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‘Closing the Loop’

How circular economic theories and practices are guiding waste management policies in the Netherlands

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Abstract

This research aimed to understand, analyse, and ultimately scrutinise, the government-wide ambitions to transition to a circular economy (CE) in the Netherlands by 2050. Within this topic, waste management (WM) arose as a suitable area of study due to the direct link to circular concepts and the established nature of the policy field which allowed for an investigation of relative changes. Crucially, the research aimed to determine alliances and differences of interests, ambitions and strategies amongst actors as a result of the ongoing transition since 2016. This was achieved by analysing three core policy documents – *'A circular economy in the Netherlands by 2050', 'Towards an economy without waste,* and the most recent '*National waste management plan' ('LAP3')* – along with a number of other reports, and seven interviews with a range of actors who had responsibility to implement WM and circular policies, an interest in processing, utilising or preventing waste, or expert knowledge on WM, the CE or sustainability science.

Policy analysis clearly indicated that the government ambitions have been translated into a wide variety of policies covering five "priority sectors" of the economy – manufacturing, consumer goods, plastics, construction, and food and biomass. 'Progress' towards the CE is not consistent across the nation at the regional and municipal level and competing governmental priorities exist. This means there are 'conflicts' between governmental departments, between municipalities, and between priorities. Meanwhile the WM system is only a component of the wider socio-economic system. All of this amounts to fragmented strategy for WM and inevitable trade-offs against other national and regional priorities, and against the wider sustainability agenda.

The government-wide programme made extensive references to waste throughout the programme and WM policies and WM plans for actor groups (producers, households, government, and waste processors). Furthermore the '*LAP3'* has now been modified to account for the government ambitions and it has indicated how WM policies can contribute to the transition to the CE and how the CE itself can make positive contributions to solving challenges around waste. Within the WM sector few profound structural changes were reported, aside from law changes to domestic and private waste material classifications and new logistical innovations connecting residual waste flows. The most significant policy development in the *'LAP3'* was the focus on establishing a "minimum standard" which aimed to both prevent waste and increase the supply of high quality recyclates. However several interview respondents expressed concerns that waste prevention – by tackling 'unnecessary' or 'excessive' consumption – was not featuring strongly enough in policy activities, despite direct reference in all three policy reports.

At the same a variety of business actors have their own interests for the CE that involves developing new business models to prevent excess waste or to utilise secondary raw materials. Within the private sector actors are both stimulated and legislated against to varying degrees. Furthermore, the degree to which policy instruments can accelerate the transition is a contested area which forms possible "policy pathways". A combination of strategies and policy instruments is required to achieve this, the balance of which is far from agreed upon. Meanwhile, preventing waste on a large scale by the widespread implementation of circular policies and practices is made problematic by the 'lock-in' of established linear actors and habits. Policy makers and citizen organisations are making efforts to impose stricter regulations and new standards on producers, such as Extended Producer Responsibility, but progress is currently slow.

Contents

Word Count: 27, 222

List of Abbreviations

Terminology

CE: Circular Economy

LE: Linear Economy

WM: Waste Management

SD: Sustainable Development

SDG's: Sustainable Development Goals

EPR: Extended Producer Responsibility

Policy

LAP: National Waste Management Plan

Organisations

EU: European Union

TNO: Netherlands Organisation of Applied Scientific Research

RLI: Netherlands Council for Environment and Infrastructure

SER: Netherlands Social and Economic Council

PBL: Netherlands Environmental Assessment Agency

1. Introduction

1.1. Introduction

In light of the current and ongoing climate crisis, policy makers, businesses, and innovators are attempting to come up with new ways to address the issue of rising greenhouse gas emissions as well as that of over-exploitative material resource extraction. To date, such interventions have so far been insufficient for reducing gross CO2 emissions on a global scale with a 63% increase from 1990-2019 (IEA, 2020). The main source of emissions – into the atmosphere, and also on land and water – is economic activity and over the latter half of the 20th century the promotion of a consumption-based, capitalist economy has come to be the dominant ideology in human societies, to enable social advancement and economic development. The growth of human populations and the economic activity practised by societies has caused a significant increase in finite natural resource extraction since the turn of the 20th century, whilst economic consumption has grown exponentially, as demonstrated in Figure 1. The government of Netherlands recognises the UN conclusion that "increasing consumption brought on by the rapid growth of the middle class world-wide means that, in the last four decades, the amount of raw materials humans have extracted from the earth has tripled" (Rijksoverheid, 2016: p. 6). Therefore they have sought to develop new policy visions for a less resource intensive and more sustainable economy and society.

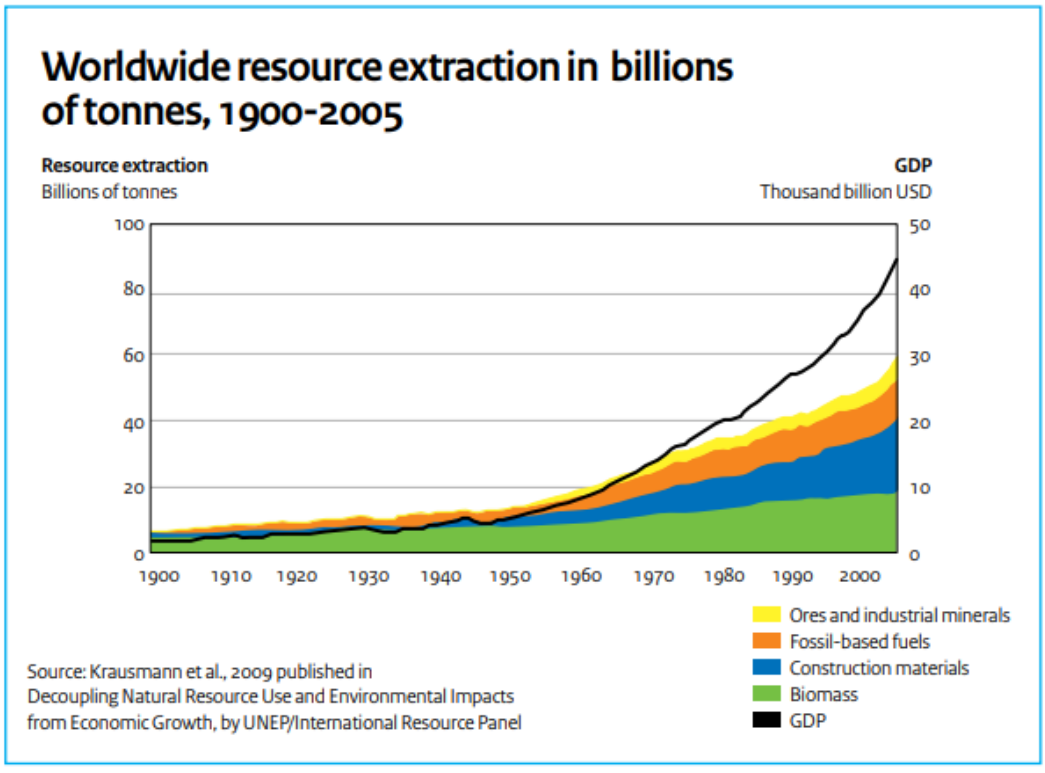

Fig. 1. Worldwide resource extraction in billions of tonnes, against global GDP growth in US$ trillions, 1900-2005 (A circular economy in the Netherlands by 2050, 2016: p. 10).

Meanwhile, material extraction and consumption causes annual environmental damage of €31billion to the Netherlands, or 4.5% of GDP, whilst the country produces 60million tonnes of waste per year (Rijksoverheid, 2020: p. 18). As such it is now increasingly clear that in order to tackle various elements of the climate crisis, and resource intensity and scarcity, a radical restructuring or overhaul

of the way economic activity is organised on a global scale will be necessary in the coming decades. The economic models that have maintained economic prosperity for Western and developed nations and enabled the rapid economic growth of a number of emerging economies will no longer be viable or sustainable throughout the remainder of the 21st century. Of course, an acceptance of these challenges and their urgencies certainly does little to answer questions of social and climate justice for the world's poorest nations and people, and their livelihoods must also form a central element of global (and particularly Western) solutions to the collective crises if commitments to the United Nations Sustainable Development Goals (SDG's) are not to be abandoned or compromised.

Various concepts for rethinking the economy have been touted but one that is gaining increasing traction in many countries – principally within practitioner circles (policy and business) – is that of a Circular Economy (CE). Policy developments based on the concept of the CE began in China in 1998 and in 2002 the government adopted it as a new guiding concept in order to "leapfrog" the earlier environmentally degrading means of economic development (Geng & Dorberstein, 2008), while maintaining high levels of economic growth; in short to "alleviate the contradiction between rapid economic growth and the shortage of raw materials and energy" (Yuan et al., 2006: p. 4). Conceptually, CE thinking does not seek to diverge from a market economy or from a doctrine of economic growth; it rather seeks to maintain it but do so in a more sustainable and environmentally-friendly manner. As such it deserves scrutiny as a pragmatic and realistic approach to sustainability. CE has so far been implemented on a modest scale in China, mostly through experimental spaces such as the establishment of eco-industrial parks (Zeng et al., 2017). Additionally, the State Environmental Protection Administration opted to pursue pilot projects for cleaner production and the building of recycling regions (Yong, 2007) in order to experiment and accelerate the transition to a CE.

Taking inspiration from China, the CE concept has inspired policy in other places such as Europe and the US, and the government of the Netherlands has set a policy ambition of a functioning CE by 2050. The policy has yet to specify exactly what a CE in the complete sense means in practice but an initial broad policy sets a target of a 50% reduction in the use of primary raw materials by 2030, relative to 2014. This agenda was specified in the 2016 policy document *'A circular economy in the Netherlands by 2050'* which broadly outlines the government vision. This ambition is also a target of the European Union's (EU) economic strategy laid out in the 2020 Green Deal. The conceptual layers of CE and waste prevention and management within European sustainability agendas is shown in Figure 2, for which CE is an inner component of a wider complex framework.

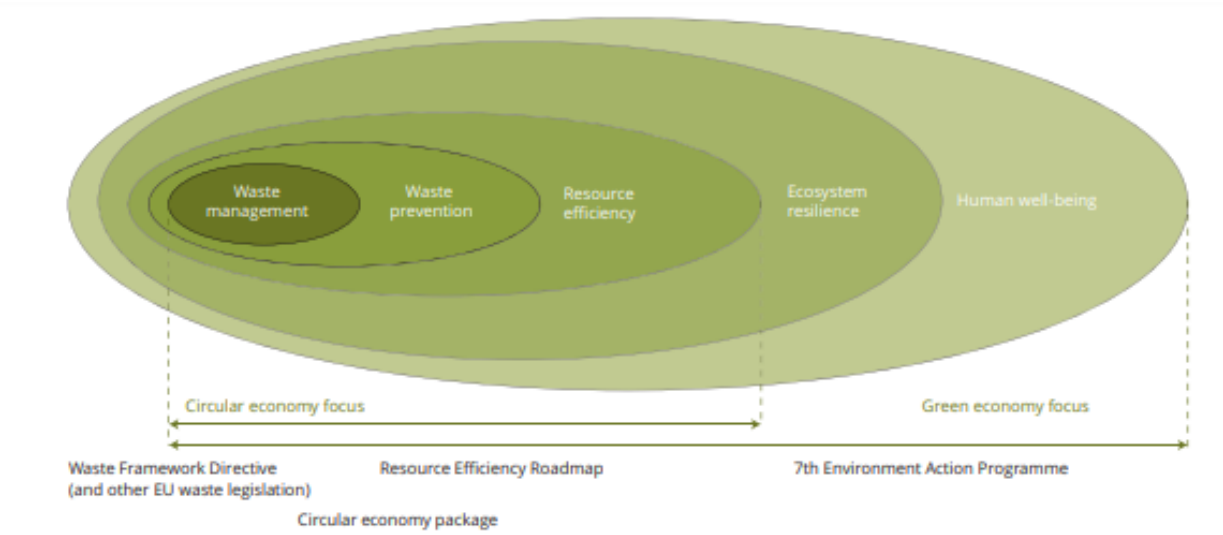

Fig. 2. A visual representation of CE and WM initiatives within the wider European policy contexts (Doranova et al., 2016: p. 13).

By conceptualising a promise to substantially cut the resource intensity of the Dutch economy, CE similarly conceptualises a promise to decrease the eventual volume of waste material output through increased material efficiency and reutilisation. In this way waste management (WM) arises as a tangible focus of study for understanding the effects and points of intervention from CE policy. Policy visions and private interventions take the CE as a starting point, aiming at both managing and preventing the flow of waste materials in the Netherlands; this produces actions at various stages of WM systems. The policy field of WM has typically been seen as a post-production problem to be 'solved' through processing or disposal activities. However, as the CE develops as a guiding concept in policy so too does the notion of waste and the opportunities for WM – this includes both the potential for waste a resource, and new strategies to tackle the flow of waste. As such WM is becoming a more central component of the socio-economic system in a way that it has not typically been regarded..

Yet in the same way that the CE is not a fixed concept – it has multiple definitions and applications – so the same can be said for WM; especially when applied to a vision for the CE. There will possibly be multiple competing interests from actors for making a transition in their activities, and actions in the WM sector and emerging WM policy will be based upon specific definitions and interpretations of CE. As such the CE – and increasingly WM – has become a "contested terrain composed of a variety of actors who have different priorities, stakes and needs" (Schroder et al., 2019: p. 208).

The study of CE has now grown in the academic field after the increasing interest in policy and business circles, meaning sustainability scientists are increasingly taking on a role of advising policies for a CE. The role of scientists and sustainability science in the CE transition is varied and includes knowledge provided by academic institutions – namely universities – knowledge institutions that operate in both a private and public capacity, and consultancy companies which may have employee sustainability scientists. Crucially, the majority of policies relating to a CE – after being drawn up by policy makers – will be implemented by private actors. In the WM sector this includes current WM actors such as incinerators, municipal waste collectors and recycling companies who will respond to legislation prompted by the vision for a CE. Furthermore policies should connect producers who are

obliged or stimulated to engage in new economic activities and waste processors who connected to companies as suppliers of secondary raw materials or new methods of waste processing. Finally, citizens – as consumers in the CE – can help to implement policies through their choices and behaviour.

In light of this, three core groups of actors emerge in the policy negotiations directing a transition to a circular WM strategy – sustainability scientists, policy makers and private WM actors. Additionally consultancy groups often act as an intermediary between actors or as research providers, whilst citizen organisations may lobby for more inclusive outcomes. As a result, understanding these negotiations will provide some understanding of the direction, nature and progress of the CE transition in the Netherlands.

However it is currently unclear exactly how recent scientific research on the CE can and will be translated into policy and how the concept is interpreted in policy negotiations. The field of CE has made many conceptual promises which can be applied in different ways and it is necessary to scrutinise this process to achieve a full and just transition to a sustainable society. Therefore the aim of this research is to map out the relationship between conceptual and scientific developments of the CE and how policy makers and business actors interpret and translate competing visions of the transition to a CE in policy negotiations and apply them in practice through policy and strategy.

As such, this paper arrives at following research objective:

'To understand how business and policy actors in the Dutch Waste management sector respond to the government ambition to transition to a circular economy in the Netherlands by 2050 and its interim target of a 50% reduction in the use of raw materials by 2030, and to scrutinise how these responses align with research and discussions in sustainability science. It will further understand how policy negotiations and potential public investments are aligned with commitments to meeting the Sustainable Development Goals within the Dutch political agenda'.

1.2. Societal Relevance

The environmental benefits of such a material reduction would be significant, yet how such a transition is to be achieved or what a CE looks like in conceptual terms is far from agreed. At the same time it is paramount for science and society to scrutinise not just the mechanisms, but the interests (of CE actors and its stakeholders) and the perceived outcomes of a (potential) socio-economic shift; the gravity of the current environmental context demands it. That is, if the CE is to live up to its conceptual promises as a way to rethink (and reduce) the environmental impacts of economic growth and activity, then it must be clearly articulated and designed into policy what the effects and outcomes are likely to be; not just environmentally but, crucially, socio-economically.

The development of a CE has clear scientific and societal relevance in light of the current national and global climate and resource challenges, and has the potential to contribute to multiple SDG's in the Netherlands – particularly:

- SDG 8. Decent Work and Economic Growth
- SDG 9. Industry Innovation and Infrastructure
- SDG 11. Sustainable Cities and Communities

- SDG 12. Responsible Consumption and Production
- SDG 17. Partnership for the Goals

Furthermore, wider reductions in waste deposition and raw material extraction can contribute globally to:

- SDG 3. Good Health and Well-being
- SDG 13. Climate Action
- SDG 14. Life on Land
- SDG 15. Life Below Water

There are also geo-political benefits for the Netherlands to reducing dependency on other nations for vital raw materials – with 68% of material requirements imported from abroad (Rijksoverheid, 2020) – which could have the potential to minimise global conflicts in the future. The government of the Netherlands has indeed recognised i) "explosive demand for raw materials"; ii) "dependency on other countries"; and iii) "interconnectivity with the climate" (Rijksoverheid, 2016: p. 9) as the core motivations for a circular transition. The current coronavirus pandemic has highlighted the instability of global socio-economic systems and resource scarcity is likely to only exacerbate these instabilities. Meanwhile the transport requirements of a global resource-intensive economy are clearly unsustainable. Therefore there is a clear need to make and accelerate the transition to a low-resource and more self-sufficient economy in the Netherlands. Additionally CE has the potential to contribute to SD in the Global South, but research on this has been minimal to date. Therefore findings could illuminate potential opportunities for SD as well as possible trade-offs in these regions.

1.3. Knowledge Gaps

The topic of WM is not a new or emerging topic but it is so in the context of the CE. WM policies have long existed in the Netherlands but now it remains to be seen how these are aligned with ambitions for the CE and exactly what strategies will be used for managing waste in a CE; this will reveal any potential new policies to assess. Additionally, new policies along with emerging technologies will likely involve different policy actors to those that are currently applying WM. It is not yet clear exactly how ambitions and conceptions of the CE are applied in WM policy and in practice, as well as how they are used as a guiding instrument in policy negotiations. Understanding core (groups of) actors currently active in policy negotiations – as well as any potential marginalised voices – will also help to reveal the most effective partnerships for WM in the CE, maximise social inclusivity, and enable an enhancement and acceleration of the transition.

As touched upon, what is also important is not just the relationship between the CE and WM but also the conceptualisation of the CE itself. The definition, interpretation and application of the concept will determine how WM is carried out in practice, and what are considered the priority points of intervention. As it is an emerging policy field it is not yet clear how the concept has been picked up in negotiations and how this aligns with sustainability science, and so more transparency is needed. Various institutional actors have acknowledged the importance of approaching WM from a multi-sectoral perspective within the overarching socio-economic system if society is to take on its

various environmental challenges. However it is not certain that enough progress has been made in developing this level of framework.

1.4. Research Question

In light of the research objective presented in the introduction, the framework arrives at the following set of questions:

'How do businesses and policy actors in the Dutch waste management sector respond to the government ambition of transitioning to a circular economy in the Netherlands by 2050, and how do these responses align with research and discussions in sustainability science?'

- What are the main policies and components of the various policy visions for a circular economy within the waste management sector?
- Which are the actors involved in the policy negotiations and responsible for strategising and implementing waste management policies?
- What interests, ambitions and strategies do these actors have?
- What science (theories, knowledge and research) are used or mobilised by the actors to underline the vision and how are these incorporated into the strategy?
- What are the trade-offs against the wider sustainability agenda in the Netherlands?

2. Theoretical Framework

2.1 Understanding and Defining the Circular Economy

There are many definitions of CE in science and policy debates, which perhaps illustrates the openness of the concept. The discussion on CE – its meaning and its use – is subject to interpretation by diverse actors. As with sustainable development (SD), CE may cater for different views as well as invoke struggles over its interpretive meaning. This in itself illuminates the complexity and challenge of realising this transition. Exploring the (interpreted) definition of the concept instructs how it is being, and will be, used to inspire policy action and to what motivation. Definitions can minimise, or indeed exacerbate, conflicts and friction between sectors and actors who are making separate circular 'transitions'. Negotiations will be made between government and industry actors throughout supply chain networks and therefore building on and engaging with various circular actors will become central to the transition.

One extensively cited source of the CE concept is from the Ellen MacArther Foundation in the UK which aims to facilitate the development of policy and innovations that could potentially accelerate the transition to a CE. The organisation defines CE as being *"based on the principles of designing out waste and pollution, keeping products and materials in use, and regenerating natural systems"* (EMF, accessed March 2020). It also considers CE as *"an industrial system that is restorative or regenerative by intention and design"* (Flynn & Hacking, 2019: p. 1262). Hobson (2016) goes further to argue that a CE is actually a *series* of restorative or regenerative systems that must also include parallel socio-

cultural transformations. From an academic perspective, Kirchherr et al. (2017: p. 229) consider CE as *"an economic system that replaces the 'end-of-life' concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes. It operates with the aim to accomplish sustainable development...[and] is enabled by novel business models and responsible consumers"*.

As of 2020, the Ministries of Infrastructure and the Environment, and Economic Affairs and Climate Policy both work towards the following understanding:

> *"In a circular economy, raw materials are used as efficiently as possible, for products and materials, so that as little new raw materials as possible are needed and the earth is not depleted. It's an economy without waste and where waste is no longer seen as waste but as a raw material. This allows maximum use in the production of materials and products are made from (secondary) raw materials that circulate in a closed container material cycle"* (Rijksoverheid, 2020: p.19).

From these definitions one of the challenges is to understand whether CE is a system or an end in itself, or a mechanism for moving to a new system or state. That is, would CE be expected to exist indefinitely without material input in the truly circular sense – a state in itself – or rather is it a conceptual idea with which to make transformative policies upon, develop indicators around and strive towards? This will determine the scope and governance of such a transition and what it is hoped to achieve. It may also invite different actors to align themselves with the policy visions based upon interests and ambitions. Meanwhile, technological or systems approaches to the circular transition at least partially concerns the concept of "absolute" vs "relative" decoupling (de Vries, 2015) of resource intensity from economic growth, with the British Standards Institute stating "a more circular approach seeks to decouple economic growth from resource consumption" (Flynn & Hacking, 2019: p. 1262).

It is not possible to understand the CE simply by studying the WM system and its processes in isolation. WM is a multi-scale concept that is bound to the economy and embedded in socio-economic systems – particularly in urban environments. Figure 3 provides a conceptual view of the relationship between WM and the economy. The socio-economic system represents three 'core' systems: (1) the production system (including raw material extraction and manufacturing processes); (2) the consumption system (the first and immediate life cycles of a consumer product); and (3) the waste management system. For the purpose of this study the WM system will also include material flows and processes included in the production system such as recycling, by considering these pre-manufacturing processes. These systems are linked by various 'flows' (arrows), such as the flow of raw material to manufacturing and waste from manufacturing.

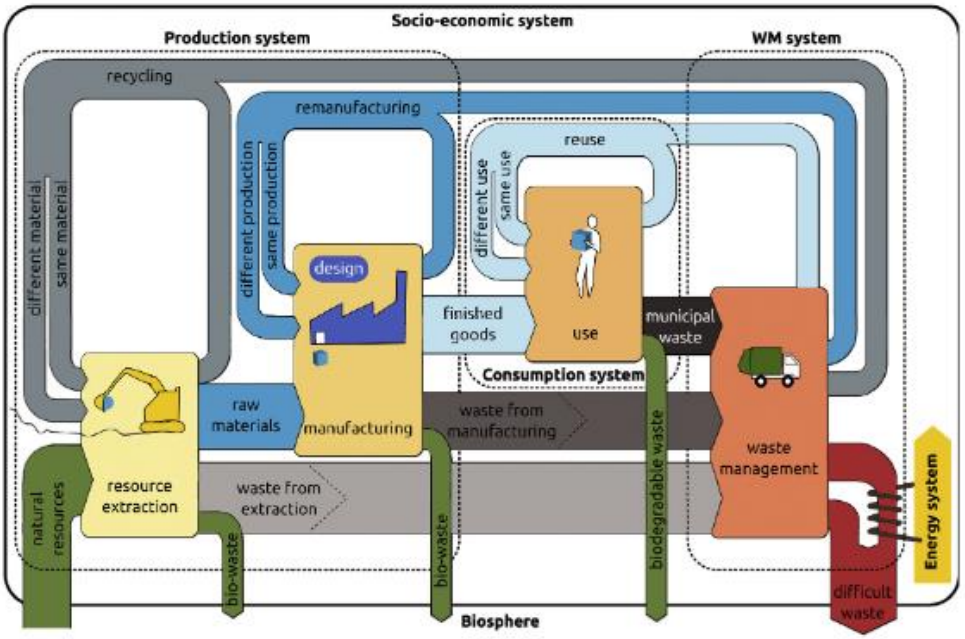

Fig. 3. A conceptual overview of resource-based socio-economic systems, encompassing production, consumption and waste-management systems, and their relative relationships (Singh & Ordoñez, 2016: p. 348).

The various WM protocols for reducing waste and reinjecting raw materials back into the production process can be seen in Figure 4 and demonstrates the opportunities for preventing waste, but also the system complexity and the difficulty of 'separating' it from other areas of the socio-economic system.

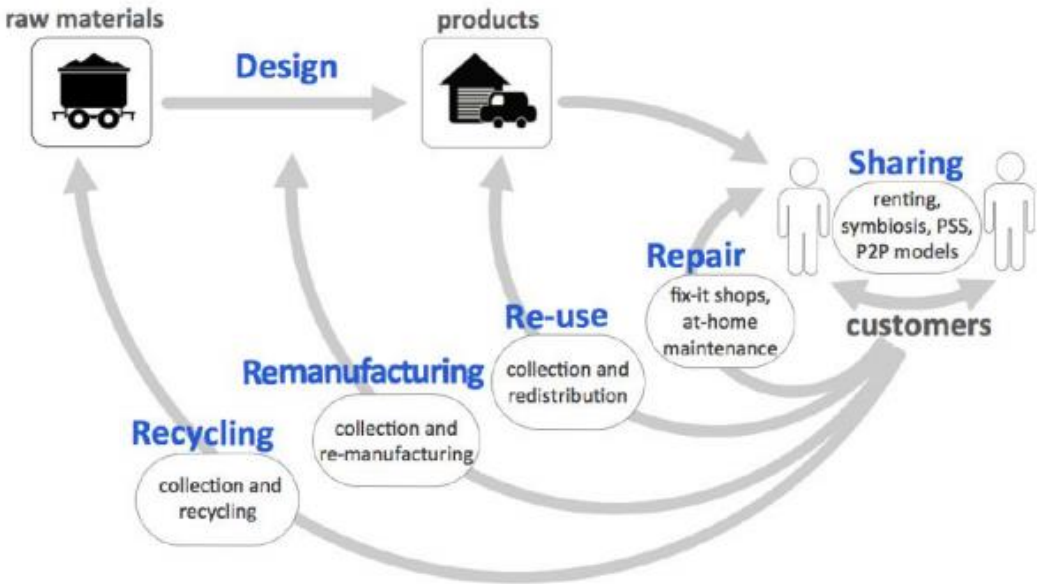

Fig. 4. A conceptual understanding of the CE in relation to the recapture of raw materials for (re)production through different tiers of the WM system (Doranova et al., 2016: p. 11).

2.2. Waste Management Policy in a Circular Economy

An analysis of CE policy in WM strategy must be able to understand and incorporate the effects of, and upon, this system arising from any transition. Policies to manage waste cannot target the WM system alone– whether that is waste collection, disposal or processing. Even in a 'linear' system the production, consumption and waste processes are not separate entities.

It may also be essential to consider the interests of actors in WM policy. Is simply reducing the output of waste (in weight or volume) the priority or are there conflicting interests e.g. utilising waste materials for repurposing? Policies to transition to a CE would presumably consider waste through such complexities and competing priorities for 'tackling' waste amongst actors would need to be addressed in negotiations. Within these negotiations there are contributions and motivations from three core groups of actors: sustainability scientists with ideas for how a circular economy could help to solve sustainability problems; WM actors who mostly operate in the private sector and therefore may have their own interests and priorities; and policy makers who have to balance the need for a sustainability transition and the needs of the economy and its actors within political spheres when facilitating negotiations. These competing and changing visions for WM within a CE result in policies which are continually reassessed and realigned in the policy negotiation arena. It is therefore crucial to understand the emerging vision for a CE in terms of the policies measures produced.

