POLICY DINNER

THE CIRCULAR ECONOMY
Pathway for Pursuing 1.5˚C

11 May 2017 | 6:30pm – 9:00pm
Bonn Marriott World Conference Hotel

The Stanley Foundation

Hosted by:
The Stanley Foundation

shifting paradigms

Presented by:
Jelmer Hoogzaad
Shifting Paradigms

CIRCLE ECONOMY

Matthieu Bardout
Circle Economy

CONTENT

Shifting Paradigms & Circle Economy
The circular economy
Its mitigation impact
Circular mitigation examples
Transformational change
Discussion

SHIFTING PARADIGMS supports the transition to a low-carbon, circular economy

shifting paradigms

CIRCLE ECONOMY is dedicated to the practical and scalable implementation of the circular economy

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Our current economic paradigm follows a **'take-make-waste'** model

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In a **circular economy**, materials and resources are effectively used to their **fullest potential**

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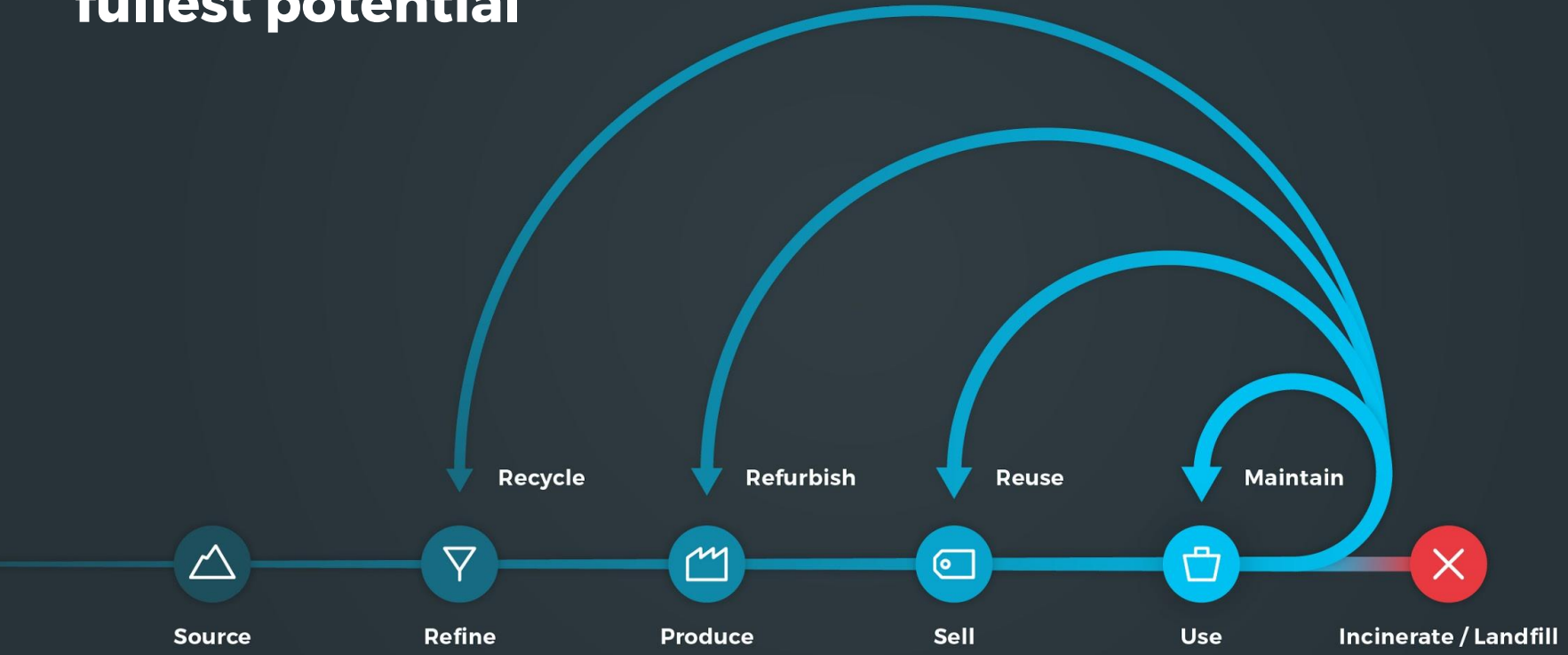

