National Institute for Public Health
and the Environment
Ministry of Health, Welfare and Sport

C2C café: realizing safe and circular material loops: challenges & opportunities

RIVM- Frieke Heens

About RIVM

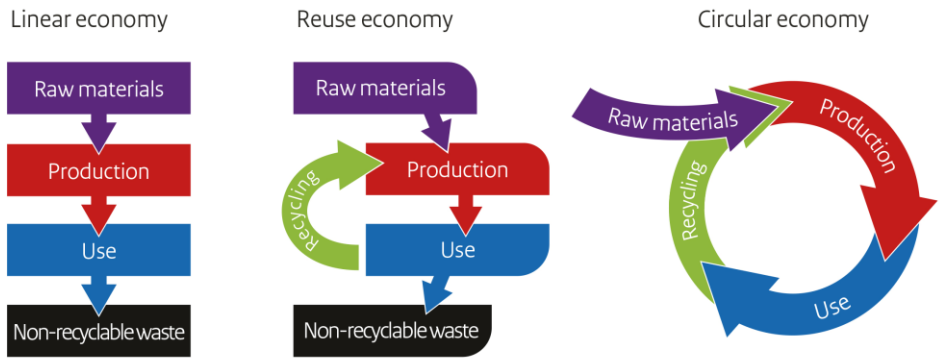
- Committed to a healthy population living in a healthy, safe environment
- Knowledge and advisory institute from Dutch government.
- Independent position (RIVM statutes)
- 3 domains:
  - Infectious diseases and vaccinology
  - Public Health and Health services
  - Environment & Safety

National Institute for Public Health and the Environment
Ministry of Health, Welfare and Sport

Chemical substances and circular economy

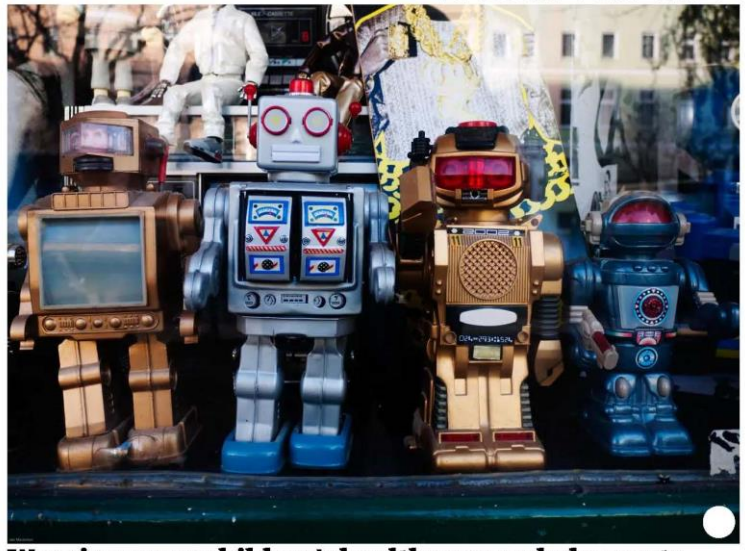
Circular Economy (CE) policy in NL ->
committed to make the transition: [100% circular in 2050]

From a linear to a circular economy



How to realize a circular economy which is safe for people and the environment?

The Guardian



Warnings over children's health as recycled e-waste comes back as plastic toys

A trend towards using plastic parts in electrical and electronic goods is causing a headache for the recycling industry

Arthur Neslen

Thu 9 Mar 2017 12.08 GMT

Flame retardants used in plastics in a wide range of electronic products is putting the health of children exposed to them at risk, according to a new report (pdf).

Brominated flame-retarding chemicals have been associated with lower mental, psychomotor and IQ development, poorer attention spans and decreases in memory and processing speed, according to the peer-reviewed study by the campaign group CHEM Trust.

Cornflakes cancer scare: Cereal makers drop recycled cardboard boxes containing deadly oils

By SEAN POULTER FOR THE DAILY MAIL
UPDATED: 02:00 GMT, 9 March 2011

Share 97 View comments

- **Tests found mineral oils could even leak through plastic inner packaging**

Breakfast cereals, pasta, rice and other foods packed in cardboard boxes could be tainted with toxic chemicals, researchers warn.

The substances appear to be leaching from the recycled paper used to make most cardboard boxes.

Studies in Germany and Switzerland found the levels to be up to 100 times the agreed safe limit in products sold in supermarkets.

The chemicals – mineral oil hydrocarbons – are said to cause inflammation of internal organs.

