Resource efficiency and circular economy in Europe – even more from less

An overview of policies, approaches and targets of the Netherlands in 2018

July 2019

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Acknowledgements

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This country profile was prepared as part of the 2019 EEA review of material resource efficiency, circular economy and raw material supply policies, which aimed to collect, analyse, and disseminate information about experience with the development and implementation of these policies in EEA member and cooperating countries.

At the time of writing, a summary report is being finalised. The report reflects on trends, similarities and differences in policy responses, showcases selected policy initiatives from member countries and identifies possible considerations for the development of future policies.

These country profiles were compiled and finalised by members from the European Topic Centre on Waste and Materials in a Green Economy, namely Bart Ullstein, Bettina Bahn-Walkowiak, Jeroen Gillabel, Margareta Wahlström, Jutta-Laine Ylijoki, Dirk Nelen, Theo Geerken, Veronique Van Hoof and Evelien Dils. The responsible EEA project managers for the work were Pawel Kazmierczyk and Daniel Montalvo.

Netherlands, facts and figures

Note: data in this section was sourced from Eurostat databases (April 2019), except where noted otherwise

GDP: EUR 737.0 billion (4.6 % of total EU28 in 2017)

Per capita GDP: EUR 43,000 (purchasing power standard) (143.3 % of EU28 average per capita figure in 2017)

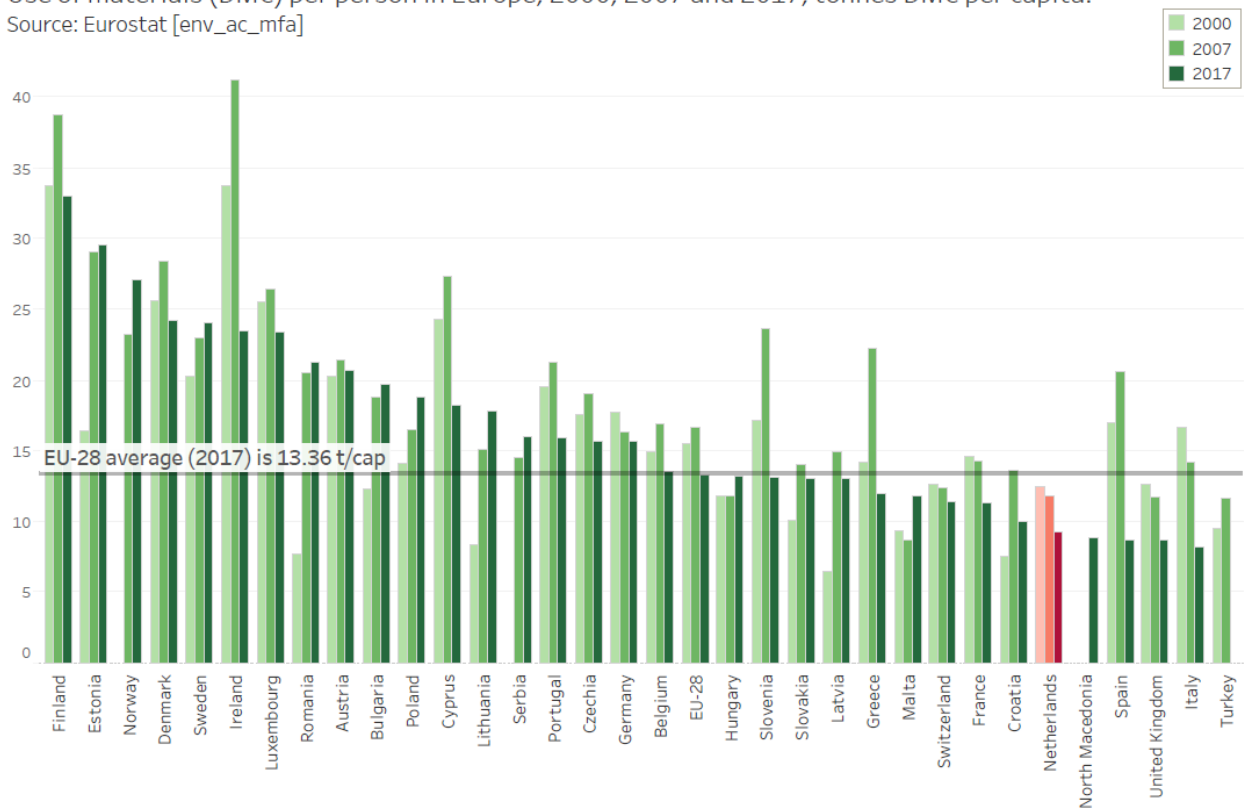
Use of materials (domestic material consumption (DMC))
159.4 million tonnes DMC (2.3 % of EU28 total in 2017)
9.3 tonnes DMC/capita (69.7% of EU28 average per capita in 2017)

Structure of the economy:
agriculture: 2.1 %
industry: 19.4 %
services: 78.5 %

Surface area: 41.5 thousand square kilometres (km^2) (0.9 % of total EU28)

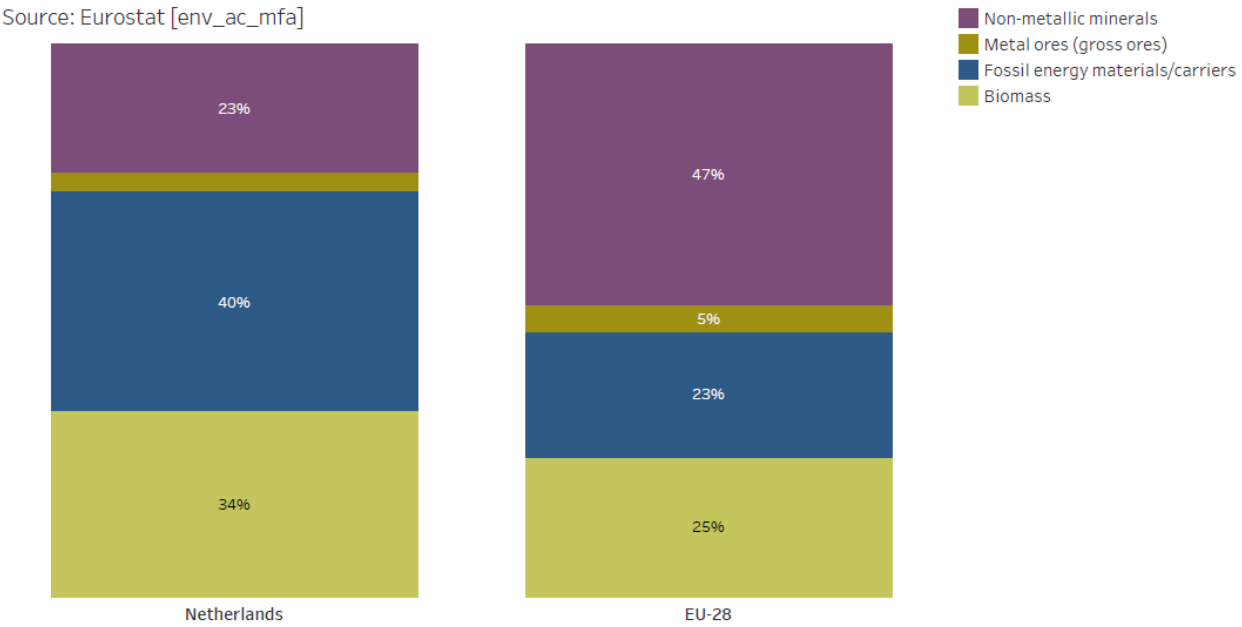
Population: 17.1 million (3.3 % of EU28 total in 2017)

Use of materials (DMC) per person in Europe, 2000, 2007 and 2017, tonnes DMC per capita.
Source: Eurostat [env_ac_mfa]



Netherlands & EU-28. Domestic Material Consumption by material category, 2017.

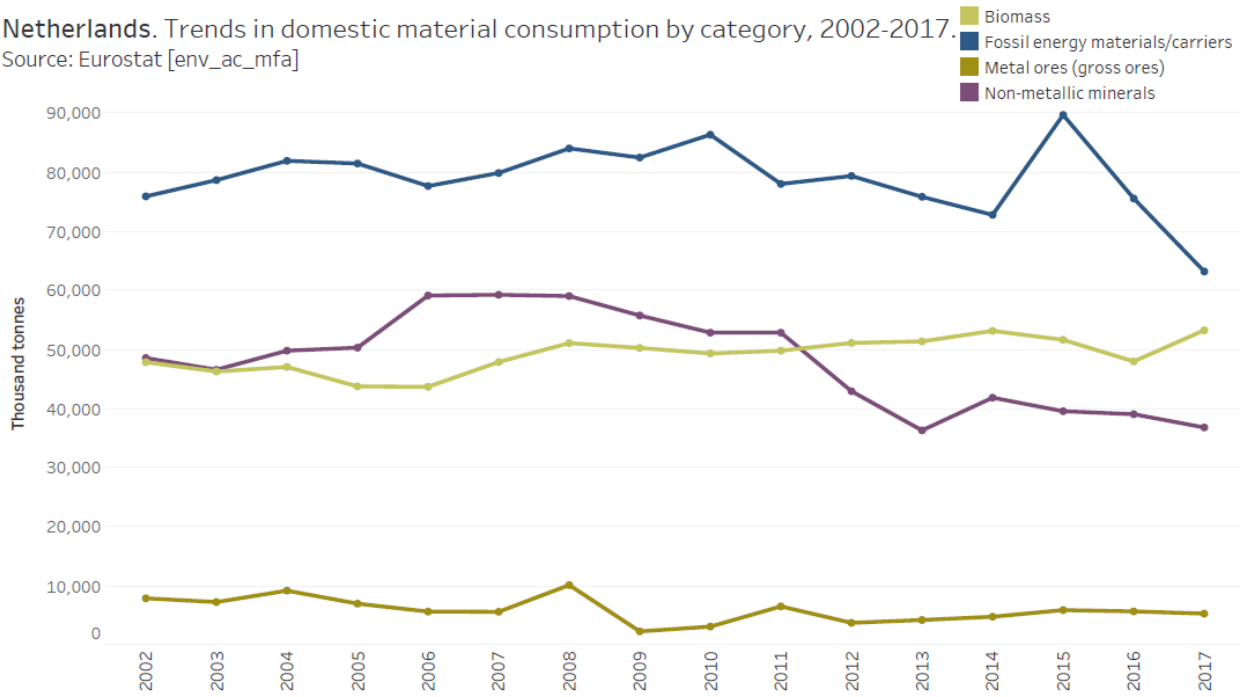
Source: Eurostat [env_ac_mfa]



Note: The domestic material consumption categories 'other products' and 'waste for final treatment and disposal' are excluded from the figure.

