Model builder

User guide

SimaPro

Title: Model builder | User guide

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Version: 1.0

Date: November 2024

About SimaPro

SimaPro was developed by PRé with the goal of making sustainability a fact-based endeavor. PRé has been a leading voice in sustainability metrics and life cycle thinking development for more than 30 years, pioneering the field of environmental and social impact assessment. We develop tools that help you create value and drive sustainable change.

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1 Introduction

1.1 What is Model builder

Model builder is a visual modelling tool within SimaPro Synergy. It allows you to see and make changes to processes and product flows on the canvas within your LCA model, as well as review and update the details of the processes through the side panel. Additionally, you can expand and collapse parts of the model, move the processes that are on the same level into a desired order, form connections between the processes, and use a few keyboard shortcuts for faster modelling.

1.2 Glossary

Process	A set of interrelated or interacting activities that transform inputs into outputs.
Process node	A visual representation of an instance of a process. If a process is used multiple times, there will be multiple nodes representing the process.
Product	Any output that is intended for the next stage of the life cycle or final use.
Input	Inputs are resources, materials, or energy that enter a process and are used or transformed during the activity.
Output	Outputs are products, waste, emissions, or energy that leave a process after transformation. Outputs can be intermediate products passed to another process, emissions released to the environment, or finished products delivered to the next phase in the life cycle.
Elementary flow	A material or energy entering or leaving the system that has been drawn from or released into the environment without any prior human transformation.
Multi-used process	A process, which is used as an input in several other processes.
Loop	A situation where a process is used as an input of itself within the model. These loops can represent recycling processes, reused materials, or recurring dependencies between processes within the system.

