

# The Environmental Effectiveness of Solid Waste Management

*A Case Study of Oslo, Norway*

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Sustainability

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# Abstract

The aim of this research is to understand the environmental effectiveness of the solid waste management in Oslo (with the exception of construction and demolition waste). This thesis does so by looking into the concept of environmental effectiveness and its four determinants (regulatory structure, time, economic structure, and science) as defined by Kütting (2000a, 2000b, 2001a, 2001b, 2009). It also employs the analysis of governance networks to understand the regulatory structure, waste governance, of waste management. Within these analytical frameworks, this research gathered data from 21 interviews, and reviewed literature published by the organizations that the informants worked for.

Although the waste governance in waste management performs well thanks to cooperation between related actors in the network, the environmental effectiveness of waste management is limited. First, it is revealed that, due to the Pollution Control Act, there is no governing agency to control industrial waste which makes up a significant amount of the total waste generated in Oslo, Norway. The second discovery is that the current solid waste management depends greatly on energy recovery and recycling, which are two feasible methods in the given context, although reuse and waste prevention are regarded as more desirable methods in preventing negative impacts to the environment from an environmental perspective. This point indicates that the waste management is more concerned with institutional feasibility rather than environmental necessity. The relationships between the waste management and three of the determinants (time, economic structure, and science) display the same results. It is important to note that the approach to these determinants are dealing more so with how we treat waste, rather than how we remove the origin of the problem.

Thus, this research concludes that, when it comes to environmental effectiveness, it is obvious that the current waste management focuses on what they can do given the context, instead of revolutionizing this context to improve waste management, making more desirable methods, like reuse and waste prevention, feasible.

# Acknowledgements

It was much more challenging and difficult to complete this master thesis than I had expected. I thought that I could manage and cope with anything that happened along the way. But I was not. I got frustrated a lot, not only by this research but also by living abroad. There were multiple occasions where I wanted to give up, but thanks to the help and encouragement I got from many people, I managed to complete this work.

First of all, I want to sincerely thank my supervisor, Professor Harold Wilhite, for his generous consideration and valuable feedback. Without his patience and understanding, I could not have finished this research. His positive and encouraging feedback also helped motivate me to work more on this research.

I would like to thank my 21 informants, who were willing to spend their time and share their opinions with me, despite their busy schedule. The most difficult part of conducting this research was contacting interviewees. Although I got frustrated by not receiving replies and lost contact with some of those I contacted, I was able to get back on the right track thanks my informants. I am indeed very grateful for their kindness.

My family, friends, and student advisors, Gudrun and Anne-Line at SUM, those who are worried about me and support me all the time, are one of the main reasons I could not give up on this thesis, which made me continue and work harder.

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# 1 Introduction

## 1.1 Rationale

We are now confronting the massive volume of solid waste that people generate daily and globally. According to UNEP (2011: 292), “every year, an estimated 11.2 billion tons of solid waste are collected worldwide and decay of the organic proportion of solid waste is contributing to about 5 per cent of global greenhouse gas (GHG) emissions” which in turn accelerates climate change. Clark and Matharu (2013: 66) insist that “the planet currently generates approximately 1.3Gt of solid waste per year, which is expected to increase to 2.2Gt by 2025.”

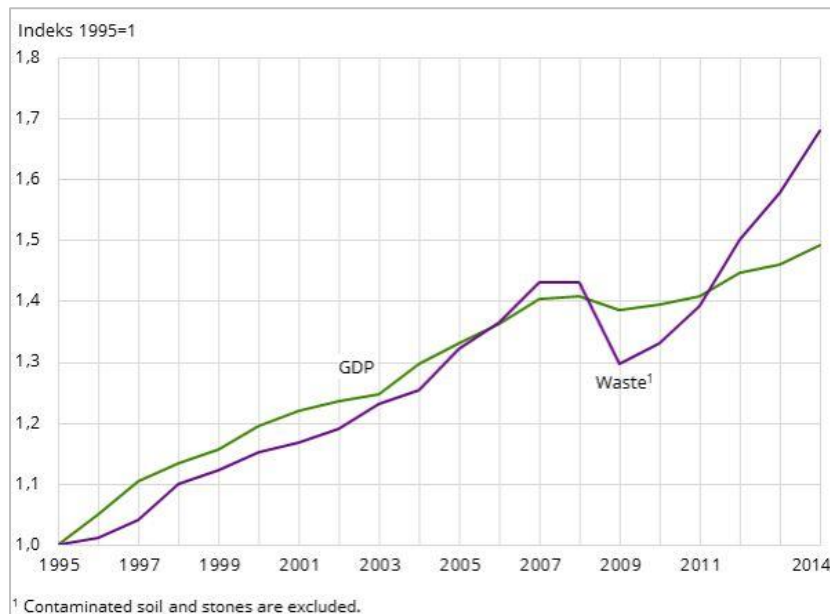
This huge amount of waste is a problem, and the question is how to deal with this waste crisis. Waste management is crucial to reducing the negative impacts of waste on the environment, and its consequences to human beings. It is the goal of waste management to treat waste in a safe and proper manner, in order to minimize harm or damage to the environment. Disposal methods such as landfilling are directly related to human health issues, as well as the environment. For instance, UNEP (2011: 302) blames landfills for generating methane as “the largest source of GHG emissions, caused by the anaerobic degradation of organic material in landfills and unmonitored dumpsites.” Like this, waste management is deeply connected to consumption, resource utilization, environmental problems, and human health.

Thus, many developed and developing countries have committed to establishing safe and efficient waste management techniques in their countries, expecting to minimize the negative impacts of waste on the environment. Norway, one of the richest countries in the world, is expanding its waste management efforts in order to deal with its huge quantity of waste. In Norway, the quantity of waste has increased by 60 per cent since 1995<sup>1</sup>. As a result, the country has set national waste targets, the first being that “the total quantity of waste shall be considerably lower than the economic growth,” as indicated in the national waste strategy report (The Norwegian Environmental Protection Agency, 2013; 11). According to Statistics Norway in Figure 1, the amount

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<sup>1</sup> Environment.no (operated by the Norwegian Environment Agency), 2016, ‘Waste’, <http://www.environment.no/Topics/Waste/> Retrieved: March 30, 2016.

of waste generated is comparable to the GDP. In compliance with the European Union (EU) criteria about waste, Norway has improved its waste management strategy.



[Figure 1. Trends in waste generation and GDP in Norway]<sup>2</sup>

There is a waste management hierarchy (Figure 8 in p.47) that is made up of five different waste disposal methods; disposal (i.e., use of landfills and incineration without energy recovery), recovery (generally through incineration), recycling, reuse, and prevention. Prevention is at the top as the most desirable method, and disposal is the least desirable, due to its environmental impacts. If a waste management focuses primarily on disposal methods, then it can expect to produce more negative impacts to the environment than other managements relying on recycling and reuse methods. As explained earlier, it has been suggested that landfills are to blame for exacerbating climate change by generating greenhouse gases on landfill sites. Inappropriate incineration is also dangerous, as it releases toxic gases and debris into the air when plastics and chemical wastes are burnt. Waste prevention is the most desirable way to treat waste, since it is the only one of the five methods which does not have harmful impacts on the environment, given that prevented waste does not require any treating. In other words, if a waste management agenda is dependent on the higher ranks on the hierarchy, it can be said that the waste management is a more environmentally sustainable approach to waste.

<sup>2</sup> Statistics Norway, 'Waste accounts 2014', <http://ssb.no/en/natur-og-miljo/statistikker/avfregno>. Retrieved: March 30, 2016.

Adopting waste prevention methods will help governments create better opportunities and conditions for themselves. Clark and Matharu (2013: 67) describe that “globally, solid waste management costs will increase from today’s annual \$205.4 billion to about \$375.5 billion in 2025. Cost increases will be most severe in low-income countries (more than five-fold increases) and lower-middle income countries (more than four-fold increases).” Thus, governments can use its limited budget effectively if the amount of waste generation decreases. In addition to this economic factor, there are several projects going on by local governments in developed and even developing countries with international organization such as UNEP.

Despite the superiority of waste prevention, the amount of research on the subject is relatively limited in comparison to other topics in waste management. When it comes to waste management at a global scale, attention is mostly focused on establishing improved waste management systems in developing countries, such as collecting and delivering waste to designated locations under a municipality’s authority and international cooperation (McCornack, 2012). Also, energy recovery and recycling become the most promising strategies being discussed, as another way to utilize waste efficiently as resource (City of Oslo, 2013; The Norwegian Environmental Protection Agency, 2013).

Considering the current effectiveness of waste management, it is time to find a new approach that goes beyond the conventional research. How can we apply more desirable methods of waste management so that we can reduce negative impacts of waste on the environment? What kinds of efforts have been made to enhance current waste management, in order to implement the higher ranking methods in the waste management hierarchy? What are the obstacles that hinder present waste management from seeking better treatment methods?

This thesis assumes that waste management has more environmental effectiveness if it utilizes primarily the higher-level methods from the hierarchy (Figure 8 in p.47). Based on this presumption, this thesis is an attempt to ascertain the environmental effectiveness of current solid waste management in Oslo. The scope of solid waste is defined in this research as all solid waste that is generated in Oslo from both households and industry. According to the Norwegian Pollution Control Act, all waste is industrial waste if it is not generated by a household. However, this thesis does not consider solid

waste from construction and demolition sites, since this type of waste is handled by special regulations and laws. Also, personally, I am more interested in how waste management copes with waste that is produced by a population's daily consumption, rather than that particular type of waste.

The main research question of this thesis is the following:

- Is the solid waste management of Oslo effective enough to prevent negative impacts of waste to the environment?

There are also sub-questions:

- What kinds of policies, programs, and projects are currently being implemented by Oslo?
- Which methods from the waste management hierarchy does this management implement?
- Which participants (actors) are engaged in Oslo's waste management?
- How do these actors cooperate in management?
- What kinds of limitations does this management face?
- How do stakeholders evaluate the waste management differently?
- What does waste management need to do to minimize its negative impact on the environment?

## **1.2 Case study site: Oslo, Norway**

Norway is located on the western part of the Scandinavian Peninsula, on the northern part of the European continent. According to the World Bank's 2014 data, its area covers a total of 365,245km<sup>2</sup>, and its population is 5.137 million. Norway is well-known as one of the richest countries in the world, since its GNI per capita reaches 103,050

USD. This is approximately ten times higher than the world's average GNI per capita, which is 10,778 USD.<sup>3</sup>

With regard to waste, the Norwegian Environmental Agency (*Miljødirektoratet*) announced that the total amount of waste in Norway increased more than 50% since 1995. In 2014, a total of 11.9 million tons of waste was generated<sup>4</sup>. The agency regards consumption habits as a key cause for this massive volume of waste, since this increased in accordance with GDP growth. However, it concluded that the amount of delivered waste for final disposal has been reduced thanks to the energy recovery and recycling methods; the combined rate of recycling and energy recovery of the total amount of waste reached 81% in both 2012 and 2013.<sup>5</sup>

According to the statistics of Miljøstatus by the Norwegian Environmental Agency, 4.5% of greenhouse gas emissions in Norway originates from waste treating processes such as landfill use and incineration.<sup>6</sup> The statistics explains that there was a 4.7% decrease of greenhouse gas emissions between 1990 and 2014 in waste treating processes, as disposal of biodegradable waste in landfill sites was banned, and energy recovery methods saw wider use in Norway. In order to further reduce greenhouse gas emissions from waste, the agency suggested generating less waste, recycling more, and utilizing energy recovery methods more.

Oslo is the capital city of Norway. It is located in the southeast of Norway, as shown in Appendix 1<sup>7</sup>, and is home to 658,390 inhabitants in 2016.<sup>8</sup> In 2012, the amount of

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<sup>3</sup> World Bank, Unknown, 'Data: Norway' [http://data.worldbank.org/country/norway#cp\\_fin](http://data.worldbank.org/country/norway#cp_fin), Retrieved: October 25, 2015.

<sup>4</sup> Statistics Norway, 2016, 'Waste accounts 2014' <http://ssb.no/en/natur-og-miljo/statistikker/avfregno>, Retrieved: May 30, 2016.

<sup>5</sup> Environment.no (operated by the Norwegian Environment Agency), 2016, 'Waste'. <http://www.environment.no/Topics/Waste/> Retrieved: February 17, 2016.

<sup>6</sup> Miljøstatus, 2016, 'Klimagassutslipp fra avfall' <http://www.milj-ostatus.no/tema/klima/norske-klimagassutslipp/klimagassutslipp-avfall/> Retrieved: February 17, 2016.

<sup>7</sup> Maps of World, Unknown, 'Oslo Map' <http://www.mapsofworld.com/-norway/oslo.html> Retrieved: October 25, 2015.

<sup>8</sup> Statistics Norway, 2016, 'Folkemengde og befolkningsendringer, 1. januar 2016' <https://www.ssb.no/befolkning/statistikker/folkemengde/aar-per-1-januar/2016-02-19?fane=tabell&sort=nummer&tabell=256001> Retrieved: May 30, 2016.

household waste generated per capita was 367 kg (City of Oslo, 2015b). After introducing a waste sorting system (Kildesortering) in all Oslo households in 2012, the recycling rate has increased. In 2009 when the municipality just introduced the system, the recycling rate of household waste in Oslo was 34% (Kjær, 2013), and later, it reached 38% in 2015 (REN, 2016a). When it comes to waste handling methods of household waste, 57% of household waste was treated by incineration for energy recovery, and 3% of the rest was discarded in landfill sites. Only 2% of household waste was reused (ibid).

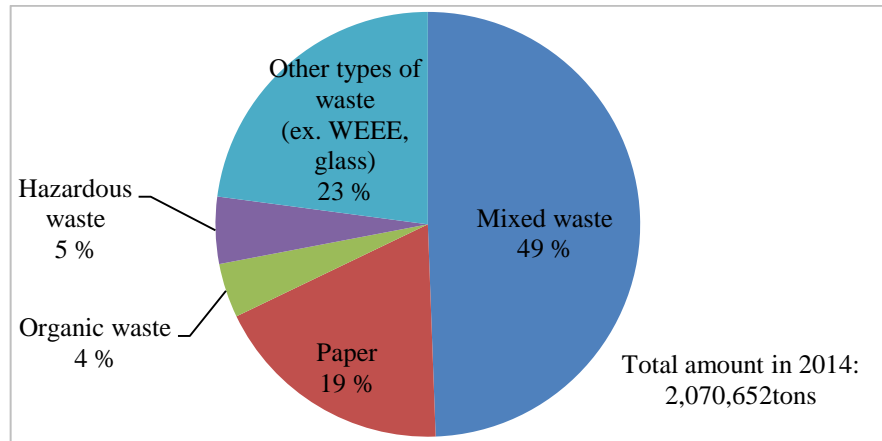
Regarding industrial waste, there is no available data showing the total amount of industrial waste produced in Oslo, since it is challenging for the municipality to determine, due to its limited authority on industrial waste. According to the Pollution Control Act, each industrial (business) actor should discard its waste in a safe manner by hiring a private waste handling company. Thus, data on the quantity of this waste is not reported to the municipality. For this reason, I refer to the national statistics on industrial waste. As seen in Table 1, industrial waste accounts for 40% of the whole waste generated in Norway, 2014.

	1,000 ton	%
Source of origin, total	11,937	100
1) Total Industry (business)	4,799	40
- Manufacturing industries	2,623	22
- Service industries	2,156	18
2) Households	2,439	20
3) Construction	2,476	21
4) Other or unspecified	2,243	19

[Table 1. Waste account for Norway, amounts of waste by source of origin in 2014]<sup>9</sup>

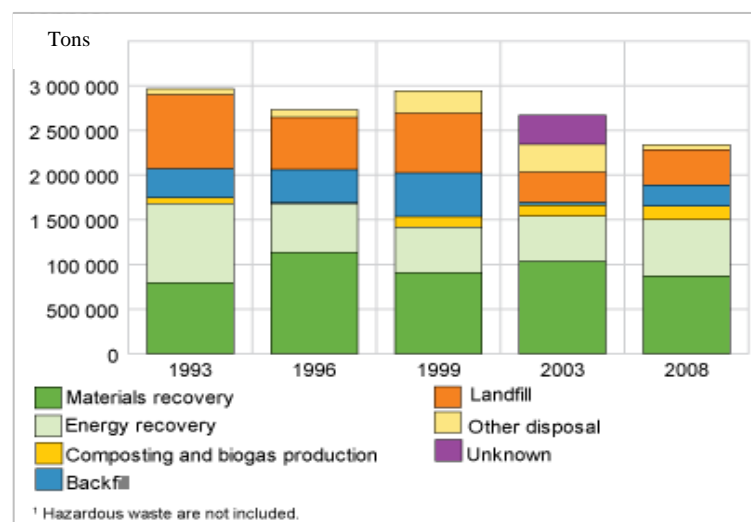
Unfortunately, there is no recent data available on what total industrial waste includes, but it is possible to figure out what the waste from service industries consist of, as seen in Figure 2, with data gathered in 2014. As the figure shows, half of the waste from service industries is mixed waste, which implies the importance of an increase in waste separation within the industries.

<sup>9</sup> Statistics Norway, 'Waste accounts 2014' <http://ssb.no/en/natur-og-miljo/statistikker/avfregno>. Retrieved: May 30, 2016



[Figure 2. Waste from service industries, by material 2014] <sup>10</sup>

The most recent data available on the treatment methods of industrial waste in Norway, is from 2008 (published in 2011). Although the data only deals with waste from manufacturing industries, excluding service industries, it is significant to see how the waste from manufacturing waste has been treated.

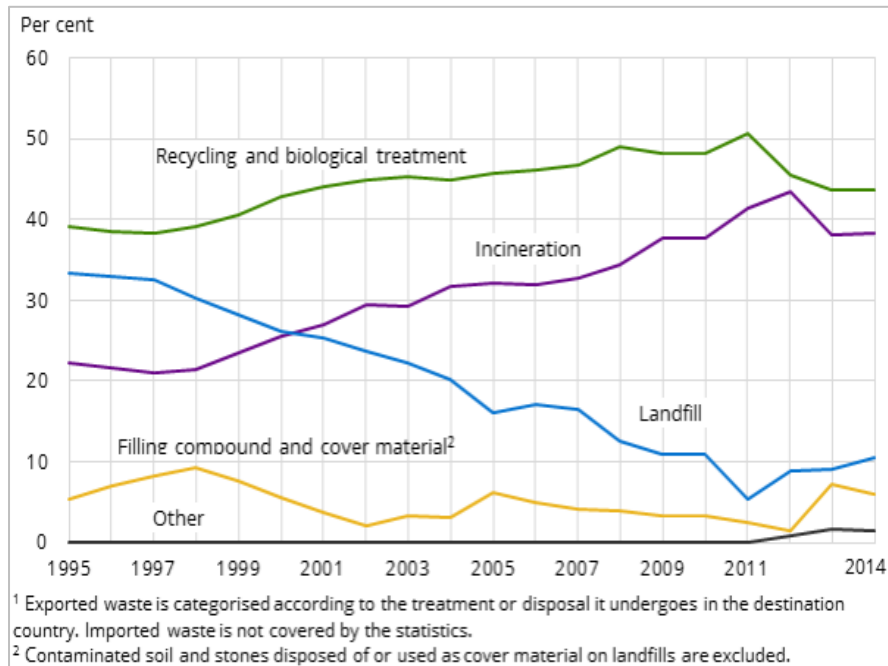


[Figure 3. Treatment methods of waste from manufacturing industries 2008] <sup>11</sup>

Overall, the rate of energy recovery mostly through incineration and recycling has increased by treating waste in Norway, as seen in Figure 4. Figure 4 indicates that recycling and incineration (mostly for energy recovery) have been the major methods used to treat non-hazardous waste, which does not need special treatment, in Norway.

<sup>10</sup> Statistics Norway, 2015, 'Avfall fra tjenesteytende næringer, 2014' <http://www.ssb.no/natur-og-miljo/statistikker/avfhandel/aar/2015-12-08#content> Retrieved: February 17, 2016.

<sup>11</sup> Statistics Norway, 2011, 'Waste from manufacturing industries, 2008', <https://www.ssb.no/en/natur-og-miljo/statistikker/avfind/hvert-4-aar/2011-12-12> Retrieved: February 17, 2016.



[Figure 4. Non-hazardous waste in Norway, by method of treatment]<sup>12</sup>

This is a desirable change since it reduces the country's dependence on landfills, which thus reduces its greenhouse gas emissions. Thanks to energy recovery and recycling methods, Norway can slow its depletion of resources such as fossil fuels and virgin materials. Therefore, it is a natural step to examine waste management in Oslo, by examining what kinds of improvements are made, and what is necessary to increase more environmental effectiveness in solid waste management in Oslo.

## 1.3 Structure of thesis

This thesis consists of eight chapters: 1. Introduction; 2. Theoretical Framework; 3. Methodology; 4. Waste; 5. Mapping Waste Management in Oslo; 6. Findings; 7. Discussion; and 8. Conclusion. Chapters 1, 2, 3 and 4 are introductions to the basic information relating to this study. In the Introduction, the rationale for this thesis and basic information regarding the case study sites are given. In Chapter 2, I will describe the two theoretical frameworks that I employed in this research: 'environmental effectiveness' and 'governance networks'. My research methods, the interviews, and a

<sup>12</sup> Statistics Norway, 'Waste accounts 2014' <http://ssb.no/en/natur-og-miljo/statistikker/avfregno>, Retrieved 30.May, 2016



review of the literature I used will be provided in Chapter 3. Chapter 4 is an explanation of why waste has become a serious problem in modern society, and why we need to have environmentally effective waste management to deal with this problem. If you are not familiar with waste research, I recommend that you to read Chapter 4 prior to all other chapters.

Chapter 5 and 6 present the findings of this thesis. Chapter 5 discusses the actors who take part in the solid waste management of Oslo. Readers will be able to ascertain the geography of solid waste management in Oslo with the content of Chapter 5. In Chapter 6 I analyze the data collected from interviews and my literature review. Based on informants' answers, we can examine how effective the present waste governance is in Oslo's solid waste management at an institutional level, by understanding how it operates, which actors join in the management, what opinion each informant has about the management, the kinds of limitations they face, and so on. Also we can evaluate the environmental effectiveness of this current solid waste management by adding three more determinants: time, economic structure, and science. It is necessary to see how the current management reflects these three factors in its system, and how these three factors function as limitations to the current waste management system.

Finally, Chapters 7 and 8 are for closing this research. Compared with previous studies, contributions and limitations of this research will be described in Chapter 7. I will also make some suggestions for further research regarding waste management within that same chapter. Lastly, Chapter 8 will conclude this thesis by summarizing my research.

## **2 Theoretical framework**

In this chapter, I will explain the two theoretical frameworks that I applied to this research: effectiveness and governance networks. The rationale for choosing these two in particular will be given in section 2.1. I will then introduce the conceptual framework of ‘environmental effectiveness,’ as suggested by Kütting (2000a, 2000b), in order to examine how environmentally effective Oslo’s solid waste management is in reducing the negative impacts of waste on the environment. This concept of environmental effectiveness makes it possible to overcome the limitation of the conventional analysis of effectiveness, which is focused on institutional performance. In section 2.3, I will explain ‘governance networks,’ which is adopted to examine the regulatory structure, one determinant of environmental effectiveness, of waste management. It will be given after reviewing the research tradition of governance networks. Lastly, limitations of the frameworks will be suggested in section 2.4.

### **2.1 Rationale for choice of frameworks**

#### **2.1.1 Environmental effectiveness**

The conventional approach of regime theorists in the study of international relations, where the focus is on how an institution functions, seems similar to that of the main research stream studies on waste. Kütting (2000a, 2000b, 2001a, 2001b, 2009) proposed the framework of environmental effectiveness to examine the effectiveness of international environmental agreements, after criticizing this conventional approach of regime theorists. The main interest of regime theorists is on the institutional performance (i.e., institutional effectiveness) of the agreements. In her researches, however, a meaningful point was raised that institutional efficiency does not solve environmental problems that these international environmental agreements are designed for. An agreement could fall short of its goals, even if it has satisfactory institutional effectiveness, because environmental necessities can be put aside. The example of CLRTAP, the Convention on Long-Range Transboundary Air Pollution, (Kütting, 2000a) illustrates how the work of maintaining a high level of cooperation (institutional

feasibility) amongst diverse actors, can sometimes deprioritize the actual environmental concerns that brought them together in the first place.

Most studies on waste management are similarly focused on the execution of waste management; that is to say, why the management was introduced, how the management is implemented, who is engaged in it, and what the management accomplishes (Davies, 2008; Karousakis, 2009; Minervini, 2013; Karre, 2013; Corvellec and Hultman, 2013; Schouten, Martin and Tillotson, 2015; Gustafsson, Hjelmgren and Czarniawska, 2015). There is also a tendency to employ the comparative method to show the differences in performance, development, outcomes and obstacles in waste governance, between different countries (Campos, 2013; Taherzadeh and Rajendran, 2015).

In summary, there are many more studies paying attention to the function of waste management, than there are looking into its 'efficiency' in preventing negative impacts done to the environment by waste. Accordingly, current research cannot adequately answer the following questions, because they require a critical perspective on the environmental effectiveness of the present-day waste treatment situation: Is recycling the best method to treat waste from an environmental perspective? Is energy recovery a truly circular way to utilize resources? Why is it so difficult to advance reuse and waste prevention methods in, given that the two are considered the most desirable methods in the waste management hierarchy?

There are a few meaningful studies that explore the limitations of the current waste management system. These studies claim that waste management should commit to changing the current performance towards more environmentally desirable methods, such as reuse and waste prevention (Fagan, 2003; Arcadis Belgium 2010; Bell and Sweeting, 2013). For example, Bell and Sweeting argue that the current waste policy in Bristol, UK, put more economic burdens on households while it is in favor of business actors (Bell and Sweeting, 2013). They contend that the reason for this unfair policy stems from a policy framework that prefers recycling over waste reduction.

It seems, however, difficult to find research that examines how effective waste management is in solving environmental problems regarding waste, and how far waste management has advanced to achieve more control over waste and environmental problems. Thus, the concept of environmental effectiveness can be a useful tool to

examine the effectiveness of waste management in the bigger picture, as determined by the four factors (e.g., economic structures, time, science, and regulatory structures) it is made up of. In addition, this enables to figure out how the waste management reflects and uses these four determinants in the management process, in order to create a more environmentally effective approach in waste management.

### **2.1.2 Governance networks**

Significant changes occur, altering the role of local governments that are traditionally responsible for waste disposal. Diverse actors, including global entities, national and local governments, private actors, and civil organizations are engaged in the production, transport and treatment of waste that influence the environmental, social, economic and political conditions of a nation (Davies, 2008; Bulkeley et al., 2006). Thus, waste governance does matter, since “waste issues are present in the discussion involving different spheres of governance (public, private and civil society sectors) at a variety scales from the local to the global (Davies, 2008: 18).” In this situation, Davies mentions the benefit of waste governance analyses, saying, “waste governance analyses would seek to understand how decisions are made in relations to waste matter,” (2008: 15). Decisions or policies are outcomes of complex interactions between actors and agencies in the decision making processes of waste governance. Based these explanations, this thesis applies the governance network analysis to examine waste governance as a regulatory structure.

The first reason for this choice, is that waste governance is not accomplished by a single actor, but rather over networks of cooperating actors across professions and differing levels of government, (Fagan, 2004; Davies, 2008). This form of waste governance occurs in most European countries, and this includes Norway. The analysis of multilevel governance could also be utilized to explain the present state of waste governance (Bulkeley et al., 2006), since the implementation of waste management in a European region is heavily affected and shaped by EU directives and national laws. Although multilevel governance emphasizes the different degree of levels ranging from international to regional level when analyzing waste governance, the approach of governance networks seems more suitable to explain the current waste governance that

is formed and carried out based on discussion and cooperation amongst the different actors in the network (Davies, 2008).

The second reason is that governance network analysis can be a useful for discovering the hidden story of the policy-making processes between actors in waste governance. Theorists adapting the network approach assume that it takes a process of negotiations, conflicts, and cooperation to come up with improved waste policies and strategies (Fagan, 2004). Thus, the analysis of governance networks enables an understanding of the following aspects: what waste governance is composed of; what kinds of networks belong to it; how these networks shape waste policies and public practices on waste issues; and who manages this governance, and how.

