

# **Towards a Circular Economy in Sweden**

Barriers for new business models and the need for policy intervention

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“If not us, then who? If not now, then when? If not here, then where?”  
- Naderev Saño

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## **Abstract**

In order to halt current resource depletion and minimise environmental destruction, we need to reduce our dependency on virgin raw materials. There is a growing political consensus in the EU that we have to move away from our current linear economic system to one that is based on closing material loops, a circular economy. There is therefore a great need for new business models based on for example sharing, reusing and remanufacturing. A small portion of frontrunner companies are leading the way in Sweden and internationally, however the current political and societal trajectory impose numerous barriers for such businesses to scale up. New and revised policy intervention is therefore needed to pave the way for circular business models. In Sweden, a lack of policies which promote such development is apparent, and the interrelations between barriers for certain business models and the need for policy intervention is highly unexplored. This study identifies barriers and the need for policy intervention to overcome them, based on input from representatives from companies currently practicing business models based on circular economy thinking. It further maps relevant environmental policies in Sweden, in order to understand how the current political landscape addresses elements related to circular economy and make suggestions for how to further support circular business models in Sweden via policy intervention. Findings show that barriers are first and foremost institutional and market based related to price signals and consumer behaviour. But they are also political in terms of lack of ambition and long-term thinking, technological in terms of product design, and organisational in terms of lack of funding and lack of integration of the concept into core business. Policy intervention therefore needs to be multi-dimensional. A mix of measures based on regulations, economic instruments, information spreading and demand stimulations need to be placed within an overall governance framework based on enabling infrastructure, national targets and broad, long-term agreements.

**Keywords:** Circular economy, business models, public policy, governance, transition, Sweden

## Executive Summary

Since the industrial revolution during the 18<sup>th</sup> and 19<sup>th</sup> century, we have created an economic system which is based on an idea of infinite natural resources. This economic system is linear by nature as products are produced, used and then disposed. During the last century, awareness about the unsustainability of the current linear economic system has grown, and the concept of circular economy (CE) has been given increased attention in Europe the last few years. A CE is, by the most widely accepted characterisation developed by the Ellen McArthur Foundation, an economy that is “restorative by design, and which aims to keep products, components and materials at their highest utility and value, at all times” (“The circular model - an overview”, n.d.).

Planing (2015) argues that transitioning to a CE requires four essential building blocks (1) materials and product design (2) new business models (3) global reverse networks (4) enabling conditions. The focus in this thesis is on the second and fourth building blocks, focusing on the need for policy intervention to *create enabling conditions new business models to scale up*. Based on the definition of a CE given above, business models should, in descending order, be based on product life time expansion and collaborative consumption; extending the product’s lifecycle via refurbishment, maintenance, reuse and redistribution; upgrading or remanufacturing; and recycling with highest possible material and energy value capture (Planing, 2015).

Essential technologies are scaling up fast and consumer behaviour is changing in a more sustainable direction, wherefore the timing for transforming the economy to a CE is favourable. Several barriers however remain for a transformation of the current economic system to happen. Examples are insufficient skills and investment, the current level of resource pricing, lack of incentives to internalise externalities, limited consumer and business acceptance, weakness in policy coherence at different levels and widespread planned obsolescence in products. To correct for this, and enable a transformation of the economy into a CE, there is a great need for policy intervention at all levels (Vanner et al., 2014).

This study focuses on Sweden, a country which traditionally has strong environmental policies. Access to large amounts of domestic natural resources such as wood, iron and other metals has however meant that security of supply of such resources has historically not been a driver for resource efficiency in Sweden. Today, the resource use (domestic material consumption) per capita in Sweden is above the EU average (EEA, 2011), waste generated per capita is growing (Naturvårdsverket, 2012) and as much waste is sent to incineration as is being recycled (Regeringen, 2014). There is therefore a need for a new strategy on how to better make use of resources in Sweden, which prioritise the development of new business models and new ways of consumption through stimulating market demand for secondary materials and products. New, niche businesses with business models based on circular economy thinking are starting to develop in Sweden, but they struggle to penetrate the market and compete with existing businesses. Products made from virgin materials are cheaper, resulting in lack of demand from consumers to buy for example reused products or leave old ones for reparation. The lack of policies to correct for this in Sweden is apparent, and the linkage and interrelations between barriers for new business models and the need for policy intervention is highly unexplored (Lindahl et al., 2015). Further, there is a lack of empirical investigations into the policy support that niche businesses would require in order to scale up.

By starting to address this knowledge gap, this study contributes to the newly initiated Resource-Efficient and Effective Solutions (REES) program, feeding in particular into Project 1: REES context – Characteristics, Conditions, Drivers and Obstacles, and Project 4: Policies for REES.

The thesis aimed to address the identified knowledge gap by exploring the need for policy intervention in promoting circular business models and start the journey towards a circular economy in Sweden. The thesis thereby aimed to answer the following research question: *What are policy measures that could support upscaling of circular business models in Sweden?*

To answer the overarching RQ, the two sub-questions “what barriers are Swedish companies currently facing in scaling up business models based on circular economy thinking?”; and “what policy measures could help to overcome those barriers?” were addressed.

The research process was comprised of two main parallel processes, namely desk research and collection of empirical data via interviews. The two initial processes were then followed by an analysis of findings, which allowed the author to suggest policy measures which could be included in a policy package for promoting circular business models in Sweden. A detailed literature search on the subjects of public policy, CE, business models and the need for policy intervention to guide the different parts of the thesis was followed by semi-structured interviews with representatives from businesses (SMEs and innovative units in large companies) with a partly or fully implemented business model based on CE thinking in place. Semi-structured interviews with selected professionals were further conducted and political seminars in Sweden were observed, to understand the current status of the policy landscape in Sweden, broaden the perspective and deepen the understanding. Relevant environmental policies in Sweden that are currently in effect or upcoming were further mapped via desktop research, to put the interview findings into context and allow for analysis.

All the interviewees recognised an increased interest from society for CE, but the findings demonstrate that the current regime is hindering circular business models to scale up and that the political system is not creating enabling conditions. Policy intervention was therefore requested by all interviewees. Findings show that barriers faced by companies with CE business models are first and foremost institutional and market based related to price signals, consumer knowledge and infrastructural lock-ins. But they are also political in terms of lack of ambition and long-term thinking, technological in terms of products not being designed for reuse, and organisational in terms of lack of funding (SMEs) and lack of integration of the CE concept into core business (large companies). In more detail, findings show that there is not a level playing field for second hand and newly produced products on the market, since the current tax system does not recognise a CE approach to business as something which should be promoted. Taxes on labour are too high and the price of virgin materials too low, and the value added tax (VAT) does not differentiate between new and second hand products. Further, consumers are not aware or informed about new ways of consuming, such as renting or leasing, and second hand products are not as attractive as new ones for most consumers. Public procurement further fails to incentivise circular solutions, as procurement tend to favour solutions with the lowest price, and because procurement has bias towards purchasing of products, not services or functions. The fact that products are not designed to be reused or disassembled in the first place is further a barrier for the reuse business to scale up. Finally, silos in political institutions, short-term thinking and focus on waste management have locked politics and infrastructure into linearity, which makes it risky for companies to invest in circular solutions.

While results are in line with previous studies, the findings from this limited empirical sample revealed several patterns that would be interesting to explore further in future studies. The most pressing issues to deal with politically seems to be to create the right market conditions by changes in price signals in the tax system and inform consumers, regulate product development to enable disassembly and reuse, and use public procurement for demand side interventions. These are common denominators from this study and previous research. Interviewees further pointed specifically to the need for political ambition and leadership in order to create long-

term rules of the game for the industry. Suggestions of concrete policy measures to overcome the identified barriers were plentiful, and the findings indicate that business' barriers and the need for policy intervention is related to type of firm and business model. The selection of companies consulted does however not allow for such an indication related to which sector the business is in, wherefore this require further research. Although it is difficult to determine whether the results are generalisable, due to the limited sample of interviewees, findings indicate that there are measures politicians can take to ensure we move towards a CE and promote business to be a part of that journey.

Lowering tax on labour was recognised as the most important measure by companies in the repair/reuse/remanufacturing business. A differentiated VAT for reused or repaired products were suggested by business to consumer firms, while business to business/government firms argued this will not affect their business significantly. A general agreement among several interviewees was further that virgin natural resources should be priced higher. To create market demand, a frequently suggested measure was also that the government should educate the public via information campaigns on CE. A suggestion for demand side intervention was further to introduce 'need-based' public procurement (PP) instead of focusing on procuring products. To regulate product design so that products are designed 'right in the first place' was further stressed, as well as the need for politicians to lead the way by setting up a long-term legal and political framework and re-think political institutions to allow for cross-collaborations. A moving away from 'waste management' to 'resource management' was requested to ensure the right type of targets are set up and enabling infrastructure is developed.

The findings thereby show that a single policy or political instrument cannot address all the barriers currently faced by business in scaling up circular business models, wherefore combining different policies into a package (or several packages evolving over time) seems to be a necessity. In line with previous studies it further became obvious that environmental policy alone cannot ensure a transition to a CE, but a cross-sectoral approach is needed involving both financial and innovation policy. The mapping of environmental policy in Sweden reveals that the government recognises the importance of a CE, but not many targeted measures have yet been implemented. For policy to support the upscaling of circular business models in Sweden, the suggestion is to carefully design a long-term policy package which includes a mix of policy instruments within an overall governance framework including enabling infrastructure and national targets for important elements of a CE, such as reusing. The mix of instruments would probably have to include economic and informative means to create consumer demand, together with changes in PP practices to ensure PP can be used to create demand for CE solutions. In addition, Sweden should keep on pushing for stringent chemical regulations in the EU and a revision of the Eco-design Directive to include design for disassembly and reuse.

Further research is needed in terms of the factors affecting what companies' needs are. A more sectoral approach would need to be taken to fully understand such factors and make tailor-made suggestions for policy intervention. To avoid future lock-ins it is also important to increase the understanding of the different components of a CE and how they relate to the policy measures needed. This relates to the need to continuously study and develop the concept of a CE itself. The findings in this study also indicate some clashes in implemented policies, wherefore a further understanding of what implications certain policies have on CE development and how such clashes can be avoided is necessary.

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## **Abbreviations**

B2B	Business to Business
B2C	Business to Consumer
B2G	Business to Government
CE	Circular Economy
EAP	Environment Action Programme
EEA	European Environment Agency
EPR	Extended Producer Responsibility
EREP	European Resource Efficiency Platform
EU	European Union
IIIEE	Institute for International Industrial Environmental Economics
MLP	Multi-Level Perspective
POLFREE	Policy Options for a Resource-Efficient Economy
PP	Public Procurement
PSS	Product Service Systems
REES	Resource Efficient and Effective Solutions
TT	Technological Transitions
VAT	Value Added Tax
WEEE	Waste of Electric and Electronic Equipment



# 1 Introduction

## 1.1 Problem definition and background

### *1. Resource scarcity, planetary boundaries and limits to growth*

As of 2015 about 7 billion people inhabit the planet Earth, but the global population is expected to grow to about 9 billion people by the year 2050 (UNFPA, 2015). Due to economic growth, 3.2 billion people are projected to be middle class consumers by the year 2020 and 4.9 billion by the year 2030. In 2009 the same number was 1.8 billion (OECD, 2011). As the global population is growing, the industrial activities are increasing and the urbanisation is speeding up, human activities are putting increased pressure on the natural environment and we are crossing the so called planetary boundaries (Steffen et al., 2015). Since the industrial revolution during the 18<sup>th</sup> and 19<sup>th</sup> century, we have created an economic system which is based on an idea of infinite natural resources. This economic system is linear in nature as products are produced, used and then disposed (Preston, 2012). Because of this, we experience a development of faster material flows and an ever increasing need for extraction of natural resources (Ellen MacArthur Foundation, 2015b). As a result, natural resources are becoming depleted, air and drinking water is getting polluted and various species are driven towards extinction (EEA, 2015; UNEP, 2012). In addition, the continuous burning of fossil fuels is proven to enhance the greenhouse effect and cause global warming at an unprecedented rate, leading to increase in extreme weather and rise of sea levels among other consequences (IPCC, 2013). The Club of Rome made a serious attempt to challenge the current economic system already in 1972 when the controversial and highly debated “Limits to Growth” was published. The book was recently updated and given out in a new edition, still carrying the same message: if we keep overshooting the carrying capacity of the natural systems of the earth, collapse will follow (Meadows et al., 2005). If appropriate measures are taken to reduce waste creation and inefficient use of resources, humanity can however still reverse some of the damage caused by our industrial activities (Meadows et al., 2005).

During the last century, awareness about the unsustainability of the linear economic system and the resource scarcity and waste production resulting in its tracks has grown. But the issue has mostly been addressed by traditional resource efficiency measures with focus on improvements within manufacturing processes, material recycling and energy recovery (Ellen MacArthur Foundation, 2013). It has however become increasingly obvious that traditional resource efficiency measures are insufficient to halt the rapid depletion of natural resources and to tackle the issue of increasing production of waste. The concept of circular economy (CE), based on the need to close material loops and preserve material and energy value, has therefore been given increased attention in Europe the last few years (Aldersgate Group, 2012; Ellen MacArthur Foundation, 2013; Preston, 2012; WEF, 2014 among others). What started as a theoretical construct is now turning into a concept which both the business and the political community is recognising as a vital building block of a sustainable future, representing an important shift in the global as well as the national context as we are moving away from ‘managing waste’ into ‘preserving resources’, something which will have to unite environmental and economic policy making (Hill, 2015).

### *2. The opportunities and co-benefits of a circular economy*

As natural resources become scarcer, the price of them also rises. The need to make better use of the natural resources already extracted is therefore not just an environmental issue, but also an economic and socio-political one (Stahel, 2010). According to the Ellen MacArthur

Foundation<sup>1</sup> (2015b, p. 14), the concept of a CE is based on three principles for the biological and technological cycles: “preserve and enhance natural capital, optimise yields from resources in use, and foster system effectiveness (minimise negative externalities)”. A CE is thereby an economy which is “restorative by design, and which aims to keep products, components and materials at their highest utility and value, at all times” (“The circular model - an overview,” 2013). In 2015, Ellen MacArthur Foundation together with the McKinsey Center for Business and Environment studied the impacts on the European economy of transitioning to a CE. The authors concluded that the European economy is extremely wasteful with resources, but that new business models and disruptive technologies have the capability to improve the productivity of resources while reducing annual costs. Benefits of up to €1.8 trillion to the European economy annually by 2030 could follow, while at the same time generating higher employment rates and an increase in welfare than the current path of development (Ellen MacArthur Foundation, 2015b). This is highlighted also by Stahel (2010) and Wijkman and Skånberg (2015), who argue that transforming the economy to a CE could boost regional job creation since it reinforces the labour intensive parts. Further results show that, compared with levels of 2012, CO<sub>2</sub> emissions could drop by almost 50% by 2030 compared to 31% on the current path of development. Primary material consumption could in addition drop with up to 32% by 2030 if a CE is fully implemented, which would reduce dependence on imports and boost the resilience of the economy (Ellen MacArthur Foundation, 2015b).

As essential technologies are scaling up fast and consumers are getting increasingly aware about environmental impacts of consumption, the timing for transforming the economy to a CE is favourable. A remaining barrier is however the lack of a consistent understanding among businesses, academia, policy makers and civil society on what exactly a CE is, what circular business models would look like and what political measures would be needed (Preston, 2012, Ellen MacArthur Foundation, 2015b). Planing (2015) argue that transitioning to a CE requires four essential building blocks (1) materials and product design (2) new business models (3) global reverse networks (4) enabling conditions. The study by Ellen MacArthur Foundation (2015b) points out that not all sectors and companies would benefit from the growth model of a CE; some would be left behind and possibly loose out completely. The authors also points out that moving towards a CE would generate substantial upfront costs in terms of public expenditure, R&D investment and subsidies for new technologies and products to enter the market. Managing the transition would therefore have to be made a top priority by European political leaders if they decide to move ahead with a shift towards a CE (Ellen MacArthur Foundation, 2015b).

### *3. Political attention and efforts so far*

Environmental issues are a priority within the European Union (EU) policy landscape (European Commission, 2015c), and the EU recently committed to reduce domestic greenhouse gas emissions with 40% by 2030 compared to 1990 levels (European Commission, 2015a). The flagship initiative under the Europe 2020 Strategy “A resource efficient Europe” further includes a target of a 30% reduction in domestic material use by 2020 (Commission Proposal COM(2011)571 final, 2011; European Commission, 2011), and the interest for the CE concept has risen high on the political agenda in the EU during the last couple of years (European Commission, 2015d). A political interest is also seen at the Nordic and national level in Sweden. The Nordic Council of Ministers arranged a multi-stakeholder conference in 2015 (Copenhagen IRIS, 2015), and at the political week in Almedalen, Sweden, a number of events were about CE in 2015 (Almedalsveckan, 2015).

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<sup>1</sup> A foundation established in 2010 to research and educate on the matter of CE and bring together businesses and partners around the world to speed up a development of a CE (“History of the Foundation - Ellen MacArthur Foundation,” n.d.)

An initial scoping study of possible ways in which policy could be designed to support a transition to a CE was commissioned by the European Commission in 2014 (Vanner et al., 2014). The study concluded that a lot of barriers exists, such as insufficient skills and investment, the current level of resource pricing, lack of incentives to internalise externalities, limited consumer and business acceptance, weakness in policy coherence at different levels and widespread planned obsolescence in products. It is therefore a great need for policy intervention if transforming the economy is going to be possible (Vanner et al., 2014). An effort was made at the EU level to come up with a policy package for the promotion of a CE in 2014. The package was adopted in July but scrapped by the European Commission in December. The package from 2014 still had a strong focus on waste management, such as targets for material and packaging recycling, which according to numerous reports, and the European Commission president Jean-Claude Juncker and vice president Frans Timmermans, would not be enough to transform the economy to a CE (Edie Newsroom, 2014; Ellen MacArthur Foundation 2013 & 2015b; Wijkman & Skånberg, 2015). That the package was scrapped was first seen as a failure by most stakeholders involved (see for example reporting by Confino, n.d. in *The Guardian*). Consultations have however now been picked up again, and hope is rising for a more ambitious package to be adopted by the end of 2015, something which has been promised by the European Commission (2015d).

#### *4. New business models, barriers and the need for policy intervention*

Fundetec (2007) points out that the development of innovations in environmental technologies require financing through both ‘technology push’, such as R&D and capital grants, and ‘market pull’, such as short term revenue support and public/private venture capital. In relation to that, Bringezu and Bleischwitz (2009) argue that sustainable resource management requires not only product innovation, but innovations at a system level, including disruptive and radical technologies which change market conditions and consumer behaviours. As mentioned above, development and upscaling of new business models based on the idea of closing material loops is therefore required, both to reduce environmental impacts, increase resource security (Planing, 2015), and create a business case for sustainability (Schaltegger et al., 2012). In a CE, such new business models would be based on for example collaborative consumption and servicising, reuse and remanufacturing of products (Planing, 2015).

Some industries and start-up initiatives are already developing new, circular based business models because they see that, due to rising and more volatile resource prices as well as increased environmental awareness among consumers, it will make business sense in the near future. Niche business models, products or companies however always struggle to penetrate the market due to societal lock-ins related to the current production and consumption patterns, and policy intervention is therefore usually needed at many different levels and in many different forms to ensure market acceptance of new business models and uptake of new technologies (Geels & Shot 2007). Geels and Shot (2007) therefore argue that a multi-level perspective (MLP) is necessary in any transition, taking into account not only financing of new technologies but drivers and barriers found in different parts of society. Within the collaborative research project ‘Policy options for a resource efficient economy’ (POLFREE) the researchers concluded that business’ barriers are both institutional, organisational, behavioural, technological and market based, combined in a ‘web of constraints’ (Bastein et al., 2014). It will therefore be important for policy makers to continuously involve businesses throughout the process of developing a CE to “(i) get insights and knowledge to identify the most relevant circular economy opportunities and barriers [...]; (ii) create early alignment on common direction for the country [...]; (iii) further demonstrate circular economy benefits to businesses and build skills as well as capacity” (Ellen MacArthur Foundation, 2015a, p. 14). In 2014, the Ellen McArthur Foundation consulted a wide range of companies from different industrial sectors about what policy measures and regulatory changes they consider necessary if they are to transform their business

models to become more circular. Results show that a wide range of policy measures are needed at various levels, including both changes in regulatory frameworks, public spending and consumer engagement (Ellen MacArthur Foundation, 2014). There further seems to be agreement in previous studies that policy measures which provide financial incentives for example for reuse, repair and remanufacturing need to be implemented (Stenmarck et al., 2014). More research is however needed in order to understand how such policies should be designed, and what policies would benefit which type of business models (Ellen MacArthur Foundation, 2014).

##### *5. Policy approaches in Sweden are not enough*

To analyse the linkages between environmental degradation and how it is related to policy is a challenging but necessary task (Pintér et al., n.d.). This study focuses on Sweden, a country which has access to large amounts of domestic natural resources such as wood, iron and other metals, wherefore security of supply of such resources has not been a driver for resource efficiency historically. Still, Sweden traditionally has strong environmental policies with high goals for waste management and has high recycling rates compared to other EU member states (EEA, 2011a). The amount of waste generated per capita is however growing (Naturvårdsverket, 2012), equal amount of waste is sent to incineration as is being recycled (Regeringen, 2014) and the resource use (domestic material consumption) per capita is above the EU average (EEA, 2011a).

To change the course of direction, the Swedish Environmental Protection Agency (EPA) suggested ) in December 2013 to set up a milestone target of at least 60% of waste from households and 'household waste' from industry to be prepared for reuse or recycling by 2020 (Naturvårdsverket, 2013). The milestone target has however not yet been adopted ("Etappmål - miljömål.se," n.d.) and research by Kalmykova et al. (2015) show that no policies which focus on reducing demand of goods have been introduced in Sweden. Waste management policies are the only ones which are related to resource consumption of non-fuels, but they fail to influence consumption patterns, preventing waste and reduce resource consumption (Kalmykova et al., 2015). There is therefore need for a new strategy on how to better make use of resources in Sweden, which goes beyond the traditional focus on recycling and prioritises the development of new business models and new ways of consumption by politically stimulate demand for secondary materials and products (Stenmarck et al., 2014). New businesses with CE business models based on for example servicising, repair, remanufacturing and reuse of products are currently on the rise in Sweden, and some large companies are transforming parts of their business to be more based on circular economy thinking. These companies however encounter several barriers and struggle to penetrate the market and to compete with existing businesses. There is a lack of demand from consumers to buy for example reused products or leave them for reparation, and studies from other countries show that reasons for this are plentiful. Virgin materials are for example too cheap in relation to reused or repaired ones due lack of correct pricing of natural resources and the setup of the current tax system. Policy intervention is therefore needed to enable CE business models to form and to scale up (e.g. UK House of Commons Environmental Audit Committee, 2014).

### **Research justification**

In Sweden there is a wide range of untapped policy opportunities linked to the development and upscaling of circular business models, but the linkage and interrelations between barriers for certain business models and the need for policy intervention is highly unexplored (Lindahl et al., 2015). As Vanner et al. (2014) reveals, most resource related policies are targeted towards material recycling and waste management. There is a lack of understanding on how holistic targeted policies which would facilitate CE oriented business models could be developed, both at EU and at national levels. Initial studies based on consultations with businesses have been



made on the European scale to understand the current barriers for companies to adopt resource efficient measures (Bastein et al., 2014) as well as the need for policy intervention for adopting CE practices (Ellen MacArthur Foundation 2014). But there is lack of conclusive evidence on how internal and external barriers actually affect the company's business strategy in relation to resource efficiency and CE, and what the need for policy intervention is (Bastein et al., 2013; Bastein et al., 2014). Consultations with businesses on the same matter in national contexts have further been done in the Netherlands (Bastein et al., 2013) and in the United Kingdom (UK House of Commons & Environmental Audit Committee, 2014), but the author has found that no such industry consulting studies have yet been done on the Swedish context. A recent report released by the Club of Rome suggests political measures which, if implemented, have the possibility to facilitate a transformation of the economy to a CE in Sweden (Wijkman & Skånberg, 2015). But what is lacking is hereby empirical investigations into what barriers Swedish companies are currently facing, and the policy support that niche businesses with circular oriented business models<sup>2</sup> would require in order to scale up. This thesis is an attempt to start filling this knowledge gap by providing a preliminary picture of the current barriers faced by seven Swedish small and medium sized enterprises (SMEs) and three large Swedish companies in scaling up business models based on circular economy thinking, as well as their view of the need for policy intervention to overcome those. Consulted on the same matter are also representatives from the newly established reuse park Alelyckan in Gothenburg. The study contributes to the newly initiated research program Resource-Efficient and Effective Solutions (REES) conducted by researchers at Lund University, Linköping University and Chalmers University of Technology. In particular, this thesis aims to provide results that feed into Project 1: REES context – Characteristics, Conditions, Drivers and Obstacles, and Project 4: Policies for REES.

## 1.2 Aim and research questions

The thesis aims to address the identified knowledge gap by exploring the need for policy intervention in promoting circular business models and start the journey towards a circular economy in Sweden. The thesis thereby aims to answer the following research question (RQ):

*What are policy measures that could support upscaling of circular business models in Sweden?*

To answer the overarching RQ, two sub-questions are addressed:

- a) What barriers are Swedish companies currently facing in scaling up business models based on circular economy thinking?
- b) What policy measures could help to overcome those barriers?

In order to address the aim and answer the RQs, the thesis takes on four tasks:

1. To provide a sound overview of the CE concept, outline barriers and the need for policy intervention to support the development of a CE as outlined in the literature;
2. To map relevant environmental policies<sup>3</sup> in Sweden, in order to understand how the current political landscape addresses elements related to CE, and to put interview findings (see next task) into context and allow for analysis;

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<sup>2</sup> A very recent research project on resource effective business models has been launched by 'Kungliga ingenjörsvetenskapsakademien', but results are yet to be delivered by the end of 2015 (IVA, 2014).

<sup>3</sup> To identify the relevant environmental policy areas in which elements related to CE included in the scope of this thesis are dealt with in Sweden, the report "Survey of resource efficiency policies in EEA member and cooperating countries - COUNTRY PROFILE: Sweden" (EEA, 2011) served as a starting point.

3. To identify barriers for new business models and the need for policy intervention to overcome those by conducting semi-structured interviews, mainly with business representatives but also selected professionals and by observing political CE seminars. The results of this task serve as the main source of information for being able to answer the sub-questions and the overarching RQ;
4. To triangulate results of the previous tasks and outline a potential mix of policies and policy instruments which could support upscaling of CE business models in Sweden.

### 1.3 Scope and limitations

#### **Scope**

The first sub-question addresses barriers for companies to scale up business models based on circular economy thinking. The focus is on external barriers since those are the ones which most likely can be overcome with policy intervention (Bastein et al., 2014), though internal ones are brought up if mentioned by interviewees. The second sub-question addresses what policies and/or policy measures could help to overcome those barriers. According to Ellen McArthur Foundation's definition of a CE it includes two cycles: a biological one and a technological one ("The circular model - an overview," 2013). The scope of this thesis only includes the technological cycle and excludes the biological cycle, hence policies for nutrient recovery and composting are for example excluded. Companies selected as interview objects are therefore SMEs and large companies which partly or fully have implemented elements of CE into business models which fits within the technological cycle. Such business models are for example based on product design for durability, disassembly, refurbishment and reuse, reuse/remanufacturing/repairing of materials and resources through different uses; circular/regenerative forms of consumption through servicising; and industrial symbiosis (Ellen MacArthur Foundation 2014, Planing, 2015, Vanner et al., 2014). Excluded are thereby businesses within in the "green" sector, such as biorefineries and activities such as biochemical extraction, composting and anaerobic digestion. Interviews were also conducted with non-business representatives with a profession in areas related to CE to get further input and widen the perspective.

Furthermore, as defined by the Ellen MacArthur Foundation (2013), a CE includes the perspective of energy, stating that in a CE all energy is generated from renewable sources. The scope of this thesis however does not include the energy aspect. In addition, a few studies apply the CE concept to the management of water resources, however this is an aspect which is out of the scope for this study.

To allow for analysis of interview findings in later steps of the research, one task of the study is to map the current status of relevant environmental policies in Sweden. The focus is thereby on Swedish public policy, but EU policies and studies on what policy measures that need to come in place on the EU level are also briefly examined in an introductory literature chapter for the sake of giving context to the Swedish situation. Since policy making in member states is heavily influenced, and sometimes directly steered, by decisions made on the EU level (Dalhammar, 2014), the author found it relevant to include this chapter. The review of studies on needs for policy support on the EU level also initially served as a base for the interview guides. The study further focuses on national policies and to a large extent excludes local and regional policies. However local or regional policies are brought in for discussion if interviewees bring special attention to them. The choice of such a scope is first of all an issue of time and resource constraints. It is however justified by the review of relevant literature and the stakeholder interviews conducted in the beginning of the research process, which suggests that political measures taken on a high level; national, EU or international, are most necessary if we are to transform the economy to a CE (Ellen MacArthur Foundation, 2014). Further, the scope only

includes public (governmental) policies. Hence voluntary industry agreements and Type II Eco-labels are for example not part of the scope. Further, only implemented policies are mapped, and the scope does not examine all policy instruments which could be relevant for a CE. The scope further only includes environmental policy but brings up other relevant policy areas for discussion when mentioned by interviewees. The justification for this scope is that policies for CE in the EU are currently being developed within the environmental policy framework, and the EPA is the agency advising the Swedish government on the matter (Swedish Government, 2015).

