Activity Browser Basics Tutorial

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Plan for today → Interactive tutorial

1. Making sure AB is working for all of you
2. What is AB?
3. Managing databases
   - Importing/exporting/making new databases
4. Managing activities
5. Tutorial time!
6. Calculating/Analyzing LCA results
7. Break + Tutorial time!
8. Reporting problems/asking for help & Wrapping up

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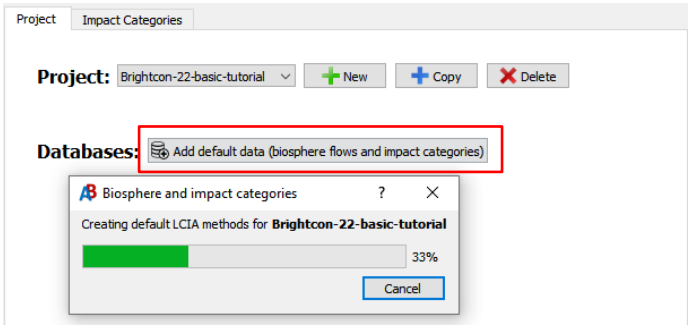
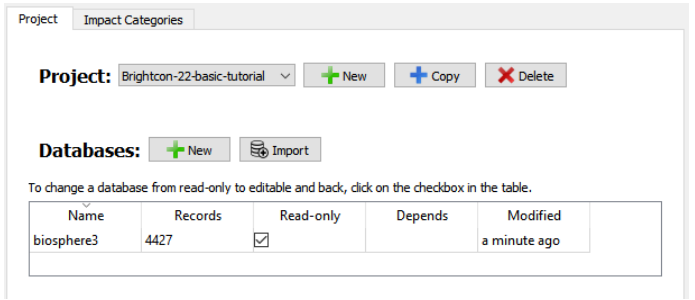
iceberg Circular Economy of Building Materials

Setting up

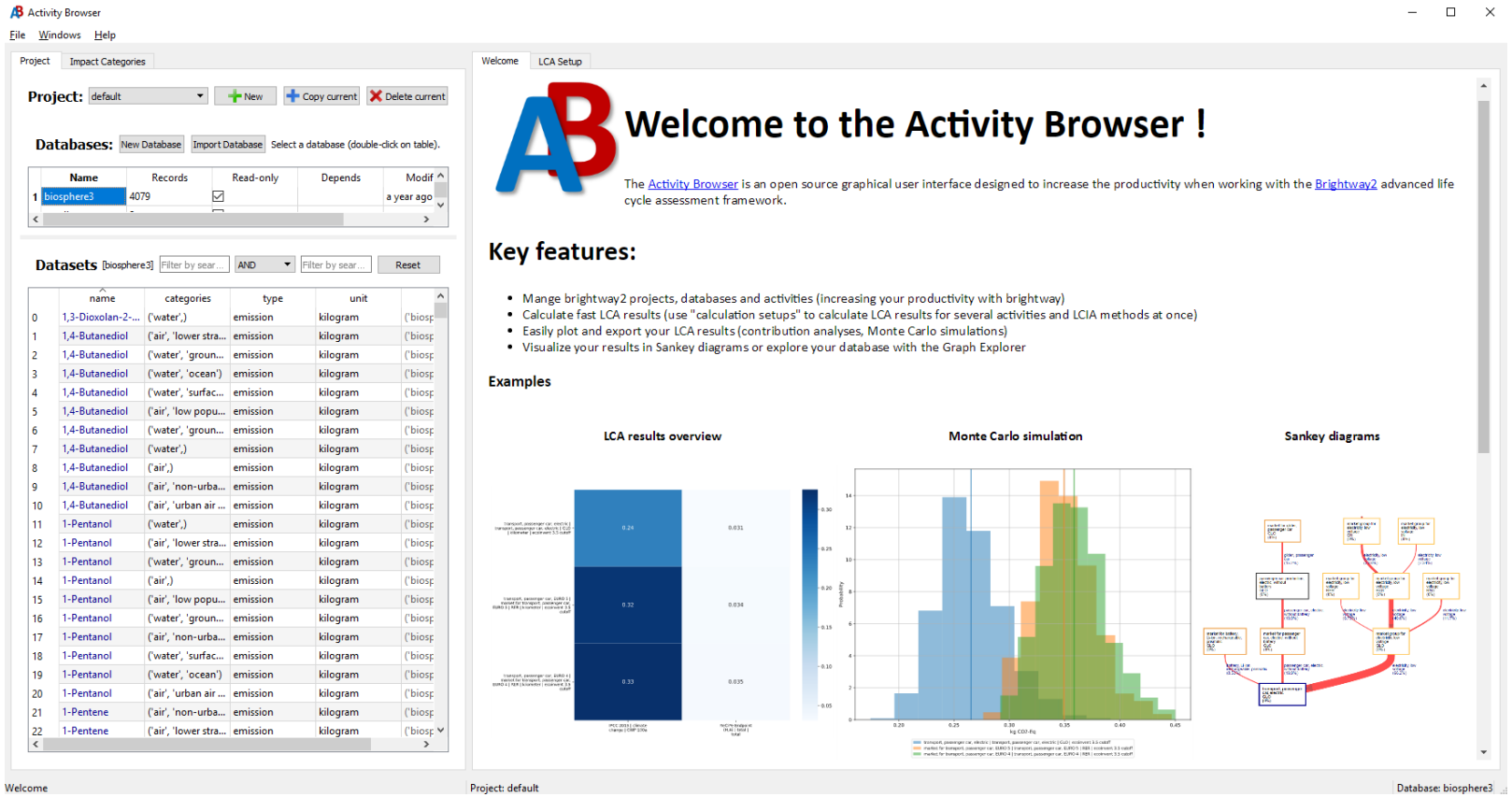
1. Installing Miniconda3
   https://docs.conda.io/en/latest/miniconda.html
2. Installing Activity Browser
   https://github.com/LCA-ActivityBrowser/activity-browser
   1. Most OS:
      ```
      conda create -n ab -c conda-forge -c cmutel -c bsteubing activity-browser
      conda activate ab
      activity-browser
      ```
   2. Apple M1 Mac
      ```
      conda create -n ab -c conda-forge -c cmutel -c bsteubing activity-browser-arm
      conda activate ab
      activity-browser
      ```
3. Add default data
   Do it now, this takes some time