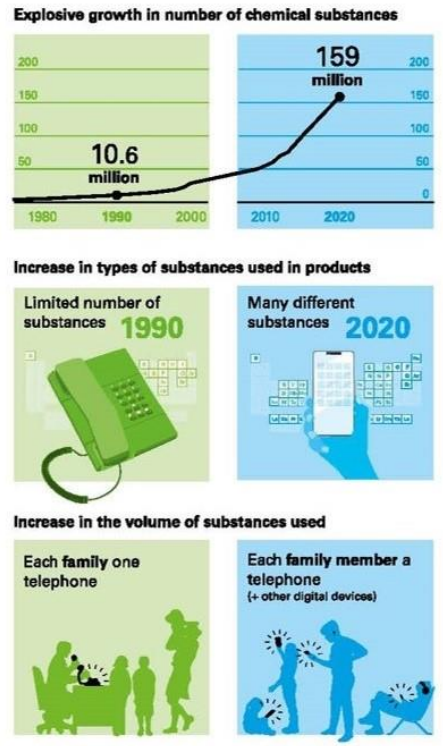
Challenge: chemicals around us

- The production of chemical substances has grown in number of substances and volume

- The consumption of chemicals hazardous to health in the EU was 216 million tonnes in 2019. (Eurostat, 2019)

- New substances of (very high) concern (SVHC) will be identified

Figure 4: Increase in the production and use of substances[11]



11 Source of figures on certain registered chemical substances: https://www.cas.org/about/cas-history. The CAS Registry contains many more substances than will eventually be placed on the market. However, the substances on the market are following a similar trend.

Source: RLI (2020)

Challenge: chemicals around us – legal framework

- EU chemical policy: REACH regulation

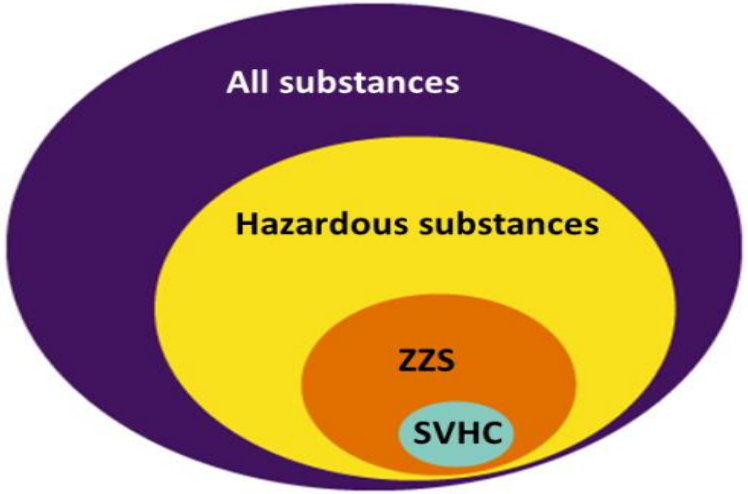
(Substances of very high concern), for example:

- HBCDD in Styrofoam (insulation)
- Cadmium in (hard) PVC (e.g window frames)
- DEHP (plasticizer) in soft PVC (e.g. flooring)

- Chemical policy in NL: substances of concern (ZZS)

- EU Chemicals Strategy for Sustainability-

Towards a non-toxic environment (2020)



