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Introduction to ecoinvent version 3 and an overview of new features

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Overview

- What is ecoinvent?
- The motivation behind ecoinvent version 3
- What is new in ecoinvent version 3?
  - System models
  - Market mixes
  - Global supply chains
  - Data format
  - Data
- Conclusions and Discussion

What is ecoinvent?

- ecoinvent is a **not-for-profit** association created by 5 Swiss research institutes
- ecoinvent **started out** as the Swiss national LCI network
  - Publishes the **ecoinvent database**
  - Version 1 published in 2003, Version 2 in 2008
- Publish **useful** and **relevant** life cycle **inventory data** in a centrally organized form
  - Serve as a hub for data providers looking to share data with the LCA community
  - Growing into a global database network

ecoinvent – Quality Features

- **Consistent**
  - Fully interlinked database
- **Reliable**
  - Independent expert review
  - Continuously developed and improved over 15 years
- **Transparent**
  - Full access to both unit process data and all calculation results
  - Individual documentation of each dataset

ecoinvent – a global LCI database

- Used by more than 6000 users in more than 40 countries
- Included in or available for the leading LCA and eco-design software tools
  - SimaPro, Umberto, Team, OpenLCA, CMLCA, GaBi, KCL-Eco, Regis, Emis, ecobilan, Green-e, and others

The motivation behind ecoinvent v3

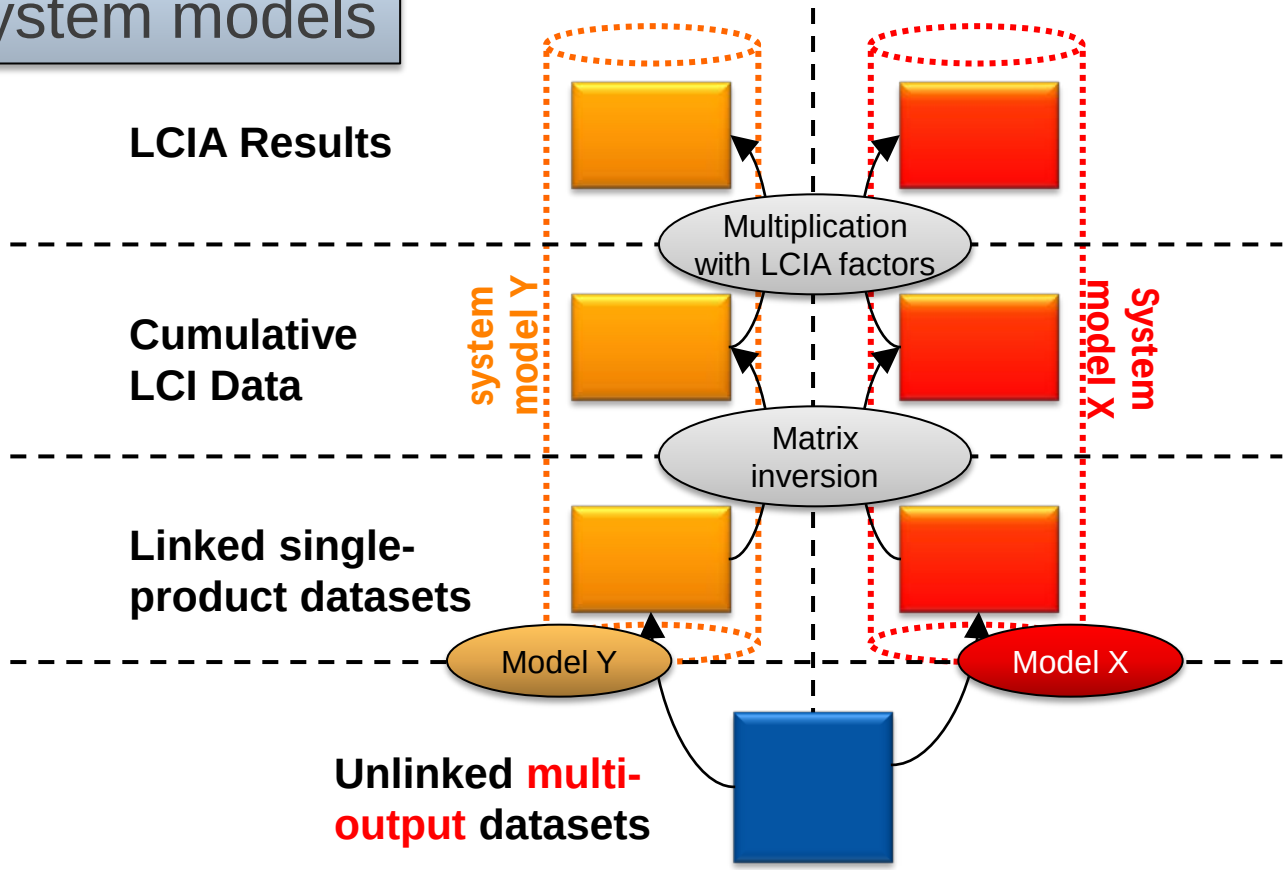
- Improve the quality and reach of the database
- Allow more flexibility for the users
  - System models
  - Market mixes
  - Global supply chains
  - Data format
- Modernize the infrastructure
- Be ready for future developments