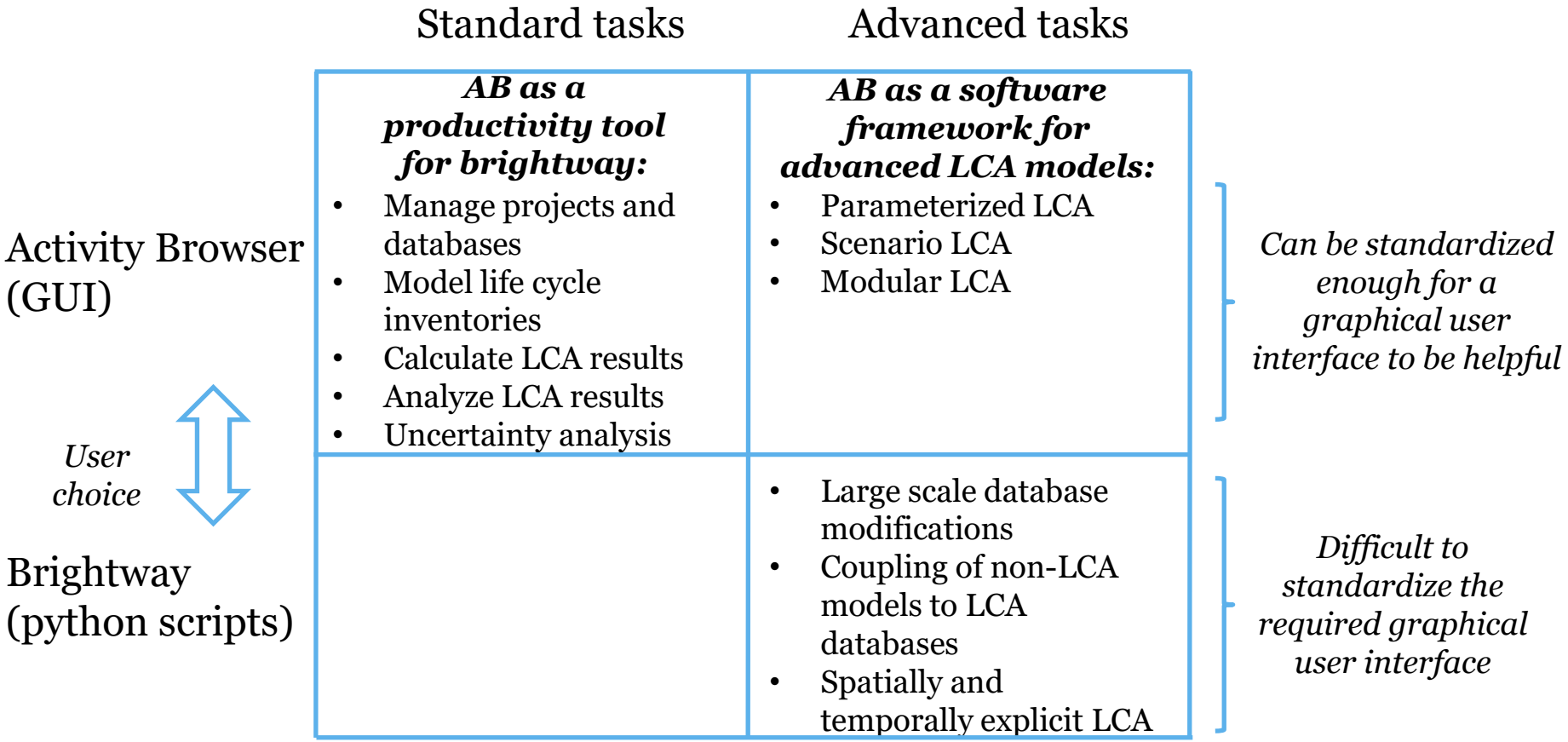
What *is* Activity Browser?

- User interface on top of Brightway
- Increases productivity for *standard* LCA tasks
- Open platform for new modelling approaches
- Core features:
  - Installing/Managing databases
  - Modelling LCI data
  - Defining impact categories
  - Calculating LCA results
  - Analysis of LCA results
  - More advanced features (not discussed here)



Steubing et al. 2020

When to use Activity Browser?



Importing/starting a database

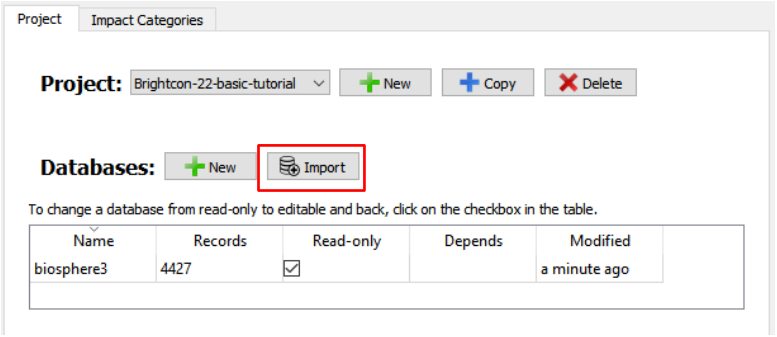
Remote imports (from internet)

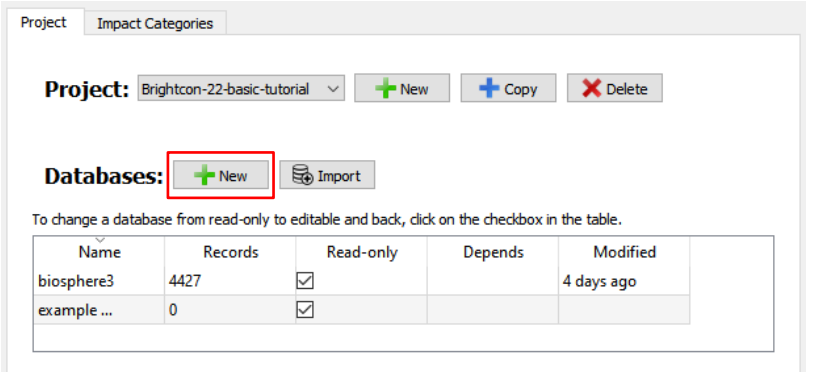
- ecoinvent
- Forwast

Local imports (from disk)

