TRANSITION AGENDA
CIRCULAIR ECONOMY | 2018

CIRCULAR CONSTRUCTION ECONOMY

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BUILDING TOWARDS THE CIRCULAR ECONOMY IN THE NETHERLANDS IN 2050 TOGETHER.

ABOUT THIS TRANSITION AGENDA.

The Circular Construction Economy Transition Agenda describes the strategy for achieving a circular construction economy by 2050 and contains the Agenda for the 2018-2021 period. This Agenda has been drawn up by a transition team made up of experts from the fields of science, the government, and market participants.

The Raw Materials Agreement ('Grondstoffenakkoord'), of January 2017, is the guiding principle for the Circular Construction Economy Transition Agenda. The team continues the work of the Social and Economic Council (SER) focused on a circular economy and the 'A Circular Economy in the Netherlands in 2050' ('Nederland Circulair in 2050') programme. The Transition Agenda follows 'De Bouwagenda' that describes a strategy and approach for reinforcing the construction industry and for making the Netherlands future-proof.

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SUMMARY

WORKING TOWARDS THE CIRCULAR ECONOMY IN THE NETHERLANDS IN 2050 TOGETHER.

The construction and infrastructure industry is facing a huge transition. In order to counter climate change and further burdening of the earth, we need to start working using completely different methods. This means we will have to design our buildings and infrastructure in such a way that all materials and resources will be reusable and that fossil energy sources are no longer used. The emphasis lies on realising high-grade (or higher-grade) recycling in all construction submarkets. The Netherlands takes this challenge seriously. The ambition is that the constructed environment is circular by 2050, but preferably much sooner. The Circular Construction Economy Transition Agenda draws up the strategy and makes concrete recommendations. One of these recommendations is that the government will require 100% circular execution for all contracts from 2023 onwards.

MAKING A FUNDAMENTAL CHANGE!

Our buildings and our infrastructure, i.e. our roads, bridges, dykes, railways and sewerage system, currently largely consist of high amounts of – often heavy – materials, such as stone, concrete, and steel. The extraction, processing and transport of these materials put a significant strain on the earth. This cannot go on any longer. In order to maintain a clean and safe living environment for future generations, we are making a fundamental change. We need to ensure that resources in the construction chain are used and reused as much as possible and more organic-based materials are used. The final goal: a completely circular construction industry by 2050.

CIRCULARITY OFFERS DYNAMICS AND OPPORTUNITIES.

The challenge is complex in nature, but certainly offers opportunities. The construction industry can develop quickly and achieve visible results in a short time. Smart reuse results in cost reductions. There is a demand for a multitude of new products and services, each with their corresponding economic incentives. Architects, designers, engineers, service providers, knowledge institutes, clients, contractors, manufacturers and countless other stakeholders are starting up a new knowledge development.
The dynamics involved in circularity enable the construction industry to present itself as an attractive, innovative employer. There are opportunities at an international level as well if the Netherlands manages to expand its lead. Circular construction is a potentially attractive export product. That is why it is vital to tackle the circular economy together with the European Union and other countries.

THE MOMENTUM FOR CHANGE IS HERE.

Never before has the circular economy featured so prominently on the social agenda. The Social and Economic Council's advice focuses on a circular economy, for which the national 'A Circular Economy in the Netherlands by 2050' programme and the Raw Materials Agreement provide important frameworks. There is a general consensus in the government at national, provincial and municipal level as well as among market participants and knowledge institutes. The 40+ parties affiliated with 'De Bouwagenda' agree with the goal of achieving a completely circular industry by 2050. Now it is a matter of keeping up the work. Frontrunners on both the executive and client side are leading the way. The Netherlands has already implemented leading example projects in the field of circular construction. The challenge lies in continuing the development of the knowledge and experience acquired and propagating it widely. The bigger the scale, the faster the development.

TO THE SUMMIT IN THREE STAGES.

This Circular Construction Economy Transition Agenda describes the strategy for achieving a circular construction economy by 2050 and contains the Agenda for the 2018-2021 period. We will explore decisive actions required to make the initial phase of a circular construction economy a success. The Transition Team envisions the process as climbing a mountain. We want to go to the top, but do not know the exact route yet. Firstly, we need to make an inventory of what is required to set out on this journey and make sure our base camp has been set up. We make a distinction between three stages:

2018-2021 the result is a fully completed base camp.

2021-2030 in which 50% of the end goal has been realised.

2030-2050 in which the goal – 'the summit' – is reached.

This Transition Agenda covers the first stage in which we set up base camp so we can really get things going during the second stage. This means that no later than by 2021 we will have:

- a first string of innovative products and services for circular construction.
- a concrete demand for circular products and services, for example for government contracts.
- knowledge, experience and tools available for sufficient people and the right people in the wholeconstruction chain.
- stimulating laws and regulations instead of inhibiting ones.
- sufficient stimuli for R&D, experiments, prototypes, and concrete projects.
- understanding, support, identifiable benefits, awareness.
- detailed ideas about socio-innovative labour organisations.
- shared language and tools for indicating and measuring circularity in projects.
- a concrete plan for making the housing stock sustainable and the challenge of creating one million additional houses in a period of ten years together with 'De Bouwagenda' and executing them as circular as possible.
- accurate knowledge and a plan of action for halving the CO_2 emission in the construction industry by 2030 and eliminating it fully by 2050.

EXPERIMENTING, COOPERATING AND SHARING KNOWLEDGE!

The transition to a circular construction economy requires new technology and expertise as well as a socio-economic system in which the government, chain partners, manufacturers, employers and clients work together in a new way. We will follow the approach of 'De Bouwagenda' in which living labs are created by multiple complementary parties who, together, pick up a challenge, share knowledge, and find solutions that will provide added value to all in the long term. Using this same principle, we will develop new business models, partnerships, ownership relationships, and forms of contracts in which circularity has been embedded. The needs and wishes of the users are key in this. We will involve them in our plans as early as possible. Employees are an important factor as well. Attention to additional education and training, development of employment options and - in some cases - high-grade labour is required. Moreover, we need to create an level playing field and achieve social innovation equal to technological innovation.

The Transition Agenda aims for an iterative process in which we launch projects, develop knowledge, and share experiences together. We focus on learning through experimenting, analysing what works and which obstacles we will face. Subsequently, this will be translated into training courses, standards, and legislation. We have already acquired extensive experience with pilot projects. A quick win lies in distilling what we learned here and making it available to the entire market. Part of this approach is creating a clear conceptual framework with a communal language, insight into the baseline situation and into materials and applications.

Furthermore, it is necessary to enthuse market parties and users through proper communication. They will need to be triggered to make the first minor step themselves; for example, by enticing them with inspirational real-life cases. At the same time, we will paint a picture of the future: the transition to a high level of circular construction that frontrunners have already started and that can be picked up by early adopters tomorrow, so the bulk of the market can follow suit.

WHAT WE WILL DO EXACTLY.

The Transition Team formulates four focal points for the 2018-2021 Agenda:

- market development
- measuring method
- policy, legislation and regulations
- knowledge & awareness

These focal points will lead to a series of proposed actions and interventions. A selection:

● ALL PUBLIC TENDERS WILL BE CIRCULAR IN 2030.

From 2030 onwards, all public tenders will be circular. Governments will actually procure circular projects. Concrete timelines will be provided for its implementation. From 2023, all requests from the national, provincial and municipal governments will be circular unless this is not (fully) possible.

● ACTION PLAN FOR CO_2 EMISSION REDUCTION IN THE CONSTRUCTION INDUSTRY.

The circular Agenda makes an important contribution to the reduction of CO_2 in the extraction, manufacture and transport of materials in the construction industry. We link up with the ambition of 'De Bouwagenda' to half the CO_2 emission in the construction industry by 2030 and to completely ban emissions by 2050. In 2021 at the latest, we will have sufficient knowledge and a plan of action to achieve this. The idea is to execute the construction of one million houses defined by 'De Bouwagenda' in a circular way in a period of ten years. Making the existing housing stock sustainable will be implemented in a circular way as much as possible. This includes the equipment in the kitchens and the water facilities for the bathrooms. The same applies to the other submarkets we want to make sustainable together with 'De Bouwagenda', such as schools and other utility buildings. By joining forces with 'De Bouwagenda', the circular Agenda can eventually lead to a 100% CO_2 emission

reduction for the construction industry. This covers the entire process from production and manufacturing to the use phase and transport for the entire industry. This will result in a reduction of about 107 megatons of CO_2-eq (per annum for both civil engineering and utility construction and ground, water and road construction). In 2030, the total emission will be halved, resulting in a reduction of 53 megatons CO_2-eq. The realisation of this challenge requires further research. The way in which this reduction can be tackled and which actions are required to achieve this will be clear by 2021 at the latest.

- **DECISION REGARDING MANDATORY MATERIALS PASSPORT BY 2020.**

Gaining insight into the materials and resources used in buildings and other works is an essential step along this route. This can be realised for example by means of a materials passport. Government parties will take the lead at all levels by exploring the added value of such a methodology in projects and pilots. In which cases a methodology will be mandatory will be determined by 2020 at the latest.

- **SUBSIDY FOR CIRCULAR BUSINESS AND REVENUE MODELS.**

The central government will offer a subsidy opportunity for temporary financial support at individual business level for circular business and revenue models. The feasibility of financing will be discussed with financiers, and the legal feasibility will be discussed with regulators.

- **CONTINUED DEVELOPMENT OF A UNIFORM CIRCULARITY MEASURING METHOD.**

Government parties take the lead by exploring the added value of a uniform, unified measuring method in projects and pilots. Hereby using existing methods as a foundation.

- **PROCESSING CIRCULARITY IN CONSTRUCTION GOVERNMENT STANDARDS.**

The circular economy will be translated into government regulations. The government will start a programme in 2018 that will perform further studies and encourages experiments.

- **INTERNATIONAL POSITIONING AND COOPERATION.**

The Netherlands will take the initiative to work on a North-West European circular construction economy together with Germany, Belgium and, if possible, the United Kingdom, so that the use of products for circular construction is stimulated. Agreements about the trade in construction materials will also be made. These agreements are part of an international strategy to create a circular economy in the construction industry.

- **CIRCULAR CONSTRUCTION A COMPREHENSIVE PART OF EDUCATION IN 2021.**

Our objective is to ensure that attention is paid to circular construction on all educational levels and in all educational programmes in 2021. The government will take the initiative in developing an all-encompassing approach for this together with market parties. An important action in addition to current initiatives is to offer a circular architect training programme and a circular commissioning training programme.