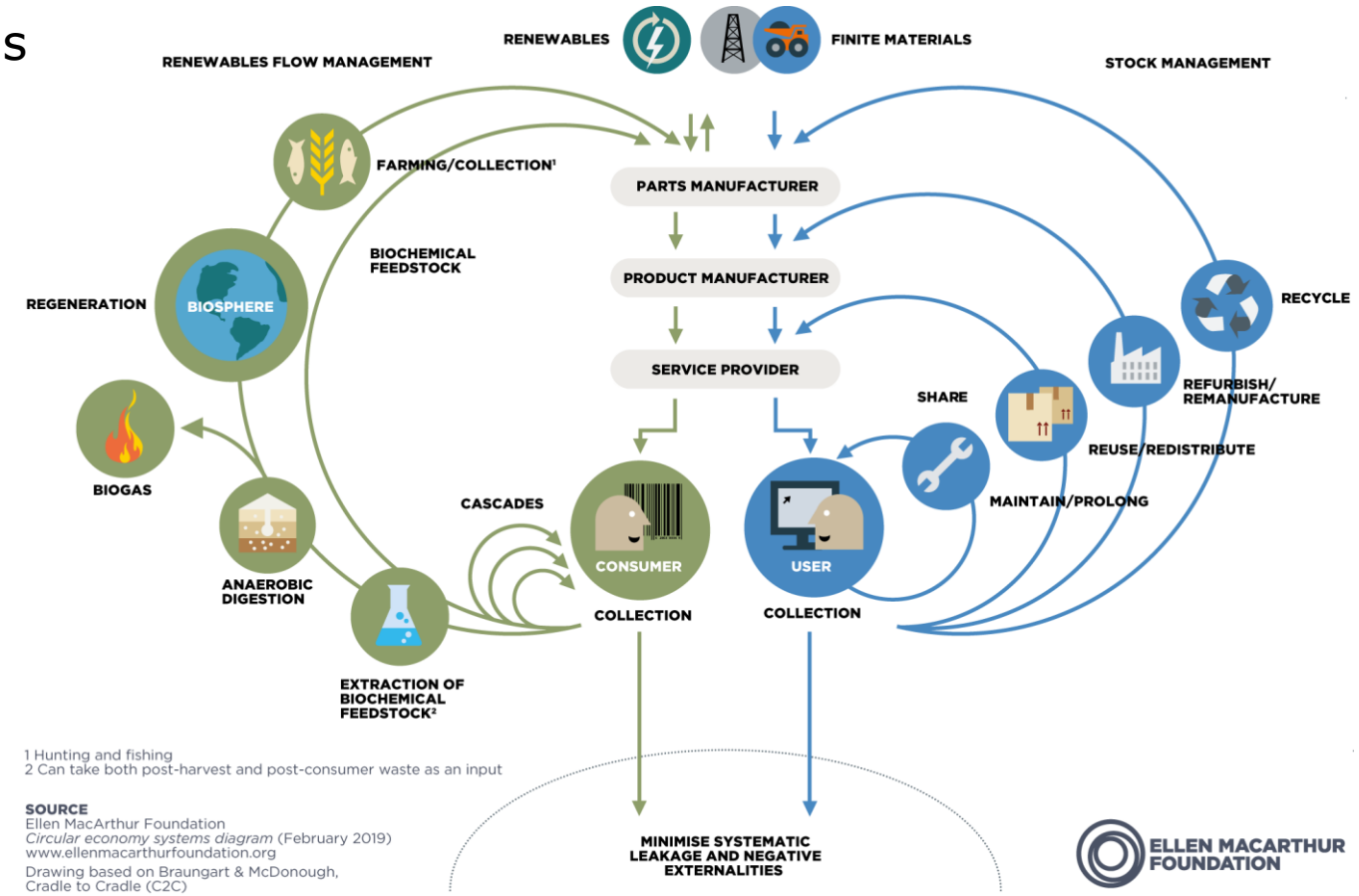
Challenge: Substances of Concern in a Circular economy – what changes?

- Additional and new material/product cycles

-> New routes of exposure!

- Not only chemicals, but also pesticides, pharmaceuticals, pathogens, etc.

- New technologies & materials



Challenge: material information throughout production and use cycles

- Many substances of concern, used in many products
- Substances of concern 'travel over the world" & product chains are complex
- Lack of transparency throughout the value chain
- Theoretical example of a mattress with a flame retardant
  - Material information is not transferred when the product becomes waste
  - Waste recyclers have no access to information about the composition

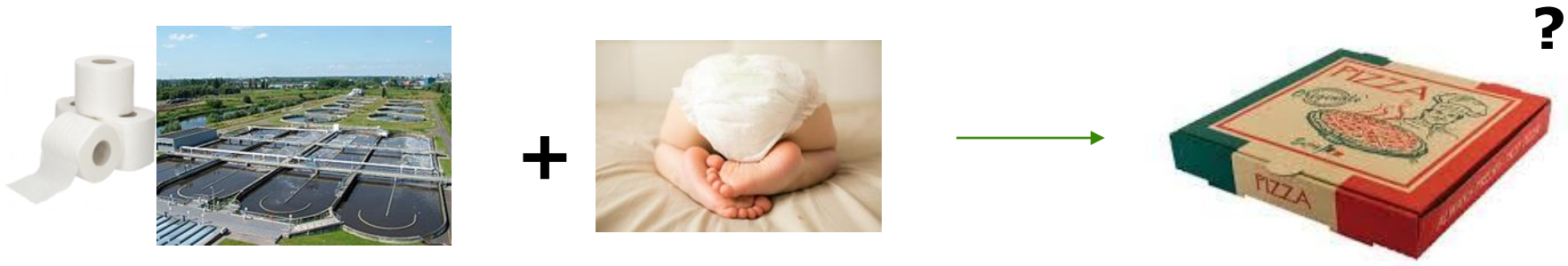
Source: Keep it clean- European Environmental Bureau

Challenge: Public perception

- 84% of Europeans are worried about the impact of chemicals present in everyday products on their health

(Eurostat 2020).

