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# Transitioning to a Circular Economy: Exploring the Role of Local Governments

A Multiple Case Study of Ålesund and Sofia  
Municipalities

Master's thesis in Globalization and Sustainable Development  
Supervisor: Ottar Michelsen  
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Dept. of Industrial Economics and Technology Management



# Abstract

In order to respond to the global environmental issues we are facing today, a transition towards more responsible consumption and production practices is needed, and all societal actors must transform and adapt to the sustainable development goals (SDGs). The circular economy (CE) has gained increasingly more attention in academia, industry and policy making as a practical strategy or tool to achieve sustainable development. Considerable research exists regarding implementation and adoption of CE practices in countries, industries and enterprises. However, the role of local governments in the transition to a CE needs further investigation. With half of the global population living in urban areas, local governments can play a significant role in facilitating CE strategies to local communities and businesses. In an effort to add to the research on how local governments can facilitate the transition to a CE, this thesis conducts a qualitative multiple case study on local government planning, strategies and initiatives for developing a CE, with Ålesund municipality in Norway and Sofia municipality in Bulgaria as the units of analysis. With this approach, the aim is to expand the knowledge on the role of local governments in the transition to a CE, bring new perspectives on approaches, opportunities and impediments regarding implementation of CE principles in a local governance context, and inspire further research on how local governments can facilitate and contribute to the transition to a CE. The central findings in this thesis suggests that local governments' traditional role as a public service provider and purchasing entity is clear and straightforward, and may explain why municipalities have more success in implementing CE initiatives focusing on e.g. waste management and public procurement. Findings from interviews conducted with employees in Ålesund and Sofia municipalities suggest that local governments recognizes its role in facilitating circular practices and solutions for citizens and businesses, however, what can be done in practice in this regard needs to be further explored, in addition to investigating in what ways municipalities can successfully undertake this role.



# Preface

This thesis is my final work as a student in the Master's program Globalization and Sustainable Development at NTNU in Trondheim. It has been a challenging and educational experience, and I want to express my gratitude to everyone who has participated and supported me through this process.

First I want to thank my supervisor, Ottar Michelsen, for all the advice and support you have provided from start to finish during this process. Your engagement, feedback and suggestions has been invaluable and it has been a true pleasure working with you. I would also like to thank International Development Norway, Anders Stølan, and those who participated in interviews for this thesis.

To my friends and family, thank you for always supporting me and motivating me to do my best.

To my classmates, NTNU, and Trondheim, thank you for two incredibly memorable years.

Mari Vedvik





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# Abbreviations

ASEM	ASIA-EUROPE MEETING
ASEIC	ASEM SMEs ECO-INNOVATION CENTER
CE	CIRCULAR ECONOMY
EC	EUROPEAN COMMISSION
EPR	EXTENDED PRODUCER RESPONSIBILITY
EU	EUROPEAN UNION
CEAP	CIRCULAR ECONOMY ACTION PLAN
GDP	GROSS DOMESTIC PRODUCT
GHG	GREENHOUSE GAS
GPP	GREEN PUBLIC PROCUREMENT
ICT	INFORMATION AND COMMUNICATION TECHNOLOGY
IPCC	INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE
JRC	JOINT RESEARCH CENTRE
KPI	KEY PERFORMANCE INDICATOR
NGO	NON-GOVERNMENTAL ORGANIZATION
NTNU	NORWEGIAN UNIVERSITY OF SCIENCE AND TECHNOLOGY
RES	RENEWABLE ENERGY SOURCES
R&D	RESEARCH AND DESIGN
SDG	SUSTAINABLE DEVELOPMENT GOAL
SME	SMALL AND MEDIUM-SIZED ENTERPRISES
UN	UNITED NATIONS
WEEE	WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT

# 1 Introduction

## 1.1 Scope and Rationale of the Study

There is a widespread consensus that the “take-make-waste” practices associated with the traditional linear economic system is unsustainable and has contributed to many of the global environmental and social issues that we are facing today. Consumption of finite natural resources is already exceeding the limits of the planet, and the European Union (EU) predicts that global consumption in materials such as metals, minerals and fossil fuels will double in the next forty years while annual waste generation will increase by 70% by 2050 (Bolger & Doyon, 2019; European Commission, 2020a; Kaza et al., 2018). The risks associated with climate change and global warming, such as rising sea levels, extreme weather events, environmental degradation and species extinction, have increased and made unavoidable the social and economic costs associated with the linear economy (Crocker et al., 2018). The latest Intergovernmental Panel on Climate Change (IPCC) report reveals that global warming is now predicted to more than double the 1.5-degree limit that was agreed upon in Paris in 2015, and it is “now or never”; it will be impossible to limit global warming without immediate emissions reductions (UN, 2022). A transition towards more responsible consumption and production practices is needed, and public, private, and third sector actors need to transform and adapt to the sustainable development goals (SDGs) as urged by the United Nations (UN, 2015).

The circular economy (CE) has gained increasingly more attention in policy making, industry, and academia as a key approach to deal with the challenges related to the linear economy. Circular economy is often presented as a practical strategy or tool for sustainable development (Geissdoerfer et al., 2017; Ghisellini et al., 2016; Korhonen et al., 2018; Millar et al., 2019; Xue et al., 2010; Yuan et al., 2006). A core principle of the CE is that the value and lifecycle of products, materials and resources should be maintained as long as possible by applying reuse, recover, and recycle activities, resulting in efficient use of natural resources and preventing the generation of waste. In addition to reducing environmental impacts, the CE can also create new jobs, products, services, and whole new industrial sectors; The European Commission estimates that a transition to a CE can create 700.000 new jobs and annual business savings of €600 billion (Crocker et al., 2018; European Commission, 2020a). The circular economy is, however, a contested concept, and its definition and topics covered are manifold. The CE concept will be explained more thoroughly in chapter 2.

Considerable research exists regarding progress towards a circular economy in countries, industries and businesses (Böttcher & Müller, 2015; Cuerva et al., 2014; de Jesus & Mendonça, 2018; Geng et al., 2009; Ilić & Nikolić, 2016; Zhu & Geng, 2013). However, fewer contributions focus on the implementation of the CE on a local governance level. With half of the global population living in urban areas (towns and cities), local governments can play a significant role in facilitating CE strategies to local communities and businesses (Dagilienė et al., 2021). Subnational authorities such as counties and municipalities are seen as important actors for implementation of EU regulatory policies (Borghetto & Franchino, 2010; Sutcliffe & Alvarado, 2021), and have the capacity to

enable substantial progress in the transition to a circular economy (Bolger & Doyon, 2019; Ghisellini et al., 2016).

This thesis is based on a qualitative multiple case study on local government planning, strategies and initiatives for developing a CE, with Ålesund municipality in Norway and Sofia municipality in Bulgaria as the units of analysis. Findings from each of the cases will first be analyzed separately, followed by a cross-case analysis comparing the findings of the two cases. The empirical findings will be analyzed in light of previous research and relevant contextual and theoretical frameworks provided in chapter 2 and 3. With this approach, the researcher aims to expand the knowledge on the role of local governments in the transition to a CE, bring new perspectives on approaches, opportunities and impediments regarding implementation of CE principles in a local governance context, and inspire further research on how local governments can facilitate and contribute to the transition to a CE.

The cases in this thesis were chosen based on the researchers previous knowledge and engagement in CE development for both cases. In fall 2021, the researcher worked as an intern at International Development Norway (IDN) as a part of the Master's program in Globalization and Sustainable Development at NTNU in Trondheim. IDN is a spin-out of SINTEF foundation, one of Europe's largest independent research organizations. IDN provides management and consulting services to international development projects, with key services including research and analyses, feasibility studies, and market analyses to discover new market opportunities for project partners. Their core areas and expertise includes SME development, green energy, entrepreneurship, circular economy, manufacturing, and strategy & policy. Since its establishment, IDN has worked with more than 100 projects amounting to more than 77,9 million euros in budgets financed by funding sources such as EEA Norway grants, EuropeAid, NMFA, Norad, Norwegian Research Council, and Innovation Norway, among others.

During the internship period, the researcher worked with projects covering various topics, including international projects related to the development of the circular economy. IDN is engaged as a partner in several development projects in Bulgaria, many of which are aimed at municipalities. One project in which the researcher was involved in was with Sofia municipality, where the objective of the project is to introduce CE principles and initiatives to the Bulgarian capital. The project also includes implementing a pilot project for developing schemes for separate waste collection, reuse, and recycling. Food waste and end-of-life tires will be in focus, as food waste from households is still disposed and mixed with other waste, and end-of-life tires are disposed illegally through incineration. As a part of this project, IDN will participate in a three-day workshop with the project team, Sofia Inspectorate employees, and municipal administration employees from the districts Bakya and Vitosha. The planned workshop was expected to take place in the beginning of 2022, however, due to the COVID-19 pandemic and other implications, the work-shop is now planned to take place later in 2022. At the planned workshop, IDN will present fundamental principles of the CE, current CE practices and initiatives, and how these can be adopted and implemented by local governments to increase circularity.

As a part of the CE project with IDN and Sofia municipality, the researcher was tasked to research an example case and write a 'good practice' report on implementing CE initiatives in a Norwegian city municipality. The researcher's professor, Hilde Refstie, suggested a field trip to Ålesund arranged by NTNU Smart Cities to learn how Ålesund

municipality works to develop and implement CE practices and initiatives. After some initial research, the researcher learned that Ålesund municipality had several ongoing and completed CE projects. Ålesund municipality is also the founder and a partner at the Ålesund United Future Lab, which is part of the UN's smart city program "United for the Smart Sustainable Cities". The lab is located at the regional competence cluster, at the Norwegian Maritime Competence Center (NMK), located at the NTNU Campus in Ålesund. The researcher wrote the report based on observation, participation in lectures and seminars, interviews conducted during and after the field trip, in addition to desk research conducted before and after the field trip to Ålesund. The report explored how Ålesund municipality have implemented CE initiatives in their region, and found that most of the CE projects were initiated by the municipality and its partners through the United future lab, and that the establishment of the lab has been important in terms of creating a network and meeting point for cooperation between local stakeholders.

The field trip to Ålesund and the involvement in the Sofia municipality project with IDN sparked the researchers interest on local governments role in transitioning to a CE, and has laid the foundation of this thesis. With some preconceived knowledge and engagement about CE initiatives in both municipalities, combined with having access to relevant data sources and participants for interviews, Sofia and Ålesund were chosen as the units of analysis. The next section presents the research objective and questions, followed by an outline of the thesis.

## 1.2 Research Objective and Questions

Despite promising economic, environmental, and social benefits associated with the transition to a circular economy, adoption of eco-innovations remains low and the progress of developing a CE seems rather slow. Local governments can play an important role in this transition, however further investigation is needed to establish how local authorities can successfully facilitate and contribute to the transition to a CE. This thesis studies two cases of developing CE in a local governance context, Ålesund municipality in Norway and Sofia municipality in Bulgaria, to explore their role in the transition to a CE and discuss how local governments can facilitate the transition to a circular economy.

This thesis aims to answer the following research questions under the overarching research question *How can local governments facilitate the transition to a circular economy?*:

1. How is circular economy incorporated into Ålesund and Sofia municipalities strategic planning documents?
2. How are Ålesund and Sofia municipalities working to increase circularity in their regions?
3. What are the similarities and differences found in the two cases related to the aforementioned research questions?

The first research question aims to examine how CE is anchored in the municipalities current and future development plans; how is the CE defined, what are the strategies for developing a CE, and which elements of the CE is prioritized.

The second research question aims to examine how the municipalities are working in practice to reach the goals stated in their strategic planning documents; what are the concrete approaches, strategies, initiatives and projects employed by the municipalities in order to increase circularity, which elements and areas of the CE are currently

prioritized, what will be prioritized in the future, and what are seen as the current opportunities and impediments in the transition to a CE from a local governance context.

### 1.3 Thesis Structure

The following chapter presents the theoretical context and explains the concepts and theories used in this thesis. The chapter looks first into literature regarding the definition, fundamental principles and aims and targets of the CE. Moreover, the systems perspective and fundamental building blocks of a CE transition is presented. Then, a short presentation on strategic planning literature is included. Lastly, previous research on the role of local governments in a transition to CE is presented.

The third chapter introduces the regulations, policies and initiatives related to the CE in the EU, Bulgaria, and Norway to provide a contextual backdrop to the cases studied in this thesis. The CE framework of the EU is presented as these policies affect both cases, in addition to the current status and national strategies for developing a CE in Bulgaria and Norway.

The fourth chapter gives an overview of the research design and methods used in this thesis, how data was collected and analyzed, and ethical considerations related to the research.

Chapter 5 presents the empirical results of the data collected from strategic planning documents and in-depth interviews for both of the case studies. Chapter 6 compares the two cases in light of the theories presented in chapter 3 and the contextual background presented in chapter 2. The quality of the research design is also discussed in this chapter.

The last and final chapter sums up the thesis, reflects on its limitations, and discuss possibilities for future research on the topic.

## 2 Theoretical Context

This chapter introduces the theoretical context in which this study is situated, and explains the specific concepts and theories used. Previous research on the role of local governments in a transition to a CE is also included. This chapter is also used as a basis for analysis and discussion of the empirical findings in chapter 6.

### 2.1 Conceptualizing Circular Economy

#### 2.1.1 Defining CE

A systematic analysis of CE definitions in the scholarly and practitioner discourse by Kirchherr et al. (2017) found that the CE is oftentimes defined as a combination of reduce, reuse and recycle activities, with the aim of achieving economic prosperity and environmental quality (Kirchherr et al., 2017). The authors constructed their own definition of the concept in an attempt to include all the nuances that comes with it:

A circular economy describes an economic system that is based on business models which replace the end-of-life concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes, thus operating at the micro level (products, companies, consumers), meso level (eco-industrial parks) and macro level (city, region, nation and beyond), with the aim to accomplish sustainable development, which implies creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations.  
(Kirchherr et al., 2017, pp. 224-225)

Moreover, del Río et al. (2021) conducted a literature review on existing CE definitions in his book *The Circular Economy: Economic, managerial and policy implications*, and found that a vast majority of CE definitions either mentions the system perspective or the closing cycles perspective, or both. del Río et al. (2021) argues that these perspectives are mutually complementary; the system perspective identifies the levels of action in which certain CE initiatives can take place, while the closing cycles perspective identifies which specific CE-related action can be implemented at that level, and vice versa; for a specific CE-related action, a certain economic level is addressed. The author defines CE as a two-sided concept:

CE is a vision of how an economic system can be ideally sustainable, practically based on closed cycles of physical resource and energy flows at different hierarchical levels and by different actors in which, after each original use, subsequent use maintains or enhances the resource-based economic value and creates or enhances environmental and social value. The CE vision of closed cycles and retained value is connected to being an instrument which contributes to Sustainable Development and which involves a rupture with the current state of the linear economy. The instrumental part of CE is embedded in the eco-innovation concept and refers to the subset of targets which are related to closing cycles and retaining value.  
(del Río et al., 2021, p. 67)