## **2.2 Environmental effectiveness**

### **2.2.1 What is ‘effectiveness’?**

The notion of ‘effectiveness’ is extensively used in diverse areas, from science to business. Due to its vague and numerous meanings depending on the context, there are several meaningful efforts to clarify the notion of effectiveness by regime theorists studying international relations<sup>13</sup> (Underdal, 1992; Wettestad and Andersen, 1991; Young, 1994; Kütting, 2000a, 2000b). Kütting divides this research of effectiveness into two schools, the Norwegian school and the American school. The Norwegian school aims to “to find indicators that examine under which conditions a cooperative arrangement will be effective,” rather than suggesting an explicit definition of effectiveness (Kütting, 2009: 17). For example, Wettestad and Andresen (1991) and Underdal (1992) explain three such indicators in their research, rather than defining

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<sup>13</sup> Ruggie (1975) introduced the concept of regime in international politics research in his study that analyzes the international response to technology. He describes international regime as, “consisting of sets of mutual expectations, generally agreed-to rules, regulations and plans, in accordance with which organizational energies and financial commitments are allocated,” (Ruggie, 1975: 569). Later, Krasner’s definition of international regime has been widely accepted after he elaborated it as, “sets of implicit and explicit principles, norms, rules and decision-making procedures around which actors’ expectations converge in a given area of international relations. Principles are beliefs of fact, causation and rectitude. Norms are standards of behavior defined in terms of rights and obligations. Rules are specific prescriptions or proscriptions for action. Decision-making procedures are prevailing practices for making and implementing collective choice.” (1983: 2).

effectiveness, because they believe that effectiveness could be defined and evaluated differently from case to case.

On the contrary to the approach of the Norwegian school on the subject, the American school examines effectiveness by focusing on institutional workings, which is prevalent among regime theorists. The theorists try to measure effectiveness by examining the casual connection between regime and behavioral change (Kütting, 2009). Thus, the school is interested with the topics considering an institutional structure, changes in the structures, performance of the institution, and the results of the institution. Young, a famous researcher of the American school, suggests the notion of effectiveness, by stating that an institution “is effective to the extent that its operation impels actors to behave differently than they would if the institution did not exist or if some other institutional arrangement were put in its place (1992: 161; recited from Kütting, 2000a: 25).”

By reviewing previous research on effectiveness (usually done by regime theorists of international relations), and introducing a new term of effectiveness, Kütting (2000a: 3) defines effectiveness “as the ability of an approach to solve a particular issue.” Also, Kütting heuristically divides the two previously mentioned studies into two different approaches of effectiveness; institutional effectiveness and environmental effectiveness.

### **2.2.2 Environmental effectiveness**

Institutional effectiveness is concerned with the institutional function, and this is a main approach of regime theorists, particularly of the American school. However, environmental effectiveness prioritizes environmental matters over institutional working. Based on the above explanation, Kütting refers environmental effectiveness as “the degree to which the degrading or polluting processes and consequences are arrested or reversed as a result of action” (2001a: 184). Kütting also makes a distinction between the two modes of effectiveness. By distinction, institutional effectiveness is concerned with institutional feasibility, while environmental effectiveness with environmental necessity (Kütting, 2000a, 2000b, 2009).

With two empirical cases of the Mediterranean Action Plan (MAP) and the Convention on Long-Range Transboundary Air Pollution (CLRTAP), Kütting (2000a, 2000b,

2001a) shows that the impact of international environmental agreements could be limited their effect on environmental problems, despite the successful implementation of the agreements. In other words, institutional effectiveness does not guarantee the improvement of the environmental problem, which is the original purpose of the agreement.

Thus, Kütting sheds light on environmental effectiveness, which is concerned with environmental amelioration first and foremost. This new framework offers a holistic view on institutions, regarding them as a “part of a web of social, political, economic and environmental relations,” (2000a: 35), while criticizing that the traditional regime theorists’ approach with institutional effectiveness does not include a social context in which the institution (or regime) is formed and operates. Kütting (2000a, 2000b, 2001b, 2009) criticizes the academic focus on institutional effectiveness, because it is impossible to separate the decision-making process and outcomes of an institution/agreement, from a larger context involving social, economic, technological, scientific and environmental processes. Without considering the different factors in a context, the impact of the institution cannot be fully measured. Thus, Kütting (2000a, 2000b) argues that appropriate outcomes for environmental amelioration will not be attained, if increasing institutional effectiveness and feasibility are only considered, neglecting the larger social context (2000a, 2000b, 2001b).

### **2.2.3 Four determinants of environmental effectiveness**

In order to take an account of environmental effectiveness, it is necessary to study four determinants of environmental effectiveness, which operate inside and outside of an institution (Kütting 2000a, 2000b, 2001b). The four determinants are regulatory structure, time, economic structure, and science. The concept of environmental effectiveness “explores four areas which are vitally important for understanding the relationship between environmental degradation and its regulation,” (2000a: 38). Based on Kütting’s assertion, it is possible to figure out how these four determinants define the relationship between waste management, environmental problems, and social structures.

## **Regulatory structure**

Kütting describes the regulatory structure as “the center of institutional effectiveness (2000a: 50)” which is a traditional concern of regime theorists. Thus, it focuses on administrative feasibility rather than environmental necessity. Kütting (2000a) explains why the regulatory structure is more concerned with administrative feasibility, giving the following three reasons. The first reason is that policy makers in a regulatory structure are government officials who do not represent the environment, but rather a government. The second reason is that these policy makers work within a rigid and fragmented administrative structure, so they cannot grasp the whole picture of environmental degradation and the potential impacts of their operation. Lastly, environmental policy-making is subject to administrative time frames rather than environmental needs.

Applying these features of regulatory structure to waste management in this thesis, waste governance can be examined with the help of the following questions: What does solid waste governance consist of? Which actors are engaged in it, and what are their roles? What kinds of obstacles occur in waste governance? How do these obstacles hinder the environmental effectiveness in waste management by, for example, discouraging reuse and waste prevention methods? This line of questioning will clarify whether waste governance prioritizes administrative feasibility over environmental necessity, or not. Also, it will be possible to figure out how this form of network governance enables or obstructs the environmental effectiveness of present-day solid waste management. As mentioned in section 2.1.2, this research assumes that the waste governance of solid waste management is implemented with networked cooperation. Thus, strengths and weakness of waste governance, will be explained when it comes to enhancing environmental effectiveness in waste management.

## **Time**

Kütting (2000a, 2000b, 2001a, 2000b) regards ‘time’ as an important determinant of environmental effectiveness due to its two unique features. The first one is ‘irreversibility’ of time. It is almost impossible to recover the environment once it has already been severely destroyed. The second one is ‘rhythmicity’ of time, which is a pretty new concept. The rhythmicity of time can be categorized into two types: linear



and circular. Kütting (2000a) believes that linear rhythmicity symbolizes the fundamental principle of modern society, which she describes as ‘mechanistic system’. She explains ‘mechanistic systems’ which are human-made, and are best described by the phenomenon of the throw-away society which replaces individual parts but does not reuse them (Kütting, 2000b). She believes these throw-away practices are enabled because the mechanistic system has established assumptions of “dividing an object into parts that can be studied individually and can be replaced easily (ibid)” On the contrary to linear rhythmicity, circular rhythmicity represents the principle of the environment, which is reflected in ‘organic system.’ The organic systems (the environment) “are based on the recycling resources and emphasize re-use and renewal, thus creating a constant energy cycle (ibid).” In her point of view, environmental degradation occurs because of the incompatibility between a mechanical system (man-made modern society) and an organic system (the environment). The mechanical system representing linear rhythmicity is so used to consuming and wasting lots of resources, which results in severe environmental degradation.

The features of time, explained by Kütting, provide interesting points for examining waste management. First of all, when it comes to the irreversible feature of time, waste management should put an effort to stop aggravating environmental degradation within a given period, understanding the irreversibility of environmental problem. Thus, it is necessary to discover how the participants in waste management recognize this irreversibility and what they will do to prevent further environmental (and irreversible) degradation caused by waste. In addition to this, it is also required to identify the factors that impede launching new policies and programs that aim for better strategies in waste management. With regard to the rhythmicity of time, it is necessary to figure out how solid waste management reflects the circular rhythmicity of time in waste policy.

Waste treatment methods in the waste hierarchy (see Figure 8 in p.47) can be categorized by representing either linear or circular features. Waste disposal methods such as landfilling and incinerating without energy recovery can be regarded as methods reflecting linear rhythmicity, since the value of waste will dissipate in landfill sites or incinerators. On the contrary to these two methods, recycling and reuse practices can be understood as reflections of circular rhythmicity, because waste is reused by replacing virgin materials partly or entirely. Energy recovery, which sits at the middle of the

hierarchy between disposal and recycling methods, reflects the circular principle to some degree, since this method uses waste as resource to generate energy for district heating and electricity, although the value of the waste will be extinguished in the energy plant. Therefore, by discovering which treatment methods the waste management focuses on, it will be revealed how the waste management is attempting to prevent further environmental degradation by pursuing compatibility between contrasting rhythms, linear and circular, which represent the modern society (mechanic system) and the environment (organic system), respectively.

## **Economic structure**

Kütting (2000a, 2001b) sees economic structures as a major determinant of environmental effectiveness, because economic structures generally determine social organization, and these structures also decide the angle how the environment and environmental issues are perceived in a society. For instance, Kütting (2001b) uses the example of 'green technology' to explain how technology is seen in modern society. She argues that green technology is perceived as a desirable method to overcome environmental degradation and to sustain the economic growth at the same time. This is because the current society has such a strong belief in the possibility of infinite progress and economic growth. At the institutional level, Kütting (2000a, 2000b, 2001b) insists that the regulatory structure reflects the economic factors, thus negotiations or agreements are greatly influenced by economic considerations and feasibilities. This is because most regulations for the environment impose a cost on economic activity and people.

This analysis of Kütting is well demonstrated in the relationship between waste management and economic structures. First of all, the current economic structure is characterized by mass production, and consumption linked to giant amount of waste generation. It is easy and cheap to buy products and throw them away. Thus, it is necessary to investigate the relationship between the present economic structure and waste generation, and from there find possible solutions. Secondly, by considering the economic factors at institutional level, we can see how the economic factors restrict the current waste management from developing better waste management plans. For example, due to the high cost of introducing a new waste treatment system, a company

might hesitate to implement it, even if the system is more environmentally friendly. In short, economic concern is sometimes prioritized over environmental necessity. Therefore, understanding the economic structure is paramount in diagnosing the problems regarding waste generation, and in seeking solutions by understanding the financial barriers to implementing and enhancing the current waste management.

## **Science**

Kütting explains that “science is taken to mean the activity, and its results, carried out by a professional group of people in universities or other research institutions trying to find laws and correlations in their study of phenomena occurring in the physical environment by simulating these in a laboratory environment (2009: 12).” Thus, Kütting (2000a, 2000b, 2000b, 2009) believes that science is a crucial determinant of effectiveness, since policy makers rely on science to understand environmental problems, and to seek possible solutions for them. The other important point of science is that “science is a social activity that cannot be isolated from other social activities,” (Kütting, 2009: 13). Accordingly, “scientific processes strongly reflect social, political, and economic processes that occur simultaneously with the scientific research related to an environmental issue (ibid).”

When it comes to waste management, science is an important factor, as Kütting has insisted above. Science offers knowledge and enables to forecast negative impacts originating from waste on the environment. Thus, this enlightens policy makers and citizens about the negative effects of waste. Also, science brings about technological advances in waste treatment that are more environmentally friendly. Science mobilizes people’s attention to an environmental issue, but public attention can encourage or discourage scientific research on the environmental issue as well. If more people are concerned with a certain environmental issue, more researchers will do their studies on the matter. Furthermore, the policy makers and private companies may provide more financial support to the studies they explore issues that they are related more closely to. By considering the science determinant in waste management, this thesis will show how scientific factors have helped to improve solid waste management in Oslo.

## **2.3 Governance networks**

### **2.3.1 From government to governance networks**

The shift of research focus from ‘government’ to ‘governance’ has brought a significant change in diverse research areas ranging from politics and public administration, to development studies. In fact, several decades ago, the terms of government and governance were used interchangeably (Finer, 1970; recited from Rhodes, 2010), with no clear distinction between the two terms. As more diverse actors, such as business players and CSOs, are engaged in politics and social issues, theoretical efforts to make a clear divide between government and governance have been developed by researchers (Torfing, 2007; Davoudi and Evans, 2005). The term of government, now, refers to a state or (sometimes) local governmental entity. For example, Torfing refers to government as “the formal state institutions that are commonly divided into legislative, executive and judicial branches, but unified by their joint monopoly of legitimate, coercive power” (2007: 3). Governance, on the other hand, can be defined as the “multiplicity of governmental and non-governmental organizations, involved in mobilizing and managing collective action” (Davoudi and Evans, 2005: 493). Furthermore, Torfing elaborates this term, saying that governance “more or less deliberate attempts to govern particular policy areas through negotiated interaction between a multiplicity of actors, processes and institutions” (2007: 3).

Regarding the comparison of structures between government and governance, Bjørnå and Aarsæther (2010: 304) assert that governance, in principle, includes horizontal relations between participants. This is in contrast with the classical government mode explained by Dahl (1963). He describes that the power to control the choices of others is the notion of a traditional government, and implies a hierarchical structure of government. Yet, it does not mean that every governance is characterized as a horizontal structure. For instance, the analysis of multi-level governance, captures vertical arrangements and complicated relations between domestic and global authorities, as would be the case for a member state of the European Union (Stephenson, 2013).

Rhodes' study (2010) makes a connection between 'network' and 'governance,' and highlights the importance of network in governance. Rhodes thinks of governance as "a change in the meaning of government, referring to a new process of governing" (2010: 15). Rhodes takes this approach while examining order and changes in British politics. The strong executive entity of the Great Britain, representing the Westminster model<sup>14</sup>, has been in danger since encountering complex and diverse relations with different institutions. Rhodes illustrates that an institution makes up "a differentiated polity, characterized by functional and institutional specialization and the fragmentation of policies and politics" (2010: 7)". Thus, according to Rhodes' argument, the traditional form of government, as a unitary form, has rapidly been replaced by a new type of governance that links different levels and types of governments and organizations.

### 2.3.2 Governance networks

Governance networks (or sometimes referred to as 'network governance'<sup>15</sup>) has been one of the dominant approaches in governance research. The definition of governance networks by Sørensen and Torfing is widely used in governance network studies. Sørensen and Torfing mention that "governance networks are a particular form of governance, and a particular kind of network" (2005: 197), and define it as follows in their study:

"A relatively stable horizontal articulation of *interdependent*, but operationally *autonomous* actors who interact through *negotiations* that involve bargaining, deliberation and intense power struggles which take

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<sup>14</sup> The Westminster model captures important features of the British political system. Rhodes (2010: 5) clarifies these features as parliamentary sovereignty, strong cabinet government, accountability through elections, major party control of the executive of Prime Minister, cabinet, civil service and etc.

<sup>15</sup> It seems that distinction between 'governance networks' and 'network governance' are unclear among researchers. Researchers well-known for their governance networks studies have the tendency to use these two terms interchangeably (Sørensen and Torfing, 2005; Torfing, 2007; Lewis, 2011; Blanco, Lowndes, and Pratchett, 2011; Klijn and Koppenjan, 2012; Blanco, 2013). Since there is a difficulty to find significant studies on the distinction between these two terms, this research follows along the same lines by referring to these studies that interchange the two terms. However, it should be mentioned that there are few studies that attempt to distinguish these two terms. For example, Davies argues that these two terms are not same, describing network governance as, "an ideal-type, the post-traditional claim that the network is proliferating and foster ethical virtues such as trust and empowered reflexivity, heralding a rupture with the past," and governance networks as, "recurring and/or institutionalized formal and informal resource exchanges between governmental and non-governmental actors," (Davies, 2011: 3). Lewis also separates these terms by illustrating network governance as, "a particular governance form" and governance networks as, "a more deliberate form of governing" (Lewis, 2011: 1222-1223).

place within a *relatively institutionalized framework* of contingently articulate rules, norms, knowledge and social imaginaries that is *self-regulating* within limits set by external agencies and which contribute to the production of *public purpose* in the broad sense of visions, ideas, plans and regulations (ibid).”

Researchers explain that changes in society and public management have resulted in this new term, ‘governance networks’. First, the concept of governance networks has risen in prominence, as the growing demand to cope with the fragmented and complicated properties of today’s society (Torfing, 2007). Furthermore, society has changed rapidly in various specialized domains, and this change requires a new type of governance that can respond and adjust to rapid changes with cohesive coordination through interaction with others (Kooiman, 2000). Second, several theorists believe that New Public Management<sup>16</sup> was an influence on the advent of governance networks. Kickert, Klijn, and Koppenjan (1997) claim that governance network is a response to the problems generated by internal fragmentation in the public sector, thanks to the New Public Management.

Network governance has been a promising type of governance owing to its four strengths (Sørensen and Torfing, 2005). First, it has great potential because not one, but many actors can identify problems find solutions that “allow for adjustments to the complexity and variety of the concrete conditions” (Kooiman, 2000:155). Kickert and Koppenjan (1997) share the same view that the teamwork of governance networks achieves results that no government could accomplish alone. Second, it can be an important instrument to gather information, knowledge and assessments “that qualify political decisions” (Sørensen and Torfing, 2005:4). Third, network governance helps to reduce conflicts among participants and to establish consensus built through negotiation and cooperation (Mayntz, 1991; recited from Sørensen and Torfing, 2005). Finally, governance networks also decrease the risk of implementation resistance, since the participants would feel a sense of joint responsibility and ownership for the decisions made, as they are involved in decision-making process (Sørensen and Torfing, 2005). These four strengths are possible because governance networks bring a substantial number of actors together in a decentralized governance system that is usually operated with horizontal relations among actors (Torfing, 2007).

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<sup>16</sup> According to the description by Klijn and Koppenjan (2012), the New Public Management is the attempt to adapt business-like ways of organizing and managing in the public sector.

With regard to the strengths of governance networks, they appear to be a promising way to govern in politics or public administration. However, it should not be seen as a panacea. First, it is difficult to optimize all functions of a governance networks in reality, because the many actors involved have different approaches and interests (Kickert, Klijn, and Koppenjan, 1997). Problems in governance networks include, for example, conflicts between actors, lack of effective leadership, high transactions cost, and lack of visible results could all lead to a network's failure (Sørensen and Torfing, 2005; Torfing 2007). Second of all, network governance generates questions about its transparency. Given the closed nature of a network to outsiders, it is challenging to assure the transparency and accountability (Haus, Heinelt and Stewart 2005). Third, several researchers give a warning that governance networks could undermine democracy (Sørensen and Torfing, 2005; Sørensen, 2006). Sørensen (2006) while researching a case study in Danish municipalities, finds that governance networks could marginalize politicians who are selected in elections by the public, since the influence of the representative democratic institution shrinks in the process of governance network.

In contrast to the concerns above, an opposing view has argued that governance networks could, in fact, enhance a democracy by increasing the diversity of participants in the representation of the public (Skelcher et al, 2011). Rhodes (2010) thinks that governance networks supplement representative democracy, because it entails functional organizations in it that mostly consists of territorially organized institutions. Kooiman (2000) also points out that governance networks improve the flexibility of democratic institutions. In sum, governance network is a double-edged sword, as a threat or a supplement to representative democracy.

There are four important concepts to characterize governance networks, according to Klijn and Koppenjan (2012:591):

- 1) Actors, interdependency and frames: Outcomes (policy) are formed and carried out in a network gathering interdependent actors. These actors have different perceptions of problems and solution, depending on their own frame.

- 2) Interactions and complexity: Complex interactions occur in the process of policy making and problem solving, because each actor has different view and strategies according to their frame.
- 3) Institutional features: Institutionalization of relations between actors is established by interaction patterns. Institutional relations also generate rule that regulate actors' behavior in networks, and that facilitate interaction in network while reducing transaction costs and influencing the performance of networks.
- 4) Network management: The complicate processes in networks needs managements of interaction, and this management is called as network management. Network management has three strategies for guiding and managing networks; "initiating and facilitating interaction processes between actors, creating and changing network arrangements for better condition, and creating new content by exploring new ideas, working with scenarios, and organizing joint research (ibid)."

Instruments are crucial in governance networks, because instruments are "the means to achieve certain goals" (Ringelign, 1983:1; recited from Bruijn and Heuvelhof, 1997). Bruijn and Heuvelhof (1997) categorize three types of instruments, asserting that these instruments can affect the governance-relevant context in two ways: whether aimed at actors, or at relations between actors in network.

"First, instruments designed and deployed for governance, and which are tailored to the actors' behavior, exert an indirect, possibly unintended effect on the governance context. The second form of influence derives from the fact that instruments are consciously designed for managing network. They may exert an indirect and unintended impact on a different level than that for which they were intended, subsequently influencing behavior indirectly and often unintentionally" (1997:126).

The first instrument is regulatory instrument, for example, legislative, executive, and judicial powers. Bruijn and Heuvelhof explain that regulatory instruments aimed at actors "influence the number of actors in a network, the power they wield and the intra-organizational pluriformity" (1997: 126). Aimed at relations between actors, the regulatory instrument tailors the relations in the network by, for example, making an actor function as a manager in the given context.

Financial instruments are the second type of instrument that is utilized for network governance, and it is powerful when combined with regulatory instruments. When it



comes to financial instruments aimed at actors, governments – with legislative and financial resources to enforce their will – can create a new demand for goods or service which open a new market. This instrument also has different methods for strengthening the autonomy of actors, like issuing unconditional tax relief, for example. Meanwhile for relations, the instruments serve to bind different actors together with financial cords. Moreover, they play a role to encourage dormant actors to engage in the network and cooperate (Bruijn and Heuvelhof, 1997).

The last instruments are communicative (or informative) instruments. The communicative instruments aimed at actors are expected to lead to changes in perception, values, and norms toward the issues the actors are working on, leading ultimately to an evolution of our conventional belief system eventually. At relations between actors, the communicative instruments serve as “the design of the concepts actors choose for formulating their problems and the solutions they devise for them” (Bruijn and Heuvelhof, 1997:130).

## **2.4 Limitation**

I should clearly mention the limitations of this study. The main limitation is adopting a concept that is utilized in international relations. Despite the fact that this research borrows the conceptual framework (environmental effectiveness) from Kütting’s studies, her explanation may not fully fit the situation of waste management. Kütting introduces the environmental effectiveness and its four determinants in her international relations studies, specifically for international environmental agreements (2000a, 2000b, 2001a, 2001b, 2009). International environmental agreements and waste management are hugely different. The major difference is in their structures. Kütting (2009) describes international environmental agreements as “formal or informal arrangements between states that aim to acknowledge, regulate, or ideally, eradicate an environmental problem collectively” (2009: 3). The agreements are different from national laws, because there is no authority to force individual states to observe international environmental treaties or regulations, and no global ‘police force’ to force the states to fulfill these responsibilities if the state fails to implement these rules. Thus, due to the

lack of sovereignty and police force on the agreements, the consensus of the participating states is at the core of international environmental agreements. However, national or regional governments control waste management with laws and regulations, thus this is not totally upon the consensus of all participants (or member states, in an international agreement). Although the consensus of participants is just as important in national governments as in international environmental agreements, there are police forces at hand to compel participants to comply with the given rules in waste management.

The limitations of these two frameworks, environmental effectiveness and governance networks, also need to be clearly addressed. First, concerning environmental effectiveness, it is difficult to measure and quantify environmental effectiveness in numbers or statistics. There are no mathematical tools or equations to indicate how the four determinants shape the environmental effectiveness specifically. Second, the analysis with the four determinants can be normative, due to the lack of deeper investigation about them. There is no clear answer, for example, to the question of which of the four determinants is the most indicative of environmental effectiveness. Therefore, this analysis mainly calls attention to environmental effectiveness and its four determinants, overcoming the current research foci on the institutional performance of waste management without considering social context. Third, there is a noteworthy concern in the governance networks analysis, stating that “the studies of governance networks seem to be problem-driven rather than theory-, or method-driven” (Torfing, 2007: 16). Torfing expresses concern that governance networks studies might lack a theoretical ground and the rigorous use of research methods, as the analytical departure point of the studies is “either the urge to understand paradoxes and anomalies, or the problematization of what seems to be normal, natural, or evident (ibid).” Yet, Torfing also suggests that this concern can be controlled by well-designed research questions and methods like qualitative interview and policy-related document reviews.

# 3 Methodology

## 3.1 Case study research

Case study research is a form of qualitative research. Yin defines the case study as “an empirical inquiry about a contemporary phenomenon (e.g., a ‘case’), set within its real-world context- especially when the boundaries between phenomenon and context are not clearly evident” (2009: 18). It is widely applied in many different study areas from anthropology to business because of its strengths. It offers a unique angle for discovering underlying mechanisms situated in reality (Moses and Knutsen, 2012). Also, a case study can be intensively utilized despite the limited number of resources (Lijphart, 1971). Yet, case study research has been widely criticized because of its lack of generalization since it concentrates only on a singular case (May, 2001; Robson, 2011; Moses and Knutsen, 2012). Although case study research carries the large risk of generalizing outcomes, social science research makes an effort to reduce this risk by supplementing it with other methods, such as quantitative method.

There are different ways to categorize a case study. First, depending on which level a study focuses on, there are six types of case study following Hakim’s category: (1) the individual case study, (2) a set of individual case studies, (3) community studies, (4) social group studies, (5) studies of organizations and institutions, (6) studies of events, roles and relationships, and (7) cross-national comparative studies (Robson, 2011). Second, Lijphart (1971) categorized six types of case study by focusing on a theoretical interest: (1) atheoretical, (2) interpretive, (3) hypothesis-generating, (4) theoretical-confirming, (5) theoretical-informing, and (6) deviant. The first two, atheoretical and interpretive case studies both focus on the single case rather than generalizing a theory based on the study. It is a hypothesis-generating case study when the research establishes a new theory from a case study. Two cases studies, theory-confirming and theory-infirming, are employing an analysis within an established theory. The last study, the deviant case study, is meaningful since it shows a deviant case from conventional generalization (Lijphart, 1971; Moses and Knutsen, 2012).

From these two categories of case study above, this thesis can be characterized as a community case study and theoretical-confirming case study. Since this study

concentrates on a community level, it will describe the characteristics of waste management occurring in Oslo. Consequently, the results of this research cannot be generalized and applied to other areas. Also, this research relies on the two frameworks of environmental effectiveness and governance networks, so the collected data will be analyzed as such.

## **3.2 Choice of method**

This research is a case study based on data gathered by two methods: in-depth interviews and literature review. First of all, interviews were critical in the gathering and analysis of information in this research. I employed the interview as a main method in determining how waste management in Oslo is effective in terms of environmental effectiveness. The goal of this research was not to find out ‘how much’ waste is handled by different waste treatment methods in the current waste management each year, but rather to discover the quality of the waste management. This aided me in coming to certain conclusions on, for example: how the management is implemented and by whom; whether this management is effective enough to minimize negative impacts to the environment; and what kinds efforts can be made to make the management more environmentally effective. It was suitable for this research to employ interview, a qualitative research method, and in doing so, I gathered valuable data that I could not find in any publications. Secondly, I referred to materials from Statistics Norway, governmental agencies, and to publications by the organizations that I had interviewed. For the purpose of designing the interview questions and analyzing the data, it was essential to know about waste issues and actors’ works in the waste management.

### **3.2.1 Interview**

Interview is a commonly practiced tool for gathering data in social science. It is used widely because of its strength. As a research method, interview offers diverse details and insights that do not appear in quantitative materials (May, 2001; Robson, 2011). It enables a researcher to grasp fruitful data such as personal opinions or the personal experiences of the interviewees. Zølner, Rasmussen and Hansen (2007) regard the

strength of interview as essential in studying governance networks because the answers from interviewees provide the details of a network's formation, development, and functioning. The authors insist that the researcher can also determine out how each interviewee evaluates interactions, negotiations, and conflicts in the network process through the interviews. For instance, official documents rarely present the details of a policy making process, which could give insight into why a decision was made, which processes have been taken, what kinds of interactions have occurred between the actors involved in the policy, and so on. Moreover, it is possible to notice different perspectives on a same issue of diverse actors in a network who hold different interests. Thus, interview can offer the hidden story of a certain topic, unlike official documents and quantitative surveys.

In addition to these two strengths, a research can acquire more information by asking follow-up questions to informants, while communicating with the informants during the interview (Wilhite et al, 1996). This is, however, mostly dependent on the type of interview. An interview can be classified into three categories, by its degree of structure: fully structured, semi-structured, and unstructured (May, 2001; Robson, 2011). A fully structured interview is comparable to survey research. May describes this as a method where "each person is asked the same questions, in the same way, so that any differences between answers are held to be real ones and not the result of the interview situation itself" (May, 2001: 121). He also explains that this interview method focuses on reducing the possibility of deviation, rather than encouraging a personal opinion (ibid). The second one, the semi-structured interview, gives more space for both the researcher and the informants; despite the existence of a pre-determined list of questions, the interviewer can freely modify questions or the order of the interview list, and may also add unplanned questions, depending up how the interview develops (Robson, 2011). May evaluates that this semi-structured interview allows interviewees to give their personal opinion, while the interviewer maintains the structure of the prepared interview (May, 2001). Lastly, an unstructured interview is a type of interview where "the interviewees answer questions within their own frame of reference" (ibid). Since it provides a wide understanding of interviewees' opinion, this method is more to suitable for a biographical or oral history interview.