- **CREATING A CIRCULAR CONSTRUCTION KNOWLEDGE INSTITUTE.**

The Transition Team is in favour of creating a knowledge institute that has an outside-in approach (i.e. based on market needs). Guiding principles are ‘evolving through learning’ and ‘network-based action’. This knowledge institute is preferably incorporated in ‘De Bouwagenda’.

- **CREATING A CIRCULAR CONSTRUCTION AWARENESS CAMPAIGN.**

We will stimulate this awareness in target audiences by means of branding and communication that clarifies the added value of circular construction. We will widely propagate successful cases and prototypes through a systematic approach.

WHAT’S NEXT?

The Transition Agenda contains an investment paragraph that provides for the financing of these actions and interventions. In order to perform the tasks on the Agenda we need a powerful administrative body that manages and adjusts this complex process. This steering committee motivates and facilitates target audiences and actors, drives processes, and monitors progress. A reflection team made up of members from the government, knowledge institutes, interest groups and market parties will periodically take a critical look at the progress and the programme and issue advice.

[1] *Source: Circular Construction. The Foundation under a renewed sector. ABN AMRO, December 2014*

Photography: Jannes Linders

THE TEMPORARY DISTRICT COURT OF AMSTERDAM.

The Central Government Real Estate Agency realised the temporary district court of Amsterdam through a Design, Build, Maintain and Remove (DBMR) call for tender. Together with the dpcp consortium – an combinationof Du Prie Bouw & Ontwikkeling and developer Cepezedprojects. The newly built construction on the grounds of the current Parnas complex at Parnassusweg is used as a temporary district court. A large part of legal proceedings can continue during the five years in which a new permanent location is developed in the same plot. The temporary nature of the building in no way harms the representativeness and quality in terms of equipment, complex logistics, acoustics, comfort, and safety. The client focuses on preventing waste and maximising the residual value after this initial use period. This makes the building highly adaptable and allows for completely different uses by different occupants. At the end of its lifespan this building can be fully disassembled and reused elsewhere.

1. CAUSE, OBJECTIVE AND APPROACH.

The Transition Agenda describes the strategy for achieving a circular construction economy in 2050 and contains the Agenda for the 2018-2021 period. Why is this necessary? What is the scope? What do we want to realise? And how will we approach this?

1.1 THE CAUSE.

There is a growing realisation in the construction industry that we need to start working in a different manner. A number of resources are being exhausted, the environment is being polluted, and excessive use of fossil fuels impacts the climate. This requires a transition towards a way of working and living without unnecessarily exhausting natural resources, polluting the living environment, and affecting ecosystems. The final goal: a circular economy in 2050.

The Netherlands takes this circularity challenge seriously. In June 2016, the Social and Economic Council issued its recommendation 'Working on a circular economy: no time to waste' that not only emphasises the necessity and urgency, but also clarifies the economic effects. Shortly thereafter, on 14 September 2016, 'A Circular Economy in the Netherlands in 2050 appeared, a national programme that explains the way in which the government wishes to shape a circular economy. The construction industry is mentioned as one of the five priorities. In January 2017 this was followed by the signing of the Raw Materials Agreement by no less than 325 parties currently. 'De Bouwagenda', presented to the government by chairman Bernard Wientjes on 28 March 2017, also has circularity as a prominent theme. These initiatives ensured that the development of a circular economy is now widely supported. There is a general consensus in the government at national, provincial and municipal level as well as among market parties, trade unions, and knowledge institutes. There is momentum for starting up this transition.

The construction industry plays a crucial part in this process. Our buildings - houses and utilities - and our infrastructure, i.e. our roads, bridges, dykes, railways and sewerage system, currently largely consist of high amounts of – often heavy – materials, such as stone, concrete, and steel. The extraction, processing and transport of these materials put a significant strain on the earth. The national 'A Circular Economy in the Netherlands in 2050' programme calculates that the construction industry in the Netherlands is responsible for an estimated 50% of the resource consumption. Moreover, it is responsible for 40% of the total energy consumption and 30% of the total water consumption. On top of that, a large part of all waste in the Netherlands relates to construction and demolition waste, and the industry is responsible for about 35% of the CO_2 emission. The thing to keep in mind is that about 97% of the construction and demolition waste is reused. An important part of this concerns low-grade applications in the infrastructure industry.

DEFINITION.
Circular construction is defined as the development, use and reuse of buildings, areas and infrastructure without unnecessarily exhausting natural resources, polluting the living environment, and affecting ecosystems. Construction in a way that is economically sound and contributes to the well-being of humans and animals. Here and there, now and later.

The transition to a circular construction industry is a complex issue, but also offers a huge potential. The larger the scale in which circular products and services are applied, the higher the cost reduction and cost effectiveness, and the faster learning experiences can be gained. On top of that, circularity also provides great opportunities on both the supply side and the demand side. Smart reuse and a lower energy demand in the production process offer cost benefits. There is a demand for a multitude of new products and services, each with their corresponding economic incentives. Through smart demolition or disassembly, demolition companies can retrieve entire construction parts from a building designated for demolition so that these can be reused. Wholesalers can also respond to the need for distribution of used construction materials. In doing so, we need to realise that a part of the construction products and materials that are currently used in practice are not always ideal for reuse purposes. This requires further investigation.

Circularity offers interesting prospects for construction workers. According to the Social and Economic Council, circularity has a ripple effect on employment retention and the creation of jobs in new circular activities, such as maintenance, repair, revision, and reuse.

Architects, designers, engineers, service providers, clients, contractors, and countless other stakeholders are developing new knowledge. Thanks to the dynamics involved in circularity the construction industry can present itself as an attractive, innovative employer, with positive effects on the influx of new talent. In order to achieve a successful transition towards a different economy, it is important to fully involve employees in the industry. Education and additional training, development of employment and high-grade labour require attention. Moreover, attention needs to be paid to creating an level playing field and social innovation in an equal role next to technological innovation.

There are opportunities at an international level as well if the Netherlands manages to get a head start. The Social and Economic Council emphasises the vital importance of tackling the circular economy together with the European Union (Action Plan for a circular economy) and other countries.

In short, the construction industry faces large challenges, but can also take advantage of the major opportunities that circularity provides. The Netherlands has the benefit of a number of frontrunners with extensive experience in circular construction. They realised interesting and innovating projects that we can learn from and about which the knowledge can be disseminated throughout the market.

1.2 OBJECTIVE AND APPROACH OF THE TRANSITION AGENDA.

Circular construction requires a transition in the construction industry. The emphasis lies on realising high-grade (or higher-grade) recycling in all construction submarkets. This may also involve the application of bio-based materials, materials with 'infinite' availability, such as wood, hemp, elephant grass, etc. It means the emergence of a new market in which chain partners work together in a different way. A market with new techniques in which other products and services are required. A financial impulse, innovative financing methods and other contracting forms are necessary. Adjustment of legislation and regulations is vital. Educational institutes will have to develop and share new knowledge and skills.

The Agenda has been drawn up by a Transition Team made up of experts from the field of science, the government, and market parties. Apart from the Transition Team's work sessions, work groups started working on further expansion of the knowledge paragraph, the investment paragraph, and the social paragraph. Together with external stakeholders and experts, a strategy and prioritisation have been laid down during a work conference: this involves exploring the decisive actions to make the initial stage of a circular construction economy a success.

The details in this Agenda mainly focus on the near future. Setting major goals as a dot on the horizon is essential, but the Transition Team considers it especially important to get the circular flywheel in motion in the short term. Thus, the Transition Agenda focuses on stimulating and pushing the construction parties consisting of clients, developers, architects, regulators, contractors, and suppliers towards developing a sustainable, i.e. circular, construction economy. The many great examples developed by frontrunners deserve to be widely copied. We want to bring about a mind shift in the market. A shift from a 'no, unless' attitude to a 'yes, of course' attitude.

Illustration: Ad Oskam

1.3 TO THE SUMMIT IN THREE STAGES.

Het Transitieteam Circulaire Bouweconomie ziet het proces voor zich als 'het beklimmen van een berg'. We willen naar de top, maar we kennen de route nog niet precies.

BASE CAMP.
First of all, we need to make an inventory of what we need to set up base camp. Base camp is located after the so-called Valley of Death, the infamous phase after 'research and development', and is located before putting an innovative product on the commercial market.

This phase is challenging, because the demand still needs to be developed and because investments are required for marketing the innovative products and services. Innovators need to convert their production processes in order to contribute to the circular economy. Business and revenue models are in the design and testing phases. Relationships between parties are changing.

It is only natural that mistakes are also made, because everything is new both on a technical, economic, and process level. This is a costly and high-risk phase. Banks and investors often deem the risks in this phase too high to make the required funds available. The investment paragraph of this Agenda reserves funds to bridge the gap of this phase.

Analogous to this metaphor of scaling the mountain, we make a distinction between three stages:

2018-2021 Bridging the Valley of Death, resulting in a fully completed base camp.

2021-2030 The period in which 50% of the end goal has been realised.

2030-2050 The period in which the goal – 'the summit' – is reached.

The Transition Agenda mainly covers the first stage, which ensures that real progress can be made in the next stages.

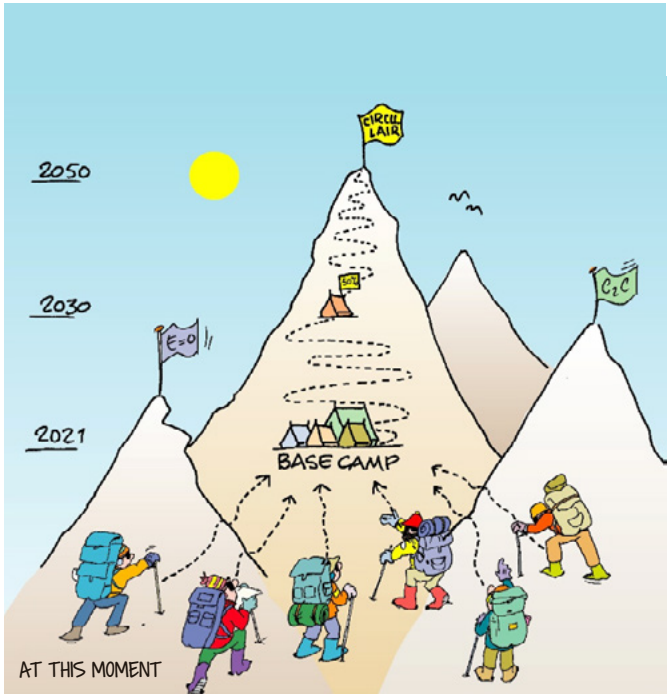


Illustration: Ad Oskam

1.4 RESULT IN 2021: BASE CAMP COMPLETED.

A fully completed base camp, what does this mean? What needs to be present as a base for the next step to 50% circular in 2030?