System models in ecoinvent v3

- A **system model** is a collection of modeling choices made for the database
  - Dealing with the allocation problem in general
  - Recycling and waste streams
  - Handling constraints in suppliers
- In version 3, **multiple system models** are possible
  - Different perspectives at the same database

System models in ecoinvent v3

One database leads to multiple system models



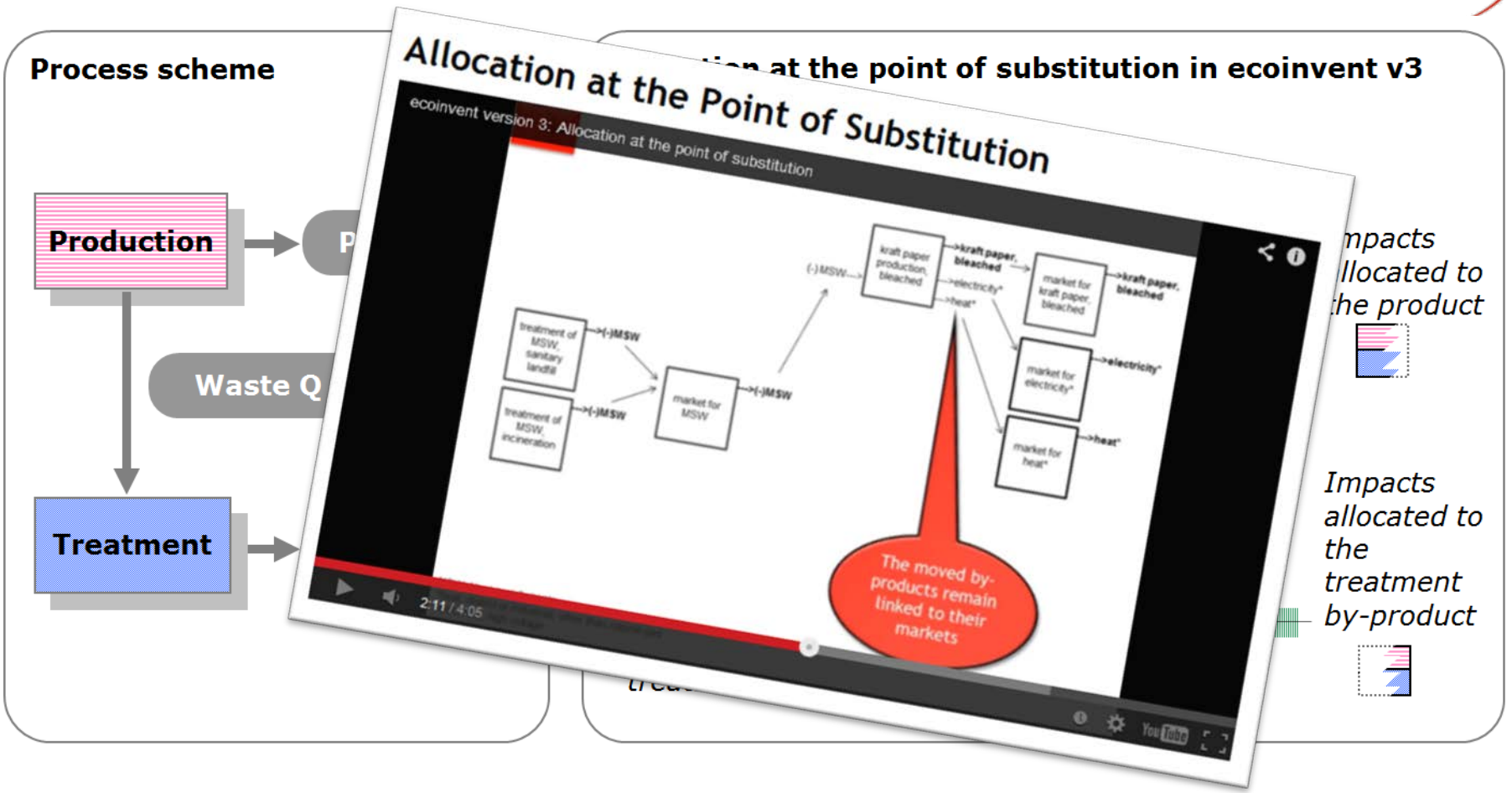
System models in ecoinvent v3

- Allocation, Default
- Consequential, long-term small-scale
- Cut-off/recycled content (coming soon)
- Other models possible
  - Waste/Recycling system models
  - Other allocation choices
  - Integration with specific standards
  - Complete mass- or carbon-based allocation (Mass Flow Analysis)

