A Multiannual Mercury Balance for Austria

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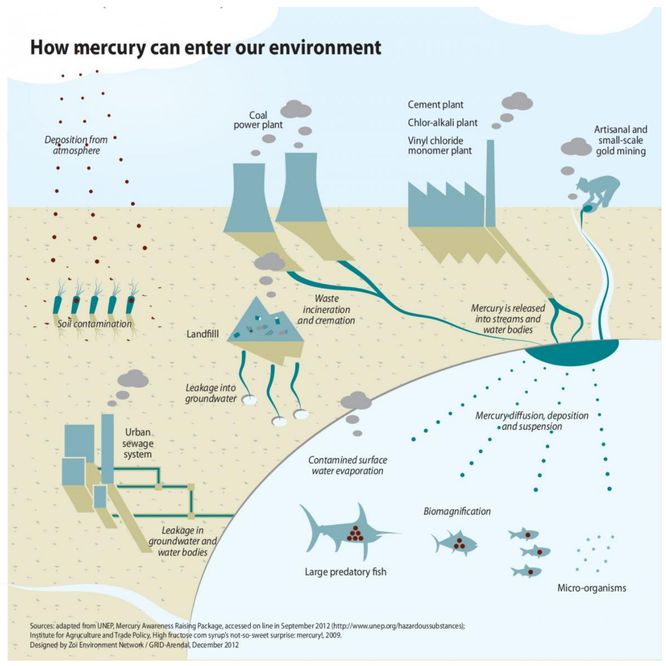
Objective



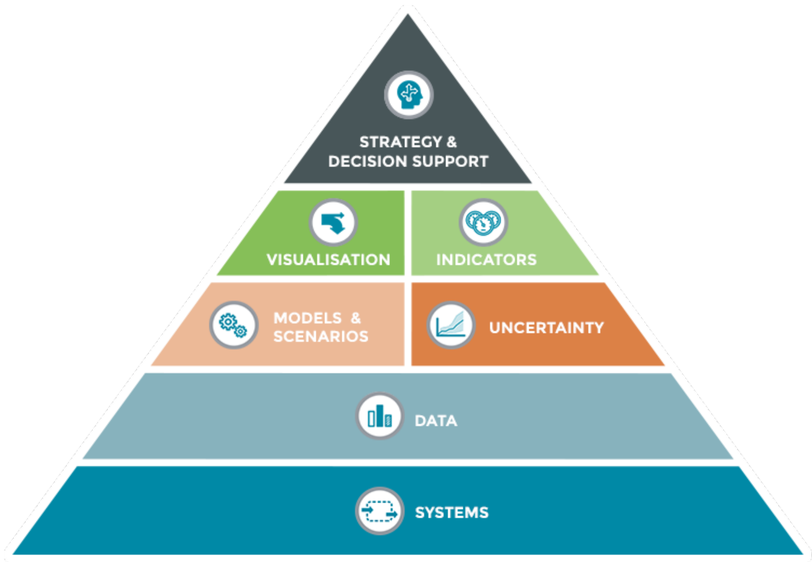
The European Union itself approved, and most countries within the European Union ratified, the United Nation Environment Program Minamata Convention on Mercury. Article 1 states the objective of the convention "… to protect the human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds.". The Conventions members agreed on a wide spectrum of measures to ensure a reduction of mercury exposure.

The aim of this project is to understand the Austrian metabolism of mercury. It will allow to assess the effects of political (e.g. passed ordinances) and environmental (e.g. leakage of mercury from historic depositions) events and technological developments (e.g. improved processing technology, new products) on the mercury flows in Austria.
In addition the comprehension of the system will enable the identification of influential key elements (flows and processes) and therefore depict suitable measures to raise the system efficiently.

Methods

A multiannual Material Flow Analysis (MFA) model, based on available data, will be established. MFA links information from many established fields that use different, often inconsistent, terms. They can be used to serve different purposes in material management, such as monitoring systems, forecasting changes, or evaluating alternative strategies. MFAs need to include different components, which are structured hierarchically (pyramid to the right): Combining these components adds new information and robustness.
In Austria (and partly the EU) monitoring systems in different sectors (such as mercury release and emissions of industrial plants or diffuse sources, air quality in general or analysis of mercury content in moos) are active. In other areas more or less unconnected measurement are recorded (e.g. mercury content in nutrition or products). The available data is collected and assessed thoroughly. If necessary, experiments and analysis will be executed to fill possible identified data gaps. Thus the data will be consolidated in the developed model. This model will undergo a thorough sensitivity analysis, to ensure its robustness and to gain knowledge about high impact factors in the system.