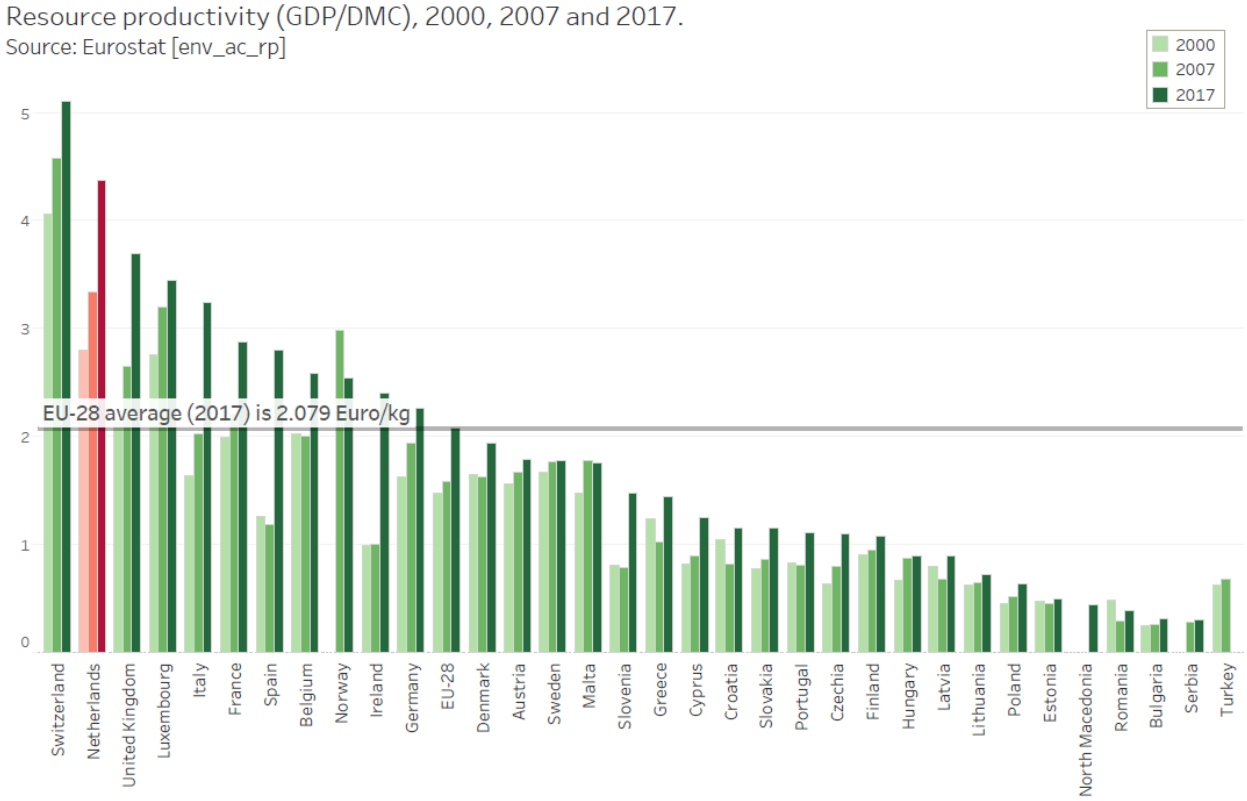
Netherlands. Trends in domestic material consumption by category, 2002-2017.

Source: Eurostat [env_ac_mfa]



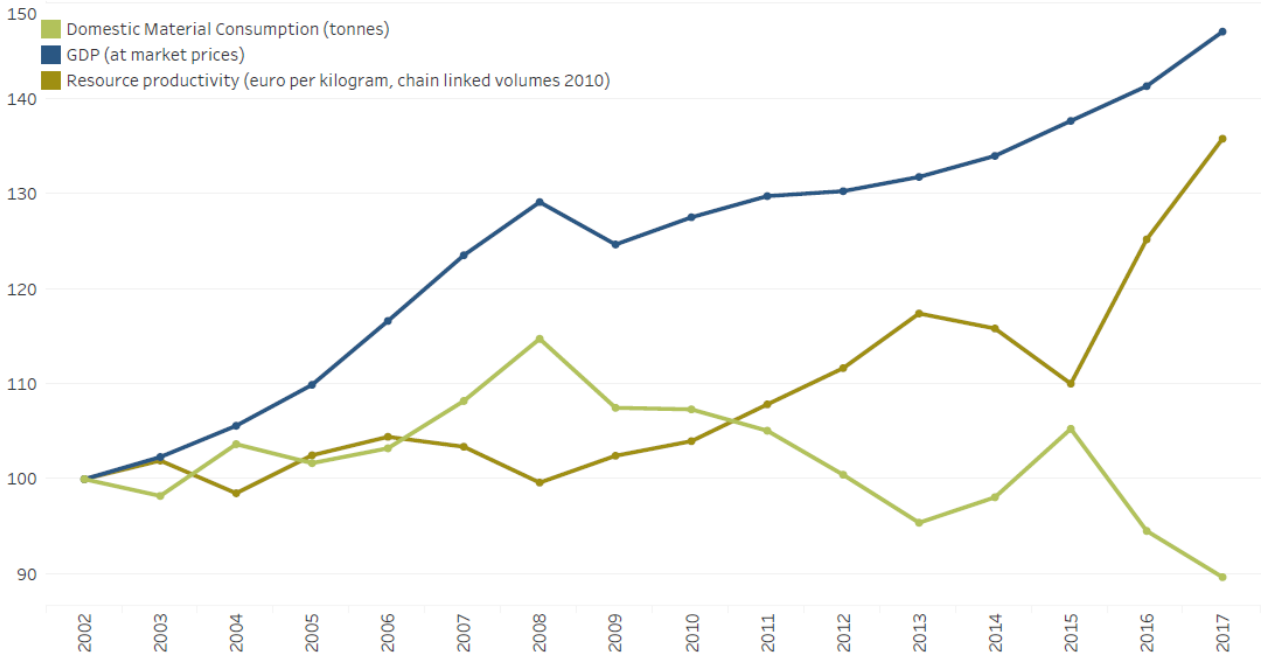
Note: The domestic material consumption categories 'other products' and 'waste for final treatment and disposal' are excluded from the figure.

Resource productivity (GDP/DMC), 2000, 2007 and 2017.
Source: Eurostat [env_ac_rp]

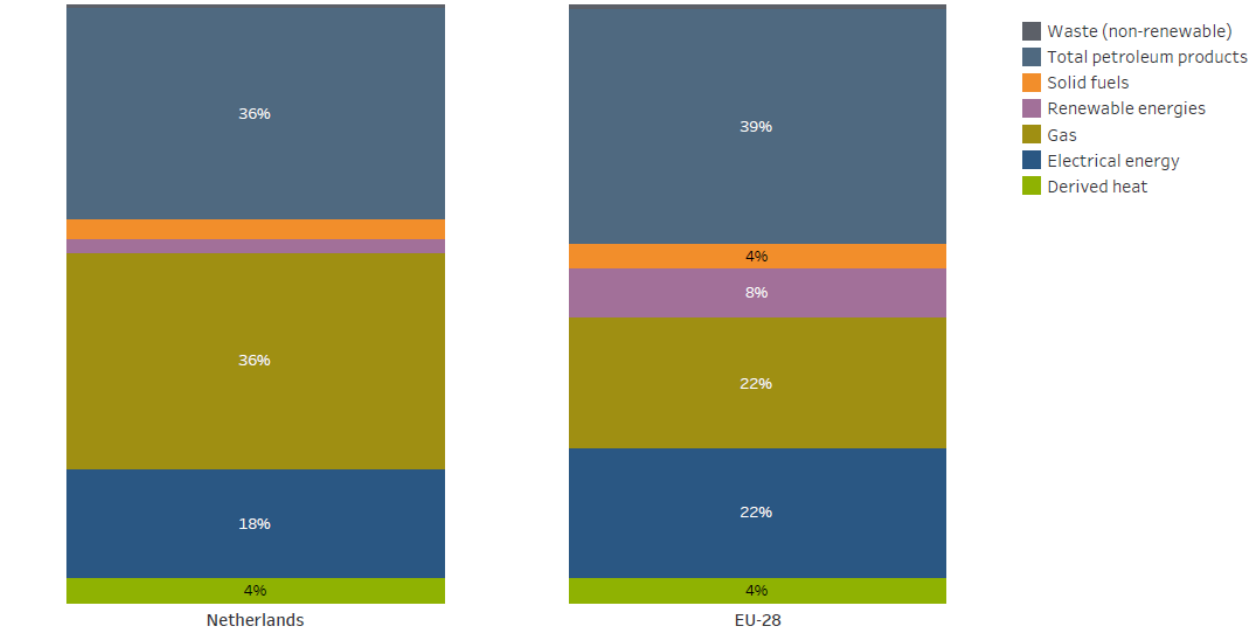


Note: GDP expressed in chain linked volumes 2010.

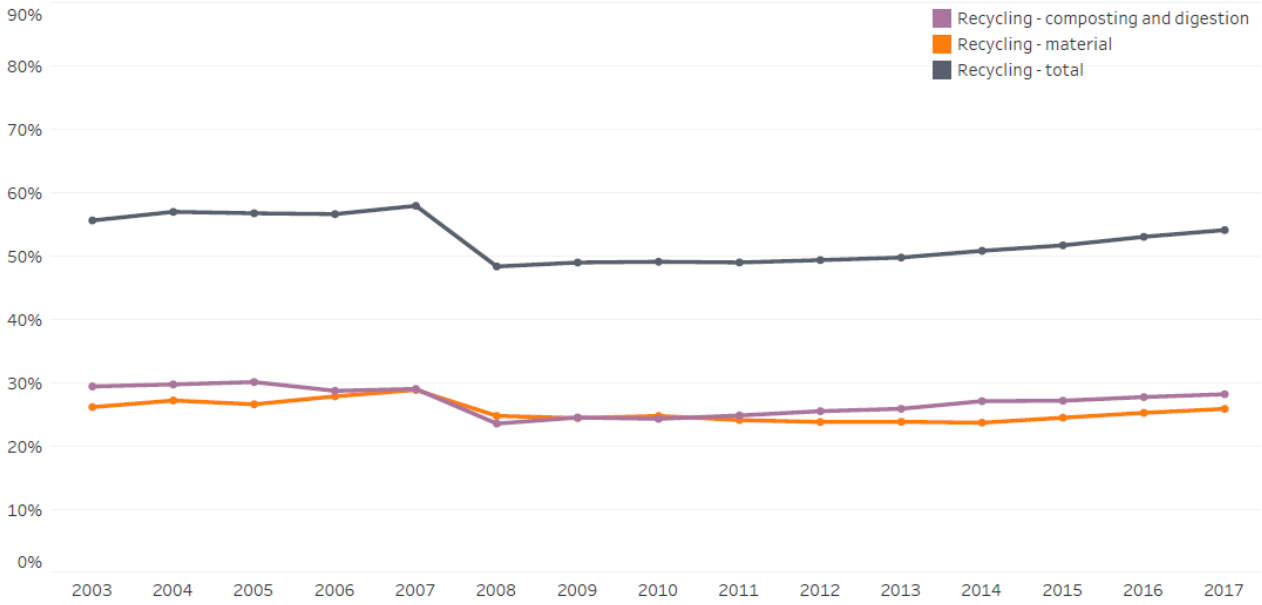
Netherlands. GDP, DMC and resource productivity trends, 2002-2017, index 2002=100.
Source: Eurostat [env_ac_mfa], [env_ac_rp] & [nama_10_gdp]



Netherlands & EU-28. Primary energy consumption by energy product, 2016.
Source: Eurostat [nrg_100a]



Netherlands. Recycling of municipal waste, 2003-2017, as share of total waste treatment.
Source: Eurostat [env_wasmun]



Note: The amount of municipal waste treatment is reported for the treatment operations incineration (with and without energy recovery), recycling, composting and landfilling.

Policy framework

Driving forces for material resource efficiency and circular economy

A number of environmental, economic and social motivations drive the development and implementation of circular economy policies in the Netherlands.

- The rise in demand for raw materials, which will lead to higher environmental impacts, increasing damage to and exhaustion of natural capital, a loss of biodiversity, a risk of exhausting the supply of raw materials and climate change. A further increase in the demand for raw materials will exacerbate environmental, climate-related and other sustainability issues, as was shown in the planetary boundaries study by Rockström and colleagues.
- The dependency of the Netherlands and Europe on other countries for raw materials, and the possible geopolitical tensions this will lead to. This, in turn, will impact the price of raw materials and the security of supplies, and thus the stability of the Dutch and European economies.
- Reducing the use of raw materials will contribute to reducing the consumption of energy and the emission of carbon dioxide (CO_2).
- The circular economy presents several economic opportunities. Innovation creates opportunities for businesses, start-ups and for science. The transition to a circular economy can lead to extra growth in gross domestic product (GDP) and new job opportunities.
- Better waste management in the context of the government programme From Waste to Resource.

