How green is my project?

An app-based approach to saving the planet

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Bad cop, good cop

- I’m the bad cop
  - I am often critical of the Green community
  - It provably wastes a lot of precious resources on work that will not help save the planet
  - It often confuses “good intentions” with “good actions”
  - It often thinks that “every little helps” is a useful strategy
  - It therefore misses the chances to put precious resources on the few things that will work at scale to save the planet
- Lorie is the good cop
  - A respected member of the LCA community
  - A Macron Save the Planet fellow
- I’ll start with an analysis and a demo of Open Analyzer
- Lorie will show a comparison of Open Analyzer with an LCA

Opinions and Black Boxes

- Much of green work is based on opinions and feel good
  - “It is obvious that by doing X we can help solve Y”
- Much is rooted in Life Cycle Analysis work
  - This is good, in principle, because it is fact based
  - Clearly there have been many excellent LCAs that have helped a lot
  - But LCAs are mostly black boxes that most of us cannot usefully query
  - And they can tip one way or the other via some sensitive inputs that most of us are unaware of
    - Which means that some LCAs have been tweaked to give the desired answer …
    - … sometimes under intense political pressure
    - And there is no way the rest of us can intelligently check for sensitivities

Mega projects

- In general, mega projects scale so it's worth getting an answer at scale
  - So do a full LCA *before* starting a mega project
    - Its original purpose was to avoid unforeseen consequences of investments
    - Good megaprojects do this already
    - Too many projects do an LCA too late
  - It might give a negative – which is good because it avoids a lot of wasted resource
  - More likely it will show the key dependencies and focus points for the project
- An LCA Lite may be useful as a quick pre-check
  - It helps stakeholder to structure their thoughts with these live scale bars, to get a feel for the big picture before the LCA expert gets into the details

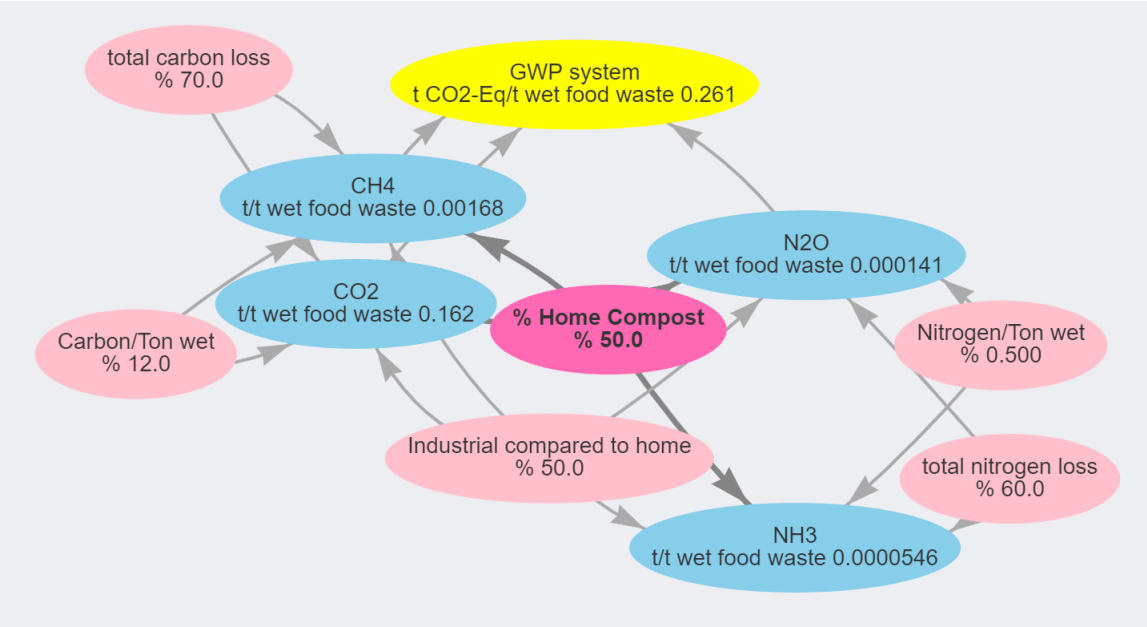
Our proposal: Open Analyzer, before you start

