiewende, Landwirtschaft, Umwelt, Natur und Digitalisierung MELUND) being the responsible ministry. Its State Agency for Agriculture, the Environment and Rural Areas (Landesamt für Landwirtschaft, Umwelt und ländliche Räume des Landes Schleswig-Holstein LLUR) is responsible for the implementation of the legal frame and is controlling and monitoring the implementation by the counties on municipal level (Landesportal Schleswig-Holstein 2017a).

The counties and larger cities are responsible for implementation of the waste management. In the case of Pinneberg county, the waste management is conducted by the Gesellschaft für Abfallwirtschaft und Abfallbehandlung mbH (GAB) (LLUR 2017: 4-8).

3.3 Stakeholder Identification

3.3.1 Process

The key stakeholders Stadtreinigung Hamburg, the City of Hamburg and the county of Pinneberg were already involved in the proposal phase of REPAiR. In the frame of REPAiR, Stadtreinigung Hamburg is mainly interested to find solutions for the biowaste stream and the county of Pinneberg is mainly interested in the question of how to improve biowaste cycles of tree nurseries in its area. Based on these focal points further stakeholders were contacted and involved through the process. The key stakeholders were interviewed and participated in several meetings. Further stakeholders were involved in roundtable discussions. The interviews and roundtable meetings were made between May and November 2017. The interviews were recorded, while the roundtable meetings were just documented in written notes.

3.3.2 Results

Results of the interviews and roundtable discussions are summarized in the two tables below. Table 3.2 summarizes results for the goals of stakeholders. Table 3.3. one can estimate the attitude towards the project, and an opinion about the necessity of their involvement during the next phases of the project

Table 3.2: List of key stakeholders involved in Hamburg case.

Title institution (Level, Sector)	Goal	Goal Description
WP6_6.2_01H	Content / Process related	Association wants to make the tree nurseries more sustainable; can work as a moderator, facilitator
WP6_6.2_02H	Content / Process related	The county wants to support the tree nurseries in order to keep them in the county. Therefore, the county has an interest to make them more sustainable.
WP6_6.2_03H	Content / Process related	Stadtreinigung wants to improve the quantity and quality of biowaste collection

WP6_6.2_04H	Content / Process related	GAB is interested in better waste management and circularity, but is not responsible for the waste of the tree nurseries
WP6_6.2_05H	Content / Process related	Include the topic of waste management into urban planning; use results for its climate action plan
WP6_6.2_06H	Content / Process related	Include the topic of waste management into the planning and management of public spaces; use PULL experience for its experience in digitalization of planning and participation
WP6_6.2_07H	Content / Process related	Improve Hamburg's sustainability according to its objectives set in policies. Share international experience.
WP6_6.2_08H	Content related	Increase the availability of good soil / compost for their usage

Table 3.3: List of key stakeholders' influence, attitudes and needs for involvement into the Hamburg case.

Actor	Influence	Attitude	Need for Involvement
WP6_6.2_01h	High	Positive	High
WP6_6.2_02H	Medium	Positive	High
WP6_6.2_03H	High	Positive	High
WP6_6.2_04H	Medium	Neutral	Medium
WP6_6.2_05H	Medium	Positive	High
WP6_6.2_06H	Medium	Positive	High
WP6_6.2_07H	High	Positive	High
WP6_6.2_08H	Low	Positive	Medium

In the interviews and roundtable meetings, the following stakeholders were mentioned/asked/recommended to be involved in the project:

- Regional associations of garden and landscaping enterprises for Hamburg and Schleswig Holstein
- Consultants for tree nurseries and gardening enterprises (Versuchs- und Beratungsring)
- Enterprises specialized on production of compost, mulch, soil
- VKN enterprise for marketing of compost (VKN Vertriebsgesellschaft Kompostprodukte Nord mbH), 64,84% owned by SRH
- Associations of garden friends, allotments (workers' gardens)
- Environmental associations (e.g. BUND, NABU)
- Federation of the Northern German Housing Industry (VNW - Verband norddeutscher Wohnungsunternehmen e.V.)
- Association of housing cooperatives in Hamburg (Arbeitskreis Hamburger Wohnungsbaugenossenschaften e.V.)

- Free and Hanseatic City of Hamburg, Ministry of Environment and Energy (Behörde für Umwelt und Energie)
- Schleswig-Holstein, Ministry of Energy, Agriculture, the Environment, Nature and Digitalization (Ministerium für Energiewende, Landwirtschaft, Umwelt, Natur und Digitalisierung MELUND)
- Local nature conservation authority of the county of Pinneberg
- Business development department of the county of Pinneberg
- City of Hamburg, Agency for Geoinformation and Surveying (Landesbetrieb Geoinformation und Vermessung)

3.4 Decision-Making Framework

Hamburg-Altona

As described in the section on waste governance in Hamburg, SRH is responsible for implementing the policies that are defined by the City of Hamburg. According to the interviews and discussions the currently most urgent topic is the increase of the quantity and quality of biowaste collection. In Hamburg, the residual waste bin is still filled up partly with recyclables. In particular, the percentage of biowaste in the residual is rather high (around 35%), which precludes its reutilisation.

Stadtreinigung takes already a variety of actions to achieve an increase of biowaste collection: more households received bins for biowaste, landlords were informed about the advantages of separate biowaste bins, and there is a financial incentive to separate biowaste, because the bill for residual waste gets cheaper. After several campaigns to convince landlords of the advantages of the separate collection, now SRH distributes bins / containers for separate biowaste collection even if landlords are reluctant - provided there is sufficient space for an additional bin.

In order to persuade households / tenants of a separation, SRH conducts information campaigns including leaflets in several languages. In the whole city waxed paper bags are being distributed for free at farmers markets, drug stores and amenity centres, that shall be used for the separation of biowaste in the households as they are biodegradable and more stable than pure paper bags.

The challenges linked to this problematic are:

- In some densely built areas of Altona, waste is still collected in pink bags (Sackabfuhr) as there is lack of place to dispose tons / containers, therefore the collection with bags is still necessary. In these areas a separation of biowaste and residual waste is not possible so far. Additionally, the pink bags are not ideal, e.g. they are also a problem of tidiness. In other areas there is only enough space for residual waste bins, but not for biowaste bins, therefore no separation of biowaste is possible. Other recyclables are collected in depot containers in public spaces, for instance at roadsides. For biowaste, this seems not to be a solution as tests with underfloor containers showed that people do not separate the waste properly. This seems to be a problem of social control.
- In some areas where separate biowaste bins are disposed, especially in large housing estates, the biowaste bins are not always used properly. Despite information campaigns, there is still a need for convincing housing companies, facility managers and tenants of the advantages of a better waste separation.
- Solutions for the aforementioned challenges require more cooperation between spatial planning on the one and waste management on the other side. At the moment waste management does not play a major role in spatial planning in Hamburg. This occurs in different fields; e.g. in the planning and situation of containers in public spaces or in the planning process of new housing estates and new quarters where the topic of waste is often neglected.

- In areas with detached houses the biowaste bins are mainly filled with garden waste, whereas the kitchen waste is mainly thrown into the residual waste bins. This is a wasted opportunity as the kitchen waste has a higher value for biogas production than the garden waste.

Pinneberg

As mentioned earlier, the county of Pinneberg is characterised by a mosaic of land uses (e.g. villages centers, detached house areas, social housing, retail, logistic) and open spaces (agricultural land, largest European area of tree nurseries, garden plant production, recreation areas, and natural preservation areas). The concentration of circa 250 tree nurseries and garden plant producers is rather unique. However, due to their proximity to Hamburg, many municipalities in Pinneberg County are attractive for new housing. Therefore some tree nurseries are threatened by urban development of the surrounding settlements.

The main waste fraction produced by the tree nursery is biowaste. According to the law the tree nurseries are responsible for the disposal of their biowaste and they have the right to do the disposal on their area. The disposal respectively further treatment is done in different ways: storage on the site, creation of compost, composting and production of gas, incineration. The biggest part is stored or incinerated directly on site, which is a rather problematic solution in terms of sustainability and energy recovery. It is also a problem due to the fact that many tree nurseries are located the peri-urban tissue of municipalities and their burning activities disturb the neighborhood.

