



Circular Economy Implementation Programme 2019-2023

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1

Introduction

1.1 Background

The ‘Nederland Circulair 2050’ (Circular Economy Programme for the Netherlands, 2050) gives the government’s vision on the circular economy¹. The aim is to have achieved a fully circular economy by 2050. The current Cabinet’s aim is to achieve an (interim) target, together with its social partners, of 50% less use of primary raw materials (mineral, fossil and metal) by 2030.

The 2050 aim has currently been endorsed in the Grondstoffenakkoord (Raw Materials Agreement) by more than 400 companies, NGOs, financial institutions, public authorities and other organisations². On behalf of those partners, transition agendas were drawn up in 2018 for five priority chains and sectors: biomass and food, plastics, the manufacturing industry, construction, and consumer goods.

The Cabinet’s response on 29 June 2018 to the transition agendas stated that the phase of acceleration and scaling up has started³. The letter opened with the sentence ‘Now is the time to start turning words into deeds’. This sentence, spoken by the chairs of the transition agenda groups, is the motto that drives the implementation of the plans and activities from the transition agendas. The Cabinet’s response includes the announcement of an Implementation programme for the circular economy, which aims to implement and act upon the inspirational intentions of the transition agendas. This implementation programme also helps achieve Sustainable Development Goal 12 (SDG12), which is about responsible production and consumption. This Implementation programme has been drawn up together with the chairs of the transition agenda groups and other partners in the Raw Materials Agreement.

1.2 Purpose and content: getting going

This Implementation programme is about how the government and the participants in the Raw Materials Agreement are energetically continuing to shape the transition to a circular economy. The specific actions and projects are the tangible outcomes showing how this will be done. The projects presented here in the high-priority supply chains combine illustrative and inspirational elements. This may encourage others (companies, the general public, regional and other authorities) to take action as well and turn ideas into business cases. The projects that we are highlighting in this programme show the active involvement of a wide range of parties. This is how the transition agendas are being translated into actual activities. In addition, the Cabinet is making clear how the cross cutting themes affecting multiple aspects of the circular transition can be facilitated. These cross-cutting themes are aimed at broadening the playing field for the circular transition, removing obstacles, providing stimuli for the market, encouraging new forms of financing, bringing parties together and accumulating knowledge and experience. In addition to the specific projects and cross cutting themes, this Initial implementation programme also considers knowledge development and pilots. Knowledge development and the use of pilots and experiments are important so that these projects can be scaled up later.

This Implementation programme is not intended to produce a full picture of what can be done concerning the circular economy: it shows what actions can be taken in a number of important aspects, in addition to the existing efforts. The programme will be updated every year until 2023 and new initiatives can be added to it.

¹ Parliamentary papers II, 32,852, no. 33

² Parliamentary papers II, 32,852, no. 33

³ Parliamentary papers II, 32,852, no. 59

‘The Earth does not have an infinite supply of raw materials. We must therefore work towards the circular economy. This government-wide programme will let us scale up the circular economy, accelerate it and monitor it. This is how we can utilise our innovative strength and create new opportunities for Dutch businesses, both nationally and internationally.’

Stientje van Veldhoven, State Secretary of Infrastructure and Water Management

In the publication by the Netherlands Environmental Assessment Agency (hereinafter referred to as ‘PBL’ entitled ‘A picture of the circular economy’⁴, PBL creates an overview for the first time of the circular economy activities within the Dutch economy (approx. 85,000 circular economy initiatives, some 1,500 of which are innovative). At the same time, PBL analyses the barriers that are currently present and the opportunities that could be used for accelerating the move to a circular economy. A sharper focus not only on recycling but also on refuse, reduce, reuse and repair (the R’s higher up the ladder) is needed here to cut down the use of raw materials in the Netherlands. The PBL’s recommendations to the government include eliminating barriers in financial areas, in legislative areas and with respect to granting permits, as well as getting all public authorities to work together towards this. This will make it possible to learn another way of thinking that is better oriented to facilitating circular initiatives. The Circular Netherlands Accelerator has been mentioned as an important instrument for facilitating and scaling up new forms of circularity.

This implementation programme is well aligned with the PBL-report’s recommendations. A wide gamut of circular-economy activities are addressed in this Implementation programme. Attention is paid for example to circular design, market incentives and sharing economy. Removing obstacles in legislation and regulations and assisting companies in ground-breaking projects relating to the circular economy are also elements of this Implementation programme.

Where possible and necessary, efforts will be made to align it with INEK (the Integrated National Energy and Climate Plan, which every EU member state has to produce in the context of the European climate objectives, giving a picture of the current state of the national policy). This will definitely be done when INEK is updated in 2024.

Monitoring is a key instrument for assuring progress in the circular economy. The aim for 2030 as formulated in the Circular Economy Programme for the Netherlands 2050 must be made more concrete and operationalised so that the progress can be measured. This will enable the transition to be steered properly. PBL will take on a coordinating role in this. Both the progress in the priority chains and sectors and the effects of the cross cutting themes will be quantified and this will be used to determine what adjustment is required.

Cooperation on a number of levels is extremely important: the regional and local scales are essential for the transition to a circular economy. Companies generally organise themselves in regional clusters, for instance; the labour market is organised on regional lines and science institutions (for both education and research) also tend to operate at a regional scale. Consumers also mostly look at the options locally and/or online. Municipalities and provincial authorities have purchasing power, moreover, and responsibility for construction and demolition, social housing, green areas and waste disposal policy. Chapter 2 on the priority sectors, shows for the various projects where the municipalities, provinces and water boards are making contributions or have taken the lead. Chapter 4 elaborates upon a number of specific projects that have been taken up on the local or regional level.

1.3 Next steps for the Implementation programme

This first Implementation programme is looking five years ahead, from 2019 to 2023. The following working cycle has been adopted for the programme:

- The Implementation programme is dynamic and looks at the prospects for the coming five years. The current state of affairs and the future prospects will be updated annually so that new developments and initiatives can be shown.
- A report will be issued every two years under the auspices of PBL looking at the progress; in addition, products will be added every year.
- In February/March of each year, a national Circular Economy conference will be organised. The progress towards a circular economy will be discussed during this

⁴ <https://www.pbl.nl/publicaties/circulaire-economie-in-kaart>

meeting with all the parties involved. Ideas can then also be put forward for strengthening, revitalising or modifying the Implementation programme.

- What new efforts are needed this will be examined annually, as will how and by whom this can best be done. The assessment will among others be based on the results of the progress monitoring.
- In June of each year, the Dutch House of representatives will be informed on the progress, the monitoring results and any updates.

The focus on objectives in the future, requires that these objectives are feasible. PBL will provide further details of how the goals for 2030 can be achieved, in the light of the targets for 2050, so that the process can be steered in that direction.

It is important to have a shared vision of how the world should look in 2050 that can be used as the basis for determining what actions have to be taken now. And vice versa, in order to determine what the current activities will mean for the world in 2050.

In order to create a shared vision such as this and to formulate the roadmap to achieve it, cooperation will be needed with the chairs of the transition agendas on drawing up these visions for the future and what is needed to get there. A Reflection Group led by the chair of the SER (Social and Economic Council) will reflect upon this annually, on request by the State Secretary for Infrastructure and Water Management (IenW). The focus here will be on the social process of transitioning to the circular economy, as set out in the Cabinet's response dated 29 June 2018. The aim is also to include labour market developments.

1.4 The link with the energy and climate transitions

The Coalition Agreement notes the link between the government-wide Circular Economy programme and the tasks relating to the climate. Accelerating and scaling up the transition to a circular economy helps the climate task: the Cabinet's response to the transition agendas also mentions the overlaps with the energy and climate transition, and the contribution that the circular economy can make towards achieving the climate objectives is stated. When fossil fuels and other non-renewable resources are replaced by renewable sources (such as biomass and recycled materials from

residual waste streams), this can represent a considerable reduction in CO₂. The same is also achieved by retaining products and raw materials in a closed loop. In addition, a circular economy helps make supplies of scarce raw materials more secure, such as critical metals that are badly needed for the energy transition. In the meantime, the contribution that a circular economy can make to reducing CO₂ emissions has been abundantly described by TNO (the Netherlands Organisation for applied scientific research TNO), PBL and others. PBL has pointed out the strong link between the energy transition and the circular economy transition⁵. TNO has calculated the effects of the programme and the transition agendas in a model study, estimating that realising the quantitative objectives of the government-wide programme and the transition agendas could lead to a considerable reduction of CO₂ in the Netherlands.

When presenting the draft (national) Climate agreement⁶, the Cabinet once again underlined the fact that circular economy measures can help achieve the climate objectives. The cabinet will therefore monitor the cohesion between this Implementation programme and the agreements made in the national Climate Agreement. The national draft Climate agreement of December 2018 includes numerous circular economy measures because they will make a contribution to the climate objectives. Circular measures thus reappear in the proposals for the 'agriculture and land use', 'industry' and 'built environment' forums. In addition, in the biomass part of the draft national Climate agreement, arrangements have been made about cascading. Also, the central government is making a substantial contribution by deploying its own purchasing power in a more circular way.

In this Implementation programme, as clear a picture is given as possible of how the specific projects help achieve the climate goals via CO₂ reduction. For some projects, the CO₂ reduction that will be achievable in the Netherlands can be made visible straight away, but circular economy projects also often help CO₂ reduction elsewhere in global supply chains. A number of projects have been financed through the supplementary fund for the climate (hereinafter the 'climate envelope') in 2018 and resources have also been allocated for 2019 to a number of circular economy projects that help the climate goals.

CO₂ effects due to the circular economy will also be part of the monitoring that will be carried out by PBL in the coming years.

⁵ <https://www.pbl.nl/sites/default/files/cms/publicaties/PBL-2018-%20Bijdrage-circulaire-economie-aan-energietransitie-3277.pdf>

⁶ Parliamentary papers, 32,813, no. 263

‘The circular economy is not only important from the perspective of using raw materials sensibly: it can also make a significant contribution towards solving the climate issue and it offers opportunities for the innovative Dutch private sector.’

Eric Wiebes, Minister of Economic Affairs and Climate Policy

1.5 Reading guide

Chapter 2 discusses a number of projects or activities within each transition agenda. To support the transition, the Cabinet’s response of 29 June 2018 formulated a number of cross cutting themes.

Chapter 3 explains what is happening within those cross cutting themes and how they are helping the highlighted projects and activities within the transition agendas.

Chapter 4 describes the developments in the regions and Chapter 5 lists the financial resources required and where they will come from.

2

Priority chains

Five agendas for the transition

The signatories to the Raw Materials Agreement have drawn up transition agendas for five priority chains and sectors using raw materials: biomass and food, plastics, manufacturing industry, construction, and consumer goods. These value chains cover sectors that are important for the Dutch economy, where there is major environmental pressure, where there is already substantial social impetus for the transition to a circular economy, and that are in line with the European Commission's priorities. A number of projects are described for each transitional value chain (hereinafter referred to as a 'priority'). These are projects that often require joint efforts. This commonality can be seen in the projects described below, in which a large number of actors are working together: companies, science institutions, NGOs, governmental authorities, educational institutions.

2.1 Biomass and food as a priority

Biomass is a key driver for the circular economy. It is a raw material for foodstuffs, animal feed, the chemical industry, materials and fuels for transport and for energy. Using it helps make a large number of sectors greener. Biomass is essential for cutting down CO₂ emissions and for making us independent of fossil raw materials.

'The success of the circular economy is not so much dependent on the technical capabilities as on society's backing for it – very much so.'

Emmo Meijer, chair of the transition agenda for Biomass and Food

Because the demand for biomass is growing worldwide, its availability will have to be scaled up sufficiently. It is uncertain whether it will be possible to meet the demand in the longer term. Because the options for producing more biomass are limited in the Netherlands, optimum use of all fractions of a crop (multiple value chains) and smart use of residual chains are very important. There are opportunities for new business models there. In the context of the Climate Agreement, it has been agreed that a National Biomass Roadmap will be produced that makes clear what quantities of biomass can be made available for various applications in the Netherlands (in addition to human food and animal feed) and what the side effects of this will be.

The transition agenda describes what is needed to create a circular, biobased economy. The emphasis is on sustainable production, optimum utilisation and obtaining value from residual flows, reducing waste (food waste in particular), regenerative use of raw materials, soil and nutrients and developing new ways of producing and consuming. The recent vision on circular agriculture produced by the Ministry of Agriculture, Nature and Food Quality (LNV), which the sector has embraced enthusiastically, is helping steer the implementation of these points⁷. Efforts will also be made to align this with the Circular Agriculture working group, which is working on the LNV's Circular Agriculture Realisation Plan.

The Dutch agriculture sector is facing some major challenges if the long-term objectives for sustainable food production are to be achieved. According to the Paris Climate Agreement, greenhouse gas emissions must be substantially reduced and need to have been cut by about 85-95% by the year 2050 with respect to 1990 levels. The National Raw Materials Agreement and the transition agenda drawn up for biomass and food require entirely closed-loop, regenerative use of nutrients and soil.

This is a tough task and it demands a holistic approach. In the longer term, the sector will have to achieve a production system that has a neutral or positive effect on not only the

⁷ <https://www.rijksoverheid.nl/ministeries/ministerie-van-landbouw-natuur-en-voedselkwaliteit/documenten/beleidsnota-5/2018/09/08/visie-landbouw-natuur-en-voedsel-waardevol-en-verbonden>

climate but also the soil, water and biodiversity. This is only possible if such a production system is also both economically and socially sustainable. The new Common Agricultural Policy (CAP, 2021-2027) can encourage the transition to circular agriculture. In the European context, the LNV is therefore making efforts to make the CAP greener and more sustainable.

In 2018, a number of working groups within the national Climate agreement discussions, as part of the Agriculture and Land Use table (namely those for Biomass; Livestock Farming; Food Consumption and the Food Chain; Agricultural Soil and Full Soil Cultivation; Trees, Woodland and Nature; and Greenhouse Horticulture) proposed measures that are at the interface with this transition agenda. These measures will be involved in the further elaboration of the agenda.

‘The shift to circular agriculture is a societal movement that everyone is involved in: farmers, industry, trade and consumers – everyone has a role to play in it.’

Carola Schouten, Minister of Agriculture, Nature and Food Quality

The following six tracks are central to this transition agenda:

- enlarging the supply of sustainably produced biomass
- getting the optimum value out of biomass and residual flows to create circular, biobased products
- circular and regenerative use of soil and nutrients
- reduction of food waste
- the protein transition to more vegetable protein
- ‘feeding and greening megacities’ as the Dutch business model

Sixteen projects will be presented below that all make a positive contribution to one or more of those tracks. This Implementation programme is not an exhaustive overview, but it does give an impression of what is happening in the sector. There are for instance also numerous regional initiatives that will help implement this transition agenda. Over the coming years, there will be cooperation with the market parties in order to work on detailing the Implementation programme. This will involve putting more flesh on the bones of the aims and developing relevant indicators so that joint steering becomes possible. The Biomass and Food transition team will continue to play an active role in this. Capacity will be freed up by the Netherlands Enterprise Agency (RVO) to support the development of the Implementation programme.

1. A uniform framework for the assessment of sustainability of biomass

In line with the Cabinet’s response to the transition agendas and the Cabinet’s summary of the outline proposals from the national Climate Agreement, a framework for assessing sustainability will be developed for biomass. The criteria, which are yet to be developed, are in principle intended to be applicable to all biomass and all its applications (irrespective of whether they are being encouraged by the government’s toolkit or not), insofar as the existing legal frameworks do not provide for this.

Led by	IenW
Involved	Stakeholders, NGOs, LNV, EZK (Economic Affairs and Climate Policy), Foreign Affairs, Ministry of the Interior
Product	Sustainability framework
Effects	Providing criteria for the substitution track of the circular economy policy (replacement of non-renewable raw materials with renewable ones)
Track	Expand the amount of sustainable biomass on offer

2. Action plan for wood and woodlands

Not only the Netherlands but virtually all EU member states expect much more demand for wood because of the shift to natural raw materials that will occur in a biobased economy. Pilots from the Wood and Woodland Action Plan are exploring the possibilities throughout the supply chain for creating more woodlands, better forestry management with higher yields and more use of wood in the construction sector. These pilots are an input for the toolbox that is to be developed for forestry management that is smart in climate terms as well as being socially responsible. They contain measures for existing woodland, new woodland, counter-acting deforestation and developing the wood processing chain and for consultative processes with the relevant parties.

In 2018, €1.5 million from the Climate Envelope (i.e. supplementary fund) was reserved for these pilots at Wageningen University and Research (WUR). Implementing the action plan can result in savings of 4.5 megatons of CO₂ annually.

Led by	LNV
Involved	A consortium of WUR, the forestry and wood sector, nature and environmental organisations, science institutes, wood and paper processing companies, bioenergy producers, the recycling industry
Product	Toolbox for climate-friendly and socially responsible forestry
Effects	The domestic supply of sustainable wood will be increased, meaning that fewer non-sustainable raw materials will be needed

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Can asphalt be made more sustainable? Until now, bitumen – a residual fossil product from oil refining – has been used as the binding agent in asphalt. It is a product that is moreover becoming scarcer. About seven years ago, Richard Gosselink went looking for a replacement material. He wondered whether lignin (which is plentiful throughout the world) could replace the bitumen. Lignin is produced when biorefining wood, grass, straw and other residual biomass flows from the agricultural and food industry. It is a natural binding agent that can be used in bio-asphalt, as well as other construction materials (among other things as a replacement for the glue in plywood sheets, fibreboard and PUR foams and composite materials). Much of that biomass is currently incinerated, whereas using lignin as a binding agent represents an increase in value by a factor of 7 or 8 with respect to using that biomass as fuel.

Six proof-of-concept projects (spread throughout the country) using bio-asphalt have shown that lignin can already replace half the amount of bitumen in asphalt (350,000 tons per year in the Netherlands). That is a substantial environmental benefit. ‘It’s more than that,’ says Richard. ‘We can also produce the bio-asphalt at lower temperatures, which yields a further, substantial CO₂ reduction.’ Furthermore, the latest tests have shown that bio-asphalt produces less noise nuisance, that braking distances are shorter and that the wear resistance is better. It therefore adds extra functionality to asphalt while retaining a level of quality that is comparable to that of conventional asphalt. This applies to more than just motorways and other roads, incidentally. The world’s first bio-asphalt cycle path has now been laid on the campus of Wageningen University.

Richard Gosselink works for Wageningen Food & Biobased Research, where he carries out and coordinates applied research commissioned by companies and governmental authorities, or in collaboration with them, into new applications for biomass components.

‘A pilot like this is a great help in convincing people that an innovative technique can be successful.’”

Demonstration projects like these turn out to be an exceptionally useful working method for proving concepts in practice, something that is almost impossible to simulate in a laboratory. Pilots like these are also a great help in convincing people that an innovative technique can actually be successful. Further research is needed into recycling bio-asphalt, the application of lignin in very open asphalt concrete (ZOAB) and the environmental impact. Information on the environmental impact is needed if the product is to be prescribed in tenders (for example by Rijkswaterstaat, the Directorate-General for Public Works and Water Management).

‘In the future,’ says Richard, ‘the roads will have other functions than just being a safe, bio-asphalt strip to drive from A to B on. There may for example be combinations of the road surface with energy production, vegetation in the road verges that can be used for the street furniture, coatings of biobased raw materials, etc.’ Proof-of-concept projects to investigate that are crucial. ‘The construction and infrastructure industries can certainly be persuaded then,’ he expects. ‘I’d anticipate a breakthrough in the coming five to ten years.’

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Tracks	<ul style="list-style-type: none"> • Increasing the supply of sustainable biomass • Optimum use of biomass value
Term	Pilots in 2019

3. Seaweed for Food and Animal Feed Programme

The sea and coastal districts (including areas within the planned offshore wind farms) offer possibilities for producing seaweed that could be the basis for food and animal feed. The North Sea is rich in nutrients that are fed into it from the rivers and the industrial sector. Seaweed and other marine raw materials (such as shellfish and microalgae) use those nutrients to grow, thereby helping restore the natural balance of nutrients that is being disrupted by eutrophication.

Seaweed could become an important sustainable source of vegetable protein for human nutrition and animal feed. Seaweed could also be a source for biofuel, bioplastics and chemicals. Large-scale seaweed cultivation is however not yet viable in Western Europe.

The Stichting Noordzeeboerderij (North Sea Farm Foundation) is a platform for the seaweed cultivation sector to which more than 85 companies, science institutions and governmental bodies are now affiliated. In addition, there is the ProSeaweed PPS programme and the Agri&Food ‘top sector’ (i.e. national priority sector). Knowledge and innovation are being developed there for the complete value chain from breeding, cultivation, processing and consumer behaviour through to applications in fish feed and animal feed. This programme runs until 2021. In 2019, studies are being carried out into the positive effect of seaweed on reducing methane emissions from cows.

Led by	LNV
Involved	North Sea Farm Foundation, WUR and the commercial sector
Product	Development of knowledge and innovation in the seaweed sector
Effects	Innovations in the seaweed sector that lead to lower production costs and greater economic returns, alternative fertilisers, reduction of the dependency on protein from outside Europe, positive effect on fish stocks, reduction in the loss of biodiversity elsewhere in the world
Tracks	<ul style="list-style-type: none"> • Increasing the supply of sustainable biomass • Optimum use of biomass value • The protein transition
Term	2017-2021

4. Bio-asphalt from wood

Lignin is a natural adhesive that gives trees and grasses their rigidity and flexibility. When wood is refined into various fractions, such as the cellulose fraction for making paper and cardboard, lignin is produced. Until recently, there were

few high-quality applications available for lignin. It is now possible for lignin to replace some of the fossil raw materials in glue and it has the potential to be used as well as the raw material for e.g. coatings and plastics. Lignin can also replace the fossil fuel-based bitumen in asphalt. A precondition for applying bio-asphalt in the civil engineering sector is its inclusion in the National Environmental Database (NMD). This requires a lifecycle analysis (LCA) in which the environmental performance is determined in a uniform way. An LCA will be drawn up in this project, after which inclusion in the NMD will be possible. The project runs from 2015 to 2020.

Led by	EZK
Involved	EZK, WUR, TNO, VWB Asphalt, lignin producers, Rijkswaterstaat
Product	A life cycle analysis for lignin bio-asphalt after which it can be included in the NMD
Effects	Large-scale applications of bio-asphalt are made possible by inclusion in the NMD, which is required in tendering procedures
Track	Optimum use of biomass value
Term	2015-2020

5. Biorizon shared research programme

Aromatics are important raw materials for the chemicals industry. They are currently still produced from fossil raw materials. Biorizon is developing techniques for producing aromatics from residual biomass flows. The aim is to make commercial production of bio-aromatics possible by 2025. Biorizon is working on functional aromatics, i.e. aromatic compounds with specific properties. Using biomass flows that already have these properties (to some extent) will allow new business cases to be developed.

Led by	Biorizon campus (TNO, Vito, ECN, Green Chemistry)
Involved	Biobased delta
Product	Commercial production of bio-aromatics
Effects	Reduction of fossil raw material consumption
Track	Optimum use of value of biomass
Term	2025

6. Circular land management

In circular land management, the biomass that results from managing land and water is treated as a valuable raw material for various applications, such as e.g. soil improvement and the production of paper and cardboard. This covers the clippings from verge mowing and from ditches, for instance. Circular land management helps close the cycles at the smaller scale. The Biomass Alliance was founded in 2013 in order to share knowledge and experience and to encourage cooperation in this area. Eighteen parties, comprising regional/local authorities, science institutes and land management organisations, are members of this

Biomass Alliance. Various initiatives and pilot projects will be used for scaling up during 2019.