2 How to start modelling using Model builder in SimaPro Synergy

1. Log into your account on SimaPro Synergy.
2. Select one of the models.
3. Select 'Model builder' in the sidebar.

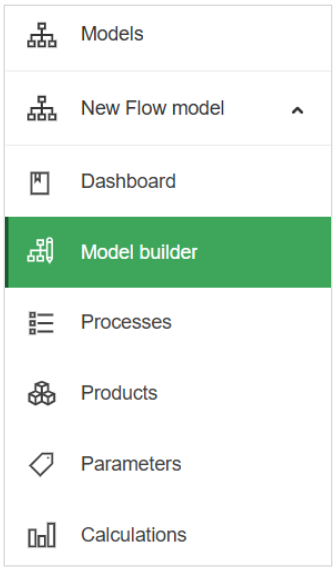


Figure 1: Sidebar navigation

4. To start modelling, press 'p' or click on the '+' button.

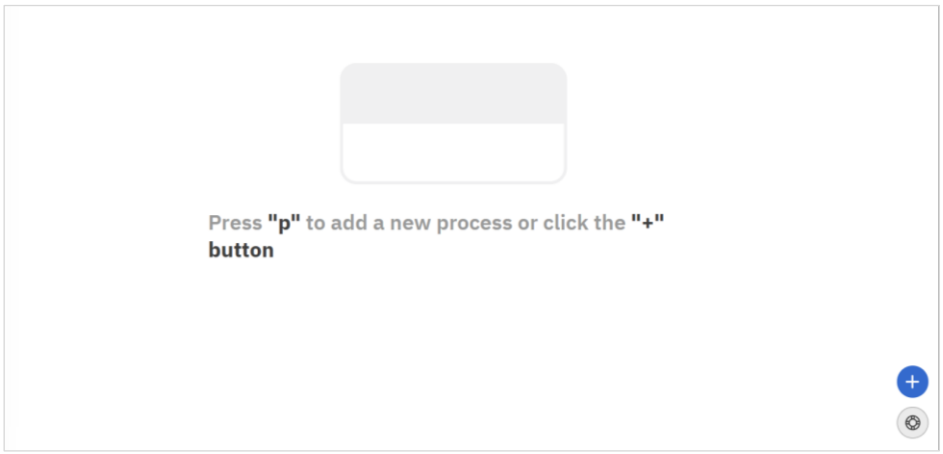


Figure 2: Adding a new process

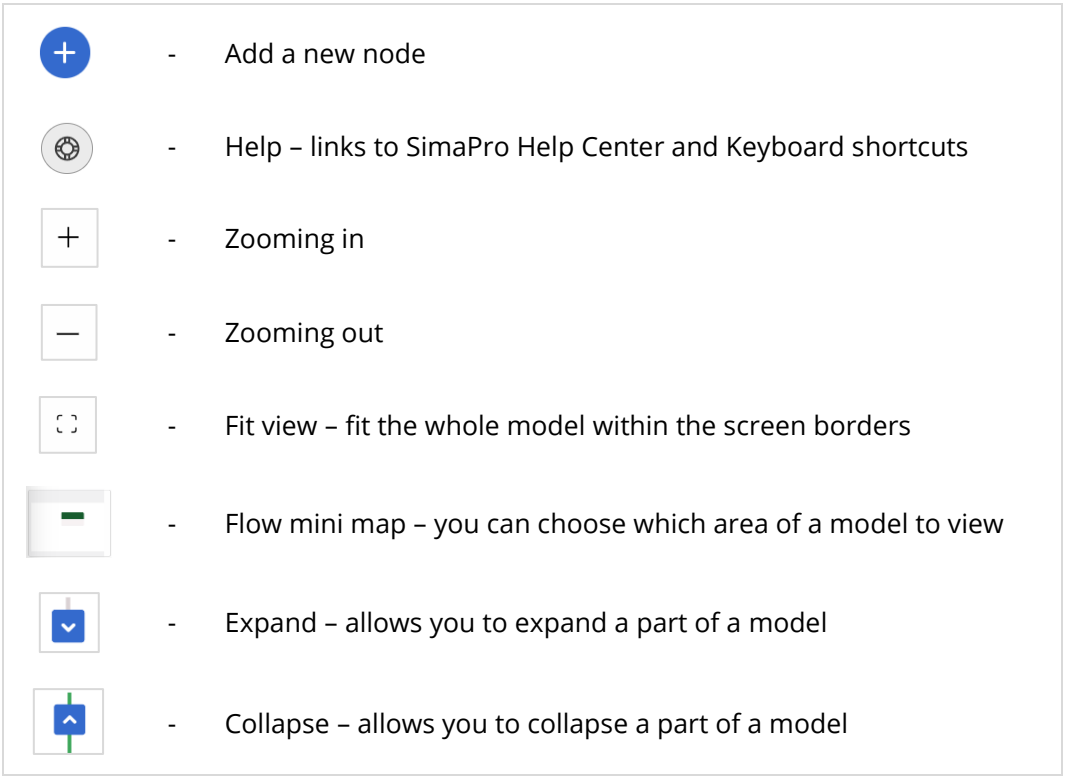
5. A node is created. When creating a node, three items are created: a process, a product, and an output in the created process based on the created product.

Information on the *Model builder* page is synchronized with the *Processes* page.

> **Please note!**
>
> If you have a node without a valid output product, it will not be displayed in the model.

2.1 Page navigation

Here is an overview of the key features of Model builder:



By default, a user can see three nodes (three levels of a model).

2.2 Side panel functionality

The side panel contains extensive process details which can be edited, the process information can also be edited on the Processes page.

Process details include a process name, geography and tags. The 'Delete process' button is located in the top right corner of the panel. Side panel includes four tabs:

1. **Inputs.** Input products and input elementary flows can be defined in the tab. You can select an input product and a producing process from a library source, if you have enabled a library in the

Selected library sources (see *Dashboard*). Alternatively, you can create an input product yourself, by defining a name, a producing process, an amount an unit.

2. **Outputs.** Output products and output elementary flows can be defined in the tab.

3. **API.** You can enable API inputs for a specific process and make it a configurable process.

4. **Documentation.** The tab can be used for comments, notes, etc.

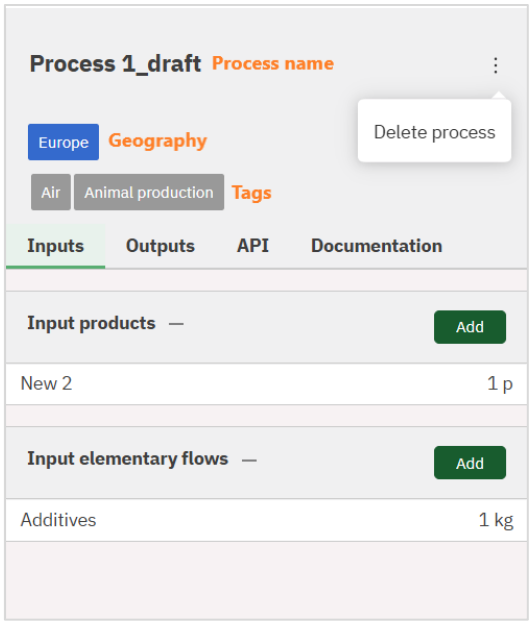


Figure 3: Side panel

2.3 Node components

The selected area is outlined with a blue border.

1. Grey node area represents a process. You can view and edit process details in the side panel.

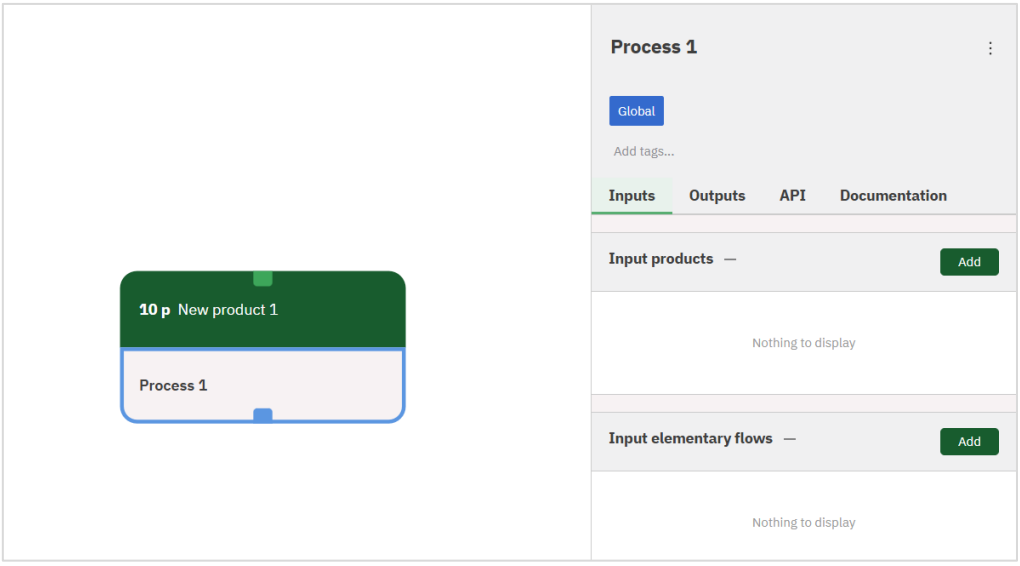


Figure 4: Reviewing process details

2. Green node area represents an output product of a process. You can view and edit output products details in the side panel.

