Activity Browser
Recent developments

Daniel de Koning - Software developer - CML

Universiteit Leiden
The Netherlands

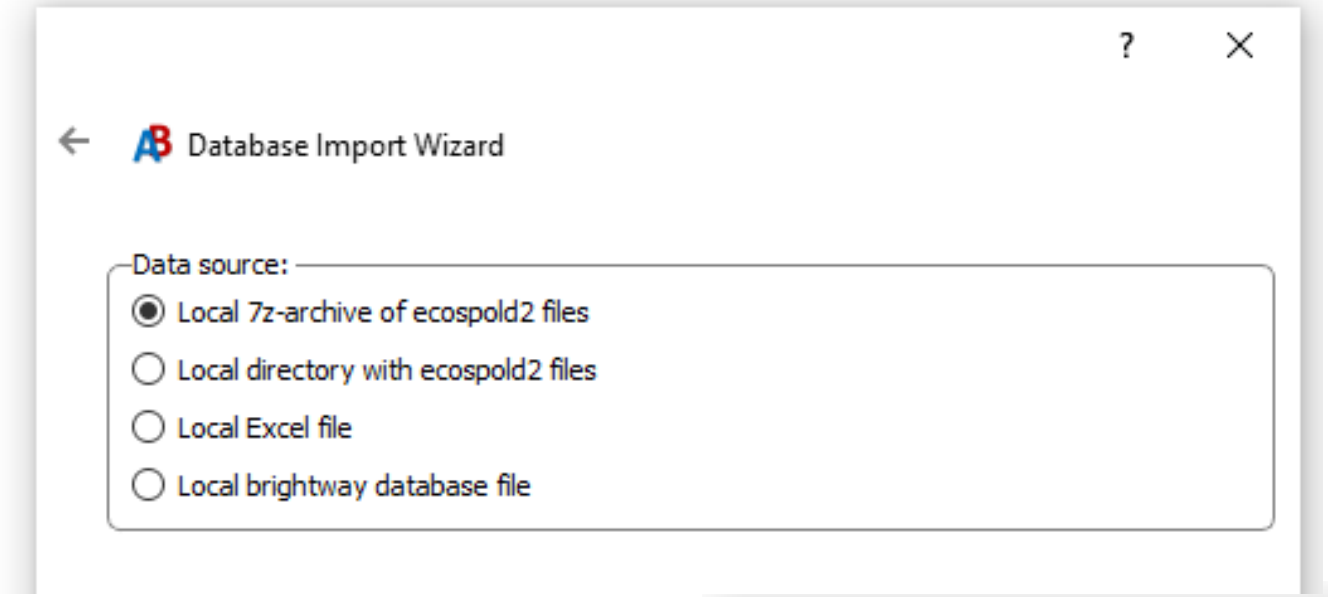
Major changes over the year

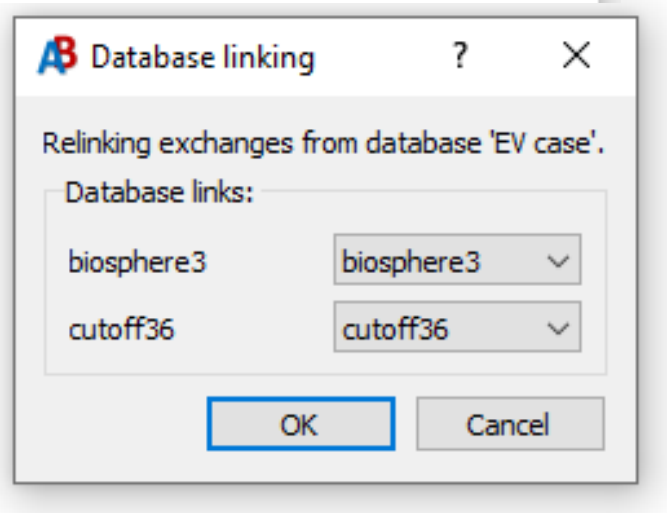
Versions **2.3.3** through **2.6.1**

1. Expanded dataset importing
2. Parameters
3. Uncertainty
4. Presamples & Scenarios
5. Global Sensitivity Analysis
6. Many background changes!