2.3. Ecological Modernisation in Sustainable Transitions

Economic assumptions have been readjusted – or at least acknowledge the science – in recent decades to incorporate natural carrying capacities and, more recently, "planetary boundaries" to the effect that ecology and economy have become (or seeks to become by sustainability scientists) more unified. *Ecological Modernisation* movements have held that there are major economic gains to be made in the move towards environmentalism, and such a move is achieved within "transformative sectors" (Buttel, 2000). Many economic actors may therefore argue that market forces are the best facilitator of sustainability transitions and any CE policy must maintain a healthy market economy and room for economic growth. Buttel (2000) further argues that ecological modernisation is tied closely to politics and the state, and that a whole scale transition will require the utilisation of political processes and practices.

It is paramount that the analysis of negotiations around CE refers back to the emerging scientific consensus around planetary boundaries and decoupling as this will highlight the motivations around CE for its different actors and its application for addressing problems of sustainability. There have long been assumptions that increasing technological and systematic developments will have the effect of decoupling resource intensity from economic growth, but now some scientists are switching their support from "sustainable" or "green" growth ideals to now actively call for "de-growth" strategies. This is based on a normative argument that acknowledges the contradiction in terms of the former concepts (Sandberg et al., 2019). On this matter a recent report in *Nature* suggested that "policy makers [in affluent nations] have to acknowledge the fact that addressing environmental breakdown may require a direct downscaling of economic production and consumption in the wealthiest countries" (Wiedmann et al., 2020: p. 3). As such any kind of economic growth may be losing its compatibility with genuine sustainability and therefore, if

governmental and economic actors express an intention to prolong and maintain economic growth (as the policy vision stipulates), then some of the sustainability credentials of these negotiations must also be questioned.

Ultimately, a commitment to stay firmly within agreed planetary boundaries (Rockstrom et al., 2009) at one end or a desire to make possible continued economic growth at the other will govern the actual management of materials into and out of the economy. Desing et al. (2020) raise concerns that the lack of a clearly defined concept for CE, that is not firmly attached to established planetary boundaries, could be easily exploited and falsely marketed as a mechanism for continuous economic growth. However, to firmly establish planetary boundaries is a challenging task; there is little scientific consensus on these boundaries, let alone in policy circles, and linking together social and natural boundaries is particularly complex (although new ambitions such as the vision for a city-wide 'Doughnut Economy' in Amsterdam are now attempting to). It may also be said that planetary boundaries and ecosystem valuation theories carry the risk of taking a too simplistic view of dynamic natural systems.

Cecchin et al. (2020) have explored the conceptual development of sustainability in response to the Brundtland Report of 1987 from the earliest conception of SD through to modern manifestations and pathways. They found that "SD quickly became a buzzword…contributing to deaden the most revolutionary aspects embedded in the core of this novel idea….Furthermore the term is variously used (or abused) by policy makers and companies to justify their actions" (Cecchin et al., 2020: p. 3). Therefore the term SD has never in itself been a benchmark to assess efforts towards more sustainable societies but, as Figure 5 demonstrates, more recent focuses on CE risks diluting its scope further until sustainability merely becomes a notion of efficiency and relative decoupling techniques as opposed to envisioning new socio-economic paradigms.

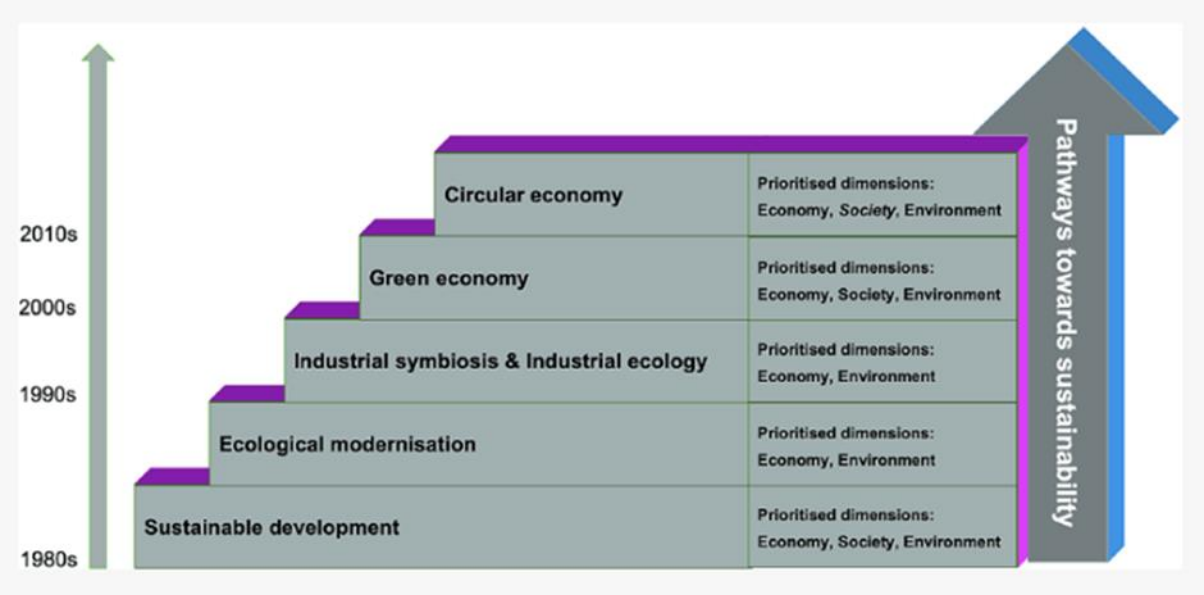

Fig. 5. Understanding the emergence and scope of the CE as a sustainability concept within the evolution of previous sustainability concepts (1980s-2010a) (Cecchin et al., 2020: p. 3).

What CE does generally provide is a more marketable concept for practitioner fields – something to set goals and targets around. In contrast one of the strongest criticisms of the concept of SD is that it

has “not aimed at creating a clear alternative to the dominant development strategies…rather it has provided a generic adjustment in order to include social and environmental aspects in the established models, without setting clear criteria and paths” (Cecchin et al., 2020: p. 5).

The exact potential of the CE, as well as its overall feasibility if a truly circular system is to be implemented, is not clear. In light of this, the research seeks to reveal progress in the transition to a CE and also the strength of policy against developments in the scientific/academic field. As the transition is now entering its fifth year it is vital to track its progress and see if policy remains both feasible and ambitious enough, and its value in realising actual solutions to the WM agenda. If achievements have been made it will be discussed how successes can be up-scaled and accelerated, whilst shortcomings can be discussed through the removal of certain barriers or issues with policy. It is further hoped that the potential of CE to SD in the Global South can be discussed through the analysis of this fieldwork. Currently, “mainstream discussions of the circular economy, while including discussions of economic growth, materials recycling, and employment opportunities, have thus far lacked explicit reference to the UN Sustainable Development Goals” (Schroder et al., 2019: p. 204) and there is a possibility that as CE becomes established as a tool for sustainability transitions that there is a trade-off against certain SDG commitments.

2.5. Environmental Governance and Transition Pathways

What ecological modernisation discussions are also closely linked to is an *Actor-Oriented* approach in the political sphere that affords a particular role to “motivated players” (Lewis, 1993) and tends to argue against traditional and static notions of politics and society. Societal change has certainly originated much from prominent economic actors in recent decades as many Western states have withdrawn from being principal provider towards primary facilitator of economic engagements. What would be necessary to understand are the perceptions of actors and their agency in these engagements. For the CE, whilst consumers certainly have a chance to interact to a fuller or lesser extent in circular production/consumption models, few would argue that the remit lies with individuals to provide the catalyst – or even accelerate – the transition; as a collective, consumers are reactive rather proactive.

Scoones (2016) has sought to theorise development transitions into four broad pathways state-led, technology-led, market-led, and citizen-led. Whilst *Transition Pathways* are not distinct and mutually exclusive, the main emphasis and driver of the transition will direct policy strategies and socio-economic outcomes and determine the main winners and losers in the transition; the defined pathway is underpinned by the thinking of what will, and should, be the driver of change. Scoones goes further to argue that such distinctions must be eroded and that the state and market are not separate entities. A just and effective transition would therefore involve decisive state action that utilises market forces and is reinforced by citizen action. These boundaries, Scoones argues, are also guided by “weak” vs “strong” notions of sustainability. Weak sustainability holds to the neoclassical economic belief that natural capital can be replaced by human-made capital so long as utility and well-being are maintained (Scoones, 2016), which may therefore put faith in a technology and/or market driven circular transition.

The theoretical pathway that any circular transition takes would also influence the actors involved in the transition, and thus, in policy negotiations. The work of Bauwens et al. (2020) depicts a matrix of potential circular societies characterised by low to high tech innovations on the x-axis and decentralised to centralised governance the y-axis. It is unlikely that any one pathway will fall completely within one of these boxes but may still demonstrate stronger characteristics. For instance China is almost certainly likely to take a path of strong "circular modernism" – through its eco-industrial parks practising industrial symbiosis, whilst the Netherlands may lean towards such a transition, but much less pronounced. By contrast many developing countries already utilise low-tech and decentralised circular solutions to waste and production, e.g. informal waste separators.

This matrix has also been translated into economic, environmental, socio-political and democratic interests and ambitions. Once these parameters are considered, then full "planned circularity" – at least in the current context – becomes 'unacceptable' in the Netherlands from a socio-political and democratic perspective and therefore the government may wish to explore other means to pursuing a successful transition to a CE. A circular modernist strategy would certainly be the most feasible and would likely attract support from business actors, but represents the least radical pathway and from a sustainability science perspective would certainly fall short of what is required to make a sustainable shift. Therefore a balanced strategy would leave what Bauwens et al. (2020) refer to as "peer-to-peer" circularity as the most preferable pathway with elements of "bottom-up" circularity included if various socio-political barriers can be removed.

Building upon pathways theories is Nordberg's transition model and Hekkert's theory of innovation. Nordberg argues that large-scale socio-economic transitions comprises two 'curves' – the upwards and downwards curves that represent the breakdown of the old system and the acceleration of the new system. A circular transition will similarly require breaking down the linear system and the actors and institutions that provide the foundation, and stimulating actors and innovations that help to accelerate the CE. Governments can intervene through different policy instruments that Hekkert argues are essential to tackle the 'lock-in' element of the old (linear) technologies whereby competitive advantages have enabled a consolidation of the linear system.

What is particularly important is how CE is interpreted and how it is sought to be utilised amongst 'motivated' (groups of) actors. Wider *Transition Theory* takes its starting point from the notion of SD as co-evolution. That is that it is both a standard and a process – technical change co-evolves with institutional change, whilst social behaviour/consumption patterns are unequivocally tied to unsustainable means of production (Kallis & Norgaard, 2010). This is also explicitly true for the CE. It is a means to, and a reference for, enacting policy and setting industrial standards, whilst also being a means in itself to achieve SD and its relative goals and attributes. Put simply, the CE is not an end in itself – both practically and normatively – and policy should reflect that. If policies are made to assist a transition, there should be a further purpose for it – sustainability or ecology – and assume that it represents an inherent good in itself. Crucially the 'ecology' represented in these theories is tied to economic activity and is not assigned a value of its own terms. If CE is to be a genuine tool for sustainability it is vital to understand whether the transition is being pursued primarily for environmental protection, or for economic gains. Jevon's paradox (Korhonen et al., 2018) questions the net environmental benefit of material efficiency gains at the macro scale due to the possibility for an increase in net consumption, whilst social dynamics are rarely considered at all.

It is the role of government to facilitate such negotiations towards the transition. Haas (2004) discusses the elements of *Environmental Governance* (which some CE proponents may proclaim it to be a mechanism for) and highlight laws, regulations, enforcement and public engagement as the principle means of enacting environmental governance. Some components of the transition to a CE may be self-governing but if the 2050 and 2030 targets are bound by law then policies in the WM sector will be regulated and enforced in a similar way. Meanwhile, in the CE that emerges a "legitimacy of standards" (Haas, 2004: p. 205) must be constructed that regulates the management of waste and allows for an engagement of the CE in civil society.

What an exploration of these theories amount to is the complexity of sustainability transitions at the socio-economic level, and also the position of the government in facilitating and enabling these transitions. Governance is not a rigid process and the government do not adopt a static position in the creation of policy. Accelerating transition means exploring pathways and connecting with stakeholders and actors who have different interests and ambitions. Whilst a democratic government may pick a general position, it is not fixed and they must negotiate with various actors; whether verbally or figuratively. Therefore the government role becomes a balance between decisive action and diplomacy. As such, analysing the circular transition in the Netherlands, in its early stages, becomes a useful tool for understanding the public/private sphere in itself and the continuously contested field of policy.

As with seemingly broader concepts like sustainability and SD, CE must also pay appreciation to the complex socio-political interactions that govern transformations and transitions. Agency and the social relations that constitute society are just as significant for an effective CE and risk being forgotten within what may be often seen as a mostly technical concept. That is circularity cannot be fully attained with embedded social interactions and consumption patterns of the modern capitalist society - breaking through the current ceiling will surely require much more than technological innovation. Figure 6 below depicts the transition from linearity to circularity against the established 9R strategy for managing waste. As demonstrated, effecting the most circular actions will require a governance strategy that develops social innovations alongside the technical.

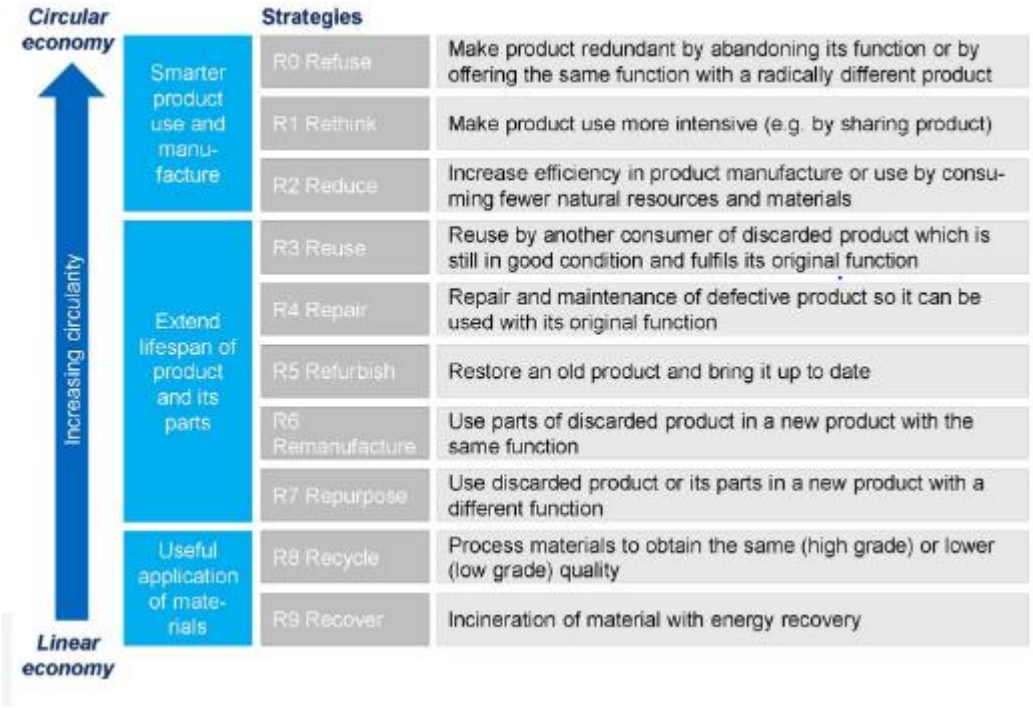

Fig. 6. The transition from a LE to CE through a 9R strategy for waste and their relative actions (Kircherr et al., 2017: p. 224).

2.5. Approaches to Policy

Critically, it seems that CE has been disproportionately represented in practitioner and business circles but has been inadequately scrutinised by science to date. It is paramount to take action on the environmental crises facing the global community, but it is also essential the 'right' action is being taken. So-called solutions and transitions must be just and equitable and this research hopes to provide a rigorous examination of the motivations and ambitions of governmental and non-governmental actors relating to CE policy, as well as relative gains for stakeholders. If CE is being touted a crucial mechanism in the battle against waste, resource depletion and environmental degradation then it must be scrutinised accordingly to promote the most effective transition whilst avoiding undesirable lock-ins and unintended consequences. It is not yet known what role the CE will play in sustainability efforts, including whether it is a tool or an end in itself.

As stated earlier, WM in a CE does not merely concern confronting end-of-life scenarios for products and materials. In order to both drastically reduce the output of waste and maintain a functioning economy, transitions must also restructure supply chains and material flows to inject the 'waste' resources back into production, as well as building new markets for 'waste' products. As such, establishing productive networks to share and develop knowledge and technology, and to minimise barriers will be an essential component of the transition to a CE and is acknowledged as a priority for governance strategy. Within networks "stakeholders are bound together by the belief that they have complementary strengths which allow them to achieve shared goals more effectively if they work together" (Evans, 2012: p. 105) and negotiations will revolve around facilitating actors in circular networks to shift systems and processes to those aligned with a CE. Within the CE transition there

will be “patterns of social relations between interdependent actors, which take shape around policy problems and/or policy programmes” (Kickert et al., 1997) and this will signify both a barrier and an opportunity for effective policy. Stale and rigid networks around WM in the linear economy (LE) must be eroded and flexible and innovative circular networks must take their place. There are likely to be innovators (with or without the capacity) within these networks and rigid actors (that may lack the means and/or the will to shift to circular production methods). The innovative actors may not necessarily be the most influential, however, and more rigid but dominant actors may take a leading role in negotiations for the CE, possibly to the detriment of the wider sustainability agenda. A sustainable and effective approach to WM much consider how multiple actors within the socio-economic system can contribute to the transition and their relative interactions, “for it is through these processes—formal and informal—that transformations are constructed in networks, alliances, and coalitions and connect diverse actors—including state and business actors, scientific-technical elites, and citizens’ movements” (Scoone, 2016: p. 308).

Dutch policy measures have so far been successful at propelling the country to the global forefront in recycling strategy, but it is not yet clear how policy ambitions related to the CE will unfold around wider socio-economic transformations. Even on a basic level, for the Netherlands to make further gains in its rates of recycling that is achieved by a high degree of primary waste separation, then “local governments need to invest a lot of time and money in campaigns to raise awareness with system users, and without that, it is not possible to meet the legislative goals in a reasonable timeframe” (Tomic & Schneider, 2020: p. 17). As such WM strategy becomes about more than simply enacting policy inspired by the CE or tightening legislation.

There is an implicit acknowledgment that a fully CE transition would require a major shift in the organisation of value chains and this is understood across various definitions and applications of CE such that “what these evolving definitions have in common is a systems approach to the flows of materials, the suggestion of positive economic benefits for organisations engaging in CE activities and the coordination and design of new markets” (Flynn & Hacking, 2019: p. 1262). However, it is essential to note that several assumptions and potential frictions are already presented here. Whilst the “restorative” and “regenerative” understandings of CE by the EMF relates to the system ability to restore and regenerate its material flows it does not necessarily imply a full state of decoupling. At the same time there is a general acceptance within the field of ecological economics that absolute decoupling is incompatible with a desire for economic growth and, as such, these conflicts and inconsistencies must be approached in the framework when analysing 2050 vision for the CE. Indeed the “systems approach”, whilst acknowledging the need to overhaul elements of the production system and its processes, does not indicate a whole scale shift towards an entire *economic* system and the coordination of “new markets” does indicate at least some expectation for continued economic growth. In this way the transition is an evolution of the current economic system rather than a small revolution that will trigger the CE. Considering their relative complexities, it is likely that the products and processes would change before the system.

3. Conceptual Framework

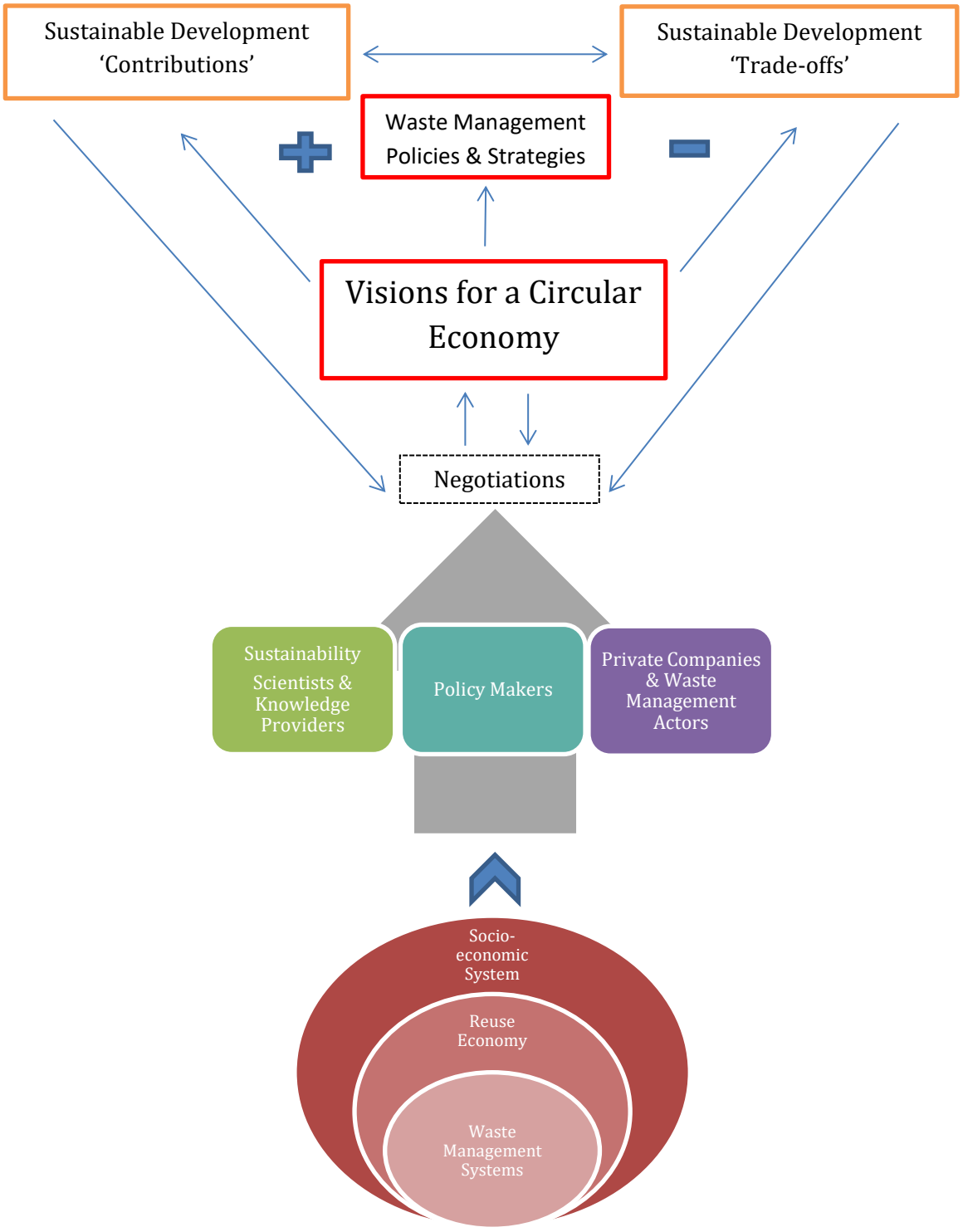

Fig. 7. Conceptual framework visualising the policy negotiation process amongst core groups of actors contributing to visions for a transition to a CE in WM and its potential impacts on commitments to the SDG's.

Figure 7 visualises the contributing processes towards the CE transition, through multiple visions for a CE in WM. The conceptualisation takes place within the broad socio-economic system of the Netherlands, and embedded in this is the "Reuse" economy (Rijksoverheid, 2016), within which is the WM system(s). In order to make the transition from a Reuse to Circular economy in WM, there must be concrete policy measures which are drawn up through negotiations with actors. The core actors include those who are able to implement policy measures (businesses in the WM sector) as well as those who use and produce waste (other businesses), those who can advise on means to achieve SD (scientists and knowledge institutions), and those who are responsible for drawing up the policy measures (policy makers and civil servants). Additionally this takes place within the current political context and the negotiated agenda of the Coalition government. Each group of actors (and individual actors within groups) have their own motivations, priorities, ambitions and strategies as well as their own interpretation of what the CE means for them. In this way policies will be negotiated and the concept of the CE will be applied in various ways – ways that are not always clear. The contribution of scientists, and economic, political and technological actors, have already created the founding policy vision for a CE in the Netherlands – outlined in the government-wide programme – which is a reference point for creating new policy measures. This policy vision, as well as new scientific research, current political and economic priorities and the ambitions of WM actors, will be an integral component of policy negotiations. Policies for a CE that are enacted, along with technological and systemic innovations, both form the overall socio-economic transition to a CE. This transition has the potential to contribute in turn to achieving one or more SDG's but may also involve trade-offs against other components of the sustainability agenda. In this way both 'positive' and 'negative' outcomes are connected to each other. Relative sustainability contributions and trade-offs could, in turn, direct current or future developments of CE policy measures, if they are picked up by policy actors in future negotiations. In this way SD is not a clear, singular path but rather one that is continually negotiated and involves many actors with multiple, sometimes competing, agendas.

4. Methodology

4.1. Data Collection Techniques

4.1.1. Policy Documents

It is essential to conduct research in the context of WM policy and legislation as well as the primary core policy vision for the CE as set out in *'A circular economy in the Netherlands by 2050'* government-wide programme. The ambitions and targets outlined formed the foundation for the analysis alongside the theoretical framework.

In addition to the national policy vision, it was also essential to briefly analyse EU-wide policies for the CE and how these are directing Dutch policies and policy actors, as well as to highlight similarities or differences in targets and strategies.

Table 1 below provides an overview on relevant policies documents that have been included for analysis in the research.

Table 1. An overview of relevant policy documents for understanding government ambitions for the CE, as well as those of other actors, that have been analysed within the research.

Policy Document	**Year**	**Organisation**	**Content**
'A circular economy in the Netherlands by 2050'	2016	Rijksoverheid	Government-wide programme for the CE
'Towards an economy without waste'	2020	Rijksoverheid	Policy progress report on the CE
'LAP3: National waste management plan'	2017	Rijksoverheid	National Waste Management policies covering: A. General Policy B. Waste Management and Shipment C. Actor Policy D. Legal Framework
'Circular economy: What we want to know and can measure	2018	Netherlands Environmental Assessment Agency (PBL)	Indicator assessment for the CE including current measurements and knowledge gaps
'Urban agenda for the EU: Circular economy'	2020	EU	EU-wide urban agenda for the CE covering strategic goals and relative barriers and drivers
'Taxonomy for the circular economy	2019	Deloitte	Investigation for the government to determine working definitions and a strategic plan for the transition

The principle government-led vision is outlined in the 2016 government-wide programme, *'A circular economy in the Netherlands by* 2050', upon which the core strategy for the transition is based. The programme outlines how the ambition for the CE will guide multiple policies, including WM, across various sectors of the economy and society. The policy builds upon the former *'From waste to resource'* programme of 2014, and the summary of this policy includes agendas that were already in

place from that programme. *'Towards an economy without waste'* is the most up-to-date report that is publically available that analyses the current progress towards the CE in the Netherlands. Thirdly, the *'LAP3'* outlines the current WM measures that are in place in the Netherlands and their connection to the CE programme. These are considered the three core policy documents through which to answer the research objective. The results will include comprehensive summaries of these documents. The first results chapter will present an overview of the most important issues and targets covered in the policies, in the form of tables and numberings. Further information that will be also be used to form policy analysis can be found in the appendix. In addition, short summaries of the other policy documents listed above will also be included in the appendix and referred to in the analysis. Results will make clear which policy documents specific findings are derived from.

