



PBL Netherlands Environmental
Assessment Agency

EVALUATION OF GREEN DEALS FOR A CIRCULAR ECONOMY

Policy Brief

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Evaluation of Green Deals for a Circular Economy

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Evaluation of Green Deals for a Circular Economy

Introduction

Since 2011, the Dutch Government has been applying the 'Green Deal' approach. Green Deals are voluntary agreements between various parties working together to increase innovation and sustainability. The primary objective of the Green Deal approach is to stimulate dynamics in society via green projects and remove any related bottlenecks. The secondary goal is for the Green Deals to be emulated in other projects, in order to achieve similar positive effects. In these deals, various ministries have committed to efforts intended, among other things, to remove legislation-related bottlenecks.

PBL has conducted research into the role of Green Deals in paving the way for a circular economy. The findings are presented in this Policy Brief. For the study's context, approach, and further results, see the background report (Ganzevles et al., 2016, in Dutch). The PBL research also supplied input for a letter by the Ministry of Economic Affairs to the Dutch House of Representatives on the formal evaluation of the complete Green Deal approach.

The PBL study focused particularly on the environmental effects that may be achieved through Green Deals. As such, it complements the broader policy evaluation, conducted by the Kwink Group (2016), which took the complete list of more than 200 deals as a starting point. As a supplement to that evaluation, the Netherlands School for Public Administration (NSOB) compiled an essay, at the request of the Ministry of Economic Affairs, expanding on the Green Deal approach as a form of network management by the government.

Within the Green Deal theme of Resources and Circular Economy, the PBL study selected 36 deals aimed at closing cycles (see Appendix 1 for a short description), hereby excluding the Green Deals that were limited to 'linear' objectives only, such as stimulating the use of renewable resources, without any additional 'circular' objectives. For the 36 'circular' deals, an overview was created of the frequency and tangibility of parties' agreements on circularity, innovation (e.g. sharing knowledge, the execution of pilots and scale ups with the intent of market rollout), and the potential benefits for both the economy and the environment. The progress in executing the deals was investigated for 13 of the 36 deals, with a focus on the aspects above, and using information supplied by the parties involved in the deal to Netherlands Enterprise Agency (RVO.nl). Five of those deals were subsequently studied in more detail, using a qualitative life cycle assessment (LCA) to evaluate the environmental claims of these deals.

This study expands on PBL's previous evaluations of the Energy Green Deals from 2011 and 2012 (Elzenga, 2011; Elzenga and Kruitwagen, 2012). These evaluations concluded that deals can be expected to have a small additional effect on achieving goals for renewable energy and lowering emission levels. This research also complements other PBL studies, such as 'Food for the Circular Economy' (Rood, Muilwijk and Westhoek, 2017) and 'Circular Economy: Measuring innovation in product chains', Potting et al., 2017).

Main Findings

The Green Deal approach has added value for the process of green innovation. For the researched deals, all parties (businesses, branch organisations, government authorities and semi-government organisations, and social organisations) were found to comply with their agreements on knowledge sharing and cooperation for a circular economy. The participants were also found to be taking concrete steps for the execution of trial projects. In addition, scale ups are currently in progress, which entails that significant market shares are kept in mind by commissioning environmentally friendly industrial installations and/or implementing a branch-wide rollout of environmentally friendly or green innovations.

Other policies remain necessary for the large-scale rollout of green innovations alongside the Green Deals. Each deal only affects one segment of the innovation process, due to limited processing time. Only a select few can be decisive for scale-ups with the intent of market rollout. The dependence on other government authorities (municipalities, provinces, and the European Union) for regulation and licencing is a priority. For example, think of the necessary, but time-consuming, adjustments to European statutory rules and regulations to allow the inclusion of insects in animal feed and food for human consumption.

Green Deals do not automatically benefit the environment. The green claims made by parties in these deals are usually neither supported nor evaluated.

Even when environmental benefits are plausible, more ambitious targets would be feasible. Resource recycling is a dominant theme in the researched deals. For an economy to be circular, the standard must be far higher. A circular economy requires more than simple recycling. From an environmental perspective, other strategies that take the entire production and consumption chain into account would be preferable. Greater environmental benefit is often achieved through careful consideration of improvements to the production process and use of products, and by increasing the lifespan of products and parts.

