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Land recycling in the European Union circular economy: (Re)development of brownfields as a potential mitigation strategy to land consumption focusing on Austria and the region of Flanders in Belgium

A Master's Thesis submitted for the degree of
“Master of Science”

supervised by
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Affidavit

I, **SARAH BANDERA, BSC.**, hereby declare

1. that I am the sole author of the present Master's Thesis, "LAND RECYCLING IN THE EUROPEAN UNION CIRCULAR ECONOMY: (RE)DEVELOPMENT OF BROWNFIELDS AS A POTENTIAL MITIGATION STRATEGY TO LAND CONSUMPTION FOCUSING ON AUSTRIA AND THE REGION OF FLANDERS IN BELGIUM", 149 pages, bound, and that I have not used any source or tool other than those referenced or any other illicit aid or tool, and
2. that I have not prior to this date submitted the topic of this Master's Thesis or parts of it in any form for assessment as an examination paper, either in Austria or abroad.

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Abstract

The issue of brownfields has been acknowledged for a long time in various countries around the world and has been gaining awareness since the 1990s. A shift away from traditional industrial and commercial sites from the city centers has left many urban spaces with abandoned, derelict of underused areas, as well as creating such sites in areas that are experiencing rural depopulation. Austria and the Region of Flanders in Belgium are both areas that are experiencing the pressures of land consumption on still available greenfields. It is estimated, that if Austria continues on this path of land consumption, that in 200 years there will be no more land available for agricultural purposes. This trend not only infringes on the open green spaces that Austria is known and admired for, but it may well become a serious question of the ability to remain autonomous in terms of food production. Similar trends can be identified in Flanders, however, while land used for agriculture and grassland still make up the largest portion, residential land take closely follows in third place. For both case study regions, the Sustainable Development Goal (SDG) indicator 11.3.1, regarding land consumption rate in relation to the population growth rate, clearly demonstrates decoupled development. For Austria, in the time frame of 2007-2019, apart from 2016 and almost 2015 with a value of 0.99 all years were a lot higher than the value 1, which means that land consumption has been disproportionately high. The mean value of Flanders, in the analyzed time amounts to 1.47, while not as high as Austria's 3.17, is also clearly shows the rising disparities. With this rising pressure the shift towards the possibilities of using these previously developed sites as potential mitigation strategies to land consumption has been widely accepted. Contaminated sites have been focused on through legal frameworks such as the 'Contaminated Sites Remediation Act' in Austria, or the 'Brownfield Covenant Act' in Flanders, which both include financial mechanisms to support the (re)development. While it is important to secure these sites, to not only protect the environment and the health and safety of residents most high-risk locations have been identified, registered and are being remediated. The focus now needs to shift to the sites that show little to no contamination as these are only now starting to become a problem, and the documentation of these sites is the main difficulty in both countries. Furthermore, while the costs of (re)development may not be as severe, these areas often have a certain level of stigmatization, making it harder to re-enter them into the economic cycle.

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List of Abbreviations

ALSAG	Altlastensanierungsgesetz – Contaminated Sites Remediation Act
CF	Cohesion Fund
EAFRD	European Agricultural Fund for Rural Development
EMFF	European Maritime and Fisheries Fund
ERDF	European Regional Development Fund
ESF	European Social Fund
ESIF	European Structural and Investment Funds
EU	European Union
MDGs	Millennium Development Goals
OVAM	Public Waste Agency of Flanders
SDGs	Sustainable Development Goals
TFEU	Treaty of the Functioning of the European Union
UBA	Umweltbundesamt - Environmental Agency Austria
UN DESA	United Nations Department of Economic and Social Affairs
U.S. EPA	United States Environmental Protection Agency

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1. Introduction

The aim of this master thesis is to analyze the potential of brownfield (re)development as a solution to combat the growing concern of land consumption, focusing on Austria and the region of Flanders in Belgium. Due to increasing land scarcity together with continuing population growth, land is becoming an ever-rarer commodity, meaning there is no space for unsustainable growth. The functioning of the anthropogenic system has and is still following the concept of a linear model, powered by the extraction of primary resources that are used to produce a particular product, which is then sold to consumers, and once the good has reached the end of its usefulness is discarded and becomes waste. This waste then causes further damage to both the environment and the initial creators: humans. This model has until now created an immense amount of wealth in many regions of the world, primarily through increased productivity in the labor and capital markets, as well as incredible strides through broad technological accomplishments. However, the world is a finite system with strict boundaries that have, in many aspects, already been reached or even broken.

One of these finite resources is livable land. Land is a precious commodity and, as we cannot simply enlarge the planet, the surface of our earth is finite. The total land surface area of Earth is approximately 148428950 km^2, of which about 33% is desert and about 24% is mountains. Subtracting this uninhabitable 57% (84604502 km^2) from the total land area leaves 63824447.6 km^2 or 6.382 billion ha of habitable land (Pianka, n.d.). Due to rising population growth land scarcity has already become a heavily discussed topic, yet the way this resource is used follows the linear model. While it is obvious that with growing population more land consumption will take place, the way already used land is managed should be a key concern.

Healthy, nutrient-rich soil is not something that can simply be produced like any other product. It requires a lot of time and includes a variety of complex chemical reactions and sensitive biota. So, what happens, if soil is not treated carefully, if too much is used, if too much is sealed? Food sovereignty may no longer be given, provision on a local and regional level may be put in jeopardy and perhaps at some point food security will also be at risk. Furthermore, climate change will be accelerated, if there is not enough free soil that can store water or provide for a positive CO2 balance. And lastly, what might seem

a small concern in the big picture of things, is that countries, particularly cities, are becoming increasingly unattractive. There is a lot of discussion concerning ugliness that is created by 'the concrete jungle', traffic circles, malls, noise barriers.

According to the Federal Environment Agency (Umweltbundesamt, 2021 a) by 2019, a total of 5729 km^2 of land was consumed in Austria. This corresponds to 7% of the country's land area and 18% of the permanent settlement area. The region of Flanders, Belgium has an area of 13625 km^2 with roughly 20% of its area being built-up surface. If the trends that are being documented continued this area could expand to a third or even half of the still open space by 2050 (Wille, 2015). Thus, what if land was treaded as the finite resource that it is and we started to use the spaces that have already been used but have in some shape or form fallen out of use? What if we transitioned away from the previously mentioned linear conveyor belt and closed the loop? One answer to these questions above might be using brownfield sites that are already present in cities. (Re)developing them into new spaces of value goes hand in hand with the circular economy principle. Rather than taking new greenfield sites and putting stress on already fragile systems, the (re)development of brownfield sites can bring new life into city districts, reduce unnecessary expansions of urban areas, as well as mitigate the potential of environmental contamination.

1.1. Hypothesis and Research Question

The hypothesis of the thesis is that there is a large potential in brownfields both in Austria and Belgium, if these sites are properly documented, managed and newly developed. These areas could reduce the pressure on new greenfield consumption and reduce phenomena such as urban sprawl and soil sealing. It is a topic that has been widely recognized for its possibilities, however it is quite complex since every site is different and brings with it new challenges and opportunities. The research questions that will be answered in this thesis are:

Research Question 1: How large is the land consumption/land take in Austria and the region of Flanders in Belgium?

Here the aim is to determine what the main drivers of land consumption and land take are and see how these trends have developed. For this there are various papers and data sets

from the Umweltbundesamt (UBA), which is the Federal Environmental Agency of Austria, and European Union working documents where there is more information. For Flanders the relevant data is obtained by the Flemish Government, specifically the Department of Chancellery and Foreign Affairs.

Research Question 2: How are brownfields documented, managed, and handled in Austria and the region of Flanders in Belgium?

Here the aim is to highlight the systems behind brownfield management in the two countries, and if the potential even exists for these sites to be mitigation strategies against land consumption. Expert interviews will give further personal insight into the fields.

Research Question 3: What are the legal and political frameworks concerning brownfields in Austria and the region of Flanders in Belgium?

The general principle that started the interest into the research of brownfields was the idea of circular economy. In 2020, the European Commission adopted "A new Circular Economy Action Plan for a cleaner and more competitive Europe" (COM/2020/98/final) (European Commission, 2020a). While brownfields are mentioned, they are not the main focus and remain a minor side note within the chapter of building and construction. Therefore, the analysis of further regional legislation and a variety of EU frameworks and directives will be looked at to give insight into the respective countries and their strategies.

Research Question 4: What are the financial frameworks concerning brownfields in Austria and the region of Flanders in Belgium? Are there incentives or support to help redevelop these sites?

2. Research Chapter: Literature Review

The aim of the following chapters is to give an overview of the core aspects of this thesis by providing a literature review. The first topic that will be discussed in Chapter 2 is the concept of urbanization, its implications and how it has become one of the leading causes of land consumption. This is followed by an overview on brownfields, their importance and development potential. Subchapters 2.3 and 2.4 will then offer a closer look at the legal framework concerning brownfield regeneration and the financial mechanisms that have already been put in place. All of these subchapters will then allow for an in-depth discussion of the results concerning the case study country Austria and the Region of Flanders in Belgium. Some sources for Flanders are only given in Dutch and have therefore been translated using the help of the online AI, DeepL[1].

2.1. Establishment of cities and land consumption

2.1.1. Foundation of urbanization

To understand the opportunity of brownfield regeneration as a possible mitigation solution to land consumption it is important to comprehend the origins and development of urbanization. Through the development of urban settlements, their linking and expanding and general population growth, cities have led to unprecedented prosperity in many parts of the world, allowing for economic growth, human development and poverty reduction. However, as land and its resources are limited, and particularly soil is a non-renewable resource, which takes a long time to form in a healthy and nutrient rich way, unsustainable city development is an increasing concern (European Union, 2012a) and must be managed in an efficient and sustainable way.

Urbanization is understood as "*the process by which towns and cities are formed and become larger as more and more people begin living and working in central areas*" (Merriam Webster, 2021). This can be specified using the definition of the United Nations Department of Economic and Social Affairs (UN DESA), where urbanization is defined as "*[...] a complex socio-economic process that transforms the built environment, converting formerly rural into urban settlements, while also shifting the spatial distribution of a population from rural to urban areas*" (UN DESA, 2019, 3). This

[1] URL: https://www.deepl.com/translator

phenomenon usually entails two main effects, which are first: that people leave rural areas, migrating to cities, and second: causes urban expansion (Zussner, 2017).

While urbanization is a concept that is linked to contemporary developments of industrialization and civilization (Zussner, 2017), the act of settlement and expansion of permanent communities can be traced much further back to the first formations of cities in Mesopotamia (Elmqvist, et al., 2013). The first documentations of cities were around 7500 BC and only 2000 years later complex networks had been established, which allowed for characteristics of cities to form (Elmqvist, et al., 2013). This bringing together of goods, people and skills vastly reduced transportation costs, as these were all brought together in one place (lumen, n.d.). It is believed that the development of agriculture in these areas was a key factor in allowing for higher efficiency and production to sustain the growing population size. The exchange from seasonal migration to attain the necessary sources of food with the formation of raising livestock and the spread of agriculture, as well as the ability to preserve a surplus of production, were pre-requisites for urban settlement (lumen, n.d.). With the further advancement of knowledge and the development of technology leading up to the industrial revolution the impact on the population was dramatic (Zussner, 2017). It caused the surge that can be seen in Figure 1, which depicts world population since 5000 BCE, with a projection until 2100.

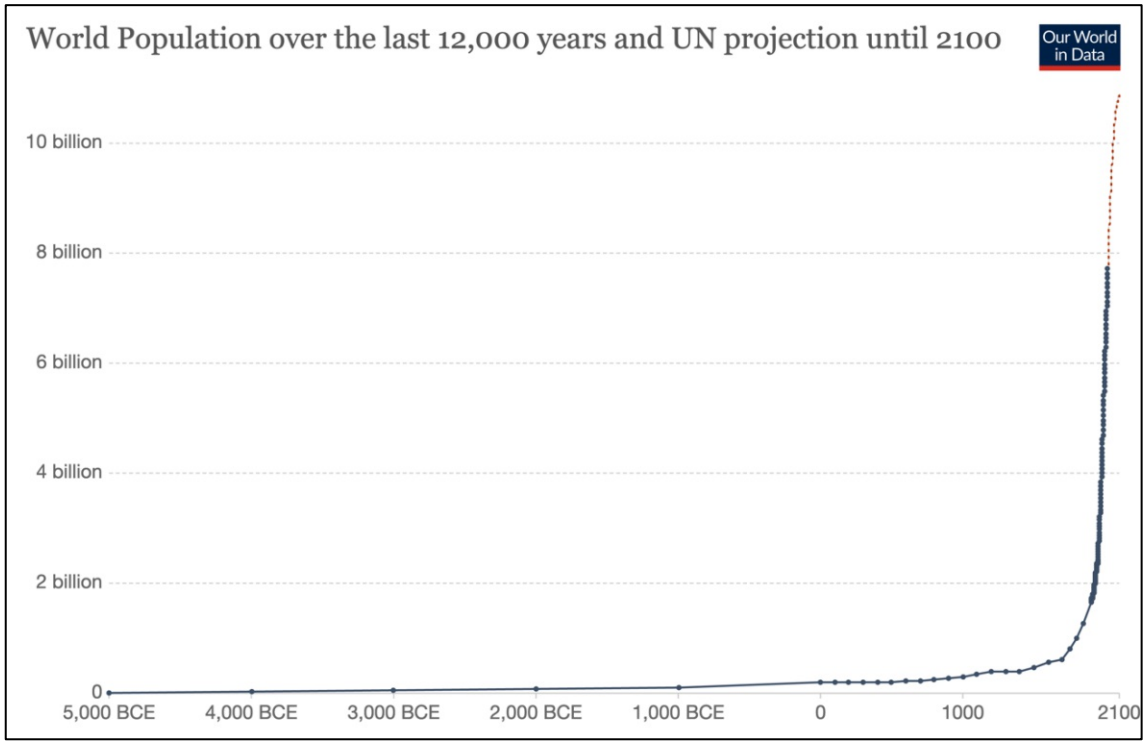

Figure 1: World Population over the last 12,000 years and UN Projection until 2100 [based on (Our World in Data, 2019)].

When regarding Figure 1 it is visible that following 5000 BCE there was a steady increase in population starting at 18 million inhabitants reaching over 10 times that, 188 million in 1 AD. By 1700 the world population was up to 603 million and would more than triple by the beginning of the 1900, with roughly 2 billion. Following this already dramatic spike, world population has seen exponential growth, reaching almost 8 billion people in 2020.

Together with population growth the rate of urbanization has also been increasing with more people moving into cities, which is demonstrated by Figure 2. This trend also follows that of population growth with the urbanization spike taking place in the last 200 years. This is what is known as the 'first wave of urbanization', which resulted in the urbanization of 400 million people (Wille, 2015). Now, in what is referred to 'the second wave of urbanization' it is expected that an additional 300 billion people will live in cities within the time frame of 80 years (Wille, 2015).

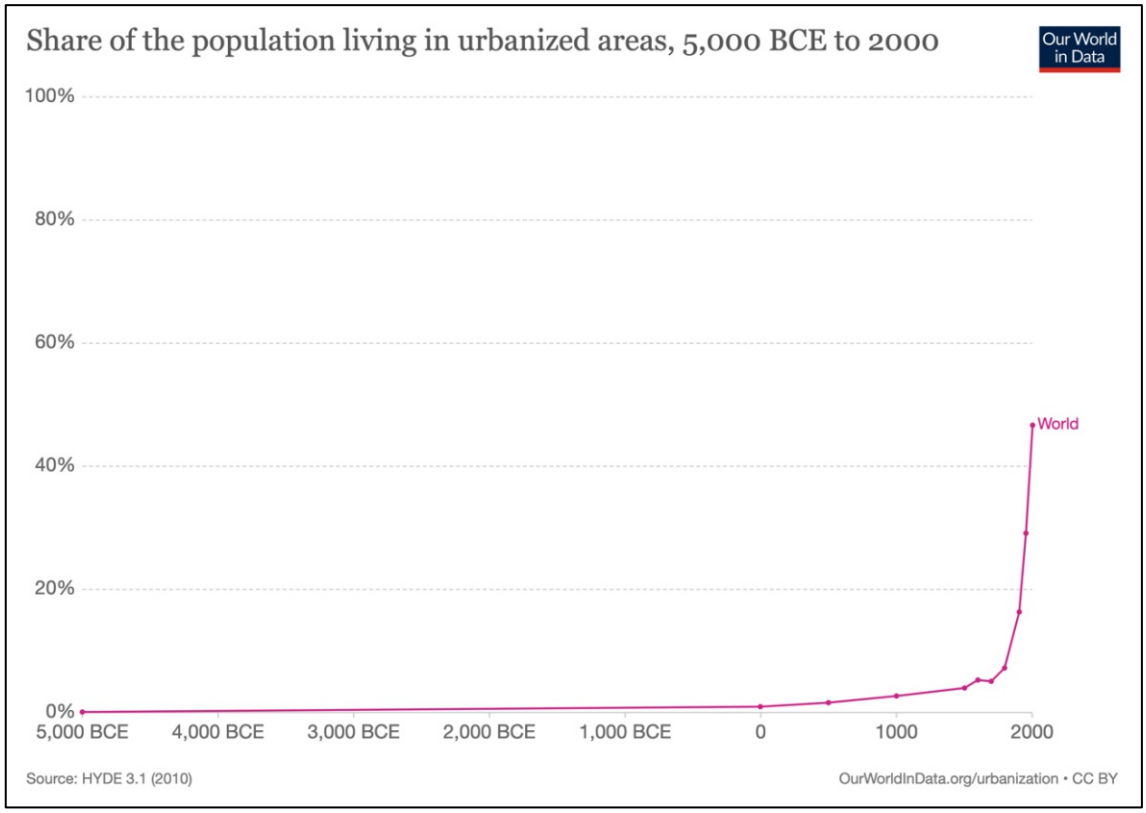

Figure 2: Share of the population living in urbanized areas, 5,000 BCE to 2000 [based on (Ritchie & Roser, 2018)].

It is estimated that by 2018 roughly 55 per cent of the world's population lived in urban settlements and that "*By 2030, urban areas are projected to house 60 per cent of people globally and one in every three people will live in cities with at least half a million inhabitants*" (United Nations, Department of Economic and Social Affairs, Population Division, 2018).

This trend is clearly visible in Figure 3, which demonstrates the world's urban and rural population from 1950 through 2020 and the projection up until 2050. This clearly demonstrates that the increase of urban areas and the expansion of cities will continue.

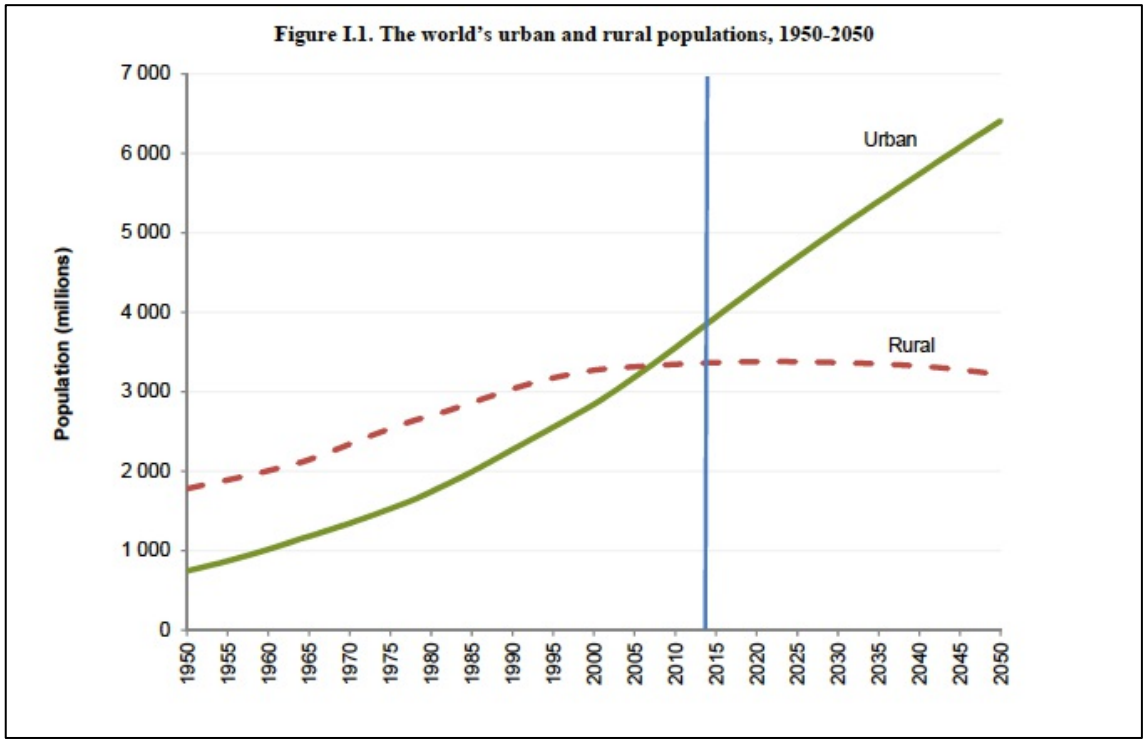

Figure 3: The world's urban and rural populations, 1950-2050 [based on (UN DESA, 2019)].

However, while population size worldwide is increasing as well as urbanization, the actual land area itself that is being taken over by cities is growing at a much faster rate than the population within them (Nicolau, et al., 2018). Consequently, the cities are not becoming denser to accommodate the rising urban population but rather sprawling towards the outer boundaries. While there is nothing wrong by making cities livable and having green spaces, the importance of urban management and properly using the area that is available becomes more crucial. With more people moving into urban areas and the expansion of these spaces, the management of this is all the more important. Seeing as, "*Unplanned or inadequately managed urban expansion, in combination with unsustainable production and consumption patterns and a lack of capacity of public institutions to manage urbanization, can impair sustainability due to urban sprawl, pollution and environmental degradation*" (UN DESA, 2019, 1).

The increasing land consumption due to growing cities, urban sprawl and soil sealing not only effects the green space available for recreational purposes but also presents a variety of other economic, ecological and social consequences. These difficulties often go hand in hand, leading to overlaps and classic cause and effect relationships. Of which many cannot be solved without the other.

Economic consequences

Economic consequences of land consumption and unchecked urban sprawl often include higher transportation costs for the general population (Schuster, 2021). Linking the outskirts of cities to the rest of the infrastructure requires maintenance of the roads and networks to connect these agglomerates, as everyone pays for the public system (Wille, 2021a). In the long run this expansion will cause an increased competition with land for agricultural purposes.

Ecological consequences

Ecological consequences for the most part include the destruction of healthy soil (Umweltbundesamt, 2021 a). The top layer of soil is very sensitive with a variety of biota and microorganisms (Montanarella, 2007). Sealing, the separation of the soil from the air by an impermeable layer of concrete or other compaction leads to a decrease in the function of the water cycle and its filtration purposes (European Union, 2012a; Montanarella, 2007). Because of this there is less area for water to seep into during heavy rain, which in turn causes an increase in flooding (Umweltbundesamt, 2021 a). It has also been documented that a rising concern is the decline in the ground water level, as there is less area that is suitable for infiltration (Wille, 2021a). Further consequences include the damaging of the ecological landscape, by segmentation (Umweltbundesamt, 2021 a), including barriers for animals which prohibit them from crossing safely on migratory routes.

Social consequences

Social consequences of urban sprawl include the social segregation of a city (Tang, 2011), between those living in cities and those living in the peripheral zones. The middle and upper-class have the means of moving to the green city outskirts and can afford driving back and forth, while the lower class remains in the cities. This leads to specific problem areas in the city, where the inner-city building substance slowly disintegrates (Tang, 2011), seeing as the financial means to support the city infrastructure is allocated elsewhere. And finally, there is a loss of recreational areas in an acceptable distance. Not everyone has the resources or the time to leave the city for recreational purposes and thus, the integration of such spaces is important to revive the urban areas.

A possibility to counteract land consumption and unnecessary expansion of urban areas and many of the above-mentioned consequences could be the redevelopment of land that has been previously used and no longer serves its purpose, i.e., brownfields. To leave these areas unused, often within cities, as these have expanded around them, is a waste of precious space that in many countries is simply not available. The integration of brownfields and their redevelopment in a way that revives the areas could halter this expansion of the cities into the "green". If walkable, livable cities are created, then there is no need to move to the outskirts, greenfields could become less attractive and the stress on space for agricultural purposes could be reduced.

2.2. Brownfields and their development potential

The previous chapter on land consumption, urbanization and soil sealing demonstrates how important it is to manage the expansion of cities and to use the areas that are available to their full potential. There is no space to waste land, therefore sites that have already been in use now require intervention to reintegrate them back into the system. Such sites are generally known as brownfields. The following chapter gives an overview of the definitions of brownfields, their classification and the possibilities, as well as challenges that their (re)development entail.

2.2.1. Definition of brownfields

In 1992, the term 'brownfield' was used for the first time in the United States and has led to the most used definition, which originates from the United States Environmental Protection Agency (U.S. EPA) (Perovic & Folić, 2012). According to this "*A brownfield is a property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant*" (U.S. EPA, 2021). Further the definitions of brownfields vary depending on which country or region is being focused on. While there is no shared European description of brownfields the most common definition that has been adopted in to various literature is that of Ferber and Grimski, developed on behalf of the Contaminated Land Rehabilitation Network for Environmental Technologies (CLARINET). It is understood that essential elements within the definition include that these areas "*have been affected by the former uses of the site and surrounding land, are derelict or underused, have real or perceived contamination problems, are mainly in developed urban areas and require intervention*

to bring them back into use" (Ferber & Grimski, 2002, 9). What is interesting here is the element of 'are mainly in urban and developed areas'. Through this specification, the working group of CLARINET have implied that the effectiveness of brownfield regeneration is linked to urban boundaries (Tang, 2011). Furthermore, the fact that contamination problems can be 'real or perceived', causing one of the most important elements when describing brownfields.

Classification of brownfields

In the real estate market brownfields have be classified according to their (re)development potential. In general there are three different economic types of redevelopments (Ferber & Grimski, 2002). Categorization of brownfields is established according to the costs of making the sites ready for construction and yield derived from the land value enhancement (Figure 4). This creates three main categories known as Type A: "Self-running", Type B: "Sites with development potential" and Type C: "Reserve sites" (Umweltbundesamt, 2008) and are widely acknowledged in various Austrian studies and in the field of brownfield development (Schuster, 2019):

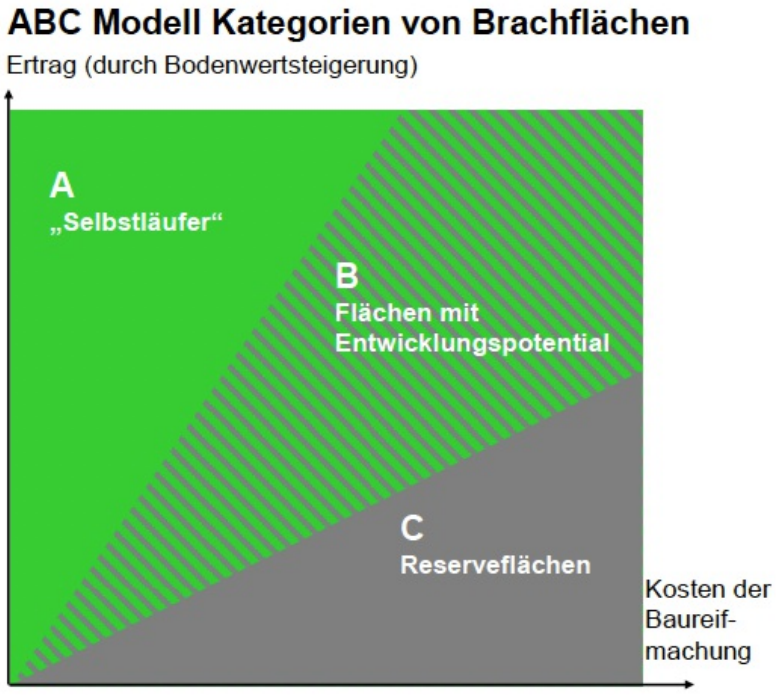

Figure 4: ABC Model Categorization of Brownfields [based on (Umweltbundesamt, 2008; The World Bank, 2010)].

Type A “Self-running”. These are sites that have an expectedly higher yield compared to the costs for (re)developing the area. These are usually sites that are in attractive location, have access to essential transportation infrastructure, and are in prospering regions. It requires no additional help, such as external funding to make these areas attractive to private investors and usually do not remain brownfields for long (Rabl-Berger, 2021).

Type B: “Sites with development potential”. These are sites where the expected profitability may not be as stable or reliable due to potentially unforeseen risks. For the (re)development of these areas to be possible and to reduce risk factors, a variety of support systems as well as defined procedures are necessary. A particular method that is mentioned in various documents is the financing strategy known as the Public Private Partnership (PPP) Model. In terms of brownfield redevelopment, it is rarely possible that the entirety of the project is realized by one party. This is often the case for Type B sites, as these sites come with a certain amount of uncertainty and risk. PPP can be understood as a long-term or permanent contractually regulated cooperation between the public sector and the private sectors, where the purpose of the arrangement is to fulfill a public task or goal (Schuster, 2019). The partnership extends over the entire life cycle of a measure and includes the phases of planning, construction, operation, maintenance and, if necessary, recycling (Schuster, 2019).

Type C: “Reserve areas”. These are sites where the expected yield from (re)development is below the costs for making the area ready for construction. These areas can usually only be (re)developed through heavy public subsidies and are sites that will most likely not be reintegrated into the economic cycle (Rabl-Berger, 2021).

It is understandable that Type A areas are quite easily regulated by the market. There is no need for intervention, and they are quickly developed. However, there remains the question what happens to the sites that fall into the Type B category? These types of brownfields often require increased intervention from public resources. Nevertheless, only a fraction of sites fulfills the categorization to be eligible for any sort of financial aid. Which means the majority of sites fall through the cracks due to stringent definitions. For a better understanding see in the case study evaluations, as this a phenomenon for both Austria and Flanders.

Over the years, the U.S. EPA has also established a roadmap that describes step by step how one should proceed when redeveloping a brownfield site (Wille, 2021a). The brownfields roadmap to understanding options for site investigation and cleanup "*provides a general outline of the steps in the investigation and cleanup of brownfields sites and introduces brownfields stakeholders to the range of technologies and resources available to them"* (U.S. EPA, 2018, 1). This helps stakeholders to gain a better understanding of the tools and frameworks that are available to them, as well as possibilities concerning the options for site investigation and cleanup. While the roadmap itself, found in Annex C: U.S. EPA Brownfields Road Map is very simplified, it establishes an overview of the first steps that should be taken and are then accompanied by extensive explanations in the resulting document. Furthermore, while the first roadmap was established in 1997 (U.S. EPA, 2018), it has continuously been updated and draws on the experiences gathered with brownfield sites. This was also the basis for the Flemish and gave them ideas on how to manage sites in Flanders, as the experiences were very similar (Wille, 2021a).

Possibilities and challenges of brownfield redevelopment

There are a variety of possibilities that coincide with the (re)development of brownfields. The most relevant one in the context of this thesis, is the ability to reduce the demand for new greenfield development, through internal city development. This means focusing on the inside of the cities and making them more attractive and livable. The quality of life within a city is dependent on livability, sustainability, and nature inclusion. There are, however, a multitude of other advantages, such as the fact that these locations are usually in strategically beneficial spots due to the fact that urban areas have grown around them, making them particularly attractive for new housing, office or commercial spaces (The World Bank, 2010).

This in turn changes previously wasteful sites into viable, tax generating areas that introduce new revenue into the region (The World Bank, 2010). Furthermore, what is often observed in these areas is that also the surroundings are affected. There are negative social implications, not just because of the environmental conditions, but also a lot of crime, people taking drugs and vandalism (Wille, 2021a). Therefore, (re)developing these sites can "*lead to the eradication of urban blight and the creation of better neighborhoods and friendlier communities*" (The World Bank, 2010, 1). What follows from all of these developments is the ability to increase the speed at which these sites are cleaned up. If

they are properly documented and perceived as a problem that could, however, mitigate other issues sites that require remediation of existing pollution could achieve higher environmental standards (The World Bank, 2010).

While the possibilities concerning brownfields are numerous, their complexity and diversity raise a range of challenges. The most concerning issue is the question of liability. Who is responsible for any environmental or health consequences that are caused by an abandoned sight? If multiple parties are involved, the former owner can no longer be identified or the new owner was not aware of possible contaminations. This is followed by unclear ownership and unclear legal or administrative situations (The World Bank, 2010). This topic is handled differently in various countries and is later described for the two case study countries. Furthermore, not every local municipality has the expertise, be it legal, environmental, fiscal, technical or planning to tackle or fully understand the complexities of brownfield redevelopment (The World Bank, 2010). Which may then cause problems at a later point in time, depending on if the site was handled correctly. Lastly, the economic situation of a country has a large impact on the need for new developments, as "*a stagnating or shrinking economy and lack of market demand for new development*" (The World Bank, 2010, 1), would reduce the need for brownfield redevelopment.

This leads us to the results and discussion part of the thesis, which focuses on two main case study areas, namely Austria and the Region of Flanders in Belgium. Both these countries have recognized the importance of tackling the issue of land consumption and see brownfields as a viable mitigation option. The following chapters give a deeper insight into how the previously discussed topics have been handled, giving a general overview at the beginning regarding the situation in the European Union as a whole.

3. Results and Discussion

The following chapter discusses the aspects of land consumption, how brownfields can be used a mitigation strategy against new land take, as well as the legal and financing mechanisms of the case study countries Austria and Flanders. These chapters are further supported by expert interviews that were conducted in the course of the research. The interviews give insight into the matter from specialists who have been working in their respective fields for many years. It allows for an understanding of the matter not only from a formal and professional point of view, but also highlights personal input and experiences, that might otherwise not be touched upon. The transcribed interviews, in the original language they were recorded in, are attached in Annex A. Explicit permission was given by the interviewees to be recorded before the beginning of the conversation.

3.1. Land take and land consumption

3.1.1. Overview European Union

For the European Union 'land take' and 'land consumption' are two important concepts and their respective implications on economic, social and environmental impacts have been gaining in awareness. Both these terms are indicators for the conversion of undeveloped land into built-up area (Marquard, et al., 2020) and have very similar definitions but different origins. The former is defined as "*the change in the area of agricultural, forest and other semi-natural land taken for urban and other artificial land development. Land take includes areas sealed by construction and urban infrastructure, as well as urban green areas, and sport and leisure facilities*" (EEA, 2019), while the latter is "*the uptake of land by urbanized land uses, which often involves conversion of land from non-urban to urban functions*" (unstats, 2021).

'Land consumption' is defined in line with the framework of the "Sustainable Development Goals" (SDGs). The SDGs were put in place in 2015, following the conclusion of the "Millennium Development Goals" (MDGs), and are a set of the most important universal goals that have been decided on by the Member States of the United Nations. Introduced in the 2030 Agenda for Sustainable Development the 17 SDGs and their 169 targets represent the purpose of the United Nations which is to "*maintain international peace and security, to develop friendly relations among nations, to achieve international co-operation in solving international problems and finally to be a centre*

for harmonizing the actions of nations in the attainment of these common ends" (United Nations, 1945). Relevant for land consumption is Goal 11 with a total of 10 targets and 15 indicators, of which the most pertinent to this thesis have been highlighted in Table 1. Indicator 11.3.1 has been calculated for Austria and Flanders in the following chapters (3.1.2. 3.1.3. indicating for the most part that land consumption has been increasing at a much faster rate than the population growth rate. For Europe in the time frame of 1990-2015 it was identified that it "*was the world region with the least efficient use of urban land: while the population increased in these years by 2.4%, the built-up areas expanded by more than 30%"* (Marquard, et al., 2020, 2).

Table 1: Goal 11 of the Sustainable Development Goals with relevant target and indicator (United Nations, Department of Economic and Social Affairs, Sustainable Development, n.d.)

	**Goal 11:**
	Make cities and human settlements inclusive, safe, resilient and sustainable
	Target 11.3
	By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all cities
	Indicator 11.3.1
	Ratio of land consumption rate to population growth rate

The European Union's Indicator on 'Land take' was established in 2004 by the European Environmental Agency (Marquard, et al., 2020) in the context of the 7th EAP (EEA, 2019). "*In 2011, the European Commission (EC) submitted evidence that an important milestone for the EU should be to reach the goal of 'zero net land take by 2050' as well as to take strict control of the impact on land taking processes of the EU policies in the new Structural Funds programming period (2014-2020)*" (European Commission, 2014; Wille, 2015), which they presented in the "Roadmap to a Resource Efficient Europe (COM(2011) 571)" (EEA, 2019). The concept behind this goal is that there is a balance between land take and land re-cultivated (EEA, 2019). Unfortunately, while there has been re-cultivation in some countries, the leading ones being Luxembourg, the Netherlands, the United Kingdom and Belgium (EEA, 2019), land take was still 11 times higher between 2000-2018 (EEA, 2019). While there has been a reduction, reaching this

goal is nowhere in sight, with land take in the EU-28 still amounting to 539km^2/year (1.3 times the area of the city of Vienna) in the time frame of 2012-2018 (EEA, 2021), with main drivers including industrial and commercial land uses, as well as residential areas and construction sites (EEA, 2021).

Both these indicators demonstrate the rising concerns of how land is being used and the rising awareness of its finite properties. Monitoring by the EEA and the UN have demonstrated that the main drivers still include residential, commercial and industrial purposes, the population, however, is not the driver behind this trend. To give further insight into the topic, the following chapters provide an analysis of land consumption for Austria and the Region of Flanders.

3.1.2. Case study: Austria

Austria has a total surface area of 83883 km^2 and a population of 8.9 million (Statistik Austria, 2021), resulting in a population density of 107.6 prs. /km^2 that places it 15th out of the European Union - 27 countries (eurostat, 2021). Starting in 1990 and over the years 2000, 2006, 2012 and 2018 the CORINE-Landcover project was supervised by the European Environmental Agency to collect data on land cover across Europe (ÖROK, 2021). According to this, Austria's surface area can be split into five main categories: built-up area, agricultural area, forests, water area and wetland area. In 2018, the largest of these categories was forests, with a portion of ~61%, followed by ~32% of agricultural and ~6% of built-up areas (ÖROK, 2021), it is interesting to note that compared to previous years both forest and agricultural areas decreased in size while built-up area increased.

Land consumption

According to estimations, within the next 200 years, if developments continue in this way, Austria will no longer have land available for agricultural purposes and will lose its autonomy in terms of food production. The definition of land consumption (dt. Flächeninanspruchnahme), soil sealing (dt. Bodenversiegelung) and permanent settlement area (dt. Dauersiedlungsraum) are all different indicators and are important in order to understand the following sub-chapters.