Dedicated national strategies or roadmaps for material resource efficiency and a circular economy

The Netherlands has no dedicated national material resource efficiency strategy, an action plan or a roadmap. However, in 2011 the Dutch government submitted a Raw Materials Memorandum to Parliament, outlining national and European perspectives on global changes in resources, raw materials extraction, supply and consumption[1]. This memorandum was drafted by the Ministries of Foreign Affairs, Economic Affairs, Agriculture and Innovation, and Infrastructure and the Environment, is the first step in this process.

In this paper the Dutch government underlined that it is primarily the responsibility of private businesses to ensure they can source the materials they require. But the civil society, research institutions and governments also play a role, and they will be involved in follow-up action. The government is also looking to strengthen bilateral relations with countries to safeguard the supply of raw materials and the delivery of important semi-manufactured products. The government will also defend the free trade system, which is crucial for the Netherlands as a transit country.

In the domain of waste as a resource, a circular economy programme From Waste to Resource (Van afval naar grondstof) was published in 2014[2], formulating specific measures and objectives to enable the transition from a linear to a circular economy (more information in section on Policies which include elements of material resource efficiency).

The topic of material resource efficiency is now fully incorporated in the Government Programme for a Circular Economy by 2050[3], which was developed in 2016 by the Ministries of Infrastructure and the Environment; of Economic Affairs; Interior and Kingdom Relations; and Foreign Affairs, Trade and Development, and launched on 14 September 2016.

[1] https://www.government.nl/latest/news/2011/07/15/government-sets-about-tackling-raw-materials-problem (English)

[2] https://www.rijksoverheid.nl/documenten/kamerstukken/2013/06/20/van-afval-naar-grondstof (Dutch)

[3] https://www.government.nl/topics/circular-economy/documents/policy-notes/2016/09/14/a-circular-economy-in-the-netherlands-by-2050 (English)

A Timeline towards a fully circular economy in the Netherlands
In this document, the Dutch Cabinet outlines a vision of a future-proof, sustainable economy. By 2020, the Cabinet will have taken a major step in accelerating the pace of transition to a circular economy. Its ambition is to realise, together with a variety of stakeholders including government, businesses, trade unions, scientists and non-governmental organisations (NGOs) an interim objective of a 50 per cent reduction in the use of primary raw materials (minerals, fossil-based materials and metals) by 2030. With this objective for the use of raw materials, the Netherlands will raise its ambitions to meet the level adopted in comparable countries.

This Programme contains current measures and sets a course for the subsequent steps to be taken on the way to 2050, when raw materials will be used and reused efficiently and with no harmful emissions to the environment. In case new raw materials are needed, they will be obtained in a sustainable manner and further damage to social and physical living environments and public health will be prevented. Products and materials will be designed in such a way that they can be reused with a minimum loss of value and without harmful emissions entering the environment.

The Programme also streamlines and coordinates current policy efforts. For example, the Biomass Vision for 2030 (Visie Biomassa 2030[4]) and the Raw Materials Memorandum (2011)[5] have been incorporated into this programme.

The Programme builds on earlier green growth programmes From Waste to Resource and Biobased Economy (see section on Overview of dedicated national or sectoral strategies for raw materials). The goals and ongoing action of these programmes have been incorporated as a single point of entry document for circular economy policies in the Netherlands. The Programme also ties in with the policy to foster a healthy and safe living environment. In addition to creating connectivity in current policy, the Programme comprises proposals to accelerate the necessary transition to a circular economy. Furthermore, it expands the approach into areas such as food, construction, finances, education and the labour market. Finally, it indicates what must happen at different scales – internationally and nationally, as well as regionally and locally.

The key objectives are a transition towards a fully circular economy in the Netherlands in 2050 and a 50 per cent reduction in the use of virgin raw materials by 2030.

The results of the Ex-Ante Evaluation of the Programme undertaken by the Netherlands Organisation for Applied Scientific Research (TNO) in 2017[6], show how these goals can be achieved, provided all underlying assumptions can be turned into operational reduction targets for fossil, metallic and other mineral materials. The reduction in greenhouse gas emissions and in water and land use for producing these materials is expected to decrease proportionally, given the present regulations. This is a big challenge, especially for manufacturing industry, as this sector has yet to operationalise targets and it uses materials with relatively large environmental impacts.

This Programme for a Circular Economy now captures all government policy efforts on circular economy, resource efficiency and raw materials. Three strategic goals form the core of the Programme:

1. high-value reuse of resources in existing material supply chains;
2. sustainably produced, renewable and generally available resources to substitute fossil-based, critical and non-sustainably produced resources;
3. new forms of production, design and consumption/use.

[4] https://www.rijksoverheid.nl/documenten/rapporten/2015/12/01/biomassa-2030 (Dutch)
[5] https://www.government.nl/latest/news/2011/07/15/government-sets-about-tackling-raw-materials-problem (English)
[6] https://www.rijksoverheid.nl/documenten/rapporten/2017/07/06/tno-rapport-ex-ante-evaluatie-van-het-rijksbrede-programma-circulaire-economie (Dutch)

In addition, five priority sectors have been identified:

1. biomass and food;
2. plastics;
3. manufacturing industry;
4. construction sector;
5. consumer goods.

For each of these sectors, transition agendas have been developed together with the relevant stakeholders in each sector. These transition agendas are an elaboration of the National Agreement on the Circular Economy (Grondstoffenakkoord)[7], which was signed on 24 January 2017 together with nine drafting partners from business, trade unions, local/regional governments and NGOs. By early 2018, almost 400 organisations had signed this (voluntary) agreement.

Against the backdrop of the recommendations made by the Social and Economic Council of the Netherlands (Sociaal-Economische Raad (SER): Werken aan een Circulaire Economie, 2016)[8] and the Council for the Environment and Infrastructure (Raad voor de Leefomgeving en Infrastructuur (Rli): Circular Economy from wish to practice, 2015)[9] and the aforementioned Government Programme for a Circular Economy, the undersigned Partners share the ambition of realising a circular economy in which the efficient and intelligent use of raw materials and products will help to reinforce the earning capacity of the Dutch economy, as well as help to bring about a sustainable use of natural capital and achieve climate and other environmental goals.

The Partners regard this agreement as the common starting point for the development of five transition agendas. The national government commits itself to fulfilling its own ambitions through incentivising legislation and regulations, effective market incentives, including socially responsible procurement, financing, knowledge and innovation, and international cooperation.

Partners, the government, businesses, trade unions and NGOs, have elaborated the ambitions in a number of sectoral Transition Agendas in accordance with the advisory reports by SER and Rli. In these transition agendas, the Partners give direction to the efforts and investments that are necessary to substantiate the transition towards a circular economy.

On 15 January 2018, the five Transition Agendas[10], together with a cover letter by the five transition team chairmen, and a Monitoring Report, were released. In June 2018 the Dutch government in accordance with the drafting partners released their plans to accelerate the transition to a circular economy within these priority sectors[11].

Government interventions within these agendas are directed at:

- stimulating legislation and regulations;
- smart market incentives;
- funding;
- knowledge and innovation;
- international cooperation;
- applying behavioural knowledge for consumer action.

[7] https://www.government.nl/topics/circular-economy/documents/discussion-documents/2017/01/24/national-agreement-on-the-circular-economy (English)

[8] https://www.ser.nl/en/Publications/Publications/The-transition-to-a-circular-economy and https://www.ser.nl/-/media/ser/downloads/engels/2016/circular-economy.pdf (English)

[9] https://en.rli.nl/publications/2015/advice/circular-economy-from-wish-to-practice (English)

[10] https://www.circulaireeconomienederland.nl/transitieagendas/default.aspx (Dutch)

[11] http://www.pbl.nl/sites/default/files/cms/publicaties/pbl-2018-circular-economy-what-we-want-to-know-and-can-measure-3216.pdf (English)

Although the circle will never be entirely closed and absolute decoupling at the global level seems to be feasible only in the very long term, this Programme is focused on this decoupling of economic growth and material use, and on a system in which the sustainable extraction of raw materials and the preservation of natural capital are guaranteed.

Overview
To sum up the most important documents that have been published so far on material efficiency and circular economy in the Netherlands:

Governmental papers:
- Raw Materials Memorandum (2011);
- From Waste to Resource (2014);
- Government Programme for a Circular Economy by 2050 (2016).

Advisory reports to the government:
- Council for the Environment and Infrastructure (Rli), 2015;
- Social and Economic Council of the Netherlands (SER) 2016.

- Multi-stakeholder documents:
- National Agreement on the Circular Economy (2017);
- Transition Agendas (2018) on:
  - biomass and food;
  - plastics;
  - manufacturing industry;
  - construction sector;
  - consumer goods.

The government response to the Transition Agendas, plus forthcoming scientific reports on effects and synergies such as those between Circular Economy and mitigation of Climate Change, have been laid down in the government paper on circular economy that the Dutch Cabinet of 29 June 2018[12].

A 2019–2023 roadmap for the advancement of the Circular Economy in the Netherlands was submitted to Parliament in February 2019[13]. This contains both sectoral actions in response to the five sectoral Transition Agendas mentioned above as a number of cross-sectoral actions to overcome financial, tax, labour market, legal, behavioural, educational barriers that may be in the path of the transition, and to involve not only the representatives of business interests but also those of scientific institutions and regional and local government.

Overview of dedicated national or sectoral strategies for raw materials

In 2011 the Dutch government submitted a Raw Materials Memorandum (Grondstoffennotitie)[14] to parliament, outlining national and European perspectives on global changes in resources, raw materials extraction, supply and consumption. This memorandum was drafted by the Ministries of Foreign Affairs, Economic Affairs, Agriculture and Innovation, and Infrastructure and the Environment.

In this paper the Dutch government underlined that it is primarily the responsibility of private businesses to ensure they can source the materials they require. But civil society, research institutions and

[12] https://zoek.officielebekendmakingen.nl/kst-32852-59.html (Dutch)
[13] https://www.rijksoverheid.nl/onderwerpen/circulaire-economie/documenten/rapporten/2019/02/08/uitvoeringsprogramma-2019-2023 (Dutch)
[14] https://www.government.nl/latest/news/2011/07/15/government-sets-about-tackling-raw-materials-problem (English)

governments also play a role, and they will be involved in follow-up action. The government is also looking to strengthen bilateral relations with countries to safeguard the supply of raw materials and the delivery of important semi-manufactured products. The government will also defend the free trade system, which is crucial for the Netherlands as a transit country.

This memorandum contains three agendas with recommendations for solving problems with raw materials.

- Agenda 1: secure, enlarge and make the supply sustainable;
- Agenda 2: restrict the demand side and, if possible, make it sustainable;
- Agenda 3: make the use of raw materials more efficient and sustainable.

In 2012, this three-part agenda was laid down in the Ministry of Economic Affairs' Programme on Bio-based Economy, which aims to replace virgin non-renewable resources with renewable resources.
In 2013, this Programme was further developed by the Ministry of Economic Affairs in a National Policy for Green Growth. Two domains were most important: the bio-based economy and waste as a resource (see also section 'Dedicated national strategies or roadmaps for material resource efficiency and for circular economy').

A study from 2015 by a consortium led by the Netherlands Organisation for Applied Scientific Research (TNO) analysed to what extent the Dutch economy is dependent on 64 different abiotic raw materials – minerals and metals[15].

For some raw materials specific International Responsible Business Conduct (IRBC) agreements[16] are developed. An example is the Agreement on Responsible Gold[17]. On 19 June 2017 the Dutch gold sector agreed to work on improving responsible international business conduct across the entire gold value chain. Transparency is an important part of these efforts, which are being undertaken by a broad coalition of partners – government, jewellers, recycling firms, smelting firms, NGOs and goldsmiths. The aim of the agreement is to achieve a tangible positive impact in the international gold supply chain and reduce (potentially) adverse human rights impacts and/or negative environmental impacts.

