

# **What kind of barriers can hazardous substances cause for the circular economy, and case demolition and recycling of construction materials**

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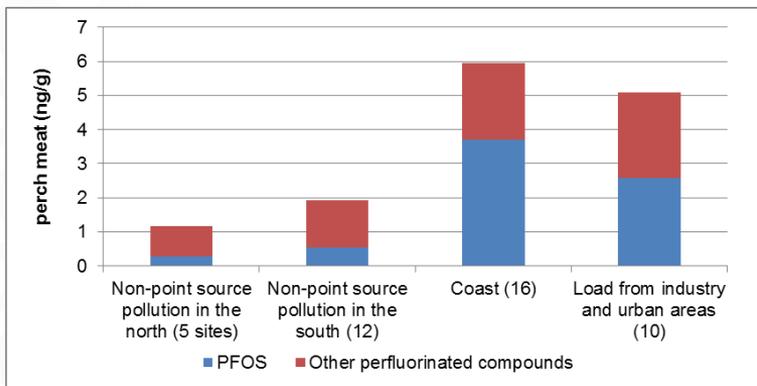
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# Hazardous substances

Persistent organic pollutants (POPs)

Substances of very high concern (SVHCs)

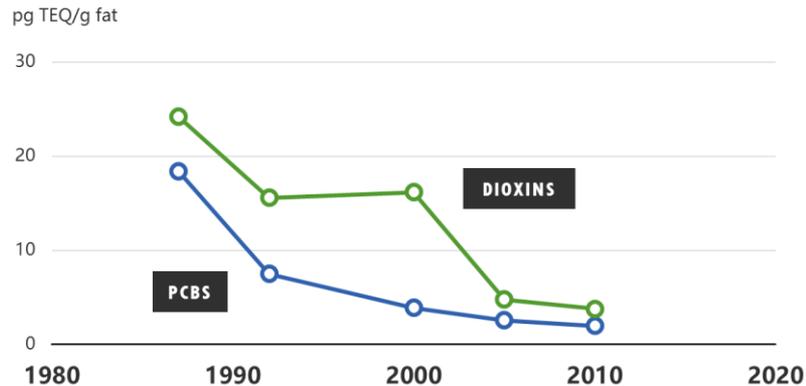


- Bioaccumulative, toxic and persistent
- Carcinogenic
- Mutagenic
- Endocrine disruptors
- Can be transported by wind and water far from where they were released

Data from Finnish Environment Institute

# Possibilities to manage hazardous substances

DIOXINS AND PCBS IN BREAST MILK OF PRIMIPAROUS MOTHERS



- The occurrence of hazardous chemicals in humans or the environment has been reduced by regulations and restrictions.



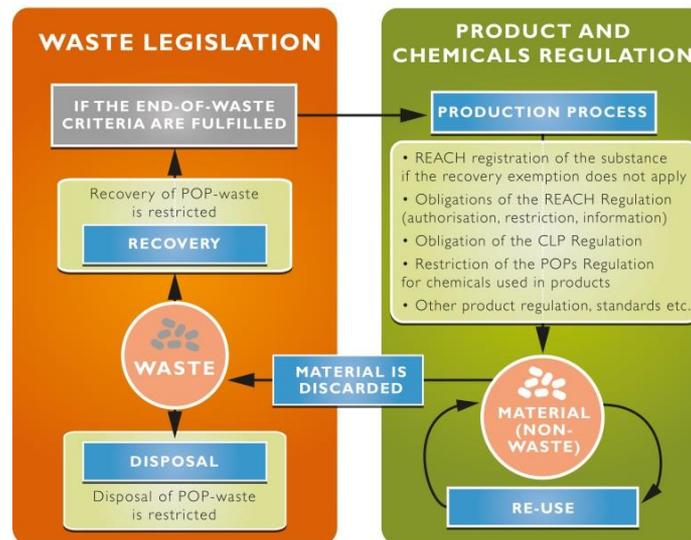
Data from Finnish institute for health and welfare



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# How to manage hazardous substances in circular economy?

