

How Network Governance Powers the Circular Economy

**Ten Guiding Principles for Building a
Circular Economy, Based on Dutch
Experiences**

By Jacqueline Cramer

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Preface

The world has woken up to the climate crisis, the effect of which is already being felt. The linear ‘take-make-waste’ extractive economy is heading toward its end. Besides the increasing greenhouse gas emissions causing climate change, resources will simply be dried up in the near future, if we postpone a major step-change any longer. Over the next 35 years, the world’s population will grow by a third. By 2050, there will be ten billion of us. Ten billion people all of whom we give a proper home, food, clothes. To meet with current average standards, by 2050 we would need three planets to generate and regenerate our required resources. It’s as evident as clear: time has come for a circular economy.

In the Netherlands, we agreed to complete a circular economy by 2050. With “we” I’m referring to public authorities, industry, civil-society organizations, knowledge institutions and many more. I’m proud to say that we’re in this together and that we’re working in five key sectors (construction, plastics, biomass and food, manufacturing, and consumer goods) towards two concrete targets. To cut raw-material use by 50% and to significantly reduce carbon emissions by 2030.

To guarantee the track towards 2050, it’s important that we monitor the actions implemented. With knowledge adjustments can be made along the way. The government-wide programme will let us scale up the circular economy, accelerate it and monitor it. This is how we can utilize our innovative strength and create new opportunities for Dutch businesses, both nationally and internationally. To share our expertise worldwide, we have established Holland Circular Hotspot, our business platform

for the international exchange of knowledge and experience on circular economy.

Setting truly ambitious goals in motion is the biggest challenge of our circular economy policy. Each of us can decide to be that spider in the web, be it at a sectoral, local, regional, national or international level. Bring together partners, because only together we can go faster and further. For me, the European Plastic Pact has been a motivating experience in this regard. We can change the direction the world is going, as long as we join forces. This book offers us the tools to do it. Using a variety of examples, Jacqueline Cramer explains in this book how we - citizens, companies, governments, and knowledge institutions - can put the circular economy into practice together. All put together in ten inspiring recommendations, rooted in her rich experience with circular initiatives.

Most dear to me is her plea for network governance regarding circular change. No company, government, or citizen can achieve a major circular change alone. Collaboration is the key: a powerful collaboration with a clear goal, with clear agreements, and a clear division of roles. An intermediary - Cramer calls this a transition broker - is often needed to power this collaboration.

This book is a must read for anyone who wants to get started with circular initiatives. The guiding principles are a helpful tool to move from ideas to practice. We're at the brink of a new, sustainable era. An era that requires a fully circular economy, which we can achieve by learning from and inspiring each other.

Stientje van Veldhoven

Dutch State Secretary for Infrastructure and Water Management

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Chapter 1

Introduction

The first Earth Day was on 22 April 1970. On that day, 20 million Americans,¹ 10% of the United States population, took to the streets to show their love for the planet they call home. I was one of them. As a student at the University of Arkansas, I attended a teach-in, packed with people, all protesting against environmental pollution. This was a defining moment for me. I realised I want to help solve this big problem threatening our future. The first Earth Day marked the beginning of my lifelong mission to help save the planet.

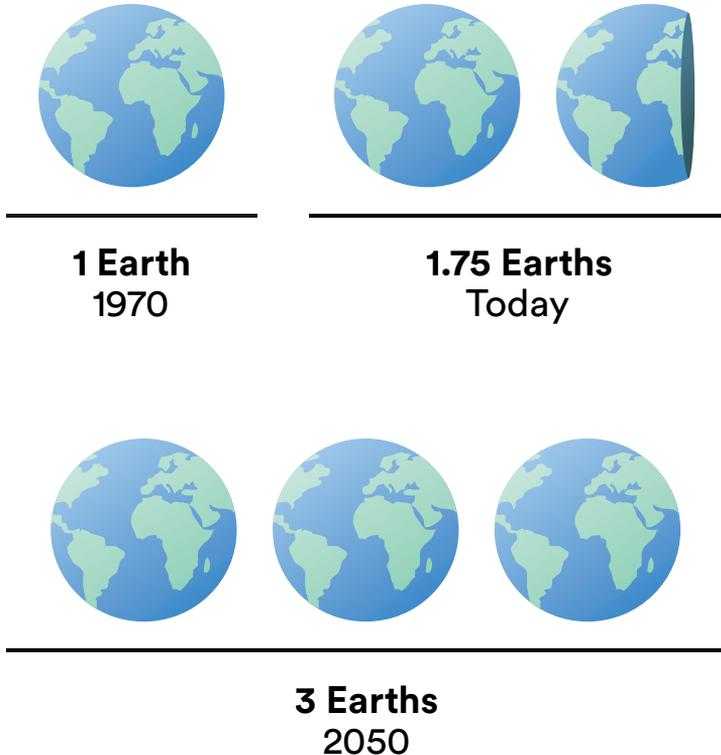
Sadly enough, the state of the environment has gotten worse, not better. Since 1970, the global population has doubled, material extraction has tripled and global gross domestic product (GDP) has quadrupled. If this trend continues, global consumption of materials such as biomass, fossil fuels, metals and minerals is expected to double over the next 40 years.²

1 *The history of Earth Day*, <https://www.earthday.org/history/>.

2 *OECD, Improving Resource Efficiency and the Circularity of Economies for a Greener World, OECD Environmental Policy Papers, No. 20, Paris, 2020, <https://doi.org/10.1787/1b38a38f-en>*.

At the same time, annual waste generation is expected to increase 70% by 2050.³ These predictions are scary, especially because we know that it already requires natural resources from the equivalent of about 1.75 Earths to sustain our current population. If we maintain our present patterns, we will need three Earths by the year 2050.

Amount of natural resources used worldwide



3

Kaza, S. et al., *What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050*, World Bank Group, Urban Development Series, Washington D.C., 2018, <http://hdl.handle.net/10986/30317>.

Keeping on this path would come at a tremendous cost to the natural environment, ultimately leading to social and economic downturns. As growing numbers of people live in cities, problems would be particularly likely to accumulate here. Cities are hotspots of material consumption, waste generation and pollution. In 1950, 30% of the world's population was urban; in 2018, 55% was; the UN expects the figure to reach 68% by 2050.

Although these messages are hardly uplifting, doomsday thinking will not help us. It is our responsibility to do everything we can to safeguard liveability on planet Earth now and in the future. One of our biggest challenges is to do that in a manner that benefits the wellbeing of all people, the environment and the economy. Often sharing their scepticism, people ask me: are you optimistic that we can change course in time? To be honest, I am, *if* we manage to put our shoulders to the wheel.

Since the 1970s, I have been actively engaged in combatting the staggering environmental problems that humanity faces. I have contributed to the cause in various capacities through my work in the environmental movement, academia, industries, and between 2007 and 2010, serving as the Netherlands' Minister of Housing, Spatial Planning and the Environment. I have since also become a change-maker, working on implementing the circular economy in different industries and regions. My optimism draws from my experiences in each of these roles. I have met thousands of people who are aware of environmental threats. These individuals want to adapt and actually help their neighbourhood, company, region and/or country too. Society's collective environmental consciousness is rising rapidly, which has led to an unprecedentedly strong call for action. It is not just a small number of environmentalists like me anymore; a broad movement within civil society, industry and the research world is actively engaging in shaping an eco-friendly future. Furthermore, we have developed so much knowledge and expertise during the last 50 years that we have sufficient technical means to solve the problems.

My firm belief is that the circular economy can help combat our environmental challenges. It provides a realistic scenario for what we can do to find a balance between what Earth provides us and what we need. It permits us to become much more resource-efficient and prudent in how we produce and consume.⁴ It ties in everything we need for restoring the environment to its healthy functioning and humankind's corresponding behaviour. The idea is simple. Instead of throwing away products after their use – a habit of the linear economy – we should keep them moving within a cycle and thus transition into a circular economy. In this economy, we aim to close the loops of products, materials and resources, yielding the lowest possible environmental impacts while using renewable energy sources and safeguarding the planet's biodiversity. In a circular economy, we reduce resource use, promote sustainable economic growth, improve wellbeing and help support equal distribution of income worldwide.

The circular economy accounts for all three major environmental issues: excessive use of resources; global warming and biodiversity loss; and the negative impacts that come with them. In particular, it addresses the excessive use of resources. When we effectively tackle this issue, we also help solve the other major environmental problems. Excessive use of resources amounts overall to over 90% of global biodiversity loss and water stress impacts; approximately 50% of global greenhouse gas emissions; and increasing scarcity of some key resources.⁵ I am not the only one who sees the potential of the circular economy. Around the world, thousands of circular initiatives exist. Countries, regions, companies and entire product chains are applying the concept of circularity to formulate future-

4 *UN Environment, International Resources Panel, Global Resources Outlook 2019, Natural Resources for the Future We Want, Summary for Policymakers, Geneva, 2019, <https://www.resourcepanel.org/reports/global-resources-outlook>.*

5 *UN Environment, International Resources Panel, Global Resources Outlook 2019, Natural Resources for the Future We Want, Implications for Business Leaders, Geneva, 2019, <https://www.resourcepanel.org/reports/global-resources-outlook>.*

proof visions and strategies.

In the past 20 years, I was involved in dozens of circular economy initiatives, both directly and indirectly. Along the way, I encountered many obstacles, but also discovered how network governance can be an essential enabler of circular initiatives. Network governance is an indispensable addition to conventional public governance. In this book, I show how it can power the circular economy. I am convinced that this power can mobilise all kinds of organisations, companies and individuals seeking to take matters into their own hands. Based on my experiences, I share 10 guiding principles for building bottom-up circular initiatives, for everyone who — just like me — is inspired by the extraordinary potential of the circular economy. Whether you are a concerned citizen in South Africa, a policymaker in India, a business partner in Chile, a researcher in the US or an NGO employee in the Netherlands, you might find that lessons I learned help you along your journey. At the same time, I hope to get your feedback and learn from your experiences. The complexity of the circular economy is immense and therefore a hard challenge to solve. I believe that the only way forward is to join forces and help each other make this transition.

Contents

This book consists of three parts. Part I opens with some background on the circular economy. It then outlines the history and current status of Dutch circular economy policies on national and local levels. The perspective here is the conventional public governance with which most of us are familiar. At the end of this chapter the complementary steering concept of network governance is introduced which forms the basis of the next chapters. Part II focuses on various examples of network governance, showing partners jointly putting the circular economy into practice. I describe transitioning towards a circular economy by sharing case studies of three product chains – mattresses, concrete and clothing – as well as one case showing transitioning within a region, the Amsterdam Metropolitan Area. In all examples, I was involved as an intermediary, a role I call that of the ‘transition broker’. Part III really gets to the heart of the matter, as I forward 10 guiding principles for building a circular economy. I also illustrate how these guidelines play out in practice, share my lessons learned and provide concrete steps for those who want to start or expedite implementation of a circular initiative. In the last chapter, I make a plea for more synergy between public and network governance in order to accelerate the transition to a circular economy as best we can.

Part 1

**Circular Economy:
The concept and
Dutch policies**

Chapter 2

The Circular Economy as a unifying concept

The term ‘circular economy’ is only a few decades old; the concept, however, goes back centuries. This chapter traces the origins of the circular economy, explaining what it actually is and why it is so promising.

2.1 A Short History of the Concept

Handling resources with prudence was a more widely implemented idea in the past than the present. Farmers worked in a regenerative closed system, using all residuals within their waste streams. For producers and consumers, reusing and recycling products was often common practice because materials represented value. But the industrial revolution changed the relationship between individuals and materials, marking the beginning of our linear mind-set.⁶ After World War II, the linear economy began to prevail. This negative development worried experts.

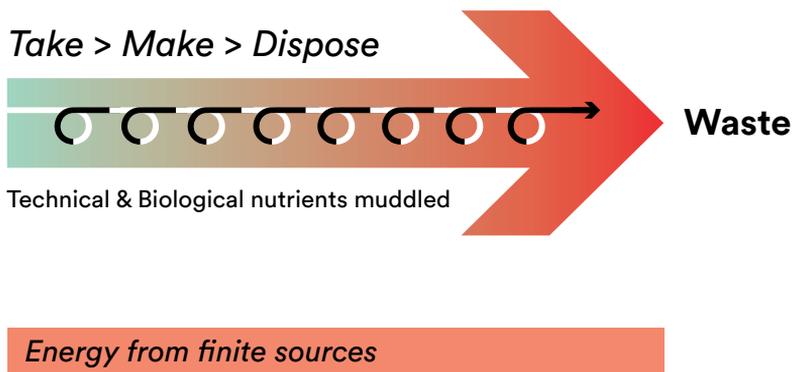
A pivotal point came in 1966, when Kenneth Boulding used the ‘Spaceship Earth’ analogy.⁷ Boulding called for a closed economy

6 *Lieder, M. and Rashid, A., Towards Circular Economy Implementation: A Comprehensive Review in Context of Manufacturing Industry, Journal of Cleaner Production, 2016, 115, 36-51.*
<https://doi.org/10.1016/j.jclepro.2015.12.042>.

7 *Boulding, K.E., The Economics of the Coming Spaceship Earth, in: Jarrett, H. (Ed.). Environmental Quality in a Growing Economy, Baltimore, MD: Resources for the Future/Johns Hopkins University Press, 1966, 3-14.*

of the future, in which the Earth is seen as a single spaceship with limited resources. In *Spaceship Earth*, humankind must build a cyclical ecological system in order to survive. Comparable worldviews were subsequently formulated, resulting years later in the introduction of the phrase ‘circular economy’. In the Netherlands, I helped give the phrase currency, when I established the Utrecht Sustainability Institute at Utrecht University in 2011, after my time as Minister of the Environment. I saw the circular economy as a mobilising concept which many people could embrace because it entails respect for the environment, the economy and social wellbeing. Circularity provides a strategy to overcome the current linear model that is based on continuous growth and increasing resource throughput, resulting in environmental degradation and overconsumption of natural resources.

Linear Economy



2.2 Circular Economy Further Explained

The precise wording of experts differs, but the following definition of the circular economy generally encapsulates their shared meaning: ‘a cyclical, closed-loop, regenerative system in which resource input and waste, emissions and energy leakage are minimised, and redesign and reuse of products are prioritised.’⁸ The dynamics of the transition to a circular economy can be viewed as iterative processes of building up the new system and breaking down ways of thinking, acting and organising that have been established over several decades. Pressures on the existing regime to transform thus increase, leading to destabilisation; at the same time, newcomers in the market (‘niches’) start to accelerate, emerging and growing into a new regime. In this process, elements of an old regime that do not transform are broken down and phased out⁹.

Moving to a circular economy usually leads to strategies in which the value of products, materials and resources is maintained as long as possible. To achieve this, manufacturers develop new circular business models that focus on retained ownership, such as operational leasing, renting or selling of services instead of goods. Another strategy is sharing costs and benefits proportionally among partners.

When discussing circularity, a clear distinction should be made between two material cycles: biological and technical.¹⁰ The

8 Murray, A. et al., *The Circular Economy: An Interdisciplinary Exploration of the Concept and Application in a Global Context*, *Journal of Business Ethics*, 2017, 140, 369–380, <https://doi.org/10.1007/s10551-015-2693-2>.

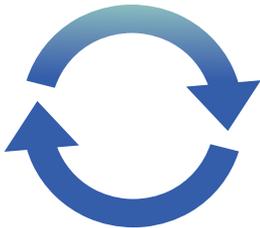
9 Loorbach, D. et al., *Sustainability Transitions Research: Transforming Science and Practice for Societal Change*, *Annual Review of Environment and Resources*, 2017, 42, 1, 599–626, <https://doi.org/10.1146/annurev-enviro-102014-021340>.

10 Ellen MacArthur Foundation, *Towards the Circular Economy: Economic and Business Rationale for an Accelerated Transition*, Cowes, 2013, <https://www.ellenmacarthurfoundation.org/assets/downloads/publications/Ellen-MacArthur-Foundation-Towards-the-Circular-Economy-vol.1.pdf>.

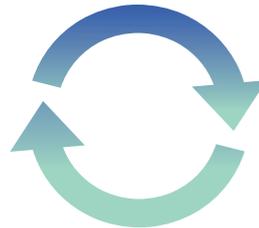
biological cycle is based on biologically based biodegradable raw materials which can – if carefully managed – be safely returned to the biosphere, either directly or in a succession of consecutive uses. Technical cycles encompass human-made materials, such as metals, plastics and synthetic chemicals. These are made of non-renewable finite resources which cannot be replenished naturally at the speed with which they are consumed. They must continuously cycle through the system so that their value is captured and recaptured. This implies that industry must maximise profits through the reuse of components and goods, instead of the old approach that minimises the cost of recycling and goods disposal. This can be achieved through ‘design to re-design’ approaches as well as maximising potential for reusing products and recovering materials.

Circular Economy

Technical nutrients



Biological nutrients



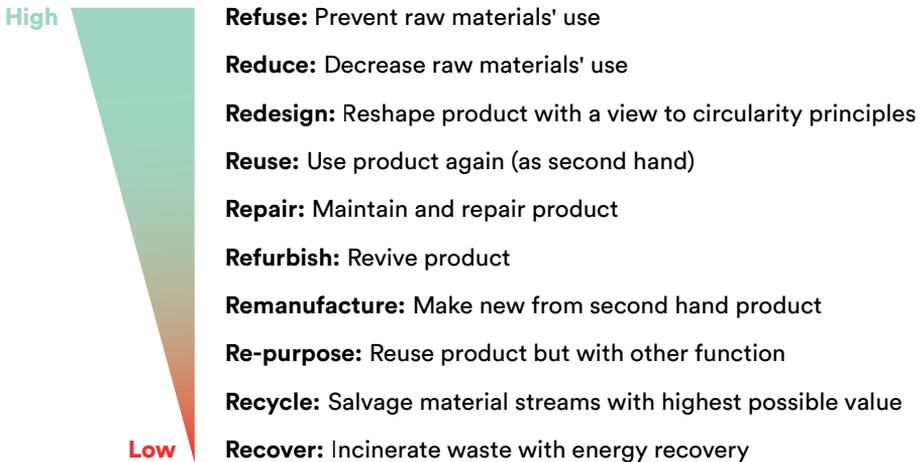
Making use of energy from renewable sources

Safeguarding the resilience of natural ecosystems

To help deal with the circular economy concept, which is complex and all-encompassing, I developed a tool which I call the circularity ladder of 10 R's.¹¹ This hierarchical depiction reflects the ambition level of circular strategies. It increases our awareness that the circular economy does not just entail recycling waste streams and that strategies higher on the ladder generally have a lower environmental impact. Highest priority should be given to refusal of use, and then to reduction, which means decreasing material use per unit of product. Afterwards, priority should be given to rethinking the product in view of circularity; next to product options such as reuse, repair, refurbishment, remanufacturing and repurposing; and then to material and resource recycling. Finally, any remaining residue which cannot be recycled should be incinerated with energy recovery, although this particular practice is not part of a circular economy.

Levels of circularity: 10 R's

Order of priority



11

Cramer, J., *The Raw Materials Transition in the Amsterdam Metropolitan Area: Added Value for the Economy, Well-Being and the Environment*, *Environment*, 2017, 59, 3, 14-21, <https://doi.org/10.1080/00139157.2017.1301167>.

Transforming linear into circular products implies not only technical innovation, but also a completely new organisation of product chains. As the raw materials and components should be apt for reuse and recycling, other types of suppliers must get involved. In the manufacturing stage, the production process must be carefully adjusted to the prescribed redesign requirements and, after use, a collection, take-back and/or reuse system should be available to give the product a second life. When the product cannot be reused, the resources should be recovered with the highest potential value and returned to the producer making new products from the reclaimed resources. To create a viable business case, a new financial arrangement that is economically attractive to all involved parties is often needed.

These different steps in redesigning, reusing and recycling cannot be organised by one individual company; all stakeholders must make a contribution. This requires alignment with suppliers, to access inputs or components with environmentally friendly features, and with customers further down the product chain. As this also requires new information and skills (e.g. ecodesign and life cycle thinking), cooperation with institutions, such as universities, consultancies and research centres is also important. Moreover, governments are often needed to set the necessary preconditions. Besides removing economic and legal obstacles and facilitating circular initiatives through innovation funds and other means, the government can also help promote circular products as a launching customer. Finally, civil society and business customers can play a role in the adoption of the circular product.

Thus, the circular economy concerns system changes in neighbourhoods, cities, regions and product chains, which means that governments, producers and consumers must adapt. It is a collective process: not one company, one citizen or one governmental body can make the change alone. Preparing the system's transformation to the circular economy requires alignment and cooperation between different stakeholders. It starts with

frontrunners taking the lead; afterwards, practices should be scaled up and mainstreamed. This process does not happen by itself; it requires a new form of governance called network governance in which different stakeholders align and cooperate to make the change jointly from one system to another – in this scenario, from a linear to a circular economy. A transition broker is often needed to orchestrate this process.

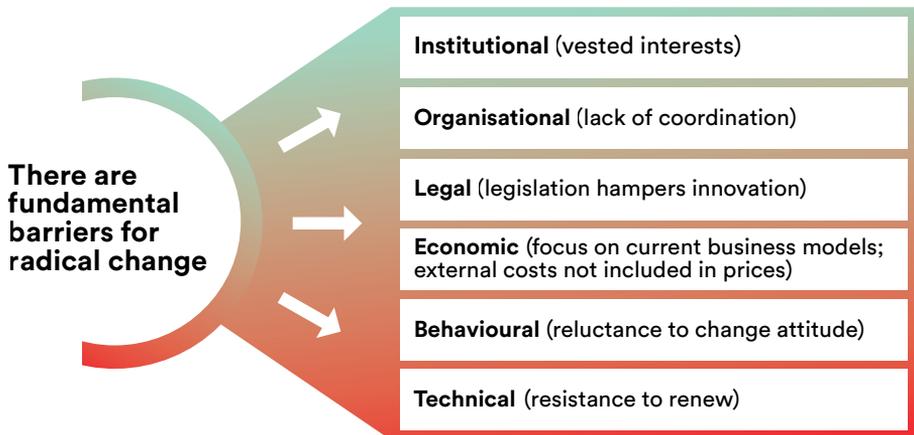
You may wonder what the difference is between sustainability and the circular economy. The two concepts are essentially global in nature, sharing concerns about how the current state of technology, industrial production and consumption might jeopardise both present and future generations. Both concepts also emphasise the importance of better integrating environmental and social dimensions with economic progress. They position system-level changes at their very core. However, sustainability, which is much broader than the circular economy, covers a multitude of objectives. Addressed in the 17 Sustainable Development Goals (SDGs), these objectives include aims from eradicating poverty and hunger to ensuring responsible consumption and production.

2.3 Opportunities for and Barriers to a Circular Economy

Benefits of the circular economy are significant. Environmental quality of life is better in a circular economy than a linear one. The same goes for the security of supplying essential natural resources. It also promotes the development of new knowledge and skills, triggers innovation and creates new businesses and jobs. A recent study on the circular economy's impacts on the labour market estimates a 0.5% increase in the EU's GDP by 2030, thereby creating around 700,000 new jobs.¹² For individual companies, the circular economy can lead to new market opportunities, cost savings — for example, because of increased resource productivity — and more competitiveness. As producers remain responsible for their products throughout their whole life cycles, consumers can buy high-quality circular products and services which are apt for reuse and high-value recycling.

If a circular economy is so promising, why not put it into practice? Unfortunately, significant barriers still stand in the way of a transition, as summarised below.

Fundamental barriers to transitioning to a circular economy



These barriers show that transitioning towards a circular economy is a complex process. It implies radical transformation of our current consumption and production patterns, in which new circular businesses are developed and linear ones are broken down. In fact, it is a revolution comparable with the internet revolution and the current biotech revolution. Perhaps we cannot yet envision exactly how our energy technologies and material cycles will appear in 30 years, but they will certainly be different from today's. We do know that this will require breakthrough innovations, both technical and social, and new business models. Such innovations are still in their infancies, though need to be nurtured and developed.

Chapter 3

Current Circular Economy Policies

When it comes to major changes, most people wait for their national or local government to do the acting. That is unsurprising considering governments can enforce changes through policy and legislation. This chapter gives an overview of this conventional public governance approach, while also highlighting European and Dutch policies and instruments that contribute to circular initiatives. Finally, the complementary steering model of network governance is explained which can power the implementation of circular economy.

