Ports as catalysts for change towards a circular economy

Illustrations from the ports of Amsterdam and Antwerp

Dr. Bart Kuipers
Erasmus University Rotterdam

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The circular economy

The idea of an economic system that focuses on maximizing the reusability of products & raw materials and minimizing value destruction.

In a circular economy raw materials are kept as long as possible in cycles.

- Products are seen as valuable 'nutrients‘
- The linearity classic *take-make-waste approach* replaced by:
  - *waste is food* and:
  - *product as a service* (pay for usage)

The circular economy

Main drivers circular economy:

- reduce dependence on availability and price fluctuations of scarce raw materials (geopolitics)
- societal need:
  - for sustainable raw materials,
  - reuse of products/materials and:
  - increasing visibility of the origins of material chains.
- government policy-driven
- business opportunities!

The circular economy:
Ellen MacArthur Foundation

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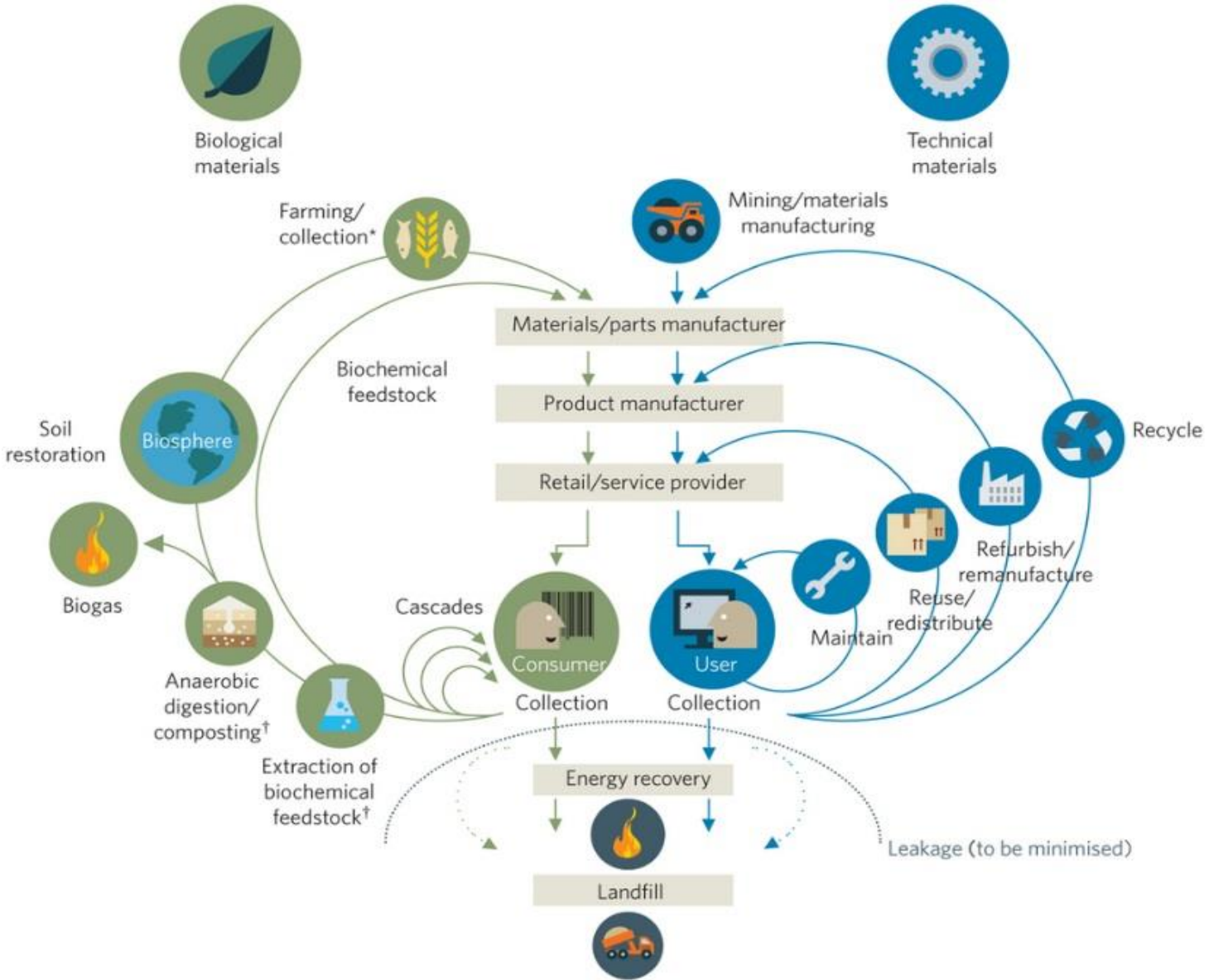