The findings above lead to the following general recommendation for the national government:

Despite the more bottom-up nature of Green Deals, aim for more 'green'.

Guaranteeing the environmental public interests of the Green Deal approach calls for increased governance. If this is not provided, the contribution of the deals to greening the economy is expected to be only limited. Aiming for green starts by making deals with a speedy, independent, and general environmental screening, the results of which can then be used for formulating the environmental aspects in the deals' agreements. Such screening could also lay the foundation for additional environmental monitoring and guidance. The preconditions set by the government for making green deals have become stricter since 2011. The addition of environmental goals and other indicators for green innovation can be another step along the implemented learning curve of the Green Deal approach.

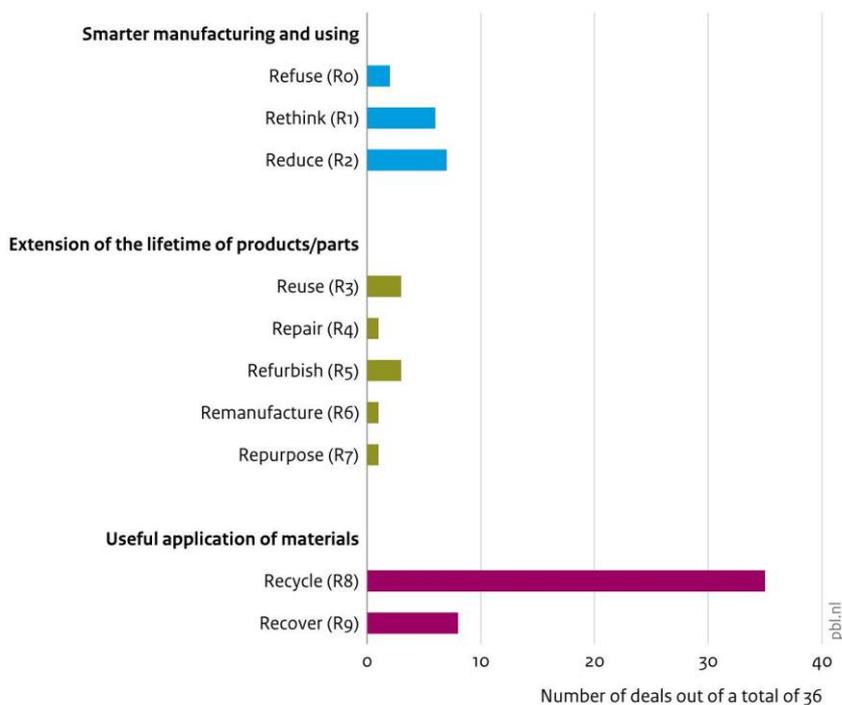
In the following sections, these general findings and recommendation are clarified and elaborated.

Current Circular Economy Green Deals are mainly aimed at recycling

According to the study, 35 of the 36 are primarily aimed at the useful application of materials through recycling (R8 in figure 1). Examples of recyclable material flows are carpet waste, plastic waste removed from the sea by boat and agricultural waste, used to create new materials. Eight of the deals involve a combination with energy generation (R9); for example, by producing bio gas by fermentation of organic waste.

Figure 1

Goals and ambitions of Dutch 'Green Deals' for a circular economy, ordered according to priority, 2015



Source: PBL

Other strategies are more favourable for gaining maximum environmental benefits (Cramer, 2014; Potting et al., 2017; Rli, 2015; Vermeulen et al., 2014). More than a third of the researched deals take smart use and smart production into account (R0–R2), aimed at preventing the need for resources. In extreme cases, this means that parties fully abandon particular products; for example, when they choose not to purchase those wrapped in plastic. Alternative product use and management is a component in six of the Green Deals studied. This means that there is a shift from providing products to providing services, which is done by focusing on practices such as car sharing and performance contracts with circular purchasing. Seven deals pay attention to more traditional resource efficiency — doing the same or even more with less input of energy and materials. One such Green Deal involves increasing the sustainability of the concrete industry’s production and supply chain. With this Deal, the sector aims to use less energy and resources in gravel extraction and the production process of concrete.