- A simple way to sketch out a relatively complex problem – an “LCA Lite”
  - In your browser
  - With no special skills
  - Via a rather simple Excel .csv file structure
  - With inputs that anyone can play with, via calculations that everyone can see, with outputs that are clear and logical
  - With the ability to clone the same model but with different input values
  - Or to take a clone then add, remove, alter inputs/outputs/equations
- Open source, Creative Commons

www.stevenabbott.co.uk/Open-Analyzer/Analyzer.php

Home versus Industrial Composting

- France (wants home composting) versus UK (wants industrial)
- An easy decision – look at Global Warming Potential
- Waste has C and N which can remain locked in (good) or converted to GHG
- So let’s explore reasonable inputs and outputs



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4	PHC	% Home Co	%	% Home Co	pink	0.5	100	0	100	1	
5	Closs	total carbo	%	Percentage	pink	0.7	100	50	80	1	
6	Nloss	total nitrog	%	Percentage	pink	0.6	100	50	70	1	
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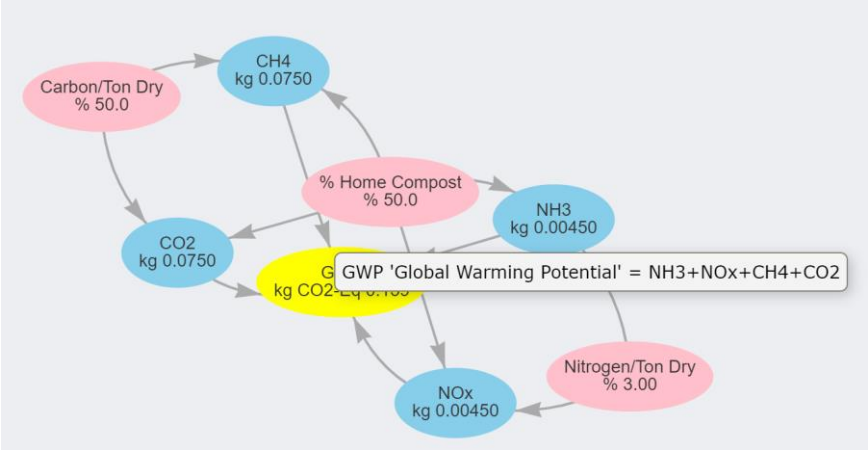
I disagree!



- That's great
- You see ALL the assumptions, ALL the calculations, ALL the constants
- You can change ALL of them
- You can create a different network with other assumptions
- It's called scientific debate
  - Open
  - Transparent
  - Numerate
- It is *much* easier to debate via Open Analyzer than via an LCA
  - LCA authors *can* and *do* run alternatives, but it is hard for others to do so
  - The sliders in Open Analyzer are more convenient than a re-run of an LCA

Our purpose during this conference

- To convince you that Green Principles require pre-project analysis using a tool like Open Analyzer to avoid putting resources into activities that cannot work at scale
- To show the principles of Open Analyzer
- To provide hands-on training so you can use it for your own analyses
- To listen to your feedback on the app and add minor upgrades during the conference and, if necessary, a major upgrade afterwards
- To discuss the Javascript code with anyone who is interested in understanding/modifying/improving/participating

Ask yourselves the question: “Why are we doing this?”