3.1 European Circular Economy Policies

The Netherlands is a member of the EU, and many regulatory and economic measures concerning the circular economy are formulated at the EU decision-making level. Member states are expected to adopt the circular economy policies laid out by the EU. Since the turn of the century, concerns have grown in the EU about the overconsumption of resources and its environmental impacts. Yet since 2015, Europe has been giving circularity issues attention, exponentially so.

In 2015, the European Commission substantiated the concept in its decision to adopt the Circular Economy Package. Called *Closing the Loop: An Action Plan for a Circular Economy*, the accompanying set of policy documents and legislative proposals

aims to stimulate the transition towards a circular economy in the EU.¹³ Besides the alarming negative environmental impacts, the EU's rationale for strengthening circular economy policy is to safeguard its economic competitiveness and innovation, create new jobs and reduce dependency on resources imported from elsewhere in the world. The Circular Economy Package identifies where obstructions to this transition exist and how they can be overcome. It contains 54 actions covering waste management and product policy measures. The action plan sets clear targets for waste reduction and recycling; it also identifies five priority areas for product policies, as shown below.

Key priorities of the EU Circular Economy Package (2015)

Waste management (targets)



65%

Recycling of municipal waste by 2035



70%

Recycling of packaging waste by 2030



Maximum of **10%**

of municipal waste landfilled by 2035

Product policies (priority areas)



Food waste



Critical raw materials



Construction and
demolition



Biomass



Bio-based products
and plastics

Bans on specific products have been recently introduced. For example, the EU has banned the 10 most polluting single-use plastics, such as plates, cutlery, straws and cotton bud sticks.

In 2020, the new Circular Economy Action Plan succeeded the Circular Economy Package, as part of the European Green

13 European Commission, *Closing the Loop: An EU Action Plan for the Circular Economy COM/2015/0614 final, Policy Document, Brussels, 2015*, <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52015DC0614>.

Deal.¹⁴ This action plan reemphasises the importance of reducing waste and creating markets for secondary raw materials. It also strengthens product policies aimed at circular design, reuse of products and extended producer responsibility (EPR). In an EPR scheme, producers take more responsibility for the treatment or disposal of goods after consumption. Furthermore, the action plan promotes frontrunner performance as progressively becoming the norm. What I find most commendable is that the formulated actions are not without obligation: most are legislative proposals and mandatory criteria for a sustainable product policy framework.

The action plan identifies seven key product value chains: electronics, ICT equipment, textiles, furniture and high-impact intermediary products, such as steel, cement and chemicals. In implementing the action plan, the European Commission intends to cooperate closely with stakeholders of these product chains. New product groups will be identified based on their environmental impact and circularity potential. The provision of information to the consumer is also explicitly part of this policy. A number of great initiatives cited in the action plan can clearly steer the economy in a circular direction. For example, green public procurement is currently a voluntary instrument for procuring goods, services or works with reduced environmental impacts, though plans for new mandatory criteria are underway. Mandatory criteria for recycled plastic content are also being considered, as are plastic waste reduction measures for key products, such as packaging, construction materials and vehicles. Furthermore, proposals have been issued for the restriction of intentionally added microplastics and measures on the unintentional release of microplastics. The European Commission also wants to include ‘right to repair’ regulations in its Ecodesign Framework Directive to improve the reuse and recycling of electronic goods.

14 *European Commission, Circular Economy Action Plan: For a Cleaner and More Competitive Europe, EU Green Deal, Brussels, 2020, https://ec.europa.eu/environment/circular-economy/pdf/new_circular_economy_action_plan.pdf.*

Key priorities of the EU Circular Action Plan (2020)



Re-emphasis on reducing waste and creating markets for secondary raw materials



Further strengthening of product policies aimed at circular design, extended producer responsibility and reuse of products



Frontrunners' performances progressively becomes the norm



Cooperation with stakeholders in key value chains, such as electronics, ICT and textiles but also furniture and high-impact intermediary products, such as steel, cement and chemicals



Key actions particularly focus on **legislative proposals and mandatory requirements**



Emphasis on provision of information to the consumer

I think it is highly innovative and impactful for the European Commission to apply the Ecodesign Framework Directive to achieve circular economy goals. This is the most substantial law to create regulations that steer the transition towards a circular economy, as it deals with how products are designed in view of the whole product life cycle.¹⁵ Until now, this law focused on products' energy-related components but hardly touched on the materials used. For this to happen, two additional instruments are crucial: product passports and a product database. These instruments can include information about origins of materials used in a product and about its composition, hazards and risks. A simultaneous and better aligned regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) with the Ecodesign Framework Directive would further enhance sharing responsibility for the materials used in products and waste streams.

¹⁵ De Römph, T., *The Legal Transition towards a Circular Economy*, Dissertation, KU Leuven and Hasselt University, June 2018; and De Römph, T.J. and Cramer, J.M., *How to Improve the EU legal Framework in View of the Circular Economy*, *Journal of Energy & Natural Resources Law*, 2020, 38, 3, 245-260, <https://doi.org/10.1080/02646811.2020.1770961>.

3.2 The Roots of Dutch Circular Economy Policies

Even though the term ‘circular economy’ had not yet been coined at the time, the first Dutch circular initiatives date back to the late 1970s.¹⁶ In 1979, the Dutch government introduced into its environmental policy the waste hierarchy of ‘reduce, reuse, recycling, energy recovery, incineration and landfill’.¹⁷ Albeit with a few exceptions, landfilling soon became prohibited. Landfilling in a country as small and muddy as the Netherlands caused serious soil pollution, and the clean-up turned out to be very expensive, particularly when new neighbourhoods were built on top of the landfills. The Dutch government therefore decided to shift in the early 1980s from landfilling to incineration and recycling. The mid-1980s brought the establishment of new waste incineration plants and recycling activities. Strategies for 30 resource streams, such as tyres, batteries and packaging, were formulated and executed according to the waste hierarchy. For some resource streams (e.g. paper, packaging, electronics and cars), an EPR was introduced from the 1990s onwards.

In 1989 the first National Environmental Policy Plan was launched. Its central mobilising concept was ‘integrated chain management’, an approach for the reduction of environmental impacts of product chains from the extraction-, production- and use phases till the waste phase. In fact, its main principles were comparable with what we now call circular economy. As a follow-up the Dutch government introduced an environmental product policy in the early 1990s. This policy encouraged companies to design products more sustainably. Coined as ‘ecodesign’, this approach accounted for a product’s potentially negative environmental impacts over its whole life cycle.

16 Cramer, J., *Milieu (Environment)*, Amsterdam: Amsterdam University Press, 2014.

17 Lansink, J., *Challenging Changes; Connecting Waste Hierarchy and Circular Economy*, Nijmegen: LEA, 2017.

In the 21st century both the waste and product policies were further elaborated. The waste policies developed in the 1980s and 1990s formed the basis of the National Waste Management Plan first issued in 2002. The plan introduced regulations for transboundary transportation of waste and a minimum standard for the quality of waste processing. So far, this standard has been anchored in licensing, and it is expected to become more stringent. Through a waste tax, the plan has also encouraged recycling activities. Updates have gradually shifted the plan from a focus on waste management to a broader life cycle approach. In 2008, when I was Minister of the Environment, I introduced a chain-oriented materials policy aimed at closing material loops. Additionally, I actively promoted the implementation of regenerative design, which is known as cradle-to-cradle¹⁸ design. This type of design tries to model industrial design after natural processes in which materials are perceived as nutrients that are circulating in sound, healthy metabolisms. Together with the chain-oriented materials policy this cradle-to-cradle approach laid the foundation for a circular economy by integrating policies on waste and products.

The next step in Dutch policy was the launch of the programme known as From Waste to Resource (in Dutch as the acronym VANG).¹⁹ This document stressed circular design of products and closing material cycles at local and global level. Launched in 2014, the programme addressed both the reduction of material loss in the waste stage and circular entrepreneurship within the framework of circular economy. It created a boom in recycling and catalysed efforts to meet the target of 75% separation of domestic waste by 2020. In addition, the programme encouraged innovative solutions for sustainable production and consumption to take advantage of

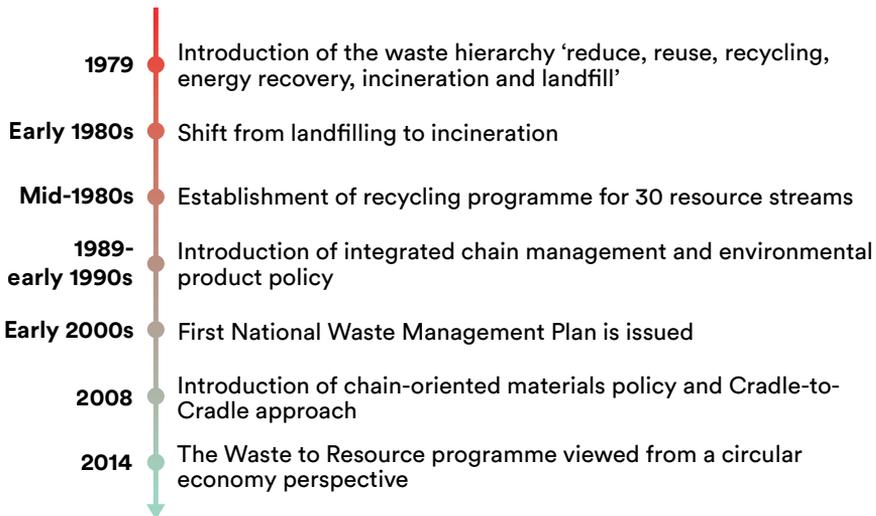
18 *McDonough, W. and Braungart, M., Cradle to Cradle: Remaking the Way We Make Things, New York: North Point Press, 2002.*

19 *Ministerie van Infrastructuur en Milieu, (Ministry of Infrastructure and Environment), Van Afval naar Grondstof; Uitwerking van Acht Operationele Doelstellingen (From Waste to Resource; Elaboration of Eight Operational Objectives), The Hague, 2014.*

economic opportunities.

This short history shows that the Netherlands has worked on several aspects of the circular economy for four decades now. Waste policies introduced since the 1980s have caused a clear shift from landfilling to incineration and have gradually made recycling common in the Netherlands. At present, the country recycles 78% of its waste, incinerates 19% and landfills only 3%. In addition, environmental product policies introduced in the early 1990s have gained growing attention since then.

Milestones in Dutch waste policies 1927 - 2014



During this time, industries and research institutes have gained knowledge and experience that can now be applied to circular economy activities. And the government has learned how to encourage more prudent use of natural resources within industries and promote more sustainable consumption patterns. This means that the Netherlands has a fertile ground on which to take its next step: bundling existing knowledge and developing new expertise to put the circular economy into practice.

3.3 Current National Circular Economy Policies

Building on past experiences, an ambitious government-wide circular economy programme was launched in 2016.²⁰ Aligned with EU policies, the programme aims to develop a circular economy by 2050 and see a 50% reduction in the use of primary raw materials, such as minerals, fossil and metals, by 2030. To reach these ambitious goals the Dutch government was well aware of the need for a fundamental transition in production and consumption patterns. The circular economy programme focuses on five key economic sectors and value chains: food and biomass; plastics; manufacturing; construction; and consumer goods. These five sectors matter greatly to the Dutch economy, have big impacts on the environment, are largely in line with EU policy priorities and represent product chains well poised to become more circular.

To reach its ambitious 50% reduction goal, the programme focuses on better reuse of raw materials, conscious use of products, smart design and promotion of circular business development. Three strategic goals have been accordingly identified, as follows:

1. Raw materials in existing chains must be used efficiently. This can help reduce the need for raw materials in existing chains.
2. Where new raw materials are needed, fossil, critical and non-sustainably produced raw materials must be substituted by sustainably produced, renewable and widely available raw materials. This makes the economy more future-proof and less dependent on fossil sources and imports thereof. Moreover, it safeguards the functioning of natural ecosystems.
3. New production methods must be developed, new products designed and spatial areas differently planned. New consumption patterns must also be encouraged. These changes can lead to the creation of other product chains, triggering desired resource use as well as its reduction and substitution.

20 *The Dutch Government, A Circular Economy for the Netherlands by 2050: Government-wide Programme for a Circular Economy, The Hague, 2016, <https://www.government.nl/documents/policy-notes/2016/09/14/a-circular-economy-in-the-netherlands-by-2050>.*

In January 2017, the Dutch government and in the end more than 400 organisations signed a letter of intent concerning a National Agreement on the Circular Economy²¹ to develop transition agendas for five priority sectors. Among the signatories were employer organisations, trade unions, nature and environmental organisations and local governments, together showing broad, societal support for the transition to a circular economy. The parties agreed that the five main focal points of the government-wide circular economy programme would be elaborated as transition agendas concerning:

- Biomass and food;
- Plastics;
- The manufacturing industry;
- A circular construction economy; and
- Consumer goods.

These agendas were further elaborated one year later. Per transition, stakeholders formulated the main lines of action, as shown on the following pages.

21 *Ministry of Infrastructure and Environment, National Agreement on the Circular Economy, Letter of Intent to Develop Transition Agendas for the Circular Economy Together, The Hague, 2017, <http://hollandcircularhotspot.nl/wp-content/uploads/2019/02/Letterofintenttodeveloptransitionagendas-fortheCircularEconomytogether-3.pdf>.*

A circular economy in the Netherlands by 2050

Schematic overview of the commitment and priorities of the Dutch government

Construction

Role model

- Major government purchasers use purchasing power to promote circularity

Clearly defined methodology

- Circular measures in 'Bouwbesluit' (Dutch Building Decree)

Information

- Materials passport

Construction targets

- Circular Construction and adjustments of dwellings

Consumer goods

Production

- European development of circular business models
- New risk assessment for banks and investors
- 'Product-as-a-service' project

Utilisation

- Circular 'craft' centres and 'repair cafés'
- Stimulate consumers to adopt a more circular behaviour
- Minimise the use of disposable products in events and hospitality industry

Recycling

- More and better recycling
- Chemical recycling

Innovation

- Less (non-recyclable) waste
- Development of smarter return systems

Manufacturing

Preventing net outflow of metals

- Expansion of 'Grondstoffescanner' (Raw Materials Scanner)
- Knowledge centre 'Kennislein Grondstoffen'

Replacing substances of concern

- Development of a method to minimise risks

Stimulate circularity of the manufacturing

- Education
- Materials passport
- Testing grounds

Learning

- Launching concrete initiatives

Food and biomass

Optimum use of biomass

- Sustainable purchasing
- European regulations

Soil and nutrients

- Transparent and quantifiable soil and water quality
- Sustainable soil management

More vegetable protein

- Protein sustainability

Reducing food waste

- Innovation, research, monitoring and public information

Sustainably produced biomass

- Circular timber chain
- Sustainable seaweed production
- Sustainability framework

Feeding and greening the cities

- Self-sustaining city with a circular food supply

Plastics

Prevention

- Support EU-campaign against microplastics
- Reduce unnecessary use
- Tackle biggest sources: litter and car tyres

Quality

- Innovative recycling systems
- Banning the incineration of recyclable waste

Biodegradable plastics

- Agreements on degradable products and materials

International efforts

- Alternatives for plastic packaging
- International projects and initiatives
- UN initiative against microplastics in the sea

Companies and their branch organisations, civil society organisations, research institutes and government representatives have set up activities to carry out the above lines of action. The Dutch government expressed commitment in 2017 to support the agendas and promote their realisation through an implementation programme. Launched in 2019, the Circular Economy Implementation Programme 2019-2023²² describes how the government and other agreement signatories are energetically shaping the transition towards a circular economy. The programme, which was recently updated,²³ contains an overview of projects to be executed in the five high-priority supply chains and a list of crosscutting themes affecting multiple aspects of the circular transition. These include instruments aimed at facilitating the transition process, for example, the adjustment or removal of obstructive rules and regulations in favour of a circular economy and financial support for companies that use fewer natural resources. Other measures are aimed at smart market incentives, circular procurement, better financial arrangements, knowledge development and innovation, international cooperation and behavioural change. The Circular Netherlands Accelerator portal, an initiative of public and private stakeholders, assists companies (mostly SMEs) in becoming more circular. It is an important instrument for facilitating and scaling up innovative circular business models, and helps businesses with regulatory problems, financing, knowledge and an adequate network.

The Dutch government has emphasised the pricing of products' environmental impact as another effective way to promote the circular economy. A lack of such pricing mechanism has so far meant that raw materials extraction and use are relatively cheap compared to secondary raw materials, known as 'recyclates'. Taxes and other charges can be introduced to account for environmental

22 Ministry of Infrastructure and Water Management, *Circular Economy Implementation Programme 2019-2023*, The Hague, 2019.

23 Ministry of Infrastructure and Water Management, *Circular Economy Implementation Programme 2020-2023*, The Hague, 2020.

impacts in the whole product chain. For example, the Dutch government is now examining a European import tax on highly polluting critical raw materials and/or products. It is also looking into a national or EU raw material or input tax, specifically for the use of energy-based products which are exempted from an energy tax (e.g. oil for the production of plastics). A tax on air pollution (e.g. SO_x, NO_x and particulate matter from industrial emissions) and a further increase of the existing waste tax are also being examined. Whether one or more of these impactful economic instruments goes into effect remains to be seen. Proposals that need EU-level consensus take time and can be particularly hard to pass.

3.4 Monitoring and Measuring Circular Activities

As part of the Dutch national policy the Netherlands Environmental Assessment Agency (PBL) was asked to set up a monitoring system. That system should not just follow the transition to a circular economy, but also find the adequate parameters to manage the transition. To carry out this task, PBL formed a consortium together with eight other institutes. To present a zero measurement of Dutch circular economy activities, PBL published an Outline of the Circular Economy in 2019.²⁴ This report contained a variety of initiatives, totalling approximately 85,000, some 1,500 of which are considered innovative. The PBL also analysed current barriers to and opportunities for accelerating the move to a circular economy. According to the agency, to cut down on raw material usage in the Netherlands, focus should not be only on recycling, but also higher up on the ladder: refuse, reduce, reuse and repair. PBL recommendations to the government include eliminating financial, legislative and permit-granting barriers as well as getting all public authorities to work together on the issue. In doing so, they can learn from each other and create more impact.

24 *Rood, T. and Kishna, M., Outline of the Circular Economy, PBL Netherlands Environmental Assessment Agency, PBL Publication Number: 3633, The Hague, 2019, <https://www.pbl.nl/en/publications/outline-of-the-circular-economy>.*

PBL wants to introduce its first monitoring report for transitioning towards a circular economy in January 2021 and thereafter every two years. The ambition is to generate independent and indisputable data that will become the fundament for the Dutch circular economy policy. Together with other scientists, I am a member of the Social Economic Council reflection group advising the PBL on developing this monitoring system. I am impressed by the great number of data that PBL has collected and interpreted. Measuring the progress of the Dutch circular economy policies and practices is hard, but the PBL seems to have managed to find a way to evaluate our success and failure factors. The monitoring system will be a work in progress: we will have to see how it plays out in practice and use national and international experiences for further improvements.

The many variables at play make developing a monitoring system very challenging. PBL has formulated indicators for both the effects of the transition and the transition process itself. Effects to be monitored include the amount of materials used and greenhouse gas emissions, both direct and indirect, as well as economic effects. To gain insight into the progress of the transition process itself and the need for adjustment, additional indicators derived from innovation research are used. Based on the mission-oriented innovation systems approach of Hekkert c.s.²⁵ the following indicators are applied: new entrepreneurship, development and sharing of knowledge, giving the circular economy direction through objectives and solutions, creation of markets and legitimacy, mobilisation of resources, breaking through resistance from the established system and orchestration of the various change processes. These transition activities, however, will only produce their intended effects over the long term. In the beginning, the transition process will be slow. Updates and new documents can be found on the Dutch government website's dedicated page

25 Hekkert, M. et al., *Mission-oriented Innovation Systems, Environmental Innovation and Societal Transitions*, 2020, 34, 76-79, <https://doi.org/10.1016/j.eist.2019.11.011>.

to the circular economy and on the website of PBL.

3.5 Local Circular Economy Policies

Local government plays a crucial role in our transition towards a circular economy. After all, the local level is where policy passed at national, European and other international levels is often implemented. In the Netherlands, local government consists of two administrative layers across 12 provinces and 355 municipalities.

Dutch local governments began making the circular economy a point of priority around 2016. This was triggered by national political interest in a circular economy, increased societal pressure locally and the promising opportunities for improving innovations in the local economy, increasing employment and decreasing environmental impacts. The policies were not completely new, aligning as they did with existing waste management policies, support of start-ups and green economy promotion. However, these activities which were previously carried out in silos now fell under one umbrella. Their scope broadened, from being a merely environmental issue (e.g. waste management) to part of an integrated approach in which the environment, the economy and social wellbeing all go hand in hand. This implied that the circular economy gradually touched on policy areas of practically all local government departments. Lessons learned by pioneering Dutch municipalities were summarised in the informative report *Circular Cities: Accelerating the Transition towards Circular Cities*.²⁶ To discover the circular potential of a city and set priorities and ambitions, various Dutch cities have applied the Circle City Scan tool created by among others not-for-profit organisation Circle Economy.²⁷ This helpful visual roadmap identifies opportunities for fostering a circular economy. How to develop circular economy strategies and define their role in the implementation is still

26 *Holland Circular Hotspot and Circle Economy, Circular Cities: Accelerating the Transition towards Circular Cities, The Hague, 2019, www.hollandcircularhotspot.nl.*

27 See <http://www.circle-economy.com>.

challenging for most local governments.

An overview of the tasks fulfilled by provinces and municipalities in the context of the circular economy is summarised below.²⁸

Tasks to be fulfilled by provinces and municipalities

Provinces (12)



Policy development

- a. Formulate vision, ambition and strategy on the circular economy
- b. Select key areas to start with, based on a mapping of main resource streams and on the crucial economic sectors of the province

Adjustment of policy instruments

- a. Bundle institutional, legal and socioeconomic barriers, and if possible remove them and communicate the remaining ones publicly to the national government
- b. Integrate the circular economy in spatial planning
- c. Coordinate the circular economy monitoring at provincial level

Policy execution

- a. Integrate the circular economy in all relevant policy areas of the province
- b. Implement circular procurement in own organization

Facilitation of innovation and learning networks on the circular economy

- a. Stimulate product chain innovation and entrepreneurship via funds, challenges and allocation of funds for living labs
- b. Enhance the creation of knowledge exchange and learning networks on the circular economy
- c. Support educational programmes to train scholars in the circular economy at all educational levels

Promotion of employment and new businesses in the circular economy

- a. Support initiatives focused on employment and new businesses in the circular economy
- b. Involve people for whom the labor market is less accessible

Municipalities (355)



Similar roles as provinces but at city level. Additional roles:

Responsibility for municipal waste streams

- a. Organise (separate) collection of municipal waste
- b. Create an appropriate volume of resource streams for qualitatively high-value recycling and reuse together with others

Interaction with citizens

- a. Communicate directly to citizens and promote desirable consumer behavior
- b. Support citizens' initiatives

3.6 Bundling Circular Initiatives in Regions

Experiences in the Netherlands show that some circular initiatives must, in order to be effective, transcend the city level and be organised at a regional level. For example, investments in advanced recycling technologies only lead to a viable business case when enough volume of a particular resource stream can be created and the commercial demand for recyclates and their quality can be guaranteed. Similarly, when cities want to use their purchasing power to increase the market for circular products and services, they do well to join forces and align with other stakeholders willing to establish circular procurement. Efforts are therefore also made to bundle circular initiatives regionally in the Netherlands. I have analysed six of those initiatives.²⁹ Spread across the country, they scope about half of the Netherlands, including 174 municipalities and over eight million inhabitants.

The six regions differ in various respects. Their size ranges in scale, from one or more provinces to a region, a city or even the bundling of a number of cities; the key actors who initiated the regional approach drew these groupings. Moreover, each region's programme priority points are determined by its specific socioeconomic and cultural strengths.

29 Cramer, J.M., *The Function of Transition Brokers in the Regional Governance of Implementing Circular Economy: A Comparative Case Study of Six Dutch Regions*, *Sustainability*, 2020, 12, 5015, <https://doi.org/10.3390/su12125015>.