Increasing the lifespan of products and parts (R3 – R7) prevents the need for resources to make new products. This strategy was found to be used only on a limited scale. Reuse of products, such as textiles and chemicals, is included in three Green Deals. Repair and renovation is a key element in one deal on sustainable traffic barriers along motorways. The creation of new products with recycled parts or the invention of new applications for discarded products hardly receives any attention in the deals studied.

Recommendation 1: Greater focus on Green Deals in which the parties involved raise the bar for a circular economy higher than merely recycling materials.

Points of attention:

- To stimulate or initiate Green Deals that promote increasing the lifespan of products and parts, or those that aim for smarter production and use of products.
 - To challenge parties that primarily focus on recycling materials to develop higher priority activities, from an environmental perspective.
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Environmental benefits are supported and reviewed only to a limited extent

When entering into Green Deals, parties are not required to formulate tangible environmental objectives for which they could be held accountable. At the same time, every deal carries the promise of greening the economy. The deal approach originated from the desire to stimulate dynamics in our energetic society. The government functions as a facilitating network partner that seeks to remove barriers for parties, instead of making new demands.

For this study, PBL evaluated the environmental goals and ambitions of 36 Circular Economy Green Deals. Approximately half of the deals were found to have rather abstract environmental objectives and to be lacking in quantitative goals. And, in the deals that did include more concrete targets, the measurability of their environmental impact and the possibility of evaluation proved to be limited. There are various reasons for this:

- Parties that make Green Deals mainly register their implemented methods for environmental improvement rather than the ultimate environmental effects. For example, describing the intention to raise the number of shared cars to 100,000, without stating a concrete positive environmental target, such as a certain decrease in CO₂ emissions or in the amount of necessary resources. One exception is the Green Deal of Dutch railway organisations NS and ProRail. Their aim is for a 25% decrease in the waste from stations and trains by 2020, compared to 2014 waste levels, to a total of 9,000 tonnes.
- The baseline situation from which environmental benefits could be measured is usually not clearly described. The focus is mostly on the future situation that the deal is working towards. However, without such a baseline, a deal's true impact cannot be determined.
- Central monitoring of Green Deals by Netherlands Enterprise Agency (RVO.nl), usually does not include environmental effects, as it was never designed to

determine such effects. Instead, it was set up to follow the progress of the agreements between the various parties involved.

- Whether or not environmental information on a deal is available, currently is largely dependent on the information provided by the participating parties. Providing this information is voluntary, although RVO.nl does encourage them to do so.

Environmental screening of deals: keeping a focus on environmental benefits

A screening evaluation was conducted for five Green Deals, following a product chain approach (a rough and qualitative life cycle assessment) to screen their potential for greening. This concerned the deals: 'Insects for feed, food, and pharma' (Deal 92), 'The benefits of horse manure' (Deal 96), the 'Fair Meter' (Deal 158), 'Circular buildings' (Deal 178) and 'Car sharing: to 100,000 shared cars in 2018' (Deal 183).

Conducting qualitative LCAs is a generic approach, which is applicable to virtually all Green Deals. In other words, not only deals that are aimed at a circular economy. Environmental screening can be conducted beforehand, to determine potential environmental benefits. An environmental expert can set up such screening within a short amount of time, provided that the parties involved in the deal issue relevant information in a timely fashion. Starting point for the screening are the changes that the Green Deal in question expects to generate along the chain. Any unintended effects on other chains should also be taken into account.