A **circular economy** includes both **material & systemic** elements

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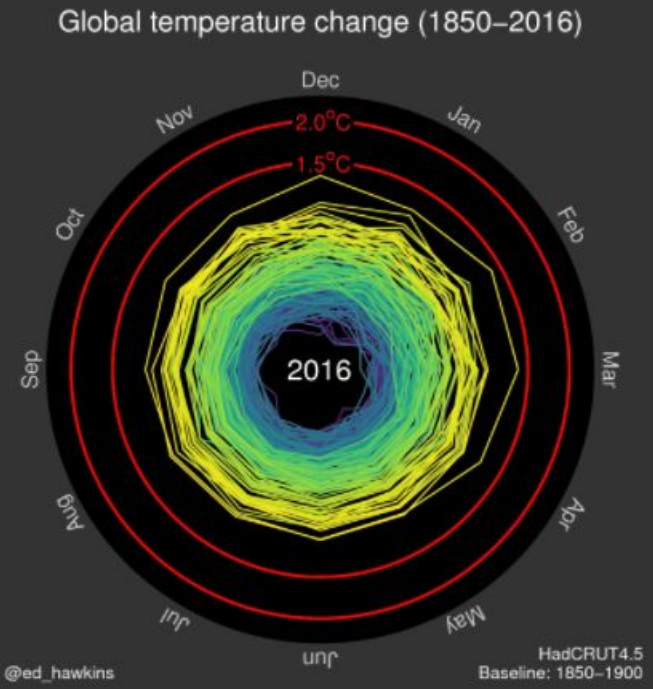
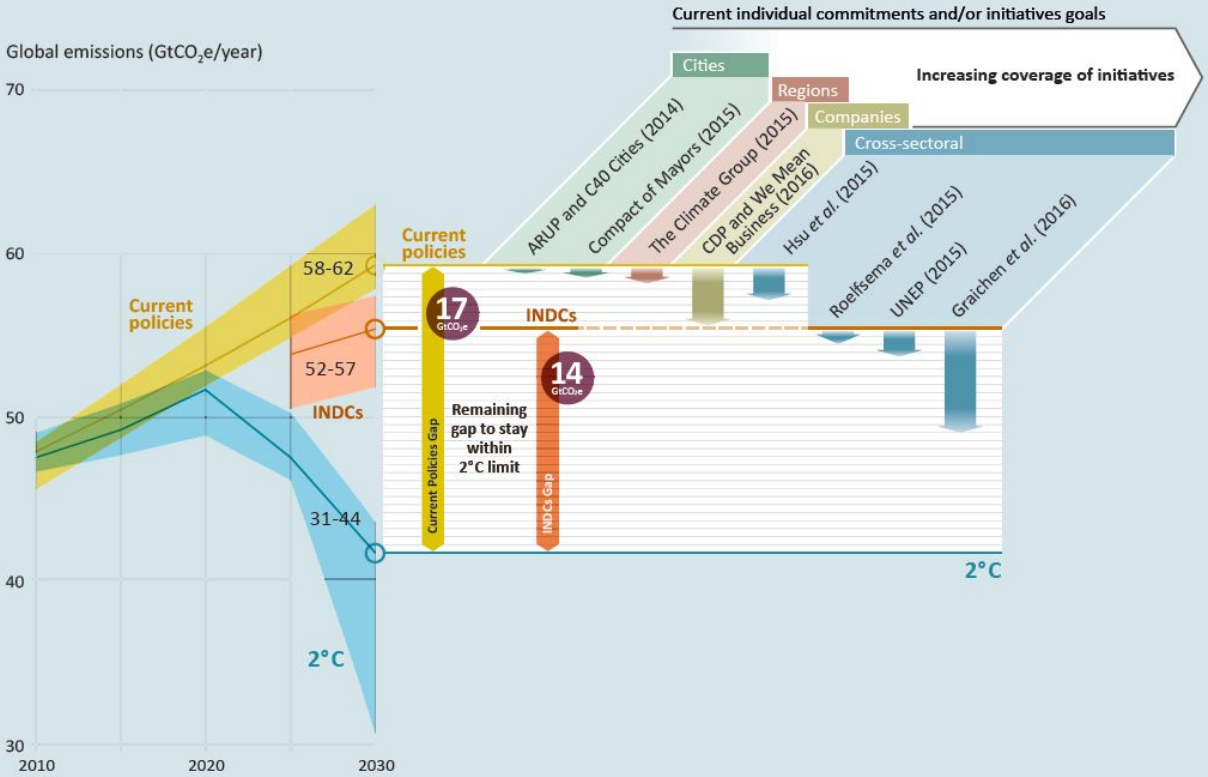
Climate change is a **major global concern**, with temperatures steadily rising toward the 1.5˚C and 2.0˚C target



Source: www.climate-lab-book.ac.uk

The latest UNEP 'emissions gap' report shows that **current policies are insufficient** to meet climate targets



Source: UNEP, 2016

The circular economy can make a **major contribution** to mitigating climate change

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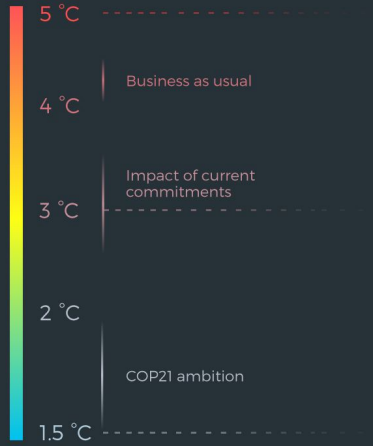
THE SITUATION

Under a business as usual scenario, the global temperature by 2100 will be more than 4˚C above pre-industrial levels

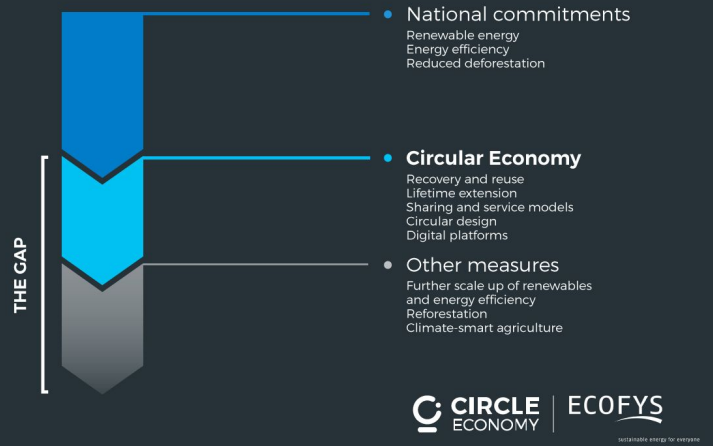


THE END GOAL

To limit temperature rise to 1.5˚C, we need to cut greenhouse gas emissions from 65 to 39 billion tonnes CO_2e per annum by 2030

THE SOLUTION

Current national commitments achieve about half of the required emissions cuts. Circular economy may fill about half of the remaining gap



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Download the report:
http://www.circle-economy.com/case/circular-economy-a-key-lever-in-bridging-the-emissions-gap-to-a-1-5-c-pathway

We extract over **80 billion tonnes** of materials per year to meet the functional needs of society...