- Ecospold2 files (.7z or file folders)
- Excel (.xlsx or .xls)
- Brightway (.bw2package)

Starting a new database

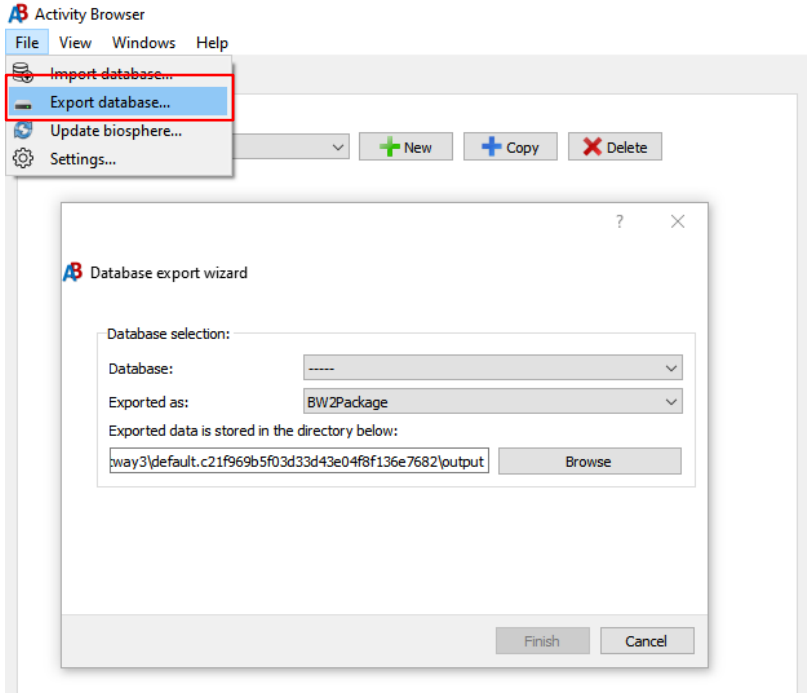




Exporting a database

Exporting databases to share data

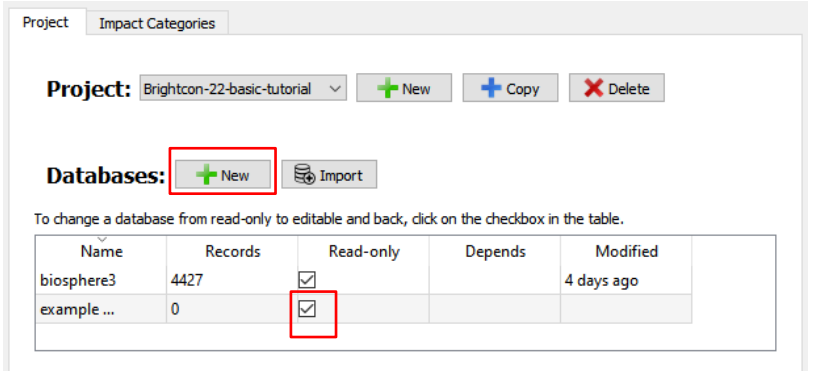
- Allows easy sharing
- Excel exports may help with troubleshooting