The current land use situation and the problems generated by the incineration activities have created a need for solutions to improve the situation and to make the waste management of tree nurseries more sustainable. The tree nursery association has an interest to support its member enterprises to become more ecological. The county of Pinneberg has the same interest; the county wants to keep the tree nurseries active and to support them for future challenges. The problematic behind this is, that once tree nurseries close down, their former areas could be changed into housing areas. The county would like to avoid this to prevent form further urban sprawl.

The challenges linked to this problematic are:

- There is a need for more information about the waste management of the tree nurseries; so far only selective cases are known showing the huge variety of how they treat their waste.
- There is a need to involve the tree nurseries and to convince them of the advantages of a more circular way of waste management.
- Regarding the governance setting there is the challenge that the county and the tree nursery association do not have legal power to change the situation, but only can work as moderators and multipliers. The willingness of the tree nurseries and other actors to cooperate is thus crucial.

4. Case: Łódź

4.1 Description

The first definition of the Łódź case study area has been done in a pre-Lab participatory process, led by the IGiPZ PAN (Institute of Geography and Spatial Organization, Polish Academy of Sciences) and PHH (Pheno Horizon) and in collaboration with other local partners and User Board Members. At the regional level, the Łódź Metropolitan Area was chosen as the relevant regional entity to start the selection of the peri-urban scale.

The Łódź Metropolitan Area (Łódzki Obszar Metropolitalny), shown in Figure XX below, is located in central Poland. The ŁMA is made up of thirty-one local self-government units of five districts: the City of Łódź, Brzeziny County, Lodz–East County, Pabianice County and Zgierz County. One of the primary objectives between the five districts is to promote socio-economic development of the Lodz Metropolitan Area through ITI Association (Integrated Territorial Investment). The total population of the ŁMA is about 1.1 million. The region is responsible for a range of policies, including economic development, public transport, and aspects of spatial planning related to suburbanisation, infrastructure and waste management.

Based on workshops with key stakeholders, as well as a preliminary territorial study, we selected the focus area of Łódź Metropolitan Area as a northern-eastern part of the ŁMA – communes located within two suburban belts - national road 14 and 72, with a particular attention to communes of Stryków and Brzeziny.

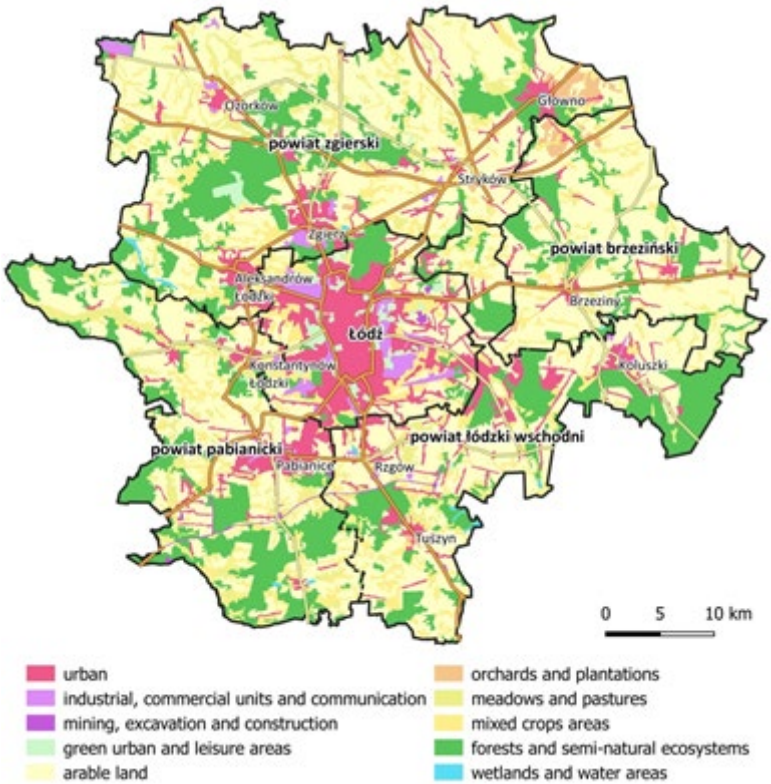


Figure 4.1: Łódź Metropolitan Area (CORINE Land Cover, 2012.)

4.2 Governance Background

In Poland, until recently, the most common form of waste disposal was their storage

mainly on landfills. This was not in line with the principle of directing as little as possible of the waste to landfills (Toruński 2010). However, recent years have shown very dynamic changes in the field of waste management. This is confirmed primarily by the introduction of new regulations and legal provisions adapting waste management to regulations in force in the European Union countries. The amount of scientific research and documentation in this field has also increased, in which the diagnosis of contemporary changes in waste management resulting from new regulations is made (Kulczycka, Kowalski 2008; Kolsut 2016; Ingaldi, Jursova 2013; Antczak 2016; Styś, Foks 2014). All studies emphasize the significant increase in the role of local governments and regions in the management and disposal of municipal waste. Waste management has also become a good business occupation related to the collection, sorting and storage of waste and various forms of their use in renewable energy.

With regards to municipal waste, Poland has a low level of management compared to other EU countries; according to data from 2013, about 63% were deposited in landfills, only 8% were subject to process incineration and 13% biological treatment. However, the dynamics of beneficial changes in this area is high. For example, in the period 2007-2012, a similar amount of municipal waste was generated annually (at the level of 12 million tonnes per year), but at the same time the amount of deposited waste in landfills decreased from 9.1 million tonnes to 7.1 million tonnes; the remaining wastes have been disposed of in various forms. The interest of entrepreneurs in the waste management sector also increases; in 2013, there were 3,731 enterprises registered to collect non-hazardous waste and, compared to 2009, it was 18% more. (Styś and Foks 2014)

Both changes in regulations and regulations in waste management in Poland are very dynamic, which results from backwardness in relation to Western European countries and the need to quickly make up for these differences. From 1 January 2012, new acts on cleanliness and order were introduced, which amended the existing regulations of September 13, 1996. They provided for the fact that the communes would have a period of several months to implement the new regulations. These changes were intended to simplify Polish law and its adaptation to European standards of municipal waste management (Ulfik, Nowak 2014). The most important regulations in line with the European Union directives concerned the recovery and re-use of waste (recycling) and the use of waste as unconventional energy sources. The new law obligated the commune, as the basic territorial unit in the country, to manage the whole waste management system, including waste collection, sorting and utilization. On this basis, the residents no longer concluded contracts for the discharge of municipal waste with private companies, but received the amount of fees for these services specified by the municipality. On the other hand, the commune after the tender procedure signed temporary contracts with companies that dealt with collecting rubbish from residents.

The new regulations came into force practically from 2013, and the Waste Act was introduced (as of 14 December 2012). In total, they have reformed all existing waste management. According to the Act, municipal wastes should be collected selectively, and communal self-governments are responsible for compliance with the principles adopted by the Act. Local self-government authorities are therefore responsible for managing processes related to local waste management; they also make the most important

decisions as to the forms and methods of their implementation. The system of containers for three categories of waste was commonly introduced: mixed waste, glass and plastic paper. However, depending on the municipality, the number of segregated categories of waste varied and ranged from three to six. The municipal governments decided about the categories of segregated waste.

The self-government is responsible not only for organizing the collection of municipal waste, but also for other aspects of waste management related also to investment processes. The most important tasks include: development and application of cleanliness and order regulations, determination of rates for municipal waste management, construction, operation and maintenance of installations and equipment for waste recovery and disposal, implementation of tendering procedures for collection and management of waste (Styś, Foks, 2014). On the other hand, the responsibilities of the regional self-government (voivodship) include: development of the Provincial Waste Management Plan and indication of regional installations for processing municipal waste.

In most communes, the municipal waste segregation system is common. In 2014, the mass of collected municipal waste amounted to 10330 thousand tones, of which about 20% were separately collected waste; 80% of this waste came from households (*Ochrona Środowiska* 2015). According to data from 2013, separately collected municipal waste had the following fractional structure: glass - 25%, paper and waste paper - 16%, plastics - 17%, large-size waste - 11%, textiles - 3%, metals - 1%, waste biodegradable - 25%. Subsequent regulations introduced recommendations related to the type and quantity of waste collected selectively at source, the colour of containers or bags for waste, the types of waste, the frequency of emptying waste containers.