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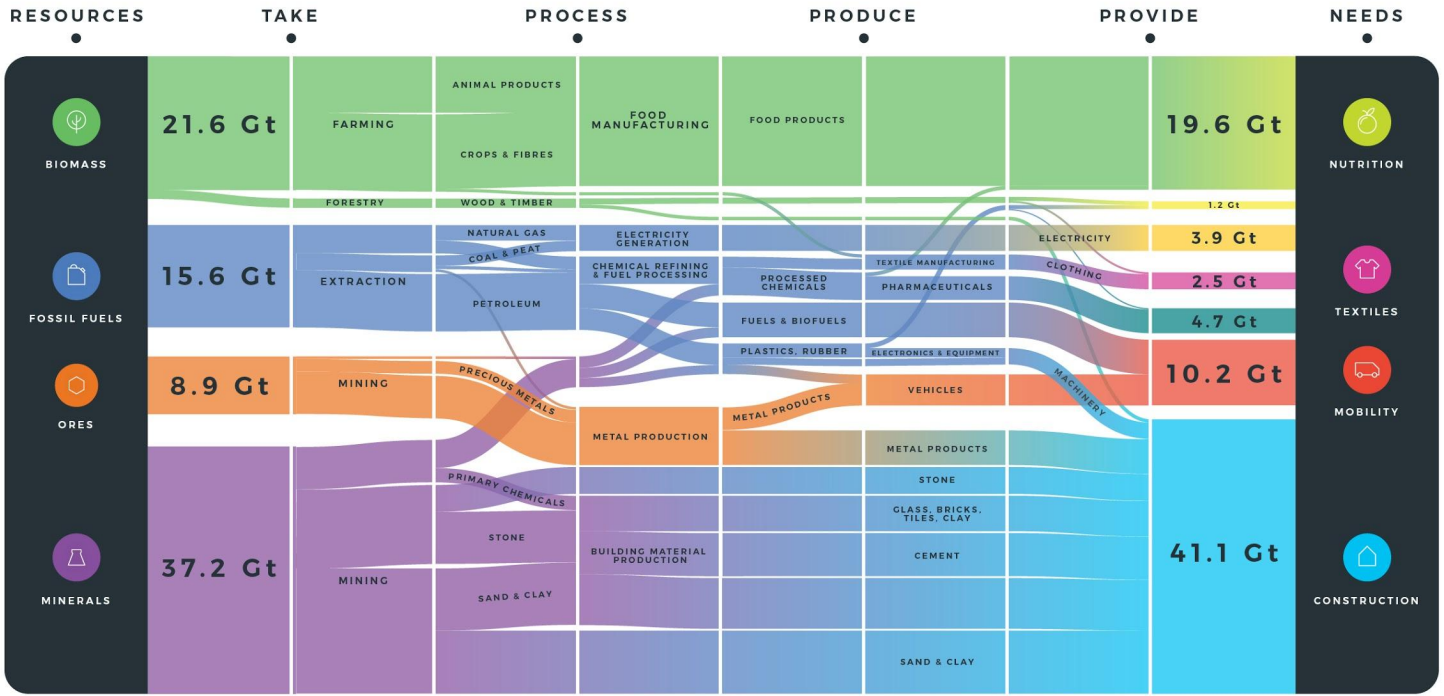

(draft analysis)

Sources: Circle Economy team analysis based on Exiobase (2011); Tukker et al., EXIOPOL - Development and illustrative analyses of a detailed global MR EE SUT/IOT (2013) Economic Systems Research, 25 (1), pp. 50-70.; Wood et al., Global sustainability accounting-developing EXIOBASE for multi-regional footprint analysis (2015) Sustainability (Switzerland), 7 (1), pp. 138-163.

… which relies on **emission-intensive** resources and processes…

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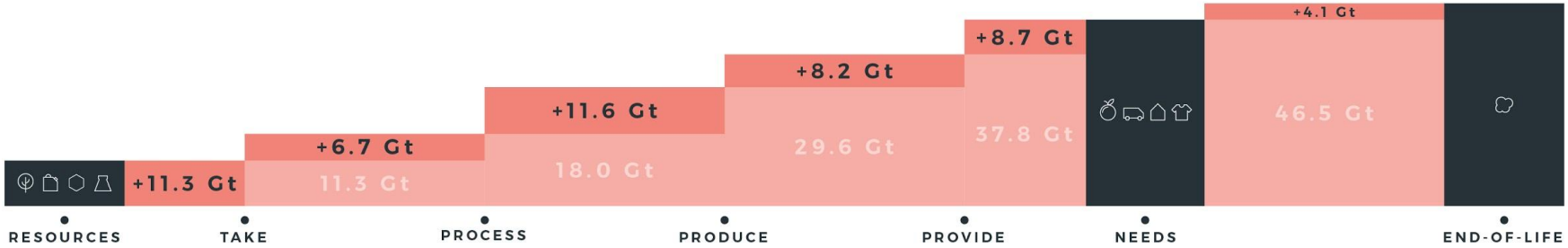
(draft analysis)

50.6 Gt CO^2e
from extraction to end-of-life



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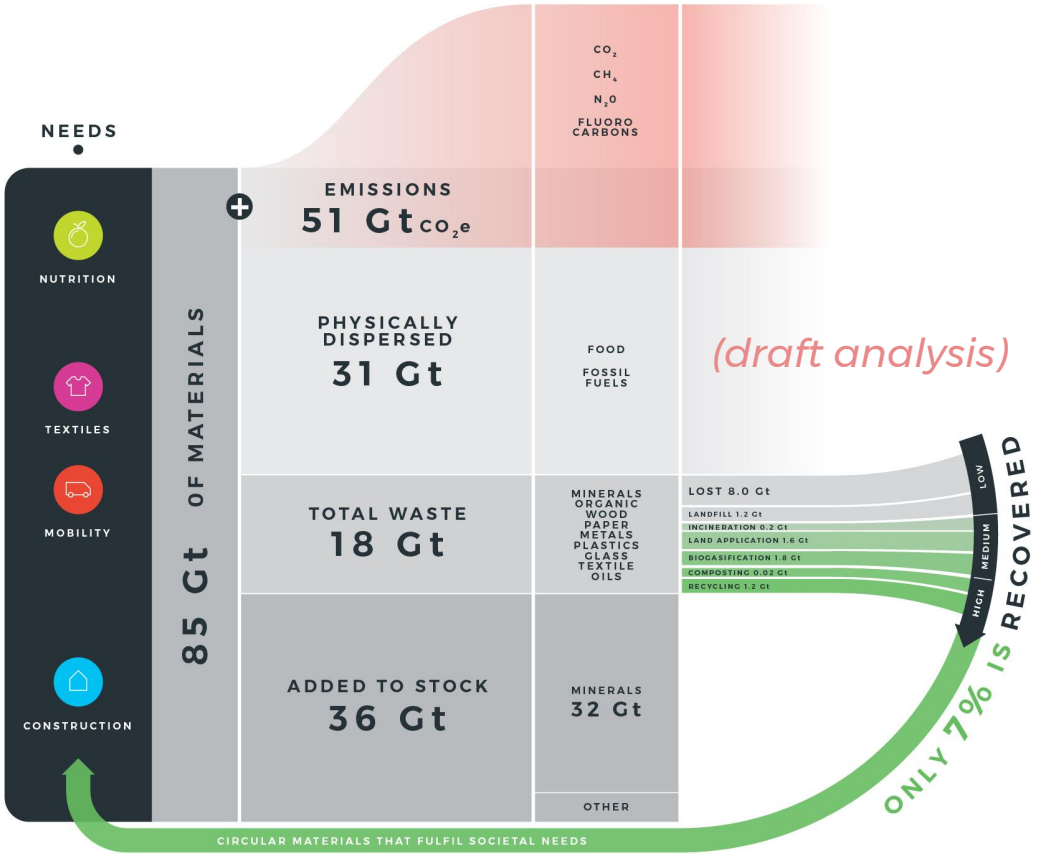
... yet only

