

Over C2C, Circulariteit en tijd

Peter Luscuere

Energy and Exergy

Efficiency and Effectiveness

Sustainability and Cradle to Cradle

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Principles of Cradle to Cradle

- Waste equals food
- Use current solar income
- Celebrate diversity

Source: EPEA



Efficiency & Effectiveness

- Efficiency is all about *reducing* costs and *reducing* negative effects
- It is the embodiment of a *negative* footprint
- What if we could generate *positive* footprints?
- It would be beneficial to Society



Beyond Sustainability



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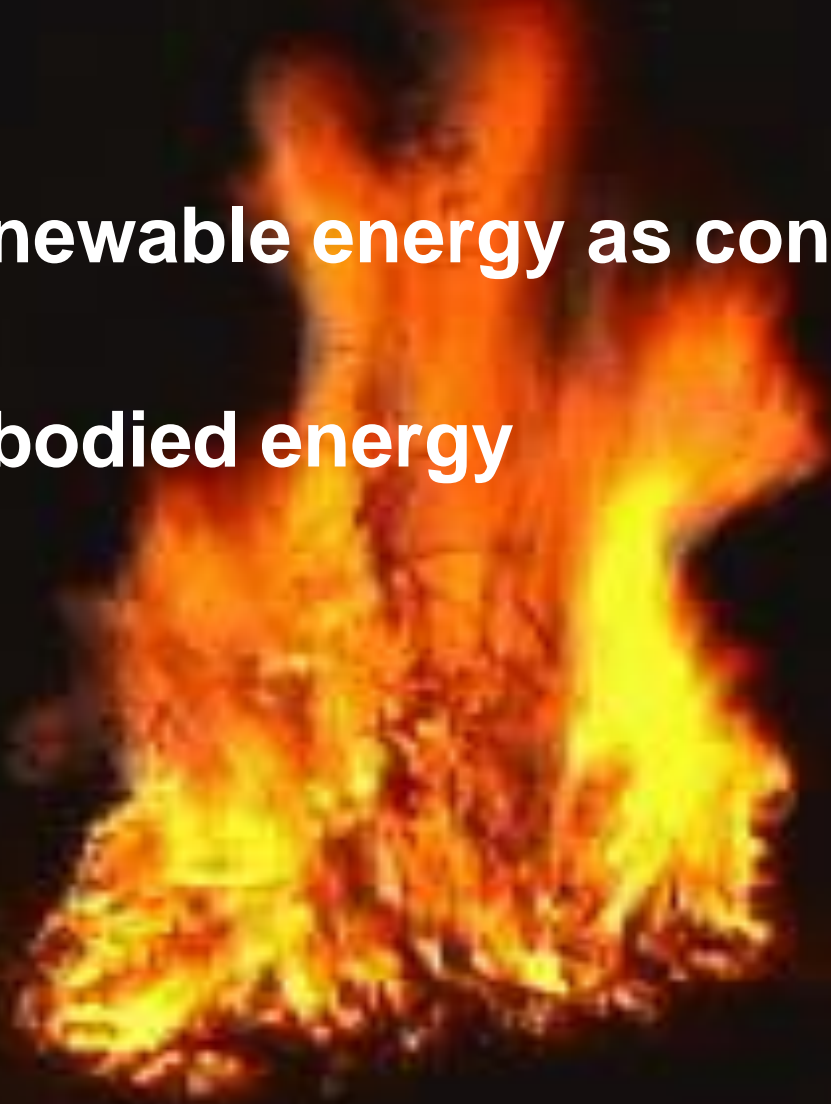
Environmental Challenges & Solutions

