Framing the Climate Change Policies and Circular Economy tenets for SMEs

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ABSTRACT. Climate change and its consequences are of growing concern for global and national governments and demand stronger policies in order to reduce the greenhouse gas (GHG) emissions and restrain global warming. Small- and medium-sized enterprises (SMEs) build the largest business group in the Netherlands, however public policies do not involve clear and effective regulations towards climate change actions, which in turn restricts the environmental actions that are undertaken by SMEs. The following research aims to point out possible points of improvement for governmental policies in the Netherlands, focusing on the achievement of greater environmental contribution of SMEs and the role of circular economy tenets in this respect. By means of a structured literature review, it was found that Dutch SMEs face several barriers towards environmentalism and require greater support in overcoming those. Furthermore, stronger legislation and the implementation of new mechanisms to measure the economy are advised. A circular economy was found to have a positive impact on the economic growth of the Netherlands and can be integrated in public policies in several different ways, for example by differentiated value-added tax (VAT) rates. Further research on circular economy mechanisms and tax changes, as well as frontrunner case studies are advised to monitor the results and learn, which systems and mechanisms work best for Dutch SMEs.

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Climate change policies, climate change in the Netherlands, SMEs and the environment, circular economy, circular economy policy integration

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1. INTRODUCTION

Small and medium sized enterprises (SMEs) are defined as enterprises with no more than 250 employees and a turnover, or balance sheet total of less than €50million, or €43million, respectively (European Commission, 2015). Due to these characteristics and with a proportion of about 98% of all enterprises, this business group makes up the majority of enterprises in the European Union (European Commission, 2015). In the Netherlands, which is the focus of this paper, they represent more than 99 percent of the country's enterprises (state 2010: 99.6%) (OECD[1], 2012). Due to the SMEs' high number, SMEs also have a large impact on the country's economy, employing 68 percent of the Dutch labor force. Consequently, SMEs are important contributors to a country's greenhouse gas (GHG) emissions, of which its reduction is increasingly tackled by European governments in order to fight global warming (European Commission, 2013). Thus, being large emission contributors, SMEs have a great impact on the reduction of those (North & Nurse, 2013), however, as most recently evaluated in 2013, statistics show only a small decrease of approximately 3,2 percent in total GHG emissions compared to year 1990 (Statistics Netherlands, 2016). European Governments already have and continue to set public policies which force enterprises and institutions to reduce their GHG emissions. However, despite the economic importance of SMEs – making up 99,6 percent of all enterprises in the Netherlands – this business group has not been a focus within policymaking.

Recently, in December 2015, the so called "Paris Agreement" was agreed upon and adopted by 196 countries, including all countries in the European Union (United Nations Conference on Climate Change, 2015). The agreement aims to limit the temperature rise below 2°C and to even tend towards 1.5°C till year 2100 and is taking into accounts individual country needs, as well as adaptation, mitigation and differentiation strategies. This agreement pushes the European member states towards stricter national policies, in order to achieve the target.

The circular economy is a growing concept that aims to lead towards a more sustainable economy, promoting the recycling and reuse of products, therefore making them 'circular' (World Economic Forum, 2015). Besides several economically attractive effects (see section 2.2), a circular economy aims to reduce GHG [2] emissions and therefore contribute to slowing down global warming (World Economic Forum, 2015).

Considering the small decreases in Dutch GHG emissions (Statistics Netherlands, 2016), and the lacking policy restrictions on SMEs, this paper is going to analyze the efficiency of the Dutch climate change policies and eventually determine potential points of improvement. For this purpose, the following research questions were framed: (1) "What are the barriers towards environmental engagement in Dutch SMEs?; 2) How do Dutch climate change policies affect the environmental behavior of national SMEs? And; (3) how can circular economy tenets be integrated to Dutch climate change policies to improve the SMEs performance?"

The findings of this research are meant to introduce additional elements to the Dutch policy makers on ways that policy usage can really contribute to the Paris Agreement. Moreover, the paper points out the relevance of circular economy tenets and their benefits for EU member states, especially regarding the involvement of SMEs.

1.1 Background on the Netherlands

The Netherlands is a low laying country located at the North Sea coast of Western Europe. Almost 25 percent of its land is laying at, or below the sea level (Worldatlas, 2015) and it has four navigable rivers flowing into the Sea. Like most Western European countries, the Netherlands lies in the temperate climate zone, causing moderate seasons with an average temperature of 4° Celsius in December and an average temperature of 17.4° Celsius in July (Noodweercentrale Netherlands, 2015). Due to its location, the Netherlands is less vulnerable to the effects of climate change than countries in other climate zones, however, it is vulnerable to flooding and at risk to the negative effects of climate change that are expected to increase (Ligtvoet et al., 2013). The global GHG emissions have increased to dangerously high amounts. According to the Statistics Netherlands (2016), from 163.080 million kilograms of CO2 in 1990, the numbers constantly rose to an amount of 165.67 million kilograms in 2013, with a peak of 182.750 million kilograms in 2010. However, after that in 2014, the amount fell below the 1990 level for the first time, measuring 157.980 million kilograms. As explained by Statistics Netherlands (2014), this change was caused by the fact that households used less natural gas for heating due to the warmer weather. Observed changes in the Netherlands throughout global warming concern a rise of the average temperature, the number of annual summer and frost days, and the level of precipitation (Ligtvoet et al., 2013), which in turn has led to several effects on the ecosystems, agriculture, public health and other sectors. With an average annual temperature of about 10° Celsius (KMNI, 2011), the average temperature in the Netherlands has risen by 1.7 °C since 1996, which is about twice as large as the rise of the global average. This temperature rise has led to an increased number of summer days, which have been risen about 20 days, as well as a decreased number of frost days, which have been fallen by about 20 days per year (Ligtvoet, W. et al., 2013). Research about the future effects in the Netherlands expects aggravation of the current changes till the year 2100. Specifically, according to the Koninklijk Nederlands Meteorologisch Instituut (KMNI, 2009), the expected future effects of global warming in the Netherlands till year 2100 are increases in dry periods between +7 and +30%, sea level increase on the Dutch coast between +35 and +85cm and an average annual temperature rise between +1.8 and +5.1° Celsius. These expectations increase the need of stronger governmental intervention regarding global warming related actions. Besides that, during this year, 2016, the Dutch Government is part of the 'Netherlands Circular Hotspot' (NLCH) campaign, during which the Netherlands is positioned "as an international circular hotspot during the time of the Dutch presidency of the EU in 2016" ("NLCH Campaign", n.d., para. 2), which reasons the importance of circular economy tenets within public policy.

1.2 Background on Climate Change

Climate Change is a topic that receives increasing amounts of attention in media, academic literature, industry sectors, public policies and even private households. When defining the concept, scientists mostly cite the Intergovernmental Panel on Climate Change (IPCC[3]). The IPCC defines the term as follows:

> Climate change in IPCC usage refers to a change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/or the climate change, its impacts and future risks, and options for adaptation and mitigation" (IPCC, 2013).

[1] Organisation for Economic Co-operation and Development

[3] The IPCC is an organization that assesses the science related to climate change, providing reports about "the scientific basis of

> variability of its properties, and that persists for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or as a result of human activity. (IPCC, 2007, para. 2, 'Definitions of climate change')

In other words, climate change explains the changes in global air and water temperatures caused by greenhouse gas (GHG) emissions that are being released into the earth's atmosphere. These emissions are both of natural, as well as anthropogenic forces.