Led by	Biomass Alliance
Involved	Various municipalities and provincial authorities, RWS (Directorate-General for Public Works and Water Management, hereinafter also 'Rijkswaterstaat'), various land managers (water boards, Staatsbosbeheer (national nature management agency), Utrechts Landschap (regional nature management agency, NGO), science institutes and educational institutions (WUR, Van Hal Larenstein and Radboud University)
Product	Getting value from clippings from verges and ditches Pilots followed by scaling up
Effects	High-quality application of clippings as a soil improver and as a raw material for biobased products
Track	Optimum use of biomass value
Term	2019

7. Exploring possible applications of wood and wood waste

Earlier research by Tauw⁸ has shown that capacity for recycling waste wood is currently a limiting factor preventing more recycling. If valuable use is to be made of waste wood or if it is to be recycled, the opportunities and specific possibilities for doing so need to be mapped out. To that end, a market survey is being carried out in 2019 to see whether feasible and scalable supply chain projects can be formulated with the aim of creating circular applications for waste wood. These efforts are also in line with the Van Eijs motion about research into the circular application of construction materials⁹.

As the final link in the cascade, there is the use of biomass as fuel. These efforts help to achieve the Cabinet's climate goals. There is however an important precondition here, in that it must fit in with another of the Cabinet's goals, namely permanent improvement of the air quality. Air quality is after all an integral component of sustainability. The two aims can be combined in smart applications of biomass. Details need to be worked out for the sustainable use of biomass as fuel, taking account of air quality (tightening up emission limits, preferential use in larger systems in line with the prioritisation in the climate dossier, modification of the stimulus framework).

Led by	IenW together with RWS
Involved	Netherlands Enterprise Agency
Product	Exploratory study of the options for a sector-wide agreement; market study for feasible sector-wide projects. Exploratory study of a draft for new emission norms for air quality
Effects	High-quality use of wood that would otherwise be incinerated, plus prevention or reduction of emissions of harmful substances into the air
Term	2019-2020
Track	Optimum use of biomass value

8. Biobased routes for circular greenhouse farming

Biomass from horticulture can be used in ways that deliver more value. Residual flows are still composted, whereas those flows could also be reused. This project focusses on separation of crop residues into dry and wet fractions from which compounds and fibres can be obtained for various applications, such as plant-based fertilisers and construction materials.

The project is derived from the circular production theme of the Waard&vol Groen¹⁰ innovation programme, which focusses on circular cultivation and reuse of residual flows, mixed cultivation and 'grow units' (cultivation with LED lighting). The aim is that this will create a picture of a viable processing approach at a practical scale that can then be used at larger scales.

Led by	Alliance between LNV and SIGN
Product	Greater value will be obtained from residual flows from greenhouse farming and upscaling will then be possible
Effects	A shift from composting to valuable application of residual organic flows
Track	<ul style="list-style-type: none"> • Optimum use of biomass value • Feeding & Greening Megacities
Term	2019

9. National Agricultural Soils programme

By 2030, all agricultural soils in the country (1.8 million hectares) will be sustainably managed and at least 0.5 megatons of extra carbon will be retained. That helps to reinforce the quality of the soil, which is good for agriculture (soil fertility) and for society (more sustainable food).

It also results in better water quality, improved water buffering and more biodiversity, as well as helping achieve climate goals because additional carbon is being sequestered in agricultural soil.

⁸ Kamerstukken II, 32852, nr.58

⁹ Parliamentary Papers II 35 000 XII nr. 42

¹⁰ <https://www.innovatieglastuinbouw.nl/sign/waardvol-groen-2016-2020/>

Since LNV published its soil/land strategy in 2018, the national programme for sustainable agricultural soils has been developed further, together with both public and private parties. The basis of the programme is a Sustainable Soil Management PPP that focusses on soil quality in a broader approach; it entered a second phase in 2017 that will continue until 2020. In line with this, a knowledge consortium was started up in 2018 involving WUR, LBI, CLM and others with the aim of using sustainable soil management to sequester additional carbon in agricultural land.

The projects run by this knowledge consortium focusses (among other things) on creating a monitoring system so that carbon sequestration can be reported in a scientifically responsible way, practical pilots for validating measures for retaining carbon, and disseminating knowledge in agricultural and nature education (including an extensive course pack). The governmental authorities are funding this from the 'climate supplementary fund' budget.

Led by	LNV
Involved	science institutes, agriculture and nature education, advisory organisations, parties from the agricultural and agro-industry sector and the regional water sectors
Product	Sustainable management of all agricultural soils (2030); economically attractive perspectives for actions relating to sustainable soil management and carbon sequestration. In concrete terms: a knowledge consortium; monitoring system; development and dissemination of knowledge
Effects	Better utilisation of biomass in agricultural soil/land so that it remains in the cycle for longer
Track	Circular and regenerative use of soil and nutrients
Term	2019-2020

10. Regenerative agriculture

In this cross-disciplinary project in the Agri&Food top sector, a situation sketch is being produced of a reformed agriculture system in the Netherlands by 2050 that complies with the principles of regenerative production/circular agriculture. Regenerative agriculture focusses on closing the nutrient cycles, thereby minimising losses to the soil, water and air, counteracting soil degradation, increasing the content of effective organic matter in the soil and improving the fertility of the soil. After working this out to

produce scientifically underpinned objectives and quantitative frameworks, best practices and 'next practices' will be developed together with arable and dairy farmers, along with a sound business model. Scenarios will then be developed that could allow that transition to be made to a new agricultural system based on circular agriculture¹¹.

Led by	TiFN
Involved	TiFN, FrieslandCampina, Royal Cosun, BO Akkerbouw, Commonland, Wageningen University & Research, Copernicus Institute for Sustainable Development (University of Utrecht), University of Amsterdam and Het Groene Brein
Product	Scenario for circular agriculture: situation sketch with best practices and 'next practices'; vision for the future; analysis and development of transition scenarios
Effects	This project provides a picture and perspectives for actions relating to a transition to new, circular business models for farmers and ultimately for a climate-neutral agricultural system
Track	Circular and regenerative use of soil and nutrients
Term	2018-2022

11. Land-based dairy farming

The LTO (Dutch Federation of Agriculture and Horticulture) Dairy Farming Group and the NZO (Dutch Dairy Organisation) are busy implementing the recommendations of the Commission for Land Linkage¹². This commission, which was set up by the LTO and NZO, presented its advice for land-linked dairy farming by 2025 in April 2018. In addition, the commission set a target for 2040. A key criterion is that a company should to a large extent produce its own feed; this is expressed as the percentage of protein coming from its own land. Grass is the basis of the cows' fodder. The commission recommends closing the cycles within the farm's own land or locally by means of district contracts with nearby farms. The recommendation leaves scope for entrepreneurial freedom, diversity and robust business operations. There is also a recommendation that raw materials for animal feed from other continents should be further restricted.

Purpose: The recommendation contains four cornerstones that must be achieved by 2025 if the Netherlands is to stay on course for land-based dairy farming by 2040.

¹¹ Landbouw, natuur en voedsel: waardevol en verbonden. Nederland als koploper in kringlooplandbouw' [Agriculture, nature and food: the Netherlands as a pioneer in closed-cycle agriculture], Dutch house of representatives, 7-Sep-2018

¹² <http://edepot.wur.nl/446638>

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How can you make better use of residual biomass flows from horticulture? That is one of the main themes of SIGN (the Foundation for Greenhouse Farming Innovation) which was set up by various entrepreneurs. Dewi Hartkamp is looking for new applications for these vegetable remains. She is particularly intrigued by the question of which other economic sectors could be involved in this.

‘The core of my assignment is to investigate when my wild ideas could be interesting for an entrepreneur, so that a new value chain can be created. For that, I look above all for possibilities outside the usual value chain. I hope, for instance, that half the growers will be able to recycle their fertilisers by 2030. The principle is simple, actually: 80% of the tomato stems is water, which you can squeeze out. You extract the fertilisers from that water and the greenhouse gardener can then use that again, after topping it all up to the correct proportions. Then it really starts to get interesting for me. Then I wonder what we could do in practical terms with the remainder. So there I am, chopping up stalks myself. I dry them in my own oven and then grind the stuff at home into powder to make samples. It’s like a real living lab – a question of thinking practically and getting a bird’s-eye overview.’

‘That’s how I came into contact – via a friend – with someone in Delft who’s working on sustainable construction materials. Then I got the idea of investigating whether fibres from greenhouse plant residues could be added instead of the plastic fibres that are currently added to concrete. Because that requires a lot of research, I started looking at building materials that use mycelium, the underground threads of toadstools. You could make mycelium composites using that. Those composites can be used in interior construction without needing to use any environmentally unfriendly adhesives. Without a market party, though, it is difficult to make any progress; that’s why I called a product manager at Gispén. They were enthusiastic from the start. It’s a company that’s already busy with circular economy products and working methods. This will for example let them replace the material they currently use for acoustic panels with plant-based materials.’

Dewi Hartkamp is a programme manager with SIGN.

‘So there I am, chopping up stalks myself. I dry them in my oven and grind them to powder to make samples. It’s like a real living lab’.

‘One problem is that the greenhouse plant residues may become waste in the eyes of the law as soon as they leave the grower’s premises. That makes it more difficult to bundle the flows, which is needed if viable applications are to be created. I hope that the authorities can help make it easier to use residual flows that have been deemed to be waste. Only then will there be sufficient scope for experimenting in order to develop new applications. I call that ‘organising the coincidences’. To make genuine advances in the circular economy,’ says Dewi, ‘we also have to innovate in how we innovate and how the authorities can create space to allow that leap into the dark.’

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Matching words with deeds...

As a result of this interview, there has been contact between Dewi and the Ministry of Infrastructure and the Environment (IenW); the authorities have in fact developed various instruments that could help with the problem that she is referring to. It is for instance possible to ask for a legal ruling from the ministry. See also Chapter 3, under ‘Legislation and Regulations’. When making an assessment of what is waste, a company can use the web tool on the Rijkswaterstaat website to help (in Dutch: www.afvalcirculair.nl > afval of niet > toetsing afval of grondstof).

The aim is:

1. Self-sufficient: 65% of protein from the farms' own land
 - fodder as the steering element
2. District contracts within a radius of 20 kilometres
 - cooperation between farmers
3. Own plot with sufficient grass
 - social acceptance
4. Feed concentrates sourced closer by
 - less importing of soya and palm kernels

Led by	NZO, the LTO Dairy Farming group, dairy farmers, the dairy processing industry, together with other stakeholders
Product	65% from their own land; district contracts in a radius of 20 km; plots of land with enough grass; feed concentrates sourced nearer by (less importing)
Effects	Imports of cattle feed will have dropped by 2040. In addition to the fact that grass is fodder for the cattle, this helps sequester carbon in the soil and improves soil fertility. Farms can allow cattle to graze on their own property and there will be more cooperation between farms in the region. The cycles will be more local and will be closed more effectively
Tracks	Circular and regenerative use of soil and nutrients
Term	2018-2025

12. Get more value in various ways from animal manure in the Achterhoek region

In the 'Green Minerals Station' belonging to Groot Zevent Vergisting in the Achterhoek region, pig manure from the region is processed sustainably into valuable fertilisers, energy and clean water.

Biogas from fermentation of slurry is used by FrieslandCampina as a source of energy for the dairy factory. In addition, nitrogen, potassium and phosphate are reclaimed as fertiliser. A low-phosphate organic soil improver is also produced.

The 'Green Minerals Station' is part of the Added-Value Manure and Minerals top sector project. Farms, businesses, public authorities and WUR are working together to achieve this. A large-scale demonstration is part of the European SYSTEMIC project. This project aims to reclaim nutrients from residual organic flows and to close the nutrient cycles as much as possible at local and regional levels. SYSTEMIC is being funded by Horizon 2020 and it runs until mid-2020.

The Green Minerals Station is linked to the 'Achterhoek without Artificial Fertilisers' project. That is a pilot project that is intended to show that artificial fertilisers can be replaced in that region by nutrients reclaimed within the

region itself. The pilot applies to a limited number of farmers and it has been approved by the European Commission. The results of the pilot are being used as input for the European SAFEMANURE study by the Joint Research Centre, in which preconditions are being drawn up for the safe use of fertilisers reclaimed from manure.

During the course of the pilot, the number of dairy and arable farms participating may be expanded from 10 to a maximum of 150. The pilot runs from 2018 to 2021.

Led by	LTO, WUR
Involved	Livestock farms and arable farms, science institutions, authority bodies, LTO, LNV
Product	Green Minerals Station; a large-scale proof-of-concept project as part of SYSTEMIC (a European project); pilot for 'Achterhoek without Artificial Fertilisers'
Effects	Reclaiming nitrogen as a substitute for industrial artificial fertilisers and the production of biogas helps to reduce greenhouse gas emissions. Reclaiming phosphate from pig manure reduces the phosphate excess in the form of animal manure. The valuable organic substances are thereby retained for Dutch agricultural land. Only the reclaimed phosphate will be disposed of outside the Dutch agricultural industry, because of the phosphate surplus in the Netherlands.
Tracks	<ul style="list-style-type: none">• Optimum use of biomass value• Circular and regenerative use of soil and nutrients
Term	2018-2021

13. Implementing the National Agenda 'Tackling Food Waste Together'

It is estimated that 2 million tons of food are wasted annually in the Netherlands. That occurs at numerous points throughout the food supply chain, from the farmer's yard to the supermarket and at all links in the chain in between (transport, auctioning, the food industry). Moreover, consumers throw away an average of 41 kilograms of food per person annually.

Society now broadly subscribes to the aim of halving the amount of food thrown away by households, companies and in the catering sector by no later than 2030. That objective puts the Netherlands right in the vanguard worldwide in the battle against food waste. In addition to the actions from the National Agenda (for which €7 million is available over the period 2018-2021), an additional sum of €1 million has been made available in 2019 from the 'climate supplementary fund' for innovation and pilots, for the SME cluster programme (linked to the Sustainable Food Initiative) and for a start-up and accelerator programme.

Led by	Stichting ‘Samen tegen Voedselverspilling’ (Combating Food Waste Together)
Involved	LNV, top sectors, Sustainable Food Initiative
Product	Innovation and pilots, SME cluster programme and a start-up and accelerator programme. National campaign focusing on behavioural change among consumers
Effects	Food wastage in the Netherlands can be brought down to 450-900 million kilograms through intensification. That will ultimately yield a reduction of at least 2-3 megatons of CO ₂ eq./year and a cost benefit of at least 1 billion euros. Monitoring food wastage at as many companies as possible will enable us to get a clear picture of the reduction in CO ₂ emissions.
Track	Reducing food waste
Term	2018-2021

14. National Action Plan for Fruit and Vegetables (NAGF)

Greater consumption of fruit and vegetables yields health gains and results on average in a nutrition pattern with a smaller environmental footprint. That recommendation from the Health Council has been included in the new Dutch ‘Eatwell Plate’ (or Five Food Groups Disc) from the Netherlands Nutrition Centre.

The NAGF – a cooperative venture involving the public authorities, the private sector and social organisations – aims to encourage the consumption of fruit and vegetables in the Netherlands over the period 2017-2020. By familiarising consumers with new fruits and vegetables, how to prepare them and the possibilities for variation, it is hoped that consumption will increase.

A number of actions have been commenced with the aim of increasing consumers’ knowledge about fruit and vegetables: the Veggipedia website has been renewed, the TV programme Nederland proeft (The Netherlands Tastes – 8 episodes in 2018 and 8 in 2019) and the TV programme Koffietijd (Coffee Time – 8 episodes) are sharing knowledge and inspirations. There is also cooperation with supermarkets, including Lidl (the Vitamini’s savings promotional action), Dirk (a test for using sales nudges in the shops) and all supermarket newsheets (colourful inspiration for ways of preparing vegetables). For the main targets – young families, the catering sector and the healthcare sector – the NAGF is creating links with relevant parties and efforts are being made to increase and accelerate activities aimed at raising fruit and vegetable consumption levels.

Led by	Vereniging GroentenFruit Huis, LNV
Involved	Social partners
Product	To encourage consumption of fruit and vegetables; specifically, various campaigns to encourage this
Effects	A shift in nutrition patterns to more plant-based proteins. The health gains are a side effect
Track	The protein transition
Term	2017-2020

15. Development of the insect sector

Insects are a highly promising alternative source of high-quality proteins that can be used not only in animal feed but also for human consumption. There are currently already insect products in the supermarkets. They are also processed into fish food and food for household pets. Cultivation of insects is generally more environmentally friendly than traditional livestock farming because less water and land area are needed and the greenhouse gas emissions are less. Waste streams from agriculture can potentially be used as a source of food for the insects, which will help close the cycles.

There are however still numerous questions about producing insects with respect to safety for humans, animals and the environment, as well as regarding animal welfare. As a result of this, the options for cultivation of insects and the development of applications based on insects are still limited within the regulations. Closer cooperation throughout the supply chain is needed, as is improved exchange of knowledge plus a clearer picture of the possibilities for making the regulations more flexible.

Together with the sector, LNV is putting together an agenda for encouraging developments and providing information about the production of insects. LNV is also offering support with respect to knowledge and the obstructive rules. In the summer of 2019, the Dutch house of representatives will be appraised of the progress.

Led by	LNV
Involved	The insect sector
Product	Agenda for the development of the sector over the coming years
Effects	A shift from traditional raw materials to sustainable resources such as waste streams from agriculture
Tracks	<ul style="list-style-type: none"> • The protein transition • Getting optimum value from waste streams • Expanding the amount of sustainable biomass on offer
Term	2019

16. Developing energy and resources factory

Bye using innovative and smart techniques, the water boards can extract energy and raw materials from waste water that industry, agriculture or other parties can use again as a valuable resource. Energy can for instance be utilised for the water boards' own purification processes, as fuel for transport or for making companies in the vicinity more sustainable. Raw materials that can be obtained from waste water, such as phosphate, cellulose, kaumera (an alginate-like biopolymer from granulated sediments) and bioplastics, can be reused as alternative raw materials for new and existing products.

Work is being done on product development based on new raw materials together with the private sector in numerous existing experiments, although the substances in question do not yet formally have the status of a raw material. A new aspect is that the water boards are not currently emphasising the potential of their waste water but instead focusing on the market's requirements.

The aim of this kind of project is to create proof-of-concept 'demonstrators' and full-scale systems for reclaiming raw materials from waste water. In the first instance, this will be looking at cellulose and neoalginate. In addition, work is being done on scaling up the production of biodegradable plastics in the form of PHA (polyhydroxyalkanoate). This could inter alia become a circular alternative to almost all the major fossil plastics.

Led by	The Union of Water Boards
Involved	Biobased Delta (a cooperative venture of authorities from Zeeland, Noord-Brabant and Zuid-Holland together with SMEs, multinationals and science institutions) and HVC (a waste, raw materials and energy company with 46 municipalities and 6 water boards playing a key role, along with numerous SMEs)
Effects	Lower CO ₂ emissions and regionally closed cycles

2.2 Plastics as a priority

The transition to a circular plastics chain represents some major challenges as well as numerous opportunities. The valuable and versatile properties of plastics mean that these materials are widely used and that use is only going to increase further worldwide over the coming years. At the same time, it results in a great deal of pressure on the climate because of the spread of plastic litter and microplastics on land and at sea, the incineration of plastic waste and the use of fossil raw materials in the production of plastics.

'Major changes won't happen overnight, but we need to start now.'

Jos Keurentjes, chair of the Plastics transition agenda.

The aim is to close the loop for plastics by using them more intelligently and more economically and by utilising more high-quality secondary raw materials and biomass.

To accelerate the transition to a closed-loop plastics chain and reduce emissions of CO₂, the Plastics Transition Agenda has detailed four courses of action:

1. prevention: more with less and reduced leakage;
2. greater supply and demand for renewable plastics;
3. better quality and better environmental returns;
4. strategic cooperation, across the value chain.

This implementation programme includes seven projects that are intended to put these four developmental aspects into practice. Together with all the actors, both public and private, efforts and investments will be made over the coming years with the aim of creating a fully circular plastics value chain by 2050.

In addition to these seven projects, the circular design of new products is an indispensable step that will also be taken further together with CIRCO (see Section 2.3 and Section 3.3).

1. Plastic Pact

The Plastic Pact targets strategic cooperation (within the value chain) between businesses and the Dutch public authorities. The parties have the joint aim of producing significantly less plastic waste by 2025, along with better recycling and reuse of the remaining plastic material. This will allow a useful contribution to be made to the climate task through reduced use and incineration of fossil resources. The scope of the Plastic Pact covers single-use plastic products and packaging, with the proviso that complementary sectors that make use of those plastics are emphatically requested to help make more use of recycled plastic material in their products and packaging.

The aim is to close the plastics cycle better by not using plastics more than necessary and by reusing more plastic, recycling it and applying it again in new products and packaging. This will play a part in CO₂ reduction, in line with the national climate targets, in reduced leakage into the environment and in meeting the goal of using less primary fossil resources.

This Plastic Pact will provide actual implementation of a large proportion of the objectives stated in the 'Prevention' track, and in addition the Pact also has a concrete impact on the objectives formulated for the other tracks.

This Pact contains voluntary but not obligation-free agreements between pioneering companies and the national government. They cover concrete, quantifiable objectives, they cover the definitions and indicators to be used, as well as quality, obstructive regulations, return logistics and consumer behaviour, plus specific actions that the parties can initiate independently and jointly.

Those agreements fit in with comparable frameworks of agreements, such as the Plastics Pact UK and the EU Single Use Plastic (SUP) directive¹³. These are concrete goals and actions that will lead to more reusable and recyclable products and packaging, less use and more recycling, and more uptake of recycled material in new products and packaging. The quantitative objectives are still a matter for discussion as the Plastic Pact becomes more complete. The progress will be monitored.

For the purposes of that monitoring, a baseline measurement will be made in 2019. Specific behavioural interventions are focused on less litter and reduced use of disposable products.

Led by	IenW
Involved	the commercial sector (individual companies, producers, supermarket chains, festivals, caterers and on-the-go catering, packaging companies, recycling companies and the industries that use plastic) and other organisations such as sector-specific ones, nature and environmental organisations and specialist consultants
Product	Pact in the first quarter of 2019 signed by the various parties; agreements on sector-wide cooperation so that the objectives can be achieved; parties: innovations in products and materials; knowledge sharing and data for monitoring; benchmark for responsibility; links to the existing online circular economy platform
Effects	More economical used of plastics (< kg, < CO ₂), more recycling and more use of recycled material in new products
Term	2019-2025

2. Microplastics

This subprogramme is part of the prevention track as stated in the Plastics Transition Agenda and it focusses on:

- banning deliberate additions of microplastics in products at the European level;
- tackling the emissions of microplastics as a consequence of the breakdown of plastic litter;
- cutting down on emissions of microplastics as the result

of wear and tear on products such as car tyres, paint and clothing;

- getting a better understanding and a better picture of the effects of microplastics in the human body.

This is all in line with the policy programme that was presented to the Dutch house of representatives on 4 June 2018¹⁴.

For clothing and paint, RIVM has drawn up two discussion papers as the basis for talks with the clothing and textiles sector (2018) and the paint sector (2019) about measures that could be taken to focus on innovation. Based on that, the commercial sector and the authorities will determine what measures should be taken. For vehicle tyres, lobbying was started in 2018 at the European level for the introduction of a threshold value for wear; this will be continued in 2019. Measurement methods for plastics and microplastics in rivers will be developed and a baseline measurement made for rivers (2019-2020); a pilot on plastics in rivers will be carried out, an action plan for clean river banks and flood plains will be drawn up (2021 and 2019-2023 respectively) and there will be a final report from ZonMw about microplastics and public health (2019-2020).