Making your first activity

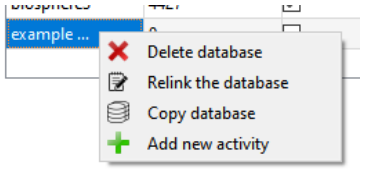
Starting a new database

- Click `New`, choose a database name and disable `Read-only`

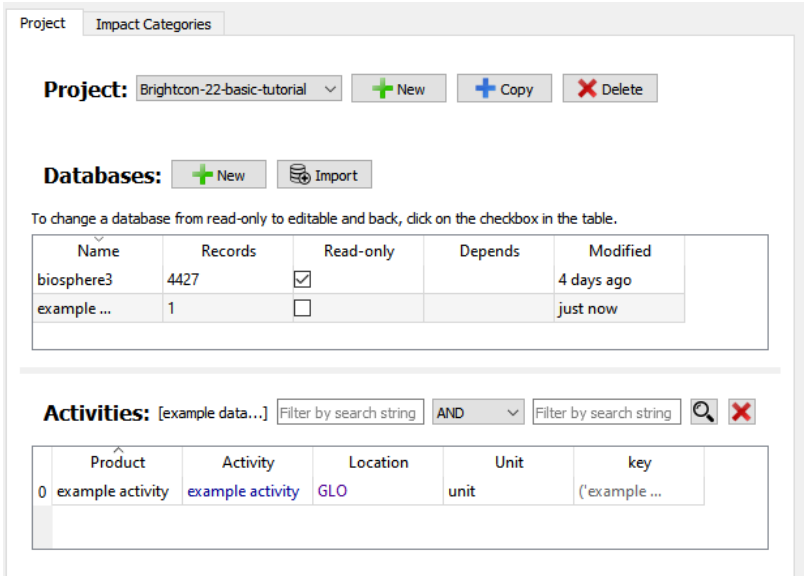


Making a first activity

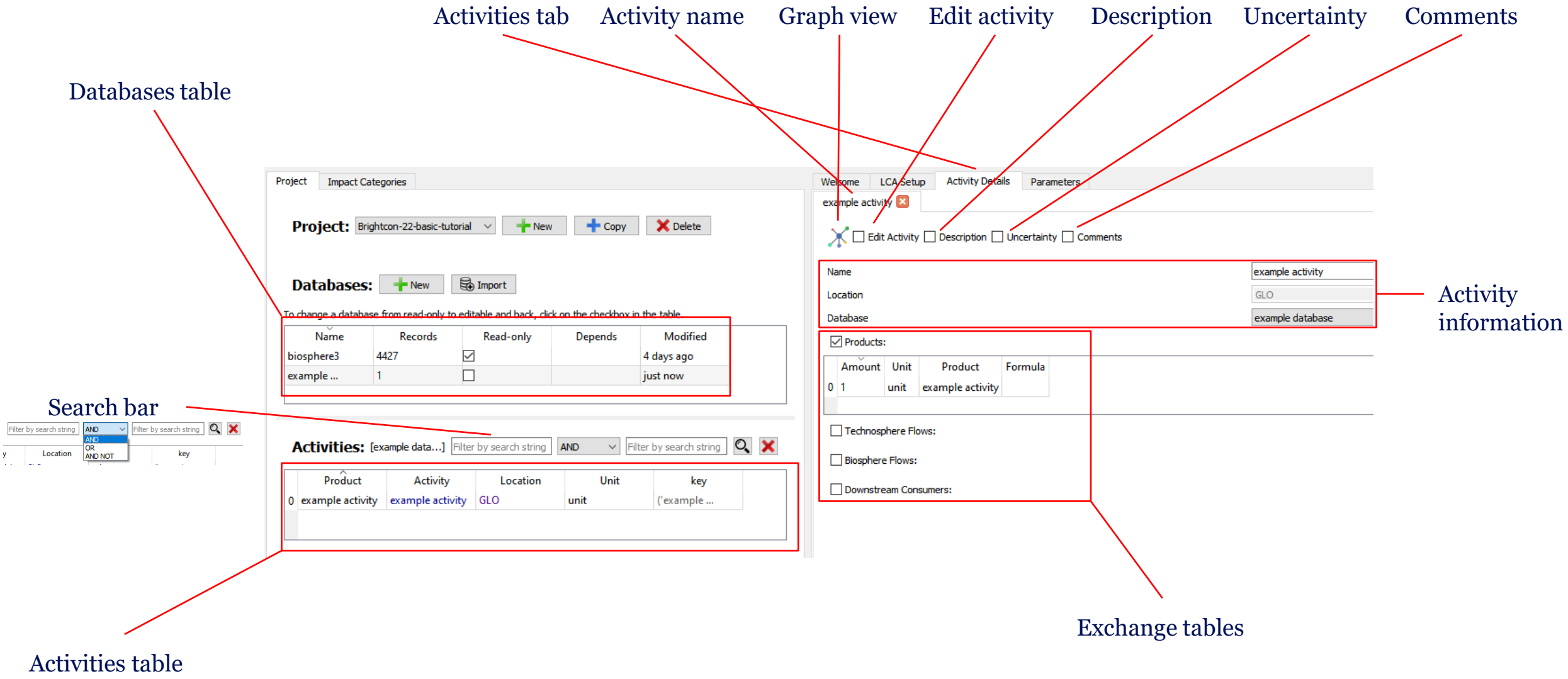
- Right-click > `Add new activity`



- Choose an activity name

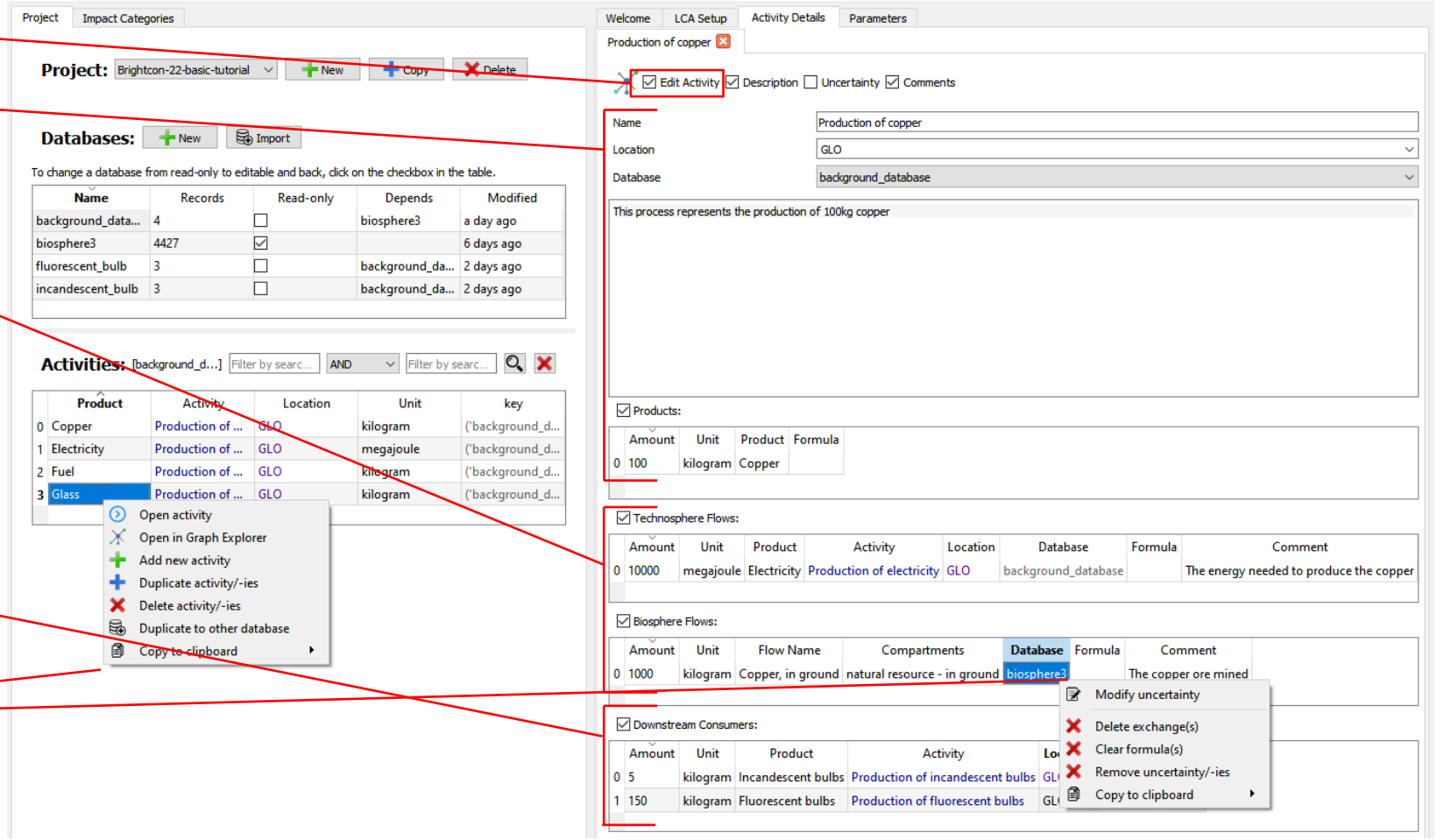


What is what in AB modelling?