By 2012, waste collection was carried out on a free market basis; the owner of the household or household union signed a contract with the company collecting waste from the property. Lack of proper records and control related to the collection of waste and their generated mass resulted in the creation of illegal dumping grounds (about 2000 in the whole country) and illegal waste incineration in house-based boiling-rooms. According to F. Czyżyk et al. (2015), in 2012 about 20% of the country's population was not covered by the obligation to have a waste collection contract. The Act of December 2012 introduced in this area changes consisting in increasing the scope of tasks of local governments in the scope of organization and supervision of municipal waste management.

In the three-year period 2013-2016, as many as 13 regulations related to waste management were introduced in Poland. They concerned, among others: management of packaging and packaging waste, utilization of batteries and accumulators, recycling of end-of-life vehicles, management of waste electrical and electronic equipment, and public impact on the natural environment.

Since July 1st 2017, new rules for municipal waste segregation have been introduced, which normalize the system of selective collection of "garbage". They fit into four separate containers differing in colour: blue - paper and cardboard, green - glass packaging, yellow - metals and plastics, brown - biodegradable waste. Thus, the waste is collected selectively at the source, i.e. directly in multi-family housing estates, single-

family houses and other places where municipal waste is generated. The general rules for waste segregation have therefore been standardized at the national level.

The Łodz region is characterized by a high level of municipal waste generation. According to L. Kłos (2012), in 2010, an inhabitant of the region produced, on average, 336 kg of waste, which is the fifth place in the country (the highest value of 379 kg was characteristic of the Lower Silesia Voivodship). In 2014, there were a total of 28 installations for municipal waste treatment in the Łodz region. The value of contracts for the collection of municipal waste amounted to approximately PLN 170 million gross (ca. 40 M €), which places this region on the seventh place in the country. The highest value was in the province Masovian Voivodeship, PLN 590 million (ca. 139 M €), and the lowest in the province Podlasie - approx. PLN 50 million (ca. 12 M €).

It is worth emphasizing that the region is characterized by the highest support in the country of the waste management sector within the framework of the Regional Operational Program (ROP) 2014-2020, which amounts to PLN 163.9 million. The main objective of this support is to reduce landfilling and to increase the level of waste recovery, including waste recycling (Regionalny Program 2017). Activities include: investments in the development of a waste management system, projects related to waste prevention, promotion of reuse and implementation of recovery technologies, and modernization or reconstruction of waste management plants. The Łodz region is divided into four regions of waste management (See figure 4.2).

Figure 4.2: The division of the Łodz Region into municipal waste management regions and a list of installations for processing mixed municipal waste (Plan gospodarki 2012).

4.3 Stakeholder Identification

4.3.1 Process

Expert knowledge is currently considered one of the basic sources of the functioning of social and economic systems. The main advantage of the expert method is to obtain reliable and reliable information from people who decide or have influence on the implementation of legal tools, in this case, in the process of resource management.

Conducted interviews on key waste management issues gave many in-depth statements regarding resource management and the challenges facing stakeholders in the process in the near future.

There has been a number of methods that resulted in the identification of key stakeholders first for the basis of follow-up case analysis. First, a Polish stakeholder REPAiR kick-off meeting organised by the IGiPZ PAN and PHH team on 1st of February 2017 in Łódź enabled the identification of waste management initiatives involved key stakeholders as identified by practice partners and user board member involved in the REPAiR project (groups – self-government institutions, NGO, waste companies, environmental institutions). Second, an analysis of policy and business documents concerning economic and spatial development of the Łódź Metropolitan Area, and the development of circular economy and waste management initiatives in it, provided further ground for identifying significant stakeholders. Finally, the key stakeholder interviewees were asked to name additional stakeholders for a second round of interviews, which can be seen as a snowball effect.

The request for interviews with key stakeholders happened by e-mail and by telephone. The interviews were held between 11th of August 2017 until 17th of September 2017 and were conducted by three members of the IGiPZ PAN team and two members of PHH team, respectively. All interviews were held 4.1face to face and all of them in person. The majority of the semi-structured interviews lasted around an hour, and were followed by a questionnaire of eleven main questions. This questionnaire can be made available when requested. Almost all interview data collected is audio-recorded, and data has been described, analysed and summarised in interview transcripts, allowing for comparing the findings.

5.3.2 Results

Table 4.1 summarizes results for the goals and responsabilities of stakeholders.

Table 4.1: List of key stakeholders involved in Łódź follow-up case with their priorities (IGiPZ PAN & PHH team, 2017).

Title institution (Level, Sector)	Goal	Responsibility of interviewed person
WP6_6.1_1L (Municipal, Pu)	Content related	Person responsible for local development in the town of Brzeziny
WP6_6.1_2L (Regional, Pu)	Content related	Person responsible for nature protection in the landscape parks of Łódzkie voivodeship
WP6_6.1_3L	Content related	Supervision and punishment for waste

(Regional, Pu)		management irregularities
WP6_6.1_4L (Regional, Pu)	Process related	Identification of significant anthropogenic impacts and their impact on surface and groundwater status, in the water region
WP6_6.1_5L (Sub-municipal, Pu)	Process related	Supporting the idea of territorial self-government and the defence of the common interests of the members of the Association and supporting socio-economic development of Lodz Metropolitan Area
WP6_6.1_6L (Municipal, Pu)	Content related	Person responsible for local development in the town and Commune of Stryków
WP6_6.1_7L (Sub-municipal, Pu)	Content related	More efficient waste management; better waste segregation; better use of biological waste; increasing the frequency of waste receiving; construction of a new waste processing plant; closing of old landfills
WP6_6.1_8L (Regional, Pu)	Content related	Regional self-government responsible i.e. for implementation of Regional Operational Programmes
WP6_6.1_9L (Municipal, Pu)	Content related	Person responsible for city development in Łódź
WP6_6.1_10L (National, Pu)	Process related	Person is responsible for main strategic governmental document "Strategy for Responsible Development" and absorption of EU funds.
WP6_6.1_11L (Municipal, Prv/Pu)	Content related	Responsible for waste management in one of the communes in Łódź Metropolitan Area

On the basis of the interviews, the literature and document analysis, one can estimate the level of power, which each actor (might) has, its attitude toward the project and an opinion about the necessity of its involvement during the next phases of the project (see Table 4.2 below).

Table 4.2: List of key stakeholders involved in Łódź follow-up case with judgements on their influence, attitude and need for involvement (IGiPZ PAN & PHH team, 2017).

Actor	Influence	Attitude	Need for Involvement
WP6_6.1_01L	High	Positive	High
WP6_6.1_02L	High	Positive	High
WP6_6.1_03L	Medium	Positive	Medium
WP6_6.1_04L	Medium	Positive	Medium
WP6_6.1_05L	Low	Neutral	Low
WP6_6.1_06L	High	Positive	High
WP6_6.1_07L	High	Positive	High
WP6_6.1_08L	Medium	Positive	Medium
WP6_6.1_09L	Very High	Positive	High

WP6_6.1_10L	Very High	Positive	Medium
WP6_6.1_11L	Medium	Positive	Medium

Action for sustainable waste management requires interaction on a number of levels with local and cross-border partners, ranging from residents, their communities, schools, business and scientific partners, across all levels of government, regulating and implementing waste management projects. It is difficult to list one or several institutions. The interviewed stakeholders proposed a number of additional stakeholders that might be worthwhile talking to in the following stages of the research, which are subdivided here in various organisation categories:

- Government: Department of Innovation in Ministry of Economic Development, Ministry of the Environment, State Forests.
- Self-government and Regional Authorities: City of Lodz, the Marshal's Office in Łódź, the Łódzkie Voivodship Office, the Łódzki Obszar Metropolitalny Association, Voivodship Inspectorate for Environmental Protection in Łódź, waste management and environmental protection departments in city and commune offices.
- Energy/circularity/waste: Municipal Waste Treatment Company.
- Academic: Łódź University, (Faculty of Process Engineering and Environmental Protection) Technical University of Łódź.
- Other: Bioregion Łódzkie.

The extensive list of additional stakeholders representing different sectors and playing different roles in the circular economy governance landscape of the Łódź region identified makes generated through snowball method provides a basis for further exploration. In the next stage, criteria will be developed to select a representative sample of the relevant stakeholders.