Six Dutch regional circular initiatives

Part of the Netherlands		Range of activities Municipalities	Inhabitants, million
Central	1 Province of Utrecht	26	1,295
East	2 Provinces of Gelderland and Overijssel	76	3,000
East	3 Nijmegen Area	13	0,250
North	4 Friesland	18	0,650
South	5 Mid-Brabant	9	0,450
West	6 Amsterdam Metropolitan Area	32	2,480

When comparing circular economy programmes across the six regions, similarities and differences come to the fore. All programmes have firm regional support from local governments and were initiated by one or just a few actors. All involved a diverse stakeholder group, consisting of business, government and research institutes (triple helix). Some also involved citizens' groups or non-governmental organisations (quadruple helix). In all, an intermediary functioned as a transition broker. The six initiatives differ in their organisation, with forms including that of association, informal cooperation alliance, part of a public-private organisation and private organisation. Budgets vary significantly too, depending on what regional support can be mobilised.

After several years of implementing the circular economy in their own regions, the six regions' transition brokers were eager to scale up successful initiatives and be more involved in preparing new circular economy policies in the Netherlands and the EU. In autumn 2019, they jointly established a platform coordinated by a civil servant from the Ministry of Infrastructure and Water Management. Its main objective was to learn from each other, improve their effectiveness and connect regional initiatives with national policies, such as the five transition agendas and specific

policy instruments. To detail how the transformational change towards a circular economy is put into practice at a regional level, I describe in chapter 5 the case of the Amsterdam Metropolitan Area. For this case I served as a transition broker and adopted network governance.

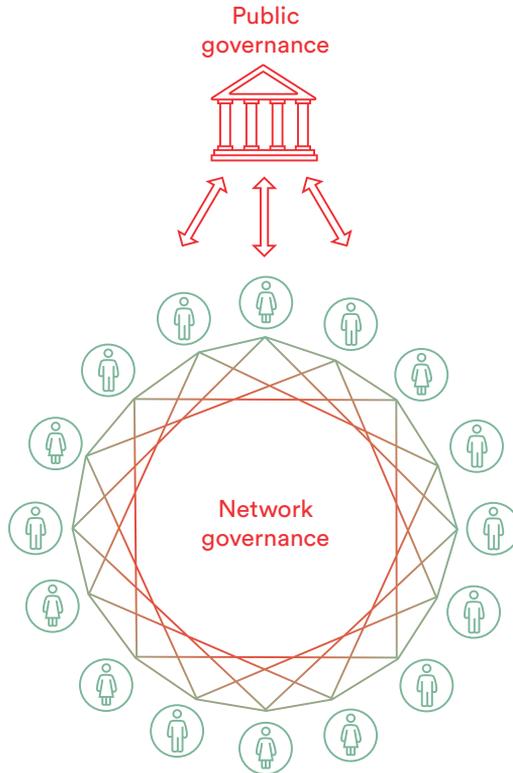
3.7 The Merits of Network Governance

Network governance is an indispensable addition to the conventional public governance I have so far described. Traditionally, the government's role as protector of the common good — here safeguarding the liveability of Planet Earth now and in the future — is to formulate rules that the market and society are supposed to follow. Through the deployment of policy instruments, the government can steer change towards desired directions and facilitate compliance by stakeholders. This conventional governance model does not suffice for the complex transition towards a circular economy, especially not in Western democracies. Network governance is needed to get everybody on board, thereby helping put a circular economy into practice. In a growing number of countries, a bottom-up movement includes all kinds of germs of renewal, which generate an inspiring environment to reconsider our current consumption and production patterns. In all kinds of practices, frontrunners emerge and demonstrate that the circular economy is in reach. These stand-alone initiatives add up to a movement that grows in size and strength, particularly when they join forces. Network governance can facilitate this process.

The importance of network governance is often underestimated, particularly due to its unfamiliarity. When putting network governance into practice, confusion arises among stakeholders about their particular roles and responsibilities. So what do we have to do differently, and why? We are so used to operating in a traditional division of roles, that we fail to realise that adopting this model is also part of the transition towards a circular economy. All stakeholders must redefine their roles and responsibilities to

help accelerate the transition. Because relationships have become institutionalised in daily practices, finding roles in a new context is difficult. I have seen how persons or organisations operating from an intermediary position – the transition brokers – can thus orchestrate the change process. When they get the mandate to fulfil this servant leadership role, the preconditions for successful implementation can be organised more easily.

Relation between public governance and network governance



It remains the responsibility of the national government to formulate policies and implement their accompanying legal, economic and social instruments. The national government can help remove fundamental barriers by implementing measures encouraging a circular economy. Such incentives can clearly accelerate the transition process, particularly when they enforce fundamental change. For example, the introduction of targeted legislation and impactful economic incentives can redirect our economy. Implementing radically new national policies, however, remains difficult due to diverging political and economic interests. Policies in democratic societies can only be implemented if supported by a parliamentary majority. That is why policy changes tend to occur via incremental, step-by-step improvements. Only in times of severe crisis or when the government can develop broad societal support for stricter policies might a window open for faster radical changes. The government can create societal support for decisions to be taken by using online and offline communication. It can also be valuable to instate citizen councils which reflect the views of a random yet representative sample of society. Such councils may surmount the day-to-day differences of political opinion, though decisions still lie with parliament.

These political constraints make it even more relevant to increase support for bottom-up circular initiatives and the accompanying role of network governance. This book contributes to this objective by sharing experiences from implementing a circular economy in the Netherlands. Among the countries that have had such experience, the Netherlands stands out. The country builds on a 40-year history of dealing with issues related to the circular economy. In the 1980s, we were an early adopter of shifting from landfills to incineration and recycling. In the 1990s, ecodesign became popular. Consequently, a large body of knowledge and experience has laid the foundation for circular economy policies.

Moreover, network governance to strengthen bottom-up change could rather easily be adopted in the Netherlands because it

accommodates Dutch culture. The Netherlands has a longstanding tradition of cooperation, consensus-building and democratic self-rule, which is known as the polder model. This stems from the time that the Dutch had to fight against the sea and built polders. To organise water management, stakeholders including the government, businesses, researchers and civil society had to work together. This Dutch approach of collaboration and joint decision-making is conducive to network governance. Although considerable progress had been made in implementing circular initiatives, the Netherlands still has a long way to go before actually becoming a circular economy.

Part 2

**Network Governance:
Dutch Circular
Initiatives**

Chapter 4

Building circular product chains

If I have learned one thing in the past few decades, it is that changing a system cannot be done by one person or organisation. To make a product chain circular, you must involve all relevant parties. But how can you make this network governance work? The Dutch circular initiatives around mattresses, concrete and clothing are ideal illustrations.

4.1 Mattresses

The case of mattresses reflects a rather focused circular initiative. How the product chain could be made more circular was pretty clear and the number of parties involved was relatively limited. I participated from the start as the transition broker, launching the initiative and transferring the execution to another transition broker. However, I remained on standby until the parties agreed on an implementation scheme. All parties were incentivised to join by the urgent need to improve the circularity of the product chain.

This initiative did not go unnoticed. It was chosen as a flagship project of the national circular economy transition agenda on consumption goods and a breakthrough project on the Dutch innovation agenda. Introducing an extended producer responsibility (EPR) for mattresses well illustrates the development of a cohesive circular economy programme in the Netherlands. It is seen as an example of best practice and an inspiration for other

circular projects. What seemed virtually impossible three years ago is now likely to succeed. The necessary innovation, legislation, increased recycling capacity and introduction of mattress labels are all well underway. This sunny forecast is a testament to the power of network governance. Business stakeholders worked closely together with Dutch policymakers while transition brokers mediated the process.

The Mattresses Case in Detail

In the Netherlands, consumers annually discard about 1.2 million old mattresses, which represents the most voluminous residual household stream. Moreover, an additional 300,000 mattresses are discarded by businesses and organisations, such as caravan parks, hotels, the army and hospitals. To this day, most mattresses are incinerated at relatively high costs. With waste incineration companies not in favour of incineration due to the technical problems and risks associated with storing and processing mattresses, the call for redesign and recycling grew louder and louder. Moreover, Dutch municipalities being responsible for the collection of 80% of all discarded mattresses, face high costs. The existing alternative path – mattress recycling – consists of dismantling mattresses and processing them into new raw materials that are often reused or used as underfelt, judo mats and cow mattress foams. However, this option is even costlier, which leaves that the two privately owned Dutch recycling companies barely able to survive. To overcome this stalemate, a new initiative began in the Amsterdam Metropolitan Area and was soon scaled up to the national level.

I launched this initiative in 2015, in my capacity as a member of Amsterdam Economic Board, a regional public-private organisation. We first took inventory of current processing and recycling methods of discarded mattresses and ideas for dealing with mattresses in a more circular manner. Drawing on this background information, I organised a circular economy lab on 25

January 2016,³⁰ together with the Utrecht Sustainability Institute. This lab format was chosen because I had already moderated 11 circular economy labs as the institute's director and, later, as senior adviser. Earlier labs showed that this format works very well when different parties are willing to seek circular solutions together. This lab's aim was to develop a strategy for redesigning and recycling mattresses.

Representatives from the whole product chain, including recyclers, and local and national governments attended the session. The main obstacle turned out to be how to finance a better alternative. To solve this problem, the participants proposed jointly setting up a national initiative aimed at introducing a voluntarily EPR. This policy would hold mattress companies responsible for ensuring that their mattresses get eventually recycled. After all, recycling costs money: about €10 per mattress.



The Circular Economy Lab on Mattresses on 25 January 2016.

The lab kicked off a nationwide collaboration between key players in the Dutch mattress industry. Manufacturers, importers, recycling companies, suppliers of raw materials, industry associations and policymakers joined forces to establish the Supply Chain Dialogue for a Circular Economy for Mattresses (known in Dutch as the Ketenoverleg Circulaire Economie Matrassen). The aim was not only to ensure that discarded mattresses be recycled, but also to establish a solid business case for the recycling process. The branch organisation of municipal cleaning services was willing to take the lead in preparing the voluntary EPR with representatives of the whole chain.

After an enthusiastic start, getting consensus on the EPR proved harder than expected. First, the recyclers could only improve and scale up their facilities if a certain volume of discarded mattresses and demand for the recyclates were guaranteed. Volume concerns could easily be allayed after an EPR introduction: if more than 70% of the mattress manufacturers agreed on a voluntary scheme, the EPR would become obligatory for all manufacturers. The demand for recyclates was more problematic since the world market was oversupplied with the main raw materials in mattresses: latex and polyurethane. This implied that manufacturers needed to redesign their mattresses in a way that guaranteed high-value material recycling. The recyclates' price and quality both had to be attractive enough to invest in the expansion of recycling facilities. Redesign for high-value recycling thus became one of the main pillars of the voluntary EPR policy. However, the participants admitted that while redesign was feasible for new mattresses being discarded within 10 to 20 years, it was not for the millions being discarded before then.

Making the initiative successful also proved less easy than expected. It required innovation, in terms of both the raw materials used in mattresses and in recycling techniques. Moreover, we needed better understanding of the types of materials used in already discarded mattresses, even if decades old and of

unknown provenance. After all, the goal was to be able to resell the raw materials generated by recycling. We also wanted to offer consumers a choice between mattresses that are easily recyclable and those that are not by using labelling practices similar to those in the clothing sector. To this day, no such label exists for mattresses. The most prominent problem to be solved was how to finance the redesign and recycling. Everyone agreed that finding an alternative for the present incineration of mattresses would cost extra money, particularly for an appropriate collection and logistics system, upgrading recycling facilities and the redesign of mattresses through innovative techniques. Views diverged on whether an extra fee should be charged on new or on discarded mattresses.

After a few meetings of the Supply Chain Dialogue for a Circular Economy for Mattresses, it became clear to me that the junior employee of the branch organisation of municipal cleaning services, who served as the coordinator, lacked time and authority to negotiate these differences of opinion. I contacted the Ministry of Infrastructure and Environment to help find a more senior person. This led to the appointment of transition broker Jan Nieuwenhuis, who had been director of Green Growth within the Ministry of Economic Affairs. The transition broker played a crucial role in mediating between all parties, beginning with a round of conversations with individual key players to understand the differences of opinion on an EPR. I sometimes joined him for these talks and, in the background, assisted him when needed.

The Dutch House of Representatives also played a role in the initiative. Some members had heard about the difficulties in the negotiation process. They passed two resolutions on EPR and recycling capacity to further incentivise the mattress sector to take action. They asked the State Secretary of Infrastructure and Water Management to introduce an obligatory EPR if the mattress chain did not respond appropriately. As the State Secretary openly started to act upon these resolutions, stakeholders were pressured to speed up the negotiations. In September 2019, just

before the deadline, the Netherlands' five largest manufacturers and importers of mattresses – IKEA, Beter Bed, Auping, Swiss Sense and Hilding Anders – informed the Ministry of Infrastructure and Water Management of their intention to engage in a voluntary EPR. This is expected to increase the rate of recycling from its current 35% to 60% in 2025 and 75% by 2028. The State Secretary is currently working with the sector on transitioning the initiative from voluntary to binding in 2021, at which point all manufacturers and importers would be required to participate.

Effects include a significantly larger proportion of discarded mattresses being recycled instead of incinerated and raw materials producers (e.g. DSM and Dow Chemical) being incentivised to make their materials more recyclable. Besides mattress manufacturers, the partners involved in the execution are the municipal cleaning departments, the branch organisation of mattresses, recyclers, governments, mattress retailers, raw material suppliers and research institutions.

Conditions for Success

Participants came to a financial agreement which implied an additional fee on new mattresses. They also set five conditions for success.

Innovation

Innovation is key to meeting the targets. One producer (Auping) has already introduced a new fully recyclable mattress together with DSM-Niaga. Emphasis is not only on redesigning mattresses, but also on using mechanical recycling methods. This sets an example for the entire sector. Pyrolysis Recycling Initiative for Mattresses (PRIMA), another sub-initiative, is exploring options for the chemical recycling of discarded mattresses. Dutch mattress recycler RetourMatras and IKEA have also begun developing chemical recycling technologies. These innovative efforts primarily address better recycling designs, of foam in particular. The next step, which is not spelled out in the EPR, is to redesign mattresses

for reuse and higher-value recycling (e.g. recycling the mattress textile fibres).

Regulations

It is important to ensure that materials recovered by recycling mattresses all comply with existing regulations. The Ministry of Infrastructure and Water Management funded an analysis of undesirable characteristics of recycled foams, such as material toxicity, odour and pathogens. The Netherlands Institute for Public Health and the Environment (RIVM) presented a research design in 2020. Product chain representatives are expected to guide the process along.

Recycling capacity

In mid-2019, came the announcement that the Netherlands would increase its recycling capacity to accommodate more than 1 million mattresses per year. The first major expansion of mechanical recycling capacity took place in 2020. This expansion was enabled by the waste processing company Renewi and Ingka Investments (belonging to the same group as IKEA Retail), both of which invested in recycling company RetourMatras. Along with the existing capacity of the Netherlands' other mattress recycler, MRE, this expansion meets the increased mattress recycling needs.

Mattress Labels

To adequately inform consumers about mattress composition and to enable companies to recycle them after 10 to 20 years, the Royal Netherlands Standardisation Institute (NEN) is developing a new Dutch norm for mattress labelling. An international norm will follow. All interested companies and organisations are welcome to contribute.

International and Other Regulations

A last condition the stakeholders formulated is that all proposals must comply with international and other regulations around the use of secondary raw materials from mattresses.

4.2 Concrete

The concrete case is another good example of how network governance can benefit the circular economy. Concrete is a relatively simple product, consisting of sand, gravel and cement. The product chain, however, encompasses a large variety of businesses, practically all of them working in the Netherlands, except for the cement production. The concrete sector is highly regulated, which makes it hard to develop and implement innovations. Commissioning parties can strongly influence the performance of the concrete sector via their procurement policies. The transition to more circular concrete is therefore an interplay between the sector itself, commissioning parties, research institutes and governments. All parties were aware of the urgent need to reduce the environmental impact of concrete, particularly cement. In response, they signed the Concrete Agreement ('Betonakkoord'). I was involved as a transition broker to formulate the agreement in the preparatory phase and as chair during the execution phase.

Each year, the Dutch concrete sector produces 15 million m³ concrete, which generates about 3.7 megatons (1.7%) of the national CO₂ emissions. Cement accounts for about 80% of concrete production's CO₂ emissions. Due to the high volumes of concrete used worldwide, the cement industry is responsible for 5 to 7% of anthropogenic CO₂ emissions worldwide. Moreover, the annual aggregate concrete production and its water consumption lead to depletion of natural resources. To reduce this impact, decreased use, reusing and recycling should become matters of course. In the Netherlands, 90% of demolished concrete now ends up as pavement under roads. More high-value recycling and reuse are possible, but not yet commonly applied. It should be noted, however, that more new buildings are constructed than demolished in the Netherlands, meaning that only about 20% of concrete used in new buildings can come from recycled materials. Sand and gravel availability is not yet a problem. But extra efforts should be made to guarantee that excavation does not lead to biodiversity losses.

The Concrete Agreement was signed on 10 July 2018. This was a second attempt to join forces at a national level to counter society's criticism of the sector's high environmental impact. An effort by the concrete sector to draft a sustainability roadmap had failed in 2015. Although it had increased the sector's awareness to improve sustainability performance, targets and timelines were lacking and actions were too noncommittal. Building on the lessons learned, a second effort started in June 2016. To reach an agreement, representatives from the concrete chain and the government negotiated for one year. After that, another year was needed to convince parties to formally sign the agreement. Negotiations concerning the text of the Concrete Agreement focused on a time horizon lasting until 2030 and four main themes: CO₂ reduction; the circular economy; natural capital; and social capital. For each theme, specific actions and clear intermediate and final targets were formulated. About 60 representatives from all segments of the concrete chain (e.g. sand and gravel extraction, concrete mortar, prefab, concrete goods, binders, demolition, recycling, contractors of the building sector, builders and architects), the government (also in their role as a public commissioning party) and research institutes were actively involved in drafting the agreement. For each theme, a working group chaired by an independent intermediary was instated.

I chaired the working group on the circular economy, which was composed of about 20 representatives. Right from the beginning, I proposed using the circularity ladder of 10 R's as our guideline. Because the stakeholders had divergent interests, it was not easy to formulate a text everyone could agree on. However, the urgency to improve the concrete sector's environmental performance and competitiveness was my guiding light. I continuously underscored how the Concrete Agreement was part of an impactful transition process, meaning that the stakeholders had to show vigour by balancing the pros and cons of the arguments and always keeping our main goals in mind. I was able to draft a text on which all working group members could agree. The two main priority points

were circular design and reusing all concrete resource streams in new buildings by 2030. The other working groups also achieved consensus after one year of negotiation. This led to a final text that could be decided on by the steering group instated during this preparatory stage.

The targets of the Concrete Agreement set for 2030 are:

- A CO₂ reduction of at least 30% though with an intended 55% compared to 1990 — which was in line with the climate targets of the Dutch government;
- 100% circular concrete, which was in line with the Circular Construction Economy transition agenda and the policy goal to make material passports of buildings and constructions obligatory in 2030;
- A net positive value of natural capital, meaning that after extracting sand and gravel, in particular, the natural environment is left with higher biodiversity than before;
- Increased social capital in the form of improving and sharing knowledge, innovation and education.

For each target, specific actions were formulated. A supportive government removing barriers, a monitoring scheme and a renewed governance structure were mentioned as important conditions for the targets to be met. Once the draft agreement was ready, a broader group of stakeholders, including the organisation directors and CEOs, got involved. They were willing to sign the agreement if their comments were taken on Board. I saw their criticism as a good sign; it meant that the results of the negotiations were taken seriously. Most criticism could easily be dealt with, but two problems stood out. First, the government needed to check whether the text was not in conflict with competition law. After waiting impatiently for half a year, this issue was resolved. The second problem was expressed by the branch organisation of the concrete sector in a side letter. This organisation requested consideration of reservations the letter raised about preconditions for the success of the agreement. Once this request was granted

without having to revise the draft text, the last hurdle was to set the date to sign the agreement. In July 2018, 38 organisations signed the Concrete Agreement, soon followed by 25 others. The three main branch organisations were sympathetic to the agreement and provided support. The group that signed the agreement took charge of the first phase of its execution.



All participants of the Concrete Agreement, including in front preparatory phase chair Jeannette Baljeu; State Secretary for Infrastructure and Water Management Stientje van Veldhoven; execution phase chair Jacqueline Cramer; and negotiation phase chair and director of MVO Nederland Maria van der Heijden.

Execution of the Concrete Agreement

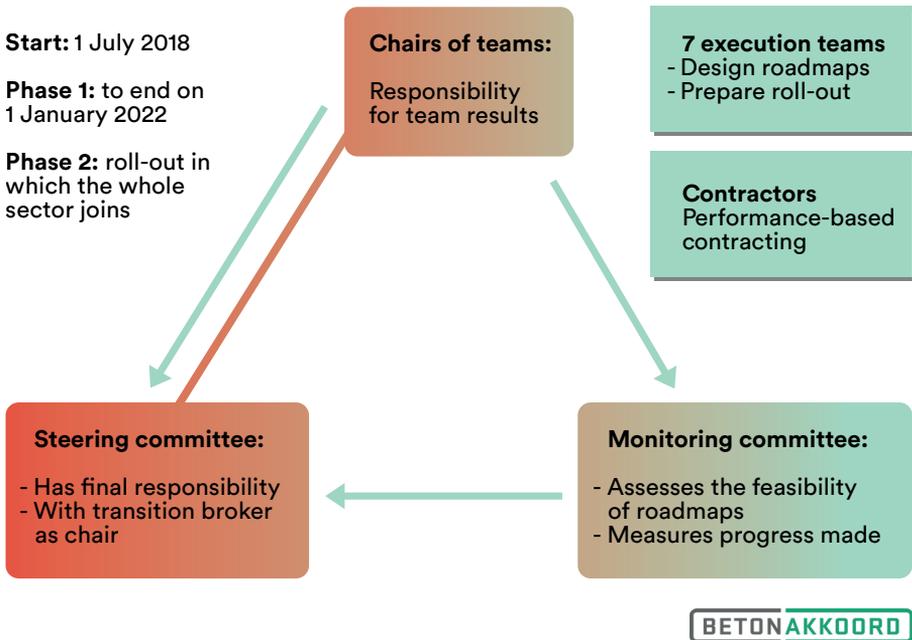
The execution of the agreement was subdivided into two phases:

- Phase 1: building (10 July 2018 - 1 January 2022)
- Phase 2: scaling up (1 January 2022 – December 2029)

What follows is a description of experiences from the building phase only, as scaling up has yet to begin.

During the building phase, which is currently on-going, we want to ensure that everyone from the concrete sector and commissioning parties can implement the Concrete Agreement. Together with a secretariat (of 0.6 FTE), I orchestrate the overall process. As a first step in this phase, I outlined a governance structure in close collaboration with the steering committee. This steering committee consists of 12 members, each representing a particular subsector of the concrete product chain, public and private commissioning parties, the national government, research institutions and civil society. As chair of the steering group and the transition broker, I prepare the meetings with the secretary. Besides that, a monitoring committee consists of three independent experts. They were asked to publish a yearly report on the progress being made, based on the input of the participants themselves. Finally, seven self-steering execution teams were instated to oversee the following themes: CO₂ reduction; circular design; recycling of residual concrete streams; natural capital; an environmental costs indicator (MKI) assessing the overall environmental improvement; knowledge and innovation; and education and knowledge-sharing. The steering group appointed directors for each team, who are tasked to prepare a roadmap for how to achieve the targets and on the needed instruments and monitoring indicators. Most costs for these activities are paid out-of-pocket by the participants themselves. The government has made some money available for hiring experts for specific tasks, financing the secretariat and communicating the results. By 1 January 2022, all preparatory work should be finished. From then on, everyone in the concrete chain is expected to act according to rules formulated in the Concrete Agreement. In the meantime, frontrunners have already implemented the needed measures.

Governance model of concrete agreement



The commissioning parties are crucial for ensuring that all parties participate. Specifically, they formulate the requirements for demolishing and building, thereby steering what the market must do. It was a major challenge to get a binding commitment from all public and private contractors to act according to the objectives of the Concrete Agreement. I asked the national government to oblige them to do so but without success. The Dutch government has decentralised many tasks, including procurement. The three ministries most closely involved in the agreement – of internal affairs; of infrastructure and water management; and of economic affairs and climate – were willing to endorse the initiative, but all commissioning parties had to come on board voluntarily. To speed up the process, I approached the major organisations representing the commissioning parties and asked them to help mobilise their

members. This process is still on-going. A frontrunner group of mainly public contractors offered to assist in developing tools contractors can use in executing the main objectives of the Concrete Agreement. This group now acts as the informal, eighth execution team. The first commissioning parties of the private sector soon joined and have also begun to follow a similar strategy as the frontrunner group of public contractors. This triggered a Cheerios effect, which I am hopeful will lead to all commissioning parties' full commitment.