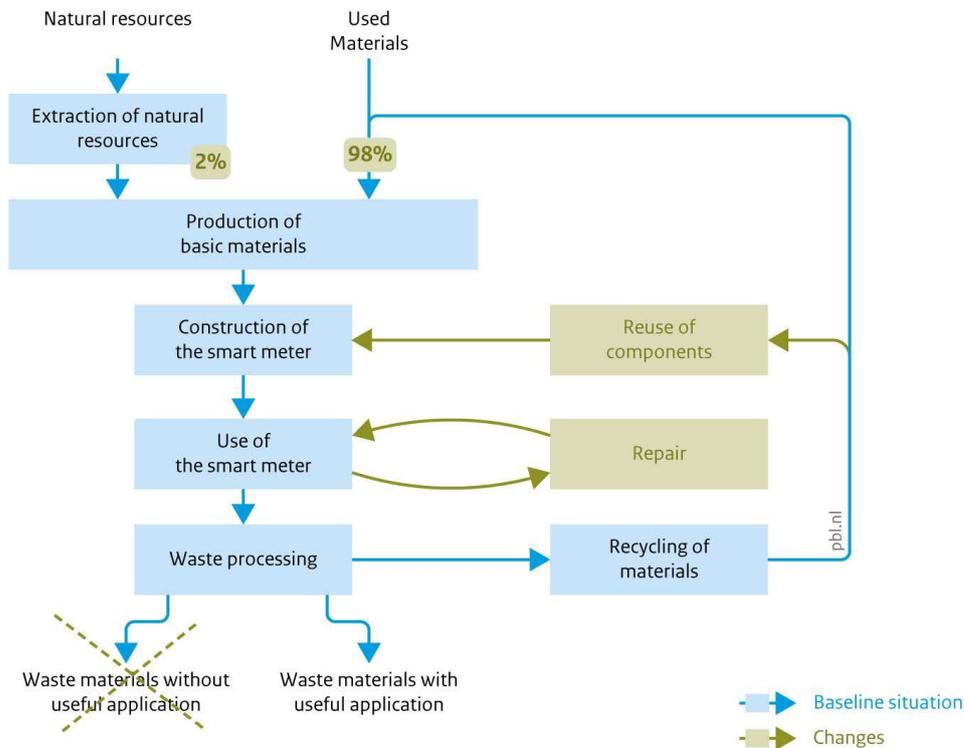
Figure 2 shows the example of the Fair Meter Green Deal — a 'fair trade' alternative for a smart electricity meter. From this Green Deal's environmental screening, it appears that most environmental benefits come from the reuse and repair of parts. This can be organised within the chain, just as parties aim for. Another ambition of the deal is that of constructing the meter from 98% in recycled materials. This may, however, have consequences for chains not included in the deal. Using recycled metal in the Fair Meter may compete with its use in other electronic devices. The issue of competition is expected to be less prominent for the recycled plastics used for the outer casing.

Another important indicator of net environmental benefits is the timespan within which the regular 'non-fair' smart meter would need to be replaced. Regular smart meters will be rolled out en masse, up to 2020. Only after this has happened could the Fair Meter take its place. This replacement term is difficult to determine.

Screening the five deals on their greening effects showed that a net decrease in environmental pressure does not come about automatically. The chosen starting point from which to measure environmental benefits, for example, partly determines the screening results. Furthermore, crowding out resource flows in other chains is only taken into account to a limited extent. Therefore, continual and critical analysis is needed about both the projected and achieved net environmental benefits.

Figure 2

Life cycle changes Green Deal Fair Meter



Source: Van der Harst; adaptation by PBL

Recommendation 2: When entering into a Green Deal, pay more attention to the basis of environmental claims and to environmental monitoring.

Points of attention:

- To clarify the baseline situation for measuring environmental benefits.
- To look at possible effects in other chains: could there be cases of unintentional displacement or side-effects?
- To involve one or more independent environmental experts for each new deal that is created. This would enable an initial assessment of any net effects that these may yield.
- To use environmental information, on deal level, to determine a limited set of environmental indicators to be recorded in the central monitoring system (RVO.nl).
- To encourage parties to make specific agreements on environmental research and the provision of information for environmental monitoring.

Systematic customisation for greening the economy

The power of the deal approach lies in systematic customisation to achieve green growth, as demonstrated in the study. The contribution to green innovation varies per deal. Each deal relates to only a segment of the innovation process, due to their limited scope and processing time.

