

Activity Browser

What is it?

Recent progress

Future plans

How can *you* contribute?

Bernhard Steubing, Jonathan Kidner, Marc
van der Meide, and others

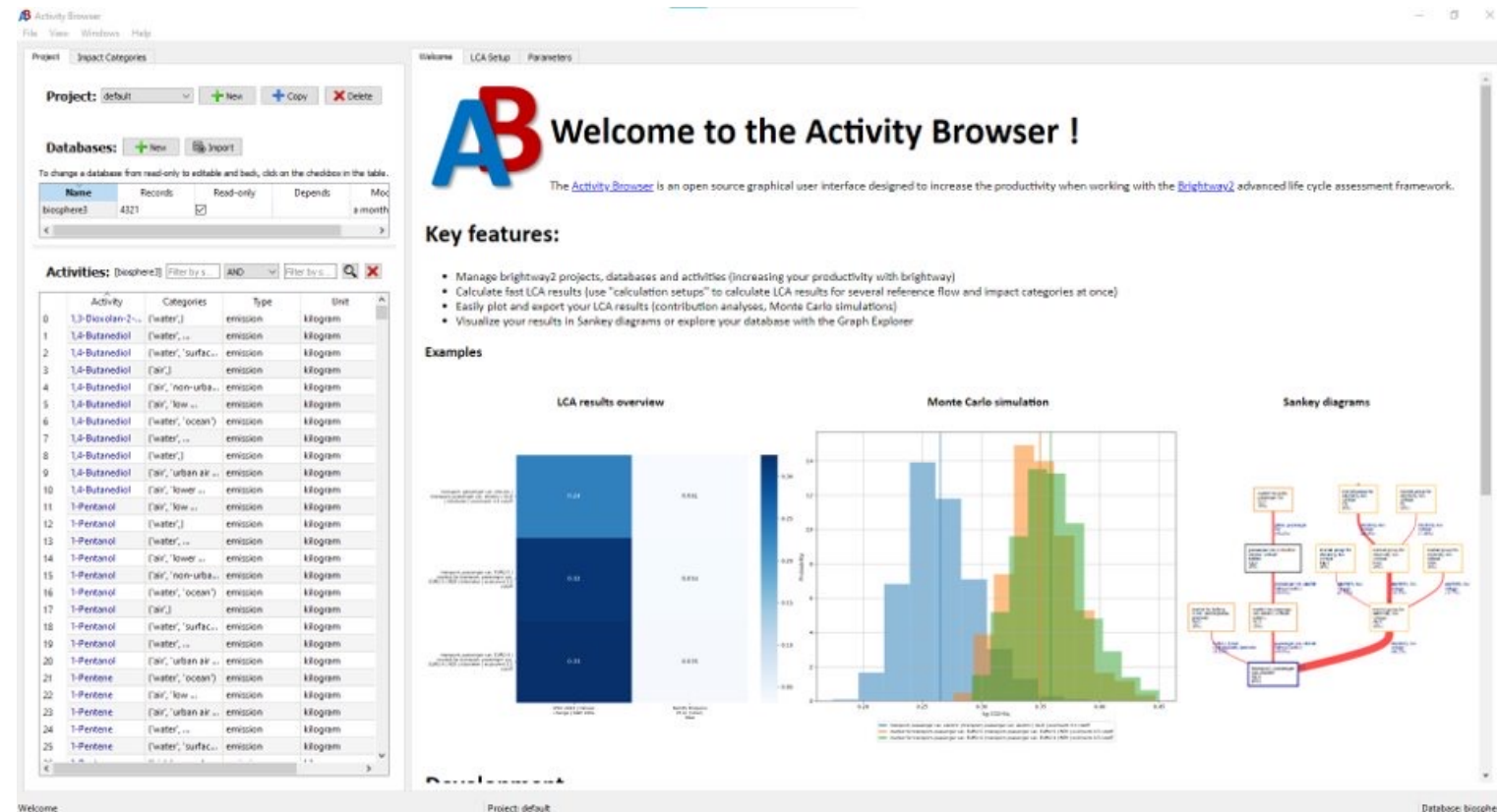
Brightcon – 20 September 2023



What is it?

Activity Browser LCA software

- Open source LCA software (python + JavaScript)
- Building on to of the brightway framework
- Fast analysis of LCA results
- Advanced modeling features, e.g. parameters, scenarios
- Possible to include future scenarios for prospective LCA studies
- Open source: transparent, extendable, community-based