Another example is the Agreement to Promote Sustainable Forestry[18], which aims to improve international responsible business conduct throughout the entire timber value chain. The Agreement was signed on 22 March 2017 by representatives of the timber, building, furniture and retail sectors, trade unions, NGOs and the Dutch government.

Similar agreements were developed on garments and textiles, and vegetable protein. Agreements on natural stone, metallurgy and floriculture are under development[19].

As mentioned in the 2016 *More from Less* Country Report[20], the Dutch Ministry of Economic Affairs carried out research on the non-organic (abiotic) materials considered critical for Dutch companies. The Report considers the vulnerability of the Netherlands' economy to supply risks weighed against the economic

[15] https://zoek.officielebekendmakingen.nl/blg-641448.pdf (Dutch)
[16] In Dutch: IMVO (internationaal maatschappelijk verantwoord ondernemen). The Agreement in question includes a practical application of the Organisation for Economic Co-operation and Development (OECD) Due Diligence Guidance.
[17] https://www.imvoconvenanten.nl/gold (Dutch)
[18] https://www.imvoconvenanten.nl/convenantenoverzicht/bosbouw?sc_lang=nl (Dutch)
[19] https://www.imvoconvenanten.nl/agreements?sc_lang=en (English)
[20] https://www.eea.europa.eu/publications/more-from-less/netherlands-material-resource-efficiency/view (English)

importance of the selected materials. These do not correspond precisely with the critical materials identified by the European Union (EU).

The 2015 study Materials in the Dutch Economy, a Vulnerability Analysis[21], extended to 64 abiotic materials, explores the sectors of the economy in which these metals and minerals are used, in what kind of products, the extent of the country's dependence on importing them, related economic, social and ecological supply risks, how these risks can be tackled and any potential for improvement in more than 100 sectors. Based on this study a self-assessment tool for criticality of resources (Grondstoffenscanner[22]) has been developed and made available to businesses through the Netherlands Enterprise Agency (RVO).

The materials with the greatest long-term supply insecurity for the Netherlands' economy are antimony (Sb), germanium (Ge), indium (In), gallium (Ga) and the rare earth metals. The materials with the largest impact on the economy are iron (Fe), copper (Cu) and aluminium (Al). Short-term supply insecurities also apply to the rare earth metals, gallium (Ga), germanium (Ge) and antimony (Sb).

The industrial sectors with the greatest risk of supply insecurity of these raw materials include electronics, electrical appliances, appliances for cars, ships and other transport vehicles, and a number of other industries including games, sports equipment, furniture and jewellery, followed by the production of metal items and machinery.

Risks related to company reputation are by far the greatest for the transport appliance sector, because of its dependence on materials with large environmental impacts or that come from countries with poor human development records, or those known as conflict metals, such as tin (Sn), tantalum (Ta), wolfram (W) and gold (Au).

Policies which include elements of material resource efficiency

The National Policy for Green Growth, developed in 2013 by the Ministry of Economic Affairs, launched the Cabinet's ambition for green growth, with important challenges and opportunities in eight domains. In respect of resource efficiency, two domains are most important: the bio-based economy and waste as a resource. The goal of the bio-based economy is to optimise the use of biomass under the cascading principle. The shift from waste to resource will lead to a more circular economy.

Several measures were formulated for waste as a resource:

- launch a pilot project for the introduction of a circular economy in a promising sector in order to gain experience with the transition process – certain high-potential production chains that place a heavy burden on the environment will also be made more sustainable over the next four years;
- publish a survey of the opportunities for and obstacles to a circular economy in the Netherlands by mid-2013;
- set out a strategy for motivating consumers to help use resources efficiently;
- launch a programme based on the triple-helix approach (public sector, industry and research institutions) to foster innovation, with the theme of waste as a resource, by 2014 at the latest. This was expected to result in agreements about what research programmes should be set up and implemented for technological, process and system innovation and training agendas;
- the focus in implementing waste policy should be on targets for green growth and, specifically, on reducing the consumption of raw materials.

[21] https://www.fme.nl/sites/default/files/afbeeldingen/TNO%202015%20R11613%20Materials%20in%20the%20Dutch%20Economy.pdf (English)

[22] https://www.grondstoffenscanner.nl/#/ (Dutch)

In the domain of waste as a resource, a circular economy programme From Waste to Resource (Van afval naar grondstof) was published in 2014[23], formulating specific measures and objectives to enable the transition from a linear to a circular economy.

This document sets out eight main objectives for the transition to a circular economy[24]:

1. enhancing front-end sustainability – eco-design, closed loops;
2. enhancing sustainable consumer behaviour patterns;
3. facilitating separate waste collection and reduction of waste incineration;
4. reorientation of waste policies and regulations towards a circular economy;
5. targeting specific chains – biotic and plastics – towards upcycling;
6. development of financial stimuli – business models, taxation;
7. connecting science and education with the circular economy;
8. simplifying measuring frameworks, indicators and certificates.

Green growth policy is built on four pillars: smart use of market incentives; an incentivising framework with legislation that promotes dynamism; innovation; and the government as a network partner.

By 2015, Statistics Netherlands observed that since the year 2000, '*the direct environmental pressure of the Dutch economy has decreased in absolute terms, while the economy grew. Only the carbon footprint, i.e. the amount of greenhouse gas emissions that result from Dutch consumption, was stable. Despite the national progress with regard to improvement of the environmental efficiency, the Netherlands scores averagely (or low) in an international context. The international position is stable with respect to other countries in the OECD or EU; other countries also grow green, and the Netherlands is not showing slower or faster progress than other countries.*' (Green Growth in the Netherlands, 2015)[25].

On 27 January 2016, the Dutch Cabinet presented its Strategic Vision for the Use of Biomass on the Road to 2030 (Strategische Visie voor de inzet van Biomassa op weg naar 2030)[26]. This indicates that sufficient sustainable biomass could potentially become available to meet the Dutch demand for biomass for food, feed, energy, transport, chemicals and materials. Provided that the efforts bear fruit, the focus will be on expanding the supply of biomass and the optimum use of biomass.

In the Agenda for Safe, Healthy and Sustainable Food (Voedselagenda voor veilig, gezond en duurzaam voedsel)[27], the Dutch government has developed an approach together with trade and industry partners to combat food waste in the context of the transition to a circular economy. Within this Agenda, the focus is on reducing food waste during food production, and also by consumers, by the optimum use of biomass and by the optimum reuse of residual waste.

A vision for circular agriculture has been presented by the Minister for Agriculture, Nature and Food Quality in November 2018[28].

[23] https://www.rijksoverheid.nl/documenten/kamerstukken/2013/06/20/van-afval-naar-grondstof (Dutch)
[24] https://www.rijksoverheid.nl/documenten/rapporten/2014/01/28/van-afval-naar-grondstof-uitwerking-van-acht-operationele-doelstellingen (Dutch)
[25] https://www.cbs.nl/-/media/_pdf/2016/49/green-growth-in-the-netherlands-2015.pdf (English)
[26] https://www.rijksoverheid.nl/documenten/rapporten/2015/12/01/biomassa-2030 (Dutch)
[27] https://www.rijksoverheid.nl/onderwerpen/voeding/documenten/kamerstukken/2015/10/30/kamerbrief-over-de-voedselagenda-voor-veilig-gezond-en-duurzaam-voedsel (Dutch)
[28] https://www.rijksoverheid.nl/actueel/nieuws/2018/09/08/minister-schouten-wil-omslag-naar-kringlooplandbouw-nu-inzetten (Dutch) and https://www.government.nl/ministries/ministry-of-agriculture-nature-and-food-quality/vision-anf (English, German, French, Spanish versions)

On 29 November 2016, the Dutch government announced the development of an Agenda for the Built Environment (Bouwagenda)[29]. On 28 March 2017 the Taskforce for the Built Environment (Taskforce Bouw)[30] presented the agenda to the Dutch Cabinet.

The Agenda for the Built Environment is a policy programme for 2017–2021 addressing the challenges for the built environment on CO_2 reduction and storage, saving energy, and the circular use of building materials and engineering installations[31]. The undersigned parties intend to give an economic stimulus to the construction sector. For the circular economy the aims are sustainable development and maintenance of real estate, green areas and infrastructure, through agreements such as Duurzaam GWW[32] (Sustainable Civil Engineering) and the Betonakkoord[33] (Agreement on Concrete).

The Dutch government works together with businesses, researchers, governments and NGOs on nine top sectors (topsectoren)[34]. With this top-sector approach, the Dutch government wants to further strengthen the international position of these sectors. The Netherlands has nine top sectors: horticulture and propagation materials; agri-food; water; life sciences and health; chemicals; high tech; energy; logistics; and creative industries. The approach focuses on relevant themes such as clean energy, sustainable food and circular economy.

The government is encouraging innovation in the top sectors in the following ways.

- Every two years, the government selects several projects or products as winners of the National Innovative Icons Competition[35] (Nationale Ikoonprojecten). These projects and products show how Dutch innovation is among the world's best. The winning entries all address major societal issues such as climate change and clean energy, population ageing, urban issues, water management and food waste.

- The Innovation Expo[36] is an event held biannually that aims to accelerate economic, infrastructural and environmental innovation. The Innovation Expo in spring 2016[37], during the Netherlands EU Presidency,, highlighted how the Sustainable Urban Delta already included circularity in bio-based production and construction. Further issues range from water management, energy and food supply, information technology (IT), connectivity, mobility and logistics, care, robotics and personalised medicine, to the social and natural effects of innovation.

  The transition towards a circular economy was one of the major themes at the 2018 edition, themed Global Challenges, Dutch Solutions. The next Expo is expected to take place in 2020, as part of the ongoing Innovation Relay Programme (Innovatie-Estafette)[38], which also comprises a network of 3,000 participants from the private sector, public bodies and knowledge institutions, who work together on innovations and technological breakthroughs.

- The Follow Innovation database (Volg Innovatie)[39] is managed by the Netherlands Enterprise Agency (RVO). It provides information on the Ministry of Economic Affairs' expenditure on various projects.

[29] https://www.rijksoverheid.nl/documenten/kamerstukken/2017/06/07/kamerbrief-met-aanbieding-bouwagenda-2017-2021 (Dutch)
[30] http://www.debouwagenda.com/over+de+bouwagenda/taskforce/default.aspx (Dutch)
[31] http://www.debouwagenda.com/themas/917080.aspx (Dutch)
[32] https://www.duurzaamgww.nl/ (Dutch)
[33] https://mvonederland.nl/betonakkoord (Dutch)
[34] https://www.topsectoren.nl/ (Dutch)
[35] https://www.nationalicons.nl (English)
[36] https://www.innovatie-estafette.nl/innovation-expo-2018 (English)
[37] https://www.innovatie-estafette.nl/vorige-edities (Dutch)
[38] https://www.innovatie-estafette.nl (Dutch)
[39] https://www.rvo.nl/onderwerpen/innovatief-ondernemen/research-development/volg-innovatie (Dutch)

- The National Science Agenda (Nationale Wetenschapsagenda)[40] identifies focal themes for scientific research in the Netherlands in the years ahead, looking at questions such as what areas hold promise for the Dutch science sector; how can science help find solutions to societal issues; and how can science create economic opportunities for innovation?

- The Innovation Attaché Network (IA-Netwerk)[41] of the Netherlands Enterprise Agency is made up of innovation attachés based at Dutch embassies and consulates. They assist Dutch companies doing business abroad, for instance by introducing them to potential partners such as research institutions or other companies.

- The Smart Industry Initiative[42] aims to strengthen Dutch industries by promoting the use of cutting-edge IT and technology, including 3D printing, nanotechnology and robots.

The current third National Waste Management Plan, (Derde Landelijk Afvalplan – LAP3, 2017)[43] under the Dutch Environmental Act (Wet Milieubeheer) contains waste targets based on the Programme for a Circular Economy.