- A first series of innovative products and services that successfully went through the Valley of Death.
- A concrete demand for circular products and services, for example for government contracts.
- Knowledge, experience and tools available for sufficient people and the right people (in the full construction chain).
- Stimulating laws and regulations instead of inhibiting ones.
- Sufficient stimuli for R&D, experiments, prototypes, and concrete projects.
- Understanding, support, identifiable benefits, awareness.
- Detailed ideas about socio-innovative labour organisations.
- Shared language and tools for indicating and measuring circularity in projects.
- A concrete plan for making the housing stock sustainable and the challenge of creating one million
- Additional houses in a period of ten years together with
- De Bouwagenda' and executing them in a way that is as circular as possible.
- Accurate knowledge and a plan of action for halving the CO_2 emission in the construction industry by 2030 and having it fully eliminated by 2050.

Photography: Eigen Haard

STADSTUIN OVERTOOM: REUSING 98% OF THE DEMOLITION MATERIAL!

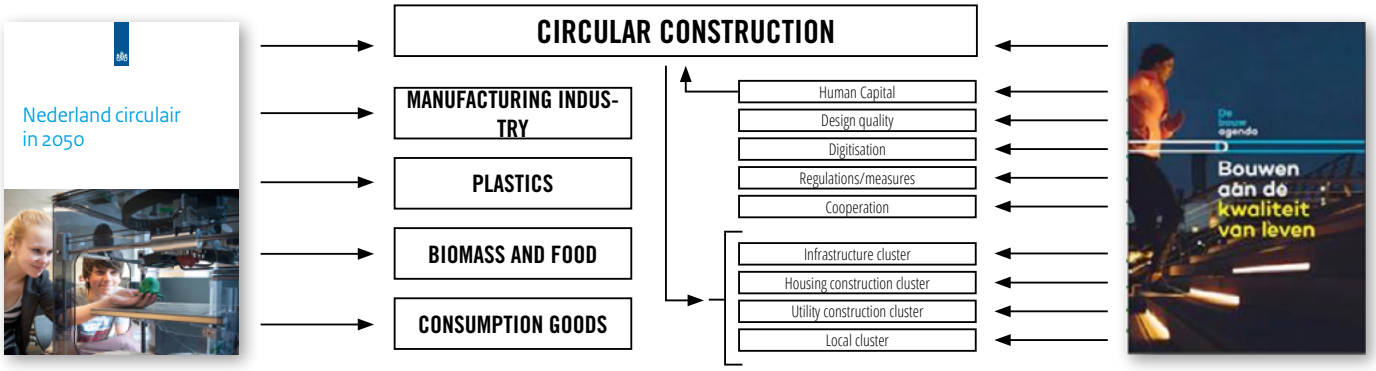
In Amsterdam Nieuw-West a consortium including, among others, Eigen Haard and ERA Contour is developing the climate-neutral neighbourhood Stadstuin Overtoom. Here, 360 outdated apartments are replaced by 480 newly built apartments. Demolition and new build take place in accordance with the Co-Green concept. The housing association opted for a circular approach. Project leader Jurgen van de Laarschot of Eigen Haard: 'We reuse no less than 98% of the demolition materials, 30% of which is used in Stadstuin Overtoom. Parts of bricks are used in new bricks, concrete is reused for the architectural construction, and sand-lime brick is returned to the plant.' According to Van de Laarschot, separating demolition materials is an important component of circular construction. 'You need to dismantle a building step by step. Suppliers fear that the quality is not sufficiently guaranteed when reusing old materials. That is why we engaged in talks with suppliers of construction materials for Stadstuin Overtoom and made clear agreements. Chain cooperation is one of the goals of our Co-Green concept.'

2. ANALYSIS.

In this chapter we will discuss the specific characteristics of the construction industry. How does the construction industry distinguish itself from other industries? What specific challenges are there? Which submarkets can we identify? And how can we create a joint vision?

2.1 INTRODUCTION.

The national 'A Circular Economy in the Netherlands in 2050' programme identifies the construction industry as one of the five priority industries. The four other industries are: biomass & food, plastics, manufacturing industry, and consumer goods. The Transition Team considers it very important to link up as much as possible with the other Transition Agendas. Mutual cross-fertilisation must become a part of the circular economy's governance structure.



Both the National Building Agenda and the government wide program ´Netherlands Circular in 2050 provide input for the transition agenda Circular Construction Economy.

Even though there are similarities and overlaps, a number of characteristics of the construction industry are different from those of the other priority sectors. Moreover, it is important to make a distinction between the different submarkets in the construction industry. The industry is largely subdivided into Civil Engineering & Utility Construction (C&U) and Ground, Water and Road Construction (GWR). These are different market segments, each with their own dynamics, players, and rules. Accordingly, each requires a custom approach.

Finally, it is important to make a distinction between the different phases of the construction economy. We are looking at newly built construction, but just as much at the design and use of buildings, regions, and infrastructure. We take the management and maintenance, innovation, renovation, transformation, disassembly, demolition, and recycling of materials into account. All these phases each require a different approach.

2.2 COHERENCE BETWEEN C&U AND GWR.

The circular economy offers quite a number of challenges that apply to both C&U and GWR and that can be tackled jointly. At the same time these fields also have a number of very specific characteristics. One of the reasons why this distinction is relevant is related to the difference in structure. The C&U field mainly deals with private financing. There is a large and diverse playing field with a lot of major and minor stakeholders. In the GWR field it mainly concerns public tenders and a smaller and amount of – more homogeneous – stakeholders.

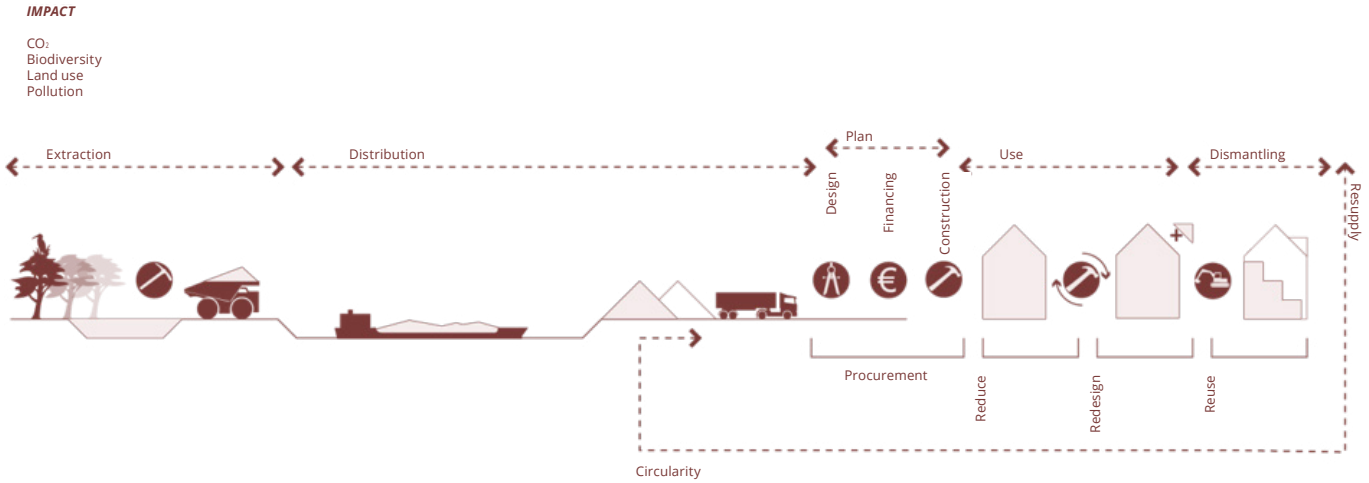
The GWR field also often deals with relatively long planning processes. 'We are behind developments'. We need to find a level of flexibility in the planning processes to ensure that new circular insights and technologies can be included the moment a plan is executed. The application thereof must also not be inhibited by choices that were made many years prior. Usually there are separate budgets for construction and maintenance. This means that a profit gained in management and maintenance (or a second life cycle) cannot simply be translated to a required higher investment in construction. From a circularity perspective it is necessary to base the work to be carried out more on the Total Cost of Ownership (TCO) idea and think about merging these budgets. The relatively long lifespan of infrastructure and the importance of its availability means that the shift from possession to use – common in other (more short-cycle) products that is logical for circularity – is not quite obvious in this industry. At the same time, you could say that RWS (the Directorate-General for Public Works and Water Management) and ProRail, for example, are suppliers of the 'mobility' service and that water boards are suppliers of 'clean water'. This raises questions about ownership in the Circular GWR and about the relationship between client and supplier.

In the GWR field, safety and availability are of major importance. Projects focus strongly on completion within scope, budget, and time. This often results in risk aversion. That is why it is essential to think about creating room for experiment in projects, risk sharing, and including circularity in the scope of projects.

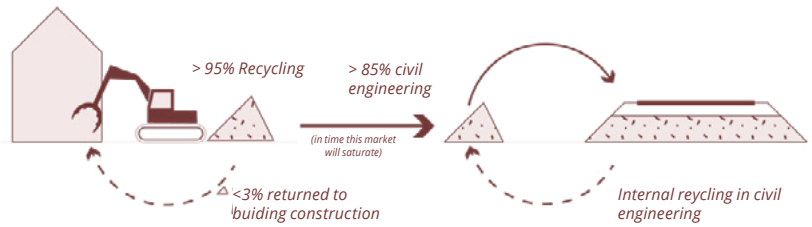
As a result of developments in the field of Smart Mobility, the GWR field faces relatively high uncertainty regarding the future mobility needs There are major questions, for example about what roads and works of art need to look like in the future and whether or not we actually still need roads. There are often also intersections, instead of isolated buildings, that cause interdependence.

At the same time, we can say that infrastructure in itself will never become obsolete. The only thing that will change is the desired scope or capacity contrary to the design, such as doorways/lighting, etc. For example, roads have been built in largely the same networks since Roman times. This raises the question if specific matters such as foundations should be built taking into account an extremely long lifespan.

In both the GWR and C&U fields the infrastructure and buildings have a very long lifespan when compared to consumer goods. Moreover, we cannot discuss the lifespan of a construction in its entirety, but we need to distinguish the different components instead. The constructions themselves usually last the longest, whereas façades and road surfaces often have a shorter lifespan, which applies even more so to the different components of the heating, cooling, ventilation, and lighting systems. The interior of buildings, such as offices and stores, is often renewed every seven to fifteen years. The interesting thing is that the technical lifespan is often much longer than the functional or economic lifespan. This offers high-grade reuse opportunities as long as the design takes these into account.