5.4 Decision-Making Framework

5.4.1 Description

The new paradigm of waste management was formed as a result of the entry into force of the Act (2013), which transferred responsibility for the removal of waste to the lowest-level local government units (commune). This Act and subsequent regulations issued by the Ministry of the Environment created the basic conditions for the role of self-government in ensuring cleanliness in municipalities.

The responsibility of local governments for waste disposal is currently one of the most important tasks in the municipal economy, and also constitutes a significant link between the local authority (efficiency of self-government) and residents of territorial units. The sensitive issue and the effect of the local waste policy is the remuneration for removing household waste. Local self-government bears, therefore, political responsibility in two ways, i.e. it must fulfil the tasks set by the legislator and is, inter alia, accountable for actions by people in local government elections.

In the above-mentioned context, issues that are perceived by the waste management

processes selected for interviews should be considered. An in-depth analysis of interviews showed regularities in the perception of major problems that have different social, economic and political conditions. However, there are relations between problems (issues) that create a general picture of waste management. The relationship between the main issues raised in interviews in the context of the interview structure is presented by figure 4.3 below.

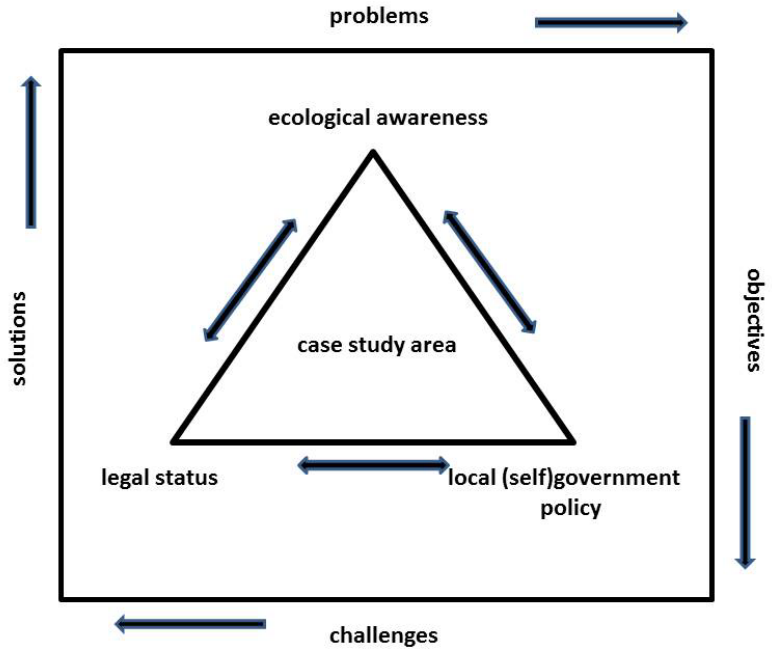


Figure 4.3: Basic problems of waste management in the opinion of process stakeholders (in the context of the structure of the interview)

In the course of the analysis of the conducted interviews, three equivalent issues, around which the conclusions on the problem of waste management can be addressed, are highlighted. Depending on the stakeholder and his role in the waste management process, the emphasis was on one of the issues, but in most interviews these three issues exist in a direct or indirect way. As a result, three key issues were highlighted:

1) **Ecological awareness** - it permeates all levels of management of the waste management process and concerns equally the decision-makers and people who produce the waste. Ecological awareness concerns the noticing of the problem of human influence on one's environment and thus the satisfaction of staying in the environment. Ecological awareness in relation to the problem of waste management is the process of acquiring and deepening knowledge in the area of reducing hazards arising from the generation of waste as a side effect of collective activity (broad approach) and unitary (narrow approach). Ecological awareness is combined with a sense of social responsibility and civic co-management of the environment. In comparison with the countries of the "old union", the level among Poles of these values is dramatically low**.**

2) **Legal status** - a set of legal regulations in the field of waste management, which include laws and regulations. The legal status is an expression of the aspirations of the legislative authority and the executive at the state level, which define the directions of

actions and the expected effect in the social space (ecological awareness) and physical space (the process of collecting and processing waste). The legal status creates the basic mechanisms of waste management. For this reason, it is under pressure of continuous assessment (approval or criticism) of social environments, including change stakeholders.

3) **Local government policy** - local government policy is a reaction to the existing legal status. Local authorities create waste management principles and are responsible for achieving effects in the collection and segregation process. Local authorities and institutions are an intermediary structure between residents (local government community), who evaluate activities and have needs and expectations, and state authorities, to which they direct comments on process imperfections, conditions and postulate (consult) new legal solutions.

The table 4.3 below presents these three basic issues in the following order: i) detailed problem identification, ii) indication of goals to be achieved, and iii) challenges and solutions.

Table 4.3: Problem identification, indication of goals to be achieved and challenges and solutions (IGiPZ PAN & PHH team, 2017).

	Problems	Objectives	Challenges and solutions
Ecological awareness	The problem of ecological awareness contains many elements that can be seen in genetic categories (causes of the current state of consciousness), functional (related to other types of consciousness) and structural (determinants and structure of consciousness). The main problems associated with the state of consciousness refer to the following issues: a) stating the low level of ecological awareness of Polish society, including the population living in the case study area, which results from the habits established over many years before the entry of legal regulations from 2013, as well as the lack of ability to predict ecological effects in the short and long term; b) irregularities in the performance of activities at the initial stage of preparing waste for processing, i.e. bad segregation or in many cases no waste segregation. As a consequence, the amount of waste going to be recycled is small; c) incineration of waste in domestic ovens, especially in winter or disposal of waste (especially non-standard waste - construction waste, from automotive workshops) in an illegal manner.	a) carrying out information and educational activities for people to properly segregate rubbish; b) social actions for extending the life of household appliances and clothes; c) application of penalties for people posing an environmental threat (burning rubbish, illegal waste disposal).	a) raising ecological awareness (knowledge, practices, anticipation) of people and authorities; It is also important to exchange experiences between stakeholders of rational waste management; b) increasing the responsibility of public institutions for ecological education, especially of the young generation.
Legal status	a) low quality of reception services and management of	a) striving for cooperation between	a) new legal regulations are needed to create real

	municipal waste, which is related to gaps in the law; b) no possibility to set up local recycling centres and opportunities for other local initiatives without the requirements of complicated environmental procedures; c) the lack of legal possibility to cover all taxpayers in local government units with the obligation to sign a contract; d) maladjustment of municipal infrastructure (especially in the case of dense urban construction) to changes forced by law for increasing waste recovery; e) lack of legal regulations for creating waste treatment installations in a flexible manner, eg the possibility of commercial institutions setting up local governments.	institutions at various levels of local government (associations as legal entities) for the influence on the selection of companies that perform good quality waste management services; b) creating the possibility of establishing local recycling centres; c) legal pressure to increase the number of taxpayers concluding contracts with local government for waste disposal; d) ensuring the achievement of the required by law levels of waste recovery, including the modernization of the sorting plant and adaptation of technical infrastructure for the collection of waste of various factions; e) providing local governments with greater freedom in waste management in the form of legal regulations regarding the establishment of commercial companies.	associations of local governments that will integrate their activities for the benefit of municipal economy; b) sealing of the off-site collection system and involvement of local government units; c) securing an appropriate level of segregated waste to build or currently constructed regional municipal waste treatment installations; d) cooperation with the Ministry of the Environment and regional self-governments to increase the rationality of using financial resources for waste management purposes.
Local policy	a) weak cooperation between local governments to implement the objectives of ecological policy; b) no widespread share of passing good practice scenarios; c) weak lobbying of local governments for innovative ecological solutions; d) poor control (monitoring) of the ecological situation in the field by self-government institutions.	a) cooperation of self-government associations for joint articulation of problems in the field of changes in law (especially at the stage of creating the basis of legal regulations, and not only in the scope of consultations on ready-made projects); b) creating books of good practice and sharing knowledge; c) increasing control by local government institutions in the field.	a) greater influence of local governments on creating legal regulations at the state level; these regulations are crucial in the field of waste management control; b) waste management requires constant improvement of qualifications by local governments and cooperation between stakeholders of the process; c) convincing residents that rational waste management, which starts in their homes, leads to a reduction in waste production costs and real savings.