4.1.2. Interviews

The core of the fieldwork attempts to understand how theories of CE and the vision laid out in the plan for a CE in the Netherlands by 2050 are directing policy, projects and strategies in the field of WM and the negotiations that such policy initiatives have facilitated (and vice versa). By interviewing policy makers, experts and private actors in the field, research attempts to understand how developments towards a CE are consistent with multiple policy visions and strategy outlines and how they relate to current discussions in sustainability science. Interviews also aimed to highlight potential contradictions in the conceptual interpretation of CE by political and economic actors when negotiating policy measures that may influence the outcome of policy and, in turn, alter the nature of the transition to a CE and efforts to achieve the SDG's. Interview responses have been analysed across separate groups of policy actors (see conceptual framework) to see how interpretations and interests differ. Interviews have also crucially been analysed against official government policy measures and policy visions to understand how they are being aligned. It was also expected that responses could be analysed within groups of actors in order to assess consistent or conflicting interests between, for example, multiple private WM actors or the ambitions and interpretations amongst various policy makers and scientists. However difficulties in gaining willing respondents due to the ongoing coronavirus circumstances meant this was not possible.

Interviews were initially expected to take place face-to-face, however due to current restrictions this was not possible for all but one interview. As a result the semi-structured, in-depth interviews took place through online video platforms.

The following sampling criteria was used to seek interviews:

- A deliberate selection bias sought interviewees who are experts in the field of CE and who are likely to be the most prominently involved in policy negotiations.
- Selection was based on prior knowledge of prominent practitioners and actors gained through academic studies on making the transition to a CE. Internet research was also used to understand important actors at a national and European level.
- Contact was made by email and telephone, seeking to conduct as many interviews as possible across the actor groups. It was expected that many potential respondents would not be available for interview and so approximately 25 potential interviewees were contacted.

The interviews included representatives from four core groups of actors – Scientists; Policy makers; Waste management actors; Consultants. Specifically this included actors in the following fields:

- Policy makers and other civil servants in the CE field
- Developers of parallel/interrelated programmes such as 'Doughnut' economy vision at the Amsterdam city-scale
- Businesses and innovators working to construct circular business models, circular supply chains and waste material repurposing
- Business representatives from the WM sector (e.g. recycling plants, separation facilities) responsible for implementing WM policies
- Experts and academics on CE and in the field of sustainability science
- NGO's social enterprises and citizen organisations related to CE field
- Consultancy companies advising policy negotiations

Table 2 below provides an overview of respondents who were interviewed as part of the research, including their organisation, position in the organisation, and actor field with relevance to the research.

Table 2. An overview of interview respondents listing their name, organisation, position and field of expertise.

Name	**Organisation**	**Position**	**Field**
Mari van Dreumel	Ministry of Infrastructure and the Environment	Senior Policy Advisor, Co-writer of government policy for the CE	Policy making
Koen Haer	Ministry of Interior Affairs	City Deal negotiator	Policy making
Dr. Wim de Haas	Wageningen University	Researcher, Senior Lecturer	Academia, Scientific research
Dr. Ardi Dortmans	Netherlands Organisation of Applied Scientific Research (TNO)	Director of Science for Circular Economy and Environment	Scientific research, Knowledge provision
Jorn Eiting van Liempt	Seenons B.V	Co-founder and Director	Waste management & logistics
Joost van Barneveld-Biesma	Barnebies	Founder and Director	Sustainability consultancy

Martine Postma	Repair Café Foundation	Founder and Director	NGO, research, lobbying

Some interview questions were tailored to the respondents, in order to investigate specific contextual information, whilst others were neutral, in order to generate scientifically valid and comparable data.

A preliminary interview outline for each respondent with important and relevant question matter can be found in the appendix, although questions were modified relative to the interview process. Complete transcripts with actual questions and their responses are not included, but are available on request for all but one respondent. Full prior consent was granted by six respondents for: the recording and transcription of interviews; inclusion of responses within this report; and use of their full names and organisation. One respondent did not consent to the recording of the interview, but gave consent for responses and direct quotes to be included in this report for data purposes.

4.1.3. Further Literature

The primary data collection will come from analysing the above policy documents and the in-depth discussions with interview respondents. However it is vital to analyse these datasets against current and emerging literature on the CE and in sustainability science. As such an extensive set of literature has been used from books, academic journals, grey sources, and non-government policy reports. Many of these have already been presented with the theoretical and contextual discussion, and findings will be referred to again during the policy and interview analysis.

4.2. Operationalisation of Data Collection

Policy documents were critically analysed to determine: their underlying vision (including interests and assumptions) in terms of the CE; which policies these have and will translate into; which are the main actors involved in the transition; and how consistencies and contradictions across policy documents. Interviews were then able to determine if targets are on track and if policy has been successful, if interests amongst actors and aligned, and if there are recent scientific breakthroughs that can support policy. As well as the overall policy vision for a CE, parallel studies of specific policy in the WM sector analysed how different policy fields are being connected and aligned with respect to CE. In order to supplement the relatively low number of interview respondents within the current circumstances, a larger number of current and previous policy documents were critically analysed from a spectrum of public and private bodies in order to understand progression of the concept from different perspectives, and to highlight common themes.

Within the critical analysis, three main sections have been incorporated – policy direction, policy alignment and policy scrutiny. The first aims to encapsulate the overall direction of WM policy in the context of the vision for CE; this includes the core components and strategies, and changes in policy direction as a result of the policy vision. The second provides a comparative analysis of the policy documents, including common themes and actors and any contradictions, in order to understand

how multiple interests and ambitions are aligned. Finally the policy scrutiny provides a critical assessment of WM policy within the CE transition, including scope and feasibility, and against the context of discussions in sustainability science.

Interviews crucially enable an understanding relating to i) interpretations, ii) interests, iii) ambitions, and iv) applications of the CE by different (groups of) actors in WM strategies. In the second section of the results these competing visions, as learned from interview responses, will be an analysed against the policy visions as a conceptualisation of the arena of governance.

4.3. Research Limitations

The core limitation that exists relates to the current and ongoing restrictions around Covid-19 which seriously limits the scope of the research by preventing face-to-face interviews, site visits and in-depth case studies at waste processing facilities. The majority of data collection is expected to continue through other platforms such a telephone, video-calling and email, and in-depth policy analysis, although the depth of research may still be compromised.

In relation to analysis of policy and programmes, it is anticipated that a five year review of the 2016 CE vision will be published in 2021 that assesses general progress and completion of the 2020 targets that were set out. Whilst much of that information is likely to already be available to certain parties and may be communicated in interviews, it is perhaps regrettable that such a document is not already available. Were this to be the case, fieldwork and analysis could be constructed against this to enable a full and up-to-date assessment of the relationship of the current CE policy measures to SWMS and a better understanding of the transition be acquired. As such, the main limitation that exists is that an extensive compilation of projects in the CE field and WM sector may not be readily available at this stage as well as a complete understanding of how CE has influenced policy and, ultimately, strategy.

Another key omission in the research relates to private WM actors that were not reached during data collection. It is difficult to genuinely assess relationship between the CE and WM and the nature of policy negotiations in this regard without having spoken to various private actors. Respondents spoke of the general support and enthusiasm amongst business actors but this needs to be verified and questioned in primary research to allow for comparison and analysis. Understanding how the concept is internalised and applied amongst different actors remains a knowledge gap. As such, so does the potential of the CE for guiding WM policies.

5. Results

This chapter is split into two core sections. First a contextual background is presented that demonstrates the current WM system in the Netherlands, as well as current policy visions for the CE – through summary of the core policy documents – and how this is being translated into WM strategies. Alongside this there is a running analysis of these policies in relation to the research objective. Further, the second chapter answers the research questions by presenting interview data and analysing the interests and ambitions of actors against policy and sustainability science.

5.1. Contextual Background

5.1.1. Waste management in the Netherlands

WM became a priority policy in the Netherlands when, in the late 1980s, there became significantly limited space for landfill in the country and a landfill ban (covering 25 categories) and a tax were introduced in 1995 (Rijkswaterstaat, 2020). Since then recycling became the preferred policy means for tackling municipal waste and the Netherland moved from a system of uncontrolled landfill to one of recycling, waste incineration, and controlled landfill (Kemp, 2007). As a resul the country surpassed a 50% recycling rate in 2009 and current municipal recycling rates are at around 79% (Rijkswaterstaat, 2013) and among the highest in Europe. However, the majority of remaining waste materials are processed into energy through incineration, which (although eradicating landfill pressures and reducing fossil fuel dependency) is a cause of greenhouse gas emissions and is now therefore incompatible with national emissions reduction targets to help limit global warming to less than 2°C. Meanwhile, until the national energy requirements principally come from clean sources then all recycling processes will be a source of CO2 emissions. This puts current waste processing and recovery policy at odds with wider climate ambitions and represents a challenge for municipalities to make significant advances in sustainably managing material resources. Figure 8 depicts the changing approach to waste in the Netherlands from 1985-2012 demonstrating the significant increase in both incineration and recycling as WM strategies, but also the stagnation of total waste production by 2000; although it should be noted that a significant decline in national waste generation is yet to occur. What is also important to note is the stagnation of recycling growth at around the same time highlighting the relative peak in recycling capacity after sharp technological improvements for a period. Total material recovery rose from 50% in 1985 to current levels of around 80% by 2012 (Gorhuis et al., 2012). The chapter will go on to analyse the role of recycling in WM and scrutinise its focus as the primary means managing waste.

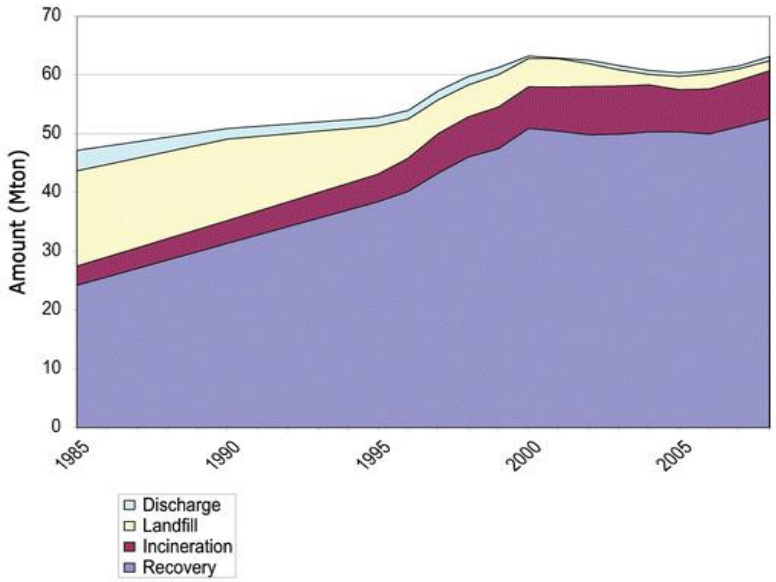

Fig. 8. WM activities in the Netherlands from 1985-2012, depicting the relative activities for processing of waste materials (in Mton) for recovery (recycling), incineration, landfill and discharge (Gorhuis et al., 2012: p. 68).

Within the government ambition for a CE, waste has become a renewed topic of focus by acknowledging that *"part of the circular economy is a different approach to waste. Dutch waste policy is increasingly aimed at moving away from landfill to incinerate, and to recycle more. This is laid down in national waste legislation. In addition, a National Waste Management Plan (LAP) is drawn up every 6 years including national targets for separate collection and basic principles for granting permits"* (Rijksoverheid, 2020: p. 25). The WM sector in the Netherlands is mainly operated by private actors and it is to these that the main responsibility for waste processing falls (Rijksoverheid, 2017). Waste processors are granted permits for waste activities (Rijksoverheid, 2020) and within the current WM plan a "minimum standard" for waste processing is enforced, which will be discussed further in this chapter. Interview responses from Joost highlighted a legal separation of domestic (household) waste and industrial waste (all private activity). It is the responsibility of businesses to organise their own waste collection, whilst domestic waste is collected by the municipality and paid for through municipal taxes.

5.1.2. Current Policy Visions for a Circular Economy within Waste Management

The following section extensively summarises the most important findings in the three core policy reports as discussed in the methodology, whilst further information which has been used to form the analysis can be found in the appendix. Tables that are presented are created by the author, but contain policy points taken directly from the policy documents. Where a 'notes' section is included in the table (see also appendix) then this contains a mixture of policy points (in quotation marks) and the author's own observations.

'A circular economy in the Netherlands by 2050' (2016)

Through the growth and development of the recycling sector, the government of the Netherlands regards the country as operating a Reuse economy (see Figure 9) that has already made significant advances in WM solutions and alleviated some of its previous problems. It now has the ambition of transitioning to a CE that maintains the cycles of production without the need for new injections of virgin materials.

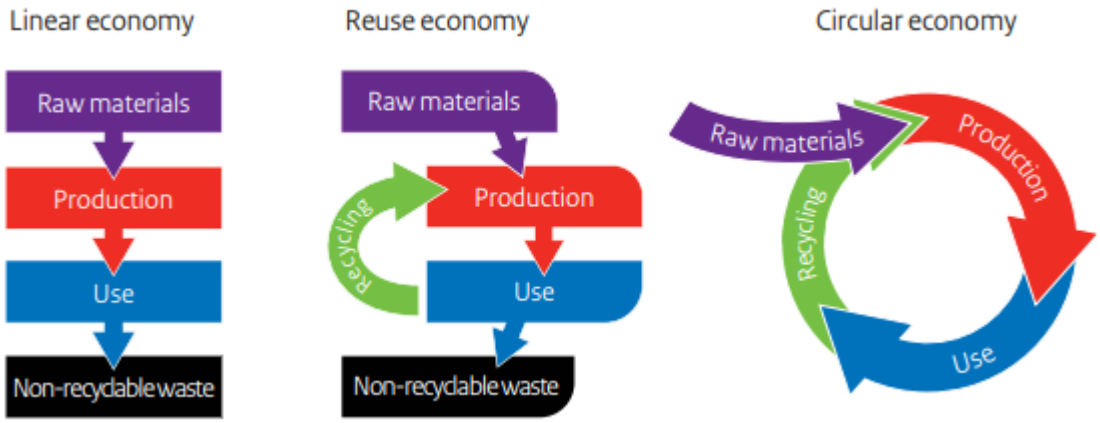

Fig 9. A definition of different stages of an economy – from Linear to Reuse to Circular – in relation to the flow of materials (Rijksoverheid, 2016: p. 15).

The programme sets out that particular vison and 'streamlines and coordinates current policy paths' (Rijksoverheid, 2016: p. 6) and builds on previous '*Waste to resources'* and '*Biobased economy'* programmes.

As a primary objective it sets out three "strategic goals" for waste materials:

> *i) "Raw materials in existing supply chain should be utilised in high quality manner"*
>
> *ii) "In case new materials are needed, fossil-based, critical and non-sustainably produced materials are replaced by sustainably produced, renewable and generally available raw materials"*
>
> *iii) "Development of new production methods, design of new products, organise areas differently to promote new ways of consumption"*

(Rijksoverheid, 2016: p. 13)

SER advises the programme be developed into a 'transition agenda that has concrete goals and transition paths' and to:

> *i) "Anticipate risks, obstacles and opportunities of the transition"*
>
> *ii) "Develop a policy framework that anticipates the transitional phase of the supply chain"*
>
> *iii) "Develop an integral assessment framework for the choice of priority value chains"*

(Rijksoverheid, 2016: p. 7)

Table 3 summarises the main "barriers", effective "intervention" points, and "strategies" for the CE explored in the programme. Additionally it lists the 'priority sectors' that have been highlighted as having the greatest potential for the CE, some of the most significant environmental impacts within the LE, and being prominent components of the Dutch economy. Appendix 2.1. provides detailed overviews of the three priority sectors of focus.

Table 3. A summary of some of the main areas of focus for the government-wide CE programme, assessing barriers to the CE, points of intervention, strategies for the transition and priority sectors of the economy.

Barriers	**Interventions**	**Strategies**	**Priority Sectors**
i) Regulations ii) External effects are not internalised iii) Lack of knowledge for technological, social and system innovations iv) Non-circular behaviour among citizens and	i) Fostering legislation and regulations ii) Intelligent market incentives iii) Financing iv) Knowledge and innovation v) International	i) Spatial economic development ii) Digitalisation iii) Toolbox for the regional level iv) Change in transport v) Local and regional circular initiatives	i) Biomass and food ii) Plastics iii) Manufacturing iv) Construction v) Consumer goods

professionals v) Coordination problem in supply chains vi) Vested interests and investments made vii) Limited influence in the international playing field	cooperation		

'Towards an economy without waste' (2020)

The following summary is from a 2020 update on progress in WM in the Netherlands in relation to the CE transition, drawn by the Ministries of Infrastructure and the Environment, and Economic Affairs and Climate Policy. A full progress report is expected late 2020 or early 2021 before the new Cabinet agreement is drawn up after the 20201 general election. Please note that some grammatical errors may occur in quotes due to difficulties in translation from the original Dutch document.

The report begins with an overview of what the transition may look like and what it should involve.

> *i) "In an economy without waste, raw materials are no longer burned or thrown away, but used optimally to create cycles"*
>
> *ii) "A transition requires the construction of a new system and the dismantling and conversion of the old system. The transition to a circular is in the Netherlands economy is still in the start-up phase. New structures and networks become built up and there is experimentation. However, these initiatives are not yet institutionalized and the establishment is still not feeling enough pressure to fit. There is therefore only limited talk of finishing and conversion"*

(Rijksoverheid, 2020: p. 6)

There is now greater integration between different elements of the sustainability agenda, as a more complete picture of the potential of the CE becomes available and resources are made available from climate departments for activities that contribute to CO2 reduction (see Appendix 2.2. for statement). It is therefore likely that greater funding and attention will emerge in the coming years.

The report analyses various individual "bottlenecks" currently blocking progress to the CE that occur within four core bottlenecks. Across these bottlenecks, the report recommends twelve "strategy goals". An overview of these goals is presented in Table 4.

Table 4. An assessment of the four main bottlenecks to the CE highlighted in the report including specific bottlenecks and strategies to remove them.

Area	**Bottlenecks**	**Strategies**

Economic	i) No environmental damage included in pricing ii) Cheap primary raw materials iii) Recycling more expensive than burning iv) Lack of (risk) financing v) Lack of demand for recycled materials	i) Pricing environmental damage ii) Stimulating the roll-out of environmentally friendly techniques iii) Incentives to move from waste incineration to recycling iv) Promoting better mono streams for high quality recycling v) Stimulating demand through social responsibility shopping vi) Boosting financing and circular revenue models
Knowledge & Innovation	i) Too slow knowledge development ii) Knowledge dissemination iii) Practical application of innovation	i) Stimulate knowledge and innovation through more long-term programmes
Institutional	i) Economic system furnished according to LE requirements ii) Short term perspective of producers iii) Barriers in (international) laws and regulations iv) Limitations in international trade	i) Adjust accounting and financial reporting towards broad prosperity ii) Make producers more and more responsible for their products iii) Promote circular design iv) International commitment and advocacy
Societal	i) Limited consciousness regarding benefits and necessity of CE/waste reduction ii) Status and fashion sensitivity around 'stuff' (consumerism/materialism)	i) Clear goals and good monitoring ii) Support sustainable action by citizens

The report outlines several "policy pathways", referred to as "variants", which emphasise removing different bottlenecks. Current measures together form the minimum necessary structure for a policy aimed at a CE – "basic variants" – whilst the next stage of the transition involves 'intensification variants'.

Intensification "Variant 1A" puts greater faith in knowledge and innovation to stimulate the transition, by supporting circular initiatives and businesses. "Variant 1B" would take a more legislative approach to transforming and dismantling the LE, targeting standards, rules and pricing – principally confronting the economic bottlenecks. In this way it could be said that 1A follows Nordberg's upwards curve, whilst 1B concerns the downwards curve. The Council for Environment and Infrastructure (RLI) and the Social and Economic Council (SER) of the Netherlands both recommend a "combination pathway" – "Variant 2" – which will form primary "building blocks" for the CE.

Currently there is a budget of €18million to implement these basic variants up to 2021, but for Variant 1A and the Combination Variant budgets would need to be significantly increased after this date and so pathways would depend on the Cabinet structure at this time. In terms of facilitating the transition the combined variants is certainly the most effective and preferable option and, compared to the €3billion needed for the climate and energy transition, the estimated €300million budget for combined stimulation and legislation are relatively low. A highly frugal government may still gear towards the legislative variant, but would likely face strong opposition from business actors without a supplementary support package.

Crucially, the report concludes that without intensification efforts – of any pathway – that the 2030 and 2050 goals for the CE will not be achieved and, as such, policy negotiations for WM will see the following measures incorporated after 2020 if ambitions for a CE are maintained. Table 8 (Appendix 2.2.) provides an overview of the three variants that report assesses, summarising "approach", "effects", "performance" expectations, and "budget" requirements. Further, the possibility of "Savings Variant" is considered and the implications of this upon the circular transition.

'LAP3: National waste management plan' (2017)

The '*LAP3'* was drawn up in 2017, covers the period 2017-2029, and became valid from 2019. The framework is a legal guideline and must be taken into account when actors carry out activities with waste. Implementation of WM policy lies largely with private actors.

'General policy'

In the WM plan are twenty core goals (see appendix 2.3.1.), many of which are also present in the two CE programmes already summarised. As such WM policy is clearly aligned with ambitions for the CE and likely forms a departure from previous policies whereby, legislation was not directly linked any particular ambition or goal other than the safe processing of waste. In relation to the goals, the following statement is included in the policy framework:

"The main objective of the government-wide Circular Economy Programme is the transition to the circular economy. The system approach that has been used for this must lead to new business models

and changes in consumer behaviour, legislation and social proper division of roles. Various general qualitative and quantitative goals have been set for this. In the context of the aforementioned policy, a letter to the House of Representatives 9 and its follow-up already set the following goals" (Rijksoverheid, 2017: p. 24).

'Waste prevention'

According to the *'LAP3', "the scope of waste prevention covers, materially speaking, the entire economy, from the extraction of raw materials, the production process and distribution up to, and including, use and reuse. Therefore, the waste prevention policy does not only concern the waste management sector, but it actually extends to all manufacturing sectors, designers and service providers, governments and individuals"* (Rijksoverheid, 2017: p. 91)

As the upper rung of the "9R imperative" (see Appendix 2.3.3. for complete hierarchy) waste prevention in the first instance is an essential step to transitioning to a CE and circular WM system. This means:

> *i) "Measures are taken before a substance, material or product has become waste, to reduce: the amount of waste, including through the reuse of products or the renewal of the lifespan of products".*
>
> *ii)* A reduction in *"the negative effects of the waste generated on the environment and human beings' health".*
>
> *iii).* A reduction in *"the content of harmful substances in materials and products".*

(Rijksoverheid, 2017: p. 91)

'Waste hierarchy: Minimum standard'

One of the significant elements of the latest WM plan is legal framework for a "material waste hierarchy", in the form of a "minimum standard". The *'LAP3'* states that:

> *"For many waste materials that are processed in the Netherlands, the various sector plans set a minimum standard. This minimum standard gives the minimum quality of processing and is a specific interpretation of the waste hierarchy for the wastes from that sector plan. The minimum standard is a reference point at permit granting for waste management: the competent authority reviews applications or initiatives for waste processing primarily to the minimum standard of the corresponding sector plan'"* (Rijksoverheid, 2017: p. 32).

The '*LAP3'* tacitly acknowledges the concept of the 9R imperative, and has laid out the following sequence as part of its framework:

> ***A.*** *Prevention*
> ***B.*** *Preparation for reuse*
> ***C1.*** *Recycling of the original functional material in an equal or comparable application*

C2. *Recycling the original functional material into non-equivalent or comparable materials application*
C3. *Chemical recycling*
D. *Other recovery, including energy recovery*
E1. *Burning as a form of removal*
E2. *Dumping or discharging*

(Rijksoverheid, 2017: p. 28)

The *'LAP3'* states that a form of recycling is only designated as "preferred recycling" when it has been established that it:

i) "Contributes to the transition to a circular economy".

ii) "Can be classified as more high-quality than other existing forms of recycling".

iii) "Is also an acceptable route from an economic point of view" [current limit is €205 per/tonne].

iv) Steers "*towards that form of processing is possible and desirable".*

(Rijksoverheid, 2017: p. 30-31).

The hierarchy is a positive step towards reducing waste output and preparing materials for (re)use in the CE. It is also process recommended across other reports with Deloitte demonstrating how a minimum standard in a "four-phase" plan with continuous monitoring (see Figure 17, Appendix 2.6.) can help to promote circularity in supply chains. However, as commented on earlier, the heavy focus on recycling is clear throughout policy reports with the greatest attention and most legal parameters. As yet there is little legislation to ensure waste "prevention" remains the first step in the hierarchy, despite direct acknowledgement of its contribution to the CE. Indeed, although there are ambitious targets in the government-wide programme for reduce quantities of waste, legislative commitments in the *'LAP3'* are far more modest, with central targets as follows:

1. "Stimulating prevention of waste, such that it reached in the period 1985-2014 decoupling between the development of the Gross Domestic Product (GDP) and the development of the total waste supply is being reinforced. This means the total waste in 2023 must not exceed 61 Mton and in 2029 must not exceed 63Mton".

2. "To encourage the prevention of household waste, such that production has decreased from 500 kilograms (fine and coarse) household waste in 2014 to a maximum of 400 kilograms per resident per year in 2020".

(Rijksoverheid, 2017: p. 92).

From this evidence it appears that the primary target is decoupling waste output from GDP growth, as oppose to reducing it in net terms. Therefore despite commitments to preventing waste as the priority standard, current WM policy has not made sufficient steps in this regard and seemingly put disproportional faith in recycling as WM strategy. A more detailed scrutiny of strategic preferences for WM will be presented in the next section.

'Actor plan'

Occupying its own chapter in the *'LAP3'*:

> *"This part of the policy framework describes for each part of the chain/for each actor indicated which obligations apply to him or her, but also which options are there to contribute to the CE, both by purchasing raw materials and products, dealing with raw materials and products, as well as the disposal of it…anyone who carries out waste operations must at least take into account a number of duty of care provisions to protect the environment"* (Rijksoverheid, 2017: p. 224).

A detailed breakdown of policies covering four strategic actor groups – households, government, businesses, and waste processors – can be found in the appendix and details how each actor group can contribute to the CE. Policies cover a combination of legislative and stimulative measures.

'Circular economy: What we want to know and can measure' (2018)

The policy report commissioned by PBL maps out the necessary and available indicators for measuring progress towards CE. The majority of the summary can be found in the appendix, whilst figure 9 below is seen as a valuable accompaniment to the three core policy reports as a conceptualisation of the government policy process for designing, negotiating and assessing policy outcomes and is essential for understanding the governance approach to the circular transition. The framework takes an actor and technology approach as the primary input for the transition. It then maps out an implementation phase whereby the 'who, when, what, how' will be translated into policy negotiations, before anticipating regular review on the effectiveness of policy (possibly in the form of further negotiations). Along with these core processes within the policy goals are affective 'autonomous factors' which highlights the complexity and dynamic nature of environmental governance.

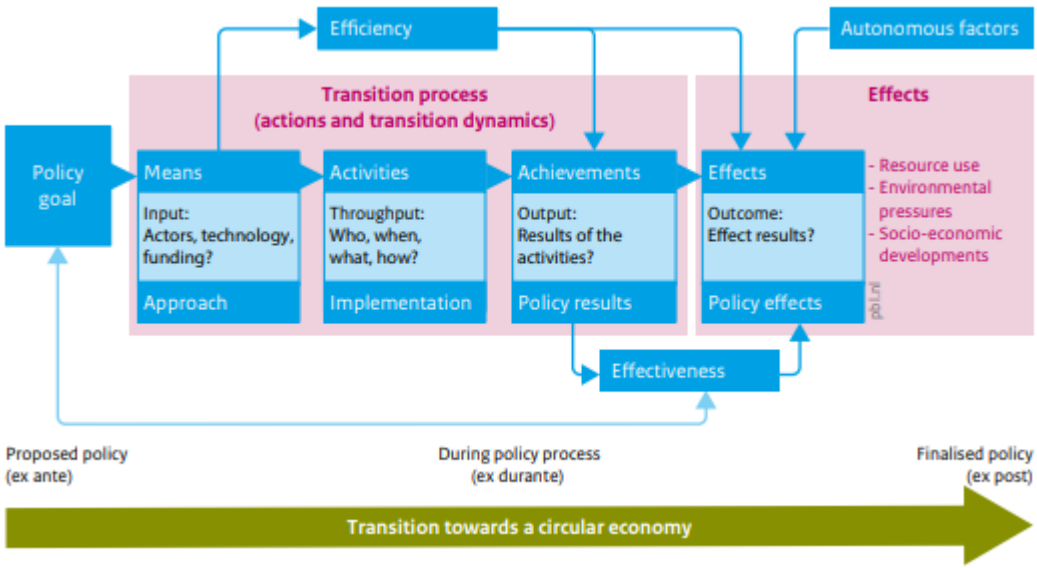

Fig. 9. Policy assessment framework for measuring the progress of a transition towards a circular economy through policy outcomes (PBL, 2018: p. 10).