Interview, however, has weaknesses in terms of reliability and validity. First, reliability is “how consistent are the results of repeated tests with the chosen measuring instrument?” (Berry, 2002: 679). This is usually the issue with trying to generalize the result. In interview, reliability would mean that the same interviewees would respond with the same answer in the same conversation with another researcher. Since interviews depend on conversation skills, the reliability of interview is not guaranteed. On the other hand, validity is “how appropriate is the measuring instrument to the task at hand?” (ibid). From an interviewer’s perspective, validity depends on how a researcher relates the answers to the theoretical framework. These two weaknesses render interview inadequate. However, these limitations can be resolved if a researcher uses it in combination with other methods, such as literature review, or observation.

For this research, I utilized a semi-structure and in-depth interview that lasted 45-60 minutes as my primary research method. I conducted twenty face-to-face interviews with twenty informants from various waste management operations, and one e-mail interview as a follow-up. The interview questions consisted of approximately twelve basic questions about their respective companies, the informants’ role there, previous/ongoing projects or programs regarding waste, the difficulties of cooperation with other actors, and personal opinions toward waste issues in Oslo. Since all interviews were semi-structured, the content and the number of interview questions varied, depending on the informant.

12 of the informants were women and 9 were men. I was able to reach 12 of 21 informants by sending an e-mail or calling him/her directly, with the direct contact information available on their respective company’s website. The remaining 9 informants were introduced when I contacted their offices by general phone numbers or email addresses, and asked whom I could have an interview with regarding my research topic. Mostly, communication managers of these offices forwarded me to these informants whose position was most relevant to this research topic. I met all my informants during the daytime. Seventeen informants were willing to invite me to their workplaces so that I could look around their offices. Four of them gave me a brief tour at their company, or held a short presentation about what their companies do. This was very helpful, enabling me to get acclimated to the place prior to the interview. Thanks to their short introductions and tours, I could ask them unplanned questions that I had not

premeditated in my preparation for the interview. It was also useful for the interviewees to hold the interviews at their workplaces, because they could utilize their previous materials and colleagues, in order to give as correct an answer as possible.

All informants can be categorized into these 8 groups, as indicated in Table 2: The Municipality of Oslo, government, industry (business), return company, business association, NGO, CSO, and second-hand shop.

Category	Informants No.	Name of agency	Method
The Municipality of Oslo	1	Renovasjonsetaten (REN) 1	Face to face
	2	Renovasjonsetaten 2	Face to face
	3	Renovasjonsetaten 3	Face to face
	4	Renovasjonsetaten 4	E-mail
	5	Bymiljøetaten 1 (BYM)	Face to face
	6	Bymiljøetaten 2	Face to face
	7	Energigjenvinningsetaten (EGE)	Face to face
Government	8	The Ministry of Climate and the Environment (Miljødirektor), Norway	Face to face
Industry	9	Ragn-Sells	Face to face
	10	University of Oslo	Face to face
Return company	11	Green Dot Norway (Grønt Punkt Norge)	Face to face
	12	Elretur	Face to face
	13	Infinitum	Face to face
Business association	14	Dagligvareleverandørenes Forening (DLF)	Face to face
NGO	15	Waste Norway (AvfallNorge) 1	Face to face
	16	Waste Norway 2	Face to face
	17	LOOP	Face to face
CSO	18	Future in Our Hands (Framtiden i våre hand)	Face to face
Second-hand shop	19	Galleri Normisjon	Face to face
	20	Fretex 1	Face to face
	21	Fretex 2	Face to face

[Table 2. The list of informants]

A specific description of each actor will be given in Chapter 5 to map out waste management in Oslo, but I will briefly explain how I selected the interviewees here. All Norwegian municipalities are responsible for collecting and handling household waste in their regions by national law (the Pollution Control Act). Thus, it is important to have interviews with the municipal agencies—REN, BYM, and EGE—in order to understand what the Municipality of Oslo does in terms of household waste. The Norwegian government influences domestic waste management with laws and

regulations. At the same time, the Norwegian government is also affected by decisions made by the European Union (EU), and tries to observe them also in Norway. At an industry level, represented here are two actors: Ragn-Sells, a private waste handling company; and the University of Oslo, an industrial (business) actor, responsible for the treatment of its own waste. According to the Pollution Control Act, all those who are not households are industrial actors, and they are responsible for the treatment and safe disposal their own waste by hiring a waste treating companies. Since the University of Oslo launched its waste separation system on the campus in 2015, I would like to know the reason for introducing the new system.

Return companies are companies that engage in take-back schemes in Norway. Although they operate at a national level, their work is obviously done in Oslo, collecting plastic packaging waste, beverage bottles and so on. DLF, a business association of grocery suppliers, is one of the associations credited with establishing return companies in Norway. Thus, it was also important to find the reason to build this take-back scheme, operation, and future plans regarding waste.

NGOs are non-governmental organizations that work on waste issues. Waste Norway and LOOP are closely cooperating with public and private waste companies, and return companies (respectively). Both of them take informative roles by providing knowledge of waste to politicians and its (Waste Norway) members or the public (LOOP). The civil society organization, Future In Our Hands, is not directly interested in waste, but rather in consumption. Through an interview, I hoped to learn its perspective on waste as an environmental organization, and its rationale for taking this view.

Lastly, second-hand shops not only shape people's consumption, they also promote reuse practices in Oslo. Moreover, REN works with Fretex and UFF to collect textile, clothes, and shoe items in Oslo via collection boxes. Galleri Normisjon is a religious organization that sells second-hand items and utilizes the profit to support the international projects of its mother organization, Normisjon. I expected to understand their work, philosophy, and the obstacles they face as second-hand shop in Oslo.

Zølner, Rasmussen and Hansen (2007) emphasize the selection of respondents for interviews, since it determines the quality of the data collected in the research. I employed 'snowball sampling' to find and gain access to relevant informants. May



describes the sampling method as “small group of people who are the initial interviewees are asked to nominate their friends, who are then interviewed by the research” (May, 2001: 132). First, I had interviews with informant 1 and 2 from REN, which is the waste management agency of household waste in Oslo. Then, the two interviewees recommended other agencies (BYM, EGE) with regard to the topic of this thesis, and gave me information about organizations (e.g., Fretex) that REN cooperates with. Second, I reviewed the waste programs and plans of the Municipality of Oslo, and I contacted the organizations (Future in Our Hands, LOOP) that are mentioned in the programs/plans. After the interview with informant 17 from LOOP, I figured out that the return companies, such as Green Dot Norway, Infinitum, in the take-back scheme of packaging waste have something in common. It is that Norwegian business associations, like DLF, put their collective efforts to establish the return companies and control them by being members of the companies’ committees. Thus I had interviews with Green Dot Norway, Infinitum, and DLF, regarding the take-back scheme and roles of industrial actors in waste management. Third, I got to know about the take-back scheme of electrical and electronic waste (WEEE, henceforth) through interviews with Green Dot Norway and The Norwegian Ministry of Climate and the Environment. After the two interviews, I contacted one WEEE return company, Elretur, and conducted an interview.

### **3.2.2 Literature review**

I utilized literature review in three ways: by reviewing previous studies, in the designing of interview questions, and in the collecting of figures and statistics to compose this thesis. Firstly, I read approximately 80 studies in the form of books and papers to understand waste, waste management, environmental degradation, effectiveness, governance, networks, and so on. These studies covered topics which range from waste research, sustainable development, sociology, public administration, regime theory, governance study and international relations studies. This interdisciplinary approach was imperative because the main theme of this thesis, waste management, is a conglomeration of public administration, governance, and environmental and economic issues. By doing the aforementioned research, I realized that waste management should be understood by taking an account of the various social factors at play.

Secondly, I studied the annual reports, environmental reports, and other such official documents published by the agencies, organizations, and companies whose informants I knew I would later interview. Most publications and reports were published in Norwegian, and thus I used Google Translator, since Norwegian is neither my first nor my second language. If translations needed clarifying, I asked for assistance from Norwegian speakers.

Lastly, literature review was an important research method to do cross checks and to discover specific details for this thesis. All informants are definitely professionals in their jobs, and they know their roles. Yet, they could not know all details and histories about their companies; not all situations, projects or programs. For example, an informant could not give a specific explanation about a project that terminated three years ago, if that person only started to work at the company a year ago. Of course, if it is related to his or her tasks, the informant was able to give current details or short explanations about what he or she knows about it. Therefore, publications and papers written by the organizations or companies were significant sources to recheck the informants' answers. In addition to this, the reports and publications contain concrete figures and statistics. Also, materials such as Norwegian laws offer explicit details about waste regulations. Thus, these materials will be utilized in this thesis to provide more information and to give clearer explanation.

### **3.3 Methodological challenges**

Language was a problem in this research in three ways. First, it took me time to understand information written in Norwegian while I was preparing for the interviews. It was easy to find English reports published by the Norwegian government, but most publications from an interviewee's organization required me to use Google Translator and a Norwegian-English dictionary to understand. I tried my best to understand the materials correctly and to find more available materials, but I need to admit that language barriers may have limited the range of accessible data in this research.

Secondly, a few informants had difficulties explaining certain Norwegian notions and systems in English. Even though all informants were Norwegian, all interviews were

conducted in English since my Norwegian is not advanced enough. The informants explained concepts as best as they could, and I also asked them to speak or write the name of a notion or system down, so that I might get help from a Norwegian friend in later interpreting it. This was rarely needed, however. The interview excerpts in this thesis are transcribed here as spoken by the informants'. However, as English was an obstacle in some cases, the transcriptions required some clarifying for the sake of comprehensiveness and readability. Every effort was made to retain the integrity of the informants' answers in this written form

The other language issue is my English fluency. Although I grew experienced with speaking in English while living abroad for some years, I made several pronunciation mistakes on account of my nervousness. A few of informants, unaccustomed to hearing English with a Korean accent, occasionally would have to ask me to repeat my questions. Thanks to their kindness and patience, all interviews were conducted in a pleasant and relaxing manner. Also, I became less nervous conducting interviews as I grew more and more experienced.

### **3.4 Ethical consideration**

Prior to every interview, I asked the informant whether he or she did not mind having their voice recorded. I clearly explained that this interview and the audio recording would be utilized only for this thesis as primary data. Fortunately, all informants agreed, so I was able to record all the interviews I conducted.

In regards to anonymity, some informants required anonymity in this thesis because they worried that some of their answers were too personal. Thus, I will transcribe all interview excerpts with the informants' numbers and their organizations, instead of stating their personal names. However, I will not even show the informant number and their corresponding organization in a few instances, because some answers might compromise the working relationships these organizations have with partners on joint programs, policies and projects. Even if it is difficult to identify an informant among employees at a certain company or organization, discovery is not impossible. Also, it is also a concern that people might mistake the answers of an informant as representative

of an entire organization. Thus, I will retain identifying information in the cases where an informant showed hesitation in answering a question.

## 4 Waste

The definition of waste is “any substance or object which the holder discards or intends or is required to discard”<sup>17</sup> by the European Commission. The Norwegian Pollution Control Act<sup>18</sup> also adopted a similar definition of waste as “discarded objects of personal property or substances, including surplus objects and substances from service industries, manufacturing industries and treatment plants, etc.”<sup>19</sup> Waste water and exhausted gases are not regarded as waste in the law.

This chapter will provide primary knowledge about waste and waste management. Although this chapter may not be directly related to the topic of this research, this chapter is imperative for understanding why waste and waste management are so important to the environment, how these have been developed in society, and what led to these changes. Linking back to the notion of waste in section 4.1, it will be clear what the origin was for ‘waste’ as a concept, and what dramatic changes in technology, economic climate, and consumption practices make waste problematic today. Afterward, section 4.2 will clarify waste classification, waste management and the hierarchical structure of waste management, as introduced by the European Commission.

### 4.1 Waste: past and present

#### 4.1.1 Waste, as a part of nature

Considering our present perspective on waste as a problem, it is interesting to note that waste has always been a natural part of past ecosystems. Waste has always existed, and

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<sup>17</sup> European Commission, 2008, ‘DIRECTIVE 2008/98/EC’. <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32008L0098&rid=1> Retrieved: February 22, 2016.

<sup>18</sup> The official name of the Act is ‘Lov om vern mot forurensninger og om avfall’ in Norwegian. But it is mostly referred and known as ‘Forurensningsloven (the Pollution Control Act in English).’ <https://lovdata.no/dokument/NL/lov/1981-03-13-6> Retrieved: February 22, 2016.

<sup>19</sup> The English version of the Act (the Pollution Control Act) is quoted from <https://www.regjeringen.no/e-n/dokumenter/pollution-control-act/id171893/> Retrieved: February 22, 2016.

it has been generated by all living beings on the Earth. However, nothing was wasted in the natural system that is characterized by ecological harmony and circulation. Waste was naturally transformed into a useful organic resource for other organisms in the circular process of the nature.

Waste generated in nature consists of organic material that can be decomposed by microorganisms in the ecosystem. Due to this decomposition, the thing we regard as waste, turns into beneficial input for other organism in the ecosystem. Thus, several researchers believe that our ecosystem has a good harmony, turning output (waste) into useful input (McDonough and Braungart, 2002; Szaky, 2014). For example, fallen leaves from trees become useful material to enrich soil after being decomposed. This nutrient enriched soil offers a better natural environment for plants to grow and is also a good habitat for animals, leading to a diverse ecosystem.

Humans generated waste daily in the past, as we do today. Before the Industrial Revolution, people produced organic waste, as explained above. People created, and consumed items from nature, which would degrade naturally when the items became waste. Organic waste was used in various ways, such as a fertilizer. Also, people sold or exchanged an unwanted item in the market, when they no longer wanted it (Parto et al, 2007). Thus, nothing was wasted in the environment. Discarded waste revived as a part of natural circulation when it entered into the ecosystem that had infinite assimilative capacity to the form of waste (Heun, Carbajales-Dale, and Haney, 2015). This harmonious feature of waste, however, came to an end with the start of the Industrial Revolution.

#### **4.1.2 Waste, becoming problematic**

Waste has become a serious social and environmental issue, qualifying now as a waste crisis. According to the World Bank's estimations, world cities annually produce approximately 1.3 billion tons of solid waste (World Bank, 2012:8). Moreover, the World Bank expects the amount of solid waste per year will reach 2.2 billion tons by 2025 (Ibid). This waste crisis has resulted from these three following factors; technological advances, mass consumption, and changes of people's practices in consumption and waste disposal behavior.

## **Technological advances**

First of all, the incredible advances in science and technology have removed an important attribute of waste: its ability to decompose in nature and become nutrients for other organisms in a harmonious circulation. After the Industrial Revolution, waste has become material that nature can no longer handle in the way it has before. New materials like plastic, which had never before existed on Earth in a natural form, was invented for human convenience (McDonough and Braungart, 2002; Szaky, 2014). Thus, these new synthetic products will take hundreds of years to decompose in the environment, if they decompose at all. Glass bottles, for example, never decompose, and a plastic six-pack holder needs 450 years to decompose. On the other hand, a banana peel only takes 3 to 5 weeks to decompose<sup>20</sup> in nature. In addition to this, some hazardous material must be handled in specialized processes in order to remove toxins that would surely be harmful to the environment and to people. In sum, the assimilative capacity of the ecosystem has been challenged by two new attributes of waste: its inability to be easily broken down in nature, and its toxicity.

More importantly, science and technology, accompanied by ‘Fordism,’ established the culture of mass production that we know today. Consequently, this meant that the ‘new waste’ as defined above, was also being mass produced. The introduction machine-operated manufacture enabled producers to manufacture goods at cheaper price and much faster pace (McDonough and Braungart, 2002). The innovative production system remarkably reduces the time to produce goods, and curtails the cost of production by replacing manpower with machine. The mass production leads to mass consumption in today’s society, which in turn generates a massive amount of waste.

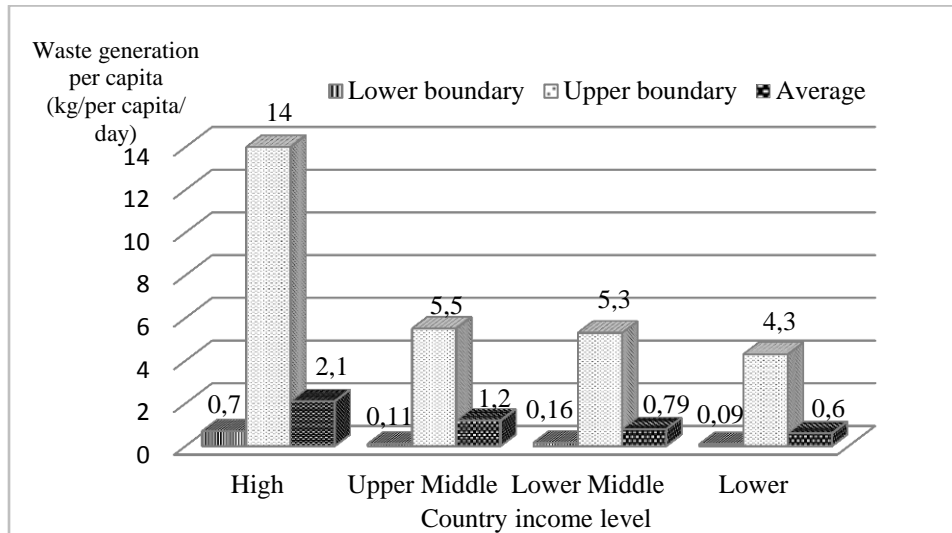
## **Mass consumption**

The second factor causing the waste crisis today is mass consumption. The growing income caused by rapid economic growth allowed people to enjoy mass consumption, and to be able to afford purchasing more items (O’Brien, 2008). Accordingly, this is a common assumption that there is a correlation between a level of income and the amount of waste generated; in other words, developed countries produce more waste

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<sup>20</sup> National park service, Unknown, ‘Answers - Living With Trash’. <http://www.nps.gov/goga/learn/nature/answers-living-with-trash.htm>. Retrieved October 27, 2015.

than developing countries (Taherzadeh and Rajendran, 2015). There is empirical data that proves that the higher the income of a country, the more waste it generates, as shown in Figure 5 (World Bank, 2012).



[Figure 5. Current waste generation per capita by income level]

However, it should be noted that this is not true in all instances. Decoupling the relation between waste generation and economic growth has appeared in more than a few studies. According to the statistics suggested by The Economist (2009), the average rate of waste produced by the OECD countries between 2000 and 2005 increased by 0.9%. This is much lower than the average rate of economic growth (2.2%) in the OECD countries during the same period, indicating that waste generation did not increase in proportion to economic growth.

Moreover, several researchers have proceeded to explain this with the EKC hypothesis<sup>21</sup> (Mazzanti, and Zoboli, 2009), which insists that higher income leads to less waste generation and more environmental friendly waste management in certain countries. For instance, with panel data on the 30 OECD countries over the course of more than 20 years, Karousakis proves that “higher GDP per capita are associated with a smaller fraction of municipal waste going to landfills,” (2009: 101). Since these OECD countries have waste facilities to treat waste in better ways, like with energy recovery and recycling, a tax is imposed on landfilling. Due to this tax, more waste is incinerated

<sup>21</sup> EKC, ‘the environmental Kuznets curve’, argues that there is ‘an inverted U-shaped relationship between per capita income and pollution (Mazzanti and Zoboli, 2009: 16). The degree of pollution increases as the per capita income grows, but at a certain point it decreases, showing a decoupling relation.



or recycled, which are more environmentally friendly than leaving waste in a landfill site. However, the assumptions and findings based on the EKC hypothesis cannot be generalized to all cases. Several researchers mention that these are applied only for developed countries with advanced waste management and environmental policies (Mazzanti, Montini, and Zoboli, 2009).

The researchers (Mazzanti, Nicolli, and Zoboli, 2009) suggest that it is the increase in population that leads to greater mass consumption and waste generation, more so than economic growth. More specifically, Andersen, Skovgarard and Larsen (2009) insist that municipal waste is deeply connected to the number of households. This perspective is the same as that of regional programs regarding waste in Oslo. In two official municipal documents (City of Oslo, 2013; 2015b), the municipality of Oslo pays attention to waste management based on the life-cycle approach (*kretsløpsbasert avfallshåndtering*) because the population growth will cause an increase in quantity of waste in Oslo.

Although it is still ambiguous whether there is a correlation or not between the rise of waste generation and economic growth, it is obvious that waste remains problematic and that waste generation will continuously grow in a culture of mass consumption. More importantly, the Norwegian policy is made with the belief that there is such a correlation, and the Norwegian government set up its national goal that “the growth in the quantity of waste generated will be considerably lower than the rate of economic growth” (The Norwegian Environmental Protection Agency, 2013:11).

The obsolescence of items is an important strategy of manufacturers to maintain mass consumption of their products, which consequently produces waste. Like trends in the fashion market, technological obsolescence makes people replace outdated goods with new and technologically improved ones (Strasser, 1999). Consequently, the old goods turn into waste despite not being broken or damaged. Obsolescence can also be applied by design by a manufacturer. Planned obsolescence produces items with low durability and little longevity. Thus, consumers cannot help but purchase new products when the old products break down, even if the items were used for only a short period of time (McDonough and Braungart, 2002).

## **Changes in consumption and waste disposal practices of people**

The third factor is the changes in consumption and waste disposal practices of people. In other words, people throw away products much more than before. Strasser (1999) finds two reasons for these behavioral changes; the perceptual changes to rationality and hygiene, and a structural change that influenced on existing consumption practices of people. First, 'convenience' has formed the practice of throwing away items more easily. Strasser (1999) illustrates the notion of convenience in the household in her research. In the early twentieth century, household efficiency became 'convenience' with the help of newly invented household appliances and items. Convenience, at that time, was a metaphor for the freedom of housewives, enabling their release from difficult household chores by saving time and effort. Thus, it became a more rational choice to buy new clothes, than spend a great deal of time fixing or remaking old ones.

Strasser's study (1999) describes that it had been a common practice to reuse old items by fixing or washing them, or transforming it into a something new. Yet, this practice had changed, when school education and the media spread that accumulated things threatened health by drawing insect and pests, and by deteriorating air quality with dust. Also, personal hygiene became a sign of moral superiority among the middle class in the U.S.A. For example, people began to use disposable tissues, instead of a cloth handkerchief which was washable and reusable. Thus, hygiene emerged as a value, and quick disposal became a generalized practice in people.

Second, two structural changes facilitated these changes in conventional practices. As suggested earlier, the first structural change is mass production, arising from scientific and technological advances. This made it possible to produce and sell items at an affordable price. For example, disposable paper has been able to be produced and sold widely after the production costs lowered considerably (Strasser, 1999). The other structural change is the introduction of a municipal trash collection system. As local communities became responsible for collecting and disposing household waste in their areas, it became easier for household to throw their waste away. When this collection system did not exist before, households had to deal with their waste by reusing, dumping, burning, or reselling their unwanted goods (ibid). Yet, the steadily increasing amount of waste created a demand for a waste collection system in each region, and then an improvement to the system itself.

## **4.2 Analyzing waste management**

Historically, waste became a serious social problem whenever it was treated in an inappropriate way. ‘The Great Stink’ is a famous incident caused by improper waste handling in the 1800s in London, England. London saw a sanitation crisis due to the exploding population, the lack of a proper sewage system, illegal waste dumping, and little regard for public hygiene. These factors were closely related to the Industrial Revolution. While people headed to London to find a job, the sanitation system at that time could not cover the needs of the increasing number of inhabitants. Therefore, people and factories began dumping their waste in the Thames River in secret. The poor sanitary condition brought about cholera outbreaks in London by killing more than 32,000 people (Water Aid, 2015: 3).

Like the London case shown above, inappropriately handled waste threatens public health, and it can be linked to urban areas where the population sees significant growth. With increasing concern for sanitation and hygiene, this has alerted the public and officials that something has to be done to treat waste issues. Thus, from the middle of the nineteenth century in the U.S.A., cities and towns became responsible for the collection and disposal of waste from households, and for cleaning waste on the streets (Strasser, 1999). In performing this role, the municipalities have faced and overcome several difficulties, such as shortages of funds for waste collection, and employment of irresponsible contractors who failed to complete their duties. However, as the population steadily increased and diverse new types of waste appeared, there was growing demands to be better equipped to coping with complex waste issues.

### **4.2.1 Waste classification**

Before going in-depth on waste management, it is important to review the various types of waste, since there are numerous ways to categorize them. First of all, waste can broadly be characterized by its physical state; solid or liquid (refer to Appendix 2). Solid waste can be further categorized as biodegradable or non-biodegradable. Finally, for non-biodegradable waste, it is classified as either recyclable or not (Water and Sanitation Program, 2012). Since this research focuses on solid waste, a description on liquid waste is not given.

Second, waste can be categorized depending on its material composition. The European Commission designed the European List of Waste (Commission Decision 2000/532/EC) to provide a common terminology to its member states with a common encoding of diverse waste characteristics (e.g., metal, glass, textile, sludge, etc.). The Commission also set up a criterion to evaluate waste as hazardous to the environment and human life, by describing properties of hazardous waste in Annex III to Directive 2008/98/EC. Most wastes from industrial, healthcare, and laboratory sectors are regarded as hazardous waste (UNEP, 2009: 7).

Third, solid waste can be separated into municipal waste and non-municipal waste. Municipal waste mostly means household waste since most municipalities are responsible for treating household waste in their regions. The latter usually refers to industrial waste (i.e., waste from industrial, commercial, and agricultural sectors) (UNEP, 2009). However, the boundary between municipal and non-municipal waste can vary from place to place, since it is set by administrative boundaries. For example, municipal waste, in some cities, may include non-hazardous commercial waste to household waste. On the contrary, municipal waste can only mean household (residential) waste in other places, excluding non-hazardous commercial waste.

The waste classification of the Norwegian Pollution Control Act (*Forurensningsloven*, 1981) is similar to the one stated above. The law has three different sorts of waste; household waste (*husholdningsavfall*), industrial waste (*næringsavfall*), and special waste (*spesialavfall*) which is waste that cannot be appropriately treated together with other household waste or industrial waste because of its size, or hazardous properties.<sup>22</sup>

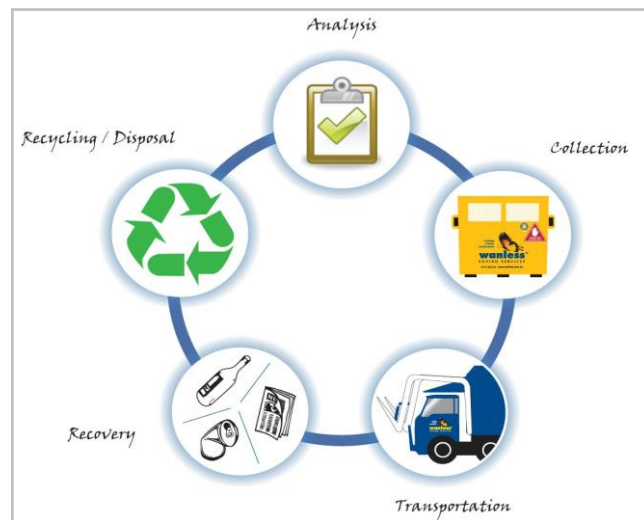
## 4.2.2 Waste management

It is important to limit the negative impact of waste with well-designed management from waste collection to disposal. The European Commission clarifies waste management as “the collection, transport, recovery and disposal of waste, including the supervision of such operations and the after-care of disposal sites, and including actions taken as a dealer or broker,” (EU directive 2008/98/EC, 2008:9). In other words, waste

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<sup>22</sup> Referring to the Norwegian version from [https://lovdata.no/dokument/NL/lov/1981-03-13-6#KAPITTEL\\_5](https://lovdata.no/dokument/NL/lov/1981-03-13-6#KAPITTEL_5) and the English version from <https://www.regjeringen.no/en/dokumenter/pollution-control-act/id171893/> Retrieved: February 25, 2016

management, as Figure 6 suggests, is a series of “activities from collection, transport, treatment and disposal of waste, to control, monitoring and regulation of the production, collection, transport, treatment and disposal of waste” (UN, 1997: 76). Also, it can include “prevention of waste production through in-process modifications, reuse and recycling” (ibid).