Another term that is frequently used in relation to climate change is "global warming". Global warming is the consequence of the excessive climate change and is caused by the so called 'greenhouse effect' that is created by the amount of greenhouse gases in the Earth's atmosphere. These gases – for example carbon dioxide (CO2), methane (CH4) and nitrous oxide (N2O) – create a barrier for the UV rays that arrive the Earth through the sun, making it difficult to reflect back the excess rays and thus leading to warmer temperatures (Eurostat, 2015). The greenhouse effect is a natural process and needed to keep the Earth warm enough to enable life. It is naturally influenced by solar variability and natural greenhouse gases that are created by volcanos, plants or animals (Bousquet et al., 2006). However, the amount of GHG emissions that are caused by humans – for example, through deforestation and the burning of fossil fuels – exceeds the natural amount to a dangerously huge extent, especially considering that the biggest contributor of all greenhouse gases, the carbon dioxide (CO2) is now at its highest level in 650.000 years, with a global air concentration of 403,28ppm . These amounts have already led to an increase of 0,87° Celsius in the Earth's average surface temperature since 1880, which has caused arctic ice to shrink by 13,4 percent per decade, land ice to shrink by 287 gigatonnes per year and the global sea level to rise by 3,4 millimeters per year on average (NASA, 2015). Other effects are, for example, higher numbers of extreme weather events, decreased snow cover on mountains and ocean acidification (NASA, 2015).

Since these effects not only threaten countless of animal species, but also climate vulnerable countries and human health, climate change is now being addressed by more and more non-governmental organizations, scientists, society and governments, in order to adopt strategies to prevent further consequences. Governmental strategies consider the adaptation to climate change, as well as its mitigation, they tackle stricter policies, subsidies for climate friendly actions/processes, environmental taxes and regulations in order to get businesses and households to contribute fighting the issue.

This paper is structured as follows. In the first part, theoretical knowledge about climate change in public policies, circular economy and SMEs are clarified, followed by an explanation of the used methods for data collection and analysis. The findings section is then focused on the actual actions being undertaken by Dutch SMEs to reduce their GHG emissions, as well as the reasons that motivate these actions and the barriers that potentially restrict them. The last two parts discuss possible improvements and suggestions towards more efficient policies, in order to achieve higher SMEs' commitment, laying a focus on the concept of a circular economy.

2. THEORETICAL FRAMEWORK

The following section summarizes some of the most relevant concepts and theories that are at the core of this research. The intention is to provide information that will serve to establish a common understanding about climate change policies, circular economy and SMEs before digging deeper into the specific aspects needed to elaborate in order to answer to the research questions.

2.1 Climate change in public policies

Climate Change is a topic that receives increasing amounts of attention in media, academic literature, industry sectors, public policies and even private households. When defining the concept, scientists mostly cite the Intergovernmental Panel on Climate Change (IPCC). The organization defines the term as follows: "Climate change in IPCC usage refers to a change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or as a result of human activity." In other words, climate change explains the changes in global air and water temperatures caused by greenhouse gas (GHG) emissions that are being released into the earth's atmosphere. These emissions are both of natural, as well as anthropogenic forces.

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2.1.1 Current climate change policy in the Netherlands

The Climate Change Performance Index (Burck, Marten & Bals, 2014) is an instrument to evaluate and compare the climate protection performance of 58 countries all over the world. The evaluations are based on the categories 'emissions', 'efficiency', 'renewable energies' and 'climate policy' and rank the countries in between a scale of 'very good', 'good', 'moderate', 'poor' and 'very poor'. The latest version has recently been published in 2016 and although "the Netherlands improved its score significantly", the country only ranks on place 35 with 'poor' performance. Regarding the emissions level, the Netherlands lays within the lowest rank (very poor), which is due to a high consumption of energy. In the areas of emission development and energy efficiency, the country also only performs poor. In the renewable energies section the performance is better, – in the 'moderate' range – based on an increasing amount of green energy usage. As the last section, the climate policies, are evaluated as 'good', which will positively affect the upcoming future evaluations, if the adoption of these policies will be realized.

The following sections in this chapter will describe the current climate change policies published by the Dutch government, including public initiatives, regulations and incentives.

2.1.2 The Dutch Climate Change Agenda

The Dutch Government has created a "Climate Change Agenda", which is a written document about the ambitions, goals and actions planned by the government in order to tackle the climate change issue. Its aim is to "reach out to businesses, civil society organizations and citizens to work together on a sustainable society". The agenda is divided in 3 parts within the climate approach:

a) broadly-based coalitions for approaching the climate;
b) adaptation to climate change;

c) mitigation of climate change;

All of the 3 themes contain the planned actions towards the achievement of the respective objectives. Here as follows a brief description of each of them.

2.1.2.1 Broadly-based coalitions for approaching climate change

The creation of a 'broadly based coalition' is to be tackled by the means of so called 'Green Deals', which are organized collaborations with "local authorities, the business community, knowledge institutions, and consumers" ("Climate Agenda: Resilient, Prosperous and Green", p. 25) towards successful sustainability projects in the fields of solid wastes, renewable energy, stimulating bicycle and public transport use, etcetera. In addition, the Netherlands is embedding climate in its foreign policies, for example by supporting least developed countries financially, as well as materialistically in coalition with other developed countries. In this particular manner, collaboration among different countries is used to fight against global warming.

2.1.2.2 Adaptation to climate change

The adaptation action line contains all efforts to adapt to further climate change in the Netherlands. This includes analyzing and managing the risks and threats that are (possibly) caused by the changing air and water temperatures, in order to finish the National Adaptation Strategy. This latter is planned to be released before year 2017. Furthermore, in this adaptation process it is to find out, how the gathered knowledge can be used to find new innovations and business opportunities.

2.1.2.3 Mitigation of climate change

Mitigation is the largest part covered in the agenda with different action lines given, the first one being the creation of a better toolbox for mitigation. The EU Emissions Trading System (ETS) shall be the main actor in this line, as well as tighter product standards "in terms of energy consumption, more efficient manufacturing, sustainability and lower greenhouse gas emissions in the lifecycle". The next action line aims to make room for facilitating renewable energy and energy conservation by means of amending the law in a way to remove barriers and burdens towards the building of renewable energy systems. For example, the noise rules on wind turbines are to be simplified. "Taking the road towards sustainable mobility" is another action line in the agenda and aims to reduce the GHG emissions of cars and other vehicles by 6 megatons of CO2 equivalents[4] by year 2030. The SER Energy Agreement (described in the next paragraph) will be the main driver to achieve this target. Moreover, one action line is about moving towards a different and more efficient use of materials and sustainable industry and is to be achieved by for instance the means of the circular economy tenets, which are described in section 2.2. The last action line described is called "Towards more productive and climate-friendlier agriculture and horticulture", meaning to "ensure that there is sufficient food for everybody (food security), without further increasing the burden on the environment". To achieve this target, the instruments used in the agricultural sector and the production processes must be made more energy efficient.

2.1.3 Initiatives, Programs and Regulations

As also mentioned in the Climate Change Agenda, there are several initiatives, programs and regulations towards the reduction of GHG emissions. The SER Energy Agreement is an agreement made between over 40 Dutch organizations with the aim to achieve "a wholly sustainable energy supply system by 2050" (SER[5], 2013). It is agreed on different objectives to be achieved, e.g. the generation of 14% of all energy from renewable resources by 2020 and the tightening of the European agreements on greenhouse gas emissions towards a reduction target of 80 percent by year 2050.