5.2. Policy Analysis

5.2.1. Policy Overview

With the latest incantation of the LAP it is clear that the CE is directly guiding WM policy with multiple direct references indicating how certain actions and policy will aid the transition, as well as reference to how the concept itself is dictating WM policy measures. This is evidence that the CE is beyond the conceptualisation phase and into the policy phase at the national level; and with the inclusion of EU initiatives the concept has become internationally accepted. It is also evidence of the direct link between CE and WM, with the latter area forming a core element of the circular transition. In this way the LAP is no longer 'reactive' on waste policy (where waste was once regarded as an outcome of the economy to be managed) but rather it now plays a 'proactive' role in the circular transition. The *'LAP3'* contains a separate chapter – *'Towards a circular economy'* – outlining how the WM plan can contribute to the CE, whilst in the '*General policy'* chapter the term CE is mentioned sixty-nine times. From the early framework in 2016 the government-wide programme has now further been translated into more rigorous policy in the *'LAP3'* and more recently in the progress report *'Towards an economy without waste'.* It is expected that prior to the 2021 political agenda, the five year progress findings will be translated into further policy. Across all three core policy reports is an indication that WM requires a comprehensive approach with consistent reference to the waste hierarchy (operationalised through a minimum standard for waste materials processing). This acknowledges that reducing waste flows at source, in addition to improving methods of waste processing, is key to circular WM. The government-wide programme builds upon the common "3R" mantra – reduce, reuse, recycle – and has since introduced a 9R imperative (see first policy summary in 5.2.1.), through which the material hierarchy and minimum standard can be implemented.

Policy also takes a sector approach – covering designated sectors of the economy, as well as individual materials – and begins to lay out a directed strategy for WM that confronts complexity and sector-specific barriers. Whilst WM has long had individual legislation for certain activities and materials, the attempt to understand how policies for waste can enable and support the circular transition is an emerging strategy and represents a shift from WM as something to be 'solved' as cheaply or efficiently as possible. It is clear that in this sense the government ambition for a CE is directly influencing how WM is understood and the practical, strategic approaches towards it.

The ambitions laid out in the government-wide policy programme have been translated into a number of quantitative targets such levels of household waste in kg, but also relating to the speed of the transition such as the commitments to removing a further 80 barriers. This makes monitoring the transition manageable and provides clear areas within WM for introducing policies. A first step is to implement circularity at multiple levels of government operations, with the aim of raising the proportion of circular purchasing to 10% and halving the volume of non-recyclable waste in government offices, both by 2020. Meanwhile, residual waste from citizens and companies accounts for 80% of the total volume of incinerated or landfill waste (Rijksoverheid, 2016). This implies that of the materials that are not, or cannot be, recycled the majority is consumer waste and this must be a

priority area for WM. Indeed, in 2014 only 50% of consumer plastics were recycled (Rijksoverheid, 2016). It is also therefore a challenging one. It must also be questioned that the initial target of 10% circular procurement within government operations does not signify an optimistic outlook for what is currently feasible, but does imply that the majority of interim targets attempt to be realistic. There are also some contradictions in targets such as between the government-wide CE programme and the earlier *'LAP3'*. As discussed in the previous sector, the aims in the WM programme are less ambitious than the CE programme with references in the former to decoupling (stabilising) waste production from GDP growth.

What is also considered important in addition to a sector plan is a more detailed material plan. It may be effective to focus policies on certain materials, in addition to or alongside sector plans. Only one material is also highlighted as its own sector within policy – plastics – whilst the others are included within a sector e.g. construction or manufacturing. During discussions Mari commented that strategy has been modified significantly over the past five years, as what is most effective for accelerating the transition now becomes more understood, which reflects the complex nature of sustainability transitions. Material plans were one specific change that must be made as *"there are three maybe four sectors that are very visible nowadays – plastics, textiles, concrete and the metals. So if I had to write it again now I would make a programme that covers those four material flows and it would have specific handling perspective"*. This also demonstrates the various angles and approaches to policy depending on how you begin to measure and deconstruct the LE.

Further, the use of residual waste flows between value chains is also seen as one key strategy and private WM companies such Seenons are seeking to connect waste streams to better incorporate secondary raw materials into production processes. Meanwhile there is work ongoing from the municipality to better separate non-industrial business waste along the same lines as municipal domestic waste. It is acknowledged that 'technological innovations are not sufficient to change the system of the economy and the relationships between market parties' (Rijksoverheid, 2016: p. 18), which is where government policies must be ambitious and comprehensive to support supply chain restructuring, foster new circular networks, and encourage citizen interaction, amongst others. In order to "change the worn-out routines and structures of the LE, social innovation is just as important as technological and systems innovation" (Rijksoverheid, 2016: p 32). Furthermore it is seen that "social change is necessary to give the new technology a place in society…in some respects, technology is even of secondary importance" (Rijksoverheid, 2016: p. 32). The need for change in social-economic structures and behaviour was voiced by all respondents and seen as a major barrier and future research priority if the transition is to be achieved and waste in the economy significantly reduced. There is still relatively little knowledge about circular business models, a concern shared by Joost and Wim, which amounts to a major barrier in the transition and prevents significant upscaling in the short-term. '*Nederland Circulair!'* has been setup to provide support for companies wishing to make a circular transition. Circular innovations "generally entail higher capital requirements…the return-on-investment times are sometimes longer, such as when businesses want to keep possession of their products and want to earn money through providing services" (Rijksoverheid, 2016: p. 30). This links to the necessity for a broader concept of "circular finance" – that Koen believes is required to accelerate projects – which ensures a more complete account of not just costs, but services and outcomes of an investment.

The government-wide programme promotes scale-specific initiatives at international, national, regional and local levels. It is likely that significant investment and funding will need to be made if waste reduction strategies are effective and circularity up-scaled. Collaboration is needed with the EU and globally to establish legal parameters across international value chains and to confront waste deposition outside of the place of production. On this front, the North Sea Resources Roundabout is a positive start which aims to facilitate cross-border trade in recycled materials that should diminish somewhat the problem of demand/supply capacity imbalances whereby in some regions the means to recycle certain materials is not available whilst in other cases there is a significant volume of high-quality recycled material with little demand.

One bold and central plan is Extended Producer Responsibility (EPR) which aims to shift the burden of WM away from consumers and municipalities and to hand producers a greater responsibility over the waste that they produce by deeming that it is ultimately still under their ownership post-sale – this compels them to take back discarded products. Additionally, the strengthening of eco-design in the form of an EU directive seeks to build on effective energy efficiency requirements and would further legislate against companies who are responsible for generating large amounts of waste; this is particularly relevant for electronic consumer goods. The EU regulation would cover aspects such as "product lifespan, reuse, repairability, renovation, and recyclability" (Rijksoverheid, 2016: p. 26). The Cabinet "is convinced that increasing the life of products, making them repairable and using products more efficiently should be encouraged" (Rijksoverheid, 2016: p. 34), but as discussed in relation to the policy pathway variants there are still discussions over whether this can be adequately fostered by innovation and encouragement or whether eventually there need to be a stronger line taken with tech giants who make huge profits off the back of exacerbating the waste problem. Knowledge institutions advise a regulation/stimulation combination but the budget availability and political structure of the Cabinet may dictate the preferred pathway.

Another stumbling block is determining the precise method of governance. For instance, the Cabinet "will not exclude the possibility, if it is necessary and effective, of making a certain percentage of recycled or bio-based material in products mandatory if it is unsuccessful in achieving the goal at a sufficient pace in consultation with the value chain parties" (Rijksoverheid, 2016: p. 26). On this point Mari still expressed reluctance on behalf of the ministry to really use legislation as a tool of coercion in the wider transition, whilst concerns were expressed Ardi that on the issue of plastics at least that very little is being done and recent findings by PBL appear to confirm his view (see Figure 15, Appendix 2.4.). Alternatively the government could seek to influence market dynamics with its strategy through monetary or fiscal interventions and includes tax breaks for use of recycled products, as well as subsidies. Wider fiscal measures for changing the nature of the economy could be a lowering of tax on labour alongside an increase on resource tax in order to promote product repair services – options proposed by both Joost and Mari. Furthermore a complete and accurate portrayal of the 'cost' of a product needs to incorporated, with aims to "deepen and expand knowledge about circular procurement and the inclusion of total product life cycles and costs in tenders" (Rijksoverheid, 2016: p. 28). This will include "integral life-cycle costs, environmental performance and the social costs during and after the life cycle of a product" (Rijksoverheid, 2016: p. 28). Whilst prices may reflect the scarcity of a good (and therefore potentially some of its environmental cost), there is currently insufficient social costing and a rigorous circular transition should attempt to incorporate this element of sustainability with "the benefits and costs for nature and the environment …not reflected or are insufficiently reflected in the price of a product"

(Rijksoverheid, 2016: p. 27). Arguably it may be up to the market to internalise this, but it is also a primary role of taxation to account for negative externalities.

A key complexity remains in the areas of public health and safety, as well as that of the environment. The CE demands that emphasis is shifted from "origin (waste/no waste) to the characteristics of a raw material (market for secondary raw materials), as well as the more complex networks and cooperatives" (Rijksoverheid, 2016: p. 26). It is not therefore a case of presiding over a shift of waste materials into secondary raw materials but to develop a better framework to determine what is acceptable as a secondary raw material. When the issue of health and safety is incorporated this not only makes strategy more complex, but likely diminishes the overall extent of the CE if some material streams are outlawed; assuming that the products produced roughly remain the same. In "the transition to a circular economy, it is important to strike the right balance between recycling raw materials, on the one hand, and preventing the spread of harmful substances, on the other" (Rijksoverheid, 2016: p. 23) but research has not provided a clear answer to this. It therefore remains possible that contradictions will occur between trying to phase out waste (through its origins) and to build production systems that utilise (and may ultimately depend upon) waste material streams. The cabinet "is aiming to establish an assessment framework for deciding, on a case-by-case basis, whether recycling or removal is the best option" (Rijksoverheid, 2016: p. 23). Literature has also argued for a clear framework that maps out a cascading strategy, however interviews suggest that this is not yet close to being realised which makes circularity problematic to upscale economy-wide. Figure 10 summarises the relative progress and application of the waste hierarchy for each of the five priority sectors.

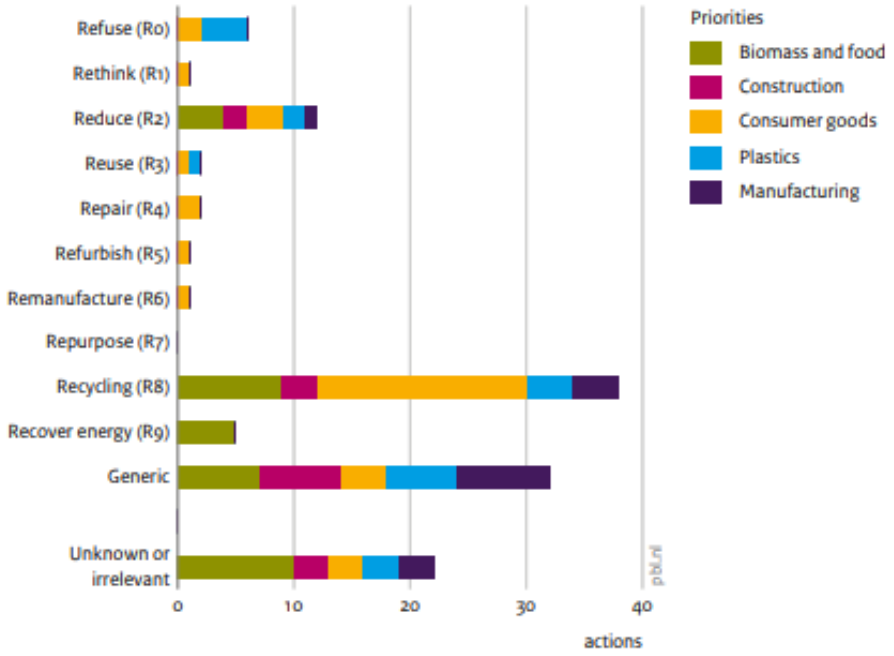

Fig. 10. Recent assessment of the relative progress in the transition to a CE, in terms of the number of actions, in relation to the 9R imperative for the five priority sectors of the economy (PBL, 2018: p. 12).

5.2.2. Primary Actors

The policy framework – for the CE vision and specific WM policy – is drawn up by policy makers from four core ministries (Infrastructure & Environment, Finance, Interior Affairs, and Agriculture). Such civil servants are direct employees of the ministry and so must also work within the agreement laid out at the beginning of the parliamentary term and the agenda of the Cabinet. As such, ministers and their policy makers remain the primary actors within the CE transition, with the latter mostly responsible for directing and implementing strategy. Furthermore there are regional policies with agreements drawn up by City Deal negotiators, responsible for CE initiatives at the municipality level.

Ardi outlines how the political system in the Netherlands follows what is known as the *Poldermodel* which is a consensus way of working and means that major political decisions (such as the CE ambitions) cannot be made without some degree of cross-party consensus. Such agendas are often negotiated at the beginning of the political term in order to be enacted over the next four years. As political parties have their various stances these agreements are "hard-fought" and there is generally little deviation from them, apart from in unprecedented circumstances; such as the current coronavirus crisis. VVD as coalition leader takes a broadly economically liberal stance – favouring market deregulation and lower taxation – and this has particular implications for their interests and strategies for the CE and may guide how the policy pathways (variants) are pursued. The difficulties within the political structure for accelerating the transition were expressed by Wim who reflected that *"in some parts of the government individuals are very interested in circular economy – developing instruments etc – and so they move but the government system is not moving because there are so many counter failing powers…And that is a problem with the organisation of government. And I think there is a large need for so-called boundary concepts – concepts that can link and align certain concepts so that they are less controversial."* In addition, with environmental issues carrying a certain 'political' nature to them means that parties often have to align themselves one way or another and may be unwilling to express support for concepts such as circularity if they believe it would negatively resonate with their support base (despite possibly yielding positive outcomes for a cross-sector of society).

Joost also referred to the political structure as a major barrier for realising the long-term goal of the CE and conceptualising such a transition in policy due to *"all these conflicts that have to be talked out between departments before they even get into action…Politicians have a relatively short horizon…they want to see results within their election term which is four years, and that's not really possible. So long-term investments like the circular economy are hampered by the political horizon, and by organisation complexity".* That being said, Koen – whilst admitting that "*the 2030 or 2050 scope of circular economy is still for a lot of practitioners very far away…so it is very tough to keep those large, long-term goals on your mind"* – did argue that what he is beginning to see *"is integrated working…we try to really keep the target of circular economy in all the other targets for different ministries – [we argue] that it enhances their policy – and then you see some movement".* What this means in practice within Koen's City Deal negotiations between municipalities and primary stakeholders is that "*it is about keeping in mind what all parties want and then putting it in such a way that you really have a community that [progresses] towards one goal without making it too political".* The decentralised nature of the Dutch political system and the ministerial structure does carry significant difficulties for making progress on sustainable transitions at the regional level with Wim arguing that "*local government [is in] a very difficult position now…they are forced to work hard*

on regional energy transitions – it's very difficult for them because they don't have the knowledge…and takes such a lot of their attention that circularity in the sense that we've talked about doesn't get much attention. Also being an abstract concept…makes it very hard for local civil servants to make circular plans".

Mari, however, was not overly deterred by the political structure claiming that whilst he did have certain commitments to the ministry he generally enjoyed sufficient freedom within his office to draw up relevant policies, talk with various actors and utilise his budget effectively (which has recently been made available after several years of limited funds for circularity projects). Different ministries and offices also have their own agenda e.g. between energy and circular transitions, and there is at least some development in connecting the CE to climate policies. In relation to the specific details and strategies of the policies, the responsibility lies with policy makers and there appears to be ample space to develop, assess and reflect upon policy direction. One significant element of governance is for the government to adopt a position – an interest – and not to be a neutral facilitator of the CE. Within Mari's office there is *"an interest of our own as the government – we want to channel the transition. So you look at stakeholders to see if they fit that interest, that position you have taken, and if there's a match then you come to them and you give them space to explore and money to innovate...that is the way the government wants to operate…because we have the money".* Crucially, he stressed that *"in this kind of policy we have decided to assume that role…because it is not really an interest that comes autonomously by itself and in practice we do not choose between interests, we do not balance between positions…we just pick the position, we match the position that fits our purpose".*

Within his office he has seen a significant leap in the systems thinking with regard to WM, with concerted efforts to *"work from the rear end of the value chain. In the beginning there was only waste-management policy – if you want to get rid of waste 'what do you have to do', or 'what should you do' to realise that. And that's when that programme came in. So it's the first structured approach to getting rid of waste. Structured in its reasoning; structured in its policy theory. It is about going beyond quick fixes for waste – those that just focus on recycling or focused applications of waste – …the ambition of this programme is to go beyond that. Dividing the economy into sectors and devising different ambitions per sector."* Joost similarly highlighted the importance, but also the difficulties of ensuring *"awareness – organisational complexity and having everyone working to the same agenda".*

The next core group encompasses WM actors (processing, disposal, incineration) who are mostly private actors and includes those responsible for municipal waste collection and enacting WM policy, but also new innovators directing and connecting residual waste streams to be used as secondary raw materials. Legislation remains a "minimum standard", in the general sense, and private actors have the ability to genuinely enhance this legislation; whilst government can provide support for this through stimulation measures. Within manufacturing and private companies there are "frontrunners" and "laggards", in the words of Mari, which necessitates contrasting policy instruments. As such, depending on their role, private actors will be targeted by either/both regulation and stimulation in WM policy. Even going beyond innovation levels, there is far from a level playing field amongst private actors with major corporations wielding a "direct line" to the ministry and the existence of lobbying organisations connected to these companies. Whilst the policy framework may be ambitious and multi-faceted, the influence of a small number of powerful

actors is a major barrier to a multi-dimensional transition that is not sufficiently addressed in policy reports. This is proving to be a significant bottleneck for eco-design development with Joost commenting that "*these discussions have been ongoing for 5-6 years already but we need to be less afraid to confront these companies, these big players, and push demands for repairability – the right to repair…It is interesting to see the arguments that companies have to avoid that."*

Jorn also explained how there is a difference in willingness to cooperate between WM actors as he attempts to build a network with his waste logistics company. Some see a business case for cooperation and are willing to engage in the company's ideas, whilst others see a threat to their business and a direct competitor. This highlights the difficult the government faces in the business arena of facilitating a transition that requires networks, cooperation and experimentation and must be able to provide support to confront these barriers. This is also connected to Wim's experiences of insufficient progress amongst business actors for stimulating the transition themselves.

On top of the fundamental governmental sphere, the policy arena for societal transitions encompasses what Ardi refers to as "*the quadruple helix – government; companies; NGO's/citizens; and science – and they all play a role in this".* The reality is that policy exists in an arena – as something to be 'fought out' – and not as an organic process based on what is the optimum outcome for society or an aligned statement of interests. Whilst government policy actors may choose to take a 'hard line' with certain private actors – such as waste incinerators – they are generally unwilling to invoke an authoritarian stance on business actors. Mari explained that *"the way we introduce WM plans is a way of supporting such kinds of developments with legislation. Usually legislation is meant to bring a certain minimum level in to what you are doing, what you want to do. And a transition like this one is not evolving through minimum standards. You have to look at the frontrunners, look at what is technically feasible, and see if you want to support them. And usually that is not backed up by legislation."* He argued that a certain level of technology "readiness" needed to be in place before legislation is desirable or indeed effective such that *"if you know that something is technically possible but still has to evolve in its maturity of the technique then you cannot demand of companies or an entire market to act that way, to change their own production processes…You have to look if things are moving in a way that it can become mainstream".* Wim, however, seemed to suggest that private actors were too eager to claim they were in a position to stimulate the transition themselves without decisive legislation being required, and the government needed to be more proactive. *"It is important to have a lot of experiments on which solutions are circular and which are not. That includes solutions with lots of government, but also solutions with less government, and we have to balance between them. But more importantly we have to experiment between them. Some sectors will say we don't need government to enforce rules, we are arranging everything ourselves. But to be honest I do not see good examples of implementations of circularity from them."*

Science is included in policy negotiations via knowledge institutions such as SER and TNO and by direct discussions with some prominent scientists in the field. Findings will be used when drawing up the government agenda that will attempt to find a balance across different positions. It is therefore highly unlikely that 'extreme' positions adopted by certain academics, such as degrowth, will be presented in the government agenda, and especially not the current Cabinet.

The specific actors involves depends on the policy and the project, as Joost outlines when explaining how he came to be involved with sustainability projects. *"The 'Circular Strategy' project last year was really a strategy building project [and] TNO, for example, supplies a lot of data and calculations and materials analysis…[but] knowledge institutions are only [for] when we need knowledge – at the beginning of policy making or in the evaluation stage; during the execution you know what needs to be done (although you may still stay informed). Ultimately it is the users of the city who are consulted with".* In many cases projects are put out by public tender when they rely on research or construction or other immediate and short-term implementation processes. However when designing the long-term strategy for the CE and envisioning new solutions for WM then negotiations become a little more complicated, and perhaps political in nature. This is when the make-up of the Cabinet becomes relevant and when the position of certain private actors in the market has to be taken into consideration. It is also depends upon *whom* is commissioning research with consultants used in both public and private spheres.

There are suggestions that some parties are lacking from discussions of a more comprehensive strategy for the circular transition is to be drawn up. Koen references circular finance and the deficiencies in accounting for all components of a project when seeking finance. Whilst it is not directly related to WM he argued that these parties are often absent from negotiations at the early stages and is indicative that more work needs to be done if the transition to be inclusive and an effective vehicle for change.

The final group of actors include citizen organisations such as the Repair Café who aim to implement CE at the community level, influence legislation around producer responsibility, and provide an inclusive and equitable realisation of the CE. At the same time citizens/consumers can make sustainable choices and benefit circular WM through sorting of household waste and buying circular or recycled products. In relation to actors in policy negotiations this is probably a core omission, with citizen organisations not directly involved. However the programme does speak of ambitions for a vibrant CE at the community level, so more grass-roots initiatives can perhaps be expected. Joost who has carried out various positions connected to CE and SD, explained that consultation generally depended on the stage or nature of the policy. When finalising strategy or implementing policy, the "users" of the city are consulted with – via focus groups, surveys, informal meetings – but generally do not feature "around the table" when legislation is being drawn up. Meanwhile, Martine of Repair Café explained that, whilst she does have direct discussion with government over policy and also manufacturers, that the organisation is simply too small for this to be extensive and that large corporations are therefore naturally far more represented in policy negotiations.

5.2.2. Policy Alignment

All three core government policy document set out and refer to the ambition of a CE by 2050 and the interim target of a 50% reduction in raw materials. Additionally these targets are picked up by other reports such as the indicator assessment by PBL and the taxonomy study from Deloitte. Therefore the CE is not only engrained in broad government ambition but is a policy priority for multiple ministries, public bodies and organisations, and private consultants. All policy documents refer to similar definitions of the CE, for example the one provided by the Ellen MacArthur Foundation. Additionally strategy is aligned across multiple policy documents, with all quoting the 9R

imperative in order of priority from Refuse to Recover. Both PBL and Deloitte present the same visualisation (see Figure 14, Appendix 2.5), whilst a similar figure was found in literature (see Figure 6), demonstrating how the imperative formulates government-wide policy strategy for the circular transition, and the circular processes connected to each step. Furthermore, the priority sector plan – the core component of the government-wide programme – is also a strong element of the EU agenda with the manufacturing sector replaced by all "critical raw materials" in the EU-wide plan (see Figure 18, Appendix 2.6.). With government efforts to better incorporate a materials plan in the near future it is likely that both agendas will be even more closely aligned.

There are no significant variations in understanding and approaches to the CE between the reports (and therefore the organisations).The main differences are Deloitte's assessment of a lack of clear taxonomy for the CE within the government-wide programme, and PBL's concerns regarding a lack of specification for the 50% interim target and how resource use is measured and accounted for in the Dutch economy. This implies that monitoring organisations may be somewhat critical of the strategy or progress on the transition but do not disagree on a fundamental level with the vision laid out in the government-wide programme.

5.2.3. Policy Scrutiny

There are certain areas of the programme which must be rigorously scrutinised. Currently there is no "clear taxonomy" for the CE (Deloitte, 2019). The 2016 government-wide programme lays out some ambitions but stops short of portraying what a CE looks like in practice (Deloitte, 2019). One core area for debate is the primary aim of a 'fully' CE by 2050, for which it is still not clear exactly what this means. If, in the absolute sense, it is a target for an economy that is 100% circular and produces zero waste then literature would suggest this is far from feasible and the programme should question the validity of such ambitious aims. If, on the other hand, a certain degree of waste is deemed 'acceptable' and a fully CE instead refers to the structural integrity of the socio-economic system – a strong relationship between WM and the production and consumption systems – then this may involve different goals of sorts. In this way the target becomes a 'functioning' CE rather than 'fully' in the absolute sense. This could be presented as waste utilisation vs material reduction (in the absolute sense). Whether these are compatible together and whether either emphasis would result in a 'different' CE is a question that needs to be answered One further argument is that it is better to follow a criteria centred approach than an activity centred approach. This ensures that negative outcomes are avoided through circular criteria rather than designating particular activities as 'circular' (Deloitte, 2019).

Another component to question is the assurance that the "preservation of natural capital will be taken as a starting point in the economic system" (Rijksoverheid, 2016: p. 13). However within its structure how does the economic system always ensure this? Currently economic growth is still taken as *a* starting point and, as the system is still a market economy, value-creation remains a core necessity in order for the economy to function. Whilst such promises are reassuring, they may be no different to similar commitments made in the SDG's for which there has been insufficient evidence of. Meanwhile, the programme makes the explicit claim that the economy "requires not only a relative decoupling of raw material use from economic growth, but also an absolute decoupling of economic growth from environmental impact" (Rijksoverheid, 2016: p. 10). So, whilst the CE

commitment is reassuring as a tool to tackle the climate crisis, there is still an indication that the conflicts and contradictions are not quite understood; or at least being acted seriously upon. This is highlighted by several references throughout the report to “green” or “sustainable” economic growth which, at its most literal, is at direct odds with the notion of decoupling. Perhaps if one believes that an economy can be 100% circular then it is not so, but if in reality a certain limit is accepted then the decoupling becomes only relative. Doubt about the degree of circularity that is achievable was consistently raised by Wim, whilst Ardi argued that 100% circularity would relieve lingering concerns about net consumption but admitted that getting there is profoundly difficult.

The programme itself refers to comments by The Netherlands Environmental Assessment Agency (PBL) that “the idea of the circular economy as a fully closed system is a mobilising ideal image…the use of primary raw materials and the creation of residual streams can probably never be completely avoided” (Rijksoverheid, 2016: p. 13). Yet despite this, the admission is not accounted for in later policy chapters and so raises some discrepancies about the overall feasibility of a circular/closed system and the consistency of the programme. In this way efforts to remodel some consumption patterns may need to be incorporated into the circular agenda to account for such shortcomings and be compatible with what is required to meet climate targets and to achieve resource decoupling – this is applicable to both absolute and relative approaches. Additionally a vision is briefly presented of a CE that can be structured so that “there is a positive coupling between economic growth and the growth of natural resources” (Rijksoverheid, 2016: p. 15). This is an ambitious aim which is at odds with the current economic model that depletes natural resources as it grows. Even a stabilising of natural resource stocks will require significant changes to consumption patterns, especially on the global scale. It is doubtful as to whether this is an understanding of the CE that is shared by the majority of actors, especially private companies responsible for implementing WM policy. For most actors it is not seen as a radical alternative system but primarily an economic model that uses materials more efficiently and sustainably which enables environmental benefits. Whilst it may involve some difficult transitions the expectation is there will be no long-term ‘threat’ to the economy. It is paramount that a transition must not cause huge social disruption, such as severe unemployment, but at some point linear structures must be dismantled and this will likely involve the decline of entire industries.