Importing and manipulating data

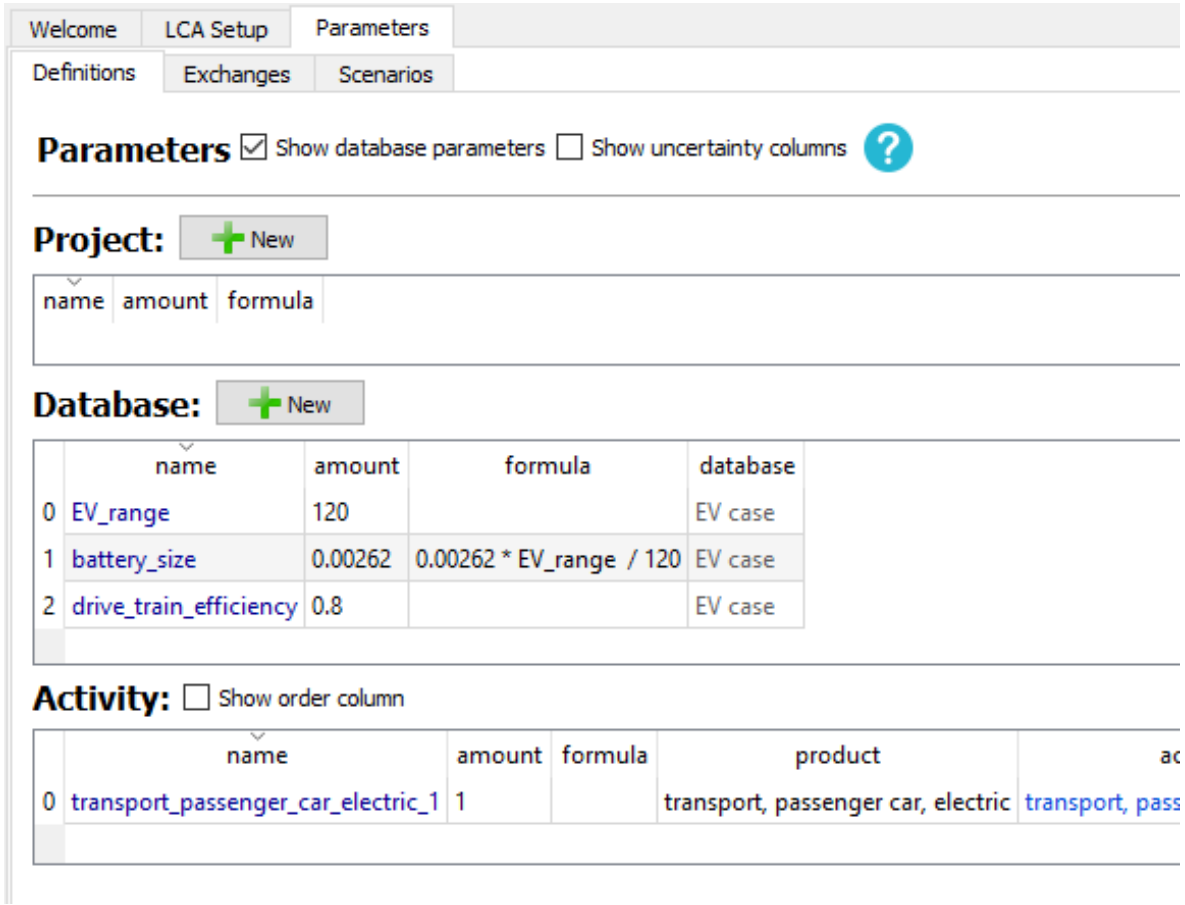
- BW2Package and Excel
  - Adapted from brightway2-data.
- Linking and relinking exchanges
  - Improve importing of shared datasets
  - Change background database(s)
- Exporting/Importing parameters
  - Share parameterized models (excel)