In doing so we should not forget that these subsectors are to a large extent interdependent. The GWR sector is an important buyer of materials for the C&U sector: about 97% of the construction and demolition waste is reused, an important part of this is used as low-grade materials in the GWR sector. In the GWR sector, the use of secondary resources is quite a normal phenomenon: an estimated 50% of the materials used (excluding soil transport) consists of recycled resources that are functionally applied and thus replace primary resources. However, this is a low-grade form of reuse. Only 3% of the resources return in its original function in the C&U industry, which means that the influx of primary resources is still high. There still is a significant influx of primary resources in the GWR sector, especially with respect to concrete production.



The development towards a circular economy puts pressure on the interdependence. Demolition of buildings often results in recycling granulate, which is subsequently used in the GWR sector as a foundation material. However, in a circular economy, this construction and demolition waste from the C&U sector flows back to new buildings and houses. The influx of secondary materials for the foundation of roads will therefore decrease over time. Bio-based materials can be part of the solution.

2.3 TOWARDS A CONSTRUCTION-WIDE VISION AND APPROACH.

Though the submarkets in the construction industry each have a different character, this does not mean that many of the circular challenges cannot best be jointly executed, because they are comparable or largely comparable. Wherever possible, the goal is to achieve circularity, to create one construction-wide vision, objective, approach and a shared package of applicable methods as well as a monitoring system and measurability of circularity.

The possibility of a division of tasks is definitely looked into in this respect. For example, one industry can primarily deal with various material streams and share the acquired knowledge. It can also be interesting to work together, because the different characteristics could add additional input. This means new concepts could be tried in the C&U field first, because this field has a more short-cycle character for some components. In the context of important developments, the GWR field may find an initial application in the C&U field so they can have quick first results. For instance, with some example projects the C&U sector has a minor advantage in the fields of disassembly, modularity, and materials passports. However, there are plenty of opportunities in the GWR sector for the development of circular projects. This concerns, among other things, bridges, viaducts, and tunnel systems.

Below you will find a number of focus points that are very relevant to the C&U and GWR fields and thus cannot be lacking from a construction-wide approach:

- Starting the development of a long-term vision and associated (sub)goals.
- Stimulating partnerships between authorities, knowledge institutes and market parties for the shared development of knowledge and improvement of cooperation between parties.
- The development of new technological regulations and definitions for circularity to speed up innovation.
- Continued development of a uniform determination procedure for measuring circularity, based on existing procedures.
- The development of one system for the exchange of data between links in the chain.

The Netherlands has a lot of experience with sustainable and energy-neutral construction. The frontrunners already have successfully executed a large number of circular construction projects, especially in non-residential construction. Progress has been made in the GRW field with the Concrete Agreement and the Asphalt Incentive. Experiments and practical projects in terms of circularity are required in order to make sure that all parties in the chain get used to a new way of working. Our current economy is structured in such a way that we focus on costs, which creates long, linear, fragmented, and international chains. The Transition Agenda builds upon existing insights and links up with programmes and initiatives in this field.

2.4 LINKING UP WITH SUSTAINABILITY AND ENERGY TRANSITION.

There is a clear connection between circularity, sustainability, and energy transition in the construction industry. The construction industry is a mass consumer of (fossil) energy in the production phase. Buildings also continue to use a lot of energy during their lifespan and leave a clear footprint in our living environment.

'De Bouwagenda' also states that buildings need to be circular and energy-neutral by 2050. Energy-neutral means that a building must not use more energy on an annual basis than the building generates itself. This is definitely a challenge. How will we deal with these systems and the components that make up these systems? When looking at the used materials and, as a consequence, the environmental score, we face an important issue. By linking up with 'De Bouwagenda', making our housing supply more sustainable - including the one million houses to be newly built - can make an important contribution to making the Netherlands circular. The term sustainability also adds another dimension to the term energy neutrality. Sustainability is not just about using 'infinite' sources, but also about preventing the deterioration of landscapes and ecosystems and the prevention of soil, water and air pollution.

There is only one possible conclusion: a circular construction is also a sustainable construction. Moreover, the construction economy will only have sustainable, energy-neutral constructions and areas in the future. The Circular Construction Economy Transition Agenda will attempt to link up with other processes, such as the Social and Economic Council's Energy Agreement and 'De Bouwagenda' for making the energy consumption in construction sustainable.

2.5 THE HUMAN FACTOR.

The transition to a circular construction economy has a major impact on the social relationships in the industry. It is vital that employees become and remain involved in the process. This is a big challenge, because the industry is experiencing a shortage of qualified personnel. This is in part due to insufficient influx of new workers. Based on research performed by EIB and Volandis, we know that in the next five years 40,000 men and women are required to cover the exit of older employees in the construction industry. This number is in addition to the 70,000 experts who have left the construction industry since the economic crisis. Nearly 70,000 professional experts in the construction and installation industry will also no longer be sufficiently qualified in 2020. This is partly due to the European energy objectives and circular goals that will have a big effect on the sustainability of the constructed environment in the years to come. This development goes hand in hand with a fast-growing supply of innovations and new products as a result of the increasing influence of digitisation.

This requires up-to-date expertise and corresponding investments in post-initial education. In short, the construction industry requires true social innovation. The Circular Construction Economy Transition Agenda has a place in two major developments: A Circular Economy in the Netherlands and 'De Bouwagenda'.

Even though the origin and goals of these two developments differ, there still are major overlaps in the parties involved and the intended activities. In the circular and social/Human Capital components, these overlaps are so large that we have opted to share these topics. Apart from efficiency, this cooperation also provides more intrinsic clarity for the people involved and for all parties that will be working on the implementation of both Agendas.

The cooperation will have a pragmatic execution: 'De Bouwagenda' makes use of the Circular Construction Economy Transition Agenda. Vice versa the Circular Construction Economy Transition Agenda makes use of the social/Human Capital agenda of 'De Bouwagenda' that is being developed right now. For further implementation of this theme, we refer to 'De Bouwagenda' and its overarching Human Capital theme.

Photography: Alliander

ALLIANDER SETS THE TONE WITH A FULLY CIRCULAR RENOVATED OFFICE IN DUIVEN.

In November 2015, grid operator Alliander opened a fully circular renovated office in Duiven. The building is energy positive, and 80% of the materials present are reused materials. Before the renovation, the complex was a collection of 1980s buildings with space for six hundred employees. After the renovation, it became one innovative and sustainable office with space for over 1,550 people.

An important principle for the renovation was circularity. 'The rubble of the old concrete façade has been ground into granulate for the concrete floor,' says Eugenie Knaap of Alliander. 'The timber for the new interior façade consists of own waste wood. We retrieved our own waste from the incineration plant and took it to the woodworker's for reuse ourselves. The façades partly use Métisse insulation, sustainable insulation made from recycled cotton for which worn work clothes of Alliander mechanics was used.

3. STRATEGY.

In order to achieve a circular construction industry in 32 years' time, we do not have to know the final steps in the process right now. A dot on the horizon, a shared end goal, is sufficient. However, it is important to start with the first steps now and to know the strategy that leads to the eventual goal. We already mentioned the three stages, the first of which leads to the creation of a base camp that needs to be completed by 2021.

3.1 BASIC PRINCIPLES.

The transition towards a circular construction economy requires a broad scope. On the one hand, ample room for new technology and expertise is required and on the other hand, room is needed for a socio-economic system in which government, chain partners, manufacturers, employees, and clients work together in a new way. As the foundation for a strong and effective strategy, the Transition Team formulates five strategic basic principles that are the guiding principles throughout the Transition Agenda:

COMBINATION OF GRADUAL AND DISRUPTIVE CHANGES.

The Transition Team focuses on a combined strategy of gradual and disruptive changes. Disruption means that the market is shaken up by organisations through the introduction of surprising products and services, innovative business models and marketing strategies as well as innovative ways of organising and managing. These could be new players on the market, such as start-ups or technological innovators as well as established players with a smart business model. Gradual changes, e.g. higher standards and regulations implemented in steps, can also have a disruptive effect. As regulators, the government can be an important driver for market changes.

COOPERATION.

A circular economy is only feasible through close cooperation between all parties involved: the field of science, the business community, the government, employees, and users. When giving substance to the Agenda, the parties will each have to take their responsibility:

- The field of science , by performing pioneering research in priority fields.
- The business community, by executing practical projects, from experiment to demonstration to market introduction of new products and services for circular construction, in which good working conditions are guaranteed in joint consultation with the employees.
- The government has two important roles.
  - a public role, as legislator and regulator and through financial schemes.
  - a private role, as the main client in the GWR field and as the launching customer in both non-residential and GWR construction.
- The needs and wishes of the user are always key in this.

PHASED APPROACH: PRACTICAL EXPERIENCE AND KNOWLEDGE DEVELOPMENT.

Our challenge requires an iterative process in which projects, knowledge development and learning take centre stage. The Transition Agenda focuses on learning what works through experiments and analysis. This will subsequently be translated into new work methods, training courses, standards, and legislation. This is only possible if there is sufficient room for experiments. The goal is that all parties in the chain will have sufficient expertise for circular construction. To this end, existing educational programmes need to be adjusted, new training modules need to be developed, and additional training programmes need to be offered.

INSIGHT IN THE CURRENT SITUATION, THE CONCEPTUAL FRAMEWORK, AND THE DISTILLATION OF KNOWLEDGE.

We have already gained extensive experience with pilot projects. A quick win lies in distilling what we learned here and making this available to the entire market. A clear and uniform conceptual framework, insight into the baseline situation and into materials and applications are part of this approach. We also need to gain insight into the way the industrial organisation is structured and how the employees are involved. The aim here is to renew management, work organisation, working relationships, and employment relationships.

FOCUS ON THREE PILLARS.

The following three pillars are key in our strategy:

- Optimal use of materials for all phases in the construction cycle.
- Using as many 'infinite' sources as possible. More and higher-grade reuse in the construction industry and at the end of the use phase.
- Making use of finite sources as efficiently as possible.

These three pillars lead to various design strategies. Which one is applied depends on the circumstances within which a project is realised. For instance, in the city centre where a building will have different functions over the years, the preferred strategy may be to focus on the building's very long lifespan and the use of high-grade materials. In rural areas, though, it might be better to fully demolish a building after twenty years, reuse all materials, and eventually hand the location back to nature.

Examples of design strategies are:
- Optimising the lifespan by designing with a focus on optimum lifespan at object, component, and material level. And by making smart choices in adjusting the functional and technical lifespan to each other.
- Designing for reuse by taking into account deconstruction and reconstruction at object, component, and material level and by taking into account the exchangeability of objects, components, and materials. Designing with a focus on adjustability to future needs (adaptive) and/or a focus on movability (logistics) fits in with this strategy.
- Using existing materials, e.g. by reusing objects, elements and materials or by extending the lifespan of existing infrastructure.
- Using fewer materials or using renewable (bio-based) materials with a low environmental impact and/or materials that are freely applicable (do not need to be packaged) and improve the health of both humans and the environment.