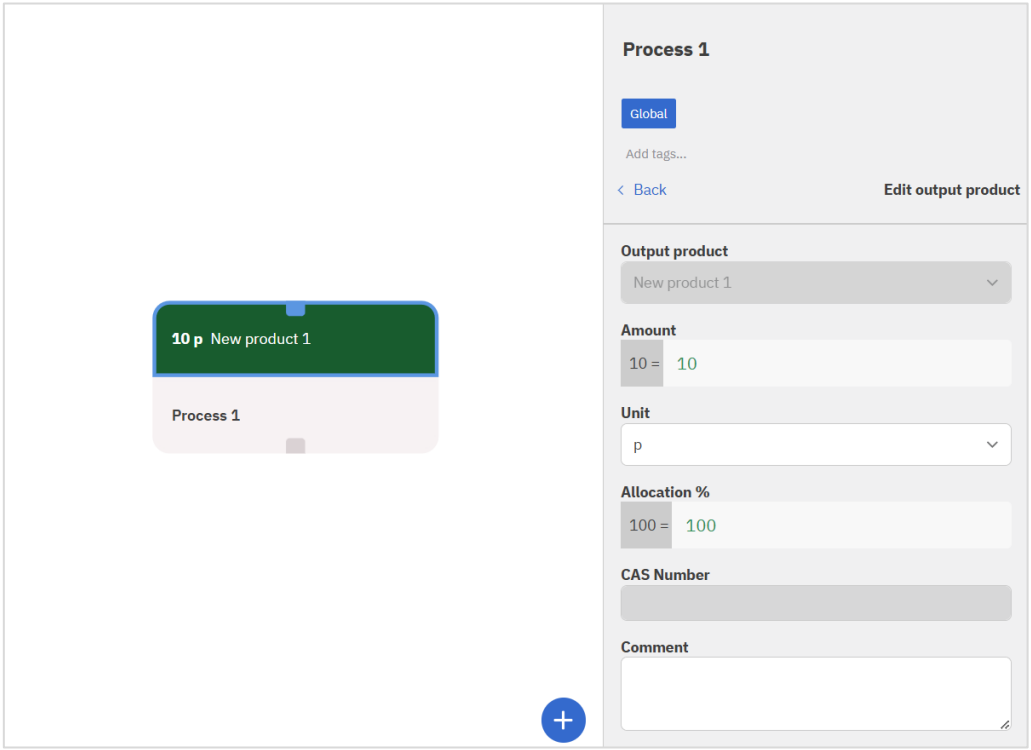


Figure 5: Reviewing output products

3. If you want to check the input products of a process, there are two options:

- Select a process, then open the *Inputs* tab in the side panel.
- Click on a product flow, the side panel will open.

Figure 6: Product flow

3 How to create a model from a stand-alone processes

3.1 Connecting entities

You can start creating a model by connecting two nodes (two processes). Grey area of a node represents the process, green area of a node represents the output product. You can only connect a grey area (a process) with a green node area (and output product) and vice versa. By connecting a process with an output product, an output product becomes an input product in another process. By connecting two nodes, you create an input product for one of the processes.

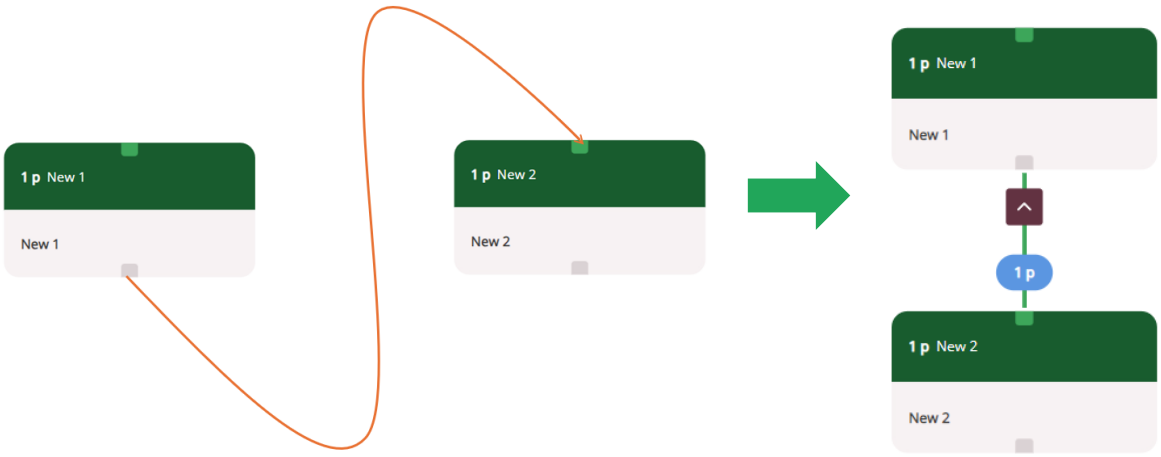


Figure 7: Connecting the nodes

You can connect the nodes either by dragging them or by adding a process as an input in the side panel.