Parameters in AB

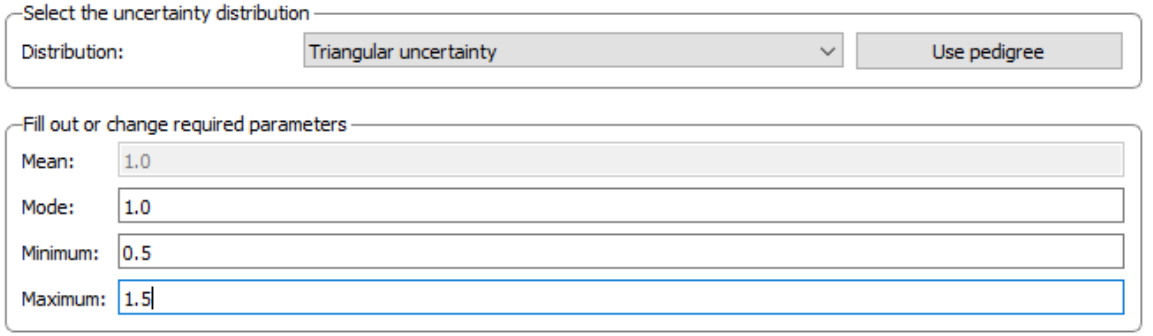
- All three layers of parameters
- Renaming and deleting parameters in brightway2
- More restrictive than brightway2

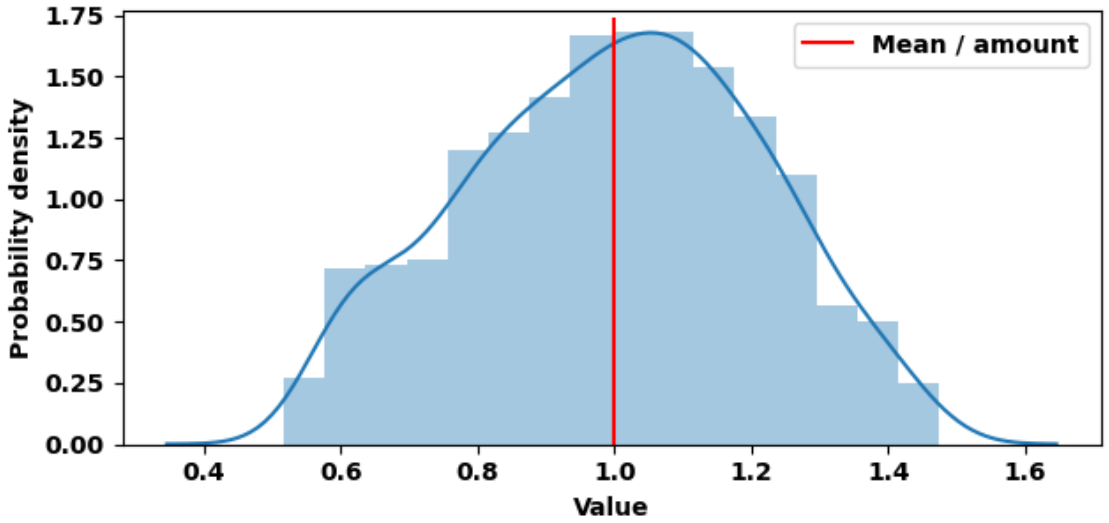


Uncertainty wizard

- Based on existing code:
  - brightway2-data
  - stats_arrays (https://stats-arrays.readthedocs.io/en/latest/)
  - pedigree_matrix (https://bitbucket.org/cmutel/pedigree-matrix/)