- Balance between maximizing the recovery and recycling of waste and the protection of health and the environment
- Products with long life cycle may contain legacy chemicals
- The change from a linear to circular economy poses new challenges on chemicals and waste regulations



Safe and sustainable circular economy. Policy brief 17/2019. Government's analysis, assessment and research activities, Finland: tietokayttoon.fi (Available after 14th of Oct 2019)

# Recommendations for the management of hazardous substances in a circular economy

Regulation



Occupational health



Waste streams and processes



Environment and human health



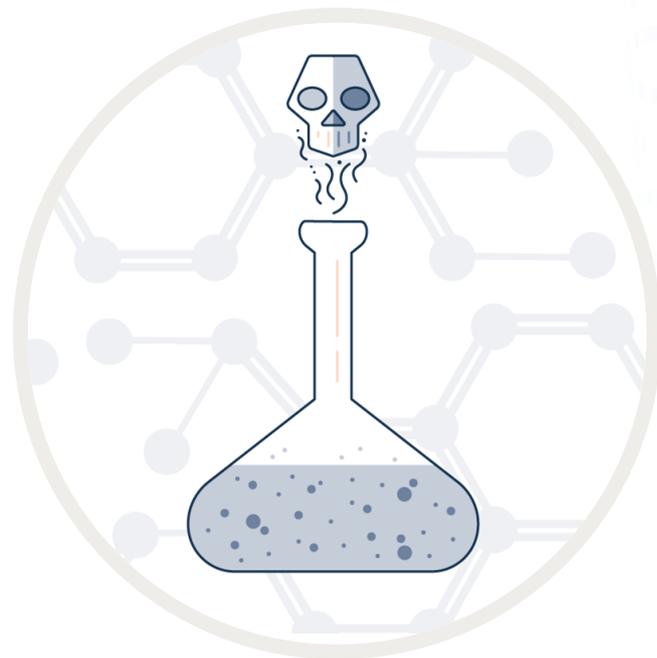
# Knowlege

- *We are able to manage only what we understand!*
- **Quantitative information on POPs and SVHCs in products, waste streams and the environment is needed.** Statistics on chemicals must be developed so that even the new chemicals included in the list of SVHCs can be identified in the material streams.
- The European Chemicals Agency (ECHA) maintains a list of SVHCs also including substance-specific information, and in future, information about SVHCs in products – education still needed at many levels
- Help for decision makers in permitting e.g. End-of-Waste classification → brings predictability in permit decisions