The main RQ is answered by suggesting components which could be included in a policy package to promote CE business models in Sweden, based on the answers to the two sub-questions and the outcomes of the tasks. However, the evaluation of the implementation and possible financial and social impacts of the suggested policies and instruments are outside of the scope and requires further research.

### **Limitations**

Ten companies plus the reuse park Alelyckan and five non-business representatives were interviewed, which of course is a limiting factor in the matter of being able to generalise the results. According to Kvale & Brinkmann (2009), 10-15 interviews is a representative sample in a qualitative study, but a larger number would inherently generate more robust data, bring upon greater insights and increase the ability to generalise the findings. Further, all the interviews were conducted in Swedish and then transcribed into English, which automatically brings upon a certain amount of interpretation even if the author conducted the translation carefully. The author takes full responsibility for any mis-interpretation of data and, if existing, any mis-translations from Swedish to English. Finally, to focus on policy in the mapping of the current political landscape in Sweden and not fully examine all policy instruments in place, as well as only looking into resource related environmental policy is of course a limiting factor in being able to analyse the interview findings in relation to the current political situation. A more thorough elaboration of the methodology and the choice of scope and interviewees is given in Chapter 3 and methodological implications are discussed in Chapter 7.

## **1.4 Target audience**

The target audience for this thesis is Swedish policy makers, but findings are also relevant for policy makers in other countries. Representatives from the Swedish EPA has expressed interest in the outcome of the thesis as they are supporting the government in the ongoing consultations regarding the new CE package in the EU. The findings should also be of interest for businesses in getting a better understanding of possible common barriers and viewpoints on policy intervention, conceivably feeding into the need for further interactions with policy makers. Further, the target audience includes researchers within the REES program as the thesis hopefully can give valuable insights as how to proceed with certain program elements.

## **1.5 Outline of the thesis**

Chapter 2 provides the results of task 1 as it is based on a thorough literature review on the concept of CE and public policy, political approaches so far in the EU, the need for new business models and suggested new or revised policy measures. Results of task 2 are given in Chapter 4 by presenting the current state of environmental policy in Sweden. Chapter 3 explains the methodology used in the thesis, including an outline of the research process and the analytical framework used to guide the research. Chapter 5 provides the results of task 3 by presenting the interview findings, followed by Chapter 6 in which the results are discussed, which feeds into providing results of task 4. Conclusions are given in Chapter 7 where the research questions are elaborated upon, together with suggestions for further research.

## 2 Circular economy and the role of public policy

This chapter provides the results of task 1, which was to provide a sound overview of the CE concept, outline barriers and the need for policy intervention to support the development of a CE as outlined in the literature. It gives a brief overview of the different schools of thought behind the characteristics of the concept of a CE and the rationale behind moving from away from the current, linear economy. There are various interpretations of the CE concept and a common understanding of a CE and its components is still lacking, something which various authors are acknowledging as an issue which might lead to confusion (Ellen MacArthur Foundation, 2015b; European Resource Efficiency Platform, 2012; Preston, 2012). The thesis at hand does not imply to provide the reader with the ‘right’ definition of a CE, but only to reveal some of the most commonly used definitions and highlight important components and building blocks as brought forward in the literature. The outline of the chapter and what each section provide is given in figure 2.1.

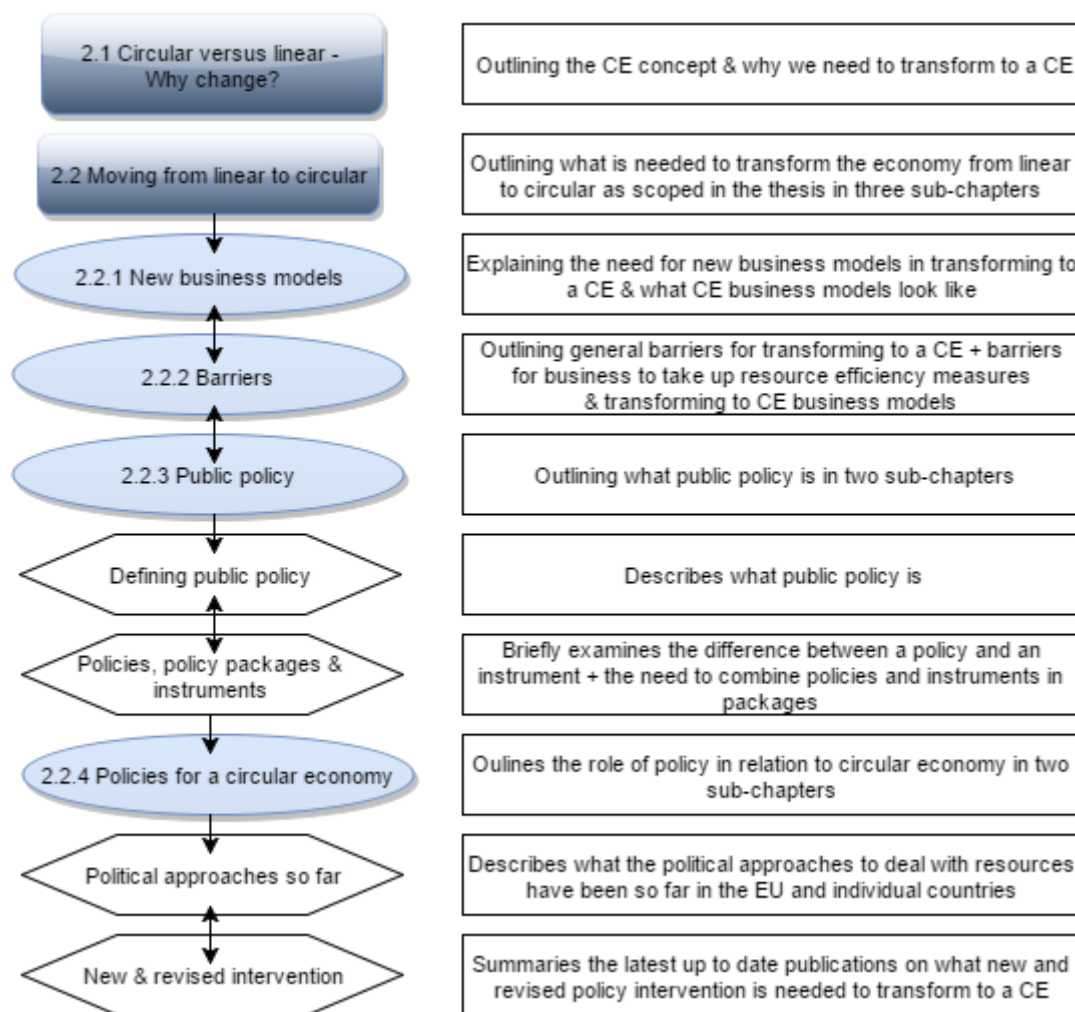


Figure 2-1. Overview of the literature chapter

### 2.1 Circular versus linear – why change?

To understand the concept of a CE, one must first understand the fundamental building blocks of today’s linear economy. In the current linear system, a material’s technological life cycle starts with natural resources being extracted, the material being turned into products to be used by a consumer and the product finally being discarded when the use phase is over (Preston, 2012). As shown in figure 2.2, such an economic system is in constant need of extraction of new raw

materials. Principles and policies are designed to maximise material flows since economic success is measured solely by GDP, which requires increased consumption of goods and services to grow (Ellen MacArthur Foundation, 2015a).

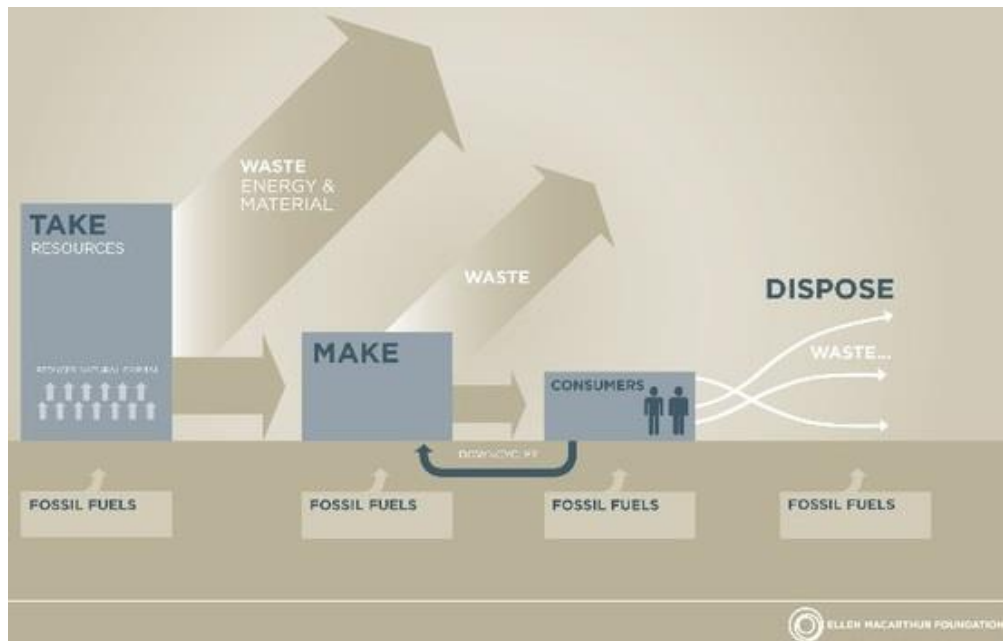


Figure 2-2. The linear economy.

Source: Ellen MacArthur Foundation (*High Resolution Graphics Pack, n.d.*)

As mentioned in the introduction, the European economy is extremely wasteful with resources. In 2012, despite some member countries in the EU having increased their recycling rates the last couple of years, only 40% of materials were recycled or reused whereas 60% were landfilled or incinerated, leading to that 95% of the energy and material value was lost and only 5% of the original raw material value was captured (Ellen MacArthur Foundation, 2015b). The numbers for Sweden are more appealing, but still 51% was incinerated, 48% recycled and 1% landfilled in 2013 (Naturvårdsverket, 2015). In a report from 2013, the Ellen MacArthur Foundation argues that this is probably because issues of resources efficiency are usually addressed with so called eco-efficient techniques which only “minimise the volume, velocity, and toxicity of the material flow system, but are incapable of altering its linear progression. Some materials are recycled, but often as an end-of-pipe solution, since these materials are not designed to be recycled. Instead of true recycling, this process is actually downcycling, a downgrade in material quality, which limits usability and maintains the linear, cradle-to-grave dynamic of the material flow system” (Ellen MacArthur Foundation, 2013, p. 23). According to Ellen MacArthur Foundation (2015b) new business models and disruptive technologies have the capability to improve the productivity of resources while reducing annual costs, but rebound effects and system lock-ins could restrain the gain of such new technologies. However, if the new business models and technologies get well integrated by applying the ideas of a CE on a wider scale, much of the structural waste could be addressed and Europe could instead achieve a growth within by generating more value from products and materials already placed in the economy and without having to consume finite resources (Ellen MacArthur Foundation, 2015b). A CE is namely, by the most widely accepted characterisation developed by the Ellen MacArthur Foundation, an economy that is based on resource *effectiveness* and allow for upcycling by being “restorative by design, and which aims to keep products, components and materials at their highest utility and value, at all times” (“The circular model - an overview,” 2013), see figure 2.3.

Per definition, the inner circles of figure 2.3 are thereby most preferable and contributes most to a CE, while the outer circles still keep materials within the technological or biological loops but energy and material value is increasingly lost. Built upon this characterisation, Vanner et al. (2014, p. IV) adds that “a circular economy goes beyond the pursuit of waste prevention and waste reduction to inspire technological, organisational and social innovation across and within value chains”.

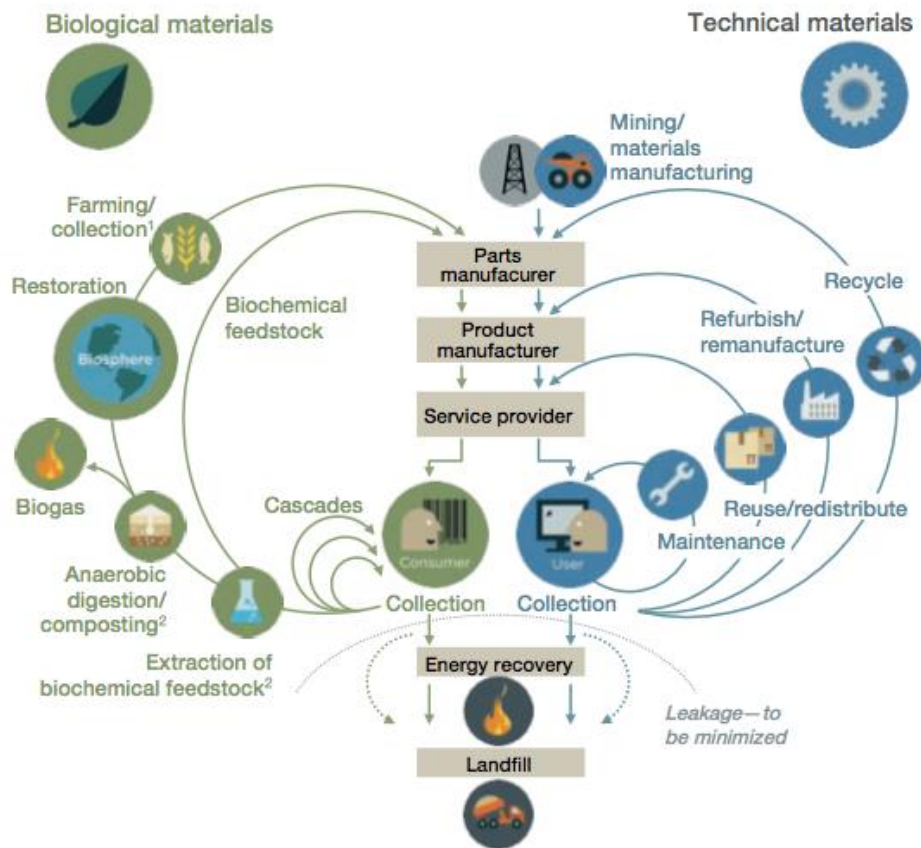


Figure 2-3. The circular economy.

Source: Ellen MacArthur Foundation (2013a)

As outlined in Ellen MacArthur Foundation (2015) and Masuda (2014), some major schools of thought with which the characteristics of the CE relates to and is based upon were brought up already in the 1970s and gained increase attention in the 1990s and early 2000s, such as cradle-to-cradle, industrial ecology, the performance economy, biomimicry and the blue economy. The idea of biomimicry is to imitate natural systems in the design and manufacturing of products and technologies (Benyus, 2002), whereas industrial ecology applies similar reasoning to industrial systems based on the idea that one industry’s waste is another industry’s resource, creating closed loop systems of materials, water and energy (Graedel & Allenby, 2003). This idea is closely linked to the blue economy, which is based on the principle that resources should travel through the economy in “cascading flows”, meaning that ‘waste’ resources and nutrients from one activity will be used as input in another (Pauli, 2010). The performance economy is based on the principle that the utilisation of the product, the service, should be sold and bought instead of the products itself (Stahel, 2010) and finally cradle-to-cradle builds upon the idea that waste does not exist: all materials brought into the economy are either biodegradable or recycled within the technological sphere with least possible losses (McDonough & Braungart, 2002). Stahel (2010) further emphasises that a loop or a circle has no beginning and no end, which

means that you need to maintain everything within the loop if the model is to be truly circular, and the smaller the loop, the more profit and resource efficient it is. In addition, the speed of the circular flow is crucial. A true circular business model or economy operates on a very low speed, in comparison to material recycling of short-lived goods which leads to a fast circular flow and loss of material and energy. Material recycling should hence be moved away from if a CE is to be promoted (Stahel, 2010).

## 2.2 Moving from linear to circular

Based on the characterisation of a CE explained in the previous section, Planing (2015) argue that moving from a linear economy to a CE requires four essential building blocks: (1) materials and product design (2) new business models (3) global reverse networks (4) enabling conditions. Establishing this new economic system will require radical change in consumer behaviour related to purchasing, trust and acceptance of these four components (Planing, 2015). The focus in this thesis is on the second and fourth building blocks, focusing on the need for policy intervention to *create enabling conditions new business models to scale up*. However, as will become clear to the reader, the four building blocks are all interrelated. The next section will briefly address number 2, the need for new business models.

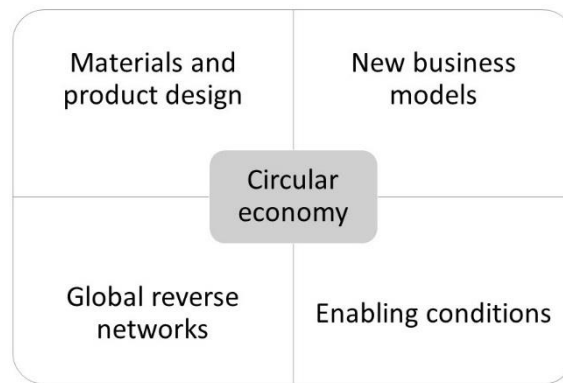


Figure 2-4. The four building blocks of the CE.

Source: Own illustration based on Planing (2015)

### 2.2.1 New business models

A business model is how a company creates value and how some of that value is generated as profit (Teece, 2010). Innovating new business models is about creating new value for the society and its different actors, companies and consumers, through changing one or several constituents of the model (Osterwalder et al., 2010). In transforming the economy to a CE, creating new business models will be necessary and will contribute positively to the economy and society as a whole (Planing, 2015, Murray et al., 2015). According to Bastein et al. (2013) among others, greater effort must be put into developing new business models which are based on selling the service of a product instead of the product itself, so called servicising or product service systems (PSS). Such a business model could both reduce life cycle costs of a product and raw material use as well as more evenly distribute the environmental benefits and costs related to production and consumption among market players (Pleppys et al, 2015, Tukker & Tischner, 2006). Business models for a CE however includes more than servicising (Boer et al, 2015; Ellen MacArthur Foundation, 2013b; Planing, 2015; Preston, 2012; Webster & Johnson, 2010). As outlined in the section above, the inner circles of a CE are the most preferable in terms of minimising material and energy losses. To be within the innermost circle, business models should be based on product life time expansion and collaborative consumption (Planing, 2015).

The second circle is about extending the products lifecycle, wherefore there is a need for business models based on refurbishment, maintenance, reuse and redistribution. In the third circle products are physically transformed, which is achieved by businesses which perform upgrading or remanufacturing and finally in the fourth circle, which is the ‘last option’ to get materials back into the economy instead of disposing them, there is a need for business models which perform recycling with highest possible material and energy value capture (Planing, 2015). Fischer et al. (2015) and others argue that there is potential for development of all the above mentioned business models under the development of a ‘leasing society’, which encompasses changes in ownership structures from consumers to producers and thereby incentivises producers to reuse, recycle and remanufacture their products. Associated business models for each stage of the CE is displayed in figure 2.5.

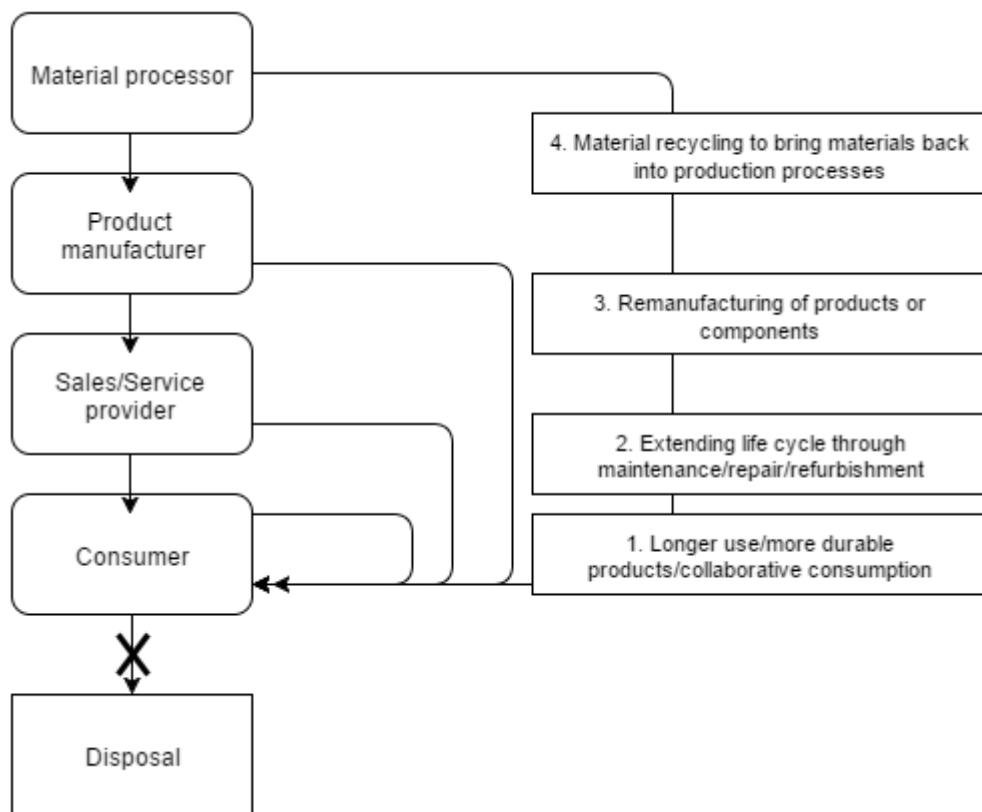


Figure 2-5. Business models in a CE.

Source: Adapted from Planing (2015) who based it on Ellen MacArthur Foundation (2014)

### 2.2.2 Barriers

This section gives a short overview of the barriers which currently hinder a transformation of the economy to a CE and CE business models to scale up, taking in wider insights from research on uptake of resource efficiency measures and green business model innovation. Associated with barriers are however also drivers, which are of both negative and positive characters grounded in increased volatility of natural resource prices and environmental degradation in combination with a fast technological development and price drop of renewable energy sources (Ellen MacArthur Foundation, 2015a, Preston 2012, EREP, 2014).

The thesis at hand uses the same characterisation of a barrier as a report from the POLFREE program, based on Kemp & Soete (1992), namely that “a barrier is not considered a concrete obstacle [...] that can be removed. Instead, the project views barriers as a web of constraints



that stems from the ‘co-evolution of (eco) innovation, institutions and markets’ (Bastein et al., 2014, p. 21 adopted from Kemp & Soete, 1992). This means that barriers are interrelated, and should be addressed that way if robust change is to be reached (Bastein et al., 2014, Preston, 2012). Bastein et al. (2014) points out that this ‘web of constraints’ is not seldom unknown to companies: companies might believe they have a barrier to their business which in fact is a result of several limiting factors imposed on it. The POLFREE project researched business barriers for resource efficiency uptakes<sup>4</sup>, and as mentioned in previous sections, a CE encompasses more than resource efficiency. The web of constraints is however suggested to be present also in developing sustainable business models (Bastein et al, 2014; Henriksen, 2012a; 2012b) wherefore these barriers are suggested to be relevant in the case of this study.

Bastein et al. (2014) clustered identified barriers into five main categories: institutional, behavioural, technological, organisational and market based. The conclusions drawn by Bastein et al. (2014) were based on data from 2012 and 2013 Eurobarometer surveys on SMEs Resource efficiency and Green Economy from 27 European countries, a 2008 Eurostat Community Innovation Survey as well as studies on resource efficiency uptake. Barrier types, their definition and examples as identified by Bastein et al. (2014) are displayed in table 2.1.

Table 2-1. Business barriers to the uptake of resource efficiency measures.

<b>Barrier type</b>	<b>Definition</b>	<b>Examples</b>
<i>Institutional</i>	Caused by political institutions	Regulations and laws
<i>Market</i>	Related to market conditions	Monopolies, lack of information, subsidies
<i>Organisational</i>	At firm level related to organisational structures & systems	Company strategy or focus, lack of funds
<i>Behavioural</i>	Individual’s behaviour within the firm	Lack of attention to subject, lack of information
<i>Technological</i>	Insufficient or too costly technology	Lacking equipment, undeveloped technology from the market

Source: Adapted from Bastein et al. (2014)

### **Institutional barriers**

Institutional barriers are related to political action and rules acting upon different actors or group of actors in society (Dijk et al., 2013). According to Bastein et al. (2014) these are for example lack of environmental policy and weak or no enforcement of regulations. In addition, Pajunen et al. (2012) argue that public policy often fail in delivering predictable signals of how and in which direction behaviour and markets will be pushed. Bastein et al. (2013) consulted industry and experts on barriers and opportunities for CE in the Netherlands and concluded that implemented policy rules and regulations impose several barriers to the development of a CE. For example, political approaches so far consider only waste management and not resource management, regulations regarding import/export of waste are too complicated and import of second hand products is often blocked. Further, changes in rules and regulations take too long to implement (Bastein et al., 2013). As pointed out by businesses consulted in Ellen MacArthur

<sup>4</sup> Explained in the report as a measure of the ability to produce more output from less input (Dahlström & Ekins, 2005).

Foundation (2014), targets set out in directives already in place might further be a hindering factor for a transformation of the economy to a CE to happen. For example: “The EU WEEE directive sets targets in terms of percentage of weight of waste that must be recycled, without taking into account whether precious metals are being recovered in the process” (Ellen MacArthur Foundation, 2014, p. 5).

### **Market barriers**

Market barriers emerge for example when there is lack of demand from the market related to i.e. consumer behaviour and unfavourable market structures related to i.e. price signals (AMEC Environment & Infrastructure and Bio Intelligence Service, 2013). Costs related to risk and lack of economics of scale can also be classified as market barriers (Ashford, 1993). When such barriers exist they can easily create a vicious circle as further development of economics of scale cannot be reached, which keeps costs high and market demand low (Bastein et al., 2014). Despite that, Bastein et al. (2014) argue that their findings show that companies do not reflect much on for example policies on taxation.

### **Organisational and behavioural barriers**

Organisational and behavioural barriers are mostly internal barriers to the company and are closely linked to each other, organisational being for example lack of labour capabilities, lack of funds and lack of expertise of managers, and behavioural being related to attitudes and values in for example lack of commitment (Bastein et al., 2014).

### **Technological barriers**

Finally, technological barriers are, as the word suggests, based on a lack of available technologies or processes which hinder companies to fully take on a concept, which is strongly linked to organisational, behavioural and market barriers, since they hamper the uptake of new technologies (Bastein et al., 2014).

As mentioned above, examples of barriers being embedded in web of constraints and not acting in isolation can be further seen in studies regarding development of sustainable business models. Henriksen et al. (2012a) reveal that barriers to transforming into a sustainable business model is amongst other things a combination of lack of consumer demand for ‘greener’ products and a lack of capacity and resources within the company to actually market their ‘green’ business model. Bastein et al. (2013) further point out that transforming specifically to a PSS business model is a challenge for the company undergoing the transformation as it needs to develop a result-based model which will have to overcome the consumer desires of owning products, and the risk of high transaction costs is prominent.

### **Type of firm, sector or business model determine barriers**

Though the barriers identified by Bastein et al. (2014) have been presented on a general level, the authors argue that there are differences among businesses on which barriers are most prominent and that there are three variables affecting this: what type of firm the company is, what sector and country it operates in and what type of measure it sets out to undertake. If the company for example is a business to business (B2B), business to consumer (B2C) or business to government (B2G), if it is just starting up with limited resources or have been in the business for a long time, and if it offers services or manufactures products are factors which will all influence how the company is affected by the web of constraints (Bastein et al, 2014). In all the 27 countries which were part of the SMEs Eurobarometer survey from 2012 which Bastein et al. (2014) used as input to the POLFREE project, barriers related to financing and investment were revealed as the main ones. Uncertainty of demand from the market, lack of funds, subsidies and external financing as well as uncertainty of return on investments were all brought up as

important barriers. Data from a 2008 Eurostat Community Innovation Survey which had a high response rate from large companies on the other hand pointed out existing and upcoming regulations as most important drivers and barriers (Bastein et al, 2014). Henriksen et al. (2012a) further argue that their research show that regulatory barriers to promote innovation of green business models are highly sector specific and that it is difficult to generalise the results.

In addition to business barriers specifically mentioned above, the scoping study by Vanner et al. (2014) identified some major gaps in the political and economic landscape which act as barriers for a wider transformation of the economy to a CE, and where further policy action can play a role. The barriers identified in the study are summarised in figure 2.6 and the need for policy intervention will be further brought up in the following sections.