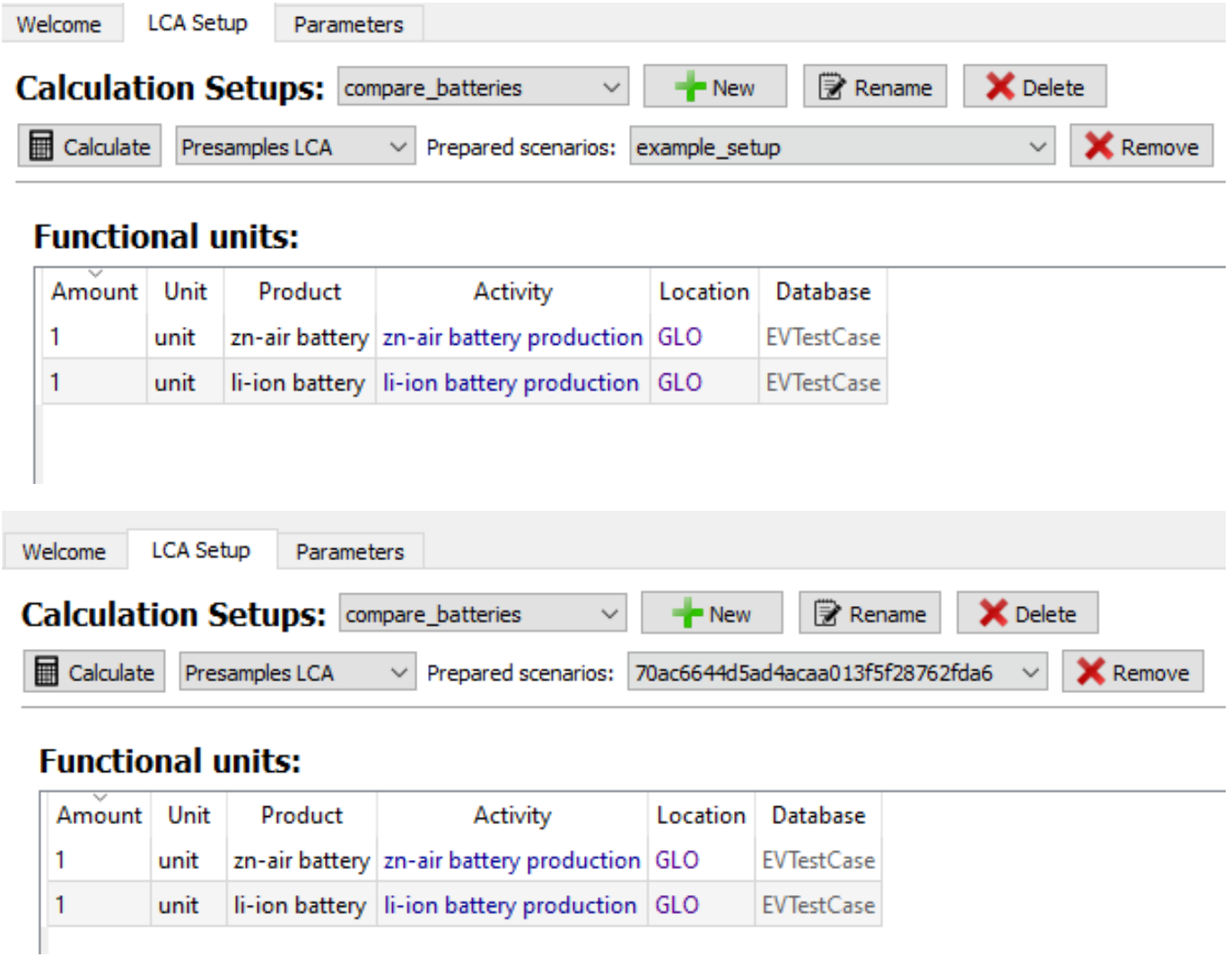
- Visualization of uncertainty distribution