7%

of materials are reused and recycled by the global economy



Sources: Circle Economy team analysis based on Exiobase (2011); Tukker et al., EXIOPOL - Development and illustrative analyses of a detailed global MR EE SUT/IOT (2013) Economic Systems Research, 25 (1), pp. 50-70.; Wood et al., Global sustainability accounting-developing EXIOBASE for multi-regional footprint analysis (2015) Sustainability (Switzerland), 7 (1), pp. 138-163.

Cross Laminated Timber is a promising **low-carbon substitute** for reinforced concrete

The cement industry accounts for 5% of global CO^2 emissions

Concrete is the 2nd most consumed substance after water

This is a nine story building using 950m^3 of wood. Its carbon footprint compared to concrete and steel is -1080 tCO^2e

Source: www.tesseract-design.com blogs.ei.columbia.edu

Biodigestion of manure, organic waste and human excretion can produce biogas and fertiliser

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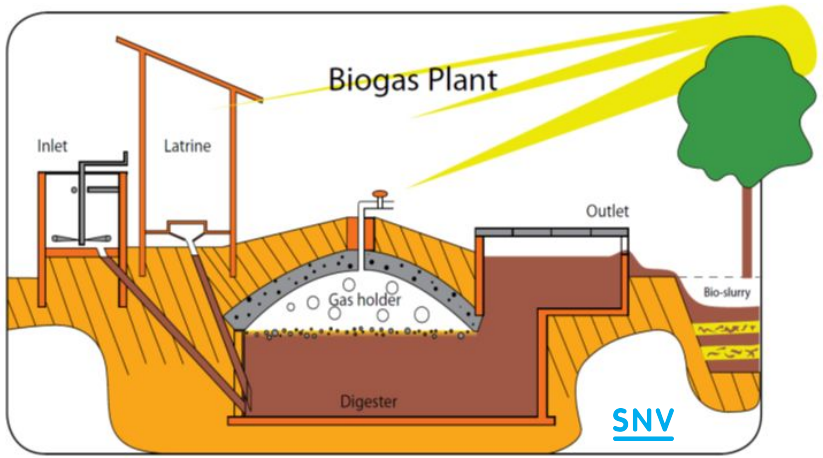
€150 million - planned investments in biodigesters in the Dutch dairy sector

10% - share of Dutch emissions from agriculture (mostly methane from cows)

1MWh - energy generated by demonstration plant in 20 days

The technology is also widely applicable in developing countries.



Source: www.theguardian.com/sustainable-business/2016/nov/02/netherlands-europe-dairy-industry-agriculture-biogas-cows-manure-poo-power

The Kumasi industrial cluster in Ghana is an example of **large-scale automotive remanufacturing**

Employing an estimated 200,000 workers
Designed their own car with **recycled car parts**
Drawing interest from car manufacturers

Source: www.ids.ac.uk

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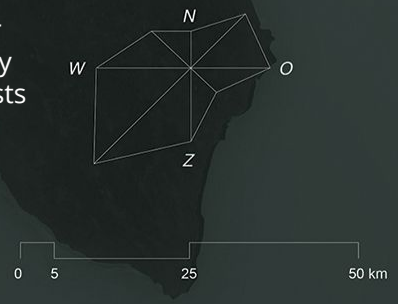
Finding systematic mitigation options requires mapping **the full metabolism** of a jurisdiction, industry or industrial cluster

The metabolism of Albania, mapping:

Food
Water
Energy
Tourists



Source: www.behance.net/gallery/40339307/The-Metabolism-of-Albania

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It offers Lao PDR an **alternative development perspective** which steps away from devastating resource extraction and its short-term rents