Permanent settlement area can be understood as the entire area within Austria that is "livable". In other words, settleable and economically useable space that is available for agricultural production, settlement development and infrastructure after subtracting forests, alpine grassland, wastelands and water bodies (ÖROK Atlas, 2021a). This is particularly important when looking at a country like Austria, which has a high proportion of alpine land. Figure 5 demonstrates the permanent settlement area of Austria in dark orange, this includes settlement, traffic and industrial areas as well as agricultural areas. The white areas are classified as non-permanent settlement areas and include forests, near-natural areas, wetlands and waterbodies. This available land does not change significantly over time, as the topography of Austria and the categorization within this definition cannot be changed. This means that of the total 83881 km^2 of Austrian territory, between 37-38% were recorded as permanent settlement areas since 2006 (Umweltbundesamt, 2021 a). Thus, the topography of Austria shows that, only about 40% of the territory are "livable" and can be used for settlement purposes or agriculture.

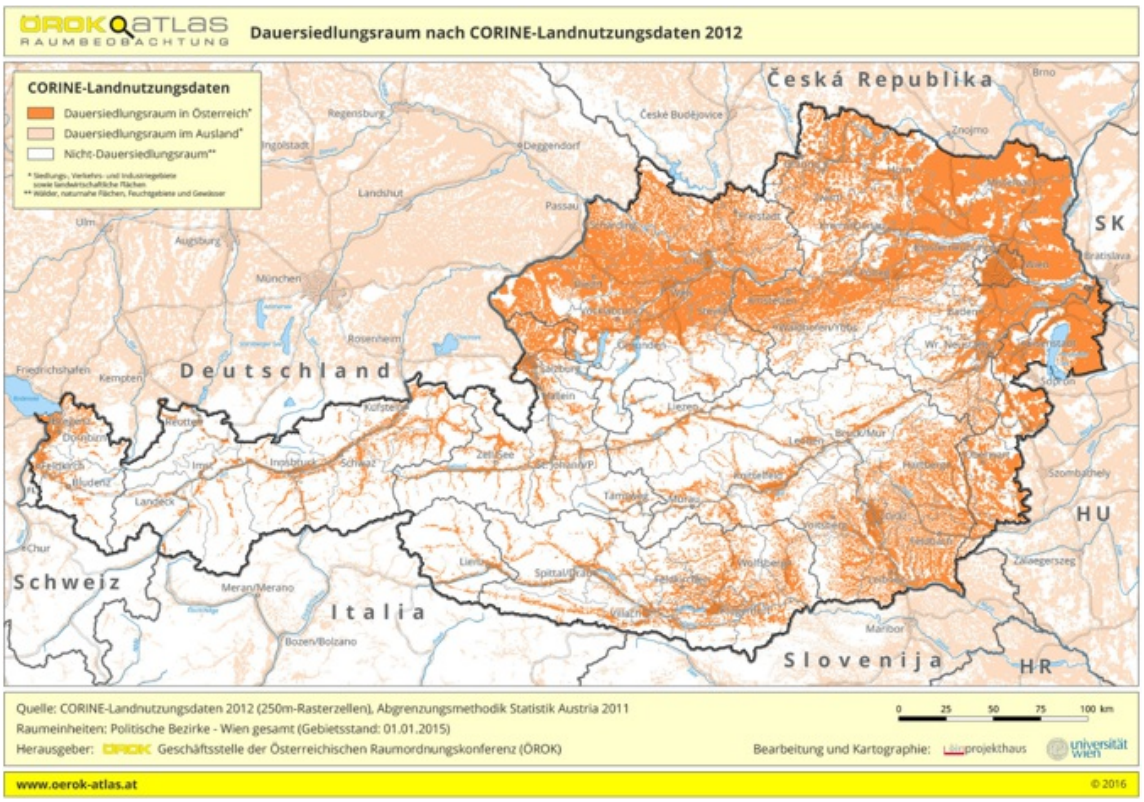

Figure 5: Permanent settlement area according to CORINE-Land use data 2012 (ÖROK Atlas, 2021a)

Now roughly speaking, when agricultural land is removed from the calculation within the permanent settlement area it leaves land consumption. According to the UBA land

consumption is the permanent loss of biologically productive soil by building and sealing for settlement and transport purposes, but also for intensive recreational use, landfills, quarrying areas, powerplants and similar intensive uses (Umweltbundesamt, 2021 a). Up until 2019, Austria consumed 5729 km^2 of its total area of 83883 km^2, which is equivalent to 6.8%, which in turn is 18% of the permanent settlement area available (Umweltbundesamt, 2021 a). Another distinction that is made is between land consumption and soil sealing. If a previously undeveloped plot of land is used to build a new house, this would fall under the categorization of 'land consumption', as the entirety of the plot is taken up for settlement activities and is no longer available for agricultural activities. However, in terms of soil sealing only the area that the actual building occupies is relevant and the garden or area that is not part of the building does not count as sealed soil (ÖROK Atlas, 2021b). So, land that is sealed is covered with an impermeable layer that loses all its production functions as well as the ability to retain water.

Already in 2002, the Austrian Federal Government laid down a goal in their 'Sustainability Strategy' that the land consumption increase was to be reduced to 2.5 ha/day by 2010 (Schuster, 2019), which is an equivalent of roughly 9 km^2/year. This goal has since been included into the current governmental program for the period of 2020-2024 to again reduce the land consumption to a net 2.5 ha/day by 2030 (Bundeskanzleramt Österreich, 2020). The following Figure 6, however, demonstrates that the land consumption per permanent settlement area is nowhere near this ideal goal, assuming that this goal is upheld starting in 2006. Between 2016 and 2019 the percentage of land consumption per permanent settlement area was almost 4%, whereas the ideal increase should have been 0.48%. In the timeframe of four year between 2006-2010 the increase in land consumption per permanent settlement area amounted to 2.1% compared to the following eight years 2011-2019, where the increase amounted to 1.48%. While this demonstrates a flattening of the curves slope, the increase is still too high.

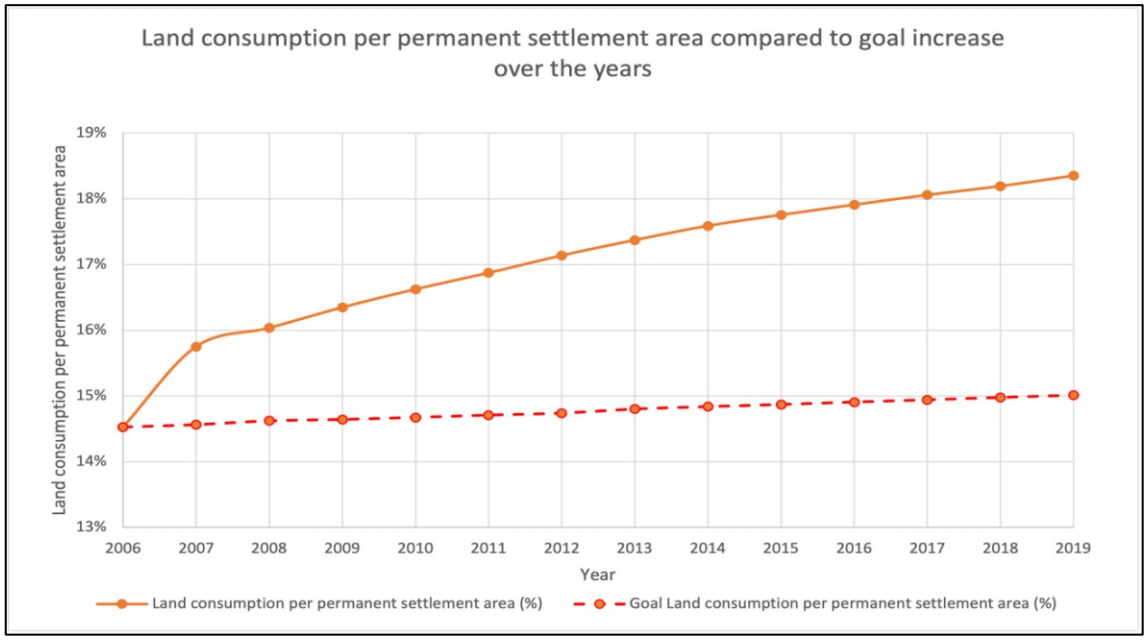

Figure 6: Land consumption per permanent settlement area compared to goal increase over the years [own depiction based on data from (Umweltbundesamt, 2021 a)].

This is even more obvious when looking at the yearly increase of land consumption in Austria (in km^2), demonstrated by Figure 7. These figures can be calculated as the difference in land consumption of two consecutive years. From 2006 until the end of 2009 there is a steady increase which then flattens and decreases from 2010 onwards. While there is a decrease the land consumption is still nowhere near the goal of 2030, which is indicated in red. Furthermore, there is again a clear growth in 2019 with a year's increase of around 48 km^2 in new land consumption. In order to make this figure more tangible, a land consumption increase of 48 km^2 per year corresponds to 13 ha/day, while the ultimate goal is 2.5 ha/day.

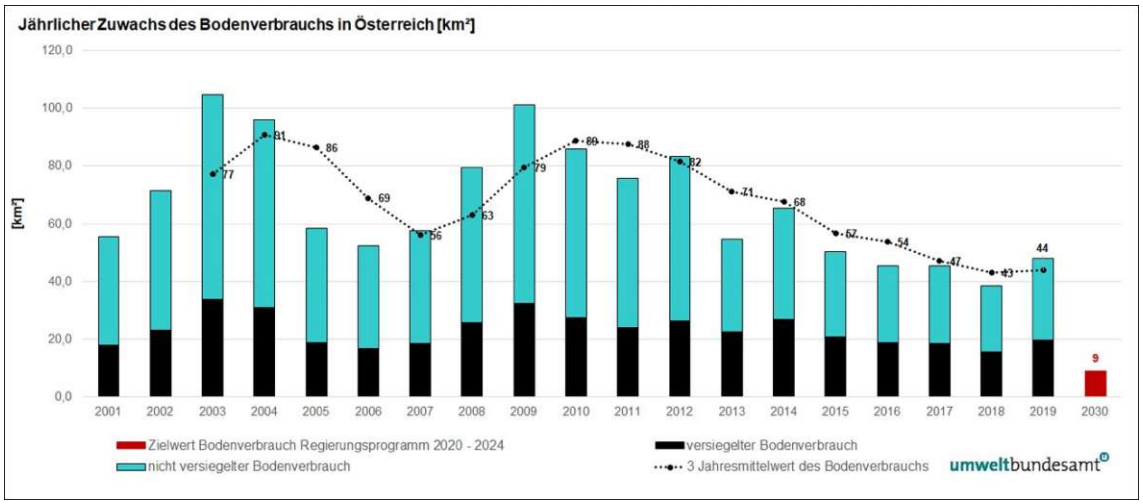

Figure 7: Yearly increase in land consumption in Austria (km2), red bar: target value for land consumption government program 2020-2024, black bar: sealed land consumption, blue bar: non-sealed land consumption, dotted line: three-year average of land consumption [based on (Umweltbundesamt, 2021 a)].

When observing the yearly increase of land consumption by sector, shown in Figure 8, it is visible that the commercial area contributes most to the increase with values between 14 km^2 and 31 km^2, even though the contribution clearly declines afterwards. The second highest land consuming sector is the building area which has an increase range of 16 km^2 to 27 km^2. The greatest increase for the building area can be detected in 2019 where there was a leap from 19.7 km^2 / year to 26.1 km^2 /year. The increase of both land consumption for roads, sport and leisure facilities as well as excavation sites has been decreasing since 2015, with a change in increase from 13.5 km^2 for roads and 8 km^2 for sports/leisure and excavation to 5.2 km^2 and 2.2 km^2, respectively. Looking at the railway sector it can be observed that it is the only area that exhibits negative increases, so there land consumption is actually declining. This is due to restructuring measures of railway infrastructure and old railways yards being repurposed for commercial or residential purposes (Umweltbundesamt, 2021 a).

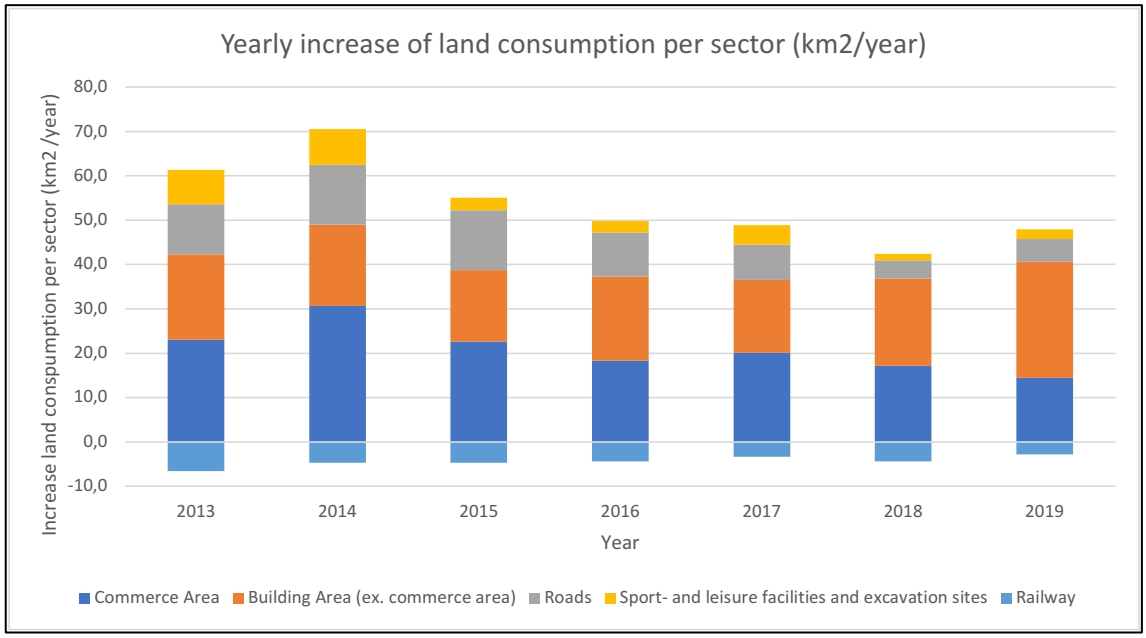

Figure 8: Yearly increase of land consumption per sector (km2/year) in Austria [own depiction based on data from (Umweltbundesamt, 2021 a)].

As mentioned in chapter 3.1.1. one of the most relevant indicators to evaluate land consumption is established by the SDG Goal 11 and is the indicator 11.3.1: "*ratio of land consumption rate to population growth rate*" (United Nations, Department of Economic and Social Affairs, Sustainable Development, n.d.). Population growth rate is defined as "*the change of a population in a defined area (country, city, etc.) during a period, usually one year, expressed as a percentage of the population at the start of that period*" (unstats, 2021, 2) and land consumption rate is "*the rate at which urbanized land or land occupied by a city/urban area changes during a period of time (usually one year), expressed as a percentage of the land occupied by the city/urban area at the start of that time*" (unstats, 2021, 2). If the indicator's value falls below the indicator threshold of 1 "(…) *the increase in built-up area is slower than the increase in the number of inhabitants, and it can be explained by the demographic trend; if, instead, the indicator value is > 1, land consumption is disproportionately high, i.e., decoupled from population growth*" (Marquard, et al., 2020, 3). Figure 9 demonstrates this indicator for Austria in the time frame of 2007-2019, where apart from 2016 and almost 2015 with a value of 0.99 all other years are a lot higher than the value 1. This shows how unproportionate land consumption in Austria is in reference to the population growth. This is particularly true between 2006 and 2012, where the value was at its highest in 2009 with 8.397. Even at

its lowest, in 2016 the indicator value was never far from 1 with 0.64, and already being above 1 again in the following year with a value of 1.27.

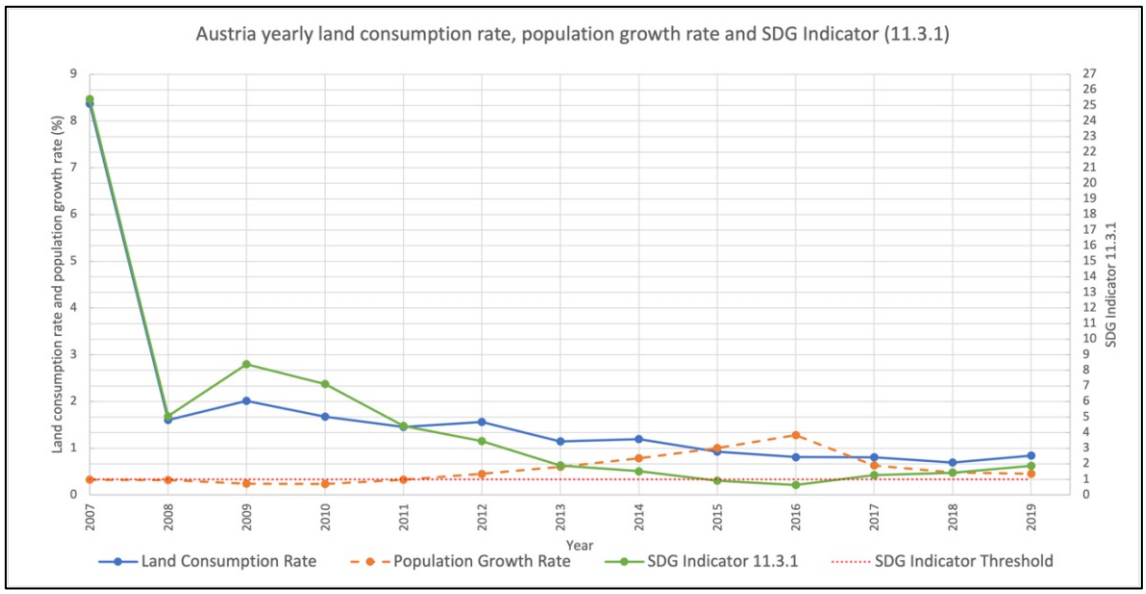

Figure 9: Austria yearly land consumption rate, population growth rate and SDG indicator 11.3.1 [own depiction based on data from (Statistik Austria, 2020; Umweltbundesamt, 2021 a)].

The progression of the land consumption rate can be compared to that of Figure 7, as the land consumption rate is calculated by means of the yearly increase in land consumption. However, when comparing the calculated yearly increase (established through the raw data given by the Umweltbundesamt (Umweltbundesamt, 2021 a), annexed in B.1. to the numbers depicted in Figure 7, there are two outliers in 2007 and 2013 that do not coincide. For the year 2013, Figure 7 demonstrates a value below 60 km^2 (~54 km^2), while the calculation made for the land consumption ratio in Figure 9 results in a value of above 60 km^2 (61.5 km^2). This deviation could be explained by a comprehensive change in the categories of land use, in which the differences in the nomenclature, figures or indicators (for example, sealed area) before and after 2012 are only comparable to a limited extent (Umweltbundesamt, 2021 b). It is assumed that Figure 7 used the old categorization to allow for comparison, leading to a difference in the values. However, this categorization change does not have a significant impact on the land consumption as a whole. For 2007, the difference is much more significant, causing the highly unlikely spike in Figure 9, which no longer corresponds to the trends of the land consumption increase in Austria, depicted in Figure 7.

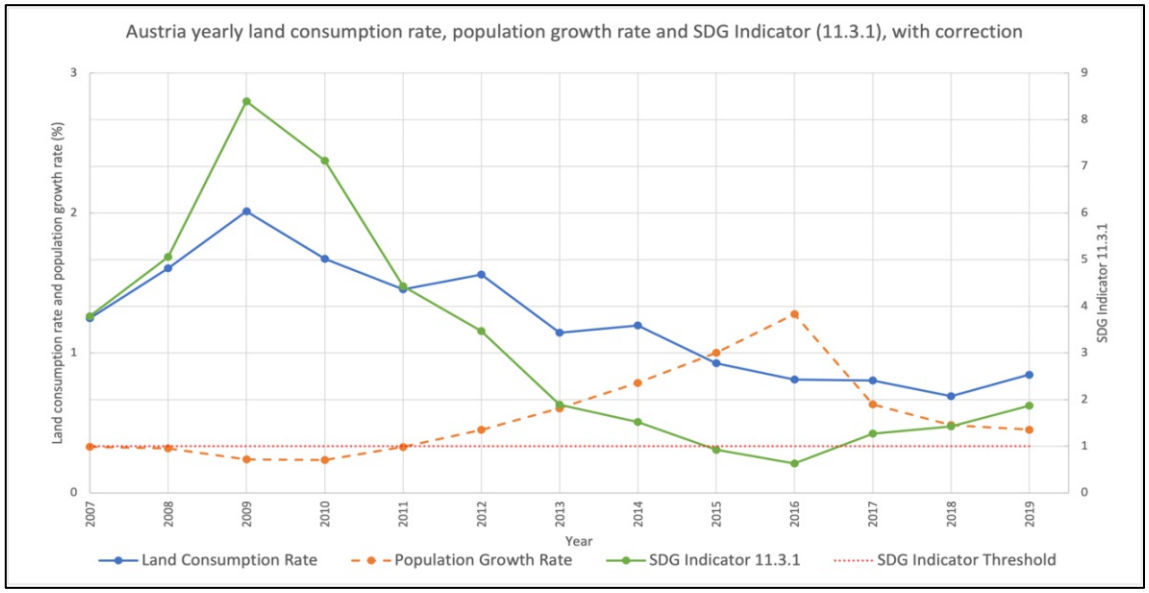

Figure 10: Austria yearly land consumption rate, population growth rate and SDG indicator 11.3.1, with correction [own depiction based on data from (Statistik Austria, 2020; Umweltbundesamt, 2021 a)].

Since all other values of the yearly increase in land consumption, obtained during the calculation of the yearly land consumption rate, coincide with those depicted in Figure 7, the unlikely outlier in the year 2007 was corrected. This was done by substituting the calculated yearly increase value of 2007, with the value read from Figure 7, which is ~57 km^2. This leads to the adjusted Figure 10, which depicts a land consumption rate progression which is much more fitting to that of Figure 7. The calculations and correction that establish Figure 9 and Figure 10 have been added in B.2. . Figure 10 then shows the highest rate of land consumption in the year 2009, which corresponds to the highest yearly increase in land consumption in the year 2009 of Figure 7. This adjustment allows for an easier analysis of the trends concerning the SDG indicator 11.3.1 in Austria. It demonstrates the extremely high land consumption rate in relation to the population growth rate and its decoupled development.

What these numbers clearly prove is that land consumption in Austria is very high and clearly stands in no relation to the population growth. How the still available space is managed is very relevant to how cities should be developed in the future. Land consumption is growing at a much faster rate than the population, which raises the question why so much area is being converted. As the land used for residential purposes is the second largest area in terms of land consumption area increase, after the commercial sector. Furthermore, Austria is far away from the goal set by the Austrian government

and new measures, ideas and strategies have to be implemented if there is any chance of reaching those goals.

3.1.3. Case study: Region of Flanders, Belgium

Belgium has a total surface area of 30688 km^2 with a population of roughly 11.5 million establishing one of the highest population densities within the European Union, ranking 3rd after Malta and the Netherlands with 377.3 prs. /km^2 (eurostat, 2021). As of 2019, Flanders has a total surface area of 13625 km^2 (Dept. Kanselarij en Buitenlandse Zaken, 2019) with 6.589 million people living in Flanders and a steady population increase in the last 20 years, it is home to more than half of the Belgian population (Statistiekvlaanderen, 2020). This indicates a clear pressure on still available land. It is estimated that the increase of urban areas is 7 ha/day, of which 5 ha/day are transformed for residential purposes (Wille, 2021c). When focusing on Flanders the leading form of land use, in 2016, by category is cropland, followed by grassland and then residential areas. For Flanders the term 'land use' coincides with the term 'permanent settlement area' in Austria, seeing as there is another distinction caused by the alpine topography of Austria. In Flanders, the most significant changes in land use are found in grassland, where in the time span of 2013-2016 it decreased by 0.8% points and residential area increased by 0.3% points (Dept. Kanselarij en Buitenlandse Zaken, 2019b), demonstrating the increase stress on areas suitable for agriculture. The following chapters highlight the situation of land consumption in Flanders, following the definitions of terms used specifically for this region of Belgium. Therefore, the resulting analyses of the two case study countries are only conditionally comparable, and the definitions of key terms should always be kept in mind.

Land consumption

In Flanders land take, or land consumption is defined as the space occupied by settlements. This includes housing, industrial and commercial purposes, transportation infrastructure, recreational purposes and also parks and gardens (Poelmans, et al., 2019), which coincides with the European Commission's definition for "settlement area" or "artificial land" which is "*the area of land used for housing, industrial and commercial purposes, health care, education, nursing infrastructure, roads and rail networks, recreation (parks and sports grounds), etc. In land use planning, it usually corresponds to all land uses beyond agriculture, semi-natural areas, forestry and water bodies*" (EEA,

2019) (EEA, 2021). However, there is also a similar term known as 'built-up area' which uses the definition of the EEC-UNO standard classification of land use (Dept. Kanselarij en Buitenlandse Zaken, 2019), by which built-up area "(…) *includes land occupied by housing, roads, mines and quarries, and also other facilities, including adjacent spaces used for human activities. It also includes certain types of open (non-built-up) areas that are closely linked to these activities, such as landfills, abandoned land in built-up areas, car wrecks storage sites, city parks and gardens*" (Dept. Kanselarij en Buitenlandse Zaken, 2019). When taking this difference into account the settlement area in 2016 was roughly 4500 km^2, or 33% of the Flemish region while built-up land was 3877 km^2 or 28.5% of the total Flemish area. The latter is demonstrated by Figure 11, showing the clear clusters around major cities such as Antwerp, Ghent, Bruges, Leuven, Brussel-capital, and Kortrijk.

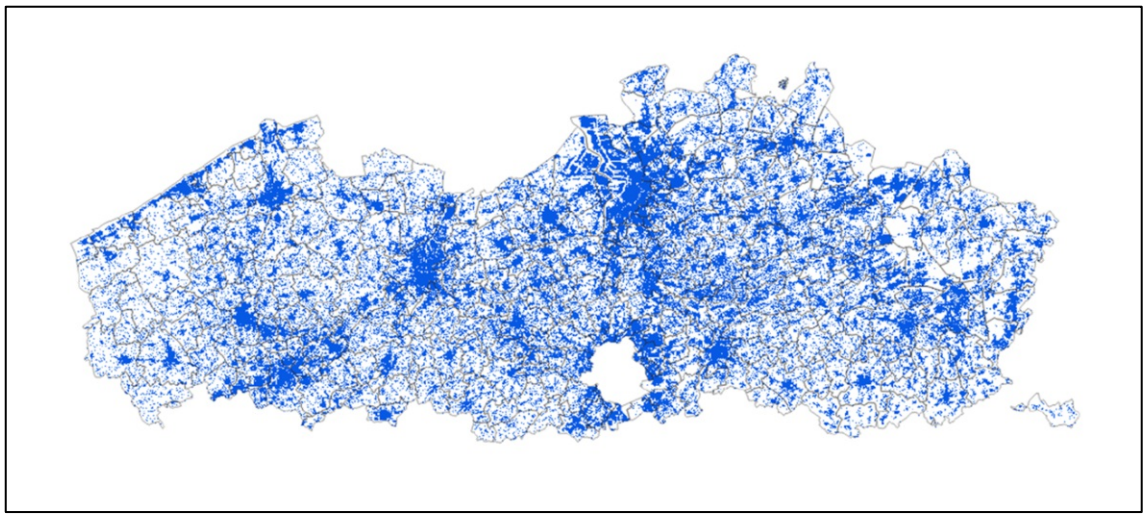

Figure 11: Built-up area of Flanders, 2019 [based on (Poelmans, et al., 2021)].

In the years 2018 and 2019 there have been some changes in the land registry, which have affected the statistics pertaining to land take in general, however, particularly built-up area. The first land registry was established in the Napoleonic period and up until and including 2017 was updated sequentially (Dept. Kanselarij en Buitenlandse Zaken, 2019), however, these were adjusted for the calculation of 2018 (Dept. Kanselarij en Buitenlandse Zaken, 2019). Furthermore, "*In line with international conventions and the guidelines of Eurostat, the European Statistical Office, the surface area of the coastal strip up to the low tide line was included in the surface of the ten coastal municipalities*" (Dept. Kanselarij en Buitenlandse Zaken, 2019) changing the total surface of Belgium

from 30528 km² to 30688 km², which also effected the Flemish Region with a change from 13522 km² to 13624 km². This change indicates that the comparison of data from 2018 with that of 2017 and before must be considered with caution. For this reason, Figure 13 and Figure 14 indicate a 'grey' bar for 2018, seeing as the data is available but not necessarily comparable, with those prior to 2018. And lastly the final, small correction was taken in 2019, when the Flemish Region was adjusted again and resulted in the total surface area of 13626 km² (Dept. Kanselarij en Buitenlandse Zaken, 2019). This, however, has no significant influence on the development shown in the following figures.

While the definition of built-up area and settlement area are quite similar, built-up area was chosen to demonstrate at the following developments, due to the fact that there is more data available and has been consecutively documented since 1985 (Dept. Kanselarij en Buitenlandse Zaken, 2019). Since 2007, the portion of built-up land per total surface area in Flanders has been steadily rising, as depicted in Figure 12. In 2007, 25.84% of all of Flanders was built-up area, and in 2019 it was 28.46%, meaning there was an overall increase of 2.62% points. This corresponds to 357 km² of the total surface area of Flanders. As the previously mentioned changes in the land registry fall into the time interval between 2017 and 2018, it is likely that the sudden increase, shown in the curve of Figure 12, can be led back to said changes. However, when looking at the increase in built-up area from 2018 to 2019, now again subject to equal definitions, the increase value amounts to 0.16%, which lies in the same range as the values for the years prior to 2017.

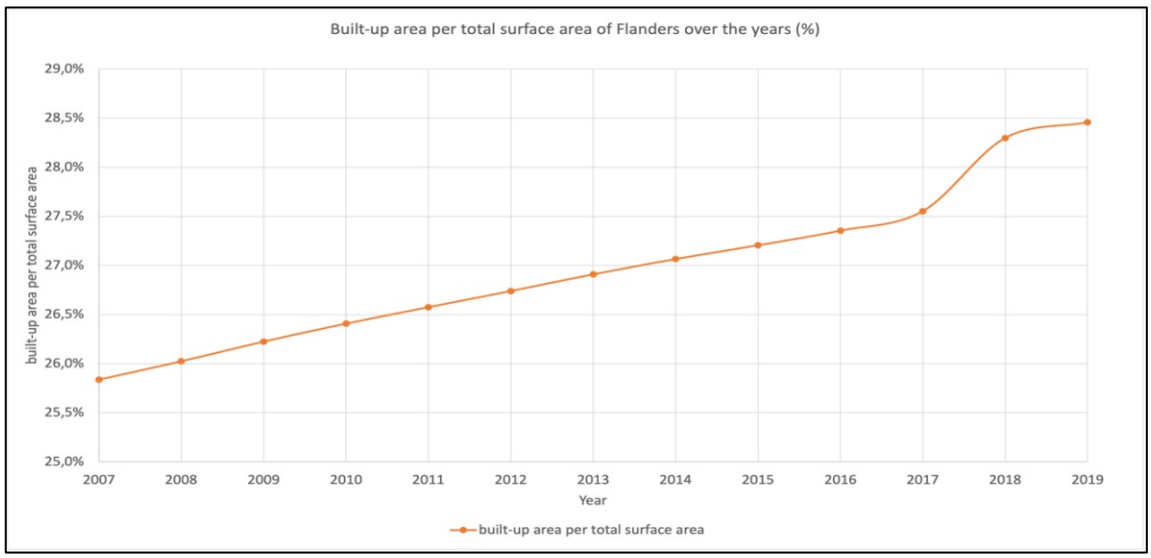

Figure 12: Built-up area per total surface area of Flanders over the years [own depiction based on data from (STATBEL, 2017)].

In the following, Figure 13 demonstrates the yearly increase in built-up area in km^2 as well as a 3-year average. In the time span of 2009-2015 there was a decline in the increase of built-up land, however this was followed by a sharp increase in 2017. In 2019, there was a 22 km^2, or 2200 ha increase, which is roughly a 6 ha increase per day. This is still double of the amount set with the goal, to reduce the land take rate in Flanders "*(...) to 3 ha/day in 2025, in order to achieve net zero land take by 2040*" (OECD, 2019, 2), which was introduced within the new spatial development strategy, approved by the Flemish government in July 2018 (OECD, 2019).

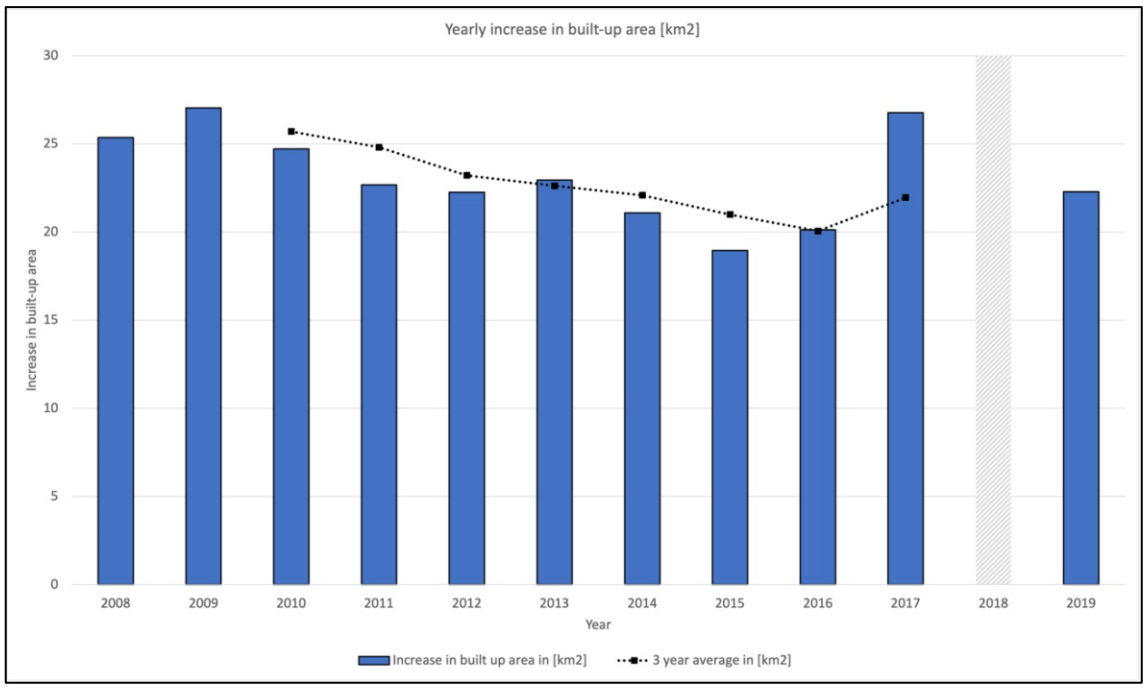

Figure 13: Yearly increase in built-up area including 3-year average (km2) in Flanders [own depiction based on data from (STATBEL, 2017)].

These figures can then be further broken down into the relevant sectors, demonstrated by Figure 14, where again, 2018 has been removed from the illustration to allow for useful scaling and comparison. Here it is important to note that some sectors experienced a reduction in comparison to the year before, causing a negative increase. This is particularly striking in 2016, where the area for transportation and telecommunication was -4.95 km^2 but was balanced again with +5.05 km^2 in 2017. It is easily visible that within the built-up sector the largest amount of land, over the years, has been consumed by residential areas. Up until 2015, this was followed by industrial buildings and sites and then recreational areas and other open spaces. In the following years recreational spaces

were the second largest yearly increase of built-up area with 9.27 km^2 in 2016 and 7.76 km^2 in 2017. In 2019, the residential portion of built-up land increased by 12.78 km^2, followed by 4.75 km^2 for recreational area, and then industrial buildings and sites with 3.25 km^2. The trend of the built-up area sector for residential use does not seem to be changing much over time, which this is only partially explainable by the population growth rate.

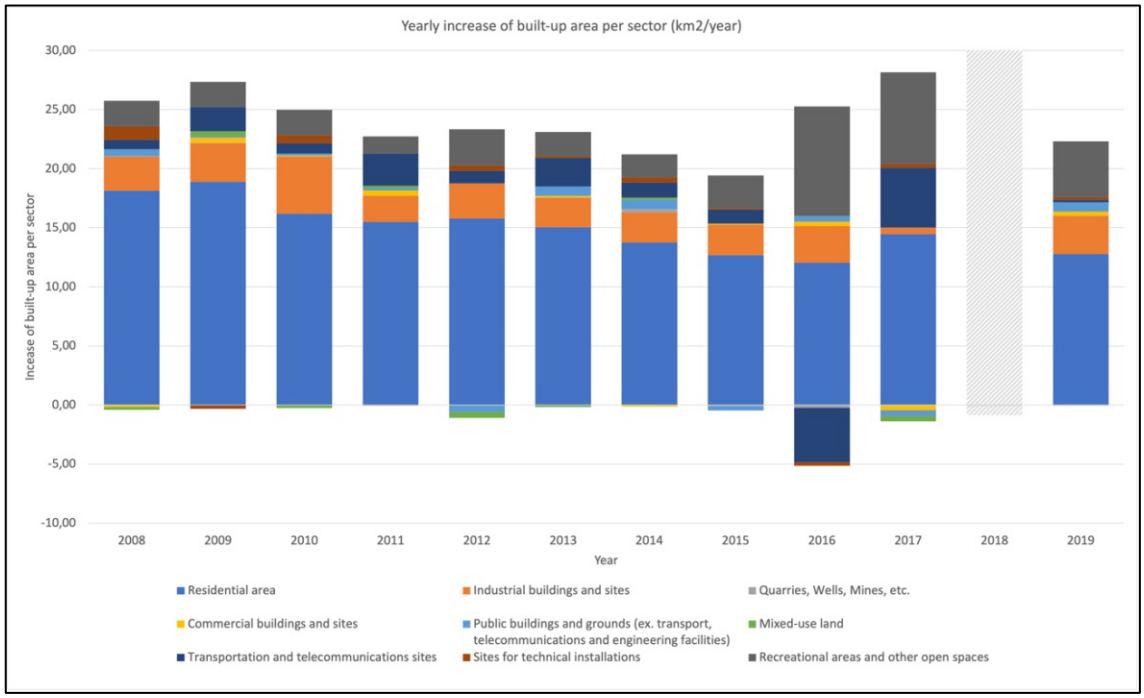

Figure 14: Yearly increase of built-up area per sector (km2/year) in Flanders [own depiction based on data from (STATBEL, 2017)].