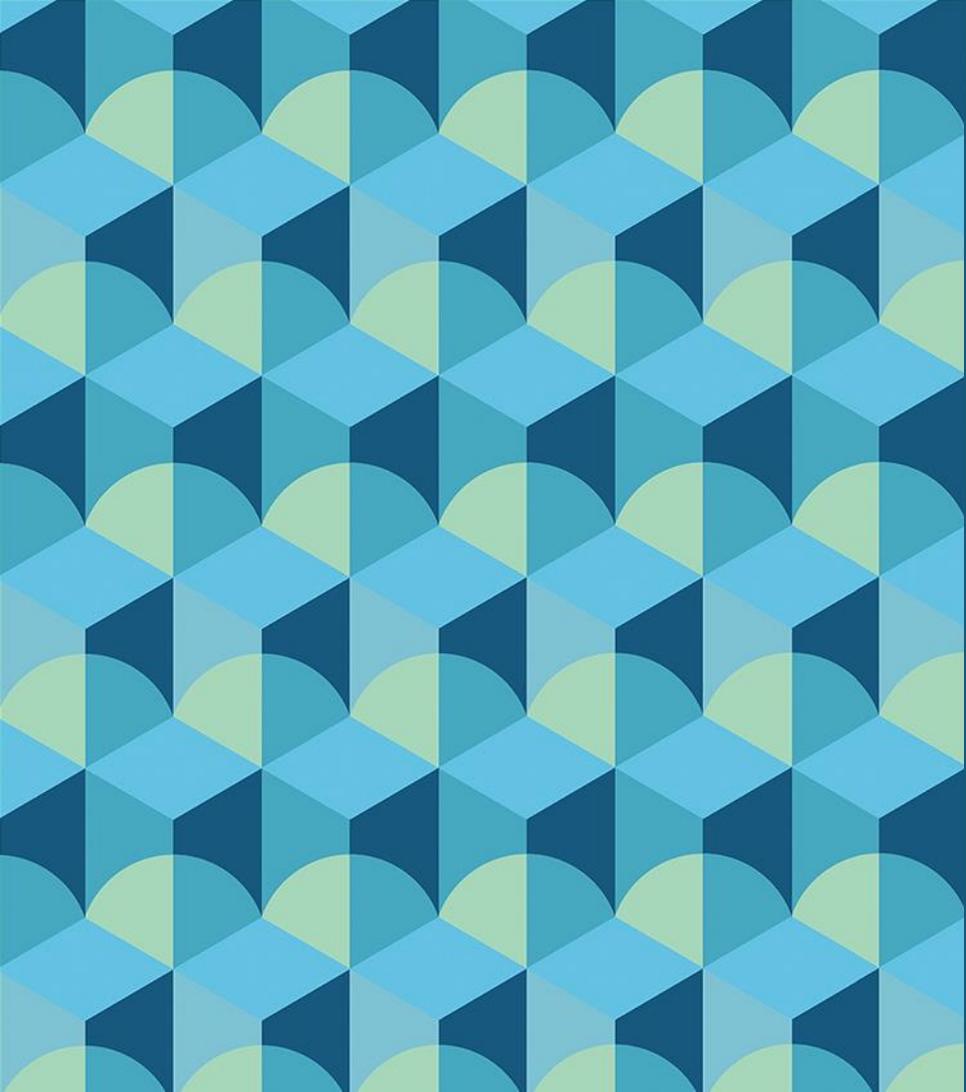
# Technological development

- *We know only what we have measured!*
- Methods suitable for identifying substances in different matrices must be developed.
  - quick methods for identifying chemicals on site
  - laboratory analytics for the reliable analysis of POPs and SVHCs in different matrices
  - methods for industrial use
- Need for financial investments



# More recommendations for the management of hazardous substances in circular economy

- **Methods must be developed for improving the flow of information** on the material and chemical content of products and harmful substances **throughout the product's life cycle**, all the way to the waste phase and new life cycles.
- **Investments must be made in developing new materials**
- **Source separation of waste**
- **Risk assessment guides**
- **The part of the waste stream that contains unidentifiable chemicals should be directed to energy production.**
- **Research needed** – should reach out for the best financial, health and environmental benefits

A decorative geometric pattern on the left side of the slide. It features a repeating arrangement of light blue and green semi-circles and diamonds, creating a 3D effect of interlocking cubes.

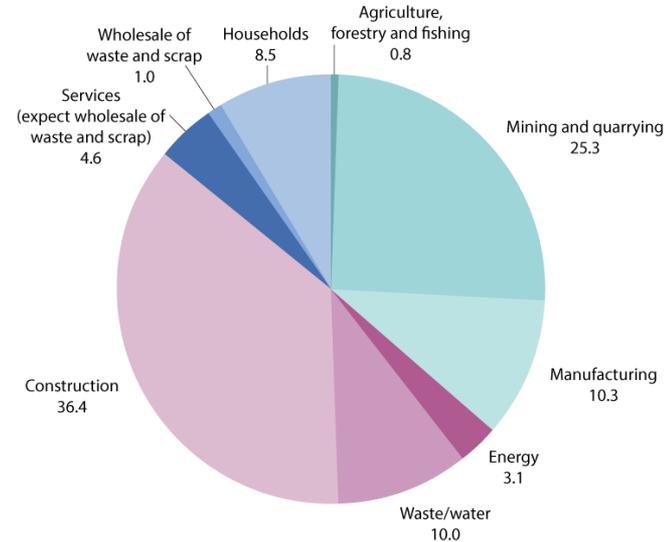
# Case: Construction and demolition

**Margareta Wahlström**  
**Senior Scientist**

# Background

- Circular economy action plan for closing the loop: Construction and demolition is one priority area
- Tightening EU regulation puts pressure on more sustainable use of materials.
- One of actions in CE action plan relates to the development of a framework for hazardous material inventory prior to demolition

Waste generation by economy activities and households in EU, 2016 (%)



Source: Eurostat, 2019

# Why important to identify haz. materials

- Removal of hazardous material from material loop and controlled management of waste containing hazardous materials
- Important to ensure safe waste materials (non-contaminated) for recycling in new products
- Worker safety during demolition work