Other contradictions are evident, relating to sector/material progress. During the interview Mari highlighted plastics as one of the key areas of innovation progress, whilst Ardi lamented that “next to nothing” was being done in this sector. This also has a lot to do with how you monitor and measure ‘progress’ - if the starting position is low then any development may be seen as progress. Meanwhile progress may be technological – such as advancements in recycling – but not legislative or societal, such as changing consumer behaviour around plastics or switching to alternative business models not dependent on plastics. This demonstrates the challenges around measuring progress in the transition, but also in terms of what is the most effective and desirable mechanism for change in WM policy. One on the one hand “legislation can serve as a driver for innovation” (Rijksoverheid, 2016: p. 23), but Mari also admitted that it is still problematic to strike a balance between driving innovation *from* legislation, and ensuring that the foundation is already there.

Monitoring of the transition suggests that, after a 7% decline in raw material input from 2010-2014, usage remained relatively stable from 2014-2016 (Rijksoverheid, 2020). As such, much more attention needs to be given to waste prevention, reuse, and repair, with the Netherlands already a

global leader in recycling and waste processing. If the circular transition is to be more comprehensively aligned with the energy transition and emissions reduction, then the policy of waste incineration for energy (currently accounting for at least 15% of waste processing according to Ardi) must be abolished. This in itself will require a greater emphasis on waste reduction to account for the shortfall of WM that is left by recycling capacity. Indeed the overall potential of recycling for replacing raw materials and providing the foundation for the CE must be questioned. Joost argued that **"***there are market inefficiencies that really hamper circular economy. Even though companies want to do things, if it is way more expensive to do so then they just won't. And that has much to do with resource prices - virgin plastic are cheaper than recycled materials – and until that is changed nothing can really happen. The price of crude oil is out of our control, but what is being worked on is making separation and collection more effective. Another thing is [price is connected to] the purity of the substance".*

At this stage, the knowledge & innovation and societal bottlenecks stand out as having the least comprehensive strategy and policy outline. It is likely that the Cabinet has faith in the innovative nature of the Dutch economy and its developments to date – thus the limited outright policies to stimulate it. However the lack of progress towards implementing the CE into mainstream society - beyond popular schemes such as the bottle deposit/return – is a cause for concern. Combined with the complexity surrounding the dismantling of the economic and institutional structures of the LE, it is clear that the transition towards the CE is still in its infant stage and has not yet stimulated policy negotiations with ambitious enough outcomes. One such gap is the construction of a viable framework to retain value in the chain, post-consumption. In a market-led economy much value is generated by the processing of raw materials and it is not yet clear whether a "closed-loop" of materials can return the same economic value needed to maintain stability in the economy. Some development has taken place with the discussions of "material cascading" which would try to combine the best-possible waste processing from an environmental perspective but also an economic perspective (in terms of optimal value creation and not just costs). However it still seems that most businesses have insufficient knowledge about how to utilise waste material streams and to stop excess materials becoming waste during current economic activities; and thus develop an economy that still creates value whilst reducing waste still seems some distance away. Ardi argued that new value streams amounted to a systemic shifts because *"if you think about the ways we make material use better than that automatically means you have to reorganise economic change in order to get things in the loop. And that automatically means changing the economic system. Because [right now] a company makes something, they sell it, they get the value, and they don't worry about what's happening afterwards. If you make a something circular then part of the value of this material will be when you use it or recycle it and this value probably should be part of the price of the product that will not get back to the company that made it…Now it is about waste and how we handle waste as cheaply as possible – end of life – and circular economy is about how to add value to waste".* There are currently efforts at the private level to reorganise waste streams and to rethink the economic value attached to waste, which is something that Jorn at Seenons is involved with. However on the macro level, WM systems are not organised as such and municipalities still prioritise efficient processing of waste.

From a citizen perspective, a more rigorous public awareness campaign to encourage participation and conscientious behaviour should be the immediate strategy, after the report acknowledges that consumer "participate in the CE through: reuse, repair, better maintenance of products, better

separation of recyclable materials, more conscientious product choices" (Rijksoverheid, 2016: p. 21). Martine argued how the Repair Café has help to facilitate and inspire a repair culture in society and to citizens the knowledge about how to maintain and repair their products. However she bemoaned a lack of government funding and support for their activities which limited the scope of their activities in education and lobbying manufacturers for better product design. Additionally, ethical considerations will remain regarding large-scale experiments to change social behaviours around consumption, as well as of course their viability. These questions must be answered, but in reality policy negotiations that will facilitate discussions on these topics have yet to really begin, whilst rigorous policies are currently lacking.

There are certainly actions that the government must take on removing some of the economic barriers and strengthening the case for circular business models, but it would require bold intervention such as subsidising recycled, secondary, and biodegradable materials, and taxing raw materials in order to phase out the remaining elements of linear production systems. A reduction in the tax on labour, combined with higher taxes on waste disposal and better residual waste collection for recyclables may also stimulate better separation and utilisation of waste materials by businesses that are currently unprepared to implement costly and time-intensive initiatives. Joost and Martine also argued that lower labour taxes and better subsidies will be required to stimulate professional repair infrastructure. It so far remains to be seen how committed the current Cabinet is to a fully CE that they are prepared to stray from non-interventionist principles in favour of heavier market regulation and stimulation. Actions by the government such as purchases and interactions with circular businesses should at least begin to stimulate these business models and strengthen their position in the market.

5.3. Interests and Ambitions in Policy

5.3.1. Approaches to Circular Economy and Waste Management

Whilst there are a multitude of academic and conceptual definitions of the CE, research does not point to a significantly diverse or contradictory understanding amongst policy actors with all interview respondents referring to raw materials, reductions in waste and some function of a closed loop system as core elements of the CE. At the same time, what was also clear is that conceptions are beginning to change; at least in the sense of a broadening of the concept. Wim explained how *"at first it was more circularity in a technical sense – how can we recycle waste etc – and over the years it has broadened to include redesign of products and then social aspects…But it is still debated as a concept – many people are confused, many people in politics consider it as a rather fake concept".* Joost had similar reflections about circularity *"getting broader which is good…because it's an holistic thing, especially if you consider the whole 'Doughnut' concept…but it also makes it really complex [for] reforming the whole economy across all the departments".* Therefore the core elements of the concept such as the utilisation of waste materials – and as such the fundamental transition – are most likely not a point of debate in policy negotiations but the broadening and understanding of the complexity of the concept does affect the scope of policy measures and the diversity of actors who will implement them.

Until recently WM has been a 'problem' to be *"negotiated away as cheaply as possible",* according to Ardi. Therefore to begin to see waste as a valuable resource or to see WM as a long-term process requiring governmental intervention and cross-sector and party collaboration is a challenge in itself. Mari stated that *"in the beginning when we wrote the framework we didn't even know where to start...and [now] for some sectors we are getting more and more of a grip on what the next step should be – what kinds of developments are the best…so you can stimulate the qualities you want for the uses you are looking for; it is time to get better at making the overview of what each sector should do, or shouldn't do".* The concept of what is economically feasible in WM is also likely to involve protracted discussion amongst actors. Incinerators have already tried to sue the government and block legislation introduced on 1st January 2015 to prevent waste incineration – the legislation (a tax levy) has been regarded as immediately successful at reducing the volume of waste incinerated. This proves that not all economic actors are enthusiastic about the CE and this reluctance will be shared by many others who are directly entrenched in the LE, such as producers of single-use plastics or throwaway consumer goods. In the earlier days of the framework Mari's ministry "*tried to stimulate all [sectors] at the same time. But in practice that doesn't work. So in time we learned to make choices, to set priorities. And also to accept the suboptimal. To accept that if there isn't 100% circular in one step, then maybe 20% more circular is enough for the next step".*

The difficulties of single transitions, let alone the wholescale economic restructuring, was lamented by Mari: *"If you see for instance how much society is addicted to plastics…then you are working on a lot of different chessboards…to get a step ahead. So you need not only to have a budget but you have to have a political vision that is viable and you have to have an organisation that can be patient, that can put things in motion and wait five years for an effect to happen…It is quite difficult to hold onto the long-term perspective in the political environment that I work in, which is the day-to-day horizon.* As a policy office, what is often the preferred strategy *"is to come up with a measure, an instrument, a target, and then let an agency work with it, give an agency the responsibility to reach that target".*

Conflict of interests was a theme consistently raised by different actors and, whilst conflicts and trade-offs for sustainability will be explored in greater detail in the next chapter, it is necessary to consider incineration as a major barrier to circular WM. Not only does the 15% of waste currently incinerated represent a major volume of waste that needs to be prevented or injected back into the loop, but it is also something that the municipality currently has a direct interest in. Jorn spoke extensively about the challenges his company faces in directing residual waste from businesses towards specific circular flows, with municipalities so far being reluctant to provide funding or support due to their interests in residual waste flows being directed to incineration for the purpose of regional energy production.

Despite complications of legislating against specific actors or activities, comments made in interviews point to a consensus on the general willingness by private actors to engage with the circular transition as it could be potentially profitable to reduce waste and open up new value chains. There are some innovative small businesses in the field of circularity that are ready to make use of government support and connect to larger companies. However business actors will not openly accept profit reductions or spend large amounts of money to implement circular business models; virgin materials often being cheaper than recycled materials remains a significant barrier. Large companies can hire also consultants but smaller businesses are not able to do this.

Frontrunners and laggards exist, as highlighted in both the government-wide programme and the '*LAP3*' and commented upon during discussions with Mari. Frontrunners may be small or medium-sized companies who have developed innovations and seek support (financial, legislative or otherwise) in order to grow their business and gain advantage in the market. Meanwhile laggards could be smaller companies without the means to adapt their business models, or larger companies who already have a sufficient advantage in the market and are willing to lobby against legislation that would jeopardise that. According to Mari the government position is to support frontrunners, especially smaller companies, as they *"have much more vision about what they want to do, much more ambition, are much more motivated to do things. And they are much more flexible in their operation...all they lack is impact; nobody listens to them. So if we back them then people, governments and companies will listen".* However, with Ardi revealing that large multinationals have a direct line to the ministry, there is potential that the more ambitious and robust legislation (such as those strengthening EPR) may be blocked, delayed or diluted. This could be especially true if such companies receive backing from one or political parties for their stance.

One of the core strategies for WM in a CE is for better logistics in business waste streams, and progress is being made on this by governments and companies. Joost explained ongoing policy developments to "*make waste pick-up and collection, and especially separate collection, more effective…The city collects all the rubbish produced by citizens, which has separate collections of recyclables, but if you're a private company – from any sector – then you must arrange and pay for the collection of your own waste, which is usually not separated. This is despite many businesses in the city – offices, restaurants etc – producing similar waste to households. So we are running pilot schemes in the city that makes sure that company which produce similar waste to households can access the same waste collection infrastructure".*

However, there are currently doubts among many commentators about the ability to align multiple interests for the CE and to realise the government ambitions through policy stimulation. Koen stressed that policies for the CE are still not specific enough and that "*what you see now is that we have generic policy from central government…[but] the companies really ask for more concrete laws and regulations because the technique is already there.* Meanwhile governmental departments are not yet all at the same level and there is a risk from putting *"new generic rules in place that other municipalities really cannot cope with because they are not as far along as that…*[meaning that] *such concrete actions will not be written into such deals because all political parties need to sign it".*

The private sector similarly suffers from circularity readiness levels that is infringing upon transitional efforts. Wim admitted that progress is slow in his experience and efforts mainly concern helping companies to "*really grip the whole idea of circularity".* This is because "*is it is relatively easy to realise the transition on the scale of one business and rather hard to realise it on the level of several businesses together. It is a question of trusting each other – they have not developed the competence yet for businesses to work together on circular solutions. Circular networks – but not communication network – rather cooperative networks. This is one of the new business models I am working on…but I do not yet have the methods or the techniques. It costs a lot of time and involves a lot of talking and experimenting."*

The final actor group included in policy documents and highlighted a core mechanism for the transition is citizens and their interaction with the CE. The fundamental barrier here is changing

consumer behaviour, and increasing and enhancing citizen actions that enable the CE. It therefore becomes a process of aligning government ambitions for the CE with the interests of producers and consumers. Apart from a limited number of companies pursuing circular business models, the concept is generally at odds with many large manufacturers whilst consumers do not adopt a circular mind set in their everyday choices. Mari believed that "*a circular person is somebody different to a linear person. A circular person may be less interesting in owning a product…but maybe there are not enough products to be leased so one of the things we are also working on is how to stimulate more concepts…there just needs to be a market for it. In the future I imagine that we will own less stuff, and I think it will change people's behaviour."* Ardi stressed that big leap needs to be made in societal approaches to circular behaviour with *"education starting at a very young age…very important to get the transition moving, which is not being sufficiently addressed in everything we are doing".*

One component of a CE that featured in policy ambitions and was raised in interviews was product repairability. In the '*Actor plan'* (see appendix 2.3.4.) producers were given a responsibility to improve product design to ensure products were easily repairable. The Repair Café Foundation has been working to increase knowledge and enthusiasm for repair and maintenance amongst citizens with community-run repair workshops. However Martine was adamant that the responsibility to repair should not fall entirely to citizens and that, despite reference to its importance as part of the upper waste hierarchy, policy action from the government has so far has been insufficient. Martine stressed that *"If you want to have a real circular economy then the repair infrastructure should be as rich, or even richer, as the infrastructure for buying a new product. So there must be professional repairers again. And it must be possible for a repairer to earn a living with his repair work. So I think that the government should make that possible and one of the ways to do that is to lower taxes on repair work and increasing taxes on raw materials so that new products become more expensive and repairing old products becomes cheaper".* Joost was also in agreement on the lack of repair infrastructure on cities and the need for tax-based policies and funding to support it. Ultimately, he said, "*the main problem facing circular economy is not the idea, it is the grounding mechanisms that make consumption so cheap."*

Some citizen organisations are concerned about promoting inclusivity and solving a range of social problems within the CE and not just focusing on economic outcomes. Many actors however still see the CE as primarily an economic function related to resource and material efficiency and not as a driver of social sustainability (or at least not a direct driver). If this not sufficiently picked up in policy then there is a danger of a trade-off against issues of social sustainability, which will be explored in greater detail in the following chapter. Furthermore the degree to which EPR is enacted also determines the extent of citizen/consumer interaction with the CE by enhancing repairability, durability etc, and thus expanding the scope of WM policy to a higher rung of the hierarchy. The direct line to the ministry enjoyed by major corporations and the impact of lobbying institutions may yet hinder progress on this.

5.3.2. Applications of Sustainability Science

The same theories that were presented in the theoretical chapter are often applied to policy, whether implicitly or explicitly. The following analysis refers to how sustainability science is specifically being applied to current and ongoing policy negotiations. A discussion of these will be presented in a later chapter.

Variant 1A and 1B of the *'Towards an economy without waste'* report roughly concerns the two facets of Nordberg's model of sustainable transitions – the upwards shift and the downwards breakdown – and is well accounted for in policy. Ardi metioned the model explicitly as a guiding theory of his research, whilst Mari implicitly made reference when outlining how legislation and stimulation are applied as policy instruments. Furthermore PBL uses similar theory in their report to visualise stages of the transition (see figure 16, appendix 2.5.). Much of the policy strategies, and the instruments used, follow theories connected to sustainable transitions.

Hekkert's theory of innovation concerns incremental change vs 'radical' innovation. Complex problems are less likely to be solved through incremental change, and there is not the time available to put complete faith in the approach. Market uncertainties often hinder the wholescale uptake of 'green' (circular) technologies, whilst linear lock-ins that give an advantage to certain technologies have "locked out" circular technologies (Hekkert et al., 2008). Therefore special attention needs to be given to removing the 'unfair' advantage of established technologies and production/consumption through either legislation or stimulation. However questions are raised over which is the most effective instrument and at what stage should various measures be implemented. There is also an economic debate about state intervention in the market and what measures are within the interests of business actors.

One of the core areas of the circular transition is developing sustainable business models that reduce waste and/or maximise utility of waste materials. Jan Jonker has been one of the prominent academics assessing the drivers of such business models in the Netherlands and found that 'sustainable' business models often do not differ substantially from traditional business models (Jonker, 2008). This could have implications for assessing circular business models which could require a more comprehensive set of drivers to be successful, or follow a similar pattern to other sustainable models with potential for widespread uptake. For Ardi and his colleagues at TNO, Jonker's theories form the three pillars for strategising sustainable transitions along with Hekkert's and Nordberg's with "*the combination…fairly critical in order have a theoretical framework".* Such thinking is also present in the policy framework through the variants and policy instruments that are discussed to stimulate innovation, prevent linear behaviour, and develop new business models. However whether these modes of thinking make the leap from policy to (private) action remains doubtful and as such establishing circular behaviour across groups of actors is not guaranteed. Ardi prioritised governance as "*both supporting the development of the upwards line, and stimulating the development of the breakdown line…As a government you could say we only take care of the breakdown and we trust that the other things will emerge, and that's not going to happen. Whilst if you only focus on the upwards curve then the old structure may be so powerful that in the end it will not work. So it requires a political decision to do both and that is the view in the Netherlands, as well as the EU".* Meanwhile Joost outlined that the framework for both the CE and the Doughnut Economy focused on material streams within three pillars that included: housing and public space; food and bio-waste; and consumer products.

Cascading represents one means to make the connection between technology and policy and move towards a combined framework for waste streams and the material hierarchy. Can technological processes for a CE be translated into a framework that works as a blueprint for WM actions? These are possibly the sorts of developments needed to turn theory and policy directly into strategy and action and a "consistent" material hierarchy is a policy direction for both Dutch and EU frameworks, but as Mari and Ardi commented translating this into viable policy is still a long way off.

The government-wide programme goes some way to incorporating prominent sustainability theory that includes natural capital, decoupling – relative and absolute – and planetary boundaries. There is even mention of "positive coupling" in a CE, that implies a restorative or productive relationship with natural capital; the programme however does not go into further detail on this. Anything less than absolute decoupling in a CE and the economic growth that the Cabinet still prioritises is problematic, however 'green' or 'sustainable' it claims to be. Meanwhile the CE needs to be constantly reassessed in relation to the latest planetary boundaries. It may mean something different to different sectors, activities or raw materials. It is not yet clear whether the conceptual promises of the CE will be realised through the development of a zero waste economy that maintain pathways to growth. Additionally there are doubts over the strength and integrity of its relationship to SD. The use of sustainability terminology implies an environmental motivation for the transition, yet specific policies and current developments do not ensure that strong sustainability will be a focus. Wim reflected on the relationship between CE and SD and their overall integrity with the possibility that *"sustainability is a goal and circularity is a means to reach that goal".* However he was also keen to stress that *"they are both fake concepts…They are important as a kind of moving target, or as an indication of the direction that you want to follow, but they are not suitable as concrete goals to reach. We have to set a next step to translate those concepts – the concepts of direction – into a concrete goal. They are therefore at most a tool to help transition to sustainable societies but not a solid structure to build them around."*

One particular concern in literature, but one that was not raised during interviews, was the social element of a CE and the overall scientific integrity of the concept. SD has been regularly criticised as a concept for being too vague and ambiguous (Schroeder et al, 2019) which has lent legitimacy to the emergence of the CE as a governing concept. Yet "the scientific principles regarding the Circular Economy have lacked any significant analysis, including from the perspective of Sustainable Development" (Miller at al., 2019: p. 14). If emerging visions – particularly those that seek to build a model for development in the Global South – fail "to consider power and authority in the CE [then this] might mean that it generates opportunities solely for big players in industrial development; and it would fail the poor, as has the previous linear development paradigm" (Schroder et al., 2019: p. 203). The government-wide programme and subsequent reports introduce a wide scope of measures to challenge various bottlenecks and target specific transition mechanisms, however "the dominant discourse on the circular economy has largely focused on material cycles, resource security and big business opportunities with issues of power, politics and legitimacy receiving limited analytical attention" (Schroder et al., 2019: p, 204). A discussion of this perspective will be introduced later, but this does account for a significant omission in current policy and strategy.

A final technical consideration to make is that in a CE the stock of 'waste' materials can only be utilised if it is available at the point of demand, otherwise raw materials will be needed to meet this demand. As the market economy depends upon immediate production, recycled materials may

never fully account for the overall resource injection needed, whilst new value streams may become dependent on such materials causing contradictions in the economy. There are some developments around this such as the North Sea Roundabout, whilst Mari spoke of several companies taking measures to better connect material streams meaning capacity is likely to improve with investment. However, the logistical limitations facing a fully circular system was not highlighted as a significant barrier in the policy reports and therefore not sufficiently accounted for in strategy.

5.3.3. Sustainability Agenda and Trade-offs in the Netherlands

Any potential trade-offs in sustainability are closely aligned with the discussions above. A lack of scientific foresight in policy ambitions that doesn't account for a holistic measure of sustainability – such as prioritising economic growth and prosperity above social welfare and planetary boundaries – will inevitably incur losses to the wider sustainability agenda. Just how much relates to the potential of the CE for reaching sustainability goals. Furthermore the ambitions for the CE – to achieve zero waste and also maintain economic growth – will also generate societal outcomes and have impacts for other targets, both positive and negative.

A first potential trade-off is between two separate transitions – the energy and material transition. Ardi explained that *"not all solutions from a circular perspective may be the most desirable solutions from an energy transition perspective…the energy transition requires a lot of scarce materials such as cobalt and lithium and so from a circular and resource efficiency perspective it is not something that you would like to do."* However he went on to argue that the urgency of the climate crisis meant that *"on the other hand you know that you do not have much alternative. So then you require solutions and alternatives that do not require these materials or you design them in such a way that you know the loop is closed 100%".* There does appear to be some progress on confronting or diminishing these conflicts in recent years, with Ardi acknowledging that *"5-10 years back there was not much attention for this, it wasn't even in discussion".* Wim also saw a further conflict between the two transitions that related to political focus such that *"they are both about the same problem, or are both working on the same issue…but in practice both can compete with each other in the way that governments have several offices working on energy and several working on circularity".* He referred to such a conflict as "*competing fields of governance".*

Interviews suggests that SD as a concept is not being sufficiently represented at policy levels (at least within CE discussions) in the Netherlands. The CE is assumed to promote social sustainability in its nature by some policy, but limited evidence for this (more research needed). The Netherlands already has sufficient social infrastructure to ensure a basic standard of living for its citizens, as such the CE doesn't need to explicitly enhance this in the way that development initiatives would need to in the Global South. However inequality does exist and a breakdown of activities associated with the LE will cause some unemployment. Therefore the CE should also be able to provide greater social inclusivity than already exists, protect the well-being of workers and generate stable employment. It may not be enough to focus on the technological and infrastructural components of the CE for the benefit of economic and environmental outcomes whilst assuming that social elements take care of themselves. Ardi specified that for him "t*hings like social justice, equality, inclusivity are not strictly part of a circular economy because as I mentioned it is a material transition. It can be beneficial but for me it is on the second ring of importance".* He did, however see a connection between the two

concepts, arguing that *"I do not see it replacing sustainable development; it is a part of it. It is already here for a long time. The concern over the availability of materials is something that goes back to the Rome report in the 1970s. But the way to look at it and make it a little bit broader in context is an evolution, it is not something completely different. It is combining a few things."*

There are certainly social gains to be made by the transition with claims that it would yield 50,000 jobs in the Netherlands according to TNO, whilst SER and PBL predict no long-term negative effects to employment from the transition (Rijksoverheid, 2020). Furthermore social cohesion is regarded as important for both companies and citizens when a behaviour change is required and encouraged (Rijksoverheid, 2020). Indeed, as policy makers both Koen and Mari were confident that the CE would contribute to social sustainability in its own right. Koen argued that *"it will enhance the social position of people because circularity also works as a sustainable approach to all people living in society – how you deal with people basically…in healthy, urban environments"*. Mari was even more steadfast in his rejection of concerns that CE does not fully account for all components of sustainability, explaining that *"our business model consists of a network of smaller businesses, usually at a decentralised regional level that do business with each other and come up with ways to use waste streams from other companies. What they also do is to create some kind of social cohesion with local people through locally made, locally used products…If you look at CE it is a multi-faceted concept, and that's why I do not agree with the notion that there is something different between circular economy and sustainable development."* Currently, however, there is only limited evidence is government-wide ambitions about how local businesses would be supported and circular models stimulated at the same time as confronting the economic power of large corporate players. Koen considered implementing policy *"that goes towards a model of more sustainable consumption without bringing about a dis-balance to all the people who work in companies which mainly facilitate consumption. On smaller steps you could try to educate people and companies about the way you want to move as a government over the next 40-50 years. And also to be a partner in them for them that. But in that way you can only take smaller steps because if you take radical steps the political climate might change and then another government comes along and does the opposite. And in this way you are not a sustainable partner for a lot of companies".* Furthermore, there is little evidence for the claim that social sustainability through locally produced and consumed products will account for real gains in inclusivity and equality. Upon this discussion, Wim questioned whether the government-wide programme was *"inclusive enough for the poorer parts of society to [be able to] participate in circular solutions".*

Whilst the transition to a CE will have many positive societal and environmental outcomes, such as the specific SDG's presented earlier, it is far from clear that social trade-offs or losses will not occur in order to get there. This may have to do with how seriously the Cabinet regards the target to reach zero land-fill waste if profound changes to consumption patterns and material use are not made and the policy of waste incineration is abolished. Currently separation of waste at the household and business level is insufficient to achieve full recycling, which would require post-collection separation and even processing of waste that has already reached landfill. Exactly how this is to be achieved without accepting sub-optimal and unhealthy working conditions is far from clear at this stage. Coupled with the ambitions for European urban mining then there is certainly a risk and a burden for workers to make the final gains that will generate a CE in the absolute sense.

The overall limitations of the CE as a means to profoundly act on waste, limit material intensity, and solve environmental challenges was expressed by both Joost and Martine:

Joost: *"I think the lie about the circular economy, a dangerous one, is that we can keep on doing what we are doing without actually changing anything about how much we are using. We have never really had to confront our personal choices and how much we use".*

Martine: *"People should realise that it is no longer possible to have new things all the time. We are still focused on buying new things and think that it is normal to have new stuff all the time, and we should realise that this is not sustainable. It's a hard message to get across to the public but we need to get used to a different lifestyle".*

6. Discussion and Conclusion

6.1. Circular Waste Management and Sustainable Development

The policy programme sets out the vision for a CE that can "play a part in removing the social and environmental impacts of our linear economic system and converting them into opportunities for sustainable economic growth" (Rijksoverheid, 2016: p. 39), which is an urgent and laudable motivation for the transition. A more circular system would remove a multitude of deficiencies for sustainability inherent within the linear system, especially around waste management. However a glaring concern remains the repeated ambitions for 'sustainable' economic growth which is an oxymoron of sorts and at odds with emerging consensus in sustainability science which doubts the ability for economies to grow sustainably through absolute decoupling and within planetary boundaries.

As a zero waste CE is generally impossible the Cabinet should decide what it understands by a 'fully' CE by 2050 as otherwise a 100% circular target may lead to wasted, even undesirable efforts. The current 20% of disposed waste in the Netherlands must be confronted and it is not clear how much of this will come from technological improvements in recycling and logistical restructuring to better channel residual waste streams towards new values. It is likely that some 'dirty' work will be required for post-disposal sorting – in other words waste that ends up on landfill will have to be sorted through mostly manual labour to reclaim recyclates that were not separated pre-collection. The likelihood of finding willing participants to this sort of work in the Netherlands is quite unlikely, and exporting this waste to developing countries is unacceptable if the Netherlands is be genuinely committed to work towards the SDG's on a global level. In addition to the dangerous work of chemical and electrical waste recycling that will increase in a CE, this sort of activity represents diminishing returns on the wider sustainability agenda the closer the country moves to 100% circularity, or zero waste. As a result the Cabinet should abandon the overly ambitious aim of complete circularity and instead develop policies and strategies that confront in the most effective ways possible for multiple sustainability targets – emissions reductions, the energy transition, social justice, and so on.