Elementary flows

Input and output elementary flows are not visualized on the canvas, due to large amount of data. To view the elementary flows, please check the side panel.

Library processes

If a secondary data library is enabled in your model, you can choose to use data library processes. You can filter secondary data library processes when selecting them in the side panel.

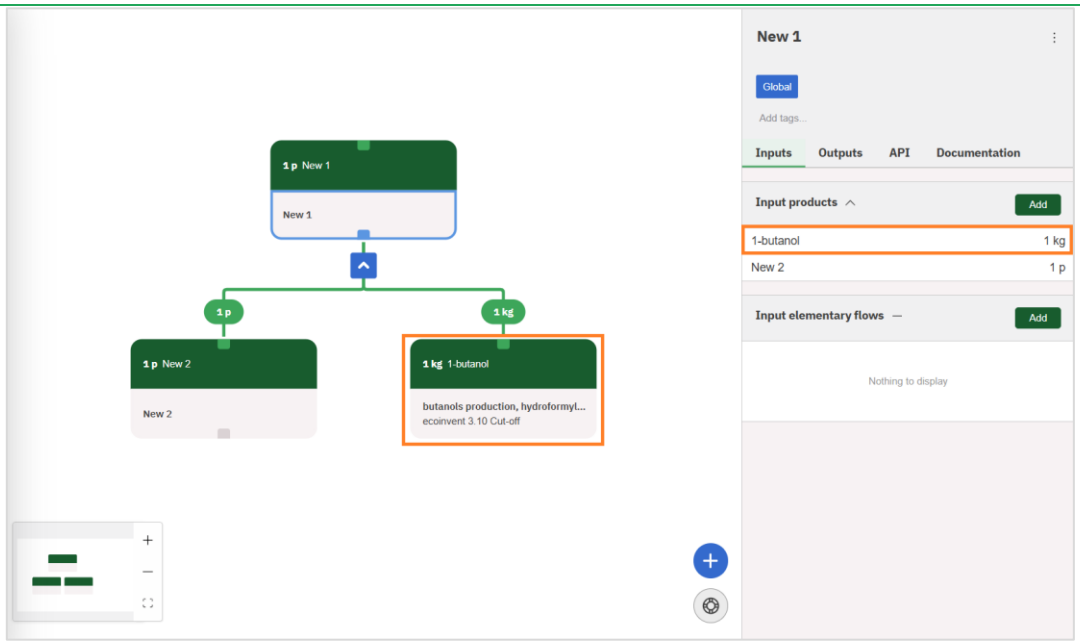


Figure 8: Selecting secondary library processes

- You can recognize a library process by the library reference in the node.
- It is not possible to connect entities to library nodes. Inputs and outputs of the library processes are predefined.

3.2 Deleting entities

3.2.1 Deleting a process

You can delete a process, by clicking on the process (grey area of the node) and clicking on DELETE or BACKSPACE button and confirming the deletion when pop-up message appears.

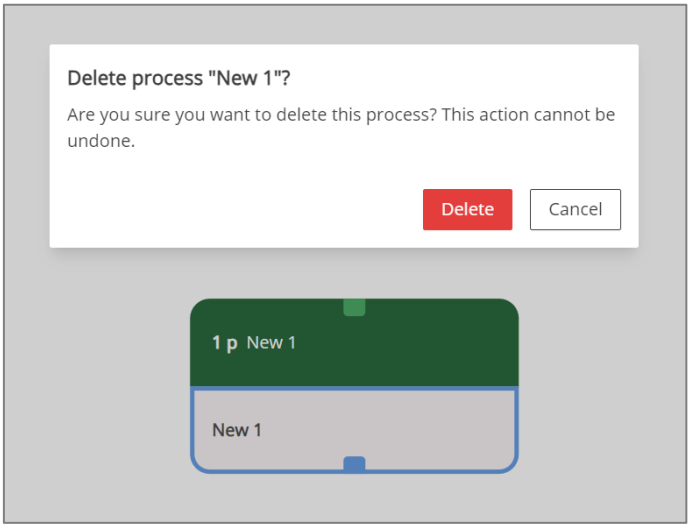


Figure 9: Deleting a process

Alternatively, you can delete a process in the side panel by clicking on the menu.

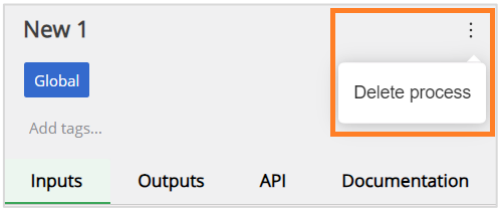


Figure 10: Deleting a process in the side panel

3.2.2 Deleting an input product

If you wish to disconnect the nodes, you can do it by deleting an input product. You can do it by selecting an amount (1p by default) and clicking on DELETE or BACKSPACE button and confirming the deletion when pop-up message appears.