Goals in Allocation, Default

- **Consistently** deal with by-products
- **Complete** product systems
- Allow inclusion of treatment **burdens** while giving **credit** for useful by-products
- Allow **mass balances**
- Avoid **allocation during treatment** if possible

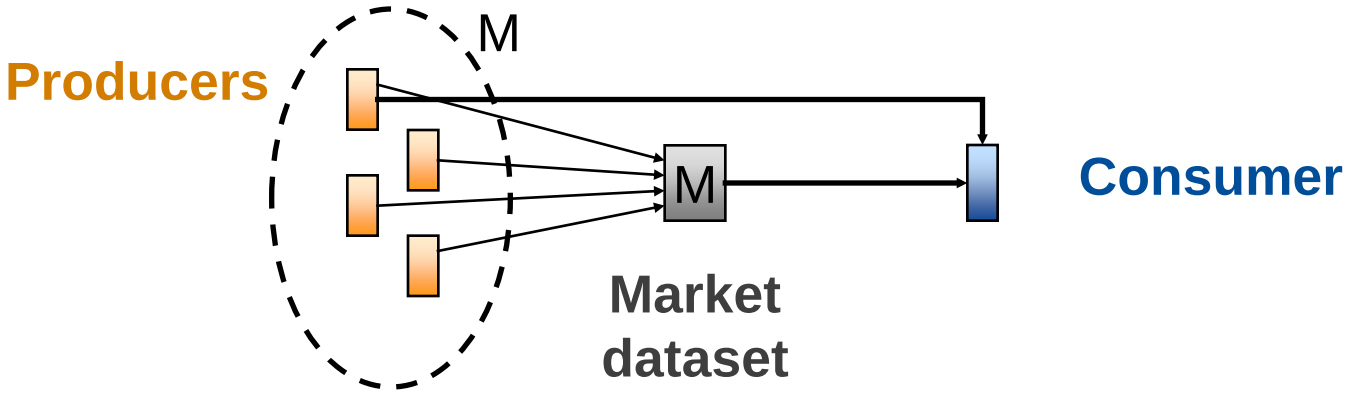
Allocation, Default



Graph: G. Doka

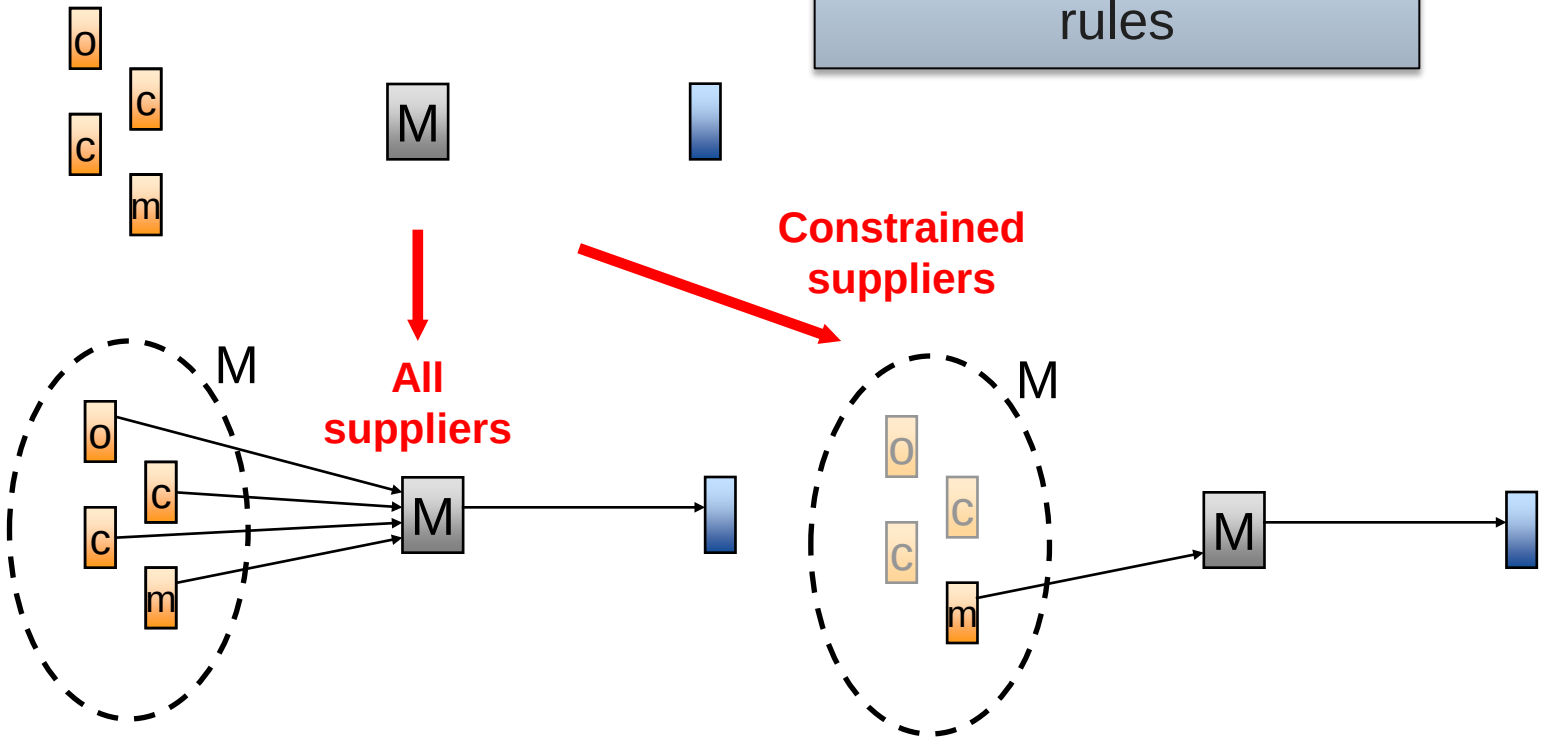
Market datasets

- **Separation** of product and activity names
  - More that one activity can produce the same product
- **Market datasets** are available for all products