The LAP3[44] also provides for exceptions on international waste transport policy to facilitate experiments. The Plan stresses the importance of waste prevention, especially in microplastics, nanomaterials, food waste, packaging and incontinence materials. It gives guidelines to all actors in the supply chain for procurement and handling of raw materials, products and waste that may contribute to the realisation of a circular economy.

As a follow-up on an earlier report, *How can the scales be bridged?* (2016), in September 2018 the Netherlands Environmental Assessment Agency (PBL) published a document on planetary boundaries, connecting the efforts of the Programme for a Circular Economy and other relevant programmes for sustainable development – for example the Energy Transition Agenda (2016) – with the UN Sustainable Development Goals (SDGs)[45].

The first edition of the *Monitor Brede Welvaart*[46] – a comprehensive 'beyond GDP' report on multiple dimensions of well-being (ranging from employment, income and savings, public health and safety, education and housing to natural resources), in line with the OECD's Better Life Index – has been submitted to Parliament by Statistics Netherlands (CBS) in May 2018,accompanied by a survey by the three Dutch planning agencies on perspectives for civil society in a circular economy (Verkenning Brede Welvaart)[47].

Institutional setup and stakeholder engagement

The Ministries for Infrastructure and Water Management, Economic Affairs and Climate, Agriculture, Nature and Food Quality, Interior and Kingdom Relations, and Foreign Affairs together are responsible for

[40] http://www.wetenschapsagenda.nl/?lang=en (English)
[41] https://www.rvo.nl/onderwerpen/internationaal-ondernemen/netwerken-en-contacten/buitenlandnetwerk/innovatie-attach%C3%A9s (Dutch)
[42] https://www.smartindustry.nl/english/ (English)
[43] http://wetswegwijzer.nl/lap3/LAP3_Deel-E_Sectorplannen_inspraakversie_(final).pdf (Dutch)
[44] https://rwsenvironment.eu/subjects/from-waste-resources/national-activities/national-waste/ (English)
[45] https://www.pbl.nl/en/publications/using-planetary-boundaries-to-support-national-implementation-of-environment-related-sustainable-development-goals (English)
[46] https://www.cbs.nl/nl-nl/publicatie/2018/20/monitor-brede-welvaart-2018 (Dutch)
[47] https://www.scp.nl/Publicaties/Alle_publicaties/Publicaties_2018/Verkenning_Brede_Welvaart_2018_ (Dutch)

carrying out the government Programme for a Circular Economy by 2050[48] (Rijksbreed programma Nederland Circulair in 2050, 2016[49]). In this paper the Dutch Cabinet outlined its plans for the restructuring of the economy to achieve a circular economy that makes optimum use of natural resources. The Secretary for the Environment is responsible for coordination.

These five ministries – responsible for sustainable development, for housing and construction, for industrial and agricultural production, and for international trade, respectively – also represented the national government as a drafting partner of the 2017 National Agreement on the Circular Economy (Grondstoffenakkoord)[50]. This is a Letter of Intent of which the signatories (partners) express a shared ambition to accelerate the transition to a circular economy by setting agendas for each of the five prioritised sectors, including action, knowledge, social and investment agendas.

Other drafting partners of the National Agreement were these stakeholder organisations:

- VNO-NCW[51] Confederation of Netherlands Industry and Employers and MKB-Nederland[52], representing SMEs;
- FNV[53] Dutch Federation of Trade Unions (Federatie Nederlandse Vakbeweging);
- VCP[54] Trade Union Federation for higher educated professionals (Vakcentrale voor Professionals);
- Stichting Natuur & Milieu[55], NGO, Nature & Environment Foundation;
- VNG[56] Association of Dutch Municipalities (Vereniging Nederlandse Gemeenten);
- IPO[57] Association of Dutch Provincial Authorities (Interprovinciaal Overleg);
- Unie van Waterschappen[58] Association of Dutch Regional Water Authorities.

In addition to the drafting partners, other organisations were invited to sign the Agreement as supporting partners that co-endorse this agreement and would like to contribute to its implementation. These organisations stem from the following groups: entrepreneurs; employees; environmental and nature conservation organisations; municipalities, regions, provinces and water authorities; financial institutions; institutions of knowledge and education; other social organisations, partnerships and platforms. At the start of 2018 almost 400 parties had signed the Agreement[59].

These agreements tie in perfectly with the much older Dutch tradition of consultation and consensus, known as *polderen* in Dutch, the term is derived from the polders that were reclaimed from inland lakes and the North Sea. For centuries, all kinds of different parties have had to work together to prevent the country from being flooded. The only difference this time is that it is not just about working together for people in the Netherlands but about people all over the world – anyone whose human rights are threatened as a result of the activities of Dutch banks and their corporate lending and project finance clients.

[48] https://www.government.nl/topics/circular-economy/documents/policy-notes/2016/09/14/a-circular-economy-in-the-netherlands-by-2050 (English)
[49] https://www.circulaireeconomienederland.nl/rijksbreed+programma+circulaire+economie/default.aspx (Dutch)
[50] https://www.circulaireeconomienederland.nl/grondstoffenakkoord/default.aspx (Dutch)
[51] https://www.vno-ncw.nl/over-vno-ncw/english (English)
[52] https://www.mkb.nl/over-mkb-nederland/english (English)
[53] https://www.fnv.nl/over-fnv/internationaal/mondiaal-fnv/duurzaam-ondernemen/ (Dutch)
[54] https://vcp.nl/english/ (English)
[55] https://www.natuurenmilieu.nl/ (Dutch)
[56] https://vng.nl/about-vng (English)
[57] https://ipo.nl/beleidsvelden/regionale-economie (Dutch)
[58] https://www.uvw.nl/thema/duurzaamheid/ (Dutch)
[59] https://www.circulaireeconomienederland.nl/ondertekenaars/default.aspx (Dutch)

The transition agendas developed as an elaboration of the Government Programme for a Circular Economy and the National Agreement on the Circular Economy are the responsibility of mixed transition teams consisting of a non-governmental chair and stakeholders from each sector/value chain – government, business, trade union and NGO representatives – at the request of the drafting partners mentioned above.

The Ministry for Infrastructure and Water Management is the leading department for the transition agendas on plastics and consumer goods; the Ministry for Economic Affairs and Climate for the transition agenda on manufacturing industry; the Ministry for Agriculture, Nature and Food for the transition agenda on biomass and food; and the Ministry for Interior and Kingdom Relations for the transition agenda on construction.

Our website[60] shows an overview of these teams, for biomass and food, plastics, manufacturing industry, construction, and consumer goods. The (co)chairs presented their agendas to the drafting partners on 15 January 2018.

Stakeholders
The governance surrounding the implementation of the transition agendas is yet to be developed. It is, however, self-evident that the involvement of businesses (both individual enterprises and trade organisations) is paramount to achieving the goals of the transition to a circular economy. But labour, represented by trade unions, too, is needed to bring in the necessary skills, from the work-floor through middle to higher management. NGOs, especially those engaged in care for the environment, have to be mobilised to ensure societal support. Consumers will be addressed by both information and incentives and are also invited to engage as part of civil society.

At the national and EU levels, policies and instruments including regulations, taxes and subsidies can be deployed to further research and development, to stimulate innovation in products and processes and to monitor overall progress. Other tiers of government are involved with respect to specific tasks: local government (municipalities) in the Netherlands is responsible for the development of industrial sites and licences to operate, for waste collection and recycling and to further employability. At the regional level, provinces are responsible for town and country planning, especially industrial zoning. The water authorities deal with water levels, safety and sewage treatment, but are also increasingly engaged in recovery of materials and energy from waste water. At all levels, the government is a leading customer that can stimulate the circular economy through public procurement, opening up markets for circular products and services.

Approaches to resource efficiency and circular economy policy evaluation

The key objectives are a transition towards a fully circular economy in the Netherlands in 2050 and a 50 per cent reduction in the use of virgin raw materials by 2030.

In an Ex-Ante Evaluation of the Government Programme for a Circular Economy[61], TNO analysed the extent to which the 2030 ambition, 50 per cent reduction in the use of primary raw materials, of the Programme[62] could be supported by the sub-goals as formulated within it. The results show how these goals can be achieved, provided all underlying assumptions can be turned into operational reduction targets for fossil, metallic and other mineral materials. The reduction in greenhouse gas emissions and in water and land use for producing these materials is expected to decrease proportionally, given the present regulations.

[60] https://www.circulaireeconomienederland.nl/transitieagendas/default.aspx (Dutch)
[61] https://www.rijksoverheid.nl/documenten/rapporten/2017/07/06/tno-rapport-ex-ante-evaluatie-van-het-rijksbrede-programma-circulaire-economie (Dutch)
[62] https://www.government.nl/topics/circular-economy/documents/policy-notes/2016/09/14/a-circular-economy-in-the-netherlands-by-2050 (English)

This is a big challenge, especially for manufacturing industry, as this sector has yet to operationalise targets and it uses materials with relatively large environmental impacts.

In 2016 a study by CE Delft was published on the effects of cutting back packaging waste from businesses and consumer households on greenhouse gases, concluding a Europe-wide reduction of 180 million tonnes of CO_2 per year was feasible[63].

In 2018 the TNO analysed the transition agendas developed in light of the National Agreement on the Circular Economy, focusing on the effects of the agendas on CO_2 emissions.

The findings were that the proposed action in the Circular Economy Programme could potentially generate a reduction of 7.7 million tonnes of CO_2-equivalent per year by 2030 and 13.3 million tonnes per year by 2050 – about one fifth of the national reduction target[64].

The monitoring system that is being developed (see section on Indicators to monitor progress towards a resource-efficient circular economy) will monitor the measures/action taken up in the Government Programme. The monitoring system will also look into the dynamics of the transition to the circular economy, thereby focusing on the transition phases in which each of the five priorities finds themselves. Effect monitoring looks into the effects of a more circular economy on material flows – direct/indirect material consumption, secondary material use, resource efficiency – as well as the impact on CO_2, land use and water usage. The effects are monitored for the entire economy as well as for the five identified priorities.

This monitoring system will be the foundation for a biannual evaluation of the Government Programme, thereby providing input to adjust and steer the measures within the Programme and the transition agendas. The Cabinet will inform Parliament annually through a progress report, which will discuss both the performance of measures and progress on the transition.

Monitoring and targets

Targets for resource efficiency and circular economy

The Government Programme for a Circular Economy includes the overall ambition of the Cabinet to realise, together with a variety of stakeholders, an (interim) objective of a 50 per cent reduction in the use of primary raw materials – minerals, fossil materials and metals – compared to 2014 by the year 2030.

The *ex-ante* evaluation of the programme by TNO analysed the extent to which this ambition could be supported by the goals as formulated within the Government Programme for a Circular Economy[65].

Chapter 5.5 of the Government Programme for a Circular Economy by 2050 also contains some measurable targets concerning consumer goods:

- by 2020, the annual volume of household residual waste will be a maximum of 100 kilograms (kg) per person; by 2025 the maximum will be 30 kg per person per year;
- by 2022, the volume of residual waste from companies, organisations and governments that is comparable to household residual waste will be halved compared to 2012;

[63] https://www.ce.nl/publicaties/1802/circulaire-economie-een-belangrijk-instrument-voor-co2-reductie (Dutch)
[64] https://www.rijksoverheid.nl/binaries/rijksoverheid/documenten/rapporten/2018/05/29/effecten-van-het-rijksbrede-programma-circulaire-economie-en-de-transitieagenda-s-op-de-emissie-van-broeikasgassen/effecten-van-het-rijksbrede-programma-circulaire-economie-en-de-transitieagenda-s-op-de-emissie-van-broeikasgassen.pdf (Dutch)
[65] https://www.rijksoverheid.nl/documenten/rapporten/2017/07/06/tno-rapport-ex-ante-evaluatie-van-het-rijksbrede-programma-circulaire-economie (Dutch)

- by 2025, citizens and companies will use consumer goods in such a manner as to allow them to remain in the cycle; not littering will have become the standard.