Values	Ecology			Economy			Equity		
Re-sources	Biodiversity	Health Effects	Climate Change	Scarcity	Cost / Benefits	PR Metaphor	Social Responsibility	Fairness	
Energy	SO ₂ NO _x Acid Rain	NO _x PM _{2.5}	CO ₂ CH ₄	Fossil fuels	Pay Back Time *****	'Net Positive'	Energy Positive Buildings	'Supergrid'	Coal Powered Electricity *****
	Solar, Wind, Hydro, Geothermal, Wave & Tidal Energy and (High Productive) Biofuels (eg Algae)								
Air	SO ₂	SO ₂ NO _x O ₃ CO PM _{2.5} PM ₁₀	CO ₂ CH ₄	Clean Air	Life Cycle Analysis *****	'Every Breath We Take'	Actively Cleaning Buildings	Global burden of disease / DALY's	Child Labor ***** Increasing Inequality *****
	Limit fossil emissions of transport and energy systems. Apply filtration in buildings, metabolize particles by vegetation, use TiO ₂ coatings								
Water	Contaminated Water	Hormones & Medicines	Rising Sea Level	Fresh Water	Total Cost of Ownership *****	'Clean'	Cleaner Discharge as Intake	Geo-Political Governance (lack of)	Inclusivity ***** Resource Depletion *****
	Local Cleaning (Reed filters), use of Algae, Nutrition Regeneration								
Materials	Waste *)	Hazardous Emissions	Chlorofluoro-carbons	Virgin Materials	Hard & Soft Costs and Benefits *****	'Healthy'	Waste as Resource & Endless Recycling	'Securing' Resources	'Externalised' Costs *****
	Non-hazardous Substances, From Down- to Re- and UpCycling								
Top Soil	Loss, Degradation & Compaction **)	Contamination	CH ₄ - Emissions	Phosphate	Co-Benefits	'Fertile'	Positive Contribution to Top Soil Quality	Displacing Arable Land by BioFuels	Rampant Environmental Pollution
	Apply Green Roofs & Walls, Close Continuous Cycles, Recover Nutrients, Apply local solutions & Large Scale Eco-Rehabilitation								

*) Toxic-, Carcinogenic-, Mutagenic, etc. **) Specific for The Netherlands Environmental Challenges / Solutions / model v14.2, PG Luscuere & WM Luscuere, Mei 2017

Positive Footprint: Energy

- **Produce more renewable energy as consumed by the building**
- **Including the embodied energy**



Positive Footprint: Water

- Produce locally a better water quality out as in



Positive Footprint: Air

- **Produce locally a better air quality out as in (using renewable resources)**

Positive Footprint: Topsoil

- **Have more Topsoil produced over the lifetime of the building as is destroyed by the building / project (Worldscale)**
- **Improve Top Soil quality, based on local threats: erosion, compaction and organic matter content (Dutch scale)**