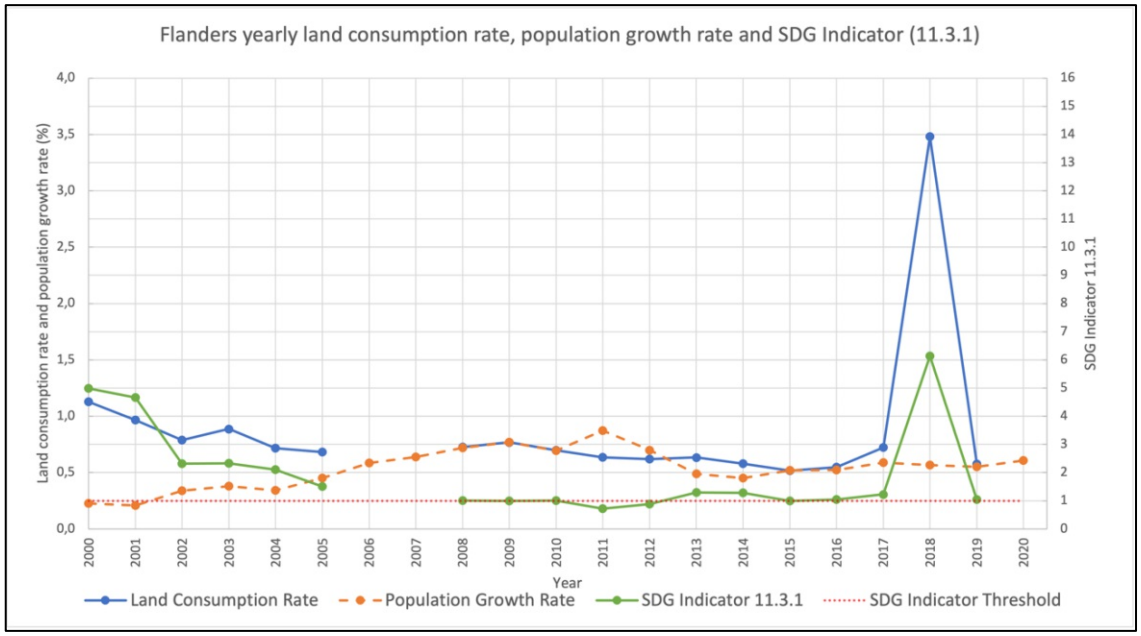

Figure 15: Flanders yearly land consumption rate, population growth rate and SDG indicator 11.3.1 [own depiction based on data from (STATBEL, 2017; Statistiekvlaanderen, 2020)]

While not as severe as in Austria, the ratio of the land consumption rate to population growth rate, which, as previously mentioned, is the indicator 11.3.1 to the SDG 11, is still disproportionately high. This means that also in Flanders, more area is being built-up than the population is growing. In the 20-year timeframe depicted in Figure 15 the indicator value falls below the threshold of 1 only in four years, these being: 2009, 2011, 2012, and 2015. The lowest values are in 2011 with 0.73. The highest value, with 4.98 occurred in 2000, when the biggest disparities were observed between the land consumption rate and the population growth rate. Again, it is important to note that as for the previous figures illustrated for Flanders, the year 2018 in Figure 15 has to be ignored due to the land registry changes, which affect the statistics pertaining to land take in general, but particularly built-up area (Dept. Kanselarij en Buitenlandse Zaken, 2019).

Both Austria and Flanders show large amounts of 'land consumption', 'land take' or 'built-up area' for countries that already experience a shortage in available land. Austria already loses a lot of its total surface area to its topography, and Flanders has already covered over one third of its total surface with infrastructure for settlement purposes such as residential, industrial and commercial, as well as transportation and recreational ones. An assumption could be made that population growth is the first thing that comes to mind to explain the push in built-up area, but when looking at the mean values of the SDG

indicator from 2008 to 2019, which is 3.17 for Austria and 1.47 for Flanders, a general situation becomes visible, which is that for both regions, land consumption stands in a disproportionate relation to population growth. It is important to note that the comparison of the SDG indicator for the two regions is only valid to a certain extent, as the underlying data of land consumption in Austria and built-up area in Flanders are based on different definitions. Nevertheless, the mean values of the SDG indicator paint a general picture of the concerning situation and disproportionately high consumption of land in both countries. This realization on the importance of land and the increasing strain in both countries has led to a variety of strategies to help mitigate this phenomenon, in the fields of spatial planning and sustainable urban development. A strategy that has also been recognized by the European Union and has already been in place in countries like the United States and the United Kingdom for a long time, is the use of brownfields and the (re)development of abandoned or underused sites. These areas have the potential of mitigating the land consumption and moving new development away from greenfields, or still unused and natural land.

3.2. Brownfield occurrence and redevelopment potential

3.2.1. Overview European Union

The European Union has a rich history of industrialization, with an economy that is rapidly shifting from industrial production to services (The World Bank, 2010). This transformation has "(…) *caused the liquidation of certain enterprises, degradation of industrial facilities and new forms of organization* [which in turn has caused] *the abolition of industrial zones from the structure of cities*" (Perovic & Folić, 2012, 376). In Europe the awareness of the environmental consequences of brownfield sites started to gain awareness in the early 1980's (Perovic & Folić, 2012), which has led to the establishment of multi-faceted strategies, brownfield programs and policies, including different methods on how to tackle regeneration, (re)development, and in cases of contamination, remediation.

This varied progress is also reflected in the lack of a European wide definition of brownfields. The fact that the definitions vary across Europe makes comparison of the extent of the brownfield situation quite difficult, with only a few countries actually having some form of documentation or estimation of their sites (Ferber & Grimski, 2002).

Furthermore, each country used different tools to try and collect the relevant information meaning that "(…) *data available are insufficient for assessing certain parameters, such as total surface area contaminated per class of contaminant, the percentage of population exposed to the contaminant, the environmental damage caused by contaminated sites, etc*." (Montanarella, 2007, 97). For this reason, the following chapters highlight the brownfield situation in two Member States in order to demonstrate the opportunities and challenges they have encountered while working within the domain of brownfields.

3.2.2. Case study: Austria

In Austria, there is a variety of definitions that have to be considered when analyzing the topic of brownfields and sites that have been previously used in some form, be it with potentially hazardous substances, waste or mere pre-use. The following box demonstrates the German terms used in literature and the English translations used in this paper.

Existing sites (Altstandort) (IG Lebenszyklus Bau, 2020): Sites on which environmentally hazardous substances were handled before 1989. It is estimated that roughly 63,000 of these sites exist in Austria. Most of these have been documented by the UBA.

Old landfills (Altablagerungen) (IG Lebenszyklus Bau, 2020): Sites on which waste was deposited before 1989. It is estimated that roughly 8,000 of these sites exist in Austria. Also, here most have been identified by the UBA.

Suspected sites (Verdachtsflächen) (IG Lebenszyklus Bau, 2020): Either existing sites or old landfills that have been reported by the governor of the province due to a suspected occurrence of contamination due to the previous forms of use with sufficient substantiation. This, however, does not yet document that there is actually any contamination or hazardous danger on the property. They are recorded in the Federal Agency's register of suspected contaminated sites and can be researched online at any time.

Contaminated sites (Altlasten) (IG Lebenszyklus Bau, 2020): These are existing sites and old landfill, as well as soil and groundwater bodies that have been contaminated,

that were created before 1989 and from which significant human health risks or the environment originate. Of the 63,000 existing sites and 8,000 old landfills only around 2,000 are presumably contaminated to the extent that they have the status of a contaminated site. These sites are specifically documented and spatially graphed by the Federal Ministry for Climate Protection, Environment, Energy, Mobility, Innovation and Technology (BMK) on the contaminated sites portal.

Brownfields (Brachflächen) (IG Lebenszyklus Bau, 2020): This term is often used as an umbrella term to include sites that were previously used or parts of sites that are currently not being used. Although the majority of these sites are not contaminated, they are often stigmatized and therefore difficult to mobilize for subsequent use.

Identifying sites in Austria

The past 50 years have been characterized by a wave of deindustrialization and various operational shifts, which have led to the emergence of brownfields. Entire industries, such as the textile industry, have disappeared, companies have merged and higher production capacities have been established on smaller areas (Umweltbundesamt, 2008). These areas are usually in good locations, either due to the fact that they were already in favorable places, or the city has grown around them. Many of these sites have the potential to be reintegrated, however the majority of investors prefer to develop on green spaces. One of the largest challenges in terms of redevelopment and reintegrating these sites is the fact that the underlying number, size and location of many of these sites is unknown, due to the fact that there is no reliable national data on the extent of brownfields in Austria, only estimations and a few selected federal provinces that conduct regional analyses.

In 2004, the Federal Environmental Agency conducted an analysis of the brownfield situation in Austria (Umweltbundesamt, 2004). The report "*was precisely the basis on which we* (UBA) *actually began to think about it* [brownfields as options for development]. *That was somehow the basis on which we looked if the topic is at all relevant in Austria, or is it null and void that partially contaminated, or little contaminated, or even more contaminated areas are considered for subsequent use*" (Wepner-Banko, 2021). The basis of the report was surveys of existing industrial and commercial brownfield sites, which had been documented in two selected model areas in

Austria. The survey was carried out in two steps. The first one was checking all the existing sites (Altstandorte), so sites on which potentially environmentally hazardous substances had been or were still being handled and had been documented by the relevant institution of the model areas. The difficulty here is that just because a site is documented as an "existing site" or "Altstandort" does not mean that it is no longer in use. On-site investigation determined which of these sites were no longer in use or had become brownfields. If this was the case and the site had indeed become unused or underused, it was documented as such. The second step was identifying "new" existing sites that had developed after 1989, because the survey of old sites, conducted by the model areas was established on businesses that had been opened before 1989 (Umweltbundesamt, 2004). So, the researchers had to determine sites that had been made operational after 1989, closed by the time of the site investigation and had become underused or unused in that time (Umweltbundesamt, 2004). Once this was documented a variety of different spatial analyses and classification of federal territory were necessary in order to be able to translate the regional data of the chosen model areas and sample municipalities onto the whole of Austria. This included indicators such as municipality size classified by the number of inhabitants, structure of the region (metropolitan area, surrounding area, industrial area), household and employment development, industrial character, economic development as well as population development (Umweltbundesamt, 2004), to name a few. This resulted in the estimation of a current nationwide brownfield occurrence of between 3000 and 6000 areas in a range of 8000 to 13000 ha (Umweltbundesamt, 2004). This rough estimation was again calculated in 2017 and lead to a similar result of 5000 to 10000 no longer used, or under used sites (Rabl-Berger and Wepner-Banko, 2017). This estimation then also led to the map demonstrated in Figure 16, which shows the brownfield occurrence in the municipalities according to the calculation variant 2, which takes into account a combination of community characteristics.

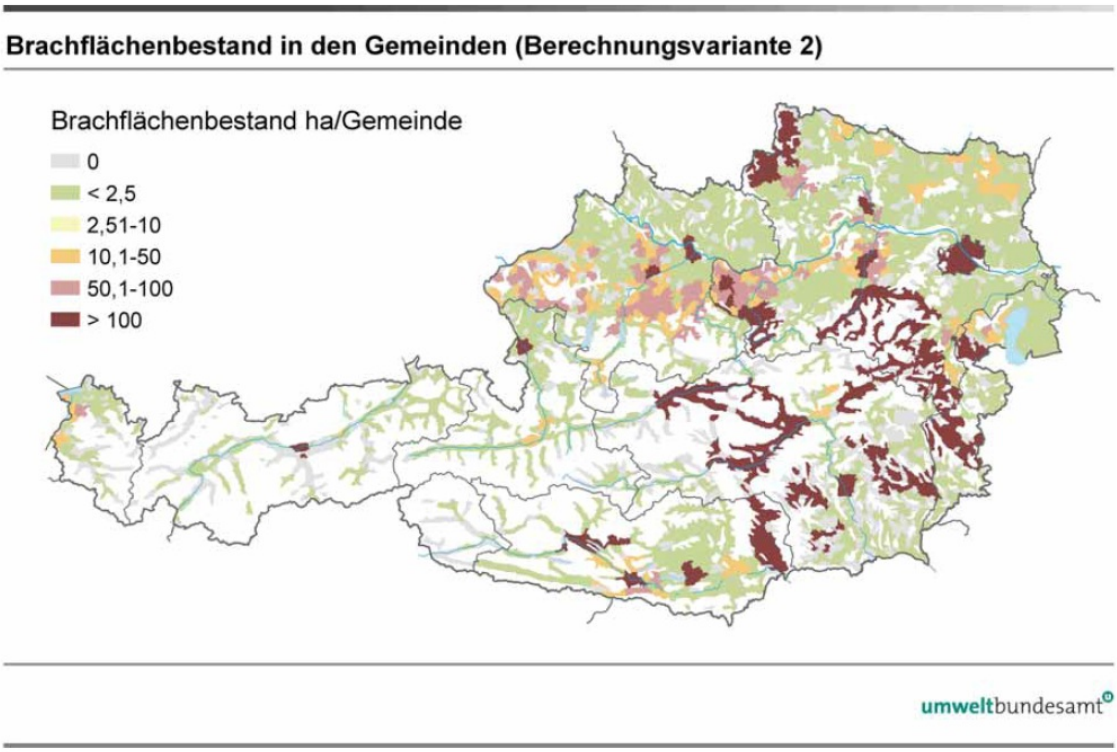

Figure 16: Brownfield occurrence in the municipalities (ha/municipality) in Austria (Umweltbundesamt, 2004)

Following further calculations using data from the model regions projections were made concerning the annual brownfield accumulation. Taking into account the municipal business closures from 1981 to 1991, the total area of brownfields in Austria (sum of annual brownfield accumulation in the municipalities), the annual accretion of brownfields is about 1100 hectares (Umweltbundesamt, 2004). This acquired data can be compared to the yearly land requirements as depicted in Figure 17.

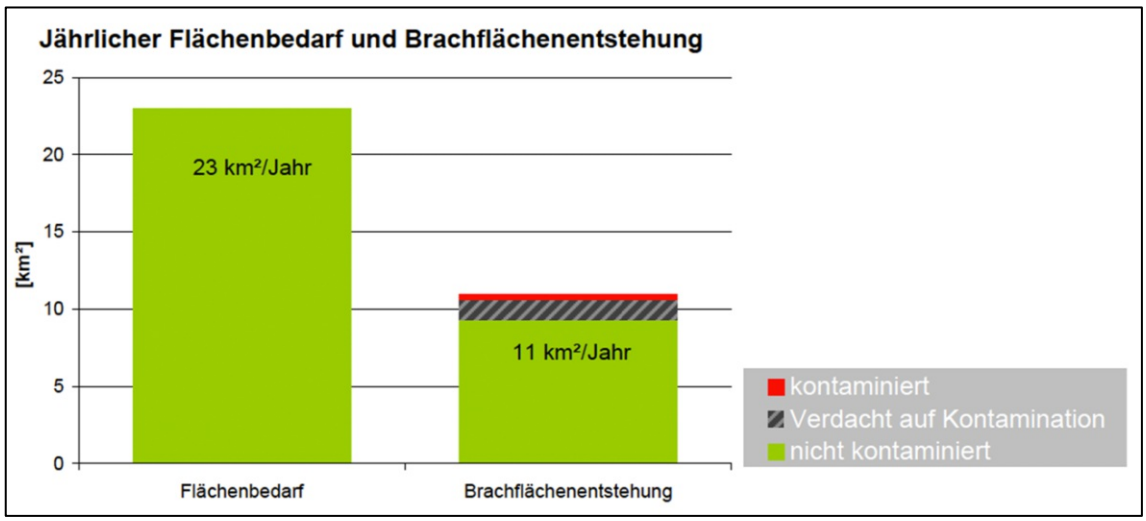

Figure 17: Yearly land requirements and brownfield development in Austria [based on (Umweltbundesamt, 2008; Schuster, 2019)].

What these numbers demonstrate is that "*yes, there really is an issue and a part, so to speak, of new buildings, can be minimized by land recycling. And it is really relevant and worth pursuing*" (Wepner-Banko, 2021). On the national level, these numbers, which are based on estimations, extrapolations and projections are still used today. "*When we publish something, we still reference the old data because we simply do not have any reliant, more up-to-date data. That is a gap, we know that*" (Rabl-Berger, 2021). What is also visible in Figure 17 is the fact that most of the sites would actually not be contaminated, followed by sites that have suspected contamination and only a fraction of the sites are actually contaminated.

It is difficult, however, to determine the amount and location of industrial and commercial brownfields that have no contamination, as the process of collecting any data related to the subject is based on long-term tedious collection methods. In 1989, the Contaminated Sites Remediation Act was enacted to help finance and secure the development of contaminated sites and is known as the "dt. Altlastensanierungsgesetz", referred to as ALSAG (Bundesministerium, 1989). This law determines that the Governor shall notify the Federal Minister for Environment, Youth and Family affairs of suspected contaminated sites (Bundesministerium, 1989) . This notification is then passed down to the UBA and is documented in a register of suspected contaminated sites (Bundesministerium, 1989). It is estimated that roughly 70000 sites exist, that at some point in time, before 1989, worked with, or potentially worked with environmentally hazardous substances (Rabl-Berger, 2021), meaning that not all the sites contained in the registry are brownfields or are even out of use. The roughly 70000 sites were acquired through systematically carrying out data collection projects which "*(...) does not happen all at once, it is a continuous process and we are now in the process of working through these areas and looking at them*" (Wepner-Banko, 2021). First engineers were commissioned to do this from state to state, by screening telephone directories, business registries and historical research. Following this, on-site visit were conducted in which the use was again confirmed, recorded and registered, creating a portfolio for each of the 70000 sites. This portfolio not only gives the former use of the site, that was collected by historical research, but also the current state or use (Rabl-Berger, 2021). However, due to this form of collection the data is no longer up to date, as some of the information on the use of these sites is up to 20 years old.

Contaminated sites in Austria are clearly mapped in a registry which is also open to the public. The sites that have potential contamination and have been reported to the UBA are documented in a separate register that is only partially available to the public. This is because sites that are suspected of contamination could easily become stigmatized if registers were readily available to anyone who potentially wanted to buy property. Specific inquiries with the relevant documentation and property numbers can be made to the UBA directly. Once the sites have been investigated, they can either be cleared as being safe or if contamination is really so severe that they are marked as contaminated they are moved into the publicly visible map.

Attempts have been started by certain provinces to try and collect data on a smaller scale. A forerunner province with such an attempt is Upper Austria, where business agencies (Standortargenturen), have been used to collect data. The hope is that local communities will have a better overview of possible brownfield sites. An example agency is the business agency "Business Upper Austria". Their goal is to create incentives for local and foreign businesses to settle in Upper Austria which will enhance the "*creation and continues development of infrastructure to encourage investments, innovation and technologies*" (Business Upper Austria, n.d.). They started an initiative where they actually went to the municipalities and the relevant bodies, giving them an online database into which they can pinpoint the locations of brownfield sites that they know of. While this worked well on a small scale in very specific locations where there is still am overview of the area, it quickly became clear that larger towns or cities did not respond as well.

The UBA is now working together with the Ministry to use already existing databases, be it satellite information, commercial registries, building and apartment registries to extract relevant data, that is also automatically updated, at a much faster rate, so the UBA no longer "*have to send someone out or get a hoard of students, and say 'alright, now in the summer everyone goes and checks the use of a thousand sites'*" (Rabl-Berger, 2021). This framework is however still in its pilot phase and being tested for its efficiency and accuracy in smaller regions (Rabl-Berger, 2021). The biggest challenge is identifying the real specific use or non-use of a site and really breaking down publicly available data (like that of CORINE) to single areas on a large scale. This is something that the accuracy

simply does not allow. Furthermore, the issue of data privacy does not allow for this data to really be broken down into single parcel increments.

For Austria, there is currently no database available for brownfield sites which makes it almost impossible to extract some form of data on the area available for use. However, according to the estimations that have been redetermined over the years and stay fairly similar it is clear that the potential exists. While the focus has until now been on the contaminated sites it is now shifting towards those that do not quite make the cut into the "contaminated site" definition, seeing as these make up a much larger part.

3.2.3. Case study: Region of Flanders, Belgium

Like in Austria, Flanders has a variety of different mechanisms in place to tackle the issue. However, the main difficulty in the management of brownfields is how these sites are documented and registered. While there are systems in place to record the contaminated sites, also supported by legal frameworks, other sites that have low or no contamination have little to no support.

In Flanders the definition of the term 'brownfield' is linked to the 'Brownfield Covenant Act', which entered into force in 2007, and is more closely discussed in chapter 3.3.3. According to this "*A Brownfield is the whole of neglected and underused grounds, which have been affected in a way that they only can be reused by means of structural measures*" (Wille, 2018, 9). Within this definition there are further specific conditions that have to be met, including the fact that the sites are "*former abandoned or under-used industrial sites,* [have] *perceived* [or actual] *soil contamination,* [the] *development is a complex process* [and there is an] *active potential for reuse*" (Wille, 2018, 9). So, while the definition itself does not mention the existence of contamination, the conditions under which sites are eligible for the covenant are very specific and exclude sites that have no contamination or are not complex enough.

Previous to this, brownfield sites were managed in a more general form, by the Soil Remediation Decree, which came into force in 1995, and addressed several aspects of soil pollution (Vanheusden, 2007). What quickly became clear was the fact that typical brownfield sites (unused, derelict, abandoned) remained unaddressed. Most of the remedial actions that were taking place were first and foremost soil related investigations

on still operational sites (Wille, 2021a). The decree pushed businesses, particularly those in the harbor regions, such as large chemical companies and petrol service stations to investigate their soil in order to not lose their permits to operate (Wille, 2021a). However, the "*underused or old sites, which were no longer operational, they did not get into a remedial action process,* [also] *orphaned sites or under used brownfield sites, nobody took the initiative in order to get a development on those sites*" (Wille, 2021a). What this development demonstrated was that the main problem in Flanders was the very specific focus on the issue of soil pollution, and "*not focusing on the fact,* [of] *is this site still in use? Should we redevelop it? Should we revitalize it? What is the future of this site?*" (Wille, 2021a). This realization of the importance of other aspects, outside the domain of the environment, such as social and economic ones, has been gaining traction in Flanders and *"Efforts to develop such integrated approaches have also resulted in a shift in attention of policy makers from the assessment of problems to the formulation of solutions that will meet the needs of society in a sustainable way"* (Ferber & Grimski, 2002, 4).

Starting in the early '90s, OVAM started gathering information using old permits and databases, and in 2006, with the new legislative reform, created a 'Land Information Register' (Wille, 2015). Following the push from the previously established Soil Remediation Decree, 3500000 soil certificates were delivered (Wille, 2021c). Of these sites 43000 have had a preliminary soil investigation and roughly 15000 descriptive soil studies have been evaluated (Wille, 2021c). Remedial projects were approved for 6.500 of which 5800 soil remediation works have begun and 3700 have already been finished (Wille, 2021c). Furthermore "*The inventory* [revealed] (…) *the existence of more that 2000 sites which could be labelled as landfills,* [with] *the total area of all these sites* [being] *approximately 80km*^{2}*,* [which is] *comparable to the surface area of an average city in Flanders*" (Wille, 2015, 6). The sites that have had a first investigation have been mapped and are visible in Figure 18, indicated by the green polygons.

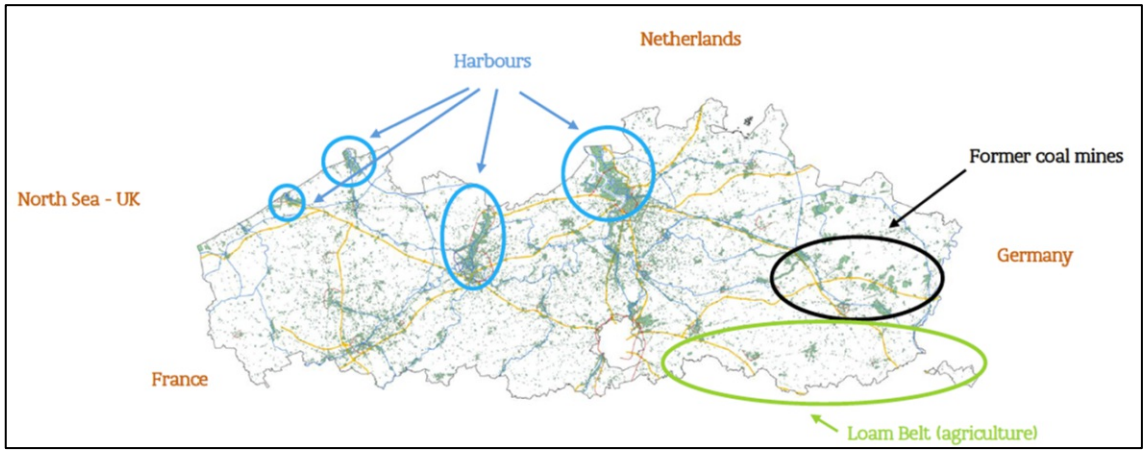

Figure 18: Land Information Register (OVAM) of Flanders [based on (Wille, 2021c)].

What is interesting and has been highlighted on the map is that the clusters of these investigated sites are located near harbors and former coal mines. Furthermore, the largest cities are also located in these areas, such as Antwerp and Ghent. Historically, a lot of cities located themselves close to rivers, as these were used as a means of easing transportation and trade. Industries settled and cities grew around them becoming hubs for the exchange of goods, information and labor. However, a shift of the importance of industries and their acceptance in the cities' perimeters have changed the situation dramatically. During the '60s and '70s there was a migration of these industries away from the historic city centers and getting new activities on those sites is now what needs to be addressed (Wille, 2021a).

Another important factor that was defined by the Soil Remediation Decree was the distinction between 'historical,' 'new or current,' and 'mixed,' pollution (Vanheusden, 2007). 'New or current' pollution was created after October 29, 1995, while 'historic' pollution was created before (Vanheusden, 2007). In Flanders, most of the problem sites are ones that were created before '95. As previously mentioned, a lot of the brownfield sites are older than forty or fifty years and are the result of the industries fleeing the cities, branches closing down, also caused by the oil crisis in '73 and following economic crises in that period (Wille, 2021a). 'New or current' pollution is rarely an issue, due to the fact that the limits determined by the decree on the soil pollution are very severe, so if there are any potentially harmful activities, that are going on they are to be immediately removed and cleaned up (Wille, 2021a).

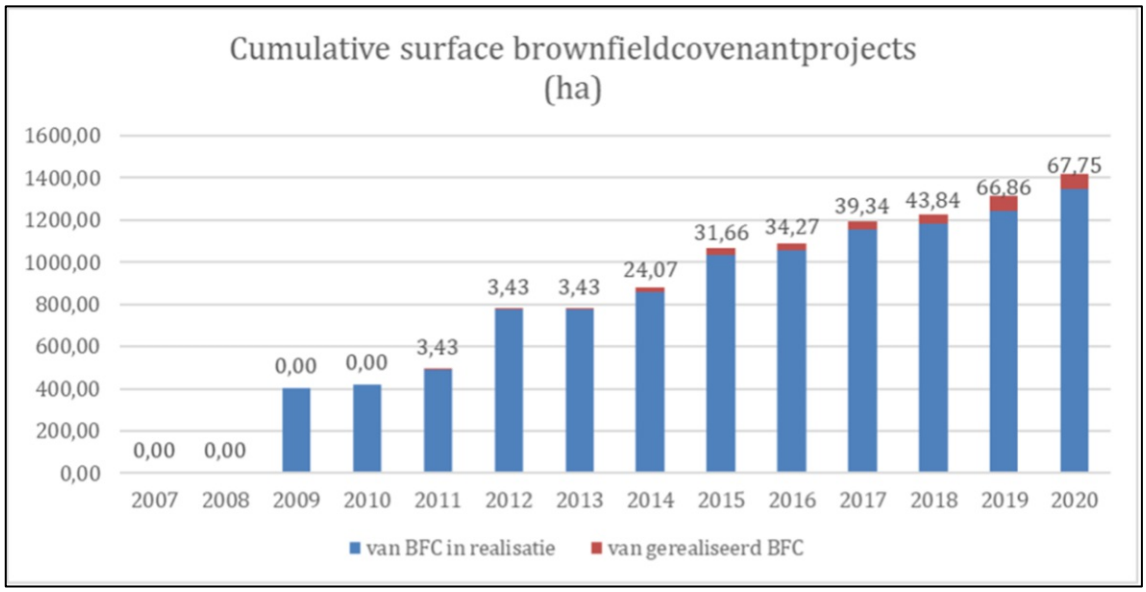

Figure 19: Cumulative surface of brownfield covenant projects (ha) in Flanders [based on (Wille, 2021b)].

Due to the complexity of the projects taken up by a brownfield covenant the realization of a whole project can take up to 10 years. This means that the impact of the projects takes a lot of time to take effect. Figure 19, however, demonstrates how the surface area that will be redeveloped or has already been, has cumulated over the years. The blue bars demonstrate the area that is to be realized by the brownfield covenant (BFC) (and red indicates the realized area. While only a small portion has already been achieved, this will increase and have an impact over the years to come.

Seeing as most of the larger former industrial sites that have high risk operations have been investigated, like oil refineries, steel industry, big automotive companies, what is coming up now are smaller businesses and brownfields, because there are still brownfield facilities or sites that have never been investigated (Wille, 2021c). Due to these sites being smaller and closer to the historic city centers their uses, if (re)developed, are usually no longer industrial. In Flanders if the use of the land is changed after its reuse there is a tax that has to be paid (Wille, 2021a). This is due to the fact that land used for housing can sell between 200 and 500 euros per square meter, while industrial lands have a property price that is 10-50% lower (Wille, 2021a). However, if the site has been approved with the brownfield covenant act, then this payment does not apply. This is because the remediation of a site is usually already burdened by extensive costs. Also, in order to receive the partnership contract with the government the (re)development of the site has

to be “complex”, as stated in the definition framework. The following Figure 20 and Figure 21 demonstrate this trend in land dedication change after redevelopment.

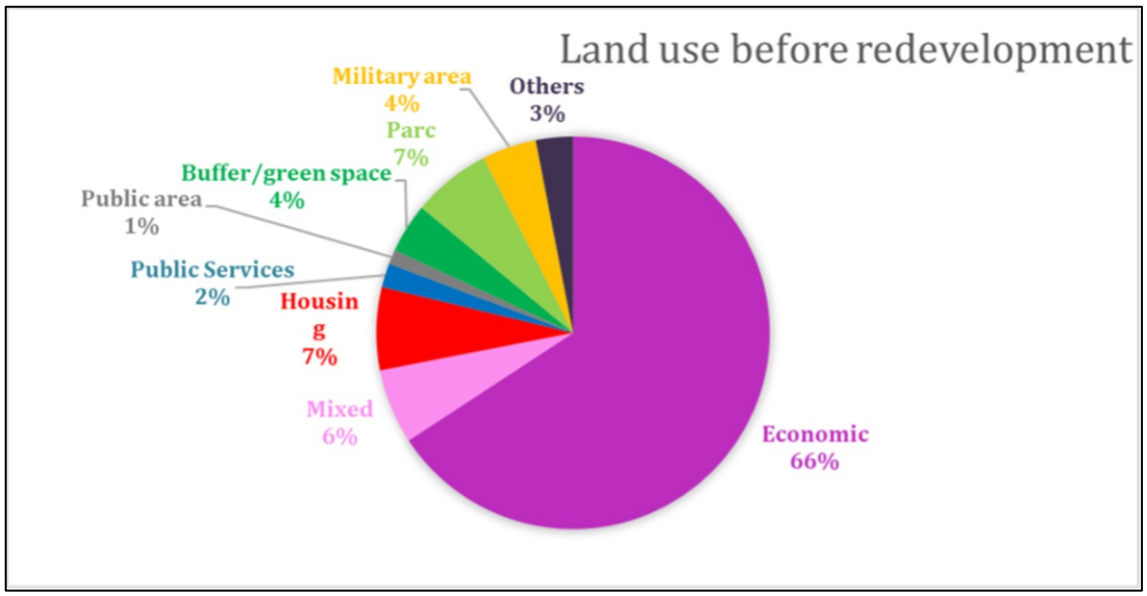

Figure 20: Land use before redevelopment of projects under a brownfield covenant in Flanders [based on (Wille, 2021b)].

The changes in land use occur in 54% of the brownfield projects. With a significant decrease of 9%, the sector of land used for economic purposes, as well as the sector of public services that decreased by half, are by far the greatest changes. However, the economic sector still takes up the largest part with 57% of the land use. The greatest increase is in the field of housing, where “*especially brownfields close to the city centers were often redeveloped for housing or public functions*” (Wille, 2021b). This coincides with the previously mentioned trends that smaller sites are now gaining in importance and are redeveloped for housing purposes, experiencing an increase from 7% to 13% after redevelopment.

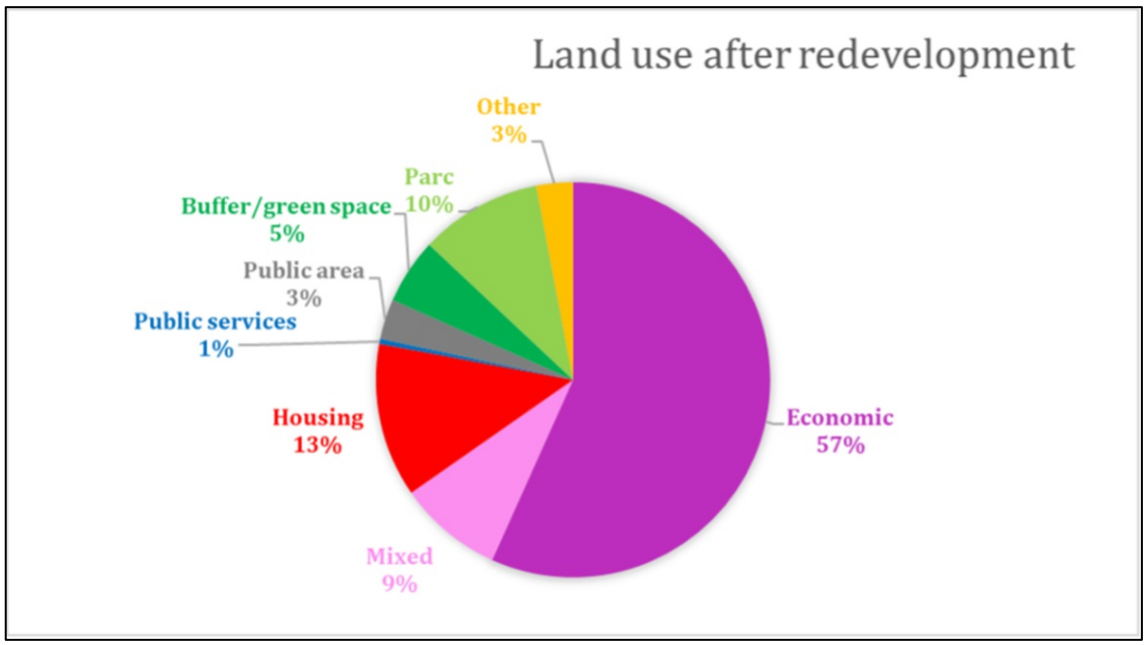

Figure 21: Land use after redevelopment of projects under a brownfield covenant in Flanders [based on (Wille, 2021b)].

Another key factor that was determined, was the time frame in which property is usually sold. When it comes to industrial or commercial sites the most are sold or transferred to a new owner within 20 years, while private property for housing is 40 years (Wille, 2021a). Meaning that even if a site is not closed down or not in use, it will at some point change its owner. In order to prevent the selling of potentially contaminated land, making the determination of the original polluter more complicated with every change, it was determined that the roughly 85000 estimated risk locations should be investigated before 2036 (Wille, 2021a), which would be 40 years after the Soil Remediation Act entered into force in 1995. This time frame is then again broken down into different priorities. So for example "*an oil refinery has a high risk on polluting the soil and ground water, so they have to investigate their sites before the year 2000*" (Wille, 2021a), if however you have a site that has a lower potential "*you have to investigate it the first time before 2002, and if it is still lower, then before 2004*" (Wille, 2021a). If, however it is "*not on that list of periodic investigation, you should only proceed to soil investigation if you are selling your land*" (Wille, 2021a).

Both Austria and Flanders are aware of the issue of brownfields and have been working on mechanisms to alleviate the issue since the early 90s. In both cases the focus on the contaminated sites is very clear. While this is, of course, important and should be a

priority, the focus now needs to shift to other abandoned, unused sites that have slipped through the screening system. In Austria estimations demonstrate that the majority of the brownfield sites are in fact not contaminated, however their documentation has not taken place. With pioneer projects now starting up in the provinces in smaller communities, the hope is that in the future federal institutions as well as local governments will have access to geo information systems on more sites. Flanders has a much larger issue with contaminated sites, linked to former industries and mining activities. They have very comprehensive frameworks and mechanisms in place to tackle the issue through the Soil Remediation Decree and the Brownfield Covenant Act.

3.3. Legal framework

3.3.1. Overview European Union

As of now the European Union has no general brownfield policies or laws. However, there are different policies surrounding topics that are related to the issues. Most of the time the relevant focus is that of soil protection as the leading concern is contamination and most applicable EU policies are linked to soil contamination. There is however no soil directive nor soil framework on the European Union level (Wille, 2021c). The 6th Environmental Action Programme (EAP), which "*is a non-legally binding document that states the Commission's objectives with regard to the environment*" (Vanheusden, 2007, 564), introduced the topic of soil protection and was in place until 2010. Following this, the 7th EAP was put in place to supports the objective of "no net land take by 2050" (European Commission, 2014), a goal which was first introduced in the European Commission's Roadmap to a Resource Efficient Europe (COM(2011) 571) which "*would imply that all new urbanization will either occur on brown-fields or that any new land take will need to be compensated by reclamation of artificial land*" (EEA, 2019).

An interesting issue in the topic of brownfields is that of liability. A relevant document in terms of environmental protection is the EU Environmental Liability Directive (2004/35/EC), which is important in regard to the prevention and remedying of environmental damages in accordance with the 'polluter pays principle' (European Commission, n.d.d). The basis of which is anchored in the Treaty of the Functioning of the European Union (TFEU) (European Union, 2012b). Article 191 (2) stating that "*Union policy on the environment shall aim at a high level of protection taking into*

account the diversity of situations in the various regions of the Union. It shall be based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should as a priority be rectified at source and that the polluter should pay" (European Union, 2012b). Directives are legislative acts, which determine specific goals that are to be achieved by the Member States. How these goals are achieved is, however, open to each country. There is always a set timeframe by which this is to be achieved, "*as the Environmental Liability Directive entered into force on 30 April 2004, the EU Member States had three years to transpose the Directive in domestic law*" (European Commission, n.d.d). This sets the basis for the questions of liability in the case study countries.

When taking a closer look at the national and regional levels, there are relevant policies and laws that have been put in place by the respective Member States. As the issues concerning brownfields are usually very distinct to the location, the former use and the age of the sites, it takes local authorities and a certain level of knowledge concerning the sites to be able to create relevant legal frameworks and policies. Even in the relevant countries it is clear that creating national laws concerning brownfields is difficult and usually met with challenges.