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The circular economy:

The power of circles

Increasing the added value in products by four circular forces:

- **Pure circle**: keeping products and cycles pure.
- **Inner circle**: shorten circles by repair or reuse.
- **Circling longer** by designing products so that they last longer.
- **Cascading:** by starting with a high value use of a material and apply a somewhat lower use in each subsequent cycle.


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Seaports and the circular economy

The seaport as a circular logistics node

- Growth international trade in ‘circular products’
- International connectivity
- Existing seaport infrastructure

The seaport as a circular industrial location

- Transition/renewal of current port operations
- Availability feedstocks/utilities/demand
- located near urban concentrations: waste generation and creative industries for reuse and remanufacture
- Start-ups and innovations related to knowledge infrastructure.

Global trade in waste and rest flows

(*1.000 tons/*million US$, 2012, UN Com.trad)

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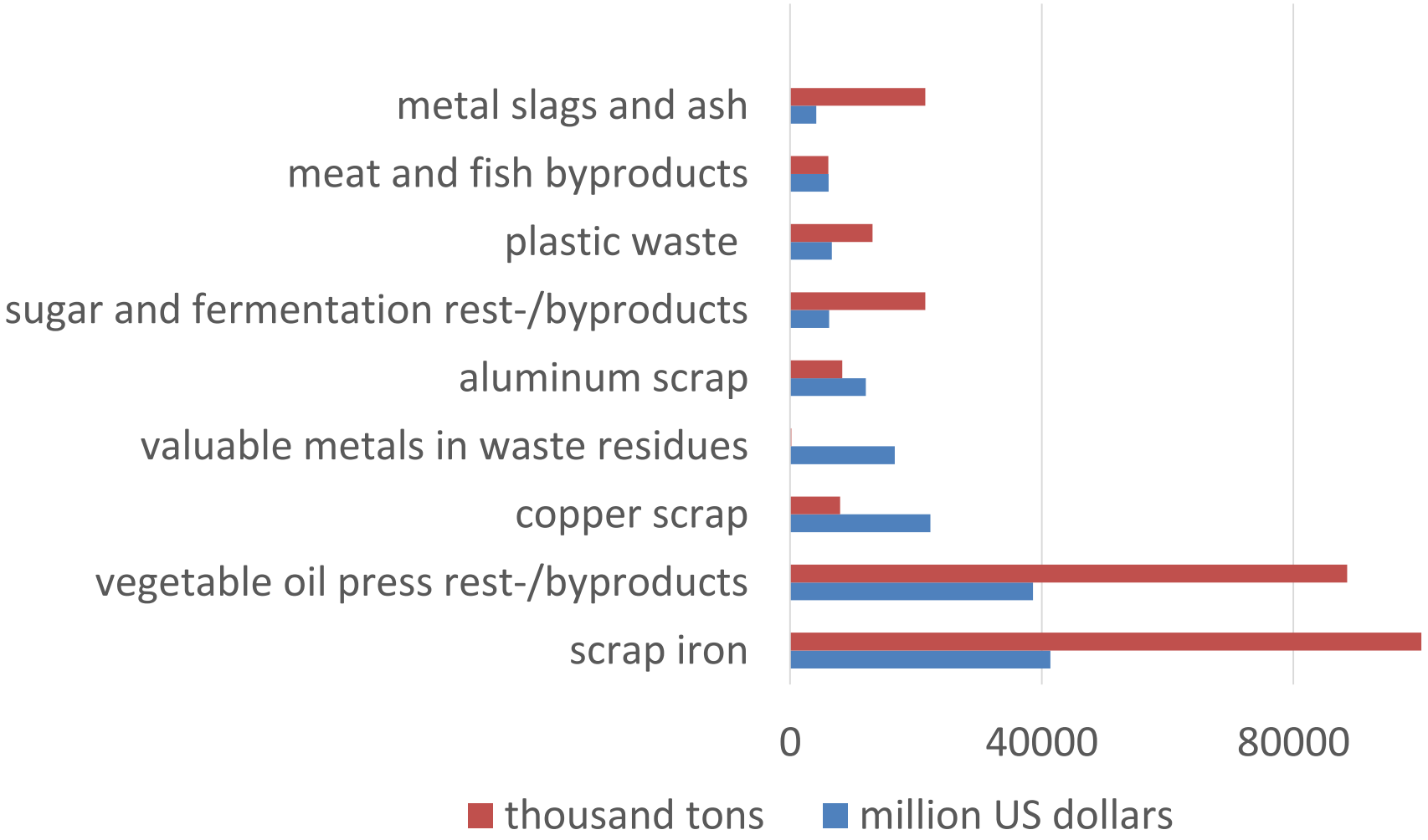