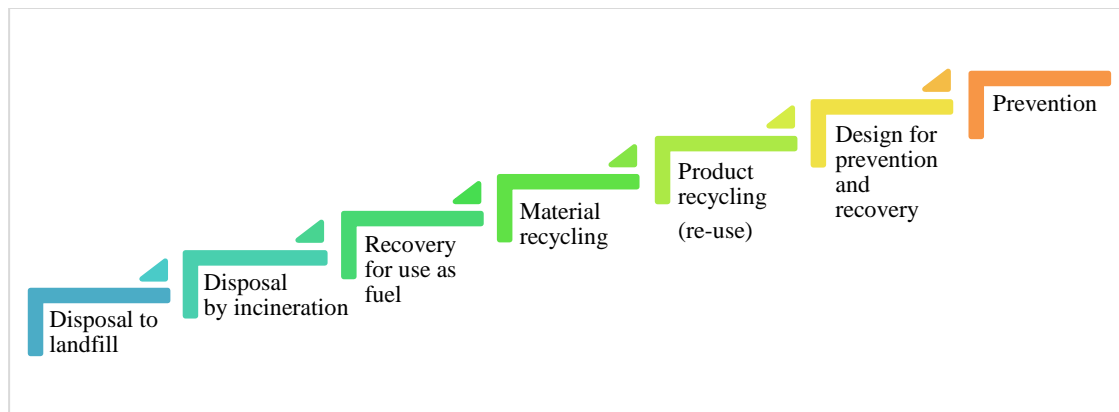
[Figure 6. Waste management]<sup>23</sup>

Although a society has a waste management system, the management can create a serious problem to the environment and to people if the main method for waste disposal is landfilling. Landfills have been criticized for causing global warming and climate change, by emitting a massive amount of methane into the air in from their sites (Gregson and Crang, 2015). Aside from creating environmental problems, a landfill gives rise to negative impacts on human life and society by being a potential place to spread disease, due to its unsanitary conditions, and by creating a terrible odor on the landfill sites (UN·HABITAT, 2010). Owing to its problematic, unhygienic, and unpleasant conditions, there has been a movement to reform waste disposal by banning landfills. Although landfilling is the most common and traditional way for waste disposal in the world due to its low operational cost, many countries and local governments are looking for better and more sustainable waste management solutions.

In the Netherlands, for example, its previous waste management relied on landfills until the country encountered a crisis in the 1970s. Due to the growing public awareness and

<sup>23</sup> Big Spring Environmental, Unknown, ‘Waste Management In A Nutshell’. <http://www.bigspringenviro-nmental.com/waste-management-in-nutshell/>, Retrieved October 23, 2015.

opposition to landfills, the Dutch government had difficulty finding new landfill sites to cope with the country's increasing amount of waste after an economic boom in the 1960s. Incineration was an alternate solution to landfilling, but shortly later the government was in the same situation, this time with trouble finding new sites to build incinerators. The risks of incineration plants were also becoming widely recognized in the public (Parto et al, 2007). Thus, the Dutch government had to implement a new waste management method that did not negatively impact society, and that also had public support. Adrianus Lansink a Dutch politician, suggested an innovative approach to waste management, called Lansink's Ladder, as shown in Figure 7 (Pioneers in international business, 2011).

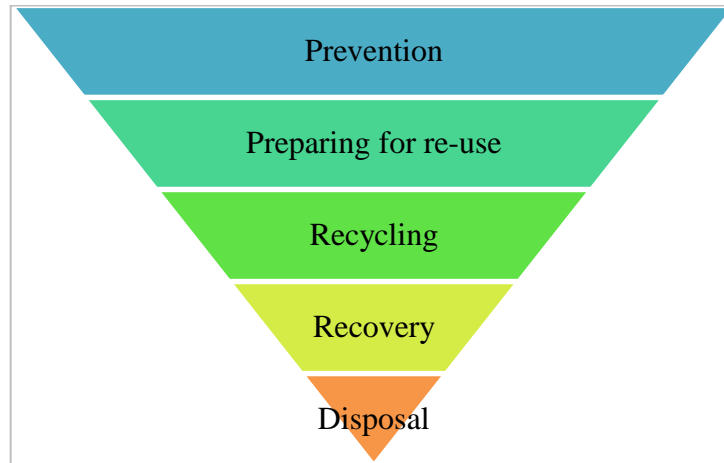


**[Figure 7. Lansink's Ladder]**

Lansink's Ladder provided the fundamental notion which the European Commission would later use to establish the waste management hierarchy in the Waste Framework Directive 2008/98/EC. The European Commission adopted the directive in 2008 in order to build a recycling society that avoided waste generation, and used waste as a resource (Arcadis Report, 2010). The purposes of the directive are to deal with waste without: threatening human health and degrading the environment; without creating unpleasant noises and odors; and without discriminating certain places like countryside. The European Commission outlined a basic waste framework for waste management and a clear definition of waste with the Waste Framework Directive, and demanded that its member states update their waste management and waste prevention programming, no later than December 12, 2013 in accordance with these standards.

The commission introduced a waste management hierarchy that consists of five stages: disposal, recovery, recycling, (preparing for) reuse and waste prevention, as shown in

Figure 8 below. It is a pyramid ordered by preference. For example, prevention, at the top of the pyramid, is the most desirable method, and disposal, at the bottom, is the least desirable.



[Figure 8. Waste management hierarchy]<sup>24</sup>

The European Commission defines each stage of the hierarchy as follows:

1. 'Prevention' means measures taken before a substance, material or product has become waste, that reduce:
  - (a) the quantity of waste, including through the re-use of products or the extension of the life span of products;
  - (b) the adverse impacts of the generated waste on the environment and human health; or
  - (c) the content of harmful substances in materials and products;
2. 'Re-use' means any operation by which products or components that are not waste are used again for the same purpose for which they were conceived, and 'preparing for re-use' means checking, cleaning or repairing recovery operations, by which products or components of products that have become waste are prepared so that they can be re-used without any other pre-processing;
3. 'Recycling' means any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations;

<sup>24</sup> The European Commission, Last updated March 30, 2016, 'Directive 2008/98/EC on waste (Waste Framework Directive)' <http://ec.europa.eu/environment/waste/framework/> Retrieved May 15, 2015.

4. 'Recovery' means any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy.

5. 'Disposal' means any operation which is not recovery even where the operation has as a secondary consequence the reclamation of substances or energy.  
(EU Directive 2008/98/EC, 2008, 10p)

The Commission made an effort to introduce and implement waste prevention in its member states. With the Directive, it clarified notions around waste, and suggested guidelines and the waste management hierarchy, which shows more environmentally desirable and sustainable methods. Thus, each member state could refer to or adopt clear concepts and frameworks for its waste management and policy. The Commission also set up common targets, such as recycling 65% of municipal waste by 2030<sup>25</sup> in all member states, and a deadline for the member states to establish their own programs for waste prevention. In addition, the European Commission also carries out a project for waste prevention, called "Pre-waste," which includes 10 member states. The website for Pre-waste becomes a place to share successful cases and practices for waste prevention, and to provide guidelines for local authorities to plan, implement, and measure their waste prevention policies. Despite these efforts for preventing waste, the Commission has been criticized for offering insufficient tools to convey waste prevention (Dutch Waste Management Association, 2014). Also, researchers such as Mazzanti, Nicolli, and Zoboli cast doubt on the Directive, since it lacks "actions oriented towards waste prevention in the formal directives," (2009: 47) despite waste prevention being at the top of the EU's waste agenda.

Thus far, a background on classification of waste, waste management, and the desirability of waste prevention have been presented. Based on the descriptions offered in this chapter, it is time to examine waste management and policies in Norway, while evaluating how the waste policies reflect the terms and notions mentioned here.

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<sup>25</sup> This target is quoted from the European Commission's official website, [http://ec.europa.eu/environment/waste/target\\_review.htm](http://ec.europa.eu/environment/waste/target_review.htm) [accessed on April 12, 2016]. This is the most updated information since March 30, 2016. However, several reports (see Dutch Waste Management Association, 2014, p.2) published before that time show the previous target, which was 70%, not 65%.



# 5 Mapping waste management in Oslo

This chapter will give an account of the roles and policies of the actors that participate in waste management in Oslo, with the goal of illustrating waste management geography in Oslo. A description about the Norwegian government's approach to waste will be provided in section 5.1. The contents will explain how the EU shapes waste policies in Norway, how the Norwegian government responds to EU influences, and what roles and goals the have government in waste management. Section 5.2 will explain the role of Norwegian municipalities in waste management, by referring to Norwegian laws and regulations regarding waste. Finally, in section 5.3, non-governmental organizations will be described to deliver basic information about the actors who belong to the waste management network in Oslo. In addition, the specific policies and programs that are implemented in Oslo will also be outlined in the introduction of these actors, and will be basic information for Chapter 6.

## 5.1 The Norwegian Government: A policy taker or maker?

It might be curious that the European Commission's Directive 2008/98/EC on waste is relevant to waste research in Norway, a non-member of the EU. However, Norway is extensively affected by EU decisions and policies, given Norway's close affiliation with Europe via the Agreement on the European Economic Area (the EEA agreement, henceforth). Thus, the EEA agreement has contributed substantially to developing Norwegian regulations and policies on waste (The Norwegian Environmental Protection Agency, 2013).

Hovden (2004) elucidates that the EEA agreement is concerned with environmental policies as well as the EU's single market. By quoting Dahl's assertion (1999, recited Hovden, 2004), Hovden explains that environmental policy was intentionally added to the EEA agreement for the purpose of making it a more 'political' treaty. Accordingly, although the EEA agreement does not represent full membership of EU, "most of the

EU's single market and environmental legislation applies in Norway in exactly the same manner as it does in full member states," (Hovden, 2004:154). As the Norwegian government mentions on its official website, virtually all environmental EU regulations are incorporated into Norwegian law, after the EEA agreement was invoked in 1994 (The Norwegian government, 2016).<sup>26</sup>

There is a critical problem arising from the role of the Norwegian government in this situation: EEA EFTA (European Free Trade Association) countries<sup>27</sup> such as Norway, do not have equal standing in EU legislative committees like other EU member states. The EEA agreements brings together the EU member states and the three EEA EFTA States — Iceland, Liechtenstein and Norway — in a single market.<sup>28</sup> Yet, EFTA countries do not have a right to vote on the EU legislative committees that shape environmental policies. The EFTA states are welcome to observe and advise the committees, however their influence is substantially limited without the right to vote. Certainly, there is 'the veto-right' as safety valve that enables an EFTA state to refuse implementing an act decided in the EU legislative committees, if the state is against the act. However, it is highly risky for a state to exercise the veto right, as the backlash for that decision may include economic and political consequences (Hovden, 2004). Because of these features in the relations between Norway and the EEA agreement, Hovden (2004) describes the Norwegian government as a 'policy taker', not a policy maker. This approach is well illustrated in recent EU studies. The studies emphasize the responsibility of the EU in regulating environmental problems (i.e., waste) at a national level, which consequently affects environmental policy-making in European countries (Jordan and Liefferink, 2004, Fagan and Murray, 2006).

Yet, this top-down relation between a state and a global entity may seem coercive, but it is not. Individual states still possess its independent authority to adopt legislations given by the EU, and to plan and develop its own environmental policies by adapting the

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<sup>26</sup> Regjeringen.no, Last updated January 8, 2016, 'Miljø og klima: Informasjon om Norges miljø- og klimasamarbeid med EU' <https://www.regjeringen.no/no/tema/europapolitikk/tema/miljo-og-klima1/id686218/>, Retrieved April 12, 2016.

<sup>27</sup> EFTA consists of 4 states; Norway, Iceland, Liechtenstein, and Switzerland. However, Switzerland is not a member of the EEA agreement as Switzerland rejected the EEA agreement in a national referendum in 1992. Thus EEA EFTA countries mean Norway, Iceland, and Liechtenstein.

<sup>28</sup> The EFTA official website, unknown, 'EEA Agreement' <http://www.efta.int/eea/eea-agreement> Retrieved April 12, 2016.

prescribed regulations to its own unique administrative structure (Lifferink and Jordan, 2004). Concerning the Norwegian government, compliance with EU regulations is a totally autonomous choice of the government. For example, the Norwegian Ministry of Climate and Environment proposed to the Norwegian Parliament in April, 2016, to make amendments to the key concepts of waste legislation in the Pollution Control Act of 1981, the first Norwegian law on pollution and waste. The aim of this amendment is to increase compatibility with the key concepts of EU Directives/2008/98 EC, by redefining their legal terminology.<sup>29</sup>

As the example stated, the role of the Norwegian government is to internalize external regulations with national plans of their own. More specifically, the government plays a key role in calling attention to waste issues, in defining the big, domestic picture of waste management with national laws, regulations and goals. This is significant because it defines the different responsibilities to be taken by various actors, and it can, in some cases, create new actors and roles within an existing system.

In 1973, the Ministry of Environment<sup>30</sup> that was established in 1972 published its first public report on waste, seeing recycling as an important principle for preventing contamination and to conserve resources. Later in the 1970s, the Norwegian Pollution Control Authority (*Statens forurensningstilsyn*) was formed under the Ministry of Environment, as an expert and supervisory entity for waste sites (Waste Norway, 2015). Finally, the first law concerning waste and pollution, the Pollution Control Act (*Forurensningsloven*), came into force in 1981, offering the basic legal framework for waste and waste management (Kjær, 2013). Later, the Waste Regulation (*Avfallsforskriften*)<sup>31</sup> by the Ministry of Environment was implemented in 2004. This regulation is concerned with different types of waste (e.g., WEEE, batteries, hazardous

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<sup>29</sup> Regjeringen.no, 2016, 'Prop. 89 L (2015–2016): Endringer i forurensningsloven (avfallsdefinisjoner m.m.)' <https://www.regjeringen.no/no/dokumenter/prop.-89-l-20152016/id2481157> Retrieved February 12, 2016.

<sup>30</sup> It is the Ministry of Climate and Environment now, after it changed its name from 2014, referring from 'Forskrift om endring i forskrifter som følge av at Miljøverndepartementet skifter navn til Klima- og miljødepartementet', 2014, <https://lovdata.no/dokument/LTI/forskrift/2013-12-19-1757> Retrieved February 12, 2016.

<sup>31</sup> Referring from 'Forskrift om gjenvinning og behandling av avfall (avfallsforskriften)', 2004, <https://lovdata.no/dokument/SF/forskrift/2004-06-01-930>, Retrieved February 12, 2016.

waste) and waste handling (e.g., take-back system for beverage packaging, landfilling, incineration).<sup>32</sup>

The government also publishes a White paper every second year, some of which have already includes waste issues. The last White paper outlining general waste and waste management was published in 2008. In the paper, the government suggests policy instruments and measures for achieving its three national goals (see Norwegian Ministry of the Environment, 2008:31). In a waste strategy report in 2013, the government expanded these three previous goals into the four goals below:

1. The growth in the quantity of waste generated will be considerably lower than the rate of economic growth.
2. The aim is for the amount of waste being recovered should be approximately 75% in 2010, with a further increase to 80%.
3. Hazardous waste must be handled properly and either recovered or secured good enough national treatment.
4. The generation of various types of hazardous waste shall be reduced in 2020 in comparison to 2005 levels

(The Norwegian Environmental Protection Agency, 2013: 11)

The Norwegian government has six key principles in their waste policy to enhance its waste strategy: the precautionary principle, the cradle-to-grave principle, the polluter pays principle, effectiveness, cost policy instruments, and economic profitability.

1. The precautionary principle: Where there is scientific uncertainty regarding serious or irreversible risks against health or the environment, uncertainty should not be used as a reason to postpone or omit to the implementation of precautionary measures.
2. 'Cradle-to-grave' principle: A product should take into consideration the overall environmental impacts of the product, from the extraction of its raw materials to its disposal state during recycling, energy recovery, or landfilling processes.

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<sup>32</sup> EIONET (European Environment Information and Observation Network), Last updated June 1, 2012, 'Factsheet for Norway' [http://scp.eionet.europa.eu/facts/factsheets\\_waste/2009\\_edition/factsheet?country=NO](http://scp.eionet.europa.eu/facts/factsheets_waste/2009_edition/factsheet?country=NO) Retrieved February 12, 2016.

3. The 'polluter pays' principle: Whoever causes environmental damage should pay the social cost of the damage, or take the necessary measures to prevent such damage.
4. Effectiveness (*Styringseffektivitet*): A selected policy instruments will achieve its goal with the greatest possible degree of safety.
5. Cost policy instruments (*Kostnadseffektiv*): Cost policy instruments involves choosing instruments that lead to a specific result at the lowest possible social costs.
6. Economic profitability (*Samfunnsøkonomisk lønnsomhet*): The overall benefit to society will be greater than the total cost.

(The Norwegian Environmental Protection Agency, 2013:12)

These principles have shaped national waste policies and laws. For example, the third principle, the polluter pays principle, affected to amendment of the Pollution Control Act in 2004, by differentiating household and industrial waste. Thus, following the idea of the polluter pays principle, each industry has become responsible for its own waste, while the local government, which used to take waste from small industries, is now responsible for household waste only.

The concept of Extended Producer Responsibility (EPR) is founded on the cradle-to-grave principle and the polluter pays principle. This concept extends the manufacturers responsibility for their products even after the products have been sold and become waste. This is because the producers have better knowledge and ability to use better solutions for collecting and discharging their products when the products turns into waste (needs clarity). The Norwegian government carried out their first the extended producer responsibility policy in the packaging waste industry in 1995, and now the policy is widely adopted for electrical and electronic products, batteries, discarded vehicles, scrap tires, and insulating windows containing PCBs. This policy asks producers or importers to recycle or to discard their products in an environmentally safe fashion (The Norwegian Environmental Protection Agency, 2013).

With regard to the process of introducing and abolishing taxes on landfilling waste by the Norwegian government, it seems that the polluter pays principle, effectiveness, and cost policy instruments worked together. The tax on landfilling was introduced in 1999, in order to encourage recycling and to reduce the amount of waste ending up at landfill

sites. It aimed to make polluters responsible for the damage they are doing to the environment by paying taxes (Kjær, 2013; Waste Norway, 2015). However, the landfill tax was abolished in 2015, since the landfill tax had little impact.<sup>33</sup> When it became illegal to dispose of biodegradable waste on landfill sites in 2009, due to the fact that biodegradable waste forms greenhouse gases (methane) in landfills, the total amount of waste discarded in landfills reduced rapidly. As a result, the landfill tax was almost halved in 2010. Thus, the government made a decision to abolish the landfill tax based on the judgement that the environmental impacts from landfill would not be significant anymore, or in other words, that this economic instrument had become invalid (Waste Norway, 2015).

Over all, the Norwegian government acts like a supervisor considering the waste situation nationally and internationally. It is true that the authority of the government has shrunk as global entities, such as the EU, emerge. The relationship between the Norwegian government and the EEA might make the government passive and limited in terms of its domestic environmental policy-making. On the other hand, the government still has an autonomous role to create a certain order or practice in its national region. With laws and regulations regarding waste, the government has a power to allocate roles or responsibilities to specific actors. The government also designs a structure for waste management by applying different principles and instruments.

## 5.2 Municipality, as a granted ruler

Compared to municipalities in other countries, Norwegian municipalities possess more substantial positions because it is the municipality who is in charge of providing public services in this welfare state (Bjørnå and Aarsæther, 2010). Waste management is a kind of provision of public service. Each Norwegian municipality is the centre for waste management and policy regarding household waste. The Pollution Act (*Forurensningsloven*) gives the monopolized responsibility to municipalities to ensure the handling of waste within their respective regions, and required them to establish facilities to manage waste.

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<sup>33</sup> Regjeringen.no, 2015, 'Regelendringer fra 1. januar 2015', <https://www.regjeringen.no/no/aktuelt/regelendringer-fra-1.-januar-2015/id2356751/> Retrieved March 11, 2016.

The project of Environment in Municipalities (*Miljøvern i Kommunene*) or (MIK), was an opportunity to develop the role and capacity of a municipality in its waste management. The project was initiated by the Ministry of Environment and the Norwegian Association of Local and Regional Authorities (*Kommunenes Sentralforbund*) in 1988. The aim of this project was to set up and develop environmental protection as a part of the municipal agenda, and to facilitate cross-sectoral environmental responsibilities at the municipal level. Around 140 municipalities in Norway joined this project, and they showed diverse creativity when it came to waste sorting in households, by presenting different waste sorting criteria (Waste Norway, 2015).

Although the municipal responsibility on waste was reduced to a sole focus on household waste after the amendment of the Pollution Control Act in 2004, national laws and regulations offer monopolized authority to the municipality in waste management. According to clause §30 of the Pollution Act, a Norwegian municipality has three significant rights regarding the collection of household waste:

1. The municipality shall make arrangements for the collection of household waste.
2. The municipality may issue regulations requiring that municipal waste collection shall apply only in built-up areas, that certain types of household waste shall be excluded from municipal waste collection, and that certain types of waste shall be kept separate.
3. The municipality may issue the regulations necessary to ensure appropriate and hygienic storage, collection and transport of household waste.

The municipality can also have an influence on industrial waste by determining its role to collect waste with rules based on the rights. For example, in 2013, the Municipality of Oslo became responsible for collecting waste from all primary schools in the region (City of Oslo, 2013). It is possible for the municipality to collect and handle waste from a small business as well, functioning like a private enterprise, if the business pays an appropriate fee for the service. By 2013, there were 314 businesses that had used the waste disposal service by the municipality (City of Oslo, 2013:73). Also, the Municipality of Oslo opens hazardous waste facilities for businesses, which private waste handling companies can also use for a fee.

Adding these three rights, “the municipality shall determine a fee to cover the costs associated with the waste sector, including collection, transport, reception, storage, treatment, control, etc,” as clause §34 of the Pollution Act. The waste fee (*avfallsgebyret*) must cover the full cost of waste handling processes, but the municipality shall have no profit on such fees, and cannot charge households more than it costs to collect and process waste (Norwegian Environment Agency, 2014). Also, only costs and income from statutory management of household waste shall be included in the calculation of the waste fee (*ibid*). Following the regulation, “Forskrift om renovasjon av husholdningsavfall” (Oslo Kommune, 2012)<sup>34</sup>, the rate for the waste fee is determined annually in the city council in Oslo. Waste fees are charged four times a year, and sent by invoice from the Oslo tax office.<sup>35</sup>

In accordance with this Act, the waste management agency (*Renovasjonsetaten*, referred to as REN for the remainder of this thesis) is responsible for collecting and discarding waste from households in the Oslo region. It also runs recycling stations (*gjenbruksstasjoner*) in Oslo, which receive hazardous waste and or oversize waste from households, to ensure safe and environmentally friendly disposal.<sup>36</sup> The Waste-to-Energy Agency (*Energigjennvinningsetaten*, and referred to now as EGE) is deeply engaged in this process in the operation of waste disposal plants in Oslo. After a waste sorting (*kildesortering*) program was launched in Oslo, food waste has been converted into biogas and bio-fertilizer, plastic waste has been recycled, and the remaining waste becomes fuel in incinerators for generating district heating and electricity.

On the other hand, clause §29 of the Pollution Act requires municipalities to use specific facilities, such as waste storage sites, waste treatment and disposal plants, for handling household waste. This is a bit problematic for cities that are too small to run their own facilities. From the 1980s, Norwegian municipalities systemized inter-municipal cooperation for waste treating, sorting and collecting (The Norwegian

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<sup>34</sup> Lovdata.no, 2012, ‘Forskrift om renovasjon av husholdningsavfall, Oslo kommune’, <https://lovdata.no/dokument/OV/forskrift/2012-02-15-165> Retrieved March 17, 2016.

<sup>35</sup> Oslo Kommune (the Municipality of Oslo), Unknown, ‘Renovasjonsgebyr og priser’ <https://www.oslo.kommune.no/avfall-og-gjenvinning/renovasjonsgebyr-og-priser/> Retrieved March 17, 2016.

<sup>36</sup> Oslo Kommune, Unknown, ‘Renovasjonsetaten’, <https://www.oslo.kommune.no/politikk-og-administrasjon/etater-og-foretak/renovasjonsetaten/> Retrieved March 17, 2016.



Environment Agency, 2014). The 1990s saw this demand grow, and the cooperation increased accordingly to make operations better and more cost efficient. The first recycling stations and centers for hazardous waste were built thanks to inter-municipal effort during the 1990s. At the moment, there are approximately 40 inter-municipal companies handling waste in Norway (Waste Norway, 2015).

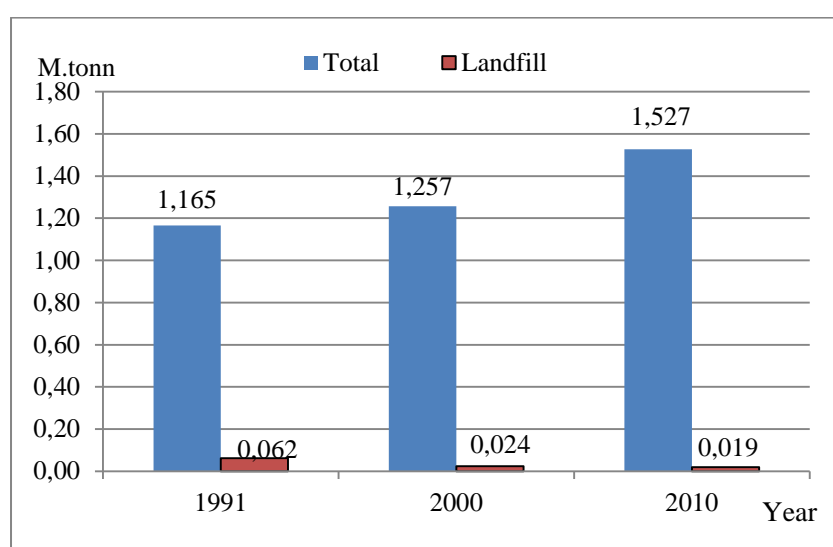
Regional policies regarding waste are passed by local politicians on the City Council (*Bystyret*) in Oslo. The Municipality of Oslo has announced its goals and plans in several official documents regarding climate change, the environment, and energy use (City of Oslo, 2011, 2015a, and 2015b). According to its application for the European Green Capital Award, published by the Municipality of Oslo (2013), Oslo had/has worked on six different programs and plans concerning waste. A few of these have expired, and some of them have been renewed. For example, the new document for the Climate and Energy Strategy for Oslo (*Klima- og energistrategi for Oslo*), a climate and energy program, was newly updated and published in 2015. Also, the Urban Ecology Program (*Byøkologisk program*) is currently being amended. New programs like Oslo Towards 2030 (*Oslo mot 2030*), and documents like the Environment and Climate Report of Oslo, focus on waste management to obtain its environmental goals.

The name of plan/program	Waste-specific content
Climate and Energy Strategy for the Oslo Region, 2005	Introducing source separation of food waste and plastic packaging, biological treatment plants, and expansion of district heating based on renewable source
Urban Ecology Program 2011-2026	Setting the aim that “Oslo must have a cycle based waste management system”, including waste prevention, waste reuse and material recycling
Action Plan for the Environment and Climate 2013-2016	Stating the annual political priorities such as “partnership with the industry on food waste reduction”
The Municipal Master Plan 2008-2025	Suggesting key priorities in all municipal sectors
Waste Management Plan 2006-2009	Roadmap for recent initiatives/investments. Measures that targets advancement of the waste hierarchy
Municipal Waste Strategy for Oslo 2011-2014	Unofficial working document for the Agency for Waste Management

[Table 3. Waste programs and plans operated by the Municipality of Oslo]<sup>37</sup>

<sup>37</sup> The Municipality of Oslo, 2013a, ‘Application to Become The European Green Capital 2016’, p.68.

Circular Waste Management (*kretsløpsbasert avfallshåndtering*) reflects the preference of the waste hierarchy as the main goal of the Municipality of Oslo. Oslo strives to reduce the greenhouse gas emissions that brings about climate change, and aims to increase resource/energy efficiency (City of Oslo, 2014, 2015a, 2015b). It has been proved that landfilling, a traditional method for the disposal of waste, aggravates climate change by generating greenhouse gases on landfill sites. Based on this data, in 2007 the Municipality of Oslo closed its main landfill site in Grønmo, after operating for 30 years.



[Figure 9. Greenhouse gas emission per person in Oslo from 1991 to 2010]<sup>38</sup>

Waste separation is an essential condition to the establishment of a circular waste management, as is enabling recycling and reuse practices. Before launching the waste separation system in households, Oslo residents only separated paper, metal, glass and drinking carton waste. However, as the need for a better sorting system grew, the Oslo City Council adopted a new waste management plan in 2006, which aimed at making Oslo citizens sort out plastic waste by 2009, and food waste by 2011 (NRK, 2006). From 2009, the Municipality of Oslo carried out pilot projects for waste separation in several areas in Oslo; by 2012, all Oslo citizens were able to separate their waste as the waste separation system was introduced throughout Oslo (Aftenposten, 2015a). The inhabitants throw away foods waste in a green bag, plastic waste in a blue bag, and residual waste in a random bag, along with the existing separation of paper, metal, glass

<sup>38</sup> Oslo Kommune, Unknown, 'Totalt utslipp av klimagasser' <http://oslo.miljobarometern.se/klima-og-energi/totalt-utslipp-av-klimagasser/avfallsdeponi> Retrieved March 17, 2016.

and so on. After the optical sorting machine separate these three bags (green, blue and random color bags) according by color at a sorting plant, each bag is sent to a treatment plant for recycling or energy recovery.