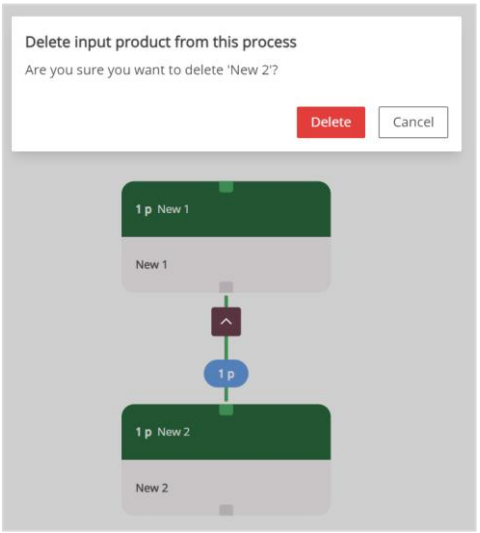


Figure 11: Deleting an input product

Alternatively, you can delete an input product in the side panel.

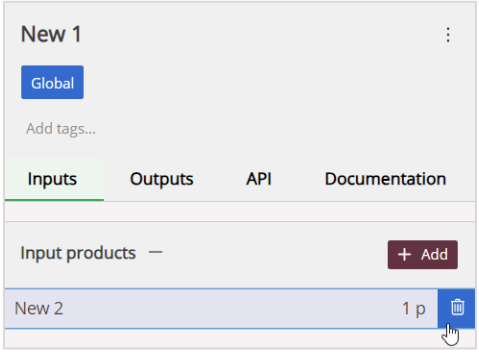


Figure 12: Deleting an input product in the side panel

Please note – if you delete an input product, you don't necessarily delete the related process – it will remain as a standalone process node.

3.3 Updating entities

Process names, amounts, edits in the side panel will reflect automatically in the visual model.

3.4 Working with multioutput processes

Now you can view multioutput processes in Model builder.

Figure 13: A node with multiple output products

This visual helps users understand that there are more than one output product. You cannot see all of the outputs at the same time in the visual model, but you will see the 'main' output product. The output products are sorted based on whether they are being used as an input of another node and if not, by highest allocation percentage and if equal, alphabetically.

Each output has its own connector. If there are only two outputs, by connecting to the connector on the right side of a node (see Figure 13), you will automatically connect to the non-visible output. In case there are more than two output products, a pop-up message will appear, prompting the user to select which output product to utilize.

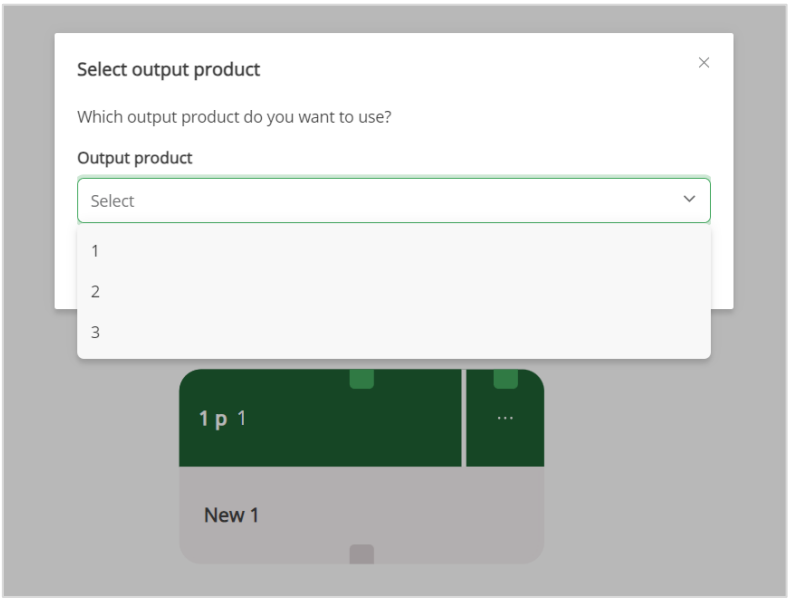


Figure 14: Selecting an output product

If the model encounters an error, the affected node will be red, and the error message will be displayed.

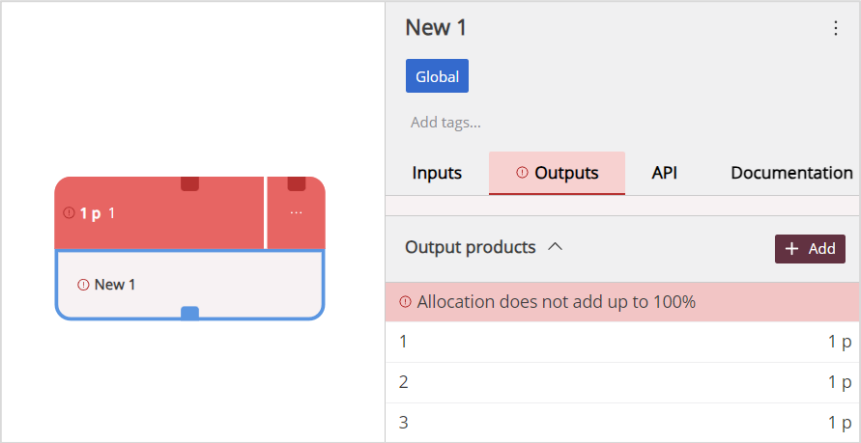


Figure 15: Error in the model

4 Additional features

In SimaPro Synergy, the structure of the model is **tree structure** – it means that a process in the model cannot have more than one parent process. In order to implement some functionality of the network structure of an LCA model, additional features were implemented.

4.1 'Looped' processes

It is possible for processes in SimaPro Synergy to receive input from their own output stream (create a loop). In case such 'looped' process is created, pop-up message appears to confirm the action. The process node that indicates a loop will be visually represented as a duplicate of the original process.