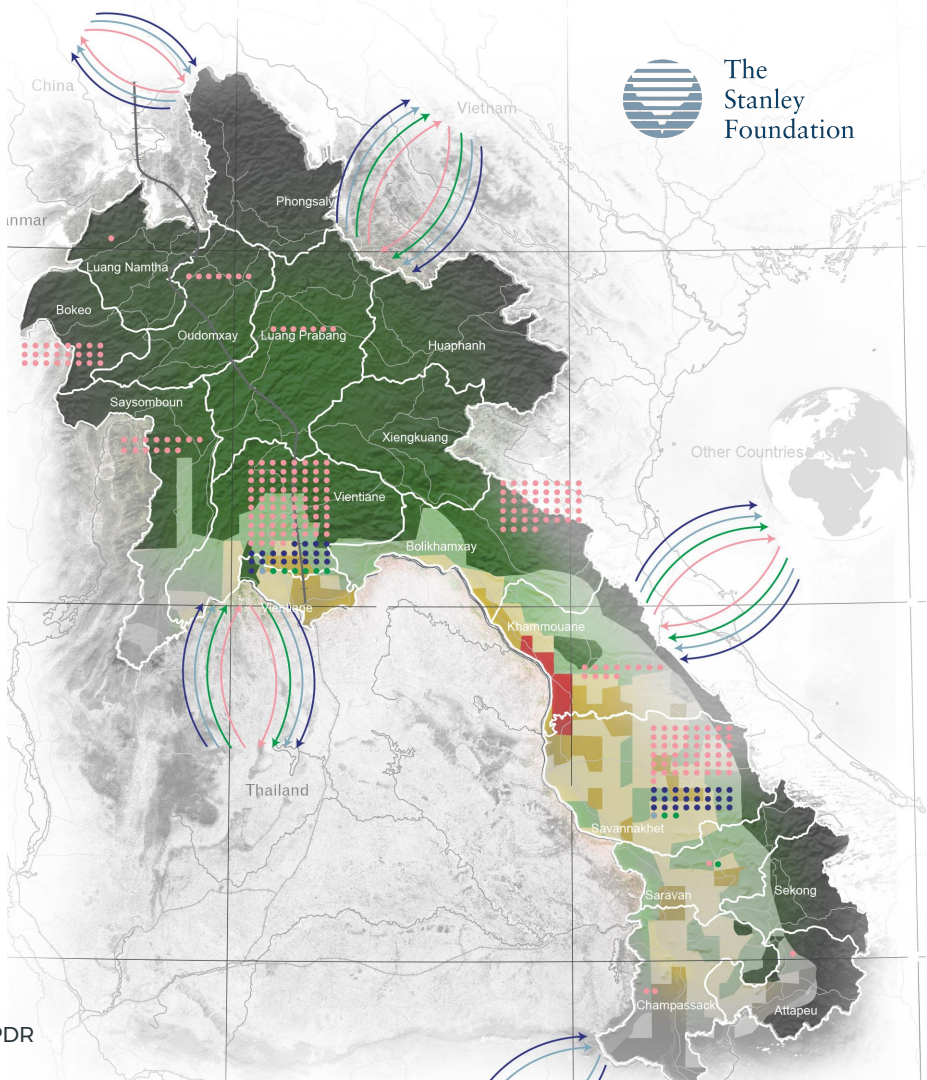
Initiative with UNDP

Mapping stocks and flows of:

- Agriculture and forestry
- Energy
- Metals
- Tourism

Opportunities

- Aquaculture in hydropower reservoirs
- Cross laminated timber
- Vehicle remanufacturing
- Nutrients recovery



Source: J.A.hoogzaad and others (unpublished draft), Circular economy strategies for Lao PDR

Circular economy opportunities to mitigate climate change are **overlooked and underfinanced**

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~67%
share of global climate finance going to energy efficiency and renewables

67%
global energy use related to material management

13%
share of global emissions related to agriculture

1%
share of global climate finance directed to land-use

15%
share of global emissions related to construction

Sources:
UNFCCC, 2016 Biennial Assessment and Overview of Climate Finance Flows.
J.A.hoogzaad and others (unpublished draft), Circular economy strategies for Lao PDR
http://www.wri.org/blog/2014/05/everything-you-need-know-about-agricultural-emissions
B. Bajželj, J.M. Allwood and J.M. Cullen, "Designing Climate Change Mitigation Plans That Add Up", *Environmental Science & Technology*, 47(14): 8062–8069, July 2013
Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3797518

The circular economy changes the **scope of mitigation action**

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From	To
Renewables, energy efficiency and reduced deforestation	Low-carbon materials and dematerialisation
Optimising existing assets/installations	Building an efficient metabolisms and systems
Plant, city or country (scope 1 and 2 emissions)	Supply chain or cross-border Interaction (scope 3 emissions)
Products	Services
Carbon tax	Extraction tax
Territorial emissions	Consumption-based emissions (30% tied to international trade)
Article 6 inspired by CDM and offsetting	Article 6 targeting cross-border trade of carbon- intensive products and materials


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Way forward

Policy links between the Circular Economy and Climate Change

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- Within the UNFCCC, Circular Economy could be taken up in a variety of ways:
  - Technical Experts Meetings offer venues to raise circular economy strategies with mitigation potential
  - Policy and business champions could make the way forward tangible with existing examples
  - The Innovation Task Force within the Technology Executive Committee could look at circular economy solutions
  - At COP 23, with Fiji as the host, SIDS can call for mobilising circular economy solutions to their waste management challenges
- Circular economy strategies also fit well with a number of sustainable development goals, including those on climate change; sustainable consumption and production; inclusive, safe, resilient and sustainable settlements; resilient infrastructure, sustainable industrialisation and innovation and even reduced poverty through job creation

Impact Modelling a *Deep Dive* into Complementarity within the Circular Economy

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- Develop further understanding of upstream emissions, particularly for minerals and ores.
- Detailed assessment of the mitigation impact of circular economy strategies within and across sectors, including positive and negative feedback loops, like in transport, agriculture, construction and healthcare.
- Complementary assessment of resource scarcity with a periodic table or elemental approach, considering also rare earth use.
- Circular economy strategies and policies can strengthen existing mitigation pathways, adding a resource availability perspective to the development and scaling up of renewable energy.
- Circular economy offers economically attractive opportunities to lower greenhouse gas emissions also in heavy industry.

Climate Finance Current Contributions and Opportunities for Circular Economy Projects

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- Integrate circular economy considerations into the work of the Green Climate Fund, G-20's Green Finance Study Group, V20, World Bank, World Economic Forum, International Monetary Fund.
- Leverage financing for circular economy initiatives with institutional investors, public investment, finance groups, and business investment, using the guidance from the circular financing team at Circle Economy.
- Assess where most of the commercially viable circulate economy mitigation options lie.

UNFCCC Negotiations The Circular Economy within the Architecture of the Paris Agreement

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Transparency framework: include metrics which reveal mitigation options in reducing the carbon footprint of products and materials which are traded internationally (scope 3 emissions, or consumption-based accounting)

Nationally Determined Contributions: While developing the architecture of the Paris Agreement, there is need for a discussion on cross-border corrections and the emissions embedded into the international trade of products and materials.The NDCs contain a diverse range of pledged targets and actions and have a voluntary character. This is an opportunity for countries to include national policies which have mitigation potential outside national borders.