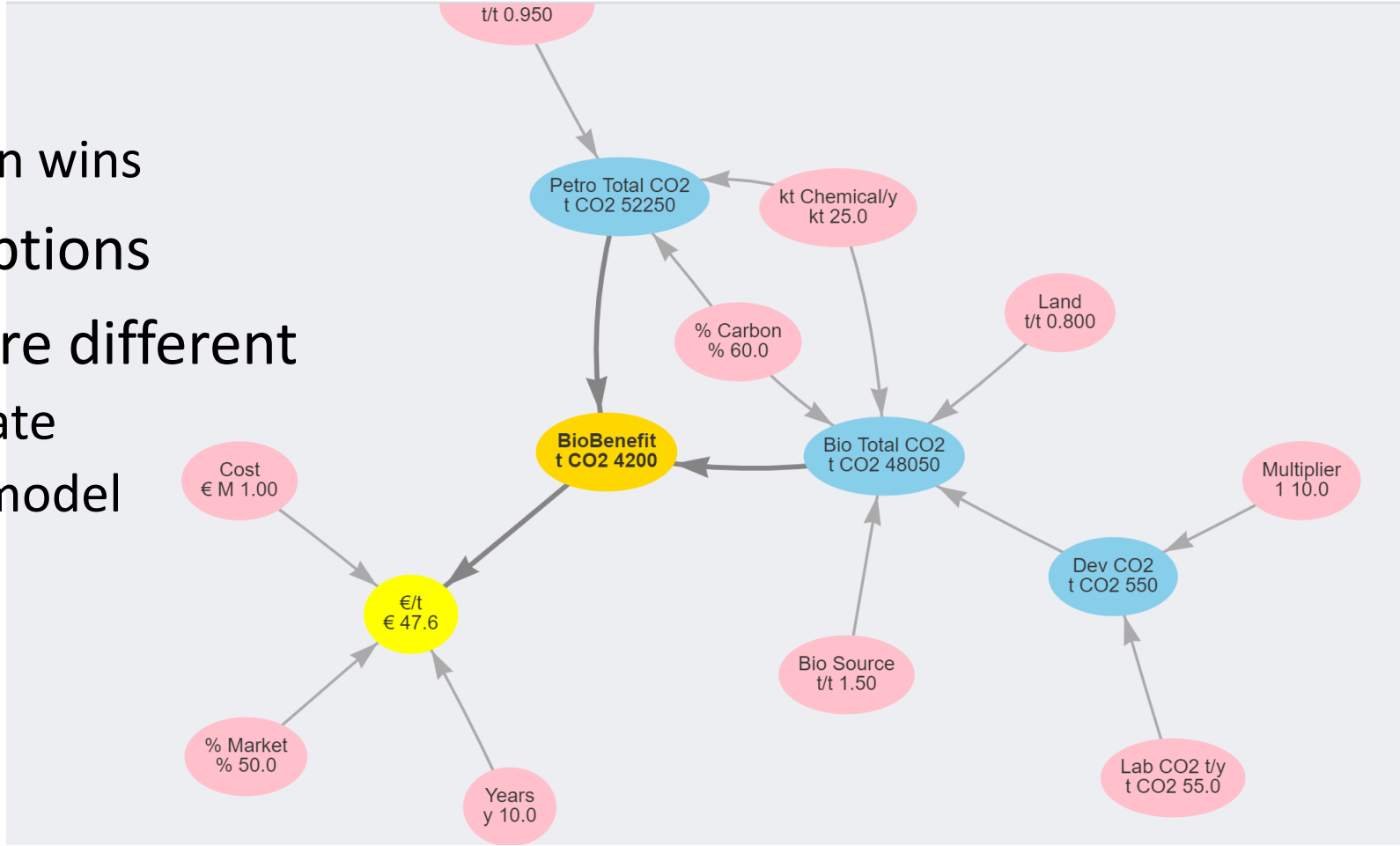
- Because resources are limited, a green project should have a clear goal of saving a significant portion of the planet
  - You have to choose “significant”
  - But if it’s a few kt CO2-equiv/year is it really worth investing resources when we need 1 Mt actions?
    - Sometimes the answer is Yes if, say, it is a Regional project to support Regional jobs
- If you know the key desired (significant) outcome then a reasonably quick model will tell you where you are in the range of
  - Impossible … Marginal … Significant … Certain
- So let’s ask a question relevant to this conference