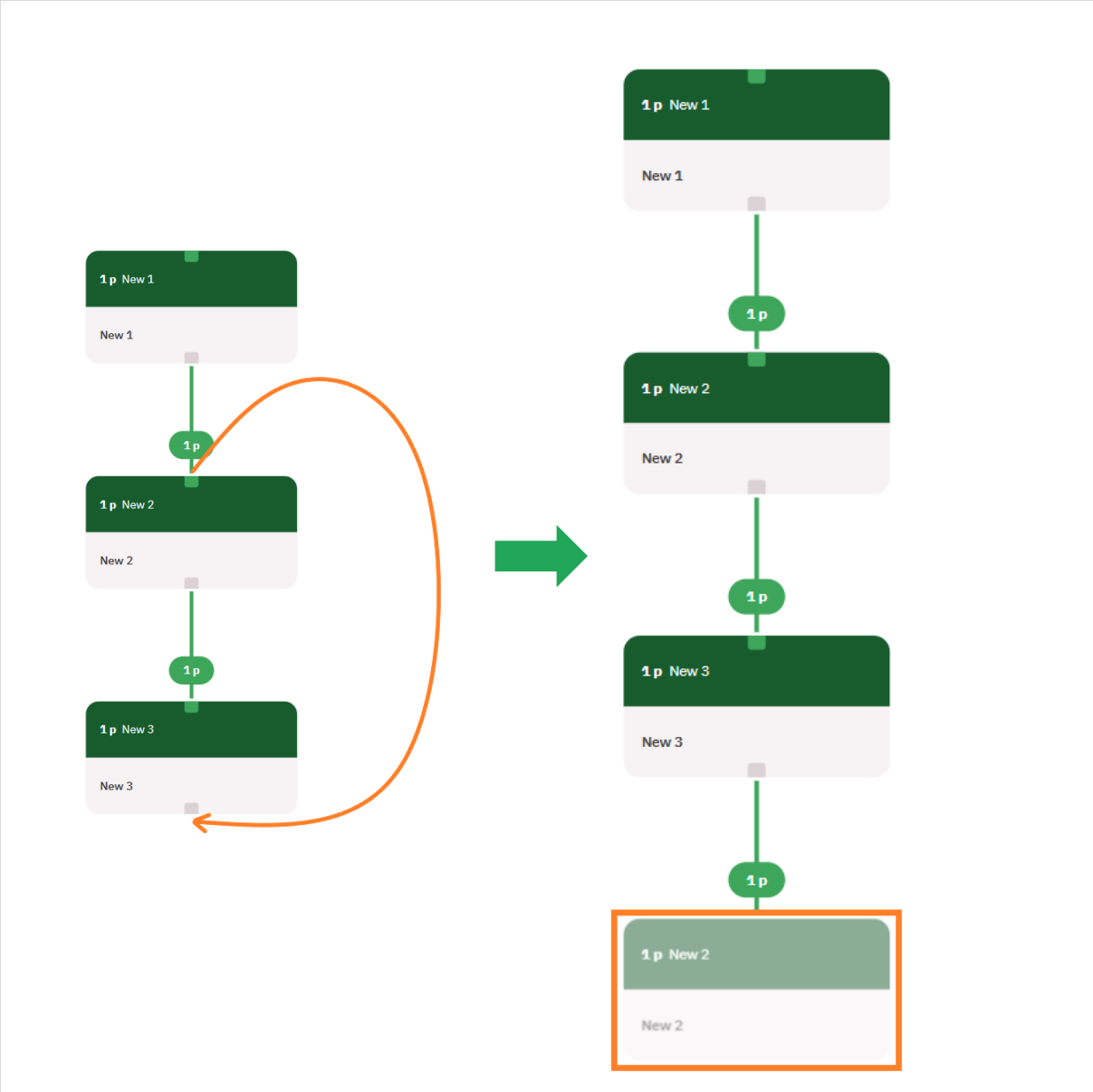


Figure 16: Creating a 'looped' process in the model

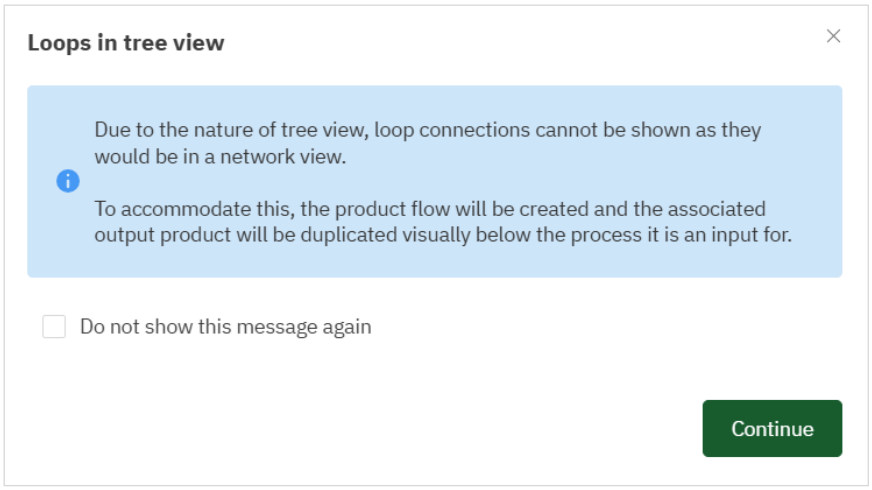


Figure 17: Notification message – creating a 'loop'

Instances of both processes (original one and the one that indicates a loop) are presented simultaneously. The process nodes that indicate a loop do not display subtrees or accept inputs. Such nodes have no connectors, therefore you cannot attach any other instances to them.