The seven self-steering execution teams started their activities soon after the agreement was signed. When the first drafts of their roadmaps were formulated, it became clear that innovation was indispensable to reach the targets. Innovation projects which could lead to implementation in about one to five years were the most appealing, as they could be rolled out in time to reach the Concrete Agreement targets of 2030. Still, more fundamental research is also needed for long-run application. The steering group asked the government for an innovation budget, but without success. The government suggested using existing innovation programmes. It remains to be seen whether enough funds can be amassed to test and prove the necessary innovations. The first funds have been mobilised to carry out specific research and to test the material quality of new innovations. To avoid overlap, the aim is to orchestrate innovation projects to be financed and, as much as possible, aligned with each other. The commissioning parties are taking the lead in this process, and will specify the innovations to be developed in their tender procedure and then ask the market to respond.

In May 2020, we evaluated progress on the roadmaps and bottlenecks we encountered via a webinar. Two main challenges emerged during this meeting. First, for some roadmaps, specific preconditions needed to be fulfilled by the national government. Second, for as long as improvements focus on the production and recycling of concrete materials, the targets are hard to achieve.

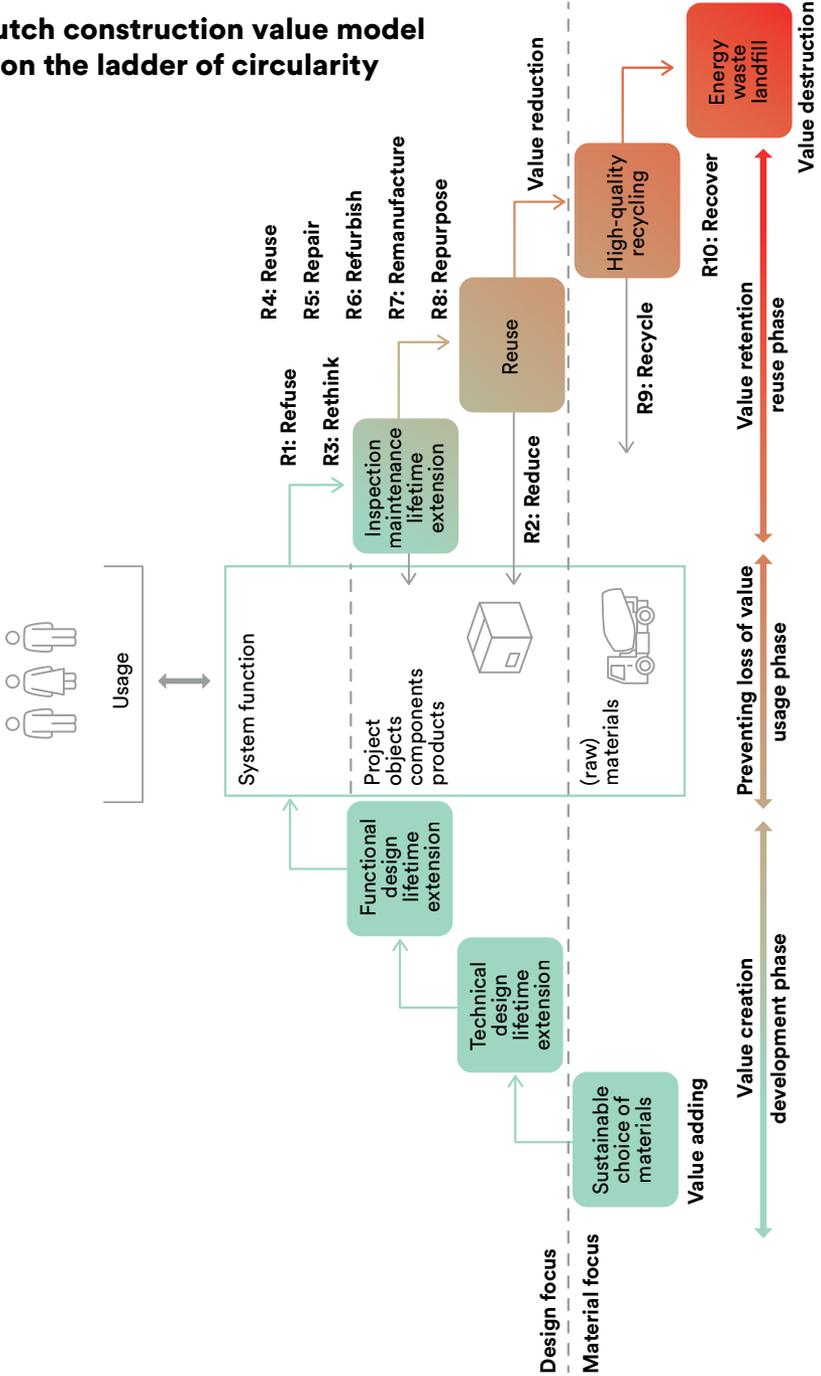
Both problems were addressed in follow-up actions. First, in a letter to the government we requested help resolving all the constraints that the teams had encountered until that moment. We thus asked for:

- Clear rules on how to attribute CO₂ reduction over the concrete chain;
- Common guidelines for commissioning parties on circular demolition and attribution of environmental impact;
- Strict application standards for contaminated concrete;
- More flexibility in the use of specific quality standards (e.g. EN 206) depending on the particular concrete application;
- Transparent comparison of different building materials (e.g. wood, steel and concrete) on environmental performance;
- Financial support for innovation and development of tools.

Since the national government had also signed the agreement, the three participating ministries were part of solving these problems.

For the second challenge, we needed to address approaches higher on the circularity ladder: refuse, reduce, redesign and reuse. These had been addressed by the circular design team in their construction value model (in Dutch known as '*de bouwwaardemodel*'), but during our webinar we concluded that the model needed more specification and had to be used in the other teams' roadmaps.

The Dutch construction value model based on the ladder of circularity



To get this done, we organised follow-up meetings, notably with representatives of the CO₂ and circular design teams. To specify possible additional improvements that could be realised higher on the circularity ladder, I asked two experts with outsider perspective and longstanding experience in concrete innovations to provide an overview. They presented a broad spectrum of additional options which were first discussed in a small focus group. This group concluded that these options were valuable, but could only be realised if the commissioning parties would take the lead together with the builders. Their procurement process would have to be adapted and include options higher on the ladder.

As the CO₂ execution team mainly consisted of material experts, the first draft of their roadmap primarily presented innovations in material composition, use and recycling. They argued that implementation of the additional options was outside their locus of control and they therefore could not guarantee successful outcomes of those. Broadening the scope, however, would mean that the CO₂ reduction potential could be increased from approximately 10 to 20% up to at least 50 to 60%. Finally, after several discussions, those options were integrated in the CO₂ roadmap. Some would cost more, others less or the same. Should these additional options fall short, a list of back-ups is available. Working on these additional options also had major impact on the other execution teams, and they have since also incorporated them into their roadmaps. To realise additional options, the steering group is responsible for approaching the commissioning parties and builders and convincing them to take action.

For all these initiatives, the seven executions teams, the team of commissioning parties and the government are all expected to finish their 'homework' before 1 January 2022, when phase 2 starts. Some work still has to be undertaken, but it is clear what should be done. The roadmaps of all execution teams are specified in more detail and include innovations that lead to the formulated goals. The innovations are divided into three categories. Those

immediately implementable can be clustered in group 1; those that require innovative efforts can be clustered in groups 2 (to be implemented in two to three years) and 3 (to be implemented within three to five years). These clusters can be used by the commissioning parties as guidelines for performance requirements in subsequent years. In order to ensure that the innovations in groups 2 and 3 are developed in time, the commissioning parties and the market are coordinating their efforts and are supported by research institutes.

Moreover, in September 2020 a major campaign has started to mobilise the whole concrete sector and the public and private commissioning parties. The branch organisations affiliated with the concrete sector are key actors in this communication process. Without commitment from their adherents, the execution of the concrete agreement is doomed to fail. The building phase is being carried out by a small group. But when their work is finished, everybody should join. If this does not happen and the realisation of the targets is uncertain, a political process will be catalysed, which will probably lead to stricter government measures. As such, urgency for the concrete sector to reach the voluntarily set targets is high.

4.3 Clothing

The clothing sector is much more diverse than that of mattresses or concrete. The fashion industry consists of many different brands of various sizes, but the big fast fashion brands are clearly dominant. These fast fashion companies largely differ from the slow fashion movement that has been popping up locally. Brands operating internationally are in a very competitive business and thus much focused on price, while the slow fashion companies are usually small and experiment with new concepts higher on the circularity ladder. The latter initiatives are supported regionally by municipalities and environmentally conscious consumers. A big challenge is whether the fashion brands can become sensitised to these new concepts and move away from the linear to a circular economy. Can the gap between fast and slow fashion be bridged by innovative brands that already experiment with circular concepts or by mainstream brands that seek new market opportunities?

In the Netherlands, the fast fashion clothing industry is under attack for bad environmental practices at home and abroad, particularly in developing countries. Urgency to restructure the clothing industry has been expressed by governments, consumers and slow fashion companies. Notably since 2010, several parties have been working on smaller and bigger circular clothing initiatives, some of which I was involved in as a transition broker.

The negative environmental consequences of the clothing sector's use of raw materials, water, energy and chemicals are clearly visible. Seeking lower costs, production is often outsourced to developing countries, where environmental regulations are often less strict. Worldwide, the clothing industry is responsible for about 10% of total CO₂ emissions. Moreover, due to how clothing is produced, water shortages and pollution have created enormous environmental, economic and social problems. For example, to produce one T-shirt, about 2,500 litres of water is used; for one pair of jeans it is 7,000 litres. Serious water pollution is caused by the dyeing process and the use of plastics, particularly polyester, which is used in about 60% of clothing. When washing our

clothing, an annual 500,000 tons of microfibers ends up in oceans worldwide, which is an equivalent of 50 billion plastic bottles. Finally, the huge increase in clothing production and consumption and its decreasing reuse lead to a growing waste mountain. About 85% of all clothing we buy is discarded annually. In the Netherlands, 305.1 kilotons of clothing and other textiles, such as towels and sheets, get discarded; in 2018, 44.6% was collected separately via thrift stores and textile collection containers. The rest is usually incinerated. The wearable share of these separately collected textiles finds its way to the second-hand market (about 53%); the non-wearable share gets recycled (33%) or ends up in the waste incinerator (about 14%). With some exceptions, the market is not yet able to turn non-wearable textile into a viable circular business case. Mounting societal pressure to improve the clothing industry's environmental and social performance has compelled a variety of initiatives both in the Netherlands and internationally.

The Dutch Agreement on Sustainable Garments and Textile in an International Context

In mid-2016, several dozen organisations signed the Dutch Agreement on Sustainable Garments and Textile.³¹ This Agreement addresses the labour conditions and environmental impacts of the clothing industry in more than 5,800 production locations, many of which are in developing countries. Its aim is to promote international responsible business conduct in the textile and clothing supply chain.

For the implementation of the Agreement, companies, trade associations, trade unions, NGOs and governments work together under the leadership of an independent chair. The Social and Economic Council of the Netherlands serves as the secretariat, gives advice and assesses the companies annually. It checks whether plans of action are in accordance with OECD guidelines for multinational enterprises and the UN Guiding Principles for

31 *Multi-stakeholder group, Dutch Agreement on Sustainable Garment and Textile, Social and Economic Council, The Hague, June 2016.*

Business and Human Rights. The market share of participating companies at the end of 2019 was estimated at about 40 to 45%. Those who join must show how they deal with the risks in their supply chain, which goals they have set and what actions they will take. Other partners in the Agreement support companies in realising these ambitions. In 2019, 36 companies – 63% of 57 assessed companies – fully met the requirements set out in the assessment framework. This is a significant improvement compared to 2018 when only five companies (8%) fully met the requirements. In the coming years, we expect to witness an increasing number of companies complying with the set goals.



A broad coalition of businesses and other organisations signed the Dutch Agreement on international responsible business conduct in the garment and textile sector in mid-2016.

In 2019, the Agreement entered into a partnership with the Open Apparel Registry (OAR) to further increase transparency in the chain. OAR is an open global database of over 32,000 textile production locations. Through this partnership, the number of companies that is transparent about its clientele and that lets NGOs in for social research has increased from 1,027 to 5,812. In 2019, Agreement participants also worked on other issues, leading to current projects addressing child labour, liveable wage, sustainable textile dyeing in China and animal welfare. Participants are expected to continue their work in the coming years.

First Initiatives to Close Clothing Loops in the Netherlands

In 2017, the clothing and textile sector, united through the Dutch Circular Textiles Platform, launched its plan ‘On the road to circular textiles: Roadmap for the Dutch textile industry’,³² which was followed by a sector plan. These documents underpin the basic philosophy of circular textiles and specify the main strategies to become circular. In addition, the Dutch government issued in April 2020 a policy letter formulating ambitious policy objectives to steer the clothing and textile industry into a more sustainable direction.³³ By 2025, the objectives set to have 25% of material in textile products be recycled or sustainable and 30% of all marketed textile products recycled. By 2030, 50% of all marketed textile products need to contain at least 30% recycled or consist of sustainable materials (20%), while 50% is recycled. The government’s intention is to meet these ambitions in close cooperation with the sector by, for example, introducing an EPR policy. Besides these national policy-oriented initiatives, a great variety of business initiatives has recently been started. They cover specific elements of the clothing product chain. For example, frontrunners in the fashion industry have introduced more eco-friendly product lines and take-

32 *Dutch Circular Textiles Platform, On the Road to Circular Textiles: Roadmap for the Dutch Textile Industry, Driebergen, 2017.*

33 *Ministry of Infrastructure and Water Management, Beleidsprogramma Circulair Textiel 2020-2025 (Policy Programma Circular Textile 2020-2025), The Hague, 14 April 2020.*

back systems for used clothes. Newcomers, both start-ups and scale-ups, have developed all kinds of slow fashion alternatives as a response to the fast fashion trends in the mainstream market. Instead of producing more clothing, these newcomers promote the idea of buying less, sharing clothing more and producing new clothing responsibly.

Several initiatives have emerged in the field of reuse and recycling. Second-hand clothing is literally becoming fashionable, which accelerates clothing reuse. Besides the traditional outlets for second-hand clothing, new second-hand concepts have been introduced, for example, online marketplaces and library and clothing lease models (e.g. MUD Jeans). Recycling non-wearable clothing – which forms about 50% of the clothing discarded in the Netherlands via the textile collection of municipalities – has slowly gotten off the ground too. However, repurposing recycled textile fibres as original clothing and textile products is relatively complicated. The costs involved, the poor quality of discarded materials and the lack of appropriate recycling technologies hamper the speed of operation. Establishing a new fiberisation factory requires an estimated yearly volume of about 7,000 to 10,000 tons of non-wearable textile. To become cost-efficient, improvements must be made to mechanical sorting and fiberisation technologies as well as chemical recycling processes. Despite these constraints, a few Dutch initiatives repurposing recycled textile fibres are already successfully underway, as seen, for example, in the staff uniforms of the Ministry of Defence, police and fire departments.



Defence working clothes have been made from recycled fibres.

Having a constant stream of workwear, which can be sorted by hand according to colour and material, creates a large market for fibres with which to manufacture these new clothes. This process is much easier to organise for workwear than fashion. Nevertheless, it is also possible to develop textile recycling for fashion, if partners in the chain join forces, organise a sufficient volume of non-wearables and introduce innovative technologies. To create a viable business case, new financial arrangements should be agreed upon.

Although progress had been made, these circular initiatives still represent standalone projects scattered across regions of the Netherlands. Most large, international companies are not yet involved due to the following constraints:

- The clothing and textile sector is very competitive, which leaves little room for experimenting and testing new business

models. Circular business models are difficult to incorporate in their concept of fast fashion.

- Most retailers and brands buy readymade products and are unbothered about development of their materials. Moreover, they feel no responsibility to implement clothing take-back systems.
- Circular materials insufficiently respond to the demand in the production chain. There is a lack of knowledge about these materials and the higher price of recycled versus virgin fibres. Moreover, explicit demand from end-users is still limited albeit growing.
- In the Netherlands, hardly any textile production capacity is left to develop technological innovations.
- Fashion labels hardly exchange knowledge or experience.

Flagship project Dutch Circular Textile Valley (DCTV)

To tackle these problems and strengthen circular initiatives, various partners involved in one or more of the aforementioned initiatives and Modint, the branch organisation for fashion, interiors, textiles and carpets joined forces. By aligning their initiatives, they expected to create more synergy throughout the whole clothing chain. This led to the establishment of the Dutch Circular Textile Valley (DCTV) in May 2019. The initiative has been heralded as a flagship project of the consumption goods transition agenda.

The DCTV is a not-for-profit foundation. Its few staff have dedicated expertise; the Board, which I head, governs the DCTV. The Ministry of Infrastructure and Water Management finances the initiative. The flagship project aims to turn a collection of individual, worthwhile, predominantly small-scale initiatives into a widely supported movement towards the circular economy. The idea is that circular initiatives gain leverage and fashion brands and retailers also join in. Besides lowering the environmental impact, the aim is also to create job opportunities and develop innovative technologies and strategies that can be marketed abroad. The DCTV's primary target groups are circular start-ups

and innovative businesses; fashion brands and retailers; and textile collection, sorting and recycling companies. Other target groups that can support new initiatives are also invited, for example research institutes, the financial sector, governments, consumers and commercial customers and supply chain partners. The DCTV supports the primary target groups with the effectuation of their circular solutions, while the other target groups are involved to help create the market.

The DCTV's objective is to create a circular textile chain by 2030 which closes loops of products, materials and resources, and utilises new business models and all the 10 R's of the circularity ladder. To achieve that goal, the DCTV wants to mobilise the combined strength of innovative companies in four regional hubs: Twente, Tilburg, Arnhem-Wageningen and the Amsterdam Metropolitan Area. These hubs reflect past and present-day economic strengths connected to textiles, fashion and clothing. Each is characterised by a specific focus area: Twente with high-grade recycling; Tilburg with circular workwear; Arnhem and Wageningen with design and new (bio-based) materials; and the Amsterdam Metropolitan Area with circular brands and business models. Each hub is coordinated by one or more transition brokers.

Four Dutch regional textile hubs



Hub Twente
High-value recycling technology



Hub Tilburg
Circular workwear



Hub Arnhem-Wageningen
Circular design and new
(bio-based) materials



Hub Amsterdam Metropolitan Area
Circular brands and business models

In Twente, high-value textile recycling gained interest in the 1990s, which is unsurprising considering the city's rich textile manufacturing history. A pilot production capacity for high-value recycling now exists, and its focus is on innovations in mechanical and chemical recycling. The initiators are seeking funds to scale up the pilot together with designers and manufacturers. These new funds should go hand in hand with large-scale collection, intricate sorting and application of recycled fibres in design and production.

In Tilburg, efforts are concentrated on the separate collection of workwear, the fiberisation of materials and reusing recycled fibres in new workwear. In this city, an innovative company that started recycling workwear leads in promoting the hub and is supported by the local government.

In Arnhem-Wageningen, circular economy craftsmanship and the manufacturing of new biomaterials for textiles are being developed, such as mycelium and fruit 'leather' and bacterial and algal dyes. Wageningen University and Fashion Academy ArtEZ in Arnhem have joined forces to set up the Future of Living Materials, BioArt Laboratories.

In the Amsterdam Metropolitan Area, various initiatives have been combined, linking a variety of slow fashion start-ups and scale-ups to interested clothing labels, many of which are located in this region. The idea is to inspire these labels to embed circular design and new business models in their strategy and to encourage them to work together with innovative start-ups and scale-ups. The Amsterdam Economic Board coordinates the regional Amsterdam hub. Since the DCTV launch in 2019, various initiatives have gained momentum. LENA fashion library is one start-up receiving assistance from the DCTV. Another example, which had gained traction before the DCTV launch, is the House of Denim. The House of Denim started with blending virgin cotton with recycled fibres from discarded garments (Post-Consumer Recycled (PCR)), thereby reducing the use of water considerably. Large-scale

adoption of PCR is hindered by its higher effort/price point and low demand. House of Denim has sought cooperation from the company Wieland in Zaanstad, as another flagship project in the Amsterdam region. This company managed to sort non-wearable clothing using new scanning techniques and works closely with the Salvation Army's clothing collectors.



Denim Deal signed on October 29, 2020.

A milestone is the Denim Deal signed on October 29 (2020) by 30 parties in the fashion and textile industry, the Ministry of Infrastructure and Water Management, the municipalities of Amsterdam and Zaanstad, the Amsterdam Metropolitan Area and the Amsterdam Economic Board. It is the first time that all parties have joined forces to achieve cleaner denim garments such as production companies, brands and shops, but also collectors, sorters, cutters and weavers.

One last example to emerge in the heat of the COVID-19 crisis entails protective aprons, six million of which are currently thrown away per week in the Netherlands. The initiative, which is also part of the regional Amsterdam hub, aims to replace these aprons with circular aprons, so that they can continue to be used after this crisis. These aprons, made from discarded laboratory coats, shirts and overalls, are suitable for care and nursing staff and practitioners and doctors in care homes and rehabilitation centres.



Circular protective clothing developed during the COVID-19 crisis.

Besides the partners active in the hub, a variety of other closely related clothing initiatives are taken. A good example is the Plastic Soup Foundation, located in Amsterdam. This NGO aims to help solve the problem of microplastic fibres that are released

into the water when washing clothes. Serving as this organisation's supervisory Board chair, I believe the link between this initiative and the hub can easily be established. The same holds for other related initiatives to which network partners in this hub are connected.

Circular Textile Valleys

Focus areas per hub indicate their distinctive ambition and capacity. However, these should not be considered as exclusive. The ambitious idea is to develop these four hubs into so-called Circular Textile Valleys, whereby existing and new companies, research institutes and regional governments collectively focus on the production, recycling and reuse of circular textiles. The overall approach consists of two priority points:

Accelerating innovators: this approach is focused on strengthening innovators through supporting them in finding funds and scaling up their activities. A limited number of projects has been selected to substantiate the new circular system.

Connecting and developing: this approach serves the first priority point. It is intended to strengthen the network between partners wanting to work on innovations and make what is needed to create a circular textile chain transparent.

In the coming years, these activities will be further enhanced, showcasing what a circular textile chain can look like. I hope that the fashion industry (both the big, international and smaller brands) will develop new lines, using high-quality textiles based on fibres recovered from used textiles and scaling up slow fashion initiatives aimed to reduce, redesign and reuse. Collaboration between innovative companies, retailers and fashion brands will make new circular concepts and business models more mainstream, which will also lead to more circular employment. However, if these expectations are not fulfilled, a more stringent role by the national government will be necessary to reach the targets set by that same government.

Chapter 5

Building a circular Amsterdam Metropolitan Area

In 2015, as a member of the Amsterdam Economic Board, I initiated a big regional circular economy programme in the Amsterdam Metropolitan Area. This programme is a great example of network governance since companies, knowledge institutions and local and regional organisations jointly work on the execution of circular initiatives. This chapter describes the origins of the programme and its results. It parallels and is well tuned to the circular economy activities of local governments. First, I set the context within which the programme was executed.

5.1 Circular Economy in the Amsterdam Metropolitan Area

The Amsterdam Metropolitan Area is a relatively densely populated region, comprising about 2.4 million inhabitants. Within it, large amounts of products and materials circulate, and many innovative and sustainable entrepreneurs are active. The region has an excellent logistics network across all transport modes and coordinated spatial planning. It represents a wide variety of economic activities and a broad knowledge infrastructure, while societal support is present for circular economy initiatives. The region is committed to its innovative and creative culture.



The Amsterdam Metropolitan Area is 2,580 square kilometres in size.

The region is composed of two provinces (North Holland and Flevoland), 32 municipalities and the Transport Authority Amsterdam. Since 2015, the focus here, aligning with national policies, has been on initiatives contributing to the circular economy. Because the municipalities are responsible for collecting and processing domestic waste, they can influence how the waste is processed vis-à-vis circularity. The main means to do so is through adjusting procurement policies. Municipalities and provinces also monitor compliance by implementing rules regarding the collection of industrial waste. With much domestic and industrial waste still incinerated, municipalities and provinces can clearly make a difference here. Jointly, the two provinces and the 32 municipalities have also installed additional programmes, mainly targeting overarching themes, such as innovation, adjusting legislation and monitoring.