Led by	IenW
Involved	Stichting Natuur & Milieu (Nature and Environment Foundation), ZonMw (promoting scientific research), RIVM, RWS and river commissions, the European Commission, the European cosmetics sector, the European detergents sector, the clothing and textiles sector, the paint sector, the maintenance sector, the vehicle tyre sector
Product	An EU ban on deliberate additions of microplastics; effective results of the lobby for modification of the EU norm for car tyre wear, measurement methods for plastics and microplastics in rivers, baseline for the rivers
Effects	Reduction of emissions of microplastics into the soil, water and air; more knowledge about and a clearer picture of the effects of microplastics on public health
Term	2019-2021

3. Chemical recycling

After being used, plastics come back in all kinds of shapes and compositions. It is often a contaminated mixture of many materials and waste types, such as for instance the residual stream from a waste sorting line or the plastic waste that is fished out of the oceans. Direct mechanical recycling is then difficult. Efforts are being made to find

¹³ <http://www.wrap.org.uk/content/the-uk-plastics-pact>

¹⁴ Parliamentary papers II, 38,072, no. 219

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‘It has been ten years of merely surviving,’ acknowledges the founder of Ioniqa, Tonnis Hooghoudt. There are ups and downs for any start-up company. The start-up spawned by the TU/e is celebrating a high point now that it has been publicly announced that The Coca Cola Company is joining as an investor. The cooperation with the American multinational will create ‘brand recognition’, Hooghoudt is sure. Particularly because The Coca Cola Company is the world’s biggest user of PET plastic. Precisely that hard-to-recycle waste from food packaging is the basic material for Ioniqa. It has developed techniques for reverting coloured plastics, using a chemical process, back into purified polymer building blocks. These can later be converted again into PET plastic. This is done by the Thai PET plastic producer Indorama, a company that Ioniqa works with. For the packaging of Coca-Cola, Fanta, Sprite, juices, sports drinks and others, the well-known drinks producer will be taking recycled PET plastic for which Ioniqa will be supplying the raw materials. The food concern Unilever earlier committed to take materials from Ioniqa and its Asian partner for PET production. Both The Coca Cola Company and Unilever are aiming to use recycled materials for their packaging.

‘We can work flat out from the summer of 2019 onwards.’

For the PET recycling, Ioniqa expects to start using its first factory (on the Chemelot Campus in Geleen) in April next year. ‘We can work flat out there from the summer onwards,’ reckons Hooghoudt, the director. The operation will have an annual capacity of 10,000 tons. Contracts have been signed with both Dutch and foreign waste processing companies for the PET plastic that will be recycled.

The thought is that the investment by The Coca Cola Company in the form of a loan (for an unspecified sum) will allow the production to be scaled up more quickly. Ioniqa wants to sell licences for the use of its technology to parties who want to build more, larger recycling factories elsewhere in the world. ‘We’re busy putting licence packages together,’ says Hooghoudt. ‘We’re holding the initial discussions with interested parties. That’s why it’s important that we can get the factory in Geleen up and running. Then we’ll be able to show that it really works like we say it does.’

Around 20 people work for Ioniqa in Eindhoven at the head office and in the laboratory. That number will double next year to about 40 when the factory in Geleen comes on line.

Source: *Eindhovens Dagblad*, 14 December 2018

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Tonnis Hooghoudt is the founder and owner of Ioniqa.

ways of recycling this group of mixed and contaminated plastics through chemical recycling to produce basic chemicals for plastic production.

The chemical recycling action plan is aiming to achieve at least 10% chemical recycling of plastics by 2030. It is possible that this percentage can rise significantly if the current pilots and demo plants for chemical recycling are a success. The Action Plan carries on where the Chemical Recycling Roadmap¹⁵ left off. This was drawn up in 2018 by the KIDV (knowledge institute for sustainable packaging), TNO and CE Delft. The action plan also gives further details of the pilots and demos for chemical recycling in the context of the climate supplementary fund for 2018.

The plan includes a decision framework for chemical recycling (weighing up output as raw material versus output as fuel). There will also be a public-private support programme for start-ups, in which the steps of scaling up and market introduction can be taken for highly promising, innovative technology. There will also be an R&D programme for the coming five years, in close cooperation with the chemistry (TKI) top sector. Where R&D is successful, it will be scaled up into various pilot factories in the Netherlands. To that end, there will be cooperation in 2019 with the Chemical Recycling accelerator forum. The action plan for chemical recycling is expected in the autumn of 2019.

Led by	Plastics Europe
Involved	Individual companies in chemical or plastic waste processing, VNCL, VNO, VA, N&M, national government, provinces, municipalities, KIDV, CE Delft, chemistry sector top companies and knowledge/innovation groups, TNO, WUR, Stenden, VNO-NCW
Product	minimum of 10% chemical recycling of plastics (2030); action plan/roadmap (2019); accelerator forum for chemical recycling (2019); national innovation strategy for the longer term; R&D programme 2020-2025 to be detailed by NWA
Effects	More reuse of plastic, less incineration of plastics, less production of fossil fuel-based plastics, greater CO ₂ reduction
Term	2019-2020

4. Biobased plastics

Biobased plastics differ from conventional plastics in that the raw material is made from biobased substrates. The term 'biobased' refers to materials that are made from renewable raw materials such as starch, sugar, cellulose, lactic acid or proteins or made by micro-organisms.

These resources mostly come from organic residual flows from maize, beets, sugar cane, wood, etc.

The aim is to sign a Bioplastics covenant in 2019 between bioplastics producers, waste processors and the national government in order to provide clarity for the market about which bioplastics do and do not add value in the circular economy and how these plastics should be handled in the waste processing phase.

In addition, there will be an action plan aimed at growing the market for biobased plastics (as long as they are sustainably produced) to a volume of 15% with respect to 2016 by 2030.

To achieve this, the action plan focusses on encouraging the demand for biobased plastics (for example by exploring what applications these are logical materials for) and by investigating the production and market instruments needed to achieve the desired transition. An update will also be produced of the integral testing framework of sustainability criteria for the raw materials used for making biobased plastics (continuing where the Green Deal Certificates leave off) with respect to fossil-based resources. Finally, biobased purchasing conditions and a biobased content label or certification will be developed. The action plan will be drawn up in 2019.

Led by	Total-Corbion
Involved	Total-Corbion, Holland Bioplastics, Natuur & Milieu, EZK, NRK, Plastics Europe, water boards, VA, research institutes, industrial applications, NGOs
Product	Bioplastics covenant between producers and waste processors; action plan (roadmap) for the production and application of biobased plastics (2019)
Effects	Reduced production and use of plastics based on primary fossil resources, reduction of CO ₂ emissions. Replacing 350 ktons of petro-chemical plastics by biobased plastics would mean a reduction of approx. 525 kton CO ₂ on an annual basis
Term	2019-2022

5. More and better sorting and mechanical recycling

Too much plastic is still incinerated. That is a waste of material that can be utilised more sustainably. Plastic recycling companies focus on collecting, sorting and processing plastic waste streams. The companies make these waste streams suitable for application in new prod-

¹⁵ https://www.vncl.nl/Content/Files/file/Downloads/VNCL_Routekaart-2050.pdf

ucts. Good sorting into monostreams is crucial in order to ensure that all the recycled material can finally be used again after recycling in high-quality ways in new products.

The action plan for more sorting and better sorting focusses on expansion of the sorting capacity and on developing stimuli to yield better quality sorted plastics. The aim is to raise the quality of the sorted plastic waste streams into 95% heterogeneous ‘monostreams’ by 2025 (as opposed to 55% in 2017). That means more plastics collected, more sorting capacity for plastics (in particular non-household plastic/metal/drinks carton streams – PMD) and better and cleaner plastic waste (monostreams that are recyclable) with respect to the flow of contaminated/mixed plastic waste.

Ways of doing this include more uniform collecting systems, better techniques for washing, separation and post-separation and introducing financial inducements that will make more sorting and better sorting more viable.

The action plans expands upon the knowledge and initiatives of earlier projects such as the Plastic Packaging Waste Learning Centre (LCKVA), More and Better Recycling, commercial PMD waste and Plastic Packaging Waste as Raw Material (KVG); it also uses the new National Testing Centre for Circular Plastics, which will become operational during the course of 2019. The action plan will be drawn up in 2019. In 2019, there will be a market survey looking at the sorting capacity that needs to be built in the Netherlands and there will be an exploratory study of the technical possibilities for improved separation and sorting (e.g. Filigrade). The Ministry of Infrastructure and Water Management is making resources available from its ‘climate envelope’ for new and innovative sorting systems and pilots, to the tune of €10 million for circular design, sorting and recycling of plastics and consumer goods.

Led by	Suez
Involved	VNG, VA, BRBS, NRK Recycling, NRK, NVRD, IenW, RWS, Nedvang/Afvalfonds Verpakkingen
Product	Market study for the sorting capacity to be built in NL; exploratory study of the technical possibilities fo improved separation and sorting (e.g. Filigrade), national testing centre for plastics will become operational
Effects	95% sorted monostreams of plastics by 2025. More sorting capacity, more plastic needing sorting to be offered to the sorting companies, better quality of the sorted streams depending on the market requirements, an approach to the mixed stream, greater demand for secondary plastics, better use of market forces and (from 2030 onwards) a considerable reduction in CO ₂ emissions
Term	2019-2020

6. Application of recycled plastic material in new products and packaging

Uniform standards for the quality of recycled plastics, based on the requirements of the companies taking it and processing it; are expected to lead to wider application of recycled material. The target is growth of 300% with respect to 2016, to approx. 750 kton/year in the Netherlands by 2030. Demand-controlled standards – with technical specifications for grades, types of plastic and product/market combinations – can be suitable for various sales markets such as packaging, construction and infrastructure, business-to-business, automotive and consumer products.

An inventory will be made in 2019 of what the market demand for recycled material is and what product specifications are crucial if that market demand is to be met: what companies will want to use it, what products will it be used for, in what volumes and what types of plastic are involved? That information is the basis for the standards that are to be developed, which will affect the chain of waste processing and production of recycled material. The net result will be a more transparent market in which precisely those recycled materials will be produced for which there is a demand.

The programme runs from 2018 through to 2023. A format giving the technical specifications for ground and recycled materials will be drawn up in 2019. The required purity for recycled materials will be determined during the period 2020-2022. The period 2021-2023 will be centred on the application of standards by market parties and these standards will be scaled up internationally (CEN/ISO). The parties involved or commissioning the work will invest both money and manpower.

A Green Deal about rightful claims relating to applied recycled materials will be drawn up in 2019-2020. IenW is supporting the process.

Led by	NRK, PSP and the Province of Overijssel
Involved	scientific institutions, the top sector Chemistry, Nedvang and companies in the value loop such as brand owners (e.g. Unilever, Philips), manufacturers, recyclers, compounders and waste collection companies and sorting sites
Product	An inventory of the market demand for recycled material; Green Deal on legitimate rightful claims relating to use of recycled material (based on mass balances); uniform European standards
Effects	Transparency in the market, increases in/use of recycled material products, uptake/reuse of secondary plastics and substantial CO ₂ reduction in that approx. 500 kton less oil will be needed for it
Term	2019-2023

7. International scaling up of plastic strategy; Indonesia as a case study

Indonesia is now one of the major polluters of the oceans with plastic litter. Improvements in the situation in Indonesia will have a major impact on the acceleration and upscaling of the circular economy in the rest of the world.

The aim of this project is to sign an international Green Deal in 2019 about the efforts to use circular design and chemical recycling of single-use plastic products and packaging. The feasibility will be examined of public-private investment in a factory for chemical recycling. Recommendations will be made to the Indonesian authorities and the packaging sector there about effective ways of using EPR for plastic collection, sorting and recycling (2019-2020). Pilot and demonstration projects will also be started at ten sites where plastic is collected separately (including a roadmap for further upscaling in 2021-2025). Finally, the knowledge and experience will be embedded in the circular design curriculum of the university course in Industrial Design at an Indonesian university (2023). The understandings gained from demonstration projects about chemical recycling will also be shared with Indonesian industry and the authorities there.

In order to flesh this out, an incoming mission from Indonesia (various ministries, the PRAISE coalition, recyclers) and an outgoing trade mission will be organised in 2020.

Led by	IenW and Indonesia
Involved	Indonesia: the PRAISE coalition (Unilever, Nestlé, Danone, Indofood, FrieslandCampina, Tetrapak, Coca-Cola), ministries of the environment, maritime affairs, planning and public works; Netherlands: RWS, CIRCO, the Dutch embassy in Jakarta, head offices of Unilever, FrieslandCampina
Product	Exploratory pilot for sorting; exploratory pilot for chemical recycling; international Green Deal; incoming mission from Indonesia; outgoing trade mission; 10 pilots for sorting; 2 pilots for chemical and other recycling using Dutch technology
Effects	Substantial reductions in small single-use packaging items, reduction of the amount of plastic ending up in the oceans, less dumping of plastic waste (legal or otherwise), a substantial reduction in CO ₂ emissions, possibilities for scaling up pilots for industry, agreements with industry about smart return systems for plastic bottles, a new high-quality infrastructure for chemical and other recycling, application of recycled plastic material in Indonesian products and packaging, a showcase for scaling up for the whole of South-East Asia
Term	2019-2025

2.3 Manufacturing industry as a priority

Dutch manufacturing industry is ready to assist the circular economy, thereby not only achieving social objectives but also strengthening its competitive position. Three objectives have been formulated in the Circular Economy for Manufacturing Transition Agenda (CETAM):

1. Improving the certainty of supply of critical materials
2. Reducing the environmental pressure from products of manufacturing industry
3. Closing the cycle for products of manufacturing industry.

‘Our common goal for a more sustainable circular economy is creating new opportunities to help keep the country competitive globally. The Ministry of Economic Affairs and Climate Policy therefore supports innovative companies through knowledge, funding and cooperative ventures to let them grow, along with their products and services.’

State Secretary Keijzer of Economic Affairs and Climate Policy

Seven tracks have been included in the transition agenda for manufacturing industry. This implementation agenda has five pioneering projects within those tracks. This will be supplemented in the years to come with more new projects. A distinction is made here between concrete investment projects and those for reinforcing the structures, aimed at improving the preconditions for a circular manufacturing industry.

Urgency and objective

Metals play a major role in meeting the growing needs of the world’s population. The key reasons for wanting to close the cycles for metals are thus:

- Climate: the production and smelting of metals has a major climatological impact. Reusing metals allows this impact to be reduced.
- Scarcity/economising: keeping sufficient materials available to meet people’s needs is important.
- Environment: the impact on the environment, land use and biodiversity must be minimised.

A growing amount of special metals will be needed for the intended energy transition as well. The availability of these metals is on the one hand limited by the available stocks in unprocessed form. On the other hand, there is the problem that metals have physical limitations in terms of recycling and separation when they are used in combinations. All the

metals can generally not be reclaimed from a product or alloy¹⁶. For that reason, smart designs are important, allowing high-quality use of metal related products for the longest time possible. Cooperation will be sought with the Netherlands Circular Accelerator and the possibilities of the climate envelope, regional resources and any European subsidies that are available will be examined. Work is therefore still being done on the funding of the projects listed below.

‘The circular economy requires manufacturing industry to innovate radically, in the technology and the organisation and the business models.’

Fried Kaanen, chair of the Manufacturing Industry transition agenda

1. Track: Circular design in manufacturing industry

In order to promote circular design further, efforts will be made over the coming years to increase the use of what are known as ‘Circo tracks’. This is being done in a number of areas such as agriculture, plastics, construction, etc. And it is also being done for the Circular Metals supply chain. At the same time, we want to look (in consultation with Circo) at developing the Circo tracks further, for example in Smart Industry and digitisation. The provinces of Overijssel, Gelderland and Noord-Brabant are using the Circo tracks in a programme for making industry more sustainable with special attention for the overlap between the circular economy and Smart Industry. This is being done in collaboration with the Ministry of Economic Affairs and Climate Policy. Smart Industry is a programme in which the digitisation of industry is encouraged, both nationally and regionally. It also lets factories use raw materials and energy more sustainably. A study will also be carried out in 2019 into the concrete impact of the measures that companies have taken in terms of CO₂, energy and raw materials.

2. Track: Security of supply of critical raw materials

Raw materials scanner and knowledge forum

The raw materials scanner was launched at the end of 2017. This will allow companies and sectors to get a clear picture of the risks they are running in terms of their supplies of raw materials. RVO (the Netherlands Enterprise Agency) manages the raw materials scanner and will encourage its use via a communications campaign. The raw materials scanner will also be used in projects from this implementation programme. Based on the scanner’s results, pilot projects will be started up for five to ten critical raw materials (CRMs) within the commercial chains, focusing on the energy transition (see below).

The raw materials scanner is currently being translated into English and will also be brought forward in international bodies.

Over the coming years, the raw materials scanner will be extended further. Commissioned by the Ministry of Agriculture, Nature and Food Quality (LNV), biotic raw materials are added to the scanner. The results of the Metal Covenant in terms of ICSR (international corporate social responsibility) will also be included.

Finally, a study will be commenced in 2019 looking at the security of supply in the process chains. The results of this will also be included in the scanner.

Project: Pilot for the security of delivery of critical materials for energy supply

Various critical materials are needed for energy supplies in e.g. wind turbines or solar panels. The rapid worldwide growth of sustainable energy means that demand for these materials will increase quickly. Materials will soon become scarcer and geopolitical risks may in future endanger deliveries of these materials. The study carried out in 2018 by Copper8, Metabolic¹⁷ and others shows this clearly. The scarcity of raw materials could, according to this study, create risks for the energy transition.

These risks will in any event decrease by more economical use of raw materials e.g. through circular design and reclamation of resources. To that end, a pilot is being carried out within a specific value chain to examine how less of the critical materials can be used throughout the entire chain and how the material used can be reclaimed in the recycling process. The first project being considered is related to wind energy; a consortium will be set up for this.

Led by	RVO and EZK
Involved	EZK, companies, sector organisations
Product	Pilots for 5-10 critical materials, focusing on the energy transition. Start-up of a wind energy project
Effect	A picture of the raw materials supply risks and how the need for raw materials affect the energy transition
Term	2019-2020

3. Track: Uniform principles and calculation methods for product groups

Uniform standards and calculation methods are needed as a ‘common language’ in the transition to a circular economy. Although there are good examples for some product groups, there are as yet no unambiguous and independent

¹⁶ https://www.researchgate.net/figure/Recycling-Metal-Wheel-reflecting-that-knowledge-of-recovering-carrir-elements-commod_fig2_270048511
¹⁷ <http://www.copper8.com/metaalvraag-van-de-nederlandse-energietransitie/>

“

Zinc is on this list of critical raw materials. The extractable resources will be exhausted in thirty years' time. Zinc is widely used in industry to protect steel against corrosion (galvanisation). The all too familiar crash barriers along Dutch roads and motorways are also made of galvanised steel. They have to be replaced after 25 years. Although the idea of reusing crash barriers appeared at the end of the twentieth century at Rijkswaterstaat, for example, it never really got off the ground. When crash barriers are replaced now, the material goes abroad as scrap.

Fred van Hest has been working on the idea of giving crash barriers a new lease of life for some time now. As a former director of a thermal galvanisation plant in Nederweert, he knows exactly what he is talking about. A feasibility study was carried out in 2005 into recycling crash barriers. He then founded the company Arrosso, a Dutch acronym for 'organisation for general recycling, renovation and zinc removal of clean scrap'.

He has calculated that 67% of the crash barriers in the Netherlands could be reused and replaced along the roads and motorways. 'Over the coming years, that recycling involves about 240,000 tons of galvanised steel. After zinc removal (and 100% reclamation), the remaining 33% – about 120,000 tons – could be reused in the Netherlands as clean scrap for making new steel. That saves a huge amount of raw material. It also represents an energy saving equivalent to the consumption of 300,000 households for the next thirty years. In addition, a climate gain of 669 ktons of CO₂ will be achieved, equivalent to 213 million kilometres driven by cars.'

'As the pioneer,' says Fred, 'I'm already thirteen years along the road. Through the RVO, I came into contact with Jeanette Levels-Vermeer of LBP-Sight (an engineering consultancy for construction, spatial planning and envi-

'67% of the crash barriers in the Netherlands could be reused and replaced along the roads and motorways. Over thirty years, that means 240,000 tons of galvanised steel.'

ronmental sectors), with whom the plans have become increasingly real. After a lot of research and various tests, a pilot facility will be built in 2019 where zinc can be reclaimed and the loop can be closed.

The pilot factory will be on the Metalot industrial set in Budel, next to the primary zinc producer Nyrstar.

'The zinc that we remove will shortly be going straight back to Nyrstar and the clean scrap will go to the primary steel producer in IJmuiden. Clustering facilities like that could also work elsewhere in the world,' reckons Fred. 'It's not being done yet because the metals supply chain is currently busy optimising labour costs rather than environmental and raw materials gains.' 'Support from the authorities is needed for the pioneering function,' says Jeanette. 'Multiple innovations are involved, in fact. For instance, we're also looking to see whether the hydrogen gas released by the zinc stripping process can in turn be used as fuel. In addition, Metalot will develop into a breeding ground for other experimental factories. Other sectors will be able to learn from this case study too, showing how you can use multiple links in the production chain to give a closed loop.'

”

Fred van Hest is the driving force behind the 'Reclamation of zinc and clean scrap' project and director of the company Arrosso. **Jeanette Levels-Vermeer** works at LBP-Sight as a senior adviser on sustainability and is one of the co-owners of the consultancy.

standards. A variety of activities are being set up for this. One of them is a national system for the environmental performance of products.

Project: Pilots for a National System for Environmental Performance of Products

Promoting transparency in the environmental impact of products is important. It helps companies and consumers to make better choices and helps the authorities make better policies and do their procurement more effectively. The intended effect is a reduction of the environmental impact. This involves examining whether the example set in the construction industry can be followed, where a successful application of a calculation method (DuboCalc) and a database (the National Environment Database) were developed. To start with, three pilots will be carried out for this in 2019 for three product groups in manufacturing industry. This will be done by expanding upon the tools developed earlier in the construction sector. The partners for it will include the governmental authorities, the commercial sector and Stichting Bouwkwiteit (the Construction Quality Foundation).

Led by	FME and Metaalunie (technological and metal-working companies associations respectively)
Involved	authorities, commercial sector, Stichting Bouwkwiteit
Product	3 pilots for 3 products in manufacturing industry
Effects	Unambiguous and independent standards as a way of reducing the impact on the environment due to a number of product groups
Term	2019

4. Track: Materials efficiency

Materials efficiency is a keyword in a circular system, based on retention of value rather than on costs. The key elements here are creating awareness and general support, so that policy and business can ultimately be based upon it. The focus is on adjusting three interrelated parameters: Firstly, pointing the research process in the right direction with a vision of the transition, with an end-of-life approach – more on use than on consumption. Secondly, knowledge about this has to be accumulated and shared. Thirdly, incentives are needed to avoid materials being consumed and to encourage utilisation. Promoting the demand side is needed too. The vision of materials efficiency also has to be a leading element in the monitoring.

Coordinated by Mzi, a research proposal has been submitted to the Dutch Organization for Scientific Research (NWO) about – inter alia – methods for extending product

lifespans in e.g. the electronics industry. If that proposal is accepted, it will help the materials efficiency track, as well as other tracks such as circular design.

Project: Urban Mining of Flat Screens

To increase materials efficiency, the ‘Urban Mining of Flat Screens’ project was started in 2019. This involves various private parties too, working on reclaiming critical materials such as indium and gallium from screens so that they can be reused in new products.

The results of economic feasibility studies are positive. With the evidence of 100 tons of discarded electronic products that were processed to yield 15 to 30 kg of indium plus other metals that can be reused in products such as solar cells, the circular economy for critical metals is being shown to work. The planned pilot is expected to result in noticeable environmental gains, such as greenhouse gas reductions. For each ton of FPD screens and CIGS solar cells processed¹⁸, these reductions will be approx. 1,000-1,400 and 1,000-2,000 kg CO₂ respectively, depending on the processes chosen.

Reclamation and recycling of indium and gallium help improve security of supplies and ensure that the exhaustion of these scarce metal resources is cut back.

