

Opportunities for a **circular economy**



START

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[HOME](#) [OPPORTUNITIES](#) [LINEAR AND CIRCULAR](#) [DUTCH SITUATION](#) [MINING THE CITY](#) [REVENUE MODELS](#) [FUTURE](#)

A circular economy is focused on the optimal use and reuse of resources in the various links along production chains; from the extraction of raw resources all the way to consumption. Resources are at risk of becoming scarce due to a growing global population and rising prosperity levels. This is why it is ever more important that the available resources are used as efficiently as possible. There are also new opportunities — new markets, more collaboration, and a reduced use of resources.

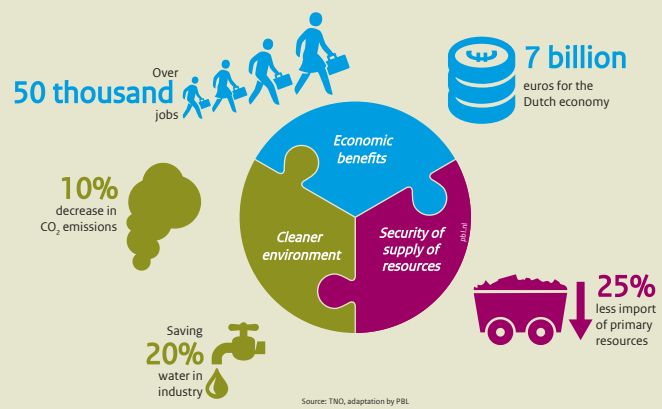
The transition towards a circular economy, according to the European Commission, is: 'the opportunity to transform our economy and to generate new and sustainable competitor advantages for Europe'.



Opportunities for the Netherlands

The transition towards a circular economy offers economic opportunities for the Netherlands, can make the country less dependent on imported, scarce raw materials and other resources, and will contribute to a cleaner environment.

What would be the benefits of a circular economy for the Netherlands?



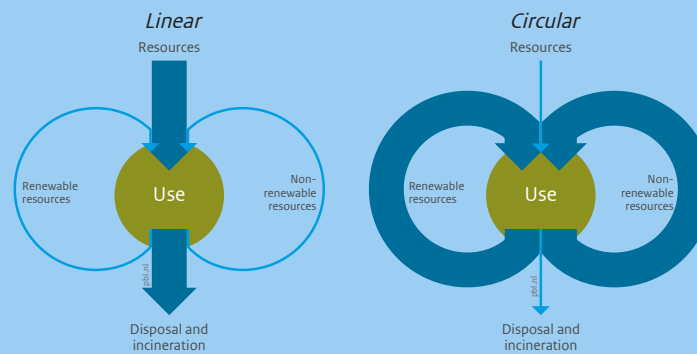
Realising these opportunities is no easy feat. Investments and new alliances between companies will be required, and the traditional, already established companies will likely slow the transition down. Government policy will often be needed to overcome barriers and to change the perception of the importance of natural resources.



What is a circular economy?

In contrast to what happens in a linear economy, a circular economy makes optimal use of raw materials and resources. This means that these materials and resources continue to be applied in a way that generates the highest economic value and the least environmental damage.

From a linear to a circular economy



A linear economy operates on a 'take-make-dispose' model, making unbounded use of

A circular economy, in contrast, centres around the reuse of products and raw materials, and the

resources to produce products that will be discarded after use.

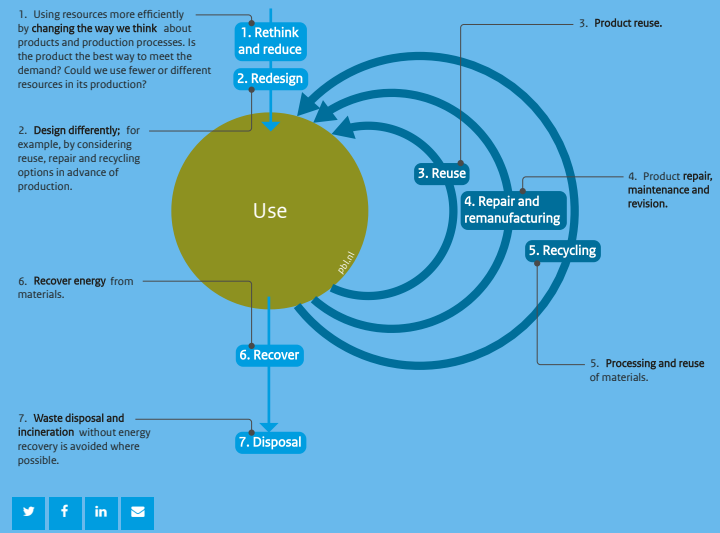
prevention of waste and harmful emissions to soils, water and air, wherever possible ('closing the loop').