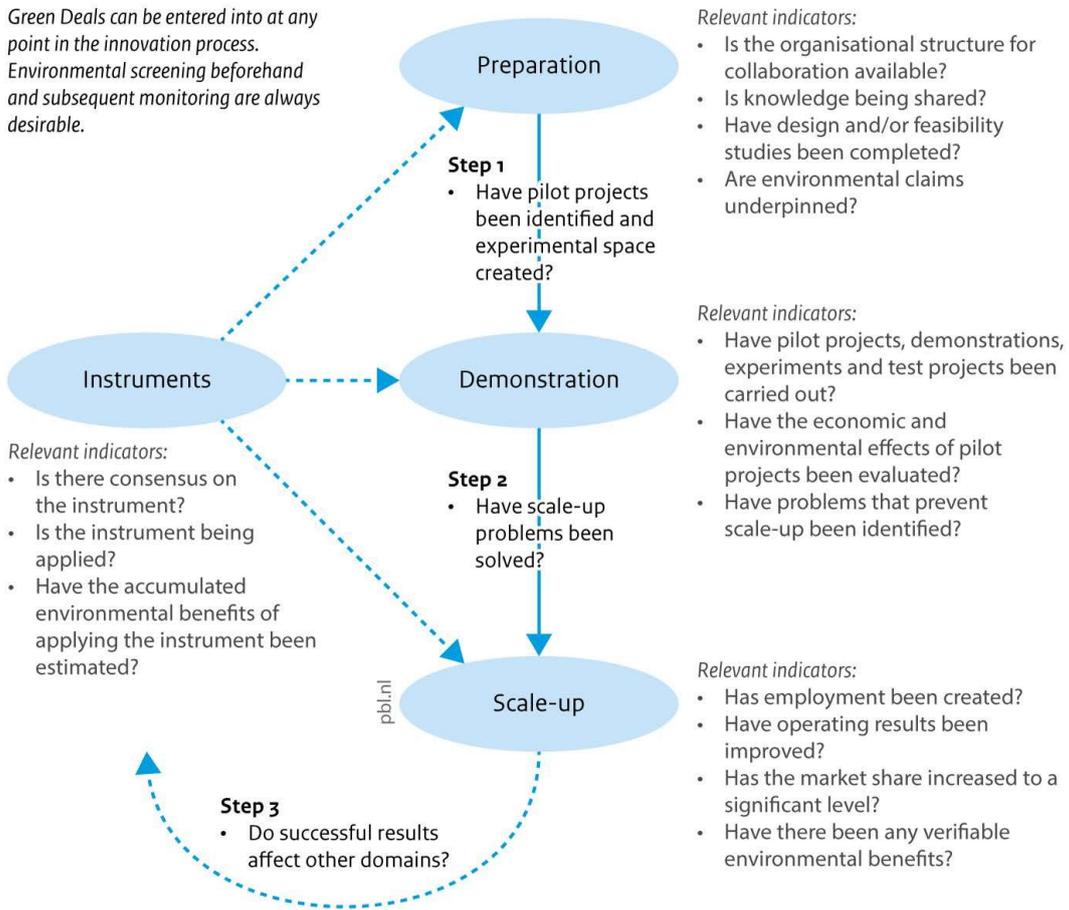
From a linear perspective, innovations go through various phases, from 'research and development' to 'making preparations' and 'demonstrating', to 'scale-up' (Figure 3). Taking these phases into account, the Green Deals studied show the following pattern:

- They are not aimed at the earliest innovation phase of research and development.
- Many of the activities conducted by parties involved in the deals are in the preparation phase. Their focus lies on preparing for the implementation of trial projects; knowledge sharing, cooperation, and the implementation of design and viability studies. This plays a role in nearly half of the deals in this study. One example is a study into the feasibility of a 'Circle City' project, in conformity with the market. This Circle City project is about extensive recycling for new buildings, and construction and renovation of existing ones. Agreements about the preparatory part of the process are usually complied with, but there is little attention for the information in support of the deal's environmental claims.
- With various deals, parties take the initiative for demonstrating innovations. For example, in the deal on bio-plastics made from biodegradable waste, where a pilot installation is an explicit part of the agreements. Another example is that of trial projects to produce building materials from waste materials from greenhouse horticulture. Occasionally, the step towards the demonstration phase is underestimated. This may for example be due to the difficulty of finding partners or locations for conducting pilots. The environmental benefits achieved in such pilot projects, however, are either not being evaluated or unclear.
- Some of the deals demonstrably contribute to a scale-up. Examples are those on energy and resource generation in sewage treatment systems, and the deal on car sharing. At the same time, there is little clarity on economic and environmental effects, such as additional employment and emission reduction.
- In addition, there are facilitating deals that are primarily aimed at instruments, such as the development of a performance ladder or a building passport. The primary concern of parties in these types of deals is to reach consensus about the instrument within the run time of the deal. At present, Green Deal descriptions give no estimations of the environmental benefits of widespread application of such instruments.
- Furthermore, in various deals, parties are attempting to couple their results to existing instruments, such as standards, regulations and current policy dossiers.

Indicators can be advantageous to determine the systematic customisation for green growth. Figure 3 shows a schematic of relevant indicators, based on a close inspection of the Circular Economy Green Deals. The relevance of indicators and how this can be measured, depends on the deal's position within the innovation process.

Figure 3

Process schematic of Dutch Green Deals



In addition to the Green Deals, other policies also are necessary to realise large-scale implementation of green innovations. Only rarely can a deal be the deciding factor in scale-ups with the intent of market rollout, because there are too many external factors involved. As such, deals strongly depend on or are even hindered by other government authorities. For example, in the case of the necessary but time-consuming adjustments to European rules and regulations, in order to allow insects to be used in animal feed and food for human consumption, or in situations where each machine trial run requires a new provincial permit. Furthermore, certain deals start up at a time when market rollout is not feasible yet, such as setting up experimenting zones for a bio-based economy in the northern Netherlands. For other deals, such as that on the generation of energy and resources for sewage treatment involving the Water Authorities, a certain scale-up had already been implemented before the deal was made. In those cases, the deals' agreements play a role in the support and implementation of scale-ups.

The involvement of the Dutch Government in the follow-up after completion of a deal is desirable, at a minimum for transferring learning experiences onto other domains. If there are opportunities, the parties involved in the deal are unlikely to take the first steps themselves. In the deals, agreements are made between parties that have contacted each

other within their respective domains. These parties have no immediate, vested interest in helping their results find their way into other domains. For example, this is the case for the separation and recycling of waste discarded in trains, with experience gained here being shared with management organisations of public and semi-public spaces other than NS and ProRail. The government has committed to help achieve this translation. The initiative for such implementations elsewhere may be taken by public–private collaborations, as is applicable to the Kennisinstituut Duurzaam Verpakken (Netherlands Institute for Sustainable Packaging).

Recommendation 3: Take into account which innovation phase a deal is related to, when making, monitoring, and evaluating deals. Relevant indicators may differ per phase or be measured according to a different method. The developed schematic may help to determine which indicators are relevant.

Points of attention:

- To adjust the central monitoring in such a way that the monitoring is focused more on indicators being in line with a deal's particular innovation stage, rather than on whether agreements are being complied with.
 - To challenge parties who wish to develop a new environmental instrument to clearly state the expected environmental benefits. The projected impact of large-scale application of the instrument could be included in the description of the deal.
 - To conduct independent screenings of the expected environmental benefits related to new deals — irrespective of the innovation stage to which these deals relate.
 - To be aware, particularly for the national government, of any opportunities for applying lessons learned in one domain also in others.
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Appendix 1

The descriptions of the deals have been taken from the parliamentary letter by Minister Kamp on the policy regarding the Circular Economy from 20 January 2015, and from www.greendeals.nl.