WeCycle handles the supply of the requisite discarded products that are to be processed and supports the implementation of successful, innovative processes. Together with Suez Water, TNO is developing innovative processes and ensuring that the most sustainable processes are selected from the various alternatives. This will also take account of a wider range of applications for other elements than indium and gallium. Suez Water and Coolrec are developing the processes at the pilot scale and carrying out endurance tests. Solience is using the reclaimed indium and gallium compounds in new solar cells.

Led by	Coolrec
Involved	Suez Water, Coolrec, TNO, WeCycle, RVO
Product	pilot resulting in knowledge being accumulated and shared
Effects	Retention of value: preventing materials being consumed and promoting utilisation. Cutting back on the exhaustion of scarce resources
Term	2019

5. Track: Recycling Technology – closing the cycles

Recycling is a key step in closing the loops, as are refurbishing, remanufacturing and upgrading. The complexity of recycling metals lies in the fact that not all elements can be

¹⁸ CIGS stands for copper, indium, gallium, selenium

reclaimed from alloys. It is important that not only the quantity but also the quality should be optimised. The better quality the input flow and the cleaner it is, the less loss there will be in terms of kilograms and functionality during the recycling process.

Project: Zinc reclamation

A project was started at the end of 2018 for reclaiming zinc from galvanised crash barriers. A consortium of parties will be setting up a test facility at the new zinc-related industrial site Metalot in Budel. In this facility, the zinc will be reclaimed in a circular approach as a metal from sulphuric acid, with the ultimate aim of reclaiming 100% of the zinc in the recycling.

The industrial site is next to the zinc produced Nyrstar. Sulphuric acid is created as a by-product of zinc production. That sulphuric acid can in turn be used for zinc removal ('stripping') and can result in 100% reclamation of the zinc in Nyrstar's production process. The quantities are substantial and over the period 2018-2048 could mean a total of as much as 170,000 tons of zinc being reclaimed. This closes the cycle.

At the same time, the company Arrosso intends – together with other parties – to strip the zinc from steel using hydrochloric acid rather than sulphuric. In the test facility that is being set up, there will be investigations into how hydrochloric acid containing zinc can be upgraded into raw material for industrial applications or how the zinc can be reclaimed.

The zinc removal process releases hydrogen gas. In the pilot facility, Arrosso is aiming to work with various parties to see how this gas can be captured and used as an energy carrier. Over the period 2018-2048, this could yield 6,000 tons of usable hydrogen.

For the very first phase of the project, funding from the Ministry of Economic Affairs and Climate Policy is available. This means that the project was ready to start at the beginning of 2019. Funding is being sought for the next stages.

Led by	Arrosso
Involved	Nyrstar, Tatasteel, Arrosso, national and other authorities and road/highway managers
Product Effects	test facility for circular reclamation of zinc Reclamation of zinc from the production process
Term	2019

6. Track: Circular Business Models

In the circular economy, business models will be based far more on 'usage' rather than 'ownership', with the producer becoming a service provider. Getting value from residual flows will also become a more important element of the business model. As a concrete project, we will be working on 'Heat as a Service'.

This also requires a new form of company financing that supports these new business models. A roadmap will be drawn up in 2019 that provides practical approaches to this for both the companies and the funding parties. This roadmap must give both companies and financing parties a good picture of the business models and the funding options. This will be done in cooperation with the Netherlands Circular Accelerator.

Together with the consumer goods sector, manufacturing industry wants to set up promotional activities relating to 'prosumers' (i.e. consumers who are also producers). To that end, a living lab called 'refurbish your lifestyle' is being set up together with prosumer organisations such as Cooperation of Good, festivals and companies who want to develop innovative circular business models. Over the course of two years, they intend to learn how active consumers can help make circular business models profitable.

Project: Heat as a Service

To accelerate the energy transition and to make heating facilities circular, work is being done on renewing the way in which heat is supplied, compared to the current method of placing central heating boilers.

The sector wants to have prepared a roadmap for this transition during 2019. The roadmap will focus on developing concepts and a sector-wide organisation at the district scale (heating networks etc.), the scale of a building (collective building concepts) and the user scale (concepts for the individual). The policy in future will be that heat should then be seen as a service, to be delivered with a guarantee of the lowest possible CO₂ emissions for the lowest possible price.

A start was made in 2019 in pilot form on setting up the concept of a chain organisation for the replacement market for central heating boilers (about 375,000 boilers a year).

The aim here is that the boilers should remain the property of the supplier, which creates incentives for them to develop devices that will be viable for longer and to use raw materials more economically by paying attention to e.g. refurbishment and recycling.

The consortium consists of: VFK (representing the sector, including manufacturers), UNETOVNI (representing the

sector, including installers), companies and start-ups in these sectors, cooperatives, real estate/construction sector parties, the Province of Overijssel, recycling companies (WEEELABEX) and energy companies.

Led by	Consortium (to be decided)
Involved	VFK, UNETOVNI, companies, cooperatives, real estate/construction sector parties, the Province of Overijssel, recycling companies, energy companies, EZK, IenW, InvestNL
Product	Roadmap for the energy transition; a pilot for the central heating boiler replacement market started up
Effects	Encouraging the business model 'From ownership to use', leading to better use of resources and more efficient devices
Term	2019

7. Track: Circular procurement/IT category management

When looking at the movement towards the circular economy, one of the issues is that procurement prioritises price incentives and profits in the short term. The parameter that has to be tweaked first is making sure that the process of searching during procurement heads in the right direction.

An important observation is that purchasing should be focused on retention of value throughout the lifespan, being viable and promoting the circular economy. Development and exchange of knowledge are the keystones of this line of enquiry.

Authorities and major commercial sector players can take on an exemplary role through circular procurement projects, asset recovery projects and promoting best practices from the market, using sustainable purchasing criteria. Circular procurement has also been included as one of the cross cutting themes in this implementation programme (see Section 3.4). A start has been made on a project relating to lifespan-extending refurbishment of IT hardware, both at companies and within governmental authorities.

Led by	EZK/Infotheek
Involved	Authority bodies, major commercial sector players and manufacturers
Product	A start has been made on a project relating to lifecycle analysis information, lifespan-extending refurbishment of IT hardware, circular objectives and possible actions, both at companies and within governmental authorities
Effects	Encouraging procurement that focusses on value retention and on promoting the circular economy
Term	2019

2.4 Construction as a priority

Construction is an important sector in the Dutch economy. It consists of the sub-sectors residential construction, non-residential construction and infrastructure construction. In the construction sector, circular working through intelligent reuse means not only cost reductions but also a demand for new products and services. New knowledge development is getting under way among architects, designers, engineers, service providers, commissioning parties, contractors and producers. The construction sector is able to adopt a profile as an attractive and innovative employer.

'The fully circular construction economy is going to happen; the only questions is how quickly.'

Elphi Nelissen, chair of the Construction transition agenda

The Transition Agenda for the Circular Construction Economy describes the strategy for achieving a circular economy in the sector by 2050 and it contains the agenda for the period 2018-2023. This agenda was drawn up by a transition team of experts from the sciences, governmental authorities and market parties. The Transition Agenda for the Circular Construction Economy is closely aligned to the strategy of the 'Bouwagenda' (Construction Agenda) for strengthening the sector and making the Netherlands more future-proof. In the Cabinet's response to the transition agendas for the circular economy as a whole, dated 29 June 2018, the Government stated it will play an active role together with the market on working towards a circular economy. The agreement for this is that the Bouwagenda will be the platform where the coordination for drawing up and implementing the implementation programme for the circular construction economy will be handled. The transition agenda and the Cabinet's response will determine how the circular construction theme is fleshed out. When the implementation programme is being directed and controlled, extending it to all other parties in the construction sector will be the guiding principle.

The main thrusts of the Transition Agenda for the Circular Construction Economy – for both residential and non-residential work and for infrastructure (GWW: earthmoving, roads and waterways) – will be:

Market developments

- An initial series of innovative products and services for circular construction;
- A specific demand for circular products and services, for example in governmental projects;
- An accurate understanding of and action plan for halving CO₂ emissions from construction by 2030 and eliminating them entirely by 2050;

- A specific plan for making the housing stocks more sustainable and the task of dealing with an additional million homes in the course of ten years together with the Bouwagenda, as well as building those homes to be as circular as possible;
- Sufficient incentives for R&D, experimentation, prototypes and specific projects.

Quantification

- A common language and tools for indicating and quantifying circularity within projects.

Policy, legislation and regulations

- Legislation and rules that encourage rather than hinder;
- International positioning and cooperation.

Knowledge & awareness

- Knowledge, experience and tools to ensure enough of the right kinds of people are in the construction chain overall;
- Understanding, backing, recognisable benefits, awareness.

After this, nine projects are presented that all assist the work in one or more of those main thrusts. This implementation programme is not an exhaustive overview, but it gives an impression of what is happening in the sector, for example in the Concrete Accord, the Circular Viaduct, the Smart City and Circular Asphalt. The ministries are also getting on with e.g. the environmental performance requirement for buildings (MPG), the materials passport and using its own purchasing power via the RVB (Central Government Real Estate Agency), RWS and ProRail. On the initiative of the Bouwagenda, the Construction Technology and Innovation Centre (BTIC) has been set up, for which circularity is one of the key subjects. This small selection from the many initiatives that are helping achieve the objectives of the transition agenda illustrates the breadth and scale of what has already been set in motion. Over the coming years, there will be cooperation with the market parties in order to work on detailing the implementation programme. This will involve putting more flesh on the bones of the aims and developing relevant indicators so that joint steering becomes possible. Capacity will be freed up by the Netherlands Enterprise Agency (RVO) and the Bouwagenda to support the development of the implementation programme.

1. Development of the materials passport

A materials passport encourages circular design and construction. That results in higher-quality use of building materials and in materials that are better for the environment.

Practical tests are being carried out with the materials passport. The Directorate-General for Public Works and Water Management (RWS), the Central Government Real Estate Agency (RVB) and ProRail have an active role in this,

as part of the national government's rolemodel position. The projects focus on testing and assurance of the preconditions that would need to be imposed upon a materials passport, such as availability, reliability of the data, storage options, transparency and governance. In addition, the CB'23 platform (an initiative of RWS, RVB, Bouwcampus and NEN) is looking at the framework within which materials passports could be realised. Various studies are also being carried out via the Netherlands Enterprise Agency (RVO), such as an inventory of the surroundings (obstacles and opportunities), including European developments in this regard.

By the end of 2020 at the latest, the Cabinet will decide in which situations a legal obligation will be introduced.

Led by BZK

Involved IenW, commissioning parties, architects, advisers, builders, suppliers, data companies, science institutions, BZK, IenW, water boards, RWS, RVB, ProRail, RVO, NEN and Bouwcampus

Product A clear picture of the preconditions for a materials passport; an inventory of the obstacles and the opportunities. Ultimately (2020), there will be a Cabinet decision on whether or not to make this a legal obligation

Effects Promotion of circular design and construction, and application of secondary and other building materials and ones that are better for the environment. This also helps make asset management more effective, with longer lifespans as a result

Term Decision made in 2020

2. Circular Cities

Cirkelstad (Circular Cities) aims to strengthen the movement towards towns and cities with less waste and less loss of materials. It is a platform for the (frontrunners in the) circular construction sector. The aim is to share knowledge and experiences, to make use of them and to scale them up. It is also about developing projects and driving innovations relating to circular and inclusive policies, procurement and design, through to circular and inclusive development and realisation of construction and demolition work. There are currently 'circular cities' and around 175 parties have joined the projects.

By the beginning of 2019 there will be a specific plan asking for commitment for the coming years. The parties will then work towards formulating the targets for construction practice, and further implementation and upscaling. The aim is to support a network with nationwide coverage comprising both public and private parties by the end of 2020. The toolbox for circular and inclusive construction will be delivered in 2022.

“

The municipality of Helmond is going to build the most intelligent neighbourhood in the Netherlands. The new district will be a living laboratory for tomorrow's society, with smart solutions for residential construction and sustainability, mobility, health, safety and social cohesion. The future residents will get an important voice. One of them is Thieu Kessels.

‘I got a golden tip from my sister-in-law, who was involved in the process of getting Brainport off the ground. My wife and I immediately registered for the project. I’m seventy-two, the kids have left home and my wife and I wanted to live somewhere smaller. This was a wonderful opportunity to do that, and in such a sustainable project too. The future starts tomorrow, and we wanted to be part of it,’ says Kessels.

Before his retirement, Thieu Kessels was a director of the Bijenkorf department store. His view of the retail sector changed during the economic crisis. ‘That was because of new developments, such as the recession in bricks-and-mortar shops as well as the need to look at consumption differently. After I retired, I started talks with retail companies to see if we could tackle things differently. A lot’s changed over the course of ten years – now the supermarkets are selling organic produce, fortunately. But there are still a lot of gains to be made if you’re talking about a circular approach. Anyone who ever does the shopping must see that, surely?’

The construction of Brainport will start at the end of 2019. ‘At the start of the project, we were given certain parameters, but we had a lot of freedom within them. With a bunch of people who had similar ideas, we set up a small collective. That includes an architect who’s well into circular and modular construction and who has some nice ideas. The best approach for handling the energy supplies properly is to make sure you need as little energy as

possible. We decided that we could lower the houses into the ground by a couple of metres, so that they’re better insulated. The northern face is in the ground, but on the south there’s a glass front and we get the sun. We didn’t think a heat pump was such a great idea; we reckon that there’ll be better methods on the market in a few years’ time. We may for example be able to use the gas mains for other applications. By that point, we want to be joining forces with others and realising solutions together. Until then, we’re using transitional solutions.’

‘How many opportunities does someone get in their life to do this kind of thing?’

‘Lots of things are still undecided, but that’s exactly what’s so challenging! There are lots of types of residents, with a wide range of different wishes. I’m confident that the cooperation will go well. There are enough people who want to be actively involved and the municipality is assisting us very nicely.’ He is curious about how things are going to progress. ‘How many opportunities does someone get in their life to do this kind of thing?’ he says in conclusion. ‘You’ve really got to seize those opportunities.’

”

Thieu Kessels is one of the future residents of the Brainport Smart District in Helmond.

Led by	the Cirkelstad platform
Involved	the four largest municipalities, BAM, Dura Vermeer, Volker Wessels, RVB, BZK/IenW are taking part. In addition, there are also parties such as NewHorizon, Madaster, Bouwprogramma MRA, Copper8 and Metabolic
Product	Plan for the coming years (2019); support for a network with nationwide coverage (2020); toolbox for circular construction (2022)
Effects	Greater sharing of knowledge, high-quality reuse and upscaling of the circular construction economy
Term	2019-2022

3. Circularity in building regulations

Presenting a clear picture in regulation of what the circularity of a building means is important for the transition to a circular construction sector. There is however not yet any uniform method for assessing the circularity of a building.

This track is looking at the evaluation of circularity in the current environmental performance requirements for buildings and infrastructure. Further tightening of this legal requirement is also being examined for housing and offices, as is extension of the environmental performance requirement to other categories of buildings and infrastructure. The Building Quality Foundation (SBK) will be making recommendations on this in 2019.

Practical experience is being acquired in the municipalities of Amsterdam and Harderwijk with the application of a stricter MPG requirement based upon a request via the Crisis and Recovery Act.

Led by	BZK and the municipalities of Amsterdam and Harderwijk
Involved	SBK, IenW, RVO, the CB'23 platform, market parties, municipalities of Amsterdam and Harderwijk
Product	A tighter, amended and extended MPG; practical experience in Amsterdam and Harderwijk with stricter MPG requirements
Effects	Amendment of the building regulations so that more circular materials are used in buildings and in infrastructure
Term	2019-2021

4. Brainport Smart District (BSD) Helmond

BSD is a pilot project - a 'living lab' - for developing the new part of the Brandevoort district in Helmond to become the most 'intelligent' neighbourhood in the world. This affects 1,500 housing units and 12 ha of commercial premises. Promising innovative concepts will be allowed to prove their worth. The latest techniques and insights will be used

in order to create a pleasant living environment that does not place a further burden on the planet.

That means being energy-positive, CO₂ negative, a circular water supply chain, a materials bank, local production of food, with new mobility concepts (including electric transport) as one of the principles, and plenty of attention to health and for data and energy cooperatives. The results of this test environment will allow acceleration and upscaling elsewhere.

The nature of BSD as a 'living lab' means – within the objectives, the main urban planning structure and the data manifest – that companies and residents (or groups of residents) can determine for themselves how the district is to take shape.

The realisation period is 2018-2028. There is a continuing business challenge in which companies submit ideas that are then implemented, as long as they fit.

Led by	The Brainport Smart District foundation
Involved	TU Eindhoven, Tilburg University, Brainport Development, the municipalities of Eindhoven and Helmond plus the province of Noord-Brabant
Product	The 'smartest' district; ongoing business challenge for implementing new ideas
Effects	Accumulating and sharing expertise and experience about areas such as policy, procurement, design and the circular construction of buildings, plus new concepts relating to mobility, health, energy, data management and participation. Showcases for new techniques and new insights will also be created.
Term	2018-2028

5. Chain-wide agreements: circular concrete as a case study

In the Concrete Accord of 2018, producers, commissioning parties and contractors agreed to work closely together on sustainability. The aim is to create greater transparency in the chain and to increase the demand for 'green concrete' by including sustainability criteria in tenders.

The target is a 100% high-quality reuse of concrete waste by 2030 and for that same year to have seen a reduction in CO₂ emissions of at least 30% with respect to 1990. Recycling of concrete can be made possible by designing concrete structures in a way that makes the maximum possible allowance for future changes in use. It is also possible to design concrete structures that can be disassembled, with elements that can then be reused elsewhere. In addition, techniques are being developed for breaking concrete rubble back down into gravel, sand and cement powder that

can then be recycled. A challenge has now been put out to tender for circular concrete.

Led by	IenW, EZK, BZK
Involved	Parties in the concrete sector – commissioning parties, producers and others from the commercial sector; Provinces of Noord-Brabant and Overijssel
Product	100% high-quality recycling of concrete waste (2030)
Effects	Less use of raw materials (primary in particular), more high-quality recycling, encouragement of innovations for processing and separation of used concrete, CO ₂ reductions
Term	2018-2030

6. Chain-wide agreements, case study of producer responsibility for façade construction

Producer responsibility (EPR – see also Section 3.1) is a good tool for circular construction. Producers then remain responsible for their products right through to the demolition and disposal phase or recycling and reuse. EPR also requires agreements to be made throughout the supply chain. The wall cladding/façade construction sector is currently working on an action plan for developing a producer responsibility concept for façade construction.

Led by	The wall cladding/façade construction supply chain, together with national government (IenW leading, plus BZK)
Involved	Companies and umbrella organisations in the cladding/façades sector
Product	Exploratory study of EPR for cladding and façades
Effects	Reduced CO ₂ emissions, less use of resources (primary resources in particular), more high-quality recycling and attention to the design and disassembly options
Term	2019

7. National government (RVB and RWS) as role-models in circular tendering and management

The Central Government Real Estate Agency (RVB) and Rijkswaterstaat (RWS) are major clients and managers for property and infrastructure. Circular management and tendering will let them act as rolemodels for other property owners and commissioning parties. That provides a positive boost to the market. The two organisations are now working together on a path for the transition with the departments involved. The aim is to be managing both the portfolio of national office buildings and the national infrastructure circularly by no later than 2030. Two examples:

The RVB is future-proofing the area around Arnhem station. This is being done through sustainable renovation of for instance the local governmental offices. The emphasis not so much on the buildings themselves as on their utility and the experiential value, as well as the partnership between the market and authorities leaving sufficient scope for innovation. Additional attention is for example being paid to sustainable and healthy business operations, through themes such as energy neutrality, circularity and health. An award criterion based on the use of materials and the process organisation could furthermore allow things to be steered towards the lowest possible CO₂ emissions and environmental impact.

RWS is testing the application of sustainable and climate-neutral asphalt (with assistance from the climate envelope) in the renovation of the A9 motorway. In collaboration with market parties, RWS has also developed a circular viaduct with a modular structure that is being used as a viaduct for roadworks. That saves not only on the implementation costs but also on building a new workviaduct each time. The widening of part of the A58 motorway (InnovA58) and the Circular Principles for Replacement and Renovation programme will also play a major role.

8. Water boards and sustainable commissioning

For the last couple of years, the water boards have been busy implementing sustainable commissioning in the projects and their programmes. To do that, they have been using the ‘Sustainable Roads and Infrastructure Approach’ and the water boards have been exercising sustainable procurement, as agreed in the Sustainable Roads and Infrastructure Green Deal 2.0 and the Socially Responsible Procurement Manifesto¹⁹. This applies in particular to projects in infrastructure and the physical living environment. This means that circular working methods will be taken into account throughout the entire process of planning, design, implementation, management and maintenance of such projects, along with the options for renewable resources, CO₂ reduction and new earnings models.

The water boards will also be using these tools in the purchasing and tendering activities for other procurement categories.

For the assessment of the CO₂ impact of measures in infrastructural projects, the water boards use a form of shadow pricing as recommended by the CO₂ Shadow Pricing Taskforce. The tool in question is called DuboCalc. It is a software tool for rapidly and simply calculating the sustainability and the environmental costs of design variants for road, waterway and infrastructure work²⁰. Once the instru-

¹⁹ <https://www.duurzaamgw.nl/wp-content/uploads/2018/06/Aanpak-Duurzaam-GWW-schema.pdf>

²⁰ www.dubocalc.nl

ment has been made suitable for the water boards' projects, they will proceed to scale up the pilots. Transfer of knowledge between the water boards is essential for this.

It is done through nationwide knowledge networks about the circular economy and about the Sustainable Roads and Infrastructure and Socially Responsible Procurement. There are regular meetings for water board employees. After the water board elections, there will be three regional administrative meetings to discuss this topic.

The aim is for the water boards to ask for 100% circular offers by 2023 and issue 100% circular tenders by 2030, as agreed in the IBP (intergovernmental programme furthering collaboration between different tiers of government and public authorities) and the Transition Agenda for Construction.

Led by	Water boards
Involved	Public commissioning parties, market parties
Product	100% circular requests for offers (2023) and 100% circular tendering (2030) by the water boards
Effects	A transition to circular working methods in all the water boards' activities
Term	2023-2030

9. Project: Land, Roads and Hydraulic Engineering (GWW)

The national government (RWS) has procured a modular viaduct that will start being used in 2019. The modular viaduct is put together from components for use as a temporary viaduct during engineering work. Once the project in question has been carried out, the viaduct can be disassembled and put together again somewhere else. This avoids the construction and subsequent demolition of 'permanent' viaducts and thus results in considerable savings of materials.

Another ambitious Rijkswaterstaat project is carrying out tests with recycled materials, for instance laying test strips of road surface using sustainable asphalt mixtures. These projects are being funded from the climate envelope.

Rijkswaterstaat and ProRail are also investigating applications of recycled steel together, for which pilots start in 2019.

Led by	IenW/RWS, ProRail
Involved	Decentralised authorities; Province of Noord-Brabant
Product	Modular viaduct; test strips of recycled asphalt; pilots for recycled steel
Effects	Considerable saving on materials
Term	2019

2.5 Consumer goods as a priority

Introduction

Human developments have always been to make progress and improve life. One of our major tasks now is to close the cycle of production. We have to come up with smart solutions for the wastage of raw materials that has become part of our way of life. The transition agenda for consumer goods helps direct the choices that can be made by policymakers, scientists, businesses and of course consumers.

Implementing the actions and the icon projects from this implementation programme means opportunities are created for more economic activity, more jobs and at the same time less wastage of raw materials for e.g. textiles, household appliances, plastics and mattresses. This also raises questions that touch upon the underpinnings of many business models, skills and management methods. Many questions have not yet begun to be answered. At the same time, while preparing the agenda, we have seen some amazing examples and (with the help of expertise centres and science institutions) we know just how to answer these types of questions. It is now a matter of making the right choices and cooperating throughout the entire value chain, as well as and between science institutions, governmental authorities, social organisations and the commercial sector.