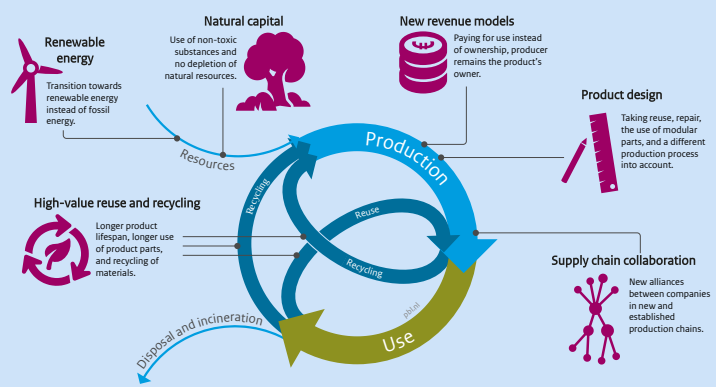
The conversion of a linear economy into one that is circular involves systems changes, or transition. Other designs or processes (e.g. 3D printing), products that can be repaired or regenerated, recycling of materials and another way of thinking about products (e.g. sharing them), are all aspects of such a change.

The rule of thumb for determining the highest value reuse of resources within the cycle is to prioritise strategies according to the 'Rs' (Rethink, Redesign, Reuse, Repair, Remanufacturing, Recycling, Recover). However, there will always be exceptions.

A circular economy is about more than recycling



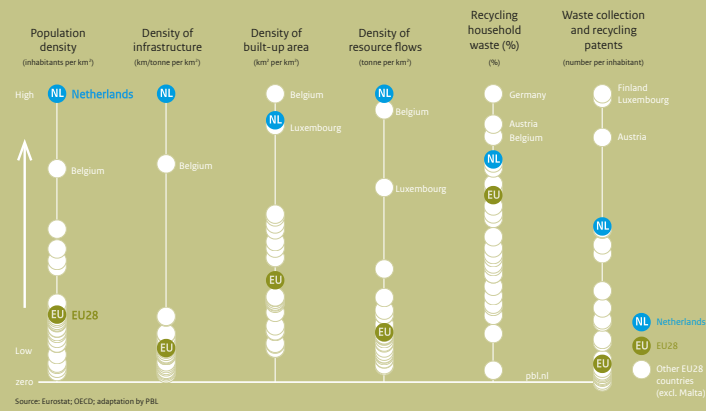
Elements of a circular economy



The Dutch situation

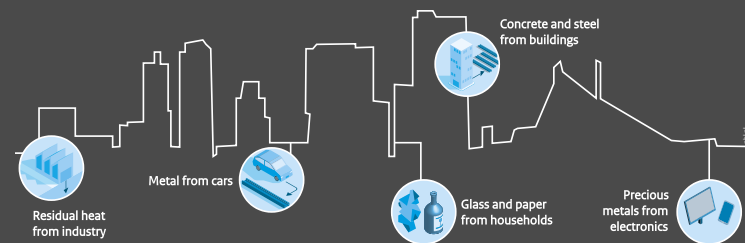
From a European perspective, the Netherlands resembles a densely populated city with excellent infrastructure, major ports and logistics. This presents the right conditions for a circular economy, and means that sharing certain products (e.g. cars) is easier and utilising industrial waste flows less complicated.

The Netherlands has a good starting position



The Netherlands began taking measures, early on, to reduce waste disposal. This is partly the reason why it has one of the highest recycling percentages of Europe. There is a large amount of knowledge on waste separation technologies and the logistical system of waste collection and recycling.

Dutch experience and knowledge can be applied, both nationally and internationally, in further circular-economy development. Moreover, many raw materials are transported via the Netherlands, which makes this country a suitable pivot point (resource roundabout).



Mining the city

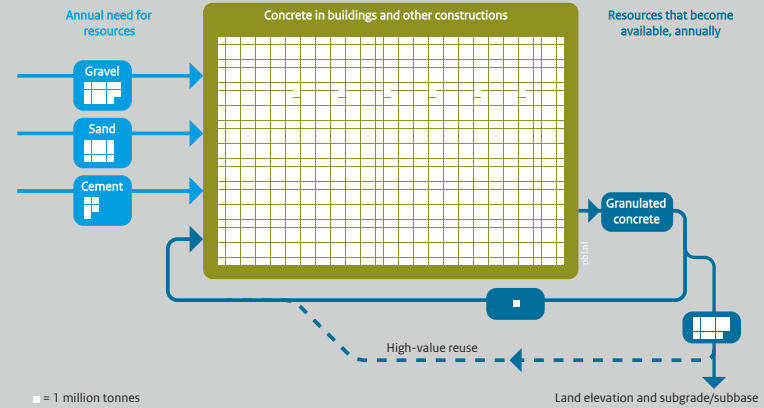
Many resources originally were extracted from the earth and became stored in buildings and infrastructure, as well as in products, such as televisions, brochures and bottles. The built environment can be considered an urban mine, from which valuable resources can be reclaimed.