3.3.2. Case study: Austria

Austria is a federal republic comprised of 9 provinces which include Vienna, Burgenland, Upper Austria, Lower Austria, Styria, Carinthia, Salzburg, Tyrol, and Vorarlberg. Each of the provinces is overseen by its own government that is headed by a governor who is elected by the province's legislature. There are certain competences in the hand of the federation and others in the authority of the federal provinces, however there are also shared domains.

Federal Governmental Program 2020-2024

While there are no brownfield specific legal frameworks on a national level in Austria, the awareness concerning the extent of land take is leading to some new points in the current governmental program of 2020-2024. As previously mentioned in chapter 3.1.2. specific goals have been set to where the land consumption should be by 2030. However, a point that is explicitly mentioned is the "*promotion and expansion of brownfields recycling* [as well as] *vacancy management (vacancy survey, database and activation)*"

(Bundeskanzleramt Österreich, 2020). What these points demonstrate is that the awareness of the issue is present, not only of brownfields but also of other topics related to unused sites like residential real estate, where estimations amount to 35000 ha of vacant residential properties (Schuster, 2019). While data management tools exist for contaminated sites, there is no platform that documents brownfields, "*but* (…) *vacancy management and brownfield recycling is an important point, and if* [we] *want to reactive brownfields,* [we] *first have to know where they are*" (Rabl-Berger, 2021).

Spatial planning and brownfields

When it comes to the issue of brownfields, it is all part of the spatial planning framework, "*in terms of the reduction of land consumption and knowing who builds, when, where, and what, that all falls into spatial planning and is in the competences of the provinces*" (Rabl-Berger, 2021). However, it is still a certain cross-sectoral matter, with various authorities at federal, state and local level that are involved, in which provincial laws form the legal basis for supra-local and local spatial planning and land use planning, and the implementation of these is in the responsibility of the municipalities (Schuster, 2019). The UBA, together with the Ministry, can only provide a framework, give recommendation and point out the general direction (Rabl-Berger, 2021). Leading to Austria having different special planning laws within each province. "*That is why you will find different regulations in different areas, in different regions. And they [the provinces] will try to use other levers to bring brownfields back into play. The province of Upper Austria, for example, has a subsidy program for the use of brownfields. This is not the case in others. However, there are restrictions, for example in the dedication of land in order to increase the pressure* [on brownfield sites]" (Rabl-Berger, 2021). While there are a few flagship provinces, instruments for an Austria wide federal spatial planning law do not yet exist, as it is still met with a lot of negative push back from the regions, as they are rarely willing to give up on any of their competences.

Federal law on contaminated sites

The most relevant legal base for the redevelopment of contaminated sites and at some point, potentially brownfields, in Austria is the ALSAG. As previously mentioned, this law was put in place in 1989 to help finance and secure the development of contaminated sites (Bundesministerium, 1989) and the last reform took place in 2017 (Schuster, 2021). While these laws have been very beneficial to the contaminated sites, it was clearly stated

by all interview partners for the topic of brownfields in Austria that a change in the ALSAG needs to take place. A reformed ALSAG-Novella 2019 was set to enter into force at the beginning of 2020, however due to the Covid-19 crisis this has been put on hold. Now many experts in the field are eagerly waiting this reform (Schuster, 2021). Even the federal governmental program of 2020-2024 has acknowledged the importance of the development of new terms and conditions of the ALSAG, with hopes that this will "*achieve faster, more efficient and safer remediation of contaminated sites and thus make contributions to land recycling*" (Bundeskanzleramt Österreich, 2020).

Liability

As previously stated, the European Union has a directive on liability and the concept of 'the polluter pays' is established in the TFEU. Therefore, in principle, the creator of a contamination is liable for any necessary measures (Schuster, 2019). This, of course, also applies in Austria, however there is such a thing as "subsidiary property liability", meaning that the current property owner can become liable if the primary polluter can for some reason not be found (Schuster, 2019). This, of course, greatly increases the risk when buying property that is either very old, has been abandoned or has not been in use for a longer period of time. It also makes greenfields a lot more attractive, seeing as the risk is non-existent. With the new ALSAG, it should be possible to buy such contaminated sites, without also buying the risk that you will one day be subsidiarily liable for pollution that you did not cause (Schuster, 2021). However, what is very important to note here is that this, of course, is only the case for sites that have actually been labeled "contaminated sites" under the Austrian definition (roughly 2000 sites of 70000) (Schuster, 2021). So, a site that is contaminated would then have a better and safer standing, in terms of legal retribution, compared to a site that is not as contaminated and just has not made it into the framework definition under the ALSAG (Schuster, 2021). The other sites fall under the Austrian Water Rights Act and the Waste Management Act. And this is definitely something that has been completely excluded from the whole conversation (Schuster, 2021). Again, Upper Austria is an example province that is also pushing for this change, so that sites that don't qualify as highly contaminated, but do have some form of pollution gain an exemption. This would make the (re)development of such sites much more attractive and would reduce the risk factors.

On a national level the key legal framework that is generally relevant to brownfields is the ALSAG. While it is very limited as to which sites are supported it established a clear definition and framework of assistance that is monitored by the UBA. While land consumption is a competence that lies in the hands of the provinces and municipalities, the awareness of the importance of non-contaminated sites has been established. There are pioneer provinces that are spearheading the transition and are closely working with other provinces or federal governments to establish new databases.

3.3.3. Case study: Region of Flanders, Belgium

Belgium is a sovereign state and a federal constitutional monarchy with a parliamentary system. Since 1980 a series of state reforms has led to the institutional structure being divided into three highly autonomous regions (Belgian Federal Gouvernment, 2021) transforming Belgium into a federal state. These three regions are the Region of Flanders, the most northern part, then the Region of Wallonia to the south and in the middle the Brussels Capital Region. Unlike the other regions, Flanders only has one government and one council for the Community and the Region (Belgian Federal Gouvernment, 2021). The Government of Flanders has a wide range of responsibilities reaching from environmental affairs to economic, education and culture, agriculture, as well as employment foreign trade, spatial planning, urban development, housing and public work (Wille, 2015). Through this state reform and the enactment of the first Waste Management Act (1981) in Flanders, the governmental agency of OVAM, which has been mentioned throughout the thesis, was formed (Wille, 2015).

Soil Remediation Decree

In 1995, the first legal steps towards brownfield redevelopment were set, where initial thematically linked initiatives were created (Minseur, 2014). While the 'Decree Vacancy Charge (22/12/1995)' and the 'Decree on Soil Remediation (22/2/1995)' were no specific brownfield policies, they created the gateway to more specific frameworks (Minseur, 2014). The Soil Remediation Act of 1995 was followed by the Soil Act of 2006. The aim of the former was "*to deal with soil contamination that has taken place in the past, over a period of 40 years, starting in 1996*" (Wille, 2018, 8) and the latter "*to prevent or immediately remedy new soil pollution*" (Wille, 2018, 8). The content of which was to determine "(…) *several aspects of soil pollution, such as who bears responsibility, the*

obligation to clean up the land, and the procedure to be followed for the transfer of a site" (Vanheusden, 2007, 572).

The first attempt at creating brownfield specific regulations started in 2000, when a strategic project was launched by the Flemish Minister of Environment and the Flemish Minister of Economic and Urban Planning, called "Brownfield Development", which was guided by OVAM (Vanheusden, 2007). The goal was to create a joint venture between various institutions that would analyze potential sites, as well as policy frameworks needed to stimulate the development in the Flemish region (Vanheusden, 2007). Thereby, improving the environmental conditions of the sites, reducing the 'development pressure' on greenfields and motivating the economic and social regeneration of the surrounding areas (Wille, 2015). While the project created positive results, it was ultimately not continued after 2004 (Vanheusden, 2007). Since March 22, 2007, the Brownfield Covenant Act has been in place, which introduced the official Flemish definition of brownfields, that has been used ever since. This agreement "(…) *offers developers the opportunity to sign a contract with the Government of Flanders and other private and public stakeholders containing mutual commitments to the realization of a brownfield project*" (Wille, 2015, 9). There are a multitude of advantages that come from going into an agreement with the government through the brownfield covenant such as the fact that there is a single contact point which is the Agency of Entrepreneurship (Wille, 2021c), a negotiator is appointed by the Government (Wille, 2021c), there is a guided participation process (Wille, 2021c), integrating multiple governmental permits (Wille, 2021c), follow-up and monitoring by steering committee as well as a tax reduction of 10% at land acquisition (Wille, 2021c).

Brownfield Covenant Act

The process of acquiring a covenant starts by sending in a project proposal in line with the call for projects. Then "*private partners must have proven ownership and control over 70% of the project areas at the moment of application*" (Minseur, 2014, 20). Table 2 is the most recent data pertaining to the call system of the brownfield covenants. Since 2007 there have been 232 proposals of which 169 have been accepted for negotiations, making that 73% of all sent in project ideas. In the end, 105 of the 169 accepted negotiable projects were actually signed, which is more than half, with 62%.

Table 2: Call system data including accepted projects for negotiations and signed covenants (2007-2020) [based on (Wille, 2021b)] see text Brownfield Covenant Act pg. 49.

Call	Proposal	Accepted	Percentage	Signed
Call 1 (2007)	50	42	84%	31
Call 2 (2010)	30	21	70%	18
Call 3 (2013)	18	15	83%	13
Call 4 (2014)	26	20	77%	16
Call 5 (2015)	11	8	73%	5
Call 6 (2016)	28	20	71%	13
Call 7 (2017)	27	16	59%	7
Call 8 (2018)	14	8	57%	2
Call 9 (2019)	12	10	83%	0
Call 10 (2020)	16	9	56%	0
Total	232	169	73%	105

Liability:

The Soil Remediation Act also covers the aspect of liability, making a distinction between an obligation to remediate and liability (Wille, 2021a). This is linked to the previously mentioned distinctions between historic and new pollution, mentioned in chapter 3.2.3. When a new site is polluted, the polluter is not allowed to just wait until they are called up by OVAM to remediate, they have an 'autonomous remediation obligation' (Lavrysen, 2007). In terms of historical site pollution, the "*remediation obligation is established once the operator, proprietor or user of land included in the list of historically contaminated soils to be remediated has actually been ordered by the OVAM to carry out the soil remediation*" (Lavrysen, 2007, 8). Sometimes there is the case where an "innocent landowner" is created, where a person somehow acquires contaminated land without knowing or not having caused the pollution (Wille, 2021a), however this is not easy to prove (Wille, 2021a).

Like in Austria, Flanders has a very comprehensive mechanism in place for contaminated sites and offers a partnership between various stakeholders to try and facilitate the (re)development of brownfield sites. Through these policies that have been legally fixed

since the mid 90s in the Soil Remediation Decree it has been made possible to create the brownfield covenants. This is particularly important in Flanders, as the majority of the brownfield sites demonstrate some sort of contamination, unlike in Austria. The covenant focuses on complex issues to try and eliminate the most pressing concerns in the cities of Flanders.

3.4. Financing mechanisms

3.4.1. Overview European Union

This chapter focuses on the question if there are financing mechanisms that have been put in place by the European Union (EU) to support the (re)development of brownfields. This can be through spatial planning concepts, sustainable urban development or other incentive mechanisms. Followed by a breakdown of how these mechanisms are put in place in Austria and Belgium, as well as the analysis of possible national and regional financing mechanisms regarding brownfield (re)development.

There are a variety of different financing mechanisms and incentives that can be put in place to support the (re)development of brownfield sites. These, however, are country specific and are usually linked to some form of legal framework. The European Union has general financial programs that allows the Union as a whole or the individual member states to allocate the mix of public and private funds where they are needed.

EU Regional Policy

The main investment policy of the EU is the Regional Policy which is directed at all regions and cities of the EU to ensure the equal development of the diverse Member States. The goal is to reduce the economic, social and territorial differences by "*job creation, business competitiveness, economic growth, sustainable development, and improve citizens' quality of life*" (European Commission, n.d.a) thereby creating the Cohesion Policy. Within the period of 2014-2020 the overall EU Budget was € 1.082 billion, of which roughly a third (€ 351.8 billion) went into the Cohesion Policy (European Commission, 2016a). Figure 22 illustrates the distribution of the Regional Fund showing how all regions can benefit and it demonstrates how the funding is allocated largely based on GDP per capita. The largest portion (€ 182 billion), roughly 50.5% goes to less developed regions with a GDP of less than 75% of EU-27, which

makes up 27% of the EU population. The second largest portion (€ 54 billion), 15.1%, goes to more developed regions, where the GDP is over 90% of the EU-27 average making up 61% of the EU population. Finally, 9.9% or € 35 billion go to transitioning regions with a GDP between 75-90%, making up 12% of the EU-27 population. Through this fair and even distribution of funds the aims are to elevate all regions of the EU simultaneously, giving aid to where it is needed most.

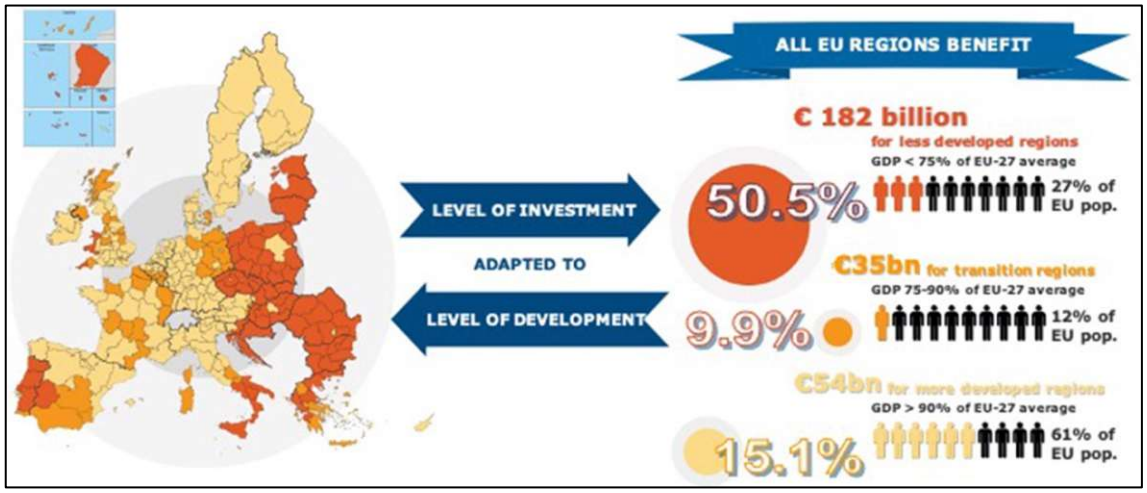

Figure 22: Investments of the European Union in all EU regions [based on (European Commission, 2016a)].

The cohesion policy is supported through the European Structural and Investment Funds (ESIF), which are comprised of five different funds: The European Social Fund (ESF), the European Agricultural Fund for Rural Development (EAFRD), the European Maritime and Fisheries Fund (EMFF), the European Regional Development Fund (ERDF) and the Cohesion Fund (CF). Between the five main funds and in the time frame of 2014-2020 the ERDF comprised 44% of the budget, making it the largest fund of the ESI, followed by EAFRD (24.2%) and ESF (19.1%) (European Commission, 2021a). This subsequently supports the three main targets of the "European 2020 Strategy" of Smart, Sustainable and Inclusive growth. Together with further national contributions of both public and private financing the total amount is around 500 billion euros.

European Regional Development Fund (ERDF)

The goal of the ERDF is to "*strengthen economic and social cohesion in the European Union by correcting imbalances between its regions*" (European Commission, n.d.b). Within these goals are included key priority areas, which handle innovation and research, the digital agenda, support for small and medium-sized enterprises and low-carbon

economy (European Commission, n.d.b). Depending on the categorization of a region the amount of the resources that are allocated are to be adjusted. This means that more developed regions are to allocate at least 80% of the funds on at least two of the priorities, the transition regions must focus 60% of the funds and lastly the less developed regions must allocate 50% of the funds (European Commission, n.d.b), with specific resources focus on low-carbon economy projects ranging from 20% to 15% and 12% from high to low developed regions.

One of the main priorities for 2014-2020 was sustainable urban development in which it was decided that "*at least 5% of [the] European Regional Development Fund (ERDF) should be invested in integrated sustainable urban development at national level*" (European Commission, 2016a). Core aspects include, that cities choose projects that correspond with the policies, the connection between urban and rural areas should be taken into account and finally the local community is to be actively included in the decision-making process and development (European Commission, 2016a). Each country has the possibility to highlight programs that would be suited for funding by the ERDF. The following chapter 3.4.2. and 3.4.3. identify how the ERDF has been applied in the case study countries, highlighting aspects that pertain to land consumption and brownfield management, with a closer look at national and regional financing mechanisms.

New cohesion policy 2021-2027

Post 2020 a new Cohesion Policy is being put in place. Currently the final document is pending formal approval by the European Parliament and the Council, however the political agreement by the European Parliament and the Council on the Commission's proposal for the new cohesion policy have been reached. The focus is on five policy objectives "*Smarter, Greener, Connected and Social Europe, and new cross-cutting objective to bring Europe closer to citizens by supporting locally developed investment strategies across the EU*" (European Commission, n.d.c). The largest portion of the investments will go to the first two priorities, which aim at creating a smarter and greener Europe. The former will be achieved through increased innovation of research and development, digitization, and further support of small and medium-sized businesses. The latter is aimed at implementing the Paris Agreement through increased funding in the energy transition to renewables and fighting climate change. Roughly 65% to 85% of the ERDF and Cohesion Fund will go to these first two priorities and will again be allocated

according to the previously mentioned regional development (European Commission, n.d.c).

3.4.2. Case study: Austria

ERDF-Austria

In Austria the eastern region, known as Burgenland, is categorized as a transition region, while the rest of Austria is a more developed region, with a GDP/head of more than 90% of EU-27 average (European Commission, 2016b). In the timeframe of 2014-2020, and through four national programs Austria has been allocated €4.92 billion from the ESI Funds, together with € 5.73 billion in national contributions a total budget of €10.65 billion was available to invest in various domains. Of the ESI budget, 10.9% were funded through the ERDF (European Commission, 2016b). Among the nine provinces in Austria the ERDF fund and the European Social Fund (ESF), or public and private national contributions were allocated as follows:

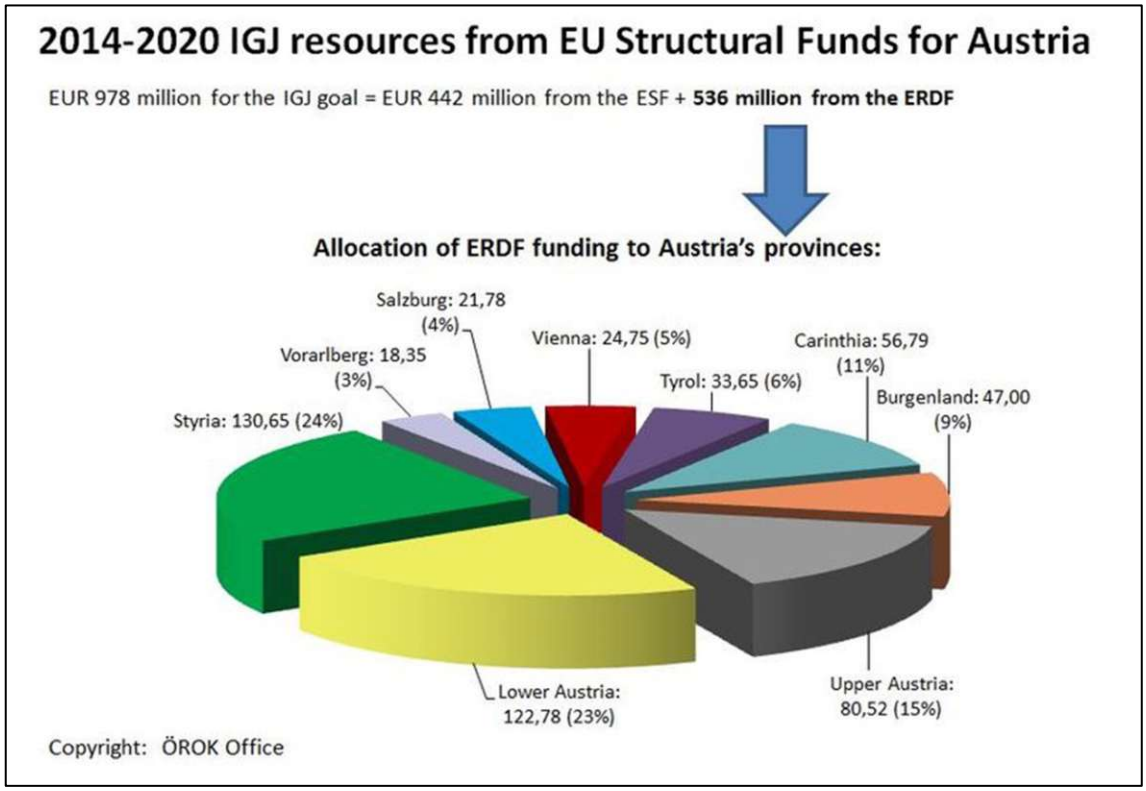

Figure 23: Allocation of ERDF funding to Austria's provinces in the financial period 2014-2020 [based on (Europäische Union EFRE, n.d.a)]

While Burgenland received 9% of the ERDF it is much higher in terms of the relation to the number of inhabitants compared to the other 8 provinces. Altogether Austria received

20% less funding compared to the pervious terms, due to an overall improvement of its economic situation. Within the 5 priorities highlighted by Austria within which there is a variety of financed mechanisms, priority 4 focuses on sustainable urban development (Europäische Union EFRE, n.d.a). Measures include: M16: Research and technology infrastructure, M17: Innovation services, M18: Resource and energy efficient development in the context of sustainable urban development, M19: Optimization of location and settlement structures in the context of urban regions of Upper Austria and lastly M20: Upgrading in disadvantaged urban areas (Europäische Union EFRE, n.d.b). Within all of the measures only one mentions brownfields and that is M19 which has a total funding sum of € 7.100.000 (Europäische Union EFRE, n.d.b). Aim of the measure is to create a unifying strategy for the urban regions with structured content and territorial development. This will allow for the implementation of specific projects that have been developed in partnership and are based on the development strategies. The projects that are to be implemented will include optimization measures in the use of existing settlements and open spaces (Europäische Union EFRE, n.d.c). The hope is that this will reduce further stress on additional land consumption and improve the environmental quality of the cities and its regions by upgrading the quality of the land. Explicitly stated are the (Europäische Union EFRE, n.d.c):

- Development and valorization of large-scale commercial and industrial brownfield sites.
- Valorization of existing unused or sub optimally used building substances or areas. By upgrading the areas, the urban substance and function of the city and district centers are restored and made more attractive.

In this regard, the funding agency for this particular measure is the office of the Upper Austrian Provincial Government – Department of Regional Planning (Europäische Union EFRE, n.d.c).

Each country has the possibility to set its own focus and the topic of brownfield was rather weak in the old funding program of Austria (Schuster, 2021). Unfortunately, this is again the case in the new program for the coming term (Schuster, 2021). Mr. Schuster tried to intervene in this decision and raise awareness to the opportunities that brownfields demonstrate and highlight the example of how the Germans have used the ERDF to remediate and (re)develop their contaminated sites. He states that "*it would be a very simple way of achieve a funding pot if, like the Germans, these brownfields were included*

in the ERDF program and a separate funding priority was set and a few million made available for this purpose every year" (Schuster, 2021). Unfortunately, the topic has again not been taken up and included in the next funding period, which will last 6-7 years, starting in 2021.

National level

In Austria, there are no federal financing mechanisms in place to support brownfield (re)development in general. Independent funding programs for land recycling are only marginally available. Municipalities, investors and project sponsors are largely dependent on the individual selection of funding opportunities from a wide range of instruments, which also vary from province to province (Umweltbundesamt, 2008). In principle, subsidies that are directly or indirectly allocated for the purpose of brownfield sites originate from the EU level, the federal government or the federal states (Umweltbundesamt, 2008). The only financing mechanisms that are in place are very specific to contaminated sites, which are legally defined by the ALSAG and are linked to waste management. This funding comes from the federal government, "*And if it* [a potentially contaminated site that has been identified on a regional level and reported to the UBA] *is a contaminated site* [determined by the initial assessment], *there is the possibility of subsidies to clean up or secure this contaminated site. And if it is not included in this regime, then the ball goes back to the property owner or polluter and to the water rights authority in many cases, and they must then become active. We* [the UBA] *are then no longer involved, so to speak*" (Wepner-Banko, 2021). This particular link between contaminated sites and waste management is something special in the remediation community, "*and is the envy of many countries, and it is also a recurring topic at study tours. Why do you* [the UBA] *have money for this remediation? How could you* [the UBA] *afford it?*" (Rabl-Berger, 2021). In Austria, the funding pot is created through a legally defined 'funding key' which determines that "*for each ton of waste that accumulates* [specific conditions], *depending on the quality of the waste, a certain amount must go into the ALSAG pot*" (Rabl-Berger, 2021). Due to this very specifically dedicated purpose, there is money available from a national level to remediate contaminated sites. However, as previously mentioned, this only covers a very small portion of the documented sites, because "*until an area really becomes a contaminated site (dt. Altlast), it must really be contaminated*" (Wepner-Banko, 2021), and changing these very specific dedication criteria to include sites that are not as polluted is

challenging. The hope is that with the new ALSAG a wider range of sites will be included in the financing scheme (Schuster, 2019), which is "*why we* [the UBA] *are in the process of somehow not letting these areas sink into a 'sleeping beauty sleep", but rather give these areas a bit of an incentive or a push, so that less contaminated areas or perhaps barely contaminated areas can be returned to the economic cycle*" (Wepner-Banko, 2021). A small step has been taken, for certain types of brownfields, with the new ALSAG which offers new funding approaches. This funding, however, is limited to a maximum of €200,000, an amount that only allows for small sites to be (re)developed (IG Lebenszyklus Bau, 2020).

The goal of the federal government is to now initiate and create cooperation with the states in order to channel and bundle ideas for funding from the states (Rabl-Berger, 2021). There will be differences in term of what the provinces need, and as seen on previous maps there are areas in Austria that are not particularly affected by brownfields, but the important thing is that everyone is working in the same direction, so that the importance of the brownfield issue is recognized in particular areas such as regional planning. Again, Upper Austria is one of the leading provinces in terms of brownfield awareness and is the only province that has a concrete funding program. Their goal is the "*funding of remediation and safeguarding of contaminated sites, but primarily the sustainable reuse of contaminate brownfield sites*" (IG Lebenszyklus Bau, 2020). While this focus is still on contaminated sites it explicitly states the reuse of 'brownfields', so the focus is shifting to really unused sites.

The most important step that needs to happen in Austria in terms of brownfield financing is the expansion of the categorization of brownfields. Of the roughly 70000 potentially contaminated sites that have been documented only 2000 are really contaminated to such an extent that they are classified as contaminated sites. With the new ALSAG-Novella the goal is to incorporate these sites that have considerable contamination and are of considerable danger to humans and the environment.

3.4.3. Case study: Region of Flanders, Belgium

ERDF-Belgium

The northern region of Belgium falls into the more developed region according to the categories of regions for the ERDF, ESF and EAFRD, while the southern region is

considered a transitioning region. In the timeframe of 2014-2020 Belgium was allocated €2.71 billion of the ESI fund, totaling €6.04 billion with the national contributions of €3.33 billion (European Commission, 2016c).

One of the success stories that has been highlighted for its use of the ESI funds and is relevant in terms of brownfield redevelopment is the Park Spoor Nord in the city of Antwerp (European Commission, 2016c). This site was a former railway yard which had been unused since the mid-1990s and all activities ceased in 2001, when the owner, the Belgian National Railway company terminated its activities, turning it into an industrial brownfield (European Commission, 2012). Following this, the city of Antwerp became the owners of the 24 ha spaces (European Commission, 2012). The total budget for the project was €412 000 000, of which €14 000 000 were contributed to the project from the ERDF (European Commission, 2016c). The redevelopment of this site has created "*one of the most popular recreational parks in the city of Antwerp and triggered a social and economic transformation of the surrounding neighborhood*" (European Commission, 2016c, 3).

National level

On a national level the only funding that is available for brownfield sites is that made available through a brownfield covenant. Here the funding allocated is agreed upon through the contract and varies from project to project. Furthermore, there are certain exemptions or suspensions if such a site is remediated within the covenant (Wille, 2018). As previously mentioned, there are exemptions from plan benefits, meaning the change of spatial allocations from industrial to residential, suspension of the vacancy tax (Wille, 2021c), prolonged use of subsidies for demolition (Wille, 2021c), as well as financial securities from the remediation through OVAM (Wille, 2021c) and suspension form registration right (Wille, 2021c). This is all due to the fact that there are other higher costs upfront as well as during the (re)development and these incentives are there to make working with these sites more attractive and help speed up the (re)development of as many as possible.

3.5. Covid-19 crisis and Brownfields

Since the beginning of 2019 the Covid-19 virus has swept across the globe and has affected the lives of every person in some shape or form. The impacts on the economy, health care systems and mental as well as physical wellbeing of the population has been tremendous, and many implications have yet to be seen. With the pandemic having such a great impact in various domains it also raised the question of if the field of brownfield (re)development or land management had somehow already experienced effects. During the interviews the topic of the COVID-crisis came up naturally in certain topics, but a specific question was also asked, namely if the experts had already identified any impact or changes the crisis may have already caused in regard to brownfields and the topic in general.

Overall, the resulting answers from the interviews demonstrated a positive conclusion. The experts had the feeling that a new appreciation of one's home and surroundings has been established. Individuals are more interested in their communities, what they see when they look outside and spending more time in their neighborhoods than ever before. While prior to the pandemic many people would leave the house in the morning and return in the evening, they now, through varying restrictions for over a year were bound to their "home offices". Breaks and weekends were spent walking, biking and strolling through the neighborhood and generally being outside. This has raised the awareness of the importance of recreational areas in cities and the need for green open spaces. People do not want to have high lanes with eight streets and eight avenues, they want to have little ways between the city where you can walk and that you can connect different locations of your life (stores, work, home, etc.) with each other, "*the concept of a walkable city is something that we also see much more last year than before the COVID crisis*" (Wille, 2021a). This was also reflected in the fact that people could not go on holiday and had to recreate in their own cities "*and what we saw is that quite a lot of old landfills or old brownfield sites, were becoming of interest due to the fact that you have green open space"* (Wille, 2021a).

However, a certain amount of caution was also reiterated, that the pandemic has again led to the image of "*economy above all, growth above all*" (Rabl-Berger, 2021). Causing a lot of governments to invest more money than they have back into the economy and creating a lot of debts (Wille, 2021a). In Flanders, the concern is that because of the

governments large amount of land property, these areas might be used to settle these debts. Eddy Wille stated that he is "*a bit afraid that they [the Flemish government] will sell lands with the highest possible value in order to pay off their debts. And we are not talking about 10 or 100 ha, it's quite a lot of property lands that they have. So, I hope they will not sell it for industry or residential area on a large scale, because that will really influence our open green space*" (Wille, 2021a).

It is likely, however that the repercussions of the crisis are yet to be seen and the impact on the field will most likely develop over time. In terms of construction and raw material Austria is already experiencing shortages with prices of certain raw materials going up by 150%. This is bound to have an impact on the projects that have been planned and the priorities that will be set.

4. Conclusion

What should always be kept in mind when discussing the topic of brownfields and generally areas that have experienced some form of previous use, and particularly with sites that have some form of real or perceived contamination is not just the question of remediation but also how they can be redeveloped and what their next use could be. This shift in awareness could give real added value to society, giving new life to areas that have become derelict and have created increased social injustices and disparities within communities. Another aspect that needs to be considered is how the formation of such new sites can be stopped. Due to more stringent laws on environmental standards in general and the protection of soil, water, and air the creation of new sites has been limited but data on land consumption clearly shows that the portion used for residential purposes is rapidly increasing, however most of the time at a much higher rate than the population. So why are these developments being invested in, funded or supported? It is clear that the key aspect lies in the spatial planning programs of the countries themselves, and maybe in the future through concrete directives will limit the expansion.

Furthermore, while it is important that sites that are contaminated are identified and cleaned up, a vast majority of underused or derelict sites fall through the grid as they are not contaminated enough to be registered in the already existing databases. It has to be acknowledged that most highly contaminated sites from historical pollution have been identified. While their cleanup is complex and takes a lot of time, they take up the largest portion of the resources with little economic or social benefits. This conditionality within funding mechanisms, political frameworks and legal documents makes it very difficult for the sites that are in this in-between state of not being contaminated and not being contaminated enough.

The awareness for the lack of data and ability to document these sites has been increasing. This is partly due to the fact that most sites, speaking particularly of the case study countries, that are clearly contaminated, and pose a threat have been identified, so a shift of focus is possible. Pioneering projects have been put in place using new forms of spatial information systems. Most important of all, however, is the establishment of uniform definitions. Through this the collection of data will be widely improved and increase the

comparability between the Member States, allowing for relevant analyses and statistics to be created, goals, targets and indicators monitored and updated on a regular basis.

Although the topic of brownfields is a highly complex and multifaceted issue with a multitude of layers and stakeholders, the analyses of the case study country Austria and the case study Region of Flanders, Belgium both demonstrate that there is a large potential in using brownfields (re)development as a mitigation strategy to land consumption.

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Annex A: Expert Interviews

The content of this thesis was supported by a variety of expert interviews from different fields within the topic of Brownfield (re)development. The following annexes contain the transcribed interviews in the original languages they were recorded in (German and English). At the beginning of each interview the experts were asked if a recording of the conversation was allowed, and the permission to record was given for each interview. Speaker 1 is Sarah Bandera and Speaker 2 is always the interviewed party. Furthermore, the transcripts of the recordings have been cut in certain places (indicated [cut]) where the conversation was not relevant to the content of the thesis and ensure that relevant information was the focus.

A.1. Interview DI Martin Schuster 20.04.2021

Throughout the interview with DI Martin Schuster reference is made to a report[2] written by the interviewed party on the topic. Page numbers mentioned in the interview refer to this report and were discussed during the interview. The document has been listed in the references and is also used throughout the thesis as a source for further information.

Interview DI Martin Schuster 20.04.2021

Speaker 1: Danke, dass Sie sich heute die Zeit genommen haben, um über das Thema meiner Masterarbeit zu sprechen.

Speaker 2: Aus meiner Sicht ist das Thema, das Sie sich da gewählt haben, sehr interessant und sehr aktuell. Zumindest reden alle Politiker darüber. Ich meine das Brachflächen-Thema und die Reduktion der Grünflächen, weil wir ja so wenig in Österreich haben. Dass man da etwas tun muss, aber es fehlen halt leider Gottes meiner Meinung nach immer noch die richtigen Instrumente dazu. Was mir wirklich fehlt, das ist ja auch die Conclusio in meinem Bericht, ist ein eindeutiges Zeichen, dass man da wirklich was tun will und auch entsprechende Mittel zur Verfügung stellt. Wir können es gerne gemeinsam durchgehen das Ganze, und ich erkläre Ihnen auch warum, aus

[2] (Schuster, 2019)

meiner Sicht ohne ausreichende Förderinstrumente im Bereich dieser Brachflächenentwicklung in manchen Bereichen wenig weitergehen wird.

Speaker 1: Ja, sehr gerne.

Speaker 2: Auf der Seite 9. Angaben, wie es in Österreich generell aussieht. Diese 13.000 ha an leerstehenden Industriebrachen werden jetzt auch noch halbwegs aktuell sein. Dann muss man manchmal bei diesen Industriebrachen oder bei Brachflächen, werden auch reingenommen, ein wenig auf die leerstehenden Wohnimmobilien aufpassen. Wenn man diese mit 35.000 ha zusammenzählt, kommt man auf ungefähr 50.000 ha, die derzeit leer stehen. Ich gehe aber im Endeffekt nachher nur auf die 13.000 ha ein. Also ich konzentriere mich in meiner Arbeit immer auf diese Industriebrachen und nicht auf die leerstehenden Wohnungen, weil das ein komplett anderes Kapitel ist.

Speaker 2: Und dann gibt es Zahlen in der Literatur, dass in Österreich ungefähr 1.100 ha jährlich an brachliegenden Standorten dazukommen. Und in der Literatur findet man das politische Ziel, indem es heißt, dass der Flächenverbrauch bis 2010 auf 2,5 ha/Tag hinunterzubringen ist. Derzeit haben wir aber einen Verbrauch von 13 ha/Tag, wo neue Grünflächen verbaut werden. Und diese Fläche fehlt dann natürlich bei den Agrarflächen. Da gibt es jetzt Studien, die hat die österreichische Hagelversicherung gemacht. Und wenn man das jetzt linear hochrechnet, dann stehen in Österreich in 200 Jahren gar keine Agrarflächen mehr zur Verfügung. Weil es eben nur eine beschränkte Fläche gibt und wenn dieser Flächenverbrauch, wenn man das linear durchdividiert, dann ist es in 200 Jahren so weit. Da will man natürlich nicht hin, also gibt es jetzt doch auch Bewegungen dagegen etwas zu tun.

Besprechung der Beilage 1:

Speaker 2: Sie sehen auf der linken Seite das neue Altlastengesetz, das soll ja so ein neues Materien Recht werden. Bis jetzt ist ja das Altlastensanierungsgesetz nur dazu da, die Finanzierung von Altlasten zu beschreiben. Künftig hat so eine Altlast dann wirklich einen eigenen Rechtsmaterienrahmen und alles, was dann da abläuft, fällt nicht mehr ins Wasserrechtgesetz usw. Bis jetzt war das ja etwas, das man umfassend betrachten muss. Das heißt, die Flächen, die wirklich zu Altlasten werden, für die gelten dann bestimmte

Grenzwerte, die zu erreichen sind und Spielregeln, welche Kontamination im Untergrund und im Wasser zulässig ist. Das ist bis jetzt eher nicht der Fall. Und wenn wir uns anschauen, wann eine Fläche überhaupt eine Altlast wird, dann müssen ja gewisse Voraussetzungen erfüllt sein. Der Standort, das ist einmal sehr wichtig, der Standort muss vor dem 1.7.89 entstanden sein. Das heißt, es geht bei dem ALSAG eher um ältere Standorte. Neuere Standorte, wenn jetzt etwas kontaminiert wird, dann kann es per Definition gar nicht zur Altlast werden. Das ist mal die erste große Erkenntnis, die man mitnehmen muss. Dann sind in Österreich ca. 70.000 Flächen erfasst und Sie sehen dargestellt, dass nach einer Erstabschätzung, das heißt man schaut sich das einmal an, kann das überhaupt so erheblich kontaminiert sein, dass mit einem Risiko für die Umwelt zu rechnen ist, dann geht man davon aus, dass ca. 60.000 Flächen aus dem ganzen herausfallen, weil die nicht einmal das Potenzial haben, so gefährlich zu sein, um zu einer Altlast zu werden. Das heißt, die sind aus der ALSAG draußen, und für diese gibt es kein Fördersystem. Und die 10.000 Flächen, die bleiben, die werden dann weiter untersucht. Dann ist es so, dass von diesen 10.000 Flächen nur 2.000 wirklich zu Altlasten werden und 8.000 auch wieder nicht so erheblich kontaminiert sind, dass sie zur Altlast werden. Die fallen dann auch wieder heraus. Es gibt dann - auf der rechten Seite dargestellt - für diese 8.000 Flächen, soll es dann ein neues Förderinstrument im neuen ALSAG geben, wo man diese Flächen, die da rausfallen auch wieder untersuchen kann. Da gibt es einen Betrag von max. 200.000 Euro, der zur Verfügung steht, das ist es aber dann auch schon. Und nur die Flächen, die zur Altlast werden, für die gibt es dann größere Geldmittel, die zur Verfügung stehen.