This implementation programme allows knowledge and experience to be developed to find answers to the major transition issues. The icon projects can provide the necessary impact for the transition to a circular economy. The parties involved in the icon projects chosen have a great deal of energy and willingness to take action and own the issues. That is why investing in and facilitating the learning curve in order to develop new business models and funding possibilities is extremely important. That is why, in the implementation of the agenda, we would like to be linked to the Netherlands Circular Accelerator's approach so that the success and failure factors can be integrated at the system level.

This chapter describes the icon projects in terms of the goals, the products, the expected effects and the actors involved. These icon projects are supplementary to current policy efforts. The icon projects and existing policy are always considered as a cohesive whole so that the overall contribution to the desired transition is maximised.

1. The Dutch Circular Textile Valley icon project

The objective of this icon project is to achieve a significant closed-loop supply of textiles by 2030.

To achieve that goal, the icon project is working on a Circular Valley for fashion and textile, in which the combined strength of innovative companies in Twente,

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‘At the moment, too much good material ends up as waste and there are still streams from the sorting installation that are too contaminated to be reused,’ says Patrick van Baal, soon to be a board member of the National Circular Plastics Test Centre foundation. ‘We badly need a new test centre to improve the technology for sorting and recycling plastic packaging.’ The new National Circular Plastics Test Centre will start operating this year.

The aim for the test centre is to become the physical location where all facilities come together at an industrial scale for developing, testing, validating and encouraging innovation in sorting technology. ‘Reusing existing technology to separate materials is simply not good enough,’ says Patrick. ‘One of the biggest bottlenecks is the quality of the sorted material. At the moment, that stream is simply not pure enough to reuse as packaging. Our focus is now on raising the quality of these materials so that they can be reused as high-quality materials.’

‘For the development of the circular economy,’ Patrick says, ‘it is also important that the costs of recycling are reduced and that the efficiency of the sorting process is greatly improved. There has been much less attention paid to this in the discussion so far, while there are still a lot of gains to be made.’ The new centre can add something in this respect as well. ‘New sorting technology will let us accelerate the overall circular process,’ he says with conviction. The Test centre should then become the place where the right people from the business sector, governmental authorities, universities and other educational and science institutions come together to start development programmes. ‘For instance to create and validate innovative test facilities together with machine builders and suppliers.’

Patrick van Baal is involved with the establishment of the National Circular Plastics Test Centre and will shortly be a board member. He works for Friesland Campina, where he leads a team that is responsible worldwide for developing the company’s packaging.

‘I believe that the acceleration to a circular economy depends greatly on the mind-set and on thinking in terms of possibilities.’

‘Everyone must dare to think differently,’ says Patrick, ‘because I believe that the acceleration to a circular economy also depends greatly on the mind-set and on thinking in terms of possibilities. The business model of the current linear economy inhibits development. People are stuck too much in the old cost models. I’m convinced that circular reuse of packaging can also be financially attractive. Which is a win-win situation for the environment and FrieslandCampina. So it’s high time we got started!’ says Patrick van Baal.

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Tilburg, Amsterdam, Arnhem, Wageningen and other parts of the Netherlands are making efforts to close the textile cycle. This is primarily done through innovations in mechanical and chemical recycling, large-scale collection, intricate sorting and application of recycled fibres in design and production. This icon project is also working on scaling up the circular roadmap for textiles for the entire sector and on the question of how value can be created for consumers, companies and society²¹.

The realisation of the following products is being worked on in the shorter term (2019-2023):

- Pilots for high-quality recycling and production with recycled fibres
- Concrete examples of circular-economy craftsmanship and manufacturing in clothing and textiles new materials, such as mycelium and fruit 'leather', bacterial/algal dyes (WUR/ArtEZ The Future of Living Materials, Bio Art Laboratories)
- An action plan for the market based on the Circular Roadmap for Textiles, including additional activities in the supply chain

In addition to realising this icon project, work is continuing in 2019 on the development of a textile policy programme, based partly on the sector plan in which the clothing & textile sectors formulate concrete goals and actions for closing the textile cycle and taking their responsibility as producers. A Denim Deal is also being worked on and research is being done into the possibilities for slowing down the 'fast fashion' phenomenon, e.g. through other business models.

- Effects**
- New lines in the fashion industry using high-quality textiles based on fibres recovered from used textiles
 - Reduction of the use of 'virgin' fibre in the Netherlands and its associated environmental impact
 - Much less textile waste in incineration (80-90%) in the Netherlands
 - Accelerate further development (qualitative and quantitative) of high-quality recycling technology
 - Accelerate the development and adoption of circular business models
 - Collaboration between start-ups and main-stream parties
 - Employment in high-quality textile recycling
 - Further development and revaluation of craftsmanship and manufacturing industry

- Led by** Modint, Het Groene Brein, ABN-AMRO, Fashion4Good, Circle Economy (core team DCTV), BHOS and RWS
- Involved** Fashion chains (shops) and producers, the Circular Textile platform, regional Circular Textile hubs
- Term** 2020-2023

2. The National Circular Plastics Test Centre (NTCP) icon project

The objective of this icon project is to accelerate the closing of the 'post-consumer' plastics supply chain. Using recycled content in plastic products inevitably comes up against obstacles. There is a gap between the supply of raw material and the application of recycled material. Current improvement processes to make supply meet demand are slow because the technology that converts recycled materials with market potential is spread across various suppliers in Europe. The NTCP works integrally on the optimisation and development of sorting, separation and reprocessing technology and processes throughout the entire recycling chain, with the goal of extracting more and more widely usable raw materials from our waste streams.

The icon project's products are:

- A leading National Circular Plastics Test Centre (NTCP) as an accelerator in the plastic recycling chain. The NTCP is an open and accessible facility for the entire market, with the objective of (inter alia) drastically increasing the amount of recycled plastic in packaging and acting as a catalyst and accelerator by making the accumulated knowledge available in a knowledge database.
- An innovation and development programme, with a knowledge database and network for sharing knowledge about the applications of secondary plastics.

The NTCP is positioned between industry and science, bridging the gap between the short-term (reducing costs) and long-term (innovation and development) goals for circularity in plastic processing. Closing that gap is how the NTCP makes it possible to accelerate the processes that are aimed at creating added value from waste streams (and thereby reducing the costs of plastic processing).

- Effects**
- Balancing supply and demand for recycled material
 - Optimising the environmental return of sorting and recycling processes
 - Improved quality of recycled material, added value and extending of the number of applications

²¹ https://www.afvalcirculair.nl/publish/pages/105419/roadmap_circulair_textiel_juni_2017.pdf

- The desire for standards and certification for a certain quality of recycled material is no longer a theoretical exercise but is based on concrete test results and real business cases
- Differentiation in rates for the Waste Fund can be matched more precisely to the market prices of recycled materials

Led by Omrin
Involved FrieslandCampina, Philips, Unilever, NHL Stenden University of Applied Sciences, WUR, Omrin, Attero, HVC, KIDV, Old Waste Fund, Packaging Waste Fund, other market parties
Term 2019

3. The Mattresses icon project

The goal of this icon project is to recycle 95% of mattresses discarded by consumers and for 75% of the new mattresses to be part of a closed-loop design process by 2025. Assessments are being made as to whether this goal can be achieved earlier for the business market (such as holiday parks, hotels, the army, hospitals). In the shorter term (2020), the goal is to start the innovation programme for mattress recycling. A recent development is to see the extent to which chemical recycling can play a role.

1.2 million discarded mattresses enter the market as waste in the Netherlands annually. Two thirds ends up at eco-friendly recycling plants and are incinerated. One third of mattresses are dismantled at two privately-owned companies and processed into new raw materials that are often reused (the steel, for example) or used as underfelt, judo mats or cow mattresses (the foams). Until recently it was not possible to develop a cost-effective business model for the annual processing of 1.2 million mattresses. For that reason, the mattress supply chain is preparing a voluntary EPR (Extended Producer Responsibility). If this has not been decided by mid-2019, making an EPR mandatory will be investigated. Products associated with this icon project are:

- Mattresses Innovation Programme;
- Proposals with regard to amending international and other regulations that impede the use of secondary raw materials from mattresses;
- Mattress passport voluntary or mandatory extended producer responsibility

Effects

- Significantly larger proportion of discarded mattresses recycled and new mattresses produced circularly
- Significantly less incineration of discarded mattresses
- Cooperation in the value chain
- Helping achieve the Dutch climate target

Led by Mattress Value Chain Director; for producer responsibility: Ministry of Infrastructure and Water Management (see Chapter 3.1)

Involved Auping, Hilding Anders, IKEA and Beter Bed, CBM, INretail, municipalities, recyclers, furniture industry (PUR foam), mattress retailers and manufacturers, business market, recycling and waste companies, NVRD, raw material suppliers, science institutions

Term 2019-2025

4. Household Appliances as a Service icon project

The objective of this icon project is to develop knowledge about applying new business models. The consumer goods transition agenda talks a lot about the Product as a Service model (PaaS). In this model, the product – a dishwasher, for example – remains the property of the manufacturer and the user pays for the use of the dishwasher. The benefits of this model are that it gives the producers an incentive to create products with the optimum useful lifespan and low energy consumption and that the manufacturer also benefits from refurbishment after use. Various pilots will be conducted via the transition agenda to test this model.

The products of the icon project are two pilots for identifying opportunities and bottlenecks. These are one pilot with Landal Greenparks and another with the Eigen Haard housing association.

Effects

- Knowledge that can be broadly applied in the programme
- Construction of a circular design knowledge platform and business models

Led by Het Groene Brein
Involved For pilot 1: Landal Green Park, TurnToo.
 For pilot 2: Eigen Haard, Het Groene Brein, TurnToo
Term 2019-2020

5. The Sharing Economy icon project

The objective of this icon project is to raise awareness among the public/consumers about sharing goods and using this concept instead of ownership, and to facilitate municipalities in promoting sharing. The shift from 'buying products' to 'access to services' will play an important role in the transition to a circular economy, Business models such as 'product as a service' and 'sharing platforms' keep coming back as core principles capable of ensuring that raw materials are used much more efficiently, that products have longer lifespans because producers will have an interest in quality and reparability, and that materials always return to the producer for a second and third lease of life at the end of the lifecycle.

'Sharing economy' services are currently rarely used, although this part of the economy can potentially help the circular economy.

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La Poubelle is a registered apprenticeship company with a shop. ‘For us people come first and the environment second, which makes us different from most second-hand shops,’ says Theo van der Bruggen. ‘We put people with disabilities or who are disadvantaged in the normal labour market back on track. Every year we offer around 600 people a reason to get out of bed in the morning. That gives them pride and offers them a useful daytime activity. As a result they can also, as the jargon puts it, take a step up the participation ladder.’

‘Our formula is very simple. We collect things from people or people drop things off here. We check what is reusable and can go directly to the shop and what is reusable as material; that goes to our craft centre – things like the many oak tables from your grandmother’s time. Those tables used to be disposed of to be turned into chipboard. Now we saw those tables up into planks again and make new tables and cupboards out of them. The people in our wood workshop take pride in that. Some even move on to the regular labour market. We usually find something that suits everyone, such as sewing, repairing bicycles or cleaning old crockery.’

‘I’d like to have a larger shop with a workshop where we can also attract other circular activities. Small companies that are housed with us business-in-business, for example to create products tailor-made for customers. But large premises in a shopping centre are too expensive for us and the rules say that a shop doesn’t belong in an industrial zone. We’re currently discussing the possibilities with Tilburg. I also want to become a kind of low-threshold portal for the recycling points. So that we first scan, disassemble and sort the things that people bring to the recycling points for recyclability. This is now done at the recycling point, and not as well as it could be.’

Theo van der Bruggen is the manager of the La Poubelle second-hand shop, which has three locations in and around Tilburg.

All in all, circular working pays off but also costs a lot. Many second-hand shops are in trouble, or will be in the near future, due to sharp rises in wage costs. ‘If the turnover doesn’t grow correspondingly,’ says Theo, ‘you immediately see a drop in results. In order to earn back the increased wage costs of our people who fall under the Sheltered Employment Act alone, I would have to sell seven hundred extra sofas a year. And that’s just not going to happen. We mainly focus on reintegration candidates, of course, but guidance from regular staff is needed and will remain so; these costs are also increasing every year. What would really help is if recycled goods were no longer taxed for VAT at 21%. I think that’s a form of unfair double taxation, because the article has already been paid for once before.’

‘I want to become a kind of low-threshold portal for the recycling points: scanning, dismantling and sorting for recyclability here first.’

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That is why this icon project is investigating in greater detail how best to encourage a wider group of people to use those services within the sharing economy, which will then benefit the transition to a circular economy. This largely involves offering a positive perspective on the actions taken. The sharing economy often has a strong relationship with physical places and communities, which is why this project focusses on municipalities that have taken up the challenge of promoting the green sharing economy and on what those municipalities do in terms of impact, ownership, structure and revenue model, etc. Furthermore, there is an assessment of the success and failure factors that can be identified.

Products associated with this icon project are:

- an online platform for shared services;
- a guide for municipalities for promoting physical sharing locations and initiatives.

Effects	Strengthening the sharing economy
Led by	Environment Central and Nature & Environment
Involved	Municipalities, local sharing initiatives, Peerby, HeelNederlandDeelt, IenW Behavioral Insight Team
Term	2019-2021

6. Circular Craft Centres

The objective is to have a nationwide network of closed-loop economy craft centres in the Netherlands by 2030. Developing such circular craft centres can let municipalities aim for a spatial policy in which various initiatives are cleverly situated with respect to one another. These could for instance be locations where combinations of recycling points, second-hand and giveaway shops and craft locations are concentrated. At these craft locations, people are skilled in extending product lifespans e.g. through repairs, refurbishing and making new products from old. Examples of such centres are the second-hand shop La Poubelle in Tilburg and the 3D Makers Zone in Amsterdam. There are many customers and they provide employment, including work for people who are at a disadvantage in the normal labour market. Additionally, La Poubelle works closely with education (in particular regional training centres and vocational training courses) and there is interaction with the Circular Education and Skills programme. Municipalities can play a binding and facilitating role in the creation of initiatives such as this.

Products	<ul style="list-style-type: none"> • Joint definition of circular craft centres • Exploration for municipalities into extending the functions of recycling points • Pilots with a number of practical examples throughout the country • A 'community of practices' for sharing experiences • A feasibility study of circular craft centres
Effects	Products and raw materials remain in use for longer and unnecessary dumping and incineration are prevented. This can significantly help achieve the goals of the From Waste To Resources programme (VANG) objectives for reducing residual household waste. It also contributes to the climate objectives because lifespan extension has a braking effect on CO ₂ emissions. The centres will be lively places with a lot of activity. Crafts are being given a prominent place once again and it is expected that employment opportunities will be created for people who are at a disadvantage in the normal labour market. The links to repair work and professional knowledge/crafts, as well as technical education, will stimulate the circular economy
Led by	IenW
Involved	Municipalities, the Association of Dutch Municipalities (VNG), Sector Association of Recycling Companies in the Netherlands (BKN), Repair Cafes, NVRD, repair services
Term	2019-2025

'Once you've been to La Poubelle, you'll never buy something new again.'

Anne-Marie Rakhorst, chair of the Consumer Goods transition agenda

7. E-commerce

The sector has the following objectives for the coming years:
 Objective 1: By 2030, the sector will have reduced the CO₂ emissions associated with the transport of parcels from distribution centres to customers by more than 50% compared to 2018.
 Objective 2: The fast-growing flow of packaging from the e-commerce sector will become a closed loop as far as possible. Objectives for sustainable packaging will be drawn up together with the sector by 2022.

E-commerce can make a significant contribution to the transition to the circular economy through sector-wide cooperation, product/market combinations, quality marks for circular products, consumer awareness, sustainable packaging and smart return logistics.

Products	<ul style="list-style-type: none"> • Rollout of Bewust Bezorgd (Awareness in Delivery), a calculation model that shows where CO₂ emissions in the logistics operation of a webshop can be reduced • Sector-wide sustainability plan for packaging and packaging manual for webshops • Pilots for efficient return logistics • Research into returning consumer goods and the French legislation on waste prevention, at the request of the Lower Chamber of the Dutch house of representatives
Effects	<ul style="list-style-type: none"> • CO₂ savings thanks to fewer logistics movements • Savings on raw materials through less single-use packaging
Led by	First three bullets: Thuiswinkel.org, fourth bullet: Ministry of Infrastructure and Water Management
Involved	Online webshops, parcel services, packing industry
Term	2019-2025

8. Consumer Approach to the Circular Economy

The goal is to involve consumers and suppliers/producers more actively in ‘circular’ forms of consumption. In practice, ‘circular consumption’ means that the choice for a certain product doesn’t change but the way in which the transaction between producer and consumer proceeds. The form that transaction takes depends among other things on the type of product, the target group and the way in which the current supply is organised. This project also involves companies who will create specific circular offers and want to learn how they can turn them into a healthy business model in the future.

The project has the following objectives:

1. To inform consumers about alternatives to buying new: sharing, repairing, second-hand
2. Encourage consumers to explore alternatives
3. Gain behavioural insights into choices
4. Exploring possibilities for circular products and services with retailers and sector organisations

The project also results in the following products:

- a better picture of consumer behaviour relating to the various circular economy aspects.
- concrete actions to let consumers and producers test various forms of closed-loop consumption
- lessons for the stakeholders involved about effective communication that will tempt parties into making a more ‘circular’ choice.

Effects	The social effect is that producers will make better-founded choices more often for ‘circular offers’ so that this option will increasingly become the new norm for consumers. The consumers involved become ambassadors for these new forms of consumption and ensure that this type of consumption grows
Led by	Environment Central and Nature & Environment
Involved	For objective 4: Dutch retail trade, individual retailers, circular businesses
Term	2019-2021

9. From Waste to Resource: quality and quantity of constituent streams and reduction of residual household and business waste

The objective of the From Waste To Resource programme (VANG) is reducing the amount of residual waste from households and comparable waste from businesses. To that end, the quality of the constituent streams suitable for recycling must be increased in addition to the quantity. The amount of waste from companies also has to be reduced by improving collection and separation of waste.

The VANG Household Waste Implementation Programme was created to initiate the desired changes in municipalities for more and better separation of household waste, contributing to the desired transition towards a circular economy²². Now, almost four years later, we are seeing that this change has clearly been set in motion. Some acceleration is necessary to achieve the goals for separating household waste (75% in 2020) and reducing the amount of residual household waste (100 kg per inhabitant in 2020). That is why it is important for the waste policy of municipalities to be sufficiently ambitious.

Municipalities are asked to pay attention to this. The practical experiences that have now been acquired at other municipalities can be used in the remaining period for the municipalities that are lagging behind. In this acceleration, quantity must go hand in hand with quality improvement. For the transition to a circular economy, the eventual use of secondary raw materials should be key in the collection criteria. Over the coming year, further work will be done with the parties involved on implementing the VANG programme for household waste and waste from the office, shop and service sectors (KWD). There is support for municipalities in this regard, where a great deal can be improved. Special attention needs to be paid to quality improvement in the constituent streams.

²² https://www.vang-hha.nl/publish/pages/106302/uitvoeringsprogramma_vang-hha_2018-2020.pdf

Products	<p>in terms of household waste:</p> <ul style="list-style-type: none"> • Separation at the source of organic waste, textiles, plastics/metal/drink cartons (PMD), nappies • High-rise project (for extra attention to metropolitan problems with waste separation) <p>With respect to industrial waste from the office, shop and service sector, the VANG Buitenshuis (Outdoor) programme will identify potential improvements in the prevention and separate collection of industrial waste (including from schools) together with the parties involved. In addition, the programme focusses on the following products:</p> <ul style="list-style-type: none"> • Pilots and experiments with efficient logistics of industrial waste • The 'Prevent and Recycle Commercial PMD Packaging Waste' programme • Waste Reduction and Separation Green Deal at NS stations and on trains, Circular Festivals Green Deal and Zero Waste Expedition Culture; the VANG programme supports the pioneers to help them produce less waste and to make business operations more circular • Screening of the legal framework for waste separation and waste collection in the office, shop and service sector and the applicable exceptions
Effects	<ul style="list-style-type: none"> • Improvement of the quality of secondary raw material flows • Increased quantity of secondary raw material flows
Led by	RWS
Involved	VNG, NVRD, VA, NedVang, Packaging Waste Fund, Confederation of Netherlands Industry and Employers, MKB Nederland (SME sector), NS (railways)
Term	2019-2020

3

Cross cutting themes

Ten themes were identified in the transition agenda that were elaborated in the Cabinet's response of June 2018. These cross cutting themes are leitmotifs running through multiple priorities and sectors. They vary widely in character, ranging from financial or framework-setting to facilitating for the private sector and consumers and employees. The Cabinet's commitment to these themes will help accelerate and scale up the transition to a circular economy.

Central government often takes the initiative as facilitator and regulator. The goals include encouraging producers and consumers, removing obstacles in regulations, encouraging new forms of financing and acquiring knowledge and experience.

3.1 Producer responsibility (EPR)

Producer responsibility (hereinafter EPR, 'Extended Producer Responsibility') means that producers and importers have a share in the responsibility for waste management of the products they bring or have brought onto the market. That includes the costs and effectiveness of that waste management via a tariff system. Additionally, EPR will encourage more sustainability and sustainable use of products, and will promote innovation in the collection and recycling of discarded products.

The general goal is to extend the use of producer responsibility in the Netherlands to multiple relevant product groups. Concrete possibilities include an EPR for textiles and an EPR for mattresses. Further expansion of EPR to other product groups will be explored, where single-use products, furniture and others are considered, in line with the transition agenda for consumer goods.

In addition, the Cabinet is also looking at EPR options in construction and for sustainable energy facilities. The Cabinet will implement the new European framework for

EPR and thus strengthen the legal foundations for EPR. In terms of waste prevention and circular design, EPR generates stimuli through rate differentiation in the funding for the collecting and recycling system, e.g. with a more recyclable products getting a lower rate. This system was implemented for packaging on 1 January 2019 by the packaging industry.

The Cabinet will also aim to broaden EPR internationally given that products are being sold on a Europe-wide market.

1. Implementation of EPR in the Waste Framework Directive

The legal regulations for EPR are based on the provisions of the EU Waste Framework Directive, which imposes a number of minimum requirements²³. The recently amended EPR provisions must be implemented by the member states by July 2020 at the latest. Existing EPR schemes must comply with the requirements by 2023.

Objective	To provide context and a bill for legislation for producer responsibility that is in line with the implementation of the EU Waste Framework Directive
Led by	IenW
Result	Framework and bill introducing producer responsibility, in line with the EU Framework Directive
Term	2nd quarter of 2019

2. EPR for mattresses and textiles

EPR is encouraged for specific product groups. Discussions have been held in recent years with producers, importers, collection companies and municipalities about collecting mattresses and textiles separately. In mid-2019, the two sectors will present a proposal for implementing EPR on a voluntary basis. A policy choice will be based on this at the end of 2019.

²³ Waste Framework Directive, number 2008/98/EC

Led by	Sector chain (initiative) in collaboration with the Ministry of Infrastructure and Water Management
Involved	Producers, importers, collection companies and municipalities
Result	Proposal from the parties with regard to implementing EPR and then decide on the actions
Term	2nd and 4th quarters respectively of 2019

3. EPR for disposable products

For EPR for disposable products (i.e. single-use products), information about the types of products, the quantities, the market and the parties will be collected in 2019. How the EPR can be used to combat litter will also be examined. This EPR can then be specified more precisely at the end of 2019.