<https://github.com/LCA-ActivityBrowser/activity-browser>

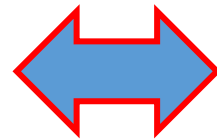
Powerful combination: bw + AB

brightway2

- Python based LCA framework



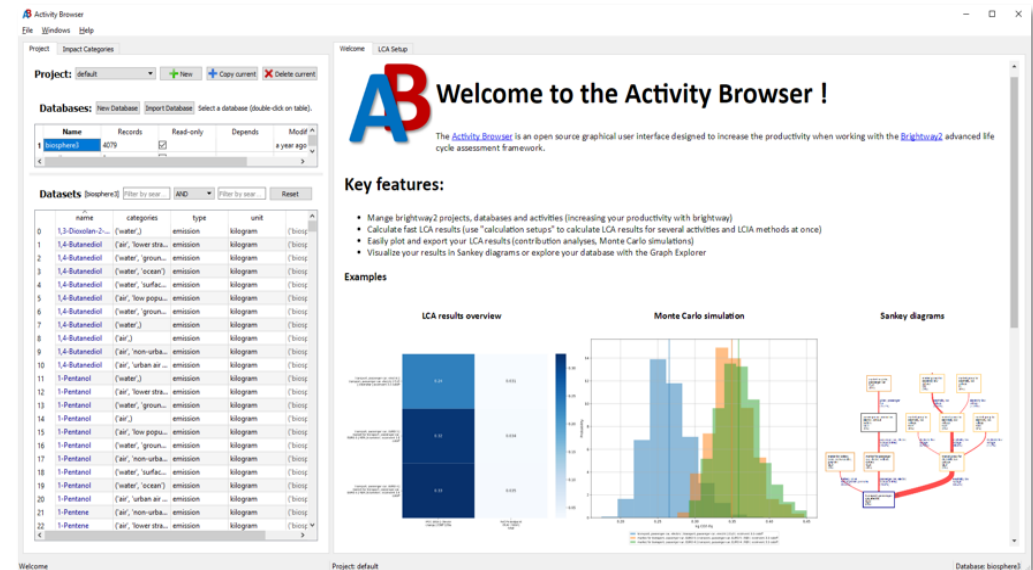
Brightway



Open source, extendable, community driven.