Speaker 2: Und ich glaube Sie konzentrieren sich ja eher, oder werden viel zu tun haben mit diesen 60.000 Flächen, die da herausgefallen sind, die nicht zu kontaminiert sind, wo aber trotzdem ein gewisser Makel da ist. Weil es eine Vornutzung gegeben hat, und wo man jetzt nicht weiß, wie man da weiter vorgehen soll, um eine Finanzierung zustande zu bringen. Das heißt, es ist immer wichtig zu verstehen, es gibt von der Umwelt her keine Veranlassung, etwas zu tun, weil das Grundwasser nicht erheblich gestört ist. Also weil es da keine Gefahr gibt für die Menschen, die dort leben, aber es gibt natürlich, wenn man mit der Fläche was tun will, sehr wohl Mehrkosten, die dadurch entstehen, dass ich, wenn ich den Boden angreife, sehr wohl Verunreinigung und Mehrkosten habe. Und dann ist es natürlich so: Wenn ich zwei Grundstücke habe und ich habe dieses Grundstück wo eine Vornutzung drauf ist und ich habe daneben eine grüne Fläche, ja dann ist es leider

Gottes im Moment so, dass man eher auf die grüne Fläche geht und das andere stehenlässt. Ja und mein Zugang war immer, dass man ganz einfach pragmatisch sagst: es muss, wenn man wirklich will das diese vorgenutzte Fläche verwertet werden, dann müssen die Kosten zwischen dem was es kostet auf die grüne Wiese zu gehen und dem was es kostet diese Alte vorgenutzte Fläche zu entwickeln muss das irgendwie finanziert werden damit das gleichwertig gemacht wird. Ansonsten wird man, solang es keinen Zwang gibt diese Flächen zu nutzen, immer auf die grünen Wiesen gehen. Das sieht man leider Gottes sehr gut in den ganzen Gemeinden in Österreich. Wo es in der Gemeinde meist irgend einen alten Industriebetrieb gibt, der seit Jahren leer steht, dann wird einmal von der Gemeinde etwas Neues gebaut, auf die grüne Wiese, und das alte steht in der Mitte immer noch ungenutzt leer. Also das ist eine Standardsituation und meistens wissen die dann auch, nicht wie sie vorgehen. Da sagt jeder: „Okay, da hat es was, das ist auch nicht untersucht". Es fehlt oft jede Phantasie etwas zu tun.

Speaker 2: Ich habe mich dann umgesehen, was es sonst noch an Förderung in Österreich gibt und wenn man da im EU-Raum schaut, gibt es diesen EFRE-Fond. Die Deutschen nützen diese EFRE-Mittel, um im großen Stil ihre Altlasten und kontaminierten Flächen zu bearbeiten und zu sanieren. Und die Österreicher haben aber diesen Punkt nicht in ihrem Programm enthalten. Also jedes Land hat die Möglichkeit, einen Schwerpunkt selber zu setzen und das Thema Brachflächen war im alten Förderprogramm von Österreich eher schwach besetzt und leider Gottes ist jetzt auch eben im nächsten Förderprogram relativ wenig enthalten. Ich habe versucht da reinzukommen und zu intervenieren und zu sagen: „Es wäre doch eine ganz einfache Möglichkeit, da zu einem Fördertopf zu kommen, wenn man wie die Deutschen, diese Brachflächen aufnimmt ins EFRE-Programm und einen eigenen Förderschwerpunkt setzt und ein paar Millionen dafür zur Verfügung stellt jedes Jahr". Es ist leider nicht aufgegriffen worden, das heißt, es ist auch in der nächsten Förderperiode, die wieder 6 -7 Jahre geht, ab 2021 weg, wieder nicht drinnen. So, jetzt überlasse ich es Ihnen zu beurteilten, wie wichtig Brachflächen wirklich sind. Wenn es dann darum geht nicht nur Lippenbekenntnisse zu machen, sondern zu sagen: „So, jetzt mit diesen Instrumenten kann ich so eine Fläche angehen und sanieren". Mein Schluss war, es ist sehr wohl so, und die BALSA ist auch als Gesellschaft angehalten, hier was zu tun und Brachflächen zu entwickeln. Aber im Endeffekt lässt man uns im Regen stehen und es gibt einfach keine Mittel für Flächen, die es nicht geschafft haben, eine Altlast zu werden. So wäre mein Resümee von dem Ganzen.

Speaker 1: Die Altlasten werden ja vom Umweltbundesamt im Altlastenkataster aufgenommen und kartiert. Gibt es da für diese nicht kontaminierten Flächen auch ein Kataster oder Programm, wo diese aufgenommen werden?

Speaker 2: Es gibt in einzelnen Bundesländern, das ist jetzt landesweise organisiert, Datenbanken. In Oberösterreich gibt es eine Datenbank, die wieder von den Gemeinden geführt wird, wo jede Gemeinde angehalten ist, ihre Brachfläche bekannt zu geben. Da kann man dann sehr gut in einer GIS-Applikation sehen, wie viele Flächen es sind. Es ist aber leider nicht bundesweit gleich organisiert. Also jedes Bundesland macht es ein bisschen anders. Es gibt auch unterschiedliche Schwerpunkte. OÖ ist, muss ich sagen, relativ weit voraus. Die haben als einziges Bundesland in Österreich ein kleines Förderprogramm für kontaminierte Flächen. Da ist die Förderhöhe aber auch mit 200.000 Euro begrenzt. Also man muss immer vor Augen haben, dass es die „Wettbewerbsregelung“ gibt und es darf keine Wettbewerbsverzerrung geben. Und aus dem Grund ist es dann meistens so, dass man, wenn man ein klein- und mittelständiges Unternehmen ist, nur diese DE-minimes Förderung bekommt und da ist ja dann auch die Grenze, dass man dann auch nur einmal alle zwei Jahre so ein Programm in Anspruch nehmen darf. Das heißt die Phantasie ist da, finde ich auch, enden wollend, was man mit 200.000 Euro machen kann, wenn es um größere Flächen geht. Da lässt sich auch, finde ich, nicht sehr viel machen. Keine großen Projekte leider. Also das ist einmal, leider Gottes nichts Erfreuliches. (Seite 71), OÖ Förderprogramm. Und im Endeffekt wurde das leider nicht aufgegriffen, trotz unserer Bemühungen. Also in der nächsten Förderperiode 2021-2027 ist alles, was wir da versucht haben zu intervenieren, das einzubringen, leider Gottes untergegangen. Also das Geld wird im Moment für andere Programme verwendet. Da geht es um Elektromobilität, Antriebstechnologien, das ist halt leider im Moment eher der Schwerpunkt.

Speaker 2: Seite 100 sind aus Deutschland Beispiele enthalten, wo so Brachflächen im großen Stil mit Mitteln der EU finanziert werden. Die bekommen ja Zuschüsse bis zu 50% der Kosten, die nicht rückzahlbar sind. Also man kann das darstellen, wettbewerbsmäßig, es geht, aber es ist halt leider so, dass der Schwerpunkt meiner Meinung nach nicht gesetzt wird.

Speaker 2: Ein weiterer Punkt wäre diese Nachnutzung, weil ja doch das Ziel vorhanden ist, die Photovoltaik auszubauen und im Zusammenhang damit gibt es ein riesen Platzproblem. Und das Ziel ist ja eine gewisse Leistung zur Verfügung zu stellen in Österreich und man kann sich leicht ausrechnen, dass, auch wenn alle Dächer in Österreich zum Beispiel mit Photovoltaikanlagen vollgepflastert werden, es immer noch nicht ausreicht, um das, was sie vorhaben, an Photovoltaik-Strom zur Verfügung zu stellen. Da ist jetzt von mir der Vorschlag gekommen, dass man Deponieflächen eben auch einbindet und Photovoltaikanlagen auf Deponien errichtet. Und da gibt es ganz interessante Ansätze, dass man einem Deponiebetreiber ermöglicht, auf der Deponie so eine Anlage zu bauen. Und in Deutschland haben sie was ganz Interessantes entwickelt, und da wollte ich auch, dass das in Österreich einmal in Betracht gezogen wird. S. 138, da sehen Sie so ein Bild von einer Deponie, die mit so einem Dach abgedeckt ist. Das besteht nur aus Photovoltaikzellen und da ist das Interessante, aus meiner Sicht, dass man statt einer Abdeckung einfach ein Dach, ein dichtes Dach draufmacht mit diesen Photovoltaikflächen. Der Deponiebetreiber hat ja die Aufgabe, die Deponie nach Betrieb zu versiegeln, also eine Abdeckung, eine Abdichtung draufzumachen, aber das kostet natürlich relativ viel Geld. Und wenn es jetzt die Möglichkeit gäbe, statt dieser Abdichtung so ein Dach draufzustellen mit so einer Zelle, dann hat das einen doppelten Nutzen, dass nämlich der Betreiber von so einer Photovoltaikanlage eine relativ günstige Fläche zur Verfügung hat, wo er seine Anlage drauf bauen kann und der Deponiebetreiber erspart sich vielleicht die Abdeckung zu machen, weil er eh das Dach draufhat. Jetzt ist es aber so, dass die Deponieverordnung diese Ausnahme nicht enthält, sondern nach wie vor vorschreibt, dass man eine Deponie nach Abschluss, also wenn sie mal verfüllt ist, abdichten muss, und dieses Dach zählt nicht als Abdichtung. Also müsste man die Deponie zuerst abdichten und dann könnte man so ein Dacht mit Photovoltaikzellen draufstellen. Das wird in Deutschland sehr wohl anerkannt. Leider hat man da bei uns nicht zugegriffen, aber da kämpfen wir noch drum, dass das doch noch eine Möglichkeit wird bei uns.

Speaker 2: Dann zu den Brachflächen selbst (S. 56), was sind diese überhaupt wert? Da ist die Abbildung hilfreich für die Definition. In der Tabelle, da ist oben der Wert des unbebauten Grundstückes, den kann man ja einfach einmal ermitteln. Dann kann man den Bauwert ermitteln, also das was draufsteht, wobei man hier das Alter berücksichtigt. Dann muss man den Merkantilen Minderwert abziehen, denn wenn einer etwas

vorgenutzt hat, ist es per Definition weniger wert, auch wenn es genau gleich gut ist wie ein ungenutztes Ding. Also hat eine vorgenutzte schlechte Fläche ein schlechtes Image und ist weniger wert. Dann muss man den Aufwand für eine Umnutzung abziehen, wenn man etwas anderes draufmachen will. Dann sind noch die Kosten für den Abbruch und für die Entsorgung der Materialien abzuziehen und dann die Kosten für die Sicherung oder Sanierung, wenn sie diese Kontaminationen beseitigen müssen. Und dann kann man sich ausrechnen, dass diese Kosten ganz leicht so groß sein können, dass der Verkehrswert im Ende negativ wird. Und dann hätte das Grundstück eigentlich keinen Verkehrswert und dann müssen sie es für null anbieten und dann wird gestritten. Kann es einen negativen Verkehrswert geben? Natürlich, denn wenn man sagt, man muss einmal etwas reinstecken, damit man überhaupt etwas bebauen kann, kann man sich das vorstellen. Aber wenn man sich die Literatur anschaut, vor allem im Zusammenhang mit Förderungen, muss man das ganze differenziert betrachtet. Es gibt nämlich manche, die sagen, wenn man eine Förderung beantragt, und man macht ein Gutachten über den Verkehrswert vorher und nachher, dann hat man am Anfang davon auszugehen, dass der Verkehrswert 0 ist. Also der kann bei diesen Fördergeschichten nicht negativ sein. Aber wenn man sich dieses Schema anschaut, kann ich mir sehr wohl vorstellen, dass am Anfang, wenn die Kosten für die Dekontamination so hoch sind, dass man mit den Kosten einer Sanierung leicht über den Bodenwert und den Bauwert rutschen kann, und dann hat man sehr wohl rechnerisch einen negativen Wert. Das heißt, wenn man von Brachflächen und deren Nachnutzung redet, ist es halt wichtig, immer vor Augen zu haben, was mit dem Grundstück getan werden muss, um es überhaupt nutzen zu können. Nutze ich nur die Oberfläche? Kann ich das, was an Kontaminationen drunter liegt, vergessen? Das drunter drinnen lassen? Reicht es auch, wenn ich das oben einfach versiegle? Und nur darauf baue? Oder möchte ich eine multifunktionale Nutzung haben? Will ich einen Keller? Dann habe ich einen Aushub, den muss ich untersuchen. Und da können dann sehr hohe Entsorgungskosten entstehen, die das ganze sehr unattraktiv machen. Ganz ein wichtiges Thema.

Speaker 2: Und dann ist es auch so: Wenn Sie zum Beispiel eine hochwertige Nutzung als Wohnbau haben, dann sage ich immer: „Ich bin nicht bereit, eine vorgenutzte Fläche für einen Wohnbau vorzubereiten und dann lass ich im Untergrund größere Kontaminationen einfach drinnen, wie Teer und so weiter.“ Und verkaufe das jemandem und der baut ein Einfamilienhaus darauf und hat drunter Teerablagerungen. Also das ist

nicht mein Zugang zu dem Ganzen. Auch wenn man sagt, man kann das dann so versiegeln, dass da keine Gefahr für die Umwelt ist und für den, der es oben nutzt, aber es hat irgendwie einen komischen Beigeschmack, wenn man weiß, da drunter hat es stärkere Kontaminationen.

Speaker 2: Ja, also Sie sehen, das ist aus meiner Sicht ein sehr komplexes und vielschichtiges Thema, das rechtlich durchleuchtet werden muss. Dann von diesen ganzen Raumordnungsprogrammen, das ist ja ein eigenes Kapitel in Österreich. Wenn Sie sich das anschauen: In ganz Europa ist es meist so, dass es die Vorgabe gibt, man muss auf Gemeindeebene einmal vorgenutzte Flächen verwerten, bevor man auf neue Grünflächen drauf kann. Und wen sie sich das in Österreich anschauen, dann ist es immer noch in vielen Bundesländern so aufgebaut, dass der Bürgermeister, und das ist ja seine stärkste Macht die er hat, dass also er bestimmt, ob ein Grundstück umgewidmet wird, natürlich mit Zustimmung des Gemeinderates, aber im Endeffekt hat er immer noch die Kompetenz zu sagen wir nehmen an neuen Grünflächen dazu und widmen diese als neues Bauland um. Was dann natürlich dazu führt, dass in vielen Gemeinden Österreichs einfach vorhandene Bauflächen nicht bebaut sind.

Speaker 2: Dann gibt es noch das Thema, aber das ist eh bekannt, mit der „Baulandhortung“. Ein Bauland ist in Österreich ja doch noch eine Sache, die über viele Generationen werthaltig ist. Der Klassiker ist, der Opa kauft für die Enkel oder die eigenen Kinder ein Grundstück und dieses Grundstück wird dann einfach für den Zeitpunkt wenn man es braucht, gehortet und steht damit der Gemeinde nicht zur Verfügung. Das heißt, sie haben viele Ortschaften, wo sie eine total löchrige Bauweise haben, und dazwischen sind Grundstücke, die sehr wohl Bauland sind und für eine Bebauung vorgesehen sind, aber es baut keiner drauf, weil halt einer das gekauft hat und es für die nächste Generation als „Sparbuch-Ersatz“ schon zurückhält. Also auch da gibt es auch Instrumente, und langsam kommt eine gewisse Dynamik rein, dass man in Zukunft das halt nicht mehr so attraktiv machen will. Das heißt, man will die Leute dazu bringen die Grundstücke, die sie haben, relativ bald auch wirklich zu bebauen oder es droht dann zum Beispiel eine Rückwidmung auf Grünland. Also das heißt in Zukunft soll es nicht mehr so attraktiv sein Baugrund zu kaufen und zu horten.

Speaker 1: Ist Vorarlberg das einzige Bundesland, dass da bestimmte Gesetze hat?

Speaker 2: Genau. Da hat es in Vorarlberg ein Gesetz gegeben. Wobei es wichtig ist im Kopf zu behalten, dass das nur für die neuen Sachen gilt. Kein Politiker traut sich solche Flächen anzugreifen. Das gilt auch für die alten Grundstücke, die sich jemand gekauft hat und hortet. Da geht ja keiner her und sagt „so da steht in einem Jahr was drauf oder es wird wieder in Grünland umgewidmet". Da gibt es ja ein Volksaufstand, wenn man das macht. Also das muss man eben auch entsprechend langfristig sehen sowas, und das dauert Jahre, bis das wirklich greift.

Speaker 1: Woran liegt das, dass das nur in Vorarlberg vorhanden ist, diese bestimmte Verordnung?

Speaker 2: Man muss auch Österreich differenziert betrachten. Weil in Tirol und Vorarlberg ganz ein anderer Druck da ist. Die haben viel weniger Flächen, wo sie sowas machen können. Da bekommt man eine Brachfläche viel leichter an den Mann und da rechnet es sich eher als in einem Bundesland wie Niederösterreich, wo viel Raum da ist und wo es alte ehemalige Industriegebiete gibt, wo halt Absiedlungen stattfinden. Also dort dann zu sagen, man macht das attraktiv, so eine alte Fabrik wieder nachzunutzen ist schwer. Weil es hier einen Abzug gibt aus der Gegend, also wie will man dort so ein altes Ding entwickeln, wenn es keine Förderung gibt? Da fehlt mir dann auch die Phantasie. Es gibt ja auch die Idee, diese Flächen wieder in Grünland zurückzubauen. Was noch komplizierter ist, weil da muss ich vorerst den Abbruch irgendwie finanziert bekommen und dann muss ich die Kontamination entfernen. Also das ist ja dann wirklich überhaupt die Kür so ein Projekt durchzubringen. Der Bedarf wäre aber durchaus da, dass man wieder neue Grünflächen schafft, aber das halte ich für das komplizierteste alle Flächen dieser Art wieder in Grünland rüberzuführen.

Speaker 2: S. 64: Baulandmobilisierung. 26% der gewidmeten Bauflächen sind nicht bebaut. Also gibt es quasi statt dem Sparbuch ein für Bau gewidmetes Grundstück, das aber nicht bebaut wird. Das heißt, ein Viertel aller bebaubaren Flächen werden einfach als Reserven irgendwo gehalten. Von vielen Privaten, das sind oft viele kleine Grundstücke und die fehlen natürlich. Das heißt, aus dem alleine entsteht ja für manche Gemeinden, damit sie sich entwickeln können, schon die Not, dass die wieder neue Grünflächen als Bauflächen widmen müssen.

Speaker 2: Dann noch ein Thema: Diese ganzen Einkaufszentren, diese Unart oder die Fehlentwicklung meiner Meinung nach, dass man immer an die Gemeindegrenze geht und dort das große klassische Einkaufszentrum im amerikanischen Stil baut, ich finde das entsetzlich. Und im Ortsgebiet haben sie dann Leerstände und Flächen, die ungenutzt sind, und das ganze Ortsbild ändert sich ja dann dadurch und stirbt in der Mitte aus. Am Rand gibt es dann diese klassischen Einkaufsparks, wo die Autos und fünf Supermärkte stehen. Da gibt es auch nur sehr wenige Gemeinden, die es schaffen dagegen etwas zu tun. Grundsätzlich hat ja jedes Bundesland eine eigene Agentur, die sich bemüht hier etwas dagegen zu tun. Die sind auch sehr engagiert, aber es ist oft schwer, denn übergeordnet für ganz Österreich habe ich keine einheitlichen Spielregeln gesehen. Es ist sehr weit unten auf Gemeindeebene angesiedelt und sehr schwer hochzuheben, dass man landesweit oder sogar bundesweit verbindliche Vorgaben macht, wie zu bauen ist. Das gibt es dann immer einen Aufschrei und dann sagen immer alle, dass das gar nicht in Frage kommt. Also wenn die den Begriff „zwang zur innen Verdichtung“ bringen. Also wenn Sie einem Bürgermeister sagen, er muss einmal alle Brachflächen der Ortschaft bebauen, bevor er wieder etwas Grünland in Bauland umwidmen kann, das müssen sie einmal versuchen umzusetzen, da wünsche ich Ihnen viel Spaß.

Speaker 2: Also alles in allem ein interessantes und wichtiges Thema, aber ich glaube es ist noch nicht ganz angekommen, in Österreich, leider. Aber es ist gut, wenn Sie sich damit beschäftigen. Es gibt nicht viele, die das jetzt wirklich aktiv betreiben und es ist immer noch in den Köpfen drinnen, dass wir in Österreich immer noch das Land der Äcker sind. Aber wenn man sich die Zahlen anschaut, ich bin selber erschrocken. Österreich ist ja Weltmeister im Flächenverbrauch. Es gibt kein Land auf der Welt, das so viel Grünfläche jährlich (anteilig natürlich) in Baufläche umwandelt und so großzügig versiegelt wie Österreich. Das gibt es sonst nicht. Also diese Verschwendung der letzten Jahre, das muss sich ganz ganz drastisch ändern, damit wir da unsere Autonomie auch bewahren. Es gibt ja Untersuchungen, die haben herausgefunden, Österreich wäre nicht einmal mehr in der Lage, den eigenen Nahrungsbedarf mit den vorhandenen Agrarflächen zu decken. Also das ist ja auch erschütternd, wenn man sich das überlegt.

Speaker 1: Woran liegt das, dass dieser Drang zum Flächenverbrauch und Versiegelung gibt und der in Österreich so hoch ist. Also warum ist das in Österreich so ausgeprägt?

Speaker 2: Es ist einfach die günstigste Lösung. Die klassische Situation ist, sie haben einen kleinen Ort, sie haben den Ortsrand, sie haben draußen dann Felder. Sie haben einen Grundstückspreis am Feld von 5 Euro/m2 und der Baugrund kostet 80-100 Euro/m2. Dann haben sie den Bauern, der halt zum Bürgermeister kommt und sagt „du, wenn ich den Acker da zu Verfügung stell, dann wird Bauland um 5 Euro plötzlich 80 wert. Dann kann man sich relativ leicht ausrechnen, dass da Begehrlichkeiten entstehen. Und wenn dann der Gemeinderat sagt „ja okay machen wir", dann verdienen viele Leute daran, aber dann entstehen halt diese typischen Situationen. Das sind eben extreme finanzielle Anreize. Es ist auch sehr schwer dagegen vorzugehen. Und es ist natürlich auch noch schwerer, wenn man dann so ein Grundstück hat, das als Bauland gewidmet ist und einen Wert von 80-100 Euro/m2 hat, dass man daraus wieder Grünfläche macht, die einen Wert von 5 Euro/m2 hat und wo man noch dazu Geld reinstecken muss, damit man das wieder in Grünland zurückführt. Also, das sehe ich als eher die Kür in dem Ganzen. So ein Projekt durchzuziehen. Da ist es, glaube ich, wichtiger einmal sich darauf zu konzentrieren alle ungenutzten Flächen wirklich zu erfassen und den Druck auf die Gemeinden zu erhöhen, alle Flächen die vorhanden und bebaubar sind, auch wirklich zu entwickeln. Ausnahmslos. Das finde ich das beste Instrument, dass man das einführt in ganz Österreich, und man davon ausgeht, dass es keine Umwidmung mehr von Grünland in Bauland gibt, ohne dass nicht 100% der Bruchflächen der Gemeinde verwertet sind. Dann kann man über sowas reden.

Speaker 1: Also, das müsste wirklich von der Bundesebene kommen.

Speaker 2: Ja, auf jeden Fall. Aber da bekommt man dann mit, wie Politik in Österreich funktioniert. Die Macht der Gemeinden. Die Macht des Bürgermeisters. Das ist sehr schwer. Es gibt ja auch interessante Kooperationen zwischen Gemeinden, so Modelle. Da tun sich drei Gemeinden zusammen und die versuchen dann halt gemeindeübergreifend ihre Flächen so aufzuteilen, dass etwas Vernünftiges herauskommt. Das ist ja auch ein guter Ansatz. Da werden dann Flächen auch ausgetauscht, umgewidmet, da versucht man dann auch Grundstücke zusammenzugelegt und etwas Sinnvolles zu machen. Also es gibt durchaus interessante Ansätze, was das betrifft, aber es gibt halt nichts Einheitliches. Es ist in jedem Bundesland anders organisiert und man muss sich wirklich durch alles durchdenken. Und es ist auch so, dass jedes Bundesland bei uns auch einen anderen

Flächenverbrauch hat und andere Reserveflächen. Das ist natürlich auch sehr unterschiedlich.

Speaker 1: Da sieht man dann auch wirklich einfach den Druck im Westen durch die Berge und die Topographie.

Speaker 2: Genau. Da ist auch die Tabelle relevant zum Flächenverbrauch der Bundesländer (S. 29): der gesamte Flächenbedarf, die Bevölkerung, die Bauflächen, die insgesamt zur Verfügung stehen, die Verkehrsflächen, der Anteil der versiegelten Flächen (Dauersiedlungsraum). Also da kann man sich dann rausrechnen, in welchem Bundesland gibt es den größten Flächendruck etwas zu tun.

Speaker 1: Seitdem Sie in diesem Bereich arbeiten, was hat sich eigentlich in den vergangenen zehn Jahren am meisten verändert? Bezüglich des Themas?

Speaker 2: Also ich mach ja mein Leben lang nichts anderes als Altlasten zu sanieren. Ich bin seit mehr als 30 Jahren in diesem Bereich tätig und kann sagen, dass in Österreich die größten Altlasten wirklich mittlerweile alle saniert sind. Das kann man sich so vorstellen: Am Anfang waren das lauter so Themen, wo es darum gegangen ist, alte Deponien zu räumen, also wirklich große Raumprojekte, wo viel bewegt worden ist. Jetzt sind aber viele kleine braune Flecken in der Landschaft noch da, und da steckt ja meistens eine Kontamination dahinter, wo es gar nicht einmal so leicht ist, das ganz gesund zu machen. Und das ist auch etwas, was sich dann im Ministerium, bei den zuständigen Behörden und auch im Umweltbundesamt breitgemacht hat, dass man von der Philosophie her weggegangen ist von dieser totalen Dekontamination, dass man also alles wieder in den ursprünglichen Zustand zurückführen will. Sondern man hat gesagt, man muss das immer nutzungsorientiert machen, das heißt ein bewusster Umgang mit dem Schmutz, um es so einmal zu sagen. Also müsste man Spielregeln definieren und sagen „wenn da ein Gewerbegebiet auf eine vorgenutzte Fläche drauf kann, dann ist es ja nicht erforderlich, dass der Untergrund jetzt wirklich auf einen Top 1A Zustand zurückverwandelt wird. Sondern man kann ja ruhig eine gewisse Kontamination im Boden belassen. Also das ist eine ganz wesentliche Entwicklung, die da stattgefunden hat, dass man also sich bewusst gemacht, hat es ist finanziell nicht vorstellbar, alles wieder komplett in einen super sauberen Zustand zu bringen, dass man theoretisch

überall, ich sag einmal, den Kinderspielplatz drauf machen kann, denn der Kinderspielplatz ist in der Literatur immer die Fläche mit den höchsten Ansprüchen. Denn da muss es ja möglich sein, dass das Kleinkind, das dort spielt, den Sand in den Mund steckt. Also darf da nur ganz sauberer Boden vorhanden sein. Sondern man hat gesagt, wenn eine gewerbliche oder eine industrielle Nutzung vorgesehen ist oder auch eine Bebauung mit einem Wohnbau stattfindet, dann kann da ruhig eine gewisse Restbelastung drinbleiben.

Speaker 2: Also dieses Bewusstsein gibt es, es gibt aber leider Gottes gibt es nicht das Interesse, sich von den Altlasten wegzubewegen und die nicht ganz so stark kontaminierten Flächen mit einzubeziehen und den Eigentümern von diesen Flächen zu helfen, dass diese Flächen entwickelt werden können. Das fehlt noch, das ist der nächste Schritt. Also wenn Sie sich das rechtlich anschauen, es gibt dieses „Subsidiäre Haftung" in Österreich. Wenn Sie eine Fläche kaufen, und sie wissen, dass diese eine Vorbelastung hat, dann kaufen Sie sich auch die Verpflichtung diesen Schaden zu beseitigen, wenn man den Verursacher nicht mehr greifen kann. Dann kommt die Republik unter Umständen zu Ihnen und sagt „so und jetzt gibt es den anderen nicht mehr, der hat die Firma in den Sand gesetzt, den können wir nicht mehr greifen" dann haften Sie subsidiär für das Ganze. Das macht das Ganze relativ unattraktiv, weil sich jeder denkt „warum soll ich mir das antun?"

Speaker 2: Die ALSAG-Novelle, die hier schon sehnsüchtig erwartet wird, die nimmt dieses Risiko ein bisschen weg. Also in Zukunft soll es eben möglich sein, solche kontaminierten Flächen zu kaufen, ohne das Risiko mitzukaufen, dass man von den Behörden subsidiär zur Verantwortung gezogen wird. Das ist ganz wesentlich, dass das bekannt wird. Allerdings, und jetzt bin ich dann wieder bei dem Punkt, wo sich das ganze wieder stark reduziert, von der Auswirkung, gilt das ja dann nur für jene Flächen, die es geschafft haben im Altlasten-Regime Fuß zu fassen. Und es entsteht die perverse Situation, dass eine Altlast rechtlich besser behandelt wird als eine Fläche, die eine Kontamination hat, es aber nicht geschafft hat, zur Altlast zu werden. Das heißt, Sie können sich dann eine Altlast kaufen, ohne dass Sie rechtlich das Risiko tragen müssen, in die Verantwortung für die Sanierung genommen zu werden. Wenn Sie sich aber die Fläche daneben kaufen, die nur halb so kontaminiert ist und wo jetzt nicht direkt eine Gefahr von der Umwelt ausgeht, dann kann es sein, weil dort gilt ja das alte Wasserrechtsgesetz usw., dass Sie sich dort sehr wohl immer noch ein rechtliches

Problem einhandeln, weil man Sie als Grundstücksbesitzer subsidiär verantwortlich macht für eine Grundwasserkontamination. Und das ist für Juristen ein breites Spielfeld, ja diese neuen Grenzen, die dann entstehen durch das ALSAG und dem bestehenden Wasserrechtsgesetz, und das ist aus meiner Sicht noch nicht zu 100% durchdacht. Weil es muss auch interessant werden und möglich werden, eine nicht so kontaminierte Fläche zu kaufen, ohne subsidiär hierfür zur Verantwortung von Verunreinigungen herangezogen zu werden. Dieses Thema wird aber noch komplett ausgeklammert aus dem Ganzen.

Speaker 1: Vor allem, weil es sich hier ja eigentlich um die Mehrheit der Flächen handelt.

Speaker 2: Genau. Nochmal zu Beilage 1. Die 60.000 Flächen ganz oben, da gilt nach wie vor das Wasserrechtsgesetz, also da gilt dann nach wie vor die Subsidiäre Haftung und für die 8.000 Flächen wird im Moment intern irrsinnig gerittert, um genau diesen Punkt. Ob man für diese 8.000 Flächen, die so ein bisschen mehr Dreck hatten, aber es doch nicht ganz geschafft haben, ob man denen den Persilschein ausstellt, mit dieser subsidiären Haftungsfrage. Oberösterreich, die wollen es sehr wohl haben, die wollen es mehr oder weniger klar geregelt haben, dass wenn ich sage, die Fläche passt nicht in die Altlast hinein, die ist nicht so stark kontaminiert, dass sie dann rausfällt, aber dass sie sehr wohl für das Thema der subsidiären Haftung eine, wie soll ich das nennen, Freistellung des neuen Liegenschaftseigentümers hat. Das ist ganz interessant zu verfolgen, denn im Endeffekt geht es da natürlich auch ums Geld. Es geht um Aufgaben des Bundes, Aufgaben der Länder, wer müsste dafür zahlen, und da wird irrsinnig im Hintergrund zu dem Thema gestritten.

Speaker 2: Viele in Österreich glauben, dass mit dem neuen Altlastensanierungsgesetz alles geheilt wird. Das ist die Wunderwaffe dafür, dass wir in Zukunft nicht mehr zum Thema subsidiäre Haftungsfragen streiten werden. Ich sag immer, das ist ein Blödsinn, denn die meisten Flächen fallen aus dem raus, sind im alten Wasserrechtsgesetz, und für die gilt natürlich das alte Wasserrechtsgesetz, mit den darin enthaltenen subsidiären Haftungsfragen. Und nur ein ganz geringer Teil ist durch diese Neuerung des Altlastensanierungsgesetz betroffen und kommt in den Genuss, sich über die subsidiäre Haftung nicht mehr den Kopf zerbrechen zu müssen. Das ist einmal ganz wichtig, wenn man verstanden hat, wie so etwas funktioniert, dann kann man auch, finde ich, sehr gut

diese Erwartungshaltung ein bisschen reduzieren, die besteht, dass das für alle Flächen gilt. Ist leider nicht der Fall. Also, da sehen Sie eh in der Beilage 1 auf der rechten Seite in Rot „keinen Fall der subsidiären Liegenschaftshaftung AWG“ also im AWG haben sie einen Paragrafen zitiert, wo das drinnen ist, das ist Paragraf 74 von AWG und Paragraf 31 von Wasserrechtsgesetz, wo der Liegenschaftseigentümer ganz klar drinnen steht und immer noch subsidiär haftbar ist.

Speaker 1: und das sind die Flächen mit „Verdacht auf Kontamination“, die in der Tabelle angeführt sind?

Speaker 2: Genau. Also für die, wenn dort was ist, kann der Nachbar hergehen und sagen „dir gehört die Fläche, du hast da was drinnen“. Und beim Wasserrechtsgesetz ist es ja so dieses Recht auf komplett sauberes Grundwasser, das ist dort verankert in Österreich. Also jeder, der vom Nachbarn von der Zustromseite ein bisschen einen Dreck auf sein Grundstück bekommt und dann in seinem Brunnen eine Kontamination drinnen hat, hat dann das Recht auf ein total sauberes Trinkwasser. Und der kann sich dann natürlich am Nachbarn redressieren und sagen „das kommt von dir, du bist verantwortlich dafür, du musst mir das sicherstellen“. Das ist in vielen Fällen so, dass dann die Behörde sagt „der hat keine Mittel, dem kann ich das nicht vorschreiben“ und dann liegt das einfach. Es gibt ja viele solche Fälle, wo einfach dann nichts weitergeht, weil man genau weiß, das würde sowieso nichts bringen, wenn ich jetzt den Bauern vom Nachbargrundstück, der auch nicht unbedingt was dafür kann, verantwortlich mach und den in den Ruin treib. Davon wird die Fläche auch nicht saniert. Aber ist natürlich, finde ich keine Voraussetzung, wie man das Thema Brachflächen gesund entwickeln kann, wenn das immer so auf einer Art Duldung beruht. Das man sagt „ja man weiß ja die Behörde schreitet da ja eh nicht ein, und die kommt dann schon nicht, und das wird nicht so heiß gegessen wie gekocht wird“. Also, es gibt viele Grundstücke, wo das genau so läuft. Da hoffen die Eigentümer immer, dass die Behörde nicht irgendwann mit einem Bescheid daherkommt und die in die Pflicht nimmt. Das ist natürlich äußerst unzufriedenstellend, sowohl für den verantwortlichen Beamten, der das eigentlich machen müsste, als auch natürlich für den Grundeigentümer, der dauernd Bauchweh hat, dass irgendwann einmal ein Bescheid eintrudelt. Also, da wird man hoffentlich irgendwann einmal regeln können das ganze, rechtlich. Das werden Sie sicher feststellen, da sind wir immer noch relativ weit entfernt davon, dass das geändert wird.

Speaker 1: Also würden Sie sagen, dass das das wichtigste wäre, dass in Zukunft dieser rechtliche Punkt geklärt wird?

Speaker 2: Ja, ein offener Zugang mit der Vergangenheit. Und eine rechtliche eindeutige Festlegung, dass man da den neuen Grundstücksbesitzer nichts rechtlich umhängen kann. Das würde schon viel erleichtern. Da ist aber überhaupt nichts da, weil das Wasserrechtsgesetz und das Abfallwirtschaftsgesetz nicht novelliert werden soll. Es ist nichts vorgesehen. Und damit ist auch klar, dass für die Flächen keine Erleichterungen zu erwarten sind. Das sind aber die Flächen, die sie wieder interessieren. Weil die meisten Brachflächen sind genau die, für die das gilt, und nicht das ALSAG. Auch nicht das ALSAG neu.

Speaker 2: Aber wenn Sie das einmal verinnerlicht haben, dann sind Sie schon ganz vorne dabei. Na wirklich. Es ist erschreckend, wie oft in der Politik, bei den großen Entscheidungsträgern, die sind dessen nicht bewusst. Die haben nicht diesen Überblick und können diese Situation so abschätzten, sondern die glauben, dass mit dem ALSAG neu all das geregelt wird. Was ja nicht stimmt [cut].

A.2. Interview M.Sc. Eddy P.H. Wille 26.04.2021

Interview M.Sc. Eddy P.H. Wille 26.04.2021

Speaker 1: My first question, just to start things off would be, in your paper, you write that the OVAM started a comprehensive inventory of these potentially polluted sites and that you have 34,000 formerly industrial sites and landfills that have been listed or preliminary been screened.

Speaker 2: Yeah. But there are also problems with our clusters. Not all the sites are brownfield, so quite a lot of them are still operational sites. For example, if you have service stations, or petrol stations, that's also on the list, not all of them are still operational, so not each activity on that list is a brownfield site. The main point is that each activity on that list is considered as having a high potential to cause soil pollution.

That's a main aspect, because that's rather an important difference between Belgium and the Northern part of Flanders. And for example, the UK or colleagues in UK, also considered brownfields, which have no soil pollution at all. I have to admit, we also have a specific legislation on brownfields. And also, the fact that soil pollution should be in places, is not also a condition, which should be fulfilled. So, we also have brownfields with no soil remediation which is needed. But I have to admit that according to my experience, that's really a minority. Most brownfields have a problem with soil quality.