Led by	Ministry of Infrastructure and Water Management together with the parties in the supply chain
Involved	Sector-wide; producers, importers, collection companies and municipalities
Result	Exploration of disposable products, followed by detailed specification of the actions
Term	2019 and 2020 respectively

4. EPR for façade construction

In 2019 the EPR for new product groups will be explored, such as for producers in façade construction. For the target group (construction companies), it is important that they know what principles or agreements there are, whether or not and how they should be applied and what they can use if they need assistance. After exploratory studies with façade and cladding builders in 2019, a sector-wide agreement can be implemented in 2020.

Led by	Ministry of Infrastructure and Water Management plus the supply chain
Involved	BZK plus the supply chain
Result	Exploratory study of EPR for façade construction
Term	2019-2020

5. EPR for sustainable energy facilities

EPR will also be explored for products that are important for the energy transition. The background to this line of activity is that producers of sustainable energy facilities must make an effort to have a circular business model in which the critical and scarce materials that are a long-term requirement for the energy transition remain in the value chain.

Led by	EZK together with the chain players
Actors	IenW, EZK plus the chain players
Result	Exploratory study of EPR for the energy transition
Term	2019-2020

6. Tariff differentiation

This action concerns the introduction of tariff differentiation in EPR systems and their promotion in the EU: The European Committee is now drafting guidelines on the application of tariff differentiation by the member states.

Dutch experience with tariff differentiation will be shared with Brussels via the usual bodies for waste regulation.

Led by	IenW
Involved	EU Commission, EU member states, private sector
Result	Implementation of tariff differentiation for packaging as of 2019; tariff differentiation for other materials
Term	1st quarter of 2019 and 2020 and beyond, respectively

3.2 Legislation and regulation

In the response from the Cabinet to the transition agenda, actions for identifying obstacles to legislation were announced with the goal of removing as many as possible and creating legislation that will encourage a transition towards a circular economy. The key actions for legislation and regulations for waste are shown below.

1. Waste Review Taskforce

The task for the Waste Review Taskforce is to analyse obstacles in waste legislation and regulations and their implementation (granting permits, compliance assurance, enforcement) and to make suggestions for solutions. This should concern obstacles to the transition to a circular economy. The proposals should fit within the framework of European waste legislation and pose no unacceptable risks to public health interests or the environment. The Waste Review Taskforce's work is in addition to current initiatives such as the Smart Regulation for Innovation programme. After the summer of 2019, the Taskforce will present independent advice to the State Secretary of Infrastructure and Water Management.

Led by	Dutch Water Authorities
Involved	IPO (Association of Provincial Authorities), VNG (Association of Netherlands Municipalities), VNO-NCW (Confederation of Netherlands Industry and Employers), ILT (Human Environment and Transport Inspectorate), environmental services, Ministry of Infrastructure and Water Management
Result	Advice by the Taskforce
Term	2019

2. Incineration ban on recyclable waste

Exploring the possibility of an incineration ban for recyclable waste (ready in 2020) and exploring a ban on destroying or incinerating recyclable consumer goods (ready in June 2019).

Led by	IenW
Result	Exploratory study for a ban on incinerating recyclable waste from 2030; exploratory study of ban on destroying/incinerating consumer goods
Term	2019/2020

3. Waste or raw material

To determine whether or not a material or raw material is waste, a non-binding declaratory opinion can be formulated. Currently, such non-binding declaratory opinions are being formulated on whether struvite from sewage sludge and beet tips are waste or not. This action has been initiated by the Ministry of Infrastructure and Water Management. The opinions will be given in 2019.

Additionally, and also in the context of waste law, collaboration between the water boards and the ministry about legal issues on whether or not residual streams are waste will be continued²⁴, as is recommended in the guidelines by Adviesbureau Berenschot (2017). Berenschot has drawn up an updated guideline for water boards about sustainable energy and raw materials. The guideline systematically and coherently maps out the entire legal landscape around the production and supply of energy and raw materials by water boards. This also fleshes out the pledge given at the general meeting of 6 September 2018 on the circular economy that the Dutch house of representatives would be informed in the letter about the implementation agenda regarding specific questions that were raised during the general meeting about how to handle certain waste streams in light of the circular economy. This will also cover the Berenschot report, beet pulp and sewage sludge.

The publication of the Waste or Product Guideline also matches the recommendations. This will be sent separately to the Dutch house of representatives. Discussions are being held between Ministry of Infrastructure and Water Management, RWS, RIVM and the water boards about various materials that can be reclaimed in the context of the water boards' Energy and Raw Materials factory.

Led by	IenW
Result	Non-binding declaratory opinions; implementation of Berenschot's recommendations with regard to collaboration with the water boards
Term	2019

4. BSSA (landfill sites and landfill bans Decree)

With respect to the Locations and Waste Substances (Dumping Ban) Decree, an assessment is being made as to whether the period of three years to store waste can be extended in the event that more circular processing techniques become available. This subject has been initiated by the Ministry of Infrastructure and Water Management. The exploratory study is expected to be completed in the first quarter of 2019. Any changes to the legislation will be made in 2020.

Led by	IenW
Result	Exploratory study of extension of the period to store waste in the BSSA; any changes needed
Term	2019/2020

5. Separate collection of waste

To improve separate collection of waste, the legal framework for waste collection in the office, shop and service sectors will be looked at critically.

Experimental pilots are being done with the collection of municipal waste from companies, including under the Crisis and Recovery Act. One of the lines concerns the possibilities for increasing the efficiency of collecting municipal waste from companies in a way that is similar to household waste.

Led by	IenW
Result	Reflection on legal framework; pilots
Term	2019 and 2020 respectively

6. Tariff differentiation

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Led by	IenW
Involved	U Commission, EU member states, private sector
Result	Implementation of tariff differentiation for packaging as of 2019; tariff differentiation for other materials
Term	1st quarter of 2019 and 2020 and beyond, respectively

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‘We recently received a declaratory opinion from the Ministry of Infrastructure and Water Management that allows us to use this peel as raw material. I’m convinced that many businesses don’t know how such requests and procedures work. I can now tell them about it.’

Sustainable Peelings Collector: that is the nickname of the young company PeelPioneers that Sytze van Stempvoort started in 2018 together with Bas van Wieringen and Lindy Hensen. After his studies in chemistry, Sytze worked at the University of York for half a year on what is known as the OPEC project (the Orange Peel Exploitation Company, a project to make biofuel from orange peel). Back in the Netherlands, he could not contain his curiosity and went to just about every company in the Netherlands where you can drink freshly squeezed orange juice to ask what they did with the peel. As it turns out, the catering sector, hotels, events, festivals, supermarkets and so forth all pay for disposal of the peel. The peelings are then incinerated because the material is hard to compost and ferment. ‘And that is such a huge waste,’ says Sytze. That was the kick-off for creating the PeelPioneers factory in Son.

‘We now use this former waste stream as new raw material,’ Sytze says. ‘We turn it into high-quality components for the food industry.’ Valuable essential oils and fibre-rich pulp are extracted from about 40,000 kg of orange rind every day. The first is a natural fragrance, colourant and flavouring. Think of currant buns, chocolate, biscuits – anything that has an orange flavour to it. The fibre-rich pulp now goes to the animal feed industry, but could later perhaps also go to the food industry. ‘We are also looking into crossovers,’ he says. For example, PeelPioneers and a large caterer have recently joined forces. PeelPioneers takes peelings from the caterer in exchange for making a circular cleaning agent based on that peel (‘We do the

cleaning with yesterday’s peel!’). These cleaning agents are developed in collaboration with TriStar (more information at: www.vanschilnaarschoon.nl).

‘Our products are not unique,’ Sytze says, ‘but our technology, infrastructure and logistics chain are. On top of that, we’re also cheaper and much more environmentally friendly than the old solution (disposal and incineration). Our supply doesn’t come directly from orange plantations like in Brazil where whole fruits are processed. We pick up the rinds from hundreds of locations in the Netherlands. This makes us unique in the world because we do it in the most environmentally friendly way possible. Renewi takes care of the logistics side of collection from clients (with retailer Jumbo as the first company in 2018) and the transport.’ ‘The peels come along as a separate flow in containers in the same vehicle as it is already driving to the Renewi location where our factory is also located.’

‘What we do unfortunately notice is some scepticism because we work with a residual product that was previously considered to be waste.’ He would personally like to play a role in conveying the necessity and to help the private sector and governmental authorities accelerate these developments. ‘We recently received a so-called non-binding declaratory opinion from the Ministry of Infrastructure and Water Management that lets us use this peel for oil as a raw material for flavouring in the food industry and animal feed. This makes it possible for us to use this rind as a raw material. I do notice that many businesses don’t know how such requests and procedures work. I can now tell them how. And finally it would be neat,’ Sytze says, ‘if the government were to pay a bit more attention and support to companies and technology that aim to obtain value from organic waste streams as products instead of energy. A lot is still possible in that area.’

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Sytze van Stempvoort (24) is CEO of PeelPioneers.

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Led by	Dutch Water Authorities
Involved	IPO (Association of Provincial Authorities), VNG (Association of Netherlands Municipalities), VNO-NCW (Confederation of Netherlands Industry and Employers), ILT (Human Environment and Transport Inspectorate), environmental services, Ministry of Infrastructure and Water Management
Result	Advice by the Taskforce
Term	2019

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Led by	IenW
Result	Exploratory study for a ban on incinerating recyclable waste from 2030; exploratory study of ban on destroying/incinerating consumer goods
Term	2019/2020

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Led by	IenW
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Term	2019

4. BSSA (landfill sites and landfill bans Decree)

With respect to the Locations and Waste Substances (Dumping Ban) Decree, an assessment is being made as to whether the period of three years to store waste can be extended in the event that more circular processing techniques become available. This subject has been initiated by the Ministry of Infrastructure and Water Management. The exploratory study is expected to be completed in the first quarter of 2019. Any changes to the legislation will be made in 2020.

Led by	IenW
Result	Exploratory study of extension of the period to store waste in the BSSA; any changes needed
Term	2019/2020

²⁴ https://www.uvw.nl/wp-content/uploads/2014/11/LR_Rapport-Juridische-Handreiking-Duurzame-E_en_G.pdf

5. Separate collection of waste

To improve separate collection of waste, the legal framework for waste collection in the office, shop and service sectors will be looked at critically.

Experimental pilots are being done with the collection of municipal waste from companies, including under the Crisis and Recovery Act. One of the lines concerns the possibilities for increasing the efficiency of collecting municipal waste from companies in a way that is similar to household waste.

Led by	IenW
Result	Reflection on legal framework; pilots
Term	2019 and 2020 respectively

3.3 Circular design

CIRCO is all about ‘creating business through circular design’. It is a programme instigated by the Creative Industry Sector Top.

The programme encourages and equips companies, production companies and creative professionals who work in product design, construction, interior, fashion, packaging, services, etc. to make a concrete start on circular business operations, with design as the engine behind it. This uses a bottom-up methodology based on design thinking, known as the *Circular Business Design Track* (or CIRCO for short).

In the future, products and the associated services and business models will have a circular (i.e. closed-loop) design. Circular design becomes the new normal, including safety by design. Continuation and upscaling of the existing CIRCO programme plays a key role in this.

CIRCO’s contribution includes smarter use of raw materials and long-term value retention of products. Creative professionals have a catalysing role in this.

‘A circular economy starts with closed-loop designs. Products, services, business models and value chains: we will have to reinvent a lot of things. So far, 360 companies participated in our ‘tracks’. It’s a nice start and now we have to scale up together.’

Jeroen Hinfelaar, CIRCO programme manager

1. Line of activity: scaling up CIRCO

The ambition is that the number of companies that are participating in CIRCO and are concretely working with circular design will grow in the period 2019-2023 from 350 in late 2018 to 4000 by 2023. This ambition corresponds to 10% of the number of production companies with more than 10 employees.

To achieve this, companies, designers, architects and others in the Consumer Goods, Plastics, Manufacturing Industry and Construction sectors are actively approached and asked about their needs and problems. CIRCO then offers customised work for each sector, product group or region; this is known as a CIRCO ‘track’. This means that a conscious choice can be made for each new product to use certain circular materials, raw materials and products. Concrete issues with Substances of Very High Concern (SVHCs) and critical materials for the energy transition will be examined for possible CIRCO tracks. The biomass and foodstuffs sector will be tackled after 2019.

The upscaling and growing interest are leading to new CIRCO trainers being trained. The international upscaling of the CIRCO concept will also begin in order to achieve circular design as the new ‘default’ elsewhere in the world. Finally, digital tools are also being designed and used.

Led by	CIRCO
Involved	CIRCO and the Plastics, Consumer Goods, Manufacturing Industry and Construction priority areas
Result	Growth in the number of companies participating in CIRCO to 4000 in 2023; upscaling of international collaboration and international application of the CIRCO method
Term	2019-2023

2. Line of activity: Safe by Design

The industry can prevent undesirable environment and health effects by taking environmental risks in the (future) value chain into account at the design stage of products and processes. That is why it is important that the ‘Safe by Design’ concept becomes integrated with the circular design approach, including in education and any tools. The Cabinet is facilitating initiatives aimed at collaboration in the supply chain that focus on designing safe alternatives to replace substances of very high concern. This is based on an innovation agenda (the Safe Chemicals Innovation Agenda) that has recently been developed to that end and the experiences that will be gained in the Plastic Pact in this regard. RIVM will also conduct a study into a specific case, namely packaging. Course and teaching materials will also be developed, e.g. for CIRCO classes and tracks.

Led by	IenW
Involved	RIVM, CIRCO and the Consumer Goods, Plastics, Manufacturing and Construction priority areas
Result	Integration of safety by design in the circular design approach; development of course and teaching materials for CIRCO classes and tracks; more companies applying safety by design
Term	2019-2023

3.4 Circular procurement

Circular procurement is an important tool for accelerating the transition to a circular economy and contributing to climate objectives. The aim is to realise savings of 1 million tons in 2021 in all governmental authorities. All transition agendas therefore need pilots and knowledge development in circular procurement.

In addition to the aim and activities that were set out in the Cabinet's response to the five transition agendas, a number of new issues will be tackled in 2019.

'The state fulfils an exemplary role as a large-scale buyer by doing as much circular procurement as possible. On top of that, we encourage others to do the same.'

Minister Ollongren of Interior and Kingdom Relations

1. Line of activity: Green Deal for Circular Procurement 2.0

Each procuring private or public participant carries out at least two circular procurement procedures or scales up an earlier circular procurement pilot. The knowledge and experience gained is shared in a 'community of practices'. The online guide to Circular Procurement that is available to anyone is being updated. It contains a step-by-step plan for circular procurement and references to relevant tools and publications.

Led by	IenW
Involved	Green deal partners, a coalition of over 40 private and public organisations Results: two executed circular procurement procedures per participant/scaled-up pilots; community of practices; updated guide
Term	2019-2020

2. Line of activity: Green Deal 'Sustainable Care'

The 'Sustainable Care for a Healthy Future' Green Deal was signed in October 2018. Healthcare providers in the Netherlands are major consumers of energy, water, food and raw materials. About 100 participating organisations, hospitals, care insurers and other parties involved in have signed up. The key challenges of this deal are a CO₂ reduction of 49% by 2030, circular business operations, medicine residues removed from waste water and a healthy living environment and natural environment. Money from the 'climate envelope' will be made available for this in 2019.

Led by	VWS (Ministry of Health, Welfare and Sport)
Involved	care sector
Result	Green Deal programme formulated; implementation started
Term	2019-2020

'The awareness and enthusiasm for participation in sustainable care is fortunately growing rapidly. Everyone benefits from it.'

Bruno Bruins, Minister for Medical Care

3. Track: Recovering the start-up costs

In accordance with the recommendation from the report 'Transition-Oriented Commissioning', the possibility is being explored of whether a revolving fund can offer opportunities for funding the start-up costs of circular procurement from savings in subsequent phases.

Led by	BZK
Involved	IenW and other authorities
Result	Exploratory study of revolving funding
Term	2019

4. Line of activity: shadow prices

CO₂ shadow pricing is being further developed and tested as an approach to let government authorities handle their procurement in a more climate-conscious and circular way. IPO, VNG and the Dutch Water Authorities are holding pilots, developing tools and organising knowledge sharing and communication.

Led by	IenW
Involved	VNG, Dutch Water Authorities, IPO
Result	Pilots, tools, knowledge sharing and communication
Term	2019

5. Track: Experimenting and learning

New pilots by central and decentralised authorities for circular and CO₂-saving procurement get support from experts. Based on the lessons learned from circular procurement in 2018 and earlier, where the potential for breakthroughs became visible, a number of experimental upscaling processes will be carried out, internationally as well to some extent. Learning networks and effect quantification are also supported. In 2019, resources from the climate envelope will be made available for this track.

Led by	IenW
Involved	BZK, RWS, RVO and other governmental authorities
Result	Pilots carried out, upscaling processes implemented, lessons and effects documented
Term	2019

6. International track

The European Commission and the UN bring large purchasers together from specific sectors such as the road construction sector and ICT with the aim of giving a major international boost to the market.

Led by	IenW
Involved	European Commission, UN, large purchasers for road and infrastructure construction, and ICT
Result	Joint roadmap in ICT procurement as the basis for partnership
Term	2019

7. Track: Artificial grass fields

Criteria are being formulated in 2019 for socially responsible procurement of artificial grass fields. in accordance with the Eijls motion, these criteria will play a part in encouraging municipalities and sports clubs to opt for sustainable and circular procurement for renovation, replacement or installation of artificial grass pitches with rubber granulate²⁵. From 2020 onwards, these criteria will also play a role in the Construction and Maintenance of Sports Premises subsidy regulations. There will also be consultations with the municipalities about the possible role of these criteria in the Specific Sports Payments for municipalities.

Led by	VWS
Involved	RWS, IenW
Result	Criteria for socially responsible procurement of artificial grass fields
Term	2019

8. Track: Circular procurement by the national government

The national government uses its own purchasing power to encourage the circular transition. By 2023, ten of the generic purchasing categories should be circular, such as office furniture, workwear, paper and printed materials, IT hardware, catering, and waste and raw materials management. The national government will be formulating targets for 2025 and 2030 for the effects in CO₂ reduction and resource savings in the national government's procurement chain. Departments are being asked to translate the government-wide goals into goals for their own department. The Central Government Real Estate Agency, Rijkswaterstaat and ProRail use their purchasing power circularly, for instance in circular management of the national government offices portfolio and the national infrastructure by 2030. There is more about this in the passage about the exemplary role of circular procurement and management by the authorities, in Section 2.4 (Construction) under project number 7. The knowledge and experience gained is shared by the national government with other authorities via PIANOo and for example the CB'23 platform. The national government is researching whether and how the transfer of knowledge can be strengthened via platforms.

Led by	BZK
Involved	RVB, RWS and ProRail, PIANOo, CB23
Result	Ten generic categories of procurement will be circular (2023); targets for the effect in CO ₂ reduction and resource-saving in the national government's procurement chain (2025-2030); circular management of the national government offices portfolio (2030)
Term	2019-2030

3.5 Market stimuli

The objective of the Market Stimuli instrument is to encourage producers to produce more sustainably and circularly, to encourage consumers to consume more sustainably and circularly or to make the effects of economic actions transparent.

1. Track: Waste tax

The tax plan for 2019 includes a proposal for increasing the waste tax rate²⁶, which will rise from €13.21 per 1,000 kg to €32.12 per 1,000 kg. Preparations will start in 2019 for widening the scope of waste tax to include sewage sludge and the incineration of waste in biomass power plants.

²⁵ Parliamentary papers II, 30,175, no. 322

²⁶ Parliamentary papers II, 35,026, no. 6

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The Waste-Free festivals Green Deal is an agreement between the Ministry of Infrastructure and Water Management and eight large festival organisers. The goal of the agreement is to organise festivals so that they are waste-free. The Green Deal is very important because the festivals have a huge reach and this approach can lead to changes in behaviour and awareness. Moreover, the pilots carried out at festivals can set an example for cities. In a way, festivals can in fact be seen as ‘small towns’. Incidentally, people are already talking about a Green Deal for Resource-Rich Festivals.

Jasper Goossen, founder of Apenkooi Events and the organiser of (among other things) the DGTL dance festival and Strafwerk, is one of the front runners in sustainable events. He organises all his events to be as sustainable as possible, but in the case of DGTL he really wants to innovate. ‘DGTL was created more or less by accident, but immediately became a success. Immediately after the first DGTL festival, we held a meeting: we went back to the drawing board and thought about what we really wanted for this festival. We put all of the knowledge we already had about sustainability into this festival. Not just in the standard way, but by looking at alternatives for everything. Could you use different materials? What do you do with the stage, the fencing, toilets? What do you do with the food? We have set aside all of the obvious.’

Jasper has new goals for the coming year. In 2020 the DGTL dance festival should be waste-free and by 2023 it will be emission-free. ‘Festivals must be made more circular. The catering and the bar produce the most waste. We’re doing something about this with our food courts. We are already using hard cups. Plastic is collected, sorted and recycled. Everything is mapped out, including where it is recycled. This year, we’re working together with Instock and centralising the procurement. We look at what ingredients we’ve

‘It is more sustainable to go to a festival than to stay at home.’”

got and what we can make with them. The food we’re offering isn’t standard fare but it’s good, and that is what’s important. We aren’t saying that people mustn’t eat meat, we are simply offering something completely different.’ He is also considering ways of encouraging visitors to leave their junk at home. ‘The biggest mess is what the festival-goers bring with them. You just don’t want to know how many piles of deodorant we have after the festival.’

Transport is also a point that needs attention. There is a project to improve this starting this year, which is also part of the collaboration with international partners. ‘We’re developing an app to find out where everyone is coming from and how visitors are travelling. We can then offer alternatives. Once there are proper arrangements for transport too, we’ll be so sustainable that it’ll be better to go to a festival than to stay at home.’

He has lots of new ideas: ‘The creativity is endless. As long as you have the financial resources, and sometimes also cooperation from the authorities. Going on grid (using solar power) was difficult, but it’s becoming feasible now that the municipality is investing more in climate and energy policy. I would also like to be able to collect human urine, filter it and sell it again as bottled water. But that’s not possible yet and wouldn’t be allowed. But if it were to become possible at some point and be scaled up, it would be an incredible opportunity that could be used in Africa or in refugee camps.’

When asked about his drive for sustainability, Jasper says, ‘It’s not so much about sustainability. It’s about quality of life. That’s only possible if you make everything more efficient: we don’t want to destroy what we enjoy, right? So we should handle it carefully. I think living like that is the only way to live. And living and working this way is also a lot of fun and it sets you apart from your competitors.’

Jasper Goossen is an entrepreneur, the founder of Apenkooi Events and the initiator of various festivals including the DGTL dance festival. He received the Greener Festival Award 2018 for DGTL at Eurosonic Noorderslag on 18 January, showing that his festival is one of the most sustainable in the world. The DGTL festival is held every year at Easter at the NDSM wharf in Amsterdam; this year it will be on 19, 20 and 21 April.

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Led by Ministry of Finance
Involved IenW, EZK
Result Further detailing of the broadening of the scope of waste tax for the 2020 or 2021 Tax Plan
Term 2019, 2020

2. Track: Incentives for dumping, incineration, recycling

In the summer of 2018, a number of stories appeared in the media saying that the stimuli for collection, dumping and incineration of waste as well as the useful application of waste, such as incineration residues, are having adverse effects and not contributing to more and better recycling as part of the push towards a circular economy. That is why an analysis is being made regarding stimuli for dumping, incinerating and recycling that support the circular economy. This analysis is expected to be completed before the summer of 2019.

Led by IenW
Involved Ministry of Finance
Result Analysis of whether stimuli for dumping, incinerating and recycling are appropriate, with suggestions for improvements
Term 2019

3. Track: Pricing of environmental damage

In 2019, the Netherlands Bureau for Economic Policy Analysis (CPB) will publish a research report about the effects of pricing environmental damage and how the demand for secondary resources can be encouraged. The Netherlands supports research by the OECD into the economic effects of the circular economy. In the next six months, the OECD will be publishing a report on the expected global use of materials in the decades to come and a report on the effects of circular economy policies. In addition to this, in the period 2019 and 2020 a study will be carried out into the distribution and employment effects of the circular economy and on the interaction between climate policy and the policy for the circular economy.