Article 6 on international cooperation: should also incentivise initiatives which decrease emissions outside national borders, for example by encouraging substitution of imported carbon intensive materials.

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Annexes

A growing body of evidence suggests **the circular economy is a promising pathway** to reduce emissions

Geographical Scope	Circular Economy strategies investigated	GHG emission reduction	Author and year of publication
World	Mobility, food waste, food chains, passive houses, urban planning, and renewable energies	17 000 MtCO2eq. in 2030	*Ellen MacArthur Foundation, 2015*
Europe	Recycling	176 MtCO2eq. (policy targets) 278 MtCO2eq. (tech. potential)	*BIO for European Commission, 2011*
Europe	Waste Directives Impact Assessment	62 MtCO2eq.	*European Commission SWD(2014) 208*
France	Packaging recycling	2.1 MtCO2eq. in 2013	*CDC Climat for Eco-Emballages, 2015*
Finland, France, The Netherlands, Spain and Sweden	Material efficiency in general	Carbon emissions reduced in all countries combined between 3 and 10%, ~75 MtCO2eq. by 2030	*Club of Rome (2015) The Circular Economy and Benefits for Society*

Source: Deloitte, 2016

Many **cities** such as Glasgow are taking initiative to develop and implement circular economy strategies

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See our reports: Amsterdam Glasgow Noord-Holland

Agrifood: in the dairy sector, different circular economy transition pathways are possible:

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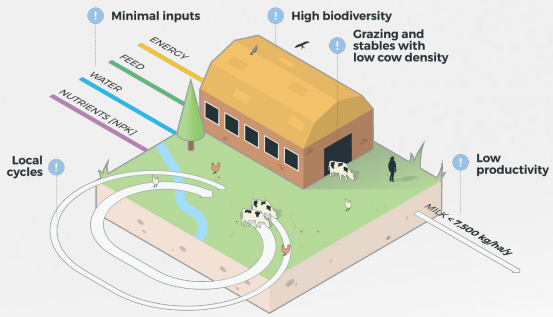
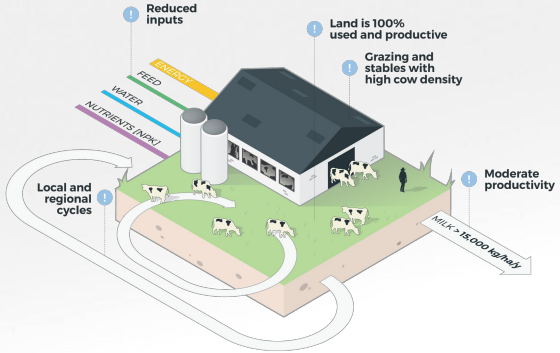
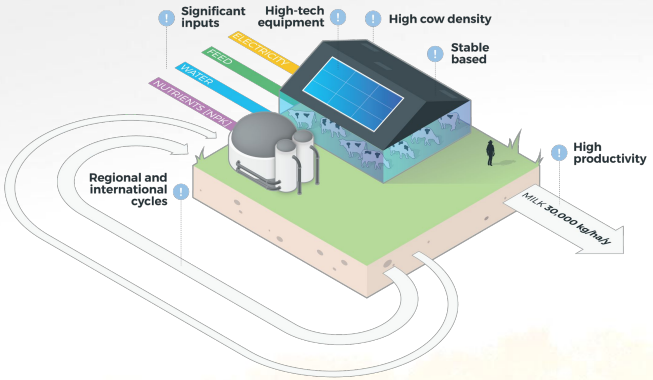
Extensive grazing



Optimised grazing

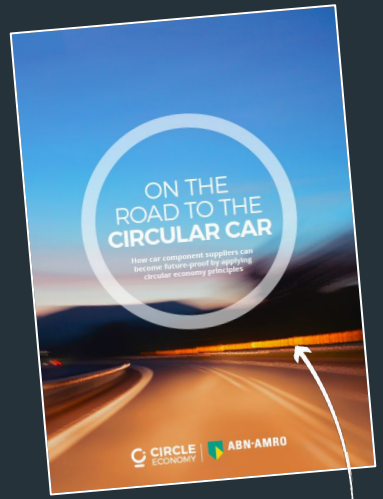


Intensive high-tech

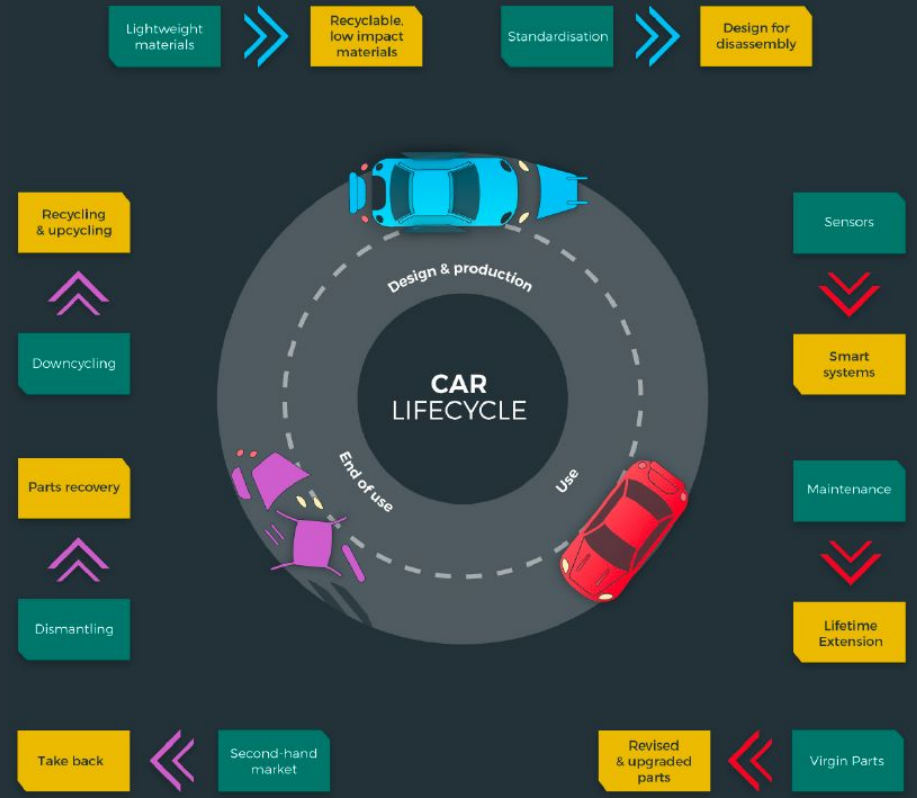


Report: http://www.circle-economy.com/case/the-circular-dairy-economy

Mobility: changing regulations and consumer demands are driving the transition to the circular economy