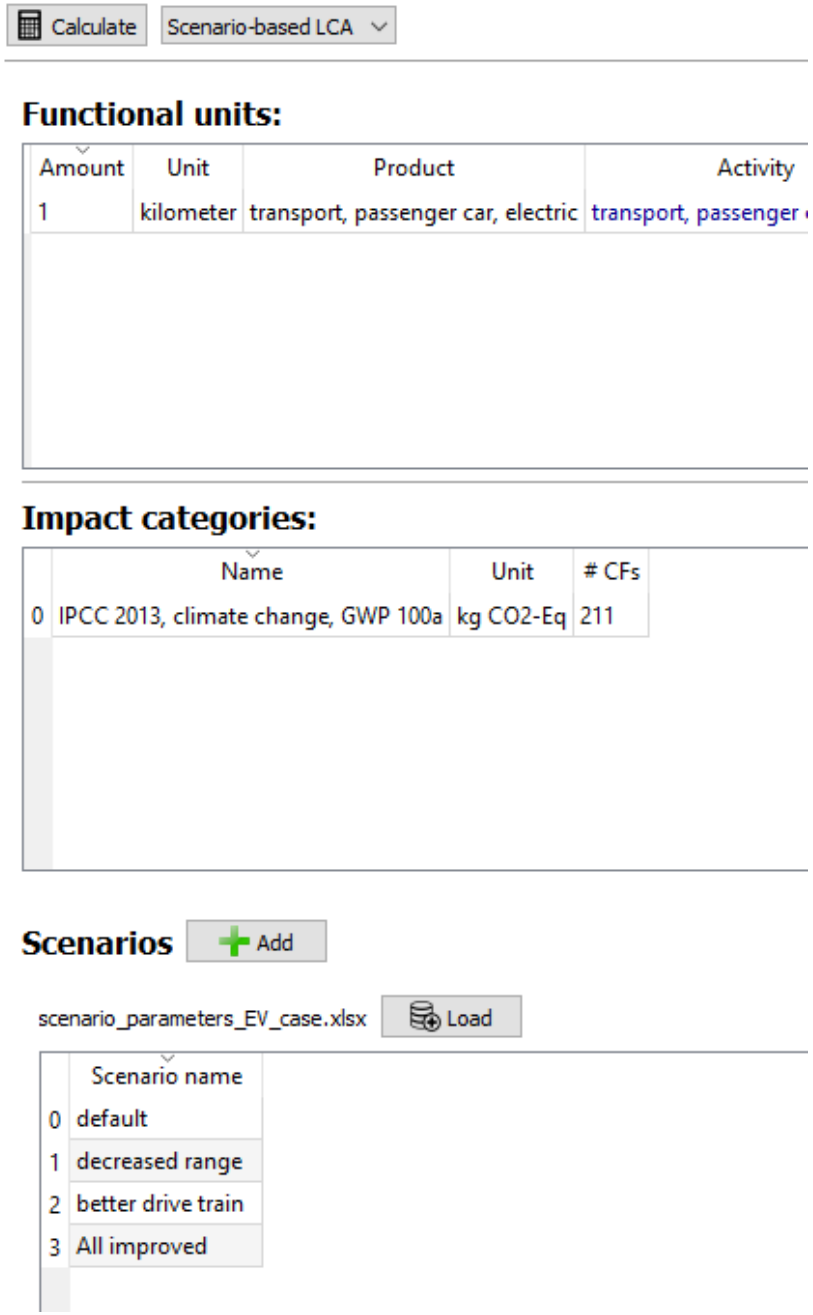
Presamples

- Presamples (https://github.com/PascalLesage/presamples)
- Create presamples arrays in brightway2 code.
- Select and use them in AB



Scenario files

- Structured excel file for:
  - Parameter scenarios
  - ‘Flow’ scenarios
- Converts excel files into presamples-like matrices
- Follows the same logic as presamples during LCA calculations