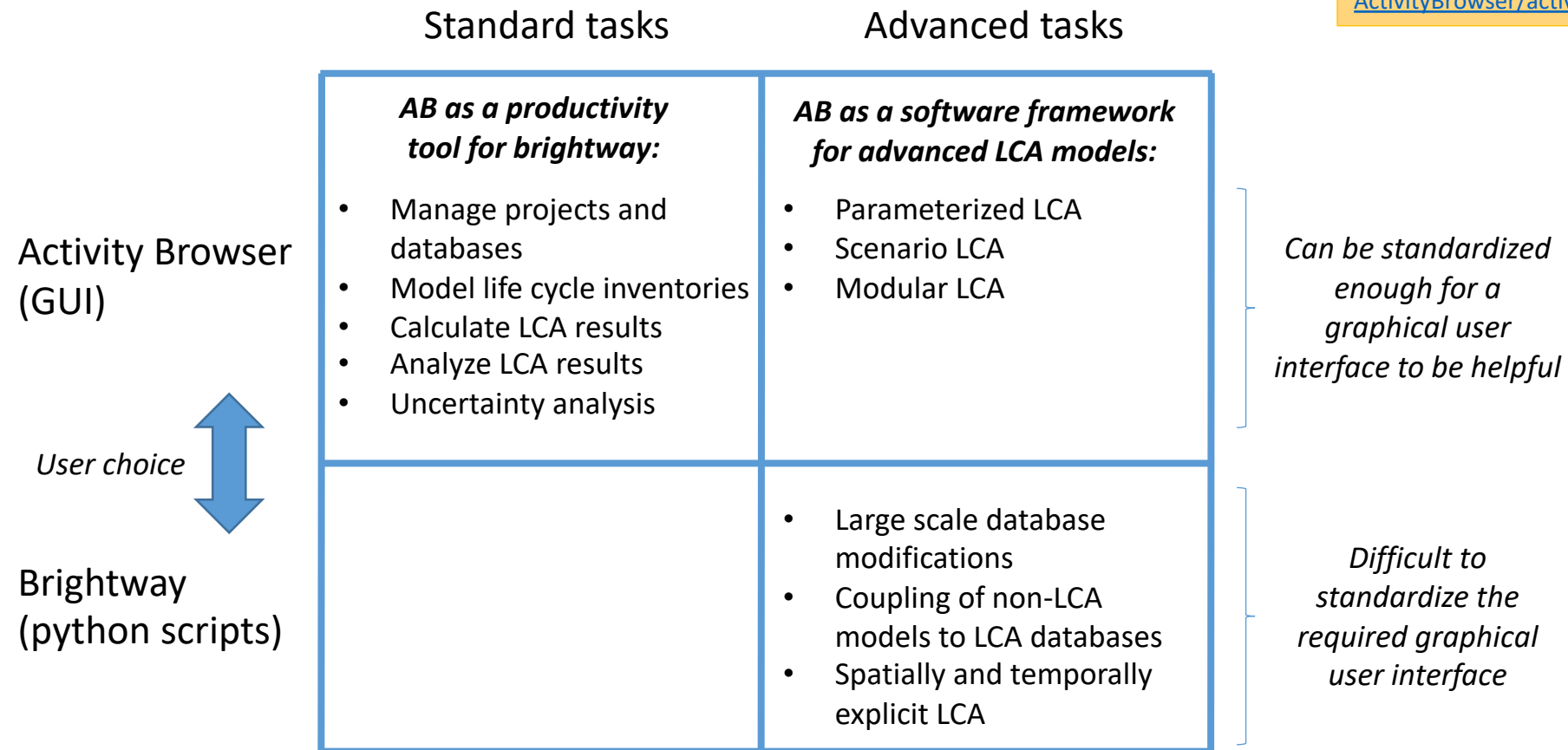
Activity Browser

- GUI and productivity tool for bw



→ Powerful combination for advanced LCA studies

When to use the AB?



Paper (Steubing et al. 2020):

<https://www.sciencedirect.com/science/article/pii/S2665963819300120>

Installation from GitHub:

<https://github.com/LCA-ActivityBrowser/activity-browser>

Quick history

First AB version in 2013

```
(py27) C:\Users\steub\Bernie\surfdrive\ETHZ\Python\tannenbaum\tannenbaum>python activitybrowser.py
```

```
This is a simple way to browse databases and activities in Brightway2.  
The following commands are available:
```

```
Basic commands:
```

```
?: Print this help screen.  
quit, q: Exit the activity browser.  
number: Go to option number when a list of options is present.  
l: List current options.  
n: Go to next page in paged options.  
p: Go to previous page in paged options.  
p number: Go to page number in paged options.  
h: List history of databases and activities viewed.  
wh: Write history to a text file.  
autosave: Toggle autosave behaviour: saves current data.activity.
```

```
Working with databases:
```

```
ldb: List available databases.  
db name: Go to database name. No quotes needed.  
s string: Search activity names in current database with string.
```

```
Working with activities:
```

```
a id: Go to activity id in current database. Complex ids in quotes.  
i: Info on current activity.  
web: Open current activity in web browser. Must have bw2-web.py running.  
r: Choose a random activity from current database.  
u: List upstream activities (inputs for the current activity).  
d: List downstream activities (activities which consume current activity).  
b: List biosphere flows for the current activity.
```

```
The current data directory is C:\Users\steub\OneDrive - Universiteit Leiden\Brightway3.  
Autosave is turned off.
```

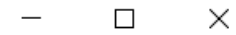
```
Databases
```

```
Empty list
```

```
>> _
```



AB Qt interface 2014



Activity Browser

Extensions Help



Technosphere LCIA Multi-LCA

Technosphere Inputs

	amount	unit	name	location
1	1.0055	kilowatt hour	electricity, high voltage, production NL, at grid	NL
2	7.825e-08	kilogram	sulphur hexafluoride, liquid, at plant	RER
3	3.24e-08	kilometer	transmission network, electricity, medium voltage	CH

Current Activity

1.0 kilowatt hour electricity, medium voltage, production NL, at grid NL

Downstream Activities

	amount	unit	name	location
1	0.036826	kilowatt hour	palm methyl ester, at esterification plant	MY
2	0.050145	kilowatt hour	glycerine, from palm oil, at esterification plant	MY
3	1.0568	kilowatt hour	electricity, low voltage, production NL, at grid	NL
4	0.041141	kilowatt hour	palm oil, in esterification plant	MY

Databases Biosphere Search LCA Results Activity Editor

	name	activities	
1	PSS default	216	biosphere, biosphere3, ec
2	biosphere	3940	
3	SPDB	1	biosphere3, ecoinvent 3.0
4	SPDB_default	25	biosphere, biosphere3, ec
5	SimaProExports	9	Waeludden_concrete, Wa
6	MP_paper	3	ecoinvent 2.2
7	ecoinvent 3.1 cutoff electricity replaced by RER etc	11301	biosphere3
8	ecoinvent 3.1 cutoff no transport	11301	biosphere3
9	ecoinvent 3.1 default	11329	biosphere3
10	ecoinvent 3.1 cutoff	11301	biosphere3
11	ecoinvent 3.1 cutoff no electricity	11301	biosphere3
12	ecoinvent 3.1 cutoff RoW electricity replaced	11301	biosphere3
13	ecoinvent 3.1 cutoff RoW inputs replaced	11301	biosphere3
14	ecoinvent 3.1 consequential no substitution	10302	biosphere3
15	ecoinvent 3.1 consequential no constrained markets	10302	biosphere3

New Database

Refresh

Loaded ecoinvent 2.2 in 1.56 seconds.

ecoinvent 2.2

AB in 2023

Activity Browser

File View Windows Help

Project Impact Categories

Project: ei391 + New + Copy ✕ Delete

Databases: + New Import

To change a database from read-only to editable and back, click on the checkbox in the table.