Speaker 1: Okay. So, brownfields in Belgium are defined as having sites that have been formerly used and can be contaminated, but not necessarily?

Speaker 2: Did I mention the definition in my paper because we have a specific law on that?

Speaker 1: I found one somewhere else. I don't recall now if it's from your paper or not. So, I have one that says, “A brownfield is the whole of neglected and underused grounds, which have been affected in a way that they only can be reused by means of structural measures”.

Speaker 2: Yup. Okay. That's the official definition. Okay.

Speaker 1: But that doesn't say anything about contamination or not.

Speaker 2: That's right. And that's a bit of difference. You have a specific law on a brownfield covenant, so making an agreement to redevelop a brownfield and that's the definition which should be fulfilled. If you have a site which is neglected or underused, and only by putting structural measures in place, you can have a redevelopment, that's a definition of a brownfield site for a brownfield covenant. If you look at OVAM, the organization where I'm working at, we also considered contaminated sites, which are no longer in use or partly in use also as brownfields, but not each brownfield of that kind will get the covenant. So, to make it complicated: Let's say that you have particularly contaminated sites, which should be redeveloped, but where the complexity is rather low and limited to the remediation of the soil. Those, for example, you have, we just received the facts a week ago, we have about 225 proposals for a brownfield covenant. So, if you look at the number of contaminated sites, that's much higher. You can imagine that about thousand or more sites can be contaminated in a way that there were no longer operational

activities, and there is an underuse of the site. So, that's also the international definition of a **b**rownfields. Maybe you have also visited the sites from, or colleagues in the United States from US EPA?

Speaker 1: No, not yet.

Speaker 2: It was in '98 that I went to Germany to have a workshop with German colleagues, but also people from US EPA environmental protection agency. And in those days, they had a specific program on brownfield redevelopment. And that was a big inspiration for me to install a similar program in Flanders, because we had the same experiences. If you look at the contaminated sites, the polluted sites, we have a specific legislation from the late 80s, but it was really a very short legislation, but we had a specific legislation which came into force in '95. So '95, we had the soil remediation act. One of the aspects that we saw rather quickly was that typical brownfield sites remain unaddressed, because most of the remedial actions that we saw are firstly soil investigations, the remedial actions were related to operational activities, for example in our harbor regions, all the big chemical companies they investigated their soil. If there was a problem, they started up remediations. If you had petrol service stations and if there was a problem, there was a specific fund created in order to remediate the sites. So quite a lot of operational activities, when they had the problem, they start to remediate in order to not lose their permit, to operate on those sides. Main problem was that under used or old sites, which were no longer operational, they didn't get into a remedial action process. And that was one of the reasons, uh, that that was the same when the United States, they also have the big companies, like Exxon, Shell, you name over those companies, they started up remedial actions. But if you have orphan sites or under used brownfield sites, nobody, took the initiative in order to get a redevelopment on those sites.

Speaker 2: One of the reasons was that there was a legislation in order to force people to remediate. But if you remediate it and you have no other options in order to continue operations, on the sites a lot of people didn't take any initiative. And that was the reason why in those days President Clinton took the initiative with his US EPA to set up a specific brownfields program, in order to get people interested in those brownfield sites. And not only set up a remedial action, but more focused on the redevelopment of the site. And that was also the problem that we had in Flanders; the soil remediation act was really focusing on: is the soil polluted? If it's polluted, is there a risk? And if there is a risk, is it

so severe that the remedial actions should be taken? That was the main focus of that decree. The decree was not focusing on the fact, is this, uh, site, uh, still in use? Should we redevelop it? Should we revitalize it? That was not the main focus. And that was a bit the problem that I discovered at that workshop in Germany, that's our colleagues in the US, and also in the UK, we are more focusing on what's the future of that site. And if you have a good idea in the future, about that site, you also come back, okay, we will remediate it, but mostly focus on this is really what we want to have on this site. New housing, new buildings, new, industry, sometimes a residential area with park. So, but that was the main focus while we were focused on what's the problem of the soil. Nobody's interested in that except us, if you get paid for it like me. So that was a big problem.

Speaker 2: Roadmap document made by our colleagues, over at US EPA; they have been dealing with it for over 55 years and are really very experienced with it. And the roadmap is really telling you step by step how you should proceed to redevelop a brownfield site, I'm still using it. But yes, we also have a more specific one, it's in Dutch. How you should proceed with brownfield sites, what you should take into account, because the problem is if you proceed in the same way as you proceed to set up a remedial remediation program that will not do, you need to contact much more people. Also, the local community, the local municipality, in order to get a feeling, what do we want with this site? What's your concern, what are the demands and how can we, um, mix that together in order to get a good redevelopment? It's not only an engineer or a geologist, will have the simple answer. It's more the combined effort. And also, one of the main focus. That's what you are also working on is how can we prevent that? How open green space will get a destination for industry or for a housing, as long as you have brownfields, which remain unaddressed. That's a bit of focus that we also at, um, Flanders region, but not only focusing on what's the soil problem, but also some kind of prevention or to prevent open green space to get also used for sealing, and other conditions, which are not, let's say, sustainable in the long term. So, this was a long introduction.

Speaker 1: Belgium is one of the countries with particularly high population density, I think in infrastructure density. So how important is brownfield regeneration, as a real mitigation strategy for this concern?

Speaker 2: The point is that we have, let's say two types of industrial areas. We have the former coal mines, which were in the province of Limburg in the East of Belgium, close to the Netherlands and Germany. And that closed down, I think the last one in '92 or '93. But that's really specific. There were large sites, 6 of them, and they were immediately taken into a redevelopment program. So that kind of brownfields, that's also what [name: inaudible], from Germany, who I worked with together years ago in the CABERNET Network, the network says, you should consider brownfields as a sort of a bath, where water is streaming into your bath, so brownfields are entering into your bath and at the bottom they are leaving. So, the first thing you should do, is preventing that new brownfields are entering. So, set up programs, when activities are shut down that you have immediately a redevelopment program. So that's what happens with former coal mines. If you look at the other brownfields, the non-coal mine industry brownfields, we have also the harbor areas and those areas, let's say, a migration of industry during the 60s and 70s, there were more going farther away from the city. You had the city of Ghent, the city of Antwerp, especially Antwerp is a very large harbor. Let's say, before the 60s, a lot of the activities were very close to the city centers, the historic cities center. Now, they are much more outside the city centers sometimes 20 kilometers to the North. The same we saw in Ghent, what you see is that the older areas with activities became brownfield sites.

Speaker 2: And that's what we also addressed to get new activities on those sides. And that's a bit the main focus we have in Ghent with the old dock lands. And also, in the harbor of Antwerp is now called 'Blue Gate, but it's a former petroleum industry at the harbor of Antwerp. So, these are rather large areas. Which should be transformed into new activities. So, there's also a specific type of brownfields. So, the coal mines, the Harbor infrastructure. And then, let's say, that the most frequently occurring brownfields are the brownfield sites or the old industrial sites which were, let's say, created during the 19th century, old industrial activities, very close to the historic city center, where you had also a textile industry, steelworks, all kinds of typical industries from the 19th century, early 20th century. And what happened is that the city expanded, and they moved around all those industrial facilities. And then also during the 50s, 60s, a lot of these activities were also displaced and put further away into specific industrial areas far from the city center. And that also that's what's happened quite a long time. People were no longer interested in the fact that you had those old industrial sites and they brownfields, a lot of

vandalism, also negative impact on the surroundings, not only about the environmental conditions, but also crime, people taking drugs, vandalism. And that's what started in the 80s, 90s, who set up specific programs in order to redevelop those sites. In the 80s was more focusing at, let's say, down development, not only the old industrial sites, but let's say old housing. And so, in the late 90s was more, due to the fact that we also became aware that, soil pollution might be a big problem, that we also started to redevelop those sites, starting with soil investigation and if necessary, set up new remedial programs and activities.

Speaker 2: So that's a bit of the three types of brownfields that we have in Flanders, the last ones are the most occurring, let's say, each city has quite a lot of that kind of sites. We also started to pick up later, quite a lot of the larger cities are very close to river or a canal, because that was also the start of the wealth of, if you look at, I don't know Graz, but Vienna, the Danube River, that's not a coincidence, no, due to the fact that you have a large transportation infrastructure by the waterway we have the same in Flanders. So, a lot of the most important cities of Flanders are close to a waterway or canal. And that's also what you see that in order to transport large amounts of products industry was located pretty close to the canal. And now what we see as, during the, that's not a good, not always a good change from the 60s on you see that the industry is moving further away from the city center, but they are not always bounded to a water way. So, they are mostly bounded, connected with highways.

Speaker 2: So, if you're talking about sustainability, from my point of view, a boat is much more environmentally friendly than 20 trucks on the roads. It's not always an improvement, but we also have specific programs now, and we try to redevelop certain brownfield sites in order to promote a waterway transport. And that's also something we are doing in Ghent, because you have two rivers which are conferencing there, in order, and also canal, in order to try to connect as much as possible. Also, the inner city with the water, again. As we can keep trucks, lorries out of the city, that we can bringing in the goods by waterway. And even we are thinking about buses on the waterways. It's not happening yet, but we are thinking it. Also, in my hometown, you have the same. We also have a river right in the middle of the city. When I was young, all along, it was all factories, industrial facilities. Now there are only a few remaining. Most of them are out of the city, and what they are doing now is also rethinking how can we use that old river

in order to transport goods and people via that waterway. That's a bit also one of the elements that I saw after the 25 years of brownfield development, that quite a lot of brownfields are connected with two or more transport facilities. You have a lot of cases, also the railway and also the highways. And these three, the three-model aspect is really important. The only problem is that only in most cases, the highway is of good quality, waterway, railway is not always adapted to the standards that we are asking today. So that's a bit the problem, but you can upgrade them.

Speaker 2: Let's say, it's a policy issue, and it's also a bit related with what you are working on. If you want to avoid new land take, you should also reconsider why did industry fled away and how can we bring them back? One of the elements is provide good transportation infrastructure. Quite often, you don't need to have to build new roads. Everything is nearly in place. You should only, for example, with drains, electrification is not always in place in those old lines or all the needs. Let's say, bigger capacity, waterway, there is not all the infrastructure to load the ships. But you can invest in that. That's a bit, what is the alternative that you are sending more people outside the town to a green open space, which has to be redeveloped as industrial land, where you're constructing highways, new docklands. It's not always the right thing to target. We thought it was the right thing to do.

Speaker 1: And then usually what is happening is that housing will then also develop around those industrial areas. No, because people aren't willing to travel that far?

Speaker 2: No, not that much, let's say we are trying to avoid that. And that's a bit also a discussion we have, that we said, you have the city where people are living and you have the industry, which is outside that we don't mix them up. And that's one of the new insights. We should also reconsider that, if you're really talking about circular economy. In a circular economy, there should be more connection between the areas where people are living and work. So, it will bring the economy back to the town. That's also one of the aspects Peter Cabus is working on with his department. How can we make a better mix of industry and residential areas.

Speaker 1: From what I've gathered from the Austrian side of things, is that already existing sites where hazardous substances have been handled and the former landfills, those that are documented are only ones that have been created before 1989 and

everything after that doesn't even fall into the definition that it can be contaminated brownfield in the end. So, it's only focusing on old sites and all the new sites still fall into the water law and into the waste management law. And the other ones fall into the [ALSAG]. So, I was wondering how this is defined in Flanders. So, the sites that you do have can they all fall into this Brownfield covenant act, for example, or is there a limitation?

Speaker 2: There's no time limitation. So, in theory they can all, aside from ‘95, can be a brownfield site. But in practice, we don't see that often. Why we, as I mentioned already, we had the soil remediation act, which came into force in ‘95. And there is a definition of a new and historic pollution. New pollution is pollution, which was generated after ‘95. And what's the main aspect on that then we have soil standards from the moment that you're exceeding or passing in those soil standards, you have to set up a remedial action. These are very severe standards, but what was the politics or the policy around that initiative in the law was that we have now environmental permits, you should operate in a way that you're not causing pollution, and if it's happening, you should clean it up immediately.

Speaker 2: So, we are no longer tolerating that new pollution is entering the soil. That's the reason why those standards are really severe. And even if you're passing them, and they are no risk you should clean up, should start to clean up. And that's the difference with the historic pollution, which was generated before ‘95 and most of the brownfields or old sites in those cases remediation should start up. If you have a risk assessment, which is pointing out that you have environmental risk at that site, it's quite possible that you are already passing the soil remediation level threshold two or three times and there is no risk. So, you don't have to do anything. But at most of the brownfield sites, I have to say, most of them are older than, let's say, 40, 50 years, quite a lot of them, are the results of the actions, that I also already mentioned, that you have old industry, which was fleeing the city, which was closed down the 60s, 70s. You had the oil crisis in ’73. It was also an economic crisis and quite a lot of old industrial action activities were closed down in that period. And one of the problems is in those days people were not, when they stopped their activities, were not, taking a look at the soil, they didn't investigate the soil in order to find out, is there a problem or not? And that was a change from ’95; after ‘95, if you’re closing down your activities, you should also undertake a soil investigation. If

there is a problem, you should also start remedial actions. That's one of the elements, we tried that out with the closure of the coal mines. So, the law that he had from '95 was then in a draft version, and we said, okay, let's try it out. On the closure of the coal mines, we started up, soil investigations first, where do we have risks and how can we deal with those risks? Or then we saw clean up actions. And it's only in the later phase that redevelopment plans were made, that's a bit the change for, with the brownfield program, from the, let's say, after 2000 that we should more have an integrated approach that you combine your soil investigation and soil remediation, which the redevelopment of the site. Not doing first remedial actions. No, also think, what do we want over here? What are the demands, the necessities from these sites and how can, because otherwise you get problems that your remedial actions are not in line which the future redevelopment of the sites, because clean-up to a background level is not always an option? So, in many cases, there are still residual contamination on the site. And that's also impacting if we want to have a residential area where you have also gardens, where you can have your own crops, children's playgrounds. Yeah. It's not interesting if there is still contamination in the top layer; so, this should be taken into account.

Speaker 1: So, how are these sites even documented? Is there someone who goes into the field and looks for these sites or are there other methods?

Speaker 2: So, um, when we started in the early 90s, in those days we get information from different players. It was a local municipality, was sending a letter to us, saying that that site might have serious problems because we saw that there are drums with oil or waste on the ground. You name it, or there was illegal action, or by the police, or by people who lived around where we think that that's the landfill is causing problems. So, we had a lot of information, which was sent to us, but not in a structured way. And that's the change from, the law from '95. What we have done is we made a list of all activities, which we are considering as having the potential of contamination, of polluting the soil. And that's what we call the risk activities or risk to soil pollution.

Speaker 2: Based on old permits and databases, databases in those days, it was not on a computer, it's hard copies. We had a list of about, the estimation was that there were, 85.000 sites with that kind of activities in the region. So, if you operate. And we had also three in the beginning, three categories, first that you have to investigate them on a periodic basis. For example, an oil refinery has a high risk on polluting the soil and ground

water. So, they have to investigate their sites before the year of 2000. If you have a lower potential, you have to investigate it the first time before 2002. And if it was still lower than before 2004. If it was not on that list of periodic investigation. You should only proceed to soil investigation if you're selling your lands, because what we didn't want any more was that people were transferring their contaminated property and that the new owner has all the burden and all the problems. So, you can only sell in Flanders your site if there is one of those 85.000 on that list, you can only sell it if you have done a soil investigation. And if there is a need to remediate it, you have to remediate the site or put a guarantee that you will do also financial guarantee. So, that's the first thing was, if you have a high-risk activity you should investigate on operating basis, or if it's not on that list, or even on that list and you are selling your land, you have to do that investigation and remediated it, or if you're closing down your activity. So, these three drivers in order to proceed with the soil investigation.

Speaker 2: So, that's already had been the case for 43.000, nearly 44.000 sites in our region to now. Because when we did it, what was the expectation that it came into force in '96, and we had also contact with the real estate companies and businesses, and they said, commercial real estate is transferred, with an average of 20 years. So, when an industrial site or a commercial site is 20 years, its normally sold, or transferred to another landowner. If you're talking about private property, the average is 40 years. So, people like you or me mostly have 40 years their own property before they sell it. And that's also the reason that we said, all sites from those 85.000 should be first time investigated before 2036, because that's 40 years after the law came into force. That means that even if it's not closed down on a periodic basis, we expect that that land will be sold within a period of 40 years. And then we have a soil investigation. So, according to the figures that we have now, more than half of those sites are already investigated. So, we are still, let's say, on schedule to reach our goal in 2036. But I also have to say, and that's a bit to the discussion I had with new colleagues. That we should also take into consideration that the high-risk activities like oil refineries, steel industry, big automotive companies, they have already been investigated. So, what is coming now are mostly small businesses, or a place where you had formally dry-cleaners or a small garage to repair the cars.

Speaker 2: So, the smaller facilities, the big facilities, landfills, for example, about half of the landfills are already, actually more than half of all of the landfills are already

investigated and if needed remediate. So, let's say, what is coming now or more the smaller problems, and also the brownfields, because we still have brownfield facilities or sites, which were never, or nearly never investigated. And if they weren't investigated where cleanup actions didn't start up, because people didn't know how to handle the problem, it's quite often a problem. If you have a brownfield site, small one, redeveloping a brownfield, there's not always a, let's say, expertise. It's what we also saw that bringing a group of experts together to redevelop a brownfield site is maybe the best option to do. Don't try it yourself, because quite often you'll pay much more, or you will have a result, which is not a sustainable result.

Speaker 1: So, is there some sort of a financing mechanism where there is some support from the government to redevelop these sites?

Speaker 2: Yup. Um, if you're working under the law of the brownfield covenant, that means that we are making an agreement to redevelop your site. According to the proposal that you have introduced, which was also approved, then you get some financial support. There is a legislation in Belgium, in Flanders when you're buying your land, you have to pay an average of 10% on the price of the selling price as tax. So, you would have to, for example, you or buy a property for 1 million, okay, you have to pay 100,000, euro taxes because of that transfer that you are realizing. If you have a brownfield covenant, you don't have to pay it. What was then the rationale behind that? The reason is that quite a lot of redevelopment costs of a brownfield sites are at the beginning, you have to demolish the buildings. You have to clean up the sites, you have to bring on infrastructure. And so it's a, quite a lot of costs, which you don't have it on a greenfields. Its green, just puts what you want on it. Although, I have to say, even on a greenfield, you have additional costs, which are not always taken into account. You have to bring everything over there, while with an old brownfield site, quite a lot of the things are already close or in place. I think of electricity, gas, road infrastructure, as I said, not always in the right condition, but it's always close. But you have to demolish old buildings. If you have asbestos, you have to clean it. If you have waste, you have to remove it. Soil contamination, you have to clean it up. So quite a lot of upfront costs.

Speaker 2: So that's the reason why we say you don't have to pay that tax, use that money to clean up the site. There is also a specific funds for local businesses. And also that's money can be used. You can get grants in order to do the demolishing of a site, but that's

also specific. If you have to do a cleanup, a soil clean up, you have to give OVAM a financial guarantee that you will also do the cleanup. If you have a Brownfield covenant, you don't have to put that guarantee. We say, okay, the fact that you have brownfield covenant an agreement with the Belgian Flemish government, that will do for us. So that's also one of the aspects. You have to do it in the beginning of your project, giving that guarantee. It's not really expensive, but it's already always influencing your business case.

Speaker 2: You have it in your account. I think from a financial aspect is not interesting that you have a guarantee it's also, affording that you have, financial means available for other things which are much more important for us. So, there are limited grants and initiatives, which you could use, if you have a brownfield covenant. There is also an exception to remediate the site, but that's not always the case on brownfield site, but so sometimes it happens. That is when you can prove that you didn't cause the pollution. For example, you buy an industrial site for an industrial site. You didn't cause a pollution which was caused in the 60s or the 50s, but another element is you also have to prove that you have bought it before '93. And you couldn't be aware of the fact that the soil was polluted. In those cases, we call you an 'innocent landowner'. In those cases, the remedial costs are paid by the Flemish government. So, we take care of the remediation. That's sometimes happening but for professionals, it's not always easy to prove that they weren't aware of the fact that the site was contaminated, but it happens sometimes.

Speaker 1: Yes, I think, that's also the issue with the way that it's organized in Austria that the liability can be transferred with the area. So, if the new buyer takes the site and isn't necessarily aware of the contamination and something happens afterwards, they are liable for anything that happens with the contamination. So, if for some reason previous owners can't be found, or who used to own it, or who caused the contamination, then the new owner is then liable, which then of course, doesn't really help people wanting to take over these sites and redevelop them.

Speaker 2: That's quite the similar problem they have in the United States. They also have what they call a 'potential responsible party'. It's a bit the same, somebody has bought a block of industrial land, and after there seems to be a problem. The form landowner is bankrupt, or doesn't exist anymore, he has to do everything. And that 'potential responsible party' issue, it was also a problem to redevelop brownfield sites, because people didn't want to get involved, because of the fact that we are liable for nearly

everything. That's limited in Flanders, liability, you have the duty to remediate and the liability that's a, we made this distinction. Liability is it's a court who has to decide. The duty is the fact that you're a landowner or the operator; at first, it's the operator and if the operated is no longer active it's the landowner. And if the landowner can say 'I didn't cause it, so I'm not the responsible party', it's an 'innocent landowner'. That's one of the elements. And also, we have a specific, that's not in the legislation, but it's an agreement. If you have a bankruptcy and a remedial cost is much higher than the value of the land OVAM will buy the land for one symbolic euro. It will take all the financial burdens for us in order to get it on the market, because what's the alternative? In those cases, you can go to court for many years, and you will see a simple euro. So, you are staying before court for 10 years and nothing is happening. So, now you are directly closing down all the discussions. Okay, we give you one euro, you give us the land and we take care of the soil contamination.

Speaker 2: We remediate it completely or and sometimes that will do, from the moment you have demolished all the buildings, put away all the waste and have a good view of the quality of the site, and that's also important, then the uncertainty of the remedial costs is very low and that is one of the aspects that, if redevelopers have a high uncertainty of the remedial costs, they are not willing to start up a redevelopment program. Because, if the value of the land is 1 million euro and you think your remedial cost is 900,000 euro is okay, you get a profit of 100,000 euros. But if you have a high uncertainty and it becomes 2 million euros you have a higher loss, and that what people don't want. In quite difficult bankruptcy cases we can reduce that gap by doing some more soil investigation in order to reduce the uncertainty of remedial costs. So, that's also a kind of helping redevelopers to reducing their risks and start redevelopment programs.

Speaker 2: There is one thing I forgot, it's also, as I mentioned you have, let's say, three types of brownfields, the former coalmine sites, the harbor areas and then the brownfield sites, the smaller ones, often close to the historic city centers. In the last cases, quite often the new land use will no longer be an industrial use. But there's also a law if you're changing your land use from industry to living areas, we get more money. I don't know how it is in Graz or in Vienna, but in Belgium, if you have industrial lands, quite often, you can sell the property prices, let's say, are between 10 to 50% of industrial land is lower. So, if you're selling industrial land, in Flanders, you get between 50 and 100 euros,

if you're selling a property for a housing, you get between 200 and 500 euros per square meter. And in those cases, you have to pay a certain tax, also because of the fact that you're upgrading law, on your land and getting more profit. We take a part of the profit you're making.

Speaker 2: If you're developing a brownfield, you'll not have to pay that, with the same, let's say, philosophy behind it. Redeveloping, a brownfield site has a lot of upfront costs, because you have to prepare the land from industry to a living area. So, you have to remediate the soil in order to get people on that site without the healthcare risks. So, that costs money. So, you don't have to pay that. Let's say that profits tax, um, due to the fact that that's only when you have a brownfield covenant.

Speaker 1: Only if; so, if I have a project that has not been approved within the brownfield covenant act, and I want to change it to redevelop it into living area, I would have to pay.

Speaker 2: Yep. Well, unless it's already on the spatial planning maps, so that's also a condition. If it's already on spatial planning as a living area, that okays. But if you're asking to change the land use officially from industry to the living area, you have to pay it, if you don't have a brownfield covenant act. So that's one of the advantages.

Speaker 1: Okay. But I'm assuming that not the majority of the sites have support through the covenant act. I'm assuming it's the larger sites that really need support. Am I correct?

Speaker 2: Yes. That's one of the elements in the definition, the redevelopment should be complex. So, if it's just demolishing, excavating 100 cubic meter of a polluted soil and putting apartments on it, that's not a complex issue, but if you have a complex remediation, complex demolition, you have also to make new spatial plans in order to change the land use from industry to residential area. Well, that's a complex project and you get a brownfield covenant. If it's just demolishing and all the land use, restrictions are already in place, that's no problem.

Speaker 1: Okay. And I'm assuming those also don't get any financial support, those regular, already previously used sites?

Speaker 2: No, they don't. But we also think in those cases that the upfront costs to have your project realized are not that big. So, you have a commercial project without any help

of the government, which can be done. Because that's also one of the aspects. If you have a brownfield covenant, due to the fact that it has a high complexity, the Flemish government is also appointing, or giving you an official brownfield negotiator in order to look at the development, that you get all the support that you need, in those cases.

Speaker 1: So, then I have more of a personal question, maybe. So, since you started working in the field, um, what has been the biggest change that you've maybe noticed with brownfield redevelopment?

Speaker 2: Uh, for me the biggest change was in the, let's say the second part of the 90s. So, the first change was that people were walking away from brownfields, because they were afraid of what kind of pollution are there over here in this place. And what are the potential costs; so, they were not interested in those sites. And the big change was that due to the fact that we set up a brownfield program, that people get interested in that type of science, they say, okay, we can't afford any longer that those sites remain unaddressed. And they also invested in people to set up an integrated approach for redevelopment. So, it was no longer limited to soil experts. They bring in people, who were expensive, in spatial planning, biodiversity, energy mobility, you name it; the many groups of people and set up a redevelopment project. And that was a change compared with, let's say, the early 90s where people were walking away from those signs, or they were not interested, it was a bit the same experience they had in the United States.

Speaker 1: So, it was also realized from the governmental side that the pressure is here now, that these sites need to be used and that kind of pushed also the political and legal framework forward?

Speaker 2: Yes.

Speaker 1: What are some of the key issues that still need to be addressed or something that's, that's still not working, and it needs to change to maybe push this forward even more?

Speaker 2: Yeah. One of the aspects that we see quite often now is that, if you have larger brownfield project, is mobility. How, organizing your transport to and from the site that's quite often a problem. Our road system is completely overstressed. So, if you're bringing in new industrial activities on the sites, people are really concerned about again, new

trucks, more transport. And it's also one of the aspects I said in the beginning, if you have a policy, which is bringing industry and all the working places out of the areas where people are living, people should also take transportation to their working places. And quite often it's a car. So also, there we see a change, a lot of our brownfield sites, we are now also asking to keep in mind infrastructure for bikes, electrical bikes, so-called bike highways, and so on. We try to connect our brownfield sites with that kind of infrastructure also. So, that's something you would also refer to the waterways that we are also looking, how can we get more transport from and to cities via brownfield areas by waterways. So, transportation is really a hot issue at this moment.

Speaker 2: I'm always going to Austria for skiing. So, in the Alps, in your mountain area, that's really an exceptional issue. You have a limited number of roads, and also in a very short period, a lot of people going to the ski facilities. We have it nearly every day. So, people have to go to work every day, but I think that's more the situation you have in Graz, or that you have in Vienna. That you have a high density of population, who should enter the village each day. And that's really one of the discussions we have quite often. And also, sustainability. What are we doing, is it sustainable? So, we are talking about green energy, water reuse, waste management. Can we make brownfield part of the EU circular economy that you are developing? That's also one of the hot issues.

Speaker 1: So, in terms of European programs what is the leading or supporting document or mechanism in place for brownfields or is there even one?

Speaker 2: No. We have quite a lot of directives, we have the landfill directive, the waste directive. Problem with the landfill directive is that it's not aiming at the redevelopment of old landfills. The landfill directive is mentioned for current operational and landfills. How should you do it in a way that its environmentally safe? We have in Flanders a specific program now on how we can redevelop old landfills, but that's not in view of the landfill directive. You have also the ground [inaudible] directive, but there is no typical soil directive at the European level. They are discussing it at the moment again. So, they are discussing it for many years, but there is no specific soil directive, like you have the waste directive or water directive. So, there is still a gap on legislation. What we are using or looking at, at this moment is the new initiatives by European commission like the Green Deal and the Blue Deal. Can we also enter specifically redevelopment programs in that kind of deals for example, in Flanders, a lot of those brownfield sites or landfills are

situated in areas vulnerable to flooding. I also know in Vienna; the University of Vienna has also done an investigation. I think it was in 2007, also, and also, they found out that a lot of landfills in Austria are also vulnerable to flooding. I'm not familiar with the situation in Austria, but in Flanders, one of the problems that we are now facing is that we think it's due to climate change, but what we see the last 5 to 10 years is that we see a changing pattern in precipitation. We have smaller period of rain, so a period of drought is large, but when we have rain, we have quite a lot in a very, very short periods.

Speaker 2: And that's really problematic because that means that your whole sewer system, your irrigation system is overloaded. And you risk that landfills in flooding areas or brownfield sites might be flooded and that's waste material is also eroded and washed away into the river system. So, that's one of the reasons why we're also take into account to remediate old landfills in order to make them less vulnerable to flooding. And another element is that, due to the fact that we have large periods of no rain our ground water level is going down. So, we are depending a lot on groundwater for our drinking water production. So, we need more infiltration. So, the more landfills and the more contaminated sites that we have, the more places that we have, where infiltration is not an option. Because you can't infiltrate to a contaminated soil or a landfill. So, that's also one of the new aspects that we are thinking of. Can we reduce the area of contaminated soil or landfills in order to make more areas suitable for infiltrating a rainwater or surface water? So, climate change really is also happening in reality in our region. So, that's not a problem that's dramatic, but we should keep in mind that we have to reorganize things in a way that it's much more adapted to the climate change that is now happening.

Speaker 2: I saw a similar problem in the Alps in France, where they have also a high precipitation values in a short period, and also the rivers in the mountains have washed away former landfills, which are close to the board, but, you know, older times where not a lot of problems, so maybe they can also be a problem in Austria.

Speaker 1: So is, is the goal then to, to excavate these old landfills. So, to really remove the waste or just to secure it further?

Speaker 2: It will be both, but you can't excavate them all. According to our inventory, you have about more over 3000 landfills in Flanders. So, we can't excavate all those landfills. What you are doing is evaluating them. What's the risk? And also, what's the

content. If it's not, think, let's say, less than three meters, we can reconsider the excavation, processing the material. Uh, and if I have a high amount of bricks, and that's also why we have worked together with Fellner, in order to set up a decision, support system to find out what's the cost of removing the landfill. And that's also what his former assistant, David Laner, who is now professor at the University of Kassel. David had done the same exercise in Brandenburg. That's the area around Berlin, and also told me, last year in Bolognian. He told me that if you have a landfill between two- and four-meter thickness and you can convert the landfill into a residential area, then now you have quite often an economic valuable case. So, the cost of processing the material will be paid by the fact that you can redevelop it as a residential area. And the reason why you have the same expertise is that Berlin has also, let's say, a high population, increasing population. And they are also working outside the border of Berlin at this moment. And that's why our colleagues from Landesamt für Umwelt has also put a perimeter of 30 kilometers around Berlin. They detect then, all the landfills and in order to find out, will it be an option to process them and create new residential area, because they also have high land prices due to the pressure from Berlin. And that's a bit, a similar situation that we have in a lot of areas in Flanders, if you are close to Brussels or the area, in the center of Belgium, you have also an increase of population and there they are having a demand for land.

Speaker 2: So, if you can offer landfills or brownfield sites, and that's also an important element in the redevelopment of those signs. I think that's one of the problems. If you, for example, Denmark, I have a colleague from Copenhagen. And one of the problems they have is that Copenhagen is expanding, expanding quite a lot, but the rest of the Denmark is losing its inhabitants at a very high rate. He even told me that they have demolished small, community, cities, because nobody is nearly living there anymore. So, if you have brownfield sites over there, that's the problem due to the fact that the population is leaving the town, the prices are also lowering, and you don't get any value for the fact that you are redeveloping a site. So that's also a problem but I can imagine that's not the case in Austria, neither. I think you have also a constant population. And also, Vienna, if you know, it's expanding.

Speaker 1: It's definitely the case. And one interesting thing that I discussed with another expert was the fact of how much area has been designated as building area, but it's not actually built on. So, I think it's a 36% of the area that is designated for building is not

built on because people just keep it for future generations. To then use it later. And it's causing these cities or rural areas to become very patchy. So, because the city themselves doesn't have any influence over how the space they need is being used and it's causing this urban sprawl, because the people are hoarding land. So that was also very interesting aspect to talk about.

Speaker 2: Peter Cabus is an expert on that because he's dealing with that problem in Flanders. We also have designated land for a residential area, for industry, which has not used at this moment. And he is working on a planning system that from 2040, if it's not used by then, you can't use it anymore. But politically it's not easy, because you're, even it's in our constitution that when you have a property is a very important issue. So, it's not a, we're not expropriating people, but it's not, they're not very happy, if you're telling them, you can't, if you're not, if you haven't built on it yet, you can't build on it after 2040. Peter has much more information on that or is dealing much more with that. And that's also one of the reasons that we say we are in favor of that. If it's an open space, please don't let them build on it, so that brownfield is much more needed. And that was something I said in the year 2000, we had a new government, and I presented in '99, the brownfield program in Flanders. And I was in 2000, invited by the new minister for economy, and spatial planning. I was one of the first things I asked him, please, don't give all those, open space free for building or for the industry, because otherwise we can't get a rid of our brownfield sites. He said, okay, I will do it, but you have to give me, sites for industry, because that was his demand. We need industrial sites. So, we take the open green space for it, unless that you can give us brownfields that we can use for redevelopment. So, it was a very good deal.

Speaker 1: It's definitely a very interesting and very complex topic. So, I was definitely not aware of this before I started my research.

Speaker 2: And I have to admit that I'm not really optimistic about it also because we have now the COVID crisis. What's quite a lot of governments. I think it's the same in Austria, but also in Flanders, a lot of governmental agencies, or departments are now investing money into the economy. So, like the famous economist from England, John Maynard Keynes, invests as a government when an economy is low, then you have to make debts as a government in order to invest in the economy. That's the main policy of John Maynard Keynes. And that's what we are doing now. But also, that means that, or

government is making debts that they have to pay it back one time. And also, and then I'm not familiar with Austria, but our government has also quite a lot of properties, lands. So, I'm a bit afraid that they will sell lands with the highest possible value in order to pay off their debts. And we have not talking about 10 or 100 ha, it's quite a lot of, property lands that they have. So, I hope they will not sell it for industry or residential area on a large scale, because that will really influence our open green space.

Speaker 1: Have you realized any other ways in which the COVID crisis has in some form influenced or impacted brownfield redevelopment or recycling these areas?

Speaker 2: Uh, yes, in a way, because, due to the fact that people couldn't get on holiday abroad they have to recreate in their own city. And what we saw is that quite a lot of old landfills or old brownfield sites were becoming of interest due to the fact that you have green open space. Especially quite a lot of former landfills are now covered with trees and shrubs, and so on. People could go for a walk in it. Also, brownfield sites. We have brownfields, which are also partly redeveloped as a park area or for recreational purposes. Also, people are now asking to have gardens. So those that buy their own apartment, but they don't have a garden, they ask can the government provide us with gardens in this area in order that we can get outside and have our own vegetables. So, yeah, and that's why we also, we had a former brownfield where we did it as an interim use. That we created artificial gardens and people could grow their own vegetable in the middle of the city of Ghent.

Speaker 1: So, are you saying that more appreciation for greenfields has actually developed because of COVID?

Speaker 2: Yes. And also, how to incorporate brownfields in the living areas where we are now limited to get abroad. So, we should stay in our own city. Can we get over there to a park? Can we go for a walk? Can we grow our own vegetables? And our view on that if we can use brownfield sites for that purpose it would be a very good thing. Also, the aspect of what they call in the United States, 'walkable cities', that's the city that is not only with high lanes like you have in New York with eight streets and eight avenues, and the many streets that you also have small little ways between a city where you can go for a walk and that you connect your, for example, your station with a lot of other stores, that you can go for by walking. Concept of a walkable city is something that we also see much

more last year than before the COVID crisis. People were much more, not that much aware of the fact that we should stay in a little place. In Flanders, I think it was 1 kilometer. In our region it was a bit more, but we should stay in a small area around to where we were living. And also, I did, I went quite a lot of, I did a lot of walking, with my bicycle, so that's what we also see that people are now asking, give us more space for bicycle lanes. And so, so that's really a change.

Speaker 1: Yes, that's definitely a very important aspect. City planning is a big issue on how to make these cities livable and also green, that's definitely something we've also experienced.

Speaker 2: And that's why, from my perspective, it's very important that if you, what you mentioned, the city planning, it's really essential. And we as experts on soil radiation for too many years have said, uh, the main issue is soil contamination. No, we should more be thinking, how should we remediate it or what is the real risk compared to the other demands that we have in that area? And city planning is much more important to take into consideration what does the city want? And then you have to remit it if you have that. But that's also one of the aspects I'm not in favor of the current landfill directive that we've introduced two years ago, a change and amendment, but it was not approved unfortunately, but currently the landfill directive is much too much going in a sense that if you have a landfill site, stay away, stay away from it forever. And that's not the way we are looking at, we have a dynamic environment. So, a landfill should be part of that dynamic environment. So, you can't make a static area from it where there is a no-go zone, that's not an option. That's the same with brownfield sites. Don't make no go zones.

Speaker 1: I think an interesting project that the Germans are doing, is that they are putting solar panels on old landfills. Because, of course, the solar panels also need space and, and that's becoming an issue if these take greenfields instead of these landfills. But unfortunately, I was talking to someone from the BALSA and this was not approved in Austria to use the PVs as covers on landfill sites because it's not a permanent cover. So, the idea was to seal the landfill with these solar panels, but this is not considered appropriate sealing. So, you would have to invest twice. You'd have to seal it and then put the photovoltaic on top.

Speaker 2: We have solar panels on old landfills, but also sealed landfills. And if you put them on old landfills, we are not asking to seal them. And we take into consideration what is the impact of the old landfill and our experience that's, not only in Flanders, but also in the Netherlands that if you have old landfills, more than 90% of these old landfills are not posing a problem. There is still waste inside. But the impact of that waste is very limited. So, we also have quite a lot of solar panels on those sites because if you don't do it on those sites, what you're doing, you're putting it on sites where agriculture also an option. And that's not what we prefer. So, we don't like to put solar panels in a valuable agricultural land.