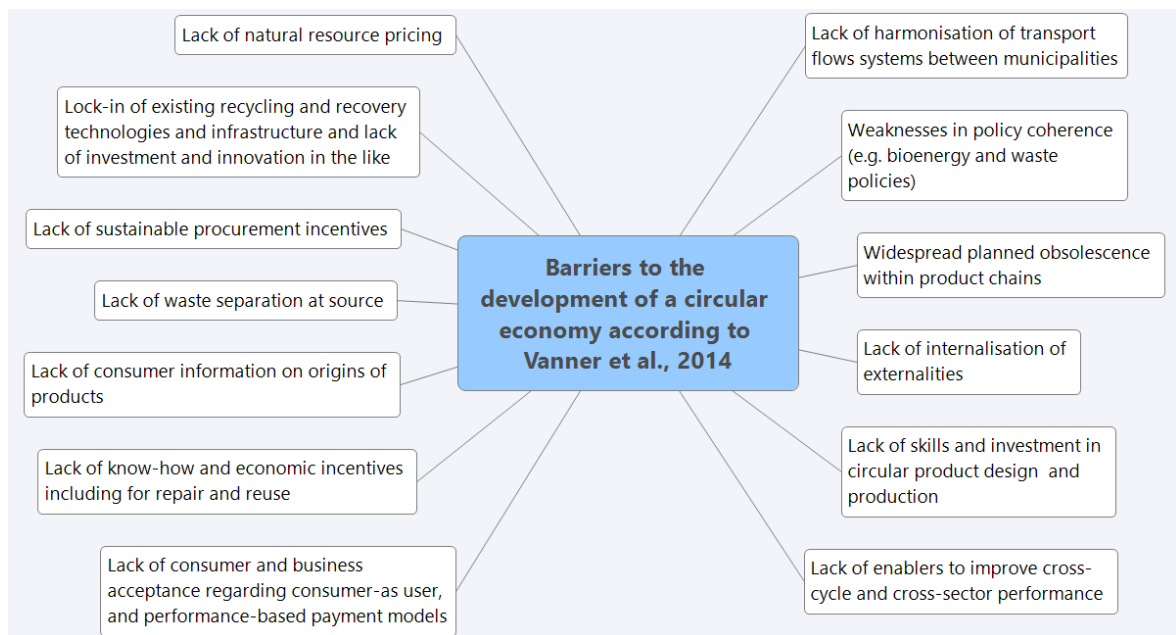


Figure 2-6. Barriers to the development of a CE in the EU

Source: Own illustration based on Vanner et al., (2014)

Similar findings as the ones from Vanner et al., (2014) were presented by an analyst team at the Ellen MacArthur Foundation which in 2015, with contributions from the Danish Business Authority and the Danish Environmental Protection Agency, developed a toolkit for policymakers with Denmark as a pilot case. Identified barriers were mostly non-financial such as existing regulations leading to unintended consequences, different types of market failures related to non-priced externalities, and different social factors. They add that what is defined as waste and what is not might act as a barrier to remanufacturing as transport and trade across borders is hindered. Imperfect information on the market might further stop manufacturers from repairing and remanufacture products and lack of knowledge about the characteristics and qualities of reused and remanufactured goods might hamper a change of consumer behaviour (Ellen MacArthur Foundation, 2015a). Further, they argue that cooperation is needed between different departments and agencies at the governmental level to avoid new barriers being implemented as current ones are overcome (Ellen MacArthur Foundation, 2015a). Schulte (2013) further recognises the wider conservative economic recognition of 'shareholder value' and 'market forces' being the way of achieving progress probably imposes a barrier to transforming the economy into a CE, since it builds in short-term thinking and rejects investments with high up-front costs.

## 2.2.3 Public policy

### ***Defining public policy***

As a help to understand the rationale behind studying policy intervention in the context of this thesis, this section gives a brief overview of some of the definitions of public policy that are to be found in the literature. As a disclaimer, many more definitions of public policy exists and the thesis does not try to give the 'right' definition, but rather to outline the definitions the author has chosen as a base for this study. The section also explains the difference between policies, policy packages and policy instruments.

Most scholars agree that “public policies result from decisions made by governments and that decisions by governments to retain status quo are just as much policy as are decisions to alter it” (Howlett & Ramesh, 2003, p.5). Dye (1972, p.2) defined public policy as “anything a government chooses to do or not to do”. This definition is according to Howlett & Ramesh (2003) probably too simplified since it factually encompasses everything, however it clearly states that the policy making agent is exclusively the government, meaning that decisions made by other actors in society, such as NGOs, businesses or other organisations are not part of public policy. It also underlines that public policy making involves a choice of doing something (e.g. increase a tax) or doing nothing (e.g. deliberately decide not to increase a tax), a choice which is made by members of the government and no one else (Howlett & Ramesh, 2003). Jenkins (1978, derived from Howlett & Ramesh, 2003, p. 6) gives a similar definition: “public policy is a set of interrelated decisions taken by a political actor or group of actors concerning the selection of goals and the means of achieving them within a specified situation where those decisions should, in principle, be within the powers of those actors to achieve”. Howlett & Ramesh (2003) argue that this is a valuable definition which complements Dye since it determines policy making as a process, and not only as a ‘snap chat’ choice. By stating that public policy consists of a set of interrelated decisions it also highlights the fact that governments seldom addresses an issue in society by a single decision but rather through a series of decisions, which, deliberate or not, builds the foundation of the policy (Howlett & Ramesh, 2003). This means that decisions taken at different departments and agencies within the government can all be part of one single overarching policy. Jenkins’ definition also implies that it is important to have a detailed understanding of international conventions, treaties and agreements to be able to understand domestic policy making since those pose both opportunities and limits to how national governments are able to make decisions (Howlett & Ramesh, 2003). If a relevant policy is not in place, under-represented, or in place but not focused on the relevant drivers, developed but not yet implemented or in place but for some reason not functioning properly there is a gap in the policy landscape (Pintér et al. n.d.). That in turn can be for many reasons, such as the theory behind the policy is not accurate or the relevant actors are not included. It can also be that the policy is clashing with the effects of another one, reducing the intended effect (Pintér et al., n.d.). To conduct a deeper analysis of the reasons behind why certain policies are not in place is however outside of the scope of this thesis.

### ***Policies, policy packages & instruments***

Instruments are the actual tools which governments can use to implement their policies and policy makers have a wide range of instruments available to address a certain policy problem and achieve a desired outcome (Bemelmans-Vidéc, Rist, & Vedung, 2003; Howlett & Ramesh, 2003). Though others exist which include four, five or even six categories, the most commonly used typology of policy instruments is the threefold one (Bemelmans-Vidéc et al. 2003). Examples of instruments of the three types are given in figure 2.7. Typologies which include more than three categories usually bring in voluntary agreements and self-regulation (Gunningham et al. 1998), which is out of the scope for this study. The three categories can however entail both mandatory and voluntary instruments (Mont & Dalhammar, 2005).

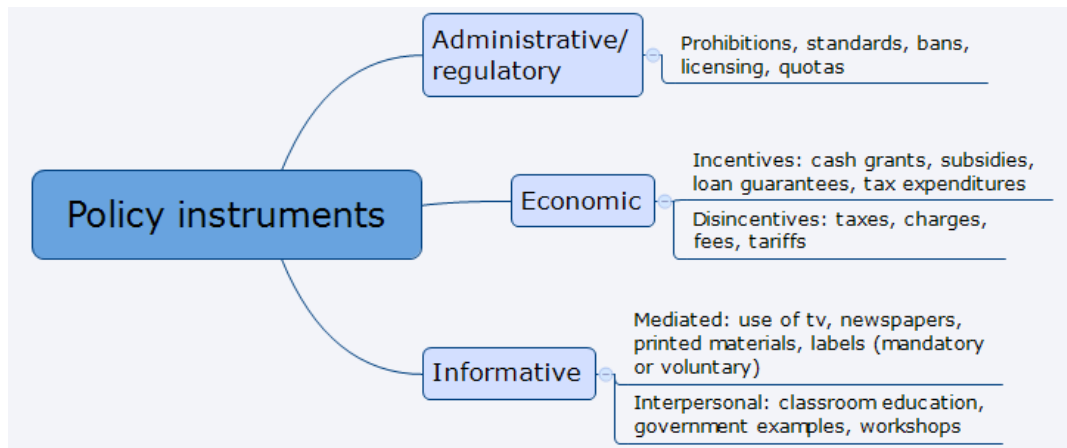


Figure 2-7. The threefold typology of policy instruments

Source: Own illustration based on Bemelmans-Videc et al. (2003) and Mont & Dalhammar (2005)

According to Alsaleh & Mahroum (2014) regulatory instruments in environmental policy making can be for example energy savings obligations or mandatory green codes, economic instruments could according to Gunningham et al. (1998) take the form of deposit-refund systems, market creation with the use of tradable permits and the removal of perverse incentives such as environmentally harmful subsidies, and informational instruments could be green information campaigns or eco-labelling (Alsaleh & Mahroum 2014). In addition to the threefold typology, governments can use their purchasing power through public procurement (PP) to affect the market place and steer market outcomes by creating demand, something which can also stimulate innovation (Edler & Georghiou, 2007). Even though every one of the three categories of instruments have something good to offer, they also have context specific weaknesses. Therefore, it is usually insufficient to only apply one type of instrument when designing policies which are to deal with complex issues such as the environment, and to adopt a mix of policy instruments is in a majority of circumstances necessary. It is usually necessary to adopt a package of carefully designed policies including programmes and/or directives and a mix of instruments targeting the identified problems (Gunningham et al. 1998).

## 2.2.4 Policies for a circular economy

The next coming sections will address number four of Planing (2015)'s suggested building blocks, 'enabling conditions', by outlining relevant political approaches so far and suggested new and revised policy intervention to enable a transformation of the economy to a CE.

### **Political approaches so far**

Experiences show that government intervention in the form of environmental policy and implementation of regulations has been a main driving force in promoting eco-innovation and cleaner technologies historically (Battisti, 2008; Luken & Van Rompaey, 2008; Montalvo, 2008). According to the findings by Bastein et al. (2014) it however seems to be a thin line between regulating too much or too little, proven by cases where stringent regulation may hamper innovation after a certain level of environmental improvement has been reached, while at the same time weak regulations leads to a lack of regulatory incentives to go beyond compliance. Further, wide diffusion of green technologies within the market often fails (Alsaleh & Mahroum, 2014), much depending on the barriers mentioned in previous sections and the presence of market failures such as unpriced costs of negative externalities, imperfect information and imperfect competition (Weber & Rohrer, 2012).

The current political landscape in the EU recognises the need for increased resources efficiency and includes some elements which can arguably be referred to as circular, such as composting, repairing and recycling (Preston, 2012). Highlighted by Vanner et al. (2014) however is that policies in place to date focus mainly on material recovery/recycling, leaving the ‘inner loops’ of the CE framework, such as reuse, upgrading and remanufacturing, untouched. Many of the approaches taken in policy design so far are therefore still incapable of breaking the linear flows of materials and energy (Ellen MacArthur Foundation, 2013a).

As promoted in the EU Waste Framework Directive<sup>5</sup>, waste should be managed according to the waste hierarchy, see figure 2.8. The top, prevention, is the most favourable option and the bottom, disposal, is the least favourable option (Council Directive 2008/98/EC). The Directive includes targets for recycling and recovery to be fulfilled. For example, certain materials from households and similar origins of up to 50% should be prepared for recycling and reuse by 2020 (Council Directive 2008/98/EC). A political measure which is currently in place to ensure the middle of the hierarchy is dealt with is the extended producer responsibility<sup>6</sup> (EPR) which is based on the polluter pays principle<sup>7</sup> (Hennlock et al., 2015). EPR is also the basic foundation of the WEEE Directive (Council Directive 2012/19/EU), which sets out recycling targets and regulates collection of waste electrical and electronic equipment (WEEE).



Figure 2-8. The Waste Hierarchy

Source: Council Directive 2008/98/EC

The Waste Framework Directive does not set out any specific targets for prevention, but it does require that member states adopt waste prevention programmes and management plans (Council Directive 2008/98/EC). It however has an unclear definition of when a product is classified as waste and a methodological application of how the waste hierarchy should be

<sup>5</sup> A directive is an EU law which member states are obliged to translate into national legislation (European Commission, 2015b)

<sup>6</sup> “In order to strengthen the re-use and the prevention, recycling and other recovery of waste, Member States may take legislative or non-legislative measures to ensure that any natural or legal person who professionally develops, manufactures, processes, treats, sells or imports products (producer of the product) has extended producer responsibility. Such measures may include an acceptance of returned products and of the waste that remains after those products have been used, as well as the subsequent management of the waste and financial responsibility for such activities. These measures may include the obligation to provide publicly available information as to the extent to which the product is re-usable and recyclable” (Council Directive 2008/08/EC)

<sup>7</sup> “The fundamental principle of this Directive should therefore be that an operator whose activity has caused the environmental damage or the imminent threat of such damage is to be held financially liable, in order to induce operators to adopt measures and develop practices to minimise the risks of environmental damage so that their exposure to financial liabilities is reduced” (Council Directive 2004/35/CE)

addressed for different types of waste is lacking, something which might impose a barrier to the development of a CE (Vanner et al., 2014). When adopted, the Waste Framework Directive did however require the European Commission to submit, by the end of 2011, the formulation of an eco-design policy and to by the end of 2014 set out decoupling and waste prevention objectives for 2020 (Council Directive, 2008/08/EC). An Eco-design Directive for requirements of energy consumption of products which are energy related is now in place (Council Directive 2009/125/EC). The Eco-design Directive has stimulated cuts in CO<sub>2</sub> emissions and managed to address energy efficiency, but critique has been appointed towards the directive for not taking a life cycle perspective and not addressing for example chemical content and recyclability (Dalhammar, 2014). This has recently started to change however, as some new standards address durability and resource efficiency. For example, the rules on vacuum cleaners now regulate the durability of motors and hoses (Jepsen et al., 2015).

The scoping study by Vanner et al. (2014) concludes that there is an existing policy base to support a CE to build upon in the EU and its member states. But the above mentioned policies are to a large extent targeting the outer circles of the CE framework, such as recycling, while the inner circles related to for example reuse, remanufacturing and upgrading have received limited attention in policy making (Ellen MacArthur Foundation, 2012, 2015a, Vanner et al., 2014). If not complemented with other measures and targets, these policies are thereby still within the framework of the linear economy (Ellen MacArthur Foundation, 2015a, EEA, 2015).

Recent years, a general acceptance that existing policies are insufficient has however risen. In 2011, the ‘Roadmap to a Resource Efficient Europe’ was adopted under which a policy framework for action in areas such as ‘turning waste into a resource’ was developed (COM(2011)571 final, 2011). The key notions of the Roadmap developed into the ‘Seventh Environment Action Programme’ (7<sup>th</sup> EAP), adopted in 2013, which outlines the need to “turn the Union into a resource-efficient, green and competitive low-carbon economy”. To reach that objective, the 7<sup>th</sup> EAP among other things highlight the need for “establishing a more coherent policy framework for sustainable production and consumption” and “giving impetus to the public and private research and innovation efforts required for the development and uptake of innovative technologies, systems and business models which will speed up and lower the cost of transition to a low-carbon, resource-efficient, safe and sustainable economy” (Decision No 1386/2013/EU, 2013). A ‘Commission Package on the Circular Economy’ further set out a policy package and a legislative proposal on how to move to a CE within the EU in 2014. The package recognised several areas within which the Commission will need to set up enabling frameworks, such as promoting circular product design, unlocking green investments, modernising waste policy and setting a resource efficiency target. The only area within which measurable targets were set up was however within waste management, for example to “boost reuse and recycling of municipal waste to a minimum of 70% by 2030” (Commission Communication COM (2014) 398). The package was however scrapped and is now being re-consulted with the aim of adopting a new package by the end of 2015 (European Commission, 2015d).

As pointed out by Dalhammar (2014), the more rules that are set on the EU level, and the more product groups that are covered by EU regulations, less room for member states to adopt their own regulations is left. Historically, member states have however frequently pushed law-making on the EU level by proposing higher national standards and targets. Member states can also go further than EU regulation via for example PP, labelling and pilot projects. Member states are also allowed to set higher targets for collection for recycling or reusing but most notify the Commission if doing so (Dalhammar, 2014).



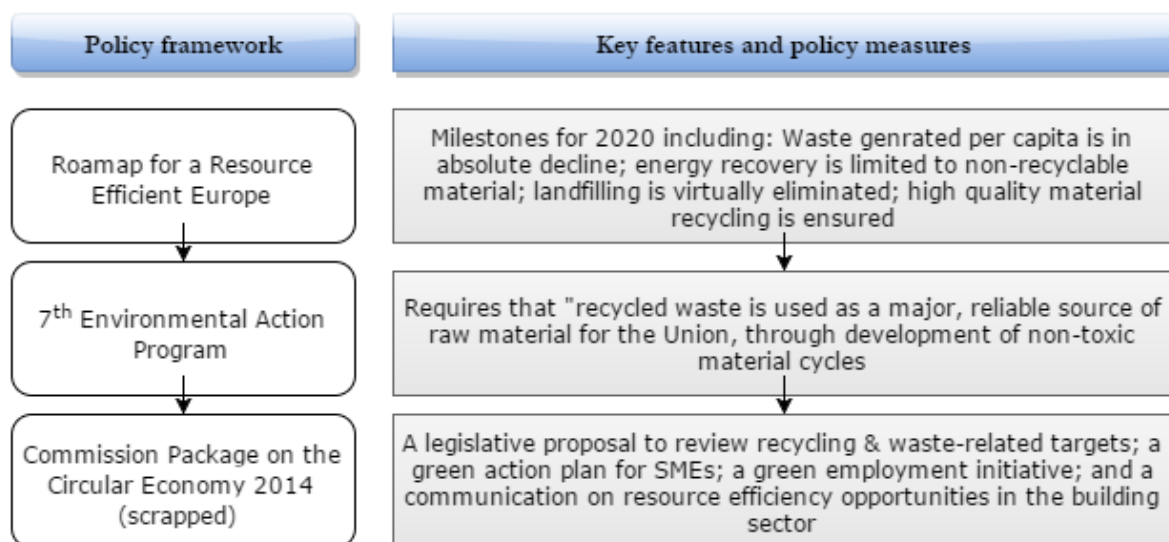


Figure 2-9. The development of the CE related European policy landscape

Source: Own illustration

In some countries, policymakers have started implementing measures to enable and support CE business models. Some of those initiatives are very briefly summarised in table 2.2. As the table reveals, most of the implemented policy efforts so far consist of consulting and providing fiscal incentives through funds, whereas regulations and changes in taxes seems to have not yet been adopted.

Table 2-2. Policy intervention for CE in selected EU member states

Country	Adopted measures
United Kingdom	<p><b>Centre for Remanufacturing &amp; Reuse, established in 2007 through government funding</b></p> <p><i>Aim: promote reuse and remanufacturing industries in the UK</i></p> <p><i>How it works: provides consultancy to companies in all sectors on promotion, development, evaluating benefits and market intelligence of reuse and remanufacturing as well as consulting public sectors on policy development</i></p>
The Netherlands	<p><b>The Green Deal Programme, adopted 2011</b></p> <p><i>Aim: Save water, material and energy &amp; boosting economic activity</i></p> <p><i>How it works: government provides responsive service for two to three years to businesses which need help to realise CE opportunities. The role of government can be to modify legislation, provide networks access, support markets in adopting new product or service. No fiscal incentives are provided to the business.</i></p>
Denmark	<p><i>Green Industrial Symbiosis Denmark, adopted 2012</i></p> <p><i>Aim: stimulate resource efficiency &amp; competitiveness by establishment of partnerships between firms which can use each other's excess resources (waste materials, waste water or surplus heat) and inputs to their activities</i></p> <p><i>How it works: a task force of technical experts established by the Danish Business Authority and the Danish regions offers companies resource checks for free to companies &amp; assist in matchmaking. Grants are given for calculating business cases &amp; various legal &amp; technical issues ahead of creating the symbioses. Grants are given out via the Fund for Green Business Development.</i></p>

Source: Compiled from Centre for Remanufacturing & Reuse (n.d.); “Danish Business Authority,” (n.d.); Erhvervsstyrelsen, n.d.; Government of the Netherlands (n.d.); Swiss Academies of Arts and Sciences (2014)

### New and revised policy intervention

This section contains general recommendations on which policies should be implemented or adjusted to facilitate a transformation of the economy to a CE as suggested in the literature.



Most publications to be found on the subject ‘policy for a circular economy’ come in the form of reports commissioned by EU bodies, from think tanks, foundations and international organisations, whereas most peer reviewed material to be found is about the experiences from the Chinese context, where CE as a concept has been implemented longer than in Europe. Recommendations and suggestions made by the participants in most of the reviewed reports are for both the technical and biological cycles of the CE, however for the scope of this thesis, only recommendations made for the technical sphere are taken into account. Recommendations for energy production and generation are also made in these reports but for the scope of this thesis excluded here.

For the uptake and upscaling of circular business models, governments must act to shape the right market conditions, as well as adopting CE thinking and practices within their own organisations (Boer et al., 2015). The uneven distribution of benefits and costs along the value chain which might arise for frontrunner companies adopting circular business models, such as redesigning products to reduce waste, might impose costs on the initiator. To control the distribution of costs and benefits along the value chain is therefore important task which the government can take on (Bastein et al., 2013). To ensure businesses are willing to take on risks and high upfront investment costs, governments must further ensure policy frameworks which are predictable, strong and clear regarding head of direction (Preston, 2012, Jiao & Boons, 2014). Governments must also enable platforms for innovation, establishment of new partnerships and providing resources for showcasing demonstration projects (Henriksen et al., 2012b). The main recommendation of the European Resource Efficiency Platform (EREP) in their ‘Manifesto & Policy Recommendations’ is to make CE a vital building block of the 2020 agenda for Europe, to ensure rightful policy and regulatory implementation (EREP, 2014). The main message from Wijkman & Skånberg (2015) is that implementation of the CE concept must engage the whole society. Vanner et al. (2014) however recognise that the inner circles of the CE framework are politically hard to address and will require collaborative action across actors and value chains. Transforming the economy to a CE will necessitate a “systemic, multi-level governance approach which takes into account the myriad of inter-linkages within and between sectors, along value chains and between actors (i.e. going beyond traditional sector/policy ‘silos’)” (Vanner et al, 2014, p. 29). How policies should be designed to enable business models across sectors and value chains to be more circular according to Vanner et al. (2014) is summarised in table 2.3.

*Table 2-3. Policy design for enabling businesses to be more circular models across sectors & value chains*

<b>Encourage manufacturers to design products with asset recovery in mind &amp; take the true cost of materials into account</b>
<b>Encourage the development of product lines that meet demand without wasting assets</b>
<b>Incentivise businesses to source material from within regenerative loops, rather than from linear flows</b>
<b>Enable businesses to develop a revenue model that generates value at all parts of the value chain</b>
<b>Get customers/ consumers to change their consumption and ownership patterns</b>

*Source: Adapted from Vanner et al. (2014)*

A sector-by-sector analysis to address the opportunities and challenges facing a transformation of the economy to a CE is further important and there is no ‘silver-bullet’ solution to how policy should intervene. Rather, a combination of policy interventions are necessary (Ellen MacArthur

Foundation, 2015a). By addressing regulatory and market failures which act as barriers to pave the way for new innovations and stimulate the market through pilot R&D investments, target setting and publicly procuring circular solutions, policy makers can play both a passive and active role. To complement policies at the EU and national levels to reduce cost, for example via product policies and fiscal instruments to promote the creation of secondary markets for raw materials, is further important (Ellen MacArthur Foundation 2015a). Greater ambition and leadership from politicians with ambitious targets and strategic visions is also requested (UK House of Commons & Environmental Audit Committee, 2014).

### *Regulation*

According to several reports it is important to improve the criteria in the Eco-design Directive to encourage use of recycled/recyclable materials and adopt product standards which facilitates dismantling, repair and refurbishment, as well as to mainstream and ensure consistency among instruments in place<sup>8</sup> to ensure a coherent product policy and to close loopholes (Ellen MacArthur Foundation, 2014; EREP, 2014; Vanner et al., 2014; UK House of Commons & Environmental Audit Committee, 2014). As mentioned in the section above, such standards are currently under development and already implemented for example for vacuum cleaners (Jepsen, et al., 2015). To demand longer warranty for consumer goods and regulate business' use of materials which cannot be recycled was further requested by businesses consulted by UK House of Commons & Environmental Audit Committee (2014).

### *Economic instruments*

A study which specifically focused on the fiscal reforms needed for transforming the economy to a CE was made by The Ex-Tax Project with a case study of the Netherlands, and the conclusion was that a tax shift from labour to natural resource use and consumption is necessary (Groothuis, 2014). Such a tax shift is in the literature referred to both as Environmental Tax Reform, Environmental Fiscal Reform and Green Fiscal Reform. That conclusion is supported by the other reports referred to in this chapter (Vanner et al., 2014, Ellen MacArthur Foundation, 2014, EREP, 2014, Wijkman & Skånberg, 2015) as well as by Fores (2012) and Stahel (2010, 2013), who argue that labour is a renewable resource which should be promoted in the tax system. Though highlighting that it is a sensitive matter which requires careful design and implementation to ensure stability in the tax revenue streams and keep international competitiveness, such a tax shift is also brought up as an opportunity by the OECD (2012), the International Monetary Fund (2012) and the International Labour Organisation (2012). To remove environmentally harmful subsidies is further a necessary starting point if we are to be able to move in the direction of a CE (Stahel, 2013). To move away from incineration towards recycling and prevention, a similar tax as the landfill tax should further be imposed on incineration or the energy generated from waste (UK House of Commons & Environmental Audit Committee, 2014). Special attention was by the businesses consulted in the UK House of Commons & Environmental Audit Committee (2014) study also given to a differentiated value added tax (VAT) for second hand products. The authors suggest that these measures would be difficult to implement in individual member states due to EU regulations but would have great impact if implemented at the European level. This is also stated by Dalhammar (2014) who specifically points to the fact that raising taxes on natural resources through national legislation might put domestic firms in a competitive disadvantage, something which is likely to be met with resistance from industry, meaning that an unanimous decision at the EU level would be needed (Dalhammar, 2014). The conclusion drawn by the UK House of Commons is however that the government "should introduce differentiated VAT rates based on life-cycle analysis of the environmental impact or recycled content of products, and tax allowances for business that

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<sup>8</sup> Eco-design, ecolabel etc.

repair goods or promote reuse” (UK House of Commons & Environmental Audit Committee, 2014, p. 16). To provide fiscal incentives for circular business models, e.g. via tax rebates, support schemes or funds with guaranteed interest rates for circular innovations and start-ups with circular business models is finally necessary if such business models are to be able to scale up (Ellen MacArthur Foundation, 2014, Wijkman & Skånberg, 2015, EREP, 2014, Vanner et al, 2014).

#### *Informative instruments*

Despeisse et al. (2015) made a sector specific study on vehicles and recognised the need for public awareness raising campaigns in order to increase reduce/reuse/recycle behaviour and promoting sharing and leasing based business models. (Henriksen et al., 2012b) further argue that for policies to promote the uptake and upscaling of PSS business models, they must be designed to take environmental impacts across the life cycle of products into account.

#### *Demand side measures*

Finally, PP should be used to steer the market in a more circular direction, re-writing policies for PP if necessary. Procurement experts should be educated on circular products and business models and an EU wide network for exchange of best practices, standardising approaches and establishment of clear guidelines should be established (Ellen MacArthur Foundation, 2014; EREP, 2014; UK House of Commons & Environmental Audit Committee, 2014; Wijkman & Skånberg, 2015).

## 2.3 Summary

This chapter has provided the reader with an overview of the CE concept and state of the art research around the two building blocks ‘new business models’ and ‘enabling conditions’ in the form of policy intervention. It becomes obvious that resource scarcity and environmental destruction due to production, consumption and waste generation is a priority rising on the political agenda, but that measures undertaken so far are not enough to steer producers, markets and consumer behaviours in the right direction as focus still is on reaching resource efficiency and managing waste. Prices of virgin raw materials are too low while taxes on labour are too high, meaning that ‘second hand’ products become relatively more expensive than new ones. It seems like a general agreement can be found around the need for a mix of regulatory, economic and informative instruments are needed if we are to be able to transform the economy in a circular direction. The results from the literature reviewed in this chapter are summarised in table 2.4 below, including additional concrete suggestions related to what has been provided in the previous paragraphs and to enforcement of existing legislation.

*Table 2-4. Summary of commonly suggested policy intervention in previous studies.*

*Source: Ellen MacArthur Foundation (2014); EREP (2014); Grootbuis (2014); UK House of Commons & Environmental Audit Committee (2014); Vanner et al. (2014) Wijkman & Skånberg (2015)*

Policy instrument	Key message	Concrete suggestion
Regulatory frameworks	Support "design for durability, reuse, remanufacture or recycling"	Ensure enforcement of the rules set out in WEEE (regarding clear and freely available information about how to repair the product and what exact materials the product contains), Shipment of Waste Regulation, ELV Directive and EU Ship Recycling Regulation Improve the eco-design criteria to encourage use of recycled/recyclable materials and adopt product standards which facilitates dismantling, repair and refurbishment Mainstream and ensure consistency among instruments in place (eco-design, ecolabel etc.) to ensure a coherent product policy and to close loopholes
	Improve waste policy	Design policies which encourage manufacturers to take into account the true cost of materials Set end-of-life targets not based on the weight or volume of products/materials recovered but on the quality of the recovery and the cruciality and quality of the materials and the recovery process, and based not on a minimum target but continual improvement.
	Review production regulations	Ban landfilling of materials with high environmental impact (e.g. vehicles, home appliances, electronics, plastics and construction materials) across the EU Improve implementation of Waste Framework Directive and set tougher targets for recycling within them
	Scale up EPR	Re-design health, safety and other product regulations so that they, when guarantee of product quality can be ensured, do not hamper the use of second-hand/re-used products. Also consider the long-term application of regulations so that component re-use is not hindered or discouraged
Economic measures	Set targets for resource efficiency and decoupling	Expand the scope of the EPR and improve coverage of schemes for vehicles, packaging and home appliances and bring in new sectors e.g. furniture For scarce materials or for materials where the environmental impact of resource extraction is significant, the EC should suggest specific targets for resource efficiency (Club of Rome, 2015). Targets for decoupling of natural resource use from economic growth should also be set On a state level, start measure and report Raw Material Consumption (RMC).
	Review trade rules	While still preventing low value and toxic materials from being exported, trade rules should be re-designed so that they do not hinder the import or export remanufactured products which are made with the same quality as new products. Cut taxes on labour and increase taxes on non-renewable resources and consumption
	Adapt fiscal measures to the objective of a CE	Provide fiscal incentives for circular business models, e.g. via tax rebates or support schemes or funds with guaranteed interest rates for circular innovations and start-ups with circular business models Incentivise leased goods, goods with extended manufacturer guarantees or higher recyclability with for example tax credits or reduced VAT rates. In general reduce VATs for remanufactured goods Dis-incentivise unsustainable products with taxation and pricing policies
	Educate the workforce	Mobilise EU funding for developing employment and skills in the sectors necessary for the CE Educate consumers in schemes and systems for collection, take-back and re-manufacturing
Public spending	Inform consumers	Develop policies which encourages use of services instead of buying products and ensure such policies also incentivise trust and convenience for the consumer Help consumer understand the product in relation to his/her needs by bringing in factors such as likely product lifetime, future value for trade-in, total cost of usage and/or ownership and certification of quality into labelling
	Leverage Public Procurement	Bring in circular economy priorities into "Green Public Procurement": train procurement experts on circular products and business models; develop an EU wide network for exchange of best practices; standardise approaches; establish clear guidelines on label use and life cycle costing

### **3 Methodology**

The section below outlines the methodological approach taken in the research and the methods used for data collection and analysis. It starts by describing the research process, followed by the conceptual framework upon which the analysis is based.