- Markets describe the **consumption mix** for a product and region



Market datasets

System models may have different linking rules



Market datasets

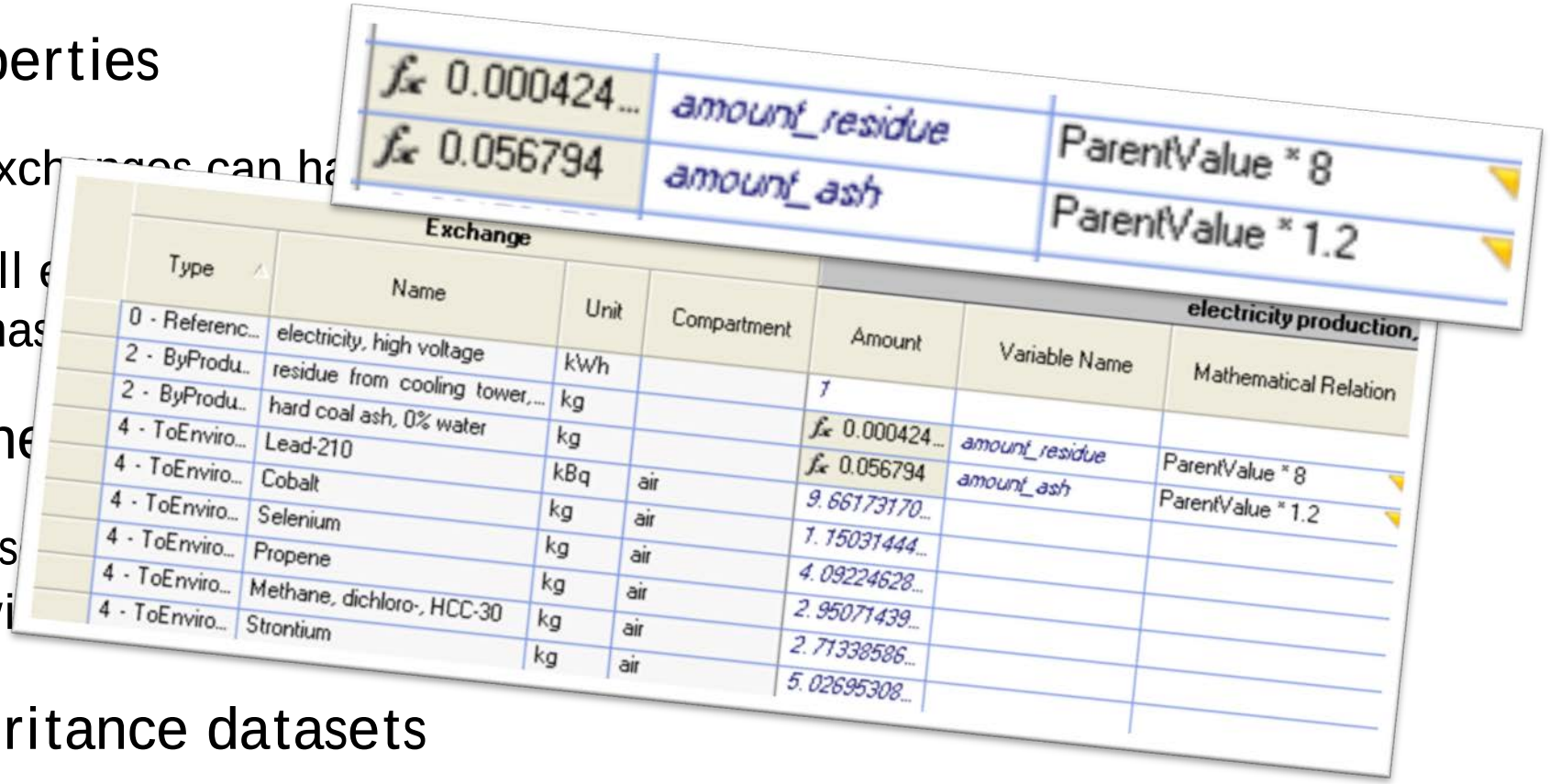
- **Market datasets** provide consistent consumption mixes of a product for a region
- **Additional information** can be added
  - Transport, losses during transport
  - ...
- Linking rules can be **modified** to create **multiple system models**
- **Consistent availability** of consumption mixes
  - Always a choice between the individual producers or the market average