The issue of wastescapes

Problems of degraded areas (landscapes) are difficult to determine for respondents, let alone indicate the role that they can fulfil in the policy of sustainable development. One of the objective reasons is the spatial variability of areas abandoned in the period of social and economic changes after 1990. Many people emphasized the abandonment of agricultural land. However, after Poland's accession to the European Union as a result of

the area subsidies policy in agriculture, the scale of this phenomenon has clearly decreased. In recent years, attention has been focused on the extraction of mineral resources needed for the construction of expressways and highways, which is largely an uncontrolled and difficult to identify process. The relationship between abandoned areas and the development of eco-environmental investments is also difficult to determine. In the opinion of respondents, areas excluded temporarily from use will find their new function due to investors seeking areas with low predispositions for social conflicts (former industrial areas adapted to new similar functions).

The issue of circular economy awareness

All respondents declared that they know the concept of "circular economy" and are convinced of its adequacy for modern waste management processes. Stakeholders in the description of understanding the principles of the circular economy have usually emphasized three features:

a) prevention of waste by re-use;

b) effective use of waste, including the process of accurate segregation;

c)conscious management of waste, including extension of product life (sustainable production and consumption);

d) reducing the use of Earth resources as a result of the application of circular economy principles.

Stakeholders emphasized that by virtue of their duties, work and implemented projects; circular economy is a natural direction of their activities and cooperation for them. Many respondents emphasized that this concept is not widely known and that much work should be done to disseminate the ideas and principles of re-use of waste that society produces. The effect of relatively low ecological awareness is also the poor functioning of the circular economy, and thus a long way to get the right results.

4.4.2 Analysis

An attempt to determine the correctness in the assessment of the current waste management system is very difficult due to the relatively short period of functioning of the new rules, which have transferred responsibility in this respect to local governments (from 2013). The coming years will be decisive for the stabilization of the waste collection and treatment system. Big responsibility lies with the legislative and executive authorities of the highest, state level, which should in a short time verify the instruments of achieving the effects of using waste for the production of new goods. An important role in this respect should be played by associations of local self-governments, which articulate the need for changes and modernization of approaches to waste management, including the creation of new legal regulations. However, achieving success in the functioning of circular economy rules will depend to the greatest extent on strengthening the ecological awareness of urban and rural residents who need to understand the social need (collective responsibility) as well as the individual based on the economic benefit of reusing waste in the production of new goods.

5. Case: Pécs

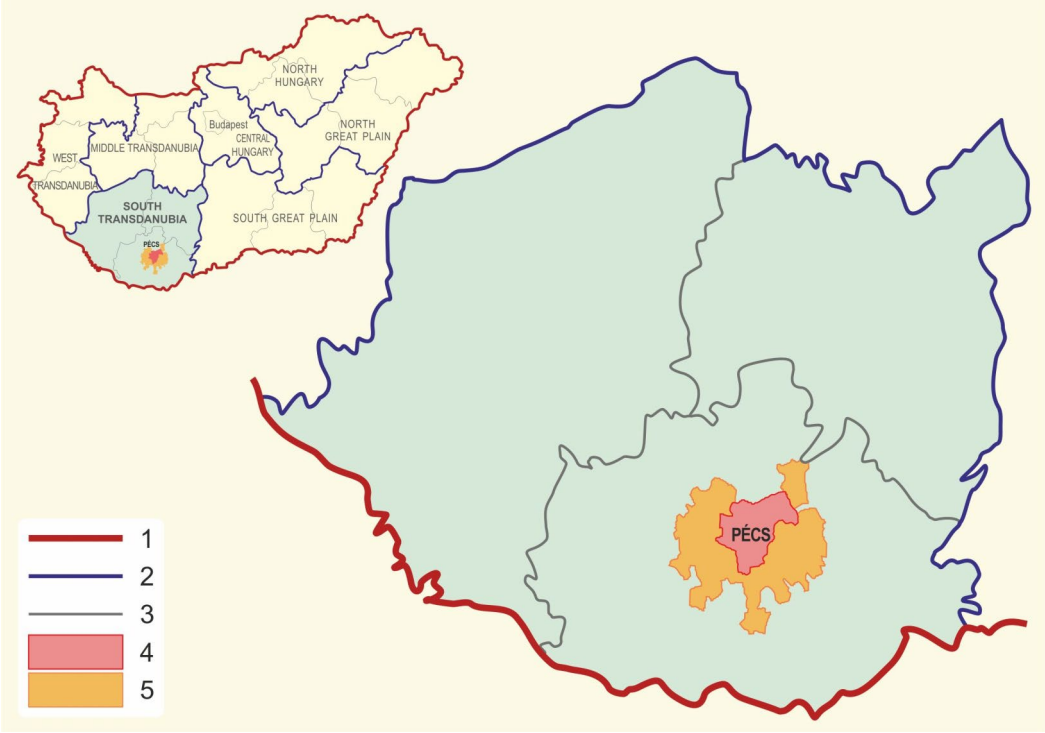
5.1 Description

Pécs is located in South-West of Hungary bearing the "title" of the less developed area. There were 144 675 inhabitants at the end of 2016 (KSH 2017[9]).

The Case Study Area of Pécs is defined by both the public administrational boundaries and functional areas of the Hungarian waste management system. The municipal solid waste was 48 443.9 tons in 2016 from which 37 343.1 tons came from the household sector (KSH 2017).

As a result of the Hungarian consortium partners' (RKI, BIOKOM) decision, the focus area has been defined as the city of Pécs. This focus area allows us to analyse the waste flows on a narrower scale, and the public administration unit covers very urbanised and rural, sparsely populated areas too.

The case study area (Figure 5.1) contains the territory of the City of Pécs (LAU1 unit) in Hungary. At higher local levels we can find two or three other potential areas: the Agglomeration of Pécs, the District of Pécs and the Commuting Region of Pécs. From the point of view the public administration only the Municipality of Pécs and the District of Pécs has legal status, the latter is one from the 197 districts of Hungary. In the Hungarian public administration system the District is the LAU2 unit. The District of Pécs, beside the City, contains 40 other settlements.

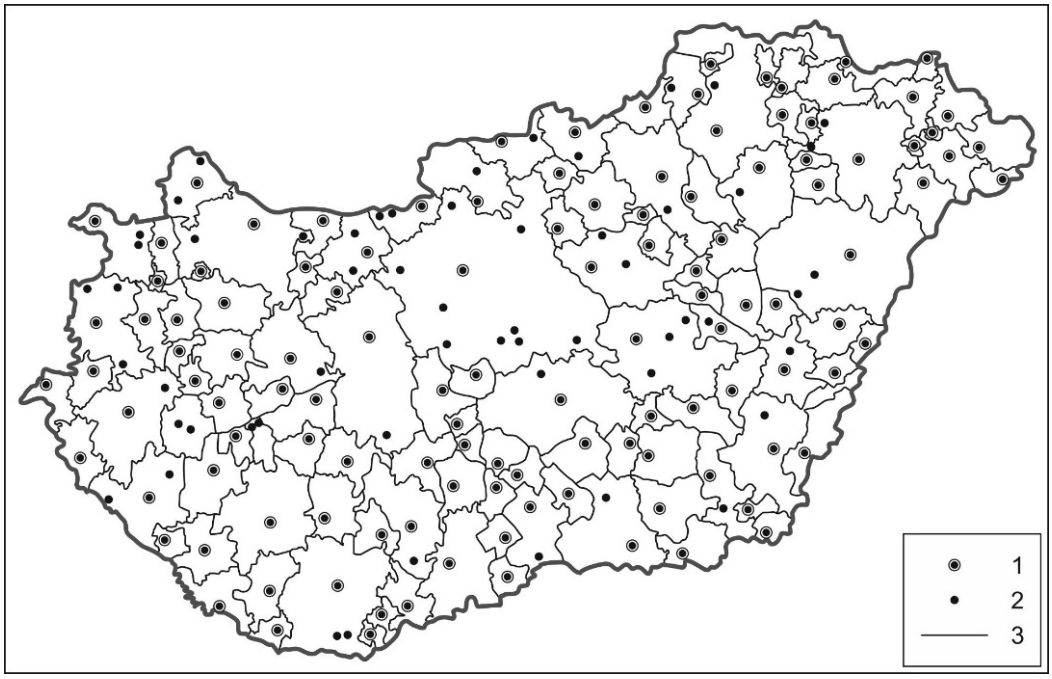


[9] KSH 2017: Dissemination database of Hungarian Central Statistical Office. - http://statinfo.ksh.hu/Statinfo/haViewer.jsp (Accessed: 01.12.2017.)