Name	Records	Read-only	Depends	
biosphere3	4709	<input checked="" type="checkbox"/>		7
cutoff391	21238	<input checked="" type="checkbox"/>	biosphere3	7

Activities: [cutoff391] 🔍 ✕

	Product	Activity	Location	Unit
0	1,1-...	market for 1,1-...	GLO	kilogram
1	1,1-...	1,1-...	US	kilogram
2	1,1-...	1,1-...	RoW	kilogram
3	1,1-...	market for 1,1-...	GLO	kilogram
4	1,1-...	molecular sieve ...	RoW	kilogram
5	1,1-...	molecular sieve ...	RER	kilogram
6	1-butanol	hydroformylati...	RER	kilogram
7	1-butanol	hydroformylati...	RoW	kilogram
8	1-butanol	synthetic fuel ...	ZA	kilogram
9	1-butanol	market for 1-...	GLO	kilogram
10	1-methoxy-2-...	market for 1-...	GLO	kilogram
11	1-methoxy-2-...	1-methoxy-2-...	GLO	kilogram
12	1-...	market for 1-...	GLO	kilogram
13	1-...	1-...	GLO	kilogram
14	1-naphthylaceti...	1-naphthylaceti...	GLO	kilogram
15	1-naphthylaceti...	market for 1-...	GLO	kilogram
16	1-pentanol	hydroformylati...	RER	kilogram
17	1-pentanol	hydroformylati...	RoW	kilogram
18	1-pentanol	market for 1-...	GLO	kilogram

Welcome LCA Setup Parameters

Welcome to the Activity Browser !

The [Activity Browser](#) is an open source graphical user interface designed to increase the productivity when working with the [Brightway2](#) advanced life cycle assessment framework.

Stay up-to-date

The AB has two mailing lists:

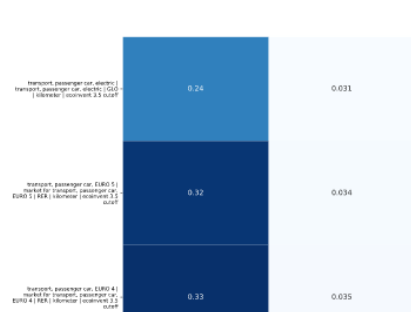
- [Updates on AB development \(e.g. new versions\)](#)
- [User channel for any topic related to the AB](#)

Key features

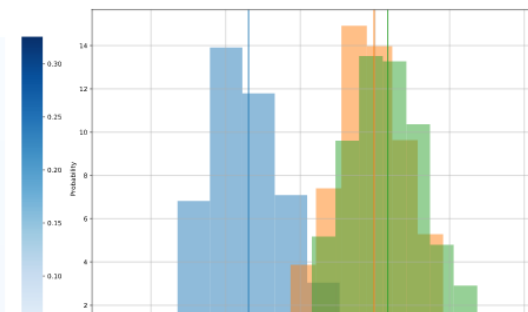
- Manage brightway2 projects, databases and activities (increasing your productivity with brightway2)
- Calculate fast LCA results (use "calculation setups" to calculate LCA results for several reference flow and impact categories at once)
- Easily plot and export your LCA results (contribution analyses, Monte Carlo simulations)
- Visualize your results in Sankey diagrams or explore your database with the Graph Explorer