Speaker 2: We also have now a program where we are looking for old landfills where we can do forestry on it because, our minister of our environment has said, 'I want 4,000 hectares of new forests by the end of 2024'. And we said, 'okay, we will look on the old landfills and see what we can do'. And that's a bit also the new vision that we have on old landfill. What are the demands? 'I want green energy. You want more forests? You want more industry, okay, we'll check out what we can do'. So, we have landfills directed to a new industry or landfills, which are transferred to residential areas where we have solar panels, where we have a nature conservation, you name it. The only thing that we don't want is an old landfill where you put barbed wire around and there is no access to it. That's what we are trying to limit that as much as possible. If you have industrial and chemical hazardous, landfills okay, that's not an option, but that's really a minority. Most of the landfills are containing municipal solid waste, construction and demolition material. And most of our landfills are rather small and are dating from before the 80s so more than 40 years over, they're not often posing a problem.

Speaker 2: I mean, we are currently working on a publication, on a report or the results of the brownfield covenant act. There are also figures on it. How many are there, I'm going to check out, if I can provide you the figures or limited number of the figures, because the first thing we have to do is to present it to our government, but if you use it in a limited way, I think I can provide you some information.

Speaker 1: That would be very great. Any, any numbers or anything that I could get, that would be perfect. I have noticed also in Austria; a lot of the figures are based on estimations. So, there's no fixed data.

Speaker 2: Yeah, that's a problem. As I mentioned, the number of sites where in the past activities, which we are considering as a risk to soil pollution, that's also an estimation that's 84,000 of 85,000. Although, I have to admit that due to getting more and more effects, it could be a reality. But what's really, hard facts is that we have our soil database at OVUM. And all the information is digitally stored in it, so that's really, those are reports are made by what we call an accredited soil remediation expert. And when that report is approved, then uploaded, these are really, there is no discussion on the facts in it. There are specific standards for analysis, for drillings, for reporting. So that all really, there are no estimations, say that's the soil condition okay, those are all hard facts. But quite often the problem is, if you try to do some policy preparation and you try to evaluate changes also quite often, you have only estimations. Problem is with politicians. They don't always consider something as an estimation, they think it's a hard fact.

Speaker 1: So, earlier you mentioned there are three types of brownfields (coal mine area, harbor area and former industrial sites around the cities) you have classified. Is this somehow documented in a legal document or an official classification?

Speaker 2: No, there is no legal document. I've mentioned it in presentations already. I try to send you a map. We have a map where you see the investigated sites in Flanders. And also, a map with sites where you have a brownfield covenant. As I mentioned, brownfield covenant is only a minority, it's only about 200 site proposals, but what you always see, you're not familiar with Flanders, but I will indicate it, that is that it's always linked with cities and industrial areas like harbors or coal mine areas. So, if you go to the outskirts, or to the areas where we have a lot of agricultural lands, you don't have brownfields. And that's also a bit, the point that quite a lot of people think that at OVAM, we are making soil maps of Flanders, that's not the case, a soil map or a geological map gives you for each point in your region the characteristics. What we have is we have, let's say some municipalities, whenever we have nearly no data, because there are no industrial activities. If you have a soil map, you've had to dig it up from everywhere in Flanders. So that's a bit of difference. You will see that you have a high density of data around the harbor areas around the cities, especially the larger cities. That's just due to the fact that you have industry over there. And also, if you look and I think I have a map where also the highways are indicated, highways and large canals, and then you will also see along those canals and highways, you have a lot of points indicating contaminated sites. That's

also one of the reasons a lot of industry is located along the highway or along the canal. So, there is a strong linkage between the infrastructure and the fact that you have industry. You don't have in the Alps, in the regions where you have skiing, in Vorarlberg or Tyrol. I don't think they have that much industry over there, neither. So, it's more limited to the area like Vienna, I think.

Speaker 1: Yes, the issue is that they definitely, because of the Alps, they have a limited space that they could even use for building. So, these brownfields don't really develop, or aren't really an issue there, because they get reused quite quickly compared to the east, which has, you know, bigger open spaces for people to use.

Speaker 2: Yeah, no, that's right. I also, I'm teaching at the summer school of Texas University and those professors also told me that in Texas, we can afford to lose one square kilometer of land. It's in the middle of nowhere. In Belgium, in the middle of nowhere, that means that within an area of 100 meters no one is living. In Texas, they have 10 kilometers where nobody is living. So, that's a completely different situation.

Speaker 1: Yeah. So, really that pressure just has to be there for it to be something that's even considered. Unfortunately, as with many things.

Speaker 2: That’s a good driver, you have policy, you have legislation and quite often the reality is also a good driver.

A.3. Interview DI Martha Wepner-Banko 27.04.2021

Interview DI Martha Wepner-Banko 27.04.2021

Speaker 1: [cut]

Speaker 2: Fein, dass sich jemand auch noch irgendwie auf den Universitäten für das Thema interessiert, das finden wir alle sehr spannend und wollen das natürlich gerne unterstützen. Ich meine, ich habe mir gedacht, ich weiß es nicht. Haben Sie konkrete Fragen? Oder sonst hätte ich mir gedacht, ich fange mal an, was wir haben oder was wir für Unterlagen und Materialien haben. Und ja und stell das mal vor. Und was wir momentan machen oder was einstweilen ruht und wie wir weiter tun wollen, auch im europäischen Bereich.

Speaker 1: Ja also das wäre perfekt. Ich bin mir sicher, dass ich im Laufe des Gesprächs meine Fragen einbauen kann.

Speaker 2: Also ich habe mal gedacht, ich fange ganz hinten an oder so mit unserer Brachflächenstudie aus dem Jahr 2004. Die kennen Sie wahrscheinlich. Die habe ich jetzt noch gar nicht vorbereitet. Die ist eh zum Download auch im Internet. Und genau also auf dem, auf der Grundlage haben wir eigentlich begonnen irgendwie uns Gedanken zu machen. Denn das war ja doch irgendwie die Basis, wo wir geschaut haben. Ist das Thema überhaupt relevant in Österreich oder so? Oder ist es eh eigentlich null und wichtig, dass irgendwelche Teile kontaminiert oder wenig kontaminiert, oder noch stärker kontaminierte Flächen nachnutzen kann? Und dann haben wir eben aus dieser Studie gesehen: Ja, es ist da wirklich ein Thema und es kann ein Teil, quasi die Neu-Bebauungen, kann durch Flächen-Recycling minimiert werden. Und es ist wirklich relevant und weiter zu verfolgen wert. Ich weiß nicht, ob Sie den Österreichischen Verein für Altlasten Management kennen. Kurz ÖVA.

Speaker 1: Nein der sagt mir jetzt noch nichts.

Speaker 2: [cut]. Also das ist quasi so ein unverbindlicher Verein, wo man Mitglied werden kann. Das können Ingenieurbüros, aber auch Dienststellen und so weiter können

dann Mitglied werden. Wo es verschiedene Veranstaltungen gibt, die verschiedene Publikationen schon erstellt wurden, Leitfäden und so weiter. Verschiedene Workshops gibt es immer wieder. Die sind jetzt halt mit Corona ein bisschen ad acta gelegt worden, aber sonst im Durchschnitt zwei pro Jahr. Und es gibt auch unterschiedliche Arbeitskreise. Ein Arbeitskreis davon ist beschäftigt sich mit Flächen-Recycling. Momentan ruht der leider auch ein bisschen, aber er so nachdem diese Studie eben 2004 veröffentlicht wurde, ist der ein bisschen aktiver gewesen, dieser Verein. Das waren von den Landesregierungen teilweise bei dem Arbeitskreis Leute dabei, Immobilien und Ingenieurbüros waren tätig in diesem Arbeitskreis. Und eigentlich es gab dann auch einige Veranstaltungen zum Thema „Bauen auf kontaminierten Liegenschaften“. Die haben wir so bundesländerweise eigentlich organisiert, sagen wir mal Ost-Österreich, dann irgendwie, in Salzburg war dann eine Veranstaltung, damit man eben möglichst viele Leute auch aus den Regionen irgendwie an einen Tisch bringt und das Thema behandelt. [cut]

Speaker 2: [cut] Und 2011 ist dann die nächste Broschüre rausgekommen, "Grund genug", ist Ihnen das ein Begriff? Das war mehr zum Thema Flächen-Management in Österreich. Was für Maßnahmen ergriffen werden können und so. Es gab da fünf Arbeitsgruppen, die haben 2009 und 2010 getagt und das ist mehr oder weniger die Zusammenfassung, was da rausgekommen ist. Bodenressourcen schützen, Flächeninanspruchnahme, solche Sachen. [cut].

Speaker 1: Und die nächste Broschüre aus dem Jahr 2012, da geht's mehr um Innenentwicklung an sechs Beispielen, an sechs Ortschaften, kompakte Siedlungen, Klimaschutz für Generationen. Und im Jahr 2015 gab es ein Seminar, „Kontaminierte Liegenschaften verwerten und entwickeln". Das war auf der Kommunalkredit, diese Veranstaltung, gemeinsam mit Umweltbundesamt, mit dem Ministerium und mit diesem Österreichische Verein für Altlasten Management. Immobilienwirtschaft war auch dabei und das ist mehr oder weniger aber halt dieses Seminar. Das ist eigentlich das, was wir in letzter Zeit so gemacht haben. Ich meine, haben Sie schon mit meiner Kollegin Sabine Rabl-Berger gesprochen?

Speaker 1: Nein, wir haben noch nicht gesprochen.

Speaker 2: Ja, die hat die ganz aktuellen Dinge, aber die machen jetzt das, Studien auch und so weiter. [cut]. So, das war jetzt mal von österreichischer Seite, was mir auf die Schnelle so eingefallen ist. Und international gab es da ein Netzwerk, das war so Anfang der 2000er Jahre. Die haben sich damals schon mit „Brownfields and redevelopment of Urban Areas“ beschäftigt. Das war also ein EU-Netzwerk aus dem Jahr 2003 gibt es hier einen Report. Das CLARINET.

Speaker 2: Und ja und wir sind ja auch im Common Forum tätig. Das ist auch so ein Netzwerk. Ein europäisches Netzwerk, das sich eben mit - eigentlich mit kontaminierten Standorten und im weiteren Sinne auch mit „Sustainable Land Management“ beschäftigt und zusammen mit dem Netzwerk NIKOL. Das ist das Netzwerk von der Industrie, das sich auch mit kontaminierten Standorten und Sustainable Land Management beschäftigt, haben wir, 2018 war das glaube ich, auch eine Broschüre herausgebracht. "Land stewardship" nennt sich die. Das geht dann schon einen Schritt weiter, weiter hinaus über Sustainable Land Management, das bezieht jetzt auch ökologische und soziologische Aspekte mit ein in die Nachnutzung von Standorten. Also das geht dann ein bisschen weiter. Und NIKOL, die haben eben auch dann so ein digitales Tool entwickelt, wo sie Leuten, die Industriestandort nachnutzen wollen, die Möglichkeit geben, eben alle Aspekte bei der Nachnutzung mit einzubeziehen. Also da kann man im Internet so was ausfüllen und das ist ja ganz nett, oder das sich anschauen.

Speaker 2: [cut]

Speaker 2: Und ich meine, wo wir jetzt da eigentlich auch irgendwie dahinter sind. Es soll ja in Beziehung auf den europäischen Green Deal gibt's ja einige Bewegungen. Ja, einerseits betrifft das die Kreislaufwirtschaft, sustainable built environment, wo auch die Bodenversiegelung, Kontamination und so weiter Thema ist. Da sind wir eigentlich auch irgendwie involviert. Und dann der "Zero pollution action plan". Da gibt's immer wieder öffentliche Konsultationen und Stakeholder Workshops, wo wir auch das Thema natürlich kontaminierte Flächen, aber auch Brachflächenrecycling immer wieder rein pushen und das auch dort enthalten ist. Auf der anderen Seite eben die "Biodiversität Strategie", wird ja erneuert. Ja und da gibt's auch jetzt Gott sei Dank Schwerpunkte in Richtung Nachnutzung von kontaminierten Flächen. Und das wird eben jetzt gerade

erneuert, Veröffentlichung, soll jetzt im zweiten Quartal passieren. Öffentliche Konsultation ist bis 27. 4 gewesen. Und das andere ist, das könnte für Sie vielleicht auch interessant sein, da kann ich Ihnen einen Link schicken. Vom Europäischen Mission Board „For Soil and Health“ wurde ein abschließender Bericht veröffentlicht, der heißt „Caring for Soil is Caring for Life“. Und da steht auch was von kontaminierten Standorten und einer Nachnutzung drinnen. Er hat zum Beispiel “Doubling of the rate of the restoration of polluted sites”. Also da kann ich Ihnen auch den Link schicken. Das ist auch recht interessant, dass die Europäische Kommission dann in die Richtung pushed, dass womöglich tatsächlich eine Bodenstrategie, eine europaweite, herauskommen wird. Das geht fast ein bisschen in diese Richtung. Und ja, genau das, was glaub ich so ziemlich, was wir da momentan auch im international, also dem europäischen Bereich machen, genau wo wir halt momentan irgendwie beschäftigt sind und in Arbeitsgruppen eben Vorschläge erarbeiten und die Inputs ins Internet stellen und so weiter.

Speaker 2: [cut: Thema CABERNET]

Speaker 2: Ja, ich meine, wir sind da ein bisschen im Zwiespalt, weil bei uns, bis eine Fläche wirklich zur Altlast wird, die muss dann schon wirklich kontaminiert sein. Und die anderen Flächen um die kümmern wir uns jetzt als Abteilung Altlasten eigentlich nicht. Das geht dann zu den Landesregierungen oder BHs und so weiteren, und ins Wasserrechtsgesetz. Und da gibt es natürlich tatsächlich dann keine Förderungen mehr und deswegen sind wir dabei auch diese Flächen, irgendwie nicht im „Dornröschenschlaf“ versinken zu lassen, sondern diese Flächen dann ein bisschen, dass die einen Anreiz bekommen oder einen Push bekommen und dass man auch weniger kontaminierte Flächen oder vielleicht doch kaum kontaminierte Flächen wieder in den Wirtschaftskreislauf zurückführen kann. Und da versuchen wir, das ist eine andere Schiene zu finden. Weil die ja wirklich stiefmütterlich behandelt werden. Und noch schlimmer ist es, oder weiß ich nicht mit solchen Flächen, die gar nicht kontaminiert sind, das wäre auch noch interessant, warum die irgendwie, auch da nichts weitergeht, wo es offensichtlich ist. Also das würde ich schon noch interessant finden, wenn es offensichtlich ist, dass da keine Kontamination ist. Warum passiert mit diesen Flächen nichts?

Speaker 1: Also ja, ich weiß nicht, vielleicht weil es nicht schwierig ist, wenn sie in einem

guten Zustand sind, dass man da einfach das oben abträgt, und dann was Neues hinbaut. Aber es ist trotzdem mit Hürden verbunden.

Speaker 2: Genau. Ja, trotzdem sind Hürden gegeben. Wenn da irgendwelche Ruinen auf diesem Standort sich befinden, oder so ist es natürlich auch, muss man die erst entsorgen einmal, entsprechend abtragen.

Speaker 1: Ja, weil ich glaube, Sie haben das auch in dem 2004 Bericht angeführt, dass der Anfall an neuen Brachflächen, wenn ich das richtig verstanden hab, auf zirka 1.100 ha geschätzt werden.

Speaker 2: Ja, dass die neu dazukommen.

Speaker 1: Und Ich glaube, da drinnen steht dann, dass 85%, haben Sie geschrieben, die eigentlich nicht kontaminiert sind.

Speaker 2: Genau, also geschätzt wird.

Speaker 1: Und nur wirklich ein ganz kleiner Teil davon ist wirklich stark kontaminiert.

Speaker 2: Ja, also in unserem Sinne kontaminiert. Eben und es soll ja jetzt ein neues Altlastensanierungsgesetz rauskommen, wo auf diese Flächen dann auch ein bisschen Rücksicht genommen wird, die dann ein bisschen einen Anschub oder eine Förderung bekommen könnten, ja, aber nachdem sich in den letzten Jahren immer wieder die Regierungen nach ein paar Jahren aufgelöst haben, jetzt liegt das Gesetz noch immer und jetzt ist natürlich Corona dazugekommen, jetzt ist das überhaupt keine Priorität momentan, dass da dieses neue Gesetz rauskommt. Auf das warten wir eigentlich schon sehnsüchtig, ja, das wird sicher auch wieder eine Anschub-Förderung für solche Flächen.

Speaker 1: Also im Moment ist der Stand, von dem Altlastensanierungsgesetz, aus dem Jahr 2019? Und da wartet man jetzt auf das Neue oder wie ist da die Lage?

Speaker 2: Ja, das ist schon wieder älter, aber man wartet auf jeden Fall, also für diese Flächen wartet man jetzt aufs Neue, genau für diese Flächen, die dann nicht mehr, nicht

als Altlast irgendwie ausgewiesen werden und trotzdem vielleicht eine leichte oder trotzdem eine gewisse Kontamination aufweisen. Da gibt's momentan eben aus fördertechnischer Sicht keine Mittel oder keine Anschübe, oder Anreize. Und das ist das, auf das wir hoffen, aber schon irgendwie ein paar Jahre hoffen! Und es ist sehr schwierig und dazwischen was zu tun. Ich meine, das wird dann vielleicht die Kollegen sagen, in Oberösterreich soll jetzt auch etwas Neues ins Leben gerufen werden. Und zwar ein Ombudsmann mehr oder weniger soll den Anspruch stellen, genau für solche Flächen, das ist jetzt irgendwie gerade Thema in Oberösterreich, die sind da auch recht dahinter. Da müssten wir vielleicht dranbleiben. Also das ist jetzt im Aufbau, am Werden. Also das weiß ich nicht, wie lange das dort noch dauert. Auf jeden Fall, ja, das wäre irgendwie auch vielleicht ganz interessant, aber eben, nachdem das ja teilweise so in Hand der Länder liegt oder der Gemeinden sogar, ja. Ist es natürlich auch für uns da als obergeordnete Stelle da schwierig, irgendwie auch mitzumischen oder etwas zu initiieren.

Speaker 1: Also die ganzen Daten oder diese Flächen werden auf Gemeinde oder Landesebene gesammelt, ist das richtig? Und Sie bekommen dann die Daten?

Speaker 2: Genau. Wir beurteilen dann die gesammelten Informationen und machen eine sogenannte Erstabschätzung. Und anhand dieser ersten Abschätzung werden diese Flächen dann ausgesiebt. Bei einem Teil sehen wir dann schon von vornherein anhand der Informationen die wir haben, dass da eine Untersuchung nicht notwendig ist, also das eine Gefahr besteht nicht gegeben ist. Zum Beispiel eine Werkstatt oder eine Kfz-Werkstatt zum Beispiel oder eine Tischlerei, ja, anhand der Größe des Betriebes oder der Betriebsdauer, können wir schon ungefähr abschätzen, da ist jetzt keine Gefahr in Verzug. Diese Fläche schauen wir uns nicht näher an und die Flächen, die dann übrigbleiben, die kommen in Untersuchungsprogramme und da werden eben über Grundwasser, Boden, Luft und Untergrund Erkundungen durchgeführt und wir schauen uns an, gibt’s da wirklich eine Gefahr in Verzug oder nicht? Und je nach den Ergebnissen, die wir dann beurteilen, wird diese Fläche eben eine Altlast oder nicht. Da geht der Schadstoffgehalt, die Schadstoffausbreitung ein und z.B. die Schutzgüter, eben Wasser, meistens ist das Grundwasser, Boden, Luft. Genau. Und das beurteilen wir dann eben entsprechend. Und wenn sie eben eine Altlast ist, besteht die Möglichkeit von Förderungen, diese Altlast zu sanieren oder zu sichern. Und wenn sie eben nicht in dieses Regime reinkommt, ja dann geht wieder der Ball wieder zurück an den Liegenschaftseigentümer oder Verursacher

und an die Wasserrechtbehörde in vielen Fällen, und die müssen dann aktiv werden. Da sind wir dann quasi nicht mehr involviert.

Speaker 2: Ja, aber mir ist jetzt noch etwas eingefallen. Da ist veröffentlicht worden eine Studie, die wir vor zwei, drei Jahren durchgeführt haben. Da haben wir dann eben in der Österreichischen Gemeindezeitung einen kleinen Artikel veröffentlicht, der aber auch unter anderem eine Zusammenfassung ist, natürlich der Vorerhebungen, 2004 und so weiter. Aber da fließen auch diese Ergebnisse ein von der Studie damals. Und nachdem das veröffentlicht wurde, kann ich Ihnen gern auch einen Link schicken. Nur um zu zeigen, also die Gemeinden interessieren sich schon auch dafür, also es ist schon noch Thema und wir haben eben in der Gemeinde Zeitung, durch diesen Artikel, wollten wir irgendwie das Thema auch wieder ein bisschen in den Vordergrund heben. Ja, also das kann ich Ihnen gerne auch schicken.

Speaker 2: Das Problem ist: Wir haben eben eine Datenbank mit diesen erfassten Standorten, die uns von den Landesregierungen gemeldet worden sind. Nur teilweise waren die Erhebungen, sind die Erhebungen schon Jahre her. Die aktuelle Nutzung ist nicht mehr am Stand, ja, am letzten Stand. Und jetzt sind wir irgendwie auch dabei da, irgendwie das zu aktualisieren über ein gewisses Tool. Also das versuchen wir jetzt auch irgendwie grad herauszufinden, was da über Satellitendaten und so, möglich wäre. Also das wird dann aber vielleicht die Frau Sabine Rabl-Berger dann genauer erklären, denn sie ist da involviert jetzt in diese Studie. Und eine Vorstudie zu dieser aktuellen Studie, diese, die Ergebnisse sind eben in dieser Gemeindezeitung, in dem Artikel veröffentlicht, die andere Studie ist nämlich nicht veröffentlicht, die eigentliche Studie ist nicht veröffentlicht worden, sondern da sind eben nur Auszüge dann drinnen von diesen Vorerhebungen.

Speaker 1: Ist das dieser Bericht zu dem Verdachtsflächenkataster, oder ist das was anderes?

Speaker 2: Naja, es ist so: Die Länder geben uns die Informationen über potenzielle Standorte, und die sind aber dann in unserer, in unserer Datenbank als erfasst oder gemeldet drinnen und wir schauen uns diese Flächen dann einmal an und teilweise können wir dann natürlich schon erkennen das es ein Problem gibt oder es gibt teilweise auch

schon Informationen zu Untersuchungen dazu, also dass da wirklich ein Verdacht ist, dass Kontaminationen vorliegen. Und die können wir dann auch gleich als Verdachtsfläche ausweisen, ja. Teilweise passiert das erst, nachdem wir das untersucht haben, je nachdem oder während wir was untersuchen, wird das als Verdachtsfläche ausgewiesen und diese sind dann öffentlich zugänglich. Die gemeldeten und erfassten Flächen, die wir noch nicht angeschaut haben, die sind nicht öffentlich zugänglich. Die haben wir nur in unserer internen Datenbank. Das sind dann eben diese ungefähr 70.000 und von denen sind dann nur ein Bruchteil Verdachtsflächen und noch weniger Altlasten. Und nur diese Altlasten und Verdachtsflächen sind öffentlich zugänglich, also einsehbar. Da kann man eben über die Grundstücksnummer abfragen, ob diese Parzelle als Verdachtsfläche oder Altlast ausgewiesen ist. Das ist öffentlich möglich. Die anderen Flächen da gibt es eben [internet connection problem][cut].

Speaker 2: Da gibt es den Bericht, der heißt „Verdachtsflächenkataster und Altlastenatlas“ mit dem jeweiligen Stand. Also es war jetzt von 2012, aber nachdem wir das jetzt nicht mehr in Papierform drucken. Da gibt es dann einen Überblick auf der ersten Seite wie viele registriert sind. Wie viele Verdachtsflächen im jeweiligen Jahr vorhanden sind. Wie viele untersucht worden sind. Wie viele Altlasten, wie viele neue dazu gekommen sind, wie viele saniert worden sind, oder gesichert ausgewiesene worden sind. Das erfasst halt keine Brachflächen.

Speaker 1: Und wäre es möglich, dass man von diesen Flächen zurück rechnet. Man hat diese 70.000 Altstandorte und nur so viele werden Altlasten. Dass die anderen, die dann übrigbleiben, dann Brachflächen werden?

Speaker 2: Nein. Im 2004-Bericht haben wird dann eh versucht, das heraus zu rechnen, aber ich mein von diesen Flächen, die da in unserer Datenbank vorhanden sind, sind ja viele in Betrieb. Viele KFZ-Werkstätten sind ja noch in Betrieb. Also in dieser Datenbank sind ja nur Flächen, die vor 1989 entstanden sein könnten. Und alle, die danach kommen, sind ja nicht mehr drinnen, aber das kann man leider nicht rückrechnen. Also teilweise Putzereien, die noch in Betrieb sind, oder andere Industriestandorte. Also da gibt es noch einige, die in Betrieb sind.

Speaker 1: Also die 70.000 sind dann noch Sachen, die in Verwendung sind?

Speaker 2: Genau, teilweise. Also wir versuchen jetzt mit dieser Studie, die die Frau Rabl-Berger betreut, herauszufinden, können wir irgendein Tool drüber laufen lassen, wo wir sehen, welche dieser 70.000 Flächen brach liegen.

Speaker 1: Okay, verstehe. Jetzt wird es mir langsam klar.

Speaker 2: Irgendeine Automatisierung, damit man nicht zu jeder Fläche rausfahren muss oder so und sich die extra anschauen muss. Sondern gibt es da irgendwie einen Mechanismus, wo man das feststellen könnte, ob diese Flächen ganz brach liegen oder teil brach. Und für eine Nachnutzung zur Verfügung stehen würden. Eben weil teilweise sind die Erhebungen auch zehn Jahre alt oder älter, und da kann sich schon wieder alles geändert haben. Teilweise, ich mein, wenn wir zum Beispiel uns diese Flächen vornehmen und eine sogenannte Erstabschätzung machen, sehen wir dann auch im Luftbild oder auf der Homepage, dass da jetzt bereits eine Wohnhausanlage errichtet worden ist. Oder auf irgendeiner Altablagerung oder auf irgendeinem Industriestandort ein Krankenhaus steht. Also unsere Daten sind teilweise einfach schon wirklich veraltet. Oder teilweise steht dann eine Parkgarage, oder dass der Bahnhof schon ganz anders ausschaut, noch vor 15 Jahren.

Speaker 1: Da wäre eh noch eine Frage von mir gewesen, also man sieht, dass viele Berichte diese Hochrechnung von 2004 verwenden und inwieweit kann man sich dann überhaupt noch auf das verlassen?

Speaker 2: Also ich glaub schon, dass das noch ganz gut zusammenstimmt. In dem Bericht von dieser österreichischen Gemeindezeitung, wo eben diese Vorstudie teilveröffentlich ist, haben wir versucht diese Zahlen zu verifizieren, ob das noch halbwegs zusammenpasst und wir sind drauf gekommen, die Größenordnung stimmt noch recht gut überein. Ich mein, das waren auch nur Hochrechnungen und jetzt keine Detailrecherchen oder so, aber da haben wir eben festgestellt, das passt recht gut. Das war irgendwie eine positive Nachricht, dass sich da jetzt Gott sei Dank nicht so viel getan hat, in dem Fall. 2004 war ja auch im Prinzip nur eine Hochrechnung, wo wir uns einzelne Gemeinden herausgenommen haben und das dann auf ganz Österreich umgelegt. Also, es ist eh alles nur eine Schätzung, aber es passt eben - wie gesagt - noch ganz gut

zusammen. Und jetzt in dieser aktuellen Studie, die lauft, da werden dann wieder ein paar Pilotgemeinden herausgenommen und da schaut man sich anhand derer das Ganze nochmal genauer an. Wie dieses Modell, das jetzt entwickelt wird, diese Automatisierung, zum Herausfinden der Brachflächen, ob das passt und da sieht man sicher auch wieder, wie die Zahlen zusammen passen.

Speaker 1: Die Flächen, die dann wirklich zu einer Altlast werden, sind das dann alles nur Flächen, die nicht in Betrieb sind oder sind da dann noch welche dabei, die verwendet werden?

Speaker 2: Das ist ganz gemischt. Also das kann man auch noch nicht herausfiltern. Also man kann sich eh anschauen dann auch, also welche Flächen ausgewiesen wurden als Altlast. Also, da sind nicht viele dabei die Brachflächen sind, wenige leider. [cut]

A.4. Interview DI Sabine Marie Rabl-Berger 29.04.2021

Interview DI Sabine Marie Rabl-Berger 29.04.2021

Speaker 1: Ja, dann wäre eigentlich vorab meine erste Frage. Ich bin jetzt bei meiner Recherche draufgekommen, dass halt sehr viel Information über Altlasten da ist und dass diese Definitionen immer in Richtung Kontaminationen gehen. Jetzt wollte ich wissen, wie das mit den Flächen aussieht, wo, wenn ich das jetzt richtig verstanden habe, eher der größere Teil nicht kontaminiert ist. Oder wie genau jetzt bei Ihnen Brachfläche überhaupt definiert wird?

Speaker 2: Also bei uns. Also Sie sind jetzt in der Abteilung Altlasten gelandet. Das führt dazu, dass wir uns, auch wenn Martha jetzt von den 70.000 Flächen unserer Datenbank gesprochen hat, wahrscheinlich, dass nur Flächen sind, die erstens, zwar zuvor genutzt sind, aber die vorgenutzt wurden mit einer Handlung, mit einer Branche, wo man befürchten kann, dass eine Umweltgefahr davon ausgeht. Eine Branche, wo das nicht der Fall ist, hat uns gar nicht interessiert. Nichtsdestotrotz kann das durchaus zu einer Brachfläche geworden sein. Sie ist nur durch unser Screening gefallen, weil das nicht unser Fokus ist. Und da haben wir noch als Altlastenabteilung das Altlastensanierungsgesetz als Rahmen. Und das bedeutet, uns interessieren und dürfen nur eigentlich Flächen interessieren, wo diese Tätigkeiten vor '89 stattgefunden haben. Jetzt gibt's aber auch Brachflächen, die '89 noch wunderschöne grüne Wiesen waren. Und dann, 90 ,91, 2005 war noch immer, genutzt wurden und inzwischen schon wieder brach gefallen sind. Das heißt, das sind auch Flächen, die eigentlich durch unser Regime durchfallen, wenn wir von diesen 70.000 Flächen sprechen. Das heißt, wir fassen unseren Altlastenbrachflächenbegriff, also Altlastenabteilungsbrachflächenbegriff, da geht es darum, das sind Altstandorte und Altablagerungen, die vor '89 benutzt wurden und, wenn wir wieder bei den Brachflächen liegen, die jetzt nicht mehr genutzt werden, oder „unter genutzt“ werden. „Unter genutzt“ bedeutet, wenn ich eben so was wie den Nordbahnhof habe, oder in Wien gibt es des öfteren, dass dann ein Parkplatz draus wird. Dass die das Einplanieren und mit einem Spray Linien drauf machen. Und das wird dann als Parkplatz genutzt, wird vermietet. Das ist aber keine Nutzung, die der Fläche in der Qualität entspricht. Das heißt, da geht's darum, mit Flächen nicht so genutzt werden, wie es ihre Umgebung quasi, wenn rundherum auch nur alte Parkplätze sind, dann würde das

zusammenpassen. Wenn aber rundherum Wohnnutzung ist oder hochwertige Gewerbenutzung, dann ist diese einplanierte Fläche, die nicht einmal befestigt ist und wo drauf geparkt wird, maximal eine Zwischennutzung. Die Martha hat mir erzählt, sie haben dieses „Bauland in sich“, diese doch ziemlich alte Broschüre aber schon mal durchgeschaut, da haben sie auch Zwischennutzungen drin. Da ist ein Beispiel drinnen, wo sie alte, also wo sie leerstehende Geschäftslokale für Ausstellungen nutzen. So, das sind klassische Zwischennutzungen. Die entsprechen jetzt nicht dem, wie man das wirklich nutzen könnte, aber auch, also sind unternutzt, de facto. Und das ist jetzt die Brachflächen-Definition, von der wir ausgehen, in der Abteilung, wenn es um unsere Nutzung unserer Altstandorte und Altablagerung geht. Aber wenn ich mich mit Brachflächen außerhalb des Altlastenregimes beschäftige, dann fällt bei mir dieser '89 Begriff weg. Also die Zahl fällt weg, weil es ist eine Brachfläche, auch wenn sie erst irgendwie von der grünen Wiese zur Nutzung nach '89 gekommen ist und jetzt nicht mehr genutzt wird. Das fällt für mich weg und es fällt der Umgang mit umweltgefährdenden Stoffen. Also die umweltgefährdenden Tätigkeiten fallen natürlich auch weg. Da geht es einfach nur darum, dass eine Fläche aus der Nutzung gefallen ist. Und da sieht man schon das Problem, dass es keine harte Definition gibt. Also, dass wenn man was über Brachfläche schreibt das erste Kapitel einmal dazu verwendet werden muss, um die Definitionen zu klären, auf die man sich dann in den nächsten 150-200 Seiten beziehen will. Also weil es keine standardisierte gibt. Ja, und dann gibt’s noch eben im Englischen den Bereich der Brownfields. Und das geht die Richtung, also die grüne Wiese und die Brownfields. Da habe ich vor kurzem erst etwas über greyfields und blackfields gelesen, das sind wirklich extrem starke Kontaminationen, also wirklich wo quasi die Ölsuppe aufschwimmt. Wo du so viel investieren müsstest, wo investiert werden muss, um die Umwelt Gefahr zu bannen. Wo es noch lange nicht darum gehen wird, das zu reaktivieren. Also die Breite ist groß. Klar könnte man sagen das ist jetzt auch eine Brachfläche, liegt brach, eindeutig eine Brachfläche. Wird aber, wenn es darum geht, das Ganze in den Wirtschaftskreislauf wieder zurückzuführen schwer. Und das sind ja die Flächen, die uns interessieren. Wenn wir uns mit Brachfläche beschäftigen, geht es ja darum, was können Brachflächen eigentlich zum Flächensparen beitragen. Wir haben diesen großen Flächenkonsum. Wir haben umweltpolitische Ziele, wir haben ja in diversester Art raumplanerische Ziele. Und wie kann das Reaktivieren von Brachflächen dazu beitragen. Also dann würden wir da diese blackfields, wie auch immer wir sie sonst nennen, würden wegfallen.

Speaker 1: Also die wären dann auch für den Begriff Altlast zu kontaminiert?

Speaker 2: Nein, nein. Also das ist eindeutig eine Altlast. Das hat die Martha sicher erklärt. Wir haben Altstandorte und Altablagerungen und nur wenn dort von uns untersucht und festgestellt wird, dass Gefahr für Mensch und die Umwelt davon ausgeht, dann wird es zu Altlasten. Also, es kann nichts zu schlimm für die Altlast sein. Und bei den Altlasten gibt es drei Kategorien. Nach Prioritäten, nach Priorität es zu beheben. So kann man sich das vorstellen. Und da wäre das eine Priorität eins, die Hälften. Von denen wir in Österreich jetzt nicht so viele haben.

Speaker 1: Dann noch einmal zu diesem „Bauland in Sicht"-Bericht. Da steht drinnen, dass der Bestand an Brachflächen eben auf 13.000 Hektar geschätzt wird. Welche Flächen sind das jetzt?

Speaker 2: Das sind Brachflächen, nicht nach unserer Definition, also nicht mit „vor '89 entstanden und Umwelt gefährdeten Stoffen umgegangen", sondern wirklich brachliegende Flächen, die auf eine Wiedernutzung warten.

Speaker 1: Welchen Teil der 70.000 macht das jetzt aus?

Speaker 2: Naja, das ist nicht so simpel, die 70.000 Flächen, die wir haben in dieser Datenpaketen, sind nicht alles Brachflächen. Es sind einfach nur 70.000 Flächen, die wir haben, wo vor '89 mit umweltgefährdeten Stoffen umgegangen worden, wahrscheinlich umgegangen worden ist. Die, wo ein Verdacht besteht. Ja, und die müssen ja nicht unbedingt brachliegen. Wenn ich jetzt in unserer, unserem Dorf nach durchdenke, dann haben wir da kein, dann gibt's da keine Schnittmenge von den Brachflächen. Das alte Sägewerk das halt noch immer in Nutzung ist. Die Karosserie-Spenglerei, die noch immer als solche genutzt wird. Nur ist halt vor '89 dort schon lackiert worden, damit mit Umwelt gefährdenden Stoffen umgegangen, damit ist in der Datenbank gelandet, ist aber keine Brachfläche. Das heißt nicht alle 70.000 Flächen unserer Datenbank sind Brachflächen. Es ist nur ein kleiner Teil davon.

Speaker 1: Und wie filtert man diesen kleinen Teil heraus, der Brachflächen?