Does the circular transition represent a "paradigm shift" in itself, or have we as a society made the necessary paradigm shift to begin thinking and acting circular in our intuition? Progress has been made in the circular transition but in a fragmented, limited capacity – linear thinking is still all too engrained in society and in our behaviour. Does the CE then represent a 'rebrand' of sorts on the LE? Solely on the issue of WM this would be an unfair accusation to levy. The programme sets ambitious goals, such as the 50% reduction in raw material use, and would yield significant results on the problem of waste. It also promises to confront multiple stages of the value chain and to not just 'recycle-away' the problem of waste materials. In this way the CE represents a long-term solution for many environmental problems and with clear socio-economic advantages. However, exactly what it promises to be in relation to what it 'needs' to be is not conclusive. It is still a market-driven economy at its core that requires profit and value creation and, on a macro-scale, growth. This has at least partly led to a WM plan that, beneath its ambitions, still puts excessive faith in recycling or repurposing as routes to value creation, despite reference to "Refuse" and "Repair" as means to cut waste. Growth and consumption are the parameters that have fed the ranging environmental and social crises and, whilst a CE is certainly an improvement and a step towards sustainability, it is unlikely to be the whole solution. As such it is important to keep SD and SDG's at the core of socio-economic policy and to even update them as new urgencies become transparent. If the CE retains its original aims – as a way to sustainably and effectively manage resources – then it will play a vital role. But this must be alongside, and embedded within, multiple sustainability transitions. The CE must not replace SD as a guiding concept for sustainable societies, after three decades of contributing to social progress on the global scale. It must also not be manipulated as a mechanism for perpetual economic growth. Regardless of what is achievable on a circular level, the latter remains an impossibility and the former a social injustice. That said it does feel as if – merely five years on – that the SDG's may be losing their appeal as an operational framework for sustainability. Alongside the current pandemic, emerging economic limitations and the growing urgency around climate change, what was once considered possible and desirable is no longer guaranteed. In its place a substantial but practical and applicable framework may become the preferable instrument for instigating change. This at least partly explains the support for the CE in practitioner circles, and if substantive gains are made to the long-standing problem of waste then that is no bad thing. The CE is certainly a welcome and promising step towards genuine, tangible sustainability, but now is the moment for rigorous scrutiny.

6.2. Circular Economy and the Sustainable Development Goals

One of the opening statements in the government-wide programme is that it "also ties in with the policy to foster a healthy and safe living environment" (Rijksoverheid, 2016: p. 7) which indicates that positive social and environmental outcomes are expected, although no specific SDG's are referred to with regards to this particular objective. This may imply that the circular economy is not implicitly seen as a component the Dutch SD agenda by some actors, although later references to several SDG's in this report and others suggests this is not the case.

The programme sees the circular transition as contributing directly to:

> i) Promote continuing, inclusive and sustainable economic growth, full and productive employment and decent work for everyone

ii) Promote sustainable industrialisation and innovation
iii) Make cities and human settlements inclusive, safe, resilient, and sustainable
iv) Ensure sustainable production and consumption
v) Conserve and make sustainable use of the oceans, the seas, and maritime resources
vi) Protect biodiversity and ecosystems

(Rijksoverheid, 2016: p. 7)

The Cabinet additionally aims to create a "well-functioning market for secondary raw materials" (Rijksoverheid, 2016: p. 38), whilst acknowledging potential negative effects on raw material exporting countries (namely developing countries). There is also ongoing study of "potential barriers and undesirable effects of existing measures with regard to waste processing (e.g. waste from electronics, textiles, metal, and paper) to serve as a basis for the development of a circular economy in developing countries" (Rijksoverheid, 2016: p. 42). In light of the declining export income for many countries and their ongoing development pressures, the Cabinet is "committed to cooperating with countries that export raw materials and with countries that have large waste flows around rapidly developing cities on the basis of the so-called *"*mutual gains approach*"*, which aims to remove the negative social and environmental impact of our linear economic system and to convert it into opportunities for sustainable economic growth" (Rijksoverheid, 2016: p. 42).

The Cabinet must also consider some of the above effects in the Netherlands too if full circularity is to be achieved through a socially just transition. It is "important that everyone is able to profit from the economic, social and environmental benefits of the circular economy" (Rijksoverheid, 2016: p. 38), however the government programme has yet to incorporate genuine measures to maximise social inclusivity and utility and to ensure a just transition .

Interesting, the SDG's (since 2015) have not existed for longer than the CE programme in the Netherlands (since 2016) but already seem to have fallen out of favour as CE becomes easier to market to businesses and practitioners. Discussions with Mari highlighted how it is rather seen as a bottleneck in his department than a facilitator of other developments such as the CE. Perhaps SD having existed in discourse since 1987 has diluted its potency as a concept to inspire genuine action.

Regardless of some of these conflicts, however, the CE does remain linked to SD and the SDG's; at least in the conceptual sense. Different kind of linkages occurs: "direct-strong" linkages and "indirect" linkages of CE to SD progress, as well as progress on SDG´s that in turn allows for progress on CE.

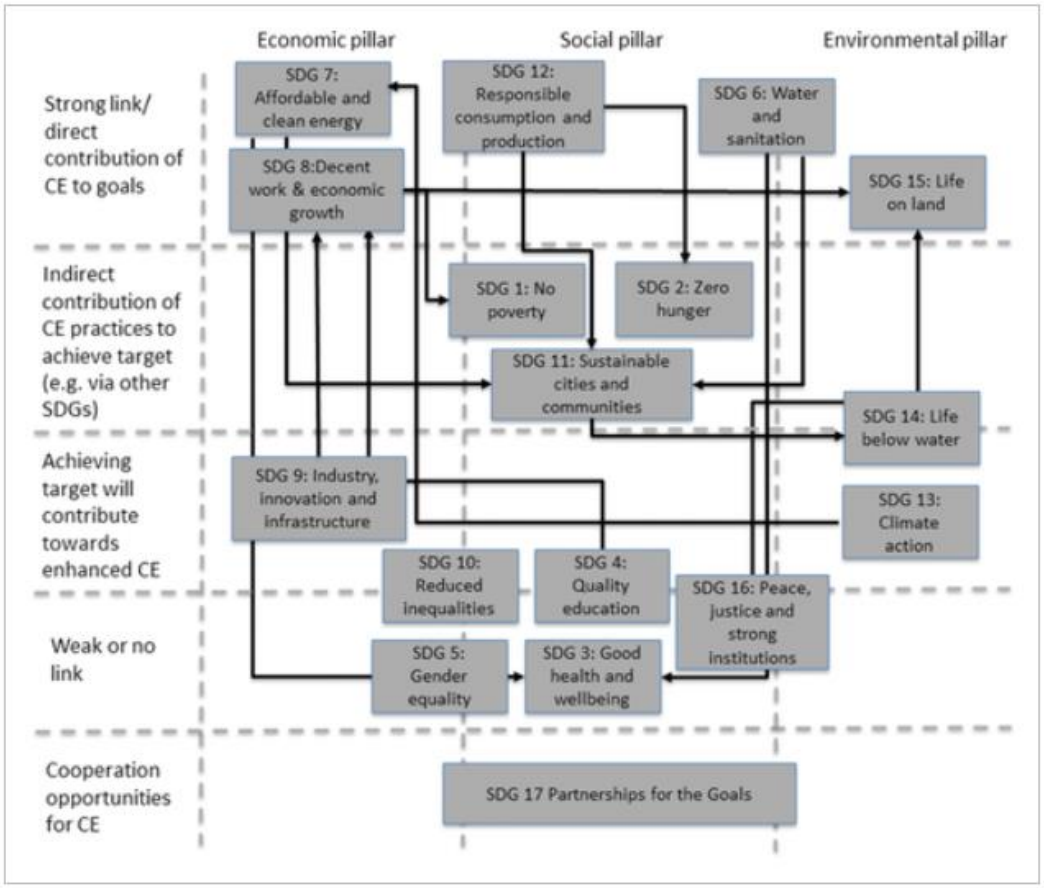

Fig. 11. An visual representation of the linkages between the SDG's and CE for the three pillars of SD – economic, social and environmental – and whether the linkages are weak, strong or none, and direct or indirect (Schroeder et al., 2019: p. 90).

Figure 11 demonstrates how, naturally, the goals that fall under an economic or socio-economic pillar are the most strongly connected to the CE and would see the greatest benefit from the CE. Contrastingly it is the predominantly social SDG's that have the weakest link to the CE, and would likely need to be addressed via a different (complimentary) sustainability programme. Providing that the transition to a CE does not diminish the SD programme in the Netherlands, there is a definite connection between the CE and the SDG's. What is also of interest is not just the contribution of the CE, but the relationship vice versa. If achievements within SD can be said to have enhanced the circular transition then continued work towards the SDG's can act as springboard to the CE and an accelerated transition can be expected for the future. For instance SDG 13 – Climate Action – through the energy transition can remove concerns over the energy intensity of waste processing and present recycling as a much more sustainable option than it already is. In relation to the converse relationship there is evidence that progress on the SDG's (those not directly related to CE) can benefit the uptake of CE practices.

In the strategies outlined in the '*LAP3'* and *'Towards an economy without waste'* is displayed both "hard" and "soft" governance strategies (Schroeder et al., 2019) that focus on infrastructure capacity building and productive partnerships. Whilst certain policy makers working on the strategy may not see themselves directly linked to the field of SD or the SDG's, the transition still has a distinct possibility of contributing to the goals and the government programme acknowledges this. However,

there is a risk that unless SD thinking remains embedded within government and its actors then a move away from strong sustainability in the CE becomes more likely in the future. It is not conclusive whether SD is seen as a sufficiently applicable model for the Netherlands, but rather a tool for development in the Global South. As Ardi suggested, it may be necessary that the SDG's themselves are updated in the coming years to reflect current priorities and possible limitations (e.g. economic growth, technological capacity), as well as the potential sustainability pathways to achieve (of which the CE would be one).

Conceptual developments of the CE have thus far come from think tanks, practitioners and academics in the Global North (Schroder et al, 2019) with few concrete developments for the Global South and what it would mean for them. However it is arguable that many developing countries are more naturally circular in their behaviour and could potentially follow a strategy for a circular transition, albeit not one facilitated by major infrastructural innovations spearheaded by large corporations. It could even be argued that the CE pre-dates 'official' conceptual beginnings – such as definitions coined by the EMF – with many indigenous communities practising such principles for decades. Whilst attempting to determine the 'true' origin of CE is not a worthwhile endeavour for this research, it does indicate that circularity has potential in the Global South and that communities may even be further along in the transition than their technologically developed Northern counterparts. As such, developed countries – NGO's, investors, practitioners – must be careful about any implementation plans they have for 'introducing' the CE and its concepts to the Global South. That said, one benefit of CE in the Global South could be to lend notions of legitimacy and competitiveness in the market to indigenous practices that have been edged out by modern, industrial techniques (Schroder et al., 2019). In this way CE becomes almost a branding mechanism in a similar way to "sustainable" or "fair trade".

A central factor that must be considered is a 'fair' and 'just' transition. Social elements should be consistently key for any country but represents possibly an even greater significance in the Global South due to the more pressing immediate needs and whether the CE economy can fulfil these without negative trade-offs. It seems unlikely that traditional methods could be genuinely circular if done with the intention to stimulate growth and for the purpose of widespread domestic consumption and export. Industrial intentions will therefore require at least some technology to keep resource intensity at a minimum. It is also essential to question who bears the burden of the 'dirty' work connected to the CE. The African Circular Economy Alliance was established in 2017, was borne out of the problem of the continent's e-waste burden, and attempts to tackle the impacts through EPR schemes (Berg et al., 2018).

6.3. Conclusion

This research attempted to understand, analyse, and ultimately scrutinise, the government-wide ambitions to transition to a CE in the Netherlands by 2050. Within this topic, WM arose as a suitable area of study due to the direct link to circular concepts, the variety of actors involved both directly and indirectly, and the established nature of the policy field which allowed for an investigation of relative changes. Crucially, the research aimed to determine alliances and differences of interests, ambitions and strategies amongst actors in WM policies as a result of the ongoing transition since 2016. This was achieved by analysing three core policy documents – *'A circular economy in the*

Netherlands by 2050', 'Towards an economy without waste, and the *'LAP3'* – along with a number of other reports, and interviews with a range actors who had responsibility to implement WM policies, an interest in processing, utilising, or preventing waste, or had expert knowledge on WM, the CE, or sustainability science.

Policy analysis clearly indicated that the government ambitions for a CE has been translated into a wide variety of policies covering five priority sectors of the economy – manufacturing, consumer goods, plastics, construction, and food and biomass – and focusing on major material flows. The primary actor involved in the transition is the government, with the elected Cabinet responsible for the main agenda, which is in turn influenced by the political agreement drawn up at the beginning of the term. Within government actions there are many interests in the CE. A variety of priorities and goals exist such as the energy transition, and ensuring a stable and productive economy. Meanwhile 'progress' towards the CE is not consistent across the nation at the regional and municipal level. This means there are 'conflicts' between governmental departments, between municipalities, and between priorities. Even within the CE there may be conflicts between priority sectors and material plans, whilst the WM system is only a component of the wider socio-economic system. All of this amounts to fragmented strategy for WM and inevitable trade-offs against other priorities and against the wider sustainability agenda.

As expected the government-wide programme made extensive references to waste throughout the programme and WM policies followed a waste hierarchy through the 9R imperative and WM plans for actor groups – producers, households, government, and waste processors. Furthermore the LAP has now been modified to account for the government ambitions and it has indicated how WM policies can contribute to the transition to the CE and how the CE itself can make positive contributions to solving challenges around waste. Within the WM sector few profound structural changes were reported, aside from law changes to domestic and private waste material classifications and new logistical innovations connecting residual waste flows. The most significant policy development in the *'LAP3'* was the focus on establishing a minimum standard around the waste hierarchy which aimed to both prevent waste and increase the supply of high quality recyclates. However several interview respondents expressed concerns that waste prevention – by tackling 'unnecessary' or 'excessive' consumption – was not featuring strongly enough in policy activities, despite direct reference in all three policy reports.

At the same time, a variety of business actors have their own interests for the CE that involves developing new business models to prevent excess waste or to utilise secondary raw materials. Within the private sector there are both frontrunners and laggards who are both stimulated and legislated against to varying degrees. Furthermore, the degree to which policy instruments can accelerate the transition is a contested area which forms possible policy pathways. In simple terms, the complete transition requires a breakdown of the LE and an uptake of the CE. A combination of strategies and policy instruments is required to achieve this, the balance of which is far from agreed upon. Meanwhile, preventing waste on a large scale by the widespread implementation of circular policies and practices is made problematic by the 'lock-in' of established linear actors and habits. Policy makers and citizen organisations are making efforts to impose stricter regulations and new standards on producers, such as EPR, but progress is currently slow.

Ultimately, for a concept with promising potential but limited policy foundation, maximising knowledge and observing diligent scrutiny is essential and thus far there have been insufficient studies connecting both practical and fundamental questions between offices of policy and science. It is hoped that this research and its finding will prove a valuable reference point when building the next stages of policy framework for the circular transition.

6.4. Final Remarks

Throughout this research it is clear that positive recent developments have sought to connect multiple crises/transitions within the Dutch political agenda. An example of this is an understanding of the role the CE could play in the fight against the climate crisis, which has generated a more unified effort towards the energy and circular transitions. Such holistic thinking is welcome and a necessary acknowledgement of these system complexities. However, one possibly overlooked aspect of these agendas is to go beyond the technological similarities to address the power structures that perpetuate both the LE and fossil energy. Fossil fuels are, of course, a principle foundation of the LE – the ultimate driver. Yet a switch to renewable energy systems once the technology becomes feasible is not so simple, in much the same way that a transition to circular production/consumption is not merely an issue of implementing greater material efficiency or better utilisation of residual waste streams. The CE – as an overarching socio-economic system – is perhaps even more complex than the energy transition, but both transitions involve a reckoning with power; social, economic and political power held within the hands of a tiny corporate minority. The Cabinet has already faced a legal challenge from major incinerators, but far more formidable economic players exist. Fossil fuel giants – the established dominant actors in the LE who were once instrumental in shaping 20th century landscapes – have now been joined (even superseded) by the superlative rise of technology companies as those with the means to dictate the parameters of society. Is it therefore logical to expect that these 21st century beacons of the LE would become willing allies in the circular transition? For some companies there is a financial incentive for better WM in their economic activities, but for others their colossal wealth cannot be derived from a model of conscientious consumption. Backed up through digital mega platforms, these linear stalwarts are endemically entrenched in the economy and, ultimately, society. It cannot be overstated that such oligarchic control represents a grave threat to the triple pillars of long-term economic stability, environmental health and social justice. Their individual and combined influence almost certainly cannot be challenged by the Netherlands alone, but if the Cabinet is serious about its commendable circular ambitions then it must be bold in its next step and have the resolve for what will inevitably be a protracted battle to redistribute economic power.

7. Recommendations to the Cabinet

In light of the findings during this research, the paper makes the following recommendations to the Cabinet of the Netherlands in order to develop its policy framework and transition to circular WM.

1. Reassess or define the commitment to a 'fully' CE. If a closed-loop system with zero waste is not feasible then establishing an 'acceptable' degree of circularity may be the most effective route forward.
2. Understand and utilise the limitations of the CE to develop sustainability alternatives for areas that the CE cannot provide solutions for, or sufficiently address.
3. Further distinguish between different types of waste in the vision. For example, in addition to legal classifications such "domestic" waste and "industrial" waste, it should be possible to capture waste streams that retain economic value and are salvageable, and those for which the minimum standard would be disposal or low-grade recycling.
4. Work to stimulate cooperative networks, and reduce competitive barriers, amongst private actors – particularly WM actors – in order to streamline and upscale new residual waste streams to be used in production.
5. Acknowledge the impact of the 'giants' of the LE – such as Fossil Fuels and Big Tech – that stand in the way of any meaningful transition and represent a bottleneck of their own.
6. Utilise combined influence of the EU to challenge actions of large actors whose activities infringe upon transitions to the CE.
7. Provide direct funding and support to citizen organisations, such as the Repair Café, who are already stimulating the CE at the community level.
8. Operationalise commitments to preventing waste into more rigorous policy measures.
9. Explore 'risks' associated with techno-economic 'lock-ins' relating to an economy that prioritises material 'reduction' and one that prioritises waste 'utilisation'.
10. Acknowledge the limitations of recycling as a strategy for WM and as a pathway to the CE. This may include the limitations of (particularly plastic) recycling for reducing total waste output, and the difficulties in ensuring optimum levels of (household) separation within the context of recyclate 'purity'/'contamination'.
11. Implement a large-scale public awareness campaign to promote circular WM amongst citizens and to better understand and integrate the 9R imperative into their daily lives.
12. Make upscaling circular business models, especially those that consider alternative modes of consumption and utilise more sustainable resources, a priority.
13. Explore policy pathways related to different transitions – state-led, market-led, technology-led, and citizen-led – to determine most effective pathways and also the potential for combination pathways.

8. Future Research

Research has mainly investigated state-led pathway of transformation with some reference to technology and market-led pathways. However future research should attempt to understand what the CE means at the community/citizen level - in terms of both grassroots initiatives for the CE as

well as consumer interactions with the CE. This will provide research to ensure a fair and just transition, and reveal drivers and barriers for consumer/citizen participation in the CE. Ultimately an effective transition, and therefore comprehensive approach to waste management, cannot happen without involvement of the citizen and/or consumer.

This also means research and experimentation into behavioural barriers/drivers for participation in the CE and changes to consumption. Behaviour change is already a core element of the government-wide programme and seen as a major driver of the circular transition. However currently it is more of a barrier and there seems to be limited progress in changing behavioural or consumption patterns. Therefore it is paramount that studies reveal how to (ethically) accelerate this change; such research would also be applicable for other areas of sustainability science.

Findings have begun to look at what a CE look like in developing countries. There is evidence of enthusiasm but it is likely to take a different path than wealthier nations with less emphasis on hard infrastructure or expensive technology. Furthermore it remains to be seen what the immediate impacts of a decline in raw material exports would do for their economies, and how this would measure against socio-economic improvements from better WM and the CE. Case studies should be able to reveal how circularity can be implemented at the local level as well as how it can be combined with the energy transition, for which there is surely much potential in the Global South. As a final comment, it is also of ignorance to assume that the transfer of knowledge would be one way. As already highlighted in this paper, many developing countries already have a far greater grasp of circularity than in wealthier nations and the Netherlands surely has much to learn in that regard – especially implementing circular initiatives at the community level.

This research has attempted an overview in light of the emerging policy field and has grouped together several sectors – manufacturing, plastics and consumer goods, which particular focus on the latter. For a more complete understanding the final two sectors of the government programme should be researched – construction and the bio-economy. Furthermore other angles should be pursued, such as focusing on individual material streams to see if the CE represents similar opportunities across the economy. Once a significant overview has been gained research should seek to accelerate and enhance the transition with particular reference to the core barriers presented. This may mean developing new circular business and consumption models amongst others. If it is accepted that the circular transition is an effective, and ultimately essential, sustainable transition then much more research needs to be done in order to firmly establish it in policy fields, develop cooperative business networks, and to involve citizens from the beginning.

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Appendix

1. Interview Outlines

1.1. Mari; Koen: Policy makers

1. What do you understand by the term circular economy? How would you define it in your own words?

2. “The programme streamlines and coordinates current policy paths” (2015 Dutch Framework). Does this mean that the core foundation for the circular transition is already there? What sort of examples of this can you give?

3. “The use of secondary resources needs to be supported by a regulatory framework for waste around a consistent material hierarchy” (2020 EU Framework). What exactly is meant by the ‘material hierarchy’?

4. Does ‘material hierarchy’ include raw materials? Is it preferable to use non-organic materials but with a greater circular potential, or bio-based materials that can be disposed and decompose after use?

5. Are other earlier commitments such as the EU-wide ban on single use plastics factored in to ongoing waste materials policies for a CE?

6. How are different priorities and contradictions balanced in policy?

7. How does ‘mainstreaming’ the circular economy work in practice? Is there any danger of diluting the more radical elements of it?

8. What is the EU “Partnership for the Circular Economy”? Is it mainly partnering goals, or partnership of actors?

9. Which groups of actors have mostly been involved in policy negotiations? How are these actors selected or brought in to policy discussions?

10. What has been the procedure for constructing CE policy? What has changed 5 years on from the first policy vision?

11. What exact policy initiatives or measures are you currently working on? What specific legislations have been introduced as a catalyst for the circular economy?

12. How are CE policies and developments in the WM sector funded? Does private funding necessitate any trade offs for the circular agenda?

13. How do the current legislations on waste promote or hinder the transition to more circular systems of waste management?

14. What role(s) does the WM sector play in the transition and in the ‘fully’ circular economy?

15. Have there been any legislative changes recently?

16. What do you see at the main benefits and outcomes of transitioning to a circular economy?

17. What are the main barriers that you are facing/believe you will face in implementing concrete policy measures/strategies?

18. What do you understand by the term sustainable development or sustainability?

19. How do you ensure that wider sustainability targets remain a core focus in government policy? (For instance the circular economy is, by definition, primarily an economic concept and cannot be a complete socio-economic model for a sustainable society).

20. Can an economic model that still promotes consumption at its core be fully compatible with efforts to radically reduce resource use?

21. Are there policy plans to reduce levels of economic consumption and/or alter the nature of consumption in the economy?

22. Have you experienced conflicting interpretations, motivations or applications of CE amongst different actors in policy negotiations?

23. Has this forced you to change or compromise on any aspect?

24. What are you hoping or looking to change/implement in the near future?

1.2. Joost: Barnebies

1. Tell me a little about you and your company's background and it came to be involved in Circular Economy and recent projects such as the Doughnut Economy in Amsterdam.

2. What is your understanding of the term Circular Economy? How would you define it in your own words?

3. How has Circular Economy been linked to your work? Is it something that connects many separate projects together?

4. When did the concept first become an element of your work and your thinking?

5. Which groups of actors (individuals, organisations, companies) do you work and connect with?

6. How are various actors incorporated into policy negotiations and who facilitates these discussions?

7. Who are the most important – or represented – actors currently implementing and negotiating the Circular Economy to your knowledge?

8. How does WM fit in to some of your projects?

9. Has thinking or approaches to this changed at all in recent years?

10. How do you consider or understand WM yourself?

11. How has the field of sustainability science influenced or guided your projects?

12. Are there sustainability scientists working for the organisation? Who do you consult with?

13. How do you see Circular Economy as a tool for Sustainable Development?

14. When making commitments to reduce waste and implement wider sustainability targets at the urban/regional scale within projects such as the Doughnut Economy, how do you incorporate material production processes that may take place in a separate location to their consumption?
    (Ie. Such visions are generally easier to implement on a local scale but Amsterdam is a global city with many imports and exports and an international population, how do you apply the notions of place and scale?)

15. Do you have ambitions or strategies for replicating Circular Economy and other sustainability concepts for developing countries?

16. The Doughnut economy is one such socio-economic model that attempts to balance the needs of society within ecological boundaries – how are the SDG's applied in practice to ensure contributions and minimise trade-offs? In reality compromises must exist?

17. What sort of complications or struggles have you so far encountered as you draw up the policy vision and begin to implement it? Any concerns you have?

18. Is there a widespread political and/or business support and will for a Circular Economy?

19. What would you most like to see change in the Netherlands or further afield in order to most effectively promote sustainability and/or Circular Economy?

1.3. Ardi: TNO

1. Tell me about the role and work of TNO and some of the ongoing research projects relating to circular economy.

2. When did you first become involved in the field of the circular economy?

3. How would you define the circular economy in your own words?

4. Has as your understanding of circular economy changed or progressed in recent years?

5. Have you seen the concept progress? E.g. in policy or practitioner fields?

6. Which groups of actors are you in contact or discussion with as you seek to accelerate the transition and develop the concept in policy fields and/or business circles?

7. Are there any particular theoretical discussions that guide your approach to researching and developing the concept?

8. Have you personally been involved in policy negotiations for a circular economy? What role do you take in these discussions?

9. Do you see or envision any particular debates or conflicts amongst actors as the circular economy is discussed in policy?

10. How are different contradictions and priorities balanced in policy discussions, or even your own research? Does TNO have its own interests or priorities relating to the circular economy?

11. What trade-offs may have to occur in the circular economy? For instance how do you balance a commitment to preventing waste at source with building an economy that utilises (and therefore possibly relies upon) 'waste'?
    E.g. is there a risk of lock-in dependency on waste material streams in the economy?

12. What are the main barriers in the transition, particularly for waste management?

13. What are the most significant current and recent developments in transitioning to a circular economy? E.g. legislation, technology, logistics

14. Is there a plan or a framework to connect R-imperatives for WM to material cascading for particular materials and/or sectors?

15. How do you think the circular economy can contribute to sustainable development? E.g. towards particular SDG's?

16. How are non-economic aspects accounted for in a circular economy? E.g. social justice, equality, inclusion and so on?

17. Do you see wider sustainability targets remaining a core area of government policy amidst the (growing) focus on circular economy?
    (For instance the circular economy is, by definition, primarily an economic concept and cannot be a complete socio-economic model for a sustainable society).

18. Can the circular economy be used as a tool for development, particularly social, in the Global South? Or does it require a certain infrastructure and/or development foundation to build from?

19. Are there any potential negatives for the Global South from the circular economy in developed nations? E.g. burden of waste separation, reduced exports.

20. Where do you think the circular economy fits into academic and political discussions about sustainable development or sustainable transitions? E.g. is it a tool for sustainable development, a component of a sustainable society or something different entirely? (Has it maybe even replaced SD in a sense?)

21. Can an economic model that still promotes consumption and possibly growth at its core be fully compatible with the necessity to radically reduce resource use?