#### **3.1 Research process**

The research process was comprised of two main parallel processes:

- 1) Desk research and document analysis on the subjects of public policy, CE, business models and the need for policy intervention as well as relevant resource related environmental policies that are currently in effect or upcoming in Sweden and;
- 2) Collection of empirical data via interviews with business representatives.

The findings from the business interviews were triangulated with results from interviews with selected professionals on the topic of CE, data from participatory observation of political seminars on CE and literature to allow for analysis and making recommendations on how to further support CE business models in Sweden via policy intervention in relation to the current status of the political landscape.

##### **3.1.1 Data collection and analysis**

The primary data collected for this study is of qualitative character via interviews. Richie and Spencer (2002) suggests that qualitative data collection and analysis serves many functions as it allows for the researcher to define concepts, map the nature, dynamics and range of certain phenomena, categorise different types of behaviours and motivations and develop new strategies, ideas or theories (Richie & Spencer, 2002). It is accepted that qualitative research is a valid approach in studying public policy as it can serve policy makers with “[...] a theory of social action grounded on the experiences -the world view- of those likely to be affected by a policy decision or thought to be part of the problem” (Walker, 1985, p. 19).

##### ***Literature search***

Reports on CE (barriers, policy need etc.) were mostly found through channels such as the Ellen MacArthur Foundation website and via the news channel ENDS Europe and EU policy and findings from research programmes were mainly gathered from the European Commission website (ec.europa.eu). Search for peer reviewed articles were limited to hits related to business models, barriers and policies for CE, though some topic specific articles (regarding certain business models such as PSS) were also included to broaden the insights. LUBSearch and Google Scholar were mostly used as search engines.

##### ***Mapping of the Swedish policy landscape***

The aim of the policy mapping task was to understand how the current political landscape addresses elements related to CE, and to put the interview findings into context and allow for analysis. As the scope only included public policy, the policy mapping was limited to official records of government decision making such laws, acts, regulations, objectives and programmes. When mapping the policy landscape the author used three approaches:

1. Desktop research of reports, scientific articles and other publications related to resource management, CE and policy in Sweden. To identify the relevant environmental policy areas in which elements related to CE included in the scope of this thesis are dealt with in Sweden, the report “Survey of resource efficiency policies

in EEA member and cooperating countries - COUNTRY PROFILE: Sweden” (EEA, 2011) served as a starting point.

2. Systematic search of the official webpages of the government (www.regeringen.se) and the Swedish EPA (www.naturvardserket.se) using the search words ‘cirkulär ekonomi’. Responsible staff at the Ministry for the Environment and Energy were contacted via phone to clarify any uncertainties which came up during the process.
3. Asking interviewees of policies in place which they consider relevant on the matter.

Worth noting here is however, as mentioned in Chapter 1 and 2, that no coherent understanding of which political measures actually would support a CE exists yet, making it hard to judge whether a political action taken really do reflect CE thinking and promotes circular business models. This will be further discussed in Chapter 6.

## **Interviewing**

### *Selection of interview objects*

The first step to conduct the research relevant to answering sub-question 1 and 2 outlined in Chapter 1 was to identify who could contribute with information, which was decided to be representatives from companies which partly or fully practice a business model based on circular economy thinking. Companies were mainly identified via the researcher network at the Institute for International Industrial Environmental Economics (IIIIEE) and via ‘snow balling’, meaning that interviewees suggested further representatives to interview throughout the process. Since the aim of the study was to get a general understanding of businesses’ barriers and their view on the need for policy intervention to overcome those, no specific business segment or sector was chosen. Rather, the selection of subjects to interview was based on getting a wide representation of companies practicing business models based on circular economy thinking both in terms of size, business model and sector. The aim was to cover different types of CE related business models such as repairing, remanufacturing, sharing and recycling. Total number of business interviews were 10 plus the reuse park Alelyckan. Seven were with SMEs<sup>9</sup> with an already implemented circular business model and 3 with large<sup>10</sup> companies which currently practice CE within parts of their business which they have an official<sup>11</sup> wish to scale up. Five interviews were also conducted with non-business representatives who were identified as professionals within certain aspects of CE. They were representatives from organisations consulting and educating businesses and public organisations on different matters related to CE, the Swedish EPA as well as the European Environmental Bureau, the organisation behind EREP. The selection of the non-business representatives were based on recommendations from the business representatives via snow balling and through desk top research on policy for CE. Findings from the non-business interviews and the participatory observations (see next section) were used to triangulate findings from the business interviews, wherefore only statements specifically highlighting *similar or contradictory views* are revealed in the findings chapter. For a full list of interviewees, see Appendix 3.

### *The interview process*

Semi-structured interviews were chosen because they allow for the researcher to choose, depending of the interview situation, whether to stick strictly to the interview guide or to follow up answers with new questions outside of the original script (Kvale & Brinkmann, 2009). Such flexibility was important in this study since the interview objects were different in nature, leading

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<sup>9</sup> An SME is a company with less than 250 employees (European Commission, 2015e)

<sup>10</sup> A company with more than 250 employees (European Commission, 2015e)

<sup>11</sup> As stated on company website, in sustainability reports of by representatives of the company

to the presumption that the interviews would take different directions. As mentioned in Chapter 1, the interview guide was developed after an initial desktop research on the subjects of CE and the need for policy intervention as expressed in newly published literature. The guide was formulated to allow for adoption related to the varying conditions of the different companies. A “funnel approach” was used, meaning that initial questions were broad and open ended, moving to more specified and targeted questions towards the end, with specified follow-up questions where clarification was needed, a general recommendation given in literature (Kvale & Brinkmann, 2009). The interview guides are found in Appendix 1 and 2. The interviews were conducted face-to-face or over the phone and took about 45-60 minutes. All the interviews were recorded. Intensive hand written notes were taken during the interview and these notes were later transcribed into separate word documents, one for each interview. Anything that was unclear from the handwritten notes were controlled for by listening to the recording and the transcript was thereby completed. The next step of the interview process was analysing. The method which is one of the most widely used for analysing qualitative interviews is content analysis, which goes through the process of coding, sorting and clustering data into different categories to allow for conceptualisation (Kvale & Brinkmann, 2009; Rubin & Rubin, 2005; Wengraf, 2001). This approach which was taken also in the interview analysis for this study. The interview analysis process therefore started by coding the text by highlighting everything specifically mentioned about the business model and its market conditions, barriers (and drivers) and policy intervention. The coded parts of the data was then sorted out and clustered into different categories: descriptions of the innovation or business model and market conditions, barriers (and drivers), mentioning of concrete policy measures needed and mentioning of policies in place acting as drivers or barriers. Barriers were further clustered according to the conceptual framework (explained in the next section). Mentioning of policy intervention was categorised into type of policy or instrument (regulatory, financial, informative etc.) and further clustered according to the conceptual framework. The non-business interviews were analysed in the same manner.

### ***Participatory observation in seminars***

Information about the current political situation relevant to CE, upcoming policy suggestions and the view on the need for policy intervention to promote CE business models in Sweden from various stakeholder groups was additionally collected through participating in various seminars on CE during the political week ‘Almedalen’ in Sweden in July 2015. The author took extensive notes on what was being discussed and quoted gambits. In total, the author participated in seven seminars hosted by businesses, branch organisations and research institutions. Collecting data in this way is known as participatory observation, a method which is more commonly used in anthropological studies by observing behaviours and actions within communities (Kawulich, 2005) There are various ethical considerations with this type of research method, especially if the participants do not know they are being observed or quoted (Bergold & Thomas, 2012). However, since the seminars held at Almedalsveckan are open to the public and to the media and most of them were being filmed and streamed online, as well as most participant being public figures, the author considered the conditions being rightful for data collection, but quotes have been given anonymously. For a full list of observed seminars, see Appendix 5.

## **3.2 A multi-level perspective on transitions as a starting point**

According to Suurs et al. (2010), the web of constraints reaches beyond barriers to the single company and encompasses the whole industrial and innovation system, the so called enabling environment, or by others called the regime (Geels, 2002). This includes technologies, norms and values which, together with for example the infrastructure developed to support the existing path of development, affects how companies are able to act in different times (Geels, 2002;



Suurs et al., 2010). As further pointed out by Pfeffer & Salancik (2003), no organisation or company acts alone but are ultimately dependent on other organisations with which they interact, and this interaction is usually optimised in accordance with the knowledge and perceptions the actors have. This provides a rationale for not changing business strategies or models but keep doing business as usual. Therefore, as the previous chapters have outlined, moving from a linear economy to a CE will require transformation of both business, politics and consumer behaviour, a *societal transition* if one wants.

The author does consider the thesis to be a transition study per se, but rather a study which provides preliminary insights into barriers and the need for policy intervention to overcome those and create enabling conditions for CE business models to scale up. However, a specific intent of the author is to open up the scope and place the study within the wider context of a societal transition to a CE. The thesis as hand therefore takes transition theory as a starting point for the research. Transition theory is built upon the concept of technological transitions (TT) which are defined as “major technological transformations in the way societal functions such as transportation, communication, housing, feeding, are fulfilled. TT do not only involve technological changes, but also changes in elements such as user practices, regulation, industrial networks, infrastructure, and symbolic meaning” (Geels, 2002, p. 1257). Transition theory is a growing research field which has gotten increased attention during the last two decades and several sub-theories have evolved on how to analyse transitions, two major schools of thought being Technological Innovation Systems (TIS) and Multi-level Perspective (MLP) on transitions (Markard, 2012). TIS focuses on prospects of a particular innovation and is concerned with the successful diffusion of the like (Bergek et al., 2008). Using TIS only allows the building of a foundation for technology specific policies (Jacobsson & Bergek, 2011), whereas MLP focus on the prospects of a broader transition or a variety of innovations and is concerned with transformative processes on a societal level (Twomey & Gaziulusoy, 2011).

Table 3-1. TIS & MLP comparison

	TIS	MLP
<b>Focuses on</b>	Prospects and dynamics of a particular innovation	Prospects and dynamics of broader transition processes/variety of innovation
<b>Concerned with</b>	Successful diffusion of a particular technology or product	Successful transformative societal processes

Source: Twomey & Gaziulusoy (2011)

The presumption is that when studying barriers for business to scale up a novel business model, findings will be of different characters and related to different levels in society, wherefore the author argues that using insights from the MLP on transition developed by Geels (2002) serves as a good starting point. The MLP is however only used as a guiding framework to help the author outline the different levels in society where barriers (and drivers) for businesses with CE business models occur and elaborate upon which of those levels of barriers can be impacted by policy. Hence a simplified picture of the MLP framework is presented. As pointed out by Suurs et al. (2010) above, the ‘web of constraints’ is suggested to be found within the regime, wherefore the author has further developed a conceptual model for analysis which uses insights from MLP and the ‘web of constraints’ combined. This will be further explained in the next section, following the presentation of the MLP outlined below.

Though still criticised by some authors for not providing an understanding differentiated enough (see for example Smith et al., 2005), the MLP has become an important meso-theory in explaining processes of transition in both production and consumption (Foxon, 2011; Markard et al., 2012). The MLP builds upon the idea that transition happens due to activities in multiple



levels in society, the niche, the regime and the landscape, and that these activities affect each other, which moves the transition forward. A simplified illustration of the refined MLP by Geels & Schot (2007) is provided in figure 3.1. Geels (2002) points out that the different levels in the MLP are not descriptions of the real world, but rather concepts made up of exploration and analysis with the aim of understanding sociotechnical change and its complex dynamics.

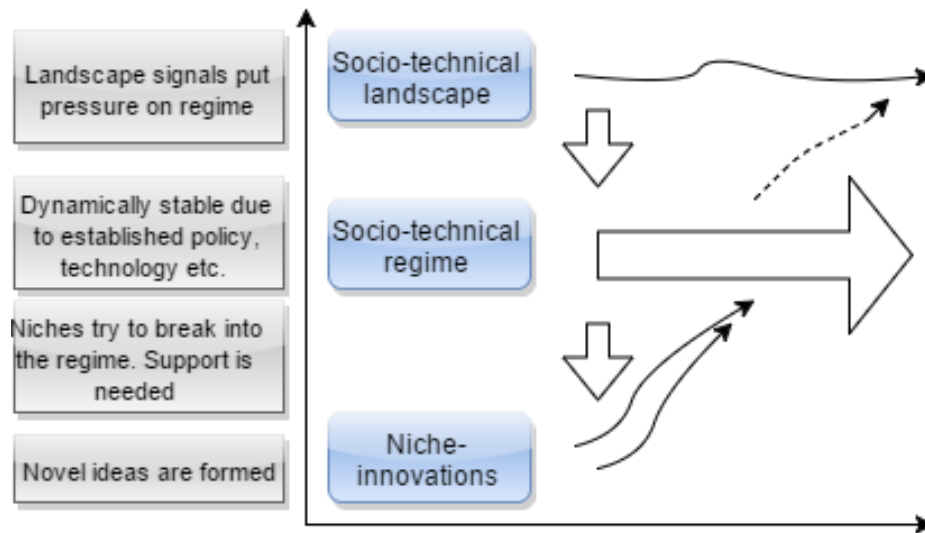


Figure 3-1. A multi-level perspective on transition

Source: Own illustration adapted from Geels & Schot (2007)

New, niche innovations (in this case business models based on circular economy thinking) struggle to break through due to activities and technologies which are already established in society; those that are part of the *regime* and around which favourable conditions for those have been created, such as markets, user preferences and technologies (Geels, 2002). Because infrastructure, user patterns and regulations are all built up to suit existing technologies, new ones have a competitive disadvantage before they have even entered the market, automatically stabilising the established socio-technical configurations (Freeman & Perez 1988).

The landscape is further the global political and economic arena within which the regime has been created. Phenomena taking place at the regime and landscape level creates *conditions* for niche innovations to develop or not whereas processes taking place ‘between’ those levels, such as niche-to-regime, have the ability to *change those conditions* by, either top-down or bottom-up, impose certain prerequisites such as policies and funding opportunities (Geels & Schot, 2007). Geels (2002) points out that decision makers have the ability to influence the regime by interacting at the niche-to regime level, but that controlling landscape phenomena is, generally, out of the hands of decision makers. If enabling enough conditions are created for niches to break through and adjusting the socio-technical regime however, the new regime has the ability to influence the landscape (Geels & Schot, 2007). Table 3.2 provides a short description of each level of analysis in the MLP and gives examples of (presumed) phenomena relevant to the case of scaling up circular business models as part of a wider societal transition to a CE based on the literature reviewed in Chapter 2.

Table 3-2. MLP, levels of analysis: description & presumed phenomena

Level of analysis in the MLP	Description	(Presumed) phenomena connected to CE business models
<b>Niche</b>	Creation of organisational, technical and social innovations.	A novel socio-technical offering in the form of new business models focusing on e.g. remanufacturing/reuse/repair is trying to enter the market
<b>Niche-to-regime</b>	Co-evolution of new technologies, user preferences/consumer behaviour and markets	Some policies and funding have possibly helped the innovation or business model to develop so far, but new or revised policy intervention is needed to help the business model to scale up.
<b>Regime</b>	Structure of current socio-technical system at the meso level, such as infrastructure, markets, industry practices and user behaviours.	The existing, linear economic system imposes barriers (and possibly some drivers) linked to infrastructure, regulations and user preferences/ consumer behaviour etc. There might be clashes between policies, policies and societal goals, policies and regulations, e.g. prices of products made from virgin versus reused/recycled materials, labour costs versus costs for natural resources, infrastructure for recycling versus reusing, the will to own versus to share, trade rules for reused products, PP practices.
<b>Landscape</b>	Political and economic trends at the macro (usually global) level	Ongoing process in the landscape affect the progress of the new innovation or business model by changing certain conditions necessary for development and breakthrough into the regime, e.g. prices of natural resources, economic growth, environmental problems, cultural/normative values, international trade rules

Source: Geels & Schot (2007); Peck, Grönkvist, Hansson, Voytenko, & Lönnqvist (2015); CE literature

The assumption in this study was that barriers can be found on all levels of the framework and that phenomena on all levels, and the interactions between those, impact the business models, whereas the niche-to-regime level is the most important one for policy interventions. By using the MLP as a starting point for the analysis, the author is able to visualise to the reader on what levels businesses encounter barriers in scaling up their business models, on what levels policies are needed to overcome those and which factors policy cannot easily influence. The MLP however does not allow for analysis of what type of policy measures will be needed to overcome a specific barrier, nor does it allow the author to distinguish between different needs of different companies or business models. As described in the next section, an additional conceptual framework *within the guiding ideas of MLP* was therefore developed to serve as the basis for analysing the findings and answer the research questions.

### 3.3 Conceptual model for analysis

As explained in Chapter 2 and in the section above, barriers are seldom single case phenomenon acting individually upon businesses to uptake certain measures, but rather they occur in a web of constraints (Bastein et al. 2014; Kemp & Soete 1992; Kemp & Djik, 2013). To allow for an understanding of the need for policy intervention to overcome the web of constraints, the analysis of barriers therefore focus on three questions as suggested by Kemp & Djik (2013):

1. Why is the barrier existing?
2. Why is the barrier existing for some businesses and not for others?
3. What could be the attempts to overcome the barriers?

The web of constraints acting upon businesses to take up resource efficiency measures has by Bastein et al. (2014) been described through a conceptual model, see figure 3.2.

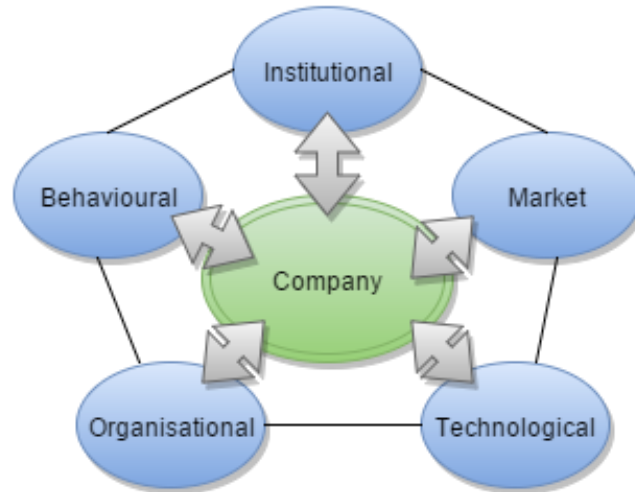


Figure 3-2. *The Web of Constraints*

Source: Adapted from Bastein et al. (2014) who based it on Kemp & Soete (1992)

This model was used as a basis to further develop a conceptual framework which allow for analysis of the interview findings regarding barriers for CE business models and policy intervention needed to overcome those. As outlined in Chapter 1, transforming to a CE will require four building blocks (1) materials and product design (2) new business models (3) global reverse networks (4) enabling conditions (Planing, 2015). As previously explained, the focus of the thesis at hand was on the two building blocks ‘new business models’ and ‘enabling conditions’, outlining the relationship between the two. However, ‘enabling conditions’ in this case is to create a political framework which is in support of development and upscaling of CE business models. The building blocks ‘product design’ and ‘reverse logistics’ are thereby assumed to be *included* in ‘enabling conditions’ in the sense that *it is presumed that product design for CE and set up of reversed logistics can be regulated through policy*.

The model was developed as follows: assuming that policy intervention only allows for minor contributions in overcoming internal barriers such as behavioural ones, the conceptual framework was refined to only include institutional, market, technological and organisational barriers. Institutional and market barriers were assumed to be found at the regime level in society whereas technology and organisational barriers are possibly found at both niche and regime level as they might be of both internal and external character (AMEC, 2013). The next step of the analysis was to create an understanding of the need for policy intervention to overcome the barriers. Another layer was therefore added to the model, suggesting policy intervention based on findings from the literature review in Chapter 2.

Whether or not a business take up resource efficiency measures is according to Bastein et al. (2014) depending on three major factors: type of firm, type of sector and country and type of resource efficiency measures considered. This has been assumed to be true also in the case of scaling up CE business models, wherefore the framework suggests that the need for policy intervention to overcome barriers and create enabling conditions will be different depending on the type of firm, in what sector the business is and what type of CE business model the business is practicing. It is also important to recognise which conditions that can only influence, but not easily be influenced by public policy, which according to Geels & Shot (2007) are phenomena happening at the landscape level. The conceptual framework for analysis, combining insights from MLP and the ‘web of constraints’ developed in line with the reasoning above is presented in figure 3.3.

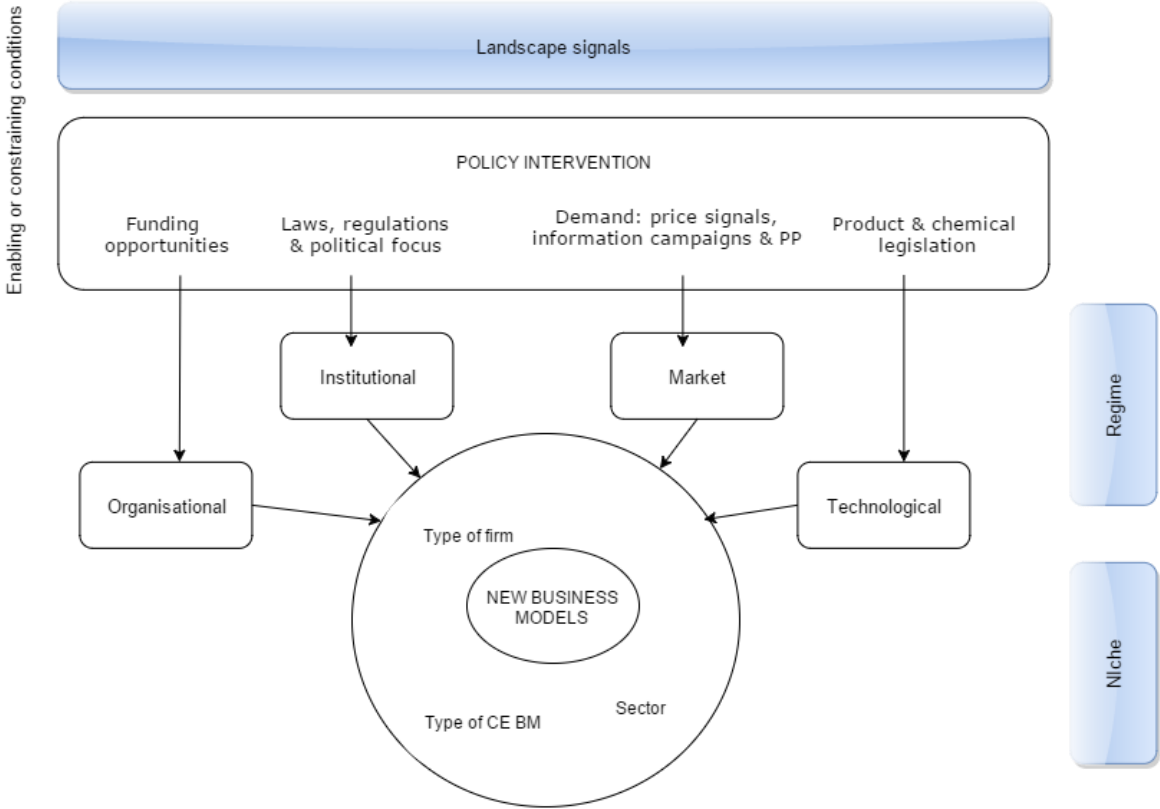


Figure 3-3. Conceptual framework for analysis

Source: Own illustration

## **4 The current policy landscape in Sweden**

This chapter provides the results of task 2, which was to map relevant environmental policies in Sweden in order to understand how the current political landscape addresses elements related to CE, and to put interview findings into context and allow for analysis. As mentioned in Chapter 3, to identify the relevant environmental policy areas in which elements related to CE included in the scope of this thesis are dealt with in Sweden, the report “Survey of resource efficiency policies in EEA member and cooperating countries - COUNTRY PROFILE: Sweden” (EEA, 2011) served as a starting point. Through the interviews, the author further identified product and innovation policy to be of relevance, wherefore these are shortly mentioned as well. The aim was not to outline all available policy instruments within environmental policy, but rather to provide the reader with an understanding of how the current policy landscape of relevance is shaped, to allow for further analysis related to the interview findings presented in the next chapter. One section outlines a snapshot of possible policy development by providing examples from the research program ‘sustainable waste management’, which several interviewees referred to as important input to the ongoing political debate. The final section reveals a few statements regarding possible policy development made by politicians at the political week Almedalen in July 2015.

### **4.1 General note on the current tax system**

In Sweden labour is taxed with a bit over 31%, meaning a third of the total cost an employer has to pay for an employee is tax. This is the highest proportion in the EU (Ekonomifakta, 2015). EU only allows member states to have three levels of VAT, where the ‘normal’ VAT cannot be lower than 15% and the lowest VAT cannot be lower than 5%. The normal VAT in Sweden is 25%, and 12% and 6% are lower exemption rates used for example for books (Skatteverket, n.d.). Environmental taxes amounts to 5-6% of the total tax system in Sweden. Tax on natural gravel is the only tax classified as a ‘natural resource tax’ (SCB, 2015).

### **4.2 Environmental policy**

#### **4.2.1 Environmental legislation**

Sweden has an Environmental Act, Miljöbalken, adopted in 1998. It is a Code that integrates several former environmental laws, with the aim of promoting a sustainable development which ensure future generations the right to a healthy and good environment (SFS 1998:808). Miljöbalken contains the general rules of consideration (allmänna hänsynsreglerna) which is a set of guiding principles. All organisations and activities should follow these rules, to the extent reasonable, and the authorities may take guidance from the rules when elaborating on mandatory requirements for organisations and businesses (for instance pollution levels and precautionary measures set in permits or after inspections). One of five ways in which Miljöbalken shall be applied is so that “reusing and recycling as well as other economising with material, raw materials and energy is promoted so that a cycle is reached” (SFS 1998:808, 1 kap 1§). Most relevant for the promotion of business activities related to a CE is Chapter 15, Waste and Producer Responsibility, under which regulations are formed and financial instruments have been developed regarding waste management. Eight product groups are covered by mandatory regulations on producer responsibility in Sweden, meaning that the producers are obliged to collect and treat the products after their end-of-life. Example of other regulatory instruments are the ban on landfilling of combustible and organic waste, and examples of economic instruments are the taxes on landfilling and on incineration of household waste (Eionet, 2012).

## 4.2.2 The environmental objectives system

Swedish environmental policy is outlined in the policy package ‘environmental objectives system’ (Miljömålssystemet), which contains policies at different administrative levels, with differences in meaning. The overall objective is outlined in the so called ‘generation target’ (Generationsmålet), which states that all major environmental problems should be solved within one generation without outsourcing environmental damage to countries outside Sweden (“Generationsmålet - miljömål.se,” n.d.). The generation target states that the environmental politics should focus on seven areas, three of which according to information provided by an EPA representative to EEA (2011) are most relevant to increase resource efficiency, namely: “‘the eco-cycles are resource effective and as far as possible free from hazardous substances’, ‘a good housekeeping with resources’, and ‘consumption patterns of products and services give rise to as little environmental and health problems as possible’” (EEA 2011, p. 7).

To ensure the generation target is met, Sweden has 16 environmental quality objectives set out to be reached by 2020. They are non-binding but influential in the sense that they are describing the condition of the environment which Swedish environmental policy shall lead to (“Miljömålen - miljömål.se,” n.d.). Extra relevant in relation to resource efficiency is number 15, ‘a good built environment’, which includes policies on sustainable waste management and which the National Board of Housing, Building and Planning (Boverket) is responsible for (EEA, 2011). There are further 24 milestone targets adopted by the government as steps on the way to reach the generation target and some of the environmental quality objectives (“Etappmål - miljömål.se,” n.d.). In December 2013, EPA suggested a new milestone target of at least 60% of household waste should be prepared for reusing and recycling year 2020 (Naturvårdsverket, 2013). The government has not yet taken a decision about this milestone target (Personal Communication, Charlotta Broman, Ministry of the Environment and Energy 11<sup>th</sup> September 2015). Two separate targets for the building and food sector are however implemented, see figure 4.1 below (“Etappmål - miljömål.se,” n.d.).

In the policy “*From Waste Management to Resource Management. Waste plan of Sweden 2012–2017*” the EPA however clearly states that a general goal is that the amount of household waste which is reused shall increase (Naturvårdsverket, 2012). As a result of the Waste Framework Directive, outlined in Chapter 2, Sweden has further developed its first national waste prevention programme valid 2014-2017 (Naturvårdsverket, 2015). The two overarching orientation targets in the programme are: 1) the amount of waste shall be reduced continuously compared to 2010 and 2) the content of hazardous substances in materials and products shall be reduced. Sector specified targets are set up for food, textile, electronics and building, complementing the milestone targets, presented in figure 4.1 below. The EPA is responsible to investigate which policy instruments are best suited to ensure targets are reached, develop indicators to measure progress and to follow up the work (Naturvårdsverket, 2015). Four instruments are currently under investigation: deduction for repair services (REP); logbook for buildings to track materials; lowered cooling temperature in shops and households; and information campaign regarding lowering of food waste in households. The programme states that the EPA will further investigate the opportunities to put demands on waste preventing measures during PP, further develop measures on how prevention of waste within the four focus sectors can become reality and suggest areas in which further research is needed, for example in the area of sustainable business model development (Naturvårdsverket, 2015). The word CE is not used in the waste prevention programme unless when describing a cradle-to-cradle based business model showcased as a good example.