Speaker 2: Das ist ein großes Thema, da fühle ich mich gleich angesprochen. Da haben wir im Moment nämlich deswegen gerade zwei Projekte deswegen laufen. Wir sind zu unseren Flächen gekommen, zu diesen 70.000, indem wir systematisch Erfassungsprojekte gemacht haben. So von Bundesland zu Bundesland, da sind Ingenieure damit beauftragt worden. Die haben dann Telefonbücher gescreent, sind durchs Gewerberegister gegangen usw. haben historische Recherche gemacht. Dann haben sie das Ganze auch besichtigt und haben da aufgenommen. Und da gibt's zu jeder Fläche, von diesen 70.000 ein Portfolio. Wo drinsteht, was sie historisch herausgefunden haben, aber auch, was Sie zu dem Zeitpunkt bei der Begehung herausgefunden haben. Das heißt, wir haben eine aktuelle Nutzung zu dieser Fläche in unserem Portfolio drinnen zu der Fläche. Aber diese Projekte, diese Abarbeitung, dieses Screening, die ist in den letzten 20 Jahren passiert. Das geht ja nicht auf einmal, das ist ein kontinuierlicher Prozess und wir sind jetzt dabei, diese Flächen abzuarbeiten und zu schauen. Okay. Da, die müssen wir mal genauer untersuchen, da können wir aufgrund der Ergebnisse, die wir haben, feststellen, ob eine Gefahr ausgeht oder nicht. Das heißt, das ist die Arbeit unserer Abteilung, eigentlich der Gesetzesvollzug im Bereich der Altlastensanierung. Aber, jetzt eben zu unserem neuen Projekt. Diese Nutzungsdaten, die wir zu diesen Flächen haben, sind bis zu 20 Jahre alt. Dementsprechend nicht mehr aktuell. Und wir haben jetzt ein internes Projekt mit dem Ministerium zusammenlaufen, dass wir versuchen, das geht dann jetzt über zu ihren Flächen auch. Dass wir versuchen herauszufinden, wie wir mit vorhandenen Datenbanken. Sei es, Satelliten-Information, aber auch durch Gewerbe-Register, AGWR, Gebäude- und Wohnungsregister, an die relevanten Informationen herankommen. Und das ganze natürlich mit Betracht des Datenschutzes. Das ist ja das nächste. Ist auch eine Rahmenbedingung, diese Nutzung aktualisieren können. Ohne dass wir jemanden losschicken müssen oder eine Herde an Studenten und sagen, „so jetzt im Sommer geht jeder tausend Flächen ab“. Und das ist jetzt, da haben wir eine Vorstudie gehabt und jetzt gehen wir in Pilotregionen, um herauszufinden, ob das so funktioniert, wie wir uns das erhoffen. Das heißt, die aktuelle Nutzung herauszufinden von einem Flächenpool, den ich habe, ist, wenn es nicht nur um zwei Flächen geht, eine Herausforderung. Schon alleine, die findet man nicht auf Knopfdruck irgendwo. Es gibt Landcover Daten, die sind öffentlich wie CORINE, zum Beispiel ist ebenso Satellitendaten, nur die runterzubrechen auf eine einzelne Fläche, das bietet die Genauigkeit nicht. Noch dazu muss ich dazu dann, ich habe da vielleicht Grünland, Wald

oder was auch immer, aber ob das brachliegt, ist dann schwer festzustellen. In Baden-Württemberg gab es da auch im Projekt dazu, wie man jetzt einfach so Brachflächen detektieren kann. Das ist eine große Herausforderung, das Detektieren der Brachflächen. Und da hat auch im Land Oberösterreich, also jedes Bundesland hat Standortagenturen. In Niederösterreich ist es zum Beispiel die „Eco-plus", die kennt man dann vielleicht, mit ihren Wirtschaftsparks. In Oberösterreich heißt diese Standort Agentur „Biz Up". Also die haben alle sehr schnittige Namen und die kümmern sich darum, als Standort-Agenturen Gewerbebetriebe in allen Größen im Land anzusiedeln. Strukturen zu schaffen, dass sie sich gerne ansiedeln. Und die haben vor, jetzt schon ein oder zwei Jahre her, auch überlegt, was können sie tun, um so Brachflächen zu detektieren, um zu wissen, wo in Oberösterreich die überhaupt sind, und haben ein Projekt initiiert, das sehr spannend ist, aber auch seine Schwächen hat. Nur grundsätzlich von der Idee her, wie man es aufsetzen könnte, kann ich Ihnen das mitgeben. Jedes Bundesland hat sein eigenes GIS und da ist ein Teil öffentlich, Oberösterreich hat es auch. Manches ist öffentlich auf manches können die Gemeinden zugreifen. Das sind diverse Layer. Und sie haben dort an die Gemeinden gewandt, weil sie gedacht haben, das ist eine Struktur, die in vielen Bereichen klein strukturiert genug ist, dass man weiß, wo die Brachflächen sind. Wir haben die Gemeinden zu einem GIS-Layer geschickt und haben gesagt „macht uns dort auf die Grundstücke Punkte, wo Brachflächen sind". Und haben da durchaus gute Rückmeldungen bekommen und haben versucht, so einmal zumindest bei den kleineren Gemeinden, denn in Steyr hat dann keiner mehr geantwortet. Wenn die Struktur, also die Gemeinde oder in Linz, weil die Stadt Linz fangt nicht an, da Mauspunkte zu setzen und die hat die Information vielleicht auch gar nicht parat. Während in einer kleinen Gemeinde weiß der Bauamtsdirektor, wo die Flächen sind. Also das sind, so haben sie da versucht Brachflächen zu detektieren und deswegen ist das auch, also die Brachflächen an sich und der Leerstand. Es steht sogar im aktuellen Regierungsprogramm drin.

Speaker 2: Also da gibt es Förderungen der Erweiterung des Brachflächenrecyclings ja, aber Leerstands-Management steht drinnen, und zwar Leerstands-Erhebung, Leerstands-Datenbank, Leerstandaktivierung. Das kann man jetzt einerseits auf die Brachflächen natürlich runterbrechen, dass im Regierungsprogramm, man könnte es so herauslesen das es steht drin, man braucht einen Brachflächenkataster. Da steht Leerstand drin, weil hier ein großes Thema auch die in der örtlichen leerstehenden Gewerbeimmobilien, die Geschäfte aber auch und Wohnimmobilien. Also das ist auch ein Thema, das wäre auch

ein anderer Bereich ihres Themas. Aber dieses Leerstands-Management und zusammen mit dem Brachflächen-Recycling ist ein wichtiger Punkt. Wenn ich Brachflächen reaktivieren will, muss ich erst mal wissen, wo sie sind. Die Martha, hat Ihnen die Studie von 2004 nahegebracht. Das war einmal eine Abschätzung.

Speaker 2: Von diesen Städten und Gemeindebund haben wir versucht, das Ganze jetzt einmal mit kleinen Mitteln, also ohne Mittel de facto abzuschätzen, in welche Richtung es gegangen ist. Damit man einmal eine Größenordnung hat. Da weiß man aber erst mal noch nicht, wo die sind. Das heißt, wenn ich mich darum kümmern möchte, dass diese Brachflächen reaktiviert werden, muss ich erst einmal wissen, wo sie sind.

Speaker 1: Genau, weil das damals ja nur eine Hochrechnung war.

Speaker 2: Genau, das andere war nur eine Hochrechnung, also kein Zählen, sondern einfach eine Extrapolation. Eine Hochrechnung auch, aus demographischen Daten, mit wirtschaftlichen Daten.

Speaker 1: Und das sind dann diese 13.000 ha, auf die in „Bauland in Sicht“ als Referenz genommen wird?

Speaker 2: Genau, also „Bauland in Sicht“ referenziert sich auf die Studie von 2004. Und wir haben jetzt auch ausgehend von der Studie jetzt unsere Hochrechnungen versucht, grob also das Ganze grob zu extrapolieren. Mit nicht viel Aufwand. Deswegen ist das jetzt auch nicht großflächig veröffentlicht worden. Wenn wir etwas veröffentlichen, dann referenzieren wir immer noch auf die alten Daten, weil wir einfach keine belastbaren, aktuelleren haben. Das ist eine Lücke, das wissen wir. Aber bis jetzt hat es noch keinen genug interessiert. Also uns würde es interessieren, aber wir bräuchten halt jemanden, den das so interessiert, dass er da bereit ist, ein Projekt zu starten.

Speaker 1: Aber das ist schon das, was Sie jetzt versuchen im Rahmen Ihrer Forschung herauszufinden?

Speaker 2: Ja. Also, diese ganze Brachflächen-Thematik ist ja in der Raumordnung beheimatet, weil es ja darum geht, Flächenverbrauch zu senken und zu wissen wer baut,

wann, wo, was dann ist das eindeutig Raumplanung, oder baut nicht. Und die Raumplanung ist in den Ländern verankert. Und deswegen in unserer Arbeit können wir als Umweltbundesamt können wir nur, also wir machen es zusammen mit dem Ministerium, einen Rahmen vorgeben. Empfehlungen aussprechen, Richtungen aufzeigen. Wir haben da keine Gesetzesgewalt, also wir als Umweltbundesamt sowieso nicht, aber der Bund auch, kann für die Länder nur den Rahmen schaffen. Die Raumordnung ist Ländersache. Deswegen werden Sie auch in verschiedenen Bereichen, in verschiedenen Ländern andere Regelungen finden. Und andere Hebel, die Sie versuchen zu setzen, um die Brachflächen wieder ins Spiel zu bringen. Das Land Oberösterreich hat z.B. eine Förderschiene für Brachflächen wieder Nutzung. Das findet sich in anderen nicht, bei anderen gibt es dann Beschränkungen, in der Widmung zum Beispiel, dass nicht mehr gewidmet wird, um den Druck zu erhöhen. Dass man auf bereits gewidmet und in der Hoffnung, auf bereits vorgenutzte Flächen geht. Weil wenn keine anderen da sind, dann müssen wir die nehmen. Also es sind verschiedene Strategien, die die Länder da fahren. Andere wie z.B. in Vorarlberg ist der Flächen-Druck an sich so groß, weil sie wenig Fläche haben. Dass das viel schneller ins Laufen kommt als in „Flächen-Bundesländern“. Ein Textilbetrieb, einen leerstehenden, im nördlichsten Waldviertel wieder zu recyceln, also nicht als Textilbetrieb, aber die Fläche zu recyceln ist schwer, wenn dort gar niemand ansiedeln will. Da wird dann auch keine grüne Wiese umgewidmet. Die Nachfrage ist nicht da. Da muss ich dann überlegen, ob ich da nicht einen ganz anderen Weg geh. Das ist glaub ich in „Bauland in sich“, dass ich da eine Ausgleichsfläche zum Beispiel schaffe.

Speaker 1: Was wäre eine Ausgleichsfläche?

Speaker 2: Eine Fläche, wo ich der Natur ihren Lauf lasse. Wo ich quasi alles entferne, was störend ist und dann sag „okay, und das ist jetzt ein keines Biotop“, weil menschlich verändert. Aber ich habe die Idee, dass ich das als Ausgleich irgendwo anders, wo ich eine Fläche brauche und verbaue, dort als Ausgleich der Natur was zurückgebe. Das sind Ideen, die auch international auch angedacht sind.

Speaker 1: Aber das kann dann nicht komplett auf eine Grünfläche quasi wieder rückgewidmet werden. Also das wäre dann noch ein weiterer Schritt, oder?

Speaker 2: Das wäre, rein von der Widmung her, nein, da bräuchte man dann einen weiteren Schritt. Also das können Sie nicht als Grünland zurückwidmen. Das ist eine interessante Frage. Dem werde ich nachgehen. Wahrscheinlich könnte man es schon machen. Das schreibe ich mir jetzt auf und werde dem nachgehen.

Speaker 1: Ich habe nämlich schon mit anderen gesprochen, dass das ein noch viel größeres Problem wäre. Denn das Schwierige da ist dann auch immer der Wert des Grundes. Also die Grünfläche viel weniger wert ist wie jetzt eine für Bauland gewidmet Fläche.

Speaker 2: Ja sicher, also da es da Ausgleichszahlungen geben muss. [cut]. Es geht natürlich in die andere Richtung nämlich auch. Das ist natürlich ein ganz fürchterliches Druckmittel. Aber wer streift die Gewinne ein beim Widmen? Wenn ich von Grünland auf Bauland geh, da ist der Grund plötzlich um einiges mehr wert. Und da beschwert sich auch keiner, dass sein Grundstück plötzlich mehr wert ist. Also da müsste es einen Pool geben, dass nämlich die Gewinne nicht nur, dass die Gewinne teilweise abgeschöpft werden, und dann hätte man einen Ausgleichs-Pool, wo man Rückwidmungen auch entschädigen könnte. Nur da landen wir wieder bei dem großen Problem, dass das ganze Ländersache ist. Das sind ganz tolle Ideen und die sind teilweise in manchen Kantonen in der Schweiz zum Beispiel schon umgesetzt. Aber die haben ja das gleiche föderalistische Thema wie wir, eben dort auch nur in manchen Kantonen umgesetzt. [cut].

Speaker 1: Inwieweit ist jetzt wirklich das Potenzial da, dass diese Flächen jetzt gegen Urbanisierung und Stadtausbreitung jetzt wirklich ankämpfen können?

Speaker 2: [cut] genau das Potenzial der Brachflächennutzung. Und das haben wir uns damals überlegt. Es passt noch immer ziemlich genau, wenn wir uns dem jährlichen Flächenbedarf anschauen für Wohnen, für Wirtschaft und so weiter. Und das Brachflächen-Ausmaß, das sich ergibt. Dann haben wir damals festgestellt, dass rund ein Viertel der neuen Nutzungen vermieden werden könnte, jährlich. Also es ist ein Potenzial da. Es ist nicht, wir werden es nicht eins zu eins umsetzen können, weil Angebot und Nachfrage sich dann nicht überall trifft dort, wo wir es brauchen. [cut: Zusammenfassung: Wenn Firmen (Amazon Graz) eine große Fläche brauchen, dann ist es unwahrscheinlich, dass so eine im Brachenzustand vorhanden ist]. Man muss schauen, wie flexibel kann ein

Unternehmen sein, um dann eventuell mit Ausgleichsflächen arbeiten. Um das Ganze realistisch zu sehen. Es ist nicht jede Brachfläche für alles nutzbar. Es sind die Brachflächen nicht immer dort, wo wir sie brauchen. Und es ist natürlich der Verbrauch größer als das, was jährlicher an Brachflächen anfällt. Also deswegen kein 100% Ausgleich und wir können nicht alles, aber es kann ein Teil der Flächeninanspruchnahme kann abgedeckt werden, könnte abgedeckt werden, wenn der Wille da ist.

Speaker 2: Jetzt haben wir in diesem Schema die Selbstläufer, das sind diese Brachflächen, die nicht lange brachliegen, wo sich jemand findet aufgrund der Lage, meistens ist es aufgrund der Lage, aufgrund der Anbindung und so weiter. Dies sind nicht unser Problem. Interessant sind, ist der Bereich, dazwischen, wo man einen Förderanstoß braucht. Entweder wenn ich die Fläche entsprechend aufbereite. Wenn ich sie bewerbe das ist auch noch ein Thema oder wenn ich dann noch Förderungen dazu biete. Dann kann ich die wieder in den Wirtschaftskreislauf bringen. Es gibt unten den Teil der Flächen, die werde ich nicht mehr schaffen. Das sind einerseits die hoch kontaminierten, die wie aber in Österreich jetzt nicht haben. Die sind jetzt für uns nicht so relevant. Das ist in England zum Beispiel haben sie da einiges an Flächen. Es wird im Osteuropa auch einiges geben, aber ja da sind wir einigermaßen außen vor. Aber wir haben dann halt auch in strukturschwachen Gebieten, wo das Angebot an grüner Wiese, an Flächen, aber auch an Brachflächen, so groß ist das es deutlich größer ist als die Nachfrage. Das sind also die Bereiche, die werden wir schwer oder gar nicht wieder in den Wirtschaftskreislauf kriegen. Da ist dann anzudenken, das Ganze als Ausgleich zu nutzen. [cut].

Speaker 1: Und Sie haben jetzt gesagt, dass die auch Förderungen bekommen oder sollen?

Speaker 2: Sollen. Ein Fördertool wäre sehr hilfreich, um da was weiter zu kriegen. Deswegen, da glaube ich hat die Martha das Thema auch angerissen. Ist das jetzt in der, mit dem neuen Altlastensanierungsgesetz sind da zum Beispiel Fördermittel in einem noch nicht zu großen Ausmaß, aber in einem Ausmaß drinnen, die da einen Anstoß bieten sollen. Es ist, aber auch jetzt kommt es ins Laufen, weil sie eben im Regierungsprogramm ist. Aber weil die hätte schon früher beginnen sollen. Da hat uns die Pandemie ein bisschen reingrätscht. Da sind andere Dinge plötzlich, klarerweise, auf der Prioritätenliste ein bisschen nach oben gerutscht. Aber das kommt jetzt ins Laufen. Da geht es jetzt darum, dass der Bund Kooperationen mit den Ländern angehen möchte, schaffen möchte,

um dann diese Förderidee der Länder zu kanalisieren, zu bündeln. Das diese Ideen einigermaßen gleich verträten sind. Klar, manche werden mehr brauchen, manche werden weniger brauchen. Bei manchen ist es ein größeres Thema, bei anderen ein kleineres. Aber dass da zumindest am gemeinsamen Strang gezogen wird, dass die Wichtigkeit dieses Brachflächen-Themas in der Länder Raumplanung ankommt. Und das ist, wie ich vorhin gesagt habe, dass ist das, was der Bund machen kann. Ehrlicherweise. Für alle da einen Rahmen zu schaffen und es zu ermöglichen, Wissen auszugleichen. Und zu pushen, zu pushen, zu pushen. Da geht es in Teilbereichen wie zum Beispiel das Altlastensanierungsgesetz, das ja ein Bundesgesetzt ist. Nur bewegen wir uns hier in dem Bereich der ALSAG-Mittel. Diese Mittel, die aus der Abfallwirtschaft kommen. Die gebündelt sind in dem ALSAG-Topf und im Förderfond. Und die kann man jetzt auch nicht einfach für alles verwenden. Die müssen ja zweckgebunden verwendet werden. Dementsprechend kann man nicht einen großen Teil davon aufwenden, sondern nur einen gewissen. Das heißt, es ist einmal die Menge, die ist einmal limitiert, der Fördertopf ist limitiert, der da in die Brachflächen geht und die Flächen sind auch limitiert. Weil wir uns da in diesem 70.000 Flächenpool bewegen müssen, damit wir den Fördergegenstand nicht verlieren. Weil dann kann ich nicht alles fördern, weil ja der Topf nur für diese Flächen vorgesehen ist.

Speaker 1: Ich bin mir jetzt etwas unsicher, ob ich das richtig verstanden habe. Die Fördermittel kommen durch das Abfallwirtschaftsgesetz?

Speaker 2: Nein, nicht durch das Abfallwirtschaftsgesetz, sondern durch das Altlastensanierungsgesetz. Und da ist festgelegt ein Förderschlüssel für jede Tonne Abfall, die anfällt, abhängig von der Qualität des Abfalls. Muss eine gewisse Menge, ein gewisser Betrag in den ALSAG-Topf wandern. Das ist damals als das Gesetz nach dem Fall mit der Fischerdeponie. Das war also der Ausgangspunkt, wo es dann darum gegangen ist, wir müssen eine Fördermöglichkeit für solche Flächen finden und das ist die Idee, die daraus geboren ist. Das man das verknüpft, den Abfallanfall mit den Altlasten. Es ist jetzt eine schräge Verknüpfung, weil ja ein Großteil der Flächen Altstandorte und gar nicht so sehr Altablagerungen sind, es geht ja bei unseren Flächen, obwohl der Ausgangspunkt die Fischerdeponie war. Aber es geht mehr um gewerbliche Tätigkeiten als um Deponie, Tätigkeiten, Flächen. Aber das ist dieser Konnex, der damals hergestellt wurde im Gesetz, der besteht und den uns viele Länder beneiden, der auch bei

study tours immer wieder Thema ist. Warum habt ihr Geld für diese Altlastensanierung? Wie könnte ihr euch das leisten? Weil es etwas Österreichs Spezifisches ist. Dieser Altlastenfond. Das ist nur daher stammt das Geld, eben weil das Zweck gewidmet ist, klarerweise, und deswegen kann man das jetzt nicht auch breit verteilen an alle Flächen, an alles. Sondern muss sich in dem Rahmen des Gesetzes bewegen und der umfasst eben die Flächen, die bei uns als potentielle Umweltgefährdungen gemeldet sind.

Speaker 1: Okay, das heißt aber, in dem Fall gibt es für die anderen Flächen keine Fördermittel?

Speaker 2: Keine Bundesfördermittel. Es gibt immer wieder kleine Landesförderungen. Oberösterreich hat zum Beispiel einen kleinen Fördertopf. Es gibt manchmal auch die Möglichkeit, über viele Winkel, in Regional-Fördertöpfe reinkommen, aber so einen richtigen Brachflächenfördertopf gibt es bundesweit nicht.

Speaker 1: Sie haben vorhin auch gesagt, dass es datenschutzrechtliche Probleme bei der Sammlung der Informationen bezüglich Brachflächen gibt. Könnten Sie das vielleicht noch genauer erklären?

Speaker 2: Ja, sicher, ja. Wenn Sie Ihr Grundstück hätten, irgendwo, eine alte Tankstelle. Nein keine Tankstelle, irgendwas Ungefährliches, irgendein altes Haus irgendwo. Das bricht jetzt schon zusammen, das ist von Ihrer Urgroßtante, dann würden Sie auch nicht wollen, dass jede Woche ein neuer Makler zu Ihnen kommt und sagt: „Ich habe jetzt gelesen, das ist eine Brachfläche. Da gibt es jetzt eine neue Förderung, das ist urcool, ich kauf Ihnen das jetzt ab.“ Dass man dann gesammelt wird, in einer Brachflächen-Datenbank. Das klingt jetzt so als Idee mal bestechend, wenn man was weiterbringen will. Aber wenn man sich das anschaut von der Eigentümerseite, dann ist das schon wieder ganz anders. Das ist was anderes, wenn von der Nutzung irgendwelche Gefährdungen ausgehen, zum Beispiel, dann ist das was ganz was anderes. Weil dann betrifft das mehr, das sind dann die Flächen, die bei uns auch nicht breit veröffentlicht werden. Erst wenn wir, weil der Verdacht noch sehr vage ist, wenn die Flächen bei uns landen. Erst wenn der Verdacht bestätigt ist, dass wirklich eine Gefährdung da ist, also eine Altlast ist, dann wird’s veröffentlicht.

Speaker 2: Und davor, wenn es einen Verdachtsfläche ist, also wenn der Verdacht erhärtet ist, dies aber noch nicht bestätigt worden, dann kann man das bei uns erfragen. Nach Umweltinformationsgesetz. Also wenn ich ein Grundstück kaufen will, kann ich bei uns mit der Grundstücksnummer kommen und sagen, ich würde mich jetzt interessieren. Nicht, dass ich ein Verdachtsfläche kauf, weil ja da Haftungen auch mit verkauft werden. Da kann man nachfragen. Aber für die, das sind nur die Verdachtsflächen, das sind dann 3000 zirka. Also es ist wirklich eine kleine, aber der große Pool wird auch nicht veröffentlicht. Weil dieser Verdacht, den wir da haben, noch sehr vage ist und ist damit nicht gerechtfertigt wäre, mit so einem vagen Verdacht eine Fläche zu stigmatisieren. Das ist was anderes, wenn die Leute sehen und sich dann erkunden, und dann denken, das wäre dann nett und dann nachfragen. Als wenn das gesammelt in einer Datenbank. [cut] Ja, also das sind auch Grenzen, die es gibt.

Speaker 1: Die natürlich das Erfassen des Ganzen einfach schwierig macht. [cut] Dadurch fehlen die Daten halt einfach.

Speaker 2: Ja, das ist zum Beispiel, wenn man sich interessiert für Daten aus dem Gebäude- und Wohnungsregister, weil da gibt's ja dann auch Informationen. Dann kann man diese Daten kaufen, aber diese sind in einer Größe von 250 x 250 Meter, also auf die Genauigkeit. Es sei denn es sind weniger als drei Gebäude, dann wird es noch größer. Also es geht darum, dass Daten, wenn sie weitergegeben werden, sie so einen Maßstab haben müssen, dass sie nicht auf Personen heruntergebrochen werden können. Das heißt für statistische Auswertungen kann man schon viel brauchen, aber wenn ich wirklich die einzelne Fläche finden will, tu ich mir schwer.

Speaker 2: [cut]

Speaker 1: Aber seitdem Sie jetzt mit Brachflächen arbeiten. Was hat sich für Sie jetzt eigentlich in den letzten zehn Jahren vielleicht am meisten verändert? Bezüglich jetzt Brachflächenmanagement, dass da irgendwelche konkreten Dinge für Sie da ausschlaggebend sind?

Speaker 2: Für mich persönlich ist es, dass ich sie ständig sehe, es lässt einen ja nicht mehr los. Also man scannt die Umgebung. Einfach, dass man es wahrnimmt. Es ist eine

Bewusstseinsbildung, die aber, glaub ich, inzwischen die Bevölkerung erfasst. Das ist jetzt nicht nur weil es mir auffällt, vielleicht bin ich auch nur in meiner großen Blase. Aber wenn ich die Zeitung jetzt aufschlag, ist es schon viel mehr Thema. Es ist auch, ich merke, die Anfragen zu Diplomarbeiten, Informationen zu Interviews und so weiter. Also die die Anfragen von außen werden dichter. Also es ist, ist der Flächenverbrauch, das hoffe ich zumindest, aber das nehme ich auch, so wahr, ist ein Thema. Das ist auch, das war vor zehn Jahren noch kein Thema. Vor zehn Jahren, wenn irgendwo eine neue Tankstelle gebaut worden ist und ich habe die Hände über dem Kopf zusammengeschlagen. Wir haben schon 27 Tankstellen in der Umgebung, wir brauchen die nicht oder den Burger King, der unbedingt auf der grünen Wiese neben dem McDonalds sein muss. Wir brauchen die nicht. Das sind Ackerflächen. Dann war das meine grüne Öko-Meinung. Also dann habe ich in das Bild der Fahrradanhänger ziehenden Mama gepasst, „sie ist nett, aber sie ist halt ein bisschen seltsam“. Und jetzt ist es so, dass Leute auf mich zukommen und sagen: „Stell dir vor, was ich gesehen habe, das geht ja nicht" und so weiter. Also das Bewusstsein verändert sich. Und deswegen, auch wenn sich in dieser Rechtslandschaft sich nur ein bisschen was verändert ist doch Veränderung da. Also in Niederösterreich, zum Beispiel dürfen Gewerbeflächen nur eine gewissen Größe haben. Und ab einer gewissen Größe dürfen sie nur als solches gewidmet werden, wenn sich Gemeinden zusammenschließen. Es ist jetzt recht neu, ich glaube seit Jahresbeginn eine Gesetzesänderung in der Raumplanung. Ein oberösterreichischer Bürgermeister hatte in seiner Gemeinde, die in der Nähe zu Salzburg ist, und der verspürt jetzt einen sehr starken Druck Bauland zu widmen, weil sehr viele Salzburger zu ziehen wollen. Es ist die Nähe, zur Stadt Salzburg, es ist dort noch günstiger als in Salzburg, und der hat jetzt gesagt, er widmet ab einer gewissen Größe nur noch um, wenn mindestens die Hälfte des Grundstücks zu ortsüblichen Preisen an ansässige Bevölkerung angeboten wird.

Speaker 1: Also es darf nicht freistehen, so quasi?

Speaker 2: Es darf nicht das neu Gewidmete sofort dem freien Markt unterliegen. Sondern eine Hälfte muss zu ortsüblichen Preisen einmal der Gemeinde, dem Ort angeboten werden. In der Stadt Tulln haben sie jetzt eine Siedlungsgrenze, über die hinaus jetzt einmal nicht, gewidmet wird, also kein neues Bauland gewidmet wird. Da hat sich der

Gemeinderat committed für einige Jahre. Es sind so kleine Initiativen, die mehr werden. Das ist das, was ich in den letzten zehn Jahren wahrgenommen habe.

Speaker 1: Das sind spannende Sachen. Weil ich aber auch gestern grad, wir sind jetzt im Moment in Graz und da habe ich in so eine kleine Gratiszeitung aufgeschlagen und gleich das Thema Flächeninanspruchnahme gelesen. Jetzt wird in Graz wieder was zugepflastert und das ist mir davor nie wirklich aufgefallen. Es ist wirklich überall.

Speaker 2: Es ist nicht nur, weil es für Sie ja jetzt Thema ist. Also es ist nicht nur das, sondern es hat wirklich in den letzten zwei, drei Jahren Fahrt aufgenommen. Absolut. Jetzt ein bisschen, einerseits gebremst natürlich durch die Pandemie, wo jetzt die Gefahr war oder ist Wirtschaft über alles, Wachstum über alles, wieder. Aber ich glaube, dass sich da durchaus auch ein Bewusstsein entwickelt. Ein Bewusstsein, dass auch Land eine endliche Ressource ist.

Speaker 1: Das wäre auch noch eine meiner Fragen, ob Sie irgendwie aufgrund von der Krise bereits schon irgendwas mitgekriegt haben. Dass das jetzt die Brachflächenentwicklung oder dieses Thema irgendwie beeinflusst hat, irgendwas gestoppt hat oder vorangetrieben hat?

Speaker 2: Nein, also es sind sicher, oder was ich glaube, dass manche Bauprojekte, also Wohnbauprojekte, teurere, dass da manche ins Stocken gekommen sind, aber das heißt noch nicht, dass es weg ist, sondern einfach nur, dass da halt Leute, sich erst wirtschaftlich, sich erst neu sammeln müssen. Also dass es da manche Dinge vielleicht langsamer jetzt laufen. Aber grundsätzlich habe ich, das Thema war vorher, hat vorher, war thematisch spannend gewesen, hat jetzt vielleicht kurzfristig ein bisschen ist es aus den Medien verdrängt worden. Aber nie ganz. Und es taucht jetzt wieder verstärkt auf. Ich glaub dadurch, dass die Leute auch jetzt mehr daheim sind, home office technisch, wird ihnen manches auch mehr bewusst. So dieses „Ja mein Dorf bauen sie nicht zu“. Das, was man vorher nicht wahrgenommen hat, weil man in der Früh wegfahren ist und am Abend heimgekommen. Dass das noch ein boost aufnimmt, aber grundsätzlich ist es wichtig, dass es ankommt. Dass es ankommt, aber dass es auch den gesetzlichen Background hat, dass sich das richtig entwickelt. Das es nicht nur ein Gefühl ist, sondern dass das Gefühl hat auch dazu führt, dass sich etwas ändert.

Speaker 1: Was wäre dann Ihrer Meinung nach dann noch das Wichtigste, was sich jetzt noch entwickeln müsste damit das weiterhin in die richtige Richtung geht und richtig unterstützt wird?

Speaker 2: Ich glaub, was für mich wichtig wäre, wäre wirklich eine Möglichkeit, eine Kostenwahrheit zu schaffen. Und zwar grüne Wiese gegen brownfields, also nicht brownfields, Brachflächen. Einerseits, jetzt hat man das Gefühl, die grüne Wiese wird einem nachgeschmissen in manchen Bereichen. Dass diese ganzen Umwidmungsgewinde, zum Beispiel, in einen Topf kommen, da dürfte nicht einer daran verdienen. Dass seine Fläche jetzt umgewidmet wird. Das würde das Ganze schon deutlich weniger attraktiv machen und das könnte zu Förderungen führen, im Bereich der Wiedereingliederung von Brachflächen. Dann hätte man schon Budget quasi zur Verfügung. Meiner Meinung nach das Wichtige ist für mich die Kostenwahrheit. Weil es ist nicht billiger auf der grünen Wiese zu bauen, gesellschaftspolitischen oder volkswirtschaftlich. Aber für den Einzelnen ist es das im Moment, ist es das ja oft noch einfacher. Es ist einfacher in der Planung. Weil ich da am Reißbrett hängen kann, ich muss auf nichts Rücksicht nehmen und es, werden ihnen Kosten erlassen. Und es ist auch so, dass manche Förderungen, ebenso die Wirtschaftsförderung oft nur greifen, wenn das quasi auf der grünen Wiese erfolgt. Das sind Dinge, die unbedingt geändert gehören. Zusammenfassend, das ist der Punkt, der für mich wichtig wäre. Aber dazu müsste man halt Umweltleistungen auch richtig monetär bewerten. [cut].

Annex B: Data and Calculations

B.1. Calculation of the Land consumption Rate, Austria (Figure 9)

Year	Land Consumption Raw Data[3] (km2)	Yearly Land Consumption Increase (km2)	Land Consumption Rate (%)
2006	4567.1	-	-
2007	4949.5	382.4	8.37
2008	5029.0	79.5	1.61
2009	5130.2	101.2	2.01
2010	5216.0	85.8	1.67
2011	5291.9	75.9	1.46
2012	5374.5	82.6	1.56
2013	5436.0	61.5	1.14
2014	5501.0	65	1.20
2015	5552.0	51	0.93
2016	5597.0	45	0.81
2017	5642.0	45	0.80
2018	5681.0	39	0.69
2019	5729.0	48	0.84

Calculation Example:

Land Consumption Rate for the year 2009

$$Land\ Consumption\ Rate_{2009} = \frac{Raw\ Data_{2009} - Raw\ Data_{2008}}{Raw\ Data_{2008}} \cdot 100\ \%$$

$$= \frac{Yearly\ Land\ Consumption\ Increase_{2009}}{Raw\ Data_{2008}} \cdot 100\ \%$$

$$= \frac{5130.2\ km^2 - 5029.0\ km^2}{5029.0\ km^2} \cdot 100\ \% = \frac{101.2\ km^2}{5029.0\ km^2} \cdot 100\ \%$$

$$\approx 2.01\ \%$$

[3] (Umweltbundesamt, 2021a)

B.2. Correction of the Land consumption Rate, Austria (Figure 10)

Year	Calculated Yearly Land Consumption Increase (km2)	Corrected Value (km2) (read off Figure 7)	Corrected Land Consumption Rate (%)
2006	-	-	-
2007	382.4	57	1.25
2008	79.5	-	1.61
2009	101.2	-	2.01
2010	85.8	-	1.67
2011	75.9	-	1.46
2012	82.6	-	1.56
2013	61.5	-	1.14
2014	65	-	1.20
2015	51	-	0.93
2016	45	-	0.81
2017	45	-	0.80
2018	39	-	0.69
2019	48	-	0.84

B.3. Calculation of the Population Growth Rate, Austria (Figure 9)

Year	Population[4]	Population Growth Rate (%)
1995	7948278	-
1996	7959016	0.14
1997	7968041	0.11
1998	7976789	0.11
1999	7992323	0.19
2000	8011566	0.24

[4] (Statistik Austria, 2020)

2001	8042293	0.38
2002	8082121	0.50
2003	8118245	0.45
2004	8169441	0.63
2005	8225278	0.68
2006	8267948	0.52
2007	8295189	0.33
2008	8321541	0.32
2009	8341483	0.24
2010	8361069	0.23
2011	8388534	0.33
2012	8426311	0.45
2013	8477260	0.60
2014	8543932	0.79
2015	8629519	1.00
2016	8739806	1.28
2017	8795073	0.63
2018	8837707	0.48
2019	8877637	0.45

Calculation Example:

Population Growth Rate for the year 2009

$$Population\ Growth\ Rate_{2009} = \frac{Raw\ Data_{2009} - Raw\ Data_{2008}}{Raw\ Data_{2008}} \cdot 100\ \%$$

$$= \frac{Yearly\ Population\ Increase_{2009}}{Raw\ Data_{2008}} \cdot 100\ \%$$

$$= \frac{8341483 - 8321541}{8321541} \cdot 100\ \% = \frac{19942}{8321541} \cdot 100\ \% \approx 0.24\ \%$$

B.4. Calculation of the Corrected SDG Indicator 11.3.1, Austria

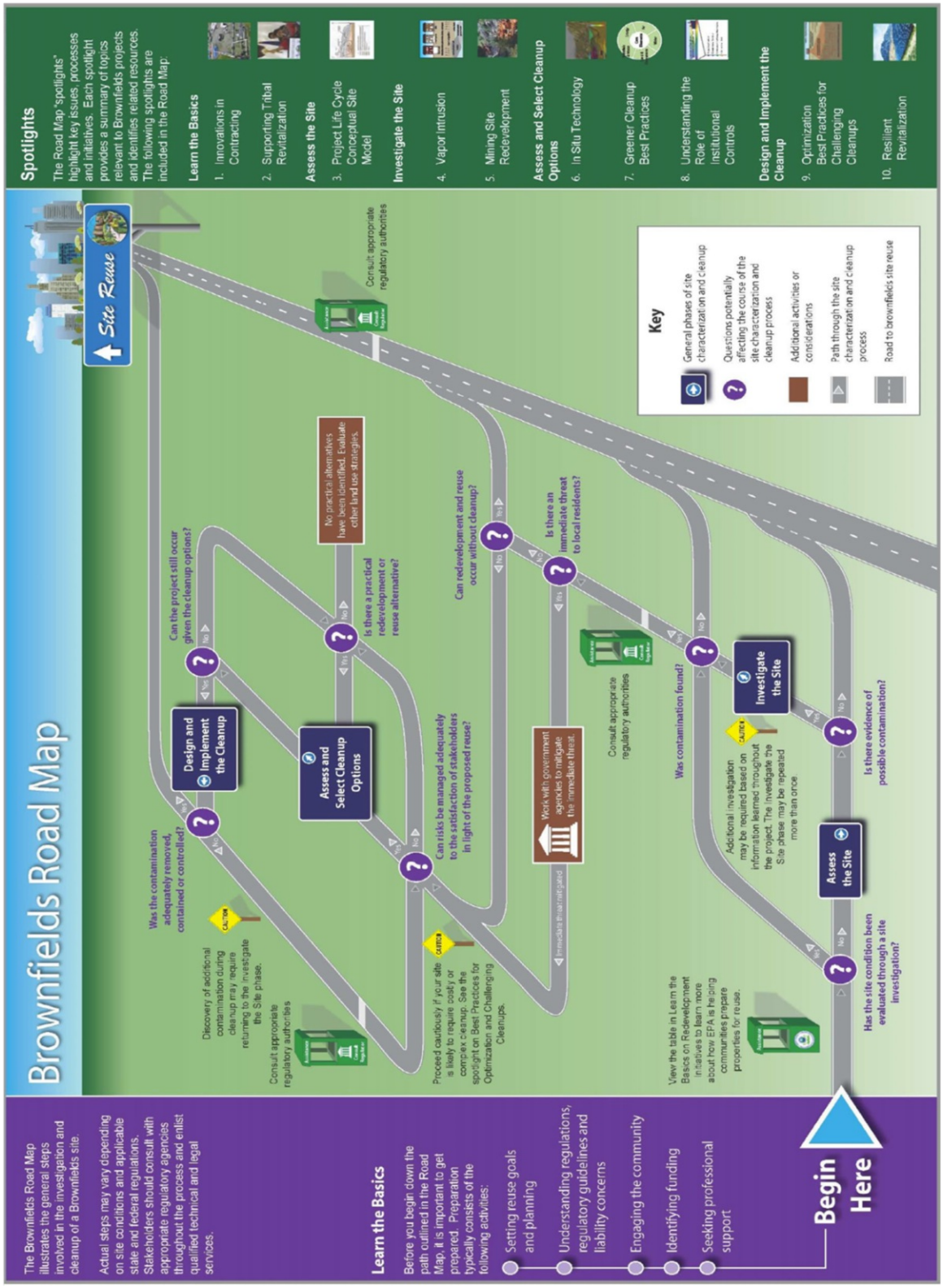
Year	Corrected Land Consumption Rate (%)	Population Growth Rate (%)	Corrected SDG Indicator 11.3.1
2007	1.25	0.33	3.789
2008	1.61	0.32	5.056
2009	2.01	0.24	8.397
2010	1.67	0.23	7.123
2011	1.46	0.33	4.430
2012	1.56	0.45	3.466
2013	1.14	0.60	1.893
2014	1.20	0.79	1.520
2015	0.93	1.00	0.926
2016	0.81	1.28	0.634
2017	0.80	0.63	1.271
2018	0.69	0.48	1.426
2019	0.84	0.45	1.870

Calculation Example:

SDG Indicator for the year 2009

$$SDG\ Indicator_{2009} = \frac{Land\ Consumption\ Rate_{2009}}{Population\ Growth\ Rate_{2009}} = \frac{2.01}{0.24} = 8.397$$

Annex C: U.S. EPA Brownfields Road Map[5]



[5] (U.S. EPA, 2018)