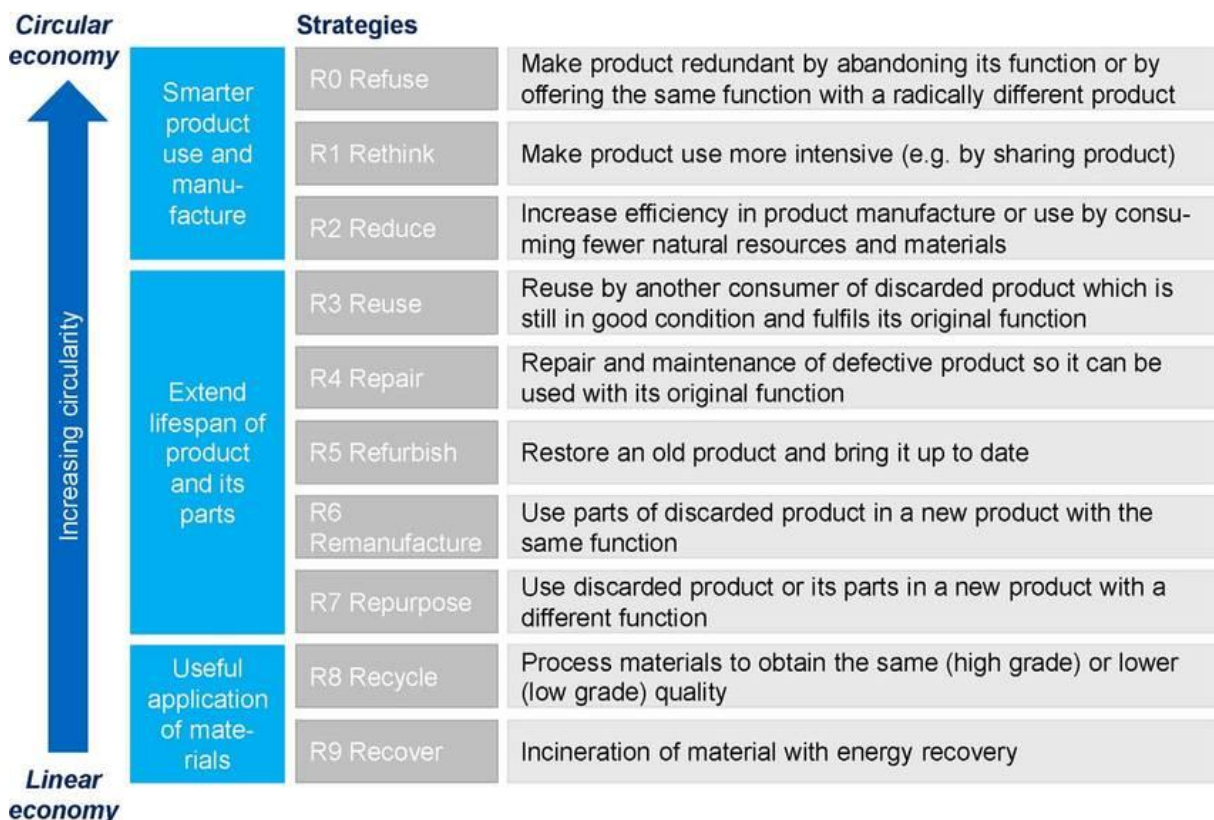
#### 2.1.2 Fundamental Principles of CE

The “closing cycles perspective”, often also referred to as the notion of “closing the loop”, focuses on cycles of products, components, materials and biological raw and processed materials (del Río et al., 2021). In order to minimize and ultimately prevent waste and the need for extracting virgin raw materials, a shift towards a material flow of



closed cycles in all products, components, and materials is necessary (Crocker et al., 2018; Millar et al., 2019; Stahel, 2016; Webster, 2015). Reduce, reuse, recycle and recover activities has been proposed as economic activities as a means to close these cycles, and these activities are often seen as the how-to, and the fundamental principles, of the circular economy (del Río et al., 2021; Kirchherr et al., 2017).

The R-framework, also referred to as R-strategies or R-activities, represents the fundamental principles of the circular economy. The 4R-framework 'reduce, reuse, recycle, and recover', which is also included in the definition by Kirchherr et al. (Kirchherr et al.), is probably the most frequently used R-framework. The 4R-framework is also used as the core in the European Waste Framework Directive (Directive 2008/98/EC, 2008; Kirchherr et al., 2017). Several R-frameworks have been introduced with more R-activities added, such as the 6R-framework (Sihvonen & Ritola, 2015), and the 9R-framework depicted in Figure 1 (Potting et al., 2017). Common for all the R-frameworks is the hierarchy feature, with the first R being a priority to the second R, and so on (Kirchherr et al., 2017; Potting et al., 2017; Sihvonen & Ritola, 2015; van Buren et al., 2016). As such, the priority in the 9R-framework would be first to 'refuse', then 'rethink', with the last priority being 'recover'.



**Figure 1: The 9R-Framework**

The purpose of the hierarchy feature is to prioritize waste prevention and replace the end-of-life concept. The hierarchy feature is closely related to the 'cradle-to-cradle' (C2C) concept, which is built on the idea that everything in nature is designed to be a nutrient for something else, and correspondingly products and production processes should be designed in a way so that materials can be reused infinitely (Braungart & Wintraecken, 2017). Most recycling is in fact 'downcycling', because it reduces the quality over time, and it is therefore important to emphasize and prioritize the rethinking of production, distribution and consumption processes prior to pursuing recycling and recovery

activities, thereby creating a waste hierarchy (Kirchherr et al., 2017; McDonough & Braungart, 2002).

### 2.1.3 Aims and Targets of CE

The circular economy is often not defined as an aim in itself, but rather as a practical strategy or tool for sustainability and sustainable development (del Río et al., 2021; Geissdoerfer et al., 2017; Ghisellini et al., 2016; Korhonen et al., 2018; Millar et al., 2019; Xue et al., 2010; Yuan et al., 2006). Moreover, the principles of CE is often seen as an operationalization for businesses to implement the concept of sustainable development (Kirchherr et al., 2017; Millar et al., 2019). Sustainable development can be defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”, and is underpinned by the equal importance of people, planet and profit (Brundtland, 1987). The most significant global effort to facilitate sustainable development is the UN’s Sustainable Development Goals (SDGs), a comprehensive and unifying international agenda to meet 17 goals before 2030, with emphasis on the three sustainability pillars environmental quality, economic prosperity, and social equity (UN, 2015). Nonetheless, exactly how the CE can serve as a tool for sustainable development, particularly in regards to the social equity aspect, remains unclear and inconsistent in the academic and wider literature (Millar et al., 2019). Kirchherr et al. (2017) found that in most definitions, the main aim of the CE is considered to be economic prosperity, followed by environmental quality, whereas the sustainability dimension social equity is often omitted.

## 2.2 Transitioning to a CE

### 2.2.1 CE as a Multi-level Framework

The systems perspective is also seen as a fundamental principle of the CE and states that it is a multi-level framework. The systems perspective asserts that a transition to a CE requires a systemic shift of the current system at different hierarchy levels: the macro, meso and micro level (del Río et al., 2021; Fang et al., 2007; Jackson et al., 2014; Kirchherr et al., 2017; Sakr et al., 2011). In CE literature, the micro-level often addresses products, services, companies and consumers, whereas the meso-level focuses on eco-industrial parks, value chains and economic sectors, while the macro-level considers cities, regions, countries and beyond. Although contributions in CE literature emphasizes that a transition to a CE requires a systemic shift at all levels, some authors argue that certain levels are more important than others. For example, Conticelli and Tondelli (2014) argue that CE requires efforts at the meso level in particular, whereas Zhijun and Nailing (2007) believes that CE should move from the micro to the macro level, and that CE practices should be implemented first at the company level.

At the micro-level, the implementation of circular processes at the company and consumer level is emphasized. For example, the bottom-up approach of the EU aims to encourage sustainability practices to all actors in society through innovative forms of consumption and production by implementing actions at all stages of value chains (Ghisellini et al., 2016; Merli et al., 2018; Swain & Sweet, 2021; Saavedra et al., 2018). At the meso-level, a particular focus has been on industrial symbiosis experiences based on the industrial ecology paradigm, which has become a widely used model to implement CE principles (Merli et al., 2018; Swain & Sweet, 2021). Lastly, CE literature on the macro-level focuses on changes in social and economic dynamics at the administrative

and governance level. For instance, China has implemented a national top-down policy for CE focusing on cities and provinces (Geng & Doberstein, 2008; Yuan et al., 2006), whereas the EU has followed a bottom-up approach by identifying patterns for a circular-oriented society, focusing on circular cities, country-level waste management, and waste flows among EU member states (Merli et al., 2018; Pomponi & Moncaster, 2017; Swain & Sweet, 2021).

### 2.2.2 Interactions between Levels and Actors

The systems perspective in the transition to a CE emphasizes particularly the need for interactions between different levels and actors. The interaction between system elements plays a key role to enable a systemic shift towards a more circular production-consumption system (Pieroni et al., 2019; Planing, 2015; Wasserbaur et al., 2022; Webster, 2013). Building on the work of Planing (2015), Wasserbaur et al. (2022) presents four fundamental building blocks, in which interaction between them, is required for a systemic transition to a CE:

<b>1) Materials and product design</b>	wide adoption of eco-design principles in product design (Mont, 2008)
	careful material selection practices (Bakker et al., 2014)
	purposeful product life extension mind-set that keeps products, components and materials at their highest possible utility and value (Russell, 2018)
<b>2) Circular Business Models</b>	business offerings based on the provision of capturing residual value in products, encouraging take-back systems and circular product design (Nußholz, 2017)
	business offerings based on function provision, e.g., leasing, sharing, pay-per-use and pay-per-result (Tukker, 2015)
<b>3) Reverse supply networks</b>	integrating reverse logistics into conventional supply chains, enabling companies to optimize their operations by making profit through the recovery of used products (Masi et al., 2017)
<b>4) Enabling conditions</b>	enablers that support a CE transition, broadly encompassing enabling policies, but can include regulations, financing, and support of markets for secondary materials or products (Milios, 2018; Saidani et al., 2018), raising consumer awareness (Michaud & Llerena, 2011), and making effective use of digital technologies (Antikainen et al., 2018)

**Table 1: Fundamental Building Blocks for a Systemic Transition to a CE**

These building blocks cover different elements of the micro, meso, and macro levels identified in the systems perspective. Common among the building blocks is the need to develop and implement eco-innovations, and as noted above, interaction between them are crucial. The next sections will cover the eco-innovation concept, and the role of developing CBMs and CE enabling policies.

### 2.2.3 Eco-innovations

Socio-technical transitions are seen as innovation-intensive processes of re-configuration and adaptation, embedded in a wider social and economic structure in a specific spatial and temporal context (de Jesus & Mendonça, 2018). Several scholarly contributions recognize the importance of innovations for sustainable development and the transition to a CE. The 'eco-innovation' (EI) concept, which links innovation with ecological and social concerns and effects, has become of particular interest in this regard (Boons et al., 2013; de Jesus & Mendonça, 2018; Kunapatarawong & Martínez-Ros, 2016; Rennings, 2000). EI can be defined as "the production, assimilation or exploitation of a product, production process, service or management or business method that is novel to the organization (developing or adopting it) which results, throughout its life cycle, towards reduction of environmental risk, pollution and other negative impacts of resources use (including energy use) compared to relevant alternatives" (Johl & Toha, 2021). Studies on novel CE-related activities and practices, CE innovations (CEI) and circular EIs also analyzes the relationship between EI and CE, despite the differences in wording (Kiefer et al., 2021). EI will be used as an overarching term covering these concepts in this thesis.

Eco-innovations are increasingly considered a key element in the transition from a linear to a circular economy (Cainelli et al., 2020; de Jesus et al., 2018; de Jesus & Mendonça, 2018; del Río et al., 2021; Gomonov, 2021; Kiefer et al., 2021; Mazzanti, 2018). EI can be used as a transformative process to move away from the current socio-economic system to a system based on the concept of the CE; this transition is both uneven, as some activities or sectors will change sooner than others, and destabilizing, as pro-CE factors and actors will encourage others to change as well (de Jesus & Mendonça, 2018). The transition to a CE requires systematic eco-innovation, including technology-intensive innovations, dynamic and holistic combinations of innovative services, and new efficient organizational structures and management systems (Gomonov, 2021). This corresponds to the fundamental building blocks presented by Wasserbaur et al. (2022), implying that the adoption of eco-innovations must take place on all levels, and interaction between all relevant actors is necessary for a systemic shift to occur.

### 2.2.4 Developing CBMs

A key element in the transition to a circular economy is the need to develop novel business models. As stated in the CE definition provided by Kirchherr et al. (Kirchherr et al.), the CE is an economic system based on business models which replace the end-of-life concept with economic activities related to the R-framework. This implies that a transition to a CE system needs to be coordinated with a transition to circular business models (CBMs) where R-activities in production, distribution and consumption processes are implemented.

CBMs has been introduced as a concept based on two underlying ideas; the circular economy and business model innovation (Geissdoerfer et al., 2020). Business model innovation towards sustainability and circularity has become a fundamental capability for businesses to sustain competitive advantage, allowing for a systemic shift in the core logic of businesses and the alignment of incentives of different stakeholders (Geissdoerfer et al., 2020; Pieroni et al., 2019; Rashid et al., 2013; Schulte, 2013). The transition to CBMs requires a rethinking of incumbent business models to enable a decoupling of value creation and resource consumption (Pieroni et al., 2019). CBMs incorporate CE principles and practices and aims at boosting resource efficiency and effectiveness, ultimately closing energy and resource cycles by changing the way

economic value and the interpretation of products are approached (Bocken et al., 2016; Pieroni et al., 2019). Circular solutions can be incorporated on different levels of business models, e.g. solutions such as circular product design, products as a service (PaaS), leasing or sharing services, pay-per-use models, take-back systems and reverse logistics (Pieroni et al., 2019; Wasserbaur et al., 2022)

### 2.2.5 CE Policies

Public policy is another driving factor for the transition to a CE (Cainelli et al., 2020; del Río et al., 2021; García-Quevedo et al., 2020; Moktadir et al., 2020). Public institutions have a social and fiduciary responsibility in promoting social welfare and equity, conserving natural resources, and advancing the notion of sustainable development (Ball et al., 2014; Dagilienė et al., 2021). Moreover, public agencies have a central role in institutional framing, from infrastructure and legislation to increasing social awareness and R&D support (de Jesus & Mendonça, 2018). The concept and practices associated with the CE has gained increasingly more attention and is now at the forefront of many policy agendas around the world. One prominent example is the EU's new Circular Economy Action Plan, which will be presented in chapter 3.

de Jesus and Mendonça (2018) found that development of the CE is particularly driven by social, regulatory and institutional factors. These factors are associated with increasing environmental legislation and standards, improving waste management infrastructure and legislation, supporting markets for secondary materials and products, raising social awareness and environmental literacy, and shifting consumer preferences and consumption patterns (de Jesus & Mendonça, 2018; Milios, 2018; Saidani et al., 2018; Swain & Sweet, 2021). For instance, environmental regulations can be a powerful instrument to put pressure on businesses to develop and adopt CE (del Río et al., 2021). CE-enabling policies can include command-and-control policies (environmental or technological standards), incentive or market-based policies (taxes, subsidies or emission permits), and innovation-based policies (grants or tax incentives) (del Río et al., 2021). Furthermore, creating attractive framework conditions with long-term targets fosters policy stability and is essential to avoid mismatches and contradictory incentives (de Jesus & Mendonça, 2018; del Río et al., 2021). Coherent strategic roadmaps are therefore seen as important instruments to steer development towards CE-inducing practices (del Río et al., 2021).

## 2.3 Strategic Planning

Strategic planning can be used as an important approach to address and implement CE enabling practices. Spatial planning has a central role in moving society towards sustainability and provides a vital tool for how cities and societies plan for sustainable development (Davoudi et al., 2008; Haughton et al., 2009; Högström et al., 2018). According to Healey (2009), the 'strategic' in strategic spatial planning lies in the changing and shaping of the future, and being selective and oriented to issues of greater concern. The latter implies that some decisions and measures can be considered more important than others, and much of the process in strategic planning is making decisions about what to prioritize in order to produce fair and structural responses to problems, challenges, aspirations, and diversity (Albrechts, 2004; Healey, 2009).

Strategic planning is visionary and action-oriented, and integrates different policy agendas, activities and actors (Banai; Tewdwr-Jones et al., 2010; Trygg & Wenander, 2021). It is seen as a method or framework for planners and policy makers to collectively

imagine a possible future, and this is translated into priorities and action programs (Albrechts; Healey, 2004; Trygg & Wenander, 2021). An important part of strategy-making is to have a long-term vision in order to manage and prepare for an uncertain future (Albrechts & Balducci, 2013; Healey, 2006). A strategic plan should thus reframe institutionalized thinking and challenge current practices, and be 'a vehicle among others to produce change', as action needs to be taken by all relevant actors and stakeholders to successfully reach the goals and priorities identified in strategic planning documents (Albrechts & Balducci, 2013; Trygg & Wenander, 2021).

## 2.4 Role of Local Governments in the Transition to a CE

The transition to a CE is seen as a promising strategy for local governments to address sustainability challenges. However, the role of local governments in such a transition needs further research. Few contributions in CE literature discuss how, or what it takes, to implement CE principles in a local or urban context, and how local governments can play an active role in a CE transition (Dagilienė et al., 2021; Levoso et al., 2020). Further research is needed to identify the tools and methodologies needed by local authorities to enable a transition to CE; the current regulatory barriers preventing local authorities in such a transition; and the social contexts and institutional conditions under which the CE is being implemented (Dagilienė et al., 2021; Ellen MacArthur Foundation, 2017a; Korhonen et al., 2018; Moreau et al., 2017; Papageorgiou et al., 2021). Nonetheless, contributions in CE literature recognize the indisputable role of local governments as important actors and facilitators in the transition to a CE.

