

Activity Browser

Recent developments

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Major changes over the year

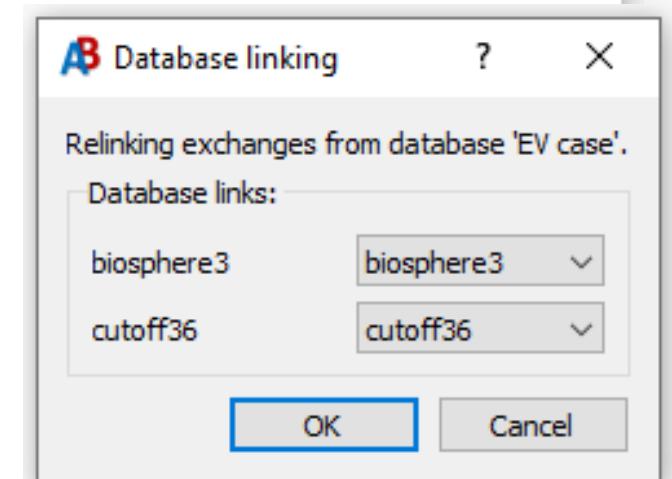
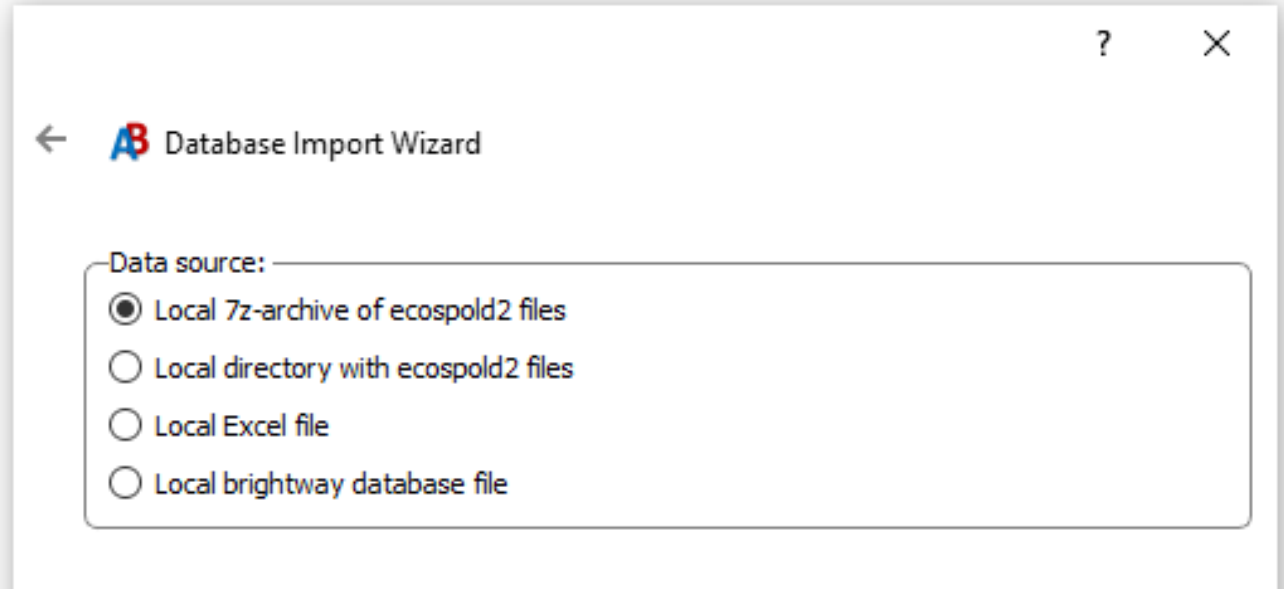
Versions 2.3.3 through 2.6.1

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

WelcomeLCA SetupParameters

DefinitionsExchangesScenarios

Parameters ☒ Show database parameters ☐ Show uncertainty columns ?