“Why are we doing this?” A Bio-based alternative source

- We make 25kt of a chemical today via efficient petrochemical synthesis
- We have an idea of a bio-based alternative
- Should we start the project?
- We are guaranteed 15kt of C equivalent saving, 55kt CO2/y
  - That’s probably not worth getting out of bed for
  - But suppose we think that 55kt is worth it – is this the whole story?
- We have development CO2, we have land use changes, we have relative CO2 manufacturing costs which might be higher (low density starting material compared to high density oil feedstock)
- How does it all work out?

Bio-based comparison

- Net saving just 4200 t CO2
  - At €50/t CO2
  - Really NOT worth starting
  - There are much bigger green wins
- But that's using our assumptions
- Maybe your assumptions are different
  - Let's have an informed debate
  - We'll help you create your model



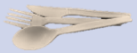
Good Cop – Open Analyzer versus real LCA

- Bio-based PET – good or bad?
- We can compare Open Analyzer with a full LCA
- The LCA says it’s a close call
- Can we see why via an Open Analyzer and get a feel for what would make a *big* change that everyone could commit to

- An LCA expert has access to all the numbers needed for Open Analyzer
  - The numbers are often public domain so we can all find them, but it’s hard
  - Experts know where to find them quickly

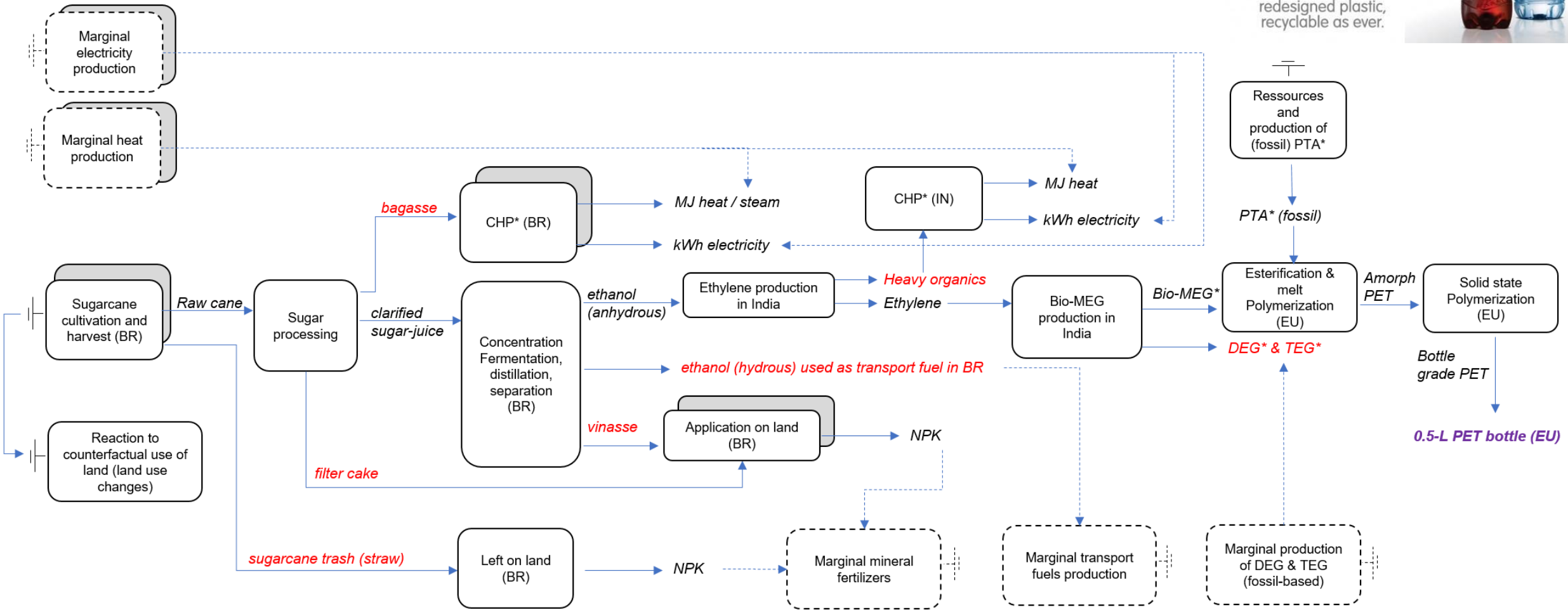
A recent EC study on bio-based materials