22. Would you advise policy measures that reduce levels of economic consumption in absolute terms and/or alter the nature of consumption in the economy? E.g. are degrowth strategies viable solutions?

23. Are you optimistic about the progression and transition to a circular economy?

24. Is there any change or progress related to circular economy or sustainable development that you'd most like to see? E.g. in the Netherlands or further afield?

1.4. Wim: Wageningen University

1. When did you first become involved in the field of the circular economy?

2. How would you define the circular economy in your own words?

3. How has your understanding of circular economy changed or progressed in recent years?

4. Have you seen the concept progress? E.g. in policy or practitioner fields?

5. Who are you in contact or discussion with as you seek to promote the concept in policy fields and/or business circles?

6. Are there any particular theoretical discussions that guide your approach to implementing CE in policy fields? E.g. Actor-oriented theory?

7. Have you personally been involved in policy negotiations for a circular economy? E.g. As an advisor or through an organisation?

8. Do you see or envision any particular debates or conflicts amongst actors as the circular economy is discussed in policy?

9. What trade-offs may have to occur? For instance how do you balance a commitment to preventing waste with building an economy that utilises (and therefore possibly relies upon) 'waste'?
   E.g. Is there a risk of lock-in dependency on waste material streams in the economy?

10. How do you think the circular economy can contribute to sustainable development? E.g. Generally or towards particular SDG's?

11. How are non-economic aspects accounted for in a circular economy? E.g. social justice, equality, inclusion and so on?

12. Do you see wider sustainability targets remaining a core area of government policy amidst the focus on circular economy?
    (For instance the circular economy is, by definition, primarily an economic concept and cannot be a complete socio-economic model for a sustainable society).

13. Can the circular economy be used as a tool for development, particularly social, in the Global South? Or does it require a certain infrastructure and/or development foundation to build from?

14. Are there any potential negatives for the Global South from the circular economy in developed nations? E.g. burden of waste separation, reduced exports.

15. Where do you think the circular economy fits into academic and political discussions about sustainable development or sustainable transitions? E.g. Is it a tool for sustainable development, a component of a sustainable society or something different entirely? (Has it maybe even replaced SD in a sense?)

16. Can an economic model that still promotes consumption at its core be fully compatible with the necessity to radically reduce resource use? E.g. Jeevon's paradox?

17. Would you advise policy measures that reduce levels of economic consumption in absolute terms and/or alter the nature of consumption in the economy? E.g. Are degrowth strategies viable solutions?

18. Are you optimistic about the progression and transition to a circular economy?

19. Is there any change or progress related to circular economy or sustainable development that you'd most like to see? E.g. In the Netherlands or further afield?

1.5. Jorn: Seenons

1. What do you understand by the term circular economy?

2. What do you see as your role in the circular economy?

3. How have your business activities changed or developed in recent years?

4. Are there any specific policies or legislation that has caused you to change your activities?

5. Do you receive any funding or support to promote the circular economy in your activities?

6. Have you been involved in policy negotiations relating the government ambition for a circular economy and new waste management policies?

7. Which sort of industries do you collect and recycle waste for?

8. Are you involved in logistical efforts to connect residual waste streams to producers as a secondary raw material? Which industries are particularly interested in this?

9. Do you encounter any resistance around improving waste management and preventing the production of waste?

10. Are there competing interests amongst actors you work with around ambitions to transition to the circular economy?

11. What challenges do you face in your efforts to become circular or help the circular transition? What needs to change in order to remove these barriers?

1.6. Martine: Repair Café

1. What made you start the Repair foundation?

2. What do you understand by the term circular economy?

3. Do you see the government ambitions and recent policies as accounting for all aspects of the circular economy?

4. How do you regard your activities with the Repair Café within the circular transition?

5. Do you see a more complete approach to waste management since the circular ambition or in recent years?

6. What recent developments have occurred in terms of policy around repairability and tackling excessive consumption?

7. What challenges do you encounter as you campaign for these issues?

8. As a grassroots organisation are you involved in policy discussions or negotiations around the circular economy?

9. How do you increase support and interaction with the circular economy amongst citizens? Do you see that it is sufficiently represented at the citizen level?

10. What are the greatest barriers to the circular economy and what developments need to happen?

2. Policy Summaries

2.1. *'A circular economy in the Netherlands by 2050'* (2016)

Sector Plans

The three tables below summarise the main points made in reference to the three priority sectors that will be analysed in this research – plastics, manufacturing and consumer goods. This includes – where specified in the programme – the main strategies, goals, and actions, as well other important notes relevant to WM policy.

Plastics

Table 5. An overview of the priority sector strategy plan for plastics, as per the government-wide programme.

Strategies	**Notes**
i) "Plastics products are designed in such a manner as to enable reuse and high-grade recycling after being discarded" ii) "Plastic materials in value chains are utilised as efficiently as possible, which would lead to a reduction in the need for raw materials and the prevention of "leakage" in the system" iii) Optimisation of the renewable use of plastic material flows, by large-scale usage of plastic recyclates and biobased plastics, making use of biodegradable plastics in specific situations in which such plastics have added value for the circular economy (more effective joint processing with biotic residues	-In Europe 40% of all plastics are used for packaging (p. 49) -In 2012 only 34% of all plastics were recycled which rose to 42% in 2014 and there was a target of 52% which was achieved. The Netherlands currently recycles 50-60% (europarl.europa.eu) -Circular economy for plastics will involve 100% renewable (recycled or bio-based) plastics by 2050. This will mean no incineration or export of plastic waste. -'There is now a "solid market" for recycled plastics'. -Network of more than 90 parties across plastics value chain have agreed to the 'Value chain Agreement on Plastic Cycles' in order to share knowledge and innovation over plastics and to connect material streams for plastic reuse and recycling (p. 51). -Action to stem the flow of single-use plastics in the Netherlands began in 2016 with the ban on free carrier bags,

pollution risks for the marine environment) (p. 51)	whilst the EU-ban on all single-use plastic will begin from 2021. -'Plastics are also incorporated into the European Ecodesign Initiative to increase use of plastic recyclates and promote upcycling, longer shelf lives, and improved repairability of plastic products' (p. 52). However there is a wider debate over what is the most desirable course of action over plastics. Should higher quality, more durable and easily recycled plastics be used? Or should bio-based but non-recyclable materials be used instead? An important thing to remember is that bio-based plastic does not mean decomposable 'plastic'. -'Innovations aimed at returning plastics into the cycle at the highest level possible will be permanently fostered throughout the plastics value chain through the network set up under the plastic cycle value chain agreement' (p. 52). The danger here is that the products and materials used (plastic in some form) are not actually altered such that a plastic lock-in of sorts remains. Plastics cannot be upcycled and recycled forever and will eventually be discarded as waste once they lack the integrity. In this way 100% circularity is not viable for a production system that still depends on plastics. -'An important point of attention with respect to closing the loop is mutual confidence in the product supply chain' (p. 52). One problem that remains is that at some point the supply of high quality recyclates may diminish. At this moment there is no shortage of plastic waste, but if virgin plastics stop being produced then this may not always be the case. -Manufacturers marketing packaged products pay a fee to the Packaging Waste Fund which is used to pay collection and recycling costs. This tax could be adjusted to promote packaging that uses recycled plastic/renewable materials and provide a financial incentive for companies to seek out better alternatives for their packaging. However the levy would need to be significant to account for the current imbalance between the costs of virgin vs recycled plastics.

Manufacturing

Table 6. An overview of the priority sector strategy plan for manufacturing, as per the government-wide programme.

Strategies	Goals	Notes

i) “Shift from critical raw materials such as metals and minerals to generally available raw materials”. ii) “Increasing efficiency and high-grade sustainable reuse of metals and minerals in all steps of relevant value chains”. iii) “Developing new ways of producing and consuming”. iv) “Bundling public and private demand for circular products and services”. v) “Shift from fossil to renewable raw materials”. (p. 56)	i) “By 2020, 50% of the businesses must be aware of the risk and opportunities involved in metals, and have taken steps towards circularity”. ii) “Development of promising business models focused on energy-intensive products with circular potential and substantial export prospects”. iii) “The Netherlands takes initiative for EU approach regarding risk management of the supply of several metals by sustainable extraction”. iv) “Meeting material needs by national and international reuse” v) “Boosting the EU Raw Materials Initiative (RMI) which comprises: access to raw materials in international markets; sustainable mining in Europe; raw materials efficiency and reusable materials through recycling” vi) “Development and implementation of a pilot involving e-waste as an existing urban mine” vii) “Development and implementation of a pilot involving new sustainable urban mines in collaboration with the maritime sector” viii) “Implementation of a strategic track with	‘A source of concern is that most businesses pay relatively little attention to the topic of supply security and the role a circular economy could play in this respect. This calls for raising awareness and new revenue models that reduce dependency on raw materials and thus the environmental impact’ ‘The Cabinet is advocating a gradual development towards a high-quality circular manufacturing industry, in which the demand for (scarce) raw materials is met by raw materials from the value chain wherever possible’ - There remains a lot of work to build the European raw materials infrastructure that will accommodate the growing demand for metals and minerals ensuing from the energy transition -The Cabinet sees a geopolitical and a medium-to-long term economic incentive for circularity in manufacturing due to the scarcity of raw materials such as metals and minerals. ‘A source of concern is that most businesses pay relatively little attention to the topic of supply security and the role a circular economy could play in this respect. This calls for raising awareness and new revenue models that reduce dependency on raw materials and thus the environmental impact’ (p. 54). -‘The Cabinet is advocating a gradual development towards a high-quality circular manufacturing industry, in which the demand for (scarce) raw materials is met by raw materials from the value chain wherever possible’. -This refers to the concept of ‘urban mining’ to utilise the pool of high quality scarce resources already in circulation or that have been discarded. However, it is not clear where such ‘value chains’ are sought. If the dependency remains on developing countries to bear the burden of sorting and recycling industrial and e-waste then this insufficiently reduces the

	businesses and knowledge institutes involved, aimed at a long-term strategy for raw materials supply security" ix) "Green Deals to be concluded with sectors and value chains that are vulnerable in terms of supply security" (p. 57)	geopolitical insecurity related to these materials, whilst also placing an even greater socially unsustainable and unethical burden on countries to secure circularity for the Netherlands. -There remains a lot of work to build the 'European raw materials infrastructure' that will 'accommodate the growing demand for metals and minerals ensuing from the energy transition' (p. 54), as well as a lot of work to ensure the health and safety of such work that has generally been outsourced to African and Asian countries until now.

Consumer goods

Table 7. An overview of the priority sector strategy plan for consumer goods, as per the government-wide programme.

Goals	**Action Areas**	**Actions**
i) "By 2020, the annual volume of household residual waste will be a maximum of 100kg per capita; by 2025 the maximum will be 30kg per capita per year". ii) "By 2022, the volume of residual waste from companies, organisations, and governments that is comparable to household residual waste will be halved to 1Mton, compared to 2012 figures". iii) "By 2025, citizens and companies will use consumer goods in such a manner as to allow them to remain in the cycle; not littering will have become the standard". (p. 63-64)	i) "Applying behavioural knowledge for consumer action perspective" ii) "Domestic waste reduction" iii) "Value chain approach" iii) "Implementation of ICSR covenant on sustainable clothing and textiles" iv) "Non-domestic waste reduction" v) "National Litter Policy" vi) "Framework agreement on Packaging" vii) "More and better recycling" viii) "Prevention and removal of litter in water" (p. 65-66)	i) "Wider deployment and expansion of behavioural knowledge" ii) "Promoting sharing, reuse, and repair among residents" iii) "Optimising consumer goods product value chains" iv) "More effective collection and return systems" v) "Improved sorting and processing systems" vi) "High-grade use of recyclates" vii) "Action on disposable products" viii) "Waste Fund Foundation" (p. 67-68)

Consumer Behaviour

- One of the significant barriers to circularity in consumer goods is the behaviour of consumers.

- Changing consumer behaviour is vitally important, with special attention focused on waste prevention. Such behaviour forms part of an overall approach to product value chains, which run from design and production up to an including discarding and recycling.

- *"It is important for consumers to realise that waste has value and can be reused if properly used and discarded…the message of efficient and effective use of raw materials must be disseminated and embraced on a much wider scale"* (p. 67)

- In the Sustainable Action project, the Ministry of Infrastructure and the Environment aims to enhance the "appeal, relevance, and accessibility of sustainable choices for consumers" (65).

- Dutch Scientific Council for Government Policy and Ministry for Infrastructure and the Environment have sought to engage in behaviour change.

- Together with manufacturers and municipalities, *"the Cabinet aims to encourage reuse by updating second-hand and giveaway shops, and reinforcing the repair and restoration through, for example, repair cafes"* (p. 67).

- However the government is reluctant to impose too much legislation that limits choices and freedom and, as such, it is unclear to what degree or how quickly these shifts will be made whilst the option still remains to make unsustainable choices. This is especially true for companies, with limited indication of how unsustainable products will be taken off the market without strong legislation.

- It is commendable that the programme seeks to make comprehensive change across all areas of the economy over the next 30 years, but this sector remains the most vague with little indication as to how these mind-sets (which forms a substantial element of what is required) are to be changed without legislation that obliges it.

Waste and Materials

- Households still produce an annual average of some 250kg of residual waste per capita. The 100-100-100 project wants to cut this by 90% to 25kg per capita per year by 2025, which is certainly ambitious.

- By 2022 volume of residual waste from companies, organisations and governments must be halved from 2 megatonnes to 1 megatonne.

- ‘Domestic Waste implementation programme’ – stakeholders are working on the material and financial closure of product value chain loops, and the optimisation of material and product flows. This value chain targets consumer goods from domestic and similar waste such as nappies, textiles, mattresses, and plastics.

- The Cabinet will explore cost-effective ways to upcycle valuable streams from foreign household and commercial waste that is currently incinerated in the Netherlands.

- Parties of the Packaging Framework Agreement are *“investing towards a sustainable packaging value chain, improving the collection and recycling of packaging waste, developing innovative return and processing systems, and initiating clean-up activities”* (p. 66)
- Sustainable packaging is developed through “*Sector sustainability plans”.*

- ‘*More and Better Recycling Covenant*’ parties are *“jointly working on the promotion of sustainable innovations in WM and recycling, focused on quality and reducing the environmental burden, in particular in the field of waste separation and collection, on increasing the cost-effectiveness of sorting processes, and on high-grade recycling”.*

- The *VANG Domestic Waste* value chain approach will be expanded to include similar commercial waste. *“The intention is to have relevant consumer goods value chains closed, in terms of materials and funding, by 2025. In addition to material and financial aspects, the value chain loop closure process will also pay attention to ecological and social (multiple) values”*

- *“The Cabinet is going to devise a method, together with producers, municipalities, and the waste and recycling sector, for the introduction of a univocal and efficient collection system for both domestic and commercial waste. This must enable consumers to dispose of their waste separately “anytime and anywhere”’* (p. 67).

- The Cabinet will encourage municipalities and waste collectors to make increasing use of “*innovative tenders”* (waste contracts) to improve the efficiency of sorting and processing systems. On this approach *“Circulus-Berkel BV and Midwaste successfully challenged sorting companies to raise the percentage of sorted plastics from 50% to over 90%”* (p. 68).

- *“The Cabinet intends to set down and make agreements on the proportion and quality of recyclates for the relevant product value chains, together with the waste and recycling sector and the producers. Recyclates must be able to compete with primary material on the market (through consistent quality, quantity and price)”* (p. 68).

2.2. *‘Towards an economy without waste’* (2020)

Statement on transition to a CE within the political agenda:

> *"With the commodity agreement, transition agendas and the implementation program there is the established a basic structure in recent years. Efforts have been made to develop further monitoring, creating support and stimulating (international) cooperation. In the Rutte-III Coalition Agreement, the ambition is towards a circular economy linked to the climate challenge"* (Rijksoverheid, 2020: p. 7).

Table 8 below provides an overview of the three "variants" explored the policy report and includes what are regarded as the most significant points of interest with implications for the research question. The table is created by the author, whilst content is directly referenced from the report.

Table 8. An overview of the three variants that the report assesses, summarising approach, effects, performance expectations, and budget requirements. (Rijksoverheid, 2020: p. 57-60).

	Variant 1A	*Variant 1B*	*Variant 2*
Approach	"Impulse through facilitation and stimulation"	"Impulse through regulation and pricing"	"Combination"
Description	"Measures aimed at stimulating innovation for building circular structures, facilitating business and the scaling-up of circular initiatives and activities". "Frontrunners draw the rest of the business community along". (p. 13)	"Measures aimed at regulating production levels of waste sectors and the pricing of environmental damage". "Measures have a generic approach where environmentally polluting activities are discouraged through pricing and regulation". "Gives producers more incentives to encourage them to switch to circular trading". (p. 14)	"On the one hand, innovation and knowledge building are stimulated and on the other hand environmental damage is priced and environmentally polluting activities and structures phased out" "The phasing of measures is extra important. By timely issuing new regulations, levies or standards, businesses can adapt and pre-sort accordingly". (p. 16)
Effects	"Obstacles in knowledge and innovation are largely removed, plus economic obstacles in part. Increases the likelihood that economic opportunities related to CE innovations are	"The measures in this building block variant focus on the conversion and dismantling of existing systems". "Pricing environmental damage and imposing	"From an international point of view, the Netherlands is taking on a leading role in the field of circular economy. The knowledge and innovation position of the Netherlands will be increased where the

	seized". "Focus on new investments in high-quality recycling". "The knowledge and innovation position of the Netherlands makes it more attractive for entrepreneurs and existing companies to invest in or get started with circularity". "The main economic barrier (unpriced environmental damage) will not be tackled and so limited progress can be expected on the phasing out and conversion of the LE". "The expectation is that a transition to a circular economy will take place less quickly because the measures in this variant are non-binding in nature". "There is little incentive for the so-called front runners to also get the rest of the business community on board". "The burdens / obligations for citizens and businesses will not be increased". (p. 13)	standards becomes a bigger part and businesses are encouraged or forced to switch more quickly to environmentally friendly techniques and business processes". "Economic impediments are mainly removed through taxes on raw materials, air emissions and incineration of waste and via rules and standards on recyclable waste and waste separation". "Circular procurement by governments becomes more mandatory". "Stricter circular requirements and standards can, indirectly, lead to innovation and better product design". "Price incentives can ensure that [circular] techniques are implemented more quickly. More innovation is needed in areas such as recycling". "What is already there must be taken into account, but also what cannot be supplied by the market". (p. 14)	businesses can benefit from this nationally and internationally". "Through more regulatory and normative action is also taking place, the transition to the CE is accelerated". "On the other hand, companies are supported to make this turnaround through subsidies and tax options and by further expanding networks and knowledge for creating good business models'. "By paying attention to behavioural aspects and focusing on supporting sustainable behaviour of the citizen/consumer, circular action is made easier. This requires customization to serve different groups in society'. 'Within the government, acceleration expected on circular procurement". (p. 16)
Performance	"Measures provide a total overview of stimulating and facilitating. There are choices to be made, for	"Measures provide a total overview. This means that there are choices that can be made, for example	"Measures require more implementation costs and subsidy development, setting up schemes and expanding networks.

	example in drawing up new subsidies versus further expanding existing subsidies. Choices can also be made about the extent to which, and with what budget, a measure is deployed". "Measures require policy implementation costs for subsidy development, setting up or expanding schemes and building networks. Little additional enforcement costs are involved". "By combining the measures with 1B, a balanced policy mix can be achieved, one of which greater effect will be made". (p. 13)	between the introduction of a tax or a standard and the phasing thereof". "In the choice of measures the position of Dutch companies within the European / international playing field is an important point of attention". "It is therefore important that these measures are introduced in phases and sufficiently in line with developments within the EU". "Circular trading also requires different transaction flows between companies and parties where regulations have not yet been adapted in all cases". "Tax measures require further investigation according to the most suitable size and design, feasibility and enforceability". (p. 14-15)	Moreover, these measures also incur implementation and enforcement costs by carrying out taxes, standards and regulations". "Since this variant is a maximum combination of building block variants 1A and 1B, this requires an explicit investment in the implementer and personnel capacity at the national government and at implementing organizations". "It should be examined whether the national measures comply with the European legal preconditions and/or there is no state aid". "There may be some overlap between measures". (p. 16)
Budget (€millions per year)	**2021**: 101-114 **2025:** 214-295	**2021**: 11 **2025:** 20	**2021:** 118 **2025:** 307

There is also a third variant – the "Savings Variant" – that is discussed whereby circular policies are completely disbanded. This variant will not be discussed in detail but it should be noted that that the projected savings from this variant amount to merely €1.8-3.6million (a fraction of the budgets for the other three variants) and indicates some of the wider environmental and socio-economic costs to the government of not pursuing circular policies. It may even be the case that if these budgets/savings were projected beyond 2025 that savings would be negative, when all else is considered. It should, however, not be disregarded that there will be at least some shrinking of the

budget after the next election – or a preference towards regulation over stimulation – in light of the current financial costs of the coronavirus prevention measures and their negative economic impacts.

2.3. *'LAP3: National waste management plan'* (2017)

2.3.1. 'General policy'

The twenty core goals are presented as:

> *"1. Where possible, removing obstacles that entrepreneurs experience with furnishing their production processes for the benefit of a circular economy and the reuse of their residual flows.*
>
> *2. Halving the amount of Dutch waste leaving the economy in 2022 by waste incineration plants and/or landfills compared to 2012. In 2012 this concerned almost 10Mton.*
>
> *3. Creating a hotspot for the circular economy in the Netherlands in 2020.*
>
> *4. Raising awareness among households and companies of their waste production and what happens to the waste in the chain.*
>
> *5. Encourage producers to make more sustainable and preferably circular products that are easier to repair and recycle.*
>
> *6. Where possible, closing chains in consultation with chain partners and others stakeholders to identify the opportunities and obstacles, to arrive jointly at formulate a desired final vision and actions to deal with the stakeholders from the current situation towards the desired image.*
>
> *7. Within chain projects, ensure greater transparency in quality and quantity of secondary raw materials offered and requested.*
>
> *8. Increase the share of waste separation (fine and coarse) household waste by 52% in 2014 to at least 75% in 2020. Waste separation here refers to both source and post-separation.*
>
> *9. Encourage prevention of household waste, such that production has decreased from 500 kilograms (fine and coarse) household waste in 2014 to a maximum of 400 kilograms per resident per year in 2020.*
>
> *10. Decrease the amount of household residual waste of 240 kilograms per inhabitant per year in 2014 to a maximum of 100 kilograms per inhabitant per year in 2020, and a maximum of 30 kilograms per capita per year by 2025.*
>
> *11. Halving the amount of Dutch residual waste from companies by 2022 compared to 2012, organizations and governments that are comparable to household residual waste.*

The covenant *'More and better recycling*' already sets the following goals:

> *12. Stimulating high-quality recycling on the basis of a clear and widely supported approach definition and methodology.*

13. Stimulating sustainable innovations in waste management and recycling, focused on quality and reduction of environmental pressure.

14. Increasing the efficiency of sorting processes allowing more material for (high-quality) recycling becomes available.

15. Environmentally responsible removal of unnecessary legal obstacles regulations that prevent more and better recycling.

The government's response to the Transition Agendas has set the following ambition:

16. Reduction of 1Mton CO 2 in 2021, to be achieved by circular procurement by all governments.

For the management of specific waste, the Netherlands has the following quantitative and qualitative LAP3 waste targets:

17. Encourage prevention of waste, such that it reached in the period 1985-2014 decoupling between the development of the Gross Domestic Product (GDP) and the development of the total waste supply is being reinforced. This means that the total waste supply in 2023 may not exceed 61Mton and in 2029 must not exceed 63Mton.

18. Increase the share of preparation for reuse and recycling of the total waste from 77% in 2014 to at least 85% in 2023.

19. Increase the share of preparation for reuse and recycling of construction and construction demolition waste from 92% in 2014 to at least 95% in 2023.

20. Increase the share of preparation for reuse and recycling of industrial waste from 81% in 2014 to at least 85% in 2023."

(Rijksoverheid, 2017: p. 24-25).

Social Dynamic

The policy acknowledges that waste management is a social utility function that is indispensable with significant implications for environmental and human health. It does however state that, whilst it must ensure the function is completed and is accessible, it is not required that the government carries it out directly. Much of waste collection and disposal is in private hands in the Netherlands.

The municipality remains responsible for household waste collection – via private companies – and enters into negotiations and contracts on behalf of the citizen. Landfill must be kept to a minimum and is preferably not necessary when striving for a CE. However it is still a function that must be well arranged in terms of minimising environmental harm.

Stimulation & Innovation

Policies aim to support innovations that make the transition to a CE.

i) "Limit the use of (primary) raw materials and/or (preparation for) stimulate reuse
ii) Lead to increased use of recyclates".
iii) "Ensure that materials or waste that are still incinerated (both as disposal and recovery) or sent to landfill are instead recycled".
iv) "Ensure that preferred recycling gets off the ground for materials that are of less high quality or not recycled at all".
v) "Aim to limit emissions or energy consumption without involving less recycling or reuse when stimulating innovations with instruments specifically from waste management and/or the environment".

(Rijksoverheid, 2017: p. 44)

Within the implementation programmes *'VANG-household waste'* and the *'More and Better Recycling'* covenant – which are components of the government-wide CE programme – "chain parties" work together to close chains. A chain is the "route that a raw material passes through from product through to disposal and recycling to reuse as a recyclate in a new product" (Risjksoverheid, 2017: p. 58).

The approach to the chains consists of the following steps:

1. "Chain analysis, description of the chains and bringing together the parties involved".
2. "Drawing up a shared wish and concrete and practical goals for 2025".
3. "Establish a work plan with related actions in which the participating chain parties commit themselves".
4. "Execution of chain agreements and monitoring and evaluation of the results"

(Risjksoverheid, 2017: p. 58

The following points of attention apply to the selection of chains:

"1. Impact on the environment and volume of waste;
2. "Opportunities for innovation and economic development that can make a substantial contribution to the transition to a circular economy;
3. "Need for improvement of the chain economy: both value of chains, the opportunities for value creation through chain closure as waste processing costs;
4. "Chain dynamics from politics in Europe and the Netherlands and society (citizens, organizations and business);
5. "Current practice of collection and processing, support and financial feasibility".

(Rijksoverheid, 2017: p. 58)

Policy Instruments & Legislation

Medium-based financial instruments – municipal waste tax and environmental tax
Targeted instruments – rate differentiation of waste tax, cost-cutting subsidies, deposit schemes and financial compliance incentives.

When considering whether Extended Producer Responsibility (EPR) is a suitable instrument for a waste stream, play the following criteria a role:

"1. The possibility of checking products during the waste stage

2. The possibilities to reduce the environmental impact of a product throughout the chain
3. Present incentives for waste treatment
4. The availability of alternative policy instruments
5. Political priorities".

(Rijksoverheid, 2017: p. 62).

Within the scope of EPR as a tool for circular WM, the policy indicates that:

> "*Before a decision can actually be made on producer responsibility a more detailed research is a suitable policy instrument for a particular waste stream of the waste flow and consultation of the stakeholders. When introducing producer responsibility for a new waste, is not just looked at whether producer responsibility is an appropriate instrument, but also whether the scope of the producer responsibility tool should be adapted and / or extended"* (Rijksoverheid, 2017: p. 66).

2.3.2. 'Towards a circular economy'

This section of the '*LAP3'* is used to highlight how the policy framework can be used to make the transition to the CE. The first section of this policy outlines the sector plans that have already been summarised in detail above. It also goes into further detail on the agreements introduced in the government-wide programme summary – the *'More and better recycling covenant'* and the *'Public waste framework'.*

The goals of the public framework are the material and financial closing of product material chains for various components from household waste through:

i) "Less waste production through smart design of products and packaging";
ii) "More reuse of raw materials through better separation and collection";
iii) "No higher costs for citizens as residents and taxpayers";
iv) "Consistent application of the principle of profit and polluter pays principle for producers and consumers";
v) "A transition path and pace that is feasible and affordable for everyone involved".