The SER Energy Agreement is also the main driver in achieving the goals stated in the Climate Change Agenda. The Incentive Regulation for Sustainable Energy (SDE+) is an incentive for companies and institutions, supporting the use of durable electricity, durable heat and Green gas. With a yearly budget (in 2014, for example, it was €3.5 billion) paid by increases of energy bills for citizens and businesses, interested parties can apply and receive subsidies for a maximum period of 15 years. The subsidies are varying according to the current energy prices. According to the CBS Netherlands (2012), about "half of new solar panels were installed with [the] SDE subsidy" in 2011, highlighting the growing demand for this type of financial support. An important role towards climate change adaptation in the Netherlands plays the Delta Program, which consists of "the government, provinces, water boards and municipalities", as well as enterprises with valuable knowledge in the field of water management. The aim of this program is to reduce the vulnerability of flooding and to ensure constant freshwater availability, which are both possibly threatened by the rising sea level and increasing precipitation (Government of the Netherlands, 2015). Decisions on the five areas of flood risk management, freshwater, spatial adaptation, the IJsselmeer region and the Rhine-Maas delta are the focus of the program and are currently being realized. The government also offers support by the use of so called 'Green Deals' which aim to "help people with local sustainable projects that are hard to get off the ground". This is done by removing barriers in a way of changing laws and rules or find partners for cooperation (Government of the Netherlands, 2015). As a regulatory instrument, the Dutch government uses so called Environmental Taxes, which are divided in energy tax and water tax. In other words, the usage of energy and water is taxed, making its usage more expensive. The aim of these taxes is to encourage people to use less water and energy, as well as to use more renewable energy sources. People who use renewable sources for energy production are exempted from the energy tax.

Summing up, the Netherlands do have several subsidies and incentives towards greater GHG emission reduction, however, there are no definite regulations towards a higher contribution of the SMEs.

2.2 Circular economy

The concept of a circular economy was first introduced by Pearce & Turner (1990) in their book *Economics of natural resources and the environment* (Anderson, 2006), and first publicly adopted in year 2002 by the Chinese central government (Yuan, Bi & Moriguichi, 2006). Nowadays, circular economy is a rising topic in Europe and other countries and regions, since it pursues great benefits for the environment, as well as the economy and is one of the actions that can greatly contribute to fighting climate

[4] "GHG emissions/removals can be expressed either in physical units (such as grams, tonnes, etc.) or in terms of CO2 equivalent (grams CO2 equivalent, tons CO2 equivalent, etc.). The conversion factor from physical units to CO2 equivalent is the Global Warming Potential (GWP) of the corresponding GHG. If X Gg of CH4 is to be expressed in terms of CO2 equivalent, then it is multiplied by 21, which is GWP of CH4 over 100 years timescale." (UNFCCC, 2014)

[5] Social and Economic Council of the Netherlands

change (World Economic Forum, 2015). As the European Commission (2015) defines,

> The proposed actions will contribute to "closing the loop" of product lifecycles through greater recycling and re-use, and bring benefits for both the environment and the economy. The plans will extract the maximum value and use from all raw materials, products and waste, fostering energy savings and reducing Green House Gas emissions. ("Towards a Circular Economy", n.d., para. 2)

The aim of a circular economy is therefore to achieve greater sustainability by gaining the maximum value of products, raw materials and waste through recycling and re-usage as often as possible. The reason of the circular economy becoming a rising topic is the fact that natural resources like coal and gas are finite and still are being used in dangerously great amounts on a "linear consumption" basis (World Economic Forum, 2014). This system of linear consumption explains the path of raw materials becoming products and instantly ending up as waste after used by end-consumers. The so called "take-make-dispose-pattern" is not only the driving factor of resource scarcity, which evolved throughout decades of extensive exploitation of natural resources (Persson, 2015; World Economic Forum, 2014), but also highly contributes to environmental pollution and therefore loss of biodiversity (Jackson, 2009). Despite these environmental consequences, excessive resource consumption has led to higher and more volatile prices on resource markets, making businesses feel "squeezed" taking into account the "high competition and stagnating demand for certain sectors" (World Economic Forum, 2014). Pearce and Turner (1990) explained the concept of a circular economy early (Figure 1). The model is based on an economic viewpoint, seeing the environment as the source to four basic economic functions: (1) amenity values, (2) a resource base for the economy, (3) a sink for residual flows, and (4) a life-support system (Andersen, 2006). To understand the circular economy model, it is important to explain the different functions. Function 1, the amenity values, can be explained as the natural pleasure that environment offers to humans in a direct way, or as Andersen (2006) explains, without interference from the economic system. To give an example, the 'beauty of landscapes' and the 'existence of particular species' is explained:

> Even if these landscapes or species have never been observed or experienced directly, such as whales or the panda, humans may accord the species some value in relation to human welfare and will experience some loss if conditions for the species deteriorate. (Andersen, 2006, p. 135)

The second function of the environment is that it offers resources for economical purposes. These resources can be either renewable (for example fish stocks), as well as non-renewable (for example fossil fuels like coal) resources. However, for both types of resources the harvest cannot exceed the annual yield, otherwise it will impact its existence and will lead to depletion (Andersen, 2006). The environment as a sink for residual flows simply explains the path of all kinds of waste leading towards environmental pollution.

The fourth function considers the environment as a life-support system that enables humans and animals to live on Earth through its biological character (Andersen, 2006). Figure 1 shows how production (P), consumption (C), utility (U), natural resources (R), recycling (r), waste (W), exhaustible resources (ER), recyclable resources (RR), assimilative capacity (A), harvest (h), yield (y) affect each other in a circular economy system.

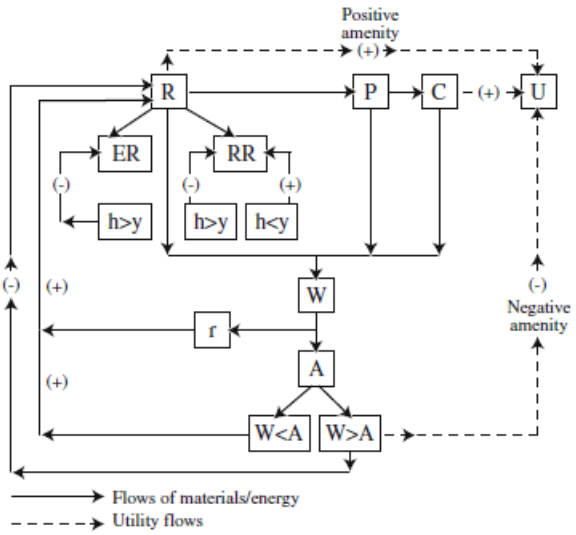

Figure 1: The Circular Economy (Pearce & Turner, 1990)

The model is used to clarify the circular economy tenets. It can be explained as follows: On top are the natural resources (R), which naturally create a positive amenity flow towards utility (U). The resources are used for production (P) and afterwards for consumption (C). This path positively affects economic utility. The resources can be either exhaustible (ER), which means that they become less, as soon as harvest (h) exceeds yield (y), or recyclable (RR), which means that they can either be recycled as long as harvest does not exceed yield, or not be recycled and negatively affect the materials and/or energy flow as a recyclable resource. Resources, production and consumption all create waste (W), which can either be recycled (r) – which in turn positively affects the flow of material and/or energy towards the natural resources – or not be recycled, which in turn directly affects the assimilative capacity (the ability of a water body to clean itself). In that case, if the amount of waste falls within the level of assimilative capacity, it can still positively affect the flow of materials and/or energy towards natural resources. If the amount of waste exceeds the level of assimilative capacity though, this creates a negative amenity flow towards utility and also negatively affects the flows of materials and/or energy towards the natural resources. As Andersen (2006) concludes:

> Residuals that are discharged to the environment do not only have the potential to cause harm (if waste exceeds assimilative capacity) by affecting amenity values and the life-support function, they have also been lost from the point of view of the economic system. This loss of residual materials from the economic system can be postponed for non-renewable resources if a circular economy that promotes recycling and reuse is instituted. (p. 135)

As explained in the report *Towards the Circular Economy: Accelerating the scale-up across global supply chains* (World Economic Forum, 2014), the circular economy system functions based on three main principles. The first one is the one that actually defines the 'closing-loop' model, being the elimination of waste from the circle by designing products that can be disassembled and re-used. The second principle restricts consumable products to be largely based on biological ingredients, to be at least non-toxic to the environment, as well as humans, and to be able of being "safely returned to the biosphere, either directly or in a cascade of consecutive uses" (World Economic Forum, 2014, p. 15). On the other side, products that are made out of technical nutrients like metals and plastics – for example, computers and phones – must be designed

for re-usage or upgrading from the beginning. The third – and last – principle expects the energy used for production to be renewable – for example through wind or solar power – in order to "decrease the resource dependence and increase the system's resilience". Therefore, the environmental benefits that are achieved by a circular economy lead to several economic benefits, including "substantial net material savings, mitigation of volatility and supply risks, drivers for innovation and job creation, improved land productivity and soil health, and long-term resilience of the economy " (World Economic Forum, 2014). Through waste minimization, the usage of biologically-based consumable goods, re-usable technical goods and the usage of clean energy, the environment is being protected from poisoning, waste overload and resource depletion. These effects will in turn contribute to decreased GHG emissions and decreased threat to biodiversity (World Economic Forum, 2015).

2.3 Small and medium-sized enterprises (SMEs)

As mentioned in the introduction section, small- and medium-sized enterprises (SMEs) in the European Union are clearly defined as businesses that have up to 249 employees and either a maximum annual turnover of €50Million or a maximum annual balance sheet total of €43Million (European Commission, 2009). These numbers differ between countries, for example, the United States of America (USA) count businesses with employees up to 500 still as SMEs and some other countries set the limit already at 200 employees (OECD, 2005).

In Europe, SMEs can be divided into medium-sized, small and micro enterprises. The medium-sized enterprise group includes businesses with 50-249 employees. The small enterprise group entails businesses with 10-49 employees. Whilst the micro enterprise group contains all businesses with less than 10 employees (European Commission, 2009). The maximum annual turnover numbers are therefore ≤€50 Million for medium-sized, ≤€10 Million for small, and ≤€2 Million for micro businesses, or annual balance sheet totals of maximally €43 Million, €10 Million, or €2 Million, respectively (OECD, 2005; European Commission, 2009). As of 2015, 99% of all European enterprises meet these criteria and are considered to be SMEs (Eurostat, 2015). A distinction can be made between independent and dependent SMEs, though. As also explained by Eurostat (2015), dependent SMEs are part of a group of SMEs, which is likely to occur in manufacturing industries, for example. To distinguish these, the European Commission has clear guidelines, which divide SMEs into 3 categories i) autonomous: if the enterprise is either completely independent or has one or more minority partnerships (each less than 25%) with other enterprises; ii) partner: if holdings with other enterprises rise to at least 25% but no more than 50%, the relationship is deemed to be between partner enterprises; iii) linked enterprise: if holdings with other enterprises exceed the 50% threshold, these are considered linked enterprises.

Generally, SMEs in the European Union (EU) make up 99 percent of all businesses, created 85 percent of new jobs in the past 5 years and provide around two thirds of the total private sector employment in the EU (European Commission, 2016). Compared to multinational corporations (MNCs), SMEs face natural barriers to growth, as the limitation of resources like knowledge, skills or financials. The Small Business Act (SBA) is a framework that was published in 2008 by the European Commission with the aim to "improve the approach to entrepreneurship in Europe, simplify the regulatory and policy environment for SMEs, and remove the remaining barriers to their development" (European Commission, 2016).

2.3.1 SME contribution to climate change in the Netherlands

As stated in scientific literature, the exact contribution of SMEs to a country's GHG emission level is not documented (Hobbs, 2000), however estimations calculate a contribution of 70 percent of all global industrial pollution (Hillary, 1995; Smith & Kemp, 1998) and a contribution of 60 percent of the total global carbon emissions (Marshall 1998).

While literature shows limited research on the environmental impacts of SMEs (Aragón-Correa et al., 2008), studies show that "environmental actions undertaken are inversely proportional to the company size" (Nulkar, 2014, p.131), which indicates that small and medium sized enterprises undertake less environmental actions than multinational companies and 'the sum total of SMEs' environmental impacts outweighs the combined environmental impact of large firms (Hillary, 2000).

As also stated by Nulkar (2014, p. 130) "SMEs may have been left out of the regulatory and social pressures", which can be explained by the lesser (if any) amount of attention in areas of media and politics. For example, multinational corporations (MNCs) appear constantly within all areas of media and online- and offline advertising, which increases the amount of societal pressure and creates the need to react socially responsible.

SMEs, as well as MNCs, appear in almost all economic sectors, "including retail, financial services, manufacturing and construction" (Bradford & Fraser, 2007, p.3), which makes it "difficult to generalize about the environmental impacts caused from such a vast array of different businesses" (Hillary, 2004, p. 561).

The sectors, which are used by the European Environment Agency (EEA) to estimate European GHG emissions, are

a) energy (fuel combustion and fugitive emissions from fuels) — which also includes transport;
b) industrial processes and product use;
c) agriculture;
d) land use, land use change and forestry (LULUCF); and
e) waste management (Eurostat, 2015).

Based on data of year 2013, the biggest contributor to European GHG emissions is found to be the energy sector (including transport), making up 79,40 percent of the European emissions. 'Industrial processes and product use' make up 7,8 percent, 'agriculture and LULUCF' together make up 9,60 percent and 'waste management' makes up 3,30 percent of the emissions (Eurostat, 2015).

In the Netherlands, data from year 2010 show slight differences, with even 84,70 percent made up by the energy sector (including transport) (European Environment Agency, 2010).

2.4 Linking the concepts

This research paper focuses on the relationship between circular economy tenets, climate change policies and the environmental behavior of SMEs and how the latter can be influenced by the others. As it was explained above, circular economy carries several economic benefits and is expected to improve the effectiveness of climate change policies. The latter in turn has the potential to positively affect the environmental behavior of SMEs, which, however, is also influenced by barriers to growth faced by SMEs. These barriers can be lessened by climate change policies and will be examined in later stages of this research.

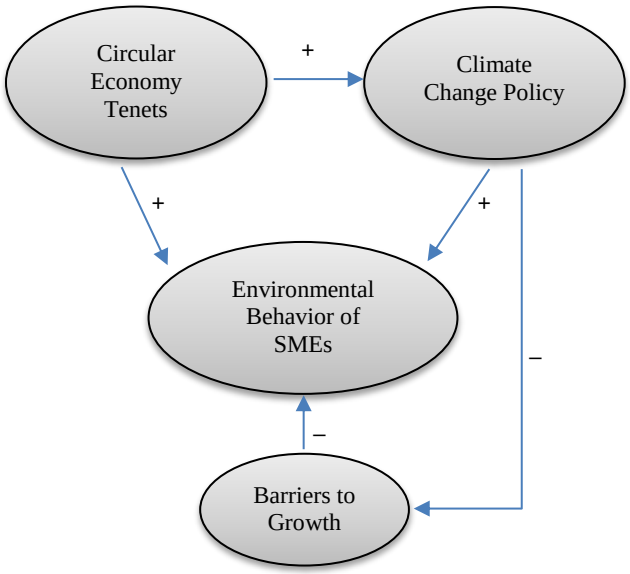

Figure 2: Linking the concepts

The linkages between the concepts are shown in Figure 2. The circular economy tenets are expected to positively (+) influence climate change policies, as well as the environmental behavior of SMEs. The latter is additionally negatively (-) influenced by barriers to growth, which in turn can be lessened by climate change policies.