More measurable targets are formulated in the context of the transition agendas (see section on Dedicated national strategies or roadmaps for material resource efficiency and a circular economy), some of which already quantify specific targets while other objectives are yet to be quantified, and the monitoring system (see section on Indicators to monitor progress towards a resource-efficient circular economy).

The Transition Agenda on Plastics Goals for 2030

Currently, only 250,000–300,000 tonnes of plastic are recycled per year in the Netherlands, while plastic producers market around 2 million tonnes. Set against the amount of discarded plastic materials, 1.7 million tonnes, this means that 300,000 tonnes remain in use annually with a recycling percentage of 15–17 per cent of the potential flow of plastics to be processed. More than five times as much is currently being sent to waste incinerators, 1.3 million tonnes.

Waste incineration is expected to decrease by 44 per cent by 2030, from a total of 1.3 million tonnes in 2016 to 740,000 tonnes. This decrease is explained by:

- more separate collection through more waste collection points with more bins for hard plastics and more and better sorting installations;
- the development of better post-separation of plastics from residual waste;
- the development of closed loop return systems, for example for mattresses, as a result of extended producer responsibility (EPR) systems for furniture, clothing, façade construction and the automotive industry;
- a decrease in exports of unsorted plastics, mainly to China, due to stricter controls in the Netherlands and import restrictions elsewhere.

With the reduced incineration of plastics, CO_2 emissions in the Netherlands will be reduced by 970,000 tonnes a year in the period 2016–2030. Thanks to heavy investment in more mechanical and chemical recycling and in the production of bio-based plastics, the production and marketing of new (virgin) fossil plastics will decrease by 36 per cent, from 1.7 million tonnes to 1.1 million a year. It is expected that the fall in the incineration of recyclable plastics and the marketing of new (virgin) fossil plastics will flatten out rapidly after 2030.

As it is currently not possible to estimate how great a CO_2 saving will be achieved with the shift of production from fossil to recycled and renewable (bio-based and carbon capture and usage) plastics, it is not possible to determine an additional quantitative effect, but in the period 2016–2030, the CO_2 emissions in the Netherlands will decrease by more than a million tonnes per year in any case.

The Transition Agenda on Consumer Goods, objective and sub-goals

The key objective of the Raw Materials Agreement is to achieve a circular economy by 2050. To achieve this goal, the transition team has set down several sub-goals around the ladder of circularity. To retain the highest possible value, any product, component, or raw material must always be used on the highest possible rung of the ladder (see Table 1 in section on Indicators to monitor progress towards a resource-efficient circular economy).

<u>Sub-goal 1: Value creation</u>

The transition to a circular economy produces value creation at the social, ecological and financial levels, both in the Netherlands and in other countries through expanding the export of circular products and services. This can be made quantifiable by using the broad-based prosperity indicator (Bas van Bavel, Utrecht University) or Kate Raworth's so-called Donut Model.

Sub-goal 2: Fewer raw materials

Rethink, refuse and reduce represent the first three rungs of the R ladder. This means that serious thought needs to be given to exactly what is manufactured or purchased. By 2030, we must have reduced the production and consumption of wasteful products. This especially applies to short-cycle products such as packaging and disposable materials. The goal is to achieve a 100 per cent reduction in the volume of non-essential short-cycle products by 2030. In addition, by 2030 all new product-service combinations must be based on circular design principles – at the national, European and also the global level.

Sub-goal 3: Optimum useful life

We can make the most of the products and raw materials that we do use by using them for as long as and at as high a grade as possible. By 2030, we will be using 100 per cent of the products and raw materials at the highest possible rung of the R ladder. Reuse and repair are preferable, as is reuse of components, whether or not in new applications. The next best option is recycling of raw materials. This means that by 2030, in principle, (raw) materials will no longer be incinerated with energy recovery, because action higher up the R ladder is viable. This must be concretised for each separate product group and will impact the recycling industry. For example, the stock of products that are still in circulation must be recycled as optimally as possible while for products that are not yet recyclable in a high-grade manner, processes and technologies must be developed to keep large volumes away from tips and incineration plants. Manufacturers of new products must demonstrate that such products are recyclable. Non-recyclable products must, in principle, be barred from the market. Loops will thus remain closed, unless manufacturers can explain why this is not feasible.

Sub-goal 4: Optimum utilisation and functionality

Finally, we will make the most of products and raw materials by intensifying our use of their functionality. In theory, a chair can be sat on for 24 hours a day. In practice, it is used for no more than a few hours. A passenger car remains stationary for an average of 22 hours a day. Tools, (children's) clothing, bread machines, other means of transportation and an array of other things are only used in a sub-optimum fashion as well. Rental, sharing, exchange and loan platforms can change this. By 2030, products must be utilised in an optimum manner, with companies and consumers opting for appropriate business models.

Indicators to monitor progress towards a resource-efficient circular economy

We are currently in the process of developing a monitoring system for the circular economy. This system will consist of three levels of monitoring:

- action monitoring;
- transition dynamics monitoring;
- effect monitoring.

Action monitoring

With this type of monitoring we review the implementation of the measures in the Government Programme for a Circular Economy. This might be supplemented in 2018 with monitoring of the measures in the transition agendas.

Transition dynamics monitoring

With transition dynamics we look into the dynamics we hope to stir up with the Government Programme and the transition agendas.

This is split into two phases: the start-up and growth phases. For each of the five prioritised sectors (see section on Dedicated national strategies or roadmaps for material resource efficiency and a circular economy), there will be slightly different indicators. The start-up phase looks into the early onset of the circular economy, focusing on the elements of capabilities, motivation and normative frameworks (kunnen, willen en mogen).

This determines the likelihood of circular strategies taking off.

- Are companies/people able to do it – financial means, is the knowledge there, does the workforce have the right skills, etc.?
- Are companies/people motivated to work towards a circular economy and do they have a vision on how to get there? Are there visionaries with a good story? Do companies get together to make plans and exchange knowledge?
- Is the normative framework suitable for a circular economy to take off – both the norms of people and the legal framework that help facilitate a circular economy?

The growth phase looks at whether companies actually implement circularity strategies (see the R-ladder of the PBL[66]). This requires the development of indicators. For recycling and recovery, the numbers are available; for the other Rs these will have to be elaborated in subsequent editions of the Monitoring Reports.

Table 1 The R Ladder

Produce and use in a smart way	R0 REFUSE	Make existing products obsolete by doing without or introducing alternatives
	R1 RETHINK	Intensify the use of products through shared use or multipurpose products
	R2 REDUCE	Produce and use more efficiently, with smaller amounts of (raw) material(s)
Prolong lifespan of parts and products	R3 REUSE	Further use of the same product by another user
	R4 REPAIR	Repair and maintain for continued use by the same user
	R5 REFURBISH	Update an old product for today's demand
	R6 REMANUFACTURE	Take parts of an old product to make a new product with the same specification
	R7 REPURPOSE	Take parts of an old product to make another product
Making good use of materials	R8 RECYCLE	Take materials from waste for another use (higher or lower value)
	R9 RECOVER	Take materials from waste to generate energy

Effect monitoring looks into the effects of a more circular economy on material flows (direct/indirect material consumption, secondary material use, resource efficiency), but also the impact on CO_2 emissions and land and water use. The effects are monitored for the entire economy as well as for the five prioritised sectors.

The Ministries of Economic Affairs and Climate and of Infrastructure and Water Management have together asked the PBL, Statistics Netherlands and the National Institute for Public Health and the Environment to compile this monitoring system and a baseline, the Circular Economy: starting progress measurement, 2018. The system under development is a growth model, starting with the data we already have, which includes data on repair and reuse of products; dematerialisation of goods – products as services; sustainability of raw material usage; lifespan of products and components; recycling rates; and substitution of critical materials and hazardous substances by widely available, sustainable alternatives[67].

Further data to be developed are monitoring information for the social aspects of a circular economy: how does it affect employment; what skills are needed and what does this mean for education etc.; and what

[66] http://www.pbl.nl/sites/default/files/cms/publicaties/pbl-2016-circulaire-economie-innovatie-meten-in-de-keten_2249.pdf (Dutch)

[67] http://www.pbl.nl/en/news/newsitems/2018/the-circular-economy-starting-progress-measurement (English)

are the effects on (a reduction in) greenhouse gases and air pollution, on sewage treatment, water and land use, both in the domestic economy and elsewhere in the supply chain?

Preliminary findings by TNO[68] (Effects of the Government Programme and Transition Agendas, work in progress) suggest that implementing the Government Programme and five Transition Agendas can help reduce greenhouse gas emissions by some. 7.7 million tonnes of CO_2-equivalent per year by 2030 and 13.3 million tonnes per year by 2050.

The number of jobs from the Government Programme is estimated to increase by 13,000 full-time equivalents, mainly in the waste recycling, construction materials, metallurgic and chemical industries; the Transition Agendas adds another 65.000, mainly in the agriculture, rubber and plastics, waste recycling, construction materials and textile industries.

Resource efficiency, circular economy and the 2030 Sustainable Development Goals

The government of the Netherlands recognises that the country produces relatively large volumes of food waste and hazardous waste, although comparisons with other countries are difficult because of the lack of proper definitions. The United Nations Environment Programme's (UNEP) 10-Year Framework of Programmes on Sustainable Consumption and Production has not yet been integrated into national policy. However, various policies, such as the Fertilisers Act and the Nitrogen Control Programme, reflect efforts to implement the framework. Programmes to prevent food waste, a National Waste Management Plan and the National Raw Materials Agreement are all part of a Government Programme for a Circular Economy.

Circular economy is seen as a cross-cutting issue, connecting various SDGs. By closing loops in the plastic value chain, for example, we prevent marine litter from polluting our rivers and oceans. And by stimulating refurbishment and recycling, we create more jobs in, for example, manufacturing industry.

In support of the SDG agenda, more than 100 organisations have signed up to the Netherlands' SDG Charter[69], committing to form partnerships to contribute to the SDGs. Individuals and organisations in the Netherlands can showcase their activities online. Charter initiatives to boost investment in sustainable development include Community Life Centres in Africa, the Human Cities Coalition and the financial sector initiative SDG Investing to boost investments in sustainable development.

In 2017 the Dutch government banned free plastic bags in most shops. Meanwhile, supermarkets have started initiatives to provide more sustainable, reusable carrier bags instead[70].

From 2018, Statistics Netherlands will report in a separate publication (Monitor Brede Welvaart) on the state and progress of natural resources, public health and education, etc. in line with reporting on the UN SDGs[71].

As a follow-up to the earlier report, *How can the scales be bridged?* (2016), in September 2018 PBL published a document on planetary boundaries, connecting the efforts of the Programme for a Circular Economy and other relevant programmes for sustainable development – for example the Energy Transition Agenda (2016) – with the UN Sustainable Development Goals (SDGs)[72].

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[68] TNO: *Effecten van het Rijksbrede Programma Circulaire Economie en de Transitieagenda's op de emissie van broeikasgassen*.

[69] https://gateway.sdgcharter.nl/ (English)

[70] http://www.sdgnederland.nl/nieuws/komt-plasticvrij-shoppen-doorbraak-aldi/ (Dutch)

[71] https://www.cbs.nl/nl-nl/nieuws/2018/04/cbs-hoogleraar-onderzoekt-brede-welvaart (Dutch)

[72] https://www.pbl.nl/en/publications/using-planetary-boundaries-to-support-national-implementation-of-environment-related-sustainable-development-goals (English)

Examples of innovative approaches and good practice

Examples of good practice and innovative approaches

There is a number of organisations and regulations in force to provide financial support in setting up businesses to develop and share best practices. To mention a few of the most important:

The Nederland Circulair! online community was formed in 2014 by a group of civil society organisations, together with the Dutch government, to accelerate the transition to a circular economy. Nederland Circulair! focuses on Dutch businesses[73]. With support from the Ministry of Infrastructure and Water Management, it shares best practice from projects, events and experiences with entrepreneurs. Sharing knowledge and cooperation are key, according to Nederland Circulair! Part of Nederland Circulair! is the campaign The Netherlands Circular Hotspot[74], which focuses on positioning the Netherlands as an international circular hotspot, thereby improving export opportunities for Dutch businesses.