### 2.4.1 Strategic Urban Planning and Policy Implementation

As subnational authorities, local governments can play a key role in the transition to a CE by implementing CE policies and regulations on a local level. Although international and national policies are important and necessary to set an overarching goal of transitioning to a CE, local interventions are crucial to make the goal a reality (Dagilienė et al., 2021; Levoso et al., 2020). Progress can be impeded without interaction between levels or if certain actors are not playing their expected role, and it is therefore crucial that local authorities are aware of their responsibility and use their position to disseminate policies, regulations and strategies to local communities and businesses (Dagilienė et al., 2021; Senge et al., 2007; Termeer & Metze, 2019). Few contributions in CE literature focus on local contexts of policy implementation despite evidence suggesting that local authorities play increasingly important roles in implementing EU policies and regulations (Borghetto & Franchino, 2010; Sutcliffe & Alvarado, 2021). The EU depends on diffusion of its policies and regulations into its member states, and the role of subnational authorities has become increasingly important as adaptations of these are often locally adjusted (Alasuutari, 2009; Borghetto & Franchino, 2010).

Furthermore, as planning authorities, local governments have the opportunity for transformative urban planning, and the capacity to encourage and implement CE-enabling practices (Bolger & Doyon, 2019; Ghisellini et al., 2016). Strategic urban planning has been suggested as an approach for local authorities to address sustainable development and guide development towards prioritized goals, by identifying current trends and selecting specific actions to improve environmental and social well-being in the local community (Albrechts, 2013; Davoudi et al., 2008; Haughton et al., 2009; Healey, 2009; Trygg & Wenander, 2021). Thus, as spatial planners and community developers, local governments can encourage CE practices and implement CE strategies,

in addition to playing a key role in facilitating and enforcing national and international CE policies and regulations at a local level.

#### 2.4.2 Local Governments as Actors and Facilitators

Local governments can be important actors, as well as driving forces and facilitators, in the transition to a CE. Dagiliené et al. (2021) has identified five local governance approaches for CE implementation: regulations, reflexive governance, negotiation networks, sharing platforms, and learning/education.

Policies and regulations can be useful tools for local governments to support a transition to a CE through financial and non-financial instruments, for example by funding businesses and research institutions in developing circular solutions; institutionalizing innovation funds; implementing environmental requirements; and using their authority to restrict or shut down activities with high levels of emissions (Dagiliené et al., 2021; Palm & Bocken, 2021; Wang et al., 2020). Local authorities can also encourage CE through reflexive governance, including integration of CE principles into public procurement processes and municipal environmental policies and plans (Dagiliené et al., 2021). Local governments are major consumers (e.g. products, services and energy) and service providers (e.g. public transportation and waste management), and can use their position to demand and promote circular practices and solutions. Public policies, regulations and investments, e.g. in infrastructure and management of energy, transport, water and waste, can contribute significantly towards the transition to a CE on a local level (Bolger & Doyon, 2019; Dagiliené et al., 2021; Nevens et al., 2013; Wijkman & Skånberg, 2015). Reducing waste and increasing reuse and recycling rates requires efforts at the local government level specifically, as they are the formal institutions responsible for municipal waste management (Dagiliené et al., 2021; Palm & Bocken, 2021).

Local governments can also encourage cooperation and negotiation networks for stakeholders to support a transition to a CE. Institutional conditions promoting cooperative efforts and democratic participation in economic activities at a local level, is recognized as a key driver in the transition to a CE (Bolger & Doyon, 2019; Moreau et al., 2017). Public authorities can ensure cooperation and coordination between local stakeholders and contribute to new cooperation and resource flows, for example by improving infrastructure for circular solutions and sharing initiatives; creating centers for citizens and business cooperation; and embedding local actors in different cooperative activities (Dagiliené et al., 2021; Nogueira et al., 2020). Establishment and promotion of sharing platforms is another approach for local governments to facilitate the transition to a CE identified by Dagiliené et al. (2021). For example, the establishment of Living Labs or innovation laboratories facilitates cooperation, testing, and development of new solutions (Dagiliené et al., 2021). Local authorities can also initiate, provide space or promote sharing initiatives such as public libraries, repair workshops, car/bike sharing services, co-working spaces, and re-use initiatives (Dagiliené et al., 2021; Palm & Bocken, 2021). Local governments often have access to high concentrations of local resources, capital and talent, and should take advantage of and mobilize these in a transition to CE, however, public authorities should also reflect on their powerful position, and not become too dominant, to avoid outcompeting initiatives from local businesses and NGOs (Ellen MacArthur Foundation, 2017a; Palm et al., 2019).

Lastly, citizen involvement and social awareness is crucial for a successful transition to a CE. Public authorities have an important role in contributing to a change in behavior and attitude by raising awareness, facilitating sustainable solutions, and involving citizens in

developing CE strategies. Educational programs, competitions, projects, public campaigns, seminars and lectures related to the CE have increased significantly and been well supported by public institutions and industry (Dagilienė et al., 2021; Lieder & Rashid, 2016). Contributions in CE literature emphasizes the significance of citizen involvement and consideration of public attitudes towards climate change when developing local CE strategies (Davidescu et al., 2020; Palm et al., 2019). Local governments also need to reflect upon their power and ensure that their strategies and goals do not outcompete civic society and their engagement (Palm & Bocken, 2021; Palm et al., 2019)

### 2.4.3 Monitoring and Managing Progress

Another element emphasized in CE literature is the need to evaluate systemic circular solutions, practices and strategies to effectively monitor and manage progress in local governments transition to a CE (Corona et al., 2019; Papageorgiou et al., 2021; Parchomenko et al., 2019; Saidani et al., 2019). Tools and frameworks for measuring levels of circularity, such as indicators, indices and assessments, are essential to ensure that decision-making is based on evidence and supports long-term goals (Papageorgiou et al., 2021). This will provide insight and understanding on performance and progress of different areas, which in turn will help identify areas of interventions and set priorities towards long-term objectives of strategic planning (OECD, 2020). Moreover, evaluating progress and performance will identify investment and regulatory needs, facilitate governance transparency, and encourage public participation by making complex information understandable and accessible (Huovila et al., 2019; Papageorgiou et al., 2021).



## 3 CE Policies and Regulations

Circular economy initiatives are increasingly incorporated into supra-national, national, regional and local policies and regulations. The EU's circular economy framework affects both Norwegian and Bulgarian governments through their close links and memberships in the EU and the EEA. This chapter describes these policies, in addition to the current status and national strategies for developing a circular economy in Norway and Bulgaria, as a contextual backdrop to the local initiatives and practices in Sofia and Ålesund.

### 3.1 The Circular Economy Framework in the European Union

#### 3.1.1 The (New) Circular Economy Action Plan

The EU adopted its first Circular Economy Action Plan (CEAP) "closing the loop" in 2015. However, relevant aspects in the CE framework appeared in EU regulations as early as in the 1970s, for example in regulations concerning waste, recycling, and resource efficiency (Mazur-Wierzbicka, 2021). When the European Green Deal, EU's strategy for a climate-neutral, resource-efficient and competitive economy, was introduced, the EU committed to present a New Circular Economy Action Plan which would aim at "accelerating the transformational change required by the European Green Deal, while building on circular economy actions implemented since 2015" (European Commission, 2020a, p. 5).

In March 2020, the new CEAP was presented by the European Commission (EC) as a core component and an important contribution to achieve the goals in the European Green Deal (European Commission, 2020a). The new CEAP introduces legislative and non-legislative measures that aim to make sustainable products the norm, while empowering consumers and public buyers, and ensuring less waste by keeping resources in the economy as long as possible (European Commission, 2020a). The action plan focus particularly on industries where the potential for increased circularity is high, including electronics and ICT, packaging, batteries, vehicles, plastics, textiles, construction, food, water and nutrients. The EC states that the synergies between circularity and reduction of GHG emissions is a prerequisite to achieve climate neutrality, and financing needs to be steered towards more sustainable production and consumption patterns (European Commission, 2020a). Some measures have already been implemented in this regard, including the integration of a CE objective under the EU Taxonomy Regulation (Regulation 2020/852/EU). The EU taxonomy is a classification system for sustainable economic activities, aiming to create a common understanding and harmonized criteria for 'sustainable' activities, boosting investments in sustainable projects and activities, and contributing to reaching EU Green Deal objectives (European Commission, n.d.).

#### 3.1.2 EU Industrial Strategy

The EC presented the New Industrial Strategy in March 2020 for a competitive, green and digital Europe, emphasizing the "twin transition" toward climate neutrality and digital leadership (European Commission, 2020a). The transition to a CE is an important element of the strategy, as incorporating circular principles is seen as detrimental to reduce environmental impact while ensuring cleaner and competitive industries. As

stated in the strategy, a circular approach will alleviate competition for scarce resources and deliver material savings throughout value chains and production processes, generate extra value, and unlock economic opportunities (European Commission, 2020a). Furthermore, the EU estimates that a transition to a circular economy has the potential to create 700,000 new jobs across the EU by 2030 (European Commission, 2020a). The new CEAP includes several initiatives focusing on measures for EU industries, e.g. the Sustainable Product Policy.

### 3.1.3 Sustainable Design and Production

There are legislative and non-legislative initiatives that address sustainability and circularity of products, for example the Ecodesign Directive, the EU Ecolabel and the EU green public procurement. However, the former regulates only energy-related products thus far, and the EU Ecolabel and the EU green public procurement have limited impact because of its voluntary basis (European Commission, 2020a). In March 2022, the EC proposed a Regulation on Ecodesign for Sustainable Products. This policy builds on the existing Ecodesign Directive to go beyond energy-related products and allow the sustainability requirements to be applicable to a broader range of products (European Commission, 2022c). In addition to setting criteria for energy efficiency, the regulation will also include criteria for circularity and the environmental footprint of products. The ecodesign requirements will be tailored to fit all of the products and goods placed on the EU market, and some specific sectoral initiatives has been introduced as well such as the EU strategy for sustainable and circular textiles (European Commission, 2022a, 2022b).

### 3.1.4 Targeted Value Chains

#### *Textiles*

The production and consumption of textile products is continuously growing and so does the industry's environmental footprint. In 2020, textiles was the consumption area in the EU with the fourth highest negative life cycle impact on the environment and climate change; the third highest impact on water and land use; and the fifth highest in terms of raw material use and greenhouse gas emissions (EEA, 2022). The fast fashion trends and industry based on selling high volumes of short-lived clothing has led to an increasing overproduction and overconsumption of textiles, and a deterioration of the quality of textile fibers making the products difficult to repair and recycle (Köhler et al., 2021; Moussu, 2022). An estimated 87 % of the total fiber input at global level is landfilled or incinerated following first use (Ellen MacArthur Foundation, 2017b; Köhler et al., 2021).

On March 30<sup>th</sup> 2022, the European Commission presented the EU strategy for Sustainable and Circular Textiles. The new EU Strategy includes measures to address the whole life cycle of textiles, mandatory requirements on environmental information of products, and stricter rules on green claims to control greenwashing. Measures on the design phase include mandatory ecodesign requirements which aim to make textiles durable and easier to repair and recycle, setting mandatory minimums of recycled fibers in new products, and criteria for safe and sustainable by design chemicals and materials (European Commission, 2022b). Moreover, the European Commission will introduce a digital product passport for textiles with mandatory requirements for environmental and circularity information and set new rules for the extended producer responsibility (European Commission, 2022b). The strategy is expected to encourage a shift toward durable, quality, and environmentally-friendly textiles for consumers and new circular business models that boosts the reuse, repair, and recycling of textiles (European Commission, 2022b, 2022c).

### *Electronics and ICT*

Electronic waste has become one of the fastest growing waste streams in the EU and less than 40% is recycled (European Commission, 2020a). Electronic products are generally not designed to be recycled, and the effort must therefore be placed on the design phase so that electronic and electrical equipment are easier to repair and recycle (Moussu, 2022). The European Commission intends to propose a Circular Electronics Initiative which corresponds with the new Sustainable Products Policy. The initiative will promote longer product lifetimes and include regulatory measures under the Ecodesign Directive, so that electronic devices are designed for energy efficiency and durability, repairability, reuse, and recycling (European Commission, 2022a). Electronics and ICT will also be a priority for implementing the 'right to repair' for consumers and improving the collection and treatment of electronic waste (European Commission, 2020a).

### *Batteries and vehicles*

The 2006 Batteries Directive (Directive 2006/66/EC) and the 2000 End-of-life vehicles Directive (Directive 2000/32/EC) already addresses batteries and vehicles to some extent, focusing on the end-of-life stage. The end-of-life vehicles directive includes harmonized measures to prevent and limit waste from vehicles, for example by prohibiting the use of hazardous substances and setting minimum targets for recyclability and recoverability of vehicles from the design and production phase (Directive 2000/32/EC). The Batteries Directive prohibits certain batteries and accumulators containing mercury or cadmium, and promotes a high level of collection and recycling of waste batteries and accumulators (Directive 2006/66/EC, 2006).

The first initiative that was delivered after the new CEAP was presented in March 2020, was the proposal for a new sustainable batteries regulation in December 2020. This regulation builds on the legislative framework for batteries and corresponds with the commitments of the EU Green Deal, the new CEAP, the new EU Industrial Strategy and the Sustainable and Smart Mobility Strategy which aims at delivering a 90% reduction of transport-related greenhouse gas (GHG) emissions by 2050 (European Commission, 2020c). The proposed regulation aims to cover the entire life cycle to ensure that batteries placed in the EU market are sustainable and safe, produced with the lowest possible environmental footprint and with ethically sourced raw materials (European Commission, 2020a). There are also proposed measures to set targets for recycled content, collection and recycling rates, and recovery of valuable materials to be fed back into the economy (European Commission, 2020a).

### *Packaging and Plastics*

The current requirements for packaging and packaging waste is addressed in Directive 1994/62/EC (1994). The European Commission is reviewing the current framework and will propose a revision of the directive to reinforce the mandatory requirements for packaging to be allowed on the EU market (European Commission, 2020a). The aim is that packaging should circulate as long as possible and keep its value instead of turning into waste after first or second use, thereby creating less waste for more value (European Commission, 2022c). Packaging will also be a priority aspect when developing product-specific rules under the Ecodesign for Sustainable product regulation, because packaging varies greatly based on product category (European Commission, 2022a).

The EU adopted a European strategy for Plastics in January 2018. The strategy aims to improve the quality of plastics and increase plastic recycling, while reducing plastic pollution and marine littering. To increase uptake of recycled plastics and contribute to a

more sustainable use of plastics, the European Commission will propose mandatory requirements for recycled content and waste reduction measures for key products such as packaging, construction materials and vehicles (European Commission, 2020a). For example, the Single Use Plastics Directive limits and even prohibits some single-use plastic items where other alternatives are available, and sets targets for the separate collection and recycling of plastic bottles and targets for recycled content in new plastic bottles (Directive 2019/904/EU).

#### *Construction and buildings*

Construction and buildings require huge amounts of resources. The construction sector accounts for approximately 5-12% of total national GHG emissions and over 35% of the EU's total waste generation (European Commission, 2020a). The European Commission committed in March 2020 to present a Strategy for a Sustainable Built Environment in order to increase material efficiency and reduce climate impacts of the built environment. The strategy is expected to cover several interconnected policy areas such as climate, energy and resource efficiency, management of construction and demolition waste, accessibility, digitalization and skills (Ragonnaud, 2021). The strategy will consider a revision of the EU Waste legislation to implement material recovery targets for construction waste, and use the European framework for buildings to integrate life cycle assessment in public procurements, among other things (Ragonnaud, 2021). Furthermore, a proposal to boost the internal market for construction products was included in the Sustainable Product policy presented in March 2022 (European Commission, 2022a).

#### *Food, water and nutrients*

The final key value chains included in the new CEAP are food, water and nutrients. The food value chain requires huge amounts of resources and has a significant environmental impact. Reducing food waste has become a particular priority, as an estimated 20% of the total food produced is lost or wasted in the EU (European Commission, 2020a). Targets for food waste reduction will therefore be proposed as part of a review of EU waste policy, in addition to a comprehensive review of the food value chain in the EU farm-to-fork strategy (European Commission, 2020a). To encourage circular approaches to water use in agriculture and industry, the European Commission will propose a new Water reuse regulation and review directives on wastewater treatment (European Commission, 2020a).