3. RESEARCH METHODOLOGY

In order to answer the two established research questions, which are based on the previously defined problem, this research paper conducts a structured review of scientific literature and reliable online information using a literature review method, as it was introduced by Wolfswinkel et al. (2011). The purpose was to clarify the linkages between the introduced concepts and assess the current state of knowledge and policy actions in these topic areas. With this method it was possible to find the most relevant literature on the topic and analyze the articles in a structured way using five stages: 1) Define, 2) Search, 3) Select, 4) Analyze, and 5) Present.

During the first stage, the inclusion and exclusion criteria for the selection of articles were defined, as well as the fields of research, the determination of appropriate sources and the collection of specific search terms. The inclusion criteria were mainly the necessity to cover at least one of the search fields – for example, *climate change*, *SMEs* or *circular economy* – in the title of the paper. However, slight variations did not directly lead to exclusion of an article, for example, titles that contained '*circularity systems*' instead of '*circular economy*', or, '*global warming*' instead of '*climate change*' still fall within the inclusion criteria. Articles that contained neither of the search fields in the title, were planned to be excluded from the selection. The search fields of the theoretical framework were broad and covered terms like 'climate change', 'circular economy' and 'SME definition' in order to find most common articles to explain the terms. The findings section, however, was divided into different sub-topics and therefore covered narrower topic-related terms like '*effects of climate change in the Netherlands*', '*climate change policies netherlands*', '*SMEs and climate change*', '*circular economy policies*', et cetera.

The second stage covered the actual article search. For this matter, online search machines including *Google Scholar* and *Science Direct* were used, as well as the online library of the University of Twente. For the findings section, which also covers official public governmental and corporate publications, *Google Search* was added, as well as the direct entering of the governmental website of the Netherlands (*government.nl)* or the European Commission (*ec.europa.eu*).

Selecting useful articles and reports from the broad range on the Internet was the next step. After entering the search terms (either in the search machines or in the respective websites), all articles that matched the inclusion criteria were opened and checked for relevance. The tactic for this matter included reading the abstract, as well as parts of introduction and conclusions, in order to find out, if the respective article was relevant for the purpose.

The articles found to be useful, were progressed to stage four: the analysis of the content. For this purpose, the articles were sorted out by topic and afterwards the full bodies of the articles were read. The relevant information was collected and noted down together with the author and document name, in order to keep the references of the findings straight.

In each stage, the number of articles was narrowed down to a final number of 56 resources. Of those, 17 papers fall within the category of scientific articles and 39 articles are publications of governmental organizations, the European Commission and other related enterprises.

4. FINDINGS

The following chapter presents the findings that were gathered in order to answer the research questions. First, the growth barriers of SMEs and their current level of environmental engagement are described, followed by possible points of improvement for the Dutch climate change policies.

4.1 Dutch SMEs' environmental behavior, the respective barriers and the impact of current public polices

This chapter describes which actions Dutch SMEs are realizing for climate change adaptation and mitigation in the Netherlands, followed by the barriers that SMEs are facing when it comes to that issue. In 2013, the TNS Political & Social Research Company carried out a survey with 13.509 SMEs, of which 11.207 were from the European Union, including 400 Dutch companies. The aim of the survey was to review the current state about resource efficiency and green markets in SMEs. The results showed that 60 percent of Dutch SMEs were complying with environmental legislation, with 44 percent which did not wish to go beyond these requirements and 16 percent were willing to do more. Generally, 93 percent of Dutch SMEs undertake at least 1 action to be more resource efficient, with 65-67 percent saving energy or materials and/or minimizing waste and 27 percent saving water. 55 percent claimed to reuse materials and/or waste within the company and 28 percent claimed to sell their scrap materials to another company. 30 percent are using predominantly renewable energy. These statements clearly show potential for the development of a circular economy. However, when it comes to financial aspects, over the past 2 years, 38 percent of the SMEs invested less than 1 percent of their annual turnover, 43 percent invested 1-5 percent of their annual turnover and only 2 percent invested 31-50 percent of annual turnover on average per year to be more resource efficient. 27 percent of Dutch SMEs offers green products or services and 62 percent do not and are also not planning to do so. The reasons for not offering green products or services were mainly insufficient demand from customers or because it would not fit or is not important for their company's image. Some SMEs stated that it is not important or not in line with their company's core values, or that it would not create a

competitive advantage or additional business opportunities. Additionally, some stated that offering green products or services would not be relevant in terms of catching up with main competitors. 4 percent stated that there is insufficient public support (financial subsidies, tax incentives, etc.) and 13 percent say that it would not be relevant in terms of compliance with national, regional or local laws.

SMEs are known to be less likely to implement or adopt environmental strategies and practices, which is why research in this study area is rare (Aragón-Correa et al., 2008; Agan et al., 2013). Moreover, they are known to be "strongly oriented towards day-to-day activities to which environmental issues are seen as somewhat peripheral" (Brammer et al., 2011, p. 424). Reasons for the lack of studies about SMEs and their environmental practices are their "lack of interest in going beyond regulatory compliance", as well as a "low degree of public interest in SMEs" and "the difficulty of obtaining data from SMEs" (Aragón-Correa et al., 2008, p. 89). Additionally, studies have shown that firm size is positively related to the level of proactiveness, showing that SMEs undertake less environmental actions than multinational companies (Arragón-Correa et al., 2008).

The reasons for the lack of environmental commitment in SMEs can be explained by using a resource-based perspective. Compared to large organizations SMEs lack the resources and information that are necessary to implement proactive environmental strategies that go beyond the minimum regulatory compliance (Aragón-Correa et al., 2008; Agan et al., 2013) in order to achieve greater GHG emission reductions. These resources concern in general the financing, expertise and structuring of the environmental plans (Leonidou et al., 2015). SMEs are struggling with the uncertainty about the programs or activities that are to be implemented, since they are not part of the companies' conventional activities and take a relatively long time to "yield a satisfactory return" (Leonidou et al., 2015, p. 2). Moreover, the implementation of environmental activities or technologies is complex and requires an "appropriate organizational structure and culture" that can encourage and support the practices, in order to achieve a full integration in all functional areas and the supply chain (Aragón-Correa et al. 2008), as well as technical expertise to introduce and maintain the new technologies or processes. As explained by Hitchens et al. (2003, p. 56), another barrier towards green initiatives, can be skepticism towards the "benefits to be derived from the environmental initiatives, and, rather differently, resistance to change, and the view that environmental performance is a necessary constraint on the activities of the firm and an interruption to production-related activities". Additionally, the TNS Political & Social Research survey about resource efficiency and green markets has proven some of those barriers and has also shown some additional ones, as experienced by SMEs. It was found that 18 percent of Dutch SMEs experienced complexity of administrative or legal procedures when trying to set up resource efficiency actions. Others experienced too high costs of environmental actions, lack of specific environmental expertise, difficulties to adapt legislation to their company or in choosing the right resource efficiency actions for their company. Furthermore, difficulties with the technical requirements of the legislation not being up to date were experienced. Of those who did undertake environmental actions, 29 percent relied on external support to be more resource efficient. Only 23 percent of European SMEs offer green products or services because of compliance with national or local laws, 5 percent because of tax incentives and 4 percent because of subsidies and/or public support. Overall, 75 percent of these SMEs received private sector support, while only 35 percent received support from the public sector. These findings prove the need for law enforcement regarding the issue.