Figure 4.1 below summarises the relevant parts of the environmental objectives system and adopted policies mentioned above.

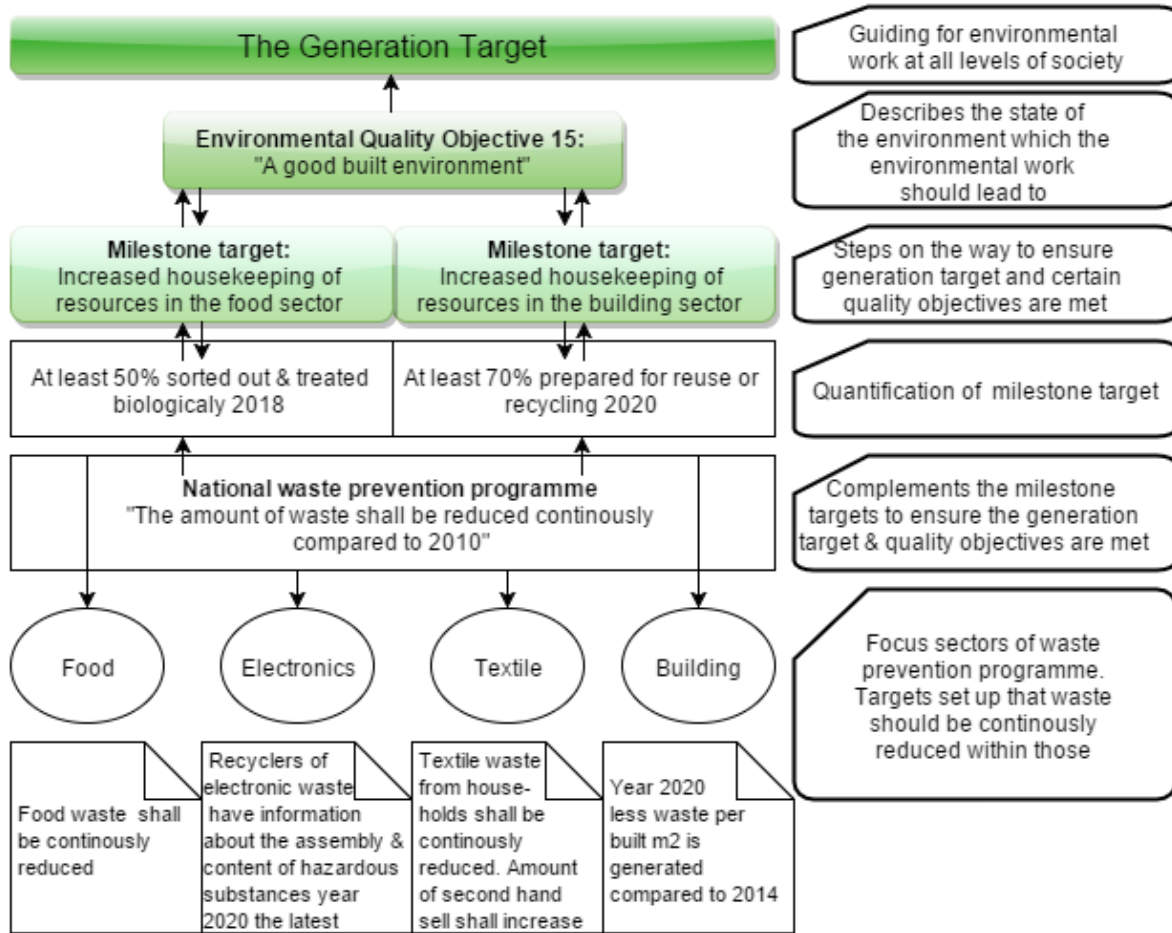


Figure 4-1. Relevant environmental policies in Sweden

Source: Own illustration

### 4.3 Outcome of political approaches so far

The EEA (2011a) concludes that the Swedish environmental quality objectives have a systematic approach to environmental issues which covers resource efficiency, and that recycling rates are high compared to other EU member states. Quantitative targets however lack in several areas (EEA, 2011a). The Swedish EPA follow up the work with the environmental quality objectives regularly, and has come to the conclusion that only two of the sixteen objectives will be met with today’s politics. ‘A good built environment’ will not be met (Regeringen, 2014).

According to Boverket’s monitoring, it is difficult to reach ‘a good built environment’ within one generation. The amount of household waste increased with 1% between 2011 and 2012 and the incineration of waste was 51% whereas the material recycling was 48% during the same period (Regeringen, 2014). The aim of the producer responsibility is to reduce the amount of waste but the effect of the regulation is hard to measure and the legislation has thereby had limited effect in that respect. Further, the effect of the landfill tax is not clearly positive since it is unclear how much raw materials has actually been substituted with recycled material due to the tax, even if the amount of landfilled materials has been reduced (Naturvårdsverket, 2012). In January 2014, the government gave Boverket the task to develop a suggestion for a strategy which shall contribute to the target being reached. In the strategy Boverket recognises the need for resource efficiency and a transition towards a CE (Boverket, 2014), but no concrete suggestions on how it should be implemented is mentioned.



Research by Kalmykova et al. (2015) show that no policies which focus on reducing demand of goods have been introduced in Sweden and waste management policies are the only ones which are related to resource consumption of non-fuels. Implemented policies however fail to influence consumption patterns, preventing waste and reduce resource consumption (Kalmykova et al., 2015).

Figure 4.2 below show the development of reusing and recycling until 2020 *if all the measures set out under suggested milestone target of 60% of household waste being prepared for reusing or recycling would be adopted*. The conclusion is that the target of 60% would be met, but that reusing would still only play a minor role while recycling would dominate (Naturvårdsverket, 2013).

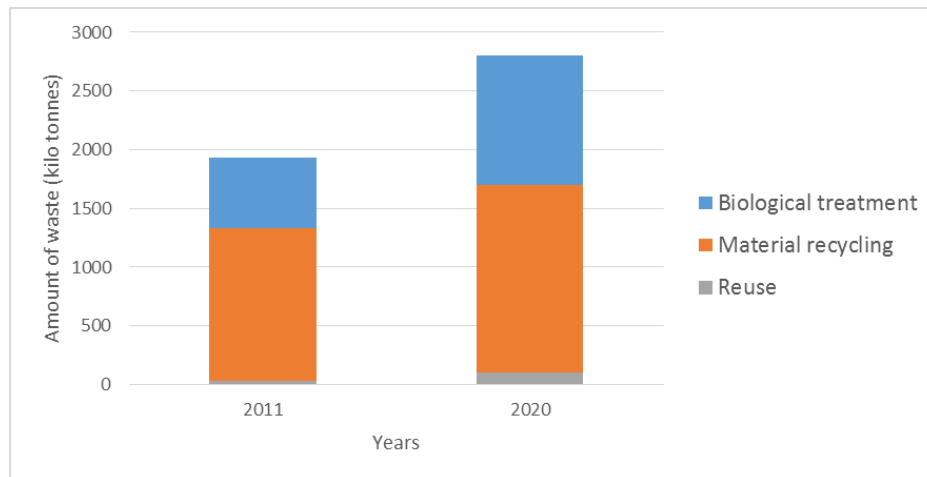


Figure 4-2. Amount of waste biologically treated, recycled or reused 2020 with all suggested measures set out under the milestone target ‘60% of household waste being prepared for reusing or recycling’ implemented<sup>2</sup>

Source: Adapted from Naturvårdsverket (2013)

## 4.4 Possible new and revised policy

### 4.4.1 Evaluated instruments for sustainable waste management

Within the six year long research program ‘Sustainable Waste Management’ financed by the EPA, fifteen policy instruments for sustainable waste management were evaluated. Two of the evaluated instruments in the program have frequently been brought forward in literature on policy intervention for CE, namely a tax on virgin raw material and a lowered VAT on services (See Chapter 2, e.g. Vanner et al., 2014; Wijkman & Skånberg, 2015). Studies during the program showed that a tax on virgin raw material<sup>13</sup> would only have a small effect on recycling since the supply of recycled material is insensitive to price changes on the market, and the net effect on the total amount of waste generated would be generally low. Consumption patterns would likely not be significantly affected due to the fact that when a product reach the end-consumer at the market, the material cost is a small proportion of the total price (Forsfält, 2011). The effects of a lowered VAT on services from 25% or 12% to 6% would be that the consumption of services would increase<sup>14</sup> and the manufacturing of products would decrease to a certain extent, meaning

<sup>12</sup> Compared to today’s level (office paper and PET cans not included) (Naturvårdsverket, 2013)

<sup>13</sup> Evaluation was done on a potential tax on all non-renewable material put on the Swedish market with 10 SEK/tonne and on another potential tax on petroleum products which are not being taxed today (Finnveden et al., 2013).

<sup>14</sup> With 3.6% (Forsfält, 2011)



that the instruments would steer the market in the favourable direction (Forsfält, 2011). The most preferred instrument in terms of environmental benefits would however be a mandatory requirement on recycling of recyclable materials (Finnveden et al., 2013). The researchers however concluded that it is hard to design policy instruments which can lead to a significant reduction of waste, and that it is obvious that developments are steered by a combination of technological and financial development as well as consumption patterns and life style choices. New ways of thinking and designing policies with a holistic approach is therefore needed if a significant reduction in waste generation is to be reached. Single instruments could probably contribute to a lowering of waste generation with 1-1.5%, wherefore a package of instruments is needed. Information is a necessary complement to all the evaluated instruments, but insufficient in itself (Ekvall & Malmheden, 2012).

#### 4.4.2 Suggestions for sustainable consumption

While it is obvious that sustainable resource management and lowered environmental impacts comes from regulating both production and consumption, most implemented policy instruments in Sweden targets the production while policies targeting consumption are traditionally controversial, and Sweden is currently lacking a cohesive strategy for sustainable consumption and production (Naturvårdsverket, 2014). Whereas production and consumption in the area of energy is regulated through both regulative (the Eco-design Directive) and economic (energy taxes), product consumption has almost exclusively been regulated via informative instruments (Naturvårdsverket, 2014). In 2014, the EPA put forward suggestions which could lead to a more sustainable consumption, and the overall suggestion was to develop a strategy for sustainable consumption. Four policy recommendations directly related to CE were made which would include the involvement of different governmental agencies, see table 4.1. It was also recognised that, for example, there is a need to increase the environmentally adjusted features in the tax system to ensure negative externalities of products are included in the price (Naturvårdsverket, 2014).

Table 4-1. Policy suggestions for sustainable consumption related to CE brought forward by the EPA

Proposals for action	Involved agencies	Measure
Investigation of policy instruments which can increase products life length	Naturvårdsverket, Tillväxtverket, Skatteverket, Energimyndigheten, Kemikalieinspektionen	Investigation
Targeted support for development of sustainable business models	Tillväxtverket	Economic
Innovation competitions and innovation procurement for reusing and CE	Konkurrensverket, Energimyndigheten, Vinnova, Naturvårdsverket, Havs- och vattenmyndigheten, Kemikalieinspektionen, Tillväxtverket	Research and development, Economic
Good examples and collaboration amongst governmental agencies for CE	Naturvårdsverket, Tillväxtverket, Vinnova, Konsumentverket, Konkurrensverket, Energimyndigheten	Informative

Source: Adapted from Naturvårdsverket (2014).

Several of the suggestions have been taken further by the government, but processes of implementation are long. The Department of Finance will develop a strategy for sustainable

consumption to be presented in the budget proposition for 2017 (Personal Communication, Ann-Cerise Nilsson, Ministry of the Environment and Energy, 11<sup>th</sup> September 2015).

#### 4.4.3 Governmental standpoints on CE

On the official government webpage, as of July 1<sup>st</sup> 2015, one can read that the government recognises a growing interest for new CE business models among Swedish companies as well as an increased interest among households to buy second-hand, rent or share products (Regeringskansliet, 2015). In the SE Non-paper on to the European Commission on the new CE package, one can read that the Swedish government “welcomes initiatives on collaborative economy/industrial symbioses and new business models” and “collaborative consumption, assisted by relevant requirements and standards on product design and resource efficiency, will provide basis for new business models and thereby business development, including new jobs” (Swedish Government, 2015, p. 3). Some of the concrete measures which Sweden would like to see in the CE package are summarised in table 4.2.

Table 4-2. Elements for the new CE proposal: measures suggested by the Swedish government

<b>Administrative/regulation</b>
<ul style="list-style-type: none"> <li>• more stringent restrictions on hazardous substances in products</li> <li>• tailored measures towards specific waste streams regarding preventing and recycling</li> <li>• common EU indicators for waste prevention &amp; stringent requirements on prevention programmes</li> <li>• binding targets for recycling which are clear and waste specific</li> <li>• EPR to include possibility to disassembly, upgrade and repair; durability; info on hazardous contents;</li> <li>• applying CE practices within the scope of the Eco-design Directive</li> <li>• development of the scoreboard for resource efficiency</li> </ul>
<b>Economic</b>
<ul style="list-style-type: none"> <li>• an analysis of the EU budget to phase out environmentally harmful substances</li> <li>• facilitate EU funding for green growth and CE</li> <li>• continued efforts at EU level on principles for internalising environmental costs</li> </ul>
<b>Informative</b>
<ul style="list-style-type: none"> <li>• improved information about recyclability and content of hazardous substances in products</li> <li>• direct policy action on sustainable consumption through education, information campaigns</li> </ul>

Source: Own categorisation with data from Swedish Government (2015)

In the proposition to the state budget for 2015, the government suggested to the parliament that one focus area within the environmental politics should be CE and that it intends to work with the industry sectors to develop CE business models (Regeringen, 2014). In relation to this the government stated the importance of environmental requirements in PP and is currently working on including the right to set up such requirements into Swedish law, a work which should be done by April 2016 (Regeringen, 2014). The budget was however voted down in the parliament and the content is subject to change (Personal communication, Olle Billinger, Ministry of Finance, 12<sup>th</sup> August 2015). A new budget proposition will be presented in September and it will state that the government shall continue to be part of the international dialogue on CE in the EU, and that CE is an approach which should permeate many areas in the environmental politics. It will not state that a strategy for CE should be developed (Personal

Communication, Ann-Cerise Nilsson, Ministry of the Environment and Energy, 11<sup>th</sup> September 2015).

#### 4.4.4 Further upcoming development?

During one of the seminars in Almedalen, the Minister of Financial Markets and Consumer Affairs Per Bolund revealed that the government has the ambition to ensure we climb in the waste hierarchy from recycling to reusing. He stated that the government is for example currently investigating a material strategy and a possible chemical tax, and from the fall of 2015 the EPR will expand to also become a shop responsibility which means that shops will have to take back what they sell. Bolund clearly stated that *“it shall be profitable to reuse”*.

### 4.5 Product policy

The Eco-design Directive is implemented in Swedish policy since 2008 and the Swedish Energy Agency (Energimyndigheten) is responsible for implementation and evaluation (Eionet, 2012). As described in Chapter 2, discussions on how the Eco-design Directive could further implement parameters on resource efficiency, such as design for disassembly, is currently being held at the EU level, and such standards are already in place for some product groups (Jepsen et al., 2015). The outlook to include wider requirements of such criteria in the Eco-design Directive seems promising (Bundgaard et al., 2015).

### 4.6 Innovation policy

Environmental and innovation policy often go hand in hand which can be seen in for example funding and research. Worth noting in relation to that is that Sweden has a national strategy for innovation developed by Näringsdepartementet which recognises climate measures and resource efficiency as societal challenges for which innovation is needed (Regeringskansliet, 2012). It was recognised at a cabinet meeting in February 2015 that resource efficient and innovative solutions can contribute to the development of the Swedish business community and a decision was taken that a review of existing regulations and measures for innovation needs to be undertaken and that an investigator should be given the mission to identify drivers and barriers for a movement of the Swedish innovation climate in such a direction. A specific task would be to analyse and come up with suggestions on how the development and upscaling of CE business models can be facilitated (Näringsdepartementet, 2015).

### 4.7 Funding & research

The Swedish government has undertaken actions to support the development of knowledge regarding the potential of PSS business models through funding of research projects and stakeholder consultations. The Swedish National Road administration has for example financed feasibility studies and conferences on car sharing, including needs and possibilities (Pleppys et al., 2015). Examples of other state funded or co-state funded research programs are briefly given below in table 4.3.

Table 4-3. Sample of funding & research related to CE in Sweden

Funding body	Program	Aim
Sweden's innovation agency, Vinnova	RE:Source	Increasing sustainability and resource efficiency through focusing on resource- and waste management combined, , strengthen the competitiveness of the Swedish industry and support the creation of new business models
Kungliga Vetenskapsakademin (IVA)	'Resource efficient business models'	Stimulate the development of new resource efficient business models and identify policy instruments which will steer the development of such models
Mistra, among others	REES 'Resource efficient & effective solutions'	To take a holistic, multi-stakeholder approach in researching resource efficient and effective solutions for the Swedish manufacturing industry based on circular economy thinking

Source: "RE," (n.d.), IVA (2014), MistraREES (2015)

## 4.8 Summary

While Sweden is a frontrunner in recycling (EEA, 2011a), the current policy landscape does not seem to be able to influence resource consumption (Kalmykova et al., 2015) and promote the inner circles of a CE. Measurable targets for reusing are only expressed in terms of "it shall increase continuously". The suggestions for a sustainable consumption includes several policy instruments which could start to address inner circles of a CE if they are adopted, and that the Department of Finance is going to include a strategy for sustainable consumption in the budget proposition 2017 is promising. The Non-Paper to the European Commission recognises the need for new business models which is further promising, though most of the concrete suggestions are around changes in waste legislation. Several of the suggested measures in the research program 'sustainable waste management' are recognised as important in studies on policies for CE (e.g. EREP, 2014; Wijkman & Skånberg, 2015), however it is yet to be seen which of the evaluated measures will be implemented. CE is to be included in the upcoming budget proposition in September 2015 as an area which should be included in environmental politics, however no strategy for CE is to be developed (Personal Communication, Ann-Cerise Nilsson, Green Economy, Ministry of the Environment and Energy, 11<sup>th</sup> September 2015).

## 5 Findings

This chapter provides the results of task 3, which was to identify barriers for new business models and the need for policy intervention to overcome those by conducting semi-structured interviews, mainly with business representatives but also selected professionals and by observing political CE seminars. As outlined in Chapter 1, the results of this task serve as the main source of information for being able to answer the sub-questions and the overarching RQ. Section 5.1 gives a brief overview of the results presented in figures, and section 5.2 outlines the findings in detail as clustered and categorised along the conceptual framework.

### 5.1 Overview of results

As mentioned in Chapter 3, 10 company interviews plus an interview with the reuse park Alelyckan were made. In addition, five interviews were made with non-business stakeholders and seven political CE seminars were observed. The figures below only contain data from the business interviews, which was the major stakeholder group. Findings from the other sources of data collection are included in the next section.

The number of times a specific barrier was mentioned by business interviewees are provided in figure 5.1. Analysing the findings show that one more type of barrier needs to be added to the conceptual framework outlined in Chapter 3, which is a ‘political’ one, related to the mentioning of lack of political leadership. Further explanation of this addition is given in the next subsection. As we can see, institutional barriers comes out on top followed by market barriers. Mentioning of other barriers are much fewer and somewhat equally distributed among technological, organisational and political. As explained in Chapter 2, market barriers include phenomena related to both price signals, consumer behaviour and economics of scale (Bastein et al., 2014). It is further difficult to place a phenomenon into being one type of barrier or the other as findings reveal that one phenomenon can lead to more than one type of barriers. Labour cost is an example of this. The definition given by Ashford (1993) would probably suggest it to be an institutional barrier whereas the definition by AMEC (2013) would probably suggest it to be a market barrier. In figure 5.1 below it is included in both categories for reasons which will be further described in the following sections. This does not come without complications, which will be further discussed in Chapter 6.

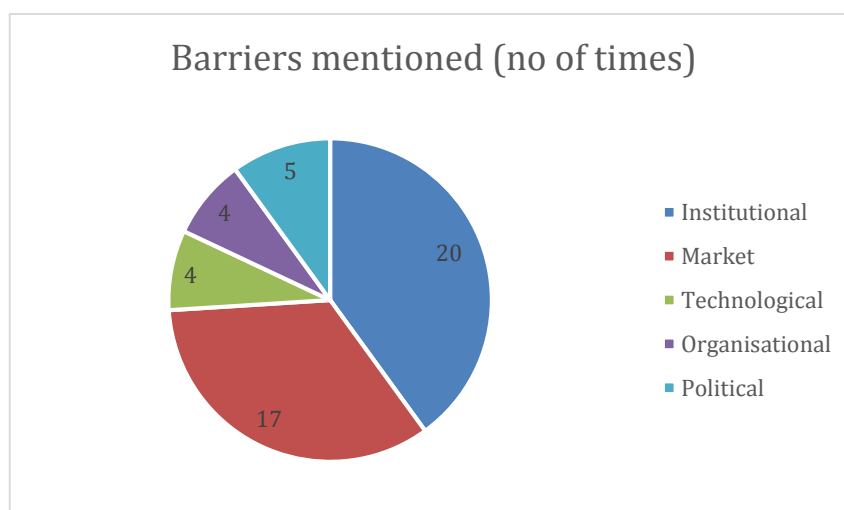


Figure 5-1. Type of barrier mentioned (no of times)

Source: Own illustration based on interview data June-August 2015

The number of times certain categories of policy measures were mentioned is summarised in figure 5.2. As we can see, economic measures were most frequently mentioned followed by an equal distribution around regulatory, informative and demand side interventions. The categorisation follow the one by Mont & Dalhammar (2005), which suggests that changes in the tax system are considered financial measures. Worth noting is that no interviewee pointed to a single measure as a silver bullet solution to overcome experienced barriers but several suggestions were rather mentioned together, suggesting a package of measures is needed. This division of policy instruments does not allow for categorisation of suggestions made regarding governments to put requirements on themselves to lead by example, to invest in enabling infrastructure or to change approach in political strategies, measures which were frequently mentioned by interviewees as needed to create enabling conditions for CE business models.

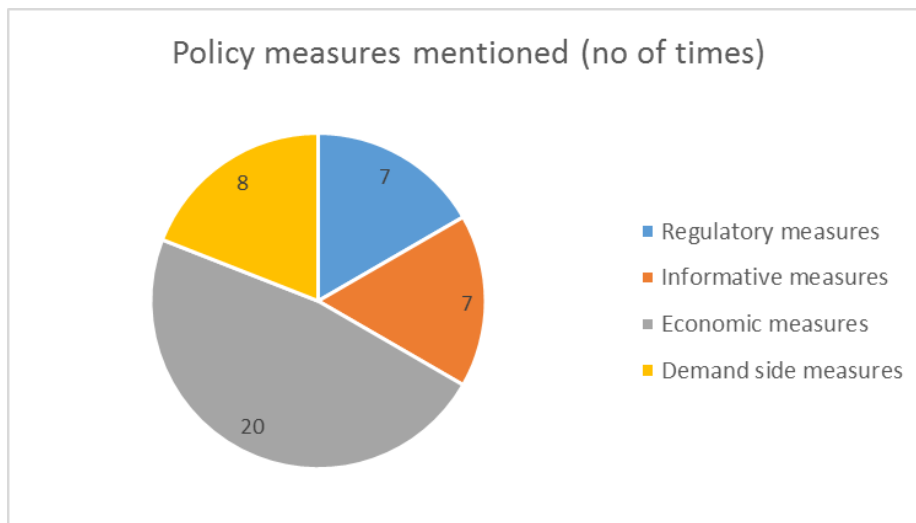


Figure 5-2. Type of policy measure mentioned (no of times)

Source: Own illustration based on interview data June-August 2015

Figure 5.3 finally presents the most common suggested measures in number of times they were mentioned. The most commonly suggested measure was to ‘educate the public via information campaigns’. It was however never mentioned in isolation but always together with for example regulatory or economic measures.

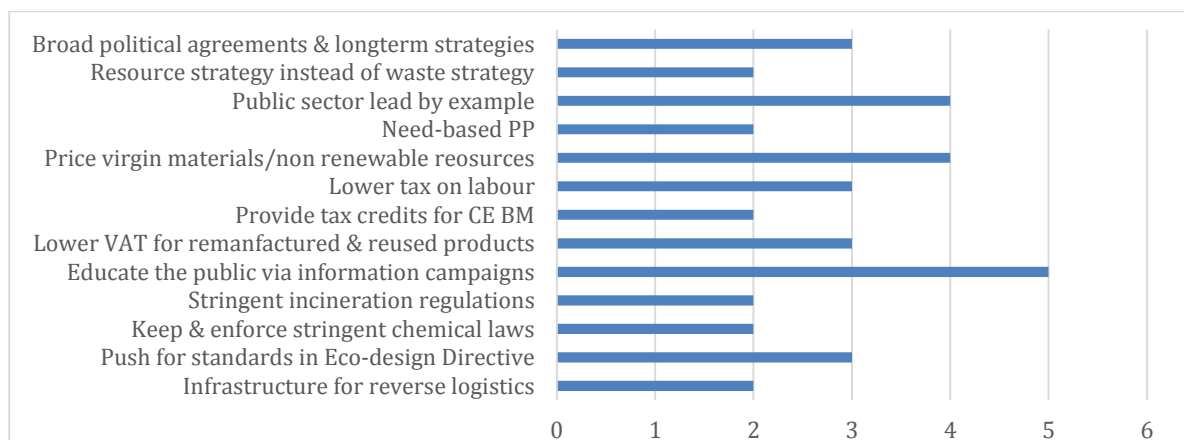


Figure 5-3. Policy intervention: most common suggested measures (no. of times)

Source: Own illustration based on interview data June-August 2015

## 5.2 Findings structured along the framework

Findings in this section are presented along the conceptual framework, which able the author to present which type of policy intervention could help to overcome which barrier. Several thematic barriers were identified under each major category, which are presented alongside each other and not in any order of priority. The same goes for the policy suggestions. As outlined in Chapter 3, findings are mainly based on the business interviews, revealing results from the non-business interviews and the participatory observations only where statements specifically highlight *similar or contradictory suggestions*. Quotes are delivered anonymously, however when it adds value to point out which interviewee made which statement, the type of business and business model is outlined in [...], for example [SME, B2B/B2C, repairing/reusing]. For further information about the companies interviewed and their CE based business model, see Appendix 4. Findings from the non-business representatives are marked with a ♠ and findings from the participation in the Almedalen seminars are presented in boxes. Worth noting is that this chapter contains a compilation of findings from all interviews, and not all interviewees agree to all the measures suggested. Who said what in what context and implications of that will be further discussed in Chapter 6. As mentioned in the previous section, it is difficult to draw the line between for example institutional, political and market barriers, wherefore some overlap might occur and some clashes might be noted. Implications of this will also be further discussed in Chapter 6. As shortly mentioned in the previous section, the framework has been further developed since presented in Chapter 3 and a ‘political’ barrier has been added. The new model is presented in figure 5.4 below.

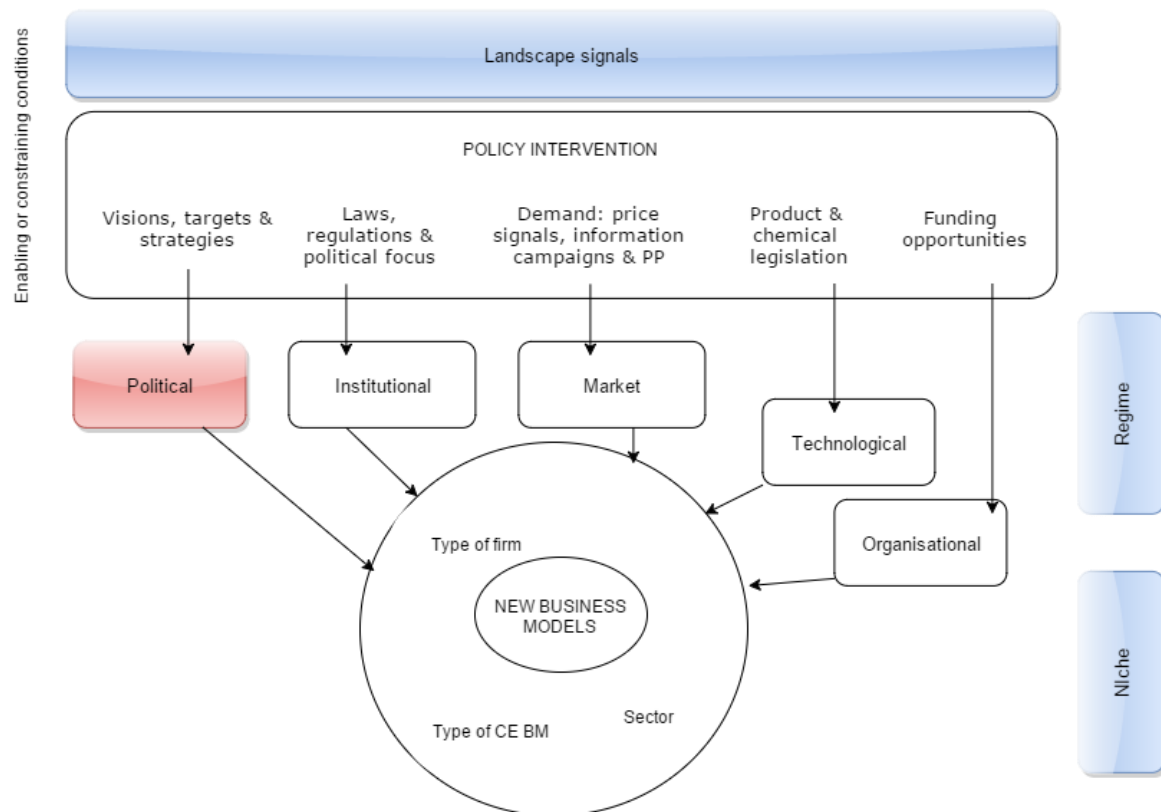


Figure 5-4. Adapted conceptual framework for analysis

Source: Own illustration

The chapter will present the findings as follows: First, overall findings related to the three levels of the MLP (niche, landscape and regime) will be revealed in order to guide the rest of the

chapter. Then, the barriers will be presented according to how they are categorised in the framework (political, institutional, market, technological and organisational), in separate sections. Policy intervention suggested to overcome each barrier is presented directly after in the same section. Links to literature is made when clarification or underlining is needed, however a deeper analysis and discussion around the findings is provided in Chapter 6.