Global supply chains

- In v2.2, **local** datasets served as **proxies** for global activities
- All processes now have a **global** counterpart
  - Often extrapolated from regional data
  - Uncertainties increased
  - Distributes supply chains and impacts for regionalized LCIA
  - Serves as a foundation for regional data projects
- Global update of **freight transport data**
  - Based on better data, sector-specific values

Data format: EcoSpold2

- Regionalization (presentation C. Mutel)
- Properties
  - Exch[illegible] can ha[illegible]
  - All e[illegible] mas[illegible]
- Mathe[illegible]
  - Us[illegible] wi[illegible]
- Inheritance datasets



0.000424...	amount_residue	ParentValue * 8
0.056794	amount_ash	ParentValue * 1.2

Exchange				electricity production,		
Type	Name	Unit	Compartment	Amount	Variable Name	Mathematical Relation
0 - Referenc...	electricity, high voltage	kWh		1		
2 - ByProdu...	residue from cooling tower,...	kg		0.000424...	amount_residue	ParentValue * 8
2 - ByProdu...	hard coal ash, 0% water	kg		0.056794	amount_ash	ParentValue * 1.2
4 - ToEnviro...	Lead-210	kBq	air	9.66173170...		
4 - ToEnviro...	Cobalt	kg	air	1.15031444...		
4 - ToEnviro...	Selenium	kg	air	4.09224628...		
4 - ToEnviro...	Propene	kg	air	2.95071439...		
4 - ToEnviro...	Methane, dichloro-, HCC-30	kg	air	2.71338586...		
4 - ToEnviro...	Strontium	kg	air	5.02695308...		

New data

- Water flows across the database (T. Levova)
- Electricity (C. Bauer and K. Treyer)
- Regional data for Quebec and Canada (P. Lesage)
- Personal transport (including e-mobility)
- Organic chemicals
- Construction materials
- Fruits and vegetables, biofuels, agriculture emissions
- Recycling activities
- ...

Conclusions

- Multiple **system models**
  - Allow different perspectives to fit different goals and scopes
- **Market** datasets
  - Add convenience and flexibility in product choices
- **Global** supply chains and global background data
  - Expands usefulness of the database into more regions
  - Foundation for regionalized LCIA
  - Framework for regional data projects
- New **functionalities** in the data format

Conclusions

- More **flexibility**, more **applications** for users
  - Database can adapt to user requirements
- "**Simple**" use still possible
  - Not forced to use the new format options
- Easier **maintenance**, easier **updating**
  - Foundation to grow into a global database
- New **data**

Thank you for your attention!

ecoinvent Centre

Questions?

www.ecoinvent.org

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