4.2 Possible improvements towards a higher commitment of SMEs in climate change adaptations

To achieve higher environmental commitment of Dutch small and medium sized enterprises, the public policies in the Netherlands can be improved and enforced. They must be adjusted in a way that most of the barriers faced by SMEs towards climate change actions are reduced or eliminated, but also create more legislative pressure to call for action. When considering policy improvement, the barriers faced by SMEs should be taken into account. According to the TNS report, the complexity of administrative or legal procedures, high costs, a lack of environmental expertise, difficulties to adapt legislation and to choose the right actions, as well as a lack of technical requirements and financial resources were mentioned as the main barriers to not set up resource efficiency actions. To the question, what kind of support would be most helpful to become more resource efficient, the following statements were given by Dutch SMEs (TNS Political & Social Research Company, 2013):

- 27 percent would like to have a tool to self-assess how resource efficient their company is with respect to others
- 23 percent stated that grants or subsidies, advice on funding possibilities, or the demonstration of new technologies or processes would help their company the most to be more resource efficient
- 21 percent said that a database with case studies that show the benefits of resource efficiency for companies would help most.
- 19 percent believed that consultancy on how to improve resource efficiency in their company would help most

The observed barriers and needs that were identified can be tackled by offering free information systems including consultancy, databases and funding possibilities; simplifying administrative and legal procedures, as well as offering service times for these matters. Moreover, offering free advice on environmental actions, technologies and circular systems should be realized, since professional advice is mostly too costly for SMEs. To react on the SMEs needs, offering resource efficiency tools, an increase in budgets for grants and subsidies, as well as the reward of good practices are needed. Rizos et al. (2015) support these findings, stating that the main points to focus on within national policies are: i) financial support; ii) internationalization support; iii) an easy and clear communication, or; iv) policy support like "tax rebates for buying certain green services and/or products. Agan et al. (2013) highlight the insufficient public policies and suggests governments to "devise environmental awareness training programs for owners and managers of SMEs" (p. 31) and to enforce law and legislation.

4.3 Circular economy principles as means to reach SMEs with public policies

After pointing out general ways of improvement, the circular economy is another important factor that can and must be included to achieve greater contribution of SMEs in the Netherlands.

In December 2015 the 'Circular Economy Package', was developed and published, which includes "revised legislative proposals on waste to stimulate Europe's transition towards a

circular economy" as well as the "Green Action Plan for SMEs" (European Commission, 2016). Additionally, during the 'Netherlands Circular Hotspot' (NLCH) campaign, the Netherlands is positioned "as an international circular hotspot during the time of the Dutch presidency of the EU in 2016". All of these events are internationally developed and push the country towards the creation of a circular economy.

As stated by the Government of the Netherlands (2015, para. 2), "an investigation by the Netherlands Organisation for Applied Scientific Research (TNO) concluded that this approach could boost the Dutch economy by some €7 billion a year, and create 50,000 jobs. It would also reduce CO2 emissions by 17 megatons, and lead to a considerable reduction in water usage".

Thus, movements towards a circular economy in the Netherlands are in progress, and this paragraph will point out means to achieve engagement of SMEs in this regard.

The TNO (2013) has created an action plan for the Dutch government as a helpful tool towards the creation of a circular economy, which covers the following actions: a) creating a clear, cross-departmental, consistent strategy that includes "policy areas such as energy, sustainability and climate, agriculture, trade, waste, raw materials, foreign affairs and development cooperation, education and research funding, and fiscal tools" to come together and form a consistent and transparent strategy towards circular economy; b) developing "a coherent education and research plan", by implementing respective topics in the curricula of education, especially in vocational colleges and universities; c) assessing "the pros and cons of existing rules and regulations regarding waste"; d) increasing the "knowledge and awareness of raw materials in each value chain", for example by offering an information service for extensive raw materials; e) frontrunners, as well as adopters of circularity systems must receive a permanent advantage towards non-contributors, "for example through value chain management"; f) reviewing "the effectiveness of a broad set of fiscal and financial incentives to promote circular behavior" for businesses, as well as civil society; g) determining "the impact of incineration plants on the viability of circular business cases and take appropriate action"; h) developing "the role of the government as an active and expert 'launching customer'" by "demanding the use of circular products or services in government procurement tenders"; i) using "the international playing field to help the circular economy move forward" by communicating and working together with other circular thinking countries like Germany or Denmark.

These actions are a necessity to successfully move towards a circular economy and will either directly or indirectly affect the SME contribution. The government should include the barriers of SMEs in this respect and remove as much as possible.

Additionally, in 2015, a more specific manifesto on the circular economy policies in the EU was published by the organizations 'De Groene Zaak Sustainable Business Association', 'MVO Nederland and 'Circle Economy', explaining several proposals on policy improvement from a "frontrunners' business perspective" on circular economy practices (De Groene Zaak Sustainable Business Association et al., 2015). The manifesto appeals to the European Commission, however, several points of action must be realized by national governments and can therefore be applied by the Dutch government.

The recommendations are divided in the following 3 areas i) Leadership: strong government policies to mainstream circular business; b) introduce economic incentives; and c) adapt and exploit existing measures.

The first part is recommending the following actions. Firstly, it is recommended to extent the existing targets along the "full circle", so that they cover also "maintenance, repair, reuse, refurbishment and cascading". Standards for recycling materials must be implemented to match the difference between supply and demand for high quality recycled materials, for example by investing in better separation technologies. Moreover, the Raw Material Consumption (RMC) per capita is advised to be used as the key indicator for resource productivity and keep track of attention areas like biodiversity, since the gross domestic product (GDP) is not appropriate for measuring a circular economy. The GDP can "grow with decreasing circularity (e.g. more waste production) and, conversely, drop with decreasing use of raw materials", which causes governments to stay on the linear economy path. For this matter, market mechanisms as the extended producer responsibility (EPR), or an economic indicator as the Genuine Progress Indicator (GPI) can be implemented.

The government can also act as a 'launching customer', by shifting towards green public procurement. To achieve this, it is important to monitor and control the long-term targets, securing that the purchasing departments contribute – instead of focusing on buying on the lowest price – and conduct "green and circular procurement training of government procurement departments". Besides that, the Dutch Green Deal Circular Public Procurement must include the "residue materials that are owned by the government after use by government or citizens" and is also manageable for SMEs, in order to be successfully realized.

Additionally, a systemic approach is needed, including actively improving market conditions, removing barriers and implementing a "framework with economic incentives that creates conditions for innovation". Within this approach, a 'flexible competition policy' can help by providing a framework for cooperative innovation and co-creation, including the allowing of cooperation and agreements between companies concerning jointly developed circular products and services that are otherwise forbidden". Moreover, a 'Circular Frontrunners Programme' provided for frontrunner companies to improve research, development and demonstration, as well as 'sectoral and cross-sectoral programs' are advised to implement to "mainstream circular business" and approach cross-sectoral partnerships.

Feasibility and pilot studies are recommended to monitor the effectiveness of incentives, circular business models and green economic growth. Other recommendations towards national governments include "tax reforms, integrated reporting and the integration of circular economy in education and training". For the businesses that might have to take losses from circular economy like lagging manufacturers, clever solutions must be found, for example by providing transition paths, measures that face their obstacles and industry appropriate incentives.

Furthermore, the empowerment of legislation on recycling is advised, for example by employing strict criteria on the incineration of waste and the usage of toxic substances.