There is a limitation – you can only create a 'looped' process using a process, that is not an input of another process.

4.2 Multi-used processes

If you would like to use a process as an input in several other process nodes, such process will be called a multi-used process. If a process is used in a model more than once, you will see a node instance in every place it is used.

A notification message will appear, in case you will utilize a certain instance more than once.

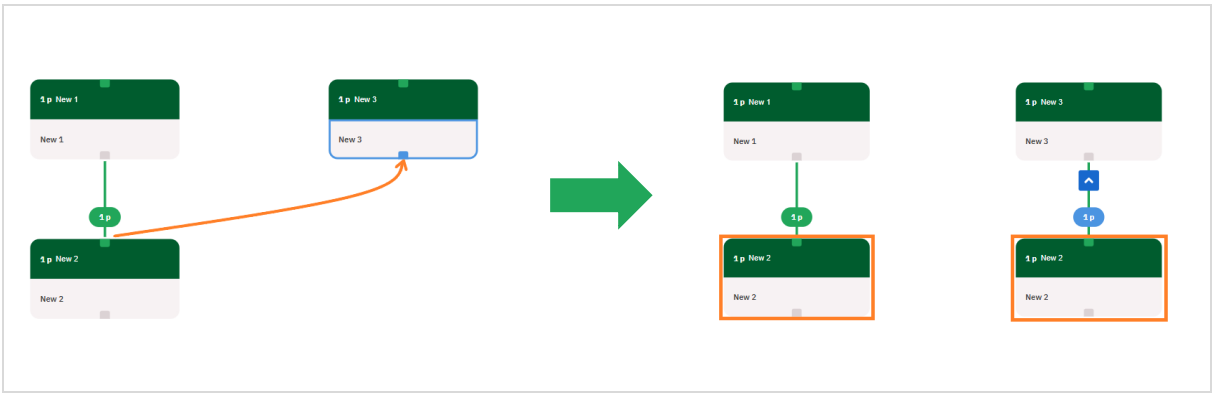


Figure 19: Creating a multi-used process

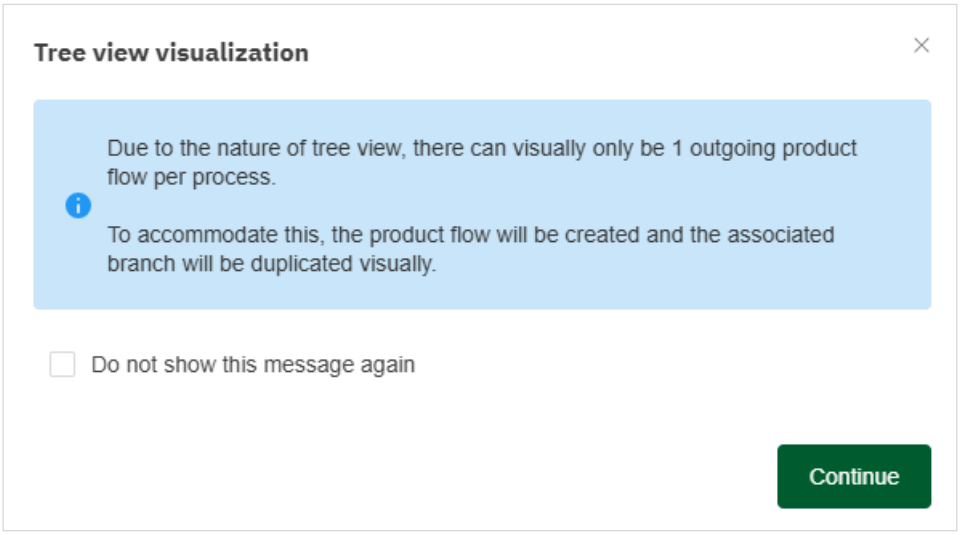


Figure 20: Notification message (creating a multi-used process)

4.2.1 Configuring multi-used processes

If a process with two node instances is selected, both nodes will be highlighted (see Figure 16). Any edits made to the process will apply to all its visual instances. Even when displayed as separate instances, they represent the same process.