Moreover, the municipalities and provinces, together with the Amsterdam Harbour Authority and the Schiphol Area Development Company, reinforced their support for development of advanced platforms for reused, refurbished and remanufactured products as well as for circular business.³⁴ Some municipalities have formulated well-elaborated city approaches to actively support the transition towards a circular economy. A good example of the city approach is the report *Amsterdam Circular: Vision and Roadmap for City and Region*, published in October 2015.³⁵ The report describes resource flows in Amsterdam and the region. Two prominent flows, construction waste and organic residual streams, are further elaborated into an action agenda. After several follow-up reports, the city recently published the *Amsterdam Circular Strategy 2020-2025*.³⁶ The main policy objectives are for 50% fewer new raw materials to be used in Amsterdam in 2030 and for Amsterdam to be completely circular in 2050. Interim objectives are for 10% of the city's procurement to be circular in 2022, and a year later, for requirements that built environment tenders be circular as well. Almere is the first city in the Amsterdam Metropolitan Area to have transformed the traditional environmental depot system for bulky domestic waste streams into a circularity station. The aim is to invite repair and maintenance companies to settle close to the station and generate new surrounding businesses which can make products from the resource streams.

Besides all the initiatives taken in the municipalities, the two provinces are active supporters of the implementation of a circular economy. They have installed additional programmes, mainly concerning overarching themes, such as innovation, adjusting legislation and monitoring. Together with the municipalities the two provinces developed a joint circular economy programme which is coordinated by the Regional Board of Local Governments.

34 See <https://hollandcircularhotspot.nl/.../amsterdam-edition-of-hch-mag>.

35 See <https://www.circle-economy.com/resources/developing-a-roadmap-for-the-first-circular-city-amsterdam>.

36 *Municipality of Amsterdam, Amsterdam Circular Strategy 2020-2025, Amsterdam, 2020.*

This programme is well tuned to the circular economy programme of the Amsterdam Economic Board and vice versa. The number of bottom-up initiatives is also rapidly growing in the Amsterdam Metropolitan Area, in city neighbourhoods, by start-ups and through existing proactive companies.³⁷

Examples are living labs, such as De Ceuvel and Buiksloterham in Amsterdam, which literally provide space for circular initiatives and entrepreneurs to experiment and innovate. The Amsterdam restaurant Instock converts rejected but still good food into meals; social enterprise company Fairphone develops smartphones designed and produced with minimal environmental impact. The second model of the company's device is one of the first modular smartphones available for purchase; it is designed to be easily repaired and upgraded. Park 20|20 in Haarlemmermeer, another great example of a local circular initiative, is the world's first cradle-to-cradle business park.³⁸ Amsterdam Airport Schiphol no longer buys LED lamps, but rather pays for lumen. Philips, the lumen vendor, remains the owner of the lamps and thus remains responsible for a long lifespan and recycling the lamps after use. Other examples are sustainable clothing brand Kurt's Amsterdam and environmentally friendly paint producer RIGO in IJmuiden.

The possibilities for reusing, repairing and reviving products are far from exhausted, and can create all sorts of new local-level enterprises. Estimates of the potential number of new jobs vary, but up to 2,000 additional jobs have been estimated in the Amsterdam Metropolitan Area by 2025. If combined with a shift from selling products to hiring or leasing them, this number could increase even further.

37 Cramer, J., *The Raw Materials Transition in the Amsterdam Metropolitan Area: Added Value for the Economy, Well-Being and the Environment*, *Environment*, 2017, 59, 3, 14-21, <https://doi.org/10.1080/00139157.2017.1301167>.

38 *Holland Circular Hotspot, Circular is Going Global*, The Hague, June 2018, www.hollandcircularhotspot.nl.



Park 20|20 is a cradle-to-cradle business park in Haarlemmermeer.

5.2 Implementation of the Regional Board Programme

In the Amsterdam Metropolitan Area, local governments initiatives regarding circular economy have clearly gained traction since 2016. A strong movement of people and organisations is now transforming the current economy into a more circular one. When I started the regional circular economy programme of the Amsterdam Economic Board in 2015, this movement was not as visible as it is today. The circular initiatives were still scattered, and municipalities mainly focused on what they could do themselves. This motivated me to draft a regional programme that would bundle the variety of initiatives and strengthen the movement of people engaged in the circular economy. I was, and remain, convinced that such a programme can benefit the economy, create new jobs, promote innovation and improve the environment in the region. This programme is exemplary for how different partners can cooperate in the regional circular transition and jointly adopt network governance. The role of the Amsterdam Economic Board

is to prepare and build new consortia of actors that are jointly willing to establish new circular initiatives. When a consortium was created, the Board withdrew and left it for the consortium partners to realise the initiative. Many of the circular initiatives needed to involve not only business, but also local governments, particularly in their procurement role. Municipalities had to join forces to realise the circular initiatives envisioned. How this network governance works in practice is illustrated below.

I started the regional circular economy programme in January 2015, then as a newly appointed member of the Amsterdam Economic Board. The Board is a respected triple helix organisation with a mission to promote innovation and new business development in key societal urban challenges. The mayor of Amsterdam is the chair of the Board, which also comprises representatives of impactful companies, research and educational institutes and local governments. The Board organisation has a 15 FTE staff. When I joined the Board in 2014, I proposed to make building a circular economy one of the key challenges. As this idea was well received, I started to draft a programme. Being aware of the positive role the municipalities fulfilled in promoting circularity, I drafted the programme in close communication with the Regional Board of Local Governments, business, knowledge institutes and citizens. Soon after the start, I was accompanied by a staff member of the Board who acted together with me as transition broker. Another Board member, an alderman of one of the municipalities in the region, was willing to act as liaison between the Board and his colleagues of other municipalities.

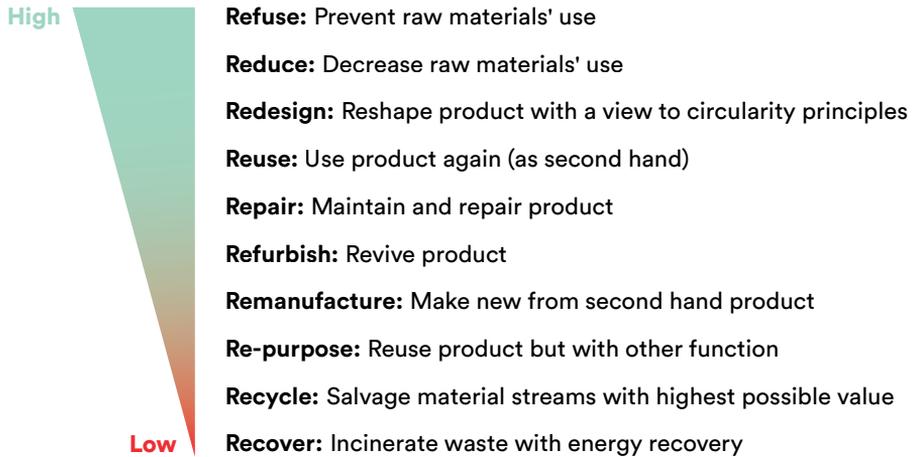
The timing of the Board's circular economy programme was fortunate for various reasons. Firstly, at that time, municipalities were searching for new methods in waste management. They had to achieve higher recycling rates to act in line with national policies. The waste management sector also responded to the national policy objectives and gradually began to redirect its strategy

from incineration to recycling. Secondly, the region's growing, innovative start-up community propagated more attention for initiatives higher on the circularity ladder, for example, redesign and reuse. And finally, local governments expressed the wish to join forces in strategic areas, among them the circular economy. This created a fertile ground to search for cooperation with them in the Board's circular economy programme. To assess their willingness for participation, I visited the 32 municipalities and explained the programme and their potential roles. As this form of cooperation was also new for them, it took some time to get all municipalities on Board. However, they all ultimately agreed to align their activities with those of the Board's programme. They realised that coordination was useful to prevent everyone from reinventing the wheel.

Together with the Board staff member I aimed to help create circular initiatives with business partners, local government and research institutes. Contrary to conventional innovation support, we focused as transition brokers on system innovation and not merely on individual business innovation. Our role was, and still is, to search for promising circular initiatives, find an interested lead business actor, connect this actor with relevant parties, help realise the necessary preconditions for system innovation and make sure that impactful, circular initiatives can be established. To stretch the circular ambition of the programme, the aim was to set up activities that focus on the highest possible options for circularity. To identify these options, we used the aforementioned circularity ladder.

Levels of circularity: 10 R's

Order of priority



A further description of the ladder can be found in 2.2.

Two strategies we defined for the programme were:

1. Closing the loop of resource streams;
2. Renewing product chains via circular procurement.

The evolution of the programme and its results thus far are discussed below.

5.3 Four Implementation Phases

The implementation process consists of four phases:

- Phase 1: Preparing the circular economy programme (2015-2016);
- Phase 2: Building circular initiatives (starting in autumn 2015);
- Phase 3: Scaling up successful examples at regional or national levels (starting in 2019);
- Phase 4: Mainstreaming at national level (this stage has not yet begun).

Phase 1: Preparing the circular economy programme

To start the Board's circular economy programme, another Board member and I co-wrote an introductory memorandum in March 2015 entitled 'The Amsterdam Metropolitan Area as a Circular Resource Hub'. Its aim was to structure the problem in question and formulate the overall objectives. Two months after issuing the memorandum and negotiating with relevant stakeholders, both the Amsterdam Economic Board and the local governments (organised in a regional Board) agreed on its contents. The next step was to develop a roadmap formulating priorities for the period of 2015 to 2018 and specifying the governance structure of local governments and the Board in terms of roles and responsibilities. This led to a division of labour in which the Board devoted major attention to innovation and circular business development at the regional or sub-regional scale, while local governments focused on fulfilling necessary preconditions. As the activities of the Board could not be carried out without the help of local governments, or vice versa, the two bodies maintained cooperation while each ran a programme of their own. The final step in drafting the programme was to formulate its strategic focus. This resulted in 2016 in the programme 'The raw materials transition in the Amsterdam Metropolitan Area: Added value for economy, social wellbeing and environment'.³⁹ It described the two strategies and priorities for the first four years. A year after its initiation, the circular economy programme could formally start. The key regional stakeholders gave the Board a clear mandate to carry out the programme along with their close cooperation.

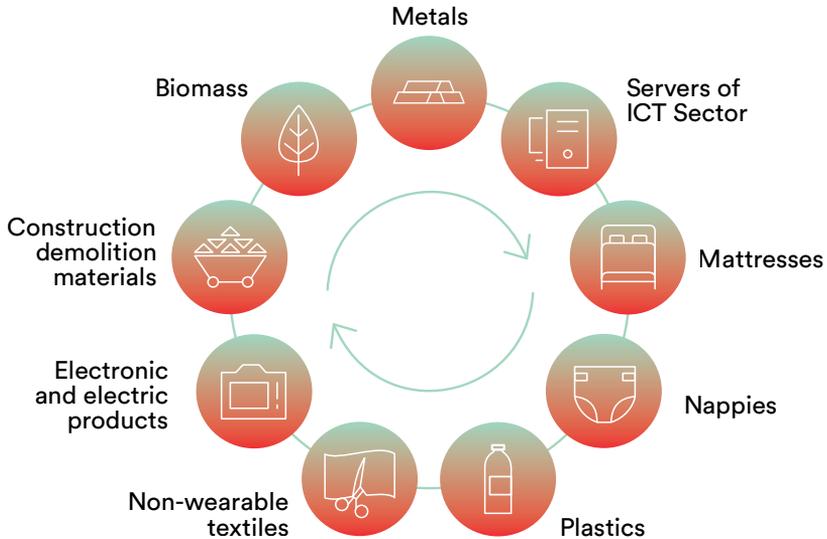
Phase 2: Building circular initiatives

The aim of phase 2 was to build circular initiatives via the two previously mentioned strategies. The first, concerning closing the loop of resource streams, started with selecting nine main resource streams, which often consisted of two or more sub-streams:

39 Cramer, J., *The Raw Materials Transition in the Amsterdam Metropolitan Area: Added Value for Economy, Social Well-Being and Environment*, Amsterdam Economic Board, Amsterdam, 2016 (internal report).

biomass; construction and demolition materials; electronic and electrical waste; end-of-life non-wearable textiles; plastics; nappies; mattresses; data servers; and metals.

Closing the loop of 9 priority resource streams



We chose these resource streams because of their high volumes and large environmental footprints as well as their potential for innovative improvement in terms of recycling, product reuse and redesign. We prioritised household waste streams because more public data is available about them than business waste streams. At the request of the Board's business partners, we also included private waste streams from the IT sector, data servers in particular, and the building, food industry-produced biomass and metals sectors. Next, I designed an approach for generating and selecting the most promising options for closing the loop of each resource stream. If applied flexibly, the approach is generic and can be easily modified for application in other circular strategies.

The generic approach consists of five steps:

- Assessment of the current situation: expert judgement and documentation offers insights into the current status of the issue at stake.
- Identification of innovative options: scientists, innovative technology providers and representatives of an issue at stake are asked in a brainstorming session and/or individually to generate and select innovative solutions based on the latest science and technology. Understanding which ambitious options are technologically and economically feasible leads to the next step.
- Market consultation: potential lead actors are asked whether they are willing to invest in one of the ambitious options identified.
- Selection of the investor(s). Once market players have expressed interest, a third party is involved to independently assess, in a process of due diligence, the best candidate(s).
- Creation of a consortium: which preconditions should be fulfilled to develop a viable business case is discussed with the selected investor(s). Only partners that can help realise these preconditions are asked to join the consortium. The partners should agree on a plan of action, including timelines, roles, responsibilities and an investment scheme. After partners commit, the initiative can start and the transition broker can withdraw (though should keep in touch should the process stagnates).

The second strategy, on circular procurement, encouraged procurement managers to incorporate circularity in their procurement policies and practices. After mobilising the Board's network to participate in the strategy, three communities of practice were successively set up. They comprised a total of 31 representatives of local governments, businesses, universities and educational institutes. Their motivations to join the community differed, but all shared two major incentives: improving the reputation of their organisation and anticipating new trends in society, such

as the circular economy. We used the following definition of circular procurement as starting point: Circular procurement aims to prevent environmental pollution by closing the loop of water, energy and resources and obey a proper balance between economy, ecology and social wellbeing. Experimenting with new ways of cooperation and innovative business models is a crucial aspect in realising this goal. Instead of the traditional procurement criteria, based on the lowest price or overall cost, the focus was on greatest value for money, including also environmental and social specifications. This implied a shift to price per delivered service and the application of new business models. Collaboration between the procurer and potential suppliers from an early stage in the tender process also became a focus point, particularly via a competitive dialogue procedure. The participants learned from each other and acquired the necessary expertise to implement circular procurement within their own organisation. It was left to the participants themselves, mostly procurement managers, to determine which circular procurement projects and contractors to select. They were in charge of mobilising internal support for their ideas.

Phase 3: Scaling up

From 2019, we started scaling up cases that could be replicated elsewhere in the region or could be extended in scope and/or ambition. We also started strengthening the network of participants in both strategies. The assumption was that scaling up would accelerate circular initiatives within and across sectors and product chains. For strategy 1, on closing the loop of resources, we focused on scaling up positive business cases and simultaneously building a broader ecosystem approach, in which prevention, redesign and reuse were also given greater priority. An example is the development of the regional Circular Textile Valley hub, discussed in the previous chapter, which promotes a broad spectrum of circular options.

In strategy 2, more purchasing departments were motivated to participate, and existing ones were encouraged to continue their circular procurement efforts. At the same time, participants selected a few product chains to be potentially transformed more fundamentally through a joint effort. Collaborating in the renewal of product chains can help procurement managers feel more confident in taking innovative next steps.

Phase 4: Mainstreaming

This phase is not yet within sight. Before mainstreaming can happen, more circular initiatives should be scaled up within and across sectors and product chains. This process can be enhanced if remaining regional barriers are removed. It will be even more impactful when national and EU policies are more aligned to actively steer the transition towards a circular economy.

5.4 The Results After Four Years⁴⁰

Strategy 1

The major aim of strategy 1 was to build consortia that could jointly create a viable circular business case. As this implies the establishment of long-term mutual commitment, the consortia were not assembled overnight. The speed of each process was case-specific. Some consortia were ready within a year, while others took three or more. When partners struggled with such commitments for political reasons this process took time. It required a lot of matchmaking to establish a consortium that would express its commitment to implementing the circular initiative. After the consortium was agreed on, the business model had to be negotiated among partners. Another hurdle was that investors often had to attract foreign capital before a new plant or activity could be launched.

40 Cramer, J.M., *Implementing the Circular Economy in the Amsterdam Metropolitan Area: The Interplay between Market Actors Mediated by Transition Brokers, Business Strategy and the Environment*, 2020, 1-14.

Still, 22 circular business initiatives took off. Five were organised separately from the Board programme, as transition brokers only played a supporting role in these consortia. We orchestrated the remaining 17, 14 of which already have agreements and the other three of which have agreements in preparation. In the latter cases, a consortium may still lack a partner, for example, to guarantee sufficient supply and/or demand, or a new initiative needs further technological development before new equipment can be installed. In eight of the 17 cases, we worked with established so-called regime actors as lead partners. These circular initiatives linked well with their existing activities. Their main reasons for participating were expanding current business, diversifying portfolios, responding to political pressure and gaining more control over the product chain through data management. In nine of the 17 cases, we worked with niche companies, mostly scale-ups, as lead actors. When new business had to be created, only niche actors were willing to come forward as first movers. Below I summarise the initiatives aimed at closing the loop in the nine priority resource streams; the mattresses case was detailed in chapter 4.

Initiatives that aim to close the loop of resource streams

High-grade food waste processing

Waste streams from the food industry consist of valuable resources which can be reused, for example, to produce flavouring additives. An offshoot of a flavouring additive manufacturer is developing plans for a bio-refinery that reclaims nutrients. This start-up works closely together with the University of Amsterdam's Green Campus. To obtain sufficient residual food waste streams, cooperation is needed with major food companies in the region. As transition brokers, we actively supported the creation of this consortium. Further research is needed to establish the bio-refinery.

Public greenery as a green raw material

This initiative concerns organic waste processing from the public green space focused on recycling for energy and resources. We helped to form a consortium consisting of a recycler, three public authorities that provide waste material and a start-up that can make insulation material from the reclaimed resources. A transition broker appointed by the regional Board of local governments is now finalising the deal.

Green Energy Factory

The production of green gas, heat, compost, citrus fuel and water from organic waste was set up by Meerlanden, one of the region's main waste incineration facilities. Their Green Energy Factory was built in Rijsenhout, just south of Amsterdam Airport Schiphol, and uses as input vegetable, fruit and garden waste from nine municipalities and 4,000 companies in the region. We helped set these developments in motion by conducting thorough market research and uniting the concerned parties.

Circular demolition and construction

Circular building and construction got a boost in 2017 through a

platform for circular building and construction in Haarlemmermeer. Co-financed by the local governments of the Amsterdam Metropolitan Area, C-creators, as the platform is called, is an independent foundation that aims to accelerate circular construction and building through learning-by-doing and experimenting. The platform joined forces with independent organisation Cirkelstad (meaning ‘circle city’) that facilitates learning communities and knowledge exchange among frontrunners in circular building. The Board has supported the establishment of C-creators, notably through the personal commitment Haarlemmermeer alderman John Nederstigt.⁴¹

Electronic/electric waste

Sorting materials is the first step towards closing the loop of discarded e-products. The Board has encouraged the two main waste incineration facilities to expand facilities for dismantling electronic and electric equipment in special service centres. The two incineration facilities do not consider reclaiming materials as their core business, so they leave this to others. The reclamation of two resource flows – plastics and cables – is already a viable business. The other main resource, printed circuit Boards, is processed abroad. New techniques can achieve higher-value recycling, so we acted as a matchmaker between a niche company and the Port of Amsterdam to set up an innovative recycling plant for printed circuit Boards. This initiative is still in the making.

Non-wearable textiles

Sorting is the first step in closing the loop of the resource stream of non-wearable textiles. We have actively supported the scale-up Wieland, which anticipates market opportunities in textile sorting using innovative technology as described in the previous chapter. Generating fibres from the sorted textiles and making new products from them is the next step. Wieland has co-initiated two consortia: the Denim deal (see chapter 4) and a consortium with a municipality, a textile collector and a niche company that

41 See also <https://c-creators.org>.

does the mechanical fiberisation and manages the supply chain up to production of new clothes. Although both consortia can start with one municipality as a commissioning partner, the business case will clearly improve when more municipalities join and supply non-wearable textiles. Along with the regional Board of the local governments, we are now trying to encourage other municipalities to synchronise their procurement policies with this initiative.

Plastics

Sorting is the first step in reclaiming the different plastics for reuse. The Board asked the Port of Amsterdam, as a landowner, to assess the prospects of a niche company we identified to be an expert in innovative plastic sorting techniques. This has resulted in the development of a new initiative, which has resulted in an up-to-date plastics sorting facility. The largest waste incineration facility in the region will be the main supplier of the resource stream of plastics.

Nappies

As transition brokers we wanted to start recycling nappies. Once recycled and sterilised, plastic, cellulose and superabsorbent polymers can be used for new applications. Having investigated the most promising options available in the market, we approached Amsterdam's waste incineration company to determine its interest in cooperation. As nappy recycling matched the diversification of its portfolio, the company was willing to co-invest in a commercial-scale facility. The next step was to select the most appropriate candidate, which happened to be a scale-up that was an offshoot of a nappy manufacturer. This scale-up had heard of our initiative and contacted us to explain their technology. Their proposal was promising. To double-check our assessment, the waste incineration company visited the company and became convinced as well. We helped the scale-up and the waste incineration company build a consortium with a customer and various municipalities willing to organise the collection of nappies. The initiative was ready for launch, when the waste incineration company withdrew due to a redirection of its business strategy. This led to a new market

consultation organised by the Board of local governments aimed at forming a new consortium, which will be realised shortly.

Data servers

The rapid expansion of its sector in the Amsterdam Metropolitan Region also compelled us to start focusing on data servers. We have approached key actors in the sector to help increase their circularity, and formed a consortium consisting of a manufacturer, two industry associations and a data centre. A first problem we encountered was a lack of knowledge about what happens to data servers once discarded. As there is no overarching administrative system, equipment is entirely untraceable, which hinders high-value recycling. A Board partner adopting block chain initiatives helped address this problem. Knowing what happens to data servers after use also increases interest in reuse, which includes the refurbishment of data servers (as parts). Consequently, SMEs and niche companies that can provide these services have become involved. Since most data servers are produced on the world market, it is hard for regional bidders to exert a radical influence on their product design.

Metals recycling

We have promoted the reuse and high-value recycling of ferrous and non-ferrous metals. The recycling of cans was a first — relatively easy — step taken by connecting the waste incineration company to the major steel company in the region. More radical, innovative steps proved harder to take. Over 50% of all mostly polluted and/or mixed ferrous and non-ferrous metal scrap is exported, while the rest is recycled in the Netherlands. To create new business through innovative processes and to reduce export volumes, we searched for interesting candidates to set up a facility. On behalf of the Amsterdam Economic Board, I organised a circular economy lab with the Utrecht Sustainability Institute to gather ideas. This lab generated new promising options, whose feasibility is currently being examined. They include reuse activities, notably in the building sector, and new recycling techniques in ferrous and non-ferrous metals.

For optimum environmental results, these resource streams must each be recycled on their own scale. Except for the demolition and construction chain, they all need to be scaled at regional, sub-regional or national levels. The voluminous residual flows of the demolition and construction chain can be reintroduced into the cycle at a municipal level. The others need bundling at regional, sub-regional or even national levels to create sufficient volume and sales potential for a profitable business case.

To help create the necessary preconditions, we, as transition brokers, engaged other actors, mostly local governments and companies. The main preconditions to be fulfilled were generally the same: an appropriate collection and logistics system; a guaranteed volume of waste; an articulated demand for the recycled material; and the acceptance of a quality standard for the recyclates.⁴² Many initiatives could only be realised if municipal authorities were willing to work together. After all, recycling often requires substantial investments in advanced recycling plants, depending on types of material flow. The private sector is certainly interested, but businesses must have sufficient assurances regarding the volume and quality of collected material they can expect and its sales potential after recycling. If such certainty cannot be offered, the collected material flows are processed and marketed in the form of low-grade applications. Close cooperation with municipalities was therefore key. As the local governments joined forces in the Regional Board of Local Governments to accelerate the circular economy. This cooperation could easily be established. The local governments have started to coordinate the collection and logistics of various resource streams (e.g. nappies, non-wearable textiles, plastics and public greenery) and also circular public procurement as commissioning party (see strategy 2).