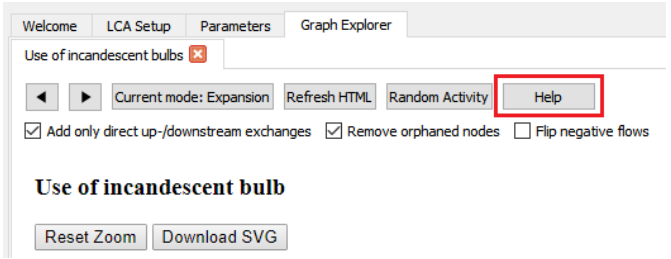
Editing activities

- Enable ‘edit activity’
- Activity details
  - You can edit the name, location, description, amount produced, unit, and product name
- Technosphere/Biosphere flows
  - Add these by dragging from the left ‘activities’ table to the correct table on the right
  - You can edit amounts or add comments to flows here
- Downstream consumers
  - This is read-only information: Where this activity is used
- Right-click in table
  - Gives additional options

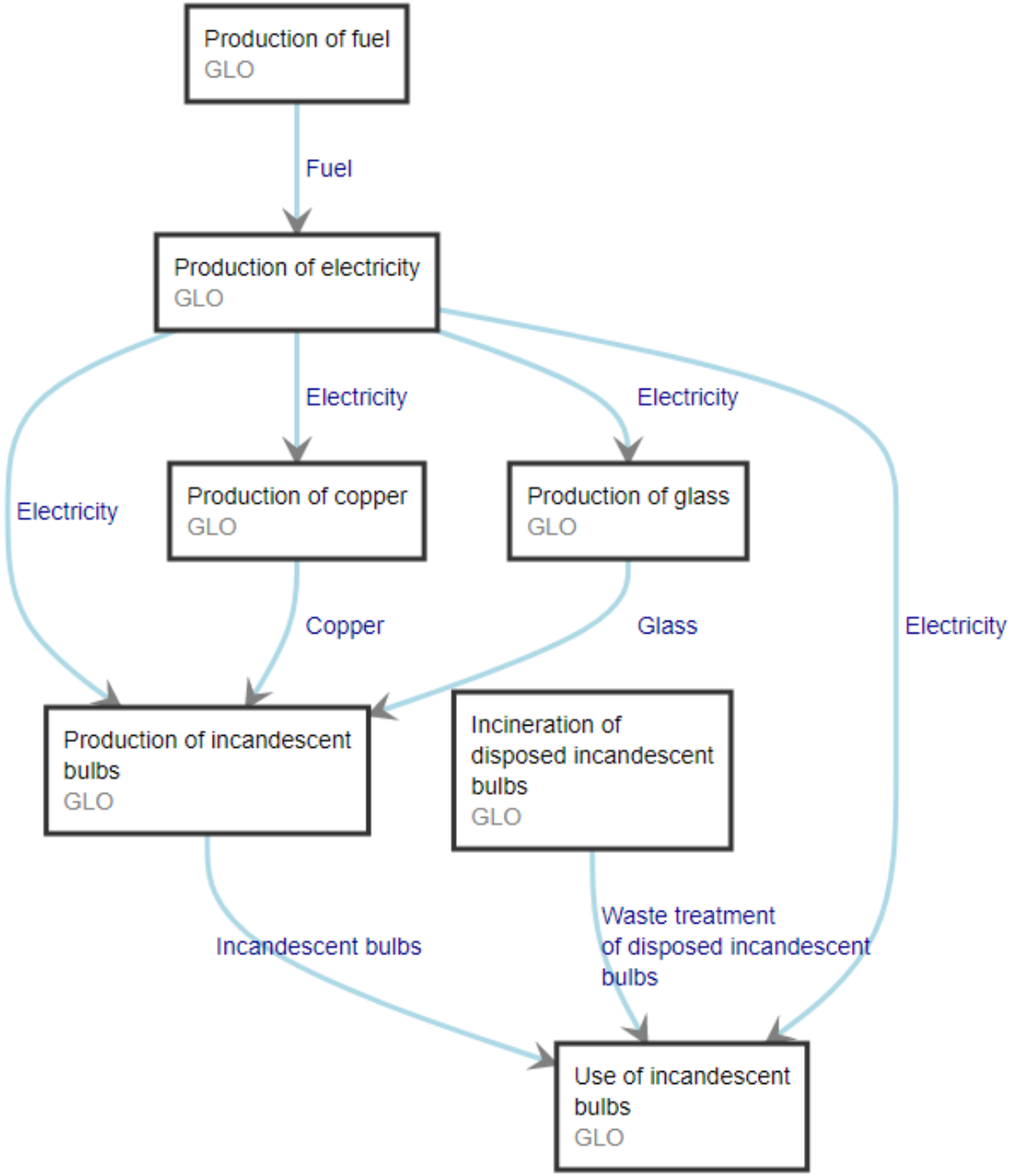


The graph Explorer

- See the relationships between your activites
- Allows you to explore a supply chain
- Use the help menu to learn how to navigate

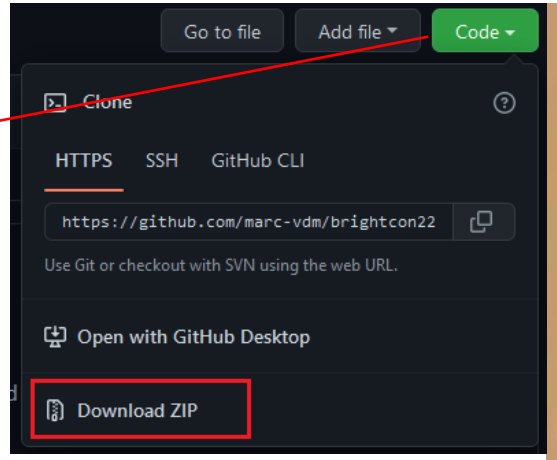


- Use the ‘minimap’ at the bottom to find your way in large networks



Tutorial time!