An initiative that focuses on circular design is CIRCO[75]. It is a movement driven by a growing community on creating business through circular design by entrepreneurs and businesses from the manufacturing and creative industry, researchers, policy makers and students. Begun in 2015, it is supported by the Ministry of Infrastructure and the Environment. CIRCO is a partner of the Nederland Circulair! network and aims to accelerate the transition to a circular economy, through design cooperation between entrepreneurs and businesses and by sharing experience, knowledge and inspiration.

The 2015 government programme Applied Research – From Waste to Raw Materials (PRO-VANG) set in motion Knowledge Innovation Mapping – From Waste to Raw Materials (KIEM-VANG)[76] a scheme to stimulate knowledge development and sharing between higher education institutions, businesses and public organisations for specific flows of materials, such as metals, plastics, rubber, building materials, nutrients, and biotic waste streams. The aim of PRO-VANG is to accelerate the transition to a circular economy by closing value chains, creating value and preventing waste. KIEM-VANG offers financial support for setting up cooperation within a consortium, consisting of a college lecturer, at least two SMEs and, if applicable, a public organisation. Concrete outcomes are, for example, joint project proposals, events, (business) models and prototypes.

The Green Deal approach in the Netherlands is an accessible way for companies, other stakeholder organisations, local and regional government and interest groups to work together with central government on green growth and social issues. The aim is to remove barriers to help sustainable initiatives get off the ground and to accelerate this process where possible. The Green Deal approach forms part of the green growth policy and is a joint initiative of the Dutch Ministries of Economic Affairs and Climate; Agriculture, Nature and Food; Infrastructure and Water Management; and the Interior and Kingdom Relations.

A Green Deal is a mutual agreement or covenant under private law between a coalition of companies, civil society organisations and local, regional and/or national government. The Deal defines the initiative and the action involved as clearly as possible (in quantitative aims or output, if possible, and likewise defines participant input as clearly as possible. Since 2011, more than 200 Green Deals were agreed in the Netherlands. Green Deals cover nine themes: energy, the bio-based economy, mobility, water, food, biodiversity, resources, construction and the climate.

As mentioned in section 'Policies which include elements of material resource efficiency', numerous Green Deals are examples of good practice, for example the Green Deal Circular Procurement (Green Deal

[73] www.circulairondernemen.nl (Dutch)
[74] https://hollandcircularhotspot.nl/en/ (English)
[75] https://circonl.nl/ (Dutch)
[76] https://www.circulairondernemen.nl/library/kiem-vang-regeling-wat-houdt-dat-in-voor-mij (Dutch)

Circulair Inkopen), which started in 2013. Procurement plays a vital role in the transition to a circular economy. By sharing experience, success and barriers within the group of about 30 organisations, participants can integrate circular procurement into their own organisations more rapidly. The lessons learned are also shared with a wider audience through the Centre for Public Procurement (Pianoo)[77], and the Dutch Centre for Corporate Social Responsibility (MVO Nederland) [78] to help buyers elsewhere, formulating selection criteria, model contracts and life cycle analysis. Examples range from procurement of coffee cups through measuring instruments to road and office construction specifications[79].

The participants of the Green Deal actively work on professionalising and scaling up circular procurement in the Netherlands, and sometimes even abroad.

An example of a financial support programme are the Environmental Investment Rebate (MIA) and the Arbitrary Depreciation of Environmental Investments (Vamil) schemes[80]. Using the MIA/Vamil schemes, you can invest in environmentally friendly products or company resources with a tax advantage and get innovative environmentally friendly products on to the market more quickly. Through the MIA, you can deduct up to 36 per cent of the investment costs for an environmentally friendly investment on top of your regular tax deductions for investments, and with the Vamil you may decide for yourself when to write these investment costs off. This provides you with an advantage in liquidity and interest. All entrepreneurs in the Netherlands who pay income or company tax can make use of MIA/Vamil. The arrangement is interesting, for example, to entrepreneurs in agriculture, shipping and industry and also to those who invest in sustainable transport, sustainable recreation and sustainable buildings.

The Government Programme for a Circular Economy (see section on Dedicated national strategies or roadmaps for material resource efficiency and a circular economy) includes a variety of different policy programmes on raw materials, resource efficiency and circular economy. An example is the Plastic Value Chain Agreement[81] (Kunststofketenakkoord), a specific contribution to the Cabinet's and various parties' shared societal aim to transform our economy into a circular one by means of a green growth strategy.

The Agreement forms a link between existing and new activities, guides parties' activities and specific Green Deals that have been signed and implemented or are yet to be signed, and guides the relevant sectoral innovation contracts (see also the section on Policies which include elements of material resource efficiency). Other parties are also very welcome to join in with this initiative – even after signing – so long as they wish and are able to contribute to the realisation of the Agreement's objectives.

The Plastic Value Chain Agreement links the activities of parties that wish to promote the fact that plastics and plastic products contribute to a sustainable society, to ensure that wastage of raw materials is prevented, and that plastic waste – however small – is prevented from ending up in the environment, and to encourage the collection and responsible processing of whatever plastics do end up or have ended up in the environment. There are four sub-objectives:

- more sustainable products on the market – reduce, replace and redesign;
- widespread implementation of sustainable value chain earnings models – circular business models, renew;
- more sustainable use – reduce and reuse – of products and materials;
- more and improved recycling – renew, recycle: collection, sorting, processing and reuse of materials.

[77] https://www.pianoo.nl/nl/themas/maatschappelijk-verantwoord-inkopen-mvi-duurzaam-inkopen/praktijkvoorbeelden-mvi/praktijkvoorbeelden-circulair-inkopen (Dutch)
[78] https://mvonederland.nl/green-deal-circulair-inkopen (Dutch)
[79] https://mvonederland.nl/wegwijzer-circulair-inkopen#tab=pane-title-step-1 (Dutch)
[80] https://english.rvo.nl/subsidies-programmes/mia-environmental-investment-rebate-and-vamil-arbitrary-depreciation-environmental-investments (English)
[81] http://www.kunststofkringloop.nl/english/ (English)

A Plastic Pact (target: reduction of plastics usage by 20% in 2025 and making all plastics reusable) has been signed by representatives of the Dutch government, recycling industries, retailers, producers and distributors of plastic packaging in February 2019[82].

Another example of a sectoral agreement is the National Value Chain Agreement on Closing the Phosphorus Loop[83] (Fosforketenakkoord). This is a collaboration between Dutch farmers, water boards, the fertiliser and food industries, knowledge institutes and the Dutch national government, focusing on creating a European market for recycled phosphorus. It is a voluntary Agreement with a network of 20 parties and is enlarged with other frontrunners in the value chain – 34 parties in 2016. The overall aim is to increase investment in businesses that are starting or scaling up activities in the field of secondary phosphorus and the circular economy. Ultimately, it will accelerate the transition towards sustainable and green growth. Implementing partners will include the Dutch Nutrient Platform, European Sustainable Phosphorus Platform and Global Partnership on Nutrient Management.

Seeking synergies with other policy areas

The Government Programme for a Circular Economy (see section on Dedicated national strategies or roadmaps for material resource efficiency and a circular economy) deliberately seeks synergies and co-benefits between raw materials, resource efficiency, circular economy, economic competitiveness and growth, and foreign trade. The Programme includes all government policy efforts and was developed by the Ministries of Infrastructure and Environment; Economic Affairs; Interior and Kingdom Relations; and Foreign Affairs, a synergy in its own right.

As stated before, the programme expands the approach not only into areas within the economy such as food, construction, manufacturing, plastics and consumer goods, but also to interventions, policy measures together with other ministries such as development of business cases, financing and taxation; research and development, skills and education for the labour market; influencing consumer involvement and behaviour; promotion of international trade standards; and public procurement for a circular economy.

Synergies

Examples of (intended) synergies between resource efficiency, circular economy and other policy areas are, in general, boosting economic competitiveness, innovation investment and employment, prevention of climate change through the reduction of greenhouse gases, and the protection and recovery from pollution of the environment and natural resources.

More specifically there are links between the Programme for a Circular Economy and:

Economic affairs: stimulating innovation, supply chain cooperation; shortening cycles, involvement of SMEs, skills and trades; creating hot spots for innovative industries such as circular textile hubs, smart industries such as 3D printing, the internet of things and blockchain.

Climate change and energy*:* business cases, direct employment in circular construction; boost for chemical recycling of plastics, rubber, fibres and textiles; reduction of greenhouse gas emissions in construction; recovery of rare earth materials from wind and solar power installations.

[82] https://www.circulairondernemen.nl/cirkels/meer-met-minder-plastic (Dutch)

[83] http://www.greengrowthknowledge.org/big-e/netherlands-implement-national-value-chain-agreement-closing-phosphorus-loop (English)

Infrastructure, transport and water management: share economy in mobility and transport; civil engineering, road, rail construction; controlling quantity and quality of water supply; innovation of sewage treatment.

Agriculture, natural resources and food: production and valorisation of sustainable biomass flows; protein transition; precision agriculture; nutrient loops; healthy soil; including international (aid and trade) projects.

Education and science*:* professional training from applying basic skills and trades to the circular economy, through marketing and design, to university and post-doctoral courses and research grants.

***Treasury, social affairs and employmen*t**: (greening) taxation; labour market policy, addressing (re)training on the job, health and safety; and enhancing employability, including people with poor job prospects, for instance by creating local goods repair and recovery centres.

Foreign trade and development aid: international climate and environmental policies and agreements; fair trade; contributing to SDG 8: Decent Work and Economic Growth and 12: Responsible Consumption and Production; climate and innovation funds; the urban delta approach; supporting human rights and development; promoting Dutch trade, skills and knowledge abroad.

Housing, town and country planning*:* research into the circular use of building materials; saving energy on lighting, heating, home and office appliances; and products as a service.

National and regional administration*:* green public procurement.

Defence: central procurement of uniforms for all branches of government; strategy on critical materials both in procurement and as a cause of international conflict; increasing efforts on circular design, repair and refurbishment.

Public health, community care and sports*:* circular sports facilities and care homes; phasing out microplastics and other hazardous materials; cleaning up waste.