3.2 FROM BOTTLENECKS TO SPEARHEADS.

A number of bottlenecks are impediments to the development towards circular construction. For instance, there is insufficient supply and demand of circular products, and market processes geared towards circular construction are lacking. Construction parties need to drastically change their own processes for which the long start-up costs are a barrier. Costs have to be made now, while the economic benefits will only present themselves much later and may benefit a party other than the original investor. Moreover, new policies and adjustments of legislation and regulations are required to pull down barriers and stimulate circularity. A significant financial impulse is vital for the transition we are envisioning. The signal that the current investors are wary of the risks of the required innovations definitely requires attention.

The Transition Team has already defined the following categorisation in which bottlenecks have been turned into spearheads for the 2018-2021 Agenda. These are:
- market development
- measuring method
- policies, legislation and regulations
- knowledge & awareness

DEVELOPING GOOD MARKET COMPETITION WITH SUPPLY AND DEMAND.

In order to achieve circular construction at a larger scale, we first need to create a demand. This requires early adopters. Clients – market parties and authorities – can encourage the market to come up with innovative, new solutions. They do this by pointing out (future) needs for which new developments from the market can be used in a focused way. They also offer testing locations for research results, and they can also be the first to actually buy a product as a launching customer. Every role demands a different and, possibly new, market approach.

The government has a very strong influence in many construction projects, which makes their role of launching customer make sense. However, it is important to also enable other parties to take part. This includes the business community, but also organisations in the semi-public sector: housing associations, schools, healthcare institutions, etc. The role these clients play must be clear and consistent over a longer period of time. They truly need to have circular procurement and indicate a clear timeline for the implementation of this circular procurement. This role can be fleshed out in a broad way. The government can, for example, use an SBIR (Small Business Innovation Research) to stimulate specific innovations in an earlier stage of the development. This is a competition in which enterprises with the best tender are granted an order for a feasibility study.

Another measure is the application of a materials passport. A materials passport of a construction provides insight into which materials have been used in the construction and how they have been processed. This makes reusing and reclaiming materials in the event of demolition or disassembly much less complicated and gives constructions a higher value. Currently, innovations are ongoing in the market for the application of such a passport, such as Madaster and BIM. Key in this is identifying the potential for reuse of the various materials and components.
The Public Procurement Act offers various tools for challenging market parties, finding the limits and innovating. In this way, clients can attribute more value to circularity in the award criteria. Calls for tenders based on the 'best price-quality ratio'. BPKV (Best Price-Quality Ratio), previously the EMVI (Economically Most Beneficial Tender), offers options to do so.

Apart from the price, they can also include quality aspects in the assessment of tenders. This makes it possible for companies to apply a high level of circularity/ material use.

It is important to not only focus on the construction phase of construction projects, but also on the use phase. There is a world to win here, for example by developing new forms of contracts for management and maintenance that enhance circularity by means of a Total Cost of Ownership (TCO) approach. By explicitly including the impact of management and maintenance in the tender process, the total costs and the sustainability performance for the full lifespan of a construction become important. This offers space for sustainable investments that will earn themselves back over the lifespan of the construction. Contractors will have more space to apply knowledge and creativity in these forms of contracts. Moreover, this way of working prevents the aforementioned issue of the contractor's short-term interests versus the client's long-term interests. For contracts including maintenance the contractor's interest in the success of a project equals that of the client. After all, the contractor remains involved and responsible for a number of years. This increases the chances of successful cooperation between client and contractor.

An important catalyst for circularity is making the constructed environment sustainable. 'De Bouwagenda' envisages the construction of one million new, energy-neutral houses in the next ten years. These houses, linked to the Transition Agenda, will be completed using the best possible circular method. This will lead to a CO_2 reduction of around 80% or 175 megatons of CO_2-eq, meaning 140 megatons of CO_2-eq over the lifespan of the houses[2] (production, transport, manufacture, and use phase). The intended increased sustainability of the current housing supply (both rental and for sale), with the final goal being a completely energy-neutral constructed environment in 2050, is also executed in a way that is as circular as possible, including any equipment in the kitchen and the tap water facilities in the bathroom. This will lead to a CO_2 reduction of about 80%, consisting of 17 megatons of CO_2-eq per year[3], and therefore 14 megatons of CO_2-eq per year.

The 2018 Budget Memorandum explicitly states that DBFM (Design, Build, Finance and Maintain) contracts will be used for a number of large-scale planned infrastructure works. Currently, these modern forms of contracts including maintenance are only applied in 3.6% of the total public calls for tenders. A more widespread use of these contracts can contribute to circularity if the type of building is suitable. One risk is that such long-term commitments could hamper innovation, because parties often work in a risk-avoiding manner and because changes/innovations are often complicated and expensive to implement during the use phase. This is definitely a point of attention. Another important point is that small-sized and medium-sized enterprises, start-ups and suppliers of products that make up only a small part of the contracting sum are also involved in the questioning phase.

In addition to the demand, the supply must also be developed. What are the products that clients like to use? How can we seduce them with circular products and services that compete with traditional supply? Which properties are going to be decisive? Increasing the circular supply requires new business and revenue models. Many submarkets in the construction industry, for example, are ideally suited to the use of a system of extended producer responsibility. This requires pilot projects, and regulations will have to offer more space for manoeuvring in the longer term.

Once there is sufficient supply and demand, the real market for it must still be developed. How will the prospective buyer's attention be drawn to the supply? What are the limitations for the application? What place will the supply have in the consideration models? How will the functionality of the supply be guaranteed (e.g. via services)? High-grade reuse of construction materials (from building to building) has a proven yield. Nevertheless, its use does not have a standard place in day-to-day practice. There still appears to be a lot of resistance due to unfamiliarity and standard patterns. Moreover, new (often local) connections must be developed to ensure the creation of the entire network of demolition, stock-taking, processing, and reuse. This requires direction and coordination. Furthermore, it is important that the learning experiences in one field are made available to other fields and regions.

[2] Source: CO_2 Footprint Woningbouw – CO_2 Uitstoot van woningen van productie tot sloop. Nieman Consultancy, June 2010

[3] Source: MONITweb, ECN Beleidsstudies (monitweb.energie.nl)

A UNIFORM, EFFECTIVE MEASURING TOOL FOR CIRCULARITY.

Making the added value insightful in terms of environment, health, comfort and safety, for example, will help to increase demand for circular construction. The price is one of the main drivers for consumer behaviour, which means that other aspects will need to compete with this. Making the added value of circular construction clear requires the presence of an accessible and reliable measuring tool based on the established definition of circular construction (and applicable to both housing, non-residential, and GWR construction). Uniformity and standardisation may facilitate the increase of the supply of circular products. However, we need to look closely at where and to what extent uniformity and standardisation are desired. Uniformity and standardisation require the involvement of the entire chain. Together we need to create a quality system and product certification. In doing so, we can build on existing methods, such as the Environmental Performance for Buildings (Dutch MPG) and the National Environmental Database (Dutch NMD), which will have to be amended.

Part of the measuring tool is a monitoring system that consists of the following elements:

- A baseline measurement to determine the progress of a programme.
- An effect monitor of the resource streams that enter the construction cycle and the waste streams that leave the construction cycle, to be further differentiated into relevant substreams.
- Further development of the MPG into a macro indicator that is used to say something about the sustainability of the entire construction production of an indicated period through an aggregation of all submitted MPGs and related resource efficiency scores. Questions to be answered with respect to the suitability of the MPG to serve as an effect monitor:
  - Are steps taken by producers to facilitate reuse of materials expressed in the MPG scores?
  - Research into whether scores can be aggregated to say something about the sustainability of the year of the construction production.
  - Research into the feasibility of the MPG in relation to current EPBD regulations in Europe.
  - Research into land use as an environmental effect.
  - Research into the consequences of broadening the scope of the MPG to include multiple building types and renovations.
- Research into the possibilities of applying several additional aspects in the life cycle of buildings/GWR within the MPG calculations, such as land use. Another aspect to consider is the land use of the building to be constructed.
- An accompanying programme or process monitoring of quality matters, such as the socio-economic context.

NO INHIBITING POLICIES. STIMULATING POLICIES, LEGISLATION AND REGULATIONS INSTEAD.

According to former environmental minister Pieter Winsemius, an effective government tool set consists of the 'carrot, lecture, and stick'. There needs to be room to experiment within the rules, contracts and agreements with respect to, for example, risk sharing, to create scope for innovation. Changes in legislation and regulations may draw out the desired disruptions in the market. Circular tendering is also a tool that is expected to lead to fast changes. Research into the effectiveness of these and other government measures for the development of circular construction is required.

In this research, we need to take a good look at which regulations and standards stand in the way of circularity. The current legislation system classifies substances and materials as a product or resource or as a waste substance. The question remains whether or not this distinction is viable in a circular economy. A recent legal study in the context of the Raw Materials Agreement showed that, in accordance with the European Waste Framework Directive, EU member states are offered more circular space than our country takes up. It has been identified where this space can be found and which possible solutions can be used to offer the circular business community this space. This provides a valuable foundation for creating an integrated, referential legal framework using which thinking exclusively in terms of waste residual streams (based on origin) has been turned into thinking in terms of recycling (resources for a specific application).

KNOWLEDGE & AWARENESS.

The circular transition requires new knowledge. We still need to develop the knowledge for part of the actions needed in the short term for setting up our base camp. Often it is also a matter of sharing existing knowledge and improving the level of knowledge across all layers of the industry's parties. Continuity, a consistent structure of the circular construction economy, awareness and interactive forms of research require attention in this respect. All parties in the chain will have to have sufficient expertise for circular construction. To this end, existing educational programmes at all levels – from universities to pre-vocational schools – need to be adjusted, new training modules need to be developed, and additional training programmes need to be offered. A separate point of attention is that, in parallel to the development of knowledge, we will also create a broad level of support for circular construction within and outside of the industry.

This will lead to the following goals:

- Using the development of knowledge based on research (practice and science).
- Interdisciplinary development of knowledge based on the needs of target audiences.
- Local sharing of knowledge as a flywheel.
- Creating broad support.

USING THE DEVELOPMENT OF KNOWLEDGE BASED ON RESEARCH.

The need for knowledge is based on questions from practice regarding the development and implementation of the circular construction economy. This way, we can ensure that the development of knowledge fits in with the construction practice and that this knowledge is usable. In addition to practical experience, professional and scientific research leads to the confirmation and further development of the knowledge agenda.
The Transition Team is in favour of creating a knowledge institute that has an outside-in approach, i.e. based on market needs. Guiding principles are 'evolving through learning' and 'network-based action'. This knowledge institute is preferably incorporated in 'De Bouwagenda'. If a decision is made to establish a Construction TKI (Top Consortium for Knowledge and Innovation), circularity will have to be an important aspect of it.