1. Go to:
   tinyurl.com/bcon22-AB101
2. Download all files
3. Use the slides as a guide to:
   - Import the file `background_database`
   - Make a new database with a name you like
   - Model the system on-screen (or on the next slide)
4. Time left?
   - Figure out how to show all your processes in the graph explorer
   - Export your new database to an excel file
     and have a look at the format
   - Re-import the `background_database` under another name
     Right-click on your own database and choose `Relink the database`
     relink to your new background database



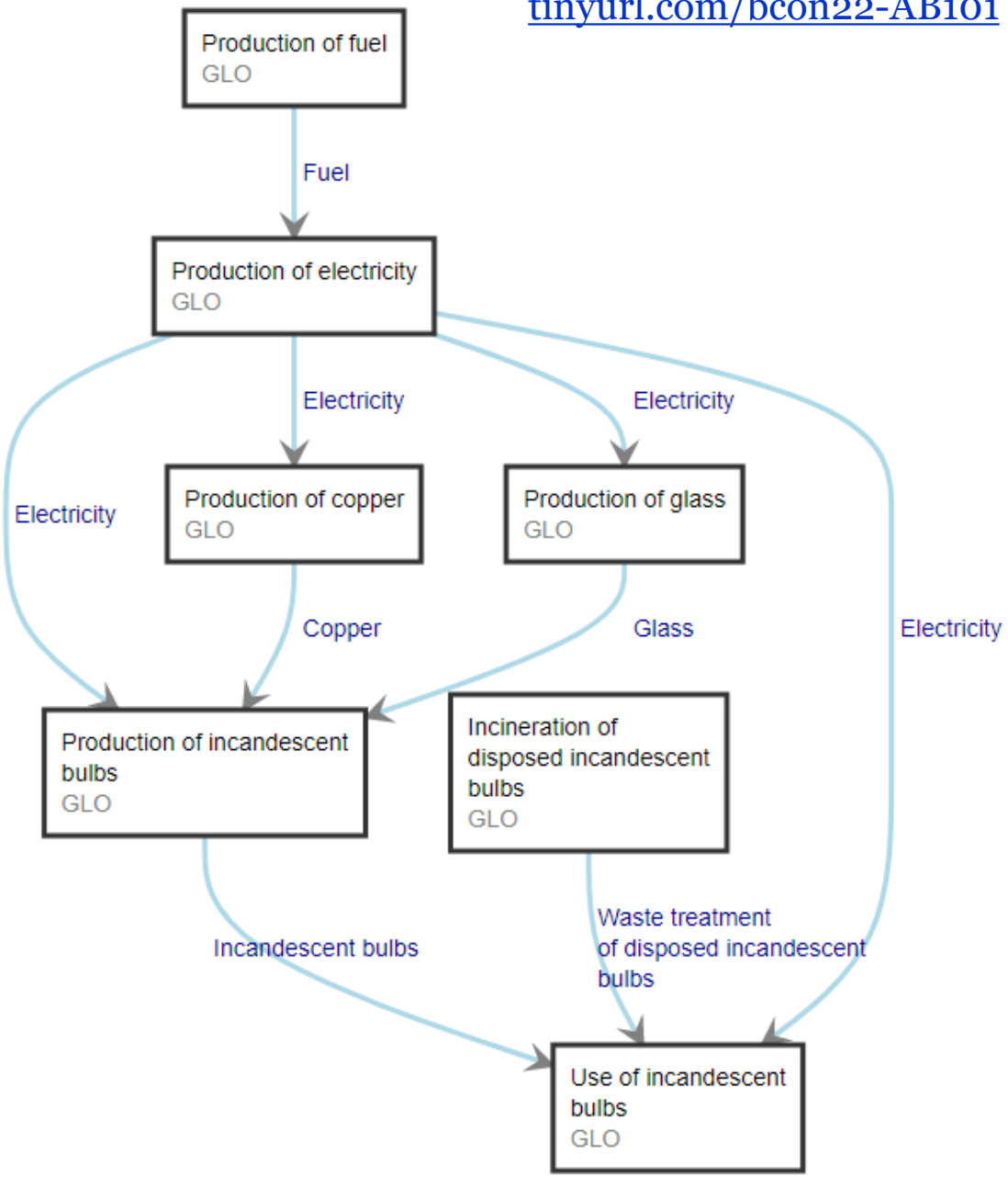
tinyurl.com/bcon22-AB101

Use of a lamp

Build the system on the right by importing the background database and creating the three processes in the table

- **You will find the following processes in the background database:**
  - Production of fuel
  - Production of electricity
  - Production of copper
  - Production of glass
- **Add the processes below to a new database:**

Activity name	Product	Amount produced	Flows	
			Technosphere	Biosphere
Production of incandescent bulb	Incandescent bulb	1'000 units	1'000 MJ electricity 10 kg glass 5 kg copper	
Incineration of disposed incandescent bulbs	Disposed incandescent bulb	-100 units		100 $kgCO_2$ to air 2 kg copper to soil
Use of incandescent bulb	Use of incandescent bulb	1 unit	10'000 MJ electricity 1 incandescent bulb -1 disposed incandescent bulb	



This example is based on Chapter 17A of Principles of Environmental Sciences (Heijungs; 2009).

Ready to continue?