Report:
http://www.circle-economy.com/case/on-the-road-to-the-circular-car



Healthcare: circular economy strategies can lead to significant cost savings while reducing material use

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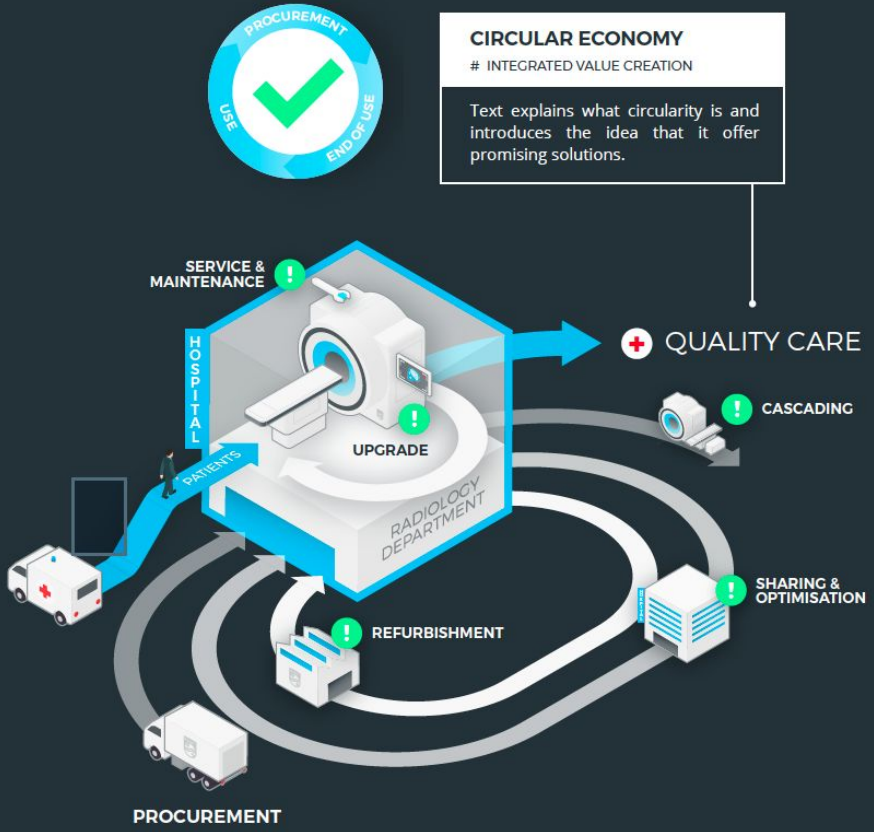

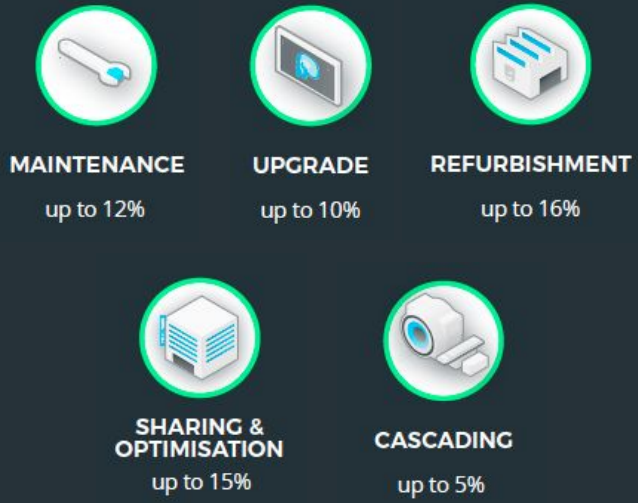

Construction: the circular economy offers interesting solutions to reduce the impact of the construction sector

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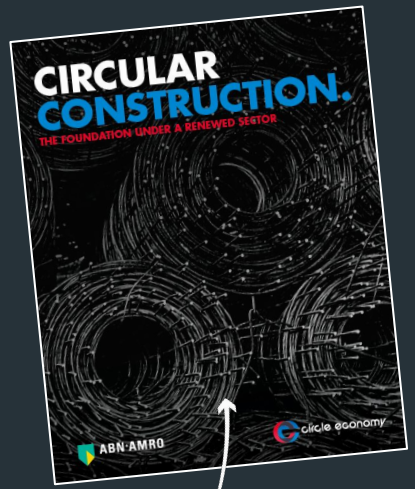
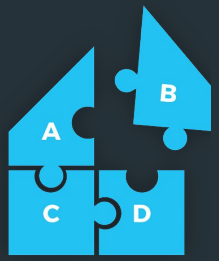
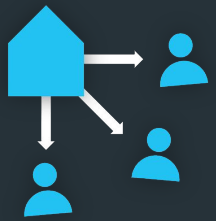
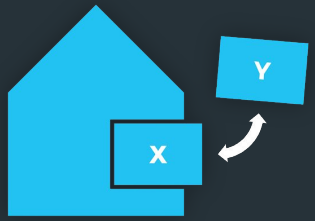




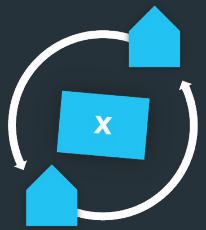
Modular elements



Asset sharing



Material substitution



Material cycling

Report: http://www.circle-economy.com/wp-content/uploads/2016/06/Circle-Economy_2015_002_Rapport_Circulair-Construction_1-21.pdf