- Consumer acceptance of recycled products is key for the success of CE



Creating awareness

RIVM publications:

- Substances of very high concern and the transition to a circular economy. An initial inventory. (2017)
- Coping with substances of concern in a circular economy (2020)

- Draw attention to safety issues -> better integration into CE policies
- Support discussions on policy development and monitoring of progress.
- Invitation to governments, businesses and community organizations to continue working on the challenges

Design and process with safety and circularity in mind

Safe-by-Design: Incorporate safety as early as possible in the design/ innovation process.
https://safe-by-design-nl.nl/

Safe-by-design as mindset/ requires a new kind of awareness for scientists, product developers, managers,…

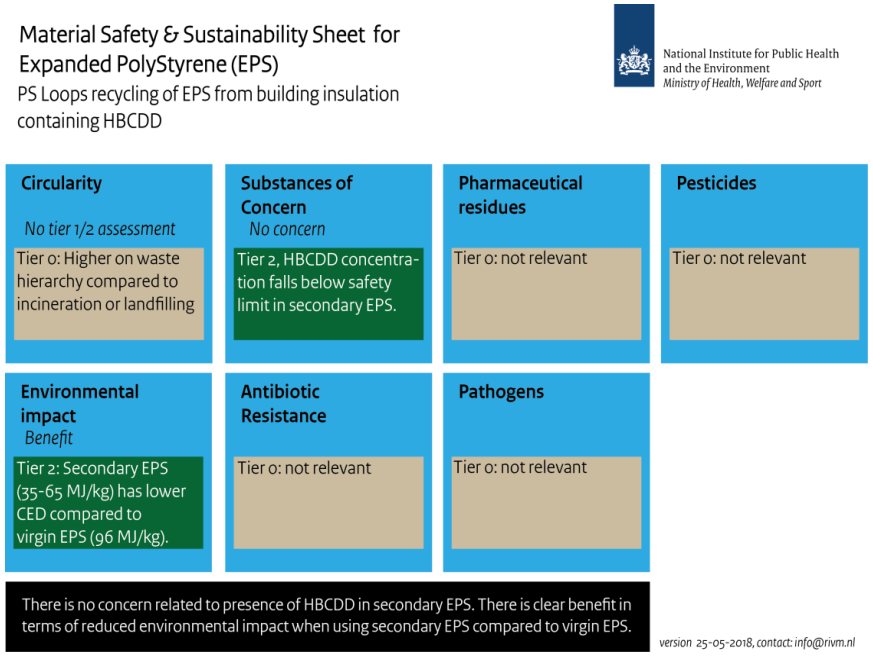
Call for innovation, as SbD includes also non-chemical solutions & other business models

Education as important pillar of SbD in NL
New skills: toxicology, design thinking, interdisciplinary cooperation -> need for innovative, design oriented Education.

Responsibly cope with Substances of Concern when prevention is not possible

- Burning or recycling? -> Integral assessment is necessary to determine “what is best”
- Safety of substances
- Circularity
- Environmental impact
- ….

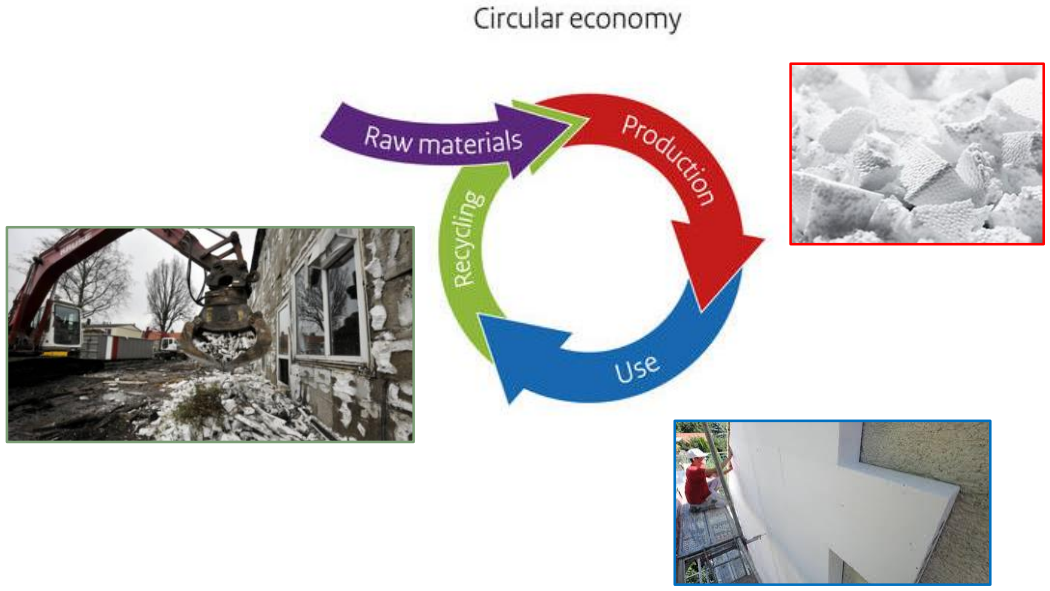
- Creating Safe and Sustainable Material Loops in a Circular Economy: framework to assess options for material recycling

