POLICY DINNER
THE CIRCULAR ECONOMY
Pathway for Pursuing 1.5°C

11 May 2017 | 6:30pm – 9:00pm
Bonn Marriott World Conference Hotel
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.
CIRCLE ECONOMY is dedicated to the practical and scalable implementation of the circular economy.
Our current economic paradigm follows a 'take-make-waste' model.
In a **circular economy**, materials and resources are effectively used to their fullest potential.
A circular economy includes both material & systemic elements.
Climate change is a major global concern, with temperatures steadily rising toward the 1.5°C and 2.0°C target.
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.

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


(draft analysis)
... which relies on emission-intensive resources and processes...

(draft analysis)

50.6 Gt CO$_2$e from extraction to end-of-life

... yet only 7% of materials are reused and recycled by the global economy.

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\(_2\)e

Source: [www.tesseract-design.com](http://www.tesseract-design.com) [blogs.ei.columbia.edu](http://blogs.ei.columbia.edu)
**Biodigestion** of manure, organic waste and human excretion can produce biogas and fertiliser

**€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.

The Kumasi industrial cluster in Ghana is an example of large-scale automotive remanufacturing. Employing an estimated 200,000 workers, they designed their own car with recycled car parts, drawing interest from car manufacturers. 

Source: www.ids.ac.uk
Finding systematic mitigation options requires mapping the full metabolism of a jurisdiction, industry or industrial cluster.

The metabolism of Albania, mapping:

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

~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
Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3797518
The circular economy changes the **scope of mitigation action**

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<th>From</th>
<th>To</th>
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<tr>
<td>Renewables, energy efficiency and reduced deforestation</td>
<td>Low-carbon materials and dematerialisation</td>
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<tr>
<td>Optimising existing assets/installations</td>
<td>Building an efficient metabolisms and systems</td>
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<td>Plant, city or country (scope 1 and 2 emissions)</td>
<td>Supply chain or cross-border interaction (scope 3 emissions)</td>
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<td>Products</td>
<td>Services</td>
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<td>Carbon tax</td>
<td>Extraction tax</td>
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<td>Territorial emissions</td>
<td>Consumption-based emissions (30% tied to international trade)</td>
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<td>Article 6 inspired by CDM and offsetting</td>
<td>Article 6 targeting cross-border trade of carbon-intensive products and materials</td>
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Way forward
Policy links between the Circular Economy and Climate Change

- 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

- 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

- 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

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

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

Source: Deloitte, 2016
Many cities such as Glasgow are taking initiative to develop and implement circular economy strategies.
**Agrifood**: in the dairy sector, different circular economy transition pathways are possible:

- **Extensive grazing**: Minimal inputs, high biodiversity, grazing and stables with low cow density, low productivity, local cycles.
- **Optimised grazing**: Reduced inputs, local and regional cycles, moderate productivity.
- **Intensive high-tech**: Significant inputs, high-tech equipment, high cow density, stable based, high productivity.

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

Report: 
Healthcare: circular economy strategies can lead to significant cost savings while reducing material use.
Construction: the circular economy offers interesting solutions to reduce the impact of the construction sector

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

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

- **Market risks**
  - Scarcity of primary resources
  - Volatility of resource prices

- **Operational risks**
  - Threats to employee health & safety
  - Product recalls due to supply chain issues

- **Business risks**
  - Inability to meet changing consumer demands
  - Threats from decreasing cost of renewables

- **Legal risks**
  - Lawsuits from consumers
  - Fines due to regulatory violations
  - More stringent climate change legislation

- **Reputational risks**
  - Negative brand image and perception
8.1% of Dutch jobs are currently connected to the circular economy.

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)*