Examples

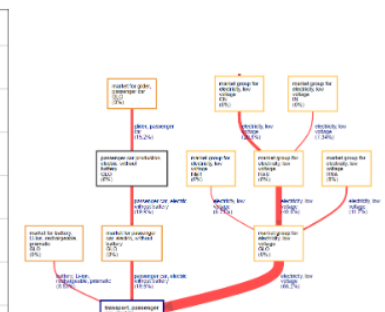
LCA results overview



Monte Carlo simulation

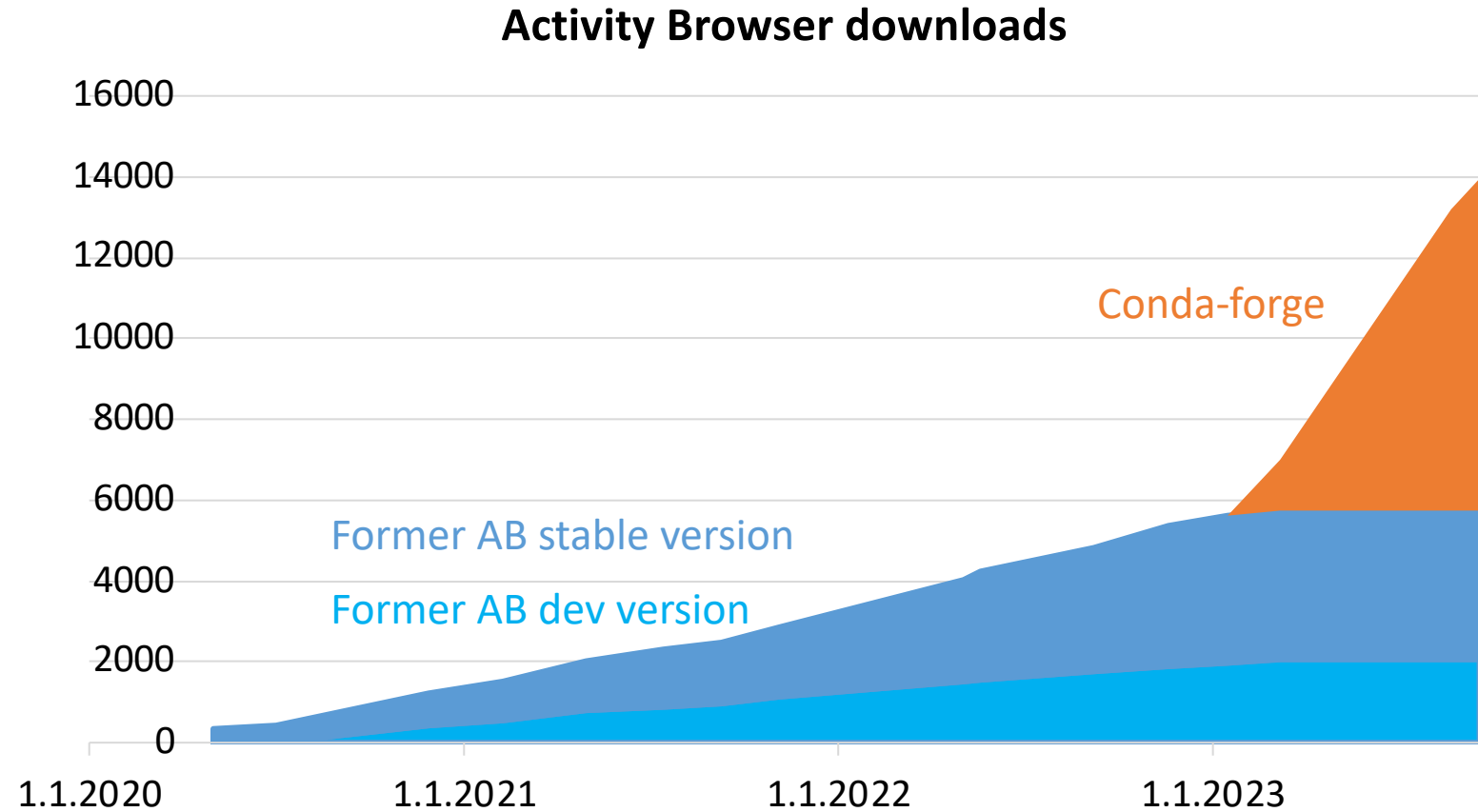


Sankey diagrams



Fast growing user base

> 8200 downloads
since January 2023!



Recent achievements

(selection)

Advanced scenario modelling

- Foreground scenarios
- Prospective LCI databases (future backgrounds e.g. from premise)
- Combination of FG and BG scenarios
- Superstructure approach
- Much faster now with .csv or .feather
- Much improved handling of file errors

Welcome Characterization Factors LCA Setup Parameters LCA results

Calculation Setup: test + New + Copy Rename Delete

Calculate Scenario LCA

Reference flows:

	Amount	Unit	Product	Activity	Location	Database
0	1	kilogram	1-butanol	hydroformylation of propylene	RoW	super_ei38_REMIND_el_20220923
1	1	kilogram	1-pentanol	market for 1-pentanol	GLO	super_ei38_REMIND_el_20220923
2	1	kilogram	1-propanol	1-propanol production	RER	super_ei38_REMIND_el_20220923

Impact categories:

	Name	Unit	# CFs
0	IPCC 2013, climate change, GWP 100a	kg CO2-Eq	211
1	ReCiPe Endpoint (H,A), total, total	points	1781

Scenarios: ? + Add Save ☒ Combine scenarios ☐ Extend scenarios

flow_scenarios_EV_case - ei38cutoff.xlsx Load

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



E.g. foreground scenarios





scenario_diff_super_ei38_REMIND_el_20220923_2scen_3times Load Delete


Scenario name
0 remind - SSP2-...
1 remind - SSP2-...
2 remind - SSP2-...
3 remind - SSP2-...
4 remind - SSP2-...
5 remind - SSP2-...