## 5.3 Niche, landscape and regime phenomena

### 5.3.1 The niche itself is the internal driver

The ‘niche’ level of the MLP in the case of this study are the new and creative business models based on circular economy thinking partly or fully implemented by the interviewed companies. Even though the companies are all established firms on the market, they are part of a niche since they have a novel idea which in one way or another try to break out of the current, linear way of doing business. Their way of doing business is not ‘business as usual’, hence they are not part of the current socio-technical regime (Geels, 2002). The driver for developing a CE business model for the SMEs were found to be mostly internal. Almost all interviewees from SMEs pointed out the fact that the people working at the company want to do something for the environment and words like “pride” and “engagement” were mentioned. The recognition of possible future competitiveness by being “one-step-ahead” was also mentioned several times as internal drivers for both SMEs and large companies: *“Companies which do not take resource issues into consideration will be outcompeted in the future”* [SME, B2C, reusing/repairing]. One other study using the MLP to analyse drivers and barriers in a transition suggest that “the way in which the relationship between niche and regime is conceptualised in MLP means that the niche cannot be anything other than a driver of transition” (Wangel, 2015, p. 5). Some internal organisational and technological challenges were however mentioned by large companies in this study, suggesting that *barriers exist at the niche level*, even if the niche itself is a driver. However, as will be explained in the coming sections, policy is suggested to have only limited impact in overcoming such barriers.

### 5.3.2 Landscape signals impose both drivers and barriers

It became obvious from most of the interviews regardless of type of firm, sector or business model that the window of opportunity for a socio-technical transition to a CE lies in the rising awareness and concern among the global population about resource depletion and environmental degradation, as well as the rising and volatile prices for natural resources. Landscape signals however still impose barriers. On a macro-economic scale, one interviewee for example pointed out that the consumption & growth based model is a true barrier for CE that we have to address. Related to that, and similar to what has been pointed out in previous studies (see for example Schulte, 2013), another interviewee highlighted that we are stuck in certain way of doing business and measure progress, pointing specifically to the focus on quarterly reports and short term profits, which make it hard to make long-term investments into changes in business activities. Finally one interviewee pointed out the complexity of having a global market: *“If Sweden is a frontrunner and set up certain requirements and standards for how products are produced, Swedish companies will become less competitive since, as the system is today, products become more expensive if you introduce such requirements. Decisions need to be taken on a high level if we’re to reach a CE: EU or completely international is necessary”*. As outlined in Chapter 2, this is recognised by the EU, which can be seen in the vast number of reports and research projects commissioned and funded by the body lately, e.g. the POLFREE project and the commissioned scoping study by Vanner et al., (2014).



### 5.3.3 The regime imposes more barriers than drivers

As mentioned in Chapter 3, the regime encompasses, in simplified terms, everything related to status quo of society at the local, regional or national level. Suggested in Chapter 3 was that the existing regime, which currently is built upon a linear economic system, imposes barriers (and possibly some drivers) to the businesses interviewed in this study, linked to infrastructure, regulations and user preferences/consumer behaviour.

Some phenomena at the regime level were recognised as drivers for the interviewed businesses. One interviewee pointed out that residual value of damaged goods and disposed materials has so far been ignored but is increasingly understood, which starts to send the right signals to the market [SME, B2C, reusing]. EU regulations regarding requirements of high percentage of material recycling of certain goods (e.g. cars) were by some interviewees highlighted as drivers, and restriction of chemical contents in products. The increasing policy attention for CE was further pointed out as a main driver by many interviewees since they expect changes in regulations and tax systems in line with a CE to come in place within some years' time. Further, a changing form of ownership, the sharing economy, is a new driver in society according to several interviewees. *"We are seeing a movement from owning to private leasing which means that people transfer the owner responsibility to someone else, pushing us to change our business models"* [Large, B2C, sharing]. The findings however show that the regime impose more barriers than drivers for the interviewed businesses, in line with Geels & Shot (2007). For various reasons, there is not enough demand for reused, repaired and remanufactured products or products made from recycled materials. This is according to the findings related to current laws, regulations and tax systems, as well as information deficiencies and consumer behaviour. One interviewee stated that there is further an interest from established players on the market to hinder reusing since it is a threat to *their* business model [SME, B2B, reusing]. Further, a general agreement seems to be that we are stuck in rhetoric of 'waste management', which has led to infrastructural and institutional lock-ins.

### 5.3.4 Policy intervention is needed to bring niches into the regime

All interviewees, business and non-business, as well as participants of the Almedalen seminars, agree that policy intervention is necessary if current path of development is to be breached and new, CE business models are to be able take place in the regime. Findings however reveal that there is no consensus on how exactly policy should intervene, though the most pressing issues to deal with politically seem to be five, summarised in figure 5.5.

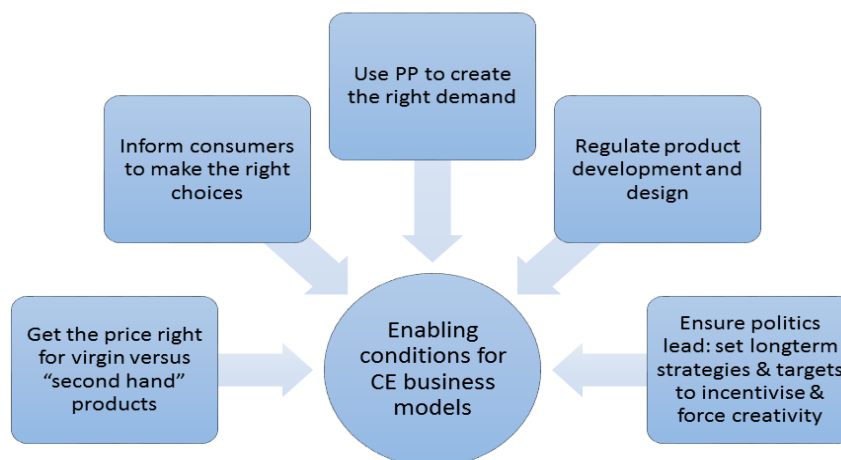


Figure 5-5. The most pressing issues to deal with politically

Source: Own illustration

The following sub-sections outline barriers found at the regime level and suggested policy intervention to overcome those, as expressed by the interviewed business representatives and as organised along the conceptual framework. As explained above, the framework has had some adjustments made to it since first outlined in Chapter 3.

## 5.4 Regime barriers and policy intervention to overcome those

### 5.4.1 Political barriers require visions, targets and strategies

#### **Barriers**

##### *Lack of political leadership*

As mentioned above, analysing the findings showed that one more type of barrier needed to be added to the conceptual framework outlined in Chapter 3, which was a ‘political’ one. Though all the external barriers within the ‘web of constraints’ are political in the sense that they can be influenced by policy, the ‘political’ barrier added to the model refers specifically to *lack of political leadership and corresponding target-setting, long-term visioning and holistic thinking in policy development* which was expressed as a barrier by many of the interviewees in this study. Representatives from the large companies expressed that lack of political leadership and corresponding clarity in policy making makes it risky for them to make any major and necessary investments, while SME representatives generally expressed that they lose out on financing opportunities and the ability to reach bigger customer segments due to this. Expressed was also that remanufacturing is among many seen as ‘second class quality’, both politically and among consumers, and acceptance and maturity of the market is therefore key. The opinion of several interviewees, independent on type of firm or business model, was that public authorities should lead the way on this matter.

To add this barrier is justified by previous research outlined in Chapter 2, for example Preston (2012) and Jiao and Boons (2014), who argue that governments must ensure policy frameworks which are predictable, strong and clear regarding head of direction to ensure businesses are willing to take on risks and high upfront investment costs. As outlined in Chapter 4, the mapping of Swedish environmental policy reveals that moving towards a CE is expressed as politically important, but no coherent political framework has been adopted which set stringent and goal oriented targets of how we should get there. The relevant adopted milestone targets are rather indicative, and only sector specific targets for waste minimisation for the building and food sector have been adopted. The same goes for the orientation targets set out in the waste prevention programme.

#### **Policy intervention**

Several interviewees pointed out that the ‘political’ barrier can only be overcome if policy makers make a decision to move in a certain direction and start developing long-term strategies and setting up goals and targets in line with such strategies. The business representatives proposed several interventions during the interviews, many of which can be summarised under the need for a **legal framework** which makes it natural to move in this direction, and to have a **holistic view** when designing policies so that conflicts do not arise. Found below are the most commonly discussed interventions.

→ The large companies expressed a need for **long-term political agreements** across the political ‘blocks’ so that companies dare to invest in for example new technologies and infrastructure. “*You can basically come up with whatever laws you want as long as you don’t change them*” was one statement. “*A broad agreement is often good in the long-term, wherefore we need to create a system*”

which enables agreements across the political boards so that long-term thinking can be the basis for decisions” was another.

→ Governmental organisations must **live as they learn within their own organisation and lead the way** was further a common suggestion. *“It would help if public authorities take the lead and promote the concept. In the United States politicians recently decided that remanufacturing systems shall be set up for all federal vehicles. The more politicians bring up the concept and push for it, the more awareness will rise and the more the market will mature, which will increase the use”* [Large, B2C, remanufacturing]. Another interviewee further stated that it should also be possible for business and society to **demand transparency in public organisations**, which would open up for reusing in governmental organisations [SME, B2G, reusing].

→ To adopt a **national target for resource efficiency** was suggested by one SME representative [B2C, repair/reuse]. The interviewee specifically claimed that it would help companies which already are resource efficient to get a jumpstart on the market, but also to force creativity for new solutions: *“Today 20-30% of a role of fabric is thrown away when it’s cut to make clothing. It costs manpower and thereby money to stand and try and lay the polygon patterns so that minimal amounts are wasted. The producers think it is expensive even if that fabric actually has a value that could be used. Creativity could be forced by having stringent targets for example for resource efficiency”*.

## 5.4.2 Institutional barriers require changes in laws and regulations

### Barriers

#### *Clashing policies and inconsistent messages*

The mixed impact of international laws and EU directives was brought up by several interviewees from both large companies and SMEs. One interviewee highlighted the fact that it is not easy to send spare parts across international borders since damaged ones might be seen as ‘waste’ and therefore illegal to send across country borders under certain international conventions, which *“definitely is a barrier to the remanufacturing business”* [Large, B2C, remanufacturing]. Another interviewee pointed out that the content of the WEEE directive is both positive and negative, especially pointing out Annex 5 as a big issue: *“This annex exists to ensure that export of damaged electronics to developing countries does not occur, but this hits against the reusing sector”* [SME, B2B/B2G, reusing/repair]. This company used to sell IT equipment to a repairer in Poland where it was further sold for reuse on the Polish market, but the interviewee stated that this is difficult now because they cannot as easy send defected goods across the border. This means that they now have to repair defected IT equipment in Sweden, but *“here it is more expensive so automatically less gets repaired here than if we could sell it to Poland. The idea of this regulation is good, but for it to be positive for the reusing/repairing business is must be cheaper to repair in Sweden”*. The high labour cost in Sweden was mentioned by all interviewees in the repairing/reusing business as something which ultimately contradicts the idea of a CE, and which is a major barrier for their business model to scale up.

All B2G businesses further pointed out that procurement customs usually hinder purchase of more durable products or reused/repared products since procurement require product declarations and usually solely focus on lowest price. Pointed out by interviewees from the reusing business was also that chemical laws work against the wish to increase re-using. There is also lack of enabling infrastructure such as central parking spaces solely for car sharing cars, something which does not go hand in hand with current environmental policies for lowering congestion in cities such as the congestion fees.

## **Policy intervention**

Suggestions related to the barriers mentioned above were mostly related to changing of existing regulations. It was recognised that many of the institutional barriers are imposed by EU and even international regulations which are out of the hand of Swedish policy makers to change. Pointed out was however that many of such institutional barriers can still be overcome if the tax system in Sweden is adjusted. Those suggested measures will however be brought up in the next sub-section ‘market barriers’ as they were mostly mentioned in relation to correcting price signals on the market.

→ **PP regulations need to be re-written** according to the B2G interviewees as PP is a bottle neck for new technologies today. ‘Environmental’ companies which are serious and follow laws offer products and services which automatically gets more expensive and thereby follow behind in procurement processes: *“Today political rules and legislations for environment are put up but it costs money to follow them, which means that companies which do follow them get left behind since price is steering PP. We need to see a change of PP regulations so that price is not the primary focus. The way it is today, municipal organisations do not manage to pick up that some companies are actually in the fore-front”* [SME, B2G, reusing; reuse park].

→ Related to that, one suggestion brought forward by two interviewees was **that procurement should be ‘need-based’** and not based on purchasing products [SME, B2G, reusing; Large, B2C, renting].

→ **Put in place enabling infrastructure**, such a centrally located parking spaces reserved for cars in car sharing systems was further requested by a company offering sharing services [Large, B2C, sharing].

→ Even if chemical laws were recognised as working against reusing, it was nevertheless obvious that no interviewee wanted to see an easing of chemical laws. Rather, **chemical laws should be used to ensure a viable market** for high quality second hand products [Large, B2C, reusing].

♠ One non-business representative who work closely with business pointed out the necessity of stringent regulations in the new EU CE package: *“The new EU CE package should include directives for product development such as design for disassembly and clean materials as well as measures for promotion of new business models. There should also be clear legislation around what materials and how much is allowed to go to incineration”*.

### **Renew environmental legislation**

It was mentioned in several seminars and from different stakeholder groups that we need to modernise environmental legislation. Brought up in several seminars was that Miljöbalken is fifteen years old and does not include legislation around climate change impacts. *“Existing legislation does not promote innovation”* was a comment made by a stakeholder involved in a sharing economy initiative.

## **Barrier**

*Focus on waste management has locked in infrastructure & fails to incentivise prevention of waste*

Several interviewees pointed out that today, most targets and plans set up by the government are supporting a linear way of thinking and doing business. Strategies, targets and planning must therefore be re-thought to support CE business models. A clear example was made regarding

that today the political priority is ‘waste management’ and waste strategies are built up to treat products at their ‘end-of-life’. This was brought up as a barrier by several interviewees since ‘used’ products are seen as waste and not as resources. Several interviewees pointed out that focus on ‘waste management’ has further led to that it is easier to recycle than to reuse for both private consumers and for companies since all the infrastructure for material recycling is already in place. It is hard to know who to turn to if you want to sell your products for reuse or to buy reused ones, whilst it is very easy to know how to recycle them, one pointed out. *“This is noticeable amongst companies which could potentially be our customers; it is much easier for them to call a recycling company and ask them to come and pick up their products than to find someone who want to buy them for reuse”* [SME, B2B/B2G, reusing]. Intertwined with the political barrier outlined in the previous section, but also related to this institutional barrier, several interviewees mentioned lack of goals to fulfil due to non-existent targets for reusing (and thereby no legal requirements to reuse in society) as holding back their type of business from scaling up. The fact that too much material is being sent to incineration due to energy demand created by investments in such infrastructure was also brought up several times. *“Waste is big business”* as expressed by one interviewee [SME, B2C, reusing/repairing].

### **Policy intervention**

Suggestions for policy intervention to overcome these institutional barriers were widespread and some of them directly contradict each other, which reveal the complexity of the issue. It seemed to be a general agreement that we have to move away from the traditional focus on waste management, which has locked us into a certain type of unsustainability, but the views differ in how this should be done. Clarity around the definition about ‘what waste is’ was also brought up as important since it affects laws and regulations on how materials are handled and what is treated as waste and not.

→ Several interviewees mentioned the need to put in place **infrastructure for reverse logistics**, so that it is easy for people and business to leave products for reuse, repair and remanufacturing instead of the easiest option being recycling or incineration.

→ Think **‘end-of-use’ and have plans and targets for that** was suggested by one interviewee: *“What we cannot make use of perhaps someone else can? There must be solutions that enables products to be used over and over again instead of solutions to treat them at their ‘end-of-life’.* For this, cross-sectoral collaborations must be enabled” [SME, B2C, recycled materials/renting].

→ Related to that, one suggestion brought forward by two interviewees was that Sweden should develop a **‘resource strategy’** instead of a waste strategy [Large, B2B, recycling; SME, B2B, reusing].

→ A suggestion brought forward was that perhaps it should be **possible to store materials in landfills** in wait for the development of new technologies to be able to successively phase out the toxic substances from the materials. This would require a **removal of the landfill tax** for recycling companies [Large, B2B, recycling].

→ **Restricting what materials are allowed to go to incineration** was a suggestion brought up by two interviewees, for example prohibiting that recyclable products to get burned [SME B2B/B2C recycling; reuse park]. One of them suggested a **national strategy on incineration** including more **stringent requirements on ‘cleanness’ of the fumes** at the incineration. *“Maybe we would then automatically conclude that plastic should not be incinerated at all?”*

→ Two interviewees suggested that **targets for collection of materials for recycling should be raised**, especially for plastics [SME, B2C/B2B, recycling; Large, B2C, reusing]. Another

interviewee however **opposed higher goals for material recycling** as in one way it is a threat to his company's business model since it indirectly puts a maximum life time on products: *"For example a computer 'should' only live for 4.8 years before it is recycled if recycling waste goals set up are to be reached. This is directly opposite to what we should want to achieve if we're to move towards a circular economy, and directly opposite to what this company wants to achieve with our business model"* [SME, B2B/B2C, reusing].

→ Yet two other interviewees highlighted that focus is on the wrong type of targets today. For their business to be viable we need to have political **targets first and foremost for prevention of waste and reusing of products**, not for recycling [SME, B2B/B2C, reusing]. One of them specifically pointed out that there also has to be possible to trace the fulfilling of such targets all the way top-down from the state level to the public sector at the local level.

→ Adding to the same debate another interviewee however brought up that **we do not necessarily need targets for reusing but an understanding of what reusing is**, and that we need to be critical about our behaviour. It was stated that it is not for granted that reusing is the best: to keep products longer is better than to 'shuffle them around': *"To not buy them at all is better in the first place. The time for which people keep a product has been drastically reduced and the question is if this is triggered by how easy it is to buy and sell reused or second hand. Are we triggering consumption here as well?"* [Reuse park].

→ In relation to that, the same interviewee suggested that politicians might have to look over the **need for stringent policies on consumption**: *"It is politically accepted to set targets for recycling but politicians do not know how to handle laws around consumption and production. This is needed to get to the core problem. For example it is strictly regulated how to import and export waste but no regulations on new products which are 'equally crap'"* [Reuse park].

### **Tough political choice to incentivise waste prevention**

It seemed to be a general agreement amongst most stakeholders and politicians in the CE seminars that Sweden has approached the waste hierarchy "upside down", pointing to that 51% of the household waste was incinerated, 48% was material recycled and 1% went to landfill last year. Several panellists pointed out that we have locked ourselves into non-sustainability by building waste incineration plants, which means that there has so far been no incentive to reduce waste. To change this will require tough political choices, since clearly there will be winners and losers among different stakeholders: *"There will be much protest from for example municipalities if we are serious about changing to a CE and thereby will regulate how much is sent to incineration plants, since great investments have been done in this kind of infrastructure"* was one statement. This conflict became obvious when it was stated in another seminar by a representative from a municipal energy company that *"we have to change our perspective and perceptions. District heating is a sharing economy"*.

## **Barrier**

### *Silos in public institutions*

The lack of collaboration between governmental agencies was something which was pointed out by some of the interviewees from the large companies in relation to the barrier of conflicting environmental goals and clashing policies mentioned above. It was referred to the word 'silos' several times in relation to how environmental policy, and policy in general, is developed in Sweden. Linked to that argument, it was brought up by an SME representative that the difficulty

of creating cross-sectoral and cross-actor partnerships is a barrier to development and upscaling of innovative niche business models in general.

### **Policy intervention**

No clear suggestions of policy measures which could help overcoming the above mentioned barrier was put forward, but all the interviewees who referred to institutional set-up as barriers suggested that we need to **re-think how environmental policy is dealt with** and find new ways of collaborating among institutions.

#### **Rethink public institutions**

This barrier was highlighted during one of the seminars in Almedalen as well, specifically pointing to the fact that we treat environmental issues in silos and don't have a holistic perspective on them. The chairperson of the government's analysis group for 'Grön Omställning' claimed: *"in the analysis group for Grön Omställning we are requested to look at how Sweden can become climate neutral in 2050 and have a fossil free vehicle fleet 2030. But this does not for example include looking at material and resource efficiency, which is a problem since it of course go hand in hand and affect for example carbon emissions"*. A professor from Linköping University went further and pointed to the fact that we should consider remaking our political institutions as they are too path dependent the way they are working now, something which is a barrier to new ways of designing cross-collaborative policies. This was highlighted also by a representative from the recycling industry, who claimed that the fact that the responsibility for the environmental quality objectives is spread out on different governmental agencies creates goal conflicts and hampers collaborative action.

## **5.4.3 Market barriers require creation of demand**

### **Barrier**

#### *Price signals*

The fact that raw virgin materials are too cheap was brought up as a major barrier by all the representatives from the reusing/repairing business, but also by several others, as it leads to lack of demand for second hand, repaired and remanufactured products. *"The fact that negative environmental externalities for the extraction of virgin material is not accounted for in the pricing of new products sends the wrong signals to the market"*, one interviewee clearly pointed out [SME, B2B/B2C, reusing]. The fact that taxes and fees do not differentiate between CE and linear solutions was further brought up as creating an uneven playing field by most interviewees, bringing up different examples: that congestion fees apply for cars which are part of sharing systems [Large, B2C, sharing], that recycling companies have to pay landfill tax when they aim to extract raw materials from waste [Large, B2B, recycling] and that VAT does not differentiate between new and second hand products [SME, B2C, reusing]. In general, there is a lack of policies which stimulate demand for second hand products, several interviewees stated.

#### *Labour costs*

In relation to price signals mentioned above, all interviewees with a business model based on repairing, reusing or remanufacturing pointed out that high labour costs makes labour intensive services too expensive to perform in Sweden relative to producing new products, imposing a competitive disadvantage for such products on the market. Such services are therefore usually either placed in other countries or simply not performed at the scale the companies would need to scale up such business activities.

### *Economies of scale*

Several interviewees stated that their impression is that most actors actually agree that we have to move towards a CE: *“everyone think it is a good idea”*. However, as pointed out by one interviewee, politicians are interested and open for input on what needs to be done to get us there, but *“the pace is slow because there is no one who is doing this kind of business (remanufacturing/ re-using) on a large scale yet. Politicians do not want to turn upside down something which is currently ‘working’”* [SME, B2B/B2C, reusing]. A few interviewees from other SMEs clearly stated that if big companies would take the lead and transform their business models, the concept would spread faster since the information and knowledge would reach the broader public. *“Our company is probably to some extent speaking to the already convinced consumers when we are marketing our products but we do not reach out to the broader mass of people”* [SME, B2C, repair/repair/renting]. Another interviewee pointed out that market penetration is limited without economics of scale since the quality of recycled or remanufactured products cannot be guaranteed.

### **Policy intervention**

As revealed in section 5.1, economic instruments were the most commonly suggested measures. All interviewees stressed the necessity of some kind of economic instruments or price correction to create a level playing field on the market, but suggestions on how such measures should take form differed. The highest level of agreement seemed to be that some kind of change in the tax system is needed, by differentiating between CE activities and businesses and non-CE businesses in the tax system. The use of both positive (incentives) and negative (disincentives) economic measures were brought up. There was however no consensus in which change is the most preferable, though a lowering of tax of labour and a rise of tax on virgin raw materials seemed to be the suggestions which most interviewees agreed upon as important. Many of the suggested incentives and disincentives were mentioned in combination by some interviewees, while others put their emphasis on one or the other. ‘Lower tax on labour’ and ‘price virgin materials’ were for example mentioned by some interviewees in combination as a ‘green tax shift’ while others did not mention that term. All suggestions brought forward in this subsection can be summarised by the quotes from three interviewees regarding stimulation of demand:

*“It is a matter of price on new products versus reused ones. To get policies which stimulate demand is necessary, there is no point in collecting material or products for reuse if no one wants to buy them. Such policies are not present for example in the new milestone targets recently adopted: there is no stimuli to create demand for the products”* [Reuse park];

*“There is no demand for cables and equivalent on the ‘second-hand’ market, even if they are brand new and still in the original packaging, since it is too cheap to buy the brand new product. Politicians need to interfere with the market because status quo is not as it should be: there is a rebate on new production of goods since no one needs to pay for emissions or pollution. This must be corrected for since it is a barrier for circular economy to get going when it is too cheap to produce new and too expensive to repair old”* [SME, B2B/B2G, reusing];

*“Remanufacturing of our products is taking place in Poland since labour costs there is only 25% of the cost in Sweden. If remanufacturing had taken place in Sweden the market had disappeared completely since the remanufactured phone had gotten as expensive as new one almost. The only alternative to move the remanufacturing to Sweden today would be if the whole process gets robotised, since that is cheaper than labour”* [SME, B2C, reusing/remanufacturing].

→ One of the measures suggested by the B2C SMEs with a business model based on repairing, remanufacturing or reusing was the need for a **lower or removed VAT on reused or remanufactured products**: *“it is a concrete action which would send a strong signal to the market”*. Two B2B/B2G businesses representatives however highlighted that such a change in the tax system



would have limited impact on their business, one stating: *“VAT reductions or repair rebates is focusing on private consumers while more than half of our company’s customers are companies and governmental departments, wherefore a lowered VAT would have limited impact on our business”*. Labour costs must instead be reduced he claimed (see next suggestion).

→ Interviewees from SMEs in the repairing, reusing and remanufacturing business as well as the reuse park Alelyckan argued that **lowering tax on labour** is probably the most important measure for them to be able to scale up. In many cases it was suggested together with a need for increased prices of raw materials (see next suggestion).

→ Another similar suggestion brought up by another SME interviewee was to **lower the payroll tax for service-based jobs** [SME, B2C, recycled materials/reusing].

→ There was a general agreement among many interviewees from all type of firms and business models that we must **raise the price of natural resources and tax what we do not want to have on the market, such as fossil resources**, to send the right signals in what direction we want to move.

→ Two concrete suggestions of possible changes in the tax system were further made by large companies; to **exempt car sharing cars from congestion fee** and **exempt recycling companies wishing to extract raw materials from landfills from the landfill tax**. *“Since such cars reduce the congestion by being one car which is used for many users, maybe it could be possible to see a change in the law here and scrap the congestion fee for cars in sharing systems”*? [Large, B2C, sharing]. *“In a CE we will get another role as a resource company instead of a waste company. If we are seen as a supplier of raw materials, we will have a role in a CE, but then we should have the same rules as the mining industry. Today we have a competitive disadvantage because of the landfill tax, which hinder us from extracting raw materials from for example ashes since we cannot pile it in wait for extraction”* [Large, B2B, recycling].

→ To give **tax credits for CE businesses models** was lifted up by two SME representatives, while not recognised by large companies.

→ For public institutions to make demand side interventions to create markets was something which was brought up by several interviewees, mostly B2G SMEs, but also by one large B2C company. One suggestion brought forward was that **municipalities should work as test beds and try-out spaces for new technologies** by stating 1% or a few % could go to new technologies through technology procurement. *“Let for example 5% of procurement become 10% more expensive to test out new technologies. It’s about taking responsibility as an official organisation”* [SME, B2G, reusing].

♣ All but one of the non-business interviewees mentioned that removing VAT on reused materials and products would be an enabler, one of them pointing out that it is only logic since *“people have already paid VAT one time for the product, why having to pay again”*? Another interviewee however pointed out the difficulty to go through with a lowering on VAT due to EU legislation, even if he supported the measure from a Swedish perspective. An easier measure to go through with would according to him be a tax rebate for repair services (REP). Another interviewee clearly stated that the way the tax system is today it is contra productive to the development of a CE and that we need a green tax shift.

♣ *“But as long as the bad is subsidised we will not get anywhere”* another interviewee pointed out and was very clear that the first we need to do is getting rid of environmentally harmful subsidies and start taxing activities which are damaging to the environment.