Challenge: lists of hazardous substance continuously updated, never final

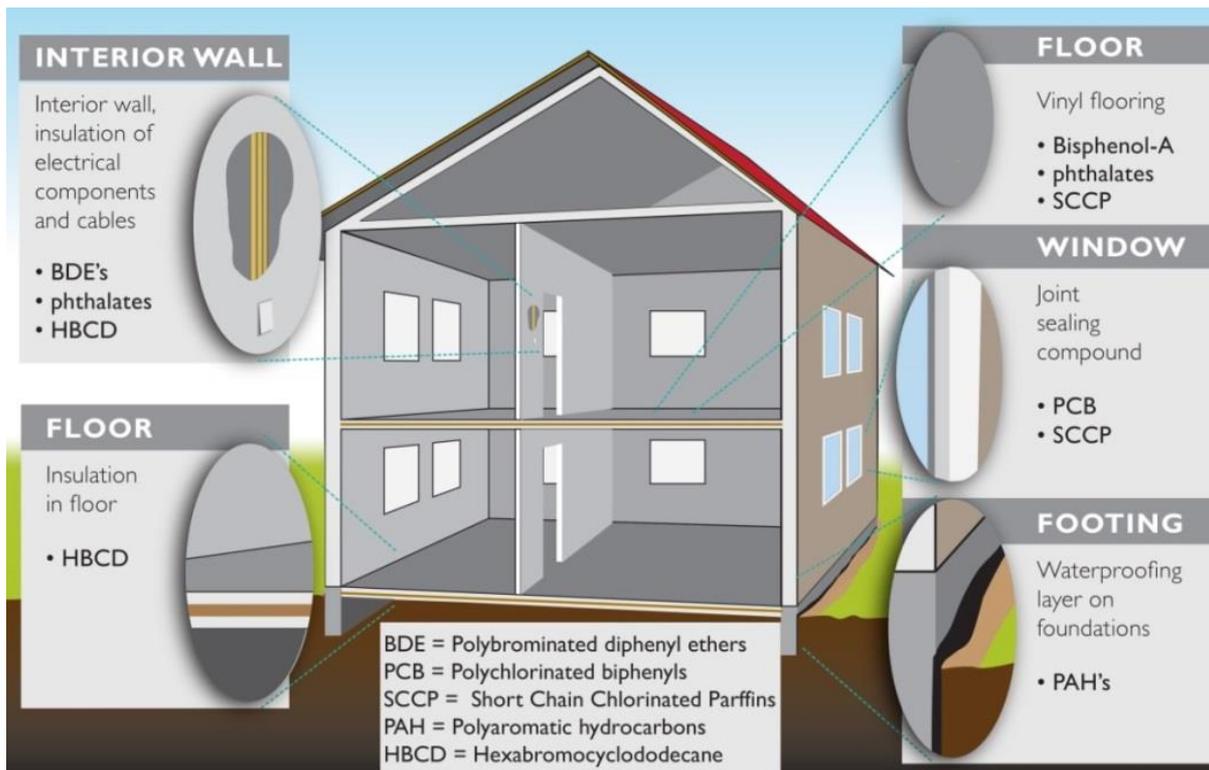
From waste...



to products...



# POPs in constructions - examples



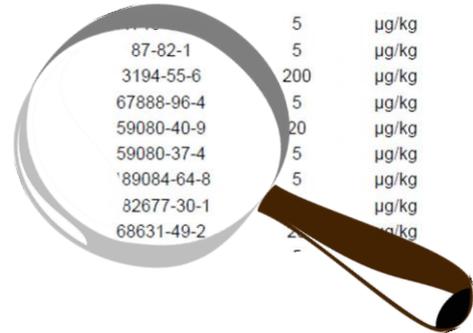
Safe and sustainable circular economy. Policy Brief 17/2019. Government's analysis, assessment and research activities, Finland: tietokaytoon.fi (Available after 14<sup>th</sup> of Oct 2019 )

# Skills for experts performing inventory on hazardous materials

- Material knowledge (when used where?)
- Knowledge on construction methods in past
- Knowledge on legislation (hazardous limits, upcoming substances...)
- Competence in “Sampling & analysis & interpretation of results”
- Informed about management options for waste
- Skills for documentation

Method: GC-MSD

|                                    |             |     |       |
|------------------------------------|-------------|-----|-------|
| Bromocyclen                        |             | 5   | µg/kg |
| Hexabromobenzene                   | 87-82-1     | 5   | µg/kg |
| Hexabromocyclododecane             | 3194-55-6   | 200 | µg/kg |
| Pentabromobiphenyl, PBB-101        | 67888-96-4  | 5   | µg/kg |
| Hexabromobiphenyl, PBB-153         | 59080-40-9  | 20  | µg/kg |
| Tetrabromobiphenyl, PBB-52         | 59080-37-4  | 5   | µg/kg |
| Pentabromodiphenyl ether, PBDE-100 | '89084-64-8 | 5   | µg/kg |
| Hexabromodiphenyl ether, PBDE-138  | 82677-30-1  |     | µg/kg |
| Hexabromodiphenyl ether, PBDE-153  | 68631-49-2  | 2   | µg/kg |



# Steps for better management

- Need for harmonized protocol for hazardous material inventory prior to demolition
- Increasing awareness in whole value chain:
  - Historical products: when used where?
  - Future products: criteria for safe by design needed
- Innovative technologies for material changes, substitution
- Standardization on product performance, methods for measurements
- Traceability and documentation of construction products composition



Photo: Testing chamber for determination of emissions to indoor air

# Thank you!

[www.materiaalitkiertoon.fi/turvallinenkiertotalous](http://www.materiaalitkiertoon.fi/turvallinenkiertotalous)

[www.tietokayttoon.fi](http://www.tietokayttoon.fi)

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