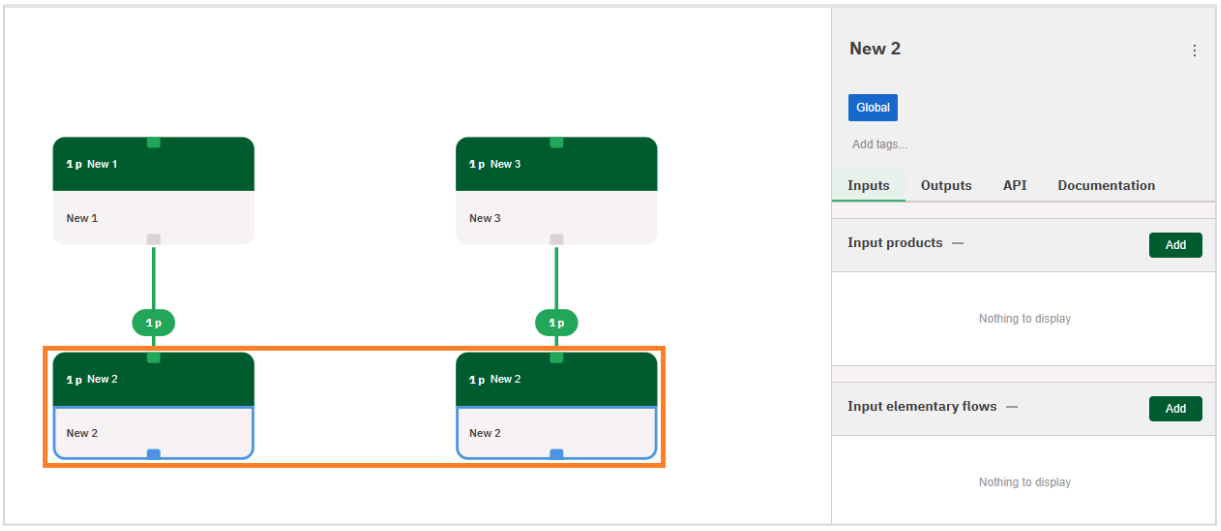


Figure 21: Configuring node instances

If you delete a process that has more node instances, then only the selected instance will be deleted (not both instances).

4.2.2 Linking instances to multi-used processes

If a newly created node is linked to one of the multi-used process nodes, a node will connect to both instances of a process. The subtree of the instance will be fully displayed for each instance.

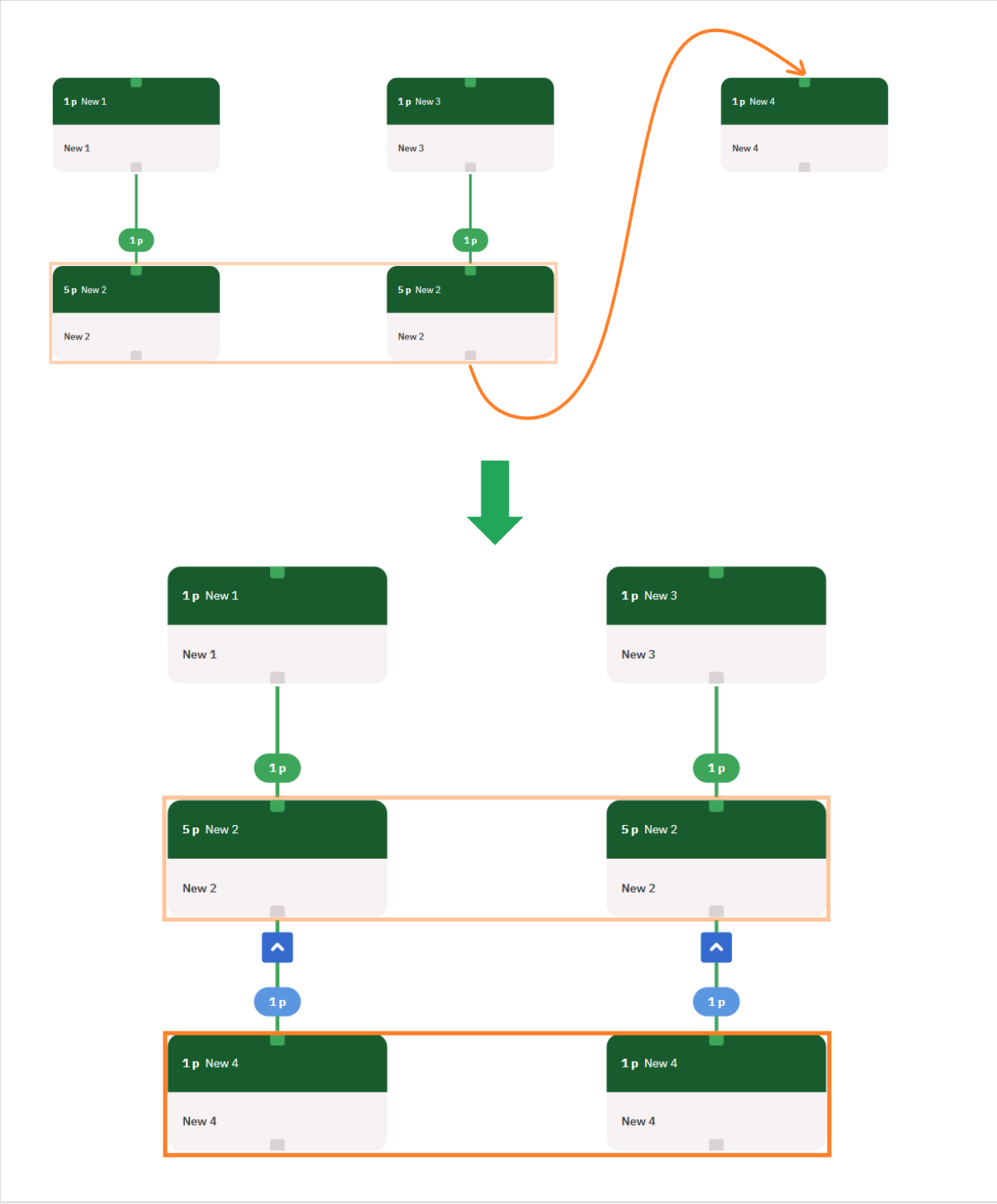


Figure 22: Linking a process to one of the node instances