Large quantities of certain materials, such as paper, steel and glass, are already being recycled. However, there are many more other types of materials and products that are currently being discarded, but could very well be reused and from which the raw

materials could be recycled. For example, discarded electronic devices contain many rare earth metals and precious metals that, at the moment, are hardly being recycled.



Recycling concrete has many possibilities



There are enormous stocks of concrete in buildings and constructions, such as viaducts and bridges. After demolition, almost all of the concrete within them is recycled, but the largest share of this material ends up in low-grade applications, such as in noise barriers, dykes and as subbase and subgrade in road engineering. However, the production of concrete produces large amounts of greenhouse gas emissions, while sand and gravel could also be used in all of the cases above. The construction sector is facing the important task of applying high-value recycling to the large stocks of concrete.

In addition, architects could take the possibilities for reuse into account in the designing phase of building or elements of buildings. For example, by applying modular design, which would make it easier to deconstruct buildings back to those modules and reuse them again.



Revenue models of a circular economy

New revenue models play an important role in the transition towards a circular economy. Consumers and companies will for example pay for the use of a product or machine more often. If products would remain the property of their producers, this would provide the producers with an incentive to ensure a longer product lifespan, or to reuse the raw materials more efficiently. In addition, producers would also remain responsible for repair and maintenance.

Examples of circular revenue models



Charges for using office chairs

BMA Ergonomics provides customers the option of leasing their office chairs. BMA not only generates additional revenues via service and repair contracts, but the company is also stimulated to reuse the chairs or chair parts. According to calculations by ING Bank, this results in lower CO2 emission levels within the production chain. The benefits for the CO2 footprint is particularly related to the extraction of raw materials (55%) and the assembling of the chairs (nearly 40%).

Car-sharing platforms

Organisations such as SnappCar and Greenwheels provide a platform for car sharing. Around 90,000 people are already using it, today. PBL has shown that the level of car ownership has decreased among car sharers, from an average of 1 passenger vehicle per household to 0.7. Close to a third of car sharers dispose of the car they own, or do not purchase one (or another one). This has meant less resource use, as well as a reduction of 15% to 20% in kilometres driven. CO2 emissions related to car use and ownership decrease by 8% to 13%.

Reconditioning of medical systems

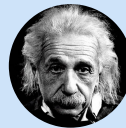
There already is a market for certain reconditioned products. The global market of reconditioned medical systems, for example, amounts to over 500 million euros. Philips has a market share of 25% in reconditioned medical equipment. Reconditioning involves upgrading old, pensioned off equipment to comply with current standards. The old parts form the basis for the new product, which is subsequently remarketed with a new warranty.

Waste recycling

Much of today's waste is already being recycled. However, large amounts of valuable material, such as scarce metals in electronics, are still being wasted. Statistics Netherlands has estimated that currently, in the Netherlands, around 27 million euros in gold in electronics ends up as waste, each year. Which shows that there are still plenty of opportunities for creating economic and ecological surplus value.



Looking towards the future



"We cannot solve our problems with the same thinking we used when we created them"

New coalitions flow from collaborations between companies, both within and between production chains. Companies look for different ways to solve resource issues. Alternative product design and production processes accelerate the transition towards a circular economy, facilitated by increasing digitisation.

Realising this transition is still an enormous task. The Netherlands is in a rather favourable position for making its economy more circular — and for making money in the process. However, this will explicitly require more than the mere recycling of materials. Many questions remain to be answered. Which initiatives would contribute substantially? Where could co-benefits be found? What could be the trade-offs? What are the barriers for innovating companies, and which companies would slow down the transition? Where could government intervention make the difference? All such questions require further research.

PBL will be continuing its research, exploring the transition towards a circular economy.



For more information

For more information or questions about this subject, please contact us via info@pbl.nl.

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


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Related publications

-  Circular Economy: Measuring innovation in product chains (2017)
-  Green Gains: In search of opportunities for the Dutch economy (2014)
-  Green Deals (in press)
-  Food for the circular economy (in press)
-  See pbl.nl/onderwerpen/circulaire-economie for more publications in Dutch

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