### **3.1.5 EU Waste Policy**

A central principle of the EU waste policy is the waste hierarchy, which establishes the prioritized steps of waste management. The priority is to prevent waste generation, then re-use, recycling, and recovery, and the last resort should be to send waste to landfills. The EU Waste hierarchy is depicted in figure 2.



**Figure 2: EU Waste Hierarchy**

The Waste Framework Directive (Directive 2008/98/EC) is the EU’s overarching legal framework for managing waste. The waste hierarchy is mentioned in Article 4 of the Directive to be applied by member states in waste management legislation and policy (Directive 2008/98/EC). Furthermore, the Waste Framework Directive introduces measures to make sure that waste is managed without endangering human health and the environment while encouraging the transition to a circular economy. While the Waste Framework Directive serves as an overarching legal framework for waste management, the EU has also introduced laws to address the various types of waste that require specific approaches. Some of these have already been mentioned in the previous section of this thesis, including the rules on textiles, batteries, packaging, plastics, and construction and buildings. The Waste Directive also includes stricter rules on hazardous waste, for example on labeling and monitoring, as it poses a greater risk to human health and the environment.

The Waste Framework Directive has set specific targets for EU member states to comply with and achieve. By 2025, 55% of household waste should be recycled, and by 2030, 60% of household waste should be recycled while no more than 10% of household waste should end up in landfills. The EU has also continued its intention of meeting the SDG of halving food waste by 2030. To meet these goals, the EU intends to continue modernizing its waste policy. With the new CEAP, the European Commission committed to tapping further into the potential of the extended producer responsibility and proposing a harmonized system of waste collection to help citizens, businesses and public authorities to better separate waste (European Commission, 2020a, 2022c). A functioning EU market for secondary materials must be established and encouraged as well. The European Commission will further develop EU end-of-waste criteria for certain waste streams, and introduce requirements for recycled content in products to boost the market for secondary materials (European Commission, 2020a). Furthermore, the European Commission intends to take action to hinder waste exports from the EU to third

countries. The Commission has proposed a “recycled in the EU” benchmark for quality secondary materials (European Commission, 2020a).

### 3.1.6 Consumers in the European Circular Economy

The consumer perspective has been emphasized in the EU circular economy framework by linking circular economy to social rights (Johansson, 2021). First, the European Commission intends to revise EU consumer law and propose a legal framework to protect consumers against greenwashing, ensuring that consumers get complete and trustworthy information about a product such as its lifespan, environmental footprint, durability and reparability (European Commission, 2022c). Second, the EC is developing new consumer rights such as the ‘right to repair’, particularly focusing on products with potential for increased circularity (European Commission, 2020a). Furthermore, the EC will propose mandatory green public procurement (GPP) criteria. Public authorities’ purchasing power represents 14% of EU GDP and can be a powerful driver of the demand for sustainable products, and to tap into this potential, the EC will present minimum GPP criteria and targets in sectoral legislation and mandatory reporting to monitor GPP (European Commission, 2020a).

## 3.2 Circular Economy in Bulgaria

### 3.2.1 Current Status

Bulgaria has been a member of the EU since 2007, and continues to lag behind in various development areas relating to the circular economy compared to other EU member states (European Commission, 2022b). Bulgaria has made progress in reaching some EU targets, for example on resource productivity and waste recycling, however this progress should be analyzed in the context of the country’s low starting levels compared to EU averages (European Commission, 2020b). For instance, Bulgaria is yet to reach certain objectives of EU environmental and climate law and the Bulgarian economy is still amongst the most resource-, energy- and carbon-intensive within the EU (BULGARIA2030, 2020; European Commission, 2020b; Zhechkov, 2019). The current overreliance on fossil fuels and the inefficient use of energy are creating a number of challenges, such as lower competitiveness in the economy, fine particulate matter pollution, and the highest number of pollution-related deaths in the EU (European Commission, 2020b). Numbers from 2020 show a circular material use rate in Bulgaria at 2.6%<sup>1</sup> compared to a 12.8% EU average, and resource productivity at €0.35/kg compared to the EU average at €2.08/kg (Eurostat, 2020a, 2020b).

Waste management continues to be a challenge in Bulgaria. Although municipal waste generation is below the EU average, Bulgaria also has one of the highest landfilling rates for municipal waste in the EU with 62% in 2018, compared to the EU average of 24% (Eurostat, 2018a). In 2018, about 7% of municipal waste in Bulgaria went to incineration and energy recovery (Eurostat, 2018a). The recycling rate of municipal waste has steadily increased to 31.5% in 2018, but this is still considerably lower than the EU average of 47% (Eurostat, 2018b). At the same time, targets for the recovery and recycling of certain waste streams, such as plastic packaging and waste electrical and

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<sup>1</sup>The circular material use rate is defined as the ratio of the circular use of materials to the overall material use. The overall material use is measured by summing up the aggregate domestic material consumption (DMC) and the circular use of materials. The circular use of materials is approximated by the amount of waste recycled in domestic recovery plants minus imported waste destined for recovery plus exported waste destined for recovery abroad.

electronic equipment (WEEE), have been successfully implemented (Zhechkov, 2019). Ūsas et al. (2021) found that Bulgaria's e-waste recycling rate is significantly higher than the EU average, indicating that successful implementation of CE principles is possible when appropriate investments are made. The high rates of recovery and recycling of WEEE in Bulgaria can be explained by an emphasis on the extended producer responsibility (EPR) scheme, in addition to the largest WEEE recycling factory in Eastern Europe being located in Sofia (Ūsas et al., 2021; Zhechkov, 2019).

The Eco-Innovation Scoreboard (Eco-IS 2021), which illustrates EU member states' overall performance in eco-innovation (inputs, outputs, activities, and socio-economic outcomes), shows that Bulgaria continues to be ranked last in the EU. The Eco-innovation Country Profile Report for Bulgaria (Directive 2019/904/EU) asserts that the consistent low performance demonstrates systemic barriers to implementing eco-innovations, and that there is a need to improve certain systems such as in science and innovation; support to SMEs; the energy system; and the less tangible aspects of social capital and availability of support structures and business intermediaries (Zhechkov, 2019). Moreover, the potential of new circular business models and GPP has yet to be explored (Zhechkov, 2019). The enduring challenges for Bulgaria include encouraging foreign and domestic investment in eco-innovation and the circular economy, increasing resource- and energy-efficiency, and further developing renewable energy sources (European Commission, 2020b). Bulgaria was also amongst the countries with the lowest score in the ASEM Eco-Innovation Index in 2018, with a 0.23 score (ASEIC, 2018).

The EU emphasizes the importance of the policy landscape to formally address the circular economy in strategic documents, and encourages national policies to invoke progressive measures to improve environmental performance and promote eco-innovations (Zhechkov, 2019). The circular economy has been included in various national strategic documents, including Bulgaria's current national development program, BULGARIA 2030.

### 3.2.2 National Strategy for a CE in Bulgaria

A national strategy and action plan for the transition to a circular economy is currently under development in Bulgaria. The Strategy is expected to include a comprehensive national framework for a circular economy, with relevant indicators and a methodology for measuring them (UN, 2020). The National Development Program BULGARIA 2030, adopted in 2020, maps the vision and goals of development policies in Bulgaria, including the transition to a circular and low-carbon economy as one of its main priorities. The aim of this priority is to increase resource- and energy productivity and promote the implementation of low-carbon, resource-efficient and waste-free technologies (BULGARIA2030, 2020). Material efficiency, waste management, and eco-innovations are presented as strategic focus areas for improvement in order to increase circularity in Bulgaria by 2030. To increase material efficiency, sustainable use of raw materials and supplies will be encouraged, which entails reducing the extraction and use of virgin raw materials while stimulating and increasing the use of alternative raw materials and circular (secondary) materials (BULGARIA2030, 2020).

Bulgarian waste management policy, as envisioned by BULGARIA2030, will specifically focus on measures to transform waste into a resource and implement the waste management hierarchy in line with EU waste policy. Emphasis will also be put on introducing new recycling and recovery technologies and using digital technologies to monitor, control, analyze and optimize waste and material flows (BULGARIA2030, 2020).

The Bulgarian National Waste Management Plan 2021-2028, which was adopted in 2021, presents 3 main goals which corresponds to BULGARIA2030: create conditions for reducing generated waste; create conditions for the transition to a circular economy, i.e. management that ensures the effective use of waste as a resource; and to reach 55% recycled amount of the national municipal waste by 2025 (Bulgarian Ministry of Environment and Water, 2021). The national waste management plan also incorporates a national waste prevention program under its first objective by integrating a number of strategies to improve and increase circularity, e.g. strengthening the polluter pays principle and extending the EPR scheme to apply to packaging, end-of-life vehicles, WEEE, waste oils and petroleum products, batteries and accumulators, and tires (EEA, 2021a).

An overarching objective in the transition to the circular economy is to stimulate sustainable production and consumption patterns. Eco-innovation activities, including the introduction of new eco-products and technologies, will play an important role in Bulgaria to successfully transition to a circular economy (BULGARIA2030, 2020; Zhechkov, 2019). A specific focus in Bulgaria will therefore be to strengthen eco-innovation in businesses, increasing resource- and energy efficiency at all stages of production, thus creating competitive advantages while protecting the environment and optimizing resource consumption (BULGARIA2030, 2020). Measures will aim at supporting businesses in developing innovative solutions to processes and products in order to reduce their environmental impact and comply with the growing environmental and social standards and regulatory requirements.

The national development program identifies research, design and innovation activities in Bulgaria to be imperative in order to improve the knowledge base related to the circular economy. Communicating the benefits of the circular economy to businesses can promote clean technologies and circular business models, while regulatory measures and economic instruments can boost the market development of recycled raw materials and supplies (BULGARIA2030, 2020). Accordingly, the Bulgarian state intends to concentrate its efforts on supporting businesses' path to circularity, for example with waste- and material flow analyses; reviewing production activities to implement industrial symbiosis; introduction of environmental standards; implementation of eco-innovations; developing clean technology projects; providing start-up capital to encourage development of new businesses; and building new capacities in the CE (BULGARIA2030, 2020).

### 3.3 Circular Economy in Norway

#### 3.3.1 Current Status

Norway has one of the highest consumption rates in the world. In fact, the Circularity Gap report Norway from 2020 shows that Norway's 2.4% circular<sup>2</sup>: Norway consumes 235 million tons of materials each year (on average 44.3 tons per person), and 97.6% of these materials are not cycled back into the economy (de Wit et al., 2020). On another hand, 2020 Eurostat numbers show resource productivity to be at 2.84 €/kg compared to the EU average at €2.08/kg (de Wit et al., 2020; Eurostat, 2020b). Norway is at the forefront when it comes to renewable energy sources, however the Norwegian economy

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<sup>2</sup> Not comparable to Eurostat's indicator on circular material use rate. The Circularity Gap Metric measures the share of cycled materials (by measuring the effect of slowing, narrowing, closing and regenerating flows of materials) as part of the total material input (domestic extraction and import) into the national economy every year.



is still heavily dependent on revenues from its oil and gas industries. Energy consumption is associated with lower emissions due to renewable electricity production, and emissions per unit of energy consumption has decreased by more than 28% since 1990 (Norwegian Ministry of Petroleum and Energy, 2017). Numbers from 2019 show that total energy consumption in Norway has decreased by 1.6% than the year before (Energi Norge, 2020). In most Norwegian industries, energy efficiency increased from 2018 to 2019, an exception was the petroleum industry, in which energy intensity increased by 3.7% (Energi Norge, 2020).

Waste generation in Norway is lower than the EU average, but the volume and rates of waste reuse, recovery and recycling are low as well. In 2020, municipal waste was at a record high 449 kg per person, and the recycling rate of municipal waste was at 41%, resulting in Norway not meeting the EU target of 50% material recycling for household waste (Hesselberg, 2021). Norway excels in the recycling of certain high-value recycling streams, mostly deriving from efficient recycling schemes, including recycling of metals (99.4%), plastics (64%), glass (91%), organic waste (85%) and paper (86%) (de Wit et al., 2020). Agriculture, forestry, aquaculture and fisheries, the process industry, construction, real estate and trade have been identified as industries of particular importance for improvement to successfully transition to a circular economy in Norway. These industries are also central in the EU circular economy action plan, and accounts for the direct or indirect impact of almost 50% of waste streams in Norway (Deloitte, 2020a; Norwegian Environment Agency, 2019). Of all waste generated in Norway, construction accounts for about 20%, and the recovery rate of these materials is only 28.8% (de Wit et al., 2020).

In the ASEM Eco-Innovation Index in 2018, Norway had an overall score at 0.62, with the highest score in the sub-category "supporting environment" with indicators such as government spending on green R&D, corporate priority level of sustainable development, and generation capacity of renewable energy (ASEIC, 2018). The lowest score was in the sub-category "activity", with indicators such as number of companies with green technology, share of green patents, and industry-academic cooperation on environmental R&D (ASEIC, 2018). Deloitte (2020b) identified regulatory, financial, technological, and structural barriers in the transition to the circular economy in Norway. First, most Norwegian regulations are adapted to a linear economy, e.g. the definition of resources and waste, and which actors are allowed to handle these. Second, the lack of pricing in social and environmental costs associated with existing products and value chains hinders profitability for circular solutions and business models. Third, the lack of digital infrastructure impedes businesses to optimize production to reduce resource use and waste; new technological solutions must be developed in order to utilize more secondary resources and to develop circular products and services. Lastly, structural barriers such as fragmented and deficient systems for waste management, lack of collaboration within and across value chains and industries, and lack of knowledge and factual basis must be addressed to achieve necessary adjustment throughout the economy (Deloitte, 2020b).

Deloitte's report (2020a, 2020b, 2020c) resulted in six advisory priority measures for the development of a Norwegian national strategy for a circular economy: Concrete goals and indicators that gives the business community a clear direction and predictability, and measurable indicators that make it possible to follow developments; create markets for circular raw materials, products and services (using taxes and fees, regulatory requirements, and supporting CE pilot programs); improved producer responsibility schemes (expanding to more products, introducing requirements and intensives for

ecodesign, and establishing material registers); clearer responsibilities and requirements for waste management (harmonizing and optimizing waste management system); data-driven circular economy (better data related to materials and waste streams and develop digital solutions); and promoting knowledge for the circular economy (for businesses, public purchasers, and consumers) (Deloitte, 2020c).

### 3.3.2 National Strategy for a CE in Norway

The circular economy concept has been applied to Norwegian national strategic documents since 2019. The government platform "Granavolden" (2019) stated its intention preparing a national CE strategy and making Norway "a pioneer in the development of a green, circular economy that makes better use of resources" (Office of the Prime Minister, 2019, p. 86). The National Strategy for a Green Circular Economy, adopted in June 2021, asserts the Norwegian government's role and efforts in the transition to a CE and illustrates how EU and Norwegian policy fit together (Norwegian Ministry of Climate and Environment, 2021). The transition to a CE is described as "a process that will contribute to value creation and sustainability and at the same time result in progress towards Norway's climate and environmental policy targets, including Norway's efforts to achieve the UN Sustainable Development Goals" (Norwegian Ministry of Climate and Environment, 2021, p. 6).

The National strategy for a Circular Economy in Norway (2021) is divided into four overarching strategies; CE through sustainable production and product design; CE through sustainable consumption and use of materials, products and services; CE through toxic-free material cycles; and CE and value creation. The former focuses on implementing a sustainable product framework based on ecodesign, so that products are designed and produced with a low climate and environmental footprint and with properties that makes products more adapted to a circular value chains (Norwegian Ministry of Climate and Environment, 2021). The government will also work on improving and strengthening the EPR scheme and Norwegian regulations relating to sustainability requirements for products, such as content of circular materials, durability, and reparability (Norwegian Ministry of Climate and Environment, 2021). Norwegian waste policy is also mentioned, including a new national goal to increase material recycling and replace the earlier goal where energy recovery was equated with material recovery, and gradually introduce measures to ensure 65% preparation for reuse and material recovery of waste by 2035 (Norwegian Ministry of Climate and Environment, 2021).