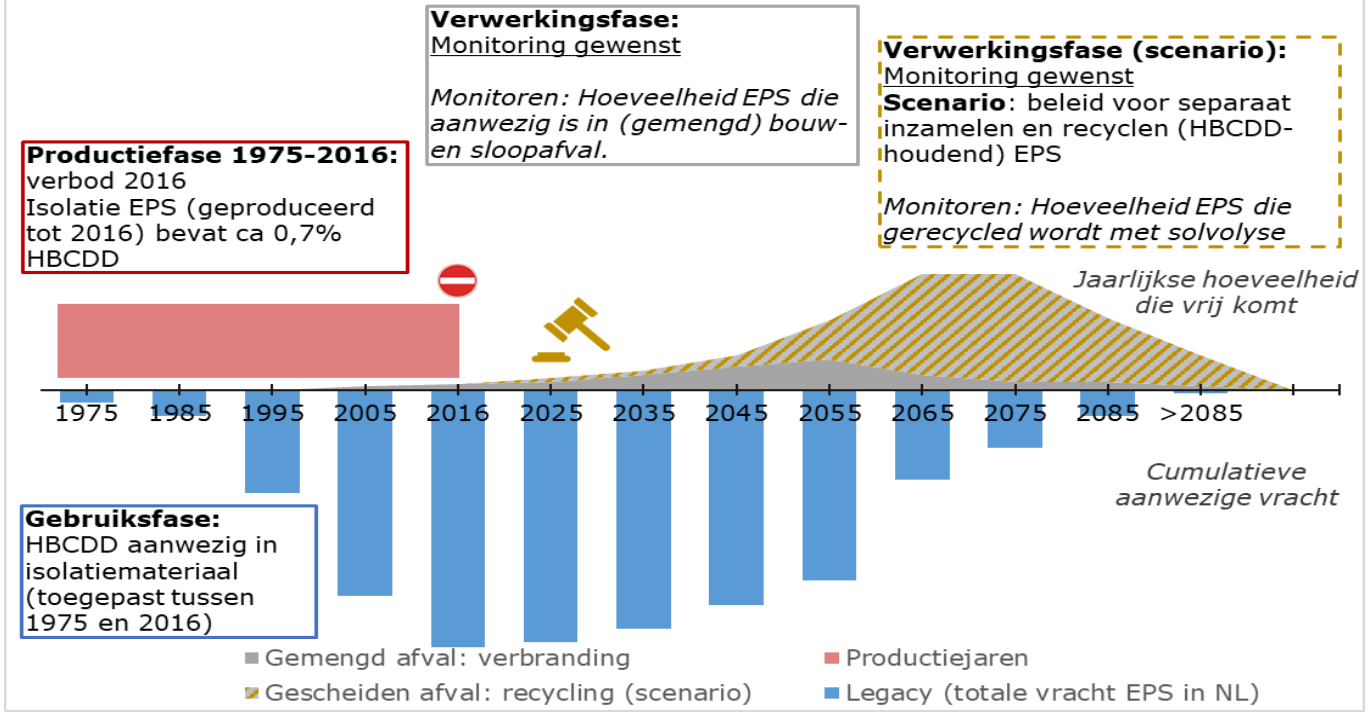


Preserve substance & material information

- increasing transparency + data management in supply chains
- Short term: ‘monitoring’ substances of concern through the circular economy

[Samen zicht houden op Zeer Zorgwekkende Stoffen in de circulaire economie belangrijk | RIVM]





Conclusions

- Preservation of substance/material information throughout the product cycle is key for circularity as well as safety (materials and their connections!)
- Safety & Circularity are irreversibly connected. May cause friction during transition, but will reinforce each other in long term
- Safety goes beyond legislation/regulation
- New approach needed for a safe & circular economy:
    - innovation (“remaking the way we make things”)
    - effort from all: authorities, businesses, investors and researchers.

Contact information

www.rivm.nl/en/circular-economy

frieke.heens@rivm.nl