Hierarch of the components of material flow analysis (MFA)



established in the course of the Hoizon 2020-project MinFuture, https://minfuture.eu/

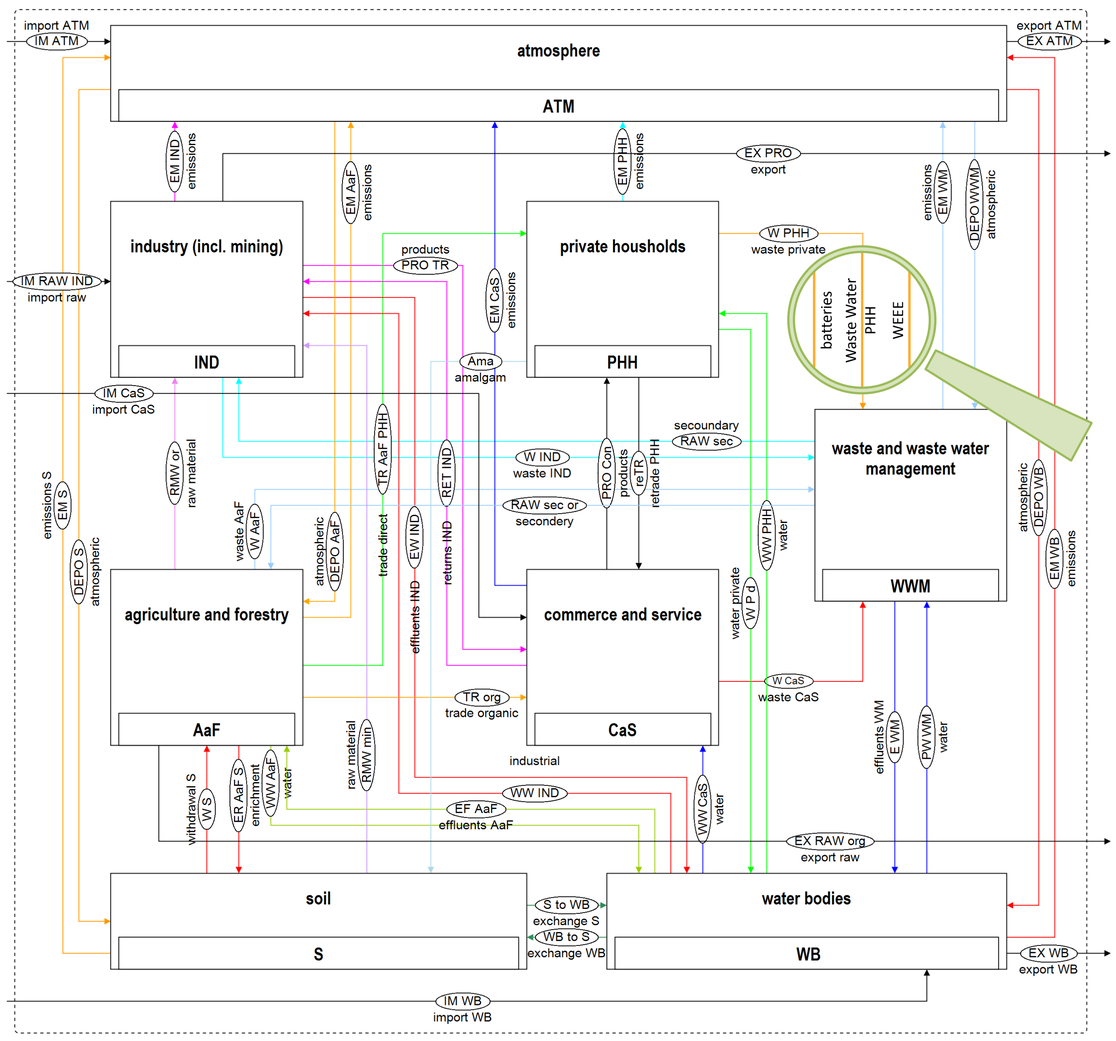
Status and Challenges

Status

A database was created to collect, characterize, group and harmonize the data. It is updated constantly.
Alongside, a generic model was designed and incrementally filled with data becoming available. Due to incompatible data and data uncertainty the system is not yet computable. But the investigation indicates which areas will be relevant.

Challenges

Due to its volatile nature mercury can be found nearly everywhere. Because of its known health risks, there is a wide range of data on mercury concentrations in different materials and goods available. As much data there is, it is/was collected under different, often inconsistent terms.
A main challenge is to determine which data is relevant and subsequently relatable in which way. In addition, the reliability must be systematically determined and expressed in some uncertainty measure.
The estimate of the size and impacts of accumulated mercury In anthropogenic stocks (e.g. in products or building materials) poses an additional challenge.



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