With the second overarching strategy, the government announces its efforts in changing consumption patterns to promote markets for sustainable products, secondary raw materials, renewable resources, and new business models and solutions with a lower climate and environmental footprint (Norwegian Ministry of Climate and Environment, 2021). Corresponding to EU regulation, the Norwegian government intends to strengthen consumer rights by implementing regulations on product requirements, marketing and consumer information, and increase the proportion of green and innovative public procurement to facilitate circular choices in markets (Norwegian Ministry of Climate and Environment, 2021). The third overarching strategy proposes measures to remove substances that lead to pollution in air, water and soil. The strategy proposes bans on use of environmental toxins and other hazardous substances in products, boosting R&D of sustainable chemicals and product design, and setting the same requirements for environmental toxins and other hazardous substances in products produced from primary and secondary raw materials to increase material recovery and provide safe products (Norwegian Ministry of Climate and Environment, 2021).

The latter overarching strategy, “circular economy and value creation”, addresses how the circular economy will change the dynamics of the market in Europe and open up new opportunities for value creation (Norwegian Ministry of Climate and Environment, 2021). Specific actions are proposed for sectors with greater potential for circularity in Norway: the bio-based sectors; the process industries; construction and buildings; and service industries. The role of subnational authorities (counties and municipalities), research and innovation, and digitalization is also mentioned. The strategy stresses that counties and municipalities are central to cooperation between local actors, and can be driving forces and facilitators for the implementation of circular measures as community developers, planning authorities, large building owners, service providers and purchasing entities (Norwegian Ministry of Climate and Environment, 2021).

The new government platform “Hurdalsplattformen” (2021), published in October 2021, also includes ten bullet points on how the newly elected government intends to increase circularity. This includes ensuring that waste is handled and recycled locally or regionally rather than being transported over greater distances; updating the Norwegian Pollution Control Act to ensure more efficient waste management; and making demands that new buildings and structures be built with climate-friendly materials and designed for low energy consumption and reuse (Office of the Prime Minister, 2021).

## 4 Methodology

This chapter presents the research design and methods used in this thesis with justifications for choosing a comparative multiple case study approach and qualitative research methods. How cases were selected, how data was collected and analyzed, the ethical considerations made during the research, and reflections on the quality of the research design is presented in the following sections.

### 4.1 Research Design and Method

#### 4.1.1 Multiple Case Study

This thesis uses a comparative multiple case study approach. A case study approach is considered appropriate when the researcher has clearly identifiable cases with boundaries (Creswell, 2007), and when there is a “need to obtain an in-depth appreciation of an issue, event or phenomenon of interest, in its natural real-life context” (Crowe et al., 2011, p. 1). A multiple case study approach focuses on a specific issue or phenomenon, and use two or more cases to illuminate different perspectives and generate a broader understanding of that specific issue or phenomenon (Creswell, 2007; Goodrick, 2014). It is also natural in multiple case studies to use a comparative perspective, encompassing analysis and synthesis of similarities, differences and patterns across cases that share a common focus or goal (Goodrick, 2014; Ringdal, 2018).

In this thesis, the researcher was interested in studying how local governments can facilitate the transition to a CE. To investigate this, the researcher decided to explore the role of local governments in this transition by using Ålesund municipality in Norway and Sofia municipality in Bulgaria as units of analysis. The research has been based on examining how the CE has been formally incorporated into the municipalities’ strategic documents and development plans, and how the municipalities are working in practice to facilitate and contribute to the transition to a CE. In other words, the role of Ålesund and Sofia municipalities in the transition to a CE was chosen as cases in order to gain a broader understanding of how local governments can facilitate the transition to a CE.

#### 4.1.2 Selection of Cases

An important aspect of designing a case study is case selection. Creswell (2007) suggests choosing cases with different perspectives on a specific issue, and Crowe et al. (2011) argues that a central consideration when selecting cases is access to the units of analysis. The case selection of this research was purposive and influenced by the researchers knowledge and accessibility to the individual cases. As described in the first chapter of this thesis, the researcher wrote a ‘good practice’ report on CE practices in Ålesund municipality during the internship at International Development Norway, as part of the CE project with Sofia Municipality. The field trip to Ålesund and the involvement in the Sofia municipality project with IDN influenced the selection of cases in to be studied. Having knowledge and access to relevant documents, in addition to having connected with some of the municipal employees participating in the IDN project and during the Ålesund field trip, was seen as a great advantage for the researcher. The preconceived knowledge and engagement about CE initiatives in both municipalities, combined with

having access to relevant data sources and participants for interviews, resulted in Sofia and Ålesund chosen as the units of analysis.

### 4.1.3 Qualitative Research Methods

The qualitative research methods used to answer the research questions in this thesis are document analysis and semi-structured interviews. Document analysis is particularly applicable to qualitative case studies and often used in combination with other qualitative research methods such as interviews (Bowen, 2009; Stake, 1995; Yin, 2014). In this thesis, strategic planning documents were initially used to gain insight into current and future strategies and goals of the municipalities related to the CE, and to answer the research question '*How is circular economy incorporated into Ålesund and Sofia municipalities strategic planning documents?*'.

Initial findings from document analyses were used as a basis for developing interview questions. In-depth interviews are based on a phenomenological perspective and are used to understand respondents' opinions, attitudes and experiences, and how they reflect on these (Tjora, 2017). The researcher found it most feasible to first examine how the CE is formally incorporated in municipal strategic documents, to be in a better position to develop relevant and precise interview questions, and also to investigate real-life attitudes and experiences relating to the commitments stated in those documents. Interview questions were also developed in order to answer the research question '*how are Ålesund and Sofia municipalities working to increase circularity in their regions?*'. A general interview guide was created to guide the interviews (see Appendix).

The findings from document analyses and in-depth interviews in both cases allows for a cross-case comparison to answer the last research question '*what are the similarities and differences found in the two cases related to the aforementioned research questions?*'. Lastly, the findings in within-case analyses and the cross-case analysis provides the basis for discussing the overarching question on how local governments can facilitate the transition to a circular economy.

## 4.2 Data

The data used in this thesis are municipal strategic documents and semi-structured, in-depth interviews with municipal employees. Data collection in multiple case studies typically draws on multiple sources of information and should include data sources that are comparable in order to do cross-case comparisons, and data sources that are flexible in order to provide a detailed description of each case (Creswell, 2007; Crowe et al., 2011). As a data source in qualitative studies, documents can be useful to uncover meaning, develop understanding, and discover insights relevant to the research problem (Merriam, 1988). Strategic planning documents produced by local governments are considered the primary documents describing their commitments and how they will deliver them, and is therefore particularly interesting for researchers to generate knowledge about current values, attitudes and policy discourses (Bolger & Doyon, 2019). The strategic planning documents used in this thesis will be covered in the next section. The second method of data generation used is semi-structured in-depth interviews. The interviews were intended to further investigate how the municipalities work in practice to reach the goals stated in their strategic documents, and to gain a broader understanding of attitudes and experiences of the municipalities role in the transition to a CE. The interviews were semi-structured and determined by a purposive selection of employees in the two municipalities.

### 4.2.1 Strategic Planning Documents

The documents used in this study were obtained from Sofia and Ålesund Municipalities websites. These are open-access and available for the public. The documents used for analysis in presented in Table 2.

Municipality	Document name	Document type
Sofia	Program for Sofia 2021-2027	Plan for integrated development
	Vision Sofia 2050	Long-term strategic development plan
Ålesund	Green Strategy Ålesund 2021-2024	Strategy for green development
	Ålesund Municipal plan 2021-2031	Long-term strategic development plan

**Table 2: Strategic Planning Documents for Ålesund and Sofia Municipalities**

*Program for Sofia* is the plan for integrated development of Sofia Municipality for the period 2021-2027. The program was developed by the municipal enterprise "Sofiaplan", a specialized structure within the Sofia Municipality responsible for the coordination and preparation of all strategic and spatial plans of the municipality. Documents that define the strategic reference framework for the development of Program for Sofia include the national development program Bulgaria 2030, and the municipal long-term strategic development plan, Vision Sofia 2050. Program for Sofia has been developed as a territorial and thematic specification of the goals described in Vision for Sofia 2050. Program for Sofia defines the medium-term goals, priorities, and proposed measures for sustainable integrated development of the municipality, and was adopted by the Sofia Municipal Council on November 25, 2021.

*Vision Sofia 2050* is an initiative of Sofia Municipality to create a long-term strategic development plan for Sofia and suburban areas until 2050. The document was adopted by the Sofia Municipal Council in 2020 and contains long-term priorities and goals for development. Vision Sofia 2050 aims to serve as a basis for all future strategies for the development of the city by 2050, and therefore overlaps with certain content in Program for Sofia.

*Ålesund Municipal Plan* consists of a long-term community plan, a spatial plan and an action plan until 2031. The community plan consists of long-term goals and strategies, and points out the direction for the development of the municipality as an organization and the municipality as a community. The action plan is revised annually and concretizes how the long-term goals in the community plan are to be followed. The UN's SDGs have been used as overarching goals for development in Ålesund, and as the basis in the work of developing the municipal plan's action part, with associated sub-goals to each SDG. The sub-goals have been selected in consultation with representatives from the various focus areas.

*Green Strategy Ålesund* is one of the key governance documents for the municipal government period 2021-2024, and specifies how the municipality will work in this period to achieve the UN's SDGs and the goals stated in the municipal plan.

## 4.2.2 Interviews

### *Format and general information*

Interviews were conducted in March and April 2022. The interviews were performed through the online meeting platform Teams, and were on average 40 minutes. The video meetings were recorded with consent from the interviewees, and the researcher took additional notes as well when needed. The video recordings were later used to transcribe the interviews. This thesis was registered as a research project with NSD in January 2022 in order to get approval for collecting personal data, and permission was granted shortly after. Personal data and video recordings were anonymized and stored in accordance with Norwegian data protection legislation, and deleted after all interviews were conducted and transcribed. Interview participants are anonymized in this thesis and will be referred to as municipal employee.

### *Selection of the interviewees*

The researcher sought to interview relevant municipal employees involved in planning, implementation, and/or execution of CE strategies and initiatives for each of the cases. When selecting interviewees for qualitative studies, respondents should be chosen based on who can express themselves in a reflective way on a given topic (Tjora, 2017). Based on the research objective and questions of this thesis, municipal employees who were directly involved in the cases were considered most relevant subjects for interviews. The researcher initially contacted municipal employees from Ålesund that participated at the NTNU field trip, and municipal employees from Sofia involved in the IDN project in which the researcher assisted on as an intern in Fall 2021. Then, the first respondents were asked during the interview if they knew of anyone who could be relevant and potential interview subjects. Because of time constraints and lack of response, only two respondents from each case were interviewed.

### *Developing interview questions*

The interviews were semi-structured and conducted in a conversational manner. A general interview-guide was developed in advance of the interview process to guide the interviews (See appendix). Previous research, contextual background, and the municipalities' strategic planning documents were used as a basis for developing interview questions. The questions were generally open-ended to give the respondents a chance to reflect and give detailed answers. Follow-up questions were asked when needed.

## 4.2.3 Data Analysis

A combination of content and thematic analyses were used to analyze the data used in this study. Content analysis refers to the process where the researcher organizes information into key categories related to the research, whereas thematic analysis requires a more thorough examination and review of the data to uncover emerging themes and patterns to be categorized for analysis (Bowen, 2009; Fereday & Muir-Cochrane, 2006).

Strategic documents were examined first to learn how the municipalities have formally incorporated the CE into their strategic planning documents. According to Bowen (2009), document analysis is an iterative process that involves skimming (superficial examination), reading (thorough examination) and interpretation. As such, the first examination of the documents attempted to locate and identify if and where the CE was directly mentioned in titles, chapters or sections of the documents. Then, the documents were skimmed through, and key words such as "circular economy", "circularity",

“resource efficiency”, “sharing economy” and “energy efficiency” were used as an additional approach to search and locate where the CE, or elements of the CE, were mentioned and incorporated. Initial findings were examined and read through more carefully, and the findings deemed appropriate and applicable to the research questions were selected and exported to a separate document in order to organize the data and create initial descriptive categories. These categories were constructed based on characteristics of the data itself and central themes derived from the theoretical framework and contextual background of this thesis.

This process was first applied to Sofia municipality’s documents, followed by the documents for Ålesund municipality, to focus on the individual case first before considering comparable findings across the cases. A typical format in multiple case studies is to first provide a detailed description of each case and themes within the case (within-case analysis), followed by a thematic analysis across the cases (cross-case analysis) (Creswell, 2007). Yin (2003) suggests using the logic of replication for multiple case studies, meaning that the researcher replicates the procedures for each case. With that said, initial findings from documents in both cases were used to develop interview questions and finalize a general interview guide.

After the interviews were conducted and transcribed, initial descriptive categories were used to organize the data generated from interviews. The next step of the analysis involved thematic analysis to identify emerging themes and patterns, including categorization and coding to integrate data gathered from documents and interviews in each case. The researcher focused again on analyzing data related to each of the individual component first. Data generated from documents and interviews from Ålesund municipality was first sorted, analyzed, and coded. Then, the same procedure was replicated with the second case. This laid the foundation for the within-case analysis presented in chapter 5. The last step of the data analysis process were analyzing and comparing across the cases. Findings from the cross-case analysis is included in the discussion in chapter 6.

### 4.3 Ethical Considerations

It is important to reflect on the ethical implications of the study. There are certain burdens and risks associated with participants of qualitative research that is necessary to consider, such as keeping the anonymity and confidentiality of interviewees. Interviewees were provided with an information letter explaining their rights when participating in the study, how their personal information and the video recordings would be stored and protected, and that they would remain anonymous in the thesis. Interviewees could provide written consent to take part in the interview, and if this was not provided, the researcher made sure to get consent verbally at the beginning of the interview. General information, such as the purpose of the research and the structure of the interview, were also provided at the beginning of each interview.



# 5 Empirical Findings

## 5.1 Ålesund Municipality

### 5.1.1 Incorporating CE in Local Governance and Strategic Documents

The long-term development plan for Ålesund municipality use the UN's SDGs as a basis for its own goals and strategies. The transition to a CE is not specifically mentioned in Ålesund's long-term development plan, although elements that are important in the CE are included in some of the goals and priorities presented in the community plan and action plan of the Ålesund Municipal Plan 2021-2031. One of the three focus areas in the community plan of Ålesund Municipal plan is 'Sustainable environment'. With this focus area, the municipality aims to develop a climate-friendly and robust society through low emissions, sustainable use of resources, and sound contingency adaptation. Two strategies were found in the community plan that directly mentions "circular economy" and "circular business models", and these are also presented in Ålesund's Green Strategy 2021-2024 (See table 3).

Ålesund's Green Strategy (2021-2024) has incorporated and dedicated a chapter to the CE. Chapter 6, 'Circular Economy', starts with introducing Ålesund municipality's perception of the CE:

Circular economy is about doing more with less resources. In the circular economy, a product must last as long as possible, be repaired, upgraded and to a greater extent reused. When a product can finally not be reused, we must recycle the waste to use the material as raw materials in new production. This is how we utilize the same resources several times and as little as possible is lost. In order to bring about such a change, waste sorting and recycling is not sufficient. We must also change design, production and consumption patterns. Consumers must be given the opportunity to make environmentally sound choices and municipalities and businesses must promote circular economy in the purchase of goods and services. Digitization and the sharing economy are crucial to changing consumption patterns. More efficient use of resources reduces greenhouse gas emissions, slows down the loss of biodiversity, reduces pollution and contributes to new green jobs and business models. The transition to a circular economy is a necessary part of the transition to a low-emission society, and in order to achieve the sustainability goals of the UN.

(Ålesund Green Strategy 2020-2024) [Translated from Norwegian]

In light of the definitions provided by Kirchherr et al. (2017) and del Río et al. (2021), the definition provided by Ålesund municipality includes most of the important elements of the CE. The closing cycle perspective is included, although vaguely, as 'using the same resources several times and as little as possible is lost' through the activities related to the R-framework (reduce, repair, reuse, recycle). While the systems perspective is not directly mentioned, the definition emphasizes the role of businesses, municipalities and consumers, and that a change in design, production, and consumption patterns is necessary to develop the CE. Lastly, the aim of achieving sustainable development (UN's SDGs) is included as well.

Four goals, with nine strategies to reach these, are presented in Ålesund's Green Strategy related to the CE. The fourth goal and its corresponding strategies are also found in the community plan of Ålesund Municipal Plan 2021-2031, as mentioned previously.