Led by IenW
Involved CPB, PBL, Ministry of Finance, EZK
Result Research into how environmental damage can be priced and how to stimulate demand for secondary resources. The results will be used in decision-making about the introduction of further market stimuli
Term 2019

4. Track: True Pricing

The long-term programme 'True Pricing' is organising a learning community in which companies, scientists, social organisations and the authorities learn together about making the external costs of food production and consumption transparent. In addition, it is investigating how consumers and companies can be encouraged to make environmentally friendly choices, for example by charging them the real prices of products.

Led by LNV
Involved EZK, IenW
Result Develop true pricing in food policy
Term 2019

5. Track: Exploratory study of collaboration with neighbouring countries

In the first half of 2019, the Netherlands Environmental Assessment Agency will publish a report on the use of raw materials in neighbouring countries and their environmental effects. This report includes the effects of joint pricing of environmental damage. Based on this, collaboration with neighbouring countries will be sought for pricing environmental damage in order to encourage the circular economy.

Led by IenW
Involved PBL, Ministry of Finance, EZK
Result A study by the Netherlands Environmental Assessment Agency; then collaboration with neighbouring countries for pricing of environmental damage in order to encourage the circular economy
Term 2019

6. Track: CO₂ shadow pricing in procurement for large road and infrastructure construction projects

For larger projects, RWS works with social cost-benefit analyses (SCBAs) and already includes a CO₂ shadow price. Such SCBAs are not used for smaller projects. In 2019, RWS will come up with an approach that can be used to add CO₂ shadow pricing to smaller procurement activities as well.

Led by IenW
Involved BZK, EZK
Result CO₂ shadow pricing in procurement for large infrastructure construction projects; an approach for using shadow pricing for smaller infrastructure construction projects as well
Term 2019

3.6 Funding instruments

Funding instruments encourage the funding of sustainable investments and investment in the circular economy.

1. Track: Investment platform

The NIA (Netherlands Investment Agency) is investigating setting up an investment platform for the circular economy together with the EIB (European Investment Bank). This can improve the funding options for companies within the Netherlands Circular Accelerator. This will be completed in the first half of 2019. The investment platform is expected to become operational after that. The study consists of two phases: a market analysis and elaboration of a strategy for the investment platform.

Led by	NIA/InvestNL
Involved	IenW, EZK, Ministry of Finance
Result	Circular economy investment platform
Term	2019

2. Track: Circular taxonomy

A study will be delivered on the requirements to be specified for a taxonomy (categorisation) of sustainable activities so that the circular economy is fully included. This will be used as input to the EU taxonomy of sustainable investments. This increases the funding possibilities for the circular economy in the European context.

Led by	IenW
Involved	Ministry of Finance, EZK
Result	A study of the requirements to be specified for a taxonomy of sustainable activities so that the circular economy is fully included, to increase the funding possibilities for the circular economy in the European context
Term	2019

3.7 Monitoring, Knowledge and Innovation

3.7.1. Monitoring: measuring & controlling

To guarantee the course towards 2050, it is important that we know how close we are to the goals set for 2030 and 2050 and how the actions implemented and the resources are contributing towards realising these objectives. With that knowledge, interim adjustments can be made, e.g. by adding specific activities. In the Cabinet's response to the transition agendas, the PBL was requested to act as an

accountant for the transition to the circular economy. The PBL was asked, together with other knowledge institutions, to develop the monitoring system further into a fully-fledged measuring and management system. This has the objective of being able to follow government policy and efforts of social parties and to make transparent to what extent the specified circular objectives have been realised, in order to see whether adjustments are needed.

The starting point for the quantification and control system is a systematic exploration of what is needed for measuring the progress towards the circular economy. Early in 2018, PBL, CBS, RIVM and University of Utrecht created a framework for it which is described in the report 'What we want to know and can measure' ('Wat we willen weten en kunnen meten')²⁷. The measuring and management system developed in this report was worked out for the three monitoring components, namely action monitoring, monitoring of transition dynamics, and effect monitoring. A description is given for all three components of what the monitoring should look like, what can be measured with the available indicators and data (baseline measurement), or what should become more concrete in order to make the measuring and management system as developed fully operational.

The following subjects will be worked out in this context:

- (a) Reflection on the goals and ambitions for the circular economy and putting them into concrete terms. Refinement of the programme objectives for each priority and for each product supply chain for the transition process as a whole and in relation to the climate and energy transition.
- (b) Following and evaluating the programme objectives:
 - A clear picture of actions taken by social organisations, companies and governmental authorities in the context of the 'Circular Economy Programme for the Netherlands, 2050' programme.
 - To what extent do the actions taken lead to the desired performance (output) and programme objectives (outcome)?
 - A clear picture of the dynamics in society in terms of cooperation within and between sector chains, the number of circular products and the scale of the volume of investment in the circular economy.
- (c) Setting up and implementing resource information systems
 - A picture of resource flows, trends in the use of resources and available stocks of raw materials in the economy.
 - Insight into the relevance of raw materials in relation to environmental pressures, security of supply and economic opportunities. In addition to quantities

²⁷ <https://www.pbl.nl/sites/default/files/cms/publicaties/pbl-2018-circulaire-economie-wat-we-willen-weten-en-kunnen-meten-2970.pdf>

of resources, this is therefore about the effects of the use of raw materials in terms of (among other things) CO₂, biodiversity and vulnerability to the delivery of critical materials.

- (d) Scenario analysis and modelling to calculate the effects of policy and evaluate the use of policy instruments ex ante.
- (e) How the use of raw materials and its effects can be influenced using instruments, both for each priority area and in relation to each other.
- (f) What measures companies and people can take, what the effects are on the environment and the security of delivery and what the costs are.

To operate the measuring and management system, the PBL is working together with other science institutions towards a Circular Economy Report (CER) which will be published independently and biennially. This report monitors not only the projects and efforts described in the implementation programme but also other relevant policy efforts by all parties involved that are helping the transition to the circular economy.

This report also gives insights into trends and identifies options for possible next steps. A link is also made with other themes such as climate, natural capital and the Sustainable Development Goals. The report will be published for the first time in 2020 but, in view of the policy cycle, will already provide the first building blocks in 2019.

Concrete actions

1. Policy letter refining the goals for 2030

The PBL will draft a policy letter about the further refinement of the goals for the circular economy in 2030.

Led by PBL
Involved TNO, RIVM and CBS
Term 2019

2. Biennial report

A biennial report gives insights into trends and target ranges, provides clarification, evaluates the policy and identifies options for possible next steps. Additionally, intermediate products are set up annually.

Led by PBL
Involved CBS, CPB, CML, RIVM, RVO, RWS, TNO and IenW
Term Circular economy report 2020; first building blocks 2019

3.7.2. Knowledge & Innovation

1. Overriding issues

For sector-transcending and sector-related issues, we are collaborating with the knowledge networks of companies and of research and educational institutions, for instance the knowledge network for rubber and plastics, the circular metals chain network and the Construction Technology and Innovation Centre, which is being set up.

Led by IenW and EZK respectively
Involved BZK, RWS, RVO, plastics, manufacturing industry, circular construction, educational institution
Result Support is provided for programming and finding funding for carrying out research project
Term 2019-2021

2. National Science Agenda

Initiatives from the National Science Agenda (NSA) are also supported. There is currently a two-year Circular Economy Start Impulse programme for developing and implementing projects about the built-up environment and about plastics under the direction of NWO/SIA. The knowledge gained is disseminated widely through international platforms and events (including Innovation Expo).

Led by IenW
Involved TNO, WUR, SIA
Result National Science Agenda, Start Impulse; spread of knowledge
Term 2019-2020

3. Knowledge sharing by governmental authorities

Knowledge sharing within both central government and regional/local authorities is encouraged by building and maintaining a knowledge community for the circular economy.

Led by PBL with IenW
Involved IPO, VNG, the Dutch water boards, Environmental Services, RWS, RIVM, RWS/WVL, (via the Veluwe Council)
Result Knowledge sharing
Term 2019-2022

4. Promoting knowledge development and innovations

To encourage knowledge development and innovations, we fit in as closely as possible with the mission-driven top sector policy and the incentive instruments provided by the Ministry of Economic Affairs and Climate Policy and the Ministry of Education, Culture and Science. At the same time, these efforts are geared to the Integral Knowledge and Innovation Agenda (IKIA) that is being prepared for the Climate Agreement.

Led by	IenW
Involved	EZK, LNV, BZK, top sectors, science institutions
Result	A place for the circular economy in knowledge and innovation agendas and the knowledge and innovation contract
Term	2019-2023

5. Financial incentive schemes

Promising innovation projects can use the existing financial incentive schemes.

To generate insights into the spatial consequences of a circular economy, an exploratory spatial study is being done for two supply chains in each high-priority sector.

Led by	BZK
Involved	IenW, PBL and sectors
Results	Exploratory spatial study of two supply chains per high-priority sector
Term	2019-2020

3.8 Behaviour and communication, education and the labour market

3.8.1. Behaviour and communication

It is important that consumers are enabled to deliberately choose circular facilities, products and services. Raising awareness and ensuring broad support are important conditions for changes in behaviour that will assist the transition to a circular economy. In addition, it is also important to consider how it can be made easier for consumers to make sustainable choices. The transition to a circular economy is not merely a technical change but also primarily a social one. The following activities can be distinguished.

1. Track: Facilities

The transition to a circular economy requires not only producers but also consumers to change their lifestyle and behaviour. Separate waste collection is already common practice, but it does not end there. It is also about driving more economically, less food wastage, different purchasing habits, sharing things or having them repaired instead of throwing them away. On the other hand, the government should encourage access for consumers to low barrier, user-friendly facilities that make the transition to circular behaviour not only possible but also easy and attractive. These are existing and new facilities in public spaces plus circular products, services and tools. Examples are Repair Cafes, locations for separate waste collection, low-meat alternatives, new circular craft centres or products as a service (topics that are covered among the projects in Chapter 2). Businesses and social organisations, as well as

central and local government authorities, have the responsibility to provide these facilities or to make them possible. Knowledge and insights from behavioural science can be used to increase the degree of acceptance and utilisation of these facilities. To this end, the execution of the Implementation Programme involves close cooperation with the Behavioural Insights Team (BIT) of the Ministry of Infrastructure and Water Management.

2. Track: communication

Communication is one of the tools for encouraging behavioural changes so that routines change. That can be done by informing people, by getting them involved and by pointing out the pros and cons of old and new courses of action.

A **campaign** is being prepared government-wide that will be calling on people to help achieve the transition goals with their own concrete activities. It is a broad and long-term ‘umbrella campaign’ aimed at climate improvement, within which various themed campaigns will be started up to encourage the public to take circular-economy actions. This will involve collaboration with parties who are active within the specific themes so that the messages of that theme can be properly anchored among the general public. This could for instance mean providing facilities that make behavioural change easier.

In addition, the usefulness and necessity of **specific measures**, including ones for disposable plastic items, are highlighted through communication so that people become aware that they need to act and that the circular economy offers them new opportunities. It is made clear to the outside world what all the partners, including governmental authorities and the private sector, are doing for the circular economy. Governmental authorities, the private sector and social organisations will work together on this. Existing tools, such as the Green Deal for events, will be used. Informative public communication will be used.

Led by	EZK (government-wide ‘umbrella campaign’ for climate improvement); IenW (specific measures)
Involved	IenW, LNV, BZK, AZ (‘umbrella campaign’); RWS, NL Schoon (NL Clean), Environment Central, the Green Deal for events (specific measures)
Term	Mid-2019 (‘umbrella campaign’) and 2nd half of 2019 (specific measures)

3. Track: specific commitment to transition agendas

Biomass and food

Knowledge about promoting behavioural change is used for each of the transition agendas. For instance, the

Behavioural Insights Teams of EZK, LNV and IenW will cooperate on the themes of Biomass and Food: Food Wastage and the Protein Transition.

Led by LNV
Involved EZK and IenW
Term 2019

Consumer goods

Additionally, behavioural interventions are envisaged for Consumer Goods, for example to encourage measures that will increase acceptance of collaborative consumption, making second-hand purchases or getting products repaired and promoting the 'Product as a Service' approach

Led by IenW
Involved MilieuCentraal, Natuur & Milieu, the private sector, RWS
Result Behavioural intervention for collaborative consumption (the 'sharing economy') and potentially for other themes
Term 2019-2020

A 'trademark' (a recognisable logo with a slogan for use in all information and communications) will also be developed to encourage consumers to separate our waste.

Led by IenW
Involved RWS, BIT IenW, Milieu Centraal
Result Commercial trademark
Term 2019

A waste stream Quality programme will also be drawn up and started/rolled out.

Led by IenW
Involved RWS, BIT IenW, Milieu Centraal
Result Focus programme
Term 2019

Plastics

For the Plastics transition agenda, the State will formulate behavioural interventions targeting litter and include one or more specific behavioural interventions relating to disposable products and litter in the Plastic Pact.

Led by IenW
Involved NLSchoon, MilieuCentraal, RWS
Result Action plan for behavioural interventions for litter, proposal for concrete behavioural interventions for disposable products and litter
Term 2019

Recommendations or an advisory report will also be drawn up for the government of Indonesia about a behavioural

intervention strategy for reducing single-use products and litter, based on the experience gained in the Netherlands.

Led by IenW
Involved BIT IenW, RWS, NLSchoon
Result Advisory report
Term 2019

Manufacturing industry

An advisory report is being drawn up for manufacturing industry about the use of behavioural knowledge in order to encourage the use of circular electronics by State employees.

Led by EZK
Involved IenW, commercial sector
Result Advisory report on behavioural expertise
Term First half of 2019

A catalogue is also being drawn up in 2019 containing suggestions for improving the roadmap for circular funding business cases in manufacturing industry.

Led by EZK
Involved IenW, private sector
Result A catalogue of suggestions
Term 2nd half of 2019

Construction

For the Construction transition agenda, finally, two behavioural interventions are being drawn up and tested that focus on small businesses, with the aim of encouraging the use of sustainable materials.

Led by PBL
Involved BZK, commercial sector
Result Behavioural interventions for small businesses
Term Second half of 2019

3.8.2. Education

Circular thinking and actions requires the right mind-set. The younger the age at which you come into contact with it, the more obvious this way of thinking will be. For awareness and the development of knowledge and skills, it is important that the circular economy is given a place within education. For that reason, extra attention is being paid to education within this programme. From primary school through to university, educational institutions are working on education for the circular economy. This includes education for pupils and students who are developing the skills for working expertly and enthusiastically on specific solutions for businesses and consumers. The private sector is developing creative and usable solutions for challenging issues, together with the Dutch expertise centres and research institutions.

‘Education and science are ensuring that we are building up more knowledge about the issues related to the circular economy. If pupils become familiar with it early on and students and the working population are taught and trained about it, all generations will give a substantial boost to the circular economy.’

Ingrid Van Engelshoven, Minister of Education, Culture and Science (OCW)

Using existing social networks and structures, we want to embed circular thinking and actions properly in education and learning. The roadmap to that goal relies on a dynamic, learning approach, put into effect together with the education system and science institutions.

1. Integration of the circular economy in the training requirements for primary and higher education

All strata of education, from primary right through to higher, are asked via this project to integrate the knowledge and skills that are important for a circular economy into their training requirements and curriculums. In the Curriculum.nu programme, teachers, school governors and schools are poring over the question of what pupils in primary and secondary education ought to know and be capable of in nine educational areas. These include People & Nature, an area in which studies are being done of the way students get a better picture of the transition from fossil resources to sustainable energy sources. The circular economy is one of the topics that attention is paid to. In 2019, the results will be passed on to the Dutch house of representatives for further decision-making and so that the subsequent steps can be determined.

In the meantime, the SBB (Cooperative Organisation for Vocational Education and Companies) has announced an action plan for secondary vocational education.

Together with OCW, IenW will enter discussions with the association for colleges and the association for universities about extending the curriculum. For the construction sector, circular design has already been included in the curriculum for architecture education (2019).

Led by	OCW (school governors and schools (primary, secondary and secondary vocational), IenW (colleges and universities)
Involved	SBB, umbrella organisations in education
Result	action plan for secondary vocational education; discussions about adding to the curriculum
Term	2019-2021

2. School Atlas of Sustainability

The School Atlas of Sustainability will be introduced into the education system. The aim is to deliver it in 2019 and to use it in education in 2020.

Led by	IenW
Involved	The ‘Lijn 3’ consortium (IenW, RWS), EZK, PBL, CBS, universities, umbrella organisations of producers and utility companies, banks
Term	atlas delivered in 2019 and used in education in 2020

3. Research into the circular economy

Involving education in knowledge networks gives them access to research about the circular economy. The KIEM higher vocational education regulation encourages colleges to carry out studies together with companies and students into circular topics, products, production and recycling processes and new earnings model

Led by	IenW
Involved	Colleges, various sectors, SIA
Result	KIEM-hbo regulation
Term	2019-2021

3.8.3. Labour market

1. Track: supply and demand on the labour market

The transition to a circular economy has consequences for the labour market. It is highly likely that the need for practical and technically oriented work will increase. This will be investigated in the coming years.

‘My conclusion is that the labour market for the circular economy offers lots of opportunities for people with a wide range of backgrounds, educational courses and educational levels.’

Mariëtte Hamer, chair of the Social and Economic Council

Even if the circular economy does lead to net employment opportunities increasing, there will be winners and losers. This may vary depending on the sector, the level of training and the region. That will also have consequences for people who are disadvantaged on the labour market. This applies, incidentally, not only for this transition but also for the energy transition and for the rise of new technology (such as smart mobility and use of robots).

It is important not merely to look at this for each sector, but also to look at the consequences of the various transitions for the labour market and for education.

This type of question has been included in the actions in the corresponding climate forums (labour market and education) and one of the recommendations from there is that the circular economy should be included in the human capital agendas that are looking at the effects on the labour market, and at instruments such as schooling, mobility and so forth. The question here should specifically be what numbers of people are affected, in what sectors, in which regions, with what needs in terms of educational levels and courses, and in what time frame.

Following on from earlier recommendations by the Social and Economic Council (SER), an as yet undefined advisory body will also pick up the studies recommended there.

Led by IenW
Involved OCW, SZW, SER (via the climate forums), CPB, SCP; trade unions, commercial sector and research centres (such as the ROA), CPB, SCP
Result Integral picture of the labour market and the educational needs for the various transitions
Term 2019

The alignment between demand from the companies and the supply of educational options throughout people's lives will be monitored. This will sometimes also mean retraining for other sectors. This will involve the Technology Pact and the regional bodies for labour mediation. The Platform Bèatechniek (PBT, science and technology studies platform) has in recent years built up experience in linking education to the labour market (and people's prospects on it). It transpires that a regional approach makes customised solutions possible in a way that fits in with the existing sector structure. For the transition to a circular economy, this approach will be reinforced over the coming years.

In addition, a Circular Skills master plan will be drawn up. That plan will state in concrete terms what requirements will be imposed at what levels on schooling, refresher courses, training and retraining, as well as the requisite course materials and skills.

Led by IenW
Involved Het Groene Brein, commercial sectors Result Circular Skills master plan
Term 2019-2021

The Cabinet will also encourage efforts to set up people's own control of schooling, for instance through 'learning accounts' (in all sorts of formats, such as e.g. vouchers, drawing rights, etc.) and expert meetings. These arrangements will also assist the circular transition. In addition, work is being done on expenditure arrangements for a public learning and development budget, in order to see

how training can be encouraged towards opportunity-rich professions.

Led by SZW
Involved Stichting van de Arbeid, SER
Result Research into fiscal aspects of learning accounts; expert meetings; expenditure arrangements
Term 2020

A task force will be set up from the appropriate themed forum in the national Climate Agreement, led by the SER, that will work on agreements about the structure of the basic information needed to control and monitor the nationwide, sector-wide and regional implementation of the national Climate Agreement as well as possible in terms of the labour market and training; this will proceed from the existing toolkits.

Led by SER
Involved relevant research organisations
Result An inventory of information needs and agreements about the structure of the basic information
Term 2020

3.9 International efforts

European and international circular economy policy is both an opportunity and a necessity at the same time. Promoting international and European cooperation and decision-making is an important opportunity to reinforces exchanges of knowledge, raise the targets and thereby expand the market for secondary raw materials. Cooperation also helps accelerate innovation, from innovative product policy and creating stimuli to accelerate the circular economy over a broader area. This increases the backing for any measures and creates the right conditions for the transition, thereby creating and using opportunities for the private sector in the Netherlands. International cooperation will also let the Netherlands assist other countries in their transition to a circular economy. In addition to the efforts that the Netherlands is making nationally to achieve SDG12 (responsible production and consumption), this will also let it help less well developed countries achieve SDG12 goals. Last but not least, European and international cooperation is very much needed because of the relationship between the circular economy and climate policy, as a contribution to the international and European climate objectives.

The National Think Tank 2018

The National Think Tank was set up with the aim of creating a bridge between the authorities, science, the private sector and philanthropic bodies – the goal being to help Dutch society advance thanks to innovative ideas. The theme for the National Think Tank for 2018 was the Circular Economy.

A group of 20 enthusiastic, intelligent and creative students or recent graduates pored for four months over the question of how the transition to a circular metropolis could be accelerated. The Ministry of Infrastructure and Water Management was a partner for the theme this year, along with HVC, Adessium Foundation, NVRD, Goldschmeding Foundation and the municipalities of Haarlemmermeer, Rotterdam and Amsterdam.

The National Think Tank focussed on 4 different consumer perspectives: living, working, consuming and eating/drinking. In the end, the think tank presented 10 solutions that are to be implemented independently by the National Think Tank or in collaboration with theme partners. The solutions range from a Return Platform for broken equipment to GoedPunt.nl, a platform that awards points to consumers who purchase circular products. Those points then give them discounts on new circular purchases/activities or let them make donations to good causes. In addition, they also presented a toolkit for circular working (WerkCE!), developed online modules for schoolchildren aged 11 to make them aware of the circular economy (SpaCE) and introduced a day for repair jobs etc., Dag van de Opknappers (Wednesday 16 January).

The 10 solutions offer potential for the Implementation Programme. The creativity, energy and entrepreneurship of the think tank people are providing an impulse for others to think about solutions. These solutions are in a number of cases very nicely aligned with the projects from the transition agendas and the cross cutting themes.

This year, for sustainability reasons, the National Think Tank has elected not to have its entire final report printed but instead to publish it on its website. For all ten solutions, you are therefore referred to www.ndt18.nl.

Hilde van der Schans of the National Think Tank for 2018 says:

‘Everyone is looking at each other, but we all have to take our own responsibility.’

“

‘The regions and provinces are different in terms of scale and profile. That’s why it’s a good thing that all the regions and provinces have their own angles and choose to implement their regional economic policy in a way that is based on circular principles,’ says Jan Nico Appelman. He is a provincial administrator and circular economy spokesman in the Interprovincial Consultative Committee (IPO). The IPO is the administrative fulcrum between national and regional policy.

The first item is a proper analysis of the raw material flows in a region. ‘Our focus,’ says Jan Nico, ‘is on creating more value: how to come up with new products and markets for businesses. To do that, you have to bring parties together and inspire them, as well as helping with innovations and collaboration. In Flevoland, we regularly organise platform meetings with businesses, for instance, where we try to bring the people and the initiatives together and help them further.’

‘Another far from unimportant item,’ he says, ‘is that the authorities have to be role models through circular procurement and tendering. There are billions of euros involved annually, which represents formidable purchasing power. With those volumes, you can get the markets to shift – something that individual entrepreneurs are not able to do. I sometimes say,’ says Appelman, ‘that the circular economy is now where the energy transition was ten years ago. The ambitions are big, there’s resistance in practice, but identifying and breaking down the barriers together will ultimately let us achieve the desired results.’