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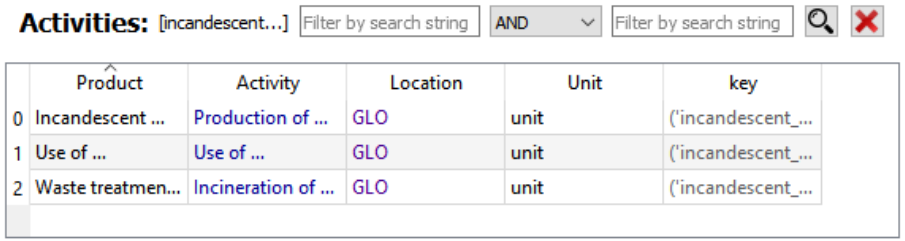
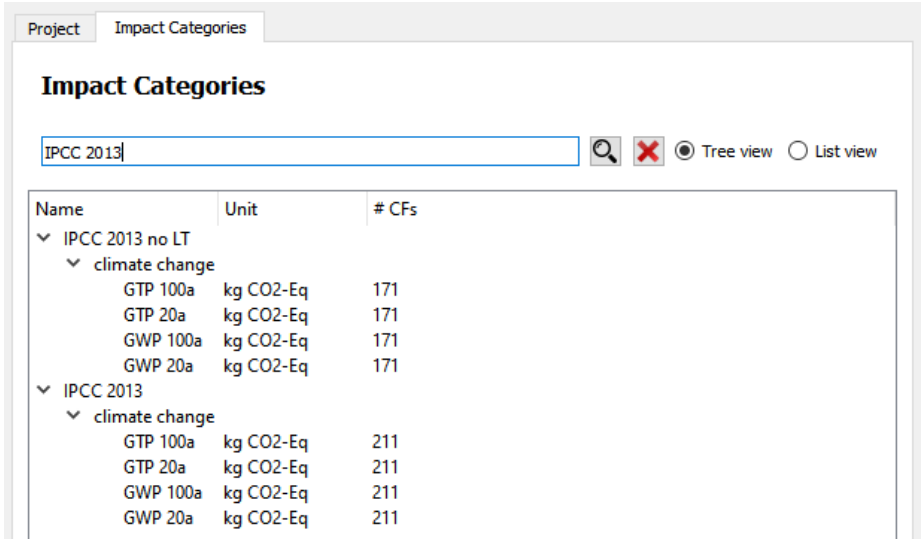
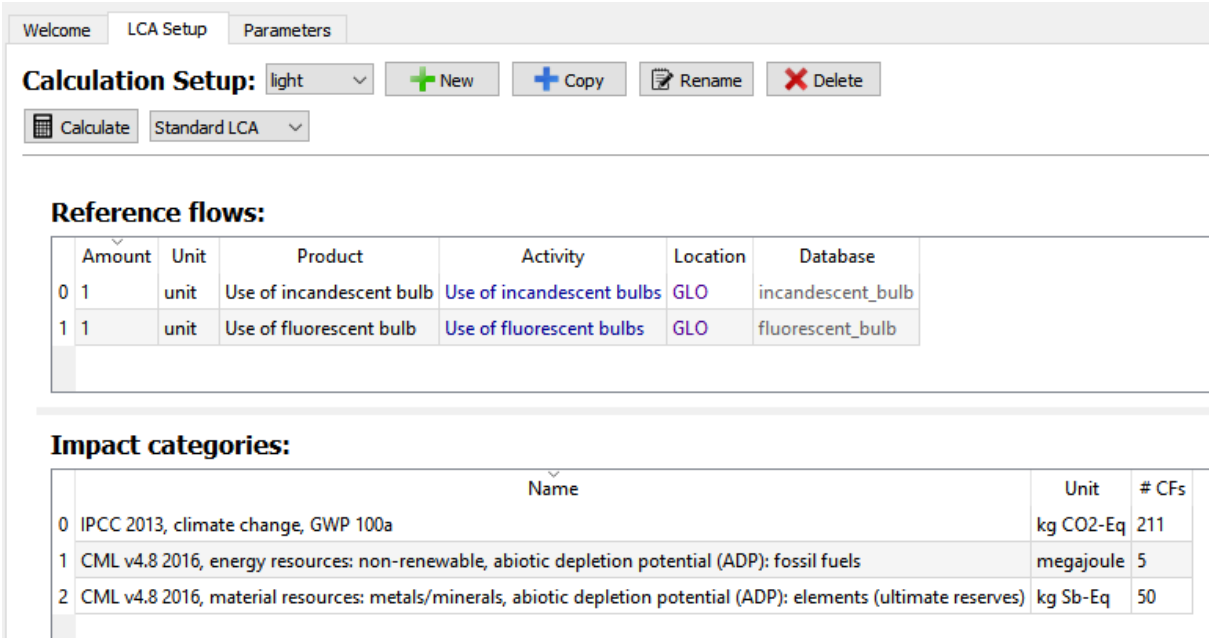
Calculations with AB