42 Cramer, J., *Key Drivers for High-Grade Recycling under Constrained Conditions, Recycling*, 2018, 3, 2, 1-16, <https://doi.org/10.3390/recycling3020016>.

To move away from low-value recycling and incineration, which are still the most commonly used methods, we aimed to develop solutions that ranked higher on the circularity ladder. Priority was given to upgrading resource streams via high-value recycling (making optimal use of resources available in the resource stream) and, depending on the resource stream, to product reuse and redesign. None of the 22 consortia worked on incineration or low-value recycling. Thirteen cases focused on high-value recycling, including generating new products from recyclates, such as flavour additives, phosphate and calcite, insulation material and regenerated clothes. Four cases addressed materials sorting and one addressed refusal, specifically concerning packaging waste in company canteens. Five cases focused on reuse and/or redesign, mainly in the selected industrial sectors of construction, mattresses, data servers and metal. In about 60% of all cases, new business models were adopted. Most often applied was the shared-costs-and-benefits model, in which key actors jointly estimated the overall cost-result ratio in advance and made a calculation that reflects the share of each actor in a well-balanced manner. Such an honest account of costs and benefits is necessary for building a consortium that is economically attractive to all partners. Other business models applied were a voluntary EPR and the formation of a cooperative which shared profits from the resource stream recycling.

Strategy 2

In the concluding evaluation, all three communities of practice stated that they were better informed about the theory and practice of circular procurement and now knew how to organise market consultation via a competitive dialogue procedure. The two provinces and 31 of the 32 municipalities in the Amsterdam Metropolitan area signed a manifesto committing to realise 10% circular procurement by 2022, 50% by 2025 and 100% as soon after is feasible.



*Signing manifesto during the event 'Acts of the Region', June 20, 2018.
Recently, commissioning parties invested 150 million in circular procurement.*

The expectation is for research institutes and businesses that were also part of the communities of practice to soon adopt a comparable approach.

The participants themselves decided which circular procurement trajectories they would select. To be as innovative as possible, the participants were encouraged to include start-ups and scale-ups. For most organisations, involving start-ups is rare because of a perceived lack of proven experience, large stock of products and financial solvency. Purchasing departments of larger organisations only occasionally acted as launching customer for start-ups. An example is the newly built circular meeting spot and restaurant Circl, located at the Zuidas, Amsterdam's business

district, and financed by Dutch bank ABN AMRO. Participants of the communities of practice invested in particular products from five groups: demolition and construction; office furniture; road signs; catering; and data servers and IT business equipment. The initiatives were pretty ambitious, mostly focusing on product redesign, reuse and refuse. High-value recycling took less priority. The purchasing departments were, however, reluctant to take too many risks and usually lacked the knowledge, time and money to help build completely new circular product chains. Moreover, bidders needed the commitment of their CEOs and middle managers as they could not implement circular procurement alone; circular procurement is also something to be integrated in the daily processes in finance, human resources, product management and shop-floor employees. If a procurement contract deviates from standard procedures, getting this internal support may take some time.

Participants admitted that total cost of ownership is a key principle in creating circular business and that new business models are therefore needed in circular procurement. Most participants had little experience with circular business models. However, some provided examples of product groups that had already gained some traction. For example, their office furniture was leased or second-hand because making use of such services was seen as good practice; it was often well received within the organisation and was cheaper than buying new furniture. The same held for workwear that was given a second life. Circular buildings stood out as another example in which new business models were used, notably in circular demolition and the reuse of building materials. In catering, small-scale pilots were also introduced, for example, a start-up that grows mushrooms from coffee grounds and another that makes products from orange peels. These initiatives also require a new business model.

Participants were led by the drive to improve the environmental performance of the products and services they purchased. If a new business model was needed to achieve this goal, participants

were willing to consider a new financial arrangement. However, they were sometimes reluctant to introduce new models because it would require extra effort. Major constraints they mentioned were that accountancy rules are strictly interpreted and therefore rarely allow longer depreciation periods; that most product groups have little experience with new business models; that adopting new models can be risky; that it is hard to make take-back system agreements for products with a long service life, especially with companies whose longevity is uncertain; and that circular procurement requires more preparation time and elaborate negotiation with the supplier than a regular procurement procedure. As such, most initiatives focused on innovative yet proven solutions. The participants stated that only a joint effort orchestrated by an organisation such as the Amsterdam Economic Board could help them more fundamentally transform product chains.

5.5 Other Results of the Board Programme: Circular Education

To ensure that educational institutes promote acquisition of necessary knowledge and skills for circular initiatives, the Amsterdam Economic Board launched a programme on the potential of circular jobs. In 2019, 15 regional frontrunners in education signed the Circular Education Manifesto. They have committed themselves to anchor circular education in their institution's mission and vision and to incorporate circular economy ideas in their curricula.



Fifteen educational institutes signed the Circular Education Manifesto on February 12, 2019.

‘By signing the Circular Education Manifesto, I hereby commit to the agreement that we incorporate circular ideas and principles in our curricula, prioritise their study in relevant programmes and let them anchor the mission and vision of the educational establishment.’

To support this initiative, the Amsterdam Economic Board was actively involved in the guidance committee of drawing up the report *Circular Jobs & Skills in the Amsterdam Metropolitan Area*.⁴³ This report, produced by Circle Economy and Erasmus University Rotterdam for the City of Amsterdam and the Amsterdam Metropolitan Area, is the world's first regional deep-dive exploration into the nature of jobs and skills in the circular economy. Additionally, it provides practical actions for urban policymakers to boost development of a future-proof and circular workforce.

5.6 Follow-up Programme

To evaluate results after four years, a 'roast' session was organised in January 2019 with 12 main stakeholders. The honest comments we received were pretty critical. One important conclusion was that the Board could make a bigger difference if it shifts focus from the end of the product chain to the beginning. This would close a gap often neglected by municipalities, which focus their efforts on waste separation and recycling. Another conclusion was that despite the fantastic examples of individual initiatives, collective circular procurement has yet to be undertaken. The participants recommended building a uniform roadmap which is tuned to the one developed by the Regional Board of Local Governments. As the local governments started to coordinate circular procurement themselves, the Amsterdam Economic Board now work on circular procurement with business partners and research and educational institutes. This work is executed in close cooperation with the Regional Board of Local Governments.

Based on this evaluation, we issued a follow-up programme for the period 2019-2023.⁴⁴ Strategy 1, on closing the loop of resources,

⁴³ Circle Economy and Erasmus University Rotterdam, *Circular Jobs and Skills in the Amsterdam Metropolitan Area*, 2018, www.circle-economy.com.

⁴⁴ Cramer, J. and Teurlings, C., *Vervolgstappen Programma Circulaire Economie (2020-2022) (Next Steps Programme CE (2020-2022))*, Amsterdam Economic Board, Amsterdam, 2020.

now aims to scale up the successful business cases. Sometimes this implies duplication of the business elsewhere in the region or country, while in other cases it concerns the adoption of a broader ecosystem approach. An example of the latter is the development of the textile hub described in chapter 4, in which high-value recycling of non-wearable textiles is combined with various other circular textile options related to refusal, redesign and reuse. Besides scaling up, new circular initiatives will be launched to shift the attention from household to industrial waste streams. Based on ICT-driven data-gathering, these latter waste streams will be traced back to their sources to include prevention and reuse in the analysis at the outset.

In strategy 2, on circular procurement, more purchasing departments are encouraged to join, and those already participating are encouraged to continue their circular procurement efforts. In a follow-up meeting, the Board and a delegation of participants selected a few product chains, among which are equipment and servers in the ICT sector, that might be more fundamentally transformed through a joint procurement effort. This strategy is now being implemented. In addition, the delegation requested the Board's help for securing higher levels of commitment from their directors, CEOs and middle managers. This request is now being executed. As a start, all Board members expressed their commitment to the procurement initiative. The large network of about 150 council members is now invited to follow. Furthermore, all participants can use a circular roadmap designed by the transition broker of the Board of local governments; perhaps in a slightly adapted format, the roadmap can become a universal standard. Finally, within the Board, the circular procurement initiative has become more widely embraced and is now an integral priority point. A movement involving businesses, research- and educational institutes is being mobilised by the Board under the name Procurement with Impact to focus on circularity, energy and mobility. This initiative is closely tuned to that of the Regional Board of Local Governments.

Part 3

**How Network
Governance powers the
Circular Economy**

Chapter 6

Ten guiding principles for circular initiatives

This book is about the power of network governance in implementing circular initiatives. It shows how a network approach can strengthen the circular economy. The guiding principles discussed here are based on my experience in dozens of circular initiatives and scientific research's reflections on this work.

Sparking the transition

Guiding principle 1: The circular initiative starts with a shared sense of urgency.

Guiding principle 2: The implementation of circular initiatives occurs in four sequential yet cyclic phases.

Guiding principle 3: Tasks to be performed for each circular initiative are roughly the same, but the focus is case-specific.

Guiding principle 4: Building a circular economy is a journey with a clear destination but no predetermined path.

Context is key

Guiding principle 5: Focus on the most promising and disrupting innovations.

Guiding principle 6: Map the key drivers and preconditions for successful implementation.

Guiding principle 7: Identify the relevant actors and assess their willingness to join forces.

Successful implementation

Guiding principle 8: New circular business models should benefit all network partners.

Guiding principle 9: Transition brokers can accelerate circular initiatives.

Guiding principle 10: A transparent division of labour among the relevant actors is indispensable.

Sparking the transition

Implementing circular initiatives is not business as usual; it requires a transformational change. The transition from a linear to a circular system goes through different phases though ultimately leads to mainstreaming of the circular economy. The first four guiding principles help lay the foundation for a successful transformation.

Guiding principle 1

The circular initiative starts with a shared sense of urgency.

Urgency is created when the government sets clear policy goals, societal pressure is increasing, or market opportunities are threatened. Participants in each circular initiative should share a sense of urgency about changing the system. If they do not understand the gravity of the problems or their role in the product chain, the initiative will fail. If that is the case, government enforcement should increase the pressure on key actors.

It is essential that despite any differences in motives, participants have enough in common to take collective action. Their sense of urgency can be compelled by different rationales, such as tangible profits, but participation more often offers intangible advantages. These can be proactive motives, such as building a better reputation among clients and current and prospective employees or preparing for new market trends. Other motives include increasing market share; entering new markets; strengthening organisational or regional innovation; and being seriously concerned about the environment. Some motives may also be reactive, including responding to societal and political pressure; reducing potential risks; anticipating regulations; and avoiding negative environmental and social performance.

I have learned that at least some sense of urgency exists in each product chain or region. Some market frontrunners have already developed circular products and services which are bought by a growing group of consumers and commercial customers. Local authorities increasingly use their purchasing power to prime the market for circular products and services and improve their waste management practices.

It is, however, a major challenge to bundle these scattered activities and build circular initiatives that can be scaled up and ultimately mainstreamed. With so much hassle involved in starting a joint initiative, individual actors often abstain from taking the lead. Each often works in a specific silo, failing to oversee how to generate a transformational change with all actors needed throughout the product chain or region. They tend to restrict themselves to what they can do in their own organisation, waiting to see whether someone else will take the collective lead for change.

In all the initiatives described in the previous two chapters, one or more actors felt the urgency to take action. How the shared sense of urgency was experienced or created depended on the actors involved and the initiative's complexity and scale. When the number of actors is limited and the scale of the initiative is just the Netherlands, such as in the mattresses case, it is much easier to instil a shared sense of urgency. Compare that to the clothing case, which proved much more challenging. In the concrete case, a shared sense of urgency was created during the process because more and more stakeholders spoke out, which gradually led to more clout power.

In the mattresses case, waste management companies expressed worries about the risks of storing and incinerating mattresses, and recyclers were concerned about the high costs of recycling, but the Amsterdam Economic Board created the shared sense of urgency. Being familiar with the stalemate between waste management companies, recyclers and mattress producers, the Board and the

Urgency felt by participants of circular product chain initiatives

	 Mattresses	 Concrete	 Clothing
Urgency	High	Medium	Scattered
Number of participants	Limited	Many	Many
Scale	National	National	International, national and regional

Utrecht Sustainability Institute organised a Circular Economy Lab for all partners of the product chain and the municipalities. During this lab, the partners expressed the need to strive for a more circular solution and to take a joint national effort. Because of this shared sense of urgency, we could pursue the initiative.

In drafting the Concrete Agreement, a greater variety of actors with diverging interests was involved. In the preparatory phase, some actors had clear, ambitious goals; others had a wait-and-see attitude or acted as watchdogs. However, *all* actors felt societal pressure to improve their environmental performance and meet national CO₂ targets and the government's circular ambitions. This triggered the needed shared sense of urgency, resulting in a Concrete Agreement with ambitious targets for CO₂ reduction, circularity and biodiversity in 2030.

The clothing case consisted of an even more diverse group of actors than the two other chains. On the one hand, a small but growing number of innovative start-ups and scale-ups felt a need to transform the textile sector into a slower circular sector. On the other hand, the dominant fast fashion brands were focused on

producing as much as possible with the lowest possible costs in a global market. In the clothing case, the biggest challenge was thus to bundle both sides of the spectrum. The four described initiatives representing different regional-level breakthrough experiments are now looking for cooperation with frontrunners in the mainstream market. Moreover, the Dutch government is cooperating with the textile sector to meet the ambitious policy targets recently set. It remains to be seen whether either strategy will work to renew the whole sector in a fundamental way. The sector is highly competitive and cross-linked with the world market, which hampers any national initiative and a shared sense of urgency. It is possible that regional initiatives will not suffice and policy targets will not be met. If that is the case, government enforcement should increase pressure on key actors. Stricter rules and regulations will eventually also lead to a shared sense of urgency.

In the regional case of the Metropolitan Area of Amsterdam, a shared sense of urgency was clearly present to start the programme and execute a great number of initiatives. The Board itself made the circular economy one of its six priority points based on its societal importance and potential for innovative opportunities. Local governments were willing to join the programme as they wanted to act in line with national circular economy policies and seize the opportunities for new business investments, more jobs and reduction of environmental impacts. The start-up and scale-up community expected more growth opportunities, while mainstream companies were interested in what was in it for them. Within each initiative, the shared sense of urgency differed. However, as the Board selected innovative companies to take the lead, these lead actors and the innovative solutions generated urgency. Other companies who were willing to join were welcome.

Guiding principle 2

The implementation of circular initiatives occurs in four sequential yet cyclic phases.

Execution of circular initiatives consists of these four phases:

1. Preparing the circular initiative;
2. Building a joint business case;
3. Scaling up a successful circular initiative;
4. Mainstreaming circular initiatives.

This four-stage process should not be seen as linear but as a cyclic journey towards improvement. A circular product chain or regional initiative cannot be realised in one go; it requires several rounds of more far-reaching improvements while avoiding a technological lock-in. This means that the transition should be seen as the implementation of a continuously growing number of meaningful building blocks on the road to a circular economy, rather than a sudden radical system change.

The three circular initiatives described in chapter 4 followed a similar path, albeit at different speeds. Occurring at the most accelerated pace was the case of mattresses, followed by concrete and then clothing. In various phases, each initiative focused on specific activities needed to achieve the set goals. As the figure shows, the scaling up phase has only just started in the mattresses case.

Model to implement circular economy in product chains

	 Mattresses	 Concrete	 Clothing
Preparing	Circular economy lab	Concrete Agreement by coalition of the willing	Regional clusters
Building	Agreement on extended voluntary producer responsibility	Development of instruments, roadmaps and innovations	Creating network of regional clusters
Scaling up	Has just started	Has not yet started	Has not yet started
Mainstreaming	Has not yet started	Has not yet started	Has not yet started

The regional circular economy programme in the Amsterdam Metropolitan Area also consists of four phases. This programme covers many different circular initiatives which are often linked to particular product chains.

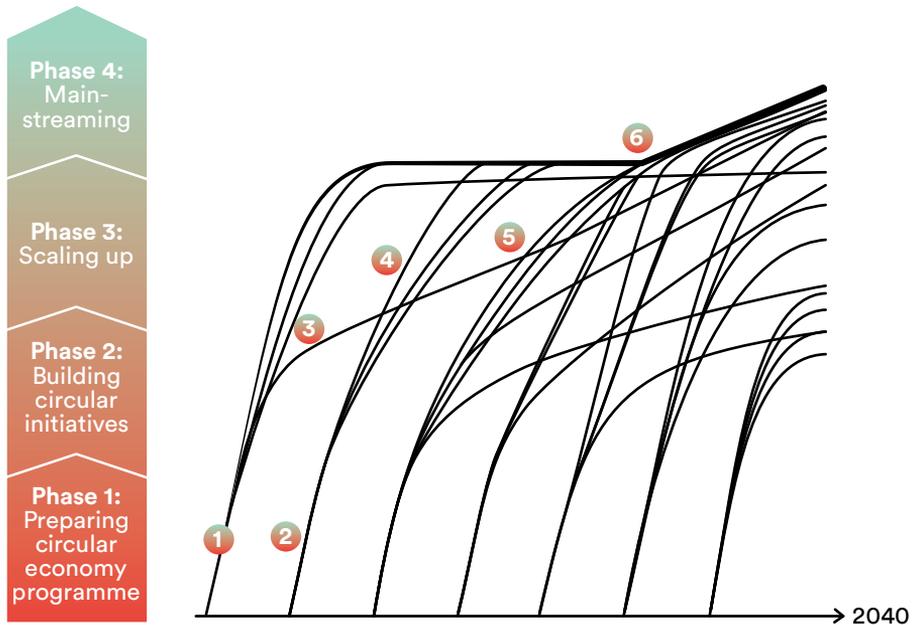
In phase 1, the regional circular economy programme of the Board was drafted in cooperation with local governments, industry and research stakeholders. Two main strategic priority points were agreed upon: closing the loop of resource streams and circular procurement. As the programme mainly focused on accelerating circular business opportunities, citizens' initiatives were not included. This was left to the local governments, who actively support such initiatives. Moreover, the Board runs a Smart City programme, which specifically focuses on civil society initiatives.

In phase 2, the first round of circular initiatives within both priority points could start. Each proceeded at its own pace and according to its unique method. A pipeline of circular initiatives was established for the first four years. While successful examples could be scaled up immediately and proceed to phase 3, others needed more time

for implementation. Mainstreaming of the initiatives has not yet taken place.

Here too, the four-stage process was not linear but cyclic because there is potential for continuous, far-reaching improvements in the products and services. After four years, an evaluation of the programme was led to adjustments. A fresh round of new initiatives has since started, largely following a similar sequence of phases. As the preparatory work will not begin from scratch, activities in phase 1 may be partially skipped or abbreviated. However, in phase 2, similar activities must be carried out to those in the first round. This also holds for phase 3. After the second round of initiatives, the entire process is expected to be repeated multiple times before the final stage of mainstreaming all circular initiatives comes within reach. This is visualised in the figure on the following page.

Model to implement circular economy at the regional level



- 1 In the first step, a roadmap is developed, which also defines what is prioritised
- 2 In subsequent years (here every 4 years), the roadmap is updated and new priorities are identified
- 3 The implementation is tailor-made, with circular initiatives developing at different speeds
- 4 Scaling up is achieved within and across sectors and product chains
- 5 Removing specific regional and national barriers further drives scale
- 6 Only once enough circular initiatives have achieved scale, the mainstream phase is (slowly) reached

The model for implementing a regional circular economy programme shows that the change process is iterative, spanning about two decades. The assumption is that as the urgency of transitioning towards a circular economy grows, so do the volume of circular activities, societal support and pressure on local and national governments to remove fundamental barriers. This, in turn, further drives up scale.⁴⁵

45 Cramer, J.M., *Practice-Based Model for Implementing Circular Economy: The Case of the Amsterdam Metropolitan Area*, *Journal of Cleaner Production*, 2020, 255, 120255, <https://doi.org/10.1016/j.jclepro.2020.120255>.

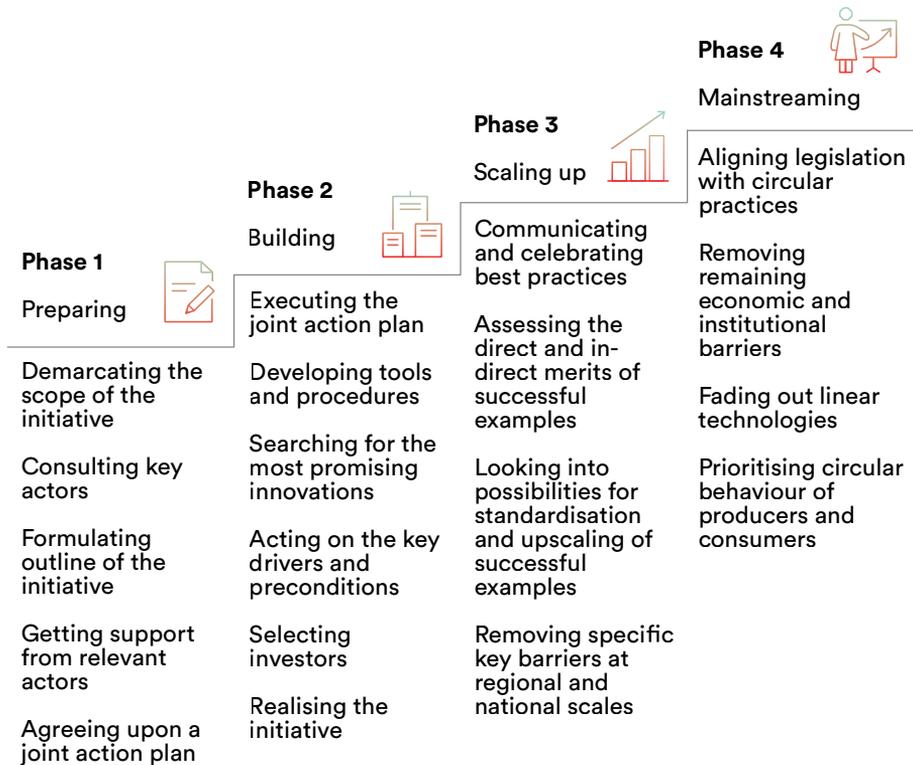
Guiding principle 3

Tasks to be performed for each circular initiative are roughly the same, but the focus is case-specific.

In each of the four phases, a similar set of tasks must be executed. How much work and how much time it takes to perform a task differs per initiative. The figure below summarises these tasks. Those mentioned in phase 4 are indicative, not yet having been tested in practice. The aforementioned tasks are executed in all three product chains, but the particular emphasis of each circular initiative differs. In the mattresses case, the focus was on agreeing on the text of a voluntary extended producer responsibility (EPR) and then on implementing this scheme. In the concrete case, much effort was put into roadmaps, tools, innovation and communication with the whole sector and all commissioning parties, before scaling up the initiative to a national level. In clothing, focus was largely on strengthening the different large-scale experiments in the four regions and connecting these clusters to national circular textile policies.

Within a large circularity programme, such as that of the Metropolitan Area of Amsterdam, not all tasks need to be coordinated by one organisation. The Board programme is part of a larger network of regional partners, involving local governments, industry and neighbourhoods. A clear division of labour exists between the Board and local government. The Board builds consortia that are willing to take steps towards innovation, while local governments create the preconditions to realise these initiatives. Since local governments and the Board have joined forces, their efforts are now closely connected. In this way, the network of actors can be cohesive in building a robust circular ecosystem. This element is sometimes missing, especially when many experiments are carried out without coordination.

Tasks to be performed in circular initiatives



Guiding principle 4

Building a circular economy is a journey with a clear destination but no predetermined path.

In designing a strategy, all cases adopted the following step-by-step action plan, as broadly applied across industries⁴⁶.

Step-by-step action plan

1



Formulate a vision and mission

2



Gain insight in the current environmental, economic and social situation and societal demands

3



Set long-term goals which guide the short-term actions

4



Draw up a strategy, including main priority points with intermediate and final targets

5



Develop the necessary tools and adapt the procedures

6



Monitor the results, evaluate the progress and formulate next steps

7



Implement an offline and online communication strategy

However, in carrying out the action plan, one cannot follow a predetermined set of activities. In a fundamental system change – which the transition towards a circular economy is – experimenting is crucial; it is not a project planned from beginning to end. It is a process requiring flexibility to achieve set goals. It is a transformational change process in which participants should

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J. Cramer, Learning about Corporate Social Responsibility; The Dutch Experience, IOS Press, Amsterdam, 2003.

continuously adapt, learn and respond to new situations. One has to think big, but at the same time approach each goal step by step. It resembles a journey in which the destination is clear, but the path is undefined. Sometimes you make fast progress, the process gets stuck or delayed, or you need to make a sharp right or left turn.