No.	Selection of Green Deals that are aimed at aspects of a circular economy (N = 36)
2	Biomass flows (platform agro-paper-chemicals) Collectively preparing six new business cases where biomass and waste flows are valorised to a maximum, before 1 January 2014 (for example, proteins from waste flows, chemical building materials from plants, ligno-cellulosis as a resource, closing the mineral cycle, water valorisation)
6	Energy saving on waste processing Achieving more recycling and energy saving by: 1) conducting cost-benefit analyses, in preparation of a multiannual agreement; 2) realising a gasification installation for waste-to-energy processing, including the cogeneration of heat to be delivered to residential areas; and 3) fermentation of biodegradable waste to produce biogas
11	Sustainable processing of carpet-waste flows Separating carpet waste, via waste sorting facilities, to be used as fuel for the cement industry and to be recycled to high-quality materials where possible.
27	Sustainable heat from biomass Entrepreneur Van 't Voske aims to realise an energy-neutral mushroom-cultivation company, by incinerating cultivation substrate for energy generation (incineration). The fertiliser industry can recycle nutrients from the ashes.
28	Waste collection and sorting Constructing a website for consumers that gives an overview of collection facilities for waste products and materials.
30	Improved sustainability of the concrete chain Improved sustainability of the entire concrete chain, from addressing biodiversity aspects during the phase of gravel extraction to saving energy and natural resources during the later phases of production and recycling – including the way recycled demolition concrete is mixed in with raw materials. Also improved sustainability of, for example, design and logistics processes.
41	Bio-based park Westland Establishing a 'bio-based' park where companies can valorise plant-based waste into superior content components, such as fibres, biocides, fruit juices, and biogas through industrial symbiosis.
57	Association of Dutch Water Authorities Realising large-scale energy plants that generate biogas, green electricity, and sustainable heat, and regenerate nutrients/resources
76	Improved sustainability in applying bottom ash from waste-to-energy power plants Waste-to-energy companies investing in the sustainable application of bottom ash along the entire chain, and taking part in relevant initiatives and communication.
81	Alternative resources for paper production Industrial pilots using alternative resources for paper and cardboard production
87	Sustainable traffic barriers Application of renovated traffic barriers to promote recycling.
92	Insects for feed, food, and pharma The VENIK company aims to use waste-flows as feed for large-scale insect farming, in order to produce bulk resources (proteins) for the feed and food industry
94	Sustainable digestate processing and protein production for livestock The Franico company aims to use duckweed, cultivated on its own digestate from fermentation, as a protein source in animal feed and for biogas generation.
96	The benefits of horse manure Equfec, Stichting iNSnet, Staal Agritech and Paard&Zo aim to construct an installation for drying and pelleting horse manure and straw.
109	Sustainability label for outdoor products and materials Development of a NL Label, a standardised method for the integral sustainability valuation of outdoor products and materials (from pavement and plant materials to street furniture)
114	Natural plastics B.V. New planting method for trees; plant anchors made of degradable bio-plastics instead of tree poles.
116	Nova lignum Construction material, such as wall plates, made from organic waste materials, such as aubergine stalks from greenhouse horticulture.
117	North Netherlands Chamber of Commerce Drawing up an inventory of bottlenecks - and removing them - for the development of a bio-based economy, and setting up an experimentation zone in the Veenkoloniën-Eemsdelta region.
131	Turntoo Purchase experiment for learning about 'performance-based contracting' and legal/administrative obstacles thereof
142	Sustainable collection of textiles Textile-waste reduction of 50% in 2015, compared to 2011 levels, thanks to the promotion of separated collection
147	Collection, environmentally friendly disassembly and recycling of mopeds Collection and disassembly of discarded mopeds for recycling
149	Approach for sustainable civil engineering From 2009 to 2012, organisations in the railway and civil engineering sector developed an approach to allow room for sustainable procurement to improve the utilisation of opportunities for sustainability and innovation. The approach for