### **Green tax shift, lowered VAT & raise in environmental taxes: differing views**

The benefits of a green tax shift was highlighted by many participants in the different Almedalen seminars. To lower the VAT on remanufactured or repaired products and possibly get rid of it completely for recycled products and materials was mentioned as promising measures, but the risk for rebound effects was highlighted as it might lead to raise in total consumption. To raise environmental taxes was therefore mentioned as key by a member of the analysis group for Grön Omställning, but opposed by a member of the opposition in the parliament: *“Personally I believe in a green tax shift, but we should not raise taxes on natural resources in Sweden since that would mean that the competitiveness of Swedish companies will go down”*. In another seminar, the issue of even focusing on the tax system in the first place was questioned by a professor from Linköping University as he argued it to be only tactical measures which we shouldn’t get stuck in. Rather we have to *“think about strategic measures if we are to transition to a CE: maybe we have to transform the educational system to reach behaviour change?”*

### **Barrier**

#### *Consumer behaviour*

All business representatives from companies which practice sharing or collaborative consumption highlighted that this is still an extremely small part of their business. They linked this to several barriers related to consumer behaviour, such as lack of consumer knowledge around such new business models and lack of trust among consumers to know what they get. These barriers were also mentioned in relation to selling of repaired, remanufactured and second hand products since remanufacturing is often seen as ‘second class quality’, and that there are social constructions around the use of second hand or reused products which make them less attractive on the market. A lack of ‘branding’ as some interviewees called it. Further it was brought up that lack of transparency of how products are made makes it hard for consumers to make conscious choices. There is no information tool which can fully present the circular aspects of a product, meaning that consumers cannot make choices based on such requirements.

Brought up by a B2B/B2G interviewee was that it is hard for them to actually get used products to buy, since companies and governmental departments do not see the value in their old products and thereby not naturally want to sell them for reuse. They therefore need to work hard to reach out to society about the importance of reusing and they have sales people calling up potential customers as there is a clear information gap [SME, B2B/B2C, reusing]. Other SME interviewees clearly pointed out that the spread of information is crucial for their businesses to scale up, but the fact that they are such small companies does not allow them to do it themselves.

### **Policy intervention**

Many interviewees mentioned information spreading as necessary to raise consumer awareness and change consumption behaviours. Two examples were given how government should intervene, the most common being to ‘educate the public via information campaigns’.

→ Representatives from all type of firms and business models stated that politicians and the media need to **spread information and knowledge through information campaigns** to encourage a certain type of behaviour or consumption. *There is a need for information to get out to people on what kind of product this is. This we cannot do alone as a small company, we need the support from society in some way for spreading information* [SME, B2B/B2C, recycling].

→ One interviewee stated that even though her company generally do not use labels, if there was a **label that incorporated the circular aspects of the product** she guessed her company would use it as it would help consumers understand what they buy and make fast choices. Highlighted was however that such a label is complex to implement: *“who would set the rules for this and how would it be ensured it actually took a CE perspective”?* [SME, B2C, recycled materials/renting].

♣ One of the non-business representatives highlighted the importance to include resource efficiency and how things are made in all levels of education, as well as in economy and design programs at the University if we are to reach long-term change.

#### 5.4.4 Technological barriers require product and chemical regulations

##### **Barrier**

In the ‘web of constraints’ the technological barrier is mostly related to whether or not the company at hand has access to the necessary technology or processes needed to take up the resource efficiency measure (Bastein et al., 2014). Hence it should according to the MLP be first and foremost recognised as a niche barrier. As explained in Chapter 3 however, the MLP also recognise technology as a regime barrier depending on how regime actors apply existing technology (Geels, 2002). Findings from this study indicate that it is indeed hard to place technological barriers in one level or the other and that it seems to be dependent on type of firm and business model. Lack of access to technology was mentioned by the large companies, for example: *“We are currently looking into new areas to include in the remanufacturing program, for example the electronics. This is however a technical barrier”* [Large, B2C, remanufacturing]. Technological development was further mentioned as a necessity for making use of resources via landfill mining [Large, B2B, recycling]. The SMEs on the other hand did not necessarily mention the lack of access to technology as a barrier per se. The barrier was rather mentioned related to how different regime actors apply existing technologies, and that products are not being designed ‘right’ in the first place. Poor product design and planned obsolescence where specifically mentioned by several SMEs [reusing, repairing, remanufacturing] as limiting factors for their business models since it gives the products too short life time, making it unprofitable to reuse them. It was further mentioned by both SMEs and large companies that we cannot ensure a viable market for secondary materials today since ‘old products’ contain a lot of chemicals which are banned in new products.

##### **Policy intervention**

The large companies did not specifically mention that policy would be of any help in developing the technologies they lacked, indicating that such technological barriers are seen as internal ones for the company. To overcome the technological barriers identified on the regime level however, policy was mentioned and regulatory measures were the most commonly suggested.

→ **Demand manufacturers to design products for disassembly** so that only the broken part can be replaced instead of needing to replace the full product was suggested by several interviewees. This could be supported by **setting standards for exchangeable parts**, something which is important for Sweden to push for in the EU [SMEs, reusing, repairing].

→ Keep **stringent chemical laws and ensure their enforcement** as it is important that we create materials which are clean and free from harmful substances from the beginning so they are possible to circulate [Large & SME, B2C, reusing].

→ Though recognising the difficulty of implementing such a regulation, another interviewee went further and suggested a **complete ban of harmful substances** in products which hinders the transition to a CE [SME, B2C, recycled materials/renting].

### **Material and product design: EPR and warranty times**

A representative from the branch organisation 'Elektronikåtervinning i Sverige' pointed out that Sweden is lagging behind regarding making use of EPR as an enabler to promote a CE. He highlighted that Sweden only has eight product groups covered by EPR when for example France has ten, and that Swedish politicians should consider including more products groups. He also brought up the fact that Spain has adopted a political target for reusing in their EPR, something which he highlighted as a measure Swedish politicians should adopt as well: "*if we would set up a reusing target we would have to structure the system alongside that*" and "*if Spain is ready for a measurable target on reusing, Sweden is also ready*". He further pointed out that the price of the EPR should be visible on the price tag for the consumers, and that the EPR price should be differentiated for the producers depending on how environmentally friendly the products is, for example if it is reusable, to send clear incentives to the producers to improve their products. Elektronikåtervinning i Sverige is going to introduce differentiated EPR now during the fall as an incentive to see how it works. "*The importance is that it is actually a producer responsibility and not a responsibility for recycling*" he claimed. A representative from the analysis group for Grön Omställning suggested that we further might have to look over 'konsumentlagstiftningen' and increase warranty times to put pressure on the producers to make products that last longer.

## **5.4.5 Organisational barriers require funding opportunities**

### **Barrier**

#### *Capacity & resources*

Most of the SME representatives pointed to the lack of manpower, financial and time resources as a barrier to scaling up since it results in too little information about their products or services reaching the consumers. Most of the interviewees from SMEs further brought up the lack of capital or funding opportunities for start-ups with CE business models as a major barrier. One interviewee pointed out that he has applied for funding for four years but been rejected every time [SME, B2G, reusing]. The same interviewee further pointed out the importance of visualising local private investors since small niche companies always start on the local level: "*schemes for this exists on national level to some extent but the system does not give any help on the regional level in the region where my company is located*".

#### *A new concept*

Pointed out as a barrier by an interviewee from a large company was the 'newness' of the CE concept and related lack of knowledge on how to do CE business. It was mentioned both as an external barrier in the sense that politicians do not know what measures would promote CE yet, and internal in the sense that it is difficult to implement it into the core of the business.

### **Policy intervention**

The large companies did not mention any specific need for policy to overcome the organisational barriers they experience, indicating that they see such barriers mostly as internal ones. Non-business representatives however suggests that policy can indeed help overcoming this by engaging in concept development, as suggested below. The organisational barriers for

SMEs were more related to lack of funding and it was recognised that policy intervention would be helpful to overcome such a barrier.

→ **Guaranteed financing schemes** and **special funding opportunities for service innovations** were suggested by several SME interviewees [B2C/B2B/B2G, reusing/remanufacturing].

♠ One of the non-business representatives who work closely with companies which want to shift to a more CE based business model pointed out that the political landscape today makes it risky to make any major investments in new technologies. Governments could for example support such investments by for example **creating pilot markets** where new technologies can be tested or provide a **guaranteed return on investment** on true circular projects.

♠ Politicians need to agree on a clearer definition of what CE actually is and what it is NOT, another interviewee emphasised. *“There is a risk that it becomes the new ‘sustainable development’, that nobody knows what it exactly is and there is no substance to it. Develop the concept will have to take time”*.

♠ Another point raised by the same interviewee was the need for targeted policy interventions for business support, as it was his opinion that SMEs in general do not have resources to put into what is needed to develop a CE business. He used Denmark as an example where there is a coaching program financed by public funds to help SMEs develop circular business models, something he believe is necessary in Sweden as well.

## 5.5 Summary

As the findings section has revealed, barriers (and drivers) for the interviewed businesses to scale up business models based on a circular economy thinking are found at both the niche, regime and landscape level. There are however significantly more barriers found at the regime level. Barriers are found to be both political, institutional, market based, technological and organisational, however institutional and market based ones dominate. The most commonly mentioned suggestions for policy intervention to overcome the barriers were related to changes in regulations and political focus and creation of demand via price signals, information campaigns and demand side measures. The next chapter will discuss the findings further and put them into context related to previous research and methodological choices.

## 6 Analysis and discussion

This chapter analyses and discusses the findings of the study and tie together the results of the three first tasks. The chapter thereby feeds into providing the results of task 4, which was to triangulate results of the previous tasks, and outline a potential mix of policies and policy instruments which could support upscaling of CE business models in Sweden. Implications of methodological choices are also provided in relation to choice of methods, scope and analytical framework.

### 6.1 Introductory reflections

As mentioned in the literature (e.g. Murray et al., 2015), research around CE is a young field and the concept needs to be further developed in a careful way to ensure avoidance of future lock-ins and ensure benefits to both society and the environment, something which has been confirmed by several interviewees in this study. The commonly used definition provided by the Ellen MacArthur Foundation is only one of many possible characterisations of the CE concept. As pointed out by a non-business interviewee, it is further obvious that there are different logics for business models in the different ‘circles’ of a CE, which means that different types of policies are needed to support different types of business activities: one to manage the inflows of material to the economy, one for the increased usage of the capacity and maintenance of products already put into the economy, and one to handle the material and energy flow back when products can no longer be used. In a true CE this last part is minimised or non-existing (Ellen MacArthur Foundation, 2013). However, reviewed literature, examined policies and revealed findings suggest there is a long way to go until society is there.

### 6.2 Findings are well in line with previous studies

The findings from the interviews in this study show that Swedish companies with partly or fully implemented business models based on CE thinking face similar barriers as the ones consulted in the Netherlands (Bastein et al., 2013) and internationally (Ellen MacArthur Foundation, 2014), and the suggestions for policy interventions are of similar nature as well (UK House of Commons & Environmental Audit Committee, 2014). The importance of creating the right market conditions by changes in price signals (e.g. the tax system) and inform consumers, regulate product development to enable disassembly and reuse, and use PP for demand side interventions are all common denominators from this study and previous research. The need for political leadership and long-term strategies as brought forward by many interviewees in this study has also been brought up in several previous studies as a general prerequisite for transitioning to a CE (Ellen MacArthur Foundation, 2014; UK House of Commons Environmental Audit Committee, 2014; Vanner et al., 2014).

#### 6.2.1 Similar and differing views

##### ***Sector, type of firm and type of CE business model***

As explained in Chapter 2, previous studies have shown that companies face different barriers in taking up resource efficiency measures depending on the type of firm, sector and business model (Bastein et al., 2014). Results from this study indicate the same phenomenon related to scaling up CE business models. Some barriers were mentioned by almost all interviewees regardless of whether they represented a large company or SME and independently of business model, while others were more specific. It needs to be stated here that many of the interviewed companies practice various CE elements in their business, for example both renting/leasing and repairing/reusing/remanufacturing. Many times the same company mentioned various barriers which could be traced to the different CE practices within the business. Without being able to

generalise on a wider note, these claims are worth discussing further, as some patterns could be observed among the companies.

#### *Type of CE business model*

► Renting/leasing/sharing practices seemed to mostly face barriers related to lack of knowledge and awareness among consumers. The business representatives argued that people still have to learn about these new forms of consumption and accept them, before they can fully enter the market. Such findings are in line with for example previous studies on PSS (Despeisse et al., 2015; Tukker & Tischner, 2006) where it has been argued that informative instruments are important in overcoming barriers and scaling up such business models.

► Repairing/reusing/remanufacturing representatives first and foremost pointed to price signals, stating the fact that there are flaws in the tax system which are hindering their businesses to scale up. Labour is being taxed too high and virgin materials too low, and therefore repaired or remanufactured products have a relatively higher price on the market compared to new ones. As highlighted by a few interviewees, consumers evaluate the possible loss of quality contra the price, which in some literature is referred to as risk aversion and consumption externalities, being “Perceived costs associated with the quality of final goods derived from secondary materials relative to those derived from virgin materials” (Willis, 2010, p. 9). The second most common barrier for these type of business practices seemed to be related to infrastructural lock-ins, related to a political focus on waste management and recycling, meaning that infrastructure for reusing is so far underdeveloped. Willis (2010) point out similar results in the UK, stating that “To overcome this a more sophisticated, layered approach to resource efficiency to determine highest value actions on a product by product or sector basis is required, such as using a common framework for recycling and reuse” (Willis, 2010, p 18). This is arguably true also for Sweden, referring to the varying nature in suggestions brought forward to overcome this barrier, indicating that no single policy measure can solve it.

► Business models based on reusing of products which does not require reparation did not to the same extent point out price signals as a barrier, but rather to regulatory implications of for example PP, which sometimes does not allow for public institutions to buy second hand products. Vanner et al. (2014) have come to the same conclusions for EU wide implications, and EREP (2014) has therefore brought forward the need to look over PP regulations and how PP can become a driver in the transition to a CE instead of a barrier. Edler & Georghiou (2007) specifically point to PP policy potentially being a major driver of innovation and uptake of new technologies if correctly designed.

► Representatives of business models based on recycling did, not surprisingly, point to the lack of access to recycled materials of high quality as a barrier to their upscaling. The need for higher recycling targets of specific material streams is recognised by for example Vanner et al (2014) and Wijkman & Skånberg (2015). The findings of this study however show that there is no general agreement among business representatives on this issue. One interviewee representing a company practicing reusing claimed that high targets for recycling disincentive practices placed higher up in the waste hierarchy, such as reusing. This highlight the complexity of the CE concept and *the need for a multi-dimensional policy approach which is based on an overall encompassing policy framework, with clear directions on where we want to head.*

#### *Type of firm*

► Another major factor seems to be related to whether the company is a B2B/B2G or B2C. B2C businesses pointed out the need for changes in taxes directly impacting the price of the product to the end consumer as an important measure, such as differentiated VAT. B2B/B2G firms claimed such measures would have only marginal effect on their business, and rather

preferred interventions to lower labour costs. B2G businesses did however, surprisingly not, first and foremost pointing to changes in PP regulations as most important, supported by several studies on the role of PP in promoting innovation and new technologies (Edler & Georghiou, 2007; Fernández-Viñé et al., 2013; Georghiou et al., 2014).

► In line with previous studies the size of a company seem to affect what organisational barriers the business face (Bastein et al., 2014). Representatives from the large companies all agreed that for various reasons, it is a great organisational challenge for them to transition to a more CE based business model. They have to make changes within an already established and functioning model, and the change must be integrated into the core development and functioning of the business. *“It is as much a business development project as a sustainability project”* was a comment by one of the interviewees from a large company, which might well be why large companies have not come further in transforming their business. SMEs interviewed in study seem to on the other hand recognise organisational phenomena acting mostly as drivers. At the same time, the SMEs mentioned the need for large, well established companies to ‘pave the way’ if small firms are going to be able to scale up and real change happen. Some of the SMEs recognised that they only reach out to the already ‘convinced’ and environmentally aware consumer segment, while failing in reaching out to the broader public. *To get regime actors to take on niche applications therefore seems to be one vital element in allowing niche businesses to scale up their businesses, and reaching a broader transition to a CE.*

► Further, some interviewees clearly linked barriers directly to needs for policy interventions while others were less clear, something which might indicate that knowledge about political interventions is different among companies. But it might also reflect difference in how different companies perceive policy being able to ‘help’ overcoming the barriers they face. As pointed out by Kemp & Dijk (2013) and Bastein et al. (2014), companies are not always aware of the ‘web of constraints’ within which different phenomena acts as barriers to their business, and thereby might not be able to clearly state how policy could help overcome those. Interestingly enough, Bastein et al. (2014) claimed that their findings show that companies do not reflect much on policies on taxation. This is clearly not true in the case of this study, where *results rather suggest that companies are well aware about taxation policies, how they affect their business and what needs to be changed.* SMEs further tend to be a little more precise in what specific requests they have for policy intervention than large companies, which tend to be more reluctant in suggesting specific measures. This might be due the fact that SMEs are in more direct need of political support than large, well established companies.

#### *Sector*

► Literature suggests that sector plays a role regarding barriers and need for policy intervention (e.g. Bastein et al., 2014; Ellen MacArthur Foundation, 2014), however no general conclusions can be drawn on this matter due to the fact that almost all companies in this study come from different sectors. *To include more companies from each sector would have to be done to conclude how much this factor affects the answers to the questions posed in this study.*

### **The non-business stakeholders**

Non-business representatives generally brought up measure with a wider implication for society. Several both business and non-business interviewees pointed out that we need to change the approach and mind-set of people in relation to how we look at ownership and consumption. However, the business stakeholder in general put a lot of emphasis on changes in the tax system and the use of economic measures and information campaigns to create demand on the market and, whereas the non-business representatives seemed to lean more towards scepticism that adjusting the tax system will be enough *“even if it is an enabler to steer the market in the right direction”*. Many pointed to that we need more focus on changes in the formation and operation of



institutions, as well as the educational system, to ensure long-term change of people's behaviour. One non-business representative pointed out the fact that if we focus on products which shall circulate this is a barrier in itself, since actually we need to go deeper and completely shift to a service based mind-set. Several business representatives recognised this as well even if their business model today encompasses 'circulating products', and revealed that they see a need to adjust their model accordingly in the future.

One non-business representative pointed out that his experience is that SMEs do not have the organisational capacity to make necessary changes in their business activities in line with a CE. However the SMEs consulted in this study already practice a business model based on CE thinking, whereas he referred to SMEs in general. He suggested a governmental business support programme, something which as explained in Chapter 2 is already implemented in for example Denmark and the Netherlands. Though the findings from this study cannot conclude if this a requested measure by the business community. *To get a better understanding of how to transform SME business models into becoming circular is therefore an area of further research.*

The main finding from observing the CE seminars during the political week in Almedalen was that a general agreement is that the role of policy is prominent: without enabling conditions through a clear political framework, a transformation of the economy will not happen. Representatives from the different parties in the parliament seem to agree that policy intervention is needed, but the issue about shifts in the tax system seem to be difficult to agree upon. Another key issue in the debate seems to be whether changes in the tax system or more long-term, major infrastructural investments is to be prioritised. Prolonged warranty times was brought up by several participants in the CE seminars, a suggestion which was made by business representatives in a similar study in the Netherlands (Bastein et al., 2014). This measure was however not specifically mentioned by the interviewed business representatives in this study. Further, changes in EPR regulation was brought up in Almedalen, and has been suggested in several previous studies (EREP, 2014, Vanner et al., 2014). The interviewed businesses representatives did not specifically mention this measure, possibly due to that most of the companies in this study are not covered by EPR.

### 6.3 The gap between the current policy landscape and the needs

As brought forward in literature, the need to move beyond the current emphasis on recycling and instead promote other, inner loops of a CE is prominent (Vanner et al, 2014, Ellen MacArthur Foundation, 2012, 2013, 2014, 2015b). This issue seems to be recognised in Swedish environmental policy, as numerous policy initiatives to ensure we move up in the waste hierarchy is currently under development and implementation, such as the recognition of the need for new business models stated in the waste prevention programme. The head of direction of the Swedish policy landscape is found to be in line with many of the suggestions from the interviews. *But the policy sample selected for mapping in this study allow the author to conclude that few policy measures are actually implemented, and concrete policy action in the direction of transitioning to a CE is not yet in place.* Measureable targets are for example only set up for recycling, while targets for reusing are only expressed in terms of it shall 'increase continuously'. The review of Sweden's Non-paper to the European Commission on the new CE package show that most suggestions for concrete measures are on issues related to waste management. Suggestions targeting the inner circles of a CE are expressed in terms of "Sweden welcomes initiatives on collaborative economy/industrial symbioses and new business models" (Swedish Government, 2015, p.3).

Kalmykova et al. (2015) argue that environmental taxes alone will probably not be sufficient to reduce resource consumption in a high income country like Sweden, but that policy instruments which promote repair of old products and a sharing economy must accompany changes in the tax system along with educational instruments to change social norms and value creation

(Kalmykova et al., 2015). This is in line with the findings of this study as all interviewees mentioned several policy measures together rather than pointing to one silver bullet solution. Such suggestions are made also by the EPA, who state that while measures such as the landfill tax has managed to increase the recycling rate in Sweden, findings show that waste generation is still growing, hence it does not manage to encourage activities which prevent waste (Naturvårdsverket, 2015).

Studies from the UK reveal similar findings, specifically pointing to the landfill tax failing in increasing remanufacturing (Willis, 2010). Willis (2010, p. 18) points out that: “a more sophisticated, layered approach to resource efficiency to determine highest value actions on a product by product or sector basis is required, such as using a common framework for recycling and reuse”.

While pricing raw materials was one of the policy suggestions most frequently mentioned by the business representatives in this study, it was concluded in the research project ‘sustainable waste management’ that such a measure would not bring upon significant waste reductions in a cost-effective manner. At the same time, the interviewee from the EPA brought up the importance of pricing goods in relation to their true environmental impact to create the right market conditions. Clearly, one measure is hereby suggested for two different outcomes: to reduce waste and to create favourable market conditions for CE businesses, but literature on CE suggests the two outcomes should be intertwined (Ellen MacArthur Foundation, 2012; 2013; 2015a). As mentioned in Chapter 4, a national strategy for sustainable consumption<sup>15</sup> will be proposed in the budget proposition for year 2017, something which one interviewee in this study specifically mentioned as important. But what some of the business and non-business representatives instead suggested was a strategy for ‘resource management’. Though it is outside the scope of this thesis to evaluate any particular instrument, *perhaps if strategies for waste management/prevention and sustainable consumption were combined into an overarching strategy for resource management, as suggested by some interviewees in this study, the impacts of an instrument such as ‘pricing raw materials’ would be different and proven to be suitable?*

Worth considering is that no interviewee mentioned the issue of raw materials being too cheap, and hence suggesting pricing raw materials, as *a standalone barrier*. Rather, it was mentioned in combination with the fact that labour is too expensive and other constraints. The idea that barriers to business uptake of resource efficiency measures occur in a web of constraints (Kemp & Djik, 2013; Kemp & Soete, 1992) is *through the results of this study suggested to be true also in the case of scaling up circular business models*.

As highlighted by many business representatives and other stakeholders during the interviews, what it inherently boils down to seems to be the need for political leadership and politicians’ ability to make bold, long-term decisions. The ‘generation target’ and the environmental quality objectives are indeed in line with such a need (EEA, 2011), but the literature reviewed in relation to mapping policies reveal that *the targets are currently not being met due to lack of targeted policy instruments* (Kalmykova, 2015). The waste prevention programme is an interesting example in this case. It is obvious that there is a vision to reduce waste and produce and consume more sustainably, but the fact that the programme lacks measureable, goal oriented targets for waste prevention as well as targeted instruments, requires further reflection. The views differ among the interviewed business representatives regarding what we should have measureable targets for - be it reusing, resource efficiency or waste prevention - but there is an obvious wish, especially from the large companies but also from SMEs, to have clear rules of the game for the industry.

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<sup>15</sup> As a comparison, Finland has had a common strategy for sustainable consumption and production since 2005 (ymparisto, n.d.).

“It has proven to work before” one interviewee stated, pointing to the history of environmental legislation in Sweden.

In the interview with a representative from the EPA, it was pointed out that the EPA has had too little resources to work with these issues so far, and that only 3-4 people at the EPA work with CE related issues. The EPA probably needs to re-structure and re-prioritise to focus more on transition, and this work should be spread out on several institutions which have to collaborate more than they do today, the interviewee pointed out.

Though out of the scope of the mapping task, a final discussion point is around innovation policy. According to Henriksen et al., (2012b), no targeted policies which promote the use of for example PSS have been found in Sweden. The fact that Näringsdepartementet (2015) is suggesting that an investigator should be given the mission to analyse and come up with suggestions on how the development and upscaling of CE business models can be facilitated is promising and a step in the right direction. Though *further research on how innovation and environmental policy can and should be combined in supporting CE business models is probably needed.*

In conclusion, most interviewees and participants of the CE seminars mentioned that Sweden is lagging behind, and pointed to other country examples which they thought Sweden should look into, such as the reuse target in Spain (Scrapmonster, 2015), the CE business support programme in Denmark and the remanufacturing requirement for federal vehicles in the USA.

#### 6.4 Suggested components of a policy package

Several interviewees mentioned that uncertainty about what CE actually means and what a CE business model actually is still exists, something which is also highlighted in the literature (Ellen MacArthur Foundation, 2015b). When conducting a study on barriers for CE business models and the need for policy intervention, one must of course take this into account and be critical in recognising the limitations it imposes, and what conclusions that can be drawn. Not knowing for certain what CE is means that we cannot establish with 100% certainty what government should do to support further developments. What we can see from the findings of this study is however that there are a handful of common barriers which most of the businesses - which in one way or another work with a CE business model - face, and that there are measures politicians can take to *ensure we move towards a CE, and promote business to be a part of that journey.*

The findings show that a single policy or instrument cannot address all the barriers currently faced by business. As explained in Chapter 2, a single policy can probably mainly address the barrier for which it is created, wherefore combining policies and instruments into a package (or several packages evolving over time) is a necessity. In line with similar findings from a study on policy intervention for energy efficiency in buildings (Thomas, 2015), results show that a well-functioning policy approach which is suitable for a wide range of business models would probably have to include a package compiled of finely balanced measures based on regulations, economic instruments, information spreading and demand stimulations *within* an overall governance framework based on enabling infrastructure, appropriate target setting and a political system based on broad agreements. Results from this study further suggest that environmental policy alone cannot ensure a transformation of the economy to a CE, but that a cross-sectoral approach is needed, involving both financial and innovation policy. Figure 6.1 provides a summary of suggested measures which could be included in a policy package for promotion of CE business models. Referring back Chapter 5, not all interviewees agree on all measures and the findings may not be generalisable. Measures mentioned by several interviewees are marked with an \* in the figure. From a Swedish perspective, a key issue concerns what policies and measures could be controlled at the national level, and which ones that are primarily decided at the EU level. This will be briefly elaborated on in the next sub-

section. In figure 6.1, measures which cannot be directly implemented at the national level in Sweden are underlined.

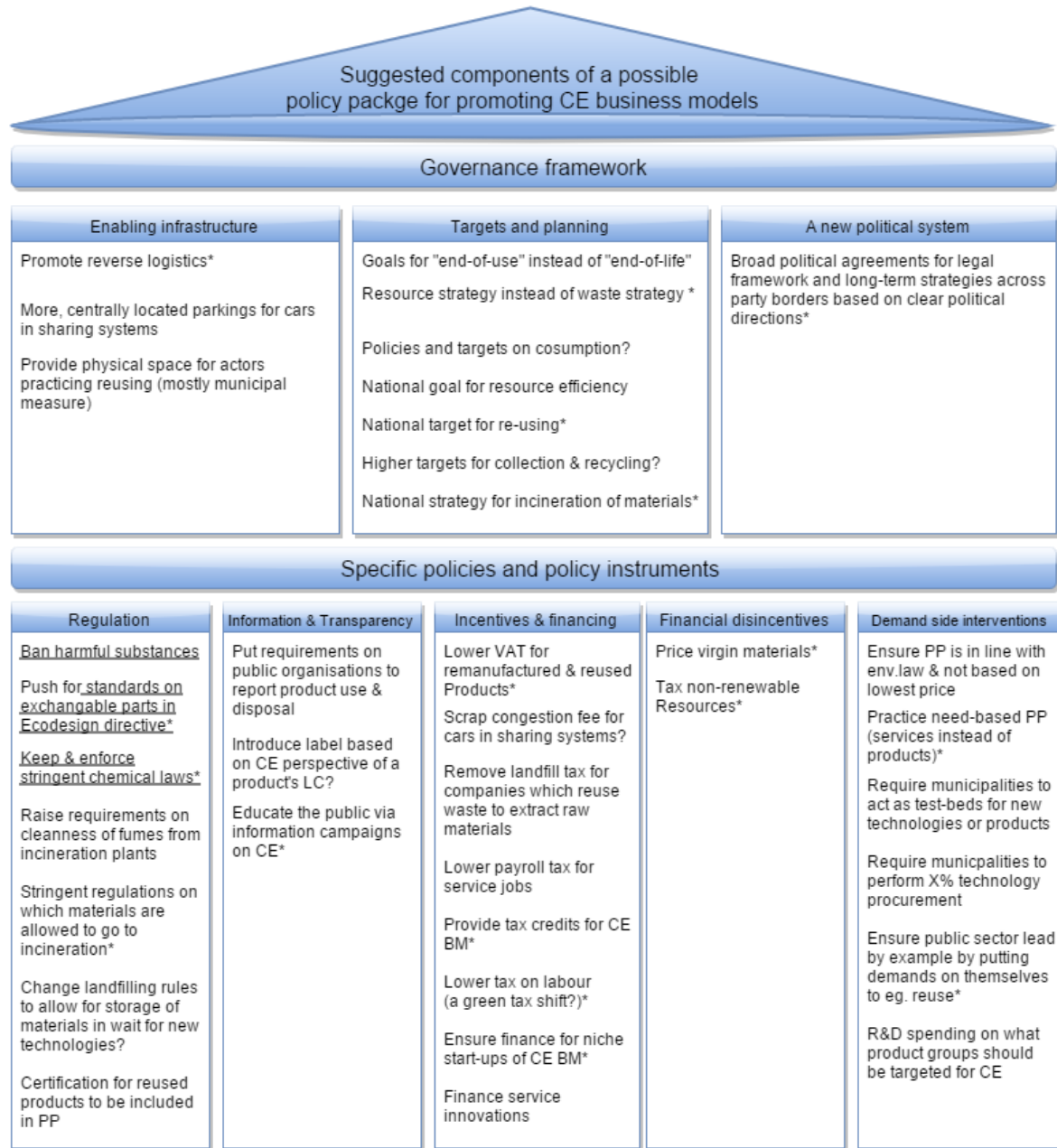


Figure 6-1. Suggested components of a possible policy package for promoting CE business models

Source: Own illustration based on interview data June-August 2015. Design inspired by Thomas (2015)

As explained in Chapter 2, a policy includes many components. For the case of this study, an example is that a lowered VAT for remanufactured and reused products (an instrument) could help reaching a national target for reusing (set out as part of an enabling governance framework), which in turn would help reaching the overarching goal of the policy or policy package if many policies are combined (to promote the upscaling of CE business models).