E.g. background scenarios

Powerful search and filtering

Activities: [cutoff391]  



	 Product	 Activity	 Location	 Unit
3469	electricity, hi			kilowatt hou
3472	electricity, hi			kilowatt hou
3476	electricity, hi			kilowatt hou
3481	electricity, hi			kilowatt hou
3483	electricity, hi			kilowatt hou
3490	electricity, hi			kilowatt hou



-  More filters
-  Manage filters
-  Remove column filters
-  Remove all filters

Impact categories tree view

Impact Categories






☒ Tree view ☐ List view

Name	Unit	# CF
> EF v3.0		
> EF v3.1 EN15804		
> EF v3.1 no LT		
▼ EF v3.1		
▼ acidification		
accumulated	kg+-Eq	22
+ Duplicate Impact Category		
Inspect Impact Category		
> climate change		
> climate change:		
> climate change: fossil		
> climate change: land use and land use change		
> ecotoxicity: freshwater		


Editing characterization factors

Method: CML v4.8 2016 - climate change - GWP 100a

☒ Hide uncertainty columns ☐ Edit Characterization Factors

	 Name	 Category	 Amount	 Unit	 Uncertainty
9	Carbon dioxide,...	('air,')	1	kilogram	Undefined or ...
10	Carbon dioxide,...	('air', 'urban air ...	1	kilogram	Undefined or ...
11	Carbon dioxide,...	('soil', ...	-1	kilogram	Undefined or ...
12	Carbon dioxide,...	('soil', 'forestry')	-1	kilogram	Undefined or ...
13	Carbon dioxide,...	('soil', 'industrial')	-1	kilogram	Undefined or ...
14	Carbon dioxide,...	('soil,')	-1	kilogram	Undefined or ...
15	Chloroform	('air', 'low ...	16	kilogram	Undefined or ...
16	Chloroform	('air', 'lower ...	16	kilogram	Undefined or ...
17	Chloroform	('air', 'non-urba...	16	kilogram	Undefined or ...
18	Chloroform	('air,')	16	kilogram	Undefined or ...
19	Chloroform	('air', 'urban air ...	16	kilogram	Undefined or ...

Plugins

 **DISCLAIMER**

Plugins are not necessarily developed by Activity Browser maintainers. Below are listed plugins from people we trust but we do not check plugins code. **Use them at your own risk.**

The plugin system is still in development so keep in mind that things may change at any point.

Since the `2.8 release` a plugin system has been added to the AB. Plugins are a flexible way to add new functionalities to the AB without modifying the software itself.

The plugin code has been designed and written by Remy le Calloch (supported by [G-SCOP laboratories](#)) with revisions from the AB-team.

Available plugins

These are the plugins that we know about. To add your plugin to this list either open an issue, or a pull request. All submitted plugins will be reviewed, although all risks associated with their use shall be born by the user.

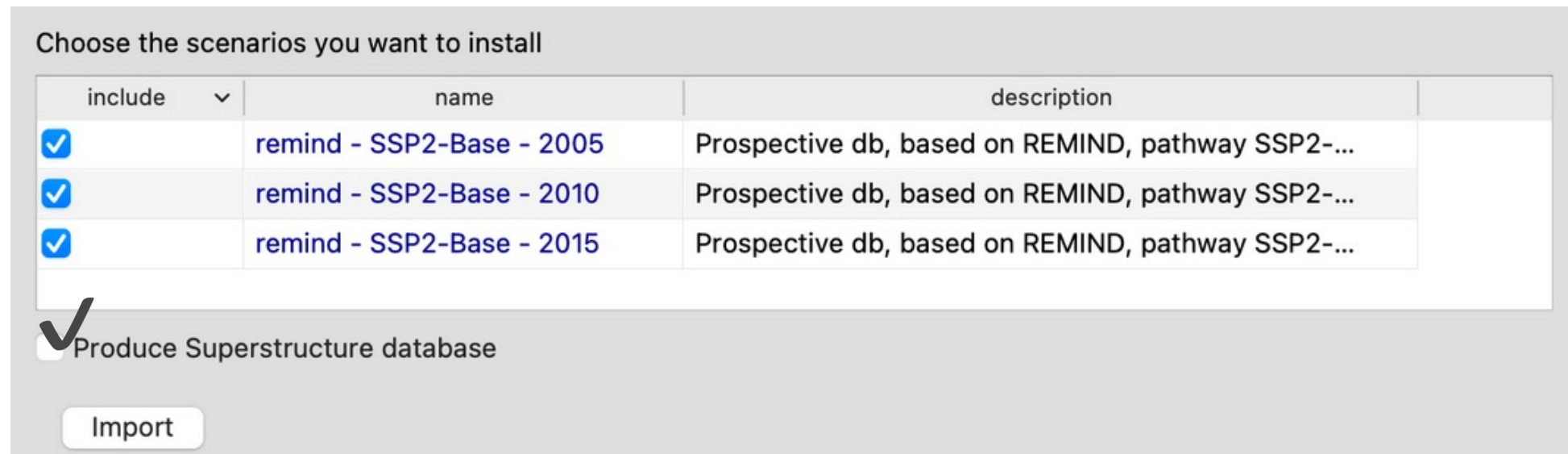
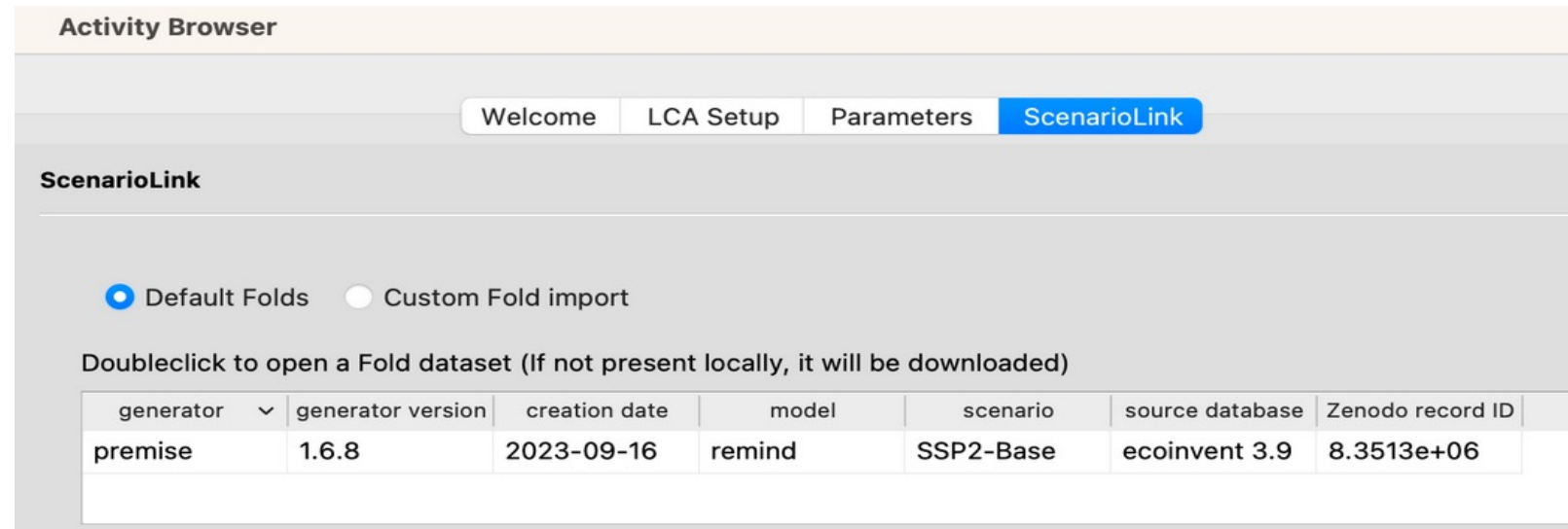
Name	Description	Links	Author
template	An empty plugin to start from	anaconda , github	Rémy Le Calloch
Notebook	Use Jupyter notebooks from AB	anaconda , github	Rémy Le Calloch