When it comes to resource and energy efficiency, energy recovery from waste is a preferred and desirable method for Oslo. District heating energy is generated by incinerators burning residual waste. In addition, the biogas plant in Nes, Romerike, converts bio-methane from food waste into the biogas fuel that Oslo regional buses run on. Food waste also becomes a bio-fertilizer (City of Oslo, 2015b). Interestingly, the Grønmo landfill site still requires the attention of the Municipality of Oslo; since the landfill site still produces landfill gas, the municipality can utilize this gas for district heating. In 2015, approximately 2,000,000 Nm<sup>3</sup> of landfill gas from Grønmo produced around 2.9 GWh of electricity and 4.1 GWh of district heating (REN, 2016b).

Recycling is regarded as a more desirable method than landfill and energy recovery in waste programs and plans of Oslo. This is because recycling saves energy and raw materials to produce new products, and prevents potential greenhouse gas emission generating from the manufacture process. The recycling of plastic in particular seems to be a major priority, given the fact that the recycling of plastics substantially reduces the emissions of NO<sub>x</sub>, SO<sub>2</sub> and NMVOC<sub>35</sub>, which influences negatively on the environment, generated in the production of plastic from virgin materials (The Environmental Protection Agency, 2013).

If Oslo municipality sets directives for regional waste management, REN (the municipal waste management agency), is responsible for the collecting and discarding of household waste, and it is in charge of implementing specific plans and programs and evaluating their outcomes. For example, REN operates 28 recycling stations which receive big and hazardous waste in Oslo, offers a '*skolestua*' program to raise awareness among children about waste, and support flea markets in Oslo. It cooperates with diverse actors including other municipalities and NGOs in order to reduce, reuse, and recycle waste in Oslo. EGE is responsible for running waste treatment plants, one optical sorting plant for household waste, two incinerators, and one biogas plant near Oslo. The Urban Environment Agency (*Bymiljøetaten*, from now BYM) does not directly relate to waste management in Oslo, but it does have a program that manages environmental issues involving waste.

## 5.3 Diverse non-governmental actors

The governmental actors, the Norwegian government and the city of Oslo, are responsible for planning and implementing waste management policies with national and municipal laws and regulations. In the past, waste collection and disposal was generally done by city staff, but it has become common to outsource this service to non-governmental actors, mostly private contractors. Thus, there are different entities that are engaged in waste management and the waste industry. Waste Norway (2015) categorizes 4 different types of participants in the waste industry in Norway; industry organizations, intercommunal companies, private operators, and return companies.

First of all, industry organizations consist of organizations, or associations that represent certain interest groups. The most interesting organization in this category is Waste Norway (*Avfall Norge*). It becomes a nationwide trade organization for waste and recycling industry in Norway, while having 197 members ranging from the municipal governing entities to private business contractors. Therefore, it takes some organization to negotiate the interests between all involved parties.

The second category is for inter-municipal companies, or *Interkommunalt selskap* (IKS) in Norwegian. As suggested in the previous section, these companies were established by inter-municipal efforts to treat waste in a more cost-efficient way. For example, MOVAR, an inter-municipal company, is owned by 5 different municipalities: Moss, Rygge, Råde, Vestby, and Våler. It provides regional waste and recycling facilities, and three wastewater plants in these areas.<sup>39</sup> Waste Norway states that around 40 inter-municipal companies handling waste exist in Norway (Waste Norway, 2015).

The third participant category identifies the private companies (operators) in the waste industry. They make their profit by providing total waste disposal service, from waste collection to the safe treatment of industrial and hazardous wastes for their customers. They can also make gains by outsourcing services and making contracts with local municipalities in Norway. Although there is a number of small and medium sized private waste companies in Norway, Waste Norway mentions 4 major companies: Norsk Gjenvinning, Ragn-Sells, RenoNorden, and Franzefoss (ibid).

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<sup>39</sup> MOVAR's website, Unknown, 'Informasjon om MOVAR IKS' <http://www.movar.no/movar/om-movar.html> Retrieved March 18, 2016.

The last actors are the return companies (*returselskaper*) which run take-back schemes (*retursystemet*) in the waste industry. They are responsible for collecting and recycling of special types of waste. There are three actors, each responsible for their own category of waste: packaging (*emballasje*), electronics and electrical waste (WEEE), and hazardous waste. Furthermore, it seems that each company is specialized and monopolized toward a certain type of material. For example, Infinitum is coping with beverage can and plastic bottles (*pants*); Green Dot Norway (*Grønt Punkt Norge*) with drink cartons, plastic packaging, and cardboard packaging; and Syklus is occupied with metal and glass packaging, and so on. The interesting point is that most of the companies in this category are non-profit companies. When it comes to the electrical and electronic return companies, there is competition among the actors, unlike the packaging recycling companies. Elretur, ERP (European Recycling Platform) Norway, Elsirk and others are major actors in the collecting and safe treating of WEEE in Norway. Lastly, there are also certain companies coping with very specialized forms of waste; Autoretur is a return company for automobiles, and Ruteretur is a return company for PCB-containing insulating windows.

These return companies work in the take-back schemes of waste. This take-back scheme reflects the concept of extended producer responsibility (EPR), established in the ‘cradle-to-grave’ principle and the ‘polluter pays’ principle briefly introduced in section 5.1. In safe and appropriate manner, these return companies collect, sort, recycle or dispose of the certain types of waste, like plastic packaging, WEEE for their membership companies or actors who pay the service or membership fee. For example, a business that generates plastic packaging waste would pay the license fee to Green Dot Norway, calculating with the remuneration rate for plastic packaging. By joining the collective recycling scheme provided by Green Dot Norway, the company can put the Green Dot mark on its products, indicating that it takes its producer responsibility by paying the license fee to Green Dot Norway. This company would not need to organize its own recycling scheme by itself, and to report the result of recycling its products to the Norwegian Environment Directorate, since these would be the responsibility of Green Dot Norway.<sup>40</sup>

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<sup>40</sup> Green Dot Norway, Unknown, ‘Spørsmål og svar’ <http://www.grontpunkt.no/medlemskap/spørsmål-og-svar> Retrieved March 18, 2016.

Regarding WEEE, the Waste Regulation (*avfallsforskriften*) mandates that all manufacturers or importers that produce WEEE in Norway are obliged to carry out their duties of collection, sorting and treatment of WEEE by paying the membership to the WEEE return companies which are certified by the Norwegian Environment Agency. The objective of this demand is to treat and recycle WEEE, which typically contain hazardous substances like mercury, in an appropriate and environmentally safe manner (The Norwegian Environmental Protection Agency, 2013). If a company becomes a member of a WEEE return company, it pays the service (or membership) fee to the WEEE return company.

The first EPR policy was introduced in 1995 in the packaging industry in Norway. Later in 1998, Norway became the first country in the world to adopt the producer responsibility scheme for WEEE. These policies are expected to develop environmentally-friendly products by reducing the usage of hazardous substance, by increasing the durability of the products, and by promoting recycling (The Norwegian Environmental Protection Agency, 2013).

Aside from these actors categorized above by Waste Norway, there are other participants that are engaged in the reuse of waste. For example, Fretex, associated to the Salvation Army, is one of the best-known organizations that receives donated items and resells them from its second-hand shops. UFF Norway (*U-landshjelp fra Folk til Folk, Norge*), and religious organizations like Normisjon, also run their own shops to sell the donated items. Some of these actors in Oslo are cooperating with REN to collect second-hand items. Specifically, Fretex and UFF Norway have contracts with REN which permit them to place their donation boxes around in Oslo for item collection.

As explained, waste management in Oslo is implemented by various specialized actors operating at different levels. The international entity, the EU, is influential in shaping the national goals of Norway, and the national government encourages better strategies for domestic waste management. The local municipality plays a major role in planning and implementing its own strategy regarding household waste, by cooperating with diverse actors. The non-governmental organizations perform their roles by observing the regulations and laws that are given to them.

## **6 Findings**

This chapter will present my findings and examine the current waste management situation in Oslo, with the 4 determinants (criteria) suggested by Kütting: regulatory structures concerned with institutional effectiveness, time, economic structure, and science. Through in-depth interviews and literature reviews, the relationships between waste management and each determinant will be explained. This will allow readers to determine the successful aspects of the current management, and which aspects require enhancements in order to become more environmentally effective.

### **6.1 Waste governance as a regulatory structure**

The Norwegian government and the Municipality of Oslo are obviously leaders in waste management, but they are not acting alone. There are various actors engaged in waste managing via policies, programs, and research, collaboration with government actors and so on. Thus, this study presumes that there is no single institution that is in charge of waste management, but rather that waste management is accomplished by waste governance, which is a form of network governance. This governance consists of multiple networks between actors from different levels and professions, and is implemented thanks to cooperation and agreement amongst themselves. This section will give an account of this waste governance: the outcomes and the drawbacks of this network governance, based on an analysis of governance network.

#### **6.1.1 Policy making process**

The two actors, the Municipality of Oslo and the Norwegian government, have full legal power and the necessary resources to implement waste policies and programs; thus they are not obliged to take into consideration the opinions of others when it comes to policy making. However, in the interviews I conducted, it became clear that these two governmental actors do indeed gather the opinions of stakeholders within the governmental structure and outside of it.

“Each time there is a new program like the Urban Ecology Program, we receive a task letter from the *miljødivisjonen* (the upper department of BYM). Then we send the letter to all municipal agencies which are related. We start with ourselves first, so we gather at workshops, and meetings, and discuss what to do and what do we need do better. And then we put all the opinions together into a document, and we send it out to external organizations, like environmental NGOs and research institutions. Then, they give their feedback, and we put it if we think there is no problem.”

–Informant 6, BYM (*Bymiljøetaten*)

“We have meetings with non-governmental organization. Especially when we worked on the European Green Capital project, the working groups involved several NGOs and other organizations.”

–Informant 5, BYM

This tendency can be found in governmental official reports as well. For example, the Norwegian Environmental Agency set a goal that the Agency shall “develop routines and attitudes that facilitate the systematic exchange of information right across the organization” (Norwegian Environmental Agency, 2014:7).

Also, other actors are active in raising waste issues, in raising public awareness about waste, and in influencing waste policy making process. Informant 18 from Future in Our Hands (*Framtiden i våre hender*), one of the biggest environmental organizations in Norway, states that the organization sets up meetings with politicians to give their opinions and advise on certain environmental policies. Informant 16 from Waste Norway gives more detail of this involvement:

“We are representing our members when we work with political authorities. We have a public side to present agendas into public debates. We have close contacts with the government regarding what is relevant to the waste agendas we work on. We work with several Norwegian Ministries, such as The Ministry of Environment, of Foreign Affairs. When they have hearings we join the hearings as the leading experts in the field, representing all branches and members. We are also representing them in international conferences in Europe.”

–Informant 16, Waste Norway

This aggressive behavior was brought to fruition when the Extended Producer Responsibility policy was introduced to the Norwegian packaging industry in 1990s.



“During the 1980s and 1990s, packaging waste got lots of attention, especially in Germany, because landfill sites were filled up with waste. So people there, and in Norway too, had to find a solution for it. The Norwegian government could choose between two things; one is to impose a tax for packaging items, like the Danish case for example. The other was for the government to ask the producers’ organization to be responsible for recycling the packaging, and then the government would not interfere with taxes. Norway chose the latter one without taxes.”

–Informant 11, Green Dot Norway

Informant 14 from DLF, a committee member of Green Dot Norway, explains that particular situation in greater detail:

“In 1995, the government considered imposing an environmental fee to all suppliers to finance the returnable system of packaging waste. Then we (business) said, ‘we can do this better and cheaper with the better quality than the government can.’ We talked and had a lot of discussions with the minister of the Environment Ministry, Thorbjørn Berntsen. And he was really forward thinking about this. He had an idea that this model was much more robust and sustainable, and that there would be more possibility to make better improvement, by letting the business take responsibility.”

–Informant 14, DLF

After the agreement on the return system in the packaging industry between the Norwegian government and business associations came into effect, the associations established non-profit return companies (*returselskaper*) in the middle and late 1990s.

### 6.1.2 Implementing waste policy

Representative business associations, like DLF, appear responsible for the running of return companies by participating as company board members (*styret*). In this case, DLF went further to widen their scope of responsibility by establishing a new company that deals with food waste.

“DLF is engaged at boards in five recycling companies in different factions: glass, metal, cardboard, plastic beverage bottles and cans (*pant*), plastics and food waste. Actually, we established a new company, called Matvett. Matvett is based on a four-year old project and established in the

last year. It is into food waste to reduce it, to get data and to know how to prevent food waste from the start.”

–Informant 14, DLF

Although the return companies are managed by business associations at their boards, the government still takes a significant role in these take-back schemes. The main role of the government is to check if these companies reach their goals, and to report the result to the EU.

“When it comes to packaging waste, for many years the government has agreements with many different companies which are producing packaging waste. We (the government) say that you (business companies) are responsible for collecting and treating their packaging waste with environmentally good solutions. The company reports the result from this process to the government, and the government reports it to EU, saying that we (Norway) are meeting their requirements. Norway has the Directives coming from EU. Norway is not a part of EU, but a part of EEA agreement, which means 90% of our regulations are from the EU. But if they (business) do not do their jobs, the government can start to regulate them in different way which makes them much harder. So they want to do good jobs.”

–Informant 8, the Norwegian Environmental Agency

The government also controls private waste handling companies, like Ragn-Sells, through the Pollution Control Authority (*Forurensningsmyndighetene*). The County Governor of Oslo and Akershus (*fylkesmannen*) is the chief representative of the King and the Government in the county. The Governor is the pollution control authority in Oslo for environment-polluting facilities that process and sort waste, such as incineration plants, landfill sites, and vehicle scrap yards. This authority grants licenses to these facilities, and this license requires these facilities to implement specific measures which minimize the negative impacts on the environment. This authority is also responsible for inspecting the facilities, to ensure all conditions are being met.<sup>41</sup>

“We are controlled by the Norwegian government, but mostly it is up to us to be better. The government just makes sure we do what we are supposed to.”

– Informant 9, Ragn-Sells

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<sup>41</sup> County Governor of Oslo and Akershus, 2012, ‘Waste and recycling’ <https://www.fylkesmannen.no/en/Oslo-and-Akershus/Climate-and-the-environment/Waste-and-recycling/> Retrieved March 18, 2016.

Return companies have relationships with local municipalities. These companies buy waste from the municipalities, which is collected by city authorities from households in the region. Informant 11 from Green Dot Norway describes their relationship with the Municipality of Oslo this way:

“We are good friends with Oslo municipality, I think. We have many discussions about how much money we should pay to the municipality. They ask for more money when we buy blue bags(for plastic packaging waste) from the municipality.”

– Informant 11, Green Dot Norway

This bargaining practice to sell their resources or services occurs to EGE when the agency makes a contract with private waste handling actors. Informant 7 from EGE assumes that the bargaining could be a difficult part when it works with other actors, as stated below, although the informant does not broker these negotiations.

“When we make contracts with private waste handling companies like Franzefoss and Norsk Gjenvinning, we have meetings and negotiations to discuss how the working terms should be, for example, the costs, and how often they come and pick up things. Although I personally do not work on this, and I do not think we have many problems regarding that, but I think it is same as other companies around the contracts. We want to get paid as much as possible, and the companies want to pay as little as possible.”

–Informant 7, EGE

REN is cooperating with other actors in recycling, and reusing the items that people bring to recycling stations in Oslo. According to the explanation given by Informant 3 from REN, second-hand organizations such as Fretex have an agreement with REN to take reusable items from REN’s recycling stations for free. Then these organizations repair or redesign the items for resale. More specifically, Informant 21 from Fretex explains that Fretex visits three recycling stations in Oslo, three times a week,

“We have a contract with REN on the three sites in Haraldrud, Smestad, and Grønmo, and we can collect items there. That is actually a good deal because people working there set aside the items that can be used again, and we collect them when we go there. For us, in fact, it is very easy, because people working there sort out the waste, so they make our jobs much easier. It is good for everyone!”

–Informant 21, Fretex

It is pretty easy to find the large donation containers on the streets Oslo, which collect used clothes, textiles, and shoes (*Tøyinnsamling*). REN recommends that Oslo residents to throw this types of waste into the containers managed by Fretex and UFF Norway. REN has contracts with Fretex and UFF that these two organizations can put their containers for free in Oslo.

“We can place our boxes on collection sites next to a box for collecting metal and glass in Oslo, based on our agreement with REN. The collection sites that Fretex and UFF Norway can put the boxes (*Tøyinnsamling*) are divided equally to Fretex and UFF Norway. We have about 200 boxes in Oslo, I guess. Besides this, we also have our own sites in Oslo, not only with the Municipality of Oslo. Everyone goes out to try to find a new location all the time, because we want more and we know that it is a part of waste reduction. Today, we collect about 3kg per capita in Oslo, but we know that up to 8kg can be reused.”

–Informant 20, Fretex

Regarding communicative instruments regarding waste, LOOP works to spread knowledge and to grow public awareness about waste sorting and recycling. This non-profit organization was established in 2000, by the Ministry of Environment at the time. It cooperates with return companies such as Green Dot Norway, Infinitum, and with municipalities to providing information and educational programs and literature. For example, LOOP makes educational materials that are distributed to students and schools, free of charge, when a return company funds LOOP. It creates educational material focusing on the type of waste that the sponsor company copes with. Accordingly, Informant 17 from LOOP says that people can tell which companies have financially supported them, judging by the educational materials. It might not be a coincidence that several return companies (Infinitum, Green Dot Norway, Norsk Metallgjenvinning, Norsk Resy) are all board members (styret) at LOOP. LOOP also produces educational materials for students in environmental education programs, held by municipalities.

### **6.1.3 Necessity of network and governance networks**

The actors carry out their role in the waste management based on cooperation or consensus made through negotiations or bargaining processes with other actors, mainly

governmental agencies. Most participants can benefit from the network they are in when it comes to sharing information and experiences with others. Learning from the experience of others and sharing information with their fellow partners seems vital. Informant 10 from the University of Oslo, an industrial actor according to the Pollution Control Act, gives this account of the benefits of belonging to such a network when it established a new waste sorting system on the campus:

“We have been working a lot with other universities. We have, I, have, myself, established a European university network, in capitals of Europe with five universities. And, I have been one of founders of a Nordic university network, where there are 60 universities in five Nordic countries. All of these are operating on an environmental and sustainable basis. We have been looking into comparing benchmarks and efforts on different issues like energy, environmental management, water management, and waste handling. In addition to that, we have been looking to see which universities have done something unique. For example, we have contact with one university that has established a waste handling system where the recycling rate came up to 90%.”

–Informant 10, University of Oslo

Informant 19 from Galleri Normisjon, a second-hand shop run by the Normisjon organization, had the same perspective on its network:

“Religious organizations running second-hand shops in Norway, we help each other. There have not been any problems yet, actually it has been very helpful. We share information and experiences together.”

–Informant 18, Galleri Normisjon

On the level of waste governance, actors share ideas with others in the network, and reflect this shared information in policy making projects, as Informant 8 from the Norwegian Environmental Agency, and Informant 5 from BYM of Oslo municipality respectively state:

“We work with other civil organizations; it is mainly on questions when we make new laws. We need advice from different environmental organizations. They are very important for us, because they have a lot of knowledge in the field. So we asked them for advice of different cases, and they come to us and yield their opinions.”

–Informant 8, the Norwegian Environmental Agency

“We actually invited NGOs into the working group when we applied for the European Green Capital, because they can be critical voices which have different perspectives on the city, and which are coming from outside.”

—Informant 5, BYM

With regard to specialization, a waste governance which consists of a network works very efficiently, since each actor within the network is specialized in their field, and already has available resources or facilities to utilize. Informant 13 from Infinitum, a return company maintaining and operating a take-back scheme for plastic beverage bottles and cans (*pant*), mentions this specialization by explaining their relationship with local municipalities:

“There are some municipalities that we are looking into and arrangements to get the bottles sorted out from waste collected by municipalities. The municipalities want it, because they think we have a very good system. They want us to take care of it of the *pant*, because it is very expensive for them to collect the waste. And when the volume gets so high, it becomes more expensive for municipalities. So they think that it is good when we get it. Also we get the better price for the drinking bottles when the bottle goes through our vending (*pant*) machine, because then it is clean material. When it goes with other types of waste, the price goes down due to dirt or contamination.”

—Informant 13, Infinitum

Networks are essential when it comes to understanding different views or experiences, but it is also important for implementing more efficient policies. For example, Informant 3 from REN explains that the reason why REN works with Fretex and UFF Norway, allowing them to put textile collection containers at waste collection points, is to satisfy the population’s expectation for convenience. By building waste collection points for multiple types of waste, people can throw their waste away into different containers without much travel. In fact, people expect that this process should be easy and convenient, since they do not want to spend too much of their time going to multiple locations to throw away their trash.

It seems necessary for government agencies to cooperate with other agencies throughout the network, in order to fill up governmental gaps in administrative structure, or to create accomplish projects that go beyond the segmentation of existing governmental

structure. In September 2015, the waste sorting bins, in keeping with the household sorting system, were introduced in Iladalen Park in Sagene, Oslo, and in bus stations near the park (REN, 2016b).



[Figure 10. Waste sorting bins in Iladalen Park and in the nearby bus stations]<sup>42</sup>

This pilot project was done with the cooperation of the District Department of Sagene (*Bydel Sagene*), REN (who runs waste management in Oslo and empties the bins), BYM (for Oslo park management), and Ruter (the common management company for public transportation). It was unclear which agency should take the initiative to introduce the waste sorting bins in public areas. Given that the park was located in Sagene, it seemed likely that the responsibility would have fallen on the District Department of Sagene; meanwhile, BYM is responsible for the maintenance of parks and roads in Oslo, and REN is working with waste, so the task could have equally been theirs. Thus, the agencies involved cooperated to place waste sorting bins in the park and bus stations, hoping to sort more of the waste in public spaces. The data gathered after accomplishing this project could then be used in other projects in public areas in Oslo as well.

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<sup>42</sup> Picture from the official Facebook page of Bymiljøetaten (BYM), 2015, <https://www.facebook.com/bymiljoetaten/photos/a.381531191864742.95417.277544045596791/1117224558295398/?type=3&theater> Retrieved March 19, 2016.

### 6.1.4 Instruments of waste governance

Instruments in public policies are generally divided into three categories; regulatory instruments, financial instruments, and communicative instruments (Jansen and Osland, 1996; Bruijn and Heuvelhof, 1997; Daugbjerg, 1999). These can be applied in two ways in governance networks; for a target, and for an institutional operation (Bruijn and Heuvelhof, 1997). Most of the present instruments implemented by actors, mainly the national and local government, are focusing on the target, like the promotion of recycling or waste separation. Also, instruments used to achieve the goal of waste management in Oslo are mainly financial and communicative.

#### Financial instruments

First, financial instruments can be classified into two categories; free and tax. REN utilizes free instruments to encourage households to recycle and reuse. All households can get special plastic bags (blue and green bags) from grocery chains for free, and people can use random plastic bags for collecting their residual waste. People can also bring their hazardous waste, for example WEEE or garden waste, to recycling stations in Oslo, and they are not required to pay for this service (REN, 2016a). Technically speaking however, this is not free of charge, since the costs of producing the special plastic bags, and of managing hazardous waste are included in the waste fee (*avfallsgebyret*) that households pay. Informants from REN think that this approach allows people to use waste disposal services in an easier and more convenient manner. In addition to this, REN receives the leftover items from flea markets (*loppemarked*) held in Oslo free of charge, thus the hosts of the flea markets do not need to worry about how to dispose of unsold items (with some exceptions). This strategy supports and encourages the inhabitants of Oslo to reuse old items (City of Oslo, 2013; REN, 2016a).

Taxation is the most common type of instrument used to achieve recycling and waste-reduction goals. The take-back scheme of beverage bottles and cans is a good example. Tax exemption can provide a reason for retailers and producers to be a member of return companies. Informant 13 from Infinitum describes the benefits of a membership with Infinitum as follows:



“The government wanted the producers and retailer to be responsible for bottles and cans. So they put an environmental tax to each bottle and can. There was an agreement with the government on beverage packaging that for every percent that we manage to collect, the environmental tax will go down simultaneously. And if we reach 95%, then the tax will be zero. So now it is zero.”

–Informant 13, Infinitum

Tax exemption will be given to the companies who recover over 95% of their produced beverage packaging. However, it is remarkably challenging for private producers or retailers to recover over 95% of their produced beverage packaging by themselves. Hence, it is wise to pay the membership fee, and become a member of a return company. This fee is still lower than the taxes that they most likely would have had to pay. Thus, this take-back scheme can incentivize recycling and encourage producers or retailers who have not yet joined the scheme, by indicating the economic advantage of doing so.

The waste policy, based on the concept of the producer’s responsibility, operates as an economic instrument to all industrial actors. If an industry actor produces smaller amounts of waste and hazardous waste, it will cost less for waste disposal services from a waste handling company. On the other hand, if it produces an enormous amount of waste and particularly hazardous waste, it has to pay big expenses to treat the waste in a proper and sound way. As a result, each industrial actor can decide its waste scheme whether it wants to save or lose money when using waste disposal services.

## **Communicative instruments**

The second category, the communicative (or informative) instruments, is highly depended on to change a population’s behavior when it comes to throwing or sorting out waste. REN applies this type of instrument to educate its many target groups, ranging from schoolchildren to households. REN offers a free education program, ‘*skolestua*’ for all 4th grade students in primary schools in Oslo (City of Oslo, 2013). The children learn how the waste sorting system works in Oslo, and visit the two waste plants: a sorting plant and an incineration plant in Haraldrud. These days, this education program is also open to people from high schools, universities, and organizations. According to the statistics of REN (2016a), over 7,000 people took the *skolestua*

programs in 2015. REN runs a ‘door-to-door’ project to raise awareness for waste sorting procedures in households. Until today, the door-to-door group has visited 39,500 households, informing them of waste separation, and has distributed 7,300 food waste containers in Oslo (REN, 2016b:18).

LOOP also provides educational materials about waste separation and recycling, mostly for schoolchildren. Informant 17 mentions that LOOP utilizes famous cartoon characters, or composes the material in the form of a cartoon or a game so that children can concentrate and understand the contents in a more entertaining way. Through this program, LOOP expects that children get to know more about waste separation and recycling, and practice this at home. Thus, the target group is not only children, but also their parents. In fact, Informant 17 mentions that the main goal of the education is “that the children educate their parents.” Additionally, LOOP also runs a website, ‘sortere.no’, in order to provide provides clear manuals and information about waste separation and recycling. People can find information about waste separation, locations of recycling stations and waste collecting points for metal and glass throughout Norway. The website shows the information about the processes that the different types of waste go through as well.

Special marks, for example the Green Dot mark of Green Dot Norway and the Swan eco label of the Nordic Council of Ministers (see Appendix 3), help consumer to choose more environmentally friendly products. The Green Dot mark signifies that the producers or importers have joined Green Dot Norway, and that the products will be recycled in a sound manner. The Swan logo indicates that this product is a good environmental choice, since the product fulfills specific environmental criteria. As a result, people can practice sustainable consumption, by purchasing products with these special marks.

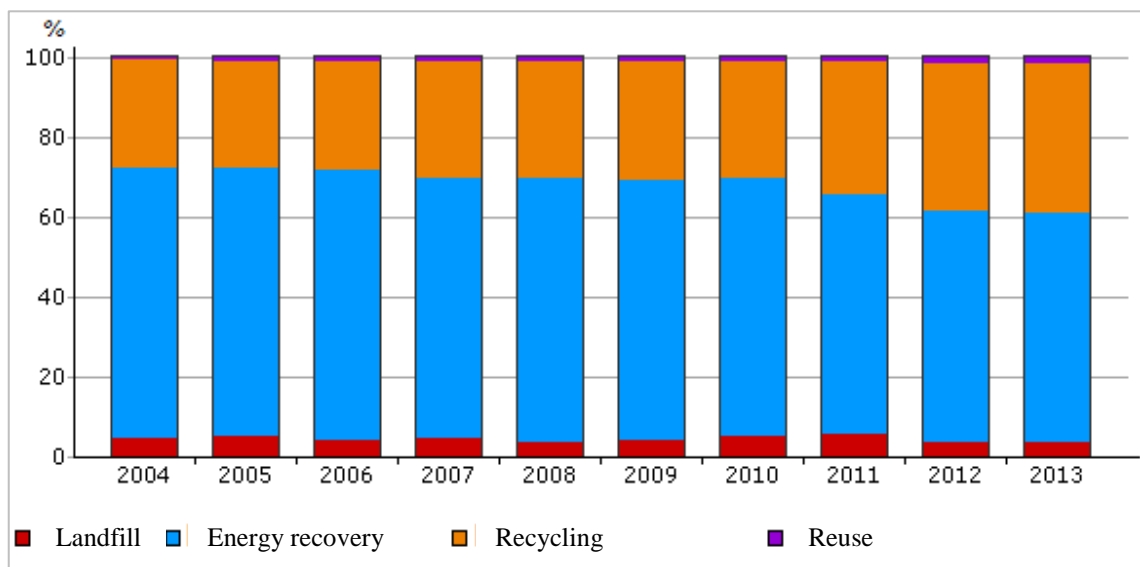
## **Regulatory instruments**

Regulatory instruments, such as law and regulation explained in chapter 5, also are utilized in waste management. The regulatory instruments especially deal with hazardous waste or polluting facilitates that require special treatment to reduce their negative impacts to the environment. For example, waste regulation is imposed on producers and importers of electronic or electrical items to join take-back schemes in

order to minimize the environmentally hazardous effects of their waste in the disposal and treating processes. By forcing take-back schemes in different waste industries, the government established a new structure that decreased the negative effects of waste in the Norwegian waste industry, and promoted a circular economy.