Finally, some examples are given of how the LAP contributes to the CE:

i) "The instrument minimum standard is ideally suited to push stragglers in the right direction and prevent a decline to lower-quality processing taking place";
ii) "The described policy with regard to international transport of waste means that (in principle) certain innovations are protected and stimulated";
iii) "By properly assessing whether a material is a waste or not, restrictions on waste regulations will lapse when they are not needed, but will continue to apply when this is desirable for control of flows or protection of the environment. The LAP elaborates the distinction between waste or non-waste policy";
iv) "The presence of substances of very high concern (ZZS) in products is an important point of attention in the transition to a CE. There is not always an unacceptable risk to people and the environment when waste is recycled with ZZS. The LAP contains an elaboration of how the Netherlands deals with this problem".

2.3.3. 'Waste prevention'

Circularity measures that lead to waste prevention are:

> ***"Refuse**: preventing the use of raw materials;*
> ***Reduce**: reduce raw materials;*
> ***Redesign**: better design;*
> ***Re-use**: product reuse (second-hand use, parts of products);*
> ***Repair**: maintenance and repair;*
> ***Refurbish**: refurbishing the product;*
> ***Remanufacture**: making new products from (parts of) old products;*
> ***Re-purpose**: product reuse with a different purpose".*

(Rijksoverheid, 2017: p. 91).

The national commitment to waste prevention was laid down in 2013 in *'The waste prevention programme in the Netherlands'*: better design - less waste - smarter consumption.
The Netherlands has opted for this as a separate program and not to be included in the National WM Plan.

> *1. Stimulating prevention of waste through decoupling between the development of the Gross Domestic Product and the development of the total waste supply. This means the total waste in 2023 must not exceed 61Mton, and in 2029 must not exceed 63Mton.*
>
> *2. To encourage the prevention of household waste, such that production has decreased from 500kg (fine and coarse) household waste in 2014 to a maximum of 400kg per resident per year in 2020.*

The aim is to prevent waste in the entire economy, that is, during extraction of raw materials, during the production process and distribution and during use and reuse of products.

General policy covers:

> *i) Product design*
> *ii) Repair and disassemble*
> *iii) Natural capital and critical raw materials*
> *iv) Waste less (focusing on unnecessary loss in the production and marketing of goods)*
> *v) Consciously consume*
> *vi) Financial instruments and market incentives*
> *vii) New business models*

2.3.4. 'Actor plan'

Businesses (excluding waste processors)

"In all business processes there may be possibilities for the generation of waste and the reduction – direct or indirect – in the use of raw materials or for existing raw materials to be replaced by sustainable alternatives. Both limiting the amount of waste and reducing the amount of raw materials provides immediate financial savings".

"The longest possible time can be taken into account when designing products' service life, the possibility to (easily) replace parts (and the availability of those parts) and the recycling of the products or parts thereof".

"If waste cannot be prevented, it may be possible to recycle part of the waste to use as raw material. By recovering discarded products or materials (which also results in contact with the consumers), to reuse or recycle is to complete the own production chain. On this a contribution is made to the CE. Sustainable (sometimes bio-based) raw materials can be cheaper. Consumers have always attached more value to sustainable products. So also from a sales point of view the switch to other raw materials make sense".

"A producer can distinguish itself in the market through innovation and by working sustainably. Sustainable purchasing is desirable and can be advantageous, for example by not buying more than is necessary".

"Sometimes products are suitable for a second life within the company".

"Individuals go to great lengths to get second-hand products or materials, but companies do little to do this. With more reuse, new materials and expensive, environmentally damaging production processes are less necessary".

"Often companies mainly look at the purchase costs during purchasing processes. The cheapest choice, however, can turn out to be more expensive than a smart, sustainable variant, when the integral costs are taken into account. After all, it is about the value of the product or service, rather than only the cost".

(Rijksoverheid, 2017: p. 226).

Households

"Private households are not directly related to the LAP or the waste hierarchy. Via the Municipal waste ordinances rules apply regarding WM and the associated waste based implementing decisions".

"In daily practice, this mainly concerns the supply of waste near the home, the deposit of certain waste materials in (underground) containers and the delivery of waste at certain shops or the environmental street".

"In private households, however, a great deal can be done about prevention and separation of waste materials that allows as much recycling as possible. By separating waste there is less household residual waste. That means less waste has to be incinerated. This leads to a reduction in greenhouse gas emissions".

"Households can achieve a very large effect through conscious purchasing and bring about market shifts"

"It is important for the environment that as little waste as possible is generated. This can be done, for example, in the following ways:

- Products or materials should not be used for only one or several uses and then discarded;
- Have products repaired if they are broken or have a part replaced, instead of directly buying a new product; there are also products for sale that themselves are easy to repair;
- Purchasing second-hand materials or products; sometimes they can be picked up for free;
- Wasting food as little as possible;
- Using as little packaging material as possible."

(Rijksoverheid, 2017: p. 228-229).

Government

Governments can deal with WM in different roles.

The government as legislator

"Within the preconditions of the Environmental Management Act and the National WM Plan, governments can make their own decisions to draft legislation. At a decentralized level, this mainly concerns municipal municipalities' waste regulations, but also in the provincial environmental regulation provisions relating to waste management".

The government as a policymaker

"Local authorities must draw up plans under which provisions on waste are included, taking into account the LAP".

The government as a tester

"About involving the LAP or the waste hierarchy in licensing or assessing of notifications based on general rules – including enforcement of permits and general rules – has already been written sufficiently elsewhere in the National WM Plan".

The government as a buyer / contracting authority

"It goes without saying that when awarding contracts that (partly) relate to WM it also takes into account the minimum standards from the LAP, or the waste hierarchy from the Environmental Management Act".

The government that releases waste

"It is desirable for governments to operate in their own offices and other buildings and during work focus on prevention and the highest possible quality WM in public space".

(Rijksoverheid, 2017: p. 230).

Waste Processors

"In the transition to a CE, more and more waste is becoming ever more abundant and recycled to a higher quality. Producers and users of products help to ensure a CE economy by ensuring that products in the waste stage are processed in such a way that waste processors have a good idea of the degree of contamination of the waste they accept and can adapt the processing accordingly. More waste can be recycled through better product design that enables simpler disassembly and with high-quality recycling, but also through the use of recycling protocols by users, which will increase the quality of, among other things, recycled building materials".

"In a CE, recycling of critical raw materials will increase sharply because these materials have a high economic value and a high risk due to the limited stock".

"Recycling companies are faced with an increasingly larger market, partly because of the use of standardized quality requirements and increased cooperation between producers and waste processors. Also the government's aim to start with circular procurement contributes to this".

"Where possible, waste materials are separated by physical / mechanical separation techniques after which they meet the quality requirements of the producers. Wastes that are severely contaminated or containing substances of very high concern are disposed of through chemical recycling and reprocessed into new raw materials".

"For low-value applications such as use as filler in salt mines and combustion then the material disappears from the economy. That is not in the interest of companies that are engaged in waste recycling. Such applications can only be found in a CE as a backstop for wastes that cannot be technically recycled".

(Rijksoverheid, 2017: p. 231)

2.3.5. 'Waste hierarchy: Minimum standard'

The '*LAP3*' states that, *"the official mission of environmental policy is "to create conditions and to set preconditions for the maintenance and improvement of environmental quality and thus contribute to sustainable development". This leads to the following goals for its waste policy:*

> *i) Limiting the generation of waste*
>
> *ii) Limiting the environmental pressure of production chains – ie the environmental pressure in the entire chain is taken into account when reducing the environmental pressure in the waste phase, which means that the environmental pressure is shifted to other phases in the chain appearance*
>
> *iii) Optimizing the use of waste in a circular economy – ie raw materials and waste materials can be used as high-quality as possible in the same or other chains to prevent these substances from being lost to the circular economy. Only waste that cannot be recovered may be removed".*

Examples of the use of the minimum standard:

> *- "A minimum standard 'recovery' means 100% recovery. It may be that recovery mixes are licensed, for example, sorting followed by recycling part and using it as fuel for the rest".*
>
> *- "A minimum standard 'recycling' means 100% recycling. However, mixed forms of the different types of recycling are licensed".*
>
> *- "If the minimum standard is designated as a specific form of recycling, it may be that lower forms of recycling are not licensed".*

Cascading

The *'LAP3' states that, "with biotic raw materials, the term cascading is often used when multiple forms of processing. In that case, the purpose of cascading is in short efficient and effective use of biomass. Cascading can therefore be seen as a further elaboration of parts of the waste hierarchy specifically for biotic flows. The LAP is not (yet) explicitly directed according to cascading".*

It goes on to explain that:

> *-There is talk of cascading ' **over time** ' when raw materials (usually biomass) become used for successive applications, such as lumber that later becomes chipboard and eventually bioenergy. The application that has the most application options at the end of each phase is preferred in order to leave it 'open'.*
>
> *-With cascading '**in function**' the separation of biomass into a functional component comes through bio-refining components, which are used as optimally as possible.*
>
> *-In cascading '**by value**', biomass is used in the application with the largest added value. This can be economic, environmental or social value. An example of cascading the economic value is the use of straw for ethanol production. An example of cascading to environmental value is the use of fresh wood in green waste for the production of peat substitutes.*

Due to its policy omission a cascading framework therefore represents a priority next step and point of attention for the future LAP.

2.4. *'Urban agenda for the EU: Circular economy'* (2020)

The EU, within its 2020 Urban Agenda programme, has unveiled urban strategy based around three broad policy areas – "knowledge", "funding" and "regulation" (see figure 12) – that are expected to provide the foundation to the four sectors of the economy – (secondary) raw material extraction, production, consumption and waste management – and their relative drivers towards circularity. Additionally key drivers have been attached to these relative action areas as transition mechanisms (see Figure X). Specific WM policies generally fall within legislation, but major advancements for the CE must also connect knowledge networks and improving circular funding options in order to move beyond the current rate of technology change. Intervening within these areas then falls within the

notion of governance, and the agenda has prioritised i) Circular business enablers and drivers; ii) Circular consumption, and iii) Urban resource management (see figure 13) as the strategic drivers to realising the circular transition.

The Urban Agenda sets out 12 strategic actions within the three policy areas (see above) for accelerating the transition to the CE in cities, within which are specific goals.

Fig. 12. 12 strategic actions comprising the EU Urban Agenda for Circular Economy (EU, 2020: p. 1)

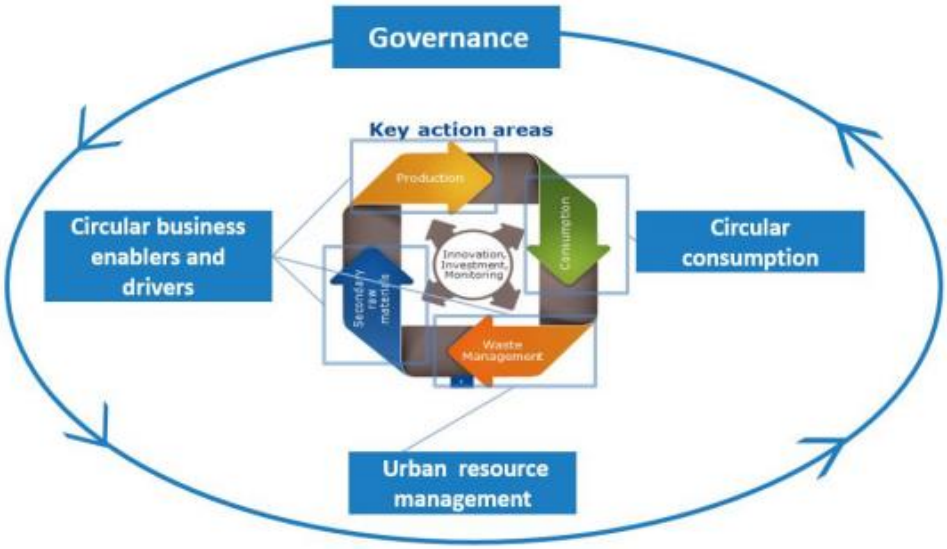

Fig. 13. Key action areas and 'partnerships focus' for the CE (EU, 2020: p. 7).

The executive summary of the report presents the ten opportunities and a further ten challenges or barriers to the Urban Agenda for the CE. This research does not have the space to go into a comprehensive and detailed summary of EU policies and goals; however it is essential to consider the close relationship of Dutch and EU policy and the value of cross-member state partnerships for achieving progress in the CE. The urban agenda sets out the following goals which are relevant to the field of WM in the Netherlands (as discussed in this paper).

1. Help make waste legislation support the circular economy in cities

Two main barriers have been identified by the Partnership:

> *i). "The regulatory framework for waste is very much risk oriented which makes it very difficult to divert products and materials away from the waste stream and back into the economic cycle. Once a product or material is labelled as waste, it is very complicated to relabel it as a secondary resource".*
>
> *ii). "Current regulatory frameworks for product design and producer responsibility do not provide the proper incentives for eco-design and innovation aimed at for example prolonging the life span of products or making it easier to disassemble products for refurbishment, reuse and recycling".*

(EU, 2020: p. 11).

2. Analyse the regulatory obstacles and drivers for boosting an urban circular bio-economy

3. Prepare a 'Circular City Funding Guide' to assist cities in accessing funding for circular economy projects

The main barrier justifying this action is the difficulties experienced by many cities and companies in securing funding for their circular projects. This can be explained both by challenges in preparing

bankable circular projects, and by challenges for funding institutions to relate to the particularities of new circular business models.

4. Mainstream the circular economy as an eligible area into the post '2020 Cohesion Policy' and corresponding funds

5. Prepare a blueprint for a 'Circular City Portal'

The necessary next steps:

> *i) "Creation of a dedicated landing or entry page on the Circular Economy Stakeholder Platform so it becomes a real 'circular city portal', with integration of the Circular City Funding Guide. Keep this Platform alive and kicking, by promoting and uploading more and new cases (including the governance aspects), strategies and knowledge".*
>
> *ii) "Create opportunities for people within cities to exchange experiences on circular governance. This will reduce silos and stimulate different departments in a city to work together with the citizens, NGO's and businesses in implementing a circular economy strategy".*
>
> *iii) "Create a strategic vision on the future of the Urban Partnerships within the Urban Agenda and/ or the European cohesion policy".*

(EU, 2020: p. 21).

7. Promote 'Urban Resource Centres' for waste prevention, re-use and recycling

The necessary next steps:

> *i) "Promote the role that these centres play as urban test beds for the circular economy".*
>
> *ii) "Ensure that resources and funds are directed to solving the challenge of scalability".*
>
> *iii) "Highlight the policy challenges that come out of the establishment of these types of centres and promote it at European level".*
>
> *iv) "Ensure a good learning environment for all the knowledge generated within the different programmes, projects and networks promoting Urban Resource Centres".*

(EU, 2020: p. 28).

8. Develop a 'Circular Resource Management Roadmap' for cities

9. Develop a 'Collaborative Economy Knowledge Pack' for cities

Drivers:

> *i) "Quantifying the impact (social, economic and environmental) of the Collaborative Economy levers, its importance and position on the political agenda".*

ii) "The Collaborative Economy has gained momentum in Circular Economy circles as well in discussions on economic development on local, national and European level".

Barriers:

i) "Lack of data on the impacts of the Collaborative Economy in relation to the Circular Economy".

ii) "Collaborative Economy is too often regarded merely as a digital platform-based economy as opposed to a peer-to-peer, community led social innovation and economic movement".

(EU, 2020: p. 32).

9. Develop 'City Indicators' for a circular economy

2.5. *'Circular economy: What we want to know and can measure'* (2019)

The policy report by PBL extensively covers the current indicators for measuring and coordinating the transition to the CE in the Netherlands. Indicators cover both priority sectors and materials and also strategic actions and goals. Mapping indicators is beyond the scope of this research, however the following figures were useful in understanding the ambitions of the government with respect to the CE, as well as some of the actors and their interests that may be involved in different areas of the economy and the WM system.

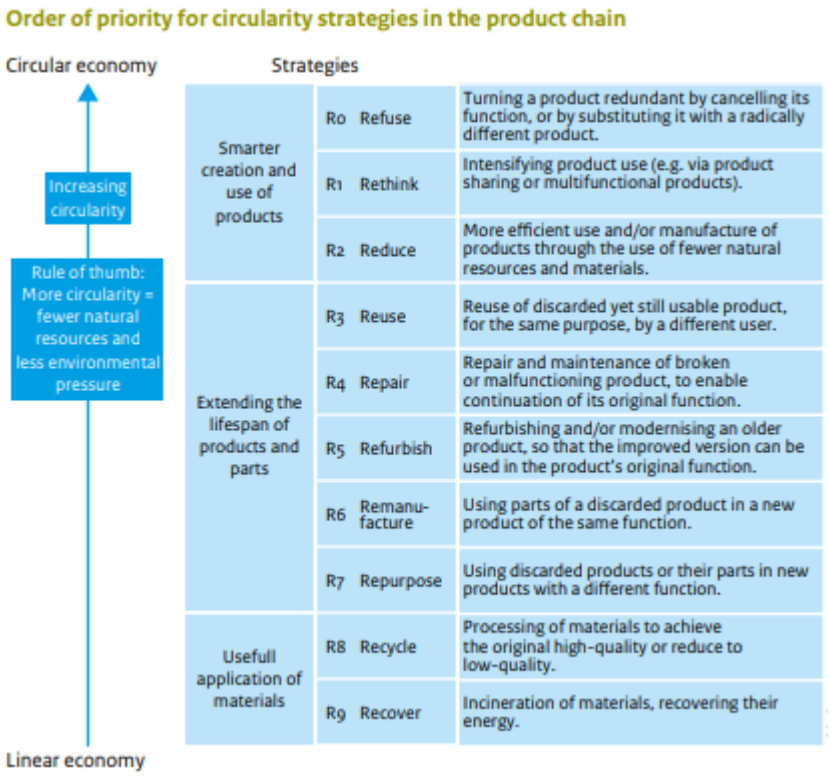

Fig 14. Strategies for the circular economy in order of priority against the 9R imperative, from Refuse to Recover (PBL, 2018: p. 27).

Figure 15 highlights the current progress on the CE for each priority sector and intervention points, and connects to barriers and also interests and ambitions. Few actions are complete (as expected), whilst many have been started. Overall, however, progress is limited. This particularly true for plastics where no action has been completed, and also international cooperation which speaks to the difficulties of realising the transition on a international scale and confronting global actors of the LE.

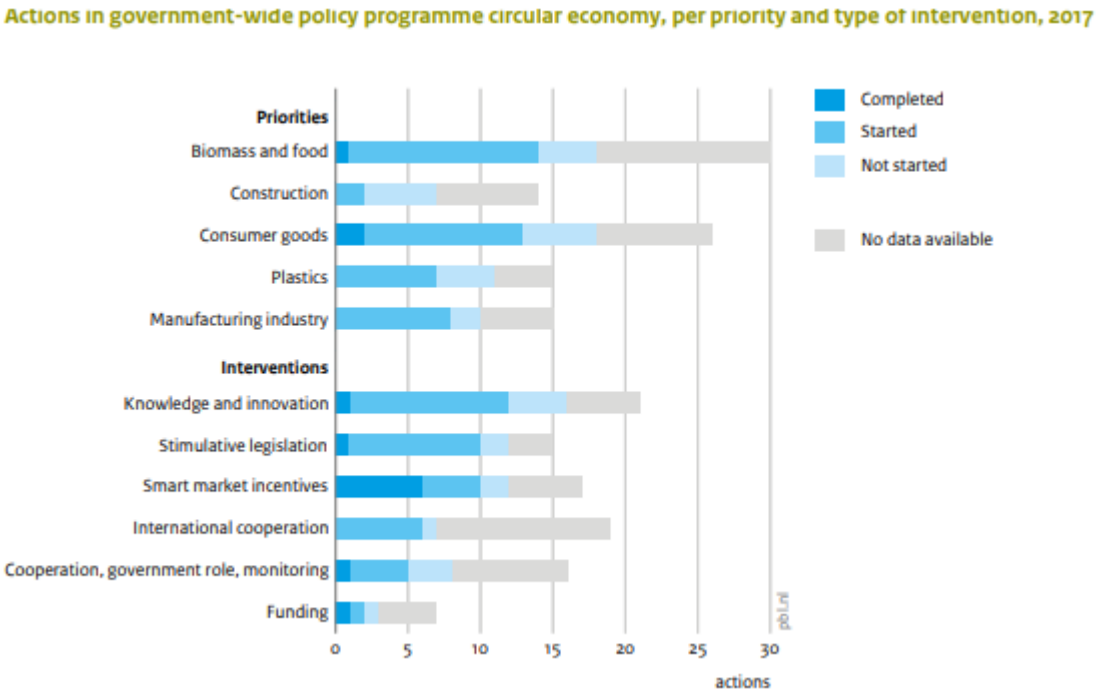

Fig. 15. An overview of current progress in government-wide actions for transitioning to the circular economy, by priority sector and intervention point (PBL, 2018: p. 33).

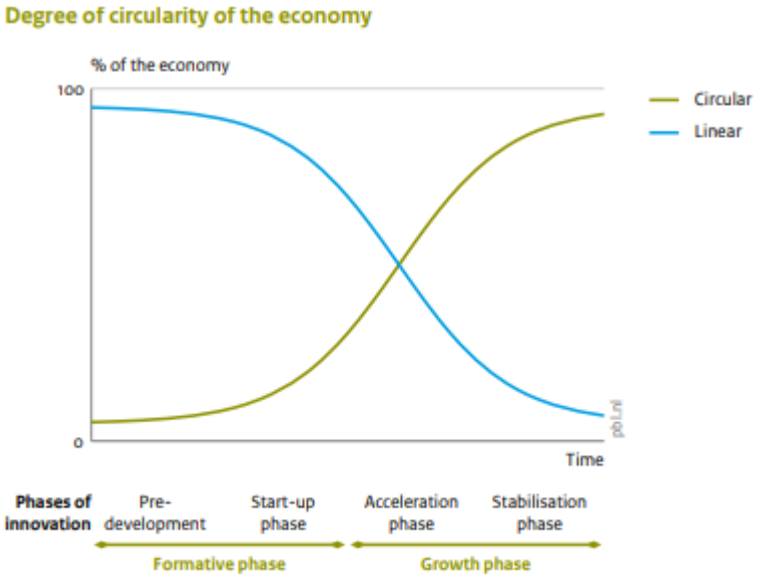

Fig. 16. Visual representative of the transition phases relating to a CE including 'breakdown' of the LE and 'uptake' of the CE (PBL, 2018: p. 41).

2.6. *'Taxonomy for the circular economy'* (2019)

The policy report by Deloitte was produced for the government by public tender and attempts to map out a clear taxonomy for the CE with the purpose of streamlining and strategising the government ambition and mapping out potential policies.

The report makes four core recommendations:

> 1. Use the strategic goals outlined in *'A Circular economy in the Netherlands by 2050'*.
>
> 2. Establish *"a list of criteria based on negative selection to prevent economic activities that are classified as circular or as a contribution to the circular economy while they are harmful or only an improvement on the linear economy".*
>
> 3. Follow the 9R framework to "*assess the level of circularity running from full linear to fully circular strategies".*
>
> 4. Adopt the criteria from Ellen MacArthur Foundation "*to measure the impact of investments"*. The R principles have been "*operationalised to measure how effective a company is in making the transition from linear to circular models".*

(Deloitte, 2019: p. 3).

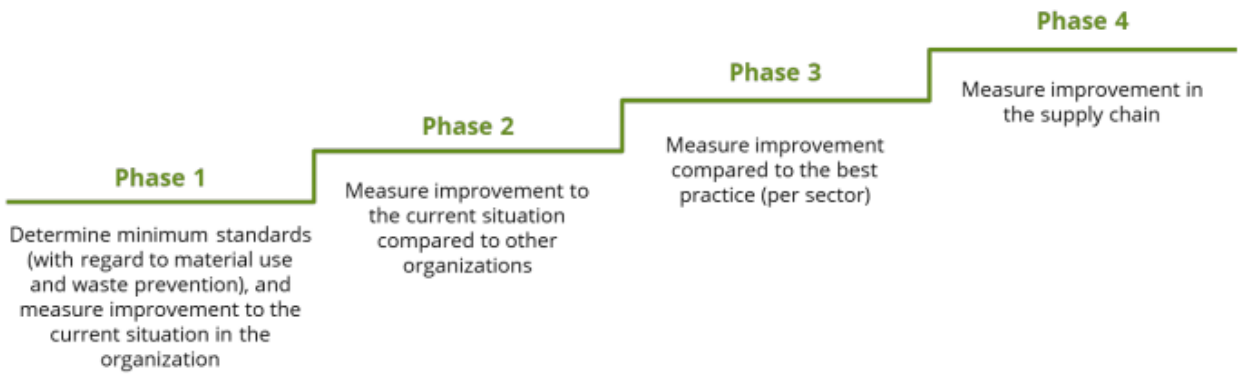

Fig. 17. The four phases outlined for transitioning to the circular economy within material supply chains (Deloitte, 2019: p. 4).

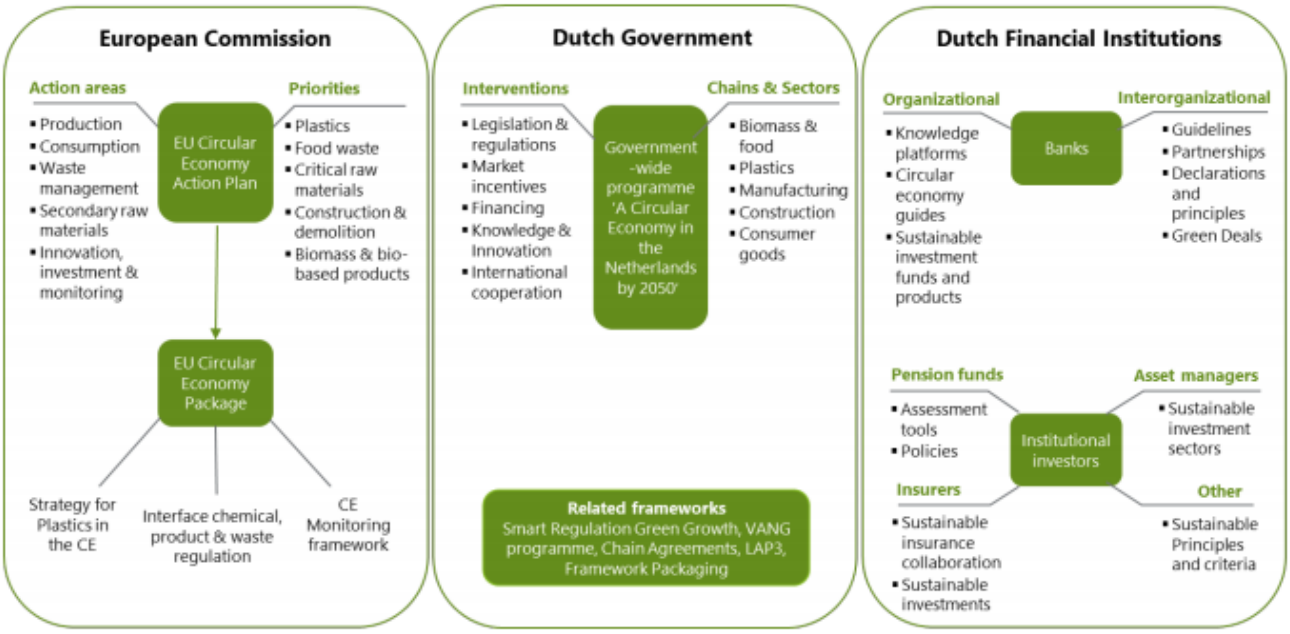

Fig. 18. Policy actions for transitioning to the CE within the European and Dutch government structures and Dutch financial institutions (Deloitte, 2019: p. 12).

The government vision for the CE should ensure:

> *i) Raw materials in existing supply chains are utilised in a high quality manner.*
> *ii) In cases in which new raw materials are needed, fossil-based, critical and non-sustainably produced raw materials are replaced by sustainable produced, renewable and generally available raw materials.*
> *iii) Development of new production methods, design of new products and different organisation of sectors. Also the promotion of new models of consumption.*

(Deloitte, 2019: p. 17)

Activities should only be classed as circular if they:

> *i) Prevent waste and harmful emissions*
> *ii) Optimise the (re-)use of raw materials and resources*

(Deloitte, 2019: p. 17).