Main goal	Strategy
<b>1.</b> <b>Ålesund municipality has contributed to the circular economy being the new normal</b>	Organize ownership in various municipal companies and activities to reinforce coordination of resources and faster development of circular value chains
	Prioritize the reuse of buildings rather than build new ones, and facilitate joint use and collective functions
	Implement requirements for purchases in order to contribute to a circular economy
<b>2.</b> <b>Ålesund municipality has facilitated smart and climate-friendly collection and treatment of waste</b>	Coordinate, visualize and strengthen the municipal efforts against littering
	Facilitate smart and climate-friendly collection and recycling of waste and at the same time utilize existing infrastructure
<b>3.</b> <b>Ålesund Municipality has significantly reduced the amount of waste through prevention, material recycling, and reuse, so that waste is utilized as a resource</b>	Increase the material recycling rate in municipal operations and in households
	Reduce the waste generation in municipal operations and households
<b>4.</b> <b>The Ålesund region is a leader in smart and sustainable urban and city development.</b>	Collaborate with the business community to develop circular business models
	Work to support a circular economy in the municipality that takes care of the global sustainability goals

**Table 3: Ålesund Green Strategy: Goals and Strategies for a CE**

In addition to the goals and strategies listed in Ålesund's Green Strategy, the community and action plan under the Municipal plan covers certain elements of the CE. The action plan includes sub-goals related to UN's SDGs to reach by 2030. Under *SDG 7 – Clean energy for all*, Ålesund's sub-goals are to increase the share of renewable energy in energy consumption; strengthen international cooperation to facilitate access to research and technology in clean energy, RES, and energy efficiency; and promote investments in energy infrastructure and technology for clean energy. Under *SDG 12 – Responsible consumption and production*, Ålesund's sub-goals are to reduce waste generation through bans, reductions, recycling and reuse; and promote sustainable public procurement. Moreover, the community plan of Ålesund Municipal plan 2021-2031 includes goals and strategies related to the sustainable development of the municipality as an organization and as a public service provider. The strategies relating to the

municipality as an organization and actor includes improving environmental management and climate change adaptation; reducing GHG emissions in line with EU objectives; and improving resource efficiency across the organization. The strategies relating to Ålesund municipality as a service provider and facilitator includes developing green mobility; improving the transportation system; facilitating environmentally friendly modes of transportation; and stimulating local actors to reduce their climate footprint.

The goals and strategies related to the transition to a CE found in Ålesund municipality's strategic planning documents emphasizes certain strategies which can be tied to the approaches provided by Dagilienė et al. (2021):

- *Reflexive governance* - Implementing sustainable and circular practices across municipal operations
  - e.g. implementing GPP, reducing the environmental/climate footprint and increasing resource efficiency across the municipality as an organization
- *Regulation* - Developing and facilitating CE practices and solutions in infrastructure
  - e.g. reducing waste generation, improving waste management, increasing material recycling and recovery rates, improving the transportation system, facilitate green modes of transportation, increase RES in energy consumption, increase investment in clean energy infrastructure
- *Negotiation networks* - Stimulating and facilitating CE practices for local businesses and communities
  - e.g. encouraging cooperation between actors, collaboration with local businesses to develop CBMs, developing circular value chains
- *Sharing platforms* - Implementing and facilitating circular solutions for the local community
  - e.g. facilitating joint use and collective functions of built environment

Goals and strategies related to raising awareness and educating citizens about the CE is not specifically mentioned in Ålesund's strategic documents. Most of the strategies and goals are tied to the reflexive governance and regulation approaches. Ålesund's strategies for a transition to a CE corresponds with important aspects of Norwegian and EU strategies, particularly in terms of waste prevention and management and implementing GPP. The Norwegian strategy for a circular economy stresses local governments role as community developers, planning authorities, building owners, service providers, and organizations with purchasing power which can facilitate circular choices in markets. The EU's CE framework also mentions the importance of implementing GPP to encourage markets for secondary materials and products. Increasing reuse and material recycling and recovery rates are also emphasized in EU and Norwegian CE strategies, which is also important goals in Ålesund's strategic documents.

### 5.1.2 The Role of Ålesund Municipality in a CE Transition

Ålesund municipality highlights its role in the transition to a CE primarily through its waste management responsibility, and as a public institution purchasing goods and services. Improving waste management and implementing sustainability and circularity requirements in public procurement has therefore been prioritized in the municipality's efforts to develop a CE. Management and recycling of household and industrial waste is mentioned in the Ålesund Green Strategy as being an element in need of improvement in order to reach national and EU targets and to contribute to the transition to a circular

economy. When asked about Ålesund municipality's role in a transition to the CE, one interviewee stated the following:

Ålesund municipality will contribute to the circular economy being the new normal. We will reduce the amount of waste significantly through waste prevention, material recycling and reuse, so that waste becomes a resource that is used in new ways. We are responsible for collecting household waste in our region, as well as the waste generated by the municipality as an organization. We are a social actor in a municipality with lots of local businesses, so we also have a desire to facilitate circular business models that allow us to recycle and reuse even more in our region.  
(Ålesund Municipal Employee, 2022)

Implementing circularity and sustainability requirements in the municipality's procurements were also recognized as a focus and key strategy to contribute to the development of a CE, facilitate circular solutions, and stimulate markets for circular materials and products. During one of the interviews, the respondent provided the researcher with Ålesund municipality's procurement strategy, which has been reviewed and will be covered in the next section. One interviewee gave the following account regarding the municipality's role as a purchaser:

As a purchaser, we have many roles: one is that we can demand circular products and solutions, and that these are durable, easily recycled and repaired, and so on. Another part of it is to make demands that foster a circular market. We have, for example, set requirements for recycled plastic in drain pipes.  
(Ålesund Municipal Employee, 2022)

The municipality also recognizes its role in encouraging and involving local businesses and citizens in the transition to a CE. Raising awareness and changing consumer attitudes and behavior is recognized as an important aspect in the transition to a CE, as well as the cooperation between levels and actors in implementing CE practices. Yet, the municipality has not focused its effort in this regard to the same degree, because the municipality's role in this aspect has not been as clear:

Our role as a purchasing entity is quite simple and straightforward. (...) [but] we should also facilitate the populations circularity, support volunteers, and encourage development of circular business models. This is happening in Ålesund too, and the municipality is trying to initiate projects related to this, but we may have not focused as much on this. (...) what the municipality can do that really matters here, I am not quite sure.  
(Ålesund Municipal Employee, 2022).

With that said, an important contribution by the municipality to involve local businesses and citizens and encouraging their cooperation in the transition to a CE is the establishment of the United Future Lab in Ålesund. The lab has functioned as a cooperation and negotiation network for local actors and stakeholders from the public and private sector, research institutions, NGOs, and citizens who want to accelerate sustainable development. The municipality and relevant partners has initiated CE projects and sharing initiatives through the lab, such as the 'smart circular city' project, which will be covered in the next section.

### 5.1.3 CE Projects and Initiatives

Most of the CE projects and initiatives in Ålesund to date have been focusing on implementing CE practices in municipal operations, and what the municipality as an actor can do to contribute to the transition to a CE. How projects and initiatives are managed and coordinated in Ålesund municipality is project-specific, as noted by one of the interviewees. For example, the climate-friendly and circular procurement projects has been led and managed by the procurement department of Ålesund municipality, while

collaborative projects where local businesses and stakeholders are involved are generally managed and coordinated through partners and municipal staff at the United Future lab.

A collaborative CE project initiated by Ålesund municipality through the United Future Lab was the 'Smart Circular City' project, where local waste management companies and the local university NTNU Ålesund were project partners. The objective of the project was to map waste and material flows in the region to get a clearer picture and status of the current circularity of the region. The project also explored how the municipality could develop tools and solutions to contribute to the development of a CE in general and through its waste management responsibility in particular. The project was finalized in 2019, and the project reports included suggestions for specific measures to increase recycling rates and improving management of waste and material flows in Ålesund. The project report specifically suggested to establish a local mechanical waste sorting plant in order to reach EU and national recycling targets, resulting in a new project between the partners to look into the feasibility to establish such a facility in the region.

The current procurement strategy of Ålesund municipality is recognized as an important initiative and step in developing the CE according to the interviewees. Two projects initiated by the municipality, 'Climate-friendly procurements' and 'Circular procurements', have contributed in developing the current procurement strategy. The projects were managed and coordinated by the procurement department of Ålesund municipality. The project examined how climate-friendly and circular principles could be incorporated into the municipality's procurements and potentially lead to reducing the municipality's climate and environmental footprint. The procurement strategy of Ålesund municipality was provided by one of the interviewees. The strategy describes how it corresponds with the national regulation on public procurements by 'ensuring efficient use of resources in public procurement'. The procurement strategy includes a waste hierarchy figure explaining Ålesund's procurement strategies in relation to CE principles, and the following measures related to the CE are also listed in the strategy:

1. Circular solutions that reduces material consumption in municipal projects and operations must be actively implemented
2. Climate and environmental impact and resource use for the entire life cycle, from production, consumption and the waste phase, shall, as far as possible, lay the groundwork for which solutions are chosen

Another project initiated, managed and coordinated by Ålesund municipality is 'circular furniture management'. The objective of this project is to create a system for repair and reuse of furniture within Ålesund municipality. One interviewee stated the following regarding the project:

The municipality buys furniture for significant sums, and there are not any good routines established for repair or reuse between the units within the municipality (...) resulting in a "use and throw" practice. It is an ongoing project, but it has been a bit slow and not much has been done yet. The project has now been put on hold because we do not have the resources to run it right now.

(Ålesund municipal employee, 2022)

In addition to these projects and initiatives, Ålesund municipality has initiated smaller-scale initiatives and projects such as a car-sharing service for municipal employees. Table 4 shows an indication of where Ålesund's projects and initiatives are situated in the R-framework and which approach it falls under.

Project	Approach	R-Framework Scale
Smart Circular City	Regulation	R8 – Recycle R9 - Recover
Circular and climate-friendly procurements	Reflexive governance	R0 - Refuse R1 - Rethink R2 - Reduce R3 - Reuse R4 - Repair R5 - Refurbish R6 - Remanufacture R7 - Repurpose R8 - Recycle R9 - Recover
Circular furniture management	Reflexive governance	R3 - Reuse R4 - Repair R5 - Refurbish
Car sharing service for municipal employees	Reflexive governance/ Sharing platforms	R1 - Rethink

**Table 4: CE projects and initiatives in Ålesund**

The smart circular city project, and the related project looking at the feasibility for a mechanical waste sorting facility in Ålesund, is situated at the bottom of the activities related to the hierarchal R-framework (R8 and R9). These projects focuses on waste management, sorting and recycling, to process materials to be used again or incineration of materials with energy recovery. Although improved waste sorting and recycling practices may be important in terms of increasing reuse of materials and resources, it may not encourage the prevention of waste and the changing of production and consumption patterns. Additionally, as stated by McDonough and Braungart (2002), preventing waste generation should be prioritized because most recycling is in fact downcycling. With that said, the smart circular city project included the mapping of waste and material flows and a roadmap for developing the CE, and may therefore be a good starting point for future planning and implementation of CE practices in Ålesund. These projects falls under the regulation approach, as it is aimed at the municipality's waste management responsibility.

The circular and climate-friendly procurement projects can cover the entirety of the strategies in the R-framework, from refuse (R0) to recover (R9). Ålesund municipality can for example demand radically different products or solutions (R0), product-as-a-service solutions or sharing services (R1), or second-hand products (R3-R5) in their procurements. By incorporating requirements corresponding to the prioritized strategies in the R-framework, Ålesund municipality can contribute to increased resource efficiency and extending the lifecycle of products and materials, reducing environmental and climate impact, and preventing the generation of waste. The circular furniture management project covers the R3 to R5 strategies in the R-framework. The successful implementation of this project can expand the lifecycle of furniture used across municipal departments and reduce the generation of waste. These projects can be placed within the reflexive governance approach, as it is initiatives aimed at municipal operations.

The car sharing service for municipal employees in Ålesund is an initiative corresponding with the rethink (R1) strategy in the R-framework. This strategy involves smarter product use and making product use more intensive, e.g. sharing a product. The car sharing initiative will increase the use of each car and may reduce the number of cars needed by municipal operations and employees. The cars used for this initiative are

electric, which also plays a role in reducing emissions. This project can be placed within the reflexive governance approach, as it is a project aimed at municipal employees and operations, but it can also be placed under the sharing platform approach. Upscaling this or similar services to citizens in Ålesund can further increase the efficient use of cars in the municipality and reduce emissions.

#### 5.1.4 Monitoring Progress and Managing the Way Forward

As mentioned in the previous section, a report on waste and materials flows of the Ålesund region, including an overview of various waste streams, was made in order to get a clearer picture of the current status. The United Future Lab also employs UN's key performance indicator (KPI) analyses as a basis for their projects and initiatives. However, when asked whether the municipality utilizes any mechanism to monitor and measure circularity in the municipality in general, or related to specific measures in particular, one of the respondents stated the following:

We measure the waste sorting degree at the organizational level and for households in the municipality, but beyond that there is not any monitoring or measuring of circularity (Ålesund municipal employee, 2022)

Moreover, when asked whether the CE initiatives implemented in the municipality have been successful and led to increased circularity in the region, another interviewee stated the following:

The initiatives have not been successful to the extent that it has led to so much change yet, I do not think there are any measurable changes. I think the initiatives has led to increased awareness and improved procurement requirements (Ålesund municipal employee, 2022)

The municipality's role as a purchaser, and the requirements in Ålesund's procurement strategy related to the CE, is seen as a key opportunity for the municipality to facilitate and contribute to the transition to a CE. However, one interviewee noted that even though the requirements in the procurement strategy have improved, it does not yet mirror their procurements in practice because circular and sustainable solutions are often more expensive. Moreover, the interviewees mentioned several impediments encountered in the transition to a CE.

Impediments related to waste management, as stated by one interviewee, is that there is "not QR codes or information attached to waste" (Ålesund municipal employee, 2022). While some waste streams are collected separately and recycled, there are still challenges related to waste management that need to be solved in order for Ålesund municipality to meet EU and national waste targets. According to the interviewees, a lack of knowledge, information, standards, and requirements are some of the main challenges. Digitalization and raising public awareness related to waste sorting were mentioned as key in responding to these challenges. Moreover, cooperation and dialogue between waste management companies and industry is vital, so that material and product information is provided to waste management companies in terms of what can be reused and recycled, and to determine the qualities of waste-based raw materials that can be used for new production. One of the interviewees stated the following related to this issue:

You have to consider both the producer stage and the waste stage. It is so easy in the waste stage to point out that something cannot be recycled or reused due to the producers. A lot of the work needs to be done at the producer level. But, then it must be in the form of requirements, because it will be more expensive [for the producers] right? (Ålesund municipal employee, 2022)

There should be greater expectations and more requirements for all actors, public and private, to increase circularity, according to one interviewee. The focus of Ålesund municipality moving forward will be to facilitate a transition to a CE moving, particularly through circular procurements and circularity in construction and buildings. The latter corresponds to the Norwegian strategy, and is also stated in Ålesund's strategic planning documents, and included in plans and finances. The interviewees also illuminated that it is difficult to determine the municipality's role and how they can actively facilitate the transition to a CE, specifically in terms of encouraging citizens and local businesses. Lastly, one interviewee gave the following statement:

We spend more money and energy at the bottom of the waste hierarchy, and must try to get more focus higher up.  
(Ålesund Municipal Employee, 2022)

## 5.2 Sofia Municipality

### 5.2.1 Incorporating CE in Local Governance and Strategic Documents

The transition to a CE is specifically mentioned in Sofia municipality's long-term and short-term strategic documents. Vision Sofia 2050 includes a transition to a CE as one of its main targets, envisioning that production and consumption practices in Sofia will be in accordance with the principles of the circular economy by 2050. The transition to a CE is also listed as a specific objective in Program for Sofia 2021-2027. The definition of a CE is also found in the Program for Sofia:

The circular economy is a model of production and consumption, aimed at reducing the generation of waste, encouraging its reuse as a resource (...), and extending the life cycle of products. In practice, this means sharing, borrowing, re-use as long as possible, and repair and recycling of existing materials and products. When a product reaches the end of its life, the materials of which it is compiled, must continue to be used. The circular economy reduces the pressure on natural resources and is a prerequisite for achieving the goal of climate neutrality by 2050 and for slowing down or even reversing the process of biodiversity loss.

(Program for Sofia 2021-2027) [Translated from Bulgarian]

The definition emphasizes the closing cycles perspective, but does not directly refer to the systems perspective or the aim of achieving sustainable development or the SDGs. It does, however, mention that the CE is necessary to reduce pressure on natural resources and biodiversity loss, as well as being a prerequisite of achieving climate neutrality. It also describes the CE as a model of production and consumption, indicating that adoption of CE practices is required on multiple levels.