### 6.1.5 Limitations of the present waste governance

The current waste governance set a goal for the alignment of their waste management plan with the waste management hierarchy. As such, there has been an emphasis on the recycling of waste and reuse of items via policies implemented through cooperation with the different actors. The actors within the network gather together to share their opinions and experiences, and in doing so identify common goals at the meetings. This waste governance works well when it comes to increasing the recycling rate in household waste treatment, as seen in Figure 11.



[Figure 11. Waste treatment methods for household waste in Oslo 2004-2013]<sup>43</sup>

Yet, the present waste governance has several limitations to overcome in order to implement a more environmentally desirable waste management. There are five types of limitations in the current waste governance: the lack of an entity to govern industrial waste, fragmentation, competition, excessive focus on waste sorting, and politics.

<sup>43</sup> Oslo Kommune, Unknown, 'Waste treatment methods', <http://oslo.miljobarometern.se/state-of-the-environment-oslo/waste-and-litter/waste-treatment-methods/> Retrieved March 19, 2016.

## **Where is the governor of industrial waste?**

Five informants show their concerns about the absence of a governing entity to control industrial waste. Based on the Pollution Control Act, each industry is responsible for its own waste. However, a control agent, like REN for household waste, does not exist in the industrial sector. Thus, decisions on industrial waste are totally up to the industry.

“The government in Norway does not have sufficient politics regarding industrial waste, and it receives lots of critique about it. Of course, there is sort of a directing agency (Norwegian Environment Agency), but no ‘governing’ agency, although we (Norway) apply the producers’ responsibility to industry.”

—Informant 16, Waste Norway

“Our members (public and private sectors handling waste) know how to handle waste. (But), some of them do not think that it is their tasks to prevent or reduce waste in industrial waste, because it is not their responsibilities. That is the producers’ responsibility and the producers decide to reduce their industrial waste or not. But few members start to bring the prevention issue, so maybe we shall start to work on the topic of waste prevention next year.”

—Informant 15, Waste Norway

The lack of a governing agency on industrial waste seems to be a crucial problem in waste management, because industrial waste from manufactures, services, construction and demolition sites account for approximately 75% of total waste in Oslo, while household waste makes up the remaining 25% (City of Oslo, 2015a:68). Without a responsible agency for managing industrial waste, each industry actor is expected to develop their own waste treatment strategy and system for disposal. Yet, this may not happen as expected. Informant 9 from Ragn-Sells, a waste collection and treatment company, describes the tendency of industrial actors below:

“To have waste sorting systems is not mandatory to industrial actors in Norway. They decide it themselves. If they order just one waste container and put all wastes (paper, cardboard, plastic, and residual waste, except hazardous, WEEE) into it, they will pay more to us. But the price gap, between doing waste sorting and not doing it, is not high enough. If the gap is high enough, they would think again.”

—Informant 9, Ragn-Sells

The informants gave their suggestions for how they could cope with this industrial waste problem. These suggestions can be categorized in two different approaches. The first solution is to emphasize the responsibility of the producer in minding its waste. The informants who gave this of suggestion believe that prevention of waste could be achieved if the industrial actors became more aware of the waste they produced. Since the industrial actors are fully responsible for their waste, the actors may adjust their behavior if they realize the seriousness of the waste problem they cause. The second suggested approach is to establish national laws which specifically regulate industrial waste and industrial actors.

“Take the energy sector, for example. There is a regulation to comply with when you build a new building to fulfill the requirements about energy in Norway. The same could be done with waste. Now we have a national goal to reach 80% of the recycling rate, and the government put this goal on the level of industrial actors by law.”

–Informant 10, University of Oslo

“If we achieve to prevent waste generation, I think, definitely, the Norwegian government should introduce regulations or laws at national level, to remove the differences in regulations among municipalities. If the Oslo municipality enforces waste regulations to industrial actors in Oslo, they will probably leave Oslo to move into a new area where no regulations exist. Then no municipality will be willing to take this risk because the determination will affect its economic situation.”

–Informant 1, REN

The reason the informants prefer regulations by the national government can be found in the explanation below:

“I think the government is most important, because it can force us to change. For example, not many years ago, we had a law<sup>44</sup> against smoking which everyone was angry at. But you see now, no one would not think of it. So I think, sometimes, you have to force to make people change. Of

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<sup>44</sup> According to the description of the Tobacco Control Laws organization, “the Norwegian law prohibits smoking in most indoor workplaces and indoor public places, subject to a few exceptions which permit smoking in living quarters in institutions that replace the residents' home and up to one half of hotel guest rooms. Smoking is prohibited on all means of public transport. In addition, smoking is prohibited in all outdoor areas of kindergartens, primary schools, and secondary schools, and near the entrances to health institutions and public enterprises.”

Tobacco Control Laws, 2016, ‘Country Details For Norway’, <http://www.tobaccocontrolaws.org/legislation/country/norway/summary> Retrieved April 3, 2016.

course at first, people will complain about it, but later, no one talks about it.”

—Informant 18, Future In Our Hands

### **Who will be responsible?**

The second issue of the present waste governance is the difficulty in assigning responsibility when a problem arises. Network governance covers the governmental gap caused by administrative divisions in government structures (as illustrated with the example of Iladalen Park in section 6.1.3). Hence, it is hard to find who is exactly responsible for a task that falls in the gaps between the clear duties of collaborating actors.

For example, it seems impossible to figure out a responsible actor to implement the waste strategy in the urban ecology program (*Byøkologisk program*) of Oslo. The strategies are described as in the program:

“Making Oslo's citizens and businesses aware of their consumption, product life-cycle costs, the possibility of reuse and repair. Further develop cooperation with schools, Grønmo Hverdag (an environmental NGO that does not exist anymore), LOOP and other relevant organizations, including by creating a separate ‘Forum for Waste Reduction’. [...]Oslo will prevent the generation of waste and contribute to increase reuse.” (City of Oslo, 2011:12)

When informants from REN and BYM were asked about who is responsible for implementing these objectives and strategies in the Urban Ecology programs, their reactions varied. Two informants from REN insist that the strategy regarding industrial waste exceeds REN's role, and BYM is responsible for this because BYM is the designer and manager the program.

“The Norwegian law (the Pollution Control Act) says that REN is only responsible for waste from households in Oslo. Of course, we can somehow affect the industrial actors in Oslo by giving a sign like ‘we are watching you’, but actually, we cannot control or force them to do something because that is not our work and responsibility.”

—Informant 1, REN

“The Urban Ecology program is BYM's work, so they are responsible for it. We definitely cooperate with them for the program, but we cannot help

them with some tasks that go beyond our roles, like with industrial actors.”

–Informant 2, REN

However, two informants from BYM claim that the waste strategies were devised by REN, so REN is responsible to carry out waste tasks in the program.

“It is quite complicated. Some cases we collaborate with other agencies, but that is very hard to give a clear picture how this is. In some cases (goals directly regarding BYM’s tasks) we do that, because BYM is responsible for managing parks, roads, parking roads and so on in Oslo. We manage the program part of it, like writing the documents about the urban ecology program. But we do not manage all the strategies in the program.”

–Informant 5, BYM

“That is true that REN is only responsible for household waste. But as you see, some waste goals and strategies includes specific details that only agencies specialized in those issues would know. This means that each agency participating in this program set its own goals, strategies, and measurement.”

–Informant 6, BYM

As indicated in the example above, waste governance done in cooperation with other actors could be beneficial for implementing policies and programs across borders; however the problem of ambiguous responsibility may occur among actors. This could be resolved by creating an overarching governing entity, or by reorganizing the present structure. The case of the University of Oslo, an industrial actor that launched its own waste sorting system on the campus, demonstrates a possible solution to the problem. Informant 10 from the University of Oslo illustrates below how the structural problem was and how it resolved it:

“One of the obstacles to launching the waste sorting system on the campus is a structural problem. We are four departments involved in waste handling. We have a cleaner department working with several hundreds of cleaners. The half of them is employed by the university and the other is hired by private cleaning companies. And then we have a department to operate, manage, and run buildings and facilities. That department has a lot to do when it comes to main logistics including waste. Then we have a parking department to run all the parking lots out of facilities where waste is also generated. We have the administrative department which takes care of all the contracts with external companies to come and pick up our waste.

So you can say that of these four departments involved, none of them were responsible for the whole waste management on the campus. So the structure was a main obstacle before, because no one led overtop of these four departments and had not had a responsibility to take care of waste management. And that means that they were dependent on each other, until this project of establishing the waste sorting system was organized above the level of these four departments.”

–Informant 10, University of Oslo

### **Competition, good or bad?**

The third limitation is competition. This is not quite problematic yet, but several informants expressed their concerns over this within the present waste governance. As explained the preceding section (5.3), every return company performing take-back schemes in packaging waste is specialized in its profession. Although each company monopolizes its own waste sector without any competition, there have not been many challenges to this system, according to the informants working within these return companies. A possible explanation could be that the return companies are non-profit organizations, and they invest their surplus into improving their service of cheap and efficient waste handling to their members. Also, it is not mandatory for the producers and importers generating packaging waste to join this take-back scheme of packaging waste, thus membership is decided totally at the discretion of the producers or importers. Thus, this same system in packaging waste industry has endured since 1995.

However, the situation is different with return companies that take WEEE back. All producers and importers that bring WEEE into Norway are obliged to join this WEEE take-back scheme by law. They can choose from the competition, comparing prices, services and so on, to find their best-suited partner. Most return companies in WEEE business are private companies, and they earn their profits through disposal services they provide to their clients. Informant 12 from Elretur states that there has been harsh competition in the waste industry since 2004. Elretur, then a company handling WEEE, began providing take-back services for packaging waste, and in doing so became a competitor to Green Dot Norway. This new actor came into an existing competition in the packaging waste industry, and the reactions ranged from welcoming to worried.



Informant 12 from Elretur defends the expansion to packaging waste services, by stating that it was a need from their customers. Also, the informant added that some customers hoped for service at a lower cost, and that the quality of the membership could be improved due to this competition. Informants 14 and 11 from DLF and Green Dot Norway (respectively), seem fine with this change, as long as there are fair rules for this business and that the laws apply impartially to all actors. They also see the competition as a chance to bring innovation to the company and business.

On the other hand, there are some worrying potential outcomes that competition could provoke. The German case was given during the interviews with other informants. In Germany the fierce competition in WEEE has become a serious problem. There is a lot of noise around the business due to the competition among the German companies in the treatment of WEEE. More importantly, the extremely low price for handling and discarding WEEE, owing to heavy competition, does not cover the full environmental cost to treat WEEE waste in a safe manner. Thus, WEEE could be mishandled. For instance, WEEE could be exported illegally to other countries, mostly developing countries. If this happens, it presents a serious threat to the environment, and also the people living near the disposal areas.

Yet, second-hand organizations perceive the moderate degree of competition as a good opportunity. This is because all of them think that the competition attracts more customers, and also helps to boost reuse behavior in people. Informants 19 and 20 from Galleri Normisjon and Fretex explain their positive perspectives on competition:

“Actually I think competition is good. Well, let me refer the case in Denmark, we have learned that if you put two different second-hand shops close to each other, or maybe on the same street their profit will both go up. Because people go to the area where there are three or four second-hand shops, and they will go to the second, and third shops if they cannot find the item they want in the first shop among them. You also see this logic in big shopping malls where shops in the same category, like clothes and shoes, are on the same floor. So it is kind of attracting people to go to the second-hand areas. So, the Christian second-hand shops in Norway, we work together. We are really helping each other. So we try to think of the competition as positive, not thinking ‘oh, here is my enemy.’”

—Informant 19, Galleri Normisjon

“If you use the market term, yes, it is competition. We all want donations because it is a resource, and we all want customers. But I think, what is happening in Norway is that there are many different actors including Fretex, so the second-hand market is kind of growing and people start to get used to the concept of second-hand items. 10 or 20 years ago, when Norwegians think about second-hand, they think ‘urghhh, second-hand. That is not good.’ But now people think that it is good, and it can contribute the environment.”

—Informant 20, Fretex

### **Is it right to do it right?**

As seen in Figure 11 at the beginning of this section, the recycling rate for household waste has increased. The recycling rate in 2015 was 38%, therefore it increased 0.8% from 37.2% in 2013 (REN, 2016a:17). The Municipality of Oslo aims to increase the recycling rate of household waste up to 50% by 2016 (ibid). Thus, the municipality has announced that it will utilize communicative methods to encourage the recycling of food and plastic waste in households (City of Oslo, 2015a:73).

For example, REN has run several campaigns in newspapers, on TV, in theaters and on the Internet, in order to educate about waste separation and recycling practices, according to REN’s annual report (2016a). It also operates diverse ways to reach Oslo’s citizens by meeting them in person, or over social media. They claim to have met 8,000 residents while a REN’s employees stood in a shopping mall for 1,000 hours, delivering information about recycling and distributing food waste containers. On the Internet, the REN’s Facebook page on waste separation has over 16,400 followers, and has been ‘liked’ over 112,000 times (ibid:18).

However, REN has been criticized for communicating the wrong message about waste. Informant 17 from Future in Our Hands casts some doubt on whether it is right to prioritize waste sorting and recycling, over preventing waste in the first place.

“It seems that REN seems to get a lot of money to run campaigns. There are a lot of posters all the time around the city, reminding people to separate their garbage. But I noticed sometimes from the poster, in terms of food waste specifically, they write something like ‘remember to put your leftovers into the green bag.’ But I think that the leftovers should be put in

a refrigerator and eaten at a later time. I think it is more important not to produce food waste instead of throwing it in the right bag.”

–Informant 18, Future in Our Hands

Indeed, one famous campaign, shown in Figure 12, could be found in many metro stations in Oslo during the Christmas period. The campaign message can be roughly translated to “there will be a lot of food in the Christmas season” and “remember to put food waste in green bags so we can use it as bio fuel.” The message emphasizes waste separation, thus the food can be turned into biofuel to run public buses in Oslo. Yet, it might be better if the campaign conveyed the message of preparing less food and throwing less food away, or not wasting leftovers, as mentioned by Informant 18.



[Figure 12. REN's Christmas campaign]<sup>45</sup>

## Politics

The last limitation of the current waste governance is that it is vulnerable to the political situation. Politics shape environmental (waste) policies, either by supporting or overlooking them. Informant 17 from LOOP gave an account of this, and also insisted the importance of a national government in waste management.

“The government should work more on waste prevention. But as you may know, now we have the conservative government and they are not known for being environmentalists. That is a problem because they still have a lots roles and things that they have to do, although they do not have the same

<sup>45</sup> The official Facebook page of waste separation (*kildesortering*) operated by REN, 2014, <https://www.facebook.com/Kildesortering.i.Oslo/photos/pb.140745493459.-2207520000.1461865436./10152588944083460/?type=3&theater> Retrieved March 11, 2016.

focus or perspective on the climate change. The leader of Fremskrittspartiet (*FrP*) party just said that climate change is not man-made. That is actually embarrassing.”

–Informant 17, LOOP

The political environment matters particularly when it comes to improving the present waste management situation, by launching or implementing new programs and projects. An informant from BYM describes the introduction of the Urban Ecology Program as an example:

“It is little bit difficult to talk about politicians and politics ... but it changed now.<sup>46</sup> Now the new politicians (in Oslo kommune) are more interested in environment, so a lot of different things are happening now. ... The program was prepared and sent to politicians in the city council of Oslo in 2008, and we emphasized the necessity and importance of the program. But it took three years to adopt this program. Because of the delay, the politicians seemed not to care about it.”

– An Informant, BYM

Yet, the political situation changes all the time. There is positive and innovative political environment that facilitates to introduce and perform innovative policy, instead of delaying new attempts. Informant 14 from DLF states the supportive political condition when business actors became responsible for their take-back scheme in packaging waste as that:

“In 1995, with the Labour party, Thorbjørn (the minister of Environment ministry at that time) was brave enough to trust business. I think he was very central in the decision, and we got the chance to deliver and proved the concept. It was quite risky, but we have proved that we do well. (But) I am not sure that we could do it (the business establish and run the take-back schemes) today if we have the same situation. I do not think it would be possible.”

–Informant 14, DLF

Informant 14 gives the reason for the opinion above that distrust of business actors is prevalent in society today, so politicians might not make the same decision due to potential huge opposition to the decision.

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<sup>46</sup> There was the election for city council members and representatives for the districts and regions (*Kommunestyrevalg og valg til bydelsutvalg*) in September 2015. The interview with this informant was done in October, 2015.

## 6.2 Time

### 6.2.1 Irreversible time and the environment

Environmental destruction, such as the climate change and deforestation, is recognized as irreversible because it takes thousands years to recover the environment, if not forever. This is why it is important to take precautionary approach to reduce environmental damage. The Norwegian government names 5 main principles of the Norwegian waste policies (The Norwegian Environmental Protection Agency, 2013; see p.52-53 in this thesis). Among these principles, the precautionary principle is suggested first with the definition that “where there is scientific uncertainty regarding serious or irreversible risks against health or the environment, uncertainty should not be used as a reason to postpone or omit to the implementation of precautionary measures,” (ibid:12). In the same document, the precautionary principle and the cradle-to-grave principle are regarded as keys to finding workable solutions.

The precautionary principle is well-reflected in waste treatment policies and regulations for hazardous waste, in order to minimize damage to the environment and to people. Hazardous waste should be treated in a safe and sound manner in Norway, according to the Pollution Control Act and the Waste Regulation. This requirement applies equally to all actors, households and businesses alike, since it is very difficult to predict with certainty what will occur from inappropriately treating hazardous waste, and how severe the damage will be. Several informants express the same concerns as follows:

“Hazardous waste is one of the most important topics considering waste, because I do not think that we know the consequences arising from it. This makes them ‘dangerous.’ We do not know what harm it generates. And there are still new products coming. We do not know how the new products interfere with other products and the environment.”

–Informant 14, Waste Norway

With the policies and facilities to handle hazardous waste safely, further degradation of the environment could be minimized. Not doing so would require lots of time and financial resources to recover the environment.

The role of the Pollution Control Authority is based on the same logic. All facilities, plants, and places that collect, sort, and treat waste must have permits from the Authority to ensure waste handling processes are done correctly. The authority may impose special conditions to a facility if necessary, to prevent severe pollution, as per the Pollution Control Act.

The proper treatment of hazardous waste is a step toward slowing down the speed of environmental degradations in the world, caused by natural material exploitations. Also, Recycling can impede irreversible environmental destruction by offering an alternative way to use materials. Informant 12 from Elretur depicts the recycling of WEEE as ‘urban mining’, when waste becomes the raw material to produce new products, once dismantled and processed in a safe way. Through this urban mining, the informant believes that we can stop destroying rainforests in the world that have been destroyed thanks to the excavation of minerals, a component of electronic and electrical products.

“Rainforest organizations in Norway now see that there is a very tight connection between WEEE and saving the rainforest, because people destroy rainforest for two reasons; either cutting wood or finding minerals. And of course, you can use WEEE (as resource) when you deliver the waste properly and, recycle it properly. You have ‘urban mining’ instead of mining in Indonesia. So I think that we slowly and slowly are getting closer to it.”

—Informant 12, Elretur

Time is important at an institutional level, since it relates to the irreversibility of the environment. With time frames, actors are able to take proper and urgent actions to control ongoing environmental problems. Also, time is crucial since most policies or programs take time to go from the design phase, to implementation. New policies, programs and regulations are not made in a short period; an informant from BYM mentioned that it took 3 years for the Urban Ecology programs to be adopted by the city council. Political climate determines the speed, and it requires time to plan, to discuss, to approve and to carry out, following administrative and legislative procedures.

Implementing a new system definitely takes more time than planning it. Specifically, it took 15 years, from 1997 to 2012, to fully establish the current waste sorting method in all Oslo households. Since 1997, households in Oslo have been separating glass, metal,

cardboard and drinking cartons (C40 cities, 2012). The city council of Oslo then adopted a new waste management plan which was more sustainable in 2006 (NRK, 2006), establishing the infrastructure for this current waste sorting system. The city built the world's largest optical sorting plant in Haraldrud, Oslo (EGE, 2015). After setting up all the infrastructures required for the new waste management, the municipality carried out pilot projects for this new waste system with an initial group of 17,000 residents in October, 2009. Gradually, this system was introduced to more and more districts in Oslo, till eventually all households in Oslo, in 2012, were able to sort metal, glass, cardboard, plastic, food, and residual waste (C40 cities, 2012).

There was some criticism that argued that the municipality could have introduced this waste sorting system earlier as stated by Informant 18 from Future in Our Hands:

“Probably it could have started bit earlier. I mean, Oslo wasn't the first municipality to introduce the waste sorting system in Norway, there are other places that have done it a lot earlier. I do not know why they are so slow. I guess it has to do with money, this and that, planning, you know everything takes time. Everything takes time in Norway, regarding these kinds of projects. I feel like Norwegian government is always doing things a little bit too late.”

–Informant 18, Future in Our Hands

Regarding this criticism, the Informants from REN (which led the waste sorting system in Oslo) replied:

“We know there are critics, saying it was late to do this. But we had to be careful, and plan well before we launched it. And we needed technical settings and a lot of money, to build new infrastructure for the system, for building the optical sorting system in Haraldrud, and distributing waste containers to all households in Oslo.”

– Informant 1, REN

“Oslo is a big city with about 600,000 residents, so we are the largest municipality in Norway. Other municipalities in Norway are smaller than us, not many people live there. So for us (REN and Oslo municipality) the situation was more complicated and difficult to start waste separation system, and it needed more time to think of all the factors (population, logistics and etc).”

– Informant 2, REN

The good part of the current waste management system regarding time frame, is that most actors in waste governance publish their environment report (*miljørapport*) annually, announcing their environmental goals and activities related to waste. The municipal government agencies, REN, EGE and BYM also publish annual reports (*årsberetning*), illustrating an analysis of the last year, and the evaluation of their previous goals. Informant 5 from BYM explains that:

Besides these deadlines at the policy level, it takes time to change a population's attitude and behavior to waste. 8 of total 21 informants share this opinion during the interviews. Like the eventual change of public opinion on second-hand goods, as mentioned in section 6.1.5 by Informants 20, it may take several decades to build new attitudes and social habits towards waste.

## **6.2.2 Getting into the rhythm**

The last important time issue is *rhythmicity*, which we can comprehend by how a society can disturb environmental rhythms. Kütting (2000a, 2009) claims that the present society, relying on mechanical and technological processes, which are established on the strong belief of social evolution, does not share the same underlying principles with the environmental process. At this point, Kütting (2000a, 2000b, 2001a, 2000b, 2009) makes a distinction between two contrasting features: linear rhythmicity pertains to the present society, and cyclical rhythmicity pertains to the environment, as explained in section 2.1.3.

Since the Municipality of Oslo focuses on waste management based on a life-cycle approach, the municipality has been aggressive in increasing its rate of recycling and energy recovery. In the preceding sections, REN has put its efforts in encouraging residents to practice the waste sorting system in their homes, with the help of posters, advertisements and the distribution of free waste containers. It has also tried to collaborate with other actors to collect, treat, and resell the unwanted products that they accumulate, instead of discarding the products. Thus, it is important for them to build a user-friendly infrastructure to increase the people's participation in recycling and reusing.



REN has successfully opened more recycling stations in Oslo, in order to enhance their accessibility to residents. The convenience of not travelling far to deliver hazardous waste, and also not needing a car to do so, means that people can visit the stations more easily. Informants 3 and 4 from REN say that this is crucial to increasing people's participation, because if it is too difficult or complicated to get to the recycling stations, people will simply put hazardous waste into their residual waste bags, which is prohibited.

REN operates total 28 recycling stations in Oslo, including 3 major stations, 21 (mobile) mini stations, 3 stations for garden waste, and 1 station for hazardous waste from industrial actors.<sup>47</sup> Mini recycling stations (*minigjenbruksstasjon*) are located in the city center and residential areas, so people do not need to travel to go to main recycling stations, which are further away from the Sentrum. In addition, the waiting times will shorten to use recycling stations, meaning users can save their time dealing with their waste. REN announced that there were over 860,000 visits by household customers to all the recycling stations in 2015, and 50,600 tons of waste was collected through these stations (REN, 2016b).

REN also runs its own recycling strategy regarding garden waste. Informant 3 from REN explains the compost made from garden waste as follows:

“This is the compost that we collect from garden waste receptions in Oslo to make compost. We make different types of composts, so people can buy what they need for their situation. We treat the garden waste through special process, and then, it becomes compost. No dangerous pests or weeds inside. Actually Oslo people like this compost, because this is high and good quality.”

—Informant 3, REN

REN used to hold a special course for home composting, to teach how foods waste could be utilized. However, it does not run the course anymore because food waste will be transformed into biofuel and fertilizer, so long as people throw food waste into the green waste bag. Yet, REN subsidizes the composting containers people can buy, according to Informant 1 from REN.

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<sup>47</sup> Oslo Kommune, Unknown, 'gjenbruksstasjoner', <https://www.oslo.kommune.no/avfall-og-gjenvinning/gjenbruksstasjoner/> Retrieved March 12, 2016.

When it comes to efforts for waste prevention, REN has a special program for encouraging the use of use cotton diapers (*tøybleier*). Informant 2 from REN describes this program as:

“We support usage of cotton diaper. If people buy cotton diapers and send the receipt to us, people can get 1,000 NOK back. Although it is not popular yet, and last year (2014) 50 people use this programs, we hope the number of users would increase.”

–Informant 2, REN

Informants 1 and 2 admit that most programs and campaigns run by REN focus on waste separation and recycling, and less on waste prevention. However, these two informants defended REN’s position, claiming that this is the role they are given by national laws. According to the laws and regulations, REN is responsible for household waste only in its collection and disposal. Their responsibility does not begin before waste collection. Of course, REN can work to minimize waste generation in Oslo with efforts like the cotton diaper program, but strictly speaking, this is not REN’s mandated role. Also, REN does not have the authority to control companies that produce disposable items, nor force them to adopt eco-design in their manufacturing process. Only industrial actors decide what they want to do. Thus, these informants do reveal that their power to prevent waste is limited, although REN does what it can.

The Norwegian government prioritizes the following types of waste in its waste strategy report (The Norwegian Environmental Protection Agency, 2013): plastics, textiles, construction and demolition waste, discarded vehicles, WEEE, and hazardous waste. Plastic waste is the top priority, and the government advocates the necessity of increasing the recycling rate of plastic waste. According to the statistics, 330,000 tons of plastic waste were generated in Norway in 2010, and only approximately 25% (81,000tons) of this total amount was recycled (*ibid*:39). It is expected that the recycling of plastic waste will reduce greenhouse gas emissions, and also reduce energy consumption in the production of new plastics. Recycling will also decrease the emissions from incinerating plastic waste. Thus, the government announces that it plans to tighten the requirements for plastic recycling in households and businesses (*ibid*). For example, a take-back scheme for plastic packaging waste will be proposed in new business sectors, like agriculture, which consumes lots of plastics (*ibid*:41). Other actors

in the take-back scheme of packaging waste sharing the same attitude as the government, will apply this take-back scheme into new business sectors.

“Other sectors, like furniture and sports, it is not that mature business. There are attempts to convince them to practice their producers’ responsibility, and to be a member by paying what they deliver to the market. Sometimes it is easy to forget other businesses because food and drink industries are so big and we have a ‘do it yourself’ principle (about waste handling in business levels). But furniture and sports are big enough to deliver a lot of waste.”

–Informant 14 from DLF

Informant 8 from the Norwegian Environmental Agency also has a similar perspective on the importance of increasing material recycling, based on growing practices of waste separation as follows:

“We produce too much waste in Norway. We have 2 million tons of waste each year, and that is a lot. We need to treat waste in a good way and not only think about energy recovery. We need to think about material recycling much more than we do today. I think, in my personal opinion, the municipality needs to sort out more of the waste it collects, because there are too much plastics and too much food in residual waste so they will be burnt out.”