Project: + New

nameamountformula

Database: + New

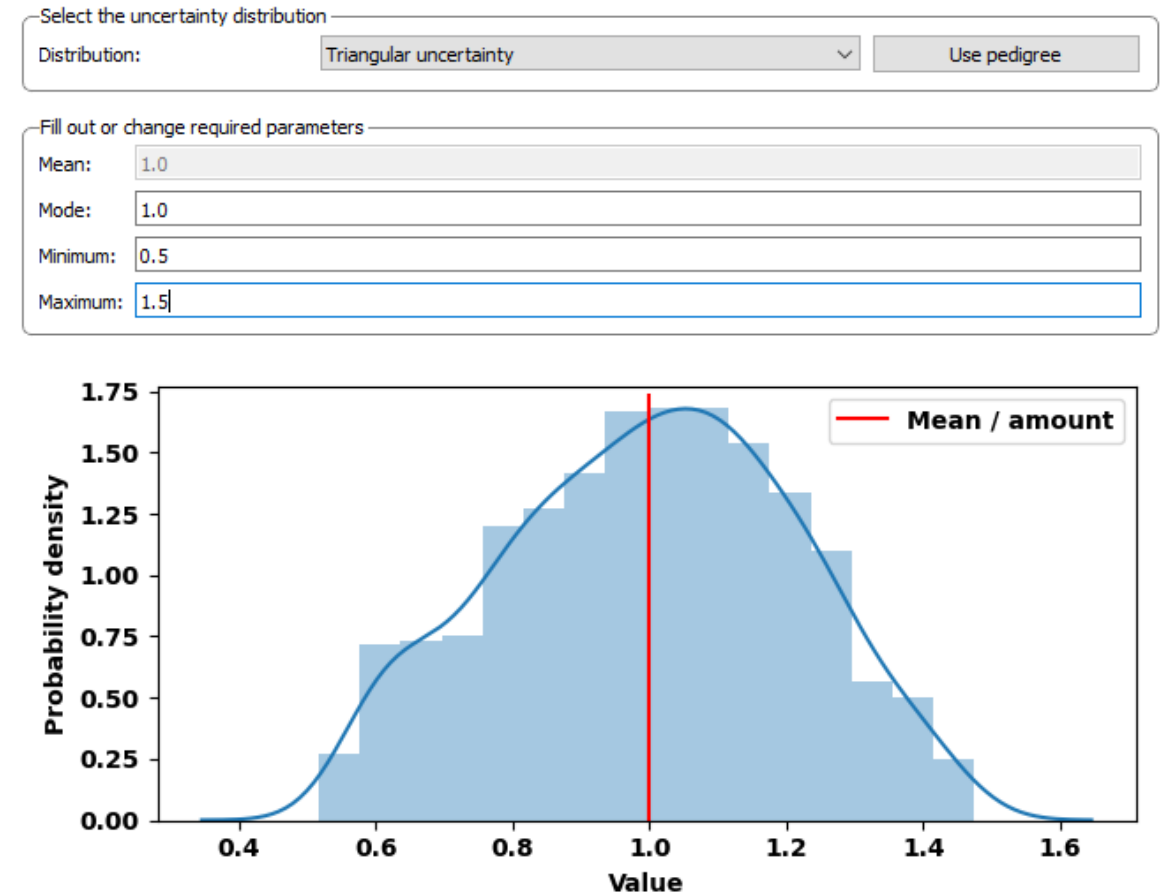
	name	amount	formula	database
0	EV_range	120		EV case
1	battery_size	0.00262	$0.00262 * EV_range / 120$	EV case
2	drive_train_efficiency	0.8		EV case

Activity: ☐ Show order column

	name	amount	formula	product	ac
0	transport_passenger_car_electric_1	1		transport, passenger car, electric	transport, pass

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

Welcome LCA Setup Parameters

Calculation Setups: compare_batteries + New 📄 Rename ✖ Delete

📊 Calculate Presamples LCA ▼ Prepared scenarios: example_setup ▼ ✖ Remove

Functional units:

Amount	Unit	Product	Activity	Location	Database
1	unit	zn-air battery	zn-air battery production	GLO	EVTestCase
1	unit	li-ion battery	li-ion battery production	GLO	EVTestCase