754 pages

Case studies	Bio-based baseline	Bio-based alternatives	Reference system(s)
Beverage bottles 	30% bio-based PET	30% PET from different biomass feedstocks	PChemPET
Single-use drinking cups 	PLA	i) PLA from different feedstocks ii) bio-based PP from UCO	PET PP
Single-use cutlery 		n/a	PS
Food packaging films 		i) PLA from different feedstocks ii) bio-based PP from UCO	PP
Horticultural clips 	Starch plastics	Starch plastics using different starch sources	PP
Agricultural mulch films 		n/a	LDPE
Single-use carrier bags 		Bio-based LDPE	LDPE

PET=polyethylene terephthalate; PLA=Polylactic acid, UCO=Used cooking oil, PP=polypropylene, PS=polystyrene, LDPE=low-density polyethylene, PChem=petrochemical

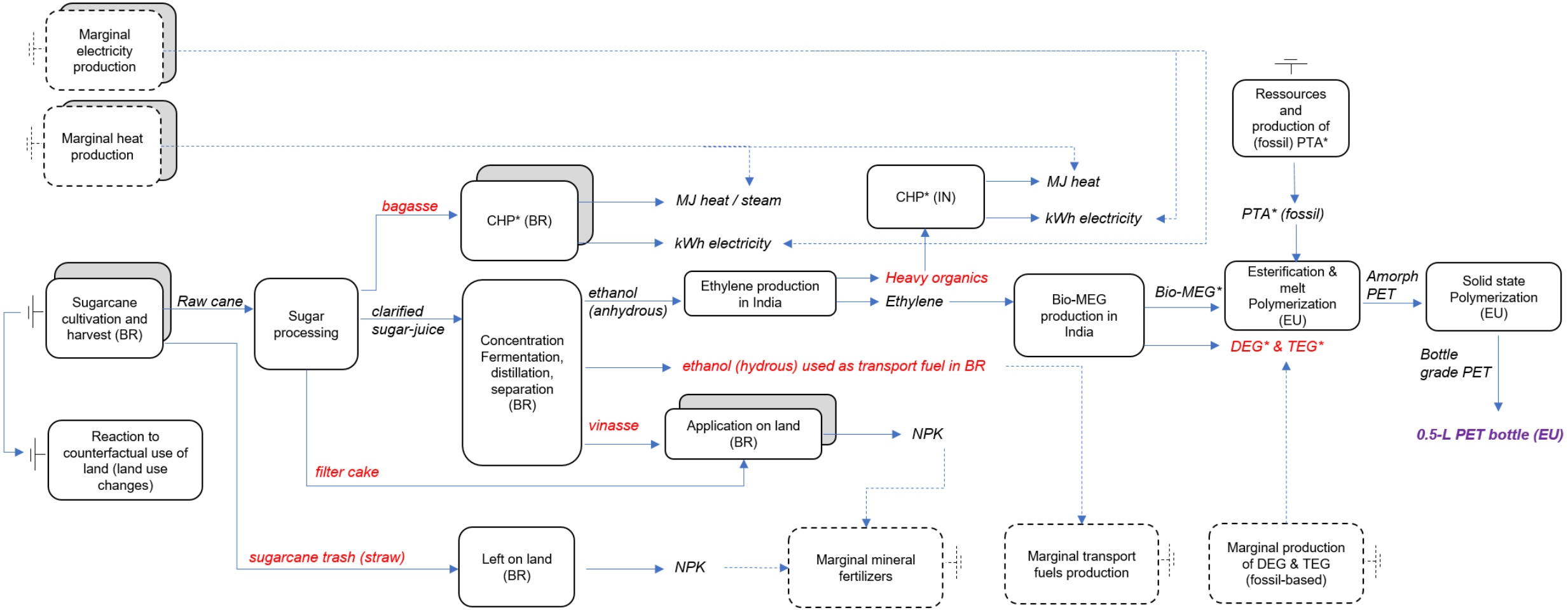
The LCA would do this (cradle-to-gate)