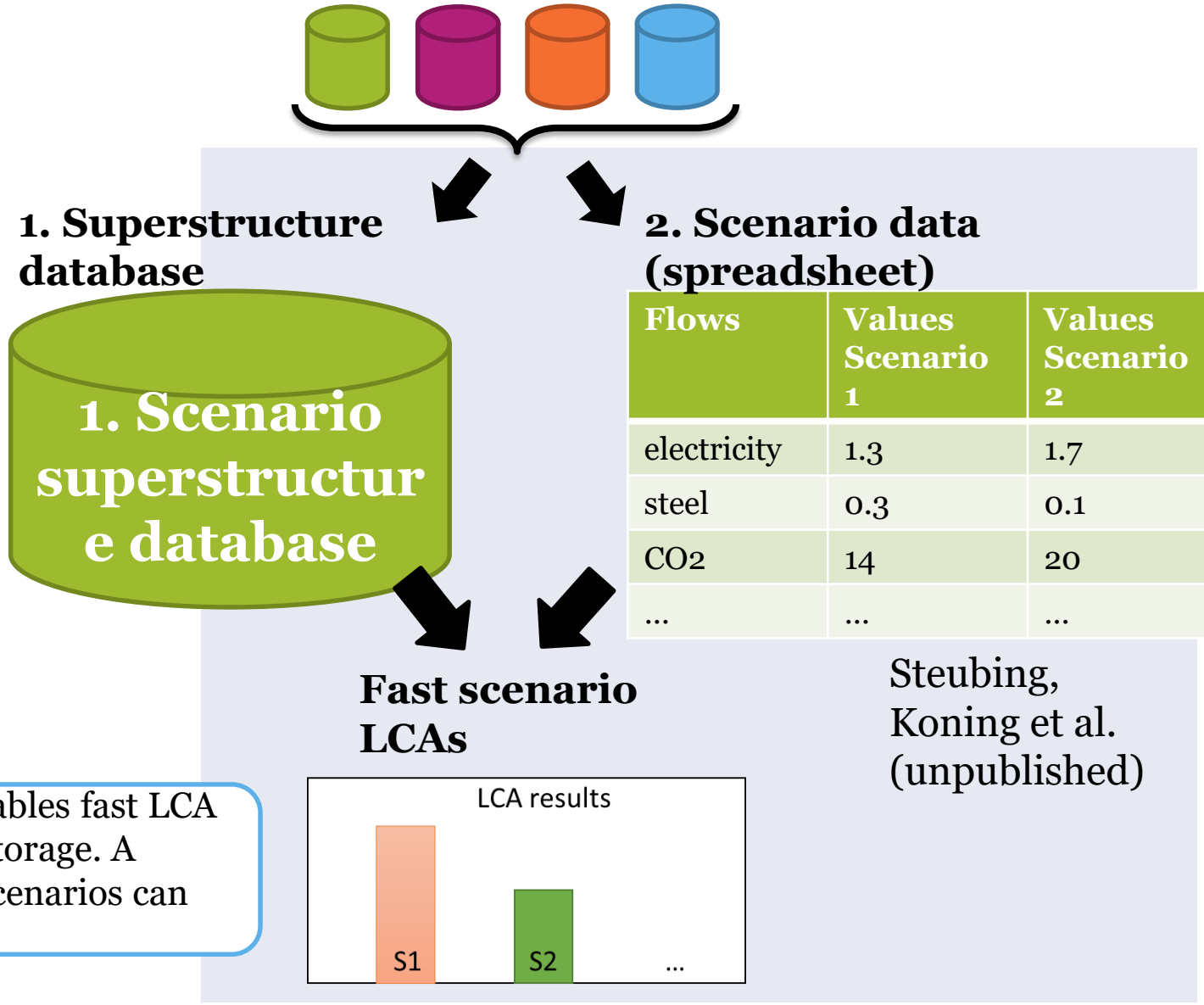


Superstructures

- Problem: storing an entire database for each future scenario requires large storage and is computationally inefficient for LCA calculations
- Solution: (based on presamples concept)