### **6.4.1 Means of implementation**

As mentioned in Chapter 1, it is out of the scope of this thesis to evaluate the policy intervention suggestions brought forward by the interviewees. However, some general reflections regarding means of implementation is appropriate.

Regarding ‘Enabling infrastructure’, this is an issue that can be controlled at the national and local level in Sweden since local authorities control issues like parking space and fees, recycling and reuse solutions. The reuse park Alelyckan interviewed in this study is an example of such a political initiative, which could be set up in other parts of Sweden and scale up reusing.

Regarding ‘Targets and planning’, targets for collection and recycling of several waste streams are decided at the EU level, but it is possible for Sweden to set higher national targets for reuse and recycling, both generally and for specific waste streams (Dalhammar, 2014). Such targets would probably create motivation for continued policy development and provide signals for companies that policy instruments are forthcoming.

Regarding ‘A new political system’, this is evidently in the hand of national politicians. EU puts certain requirements, for example the EU Waste Framework Directive required that Sweden developed a Waste Prevention Programme, but there is nothing that stops EU member states from setting additional targets and plans (Dalhammar, 2014).

Concerning regulation, product and chemical laws must be adopted at EU level since such rules are harmonising to a large extent and allow little scope for EU member states to develop their own laws (Dalhammar, 2014). However, there is room for other national initiatives which can trigger the same intended outcome as product regulation, such as the reuse target adopted by Spain (Scrapmonster, 2015), which hopefully will trigger design for durability. Regarding landfilling and incineration, member states have the ability to set stringent regulations (Directive 2008/98/EC). Further, while EU rules guide PP, they leave room for member states to implement environmental criteria in technical specifications (Dalhammar, 2015). This is relevant both for the regulative suggestion to include certification for reused products in PP as well as the suggestions brought forward under ‘demand side interventions’.

Regarding ‘Information and Transparency’, the suggestion to put requirements on public organisations to report product use and disposal is possible to implement at national level, but it needs further development before it can be fully recommended to imply such a measure. What should be reported on and how? The interviewee’s suggestion did not provide further details on this matter. The calls for a ‘CE label’ would require some thinking and might not be easy to implement from a life cycle perspective. The interviewee who referred to this measure acknowledged this and did not have any suggestions on exactly what such a label should cover. A quality label for remanufactured products might as an example be easier to implement?

Regarding ‘Incentives and financing’ and ‘Financial disincentives’, all the suggestions are technically related to national policies, however some might be more difficult to adopt than others. As revealed in Chapter 2, a tax on resources could hit domestic industries (Dalhammar, 2014), whereas differentiated VAT and financing for start-ups and service innovations are seemingly easier to adopt. Tax on labour might be difficult to change in the short term since it accounts for such a large part of the tax base in Sweden.

Overall, it is obvious that there are numerous policies which Sweden could adopt to promote CE business models. Product and chemical legislation are in this case technically the only suggestions which national policy makers in Sweden cannot directly impact.

## 6.5 Methodological choice and implications

### 6.5.1 Interviewing as a method and choice of scope

The choice of data collection for this study was qualitative interviews. This choice of method limited the number of objectives to be included due to time and resource constraints, which is recognised as a limiting factor in the ability to generalise the results. The author therefore recognises that the sample of business representatives is not representative for the ‘Swedish business community’, but still enables for insights into general challenges that the interviewed companies face. In qualitative studies, the choice of interviewees will further affect the outcome of the studies in one way or another (Kvale & Brinkmann, 2009). The choice of representatives to interview was, as explained in Chapter 3, mostly based on recommendations and snowballing. Interviewing people with other positions within the companies, or more than one representative at each company, could possibly have generated different results. Further, there is always a risk that the author possibly influenced the answers given by the interviewees, something called the interview effect (Kvale & Brinkmann, 2009). A question such as “does focus on material recycling hinder your business model” (see Appendix 1) can rightfully be seen as a leading question. The author was aware of this and only posed such questions if the interview had already taken a direction in which it seemed appropriate. However, whether or not the question was posed might have affected the outcome and this is recognised as a limitation, which is related to the author’s lack of professional experience in interviewing.

Other methods which could have been used would be for example surveys or focus groups. With a survey, a greater number of companies could have been reached. However due to the scope of the thesis, which was to focus on companies which already partly or fully practice business models based on circular economy thinking, it would probably have been difficult to identify a big enough sample to conduct quantitative analysis. Focus groups is further a good methodological choice when studying a specific topic, however due to the difference in nature of the selected companies, focus groups might also have imposed bias due to the participant’s impact on each other (Stewart et al., 2007). Also, to assemble focus groups was not possible due to time and resource constraints due to the geographical distance between the companies.

As noted in Chapter 1, the aim of the thesis was to provide preliminary insights of barriers and the need for policy intervention to overcome those across sectors and type of firms, rather than focusing on a specific CE business models, firm or product. This approach of course imposes limitations on the ability to generalise the findings, as the companies interviewed are so different in type, size and what business model they practice. It has indeed been challenging for the author to analyse the data and a more narrow scope, focusing on for example either SMEs or large companies, could partly correct this.

Previous reports concerning the need for policy intervention to support a CE have mostly been generic to the EU level, whereas the focus of this thesis has been on the national level in Sweden. As mentioned by Vanner et al. (2014), one need to keep in mind that studying barriers and policy needs for a concept like CE on a national level inherently includes limitations since the activities different businesses would practice in a CE -such as refurbishment, remanufacturing and reuse- do not necessarily occur within specific country borders. The author has tried to limit the impact of such a limitation by also bringing in the EU perspective and linking EU and national policy as far as possible. It however became clear throughout the study that it is hard to distinguish between barriers imposed by Swedish versus EU wide phenomena, as well as to make recommendations for Swedish policy makers based on suggestions which could only be regulated at EU level.

Despite the limitations related to choice of scope and methods, findings from this study seem to give a pretty clear idea of which barriers are currently imposed on companies practicing CE business models. They also confirm conclusions drawn in previous studies, which state that the government has multiple roles to play in a transition to a CE, from pushing for standard setting in EU regulations to ensuring the right price signals are given on the market, educating the people, using their purchasing power to create demand and lead by example.

### 6.5.2 Re-visiting the framework – reasoning, validity and implications

As explained in Chapter 3, the author does not consider this thesis to be a transition study per se, but rather an exploratory study in outlining barriers experienced by a number of Swedish companies, and their view on the need for policy intervention to overcome those. The MLP on transition was used to *expand the scope to allow for an understanding of the wider picture of a transition of the economic and industrial system, within which the study fits*. Instead of using all the elements of the MLP for analysis it was in this sense only used as a guiding framework to help the author outline the different levels in society where barriers (and drivers) for businesses with CE business models occur, and which of those can be impacted by policy and which cannot. Hence a simplified picture of the MLP framework was presented.

The choice was then made to further develop a conceptual framework specifically for the task of this study, *embedded in the wider transition framework*, and the ‘web of constraints’ model developed by Bastein et al. (2014) was used as a base. To combine the MLP and web of constraints allowed the author to give a broad picture of the findings and present them in a structured way. However, the limitations to this model are several, mostly related to the fact that *any conceptual model is a simplification of reality*. The author recognises that the division of barriers into the five categories chosen for the framework does constitute a simplified picture of reality, that the organisation of policy intervention to overcome certain barriers overlap, and that it would have been possible to categorise the data differently. The limitations related to this will be discussed below and suggestions for further improvement will be provided.

As explained in Chapter 3, the ‘web of constraints’ model was developed when studying business barriers to resource efficiency, and it became obvious when conducting the research that a CE indeed require much more than uptake of resource efficiency measures, as outlined in previous studies (Ellen MacArthur Foundation 2012; 2013; 2014; 2015; Preston 2012; Wijkman & Skånberg, 2015 and more). Reference to the lack of political leadership and direction made by several interviewees is evidence of this, and a ‘political’ barrier category therefore had to be added to the final framework for this study. It however became obvious when trying to outline barriers that there is no such thing as a clear division of what type of barrier a phenomenon is, why it exists, and how it should be categorised. Some studies which have used the MLP compile all phenomena within the regime which are caused by formal institutions (tax rules, laws, regulations, infrastructure etc.) into the category *formal institutions* (see for example Wangel, 2015), while the author for this study chose to not use this division but rather argue that political, institutional, market, organisational and technology barriers are *all impacted by formal institutions to some extent*, hence the choice was made to not use this overarching category.

As an example, the author does not argue that a formal decision made by an institution has imposed a specific technological barrier which an interviewed company in this study face. However, as described in Chapter 2, public policy is as much about *what governments choose not to do as about what they choose to do*. It therefore seems valid to argue that for example ‘planned obsolescence’, which was mentioned as a technological barrier by some interviewees, is a consequence of political inaction in ensuring that environmental externalities are accounted for in the pricing of products. This political inaction leads to that it is cheaper for regime actors to

produce products which do not last than products which do. Hence, ‘formal institutions’ indeed creates this barrier to some extent, *acting in the background as part of the regime*.

Market and organisational barriers further comprise of phenomena not directly caused by formal institutions but rather by user preferences, cultural means and knowledge (Geels, 2002). However *non-actions by formal institutions to educate the public on matters related to a CE in this case play a role in creating this barrier*. As suggested by AMEC (2013) ‘consumer behaviour’ was therefore in this study placed under ‘market barriers’ and suggested to be overcome by creating demand via informative measures.

Due to the difficulty of categorising the barriers, the different categories chosen for this model require further reflection. Barriers mentioned by SMEs such as ‘lack of large companies which pave the way’ was in this study categorised as ‘lack of economics of scale’ and placed under ‘market barriers’. The author argue that this is indeed in one sense a correct categorisation, since the large companies dominate the regime and their actions shape consumer behaviour, imposing difficulties for niche innovations to make themselves heard. The underlying reason why it is so however probably goes deeper, and one could possibly argue it is due to for example resource pricing and hence a barrier imposed by landscape signals.

Further, it became obvious that a phenomenon such as ‘high labour cost’ cannot easily be placed as either an institutional or a market barrier. Even though it is created by formal institutions it also plays out as a market barrier by making repaired/remanufactured products more expensive relative to new products, which have been produced with cheap labour in other parts of the world. This is an example of how *one phenomenon can result in two types of barriers, and probably require more than one type of measure to be overcome*. To lower the tax on labour requires a change in existing regulations which would play out as an incentive for CE business models on the market, but would probably not be sufficient unless the price of virgin materials or products is raised at the same time. The same reasoning could be applied to most of the barriers, *showing the complexity of the real life situation and a need for further research in this area*.

Referring back to the MLP, it is further not always clear how one should distinguish between regime and landscape phenomenon. The author for example decided to place phenomenon related to EU legislation within the regime, with reference to that national politicians can influence decisions taken at the EU level. Some might however argue that the level of influence is marginal, hence suggesting EU legislation to be landscape signals. One could however also argue that it might not be most relevant how different barriers are categorised, but rather to keep in mind that political decisions can and do impact *all parts of the regime, hence helping to stabilise or disrupt it*. As pointed out by several interviewees, transforming the economy to a CE will require re-formations of political institutions and new, multi-dimensional and cross-sectoral political approaches will need to be implemented. The conceptual model developed for this study try to visualise this by placing all the policy interventions together within the ‘enabling conditions’ building block. However, a potential improvement of the framework would be to more clearly reveal the interconnections between the different barriers and corresponding policies to overcome those.

Finally, the role of the researcher as an interpreter of the results of a study needs recognition. As a researcher, the author of this study made warranted inferences of the data to be able to reveal them as findings and draw conclusions, and other researchers might have done it differently. However, “making warranted inferences is the whole point and the only point of doing social research, irrespective of what type of data and what style of research we use” (6 & Bellamy, 2012, p. 9).



## 7 Conclusions

This chapter reflects on the RQs, reveals the main inferences drawn from the policy mapping and makes suggestions for how to further support CE business models in Sweden via policy intervention. First, answers are provided to the two sub-questions. The answers given to the two sub-questions, together with the results from the three other tasks, then feeds into the ability to answer the overarching RQ, which was: “*What are policy measures that could support upscaling of circular business models in Sweden?*”

*1) What barriers are Swedish companies currently facing in scaling up business models based on circular economy thinking?*

All the interviewees in this study recognised an increased interest from society for CE, but the current regime is hindering circular business models to scale up, and the political system is not creating enabling conditions. Policy intervention was therefore requested by all interviewees. Companies experience a complex mix of barriers, but they are first and foremost institutional and market based, related to price signals, consumer behaviour and infrastructural lock-ins. The findings further demonstrated that the category ‘political’ barrier needed to be added to the conceptual framework, as lack of leadership and ambition was mentioned as a constraining factor for many of the interviewed companies. Findings indicate that barriers and the need for policy intervention is related to type of firm and business model, but the selection of companies consulted does not allow for such an indication related to which sector the business is in. Listed below are the five most commonly mentioned barriers.

- a. There is not a level playing field for second-hand and newly produced products on the market. The current tax system does not recognise a CE approach to business as something which should be promoted: taxes on labour are too high and the price on virgin materials too low, and the VAT does not differentiate between new and second-hand products.
- b. Consumers are not aware or informed about new ways of consuming, such as renting or leasing, and second-hand products are not as attractive as new ones for most consumers.
- c. Public procurement fails to incentivise circular solutions provided by B2G companies as procurement tend to favour lowest price and the focus is on purchasing products, not on fulfilling needs or functions.
- d. Products are not designed to be reused or disassembled in the first place.
- e. Silos in political institutions, short-term thinking and focus on waste management have locked politics and infrastructure into linearity and makes it risky for companies to invest.

*2) What policy measures could help to overcome those barriers?*

Listed below are the five most commonly suggested policy measures to overcome the above mentioned barriers, as clustered by the author.

- a. Taxation policy should be re-designed so that CE business models are incentivised. Lowering tax on labour was recognised as the most important measure by companies in the repair/reuse/remanufacturing business. Within the same business model category, a differentiated VAT for reused or remanufactured products were suggested by B2Cs, while B2B/B2Gs argued this will not affect their business significantly. Tax credits or other financial support for start-ups with CE business models were further requested by SMEs. A general agreement among several companies independent of type of firm or business model was that virgin natural resources should be priced higher.
- b. Independent on type of firm or business model, a frequently suggested measure was that the government should educate the public via information campaigns on CE to raise awareness and help to create consumer demand. It was one of the dominant measures requested by representatives from businesses practicing renting/leasing.

- c. B2G firms expressed a need for PP practices to be changed so that the custom is not that PP should be based on the premise of lowest price, but can be used to incentivise CE business activities. A suggestion brought forward by both an SME and a large company representative was to introduce ‘need-based’ PP instead of focusing on purchasing products.
- d. Many interviewees suggested that governments should regulate product design so that products are designed ‘right in the first place’. This measure was mostly recognised among representatives from the repair/reuse/remanufacturing business.
- e. Politicians should lead the way by setting up a long-term legal and political framework and re-think political institutions to allow for cross-collaborations. To move away from ‘waste management’ to ‘resource management’ was requested to ensure the right type of targets are set up and enabling infrastructure is developed.

The mapping of environmental policy in Sweden revealed that the government recognises the importance of a CE, but that not many targeted measures have yet been implemented. Triangulation of results from previous studies, interview findings and CE seminar observations allow the author to suggest that policy intervention is further needed to support the upscaling of circular business models in Sweden. As outlined in Chapter 6.4, the suggestion is to carefully design a long-term policy package which includes a mix of policy instruments, within an overall governance framework including enabling infrastructure and national targets for the inner circles of a CE. Although some measures are more difficult to implement than others, Swedish politicians have the authority to adopt most of the suggested policy measures presented in figure 6.1. Suggestions regarding revision of the Eco-design Directive and stringent chemical legislation are technically the only ones which national policy makers in Sweden cannot directly impact, but which Sweden should push for in the EU.

### **Further research**

This study has provided preliminary insights on the need for policy intervention to support CE business models in Sweden. To get a more comprehensive, and possibly quantifiable understanding, a larger number of companies would have to be studied. The amount of businesses already practicing CE is however limited, wherefore including other type of business models might also be of value to understand barriers for starting up CE practices. A more sectoral approach would further need to be taken to fully understand *what factors are affecting what companies’ barriers and needs are* and to make tailor-made suggestions for policy intervention. Similar suggestions are made by the EPA (Naturvårdsverket, 2015). This results in the need to further understand the *interrelations between business models and policy*, as already recognised by Lindahl et al. (2015). To look into how innovation and financial policy can be better integrated with environmental policy to promote a CE is further suggested. In relation to that, some of the policy recommendations made in this study have been turned down in research related to waste management, such as a tax on virgin raw material. Further research is therefore needed in *understanding what role such measures would play in a context of promoting CE business models and not ‘just’ minimising waste*. It would further be interesting to understand what implications a political shift from ‘waste management’ to ‘resource management’ would have. To avoid future lock-ins it is also important to *increase the understanding of the different components of a CE and how they relate to the policy measures needed*. This relates to the need to continuously study and develop the concept of a CE itself. The findings in this study also indicate some clashes in implemented policies, wherefore *a further understanding of what implications certain policies have on CE development and how such clashes can be avoided is necessary*. Finally, the socio-technical landscape also needs to be studied in order to understand how landscape signals relate to barriers for creation of new business models, and ultimately the transition to a CE. The landscape signals mentioned by interviewees in this study, such as GDP and quarterly reporting as measures of success, are all relevant for further research since they impact the ability to transition to a CE (Ellen MacArthur Foundation 2015a; 2015b; Naturvårdsverket, 2014).

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## Appendix 1 - Interview guide business representatives

*WHY is this interview important?*

- I need to identify what drivers there are for these companies to practice the (circular) business models that they do
- I need to understand what barriers that still exists for these companies to scale up/fully implement /fully transfer their (circular) business model
- I need to get the companies view on what role policies play for the implementation/fostering/up-scaling of their (circular) business models and what policy measures they suggest can help overcoming the barriers they face

*WHAT is this interview supposed to deliver/lead to?*

- By knowing the above mentioned I will be able to identify some of the (policy) support that is already in place in Sweden to support the (circular) business models of these companies
- By learning about the above mentioned I will also, after having studied what policies that are actually in place in Sweden identify what policy gap that exists in Sweden in terms of support for circular economy
- By understanding how these companies perceive the role of policy support I will be able to analyse my findings according to the analytical framework developed for the task

*HOW is this interview going to be formulated?* → Talk first about why this is interesting for the study and for them!

- Start with talking about product and market and how they see the future of their business before going over to policy measures (big to small → funnel = can steer the direction of the interview) → might start talking about what they need without me having to ask
- (Idea with semi-structured is that you can follow up questions and do not have to follow order exactly).

Split the interview into three parts based on a funnel perspective (broad, undefined questions moving on to more specific, detailed questions depending on situation and object).

### **General information:**

1. Name, position, workplace, details about company (size, year established etc.)

### **Part 1. General questions on the system's dimension and the business' competitiveness:**

1. Explain shortly about your business model (how is it a circular business model)?
  - a. What are important features of the products/services in your business?
  - b. How does the market look like for your business?
2. What does the future look like for your businesses?
  - a. Opportunities?

- b. Risks?
- c. Challenges?

**Part 2. Drivers, barriers, and the need for policy intervention**

3. What are drivers for your company to work with this (circular) business model?
4. What are barriers for your company to work with this (circular) business model?  
(Context specific: implement? Transition? Scale up? Have the whole business in Sweden?)
  - a. What is needed to overcome those barriers?
5. What is the role of (public) policy in promoting circular economy business models?
  - a. What policy measures do you consider important in enabling your business to overcome the barriers your company face?  
OR:
  - b. Is there (policy) support for the kind of (circular) business model that you practice? OR:
  - c. Is the (public policy) support sufficient for the kind of work/activity you do?  
OR
  - d. Which actions should in general be given (policy) priority at the national level in Sweden to promote circular economy solutions?  
(Context specific: implement? Transition? Scale up? Have the whole business in Sweden?)
6. Do you have any final ideas on the policy situation as it is today?

**Part 3, specifics if relevant: questions regarding the concept of circular economy versus “traditional” resource efficiency via e.g. material and recycling:**

1. Does focus on recycling of material hinder your business model?
  - a. Do we focus too much on recycling (which remove focus from re-using and remanufacturing)?
  - b. Are certain actors too focused on recycling?
  - c. Is there an issue with focus on quantity instead of quality in the recycling process? (Both mind-set and infrastructural lock-ins related to recycling targets)

**+ If knowledge in certain policies seem to be good, add follow-up questions:**

1. **What additional considerations are important when applying circular economy principles to products in Sweden?**
2. Would you like to see any changes in existing policies (for example the eco-design directive)? (Any opinions on how products should be designed and what support is needed for such design?)

## Appendix 2 - Interview guide non-business representatives

Split the interview into two, possibly three parts based on a funnel perspective (broad, undefined questions moving on to more specific, detailed questions).

### *Part 1. Personal and professional relationship to circular economy*

1. Tell me a little bit about yourself and your work: what do you do?
  - a. What is your relationship to circular economy (how do you work with it)?

*Tell that I am taking a company perspective on the study and ask if they have interactions with companies. If yes, ask them to clarify whether they speak from a personal/professional perspective when answering the questions (for example based on research/actual policy making) or if it is based on what they have learned from working with companies.*

### *Part 2. The role of public policy in supporting circular economy*

1. What are barriers to a CE? (and CE business models)
2. What are the most important steps we need to take to transform our economy from linear to circular? (at society, company, other levels)
3. What is the role of (public) policy in promoting such a transition to a circular economy and CE business models?
  - a. What is the current status of policy support for CE in Sweden?
    - i. Do you get the impression that policy makers (in Sweden) promote circular business models/circular economic thinking? (How or how not?)
    - ii. Are there policies already in place which can support circular economy? (do they need any reformations to support it better?)
  - b. Which actions should in general be given (policy) priority at the national level in Sweden to promote circular economy solutions?
    - i. Can you give specific examples of policy areas that should be prioritized?
    - ii. What type of instruments would be the most effective? (In short/long term? For promoting CE business models?)

### *Part 3. If not brought up before*

4. Do you also have the companies' perspective on what is needed? (how?)
5. Possibly: How are policies in the EU affecting policies in Sweden?
  - a. Can policy makers make better use of the policies on EU level to speed up transition to CE in Sweden? (How?)

## Appendix 3 – List of interviewees

	SME
	Large company
	Municipal organization with CE initiative
	Non-business representative

Organisation/Company	Name & Affiliation	Date	Type of interview
Inrego	Erik Pettersson, Sustainability Manager	9 June 2015	Face-to-face
Godsinlösen	Christian Jansson & Patrik Zalewski, CEOs & founders	11 June 2015	Face-to-face
Qlean Scandinavia	Petra Hammarstedt, CEO & founder	15 June 2015	Phone
Off2Off	Fredrik Östlin, CEO and founder	16 June 2015	Face-to-face
Houdini Sportswear	Mia Grankvist, PR and communications officer	23 June 2015	Phone
Polyplank	Bengt Nilsson, CEO	23 June 2015	Phone
Kompanjonen	Per Håkansson, GM & Founder	18 Augst 2015	Phone
IKEA	Per Stoltz, Sustainability Developer IKEA Retail Services AB	16 June 2015	Face-to-face
Volvo Cars	David Weiner, Director External Relations & Gunnar Magnusson, Remanufacturing, Product & Project	25 June 2015	Phone
Ragn-Sells	Anders Kihl, Business Area Manager	2015-07-01	Face-to-face
Göteborg Kretslopp & Vatten (Alelyckan Kretsloppspark)	Jeanette Hartug, Project & Development manager at Unit for Waste, Ann-Louise Elisasson, Strategist & Per Hogedal, Unit manager Recycle & reuse	17 June 2015	Face-to-face
Modig Minoz	Åsa Minoz, Founder	16 June 2015	Face-to-face
Circulareconomy.se	Tobias Jansson, Founder	17 June 2015	Face-to-face
Accenture	Jakob Rutqvist, Manager Accenture Strategy	30 June 2015	Face-to-face
European Environmental Bureau	Mikael Karlsson, President	1 July 2015	Face-to-face
Naturvårdsverket	Catarina Östlund, Unit for guidance	14 July 2015	Phone

### **Additional personal communication**

Ann-Cerise Nilsson	Ministry of the Environment and Energy	Phone 2015-09-11
Charlotta Broman	Ministry of the Environment and Energy	Phone 2015-09-11
Olle Billinger	Ministry of Finance	Email 2015-08-12



## Appendix 4 - Company descriptions

Company descriptions found in the table below are based on information collected in interviews with company representatives, from the companies' websites and sustainability reports and allabolag.se (n.d.). Size of company is based on the European Commission Recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises (2003/361/EC, 2003).

Company name	Size	Focus area/sector	CE aspects of business model	Main customer group
Inrego AB	Medium (80)	Electrical and electronic products	Reconditioning and reuse of computers and other electronic office equipment plus "Arbetsplats som tjänst": short/long-term rent of computers and other electronic office equipment.	Governmental, business, consumers
Godsinlösen Nordic AB	Micro (9)	Electrical and electronic products	Repair- and reuse of damaged goods from insurance companies; mainly computers, mobile phones and other electronics.	Consumers
Qlean Scandinavia AB	Small (20)	Building cleaning and maintenance	Chemical free cleaning of buildings and prevention of oil leakage with pure water. Re-use of water.	Governmental, Business
Off2Off AB	Micro (2)	Furniture, office equipment, electrical and electronic products etc.	Reuse via cloud-based communications service: Online marketplace for public organisations to manage their needs or excess in resources.	Governmental
Houdini Sportswear AB	Small (26)	Outdoor clothing	<p><b>The Re:project:</b></p> <p><b>Product design:</b> Majority of the clothes are made from recycled and renewable fibres and made fully recyclable or biodegradable</p> <p><b>Service-based offering:</b> renting some of the clothes</p> <p><b>Repair- and remanufacturing:</b> services in all stores</p> <p><b>Reuse:</b> All stores offer take-back of used garments, some of the stores offer sales of second-hand products</p>	Consumers
Polyplank AB	Small (19)	Building material and industry plugs	Produces building material of recycled plastic and woodchips. Take-back scheme for plastic plugs for reuse.	Business, Consumers,
Kompanjonen	Small (5)	Building material, lighting, furniture	Reusing: Sell of second hand building material, lighting and furniture for reuse via web-shop & shop outside Stockholm.	Business
IKEA	Large	Furniture and home appliances	"Turning waste into resources" initiative implemented to develop reverse material flows for waste material and to take a stand for a closed loop society. Measurable and time bound targets set up for recyclability and recycled content in products and waste prevention within own operation. Strive for zero waste to landfill from own operations where possible. Some stores have	Consumers

			take back systems and re-selling of used furniture. Part of Ellen MacArthur Foundation.	
Volvo Cars	Large	Cars	<b>Volvo Cars' Parts Exchange System:</b> dealers connected to the Parts Exchange System have an incentive to return replaced parts included in the exchange product range. Parts which meet the requirements are remanufactured by external suppliers, then handled as regular spare parts and distributed in the ordinary logistic flow <b>Sunfleet:</b> membership based car sharing via online and app-booking for private and business users. Hourly or long-term rent.	Consumers
Ragn-Sells AB	Large	Waste management	Currently material recycling of all fractions possible to recycle without harming health or environment. Moving from "waste management" to "resource management" by investigating new forms of using materials from old products and waste e.g via landfill mining. Part of Ellen MacArthur Foundation.	Business
Alelyckan Kretsloppspark	Municipal organization (non-profit)	Building material, home appliances	New type of recycling station where people can leave products for reuse and refurbishment; products then sold in different parts of the park depending on type of product.	Consumers

## Appendix 5 - Observed CE seminars in Almedalen

Name	Organiser	Date
Innovation, tillväxt och nya jobb i en cirkulär ekonomi- vem gör vad och hur kommer vi dit?	Återvinningsindustrierna	2015-06-30
Cirkulär ekonomi på riktigt	Regional Energi	2015-06-30
Cirkulära affärsmodeller och framtidens näringsliv	Accenture	2015-06-30
Gräv där du står, cirkulär prospektering	Ragn-Sells	2015-07-01
Färdplan för en hållbar elektronikkonsumtion i en cirkulär ekonomi	Elektronikåtervinning i Sverige; TCO Development; Svanen	2015-07-01
Förlustfria cirklar – hur främjar vi innovation och helhetslösningar för återvinning?	Ragn-Sells	2015-07-02
Vad är vinsterna med kollaborativ ekonomi?	Modig Minoz; cience Park Gotland; Coompanion Sverige; Mötesplats Social Innovation; Skjutsgruppen; Swinga Bazaar; DelaEko; Camino	2015-07-02