‘All the regions and provinces choose their own angle and circular route that is right for the scale and the characteristic profile of that province.’

‘The goal is that our activities will be almost entirely circular by 2050 and that waste streams will have been reduced to a minimum. I think we’ll manage that. Every component of a product then has a passport, as it were, and can be used again usefully in the raw material flows. We then no longer have to throw things away, because we’ll be reusing everything. And the products will be designed for that too. ‘Green growth’, in other words. As a country, we’re good at that and we’ve also got the kinds of businesses that are open to the idea.’

”

Jan Nico Appelman is the Province of Flevoland’s economic affairs representative and spokesman on behalf of the provinces on the circular economy in the administrative committee for the regional economy in the Interprovincial Consultative Committee (IPO). He signed the Raw Materials Agreement on behalf of the provinces and he is also involved in the administrative consultations about the Raw Materials Agreement.

‘The circular economy is the way to achieve sustainable, inclusive growth.’

Sigrid Kaag, Minister for Foreign Trade and Development Cooperation (BHOS)

1. Track: strengthening international cooperation

The Netherlands actively expresses its ideas and experience in the circular use of raw materials, cooperation throughout the sector chain, safe design, high-quality recycling and a raw material efficient production. The Netherlands is committed to an ambitious follow-up to the EU Action Plan for the circular economy, which is ending as of 2020²⁸. This commitment is focussed specifically on European co-financing related to climate adaptation and the transition to a circular economy. A key driver in this is creating new industry and employment opportunities in the Netherlands, Europe and elsewhere. A number of the activities listed below are ongoing activities (unless stated otherwise).

Activities:

Strengthening the political backing for the circular economy in multilateral forums

(UN, EU, UNFCCC, UNEP, OECD, VNECE, G20); on the one hand in order to raise the level of ambition and to enlarge the market for raw materials, and on the other to encourage lagging EU member states that do not yet have an appropriate recycling infrastructure.

Led by IenW and BHOS
Involved EZK, LNV

Strengthening international cooperation and governance for marine plastic litter

Led by IenW
Involved RWS, LNV, BHOS
Term recommendations in 2019, then worked out in detail

Strengthening and renewing EU action plan for the circular economy and its implementation, by:

1. CEAP – Renewing and strengthening the European Stakeholder Platform for exploratory studies, pilots, and exchanges.
2. Strengthening the link between the circular economy and the climate, as for example done in the EU’s climate vision for 2050, ‘A clean planet for all’²⁹.
3. Strengthening efforts relating to developing countries and those producing raw materials.

Led by IenW together with BHOS

PACE (Platform for Acceleration of the Circular Economy) was set up in 2018. This is a multi-stakeholder collaboration aimed at accelerating the transition in specific sectors and supply chains, including plastics, electronics waste, sustainable procurement and biomass/food. The international aim of the Netherlands is to help other countries (including developing countries) to achieve a circular economy.

Led by IenW
Involved BHOS
Term 2019-2021

Holland Circular Hotspot: Mobilisation of company networks and knowledge networks in order to create international backing for the circular economy, showcasing Dutch expertise and scaling up circular innovations. This is also (and indeed particular) important for lagging EU member states. Cooperation with European Hotspots.

Led by IenW
Involved BHOS

Utilising the network of diplomatic posts to increase backing for and understanding of the circular economy.

Led by BHOS
Involved IenW, LNV

Active participation in the European Sustainable Phosphorus platform. The effect will be to strengthen the circular economy transition for phosphate and other nutrients.

Led by IenW
Involved Nutrient Platform

Mobilisation and utilisation of funds (including the Climate Fund) in order to make Dutch and other knowledge about the circular economy more widely available for developing countries and to make the best possible use of existing projects and funds (from BHOS and elsewhere).

Led by BHOS
Involved IenW

For two economic sectors (yet to be decided – value chain projects), the consumption of raw materials, CO₂ emissions and waste streams in developing countries will be mapped out so that efforts can then be made relating to reuse, repairs and recycling, in line with the earnings models that apply there. This will make a contribution to the sustainable development goals.

²⁸ <https://europadecentraal.nl/onderwerp/klimaat-energie-en-duurzaamheid/circulaire-economie/eu-actieplan-circulaire-economie/>

²⁹ https://ec.europa.eu/clima/sites/clima/files/docs/pages/com_2018_733_en.pdf

Led by BHOS together with other organisations such as HcH

Involved IenW

2. Track: financial instruments

The EU funding instruments Horizon and LIFE support the world of innovation, in the Netherlands and elsewhere.

Led by IenW

Commitments will also be made for EU funding instruments for making primary raw material extraction/processing greener.

Led by EZK

Involved BHOS, IenW

Term 2019

3.10 Netherlands Circular Accelerator

The Netherlands Circular Accelerator (hereafter: Accelerator) helps individual companies (mostly SMEs), regions and breakthrough projects to make circular initiatives possible and/or to scale them up. The Accelerator is demand-driven in this regard, based on a careful appraisal of what is feasible in economic and environmental technology terms and of what makes a substantial contribution to the transition to a circular economy. Entrepreneurs in the circular economy are often investing innovative ideas in new areas. It means that they are subject more than average to obstacles in terms of funding, knowledge, market opportunities, the chain-wide approach, legislation and regulations, and design. As a result, it takes longer for entrepreneurs to substantiate their business case. Taking an integral look at these aspects and bringing parties together is how the Accelerator helps find solutions for the obstacles these businesses come up against. The Accelerator also assists in the search for funding or in the commitment from market parties so that entrepreneurs can put together a solid business case.

‘Many projects for reusing raw materials don’t get off the ground at all, or fail to take off. Like the government, VNO-NCW wants to change that. But the entrepreneurs are the only ones who can turn that policy into reality.’

That is why we have set up the Netherlands Circular Accelerator, together with parties such as IenW and the Circular Economy Programme for the Netherlands. That’s how we’re helping entrepreneurs make the dream of a circular economy come true. Whether it’s about recycling plastic or reusing mattresses. That kind of thing can only be done with entrepreneurship, creativity and good business cases.’

Hans de Boer, chair of VNO-NCW

Accelerating the transition and scaling projects up requires cooperation between the private sector, authority bodies and NGOs. That is why IenW, VNO-NCW (the Confederation of Netherlands Industry and Employers, also acting on behalf of the Dutch SME association MKB Nederland), the Circular Economy Programme for the Netherlands (MVO Nederland, Het Groene Brein and Circle) and the IPO (the joint provincial consultative body) cooperate, while retaining an individual identity and responsibility. On the one hand, this is about a commercial approach (business cases) and on the other about organising breakthrough projects (demand-oriented). Breakthrough projects are selected on the basis of their potential contributions to the transition and the environmental returns that are envisaged from the proposed projects; the NGOs and governmental bodies are involved in the selection. The public-private platform Holland circular Hotspot (HcH) will be aligned with the Accelerator and use its infrastructure and knowledge for international customers.

The Netherlands Circular Accelerator will furthermore help extend the overview of the numerous circular economy projects. This will involve building further on the existing initiatives and organisations. The solutions that already exist for companies will be made available to other entrepreneurs so that they will contribute to the scaling up of good initiatives. The Accelerator and many existing centres of expertise are developing knowledge and skills relating to the circular economy. This is also putting the promise into effect that was made during the IenW budget debate for 2018 in response to the Van Eijs motion (which was adjourned), stating that the implementation programme should make efforts to bundle knowledge and expertise about the circular economy and make it accessible, if possible proceeding from the initiatives and organisations that are already present and making use of the pioneers³⁰.

³⁰ Parliamentary papers II, 35,000-XII, no. 44

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‘The aim of the Metropolitan Region of Amsterdam (MRA) is that half the procurement by the parties affiliated to the MRA will be circular by 2025, and the target is 100% by about 2030.’ These are the words of Lex Hendriksen, the circular economy programme manager at the MRA. The MRA comprises 32 municipalities, 2 provinces and 1 transport region. ‘I see circular procurement as a genuine game changer, because this is about a regional procurement volume (products, goods and services) of about four billion euros annually.

We’ve worked together to produce a timetable of how a municipality can get started, based on its own specific circumstances. One of the key aspects of this, I reckon,’ says Lex, ‘is that municipalities get started quickly on preparing their organisations for the phenomenon of circular procurement and that they retrain their staff, as it were, to become circular economy thinkers. There are four components to that in the MRA: offers, purchases, drivers and coordination. The last of those in particular is very important. It’s about municipalities staying in step and reinforcing what each other is doing, complementing one another.’

‘The obstacles I see looming up along the way,’ says Lex, ‘are legislation and regulations – particularly the European ones – and the complexity of getting business cases to be financially viable and the management of waste streams.’ One example is the factory in Almere that recycles mixed plastic to create new shoring pillars for public waterways. For this to be successful, the MRA municipalities must include requirements in their tenders about the use of mixed plastic in the products they will buy, and they must then supply their mixed plastics to the plastic factory as a separate material stream. The MRA’s role in this is to ensure that they make cooperative agreements with each other and that the obstacles are eliminated. ‘That’s tricky,’ says Lex, ‘but it’s possible if it’s handled as an innovation project.’

Lex Hendriksen is on secondment from the municipality of Haarlem for 18 hours a week as the circular economy programme manager for the Metropolitan Region of Amsterdam, as well as being the sustainability secretary for the G40 Stedennetwerk, the network of the forty biggest urban municipalities.

One of the action points for the MRA is bundling raw materials together as much as possible. ‘That means that a lot of existing initiatives can be channelled and companies can reinforce each other’s work. What we want is more recycling and more reuse at a larger scale. Our dot on the horizon is a regional raw materials alliance. That means that you join forces in putting out tenders for materials flows and ensure the best possible processing of raw materials in the region, instead of the current situation of it being every man for himself. Naturally, it’s important that we get a clear picture of those flows and that everything is aligned better. We’re busy doing that now for various flows. Waste from the commercial sector is one of the challenges, because it’s not something that we control. We – the municipalities – can’t tackle that. It also makes the desired link between the construction task, for example, and the options for reusing materials from demolition work very awkward. It’s a huge puzzle,’ says Lex, ‘and there are still some massive gains to be made.’

‘I see circular procurement as a genuine game changer, because this is about a regional procurement volume of about four billion euros annually.’

‘I’d want the circular economy to belong to everyone,’ he says finally. ‘That would help enormously. We’re at the beginning of this transition and taking small steps forward, towards a more aware way of living. I’d rather that we’ll be able to look back at today from the 2030 viewpoint and see that it wasn’t really a big deal, instead of looking back in shame in 2030 and having to admit that we did absolutely nothing in 2019. We mustn’t keep bickering now: it’s time to act. That drive is something I can also see in our administrators.’

”

The experience acquired will be shared so that government policy and instruments can be amended. This will help find structural stimuli for the circular economy.

The starting signal for the Accelerator will be given early this year. The Accelerator will be developed further over the coming period and will respond flexibly to the demand and to new parties that want to work with it. The progress of the Accelerator will be evaluated in 2021.

Concrete actions:

Start-up of the Accelerator and strengthening the cooperation with other contact points, cooperative ventures and organisations that could bring in knowledge and expertise.

Led by VNO/NCW, NL Circulair (MVO NL, Het Groene Brein, Circle Economy) and IenW
Involved HcH, IPO/provinces, NGOs, science institutions and financial institutions
Result Accelerator operational; improved cooperation about knowledge and expertise
Term Start-up at the beginning 2019; evaluation in 2021

Breakthrough projects to be started up annually: 5 per year. The breakthrough projects that have already been started up are in chemical recycling, textiles and mattresses.

Led by VNO/NCW
Involved Private sector, MVO NL, IenW, LNV, EZK, BZK, RVO, RWS, etc.
Result 5 breakthrough projects per year
Term From January 2019 to 2023

Acquisition of financing for projects in the Accelerator for realisation of circular economy business cases and breakthrough projects.

Led by Nederland Circulair, VNO/NCW and IenW
Involved In particular banks, philanthropic funds, InvestNL, the commercial sector, MVO NL, VNO/NCW, LNV, EZK, BZK, RVO, RWS, etc.
Result Financial support for projects in the Accelerator
Term 2019 to 2023

Individual companies and their regional organisations (and the regions themselves) provide support for completing a business plan. Also: the solutions developed with the pioneers should be widely communicated to other companies. An inventory should be made of the experience gained and the bottlenecks encountered; this can be used for structural solutions for innovative companies in the circular economy.

Led by Nederland Circulair (the Circular Economy Programme for the Netherlands)
Involved Regions, VNO/NCW, MKB-NL; provinces (Groningen, Overijssel, Zuid-Holland, Noord-Brabant), knowledge centres and financial institutions, IenW
Result Support for companies; knowledge sharing; inventory made of the obstacles; obstacles removed
Term 2019-2023

4

The circular economy at all levels

The circular economy acts at all levels: the municipalities, provinces and water boards are all extremely active. For instance, many of the provinces have mapped out the raw materials flows in their regions. This shows where there are opportunities for the circular economy on the regional and local levels.

The provinces are working together with the national government on setting up InvestNL, which provides a single point of contact for venture capital, guarantees and funding programmes, inter alia for circular projects.

A number of concrete projects in various provinces include:

- The BIObased guide (Gelderland), a place where municipalities can ask questions about getting more value from biomass flows, to be delivered in 2019;
- The Protein Cluster (Gelderland, Overijssel), a catalyst for businesses in the plant-based protein chain who are committing to the sustainable commercial potential and internationalisation of 'green' protein (2019);
- The Circular Economy in Smart Industry project (Overijssel, Gelderland and Noord-Brabant plus TNO), which should start producing results in 2019;
- The Alliantie Cirkelregio Utrecht (Utrecht Circular Region Alliance), a regional collaborative venture focussing on encouraging and accelerating various initiatives relating to the construction and demolition sectors, waste-free zones (including waste-free offices), biobased products and high-priority raw material flows. Work is being done in Overijssel on the Plastic Road Cement-Free Concrete Circle. In 2019 and 2020, TNO is working together with the provinces of Noord-Brabant and Gelderland on accelerating the transition to the circular economy in the construction sector, focussing on valuable use and reuse of secondary products and materials, through insights obtained digitally and the development of indicators and business models.

- The province of Noord-Holland is organising Circular Business Design Tracks for entrepreneurs. Participants will investigate how you can produce innovative business models and product design by applying circular design principles.
- In addition, the province has selected ten circular-economy companies to take part in the OG!-NH programme, which helps entrepreneurs to develop their ideas further and get them launched.
- Investment-Ready Innovative SME programme (PIM) in North Holland helps circular economy businesses that need funding.
- A major conference is being organised in May about how regulations are inhibiting circularity, held by the province of Noord-Holland in collaboration with the municipalities. In that context, please refer also to Section 3.2 (the Waste Review Taskforce), in which the regional/local authorities are working actively on recommendations for resolving the regulatory obstacles.

An important and promising track in which the provinces are in the driving seat is **Circular Procurement and Tendering**. Led by the Province of Groningen, the provinces are focusing on three items via the inter-provincial forum (IPO):

1. Proper organisation of the tripartite role as commissioning party, policymaker and purchaser. If this tripartite role is not properly arranged for each province, it will then be difficult to properly formulate substantive projects and make them a success. In short, this is an important precondition.
2. Mapping out the footprint in terms of sustainability issues of all provinces in the same way, as is done e.g. for CO₂ emissions.
3. Carrying out pilots relating to circular commissioning. At least one round of circular tendering and one for (other) procurement.

The provinces want to produce concrete details in 2019 for the CO₂ shadow pricing instrument. The IPO has submitted a proposal to that end to IenW, as have the water boards and the municipalities. The provinces want to work this out further in the context of the broader Circular Procurement and Tendering policy, aligned with the water boards and the municipalities.

Specific projects mentioned by the provinces relating to circular procurement and tendering or related to the above activities include the formulation of Socially Responsible Procurement criteria for the carpet industry by the Province of Overijssel and the study by the Province of Gelderland (together with IenW and VWS) into waste streams that could possibly be difficult to recycle, including artificial pitches (implementing a motion by the provincial councils following a Zembla TV programme).

The results of this study are expected in 2019. An international example of provincial commitment is the EU Interreg Circle, a project looking at circular economy action plans for biomass, textiles and the construction sector.

The water boards, finally, are driving the taskforce looking at obstacles in the waste products legislation and regulations, in which the IPO and VNG are again heavily involved.

Regional approach

In line with the IBP, the central government and the regional/local authorities are going to cooperate in order to develop regional circular economy strategies together. To that end, circular economy action agendas will be drawn up in 2019 so that a regionally-based approach can be used. In more concrete terms, the aim is that all the biggest forty municipalities and the provinces in question will have formulated circular economy agendas before the end of 2019. A number of resources will be used for drawing up the regional strategies, such as a series of workshops over a period up to mid-2019. The 'Regiotool' will also be discussed during these sessions. This regional tool is an aid for sketching out the circular economy in spatial and administrative planning terms in a structured way per municipality. The Netherlands Circular Accelerator will also focus on driving regional business cases.

5

Funding the programme

Numerous parties will benefit from the transition to a circular economy. Therefore, there are currently numerous initiatives under way that will help that transition. These efforts require manpower and resources from all the parties involved. Those projects are being carried out by private companies, local/regional authorities and other parties within society. The national government is also contributing. Innovation and investment are crucial for the transition.

Sufficient resources are required for scaling up and accelerating the transition, on the one hand for developing circular products and services and on the other for achieving the right conditions to bring about that circular society and market.

Within the implementation programme, in which numerous initiatives have incidentally been included from parties within society, the contributions and resources are determined at the project level. The central government has in addition a number of funding sources available that can be deployed and further utilised.

1. To a large extent, those resources come from existing budgets (the national budget). Efforts that are already under way that are or will focus on the desired transition have partly been included in the implementation programme. This applies for example to many legislation-related efforts and to the efforts within the supply chains that have been prioritised. Room has sometimes been created within existing budgets.
2. In addition, claims are being made on the budgets that have been made available in the coalition agreement. One example of this is the 'climate supplementary fund'. Project proposals can be made and submitted for this. In 2018, €12.5 million was made available for projects; for 2019, €22.5 million has been assigned to the Ministry of Infrastructure and Water Management. In addition, €6 million was made available in 2018 for promoting sustainable soil management and €1.5 million was made available in 2018 from the Climate supplementary fund for carrying out forestry management pilots led by WUR. Moreover, €1 million was made available from the 2019 climate supplementary fund for combating food waste. That is on top of the €7 million that the Cabinet had already promised for that topic during the period 2018-2021. The money is being invested in innovation, research, monitoring and providing information.
3. The IenW budget for 2019 and 2020 includes a total of €16 million extra that has been freed up for (among other things) monitoring the progress of the programme and for implementing the IenW share of the transition agendas. This can also be used for helping fund the Netherlands Circular Accelerator.
4. The BZK has allocated budgets for implementation of the Construction priority area. These budgets are used inter alia for work done by the Netherlands Enterprise Agency (RVO) and the Bouwagenda, and for carrying out various studies into building regulations. The RVB (Central Government Real Estate Agency) will draw up a roadmap for the transition together with the departments concerned; this will include the necessary financial and other resources. To encourage circular and climate-neutral procurement, extra resources have been made available in 2019 through the climate envelope. The core element of the approach is that the central government will use its procurement expenditure of some €12 billion for achieving social objectives such as the circular economy.
5. The Ministry of Economic Affairs and Climate Policy has made resources available in the 2019 budget for support for the Circular Manufacturing Industry implementation agenda. This relates to the implementation capacity at the RVO for setting up and supervising projects and to the management and updating of the raw materials scanner.
6. The Nature and Water Quality supplementary fund: this is a budget that is disbursed via the Delta Fund. For combating microplastics, €10 million has been made available for the period 2018-2021, of which about €3 million is specifically for 2019.

7. The Regional supplementary fund: regional deals are detailed here. A sum of €90 million has been reserved for four circular economy projects. Later during this term of office, the Cabinet will provide a new tranche for the regional supplementary funds or 'envelopes' (probably in 2019), in which a total sum of €185 million will be made available.
 8. Intergovernmental Programme: The Intergovernmental Programme (IBP) is how national government and the other authorities have set out their aims relating to a number of urgent social tasks. This includes the cooperation needed for drawing up the regional circular economy strategies (see also Chapter 4). By broadening the standardisation system and activating the step-up/step-down system, the national government has made additional resources available for the other authorities. The principle included in the IBP is that all the authorities will make financial commitments to the tasks that they are involved in.
 9. Investments: InvestNL will be starting up in 2019. This institution will be supporting businesses in large social projects, helping with the funding where necessary. The circular economy is an important theme here. The precursor of InvestNL, the NIA (Netherlands Investment Agency), is working with the EIB (European Investment Bank) on setting up an investment platform for the circular economy.
 10. Resources are being made available from various 'supplementary funds' for research, including the cross-over call from the Netherlands Organisation for Scientific Research, NWO (€20 million), and the resources that the Ministry of Education, Culture and Science (OCW) has made available to the NWO for implementing the National Science Agenda (€70 million extra available, increasing to €108 million in 2019 and €130 million from 2020 onwards). In addition, resources are being made available from various 'envelopes' (supplementary funds) for innovation (general)³¹. These will be used where possible for the circular economy, for example by calling on resources that the Ministry of Economic Affairs and Climate Policy (EZK) makes available for applied research (TO2), for the PPP supplement in the EZK's innovation policy. The Ministry of Agriculture, Nature and Food Quality (LNV) is investing about €3.5 million per year in public-private partnerships (PPP) and EU cooperation within the theme of circularity for the Agri & Food top sector. Together with the Agri & Food top sector, LNV is making €5 million available via the 'Seaweed for Food and Feed' long-term investment plan in order to increase sustainable seaweed production.
- On top of that, LNV is investing €1.75 million per year in knowledge about the protein transition to more vegetable proteins.
11. In what the LNV refers to as 'knowledge basis programmes' for Wageningen Research, a programme has been included for the circular economy and climate relating to food and greenery. A great deal of attention has been paid in this to circular agriculture, biomass production, and climate measures and their effects. The scale of this programme is approximately €3.5 million per year.
 12. The MIA (environmental investment deductibles) and Vamil (arbitrary depreciation of environmental investments) regulations are being used to encourage investment in innovative and more environmentally friendly operating assets. For instance, within the existing MIA/Vamil budget, more scope is being provided through the Environment List for notification of circular economy techniques and assets, and the tax advantage is being increased where possible. It is expected that about €45 million will go to circular projects in 2019. This is an increase of 15-20% with respect to 2018. That applies to both circular operational resources and circular applications in the construction sector.
 13. Funds: Dutch equity funds have made key initiatives in the circular economy possible and are thereby playing an important role in initiating further initiatives. A recent example is PeelPioneers (see interview), where the DOEN Foundation (together with Brabant BOM ventures and the ABN AMRO bank) has made starting capital of €1 million available. The funds have also made an initiative such as Circle Economy possible and inter alia the deployment of a member of staff from the environmental organisation Natuur & Milieu to assist the national transition agenda. Two other reasons for involving equity funds in the implementation programme: their wide-reaching networks and their knowledge of the circular economy. There is a leading group of funds that want to play an active role in the transition; their precise place in the programme structure will be determined in the first quarter of 2019.
 14. For promoting the circularity of artificial grass pitches, the Ministry of Health, Welfare and Sport is examining the possibilities within the Construction and Maintenance of Sports Premises and Sports Materials subsidy regulations and the specific disbursements for sports, together with the sports sector, municipalities and the commercial sector.

³¹ <https://www.rijksoverheid.nl/documenten/kamerstukken/2018/07/13/kamerbrief-naar-missiegedreven-innovatiebeleid-met-impact>

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