The second part of the manifesto specifies possible economic incentives to optimize market conditions for businesses. It is suggested to adjust economy-wide taxes and differentiate value-added tax (VAT) rates on products and services in order to promote circular systems. For example, increasing the tax on "primary raw materials while reducing the tax on recycled materials and labour", "zero VAT rates on circular products and services", as well as "tax benefits for companies switching to integrated reporting" are possibilities to guide and encourage businesses towards circularity. The Ex'Tax Project was developed by four large firms (Deloitte, EY, KPMG Meijburg and PwC), focuses on such tax shifts and provides a toolkit for the respective implementation.

"Adapt and exploit existing measures" is the third, and last part of the publication. It is advised to turn the 'Ecodesign Directive' into a Circular Design directive, especially reducing administrative burdens to a minimum, therefore simplifying the

design also for SMEs. At last, the following actions are recommended: i) the implementation of end-of-waste criteria, especially preventing from abuse; ii) improve the framework to make optimal choices in sectoral and product levels; iii) continuing calls for proposals for circular economy systems, for example research on "waste separation techniques, alternatives for critical or toxic raw materials, new business models and the removal of linear obstacles for circular business", as well as the development of EPR schemes; iv) the "integration of circular economy in education and training"; and v) "a strategic policy on critical raw materials including sharp anti-dumping policy for raw materials".
As these recommendations are in total represented by over 2300 companies, including MNCs, as well as SMEs, they take the most important barriers towards circular economy into account and are guided by frontrunners' experiences.

5. CONCLUSIONS

This research paper focused on the research questions (1) "What are the barriers towards environmental engagement in Dutch SMEs?; 2) To what extent do Dutch climate change policies affect the environmental behavior of Dutch SMEs? And; (3) to what extent can circular economy tenets be integrated to Dutch climate change policies to improve the SMEs performance?"

Based on the linkages between the covered concepts, it was found that Dutch SMEs face a wide range of barriers to growth, which restrict the will of respective decision-makers, as well as the required resources to implement environmentally friendly, or even circular, processes. At the current state, the Dutch climate change policies do not actively call for action in SMEs and do not support the overcoming of the faced barriers effectively enough. For most SMEs, the effort towards environmentally-friendly processes is not worth it and legislation is not strict enough to change this attitude.

Considering these points, as well the low level of environmental behavior in Dutch SMEs, several potential points of improvements for the Dutch climate change policies were found, as well as a wide range of recommendations towards the integration of circular economy principles. It is of particular importance to diminish as much as possible those barriers towards SMEs' environmental growth. For example, the lacking resources issue must be covered by higher budgets for grants and subsidies, as well as rewards for good practices, in order to encourage the firms to engage more. As for the circular economy principles, the government must continue to spread knowledge about the different systems and offer easily accessible support in implementing circular economy systems, especially taking into account the Circular Economy Package that was introduced by the European Union.

5.1.1 Limitations

Regarding the reliability and validity of this article, several points of limitations need to be considered. As the first point, the paper was written within a time frame of three months, which restricted a more extensive search for articles, and thus the depth of the research. Moreover, the research relied on sources that were accessible in online libraries and search engines, which might have led to the exclusion of some important scientific findings that were not published on the Internet. Therefore, a larger range of articles might cover different viewpoints and possibly lead to differentiated conclusions.

5.1.2 Recommendations

Considering the limitations of this paper, future research should include a wider search of literature, including, for example, articles or case studies from good practice countries like Germany or Denmark. Thus, comparisons can be made and potentially more possible points of improvement can be found. In addition, a greater amount of articles might bring up a more critical view on the circular economy implementation and the negative effects in particular industries, e.g. chemistry, which not directly benefit from circular systems and its waste and substance restrictions. Furthermore, practically, surveys of best practice SMEs, as well as weak practice SMEs should be conducted, in order to deepen the knowledge about the reasons for environmental engagement, as well as non-engagement. Furthermore, to cover the research questions of this paper, the points of improvement should be considered to come in practice and afterwards be monitored and adjusted, where needed. Generally, based on the findings of this paper, it is advised to take faster steps towards a circular economy in the Netherlands.

6. REFERENCES

1. **Agan, Y. et al. (2007).** Drivers of environmental processes and their impact on performance: a study of Turkish SMEs. *Journal of Cleaner Production 51 (2013) 23e33.*
2. **Andersen, M. S. (2006).** An introductory note on the environmental economics of the circular economy. *Sustainability Science April 2007, Volume 2, Issue 1, pp 133-140. Integrated Research System for Sustainability Science and Springer 2006.*
3. **Arragón-Correa, J.A. et al. (2008).** Environmental strategy and performance in small firms: A resource-based perspective. *Journal of Environmental Management 86 (2008) 88–103.*
4. **Bastein, T. et al. (2013).** Opportunities for a circular economy in the Netherlands. *TNO 2013 R10864.*
5. **Behrens (2016).** Time to connect the dots: What is the link between climate change policy and the circular economy? *Centre for European Policy Studies (CEPS, 2016).*
6. **Bousquet et al. (2006).** Contribution of anthropogenic and natural sources to atmospheric methane variability. *Nature Publishing Group Vol 443 | 28 September 2006 | doi: 10.1038/nature05132.*
7. **Bradford, J. & Fraser, E.D. G. (2007).** Local Authorities, Climate Change and Small and Medium Enterprises: Identifying Effective Policy Instruments to Reduce Energy Use and Carbon Emissions. *Corporate Social Responsibility and Environmental Management 14, 0000-000 (2007).*
8. **Brammer, S. et al. (2011).** Environmental Management in SMEs in the UK: Practices, Pressures and Perceived Benefits. *Business Strategy and the Environment 21, 423–434.*
9. **Burck, J. et al. (2016).** The Climate Change Performance Index – Results 2016. *Germanwatch, December 2015.*
10. **CBS, PBL, Wageningen UR (2015).** Emissies broeikasgassen, 1990-2014 (indicator 0165, versie 27, 29 september 2015).

www.compendiumvoordeleefomgeving.nl. CBS, Den Haag; Planbureau voor de Leefomgeving, Den Haag/Bilthoven en Wageningen UR, Wageningen.