Moreover, it is important that pre-competitive knowledge about, among other things, development of construction materials and methods is freely available to the entire market. The Transition Team proposes to make better use of existing booster teams for the distribution of pre-competitive knowledge to the contractors of practical projects.

INTERDISCIPLINARY DEVELOPMENT OF KNOWLEDGE AND THE NEEDS OF TARGET AUDIENCES.

De transition towards a circular construction economy requires a different way of working for all parties in the chain. This implies that interdisciplinary development of knowledge is a requirement and that the required transition demands cross-sector transparency. Chain partners need to learn from practical cases together. In order to make progress in practice easier, guidelines and tools will have to be made available to various target audiences for all phases of the construction process including design, management, and demolition and removal.

LOCAL SHARING OF KNOWLEDGE AS A FLYWHEEL.

Linking up with practical cases and applicability are facilitated by emphasising local development and sharing of knowledge and subsequently connecting this nationally in the fields of education, standardisation, knowledge sharing, and smart incentives. The following points of attention have been determined:

- Linking up with existing local platforms and regional networks, stimulating new networks.
- Developing a model for local circular development.
- Participation is conditional (transparency, expertise, reliability, innovative power);
- On a national level, connecting:
  - educational programmes,
  - advice in the field of standardisation and regulation,
  - sharing of knowledge about the local platforms,
  - reinforcing 'underexposed parts' of the chain,
  - smart incentives (improving continuity),
  - businesses education and research.

CREATING BROAD SUPPORT.

If we want to enter the next phase of the circular transition from the base camp in 2021, we will already have to work on creating widespread support now. Communication both within and outside of the construction community is paramount in this respect. We must stimulate a social dialogue about the use and necessity of circularity in the construction industry, develop a shared language, and present practical examples both nationally and internationally. To this end, an effective awareness campaign, focusing on various target audiences involved, can be developed. In doing so, we will link up with 'De Bouwagenda' as much as possible.

Photography: Directorate-General for Public Works and Water Management

THE FIRST CIRCULAR VIADUCT IN THE NETHERLANDS.

A viaduct that can be completely disassembled and reused. The following challenge is tackled jointly in the Circular Design Consortium (Van Hattum en Blankevoort, VolkerInfra, Spanbeton/VBI, SGS Intron, SBRCURnet, and the Directorate-General for Public Works and Water Management): designing and building the first circular viaduct in the Netherlands.

The circular viaduct is fully reusable. It can be retrieved undamaged in components or at resource level and can be maintained in ecological and technological cycles. The basic principle? Modular construction like Lego. The work of art can be disassembled without any waste and can be turned into a new work of art undamaged.

The consortium has the transparent sharing of knowledge, learning from each other, working together and trusting each other as its starting points. The circular design principles have been determined jointly, the design is ready, and the project can be executed. Construction is expected to start in 2018.

4. ACTIONS AND INTERVENTIONS.

In this chapter we will formulate the concrete actions and interventions for the 2018-2021 Agenda. We will do so on the basis of the spearheads formulated in the previous chapter.

4.1 MARKET DEVELOPMENT.

Activities focused on gaining insight into the market developments and stimulating the demand for circular construction are required. We want to stimulate this demand to such an extent that a viable market has formed in 2021. Initiatives requiring circular construction will be reinforced.

ALL GOVERNMENT REQUESTS FOR TENDERS ARE CIRCULAR IN 2023 UNLESS ...

From 2023 onwards, all requests from the national, provincial and municipal governments will be circular unless this is not (fully) possible.

ALL PUBLIC TENDERS WILL BE CIRCULAR IN 2030.

From 2030 onwards, all public tenders will be circular. The forms of contracts will be in line with this. Government will truly have circular procurement in place and indicate a clear timeline for the implementation of this circular procurement. Government clients in the GWR and C&U fields will develop the required tool set together and in consultation with the market. To this end, they will set up pilots and experiments and create a 'learning environment' for the distribution of acquired knowledge. Agreements are also entered into with market parties and clients in the semi-public domain, if this also applies to them.

ACTION PLAN FOR CO_2 EMISSION REDUCTION IN THE CONSTRUCTION INDUSTRY.

We will use the increasing sustainability of the constructed environment as a catalyst for circular construction. We will link up with the goal of 'De Bouwagenda' – one million newly built houses in ten years – by building as circular as possible. The increasing sustainability of the existing housing supply will be tackled in a way that is as circular as possible, including the equipment in the kitchens and the tap water facilities of the bathrooms. The same applies to the other submarkets 'De Bouwagenda' wants to make sustainable, such as schools and other non-residential buildings. By linking up with 'De Bouwagenda', the circular Agenda may eventually lead to a complete reduction of the CO_2 emissions for the construction industry, from production and manufacture to the use phase and industry-related transport. This means a reduction of about 107 megatons of CO_2-eq[4] per annum for both the C&U and GWR fields. In 2030 the total emission will be halved, resulting in a reduction of 50% (53 megatons CO_2-eq). Meeting this challenge requires further research. The way in which this reduction can be tackled and which actions are required to achieve this will be clear by 2021 at the latest.

DECISION REGARDING A MANDATORY MATERIALS PASSPORT NO LATER THAN 2020.

A first step is to gain insight into the materials and resources used in buildings and projects, e.g. by means of a materials passport. Government parties at all levels will take the lead by exploring the added value of such a methodology and the preconditions for successful development and implementation in projects and pilots, starting with new build (C&U and GWR) and gradually expanding to existing buildings and projects while taking into account existing initiatives, such as Madaster and BIM. In which cases a methodology will be mandatory will be determined no later than in 2020. Agreements are made with market parties and clients in the semi-public domain about when this also applies to, especially, buildings in the (semi-)private domain. Key in this is identifying the potential for reuse of the various materials and components.

SUBSIDY FOR CIRCULAR BUSINESS AND REVENUE MODELS.

The central government will offer a subsidy opportunity for temporary financial support at individual business level for circular business and revenue models. Government authorities and market parties will together investigate which models can be used for which product categories or specific circumstances. The feasibility of financing will be discussed with financiers, and the legal feasibility will be discussed with regulators. Moreover, the accounting regulations (IFRS) within the financial frameworks must be aligned with these models.

CREATING PILOTS FOR PRODUCER RESPONSIBILITY.

Market parties are initiating research into the options for increasing producer responsibility. They map out the obstacles and formulate a plan of action. Regulations could offer more space for manoeuvring and pilots will be created. In 2021, the various chains will be familiar with such systems and offer them actively to client parties.

[4] *Source: Circular Construction. The Foundation under a renewed sector. ABN AMRO, December 2014*

CREATION OF LOCAL NETWORKS FOR HIGH-GRADE REUSE.

The efforts of the Transition Team focus on creating space, including financial space, for the realisation of bottom-up network programmes in the region, in which the entire chain is used to work on new experiences through a proof of concept method. The goal is the realisation of circular transformation and renovation in the construction industry and thus increasing the knowledge about and awareness of circular construction. A start can be made in regions where 'Cirkelstad' is active, i.e. the major cities, the 'Drechtsteden', etc. In the eastern Netherlands, a connection is an option with empty real estate that needs to be repurposed. Market parties will take the initiative in scaling up local networks for high-grade reuse. The objective is to have a substantial part of the local networks (G32 + G4) operational by 2021 and to significantly scale up high-grade reuse in practice. The local and national government will provide support, among other things by facilitating (large-scale) practical projects. And by, if relevant based on their role, linking up with the initiative.

RESEARCH INTO MEASURES TO INCREASE THE CIRCULAR SUPPLY.

The central authority will take the lead in 2018 to research how stimulating measures can increase the circular supply. Think of, for example, stimulating the development of prototypes or discouraging, through price incentives, the use of non-circular construction products and/or buildings. After this period, the emphasis will shift to more compulsory/mandatory measures that will also cover the stragglers ('minimum standard').

4.2 MEASURABILITY.

The circular construction economy can only be a success if it becomes tangible and measurable. What does circular construction mean at the various stages of the life cycle of a building? And what does it mean for the various materials, products, and applications? What is the added value for the user, supplier, producer, and other chain partners? Transparency is required to win trust. The development of a shared language and measuring methods is necessary. Obtaining insight into the baseline situation and into materials and applications is also covered by this.

- Development of a uniform circularity measuring method.
  Government parties at all levels will take the lead in this by exploring the added value of a uniform, unambiguous measuring method in projects and pilots. Based on these projects and pilots, it will be determined, by 2020 at the latest, in which cases a methodology will be mandatory. Agreements will be made with market parties when this also applies to, especially, buildings in the private domain. Furthermore, agreements will be made regarding methods of making conventional construction more difficult or expensive than circular construction, for which this new measuring tool will be used. For example, we could use labels analogous to the EPC for buildings.

This includes actions such as:

- Developing materials/products database.
  Performing exploratory research into the possibilities, use and necessity of a phased formation of a complete, consistent tool that is accessible to all parties involved. This tool will provide information about the environment, materials and construction parts (from the existing supply) for circular construction and the accumulation of products and materials in the construction environment for circular construction. For comparison's sake, this is like 'Marktplaats.nl'.

- Definition of circular construction.
  Further elaboration of the definition for circular construction and its widespread distribution among clients and contractors.

- Baseline measurement and monitoring.
  Creating insight into the development of circularity in the Dutch construction economy by performing a baseline measurement and determining and executing a monitoring methodology. To this end, proper indicators will need to be determined that take the various existing definitions of waste into account.

4.3 POLICY, LEGISLATION AND REGULATIONS.

The government can play an important part in the transition towards a circular construction economy in various ways. Apart from the government's role as a launching customer, it is also responsible for legislation and regulations and the facilitation of many developments on both a national and an international level.

EMBEDDING CIRCULARITY INTO CONSTRUCTION REGULATIONS.

Circular economy is translated into government regulations, standards and tools, which in part is already an ongoing activity. The central authority already has every intention of implementing the minimum requirements for the environmental performance of houses and offices with effect from 1 January 2018. In the years to come, the MPG determination procedure will be refined, so circularity will optimally be valued. The government will start a programme in 2018 that will perform further research and encourage experiments. Think of, for example, reuse as part of the MPG/NMD methodology, but also of 'Circular regional development' through spatial planning, tendering the issuing of land, changing ground lease conditions or tightening the requirements for demolition permits. It is important that the government,

in part based on the results of the started research and experiments, records ambitions for a future tightening of the minimum requirements for the environmental performance of constructions.

FORMATION OF A TASK FORCE FOR THE REVIEW OF WASTE MATERIALS.