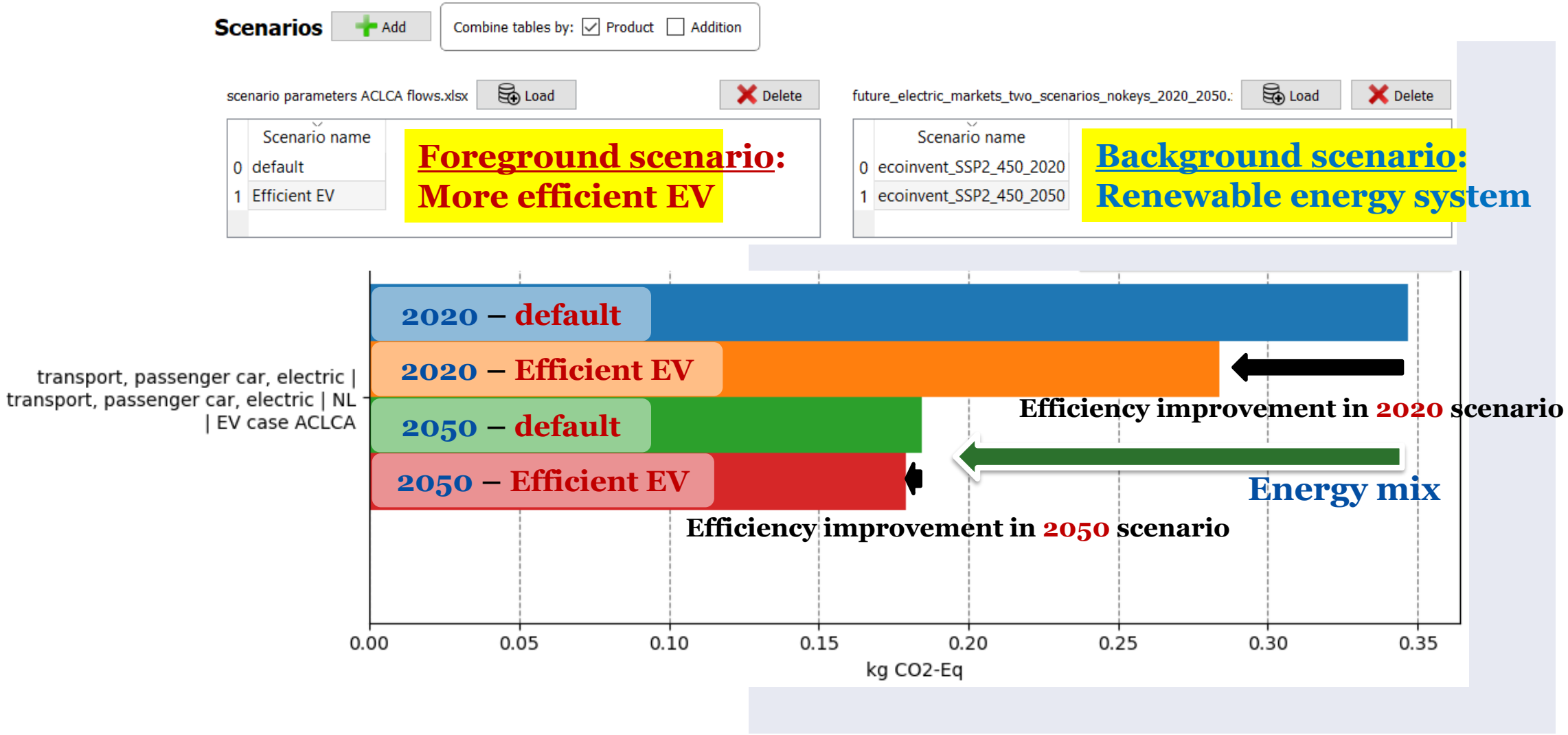
1. A **"superstructure" database**, which contains all activities and flows that occur *across* all future scenarios. This is a "template" for the future product system.

Only 1 future BG database is required, which enables fast LCA calculations and avoids unnecessary data storage. A spreadsheet contains the scenario data. New scenarios can easily be added.



Steubing, Koning et al. (unpublished)

Combining FG and BG scenarios is possible in the AB



Global Sensitivity Analysis (GSA)

- One possible implementation for GSA.
  - Uses Monte Carlo LCA results
  - Filters flows by impact
- The flow or parameter that has the most influence on the result of the functional unit and LCIA method.
- Cucurachi, Blanco, Steubing, Heijungs, (in preparation)
- https://github.com/bsteubing/lca-global-sensitivity-analysis

Global Sensitivity Analysis

Run | Functional unit: 'mandarin production' (kilogram, ZA, None) | LCIA method: ('IPCC 2013', 'cl

Cut-off technosphere: 0.01 | Cut-off biosphere: 0.01 | Save input/output data to Excel after run

	GSA name	delta	delta_conf	S1	S1_c
0	B: Dinitrogen monoxide // ...	0.17766	0.066323	0.19144	0.15879
1	T: electricity, medium voltage ...	0.1774	0.086873	0.21823	0.12866
2	T: diesel, burned in agricultural ...	0.14192	0.080346	0.13731	0.265
3	T: electricity, low voltage FROM ...	0.13679	0.074141	0.23057	0.15049

Changes in the background

- Licence change from GPL3 to LGPL
  - PyQt5 to PySide2
- Bugfixes
- Reworked and refactored code
  - Tables
  - LCA Results tabs
- Added tests
- …

Questions?

Universiteit
Leiden
The Netherlands