** CHP: Combined heat and power; MEG: Mono ethylene glycol; DEG: diethylene glycol; TEG: triethylene glycol; PTA: purified terephtalic acid; EoL: End-of-Life*

The Open Analyzer version

Climate-wise, is it worth it?



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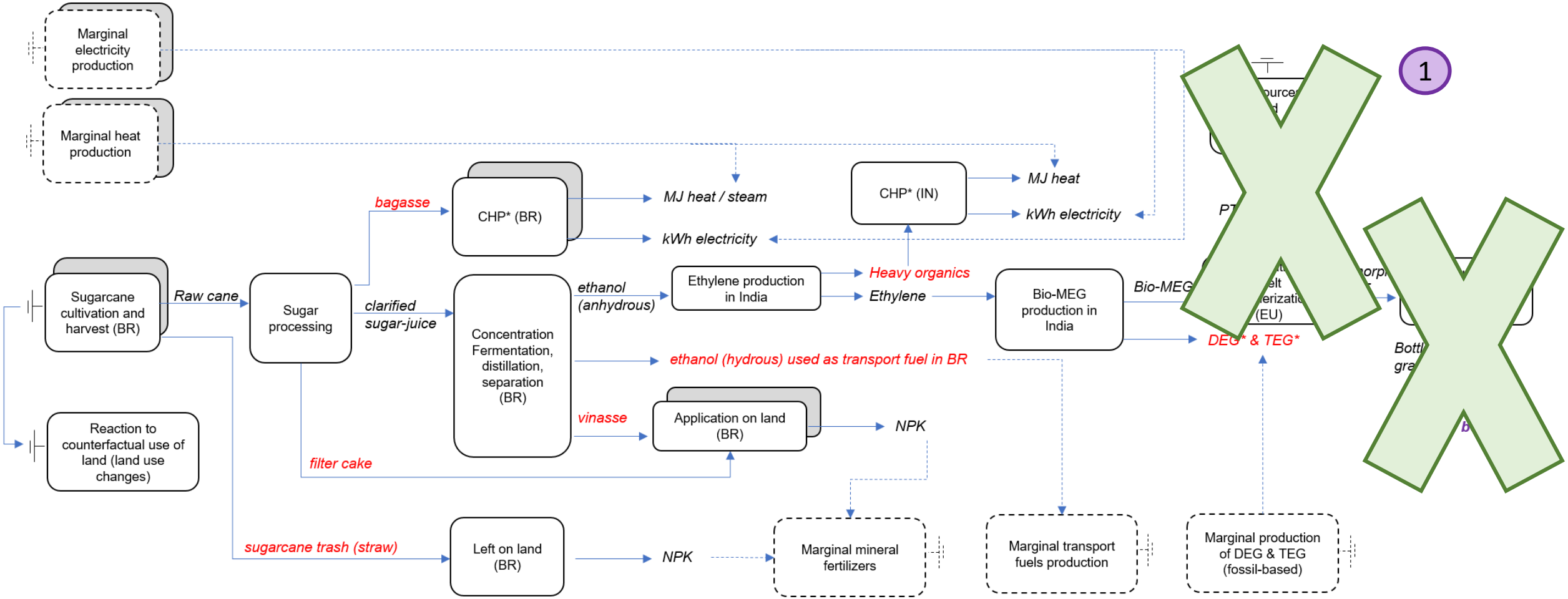