–Informant 8, the Norwegian Environmental Agency

However, there are some critics who cast doubt on the effectiveness of material recycling. Material recycling does not preserve the original quality of materials over the course of the processing, as the informant explains below. This mean that we cannot recycle certain types of material forever; at some point a material is exhausted, and it becomes necessary to use virgin resources to make a new product:

“Like cardboard, every time you recycle it, it will be of lower quality. So then you will get less money for that. But, like aluminum, for example, that has the same quality for a long time.”

– Informant 9, Ragn-Sells

Some informants discuss the effectiveness of material recycling from an environmental standpoint. Informants 20 from Fretex, and 17 from LOOP, share these views:

“I think that so much energy is going to treat energy recovery and recycling, of course we need that. But it is only because we create this waste problem at the first place. I think it is smart to go to the root of the problem (which means we need to work on prevent waste at the first place).”

–Informant 19, Fretex

“Yes, Oslo residents are quite good at sorting waste. But, there is a debate about waste, and in the debate, sorting waste is not necessarily doing benefits for climate change. Aftenposten has now the big issue about waste sorting waste in which they compare that it is not very important what you do as a consumer because the effects overall are small. But if you look at a bigger picture in resources, it is really necessary to recycle and use things more than once. They agree on that, but there is always a debate.”

–Informant 17, LOOP

The Norwegian government has also acknowledged the necessity of preventing waste generation and, therefore lists food waste as its priority in the prevention of waste. In the national waste strategy report (The Norwegian Environmental Protection Agency, 2013), the government has shown that departments related to food (e.g., the Ministry of Agriculture and Food, and the Ministry of Children, Equality and Social Inclusion) would cooperate with industries, retailers, food producers, wholesalers and households (ibid:38). Once the organizations ‘Matvett’ and ‘ForMat’ (*Forebygging av matavfall*) were established by business associations in food and retail industries, the Norwegian Ministries have collaborated with these organizations and research institutions to prevent food waste. Matvett, for example, aims to educate people on food waste, with the goal of encouraging people to throw less food away. For example, they posted an article on their website explaining that the ‘best before’ date stamped on food is not an expiry date, and that food is still safe to consume for a period beyond it. The organization also offers small tips to keep ingredients longer.

What of the waste that cannot be recycled or reused? There are two options which reflect the linear rhythmicity. The first is to utilize as much of the waste as possible for energy recovery. This option is preferred by the Norwegian government and the Municipality of Oslo. The second option is to prolong the longevity of items as much as possible, consequently delaying a product’s transformation into waste. As mentioned several times throughout this thesis, the choice of extending the longevity of items is

substantially dependent on their respective industries, since they are themselves responsible for their waste.

The Norwegian government and the Municipality of Oslo encourage energy recovery (energy utilization) as the ideal approach to waste when all other upper level methods in the waste hierarchy do not apply. The Norwegian government has set a national target to increase energy recovery in an economically and environmentally sensible way (The Norwegian Environmental Protection Agency, 2013). The Municipality of Oslo plans to utilize waste as much as possible to produce energy for district heating (City of Oslo, 2015a). According to the Environment and Climate Report, in 2014, the EGE agency produced 904GWh for district heating from energy recovery processes (City of Oslo, 2014:31). The municipality forecasts that the output would increase to 1,000GWh and 1,130GWh in 2015 and 2016, respectively. With regard to electricity generation, EGE produced 125GWh in 2014 (ibid). Energy recovery is not the best way to treat waste from an environmental perspective; it is, however, the best option when there is no other desirable treatment method available. Informant 7 from EGE describes as follows:

“If we cannot prevent, reuse, and recycle the waste, and these methods are no longer possible, the best way is incinerating. We get two products from it, we get electricity and district heating, which are both are made in an environmentally friendly way. So incineration is definitely the only way to do right now, because the waste will disappear and be burnt so that only ash remains. But, of course, we want all these steps (waste prevention, reuse and recycling) to be on top mind first. These are what we want to do first.”

–Informant 7, EGE

EGE tries to utilize waste as a resource as efficiently as possible for recycling, by sorting out waste during the energy recovery process.

“We (EGE) took all the ash out after incineration, we got two products from the ash. One is bottom ash, which is not toxic, and the other one is toxic, the flying one. The bottom ash, which is not toxic, contains lots of metals from industry. So what we do is take the ash out to the facility to treat this ash. There is a huge magnetic separator in the facility, so we take out all the metals and sell them into the metal market. That is also reused again.”

–Informant 7, EGE

Industrial actors can reduce waste generation by utilizing their existing materials more and delaying obsolescence, instead of purchasing new products. Informant 10 from the University of Oslo illustrates its efforts to prevent waste generation.

“When it comes to furniture, when we renovate, we wonder how we can possibly make a pool of furniture and equipment available to others so that others do not have to buy new ones. You will see a lot of wooden material like teak in the library at Vilhelm Bjerknes' Hus, but it is wounded. This is what we reuse, and we never buy teak now. But the old teak shouldn't be wasted, we take it out the door and remake it into new stuff and furniture.

Another example is the computer. Twice a year, the University of Oslo has an internal process where the IT department asks all departments of how many computers they need in the next half year. Then they (IT) ask you specific types, like big or small laptop, or specialized desktops or so on. Then they go out into the market to ask for the products. Then, at some point, the service agreement is included. IT departments had the service agreements which prolonged for three years, but now, they change the agreements into four years. That is a major step when it comes to reducing waste, because of course then the average age of computers will have to go up and the computer companies will be more reluctant to forward the lower quality computers, because the companies know that they will not be able to do service on those computers for the next four years.

This is the example what we want to explore what we can do the same. We have calculated that, within the period of 10 years, by just doing this small and tiny change in our contracts, we have reduced 2,500 computers to be purchased, that means that 2,500 computers are prevented to become waste. Of course this is little more expensive to ask the contract for four years than three years, but we also save lots of money not buying 2,500 computers.”

—Informant 10, University of Oslo

Since industrial actors are responsible for their own waste and determines waste treatment as per the Pollution Control Act, it seems vital to recognize the potential benefits they could see from preventing or reducing waste generation as in the example for the University of Oslo shown.

## 6.3 Economic structure

### 6.3.1 Easy come, easy go

Modern society has made remarkable advancements, thanks to on mass production and consumption. As noted in section 4.1.2, it is large-scale consumption, compounded with manufacture production that has been blamed for the waste crisis in the world today.

The Norwegian government has stated that “the total quantity of waste shall be considerably lower than the economic growth” (The Norwegian Environmental Protection Agency, 2013:11). When it comes to defining what ‘how much lower’ amounts to, however, there is not yet a clear answer.

Most informants recognize that the current waste problems can be attributed to Norway’s consumption habits; buying too many products and discarding them quickly.

“I think that waste is an important environmental issue in Norway. That is mainly because Norwegians have a lot of money here in this country, and we buy a lot, and we use a lot in a very short time. Since we are the one of heaviest users of new products, we have to take care of the waste.”

–Informant 11, Elretur

“Still, we have a lot of to do when it comes to producing waste. We know that. We have been looking into the waste statistics, seeing the direct link between GDP and waste generation, and also when it comes to the organizational level. We waste more than Swedish universities, and they waste more than most other universities (in the world). And there is no reason that why we should have more waste than Swedish universities.”

–Informant 10, the University of Oslo

“What the problem is in Norway, is people have so many things. When people need something, they just go and buy something new because it is easier and cheap. It is too cheap that is why people can buy something continuously.”

–Informant 18, Future in Our Hands

“The important reason why we succeed in the second-hand business, is because people in Norway have too much stuff. Norwegians loves to decorate by painting walls with new colors, and buying new sofas, because Norwegians have too much money. That is the problem. They want to

change everything, and what to do when they don't need their old sofa? Then they give it to shops like Gallerinormisjon or Fretex.”

–Informant 19, Galleri Normisjon

Thus, in order to stop generating this massive quantity of waste, informants insist that people should change their consumption habits.

“We need to change our attitude. We need to tell people that ‘you do not need to redecorate your house every two years. You do not need a new kitchen just because IKEA has produced something new.’ That is like a new cell phone, for instance. ‘Oh, new Phone is coming! I have to throw my old one because they produced a new one.’ We do not have to do that. But that is the never-ending story. How to work with human minds to change behaviour, I do not know. Each of us can do a lot, but the changes will not be shown until we work together.”

–Informant 15, Waste Norway

Unfortunately, there are very few programs which encourage reuse practices by REN, which include: receiving leftover items from flea markets, cooperating with Fretex and UFF Norway, making compost from garden waste, and supporting cloth diaper initiatives. Yet, most of REN's communicative instruments (its posters and advertisements) concentrate on waste separation for recycling and energy recovery, as mentioned in section 6.1.5.

Fretex also works on educating people to increase the awareness of second-hand items and to promote reuse behavior by opening its SNS account. However, the effect of these communicative instruments is limited, because it depends on the voluntary effort of a population to change their mass consumption habits.

Regarding the role of producers, few informants suggest increasing the feature of products, rather the quantity of what they produce. However, this decision is also entirely up to the producers, and there is no room for other actors in waste governance to influence such a change.

“Producer should think which effects their products might cause even in the waste treatment process, when their products become waste and start to be handled. For example, the sandwich panel is really difficult to separate into its components for disposal in a safe manner. I think the producer can make it more environmentally friendly if they take care of the last stage



when the products turn into waste, and if they care of waste treatment of the product from the early process. So I think producer should be more responsible what they are producing.”

–Informant 3, REN

“Producers, they should be more mindful of waste what they produce. When you buy bread, you get this bread bag made of plastic and paper. Then, it will be more difficult to sort out plastic and paper because it is put together.”

–Informant 9, Ragn-sells

### **6.3.2 Money matters**

Economic factors seem to be the most crucial considerations which dictate decision-making and waste management implementation. In most cases, economic factors become barriers or obstacles to launching better waste management systems.

First of all, a big budget tends to delay the launch of an improved system or a better facility. Informants 2 from REN, and 10 from the University of Oslo, describe how the building of a new infrastructure for waste sorting was delayed, due to the large expenditures predicted for the project. Informant 10 from the University of Oslo gives more detail as follows:

“We have several issues relating to cost. The facilities (new big waste bins with fractions as replacements for the old green existing waste container on the campus) take quite a lot of money. Also, it needs quite a lot of money for communication, training, and raising awareness of this new (sorting) system in students, employees, and cleaners.”

–Informant 10, University of Oslo

Yet, the high cost should not matter if the results of the project would recover initial expenditure in the long run. If an actor does not see any potential economic and environmental profits, it will end its investment. In the Climate and Energy Strategy 2015, the Municipality of Oslo announced the plan to build a carbon (CO<sub>2</sub>) capture plant at Klemetsrud, Oslo, by 2030, which would increase the city’s sustainability and reduce emissions from the incinerating plants there (City of Oslo, 2015a). According to the information given by Bellona, a non-profit organization fighting climate change, this

would be the first plant in the world that would capture the carbon emission from a waste plant.<sup>48</sup>

In fact, the concept of a carbon capture plant is not a new idea. In 2007, the previous Norwegian Prime Minister, Jens Stoltenberg, initiated a similar project in Mongstad, Norway, calling the project ‘moon landing’ (*månelanding*). Unfortunately, the project came to a halt in 2013, after millions of Norwegian kroner had already been spent. The investors decided not to fund the project further, because they became unconvinced that they would be satisfied with the project outcomes (Aftenposten, 2015c).

Thus, the decision made by each actor is a rational choice after considering potential benefits the actor can have. Informants 10 from the University of Oslo, and 14 from DLF, elucidate the reasoning of business actors:

“We pay a lot of money to others for taking care of our unsorted waste. When we focus more on waste sorting practices, we see that quite a lot of money that could be saved. So even we have to invest to make this happens, we see that it is an expensive project in a short term, but it is the project that we save our money in a long term.”

—Informant 10, University of Oslo

“For example, Ringnes, who produces beverage products in Norway, has the choice ‘should I fill up this bottle in plastic, glass or can?’ And there are a lot of elements (regarding this choice). One of the elements is that how much it costs to run the recycling of it, how much the fees are from the government in plastics, glass or metals, what the consumer expects, and so on.”

—Informant 14, DLF

Also this economy-oriented tendency might help to prevent waste generation in business, if businesses do not want to waste their money on inefficiently used materials in the manufacturing process.

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<sup>48</sup> Bellona, 2016, ‘Åpner i Oslo: Verdensnyhet innen CO2-fangst’. <http://bellona.no/nyheter/co2-fangst-og-lagring/2016-01-apner-i-oslo-verdensnyhet-innen-co2-fangst> Retrieved March 20, 2016.

“I think, big companies, they do not produce much waste, because they know the value of waste. So they do not want to have waste because they want their material for production.”

–Informant 15, Waste Norway

On the contrary to the high expenditure to handle waste, what if all costs for waste handling were cheap? What kind of obstacles or problems would that create?

“Now the cost of plastic beverage bottles and cans (*pant*) is a problem too. Due to the deposit of 1NOK or 2.5NOK, it is not so much for Norwegians, they put the *pant* bottle into a plastic or residual bag, instead of going to a shop to return it through the collecting machine.”

–Informant 13, Infinitum

“Regarding *pant*, we have had several discussions to raise the price (of the deposit). This price has been the same for at least 10 years, I guess. And considering inflation, if you have a comparable price for *pant*, it should be 5 or 10 NOK.”

–Informant 14, DLF

A waste handling company, Norsk Gjenvinning, describes the features of the recycling market as ‘low margin, and fierce competition’ in its 2014 annual report (Norsk Gjenvinning, 2015). Relating to the low margin in the recycling market, it can be assumed that this might generate a preference for incineration rather than recycling of mixed waste.

“We separate it (when we received mixed waste) as much as possible, but there is always something left. It is very difficult to separate, and this is also ‘an economic question,’ like how much time should we spend on it. We could do more if we have more employees. But still we try to get most of it before incinerating the mixed waste.”

–Informant 9, Ragn-Sells

As Informant 9 said above, the company still put in an effort to sort out mixed waste for recycling. However, since companies like Ragn-Sells are private and for profit, they may opt to forgo it if the cost, for manpower in this case, would be higher than their expected profit.

Waste handling and recycling companies often send their waste to other countries, like Sweden or Germany, to handle their waste, since it is cheaper to do so there, than in Norway. However, transport of the waste generates carbon emission on the journey abroad. When informants are asked the question concerning the CO<sub>2</sub> footprint of this transport, they explain that it is not substantial enough to matter, since it allows them to capitalize on a resource that would be otherwise wasted. Informant 11 from Green Dot Norway gives more details as below:

“We just fill up the empty containers. In Norway, we import a lot from Germany or other countries. So when the transportations come to Norway and unload imported goods, we fill up the empty space with the same amount of our waste. So they go back to the countries with it, rather going back with empty containers.”

–Informant 11, Green Dot Norway

The second reason is that the amount of CO<sub>2</sub> generated does not seem significant in the bigger picture, when compared to the emissions from the long journey of a product, from production to being sold. An informant describes that:

“The thing is that, if you see the product, it is produced in Korea, and sold in the U.S.A. through a distributor. Then it comes to the store in Germany, and goes on to me in Norway. It goes around the world and ends up upon me. Then, transporting waste from Norway and Sweden is nothing compared to the long journey of the product. I think the most important thing is to ensure your waste management facilities are taking care of waste. It is not a matter of transport.”

–An Informant, anonymous

In 2009, incinerators in Oslo had to use fossil fuel for operation, when there wasn't enough waste to burn; most of it had already been sent to Sweden. The treatment fee of plants in Sweden was almost the half of fee in Oslo, since the capacity of Swedish incineration plants outperformed Norwegian ones, and they offered lower taxes (Norsk Fjernvarme, 2009). Informant 7 from EGE illustrates the situation as:

“What happens there in Sweden, they built a lot of incinerator plants based on energy needs. But then, they do not have enough waste to fill up the plants. So what they do is pushing the price and the gate fee down, and so

it is easier for a company, maybe in Trondheim, to take their waste and drive passing by this facility in Oslo and go to Sweden, and pay less to get rid of their waste there. This is bad, because, first of all, it is really bad for the environment to have a big transportation truck going all the way to Sweden, that's lot of carbon emission. But we have a principle, called the 'closeness principle' that we want that waste travels a short distance from where it arises. So if we make waste here, we want to treat it as close as possible where the waste comes from. But people who do business do not have that in mind; they only have a business perspective. So that is why they go to Sweden, which is unfortunate."

—Informant 7, EGE

For business actors it was a rational choice to save their cost, but for the municipality there was no other choice but to use oil to sustain the operation of its plants. After the incineration tax was abolished in 2009, the fee became less expensive than before. Instead of watching Norway be outperformed by Sweden, EGE also is aggressively seeking customers and waste from abroad. Informant 7 from EGE gives this example of international business, with household waste from England:

"In the winter period, Norway is cold so we need a lot of heat. In England, it is very expensive to get rid of waste by landfilling and incineration. So actually it is cheaper for England to take its waste by boat, and to treat the waste here. First of all, it is very environmental friendly, much more anyway than it would be in England. We provide better systems, because our facilities are very modern and the cleaning systems are very good. And also, it is a good business for both of us. As we get the waste, we earn money and gain heat from waste in winter, and they pay lower price to treat their waste. So it is a kind of 'Win-Win' situation both for the climate and business perspective."

—Informant 7, EGE

During the interview with Informant 7 from EGE, the informant states "waste is such as a big business," since electricity and heat from the incinerators are generated through the energy recovery process and the agency can make profit. In fact, the Municipality of Oslo sells the heat generated from its two incinerators in Klemetsrud and Haraldrud, to Hafslund Heat AS, and electricity produced at the Klemetsrud incinerator is sold to to Undervisningsbygg KF (City of Oslo, 2014).

Then, the question of how to use the profit has to be addressed, relating to restrictions from local municipalities on waste management issues. It seems that the Norwegian government is quite strict to local municipalities when they connect with business part, given the example that the government banned cross-subsidization of business waste by local municipalities in 2014 (The Norwegian Environmental Agency, 2014). Informant 8, from the Norwegian Environment Agency, mentions that it is very important to set clear economic separation between household and industrial waste, for those municipalities with plants treating both types of waste. Since households pay a fee (avfallsgebyr) to their municipalities for waste treatment, the municipalities should use the money for its original purpose, instead of subsidizing industrial waste by offering cheaper prices when the incinerating market takes a downward turn. With the similar principle, Klemetsrudanlegget AS (Klemetsrud plant) was demerged from EGE in 2015, leaving EGE to focus solely on household waste, while the new company deals with industrial waste. In terms of usage of profit, Informant 7 from EGE explains that:

“When we sell the incineration service, the profit (selling heat and electricity produced from incinerators) goes back to the same pocket (of the municipality). The municipality pays a lot of money to get these plants working, because it is very expensive to have facilities like these. So the municipality says ‘here is the money to run this plant, but when you earn the money you need to give it back to us.’ And they use it (the profit) for further investment, like when Oslo municipality wants to build some plants, like a biogas plant, to make climate better. So this is quite like a climate investment. So the municipality does it for the climate, not for the money.”

–Informant 7, EGE

## **6.4 Science**

### **6.4.1 Science as a catalyst**

Science has enabled waste management to be more efficient, both in economic and environmental terms, by developing technology and knowledge. First, many informants put an emphasis on technology to solve problems related to the waste they encounter.

Particularly, technology provides economic benefits, either by creating new products to sell the market or by reducing costs through waste treatment process. With advanced technologies such as energy-generating incinerators, and biogas plants, the Municipality of Oslo can earn a profit from the production of heat and electricity.

When it comes to reducing the costs in waste handling processes, Informant 9 from Ragn-Sells explains that the company is looking into an automated waste separating system; the sorting task would be easier and the company would cut costs on manpower. Informant 3, from REN, talks about how they hope technology can help reduce the volume of Styrofoam. Since a small mass of Styrofoam takes up so much space, it is very expensive to transport this material to its designated handling plants. If the technology could be developed, the municipality could save on transportation costs.

Technology, in its ability to create better waste treatment methods, can help decrease damage to the environment. There are more and more innovations in packaging materials that are produced with recyclability in mind. Informant 14, from DLF, gives an explanation of the new beverage packaging material:

“Producers are inventing new materials. For example, the Coca-Cola company has used what we call a ‘plant bottle.’ They have plastic which is both recycling friendly and also some part of the plastic comes from plants. It says that 22.5% of plastic is based by plants, 25% from recycled plastic, and is 100% recyclable.”

–Informant 14, DLF

Informant 11, from Green Dot Norway, highlights the innovative role of producers in waste issues, by stressing the importance of considering the environmental effects of a product in its whole lifecycle; the ‘eco design’ approach. The informant wishes that more producers would apply the eco-design approach in the production of their goods, so that the products can be discarded in more environmental friendly way.

Also, technology has created more environmental friendly practices in waste management. For example, the Municipality of Oslo can separate household waste more easily thanks to the optical sorting plant in Haraldrud. As mentioned before, it will be possible to capture carbon in the air with carbon capture plants. Informant 7 from EGE

has a strong belief that the current waste management owes much to the advancement of technology.

“I think, Norway is now on the very right path, treating waste as well as we can. Because technology used here for cleaning smoke from the incinerator in Klemetsrud is the best, maybe not only in Europe, but in the world. We have chosen the best possibilities to treat waste and to clean the smoke. So as long as we treat the waste in this way, waste is not an environmental issue anymore.”

–Informant 7, EGE

The government understands the necessity of improving existing technology and developing new ones in, for example, sorting technology (The Norwegian Environmental Protection Agency, 2013). The government believes that this kind of sorting technology should be adopted in more places, given population growth, as this technology enables the efficient utilization of waste.

Secondly, the knowledge produced by research is vital to concretizing the seriousness of waste problems with specific details and numbers. It is also important to plan and implement waste projects or policies based on scientific knowledge. For instance, Informant 11 from Green Dot Norway, thinks the company could save the environment by recycling plastic packaging, since the recycling of 1kg of plastic ultimately saves 2kg of oil used making new plastic. By recycling plastic, the informant states that industries would save on oil, and produce less carbon emissions in the process.

The Norwegian government has realized the significant role of research, so it sets the topic of waste under the ‘Nymiljø’ research of the Research Council of Norway (*Forskningsrådet*) (The Norwegian Environmental Protection Agency, 2013). The Research Council of Norway offers financial supports to research programs or independent research in order to promote R&D (research and development) and to develop knowledge that can solve issues in society and business sectors. There is a program called Miljø 2015, under the Nymiljø research<sup>49</sup>, and the program has

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<sup>49</sup> The Research Council of Norway, 2014, ‘Ny satsing på miljøforskning’  
[http://www.forskningsradet.no/prognnett-miljo2015/Ny\\_satsing\\_pa\\_miljoforskning/1253983417690](http://www.forskningsradet.no/prognnett-miljo2015/Ny_satsing_pa_miljoforskning/1253983417690),  
Retrieved March 21, 2016.



received 70 million NOK per year to support projects.<sup>50</sup> The government also proclaims its task to develop indicators regarding impacts of selected types of waste, following the requirements by the EU's waste framework directive (The Norwegian Environmental Protection Agency, 2013).

There are also several non-governmental organizations that are working on research to produce knowledge about waste as well. For instance, ForMat publishes reports and surveys about food waste in Norway every year. By doing this, it creates and spreads the knowledge to business actors to reduce food waste generation. Similarly, Informants 15 and 16 from Waste Norway explain their organization's role in developing and sharing information among its public and private members.

“The purpose of this organization is to gather different organizations handling waste in Norway in both public and private actors. We want to help them to treat waste in a better way. And we try to raise the level of knowledge about waste, both in how to manage waste and its problems, and in environmental issues.”

—Informant 15 from Waste Norway

“We hold conferences, seminars and meeting with our members, and we publish documents and papers regarding waste. And we cooperate with universities and other institutions for a scientific research to develop agenda, technology, technics, or better systems concerning waste.”

—Informant 16 from Waste Norway

Recently, Waste Norway launched a program, ‘Redu’ to produce future waste experts in waste or recycling industries, by joining forces with two Norwegian universities, NTNU and NMBU. Waste Norway achieves this goal by strengthening the academic curriculum on waste in these institutions, and by holding informational workshops with students. Waste Norway has another network branch called ‘AvfallsForsk’ (Waste Research), and they are responsible for promoting R&D in the waste sector in Norway, supported by the Research Council of Norway.

Some data generated by the research works to correct stereotypes about waste. Informants 11 from Green Dot Norway, and 18 from Future in Our Hands, mention the

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<sup>50</sup> Ibid, Unknown, ‘Norsk miljøforskning mot 2015’. <http://www.forskningsradet.no/no/Utllysning/M-ILJO2015/1159778041070>, Retrieved March 21, 2016.

advantages of using packaging and disposable products, from an environmental point of view:

“Well... of course there is some goods not using plastic packaging, but when people use industrial packaging for food, the food waste extremely goes down. For example, cherries in stores, people complain about the plastic box. But actually, the packaging help cherry stay longer because it captures the moisture from the cherries. Otherwise, the cherries will be dried and go bad, so it turns into food waste. So in terms of this, packaging reduces food waste. Thus, we need to optimize packaging, instead of minimizing it.”

–Informant 11, Green Dot Norway

“There are numbers suggesting that if you are going to use a cup one time, it is better to use a disposable cup. Because in terms of the climate, there is less emissions from using the disposable cup than that from using one cup only one time and washing it. It is only better to use normal cups if you use the cups at least two times. So I can understand why lots of places (in Oslo) have disposable products. But ideally, people need to bring their own water bottle to fill up.”

–Informant 18, Future in Our Hands

### **6.4.2 Call for more attention**

Although several studies are being conducted to invent new technology and produce knowledge about waste, the topic still remains an unattractive issue to research institutions and environmental organizations. They are mostly interested with the climate change, animal welfare, and renewable energy; waste studies do not get the same attention. Several informants expressed their concern about this, with one informant stating:

“Yes, true, they are not into waste that much as before. Bellona is a little bit because there is just one person that is into it really. But not enough are into it. But I think it is going to change with this new concept of circular economy because it closes the loop when it comes to the waste.”

–Informant, anonymous

Paradoxically, several informants believe that the lack of attention on the subject can be attributed to a good waste management system in Oslo. Informant 16 from Waste Norway specifies this perspective as below:

“Well, I think it relates to ignorance. As long as the waste management system works, it does not really bother people. They are affected by it, but they realize only when it does not work.”

–Informant 16, Waste Norway

Other informants suggest other interesting perspective on why waste is overlooked compared to other environmental issues, emphasizing that the conventional perception. However, they predict that more attention will be paid to waste once it becomes better known as a resource.

“Historically, the ones who were working with waste had no education. It has been seen as something that is not important. And I think that society has slowly changed, now you see, you need education when working for this sector, and there are courses in universities. And more organizations start to work on waste to make money.”

–Informant 15 from Waste Norway

“There are not many organizations that focus on waste. That is true. Previously, waste was just something that you do not think about and that you do not want to see. So people do not think of waste as energy. But as we work and talk to people, and with educational programs like Skolestua by REN, we enlighten people more and more about waste. So people get more conscious about waste, and I think this will lead more and more organizations to be more conscious about waste.”

– Informant 7 from EGE

## 7 Discussion

This research has attempted to examine the effectiveness of Oslo's solid waste management, in preventing and dealing with environmental problems caused by waste. In order to analyze the environmental effectiveness, I have applied a conceptual framework of environmental effectiveness from Kütting's existing studies (2000a, 2000b, 2001a, 2001b, 2009), which examined how international environmental agreements were effective in ameliorating environmental problems, by considering four determinants; regulatory structures, time, economic structures, and science. The result of this research indicates different and but mostly similar results with those of Kütting's existing researches, by suggesting necessary efforts to increase environmental effectiveness of the waste management.

Firstly, the regulatory structure of solid waste management in Oslo is functioning well, in comparison to the international environmental agreements in Kütting's studies (2000a, 2000b, 2009). Legislation or policies, made in cooperation with the various partners in the network, have been successfully implemented and appear to be reducing the negative effects of waste on the environment. Once a decision was made, the decision took shorter time to be implemented than that of the example of MAP (Kütting, 2000a). Also the decision is complied by actors who are related to, because the actors raised their voices and were engaged in the decision making process, as the case of the take-back scheme of packaging waste in chapter 6. This is a strength of governance networks stressed by Sørensen and Torfing (2005).