Due to the scope and complexity of the waste issue, a task force will be appointed that will design a new circular legislation and enforcement framework that fits in seamlessly with the new Environment and Planning Act. This design includes both short-term amendments to existing legislation and regulations as well as proposals for amendments that will take more time, such as European legal matters. Furthermore, the design must contain a responsible balance between standardisation and setting a framework on the one hand and producer responsibility, such as quality assurance, certification, etc. on the other hand. The task force must also consider the current system of issuing permits that is currently not tailored to a circular system.

Because the implementation of waste and environmental legislation primarily takes place at a decentralised and executive level, the representatives of provinces, municipalities and water boards (IPO, VNG and UVW) intend to take the organisation of this 'Task Force for the Review of Waste Materials' upon themselves in the context of their joint CE Investment Agenda. This task force will consist of a balanced group of representatives from the central government, other authorities, inspectorates, NGOs and the organised business community with a strong mandate to achieve the changes that are deemed necessary. At the recommendation of the authorities, the task force will be formally appointed by and report to the Minister of Economic Affairs & Climate and the state secretary of Infrastructure and Water Management.

STIMULATING 'CE COOPERATION IN THE CHAIN'.

Efforts are directed towards stimulating 'CE cooperation in the chain' in the chains relevant to the government. The government itself is often also a link in the chain. Think of, for example, entering into chain agreements or the joint use and accrual of knowledge in Green Deals. Think of, for example, 'Cirkelstad' or City Deals (e.g. 'Circulaire Stad'). This will be stimulated within existing structures as much as possible.

OPENING UP A FINANCING FRAMEWORK FOR CIRCULAR ECONOMY.

The existing financial tool set is currently not fully available for circular market initiatives. The central government takes the initiative to make existing schemes for innovation and support also available to circular proposals in 2018. If there are any obstacles in terms of financing, whether or not and how these obstacles can be removed will need to be looked into. Which (financial) tools can be used can be determined based on the results. This can vary, for example, from a premium on the National Mortgage Guarantee Scheme (Dutch NHG) for circular houses to a large-scale transformation fund for existing constructions. Market parties will take the initiative, while the central government will provide support.

INTERNATIONAL POSITIONING AND COOPERATION.

An effective transition strategy not only focuses on the Netherlands, but also tries to link up and cooperate as much as possible with surrounding countries. The new European Public Procurement Directive offers sufficient room for innovative procurement. The wide-ranging rules in REACH, European waste regulations and the Construction Products Regulations, for example, should not impede circularity. The government and the business community are involved in the important cases together and proactively focus on adjusting European regulations.

The central authority takes the initiative to design an international strategy for a circular economy in the construction industry. This involves creating favourable, correct (international) legal and economic conditions, reinforcing the international market for Dutch frontrunners, and providing a contribution to an international circular economy without shifting it to another party. We follow the various developments at a European level and, from the Netherlands, will take a clear position on those developments. Components of this strategy are:

- Forming an international coalition focused on removing obstacles, such as the European procurement regulations for public contractors and the interference between REACH, European waste regulations, and Construction Products Regulations.
- Linking up with the initiatives of the European Commission, such as LEVELS and PEF for Buildings.
- Weighing up the costs and benefits of actively focusing on European harmonisation of information requirement standards, such as European standardisation under the Construction Products Decree.
- Using EU funds to research what CE means for the construction industry, using programmes such as Horizon2020, EFSI, Structural Funds and LIFE.
- Agreements are made with Germany, Belgium and, if possible, the UK, regarding a 'North West European circular construction economy so the sale of circular products is stimulated. Agreements about the trade in construction materials will also be made. Cross-border (price) differences between circular and non-circular construction products will disappear.
- The Netherlands will be actively presented as the hotspot for (knowledge about) the circular construction economy. The lead developed in the Netherlands will be used, because countries with fast-growing economies are investing heavily in urban engineering and infrastructure programmes (so-called green cities or smart cities).
- Where possible, making a positive contribution from the Netherlands to increasing the sustainability in other regions in the world, for example, via Infravation or the UN 10 Year Financial Programme.

4.4 KNOWLEDGE & AWARENESS.

CIRCULAR CONSTRUCTION IS AN INTEGRAL PART OF EDUCATION IN 2021.

The objective is to ensure that attention is paid to circular construction in all educational levels and all educational programmes in 2021. The government will take the initiative in developing a comprehensive approach for this, together with market parties. In doing so, we will link up with current initiatives in this field, such as the Circular Construction course programme of the HAN University of Applied Sciences. Linking up with other relevant course programmes, such as design, logistics, IT, and financing is also important. Within the educational field, more attention will need to be paid to transformation and renovation challenges. An important action in addition to current initiatives is to offer a circular architect training programme and circular commissioning training programme. Which course programmes are required for other parties in the chain will also be examined.

CREATING A CIRCULAR CONSTRUCTION KNOWLEDGE INSTITUTE.

The Transition Team is in favour of creating a knowledge institute that has an outside-in approach, i.e. based on market needs. Guiding principles are 'evolving through learning' and 'network-based action'. This knowledge institute is preferably incorporated in 'De Bouwagenda'.

RESEARCH INTO ADDED VALUE OF CIRCULAR CONSTRUCTION.

In 2018 and 2019, the government will carry out research to map the added value of circular construction. This will not only concern the added value in terms of the environment, health, comfort and safety, but also the added value in the fields of increased productivity, employment, (international) competitive position, and the reduction of CO_2.

STIMULATING AND FACILITATING CIRCULAR KNOWLEDGE BOOSTER TEAMS.

Government parties take the initiative to deploy booster teams in cooperation with market parties that can help embed the circular economy within client organisations. Based on this, a process of sharing and developing knowledge will start , that will ensure expertise in the field of circularity among clients, contractors, and producers. This will mostly involve knowledge in terms of commissioning practice, procurement, forms of contracts and partnerships, and conclusive business cases. New learning experiences from practice will have to lead to new insights within the aforementioned course programmes. Moreover, it is important that pre-competitive knowledge about, among other things, development of construction materials and methods are freely available to the entire market. The Transition Team proposes to make better use of existing booster teams for the distribution of pre-competitive knowledge to the contractors of practical projects.

CREATING A CIRCULAR CONSTRUCTION AWARENESS CAMPAIGN.

The awareness of relevant target audiences can be stimulated through branding and communication. This will provide them with better insight into the added value of circular construction.
The market will take the lead in this, for example, by appointing booster teams for specific knowledge transfer. Successful examples from practice and pilot projects will be extensively presented through a systematic approach.

PRACTICAL GUIDELINES AND TOOLS.

In order to facilitate progress in practice, guidelines and tools will need to be made available for all phases of the construction process including design, management, and demolition and removal. The government will take the initiative for this, in close collaboration with market parties.

STRATEGIC RESEARCH.

Market parties, knowledge institutes, the government and - if relevant - employee organisations will perform strategic research together with the following questions as the main focus:

- What social and economic innovations are likely and what do they mean for the construction industry?
- How do material cycles align with each other, what requirements should be set for the purity of materials to allow for reuse across multiple cycles? And what are the consequences for material streams that need to stay separated?
- Which functionally equal products and elements are available in the current constructed environment?
- If more materials are kept within the cycle, what does this mean for the value of these materials? And what does this mean for the ownership of those materials?
- The goals of energy-neutral and resource-saving construction sometimes seem to be at odds. How can you prevent, for example, the use of more solar panels from resulting in the exhaustion of the supply of rare metals? How can you save on resources if you need to use more insulation?
- Every location offers opportunities and limitations for the sustainability measures. How can you achieve cooperation with all stakeholders for each location to cash in on these opportunities and counter these limitations?
- What will our response be to scarcity of materials?
- When is custom work, linked to high-grade material reuse, preferred over a standardised modular form of construction with a high extent of reuse?
- Our infrastructure and utility constructions have a long lifespan; what will this lifespan look like in twenty, fifty, one hundred and four hundred years? What do the developments in the field of smart mobility, smart buildings, the new way of working and a circular economy for the Netherlands mean for the future needs in the infrastructure and utility construction industry?
- How will we deal with the term valorisation in the various subsectors of the construction industry?
- What does the long lifespan of most infrastructure works mean for circularity? How does this affect business models, financing, and partnerships?
  - Which business models for circularity have stranded and which require (temporary) support?
  - How will we apply circular forms of contracts for management and maintenance to the private housing construction industry and to the development of housing projects?
- What does this mean for the book value, sales value and social value of an object if the constructed environment is considered to be a materials database?
- How can you construct in a demountable manner as a constructor?
- Which design and assembly strategies can you apply?
- What are factors of success in circular procurement?
- Which new knowledge fields will be developed as a result of the circular construction economy?

Photography: Waterschap Vallei en Veluwe

RESOURCES FROM WASTE WATER: SEWAGE WATER IS WORTH ITS WEIGHT IN GOLD!

On 17 June, 'Waterschap Vallei en Veluwe' opened its new Energy and Resources Plant at the water purification plant in Amersfoort. It is the first plant in Europe that produces ready-to-use artificial fertiliser from waste water.
'This factory shows how we view our role as a water board in the future,' says 'dijkgraaf' (water board chair) Tanja Klip-Martin. According to the principles of the circular economy, it is a future in which water purification plants become suppliers of energy and resources. 'Waste water is the oil of the 21st century,' she predicts. Apart from resources, the water board also retrieves energy from waste sludge. Last year, the water board also opened a similar plant in Apeldoorn. Together, these two plants already produce 80% of all energy the water board requires. The water board will be energy-neutral in 2020.

5. THE REQUIRED INVESTMENTS.

The spearheads mentioned in the Transition Agenda all to some extent require investments to start. These spearheads will individually be discussed here.

5.1 INTRODUCTION.

The spearheads in our strategy require both a short-term and a long-term approach. For instance, on the one hand it is important to quickly begin experimenting, executing pilot projects and scaling up wherever possible. On the other hand, however, it is important to first look at the consequences of amendments to legislation and regulations before they are implemented.

That is why additional investments are required to increase the volume and speed. These impulses will earn themselves back in the long term and will help to achieve the goals and ambitions faster and more effectively. They will also help boost the development towards a circular economy in the industry. Moreover, experiments and pilot projects result in valuable practical experience that can then be used to support research programmes. After all, 'the proof of the pudding' is still empirical. It is important that the investments relate to all three pillars mentioned in paragraph 3.1.

Construction market parties are already busy experimenting with circular initiatives. Examples include the high-grade reuse of materials from office and housing construction. It is mainly important to scale this up and learn from it, to make high-grade reuse a mainstream thing with the help of the tool set. The national waste management plan (Dutch LAP) is especially suitable for this approach.