Welcome LCA Setup Parameters

Calculation Setups: compare_batteries + New 📄 Rename ✖ Delete

📊 Calculate Presamples LCA ▼ Prepared scenarios: 70ac6644d5ad4acaa013f5f28762fda6 ▼ ✖ Remove

Functional units:

Amount	Unit	Product	Activity	Location	Database
1	unit	zn-air battery	zn-air battery production	GLO	EVTestCase
1	unit	li-ion battery	li-ion battery production	GLO	EVTestCase

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

Calculate

Scenario-based LCA

Functional units:

Amount	Unit	Product	Activity
1	kilometer	transport, passenger car, electric	transport, passenger

Impact categories:

	Name	Unit	# CFs
0	IPCC 2013, climate change, GWP 100a	kg CO2-Eq	211

Scenarios

+ Add

scenario_parameters_EV_case.xlsx

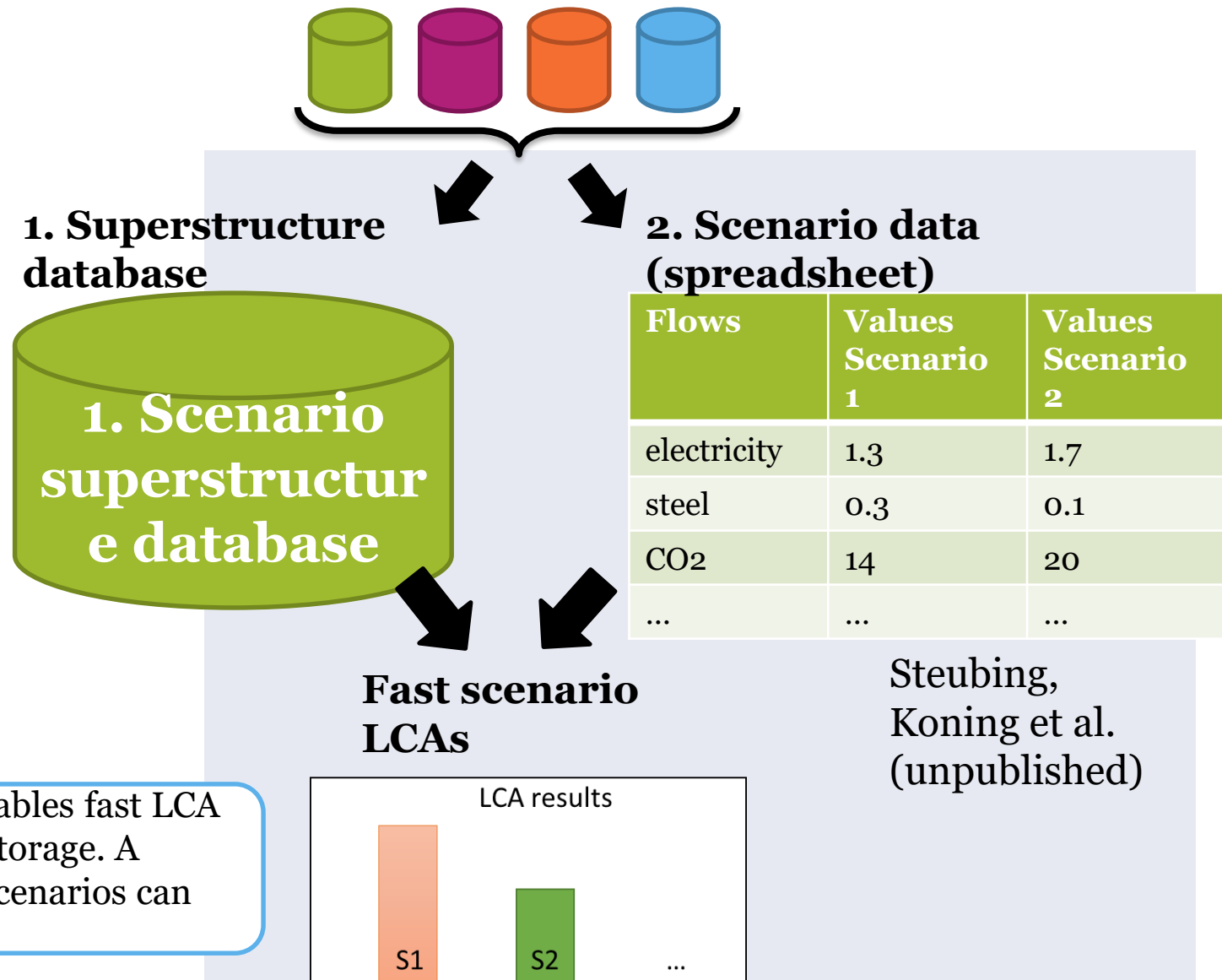
Load

	Scenario name
0	default
1	decreased range
2	better drive train
3	All improved

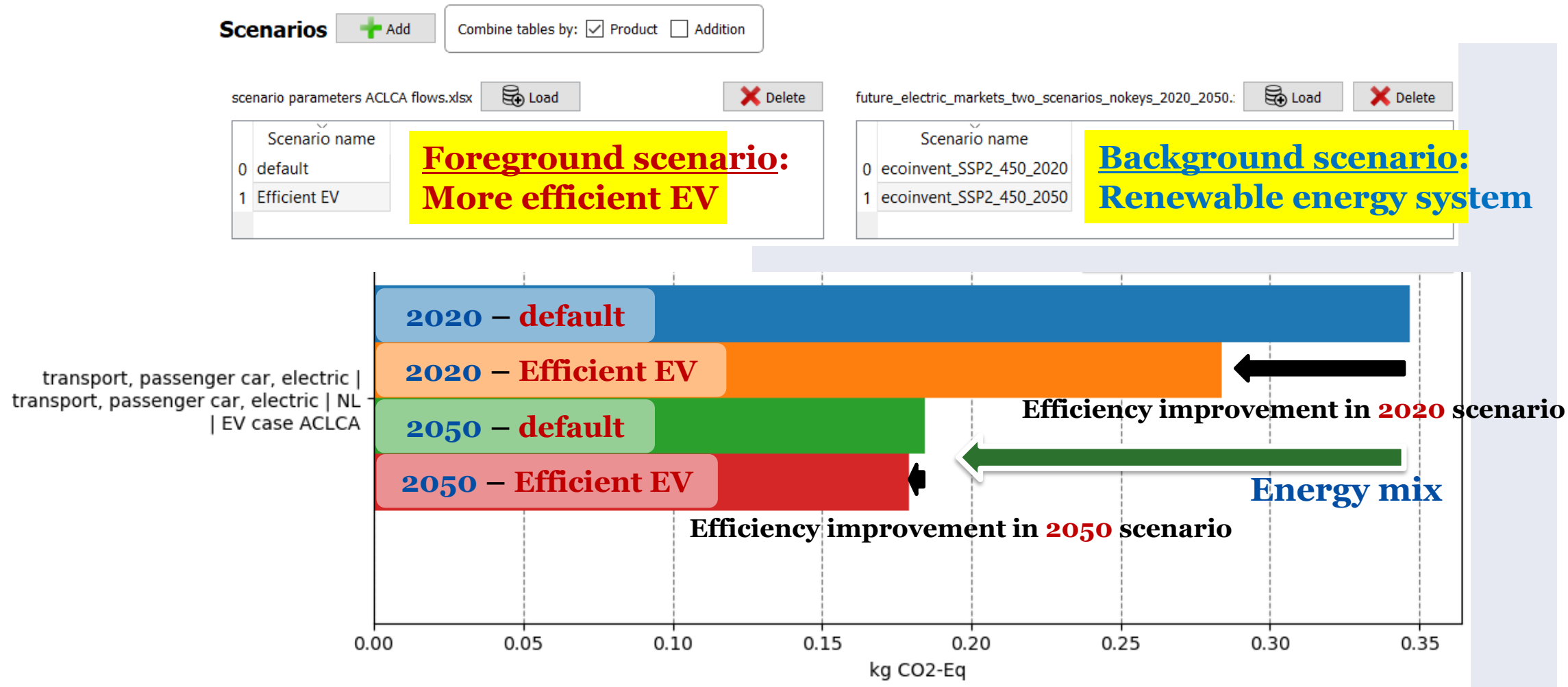
Superstructures

- 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.



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', 'd

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?



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