	sustainable civil engineering is developed to the point that parties can now implement, spread, and continue to develop it.
156	CE Hotspot Netherlands Accelerating the transition towards a circular economy by conducting circular projects that can be scaled up. By realising synergy between companies and business projects, conducting sector and regional analyses, and developing policies aimed at green growth, the Netherlands will be able to position itself as a global 'hotspot' in the circular economy.
157	Production of bio-plastics from VGF (vegetable, garden and fruit waste) Parties want to make VGF collection sustainable, and develop a high quality VGF processing option. Parties cooperate on research into the generation of PHA (Polyhydroxyalkanoate) made of VGF, to enable the production of bio-plastics. In order to do so, they agreed on a pilot installation for the production of PHA in 2014. The PHA from the pilot installation is used for making bags for the environmentally friendly collection of VGF in the Venlo municipality.
158	Fair Meter Making minimal use of new resources for the production of the Fair Meter. As a minimal requirement, the materials in question must be acquired responsibly ('fair'). In addition, reused and recyclable materials will be used in the production process. Furthermore, the meter is fitted with a resource label. The goal is to have every meter consist for more than 98% of used resources and materials, and have them be 'designed for reuse'. A controlled experiment of 1,000 Fair Meters will be started.
159	Circular procurement Contributing to achieving a circular economy through the instrument of procurement. In concrete terms, this means that purchasing organisations in 2014 each started at least two Circular Procurement programmes, and that they actively share their gained knowledge and experience with other stakeholders. PIANOo, NEVI, MVO Nederland and Circle Economy facilitate this knowledge sharing. Where possible and relevant, Circular Purchasing participants integrate their purchasing processes.
160	Grasses and crops The development of business cases and market structure of bio-based products, with grasses and crops as raw materials.
166	Ship-generated waste Prevent continued pollution of seas and oceans by cutting back on floating plastic litter. Through prevention, separation, and recycling of plastic, improving supervision and harmonisation of waste disposal in harbours, parties intend to contribute to closing the plastic cycle.
168	Circle City Supporting a transition towards a circular and inclusive economy regarding material cycles in the construction sector by achieving a similar approach in at least five cities other than Rotterdam. The key component is project implementation (new buildings, construction, renovation) and securing work experience where involved parties cooperate.
170	'Take back' chemicals Implementing practical innovative company models that realise a sustainable and efficient use and reuse of chemicals and materials and remove any obstacles.
171	Fishery for a clean ocean Decreasing the amount of fishing-sector waste that ends up in the oceans. The entire fishery waste chain is involved in storing separated waste on board and in Dutch harbours, and recycling as much as possible.
174	Association of Dutch Water Authorities' resources Stimulating, accelerating, and where possible scaling up the generation and regeneration of resources from sewage. Parties strive to realise pilot and demonstration projects, and initially aim to generate and provide phosphate, cellulose, bioplastic and alginate.
178	Circular buildings The Green Deal 'Circular buildings' aims for minimal use and reuse of resources and products for the design and exploitation of commercial buildings. This means that not only the use of materials will be addressed, but also the extension of the lifespan of buildings, by maximising the adaptability of a building's use functions. An important component of this deal is the development of a building 'passport', which lists the circular characteristics of the building.
180	Waste reduction and recycling at train stations and in trains The goal of this green deal is to limit the amount of waste at stations and in trains (from 12,000 tonnes in 2014 to at least 9,000 tonnes by 2020) and to improve waste recycling to at least 75%. In order to do so, the Dutch railway service NS is cooperating with shop owners at stations to decrease the amount of packaging and to ensure that packaging is more recyclable. In addition, Dutch railway infrastructure service ProRail is providing new waste facilities and together they stimulate travellers to separate waste.
183	Car sharing: aiming for 100,000 shared cars by 2018 The goal is to have 100,000 shared cars by 2018. This is the implementation of an existing objective in the national energy agreement for sustainable growth. Car sharing and the sharing economy are both still in their infancy. In order to further develop these activities, mobility providers could utilise growth opportunities by increasing visibility, sharing knowledge and gaining experience in pilot projects.
184	Improvement in waste management in the Caribbean Netherlands This green deal aims to improve waste management on Bonaire, Sint Eustatius and Saba (BES islands). Improvements may be implemented for separating waste flows, by determining the amount of waste produced on the BES islands, the quality of this waste, and from where it originates. Furthermore, the green deal also involves setting up a knowledge platform to inform the island governments about the organisations active in the waste sector and to utilise their expertise when dealing with waste management issues. This will improve the governments' knowledge on waste, waste separation, and waste recycling.