Legend: 1) Country border; 2) NUTS 2 (South-Transdanubia region) border; 3) County border; 4) City of Pécs; 5) Agglomeration of Pécs with 41 municipalities.
Figure 5.1: The Case Study Area of Pécs (Valéria Fonyódi, 2017)

The Agglomeration of Pécs is defined by the Hungarian Central Statistical Office (KSH 2014) as one from the agglomerated regions[10] of Hungary. Pécs Agglomeration encompasses Pécs and other 40 settlements around the city (these are almost the same municipalities then the members of District of Pécs). The city's economic and functional integrator position has been strengthened from 2003, when only 20 municipalities were in the agglomeration of Pécs (KSH 2014).

Another functional city region is the commuting area (Figure 5.2) of Pécs. According to Pénzes et al. (2014), within this economic district, nowadays, Pécs attracts more than 100 settlements from the region. The circular economy concept has strong economic background conditions that is why we have to deal with the operation of the regional economy as well.



Legends: 1) commuting area centre; 2) commuting area sub-centre; 3) border of commuting area.
Figure 5.2: Commuting regions of Hungary (based on Pénzes et al. 2014:486)

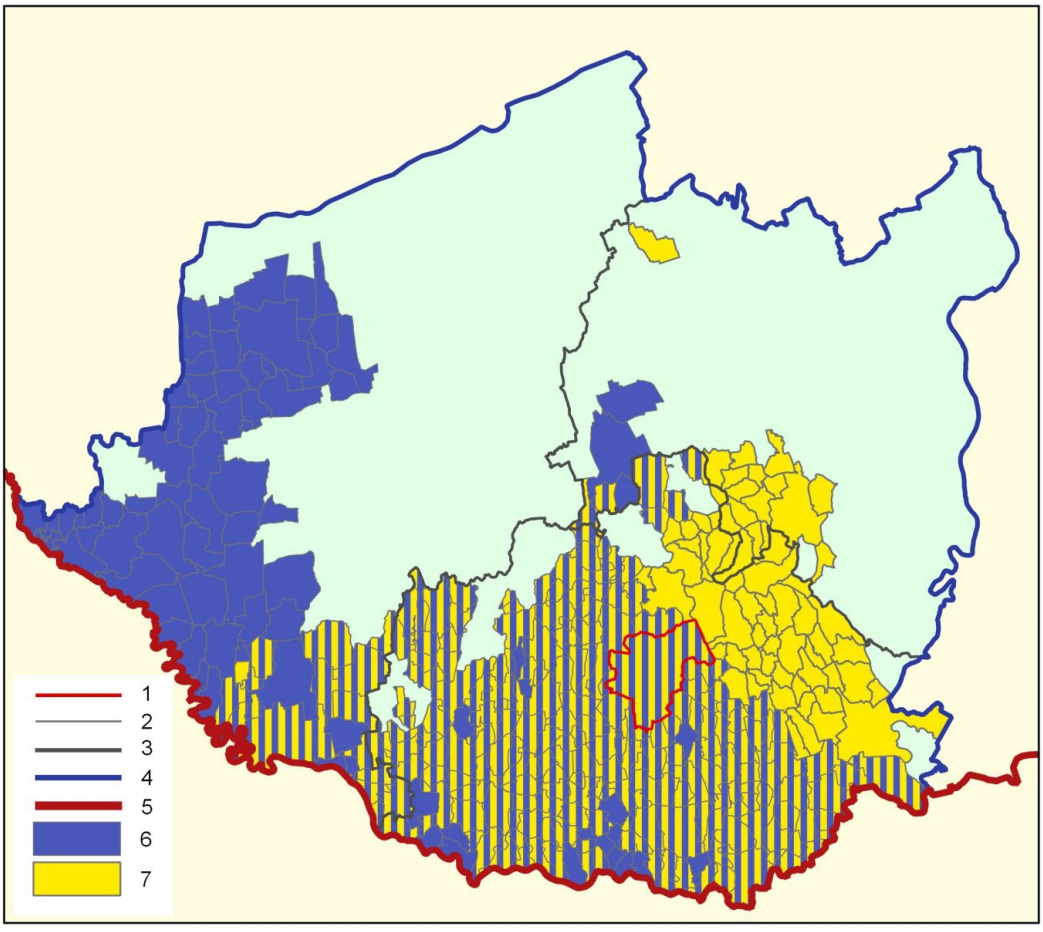
After a long discussion with the other Hungarian partner (BIOKOM), to fulfil the REPAiR project's requirement, we have chosen the city of Pécs as a focus area. This administrative entity seemed like a good research area for modelling phase (with a lot of local data); and it is a statistical-planning unit for physical planning, development policy and public service provision, too.

For the analyses fo the REPAiR project, Baranya county (NUTS3) has been chosen.

[10] The Hungarian Central Statistical Office collects a lot of indicators to draw up the boundaries of potential and functioning agglomerations (group of settlements) of Hungary.

Although, the public administrational territorial area of the counties do not have real intervention in the waste management in Hungary, counties have development and spatial (physical) planning roles and a so called integrator position came from the planning hierarchy. (County level in REPAiR project is used for MFA purposes.) In the Hungarian governmental system the NUTS 2 regions do not have governing positions, they are functioning as statistical-planning units (for receiving EU funds) only.

There are another functional regions from the viewpoint of REPAiR project. Taking into account the MSWM we can delimit the MSWM area (yellow in Fig .5.3) and an investment area that was the basis for modernisation of MSWM infrastructure. Both areas were created via a bottom-up approach based on the voluntary cooperation of settlements/local governments. The Mecsek-Dráva Project Area is delimited by a development project financed by the Structural and Cohesion Funds of European Union. This project area encompasses 313 municipalities (Figure 5.3). Due to the project maintenance obligation (5 years for the local level actors and 10 years for the management authority) and the established association of the municipalities which own and manage the infrastructure and assets installed by the development project.



Legend: 1) Pécs; 2) Settlement border; 3) County border; 4) NUTS region's border; 5) Country border; 6) Mecsek-Dráva project area; 7) Waste management public service provider's (Dél-Kom Ltd.) area.

Figure 5.3: The Mecsek-Dráva Project Area and the MSW service area of the local MSW service provider, Dél-Kom. (Tamás Szabó and Valéria Fonyódi, 2017, based on BIOKOM and Dél-Kom

data)

The Mecsek-Dráva development project ran between 2013 and 2016 (in association of 313 municipalities and led by City of Pécs) has developed a new waste management system for the Mecsek-Dráva Project Area (Figure 5.3).

This Mecsek Dráva Investment Project made in the area:

- 3 sanitary landfills
- 3 material recovery facilities (55.000 t/y capacity)
- 1 mechanical-biological treatment facility (120.000 t/y capacity)
- 1 composting plant (10.000 t/y capacity)
- 5 transfer stations (60.000 t/y capacity)
- 18 civic amenity sites (Recyclables, Bulky waste, Construction and Demolition waste, Green waste, Electronic waste, Tires, Hazardous waste from households)
- 800 waste collection points.

By 2016, as a result of this project, Pécs and the Association of Mecsek-Dráva had a new, improved waste management system with new technologies, infrastructures, assets and landfill capacities for the next 20 years (for the 313 municipalities and more than 400 000 people). During the investment period the waste management public service provider (BIOKOM) was the dominant actor of the Mecsek-Dráva Project Area, and the it played a decisive role in the planning and implementing phase of the investment project. BIOKOM is established and owned by the Municipality of Pécs. From 2017 the new service provider of Pécs and Pécs's region is Dél-Kom Ltd. (Figure 5.3), which is owned by the BIOKOM Nonprofit Ltd. The latter has become the property manager of the Mecsek-Dráva Association's assets, sites and infrastructure.

Based on the interviews with key stakeholders and the discussion with BIOKOM's experts, we have selected the following waste flows:

- OW, organic waste: biowaste (which collected by the Dél-Kom Nonprofit Ltd. as public service provider);
- MSW, municipal solid waste (collected by the Dél-Kom Ltd.);
- PCPW or Plastic waste (selectively collected by the Dél-Kom Ltd., but the secondary raw material is owned by the state).