11. **Centre for European Policy Studies (2016).** Moving towards a Circular Economy: Challenges and Opportunities for SMEs. *Retrieved on 01st June from: https://www.ceps.eu/events/moving-towards-circular-economy-challenges-and-opportunities-smes*
12. **De Groene Zaak Sustainable Business Association et al. (2015).** More prosperity, new jobs – Manifesto on Circular Economy Policy in the EU. *Retrieved on 13th June from: http://degroenezaak.com/business-politics/circulaire-economie/more-prosperity-new-jobs/*
13. **Ellen MacArthur Foundation (2015).** Growth Within: A Circular Economy Vision for a Competitive Europe. *EMF.*
14. **European Commission (2009).** What is an SME? *Retrieved from: http://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition/index_en.htm*
15. **European Commission (2013).** SMEs, Resource Efficiency and Green Markets. *Flash Eurobarometer 381 - TNS Political & Social.*
16. **European Commission (2015).** User Guide to the SME definition. *Luxembourg: Publications Office of the European Union, 2015.*
17. **European Commission (2016).** Closing the loop – An EU action plan for the Circular Economy. *Retrieved on 31st May from: http://ec.europa.eu/environment/circular-economy/index_en.htm*
18. **European Commission (2016).** Entrepreneurship and Small and medium-sized enterprises (SMEs). *Retrieved on 07th June from:* http://ec.europa.eu/growth/smes/
19. **European Commission (n.d.)** Towards a Circular Economy. *Retrieved from: https://ec.europa.eu/priorities/jobs-growth-and-investment/towards-circular-economy_en*
20. **European Environment Agency (2010).** GHG Trends and projections in the Netherlands. *Retrieved on 5th June from: http://glossary.eea.europa.eu//terminology/sitesearch?term=emission+trends+netherlands*
21. **Eurostat (2015).** Greenhouse gas emission statistics. Retrieved on 11th May 2016 from: *http://ec.europa.eu/eurostat/statistics-explained/index.php/Greenhouse_gas_emission_statistics*
22. **Government of the Netherlands (2015).** Dutch national measures on climate change. *Retrieved from: https://www.government.nl/topics/climate-change/contents/national-measures*
23. **Government of the Netherlands (2015).** Government asks SER for advisory opinion on circular economy opportunities. *Retrieved on 30th May from: https://www.government.nl/latest/news/2015/12/11/government-asks-ser-for-advisory-opinion-on-circular-economy-opportunities*
24. **Geng, Y. & Doberstein, B. (2008).** Developing the circular economy in China: Challenges and opportunities for achieving 'leapfrog development'. *International Journal of Sustainable Development & World Ecology, 15:3, 231-239, DOI: 10.3843/SusDev.15.3:6.*
25. **Hillary, R. (2004).** Environmental management systems and the smaller enterprise. *Journal of Cleaner Production 12: 561-569.*
26. **Hitchens, D. et al. (2003).** Competitiveness, Environmental Performance and Management of SMEs. *GMI 44 Winter 2003.*
27. **Hobbs, J. (2000).** Promoting Cleaner Production in SMEs. *In R. Hilary, SMEs and the Environment (pp. 149-157). Sheffield: Greenleaf Publishing.*
28. **IPCC (2007).** Climate Change 2007: The Physical Science Basis – Summary for Policymakers. *IPCC WGI Fourth Assessment Report.*
29. **IPCC (2007).** Observed changes in climate and their effects. *Retrieved from: https://www.ipcc.ch/publications_and_data/ar4/syr/en/mains1.html*
30. **Jackson, T. *(2009).*** Prosperity without Growth: Economics for a Finite Planet. *Earthscan Dunstan House 14a St Cross Street London EC1N 8XA, UK.*
31. **Leonidou, L. C. et al. (2015).** Internal Drivers and Performance Consequences of Small Firm Green Business Strategy: The Moderating Role of External Forces. *Springer Science+Business Media Dordrecht 2015, DOI 10.1007/s10551-015-2670-9.*
32. **Ligtvoet, W. et al. (2013).** The effects of Climate Change in the Netherlands: 2012. *The Hague: PBL Netherlands Environmental Assessment Agency.*
33. **Ministry of Infrastructure and the Environment (2013).** Climate Agenda: Resilient, Prosperous and Green. *Retrieved from: https://www.government.nl/topics/climate-change/documents/reports/2014/02/17/climate-agenda-resilient-prosperous-and-green*

34. **NASA (2011).** What are Climate and Climate Change? *Retrieved on 11th May 2016 from: http://www.nasa.gov/audience/forstudents/5-8/features/nasa-knows/what-is-climate-change-58.html*
35. **NASA (2015).** Global Climate Change: Vital Signs. *Retrieved on 19th May from: http://climate.nasa.gov/vital-signs/carbon-dioxide/*
36. **Noodweercentrale Netherlands (2015).** The climate in the Netherlands. *Retrieved on 1st May 2016 from: http://www.noodweercentrale.nl/en/weather.html*
37. **North, P. & Nurse, A. (2013).** 'War Stories': Morality, curiosity, enthusiasm and commitment as facilitators of SME owners' engagement in low carbon transitions. *Geoforum 52 (2014) 32–41.*
38. **Nulkar, G. (2014).** SMEs and environmental performance – A framework for green business strategies. *Procedia - Social and Behavioral Sciences 133 (2014) 130–140.*
39. **OECD (2005).** OECD SME and Entrepreneurship Outlook: 2005. *OECD Paris, page 17.*
40. **OECD (2012)**. "The Netherlands", in Financing SMEs and Entrepreneurs 2012: An OECD Scoreboard. *OECD Publishing. http://dx.doi.org/10.1787/9789264166769-14-en*
41. **Pearce, D. & Turner, R.K. (1990)**. Economics of natural resources and the environment. *Harvester Wheatsheaf, London.*
42. **Persson, O. (2015).** What Is Circular Economy? – The Discourse of Circular Economy in the Swedish Public Sector. *Ola Persson and the Department of Earth Sciences, Uppsala University, Published at Department of Earth Sciences, Uppsala University (www.geo.uu.se), Uppsala, 2015.*
43. **Rizos et al. (2015).** The Circular Economy: Barriers and Opportunities for SMEs. *CEPS Working Document No. 412 / September 2015.*
44. **Social and Economic Council (2013).** Energy Agreement for Sustainable Growth. *Retrieved from: https://www.ser.nl/~/media/files/internet/talen/engels/2013/energy-agreement-sustainable-growth-summary.ashx*
45. **Statistics Netherlands (2012).** Substantial increase in use of solar panels. *Retrieved from: http://www.cbs.nl/en-GB/menu/themas/dossiers/eu/publicaties/archief/2012/2012-3673-wm1.htm*
46. **Statistics Netherlands (2013).** The Netherlands and the Kyoto target. *Retrieved from: http://www.cbs.nl/en-GB/menu/themas/dossiers/eu/publicaties/archief/2013/2013-01-24-broeikasgassen.htm*
47. **Statistics Netherlands (2015).** Higher CO2 emissions in the second quarter 2015. *Press release, 14 August 2015 15:00. Retrieved from: http://www.cbs.nl/en-GB/menu/themas/macro-economie/publicaties/artikelen/archief/2015/hogere-co2-uitstoot-in-tweede-kwartaal.htm*
48. **Statistics Netherlands (2016).** Emissions of greenhouse gases according to IPCC guidelines. *Retrieved from: http://statline.cbs.nl/Statweb/publication/?DM=SLEN&PA=70946eng&D1=a&D2=a&D3=a&LA=EN&HDR=G2&STB=T,G1&VW=T*
49. **The Netherlands Circular Hotspot (n**.d.) NLCH Campaign. *Retrieved on 15th March from: http://www.netherlandscircularhotspot.nl/nlch-campaign.html*
50. **TNO, Nederlandse Organisatie voor toegepast (2013).** Opportunities for a circular economy in the Netherlands. *TNO 2013 R10864.*
51. **UNFCCC (2014).** What is "CO2 equivalent"? *Retrieved on 10th May 2016 from: http://unfccc.int/essential_background/basic_facts_figures/items/6246.php*
52. **United Nations Conference on Climate Change (2015).** Paris agreement short glossary. *Retrieved on 19th May from: http://www.cop21.gouv.fr/en/les-mots-de-laccord/*
53. **Wolfswinkel, J. F., Furtmueller, E. & Wilderom, C. P. M. (2011).** Using grounded theory as a method for rigorously reviewing literature. *European Journal of Information Systems (2013) 22, pp. 45–5*
54. **Worldatlas (n.d.).** Netherlands Geography. *Retrieved from: http://www.worldatlas.com/webimage/countrys/europe/netherlands/nlland.htm*
55. **World Economic Forum (2014).** Towards the Circular Economy: Accelerating the scale-up across global supply chains. *World Economic Forum 91-93 route de la Capite CH-1223 Cologny/Geneva Switzerland.*
56. **Yuan, Z., Bi, J. & Moriguichi, Y. (2006).** The Circular Economy: A New Development Strategy in China. *Journal of Industrial Ecology Volume 10, Number 1–2. Massachusetts Institute of Technology and Yale University.*