Premise plugin

- Get premise databases directly from within the AB (zero coding...)

<https://premise.readthedocs.io/en/latest/>

<https://github.com/polca/ScenarioLink>



More recent achievements

- Move to conda-forge (easier installation)
- AB installable via mamba
- Filtering of results after LCA calculations
- Increased use of pandas for internal data storage and for exporting data
- Better issue template
- ...
- Other bug fixes and changes under the hood

Special thanks this year to



Jonathan
Kidner



Marc van
der Meide



Rémy Le Calloch
Pan6ora

...and to everyone else how contributed to the AB project!

Future plans

Vision / hopes

- Brightway and the AB become an even stronger backbone for cutting-edge LCA research
- Brightway and the AB offer all the features that standard LCA software offers (no reasons to reject them!)
- the LCA community engages even more strongly in developing these tools jointly
- Strengthen the organizational foundation of bw-AB



Priorities for future development

Under the hood

- Updating to newer version of python (currently python 3.9)
- Migration to bw 2.5?
- Re-aligning with brightway

Features

- Handling multifunctional processes*
- Access to additional LCI databases and LCIA methods*
- Import/export to different formats and LCA software*
- Adding normalization and weighting

** Needs at least a partial implementation in brightway*

**Let us know
what you need!!**

Open position for an Activity Browser (lead) developer

Vacancy

Software developer / Scientist, Industrial Ecology

Vacancy number 14071

Job type Academic staff

Hours (in fte) 1,0

External/ internal External

Location Leiden

Placed on 12 September 2023

Closing date 1 October 2023 13 more days to apply

**If interested,
please talk to us!**

Apply now

<https://www.universiteitleiden.nl/vacatures/2023/q3/14071-software-developer---scientist-industrial-ecology>

Resources



LCA Activity Browser

@activity-browser 255 Abonnenten 6 Videos

Explanatory videos around the open source and free Life Cycle Assessmen... >

github.com/LCA-ActivityBrowser/activity-browser

Abonnieren

ÜBERSICHT

VIDEOS

PLAYLISTS

COMMUNITY

KANÄLE

KANALINFO



Videos ▶ Alle wiedergeben

#6
Modeling with
scenarios



Brightway 14:28

06 Modeling with Scenarios

1950 Aufrufe • vor 1 Jahr

#5
Analyzing LCA results



Brightway 6:44

05 Analyzing LCA results

3307 Aufrufe • vor 3 Jahren

#4
Inventory modeling



Brightway 6:10

04 Inventory modeling

3935 Aufrufe • vor 3 Jahren

#3
Installing databases



Brightway 3:42

03 Installing databases

3035 Aufrufe • vor 3 Jahren

#2
Installing the AB



Brightway 3:23

02 Installing the AB

3433 Aufrufe • vor 3 Jahren



AB Wiki

LCA-ActivityBrowser / activity-browser

Code Issues 97 Pull requests 6 Discussions Actions Projects 2 **Wiki** Security Insights Settings

Type / to search

Home

bsteubing edited this page on Apr 21, 2021 · 9 revisions

Welcome to the Activity Browser wiki!