We try to concentrate on the waste fractions that have collected and managed by the public service provider. The waste came from the households is one of the most pronounced priority of the national and local governmental waste policies, as the cost-effective, accessible and good-quality public service provision are too. That is why our research area is focused on the public service provider's waste flows (organic waste of households, municipal solid waste, and selectively collected plastic waste from household).

5.2 Governance Background

The waste area is governed by different sectoral ministries in Hungary. The Prime Minister's Office, the Ministry of Agriculture, the Ministry of Human Capacities; the

Ministry of National Development and the Ministry of Home Affair all have responsibilities in the waste sector (HWMPSP 2016). The new Waste Act[11] accepted in 2012 has fixed the definitions of waste types and has introduced the waste hierarchy (the first step is the prevention that is followed by the preparation for reuse; the recycling; the other forms of reuse (energy production) and at the end of the hierarchy is the disposal.

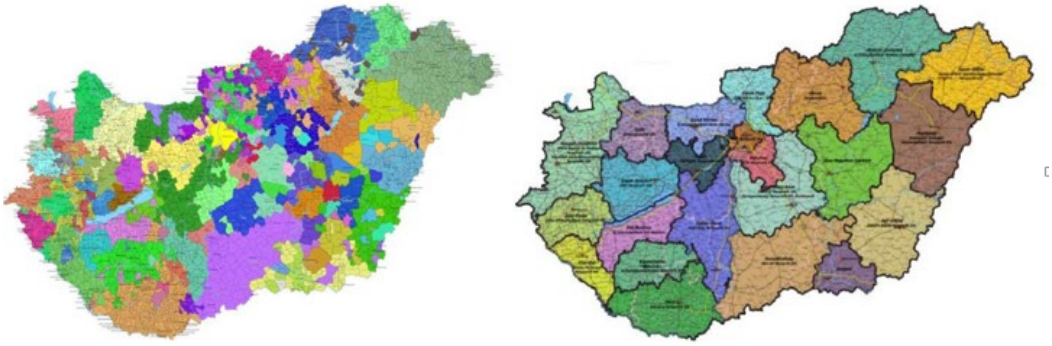
The Hungarian national government has accepted the Hungarian National Waste Management Plan for 2014-2020[12] in 2013 (HNWMP 2013). In this concept, the targeted proportion of the prepared for reused household waste is 50%. And there was also a priority about the provided opportunities of separate waste collection in each municipality. About the biowaste there was a commitment to the reduction of its proportion from the residual waste.

The Hungarian Waste Management Public Service Plan (HWMPSP 2016) made by the National Coordination of Waste Management and Asset Management Plc. (NHKV Plc.) in 2016. In this document the NHKV Plc. accepted a new regional optimization plan for the waste management public service provision.

The priorities of the Hungarian Waste Management Public Service Plan are (HWMPSP 2016):

1. Preserve the achievements of the cost reduction programme of the state (household tariffs).
2. Ensure a uniform quality of waste service in each region.
3. Regional equalization in the public service provision level.
4. Sustainable finance of the waste management public service provision.

The most important effects came from the new Hungarian Waste Management Public Service Plan that is the top-down regionalization (‘integration’) of the public service providers in Hungary. There were more, than 110 organisations in 2016, while the targeted number is 20-22 units (Figure 5.4 below).



[11] The Act CLXXXV of year 2012 on wastes.

[12] HNWMP 2013: Hungarian National Waste Management Plan for 2014-2020. http://web.okir.hu/dokumentum/318/Orszagos_Hulladekgazdalkodasi_Terv_20142020.pdf (Accessed: 01.12.2017)

Figure 5.4: The integration plan of Hungarian Waste Management Service Providers' System. (NHKV, 2017)

However, on the other hand, in Hungary, the local municipalities have the right to make contracts with the waste management public service providers[13]. From 2013 the contractual freedom of local governments has been limited. From this time they can make just one, integrated contract for the waste collection and the waste management. Beside the waste collection and waste management, the city government is responsible for other (development) policies (e.g. spatial planning, settlement and economic development, public health, environmental protection, water and sewage services (Local Governmental Act[14]) that affect the waste issue.

Due to the fragmented Hungarian local governmental system (more, than 3150 municipalities have the right for governing on local level) the central government tried to insert integration incentives and rules into the public service provision processes. From 2010, there was a strong (re)centralization process in Hungary, when only few functions/tasks have remained at local governments. The waste management was one of them. As a result, the fragmentation of waste management system has also remained (Figure 4). In general, the centralisation of environmental public sector started in 2010 with the cease (integration) of Environmental Ministry (into the Ministry for Agriculture) leaving less and less possibility for real environmental policy integration (EPI). The independent regional green authority was also integrated under central governance (under county government offices) in 2016, accompanying by a very degraded role in EPI, in expert task, in environmental consultancy.

From 2004 (EU-accession of Hungary) financial supports for investments on regional level came from the EU Cohesion and Structural Funds. To use this potential external development fund needed local governmental partnerships and wider territorial scale for the implementation of investment projects.

Since the introduction of the new Waste Act in 2012 a strong coordination role of the central government has started in the waste sector. Part of this centralization process, the central waste sector coordinating organisation – the NHKV Plc., the National Coordination of Waste Management and Asset Management Plc. – was established in 2016. The main aim of the NHKV was the introduction of the new, integrated, standard invoicing system for waste service, which is fighting ongoing operational problems during 2017.

The year 2017 was also the starting point of the territorial 'integration' efforts of the state. With the right of the permission, the NHKV can diminish the number of public service providers, due the end of 2017. However, the list of potential service providers is only a possibility of optimised regional scale system, because it is the local governments who have the right to make contract with anyone from this list (even not the nearest one). The optimised waste region was defined in the Hungarian Waste Management Public Service Plan of 2016. The potential regions should integrate a minimum 50000 inhabitants (but

[13] We have to note here that due to the new 'waste legislation' public service provider in Hungary have to be owned by public owner (by local government or by the state) in 51% at least.
[14] Act CLXXXIX of year 2011 on the local governments of Hungary.

the economies of scale principle needs at least 200000 inhabitants), where the maximum transport distance is 50 km (or 120 km with transfer stations), and it should be a gapless service provision area (HWMPSP 2016).

From 2017, the secondary raw materials and residue-derived fuels (RDF) collected (and selected on site or afterwards) by the household sector are owned by the state (NHKV) and not the local/regional public service providers. (Secondary raw materials collected from private sector are still under market conditions). Therefore, these materials cannot be managed surely on local/regional level. They are managed in national circular system. However, many of the local major companies, which use this materials as resources, can buy large amount from these materials from the NHKV (via public procurement procedure), and they do not depend on the limits of the regional waste market any more.

Nowadays, as a result of the new legislation, the local governments have the responsibility of waste management at local level, but they cannot manage the local waste alone (as it was described above). On the other hand, having regarded the spatial development strategies, main local/regional governments aim the followings: less waste, higher recycling rate, better pro-environmental attitudes of households and good quality of public services. For these goals we can find a good infrastructural background, however, there is an unclear financial responsibility for the renewal of hard infrastructure.

The underdeveloped regions of Hungary, like the Pécs case study area in REPAiR project, suffer from the lack of economic activity; therefore, there is a lack of local potential end-users of secondary raw materials. The potential pull function of circular economy should come from the business sector that can use the waste as a resource of production, but the monopolisation effect (state owned materials) and the lack of good experiences in the reuse of wastes can be the barrier of the local CE concept.

Although, Hungary and Pécs do not have CE concept or CE development, in the national waste legislatives and in the local development plans we can find some main elements of the CE concept, for example the resource effectiveness and the diminish of residual waste.

5.3 Stakeholder Identification

5.3.1 Process

As we focused on the waste flows managed by the public service provider we tried to concentrate on local actors, who are interested in the municipal waste flows. First, we analysed the policy documents, legislative framework in order to find the potential actors. Based on this analysis, we made a first list of stakeholders. During the interviews we asked the interviewees to name additional stakeholders for the further interviews (snowball method). Lastly, we had a workshop organised by the RKI on the 28th of November, 2017 in Pécs with a lot of local/regional waste experts, practitioners and stakeholders (partly from topics (e.g. re-textile manufactory) of CE differing from the ones we are focusing in the project).