- Drag/drop activities and impact categories to the setup







Analyzing results in AB

We only focus on 2 tabs for now

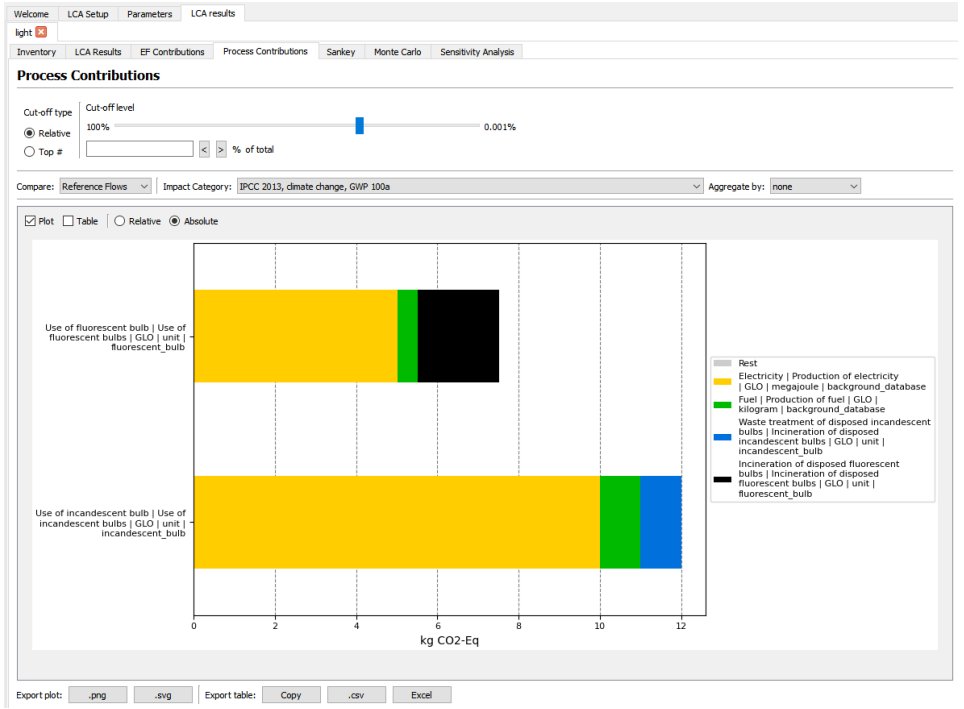
- Process contributions

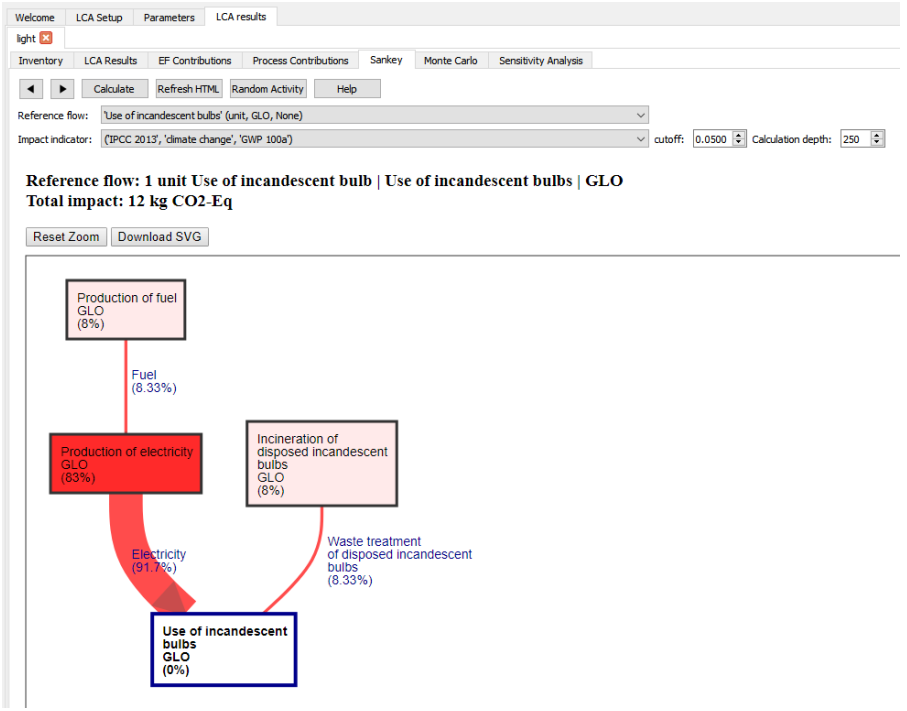
See impacts from individual processes contributing to results

- Sankey

See where impacts originate from (how they 'flow' through the system)

⚠ This view does not necessarily count total impact!





Tutorial time!

1. Take a break, grab a drink
2. Use the slides as a guide to:
   - Import the file `fluorescent_bulb.xlsx`
   - Make a new calculation setup and add processes:

     'Use of incandescent bulb'

     'Use of fluorescent bulb'
   - Add the impact categories:

     'IPCC 2013, climate change, GWP100a'

     'ecological scarcity 2013, energy resources, total'

     'ecological scarcity 2013, mineral resources, total'
   - Calculate and explore the Process contributions and Sankey!
3. Time left?
   - What are the other tabs in the results? What information do they give you?

Ready to continue?

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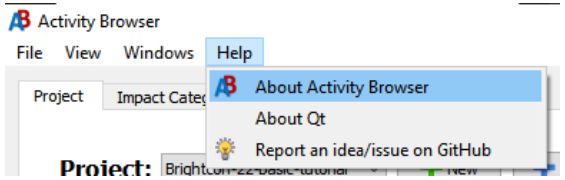
Reporting problems and asking for help

- Are you having problems or did you find a bug?
- Don't know how to do something?
- Do you have ideas for improvements or totally new features?

Report it on our [github-issues page]

- Reporting a problem? Provide the following for quicker help:
  - What were you trying to do/expecting?
  - What did happen?
  - If relevant share extra information:
    - Screenshots
    - Error messages from the terminal
  - The version of your Activity Browser →

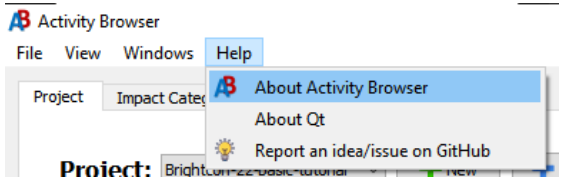


Wrapping up

1. You know what AB is and what it does
2. You can manage and create new databases and activities
3. You got a sneak-peak into what results AB can show you
4. You know where to ask for help

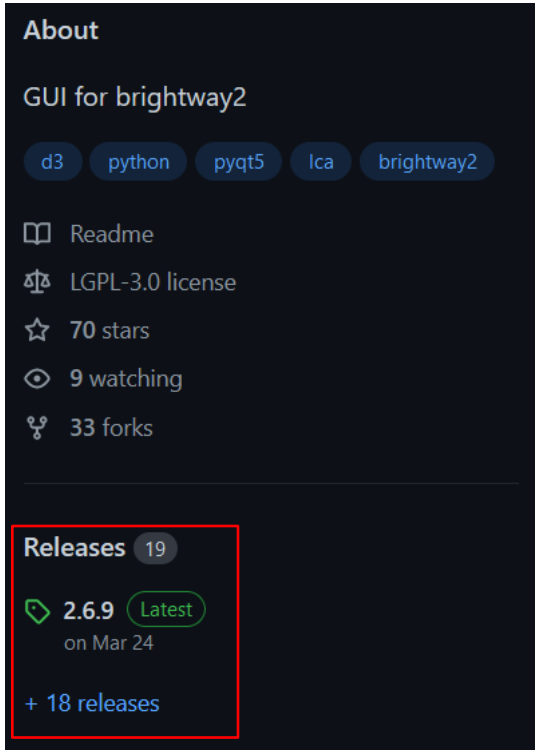
Updating AB

- Updating will never remove data in your projects/databases
- You can check what version of AB you're on under: Help → About Activity Browser



- You can see what version is the latest release on our github under releases
- You can update activity browser with:

```
conda activate ab
conda update activity-browser
```



- Want to be on the cutting edge?
  - You can download the development version here
  - You can have both versions side-by-side and both will have access to the same projects/databases etc
  - The development version gets more updates, but things may break more often

General tips

- **Tooltips:** Hover over a button/slider/item with your mouse to get a popup for more information.
- **Excel format:** While AB supports the excel format, please don't make databases in excel, only edit them there, it's *very* easy to make mistakes and break your file.
- **Modeling waste treatment:** Be aware that ecoinvent considers waste treatment a service that an activity needs as 'input', not as an output product. This is modeled by having a negative value for production and the input into a process.

Q&A

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