Continuing to operate in the linear economy relates to various **risks for businesses and investors**

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	LINEAR ECONOMY BEHAVIOURS			
	Utilise non-renewable and/or toxic resources	**Prioritise sales of new products**	**Monopolise knowledge and IP**	**Maintain status quo**
Market risks	-Scarcity of primary resources -Volatility of resource prices	-Scarcity of primary resources -Volatility of resource prices	-Limited opportunities to expand to new markets with trade partners	-Scarcity of primary resources -Volatility of resource prices
Operational risks	-Threats to employee health & safety -Product recalls due to supply chain issues	Inability to adapt to new value chain models	-Increased supply chain inefficiencies and miscommunication	-Inability to adapt to new supply chains -Threats from automated production lines
Business risks	-Inability to meet changing consumer demands -Threats from decreasing cost of renewables	-Inability to meet changing consumer demands -Decreasing margins from commoditisation	- Inability to meet changing consumer demands - Threats from disruptive new technologies	-Inability to meet changing consumer demands -Threats from disruptive new technologies
Legal risks	-Lawsuits from consumers -Fines due to regulatory violations -More stringent climate change legislation	-Lawsuits from consumers -Requirements for extended producer responsibility	-Anti-trust regulations -Patent disputes	-Changing environmental regulations
Reputational risks	-Negative brand image and perception	-Inability to connect with new generation of consumers	-Negative brand image and perception	-Inability to connect with new generation of consumers

Higher risk Lower risk

8.1 % of Dutch **jobs** are currently connected to the circular economy

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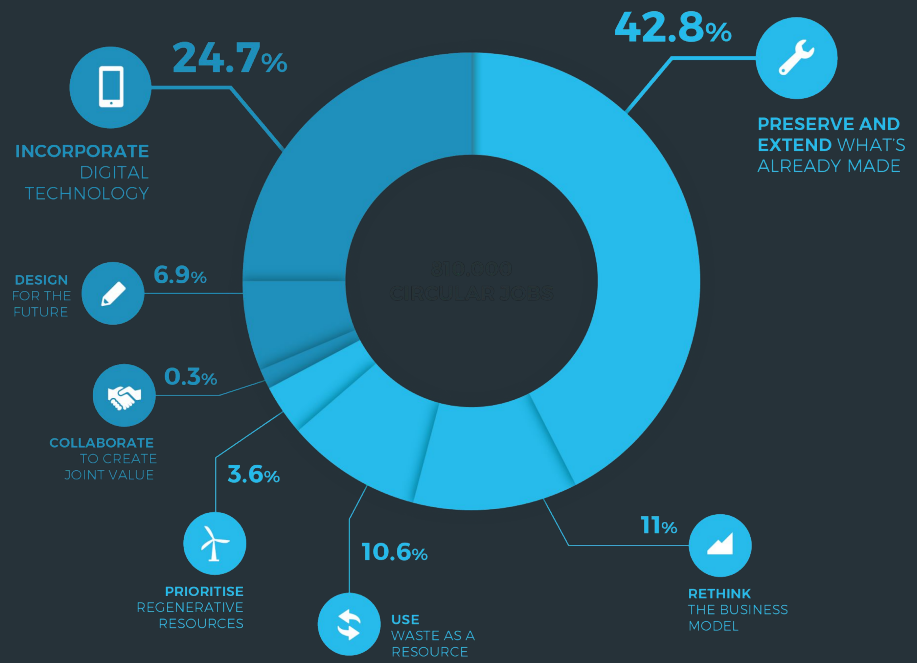

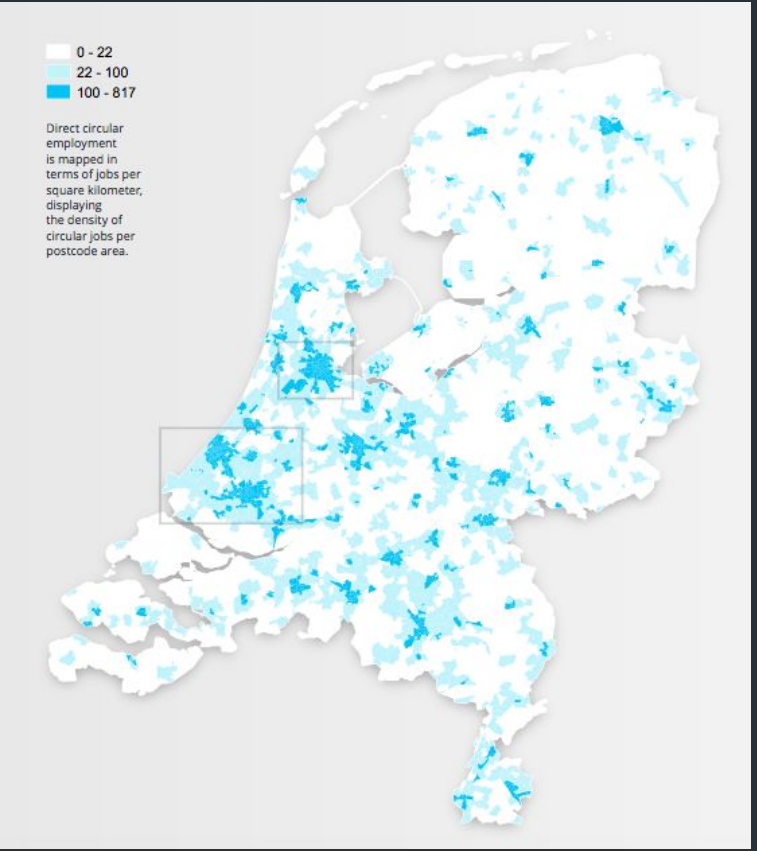

Report: http://www.circle-economy.com/Circular-Jobs

The circular economy offers promising solutions to contribute to the UN **Sustainable Development Goals**

Overview of **material flows (1)**, associated **emissions (2)** and **waste generation (3)**

(draft analysis)

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