The mattresses case took a focused step-by-step approach. The main goal was clear: closing the loop of mattresses. The chosen method: a voluntary EPR. As it has turned out, this method results in better recycling, but does not yet lead to a complete redesign of mattresses. This issue was a bridge too far for most mattress producers. Only a first frontrunner took a major redesign initiative, which could become the future standard. This means that the search is still on for how to engage participants in redesigning their products in order to close the loop more fundamentally.

The Concrete Agreement also started with a clear step-by-step approach, but the actual execution evolved otherwise. It was a search for how to achieve the ambitious goals and what kind of technologies to use. The original group drafting and executing the Concrete Agreement consisted largely of the concrete sector itself. In time, however, it became clear that without active participation from builders, commissioning parties and the government, goals could not be met. This changed the strategy and the tools to be developed.

The clothing case is still in the making. Regions have recently formulated their particular action plans though are still missing clearly set targets. The process is thus more diffuse and harder to steer.

The Board's regional circular economy programme largely followed traditional steps in a road map for change. To become a more circular region, we established two focal strategies: closing the loops of resource streams and renewing product chains via circular

procurement. Executing those strategies was, and remains, a quest for the best way to realise different circular initiatives. It is learning by doing; we could not have foreseen all the challenges that crossed, and keep crossing, our path. In some cases concerning closing the loop of resource streams, for example, the circular initiative was hard to get off the ground because we could not immediately find an innovative lead actor or relevant complementary actors. In other cases, the search for a coalition of the willing was quickly completed or concluded because the Board had little to more add to what others already initiated. In the circular procurement strategy, the focus on exchanging knowledge and experiences among procurement officers from 33 organisations was a worthwhile first step. In the next, we seek ways to motivate procurement officers and others from crucial departments within their organisation. Executing this strategy was a search for how to overcome most procurement officers' risk aversion. We had to find ways to inspire them and facilitate their movement in the direction of circular procurement through joint efforts. Since there was no proven method for this, we learned this on the job.

Context is key

When one aims to move from a linear to a circular economy, a number of key system variables should be taken into account. One needs to know the context in which the transformational change is to take place. These variables are rarely clear upfront; finding them is part of the challenge. A first global overview is enough to start a circular initiative. In time, more insight into the specifics of the system variables emerges. This generates a sharper picture of the context in which one operates and thus how to steer towards a circular economy. The following three guiding principles delve more into this context.

Guiding principle 5

Focus on the most promising and disrupting innovations.

Because the transformation towards a circular economy requires fundamental changes, innovation is indispensable. The aim should be to give room to innovative solutions and resist the pressure of companies that defend the current system. This measure was intended to avoid the problem of becoming locked in conventional innovation trajectories such as low-grade recycling. To generate and select the most promising innovations, I developed a generic approach, as summarised on the following page.⁴⁷

47 Cramer, J.M., *Implementing the Circular Economy in the Amsterdam Metropolitan Area: The Interplay between Market Actors Mediated by Transition Brokers, Business Strategy and the Environment*, 2020, 1-14, <https://doi.org/10.1002/bse.2548>.

Generic approach for generating and selecting the most promising innovations



When selecting options, keep in mind the 10 R's described in chapter 2. I developed this hierarchy to give guidance in prioritising those options that are higher on the circularity ladder.⁴⁸

48 Cramer, J., *The Raw Materials Transition in the Amsterdam Metropolitan Area: Added Value for the Economy, Well-Being and the Environment*, *Environment*, 2017, 59, 3, 14-21, <https://doi.org/10.1080/00139157.2017.1301167>.

Levels of circularity: 10 R's

Order of priority

High



Refuse: Prevent raw materials' use

Reduce: Decrease raw materials' use

Redesign: Reshape product with a view to circularity principles

Reuse: Use product again (as second hand)

Repair: Maintain and repair product

Refurbish: Revive product

Remanufacture: Make new from second hand product

Re-purpose: Reuse product but with other function

Recycle: Salvage material streams with highest possible value

Low

Recover: Incinerate waste with energy recovery

To deal with potential resistance to make bolder steps, it is helpful to regularly refer to the targets to be achieved and put the companies behind the most innovative options in the driver's seat of a change process. These companies can either be established companies (regime actors) or newcomers (niche actors). If a newcomer has the most promising innovation, it should take the lead and get scaling up support from established companies. This dynamic interaction only occurs when niche and regime actors join forces on the basis of an ambitious goal and common interests. This is visualised in the figure on the next page.

I have often experienced that established companies are reluctant to lead the transition towards the circular economy. Organisational inertia and external challenges prevent them from developing new strategic networks around the circular economy and replacing existing relationships. Moreover, they are often hampered by risk aversion and special interests, with much to lose in the short run. They therefore tend to remain close to their core business and focus on incremental improvements. They may, however, be

Interaction between niche and regime actors

	No dynamic interaction	Dynamic interaction
Niche actors	 <p>Development of innovative product/service but limited scaling opportunities</p>	 <p>Development of innovative product/service with the potential of scaling through support of regime actors</p>
Regime actors	 <p>Tendency to focus on incremental improvement unless they are frontrunners</p>	 <p>Willingness to become more innovative through niche actors' influence, unless market opportunities and/or political and societal pressure are lacking</p>

inclined to join circular initiatives or even take the lead if they are frontrunners or envisage market opportunities through diversification or redirection and/or experience political or societal pressure. Newcomers to the market who focus on innovations that deviate from existing regimes are less affected by these constraints. They can create a starting point for system change, but often lack the broader market acceptance to scale up these innovations.

The three product chain cases from chapter 4 used both the generic approach for selecting circular options and the 10 R's of the circularity ladder, each in its own way. The mattresses case focused mainly on the ladder. The aim was to move away from incineration and towards recycling and redesigning new circular mattresses. The redesign specifically focused on design for recycling rather than more extensive redesign, as this was a bridge too far for most mattress producers. Recycling – lower on the ladder – got more priority in the execution phase, as this was the

most promising short-term option. I hope that in the next phase plans will be developed for more far-reaching redesign.

The concrete case used the generic approach to find the most promising innovations. Unfortunately, the first innovative ideas participants devised did not promise to add up to meeting goals for 2030, particularly not for CO₂ reduction. Most options were related to CO₂ reduction in the materials used, which was the concrete sector's main expertise. As chair, I asked two experienced experts to broaden the scope and include options higher on the circularity ladder. This led to a great number of additional options for CO₂ reduction, which ultimately add up to a reduction of at least 60%. These options must be implemented by other actors, such as commissioning parties and the building sector. Additional efforts were thus made to involve the parties in the Concrete Agreement. To ensure that the identified innovations would be technologically feasible in three to five years, we orchestrated a process for developing and testing. As such, we aimed to avoid double work and focus on main priorities. This required a lot of alignment among partners from the concrete industry, contractors and builders.

The innovation process in the clothing sector remains diffuse. While the generic approach was adopted only in specific cases, the circularity ladder was clearly applied. Niche companies representing slow fashion often focus higher on the ladder, while particularly the international, fast fashion industry hardly bothers about what happens with their clothes after use. The start-up and scale-up community is mainly concerned with refuse and reuse and also with recycling of non-wearable textiles. Only a few of these options are technology-intensive (e.g. mechanical and chemical recycling). The more capital-intensive receive more attention from investors than the low-tech options that are higher on ladder. Government support via innovation funds also tends to highlight high-tech innovations that are usually lower on the ladder, such as recycling. This means that niche companies have

a double problem: they are still small market actors and get little attention from investors. To strengthen their position, they must join forces with colleagues and mainstream actors interested in moving higher on the ladder. This is the aim of the regional clusters.

The regional circular economy programme used both the generic approach and the ladder, particularly in strategy 1, closing the loop of resource streams. Here all circular initiatives followed the generic approach and ended up with the formation of a consortium of partners willing to join forces and carry out the action plan. The aim was to close the loop at the highest possible level. This structured approach identified the most promising options. In some cases, innovative established companies took the lead, while in others, niche companies were in the driver's seat. Frequently, regime and niche actors engaged in a dynamic interaction, but in all cases, the innovative solution was leading. In strategy 2, circular procurement, the Board could not adopt the generic approach because procurement officers were in the lead. However, over time, it became evident that individual procurement officers would not consider more innovative options because they were too risky. This encouraged the Board to set up a joint initiative of interested procurement officers from different organisations, aimed at more ambitious solutions in specific product chains. ICT products are a first example of this joint exploration. The generic approach and the circularity ladder are both used as references.

Guiding principle 6

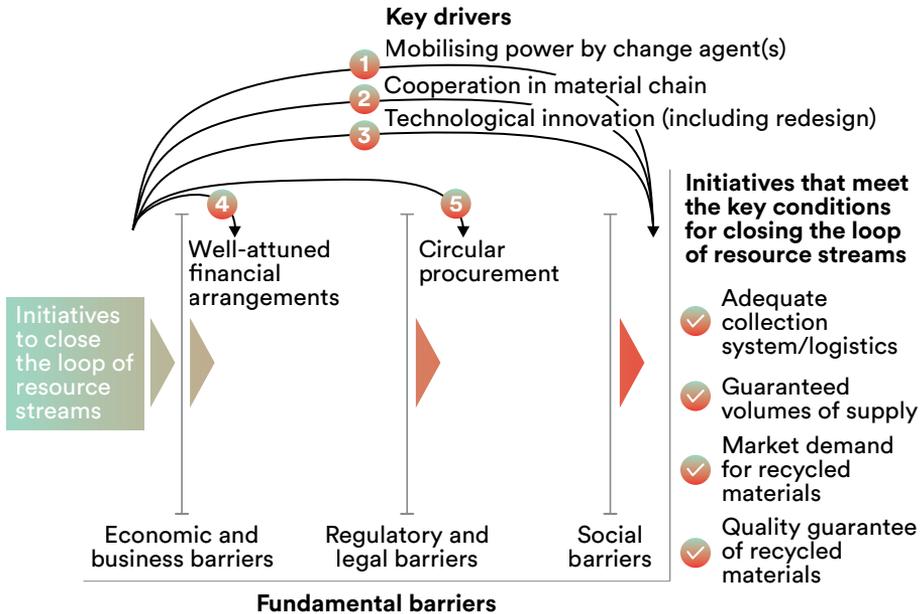
Map the key drivers and preconditions for successful implementation.

To effectively steer towards the desired circular direction, you need to know the force field in which you operate. You need to be aware of the fundamental barriers – be they economic, financial, legal or social – that you might encounter. These cannot be removed at the regional or chain level. In my experience, some of these barriers can be circumvented by accounting for specific key drivers and preconditions. By doing so, we move forward *and* we increase the pressure to tackle these fundamental barriers at a higher level. It is possible to map these drivers and preconditions upfront, but only in general terms. Specification follows gradually after the initiative has started. An explicit description of how to mobilise key drivers and realise preconditions is useful for having a focused discussion among the actors. It will clearly pinpoint who has to do what for collective success.

One can encounter several types of key drivers and preconditions. The Board's regional circular economy programme has generated a wealth of information on this topic. In reading, please bear in mind that every change process has its own particularities and should be understood in its own specific context.

The main key drivers largely converge while preconditions for successful implementation differ between the two main strategies of the regional circular economy programme: closing the loop of resource streams (strategy 1) and circular procurement (strategy 2). For the first strategy, we found four key conditions and five key drivers, which are shown in the following figure.

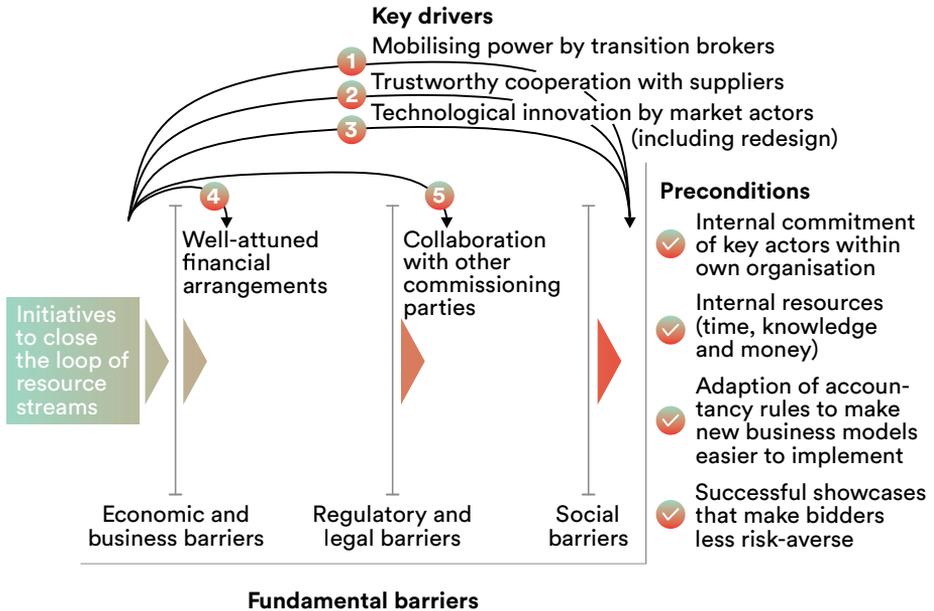
Key drivers and preconditions for closing the loop of resource streams



In this strategy, the transition brokers and the lead innovative actor built a consortium with other relevant partners who could jointly realise a circular initiative. This required cooperation between partners and mutual agreements about the fair distribution of costs and benefits. To create the right conditions, it was necessary to provide the lead actor with some certainty that the required volumes of raw materials would be collected, transported and supplied as well as, if possible, that the recycled materials could be sold in the region. Circular purchasing and tendering often turned out to be an important key driver. If this whole process met all the conditions, it was possible to realise the initiative and circumvent the fundamental barriers.

For the second strategy, we also found a number of key conditions and drivers for accelerating the implementation process, which are shown in the following figure.

Key drivers and preconditions for circular procurement



Five key drivers of strategy 2 which largely resembled those of strategy 1, played a crucial role at the start of the circular procurement initiative at a regional level. Following the work of three communities of practice, the orchestration of the process continued albeit in a different manner. All five key drivers and four, mainly internal, preconditions were kept in mind when rolling out the next phase: scaling up circular procurement in the region. The role of the transition brokers changed from moderating communities of practice to strengthening the region's circular procurement movement. This consisted of various activities, requiring the heads of participating organisations to create the right internal preconditions, enlarging the group of organisations and lowering risks of innovative circular procurement trajectories through a joint effort of procurement departments. In cooperation with PIANOo, the well-functioning national expertise centre for sustainable procurement, successful circular procurement ex-amples were,

and still are, advocated. In this way, we hope to circumvent the fundamental barriers to move to a circular economy.

The key drivers and preconditions playing a role in the three product chains can be visualised in a similar manner. It turns out that in all three cases, the key drivers are roughly comparable to the aforementioned drivers. The preconditions are more case-specific. For example, the main preconditions in the concrete case are: 1) development of adequate tools and procedures applicable for everyone; 2) adjustment of quality norms and standards; 3) knowledge transfer and training of new methods and innovations; 4) new ways of working on the shop floor; and 5) adaption of resource stream collection and logistics. In the other product chains we also found another customised set of preconditions.

Guiding principle 7

Identify the relevant actors and assess their willingness to join forces.

To enhance the transformational change towards a circular economy, it is crucial to have a network of willing actors that joins forces and creates cohesion in building a circular economy. The first step is to find actors that can be the engine of change. Upfront it is hard to determine which actors are interested in simply being part of the change process and which actors are prime actors. One can only make a rough assessment and gain a fuller picture over time.

In the three product chain initiatives, we could map out relevant actors during the course of execution. They could be grouped into three categories: prime actors, complementary actors and supportive actors. Generally speaking, prime actors can steer the transformational change process into the direction of scaling up and mainstreaming. However, if they are reluctant to do so, the process will stagnate. At that point, the national government will have to remove fundamental barriers to make mainstreaming possible.

In the mattresses case, the relevant actors could be identified during the circular economy lab organised at the start of the scaling up phase. It became clear that the producers were prime actors in the change process; scaling up would be hampered if 70% of them were unwilling to join a voluntary EPR. Main complementary actors were the two recyclers that needed to upgrade their facilities, the government as a regulator, the municipal cleaning departments to collect the mattresses and researchers needed to develop new knowledge and technologies. The latter group could contribute during all stages of the product chain: from redesign to improving recycling technologies, quality control of the materials and

Actors involved in three product chains

	 Mattresses	 Concrete	 Textile
Prime actors	Mattress companies	Concrete sector, commissioning parties, recyclers and builders	Fast and slow fashion industry and innovative fashion brands
Complementary actors	Recyclers, government as legislator, municipal cleaning departments and researchers	Government and researchers	National and local government, consumers' organisations, professional customers, recyclers and researchers
Supportive actors	Branch organisation of mattresses' industry, mattress retailers, raw material suppliers, government and consumers.	Branch organisations of concrete sector, recycling industry and building sector and organisations representing commissioning parties	Individual consumers

devising the consumer label. Supportive actors consist of a range of actors. In drafting the Concrete Agreement, we started with representatives from all segments of the concrete chain, dealing with sand and gravel extraction, concrete mortar, prefab, concrete goods, binders (cement), demolition, recycling, contractors, builders and architects. The government as the public commissioning party and research institutes were also involved. In the execution phase, representatives of the concrete sector (including recyclers) were the prime actors. However, the agreement's success largely depended on the commissioning parties that needed to integrate the principles of the agreement in their procurement policies. That is why this group also became a prime actor. Together with the builders, they could steer the sector in the necessary direction. If contractors remain reluctant to take up this role, the government may enforce them to act in

accordance with the Concrete Agreement. Researchers and governments can be considered as complementary actors and branch organisations as supporting actors.

In the clothing case, a clear distinction exists between international, big fashion labels producing fast fashion and the innovative start-ups and scale-ups aiming for slow circular fashion. Innovative fashion brands act as third party. For as long as the big labels do not include circular strategies, these labels remain the dominant prime actor. The slow fashion movement is gradually growing but is not yet strong enough to become a bigger market player. Members of this movement can be seen as prime niche actors that together with innovative fashion brands aim ultimately to overrule the mainstream market. However, if the stalemate continues, their niche initiatives will not lead to scaling up and surely not to mainstreaming. At that point, the national government has to implement more stringent policy instruments discouraging the big fast fashion labels from continuing on their current path. When that happens government switches from being a complementary actor to prime actor. Other complementary actors are local governments, consumers' organisations, business customers, recyclers and researchers. Individual consumers serve as supportive actors. In the regional circular economy programme, similar patterns were observed. In the first phase of drafting the overall programme, for example, prime actors consisted of the local government, members of the Amsterdam Economic Board and key business partners. Because the programme should be complementary to what local governments do themselves, it was important for the Board to get formal approval from these prime actors. In the phases of building and scaling up circular initiatives, relevant actors for each particular initiative were identified.

Successful implementation

After preparing and building a circular initiative, comes its implementation. In the past two decades, I have learned that a successful implementation depends on three key factors, which inform the last three guiding principles.

Guiding principle 8

New circular business models should benefit all network partners.

Financing a circular initiative in which several partners are involved is one of the hardest parts of implementing such initiatives. This business model should benefit all network partners; it helps the actors to structure and align their efforts towards the circular economy and to market their own circular product or service. My colleague Julia Planko and I have called this a ‘networked business model’.⁴⁹ As each individual business wants to ascertain a fair share of the overall network profits, a networked business model needs to be linked to the companies’ individual business models. Two interconnected business models are therefore necessary: one at the company level and one at the systems level.

A networked circular business model can represent a variety of new financial arrangements, as I observed in the circular initiatives described in chapters 4 and 5. The particular case determines which financial arrangements are developed and at which point in time these really became an issue. In the mattresses case, financing was the main problem, so it was immediately on the

49 Planko, J. and Cramer, J.M., *The Networked Business Model for Systems Change: Integrating a Systems Perspective in Business Model Development for Sustainability Transitions*, forthcoming in: Aagaard, A., Lüdeke-Freund, F. and Wells, P. (Eds.), *Business Models for Sustainability Transformation*, London Borough of Camden: Palgrave MacMillan, 2021.

table. The commonly shared solution was the voluntary EPR. In the other cases, a variety of new financial arrangements were developed. For instance, in the case of clothing, newcomers introduced various product service models, such as leasing, borrowing and renting, among other arrangements to share costs and benefits among partners. In the concrete case, it still remains to be seen which new financial arrangements will be developed; they will depend on the specific solutions that will be introduced. In the regional circular economy programme, new financial arrangements were introduced too. In strategy 1, closing the loop of resource streams, new business models were adopted in about 60% of all cases. The model most often applied was the shared-costs-and-benefits model, in which key actors jointly estimate the overall cost-result ratio in advance and make a calculation that reflects the share of each actor in a well-balanced manner. Such an honest account of the costs and benefits was often needed to build a viable consortium that was economically attractive to all consortium partners. Another business models that is being considered is the formation of a cooperative, in which the profits of recycling the resource streams of the food industry are shared. In strategy 2, circular procurement, total cost of ownership was seen as a key instrument in creating a circular business. New business models were therefore also adopted here. Examples that stood out were the leasing and second-hand use of office furniture, workwear that was given a second life and circular building, particularly in circular demolition and reuse of building materials. Small-scale pilots sometimes also required a new business model, for example, the collaboration between a catering company with a start-up that grows mushrooms from coffee grounds and another that makes products of discarded orange peels.

However, generally speaking, procurement officers were often reluctant to introduce new business models, particularly when not yet proven in the market. Constraints were that accountancy rules are strictly interpreted and therefore rarely allow longer depreciation periods, and that little experience exists with new

business models for most product groups, which makes adopting them risky. Another constraint was that it is hard to agree on take-back systems for products with a long service life, especially with companies whose longevity was uncertain. Another constraint was that circular procurement requires more preparation time and more elaborate negotiation with the supplier than a regular procurement procedure, even more when it also involves a new business model. The procedure then becomes even more complex and time-consuming.

Guiding principle 9

Transition brokers can accelerate circular initiatives.

No one can realise a circular initiative alone. Every actor is constrained in one way or another, and needs other types of actors to work on the initiative. Local governments, for example, have some room to introduce specific measures but need to act within the national policy framework, which is itself a compromise between different political viewpoints in Western democracies. To transition towards a circular economy, governments depend on the market as well as civil society and research and educational institutes. Companies are crucial actors as they largely determine what will be put on the market. They do, however, need to cooperate with other actors to realise circular initiatives. Citizens and NGOs can pressure the market and governments to take action. The influence of these societal representatives can be substantial, especially when civil society shares their concerns and also expresses the urgency to act via the media and social media. Research and educational institutes play a key role in innovation, knowledge development and diffusion and cultivating new expertise and competencies.

Because many of these actors are used to working in silos – sometimes even within their own organisations — building circular initiatives through new forms of cooperation is a real challenge. Intermediaries, or what I call transition brokers, can help align all relevant stakeholders. Sometimes a transition broker is just one person; other times it is an organisation. It is the broker's role to orchestrate the transition process,⁵⁰ which is something they can accelerate from a neutral position. They are trustworthy and try to

50 Cramer, J.M., *The Function of Transition Brokers in the Regional Governance of Implementing Circular Economy: A Comparative Case Study of Six Dutch Regions*, *Sustainability*, 2020, 12, 5015, <https://doi.org/10.3390/su12125015>.

build coalitions with parties that are willing to take transformative steps forward. When transition brokers have the formal mandate to fulfil a servant leadership role, they can help steer the circular initiative into the desired direction. Their tasks are to develop proper interfaces between the different actors, help satisfy the necessary preconditions and make sure that impactful circular initiatives can be established. Other important tasks are to motivate the majority of companies to join circular initiatives and help establish the link between local and national governance.

Transition brokers orchestrate not only the process, but also the content of the circular transition. Their efforts focus primarily on circular initiatives with a positive impact on prosperity, wellbeing and the environment. The transition brokers need to ensure that the most promising circular options are prioritised in building the circular initiatives. To raise standards and keep ambitions high, they must involve external experts and innovative companies. It helps tremendously when clear and ambitious short and long term goals are jointly set by the participants. This approach often leads to more advanced ambitions than individual market actors can achieve by themselves.

To carry out these tasks, a transition broker ideally has certain competencies.