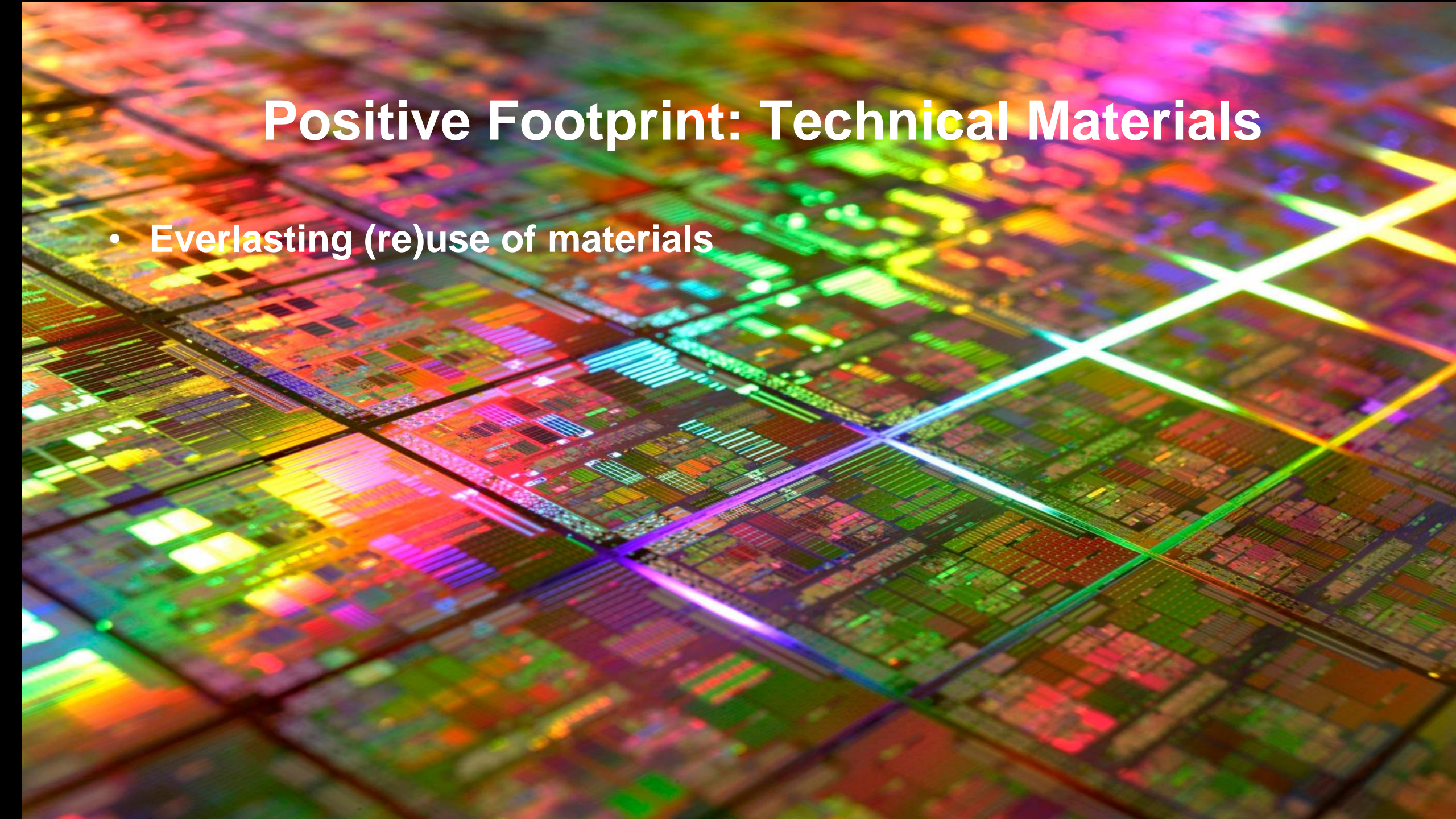


Positive Footprint: Biological Materials

- **See Waste as Resource**

Positive Footprint: Technical Materials

- Everlasting (re)use of materials



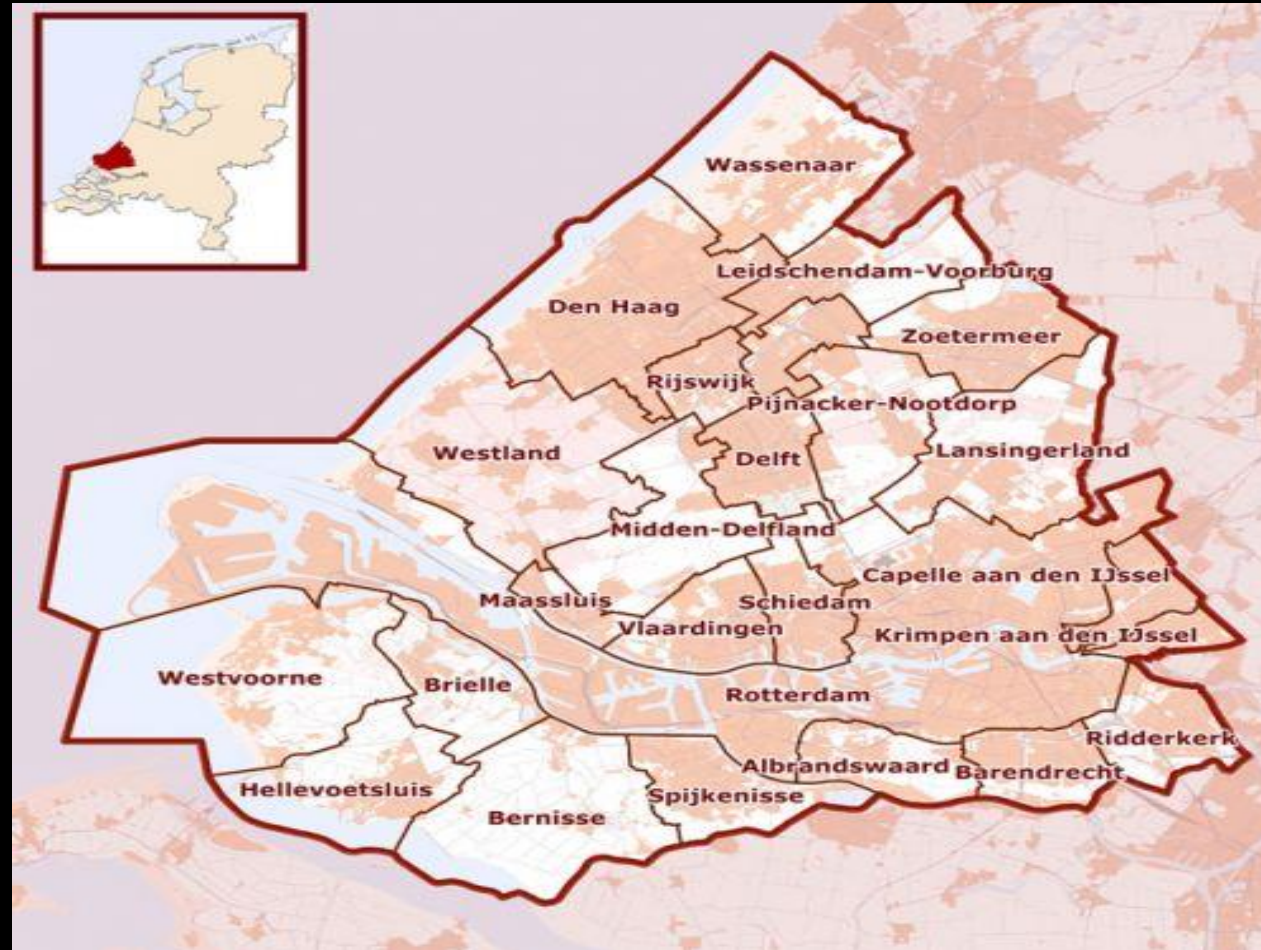
Roadmap Next Economy Circular Economy



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Metropole region Rotterdam Den Haag



Transition pathways

- **Smart Digital Delta**
- **Smart Energy Delta**
- **Circular Economy**
- **Entrepreneurial Region**
- **Next Society**

Circularity

Circularity = Renewability
of all natural resources

- Energy
- Water
- Materials
- Top Soil
- Air

Action Perspectives

- 2050: Post fossil era: transition to renewable energy
- Later on too much focus on 2030 / 2020

Maatschappelijke Advies Raad



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Thema's

- Sustainability & Resource depletion
- Beyond Sustainability
- Beyond (smart) cities
- Social Innovation
- Community building

- Directiezingen

PROGRAMMABOEKJE

KOPENHAGEN/SAMSØ



3-daagse

Inspirerende 'Circulair Economy Trip'



13 t/m 16 oktober 2016

Samsø – Renewable Energy and fossil free island by 2030

**1.0 - 100% Renewable Energy
Island in 10 years**

2.0 - Fossil Free Island by 2030

Lesson from Samsø

- Technique is not the limiting factor
- It's how you organize it !
 - Interests / Involvement
 - Inclusion

Circular Economies

Beyond Oil



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The DNA of MRDH

Port (black) and Petrochemical Industry (red) all fossil based



The DNA from MRDH

Greenhouses, production and transport largely fossil based



Synergy Industry / Horticulture



- Convert Oil- to Bio-Refineries
- Grow feedstock in Greenhouses

Total: convert oil refinery to renewable diesel production

Novamont: 2 renovations

Directielezingen



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TVVL - DIRECTIE COLLEGE
P E R S O O N L I J K E U I T N O D I G I N G