These positive features of the waste governance are possible, due to its differences in structure from that of an international environment agreement. In waste governance, there are legitimate actors, the national government and the Municipality of Oslo who have the authority over other actors, as well as the power to allocate financial resources in waste management. They enforce laws and regulations and invest a huge amount of money to build better waste treatment facilities. Since the national and local governments possess this authority, the improvement of waste management for the sake of employing more environmentally desirable methods (e.g. recycling and energy recovery) has been accomplished quickly and effectively. Meanwhile, there is no designated actor performing with this kind of authority over other nation actors in

international relations (Kütting, 2009). In evaluating the outcomes from these two studies, one could argue that it is vital to have an authorized actor that enforces laws and assigns financial resources when dealing with environmental problems.

With regard to the existence of authorized actors, several governance network studies (Sørensen and Torfing 2005; Torfing, 2007; Magetti and Gilardi, 2014) highlight that national and local governments are still important in network governance and in policy processes. Torfing argues that “the power of the state has not declined, but its tactics and ‘modus operandi’ has changed” (Torfing, 2007: 4). The state changes its ruling practices to be dependent on other actors by cooperating with them, when it comes to achieving its social goal. This point is shown in the interviews with informants from local and national government officials. The informants clearly recognize the importance of cooperating with NGOs ranging from CSOs to business actors. Yet, the government entities retain their monopolized powers, and these powers enable the state to lead other actors in policy-making processes even in a horizontal network structure. Furthermore, the government has a legal right to control and supervise the waste treating processes of waste handling actors (local government and private business), according to the Pollution Control Act.

Regarding cooperation through networks, some Scandinavian researchers (Löfgren and Ringholm, 2009; Fotel and Hanssen, 2009; and Jansen and Osland, 1996) point out that this tendency is a unique convention in Nordic regions. Fotel and Hanssen (2009) refer ‘corporatism and pluralism’ as a special tradition of Nordic municipalities. They insist that including both relevant civil society organizations and private sectors in policy making is common practice in networks in Nordic regions. In the networks, local governments have been key players because local governments have always had vital roles in Norway and Nordic regions. According to the explanation of Löfgren and Ringholm, Nordic local governments have a long tradition of undertaking welfare and public policies. These explanations are well illustrated in the informants’ responses in chapter 6. Significant changes in solid waste management, like introducing take-back schemes and building advanced waste treatment facilities, were driven by both the Norwegian and Oslo government, although these were accomplished with cooperation of governmental and non-governmental actors. Governmental actors were initiated to

make positive changes in the waste management, but the decision making regarding policies and programs was based on discussions with various other actors.

At this regulatory structure of waste management, trust between others plays a key role in network governance. For example, the introduction of take-back schemes, and the choice to not assign an overarching governing body for industrial waste, depends on trust between industrial actors. Thompson (2003; quoted from, Davies, 2011:14) believes that, “a generalized trust, honesty and solidarity must transcend any minor negotiating infringements,” in network governance. Klijn and Koppenjan (2012) also view trust as a positive mechanism that can reduce strategic uncertainty and the necessity of complex contracts, and can catalyze the possibility of sharing information and seeking innovative solutions among actors in networks. Since strong bonds have developed between industrial actors in Norway, the business actors can undertake their take-back schemes over 20 years and they can expand their realm from packaging waste to food waste recently. In addition to this, the government believes that industrial actors are ‘rational’ in their activities, as suggested by Informant 15 from Waste Norway, in section 6.3.2. Industrial actors are responsible for their waste to treat them in a safe manner. Thus, they try to reduce the quantity of waste that they generate, and use less hazardous substances, in order to pay less for waste disposal services.

Even if there is a powerful authority at the regulatory structure, and mutual trust among actors at networks, the lack of an overall governing entity on industrial waste causes the absence of a comprehensive strategy of industrial waste in Oslo, as seen in section 6.1.5. According the Pollution Control Act, there is no place for the government and local municipalities to promote waste prevention or reuse to industrial actors. Thus, it is totally upon the voluntary action of each industrial actor to introduce better strategies in industrial waste management. This situation is similar to that of the international environmental agreements in Kütting’s studies, which suffered from a lack of a governing policy to control individual states (2000a, 2000b, 2001a).

Although many informants and materials mentions that polluter pays principle is main principle for the situation letting industrial actors be responsible for their own waste, the situation can be interpreted differently. Dean (1999; recited from Torfing, 2007: 11) highlights self-regulating networks by organizations and individuals. Dean argues that neoliberalism does not prove a significant degree of reduction in state regulation and

control, although it claims the reduction of state authority. Therefore, the concept of ‘advanced liberal government’ emerges, concerned with unburdening the huge roles and duties of the state, which shares the same stance with neoliberalism. If individuals are responsible for their own performances, self-governing governance networks will allow the state to utilize less resources and power to reach various target groups (Rose, 1999; recited from Torfing, 2007: 11). In this sense, government agencies somehow can be free from responsibility for industrial waste, by letting only industrial actors be responsible for their waste.

However, this is not adequate for the two following reasons. First, industrial waste accounted for 40% of the whole waste generated in Norway, 2014, while household waste (which is the responsibility of local governments) accounted for 20% as Table 1 seen in chapter 1. Second, the Norwegian government set this national goal on waste, stating that, “the total quantity of waste shall be considerably lower than the economic growth” (The Norwegian Ministry of the Environment, 2008). Without working on the industrial waste that accounts for almost half of all waste generation, it is to be expected that this goal shall not be easily achieved.

As several interviews explained in Chapter 6, consideration about waste prevention and reuse is typically not a priority to industrial actors, waste handling companies included, are mostly concerned with their given roles and profits. At this point, a possible solution arises from Kickert and Koppenjan’s (1997) research. They argue that “public management is not only about increasing effectiveness and efficiency, but is also a matter of legality and legitimacy, of more than strictly businesslike values,” (Kickert and Koppenjan, 1997:38). Therefore, the effort to deal with industrial waste in a more environmentally desirable manner should be undertaken at the level of the government. In fact, the Norwegian government announced in its national strategy report that it would build a waste forum that all related actors could meet join in discourse (The Norwegian Environment Protection Agency, 2013). At the first meeting in January, 2014<sup>51</sup> there was a gathering of the different actors in waste management: from NGOs, local municipalities, representatives of industrial actors, and the national government. Although the forum was a useful place to share and gather information, opinions, and

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<sup>51</sup> The Norwegian Environmental Agency, 2014, ‘Ny møtearena for avfall’  
<http://www.miljodirektoratet.no/no/Nyheter/Nyheter/2014/Januar-2014/Ny-motearena-for-avfall/>  
Retrieved March 25, 2016

experiences regarding waste issues, a governing entity for industrial waste was still missing, and is a demand that continuously arose in the interviews with informants.

Also, it is necessary to ponder whether recycling and energy recovery are the best methods in waste management from an environmental perspective. It can be said that recycling and energy recovery possess some circular characteristics (circular rhythm, as Kütting would put it) which can utilize waste efficiently and reduce the use of virgin materials. Both the Norwegian government and the Municipality of Oslo promote these two methods as a life-cycle approach, since they believe that recycling and energy recovery are sustainable by using waste as resource to generate energy and to make new products (The Norwegian Environment Protection Agency, 2013; City of Oslo, 2015a, 2015b). As in the example of REN's advertising poster in Figure 12, REN put its efforts in encouraging Oslo residents to sort out waste in order to utilize it for energy recovery and recycling.

However, when it comes to environmental effectiveness, recycling is not the best method even though it does prevent some resource extraction (Arcadis report, 2010; McDonough and Braungart, 2002). Only few materials, like glass and metal, are able to be recycled continuously without a degradation of quality. Meanwhile, cardboard and most types of plastic, which make up a massive amount of the waste, are down-cycled and can be only used to produce lower quality products. For example, plastic drinking bottles cannot be recycled to make a drinking bottle of the same quality. It is only used to make lower quality plastic, for products such as fibers for stuffing pillows.<sup>52</sup> This means that to make a new plastic bottle, manufacturers have to produce high quality plastic by extracting it from the original resource, oil. The recycling process also demands energy to operate, although it certainly consumes less energy and produces less greenhouse gas emission than the process of making new materials from natural resources.

According to the researcher, Anne Grete Bruvoll, from Vista Analysis, the effects of material recycling and energy recovery are not as significant in reducing greenhouse gas emission as people expect. She gives specific statistics about the outcomes from practicing recycling and energy recovery in an article for Aftenposten (2015b):

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<sup>52</sup> About.com, unknown, 'A guide to plastic recycling', <http://greenliving.about.com/od/greenathome/a/Plastic-Recycling.htm> Retrieved March 25, 2016



“1) Biogas for running buses from food waste in Oslo saves 0.02 per cent of Norwegian emissions.

2) Sorting and recycling of plastics from households saving 0.09 percent of total Norwegian greenhouse gas emissions.

3) Reusing plastic is also possible to save oil. ... (However,) by recycling plastic could a maximally save 0.04 percent of Norwegian oil production.”

Therefore, the EU Waste Framework Directive and reports (Arcadis, 2010) prioritize waste prevention as the best method not only to minimize but also to prevent negative impacts from waste on the environment.

Bell and Sweeting (2013) criticized the skewed dependence on recycling and incineration methods in their research in Bristol, U.K. They claim that focusing on household waste, instead of waste prevention in business, is unfair to households since households need to pay more taxes to cover the preventable waste coming from the production processes of manufacturers. If the producers could make their products more durable and with less packaging, households could throw less waste away and pay less tax for the waste they generate. However, since producers earn a consistent profit from making and selling low quality products, households bear the financial burden in this unsustainable sale practice of producers. Thus, these researchers argue this situation is unfair when it comes to the concept of ‘environmental justice.’<sup>53</sup> In order to share the fair burden of economic and environmental costs between households and business, the researchers say the practices of the three “R’s” (reducing, reusing, and repairing) should be realized at the business level.

In contrast to the perspective of Bell and Sweeting, several informants in this research believe that producers should be more mindful of the materials they use by choosing more environmentally friendly, and not necessarily using the three R’s. They also give a few examples of materials newly invented with green technology, like the plant plastic of the Coca-Cola company. This is interesting, because the informants believe green technology may resolve environmental problems while sustaining current mass production and consumption practices at the same time.

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<sup>53</sup> Bell and Sweeting refer to ‘environmental justice,’ as “the ideal of a healthy and safe environment for all, and a fair share of natural resources, access to environmental information and participation in environmental decision making.” (2013, p.202)

However, green technology (i.e. advanced technology) has been panned as not a fundamental solution in this mass consumption society (Braungart and McDonough, 2009; Herring and Roy, 2007). Herring and Roy refer to the ‘rebound effect’<sup>54</sup> when they cast doubt on the expected environmental outcomes (e.g. reducing greenhouse gas emissions from using energy-efficient technology in energy consumption). As suggested in section 4.1, modern waste became problematic when it was transformed into chemical and synthetic materials that the environment cannot degrade in a natural way. In this sense, green technology, such as inventing more environmentally friendly substances will enable waste to be disposed quickly and safely in the environment, and to be more easily recycled. Yet, this is an inadequate solution when it comes to the giant amount of waste generated every year. As mentioned earlier, Clark and Matharu (2013: 66) state “the planet currently generates approximately 1.3Gt of solid waste per year, which is expected to increase to 2.2Gt by 2025.” No matter the environmental-friendliness of the waste, the environment does not have infinite ability to handle that enormous a quantity of waste every year.

In addition to finding solutions with technological advances, change in consumption habits should also take place. Section 4.1 presents the common assumption that mass consumption (and consequently, waste generation) is related to economic growth, despite a few studies stating the opposite. Also, changes in consumption practices, as explained by Strasser (1999), contribute to the generation of more waste than ever. Thus, consumption practices can be the other critical issue to address in the effort to minimize waste. In fact, many informants in this study assert that we (consumers) should change our present consumption habits in order to prevent waste in the first place. They mention that people should consume less so that they throw waste less.

The approach from social practice theory could be helpful in changing people’s buying habits. However, such a shift will not occur just by providing information or more efficient technology (Wilhite, 2012). In his research, Wilhite highlights the concept of ‘social learning’ in changing people’s practice in (energy) consumption, by introducing new practices to people and giving them pleasant learning experiences.

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<sup>54</sup> Herring and Roy define the rebound effect as “the extent of the energy-saving produced by an efficiency investment that is taken back by consumers in the form of higher consumption, either in the form of more hours of use or a higher quality of energy service.” (2007, p.3)

This view can supplement the limitations of communicative instruments by REN. As mentioned in Chapter 6, REN has utilized informative instruments widely to educate residents with posters, SNS, and educational programs. Jansen and Osland (1996) explain that communicative (informative) instruments are used extensively in Norway to increase environmental awareness. However, these informative instruments are not powerful enough to affect people's behavior, if they do not care about the advertisements. Thus, as per the suggestion of Wilhite (2012), it seems that REN needs to consider more inclusive and empirical programs in its informative instruments. For example, it can hold seminars or workshops with Fretex volunteer designers to teach participants how to reform old-fashioned jeans to a cool new skirt. Through this course, the participants may be more willing to reuse their old items, and consequently produce less waste. Or, at least, they will recognize clearly that they can put their unwanted clothes in Fretex boxes when they want to throw it out, which means the items will be recycled or reused. Therefore, the existing instruments should evolve from just delivering messages and information through websites or commercials, to making people realize how this information could be more relevant to their daily lives.

In sum, the lack of governing agency on industrial waste, and the heavy reliance on energy recovery and recycling restrict the current solid waste management in Oslo from increasing its environmental effectiveness. This happens because this waste management seeks feasibility rather than environmental necessity. Recycling and energy recovery processes do not ask actors to make new efforts which go beyond the conventional administrative/functional segmentation. On the other hand, waste prevention and reuse practices should be accompanied by the cooperation of manufacturers, since this is "horizontal action taking place in all steps of the material flow, over extraction, production, distribution, consumption, waste and end-of-waste phase" (Arcadis report, 2010:21). However, due to the segmented supervision between actors by regulations, it seems challenging to make a comprehensive cooperation across the segmentation. Thus, the actors concentrate on what they can do within the given role and supervision by regulation.

How can the solid waste management improve its environmental effectiveness by adopting reuse and waste prevention methods? This effort should be done with cooperation between governments, businesses and people. First, Oslo and national

governments should recognize the necessity of controlling industrial waste. The quantity of industrial waste is too immense (40% of total waste in Norway, 2014, see Table 1) to leave to each industry actor's discretion. Although regulations ask the industrial actors to be responsible for their waste, their stances are largely dependent on economic benefit rather than environmental necessity, as informants mentioned in Chapter 6. Thus, by cooperating with business actors, the government entities have to seek facilitating methods to prevent and reuse industrial waste. Also, it is required to develop knowledge through support for scientific and academic research. Based on this study, it is possible to come up with specific solutions to increase the environmental effectiveness of waste management.

Second, businesses should give more consideration to the life-cycle approach, which takes more responsibility for the environmental effects of their products, from the designing phases to the disposal of the products. Inventing new environmentally friendly materials can make waste disposal easier, but this may make little difference to the total amount of waste generated. Moreover, producers need to consider prolonging the durability of their products so that they become waste less quickly. Given the success of the take-back schemes, these demands do not seem impractical. Norwegian business actors have taken the initiative to be more responsible for their products and waste, and recent efforts include the opening of the organizations, ForMat and Matvett. These initiatives prevent food waste with the cooperation of the government and research institution. Since they have worked on well-functioning schemes for treating their waste they made, it is time to think what they can do to generate less waste from their manufacture processes and products.

Lastly, people should change their unsustainable consumption and waste disposal practices, which are to blame for generating the enormous quantity of waste in this society. By learning new practices (Wilhite, 2008, 2012), they could consume and throw away fewer products. Seeing how people's perception and practices on waste changed in the example provided by Strasser (1999) in chapter 4, this is proven to not be an impossible task. In addition to this change, it is important to use consumer demand for creating positive change in producers. This approach, which depends on public opinion, has received some criticism. For instance, Dryzek (2005) is suspicious of leaving environmental solutions to the public, because there might not be direct

political power for people to control the problems and public opinion can be easily manipulated. His arguments are partly true, however, people have economic power as consumers, even if they may not have political power. In section 6.2.2, Informant 10 from the University of Oslo illustrates how consumer demands are significant when they purchase products from manufacturers. Manufacturers become more concerned of the quality of their products, when their consumers take care of the durability of the products they buy. Thus, it is possible to stop planned obsolescence and low durability of products through consumer demand. With this change, the current economic structure, which is characterized by unsustainable mass production and consumption, could be reformed.

This research has attempted to figure out how solid waste management in Oslo is environmentally effective in the consideration of the four determinants; regulatory structure, time, economic structure, and science. Although it does present specific figures or statistics quantifying the effect of each determinant, it is nonetheless a meaningful evaluation of waste management with the four factors, instead of analyzing how the management works regarding institutional effectiveness. If this research was considering institutional effectiveness, recycling and energy recovery methods would not be problematic, since these two methods perform well in the current waste management thanks to supports from governmental agencies. However, when it comes to environmental effectiveness, it is obvious that the current waste management focuses on what they can do given the context, instead of revolutionizing this context to improve waste management, making more desirable methods, like reuse and waste prevention, feasible.

## 8 Conclusion

The aim of this research is to understand the environmental effectiveness of solid waste management in Oslo (with the exception of construction and demolition waste). This thesis does so by looking into the concept of environmental effectiveness and its four determinants (regulatory structure, time, economic structure, and science) as defined by Kütting (2000a, 2000b, 2001a, 2001b, 2009). It also employed the analysis of governance networks to understand the regulatory structure, waste governance, of waste management. Within these analytical frameworks, this research gathered data from 21 interviews, and the literature review of documents published by the Norwegian government, the Municipality of Oslo, and the organizations that the informants worked for.

The first finding is that waste governance works well thanks to cooperation between related actors. Government agencies, for example, invite CSOs or NGOs in their decision making process. Also, some business actors take the important role of recycling their own waste in take-back schemes. Different actors cooperate together to introduce better waste management methods through programs or policies. In this network governance, competition and bargaining occur, which maximizes profits for the respective actors.

However, it is revealed that there is no governing agency to control the industrial waste which makes up a significant amount of the total waste generated in Norway. Due to the Pollution Control Act, each industrial actor is responsible for its own waste. Yet, many informants believe that industrial waste should be controlled by an overarching governing body to generate less waste, and to minimize the use of hazardous substances in industrial waste. The Act trusts the rational decision making of industrial actors, but their choices are greatly vulnerable to economic factors.

The second finding is that the current solid waste management depends greatly on energy recovery and recycling, which are two feasible methods in the given context. These two methods do not require comprehensive cooperation between actors for these processes in the fragmented structure of roles and supervision. The solid waste management in Oslo has reduced the negative impacts of waste by utilizing these two

methods. Yet, they are not the most desirable methods on the waste management hierarchy. Energy recovery and recycling still require energy to operate plants, and doing so generates greenhouse gas emission during the process. Also, there are very few materials that can be infinitely recycled, which implies that producers still need to extract natural resources to maintain mass production of their products. Furthermore, several researchers question about the environmental effectiveness of the two methods, insisting that the outcomes of recycling and energy recovery are not impressive. Thus, reuse and waste prevention are regarded as more desirable methods in preventing negative impacts to the environment from an environmental perspective. There are very few programs and projects working on reuse and waste prevention, while most waste policies, programs, and instruments are aimed at energy recovery and recycling. This point indicates that the waste management is more concerned with institutional feasibility rather than environmental necessity.

The relationships between the waste management and three determinants (time, economic structure, and science) display the same results. When it comes to the rhythmicity of time, energy recovery and recycling methods are preferred by the national government and the Municipality of Oslo, since these two methods enable the life-cycle approach in the waste management. In the economic structure, policy and programming around the waste management do not have significant enough influence on changing consumption habits. On the other hand, the actors in waste management are hugely affected by economic factors when they undertake new programs or improve their waste treating methods. Also, several informants insist that more attention has to be given to scientific and academic studies regarding waste, since advanced technology will bring better outcomes in waste management. However, it is important to note that the approach to these determinants are dealing more so with how we treat waste, rather than how we remove the origin of the problem.

Elling (2008:16) mentions in his book that, “the first environmental laws might be better compared to a kind of fire-fighting rather than fire protection.” His statement can be applied to the situation of the solid waste management in Oslo. The waste management functions well in treating waste which already produced, but not well in coping with the root of waste problems. However, there is still hope that these present limitations on its environmental effectiveness can be solved, given the previous changes

accomplished in waste management. The solid waste management in Oslo has been developed through cooperative efforts among different actors and people. Thus, more prevention and reuse policies should be implemented in waste management, as there is a growing awareness of the desirability of these methods.



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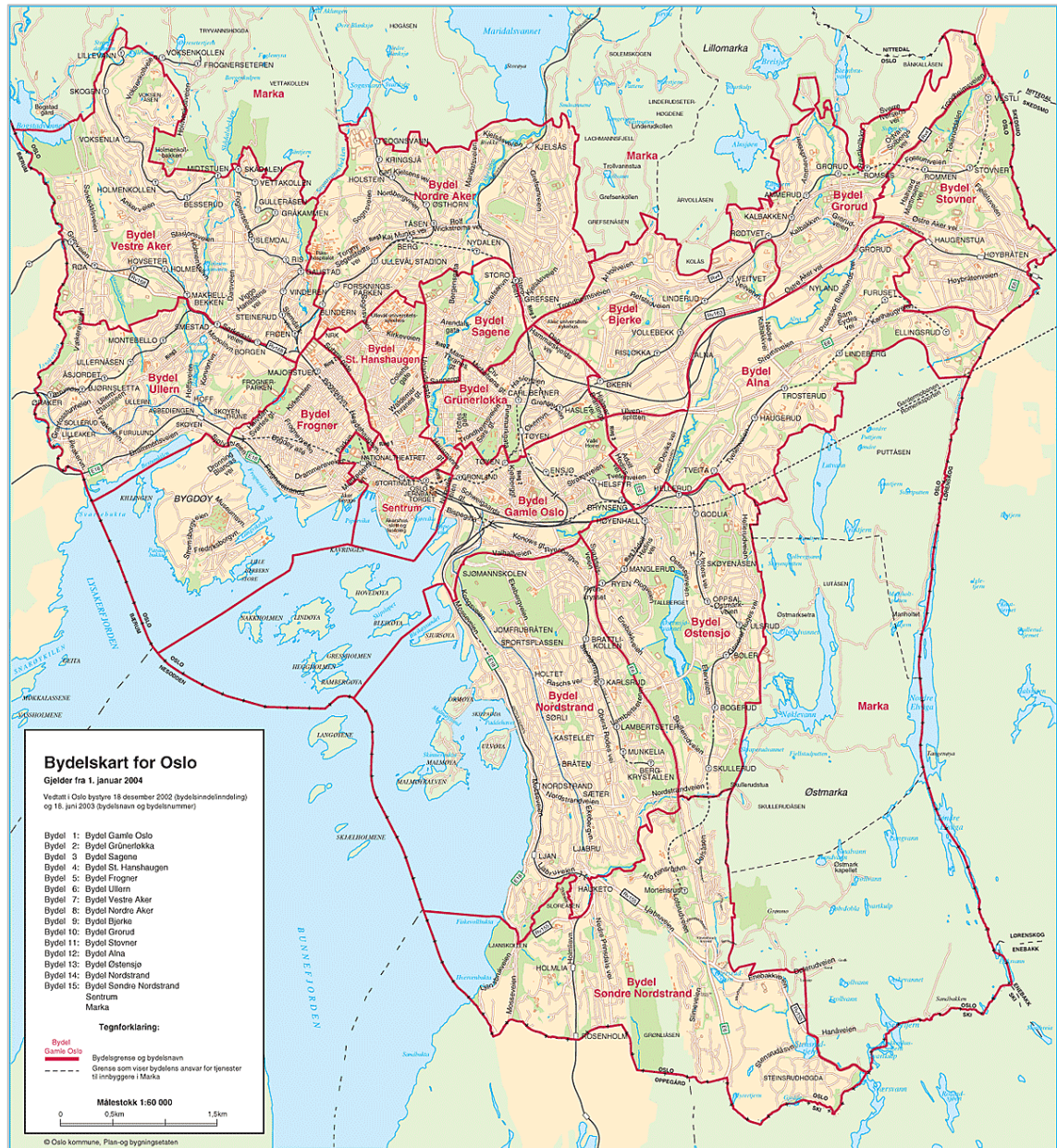
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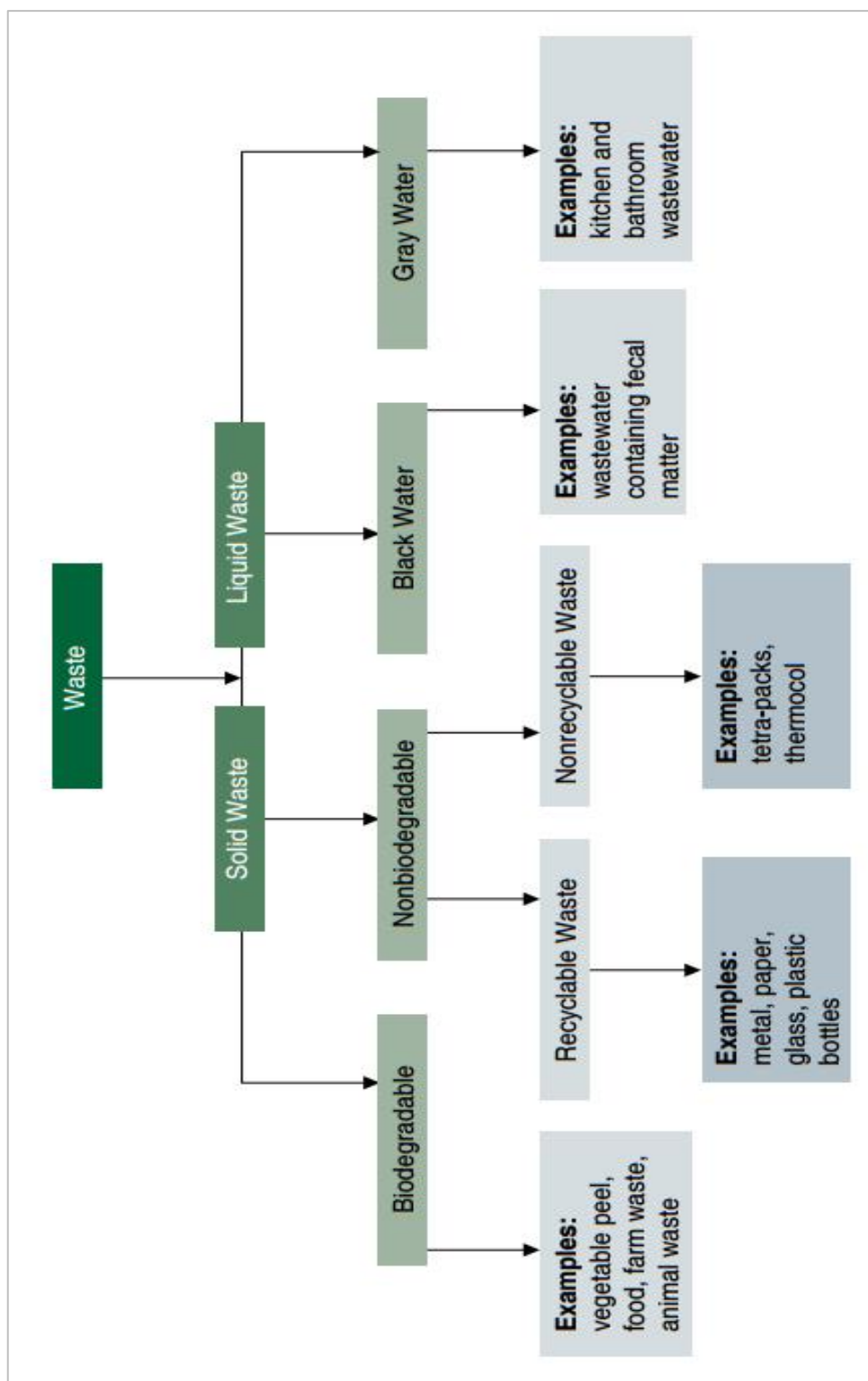


# Appendix



[Appendix 1.Oslo map]<sup>55</sup>

<sup>55</sup> Mappery.com, 2004, 'Oslo Neighborhood Map' <http://www.mappery.com/map-of/Oslo-Neighborhood-Map> Retrieved Nov 17, 2015.



[Appendix 2. Types of waste]<sup>56</sup>

<sup>56</sup> Waster and Sanitation Program, 2012, Handbook on Scaling up Solid and Liquid Waste Management in Rural Areas, The World Bank: New Delhi, p.9



[Appendix 3. The Green Dot Mark<sup>57</sup> and the Swan Eco Label<sup>58</sup>]

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<sup>57</sup> <http://www.grontpunkt.no/nyhet/nye-regler-for-bruk-av-groent-punkt-paa-emballasjen>

<sup>58</sup> <http://www.svanemarket.no/Global/logotypes/svane.jpg>