The LAP indicates a minimum requirement and does not have a frontrunner mindset, so this calls for adjustment. A new angle would be the development of a form of producer responsibility for materials and services. This is applicable for installation technology, but also for applying materials and products in office and housing construction.

Reusing materials from the GWR industry has been common practice for a long time. However, with the exception of soil transport, the application of embankment and construction aggregate is still a matter of downcycling. The challenges in the GWR industry are related to instrumentation of circular management, maintenance, replacement and renovation, the design for reuse as well as reusing the product and material streams that are not strictly tied to soil transport and embankment materials in a high-grade manner. This involves guide rails, matrix signs, fixtures, sound screens, supports for overhead lines or complete stops, but also baked bricks, concrete paving materials, public lighting, street furniture, shoring, and playgrounds. This requires a budget for sharing the risk and for the costs that are required for organisation and management, supervision, and research.

Apart from using the existing tools, the transition in the construction industry will need to align with other priorities of the government. The energy-savings approach in the housing construction will go hand in hand with circular practices, for instance. The additional impulse linked to the national roads system will provide the experience that is required for circular initiatives in the GWR field. This combined approach is entirely in line with 'De Bouwagenda' that ensures innovation throughout the construction industry.

5.2 FINANCIAL NEEDS PER SPEARHEAD.

The Transition Team determines the financing needs per spearhead as follows:

DEVELOPING SUPPLY AND DEMAND.

Circularity can only be developed if there is sufficient market demand. Becoming and being circular must therefore be made attractive to the offering parties by means of a clear market demand. This is possible, for example, by increasing knowledge and awareness of circular procurement among clients or by having the major national clients (RWS, ProRail and RVB) set up living labs projects. These parties can jointly tackle a challenge, share knowledge and find solutions that will provide added value to all in the long term. Implementation of the Concrete Agreement that is in formation is also a part of this.

On the other hand, a number of techniques and products that are required for the circular economy do not yet exist or only partly exist. This includes demountable construction and large-scale use of bio-based materials in new applications, such as insulation. Developing technological regulations is also necessary. These overarching themes are best tackled at a pre-competitive level in collaboration between market, government, knowledge institutes and users; preferably in a TKI model.

A number of technologies will be developed by market parties themselves, because this will give them a head start in their own market field. Industry organisations capable of mobilising and uniting a large part of their supporters behind a common interest need to receive appropriate support. A subsidy tool, such as the WBSO (Act for the Stimulation of Research & Development) may accelerate technological developments.

Moreover, circular construction will have to be part of education and course programmes soon.

Market processes can be stimulated further by developing producer responsibility through chain projects and the stimulation of initiatives via the use of tool sets like MIA/Vamil.

The circular economy will only work in an economic sense if materials have a significant value upon reuse. This requires market parties that focus on creating value from materials and components in the constructions themselves. This value is higher if these components have been made specifically for reuse and as such are high-grade reusable components. This implies that reuse already needs to be taken into account during product development and in the design phase of a construction, even after a period of dozens of years.

New business models need to be created and directors will need to be engaged that offer an attractive proposition in the shape of a materials database. With sufficient volume, market parties will start offering these services. However, initial investments are required to start this.

The basic principle for the table below is that other existing funding sources can be found within the centralised and decentralised government for many actions. Because the Transition Team does not have complete insight into this matter, we estimated that 50% 'new' capital needs to be introduced.

ACTION	2018	2019	2020	2021	GOVERNMENT CONTRIBUTION	MARKET CONTRIBUTION
Client awareness	0.5	0.5	0.5	0.5	1	1
GWR living lab projects	20	30	40		60	30
C&U living lab projects	10	15	20		15	30
Development and sharing of knowledge	0.5	1	1		2.5	
Development of chain projects for producer responsibility	1	1.5	1.5	2.1	1.1	5
Research into and stimulating of social innovation	0.2	0.2	0.2	0.2	0.4	0.4
Circular design course programmes	0.5	1	1	1	3.5	
Developing technological regulations	1	1	1	1	1	3
Development of materials database	5.1	10.1	20.1	30.1	0.4	65
					84.9	134.4
50% new					42.45	
50% existing funds					42.45	

x € 1,000,000

POLICY, LEGISLATION AND REGULATIONS.

Existing regulations can sometimes unintentionally halt innovation. After all, regulations lag – by definition – behind the state of the art. Therefore, facilitating room for maximum circular experimentation is a precondition.

An important part of the means for the circular transition will be funded through revolving funds. The granting of loans results in the injection of additional capital in demonstrably circular C&U and GWR projects and allows a guarantee to be issued. Guarantees are in place to cover the larger risks related to market introductions. In turn, this will free up additional funding for projects where circularity is actively implemented. This fund is filled by the government and market parties (jointly).

ACTION	2018	2019	2020	2021	GOVERNMENT CONTRIBUTION	MARKET CONTRIBUTION
Revolving Circular Fund	5	10	20	30	20	45
					20	45
Probably to be combined with existing funds				net	nil	

x € 1,000,000

STARTUP COSTS AND TIME.

In order to boost circularity from the start it is important that the parties involved put in active efforts and make connections between clients and contractors, government and the market, as well as between challenges and potential solutions. These parties are often not-for-profit in nature and play a strong part in getting circular initiatives off the ground.

ACTION	2018	2019	2020	2021	GOVERNMENT CONTRIBUTION	MARKET CONTRIBUTION
Scaling up of high-grade reuse	2.4	3.4	4.4	5.4	1.6	14.0

x € 1,000,000

MEASURING AND COMMUNICATION.

A uniform and universal measurement tool is vital to a good circular mechanism. This will require investments quickly. The same applies to the underlying source of relevant information: a database that is accessible to everyone.

Apart from measurement, awareness also needs to be created among both the directly involved parties and among society as a whole. We can launch a large number of well-focused campaigns to achieve this.

ACTION	2018	2019	2020	2021	GOVERNMENT CONTRIBUTION	MARKET CONTRIBUTION
Development of a measuring tool	0.1	0.2	0.2	0.2	0.7	
Expanding and improving NMD		0.1	0.2	0.2	0.5	
Communication about circularity campaigns	1.0	2.0	2.0	1.0		6.0
					1.2	6.0

x € 1,000,000

GOVERNANCE.

The success of the execution of the circular Transition Agenda is closely tied to how it is managed. For this reason, governance is a very important aspect, which will require the following investments. Read more about the Governance proposed by the Transition Team in chapter 6.

ACTION	2018	2019	2020	2021	GOVERNMENT CONTRIBUTION	MARKET CONTRIBUTION
Programme agency	0.8	0.8	0.8	0.8	3.2	

x € 1,000,000

INNOVA58: TESTING GROUND FOR CIRCULAR ROAD DESIGN.

No one really knows yet how circular road design needs to be tackled. For this reason, the Directorate-General for Public Works and Water Management will find this out together with the market, regional partners and knowledge institutes in the InnovA58 project. It is one of the ways in which the Directorate-General for Public Works and Water Management works towards the goal of working in a circular manner by 2030. In addition to a standard design, engineering firm Witteveen+Bos will draw up a fully circular design for the road expansion from two lanes to three lanes of the A58. All circular aspects will be taken into account: modular/adaptive construction, smart land use, maximum recycling with bio-asphalt, for instance, stretching the lifespan of materials, service-oriented procurement (instead of product-oriented).

'The design will be ready in the first quarter of 2018 and will certainly contain circular aspects,' says Wim Leendertse, project manager of InnovA58 Directorate-General for Public Works and Water Management. 'Whatever is feasible will be built circularly for InnovA58. The primary goal, however, is to acquire knowledge together. 'Circularity comes with many dilemmas. The consideration between energy and circularity, for example. Soil is a basic resource that remains the same and can thus be reused infinitely. We should build with soil as much as possible, but its transport involves a lot of CO_2 emissions. How will we deal with that conflicting interest? Another topic is modularity. Which modules can be applied in a broad scope? What is a good standardisation method? We will discuss these dilemmas with all collaborative partners in a community for a circular GWR industry.'

6. PROGRESS.

The Circular Economy Transition Agenda focuses mainly on the near future, so concrete steps can be made quickly. However, it is of vital importance to already start looking at the next phases. The Transition Team makes a number of recommendations to organise this in a scheduled way, from actions to programme. Clear governance with good progress monitoring is crucial in this.

6.1 GOVERNANCE.

In order to perform the tasks on the Transition Agenda we need a powerful administrative body that manages and adjusts this complex process. A steering committee will determine the programme and the budget and will lead the transition process. To this end, the steering committee will motivate and facilitate target groups and actors and will boost processes. Communication and PR are indispensable. Moreover, the steering committee will provide the required institutional conditions for the transition. The committee will determine the indicators on the basis of which progress is measured and is responsible for setting up and implementing the monitoring programme.

Our proposition is to create a compact Steering Committee that contains about six members of the current Transition Team. An execution team or programme agency will ensure the day-to-day implementation of the Transition Agenda. Furthermore, a feedback team made up of members from the government, knowledge institutes, interest groups and market parties will periodically take a critical look at the progress and the programme and issue advice. The current Transition Team has a good composition for this and can take up these duties after the Transition Agenda has been determined. The benefit is that this enhances continuity.

Close collaboration with 'De Bouwagenda' is a necessity. If a Construction Top Sector is formed, the Steering Committee would naturally fall under it. A TKI-like structure is the obvious choice.

6.2 MONITORING.

It is important to measure the progress of the circular transition.
This provides insight into whether or not the transition is headed in the right direction or needs to be adjusted. The national programme already announced the development of a measuring protocol (Infrastructure and the Environment & Economic Affairs 2016b). In the Raw Materials Agreement 2017, the central government orders knowledge institutes to develop this monitoring system including baseline measurement, based on the relevant physical, economic and social indicators, that can count on a high level of support and aims at providing insight into:

- The progress of agreed-upon actions.
- The development of resource streams to, within and from the Netherlands.
- The transition dynamics (how far along in the transition we are, how people and organisations are included in the transition, how interventions of partners are attuned to the transition phase of the separate chains and sectors).

The order for the development of the monitoring system including the baseline measurement has been assigned by the central government to the Netherlands Environmental Assessment Agency (PBL), Statistics Netherlands (CBS), and the Netherlands National Institute for Public Health and the Environment (RIVM). Other knowledge institutes have also been employed for specific components (see below).

The developed monitoring system including the baseline measurement consists of three monitoring components (analogous to the trichotomy in the Raw Materials Agreement 2017):

- Actions in the national programme (RIVM, Directorate-General for Public Works and Water Management).
- Effects on resource use, the environment and the economy (CBS).
- Transition dynamics (PBL, Utrecht University).

The developed monitoring system will be presented for approval to the Second Chamber early next year.