Droom
Daad



Tussen droom en daad
Over de verduurzaming van onze leefomgeving

TVVL - DIRECTIE COLLEGE

PERSOONLIJKE UITNODIGING

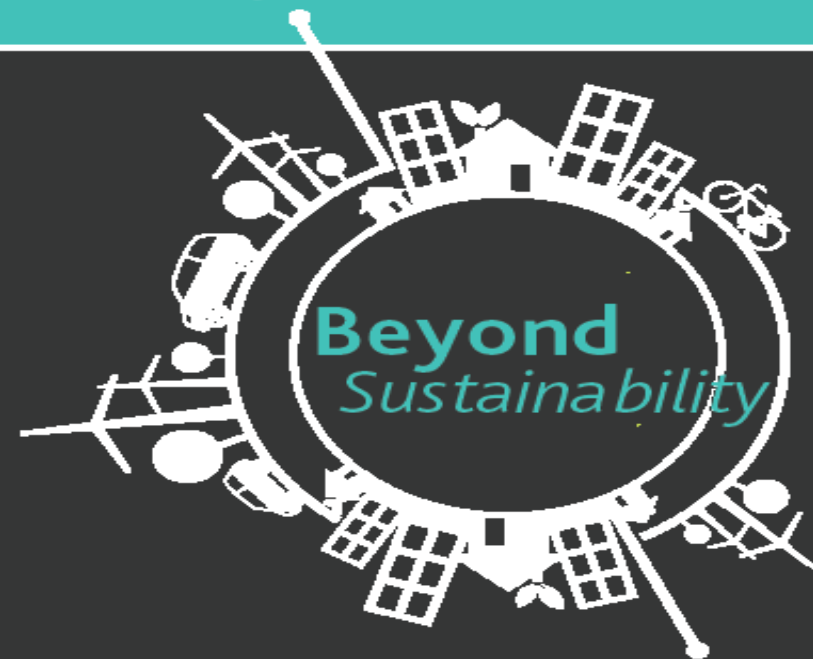
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Duurzaam ondernemen
Over investeren in duurzaam ondernemen

TVVL - DIRECTIE COLLEGE

PERSOONLIJKE UITNODIGING



Duurzaamheid voorbij ... een 'positive footprint' in 2050!



TVVL

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Ministerie van
Onderwijs, Cultuur en Wetenschap

Nederland Circulair



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Nederland Circulair

Rijksbreed programma Circulaire Economie

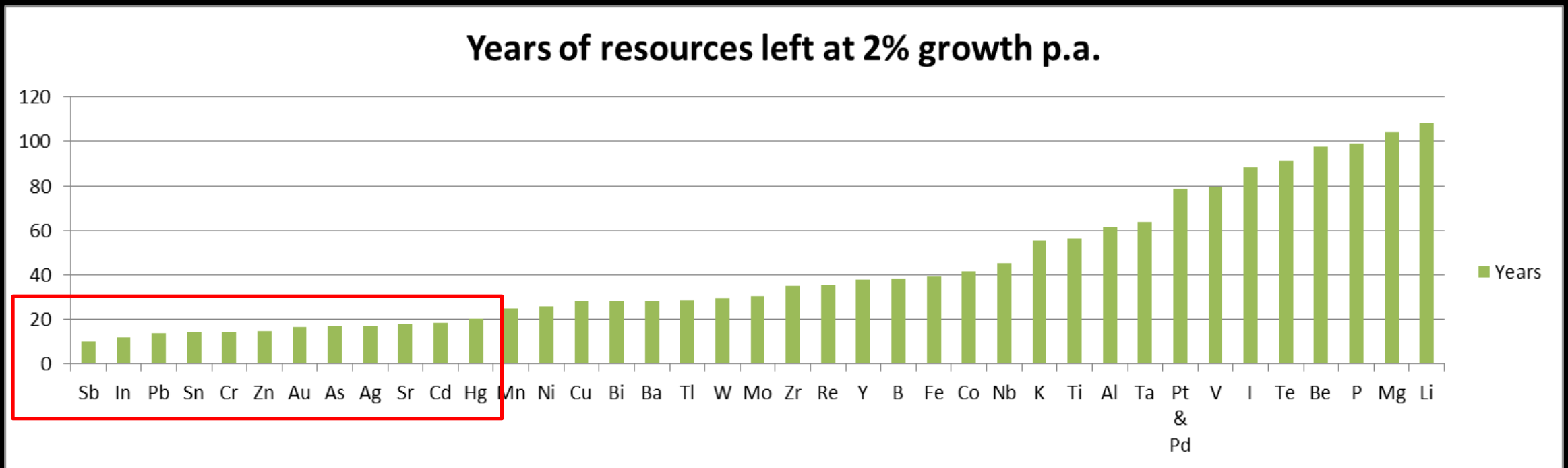
Reduction of minerals, fossils and metals



2030: 50 %

2050: Full Scale Circular Economy

Do we have enough materials ?



Do we have enough time?

From today Nov 8th 2017 to:

2030	3.394 workdays (50% circular)
2050	8.613 workdays (100% circular)