The preliminarily identified stakeholders were invited to define the regional waste flows, to analyse the potentials of CE concept in Pécs and to get a first impression about the

challenges and the potential suggestions, eco-innovations related to the preliminary selected waste problems. We conducted all of the interviews face to face and concentrated on the questionnaire made by the WP6 team. The interviews were conducted between 08 August 2017 and 21 November 2017. Some of the interviews were recorded by audio-recorder, but others were just written.

5.3.2 Results

Table 5.1 summarizes results for the goals of the stakeholders.

Table 5.1: Stakeholder Identification

Title institution (Level, Sector)	Goal	Goal Description
WP6_6.2_1P (Municipal, Pu)	Content/Process related	Further development of waste management infrastructure; maintain the good quality of public service.
WP6_6.2_2P (Regional, Pu)	Content/Process related	Further development of assets and infrastructure managed by the service provider; habit-change of the local society; diminish the amount of landfill waste by 20%; increased quality of RDF and secondary raw materials by technological change.
WP6_6.2_3P (Regional, Pu)	Content/Process related	Asset-development for manage the problem of the city came from the special morphological specialties; further investments in the area of biowaste treatment.
WP6_6.2_4P (National, Pu)	Process related	Optimized and functional regional public service system, preparation for the circular economy concept.
WP6_6.2_5P (Regional, Pr)	Content related	Enough waste with good quality; further economic development of the region.
WP6_6.2_6P (Municipal, Pr)	Content related	Active local economic development actors; local resource based local businesses; good legislation for the waste sector; state incentives in circular economy.
WP6_6.2_7P (Municipal, Pu)	Content/Process related	Habit-formation of the local society; ongoing communication toward the inhabitants; financial tools of waste legislatives (fees of waste); re-decentralization.
WP6_6.2_8P (Sub-Regional, Pr)	Content related	Technology development (because of the chlorine content of the RDF); more effective communication with the actors (for example the selective collection of construction waste could be a good potential for the cement factories).
WP6_6.2_9P (Sub-Regional, Pr)	Content related	High quality of SRF/RDF, separated collection of food waste at household (improved 'quality' (decrease water content) of municipal waste and the residual fraction for RDF); further investments into the regional waste infrastructure; change in habits of households.
WP6_6.2_10P (Regional, Pu)	Process related	Need of investors of waste sector; need of habitat-formation of local society and better communication toward the local inhabitants; better re-use of construction waste and RDF.

On the basis of the interviews, the literature and document analysis we have estimated the level of influence of actors, their attitudes toward the project and the potential involvement level during the next phases of the project (Table 6.2).

Table 5.2: Stakeholder Evaluation.

Actor	Influence	Attitude	Need for Involvement
WP6_6.2_01L	High	Positive	High
WP6_6.2_02L	Medium	Positive	High
WP6_6.2_03L	Medium	Positive	High
WP6_6.2_04L	High	Positive	Medium
WP6_6.2_05L	Low	Positive	Medium
WP6_6.2_06L	Low	Positive	Medium
WP6_6.2_07L	Low	Positive	High
WP6_6.2_08L	Low	Positive	Medium
WP6_6.2_09L	Low	Positive	Medium
WP6_6.2_10L	Medium	Positive	High

With the help of the interviewed stakeholders and experts of the consortium, we made a list of additional stakeholder-groups:

- Government actors: Ministry of Agriculture; Ministry of National Development; neighbour municipalities.
- Enterprises: Local end-user business actors.
- Energy producers: biogas producers.
- Financial actors: local/regional banks.
- Academic actors: regional universities.

5.4 Decision-Making Framework

5.4.1 Description

In the case study area local government has the responsibility of the waste collection and treatment, additionally, local government has to make (sectoral and spatial) development concepts and local land-use plans as well. The local government can involve the local actors into the planning procedure, however, the social background, the environmental attitudes and the weak participation practice of local inhabitants, the lack of potential raw material users, the weakness of industrial sector and the poor economic performance of the region make major difficulties to draw up development objectives along the Circular Economy concept.

5.4.2 Analysis

Pécs and the city's waste management company have a creditable history in the area of professional and sustainable waste management. In Hungary the first selective waste collection system started in Pécs in 1995. Until 2017, BIOKOM was the public service provider here (and in the area). From this year household waste collection is performed by BIOKOM Ltd. as subcontractor, since the Dél-Kom Ltd. is the public service provider for solid waste collection and treatment for the area. Dél-Kom's activities geographically cover the region of South-Transdanubia, (Baranya, Somogy and Tolna counties). About 438 000 inhabitants belong to this supply area, that includes most of the 313 municipalities of the Mecsek-Dráva Waste Management program. The service area of the

Dél-Kom Ltd. more or less covers the South-Transdanubian region, reflecting the National Coordination of Waste Management and Asset Management Plc.'s (NHKV Plc.) regionalisation ambitions.

According to the new legislative framework from 2018, BIOKOM Ltd. could be the asset manager of Mecsek-Dráva project area's infrastructure and assets. However – as it was mentioned before - the owner of the secondary raw materials became the NHKV, the National Coordination of Waste Management and Asset Management Plc. In this role, the NHKV try to sell the tradable 'products' (e.g. plastic, RDF) under public procurement procedure taking into consideration all the secondary raw materials collected from household in Hungary, so the local service providers lost the direct connection (and partnership) with the regional stakeholders, end-users and they faced a very massive limit in their management, development potential and independence. On the other hand, NHKV appeared on the market as a 'seller' and secondary material users as a 'service provider' (as the interviewee pointed out). For instance, in this situation, cement factories are providing RDF burning capacity (as a service) for NHKV (and other waste treatment companies who are 'trading' with the industrial sector (not with the household sector/public service provider) and can purchase 'fuel' more freely. NHKV should guarantee the quality of secondary raw material, otherwise, cement factory purchase 'fuel' from other sources. Since, the centralisation process closed down the room of public service provider (traditional waste management companies) but opened up the market for secondary raw material end-users.

The local actors, end-users also lost the connection with the local service providers. Additionally, secondary raw materials – for sale by NHKV - have different quality depending on the sites where they come from. The big end-users, just like the cement factories of the South-Transdanubian region, although needs a large amount of fuels or raw materials, but in reliable quality. The changing legal framework of the waste sector is changing the existing networks and partnerships on regional level.

The priorities of the EU' or the national development priorities have direct and major influence on the local development priorities.

The municipality usually made the local development plans due to the legal framework (they had to do it) or when a development project requires it. During the planning process the involvement of local actors also managed by obligatory rules and legal frameworks. On local level, due to the lack of good practices, it is difficult to identify, to activate and to involve local stakeholders. Most of the local actors - probably - have never heard about the Circular Economy concept, but in the region there are a lot of experts and actors who are already interested in the waste sector, and they have good knowledge about the potential of CE. Circular concepts at local level could only be voluntary and collaborative approach that needs information, and there is a need for active actors and room for manoeuvre for them and different incentives, tools to support the development processes towards circularity.

Summing up, the main challenges for Pécs defined by the research group, the interviewees and the workshop participants are the following:

- The concept of Circular Economy is only known among some stakeholders and experts in the region.
- The lack of decentralisation limits the possibility for implementation of Circular Economy principles and practice.
- The conflict between the organisations of previous practice (local public service providers) and the new actors (NHKV, selected public service providers) hinders the needed changes of the sector.
- Strong role of public sector, but the CE concept is needed engagement of private actors too.
- Lack of real dialogue private/public sector (just obligatory involvement practice).

6. Outlook

Deliverable D6.2 gives an overview on the governance and decision-making in the field of waste management in the four follower cases, following in the analysis and interview methods laid out and tested as part of D6.1.

The analysis will be used for the development of decision models for the four follower cases in the upcoming deliverable D6.4. These will also be considered as part of the individual process models for D3.3-3.7, for each of the four case study cities specifically. In addition, the stakeholders consulted and analysed as part of this deliverable will be an integral part of the PULL work conducted by WP5, as will be detailed later in D5.5-5.8.

A report on the cross analysis on the developed and tested decision support models for the pilot and the follower cases will be published in deliverable D6.5: Cross analyses decision models. This will be followed by an input of decision models into the geo-design decision support environment for all cases in deliverable D6.6: Decision models for GDSE.

All deliverables in the REPAiR Work Package 6 will be public except D6.6.

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