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Port of Antwerp

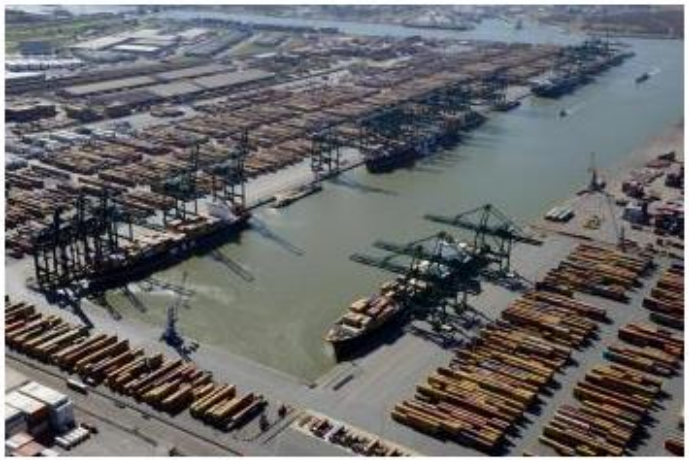
News

Radar 72 - May 2015

→ New billion-euro investment in the Port of Antwerp

New billion-euro investment in the Port of Antwerp

Thursday 07 05 2015 | The leading Saudi Arabian company Energy Recovery Systems Company Ltd (ERS) with its innovative solutions for recovering energy from waste is the preferred candidate for the Delwaide dock concession.



The Antwerp Port Authority board of directors has considered the results of the call for proposals that was issued at the end of last year for the southern and northern areas of the Delwaide dock. Based on the proposals received, the board has selected the submission by Energy Recovery Systems (ERS) as the most suitable project for this part of the Delwaide dock. The Port Authority management committee has now been instructed to pursue further negotiations with a view to making a concession agreement. The land will be used by ERS for the construction of a new production unit for green ammonia and green urea (chemical fertiliser) with an investment value of 3.7 billion euros. This factory will offer work for 900 people.

ERS was founded in 2012 in Saudi Arabia and is operating in waste treatment and recovery and in the development of so-called Waste to Chemicals projects. The factory that ERS wants to build in Antwerp is for the latter type of activity. Here non-recyclable industrial waste arrives by ship, with gasification used to convert the materials to synthetic gas and ultimately two important chemical products: ammonia and urea. Ammonia is a raw material used in the chemical industry and is much demanded by the Antwerp chemicals cluster. Urea is a sustainable fertiliser with worldwide demand on the increase.

The Waste to Chemicals world's first represents a giant step in the circular economy: besides the traditional forms of waste reduction (reduce), waste reuse (reuse, recycle) and energy generation (Waste to Energy), Waste to Chemicals goes one step further. Non-recyclable industrial waste becomes a raw material for high quality, ready to trade finished chemical products. As distinct from their equivalents produced on the basis of fossil raw material, the ammonia and urea are 'green' and sustainable.

Antwerp investment: breakthrough circular economy in seaports!

- Energy Recovery Systems Company (Saudi Arabia): *"Preferred candidate* for Delwaide dock consession"
- Investment value: 3.7 billion euro/900 jobs
- Waste-to-chemical: *non-recyclable* industrial waste!
- 3.5 million tons raw material for high quality biochemical products: 1.2 million tons green urea, 645 thousand ton green ammonia.
- Facility located in world-scale chemical cluster: greening and strengthening chemical cluster
- Waste arrives by ship and green products are exported: logistics strengths seaport location and to hinterland network

Thank you very much for your attention!