One of the goals in Program for Sofia is to become a "sustainable, green and adaptive" municipality, and the transition to a circular economy is listed as a specific objective in order to achieve this goal. Three measures are presented under the objective to transition to a circular economy in Sofia:

1. Reduce waste generation and encourage reuse of goods
2. Improving separate collection of waste
3. Improving the recovery of separately collected waste

Ideas for specific actions and projects for each of these three measures are included in the strategic document as well. Waste prevention and management are identified as the area with the greatest need of intervention for a transition to the circular economy in



Program for Sofia. The justification for this, as stated in the strategic document, is that “waste management is an important element of the transition to a circular economy” and that “improvements in the waste recycling process can bring benefits to the environment, climate, human health, and the economy”. Moreover, the transition to a CE is depicted in Program for Sofia as closely related with the transition to a low-carbon economy, and that resource efficiency also includes energy efficiency and RES. The ideas for specific actions and projects of the three measures presented above can be categorized into the five approaches identified by Dagilienė et al. (2021):

- *Regulation* - Developing and facilitating CE practices and solutions in waste management and infrastructure
  - e.g. implementing a new incentive fee calculation mechanism that stimulates reduction of generated waste, improving the separate collection of waste streams, implementing requirements and improving management of construction waste, implementing collection points for hazardous household waste, expansion of biowaste collection system
- *Reflexive governance* - Implementing circular practices across municipal operations
  - e.g. preparation and implementation of plans for recycling waste in municipal units and enterprises
- *Negotiation networks* - Stimulating and facilitating CE practices for local businesses and communities
  - e.g. improving cooperation with scientific organizations and businesses in the development of technologies and products leading to prevention of plastic waste
- *Sharing platforms* - Implementing and facilitating circular solutions for the local community
  - e.g. construction of repair and reuse centers, creating online platforms for sharing goods and services
- *Education* - Increasing social awareness and involving citizens in developing the CE
  - e.g. providing information to citizens aimed at sustainable consumption, promoting opportunities for reuse and recycling through coordinated and ongoing actions for raising public awareness and engagement, coordinated information campaigns between the municipality and local actors

The measures and project ideas related to the transition to a CE presented in Program for Sofia focus on waste management. Most of the suggested actions and projects are aimed at the separate collection and improved recycling rates of household waste, and certain waste streams such as construction waste. A majority of the suggested actions falls under the regulation and education approaches.

The long-term development plan for Sofia municipality, Vision Sofia 2050, presents 13 goals in order to successfully achieve a transition to a circular economy:

1. Waste is sorted and recycled
2. The polluter pays
3. Ecosystem services participate in management and governance of the city
4. Forest resources are used sustainably
5. Businesses are mostly digitized
6. Waste generation is minimized

7. Local production is a priority
8. A shared understanding of the circular economy
9. The sharing economy is a significant part of the urban economy
10. Water resources are used sustainably
11. Industry is resource- and energy efficient
12. Buildings are energy efficient
13. Energy consumption is produced mainly from RES

Specific strategies are presented in order to reach these goals. The strategies and the corresponding goals are listed in table 4.

Strategy	Vision Sofia 2050 Main Goal #
Administrative reliefs/incentives and campaigns to promote businesses in the sharing economy	9
Development of a local, urban action plan for the transition to a circular economy	8
Development of methodology and regulatory requirements for implementing CE principles in the construction of new buildings, energy facilities and systems, in order to minimize energy consumption and waste generation and encourage reuse of resources	1, 2, 6, 8, 12
Expansion and monitoring of afforestation objectives	3, 4
Development of methodology with indicators for increasing the energy efficiency of enterprises	11
Transparency of information and governance of the city's energy system, including the development of a digital reporting system	11, 12, 13
Trainings for increasing the expert capacity in the municipal departments for energy efficiency and RES	11, 12, 13
Trainings, exchange of experience, and information campaigns for the circular economy	8
Hackathons and competitions for startups aimed at innovations related to recycling, the sharing economy, reuse of materials and renewable resources, and commercialization of these	5, 6, 7, 8, 9, 11
Consultation program and financial instruments to support the adoption of CE principles, organic local agricultural production, waste minimization, and resource efficiency	7
Relief of regulatory provisions for introducing RES in residential and industrial buildings	12, 13
Promotion of farm markets and investments for local eco-friendly products	7
Educational programs related to the circular economy	8
Tax reductions and infrastructure incentives for companies implementing CE practices	7, 8, 10, 11

**Table 5: Vision Sofia 2050: Goals and Strategies for a CE**

Similar to the strategies in Program of Sofia, the long-term development plan Vision Sofia 2050 covers all of the approaches identified by Dagilienė et al. (2021). Vision Sofia

presents goals and strategies encompassing a more holistic perspective on what is envisioned to transition to a CE, in contrast to Program of Sofia, in which the measures are limited to waste prevention and management.

Sofia municipality's long-term and short-term goals and strategies corresponds to national and EU policies for developing a CE in several ways. Following national and European waste management policies, Sofia municipality's goals and strategies related to waste management use the waste hierarchy as a basis, and the prevention of waste is therefore seen as a priority. Sofia municipality aims to focus on preventing waste generation by, for example, promoting activities for reuse, repair, and sharing. Improving the sorting of waste, increasing recycling rates, and reducing landfill rates are also included in Sofia's goals and strategies and corresponds with Bulgarian and EU policies and waste targets. Moreover, Sofia municipality addresses its overreliance on fossil fuels and inefficient energy use in their strategic planning documents, and includes several measures to increase energy efficiency and the use of RES in their region. Similar to the Bulgarian national strategies, Sofia municipality also includes strategies to strengthen the polluter pays principle, promote eco-innovations, support CBMs, and encourage resource- and energy efficiency at all stages of production and consumption.

### 5.2.2 The Role of Sofia Municipality in a CE Transition

Sofia municipality focus its role in the transition to a CE as a public service provider, concentrating primarily on improving waste management, developing green mobility solutions, and increasing the share of RES in total energy consumption. The municipality also recognizes its position in education the public, and plays a key role in facilitating and encouraging participation of local businesses and citizens in the development of a CE. When asked about the municipality's role in the transition to a CE, one interviewee stated the following:

The municipality develops and implements strategies related to the development of the circular economy. The participation and involvement of businesses, academia and civic society is important for accelerating progress and in selecting priority areas for projects and initiatives.

(Sofia Municipal Employee, 2022)

Waste prevention and improved waste management has been one of the priority areas for Sofia municipality. The municipality has several ongoing initiatives and projects to increase separate collection of waste and recycling rates, in addition to exploring solutions for using waste as a resource. One interviewee gave some examples of how the municipality wants to utilize the waste in their region

We want to find solutions where we can use waste as raw materials for new production. For example energy, heating, and fuel for public transportation. (...) but also other innovative solutions such as using end-of-life tires for producing ground coverings for playgrounds.

(Sofia Municipal Employee, 2022)

Developing green mobility solutions and increasing the share of RES in energy consumption is also prioritized areas in need of improvement to contribute to the transition to a CE. There are various ongoing projects and initiatives related to these areas in Sofia municipality, which will be presented in the next section.

The municipality also recognizes its role in encouraging and involving local businesses and citizens in the transition to a CE. Raising awareness and changing consumer attitudes and behavior is recognized as an important aspect in the transition to a CE, as well as the cooperation between levels and actors in implementing CE practices. The

interviewees noted that participation of citizens and businesses in Sofia is crucial for progress in the transition to the CE. Sofia municipality's strategic planning documents includes several strategies aimed at educating the public and involving citizens in the transition to a CE. The municipality has launched information campaigns, encouraged public consultation in municipal projects, and initiated hackathons and competitions to educate the public and involve citizens. The strategic planning documents also includes suggested projects such as establishing repair and reuse centers and developing digital sharing solutions. With that said, one interviewee stated that the municipality needs to expand their efforts to reach all of its citizens:

We want to be able to raise awareness and educate citizens about sustainability and practices related to the circular economy. A lot is being done in this regard, but we need to continue and accelerate this work to reach more people and businesses (...) and get them involved.

(Sofia Municipal Employee, 2022)

Lastly, the establishment of Sofia Development Association and similar negotiation networks can be important arenas for involving businesses, academia, NGOs, and citizens in the transition to a CE in Sofia. Some projects have already been initiated with Sofia Development Association as a project partner, one of which will be presented in the next section.

### 5.2.3 CE Projects and Initiatives

The CE projects and initiatives in Sofia municipality to date has been focused on improving waste management and recycling rates of certain waste streams, implementing and developing green mobility practices, and increasing the share of RES in energy consumption. Coordination and management of CE projects and initiatives in Sofia municipality is project-specific, as various municipal departments are involved based on the development and project areas. These includes the European Projects and Programs Directorate, the Environment Directorate, the Waste Planning and Management Directorate, the municipal enterprise Sofiaplan, and the Sofia municipality Inspectorate. The latter is responsible for monitoring and implementing ecological policies. The NGO Sofia Development Association, established by a Sofia municipal council resolution, have been involved in CE projects and initiatives as well. The Association functions as a resource and research center encouraging cooperation across private and public sector actors, civic society, and academia.

There are several ongoing initiatives and projects related to improving waste management in Sofia municipality. One of the ongoing projects, *Improving waste management on the territory of Sofia Municipality*, is funded by EEA and Norway Grants with International Development Norway (IDN) and Sofia municipality as project partners. The aim of this project is to increase the share of recycled waste in Sofia municipality by implementing a pilot project for municipal waste schemes, focusing on the separate collection, reuse, and recycling of food waste and end-of-life tires. There is already established a modern facility for electricity production and compost from food waste in Sofia municipality, however this is per now limited to food waste from restaurants, schools/kindergartens, and bazaars, and food waste from households is still disposed and mixed with other waste. There is also not established adequate systems for disposal of end-of-life tires yet; these are disposed through incineration, resulting in the release of toxic gases and harmful pollution. The first objective of this project has been to identify trends and consumption patterns related to waste generation in Sofia municipality, and then developing and implementing systems for separate waste collection and recycling,

including a door-to-door collection of food waste from households in 3 districts within the municipality and a system for collecting end of life tires. Another important objective of this project is to raise local awareness in local communities related to waste sorting and recycling through information campaigns.

Additional initiatives related to preventing waste and improving waste management in Sofia municipality, as noted by one of the interviewees, includes recycling competitions in schools, municipal information campaigns for separate collection and recycling practices, and the EU *FoodWave* project which aims at increasing awareness and knowledge of sustainable consumption and production of food among youth.

The *INNOAIR* project is a green mobility project managed and coordinated by Sofia municipality and co-financed by EU funds as part of the Urban Innovation Action initiative. Project partners include the Sofia Development Association, local universities, and Sofia urban mobility center. The aim of this project is to create 'green corridors' of low-traffic and clean air routes, as well as developing and implementing innovative models for green mobility in Sofia. The project plan includes the purchase of electric buses and developing a mobile application so that instead of driving predetermined routes, the bus routes will be calculated based on route efficiency and requests by citizens made through the mobile application. Another aspect of the *INNOAIR* project has been the further development and improvement of existing infrastructure for bicycling, such as bike lanes, in order to facilitate green mobility solutions for citizens in Sofia. One interviewee also mentioned shared mobility schemes, such as digital platforms for car sharing, as a key development in facilitating green mobility in Sofia.

Sofia municipality has also initiated projects related to increasing the share of RES in energy consumption. One such project initiated by Sofia municipality is aimed at replacing solid fuel heating and cooling devices in private low-income households with alternative sources such as gas, electricity, and pellets/wood biomass. Another project mentioned by one of the interviewees aims at replacing heating and cooling devices in public buildings with geothermal energy, in order to increase the share of energy consumed by RES, reduce GHG emissions and pollution, and improve air quality in Sofia.

Project	Approach	R-Framework Scale
Waste management projects	Regulation/Education	R8 - Recycle R9 - Recover
INNOAIR project	Regulation/Sharing platforms	R1 - Rethink R2 - Reduce
RES projects	Regulation/Reflexive governance	R0 - Refuse R1 - Rethink R2 - Reduce

**Table 6: CE projects and initiatives in Sofia**

The waste management projects in Sofia municipality is placed low in terms of the activities in the R-framework (R8 and R9). The waste management projects in Sofia concentrates on improving waste sorting and increase recycling rates, to process materials to be used again or incineration of materials with energy recovery. Nonetheless, Sofia's waste management project may be useful in increasing rates of reuse and material recovery, to use waste as a resource or raw material in new production. The work done to map consumption patterns and raising social awareness regarding waste prevention, sorting, and recycling may also change consumer behavior and attitudes. As the waste management projects are aimed at the municipality's waste

management responsibility, but also on educating the public regarding these practices, these projects can be placed under the regulation and education approaches.

The green mobility project INNOAIR can be situated higher in the R-framework (R1 and R2). The solutions planned for the electric bus routes in Sofia can increase efficiency in public transport, and the sharing solutions related to this project makes product use more intensive. Implementation of these solutions can facilitate green mobility solutions for citizens and reduce environmental and climate impact in Sofia municipality. This project can thus be placed under the regulation and sharing platform approaches.

The RES projects initiated by Sofia municipality can also be placed at the top of the hierarchal strategies in the R-framework (R0, R1 and R2). These strategies involves smarter product use and manufacture. Replacing solid fuel heating and cooling devices with alternative sources falls under these strategies by offering the same function with a different product, and consuming fewer natural resources and materials. The municipality has projects aimed at private households to facilitate the use of RES for citizens in their homes, in addition to public buildings; the projects can therefore be placed under the regulation and reflexive governance approaches.

#### 5.2.4 Monitoring Progress and Managing the Way Forward

To date, there are not any mechanisms in place to measure circularity in Sofia municipality. Under each goal in Vision Sofia 2050, information is provided regarding how the municipality intend to monitor progress, however, the majority of the base numbers and targets are still to be studied or to be determined. Waste sorting and recycling of household waste is measured, but there are not any mechanisms in place yet beyond that to measure and monitor circularity in Sofia municipality. When asked whether CE initiatives implemented in Sofia municipality has been successful and led to increased circularity in the region, one interviewee stated the following:

There has not been implemented enough initiatives (...) or initiatives of larger scale. The results thus far in regards to increasing circularity have not been sufficient.  
(Sofia Municipal Employee, 2022)

On a strategic level, Sofia municipality shows strong commitment to the transition to a CE. One interviewee mentioned the need of creating a clear strategy and detailed action plan related to the transition to a CE, which is also mentioned as the second strategy in Vision Sofia (see table 5). One interviewee stated that with the planned CE urban action plan, the municipality will look into measuring and monitoring of progress related to the transition to a CE.

The interviewees mentioned several impediments related to accelerating progress in developing the CE in Sofia. One interviewee stated that although there has been implemented various pilot projects related to the CE in the municipality, the activities are often ended at the end of the projects, and that long-term investments needs to be made. A majority of the initiatives focus on waste management and RES. One respondent stated the following:

The traditional focus has been set on decreasing energy consumption and driving down amissions, as a key to success in the transition to a CE. (...) Raw material use, water usage, and so on, must also be factored in to achieve true circularity.  
(Sofia Municipal Employee, 2022)

The focus moving forward in Sofia municipality, according to the interviewees, should be to develop solutions to use waste as a resource and raw materials in new production. The

municipality should also continue its work related to raising awareness about developing the CE among the population and businesses to encourage and promote circular practices. One interviewee also mentioned GPP and implementing sustainability requirements in public procurements to increase circularity and encourage eco-innovations as a future measure in Sofia municipality.

## 6 Discussion

The previous chapter presented the empirical findings of each individual case. This chapter compares these findings by conducting a cross-case analysis in order to answer the research questions of this thesis; first, *how is circular economy incorporated into Ålesund and Sofia municipalities strategic planning documents?*; second, *how are Ålesund and Sofia municipalities working to increase circularity in their regions?*; and lastly, *what are the differences and similarities in the two cases related to the aforementioned research questions?*. A general discussion on how local governments can facilitate the transition to a circular economy will be provided as part of answering these research questions. A discussion on the quality of the research is also included at the end of this chapter.