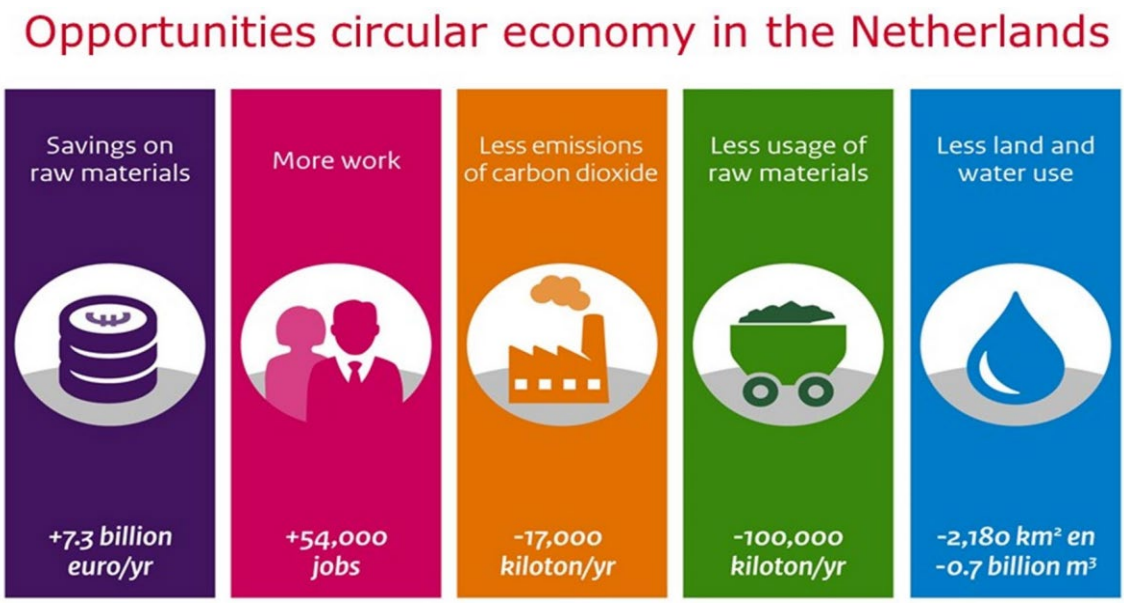
Expected benefits

The 2017 *ex-ante* evaluation concluded that a 20–50 per cent reduction in the consumption of fossil materials, metals and other minerals is feasible, combined with reductions of land and water use and greenhouse gas emissions in the same range.

The report, however, contained a caveat that there are major challenges to be met, for instance in manufacturing industry (especially in high-tech equipment) which uses many types of metals with high environmental impacts. In addition, there are not yet many strategies aimed at increasing the durability of products, and some strategies may be aimed at the same material chains so there is a risk of interference. The TNO researchers advised making targets more explicit in the fields of reducing environmental impacts, securing supply and economic opportunities. This will automatically draw attention to the raw materials and products with the highest impacts.

The number of jobs created – around 54 000 full-time-equivalent more than in a business-as-usual scenario – is a rough estimate and has yet to be specified. Although the overall outcome for the Netherlands is expected to be positive, there will be winners and losers in different regions, branches and levels of skills.

In addition, the possible synergy of a circular economy with other major transitions, such as moving over to sustainable energy or adaptation to climate change, has to be calculated.



These synergies will have to be further established in the government paper on circular economy that the Dutch Cabinet is expected to submit to Parliament by mid-2018.

In view of the great significance of foreign trade for the country's economy and the fact that economies are increasingly interwoven, an international effort to realise the transition to a sustainable economy is vitally important to the Netherlands. International trade puts considerable pressure on the environment, particularly in mineral-rich developing countries. The Netherlands' carbon footprint is relatively high and has increased slightly in recent years. Through the Sustainable Trade Initiative[84], and in partnership with Solidaridad[85] and other concerned organisations, the Netherlands is striving to import more sustainably produced raw materials. It is working with commodity-exporting countries such as phosphate-producer Morocco to promote sustainable economic growth.

The Netherlands promotes socially responsible procurement of goods, for instance through our procurement policy for sustainable (tropical) timber, the Circular Procurement Green Deal[86], which encourages public and private companies to purchase circular produced goods and to report actively on how they engage in more sustainable procurement, and through the Infranature' Green Deal[87], an agreement of governmental and private engineering parties to share and promote knowledge about biodiversity preservation and management of natural areas around canals, roads, railroads and power lines. It also invests in the transition to a circular economy in other countries by exporting useful knowledge.

In the Global Alliance for Climate-Smart Agriculture and the Postharvest Network, the Netherlands has joined forces with the World Bank and Food and Agriculture Organization of the United Nations (FAO) to promote food security and reduce greenhouse gas emissions. As parties to the European Partnership for Responsible Minerals, the Scaling Up Mineral Traceability Initiative and the Extractive Industries Transparency Initiative (EITI), the Netherlands and its public and private sector partners are committed to increasing the world's supply of conflict-free tin, tantalum, tungsten and gold.

The partnership approach is at the heart of international efforts combining aid, trade, knowledge and investment. For example, through Responsible Business Conduct Agreements different stakeholders

[84] https://www.idhsustainabletrade.com/ (English)
[85] https://www.solidaridadnetwork.org/ (English)
[86] https://www.circle-economy.com/green-deal-circular-procurement/#.WsTOokdPP4w (English)
[87] http://www.greendeals.nl/gd196-infranatuur/ (Dutch)

undertake collective action at the consumer end of value chains in order to perform due diligence on the most serious risks to people and the planet in all parts of their value chains. Five voluntary agreements on responsible business conduct were signed in 2016 and 2017 with the textiles, banking, plant proteins, forest management and gold sectors. A pilot agreement has been set up for natural stone and new agreements are under development for insurance, food, metallurgy, floriculture and pension funds.

These agreements tie in perfectly with the much older Dutch tradition of consultation and consensus, known as *polderen* in Dutch, the term is derived from the polders that were reclaimed from inland lakes and the North Sea. For centuries, all kinds of different parties have had to work together to prevent the country from being flooded. The only difference this time is that it is not just about working together for people in the Netherlands but about people all over the world – anyone whose human rights are threatened as a result of the activities of Dutch banks and their corporate lending and project finance clients.

The agreements also stress the importance of knowing and showing. The agreements are based on the OECD Guidelines for Multinational Enterprises and the United Nations Guiding Principles on Business and Human Rights (UNGPs). However, they also include an implementation framework, which includes tangible objectives and measures, based on consensus between the parties. In the case of the banking sector agreement, signatory banks must require project finance clients to follow the principles of free, prior and informed consent (FPIC), for example. Other elements of this agreement lay the foundation for a value chain mapping exercise of high-risk sectors, starting with palm oil and cocoa; increasing transparency; conducting and publishing a study on good practice for increasing leverage; and establishing a working group. This group will explore banks' responsibilities regarding access to remedy in accordance with the OECD Guidelines and the UNGPs, and advise banks on taking appropriate steps to incorporate findings.

Resource efficiency and circular economy policy initiatives from subnational to local level

The Green Deal approach[88] in the Netherlands is an accessible way for companies, other stakeholder organisations, local and regional government and interest groups to work with Central Government on green growth and social issues. The aim is to remove barriers in order to help sustainable initiatives get off the ground and to accelerate this process where possible. Central Government plays a key role in this area. Initiatives often start from the bottom up, in response to societal dynamics.

All tiers of government in the Netherlands – national, provincial, municipal and the regional water authorities – participate in sharing experience and knowledge on circular economy, as a new subject under the intergovernmental programme (IBP)[89].

Several Dutch provinces, including Friesland[90], North-Brabant and North-Holland[91], have set up action plans and pilot projects according to their regional economic profiles, some focusing more on agriculture and biomass, others more on manufacturing and construction or high tech.

Municipal governments have also set up circular initiatives, directed at local businesses, some of which can operate globally, such as Schiphol Airport in Haarlemmermeer[92]; management of public infrastructure,

[88] http://www.greendeals.nl/english/ (English)
[89] https://kennisopenbaarbestuur.nl/rapporten-publicaties/programmastart-interbestuurlijk-programma-ibp/ (Dutch)
[90] http://www.circulairfriesland.frl/icoonprojecten (Dutch)
[91] https://www.noord-holland.nl/Onderwerpen/Economie_Werk/Duurzame_economie (Dutch)
[92] https://www.hlmrmeer.nl/nl/ondernemen/circulaire-hotspot (Dutch)

such as renewal of roads, council housing and industrial zones including in Dordrecht[93] and Apeldoorn[94]; and at their own operations, for example the new city hall in Venlo[95] or the Upcycle Centre for waste management in the new town of Almere[96].

In order to stimulate the transition to a circular economy and enable more initiatives, eight cities, ministries, knowledge institutions and companies have signed a so-called City Deal. With this they take the lead in accelerating the transition to a circular economy at a local and regional level. The City Deal Circular City (Circulaire Stad)[97] was signed during the National Top Conference on Circular Economy of the Association of Dutch Municipalities in November 2016.

Another example is found in the Amsterdam Metropolitan Area. In the field of raw materials and product reuse, significant initiatives have been taken, especially at local level, such as separate collection of general and bulky household and industrial waste, including, for example, repair shops for product reuse and for giving household appliances a second life. But there is still room for improvement. Government and companies realise that cooperation within the Metropolitan Region is needed to speed up the process towards the circular economy and make business cases more feasible. Amsterdam Economic Board Members Jacqueline Cramer, former Minister of Housing, Spatial Planning and Sustainability, and John Nederstigt, former Alderman for sustainable economic development in Haarlemmermeer, direct this process. In close collaboration with various parties in the Metropolitan Region of Amsterdam, they have written a paper, The Amsterdam Metropolitan Area as a Circular Raw Materials Hub[98], containing a coordinated regional strategy to close loops of raw and used materials, to stimulate product reuse and re-design and to create new business.

The associations of local governments (provinces, municipalities and water boards) were also among the nine drafting partners of the National Agreement on the Circular Economy (see section 'Dedicated national strategies or roadmaps for material resource efficiency and for circular economy').

Other resources

Examples of policies which go beyond "material resources"

From 2018, Statistics Netherlands will report in a separate publication, *Monitor Brede Welvaart*, on the state and progress of natural resources, public health and education, etc. in line with reporting on the UN SDGs[99].

The annual monitoring report will be accompanied by a more exploratory thematic report by the economic, environmental and socio-cultural Planning Agencies. The first report, in 2018, focused on the circular economy[100].

[93] https://www.dordtduurzaam.nl/actueel/oude-nieuwsberichten/november-2017/op-naar-een-circulair-wielwijk (Dutch)
[94] https://www.cleantechregio.nl/nieuws/298-gemeente-apeldoorn-gaat-voor-circulair-verantwoorde-renovatie (Dutch)
[95] https://www.circulairondernemen.nl/solutions/circulair-stadskantoor-van-gemeente-venlo (Dutch)
[96] http://upcyclecity.almere.nl/ambities/upcycle-centrum/ (Dutch)
[97] https://agendastad.nl/citydeal/circulaire-stad/ (Dutch)
[98] Jacqueline Cramer and John Nederstigt: *De Metropoolregio Amsterdam als Circulaire Grondstoffen Hub*, https://www.amsterdameconomicboard.com/app/uploads/2016/02/Startnotitie-De-MRA-als-circulaire-grondstoffenhub.pdf (Amsterdam, 2015)
[99] https://www.cbs.nl/nl-nl/nieuws/2018/04/cbs-hoogleraar-onderzoekt-brede-welvaart (Dutch)
[100] https://www.cpb.nl/publicatie/naar-een-verkenning-brede-welvaart (Dutch)

The way forward

Reflections on future directions of policies on resource efficiency and circular economy

The main challenges to the implementation of circular economy policies are:

- knowledge on the nature of transitions and development of indicators for monitoring progress, which we are tackling by working with a consortium of contracted knowledge institutes (Netherlands Environmental Assessment Agency, Statistics Netherlands, National Institute for Public Health and the Environment) on a new monitoring system;
- the social (cooperation) aspect, rather than technological development, as the main and much more challenging barrier – including understanding of circular economy by consumers/changing consumer behaviour; dealing with the established order (in this case, the linear economy of 'take, make, waste'); and cooperation within value chains.

As professor Derk Loorbach said in his inaugural speech (Rotterdam, 2014): '*The established regimes predominantly focus on optimisation, improvement and efficiency to reduce negative impacts. Over time however these regimes become increasingly locked-in, adding to the persistency as well as their systemic vulnerability. Simultaneously the understanding of the persistent nature of our problems, along with the alternative technologies and practices, slowly ripens and matures. We are now in a period where dominant regimes become fundamentally challenged by these alternatives, creating the contexts for tensions, conflicts, surprises and, ultimately, disruptive systemic changes*'[101].

[101] https://drift.eur.nl/nl/publicaties/transition-governance-panarchy-new-transformation/ (English)

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