This page aims to explain how to get started using the Activity Browser to import and organize your data, construct and run simple LCA calculations, make changes to datasets and create simple parameterized systems.

The Activity Browser (AB) is an open source LCA software that builds on top of the **Brightway** LCA framework. Users that are unfamiliar with Brightway2 are invited to also look at [the documentation of the framework](#), as this will explain a number of the components and terms used by AB.

Please consider also watching our short AB [Youtube tutorials](#)

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- [Creating a calculation setup](#)
- [Editing processes](#)
- [Creating parameters](#)

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Find a page...

Home

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- Creating a calculation setup
- Editing processes
- Creating parameters
 - Project parameters
 - Activity Parameters

Global Sensitivity Analysis

Monte Carlo Simulation

GitHub Discussions

GitHub LCA-ActivityBrowser / activity-browser

Code Issues 97 Pull requests 6 **Discussions** Actions Projects 12 Wiki Security Insights Settings

Adding an impact category

🙏 Q&A · mwskelton

is:open Sort by: Latest activity Label Filter: Open New discussion


Categories

- View all discussions
- General
- Ideas
- Polls
- Q&A
- Show and tell


Discussions

- 1 Results of the single technosphere elements of an activity
ezio95 asked on Jul 25 in Q&A · Unanswered 5
- 1 How to get results directly in brightway2 using the calculation setup already made in activity browser
zeeshankhan2 started 2 weeks ago in General 18
- 1 Creating multi-output activity
LUCASmaxime asked on Jul 11 in Q&A · Answered 2
- 1 How do I update the impact categories?
JuliSant asked on Jun 12 in Q&A · Unanswered 13

Issues


 LCA-ActivityBrowser / activity-browser


+ ▾





Code


Issues 97


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 Discussions


 Actions

 Projects 12


 Wiki


 Security

 Insights

 Settings

Filters ▾

 Labels 18

 Milestones 1

New issue

☐ 97 Open ✓ 472 Closed

Author ▾



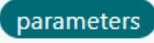
Label ▾

Projects ▾



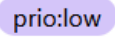
Milestones ▾

Assignee ▾



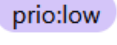
Sort ▾

☐  Parameters break when combined into 1 exchange  



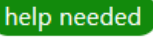
#1039 opened 4 days ago by marc-vdm

☐  Editing CF uncertainty should only be possible through dialog  


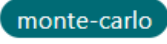
#1033 opened 2 weeks ago by marc-vdm

☐  Strip white-space at end of search fields  


#1031 opened 2 weeks ago by marc-vdm

☐  character size issue  

#1030 opened 2 weeks ago by Lamagentle

☐  Why aren't the Monte Carlo results distributed? 

#1022 opened 3 weeks ago by lucas-sys-cmd

 1

How can *you* contribute?

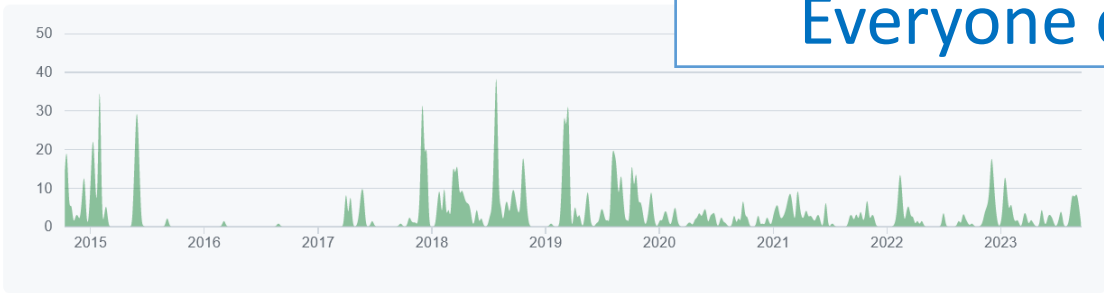
♥ Get in touch with the AB team ♥

♥ Raise issues on GitHub (bugs, feature requests, ideas...) ♥

♥ Discussions: help others on GitHub ♥

♥ Code contributions ♥

Contributions to master, excluding merge commits and bot accounts



The AB is a community project!
Everyone can contribute!

Thank you!
Questions?
What are your needs?