### 6.1 Cross-Case Comparison

The circular economy is incorporated in different ways in Ålesund and Sofia municipalities' strategic planning documents. Ålesund municipality does not specifically mention the transition to a CE in their long-term development plan, but has dedicated a chapter to the CE in their shorter-term *Green Strategy*. The transition to a CE is specifically mentioned in both of Sofia municipality's strategic planning documents, although in the shorter-term document *Program for Sofia*, the strategies are limited to improving waste management. The closing cycle perspective is emphasized in both municipalities' understanding of the CE. Sofia municipality describes the CE as a model of consumption and production, and similarly, Ålesund municipality highlights the role of consumers, businesses and local governments in implementing and adopting CE practices. Digitization and the sharing economy is mentioned in both Ålesund and Sofia municipalities' strategic documents as crucial for changing consumption patterns and as being key elements in the transition to a CE. For Sofia municipality, a transition to a CE is seen as closely related to the transition to a low-carbon economy, with resource efficiency also including energy efficiency and RES. Similarly, Ålesund municipality asserts that the transition to a CE "is a necessary part of the transition to a low-emission society". For both municipalities, the transition to a CE is not described as a goal in itself, but rather a means to achieve sustainability and sustainable development.

Vision Sofia 2050 presents a comprehensive and holistic set of goals and strategies related to the transition to a CE, including aspects such as improving and increasing resource and energy efficiency, RES in energy consumption, sustainable use of water and forest resources, ecosystem services, digitization, encouraging local production, and promoting the sharing economy. Ålesund municipality, on the other hand, presents strategies and goals related to the CE mainly in terms of improving waste management and implementing circularity requirements in GPP. There are goals and strategies in Ålesund's strategic documents that covers energy efficiency, increasing the share of RES, implementing environmental management in municipal operations, and developing green mobility solutions, however, these goals and strategies are not directly mentioned as measures or strategies related to the transition to a CE. As described, Ålesund highlights its role as a purchaser to promote the CE, an aspect that is not mentioned in Sofia municipality's goals and strategies. Lastly, it is noted in both municipalities' strategic



documents that waste sorting and recycling is not sufficient in the transition to a CE, however, a majority of the strategies in both municipalities focus on those aspects.

On a strategic level, Sofia municipality presents a more profound and holistic vision of the CE compared to the one presented in Ålesund municipality's strategic documents. Both municipalities have included elements of national and EU policies in their strategies, and is therefore playing their part by facilitating these at a local level. For example, both municipalities works to reach national and EU targets on waste sorting and recycling and reducing GHG emissions in line with EU objectives. Ålesund's focus on implementing GPP can also be explained by the Norwegian national focus on this aspect, as implementing sustainability and circularity requirements in public procurement has been a national focus in Norway encouraged and promoted by EU policies. Similarly, a national focus in Bulgaria has been to reduce its overreliance on fossil fuels and increase the share of RES in energy consumption, explaining the emphasis on replacing solid fuel heating and cooling devices in households and public buildings with new alternative and sustainable sources.

Interviewees from Sofia and Ålesund acknowledged that municipalities can play an important role in the transition to a CE as an actor and facilitator. However, how the municipalities can contribute to such a transition as an actor is more clear and straightforward, while exactly how municipalities can facilitate circular practices among citizens, businesses and industry is more unclear according to the respondents. For example, when asked about the municipality's role in the transition to a CE, respondents from both municipalities emphasized the responsibility in managing municipal waste. Both Ålesund and Sofia municipalities has incorporated strategies for improving waste management, and initiated CE projects focusing on waste sorting and recycling. This role is easy and straightforward, as municipalities has traditionally been the responsible actor for managing waste from households in its territory. Both municipalities has undertaken a regulation approach in order improve waste management in their territories. Sofia municipality also focus its role in regards to waste management to increase awareness of the population and educate citizens about CE practices and waste sorting behavior. Ålesund municipality has not concentrated its efforts on educating the public to the same degree, but has concentrated its role in facilitating practices for citizens to make it easier for the population to choose circular and sustainable solutions. It is also natural for Sofia municipality to focus efforts on improving and increasing waste sorting and recycling, as they have been lagging behind in reaching certain waste targets compared to EU averages. One interviewee also highlighted that CE projects focusing on waste management in Sofia aims to find solutions for utilizing waste as a resource or as raw material in new production, e.g. end-of-life tires in surface coverings in playgrounds.

Ålesund municipality highlights its role in incorporating CE practices in its procurements. This role is also easier to grasp, as the municipality is an actor that purchases goods and services for considerable amounts each year. By implementing requirements for circularity in procurements, the municipality can contribute to fostering markets for secondary (circular) materials and encourage eco-innovations. The climate-friendly and circular procurement project, as well as the circular furniture project in Ålesund, falls under the regulation and reflexive governance approaches. Ålesund's strategies and projects thus concentrates on what the municipality can do as an actor to develop the CE, and recognizes that these efforts can promote and facilitate circular practices and solutions. Sofia municipality has also initiated projects that focuses on the municipality's role as an actor and public service provider. The green mobility projects in Sofia can

facilitate green modes of transportation for citizens, and can also contribute to a change in attitudes and behavior. With that said, Sofia municipality has also focused on educating and involving citizens and businesses through information campaigns, public consultations, competitions, and hackathons. Sofia's strategic documents also includes measures for raising social awareness related to the CE, and respondents in interviews from Sofia highlighted the municipality's role in educating the public related to CE practices.

Respondents from both municipalities mentioned the desire of the municipalities to involve and cooperate with industry, businesses, NGOs and citizens to develop the CE. One interviewee from Ålesund stressed that the municipality's role in facilitating circular practices and solutions to citizens and local businesses is not as clear, and that it is difficult to see exactly what the municipality can do in this regard. The same issue was mentioned in regards to encouraging and involving industry and businesses by one respondent from Sofia municipality. Ålesund and Sofia municipalities also emphasizes the sharing economy and digitization as key elements in the transition to a CE, but again, the respondents reiterated that the municipalities' role in this is unclear. The municipalities can provide space or promote sharing initiatives such as public libraries, repair workshops, car and bike sharing services, co-working spaces, and re-use initiatives, and such initiatives has been planned and/or implemented in both municipalities. However, as noted by Palm & Bocken (2021) and Palm et al. (2019), it is important that local authorities reflect on their position and not become too dominant in implementing such solutions as it can outcompete initiatives from local businesses and NGOs. Municipalities can encourage cooperation between actors to accelerate the development of eco-innovations such as in digitization and sharing solutions. The establishment of the United Future Lab in Ålesund municipality, and Sofia Development Association in Sofia municipality, may serve as important platforms for cooperation and coordination of future development of the CE in Sofia and Ålesund.

When asked about monitoring and measuring of CE initiatives and projects, interviewees from both municipalities noted that there has not been any measurable change as they know of. Waste sorting and recycling rates are measured, but circularity beyond that is not measured or monitored in either city. It is therefore difficult to say whether the current initiatives in Ålesund and Sofia has been successful or led to any measurable change in terms of increasing circularity. As one interviewee from Ålesund municipality noted, the initiatives have at the very least contributed to increased awareness of the CE. So far, the focus in Sofia municipality has been to incorporate the CE on a strategic level and implement CE initiatives and projects in improving waste management, developing green mobility solutions, and increasing energy efficiency and the share of RES in energy consumption. The focus in Ålesund municipality has been on improving waste management and implementing circularity requirements in public procurements, concentrating what the municipality can do as an actor to increase circularity.

As demonstrated in table 7, both municipalities has initiated CE projects that covers most of the approaches identified by Dagilienė et al. (2021) and the strategies in the R-framework. As discussed, most of Ålesund municipality's projects falls under the regulation and reflexive governance approaches as the focus has been waste management, GPP, and increasing circularity across municipal operations. Similarly, CE projects in Sofia municipality focuses on the municipality's role as a service provider, and thus falls under the regulation approach. Sofia and Ålesund municipalities has initiated projects related to improving waste management, both of which can be situated at the

bottom of the R-framework scale (R8 and R9). Ålesund’s circular procurement project can cover all of the strategies in the R-framework, depending on the requirements and nature of the solutions, goods and services procured. Moreover, Ålesund’s circular furniture management project and car-sharing initiative among municipal employees, are situated higher up in the R-framework. However, it is important to note that these projects are limited to municipal operation, and while it may produce increased circularity in the municipality as an organization, these projects may have a greater impact if such solutions are upscaled. Sofia municipality’s green mobility and RES projects can also be placed higher in the R-framework strategies, as they involve rethinking incumbent solutions and implementation of novel sustainable solutions.

	<b>Project</b>	<b>Approach</b>	<b>R-Framework Scale</b>
<b>Ålesund</b>	Waste management projects	Regulation	R8 - Recycle R9 - Recover
	Circular procurements	Reflexive governance	R0 - Refuse R1 - Rethink R2 - Reduce R3 - Reuse R4 - Repair R5 - Refurbish R6 - Remanufacture R7 - Repurpose R8 - Recycle R9 - Recover
	Circular furniture management	Reflexive governance	R3 - Reuse R4 - Repair R5 - Refurbish
	Car-sharing initiative	Reflexive governance/ Sharing platforms	R1 - Rethink
<b>Sofia</b>	Waste management projects	Regulation/Education	R8 - Recycle R9 - Recover
	Green mobility projects	Regulation/Sharing platforms	R1 - Rethink R2 - Reduce
	RES projects	Regulation/Reflexive governance	R0 - Refuse R1 - Rethink R2 - Reduce

**Table 7: Cross-case comparison of CE initiatives and projects**

It is important to note that it may be easier to indicate where some projects and initiatives are located in the R-framework than others. The projects are also placed under the different R-strategies based on the researcher’s indication. Whether the R-framework is an appropriate scale to measure projects, or suitable to use as an analysis tool, can be debated. However, the R-framework scale has been used in this thesis to give a general overview and suggestion of the strategies and approaches in CE projects and initiatives.

### 6.2 Quality of Research Design

A comparative multiple case study approach and qualitative research methods has been used in this thesis. Although justifications has been provided related to the methodological choices made in chapter 4, it also important to reflect on the flaws and overall quality of the research design, including its generalization, validity and reliability. The case study approach has been criticized for “lacking scientific rigor and providing little basis for generalization” (Crowe et al., 2011, p. 7). However, multiple case studies

has the advantage of exploring an issue in-depth by selecting multiple units for analysis and allowing systematic comparisons, and can therefore produce knowledge that is easier to generalize about causal questions (Bartlett & Vavrus, 2017; Goodrick, 2014). The multiple case study approach was chosen to provide a broader understanding of how local governments can facilitate a transition to a CE. Two units of analysis chosen were based on convenience, which is not necessarily optimal for the greatest possibility of generalization (Tjora, 2017), but the researchers' engagement and knowledge in the two cases has been useful to provide a comprehensive and in-depth description and analysis of each individual component case. It is also important to note that there may be national characteristics and cultural contexts not accounted for in this thesis, which can also reduce the basis for generalization and transferability.

The researcher's position as a Norwegian may have influenced the research and implicated its reliability, as one of the units of analysis is a Norwegian municipality. The researchers' knowledge of the Norwegian national and local cultural and political context, compared to the Bulgarian context, may have resulted in a discrepancy of the researchers' insight and understanding of the cases. Data collection and interpretation may also be influenced by the researchers' position; documents retrieved and interviews conducted with employees from Ålesund municipality were in Norwegian language, whereas documents and interviews with Sofia municipality were either in English or translated from Bulgarian to English. The researcher's interpretation of data may therefore be more accurate in the Norwegian case compared to the Bulgarian. To reduce the potential of misinterpretation, the researcher requested feedback from Bulgarian interviewees after interviews were transcribed. Nonetheless, the researcher has been aware of potential subjective biases, and the involvement, engagement and prior knowledge in both cases has been helpful throughout the research.

To provide a credible analysis of the cases in this thesis, the researcher sought to interview relevant municipal employees who were able to give reflective and holistic answers related to the research questions. The interviews gave the researcher useful insight and understanding of the municipalities' role, projects, initiatives, priorities, opportunities, and barriers in a transition to a CE. However, only a few interviews were conducted. Ideally, more interviews would have been conducted to provide a richer account of experiences and perspectives of the cases. Getting responses to interview requests were the biggest issue for the researcher. The lack of responses may indicate a low sense of ownership to the CE initiatives in the municipalities. In both cases, the interviewees noted that the management and coordination of initiatives were project-specific, indicating that there might be additional initiatives within the municipalities not mentioned in this thesis because the interviewees have not been involved or even aware of these. However, the findings from interviews corresponds to the major findings from strategic documents in both cases, which implies that adding more interviewees would probably not have given different results. Moreover, triangulation of data and the analysis process has been carefully described to enhance the transparency and trustworthiness of the research.

The interviews conducted in both cases as part of this research was with municipal employees, and when combining with the municipalities' strategic planning documents, the findings in this thesis provide an 'official attitude' of the research questions in this thesis. To further elaborate and dive deeper into how (un)successful the local governments have been in both cases to facilitate the transition to a CE, researchers can include local actors, stakeholders and citizens to investigate their attitudes and

experiences related to the issue. Insight in citizen and stakeholders experiences and attitudes on how local governments can facilitate the transition to a CE can also be useful for local governments when developing new or enhancing existing strategies and initiatives.

## 7 Conclusion

This thesis sought to expand the knowledge on how local governments can facilitate the transition to a circular economy by investigating the role of Ålesund and Sofia municipalities in strategic planning, projects, and initiatives related to the transition to a CE. This study confirms previous research in CE literature (see e.g. Dagilienė et al., 2021) that in general, local governments identify their role in the circular economy primarily through their traditional waste management responsibility, and strive to reach waste and recycling targets defined by legal frameworks. Although such initiatives are important and a natural place for local governments to start the process of transitioning to a CE, the focus should be shifted to higher up in the R-framework and waste hierarchy. Local governments' traditional role as a public service provider and purchasing entity is clear and straightforward, and may explain why municipalities have more success in implementing CE initiatives focusing on e.g. waste management and GPP. Findings from interviews suggest that the municipalities recognize its role in facilitating circular practices and solutions for citizens and businesses, however, what local governments can do in practice in this regard needs to be further explored in addition to investigating in what ways municipalities can successfully undertake this role. Mechanisms to measure and monitor progress should be utilized to gain insight into what is working in practice, what is making a measurable change in terms of increasing circularity, and what needs to be done differently. The findings in this thesis provides an 'official attitude' of the research questions in this thesis. To further elaborate and dive deeper into how local governments can the transition to a CE, future research can include local actors, stakeholders and citizens to investigate their attitudes and experiences related to the expected and potential role of local governments in facilitating the transition to a CE.

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# Appendix

## Interview Guide

### Introduction

- The purpose of the interview (Master's thesis)
  - The purpose of this interview is to collect data on how X municipality is working to increase circularity, and this data will be used in my master thesis. The Master's thesis is for the study program Globalization and Sustainable Development at the Norwegian University of Science and Technology. The research objective is to investigate how municipalities work to increase circularity within their region, with the research question "How can local governments facilitate the transition to a circular economy?"
- How the data will be handled/anonymity (NTNU server)
  - Participants will not be named in the master's thesis. Personal data will be processed confidentially and in accordance with data protection legislation. The project supervisor and I will have access to the data. This interview will be recorded electronically and deleted after it is transcribed.
- Content and estimated duration of interview (approx. 45 min)
  - The interview will take approximately 45 minutes. I will start with some background questions and then move on to management and coordination of CE projects in the municipality, then sum up and conclude the interview.

### Questions

- What is your role/background?
  - How are you involved with CE development/projects in X municipality?
- How do you define circular economy?
  - How does the municipality define a circular economy?
  - What are the fundamental principles of CE according to the municipality?
- What is the municipality's role in a transition to a CE?
- What are the current plans and initiatives for developing CE in X municipality?
  - Is there a specific focus on the current projects?
  - projects targeting consumers? businesses? reuse/repair services? sharing services? product-as-service? recycling/waste management?
  - Can you tell me more about project X?
- How does the municipality manage and coordinate its CE projects?
- Are there any public-private partnerships to develop CE?
- Does the municipality encourage cooperation of producers, consumers and other societal actors?
- What mechanisms exist to monitor progress?
  - How is success measured in CE initiatives/projects?
- In regards to the existing plans to transition to CE, would you say the current initiatives have been successful?
- Are there any obstacles that you have encountered that make it difficult to increase circularity?
- Are there any special measures you think the municipality or other actors should take to increase the degree of circularity?
- moving forward, what will be the municipality's main focus to increase circularity?

### Concluding the interview

- Summarizing the conversation
- Anything else the respondent would like to add?