Competencies of transition brokers



To be entrepreneurial, dare to leave your comfort zone, persevere, be impatient and be willing to follow up with contacts



To excite and inspire others to cooperate



To think and act from a systems perspective but at the same time to be pragmatic



To get the idea of circular economy accepted in a variety of businesses and organisations, translate the desired actions into the language of other organisations and do not appear threatening



To act in the collective interest and be professional enough to stand above the parties



To have a very broad knowledge base in circular economy innovations, the business environment and political culture



To be able to open doors at all policy levels to remove barriers that need to be solved by governments

As it can be difficult to combine all of these requirements in one person, two or more persons can be included to cover all competencies needed in the team.

In all three product chains described in chapter 4, I acted as one of the transition brokers. In the case of mattresses, I started the initiative because the product was one of the nine priorities in strategy 1 of the regional circular economy programme. Soon after the start, I realised that a circular mattress initiative could not take off on a regional scale. I therefore co-organised and moderated a circular economy lab on closing the loop of mattresses, where all segments of the product chain were represented. After the lab, they agreed on drafting a voluntary EPR. I expected that the next phase, getting consensus on this instrument, would be time-consuming, which is why I handed over my role as transition broker to the branch organisation of municipal cleaning services. Because progress was going too slowly, I requested the Ministry

of Infrastructure and Water Management to finance a senior person who could act as transition broker. The ministry responded positively and enabled appointment of a former director from the Ministry of Economic Affairs. He managed to reach an agreement among the prime actors. My role was modest in this process, requiring me to keep in touch with the transition broker and assisting him as needed.

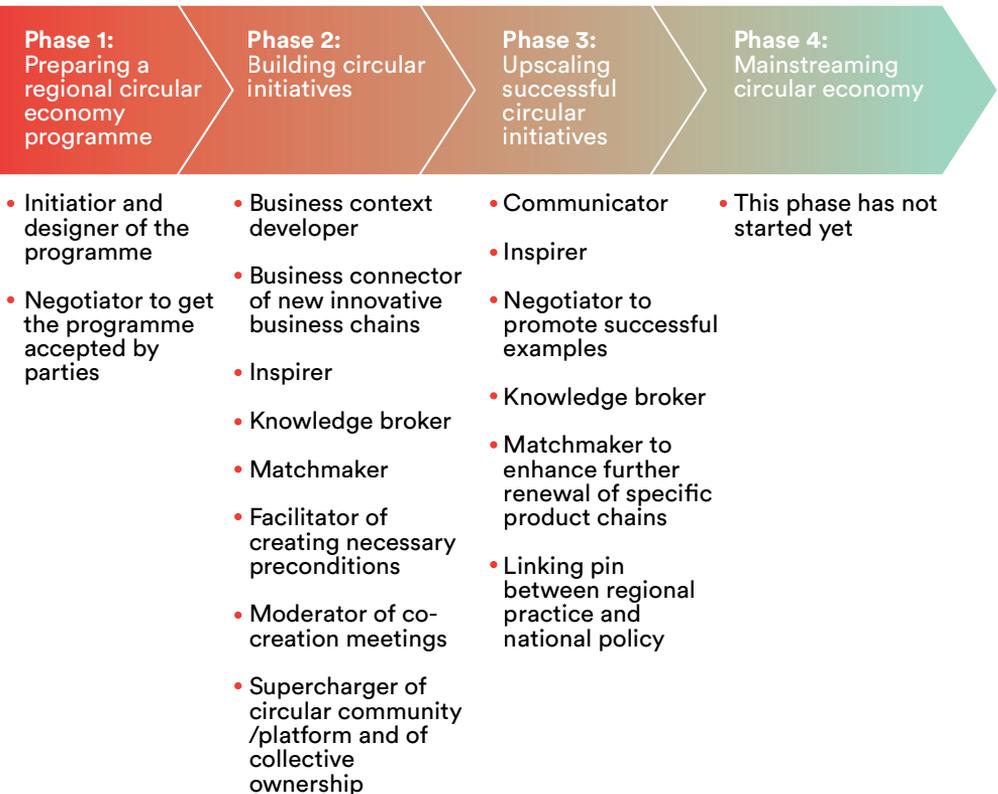
For the concrete case, I have been orchestrating the overall execution process as a transition broker ever since its start in 2018. I am supported by an assistant, seven self-steering teams and a group of proactive public contractors. The process is set up according to the basic principles of managing transformational change. We constantly evaluate progress, intervene if necessary and involve critical outsiders if the objectives seem to go unmet.

In the clothing case, a number of transition brokers are active at the regional level, while coordination of these initiatives takes place at national level. The future will show how these transition brokers bundle their initiatives.

In the regional circular economy programme transition brokers played an important role at various levels of execution. I initiated the programme and was soon supported by a Board employee who also acted as transition broker. We were an ideal tag team. With my background in politics and business, I could open doors at all policy levels and contact businesses both at management and shop-floor levels. Moreover, as a moderator, I helped the three communities of practices focus on circular procurement and conducted labs with stakeholders. My colleague chased after each initiative to make sure that a viable consortium would be built and the communities of practice kept activated after its formal ending. Our involvement in each initiative decreased when a consortium was created. This did not mean we could withdraw. Frequently, we were requested to help an initiative get back on track, for example, when one of the consortium participants in the nappies case stepped back

and, in the public greenery case, when internal problems arose. In the course of the process, the regional Board of Local Governments also appointed two transition brokers to carry out tasks for which local governments were held responsible. These included further elaboration of the circular procurement initiative among local governments and the inclusion of circularity in the procurement of resource streams such as nappies, plastics, roadside grass and non-wearable textiles. This led to a fruitful division of labour between the Board's transition brokers and regional-level local governments. The Board's transition brokers fulfilled a variety of roles in the various phases of the regional circular economy programme.

Roles of transition brokers in various phases



Guiding principle 10

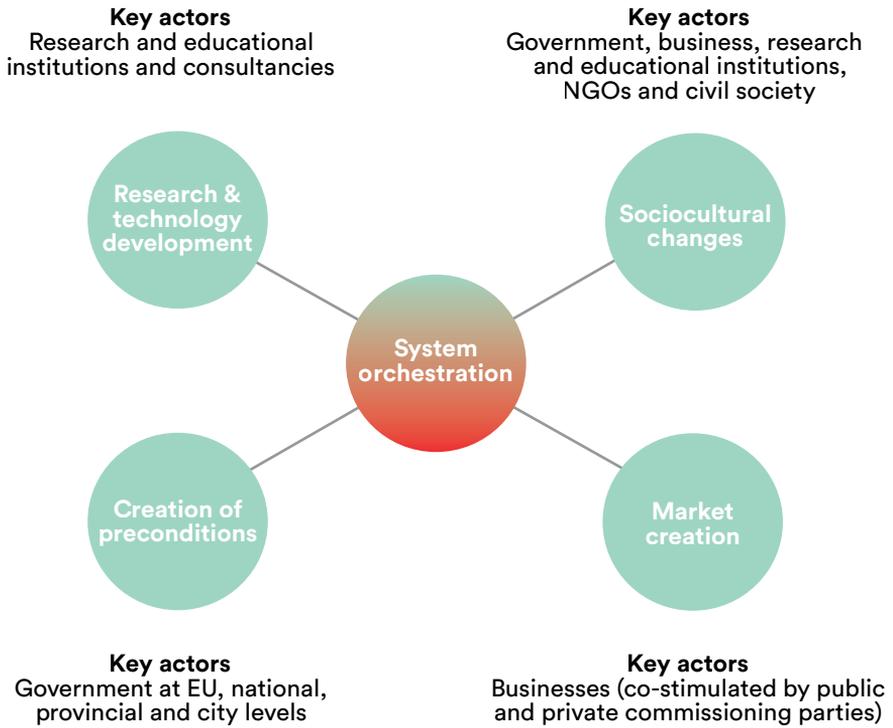
A transparent division of labour among the relevant actors is indispensable.

To successfully build a circular initiative, key actors should feel responsible for the execution of the necessary activities related to their roles in the system. It is therefore crucial that the function of each actor and system-building activities be agreed upon upfront in general terms and more specifically later in the process. This sounds self-evident, but my experience is that this important last guiding principle is often overlooked. Most actors willing to join forces will admit that an alignment of actors is necessary for successful implementation of circular initiatives. Making transparent arrangements about a division of labour is less common, but it appears to be indispensable. Generally speaking, the function of each actor in the system transformation is rather obvious. For example, the government is responsible for the creation of proper preconditions; businesses for the provision of circular products and services; research and educational institutions and consultancies for the development and transfer of knowledge; and all actors for necessary sociocultural changes. However, how every function plays out in a particular case and which particular system-building activities should be performed by each actor are usually not specified or agreed upon

I have used the term 'network governance' for this model of jointly building a circular initiative, as explained in chapter 2. I believe that this new form of governance empowers all relevant actors to make a transformational change. The essence is that all actors depend on each other for successful implementation of the initiative. When some system-building activities are not taken up, the change process will stagnate. Each party has a singular role to play, but collectively they enact change. One particular actor cannot transform the system, but together with other actors,

change is possible. As this often does not happen by itself, it is helpful to have the transition broker functioning as orchestrator. The figure below summarises five key actors clustered in five different functions.⁵¹ System orchestration is placed in the middle, as this is the interlinking element between all functions in the system.

Key actors and functions in network governance



51 Cramer, J.M., *The Function of Transition Brokers in the Regional Governance of Implementing Circular Economy: A Comparative Case Study of Six Dutch Regions*, *Sustainability*, 2020, 12, 5015, <https://doi.org/10.3390/su12125015>.

The system-building activities related to the five key actors and functions are visualised below. These activities are roughly the same but need to be specified, depending on the case at stake.

Functions and system building activities to be performed by key actors

Function	Key actors	System-building activities
Research & technology development	Research and educational institutions and consultancies	Knowledge development and exchange Co-creation of circular products and services
Creation of preconditions	National and local governments	Policy development Adjustment of policy instruments Policy execution Promotion of employment and new business in circular economy Facilitation of innovation and learning networks on circular economy <i>Additional for municipalities</i> Responsibility for logistics/collection of municipal waste streams Interaction with citizens
System orchestration	Transition broker	Preparing circular initiatives Helping to build circular initiatives Upscaling successful circular initiatives Mainstreaming circular economy
Sociocultural changes	Government, business research and educational institutions, NGOs and civil society	Changing behavior (e.g., of consumers, users or bidders) Creating institutional changes to anchor circular economy in organizations Effecting changes in the education system Generating a pool of skilled labor
Market creation	Business (co-stimulated by public and private commissioning parties)	Developing commercially viable circular products and services Building circular business in partnership Cooperating with other stakeholders in product chain and/or in the local context Developing circular business model

This process of clearly defining a division of labour took place in the three product chains. By doing so, the roles of all actors in the particular initiative were clear, and participants could address each other to act accordingly. If division of labour is vague, frustration often arises, with some actors not doing what they were supposed to. The role of the national government in the respective product chains, for example, turned out to be a mix of activities. These included revising quality standards and procedures; changes in EU and international policies; using purchasing power through circular procurement; developing innovation budgets for targeted projects and process budget for orchestrating the transition process. The government could therefore not simply proclaim policy objectives to which the market should conform and execute. The government had its own function to fulfil in the execution.

How labour was divided was case-specific. In the mattresses case, the group of actors involved was rather broad at the start and did not focus on a division of labour. After a transition broker was appointed to orchestrate the voluntary EPR negotiations, the division of labour became clear. The mattresses producers were held responsible for the introduction of the scheme, while the recyclers had to invest in higher efficiency of the equipment. The collection of discarded mattresses was defined as a joint task for municipal cleaning departments, different sectors and retailers to fulfil. As it is a voluntary scheme, the role of the national government was limited to independent inspection and strengthening policies if the mattresses producers could not agree on a voluntary system.

In the case of the Concrete Agreement, the role of the concrete sector first seemed obvious, taking the lead for developing a roadmap to meet the ambitious targets. In drafting these roadmaps, however, the importance of other actors became explicit. Commissioning parties and builders had to be made responsible for implementing options higher on the circularity ladder as these were not within the remit of the concrete sector itself. The same held for the active involvement of public commissioning partners

and the need to adapt quality standards and procedures to the specific concrete application. These tasks had to be performed by the government. As transition broker, I called for a transparent mapping of who has to do what and emphasised the need for every actor to act accordingly. This was a relief for the concrete sector, as they originally thought themselves mainly responsible for the execution of the agreement.

In the clothing case, the division of labour in the regional clusters is becoming clearer. As the regional network of actors involved enlarges, the necessity to define which tasks are performed and by whom, becomes more prominent. The same holds for the execution of the recently launched national textile policies, which also will see discussions about division of labour.

In the regional circular economy programme, the division of labour was also a key issue. In the first phase of programme preparation, for instance, we explicitly described the role of the Board. As it was a new function, it took a while to convince the regional partners of this new form of network governance. In the next phases of the programme, it remained crucial to be clear about the system-building activities every actor had to carry out in each circular initiative. In strategy 1, closing the loop of resource streams, the building of a consortium was the defining moment to determine which system-building activities were to be performed and by whom. In strategy 2, circular procurement, the division of labour shifted in the course of time. In the building initiatives phase, the procurement officers were in charge, while the Board assisted in the communities of practice. In the scaling phase, the Board had to perform other system-building activities, such as mobilising support from the heads of the organisations involved, taking the lead in collectively organising more innovative solutions in specific product chains and attracting more organisations in the region to join.

Chapter 7

The power of network governance

It is my firm belief that network governance is key in effectuating a circular economy. It will not replace conventional public governance, but rather complements it. Network governance bolsters the positive forces in a democratic society, thereby making a crucial contribution to the circular objectives of countries and regions.

The main message of this book is that network governance fills an important gap in the implementation of circular initiatives. Conventional public governance is insufficiently connected to the people who are supposed to help realise the circular economy goals set by the national government. Circular economy requires a fundamental system change, which implies that we need radically different implementation strategies than those used in the past. When the national government introduced environmental policies in the 1970s, in response to increasing pollution, its major focus was on regulating industrial emissions. The roles were clear: the government made the regulations and industry had to comply. NGOs acted as watchdogs and pressured the government to be strict with industries.

Nowadays, environmental problems have become so overwhelmingly huge that just regulating emissions is not enough. This notably holds for one of the most major worldwide environmental

problems: resource scarcity and overconsumption. To cope with this, we need to change how products are produced and consumed in a fundamental way. Thus, we need to transition towards a circular economy.

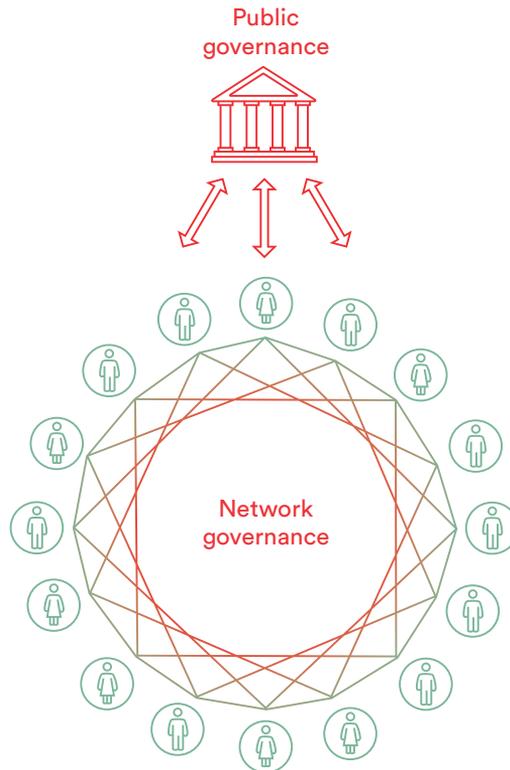
The national government is, as guardian of the common good, still responsible for environmental policies to which all stakeholders should conform. The government sets policy goals and formulates the appropriate instruments, such as regulatory, economic and social measures. This is what traditionally belongs to the realm of public governance. In a democratic country, such as the Netherlands, all kinds of stakeholders are consulted in drafting the policies, but Parliament ultimately decides. It is also possible to instate citizen councils consisting of a representative but randomly selected group. I was impressed by the results of a democratic experiment in France in 2019, when 150 French members of the population invited to a citizens' convention on lowering carbon emissions came up with very innovative ideas.

The problem arises when it comes to putting policy into practice. What has been agreed upon in Parliament may not be simply executable in practice. As a minister, I also struggled with this problem, for example, in setting up the first governmental climate policy programme covering all major sectors of society. Although I really tried to cooperate closely with the parties that had to carry out the national policies, I experienced an undeniable distance between the practitioners and myself. It was hard to grasp whether the partners responsible for execution were sufficiently equipped to deliver the results needed. I could only monitor the progress made.

The same problems arise in the implementation of circular economy policies. For example, the five circular transition agendas I described in chapter 3.3 are very useful strategies, developed with representatives of the sectors involved. However, the most challenging step is implementing those strategies in practice,

in product chains and at local levels. Complementing public governance with network governance can bridge this gap. It can create an alliance between national policies and their actual implementation.

Relation between public governance and network governance



Network governance is about building a coalition of partners: people willing to contribute to transformational change and who need each other to realise this. In this book, I have shared my experiences with how network governance can be operationalised in product chains and at the local level. Although every case is

tailor-made, several characteristics were common to all. Each circular initiative showcased how the partners jointly developed a circular initiative, often mediated through a transition broker. Each successful circular initiative is a building block for the circular economy we so desperately need. When such an initiative is scaled up and ultimately becomes mainstream, the linear economic system is successively broken down and the circular system built up. This process of creating building blocks should be repeated several times in a significant number of product chains to become fully circular. To reiterate, the transition to a circular economy is not linear, but iterative and spanning at least two decades. It is a continuous transformational change, in which all product chains play an important role.

A variety of changes can occur that, depending on context,⁵² differ in depth, scale and speed. A transformation process can be accelerated in case of sudden disruption (e.g. through specific catastrophes or high-impact events) or when the national government strengthens its policies. This might happen when societal support for stricter measures increases and political parties take bolder steps. This helps lift legal and economic barriers that constrain the transition towards a circular economy.

In each circular initiative the partners fulfil a specific function in the network and are expected to perform those system-building activities that correspond with their responsibility in the network. If some activities go unaddressed, the change process will slow down or be put on hold. Thus, the success of a circular initiative largely depends on the weakest link in the network. This implies that network governance should not be seen as informal cooperation between partners, as is sometimes argued, but as a formalised structure. In network governance, the system-building activities to be carried out by each stakeholder need to be agreed

52 Termeer C. et al., *Transformational Change: Governance Interventions for Climate Change Adaptation from a Continuous Change Perspective*, *Journal of Environmental Planning and Management*, 2017, 60, 4, 558-576, <https://doi.org/10.1080/09640568.2016.1168288>.

upon upfront in general terms and specified in the course of the process. Each partner has to contribute to the overall result. Network governance requires an attitudinal change of *all* partners because it includes a new way of working. However, I have learned that this change has the most drastic consequences for governments, both locally and nationally. Although the trend toward privatisation and liberalisation of markets is increasingly questioned in most Western societies – the Netherlands included – the division of labour between government, industry and society is still rather fixed; governments formulate the general rules while the market determines how to cope with them. However, when a transformational change is needed, as in the case of the circular economy, the government cannot just leave implementation to the market. Firstly, this is because the mainstream market has too many stakes in its current, mostly linear economy.

Secondly, the market cannot make the system change alone; companies need partners, such as the government, researchers and citizens. The government must act as one of the network partners and cooperate while keeping equal footing with the others. At the same time, the partners must rely on the system-building activities performed by local or national governments in the timespan planned. These activities are often tailor-made and therefore do not constitute the standard repertoire of governmental instruments.

It is crucial that all partners involved agree on an ambitious vision, mission and targets of the circular initiative. They must be jointly responsible for meeting these targets based on a shared sense of urgency. This is a delicate process, as market actors will diverge in interest and more established large companies will tend to dominate the process. That is why a neutral transition broker is crucial for guiding the process into the desirable direction. To act as transition broker requires a specific skillset, as described in chapter 6. This intermediary can be a free agent or someone from an organisation (e.g. an Economic Board). But it is crucial that this person be respected, trusted and seen as neutral for all partners

involved. Preferably, the transition broker will have a formal mandate to operate as intermediary and fulfil a servant leadership role. A transition broker can assign innovative businesses the driver's seat. These businesses can catalyse changes, leaving the mainstream market to follow. This starting point has severe consequences. It means that the market will be challenged to generate more far-reaching solutions than the incremental change the mainstream market usually makes.

The transition towards a circular economy is not just a technological endeavour. It is far more a socioeconomic and behavioural challenge. People may feel uncomfortable with the idea that our current production methods and consumption habits are unsustainable. As we all are creatures of habits, we may shy away from the consequences of fundamental change. That is why initiatives close to the hearts and minds of people are essential for any fundamental change, including our transformation into a circular economy. If an inspiring perspective is shared, the actual step to doing something becomes smaller. That perspective might consist of concrete examples of how an individual or an organisation can contribute to and benefit from change, either as producers or consumers. The sender of the perspective also matters: people are more inclined to adapt their behaviour when those close to them or those they admire urge them to join. This holds both for everyday citizens and entrepreneurs.

Network governance incentivises the positive forces in society and gives wings to the ideals of individuals. In today's society, we tend to underestimate what people are capable of if they are empowered and taken seriously. However, the COVID-19 crisis made it crystal clear that people can move mountains.

In the book, I presented examples of circular initiatives taken mostly by business partners, in cooperation with governments and researchers. However, the added value of network governance also holds for circular initiatives in which citizens lead. Here, too, we need alignment among people who can jointly effectuate

initiatives. I can best illustrate this based on experiences in my hometown of Amsterdam. I am involved in the 02025 project, a bottom-up initiative in which about 2,000 ambassadors from different neighbourhoods work on the city's energy transition and simultaneously create jobs for people in these neighbourhoods. As an ambassador in my own neighbourhood, I have managed to get things done. Solar panels now rest on my apartment building's rooftop, and I have shared my experience in arranging this with others intending to adopt a similar initiative. I am also in close contact with energy supplier ENGIE, which installed the heat cold storage units in our neighbourhood. I have encouraged the company to assess the neighbourhood buildings' energy performance and investigate additional improvement measures (e.g. the use of sustainable energy for powering the heat cold storage units). A lot is happening in other neighbourhoods too. This reveals a powerful network of citizens in the city seeking to contribute to our future challenges. I actively participate in the core group of the 02025 movement to increase its strength and execution power. We do, however, need the municipality. The councillor is willing to support our initiative, but the formal procedures hamper easy cooperation. This problem also occurs in other citizen initiatives, for example, in developing energy cooperatives. If municipalities would embrace network governance, they could actively use the power of the people in neighbourhoods to help realise their climate goals. Municipalities, together with these citizens, would decide how to divide roles and responsibilities. Citizen groups would then get the mandate to assist the municipality in executing climate actions.

Network governance can boost implementation of circular initiatives tremendously. It can align the growing number of inspiring standalone initiatives, thereby establishing a firmer, circular economy movement. By complementing conventional public governance with this new form of governance, the best of both worlds is created. It strengthens the positive forces in society and gives a voice to those who sometimes do not feel heard by the government. At the same time, network governance helps realise

circular economy policy goals for 2030, formulated by the Dutch government. It also increases societal support for more stringent measures if we are not on track in reaching the goals.

The Netherlands is currently undergoing a learning curve, better understanding how to reinforce this interaction between public and network governance. But consensus is gradually growing that it is a valuable road to explore. It is my firm belief that network governance and its 10 guiding principles can also work in other countries. Hopefully, this book provides the inspiration to embark on this challenging but at the same time inspiring journey towards a global circular economy. We have no choice but to make this change together.

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Jacqueline has always promoted combining practice-oriented, sustainability initiatives with theoretical reflections. In her time as a professor of sustainable innovation at Utrecht University, she has written many scientific publications, some of which are cited in this book. To this day, she belongs to various international and national advisory Boards of governments, industries and non-profit organisations. Some of her current roles include supervisory Board chair of Holland Circular Hotspot, of the Frisian Energy Fund and of the Plastic Soup Foundation, mayor of Cirkelstad (Circle City) and chair of the Dutch Concrete Agreement.

In recent years, Jacqueline has advised various governments and international organisations on circular economy implementation. As a well-known expert on the subject and sustainability overall, she has given talks at many conferences in the Netherlands and abroad.

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