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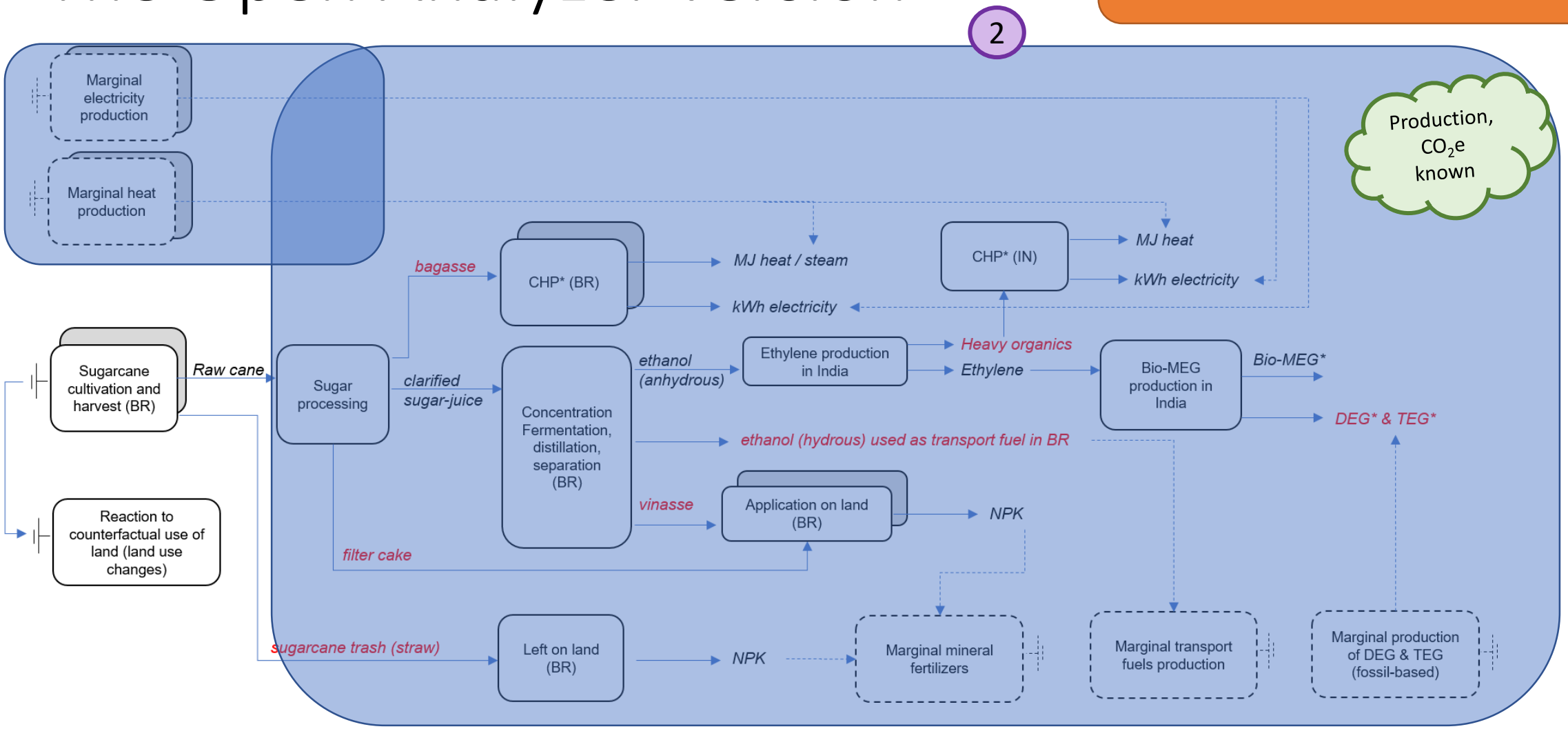

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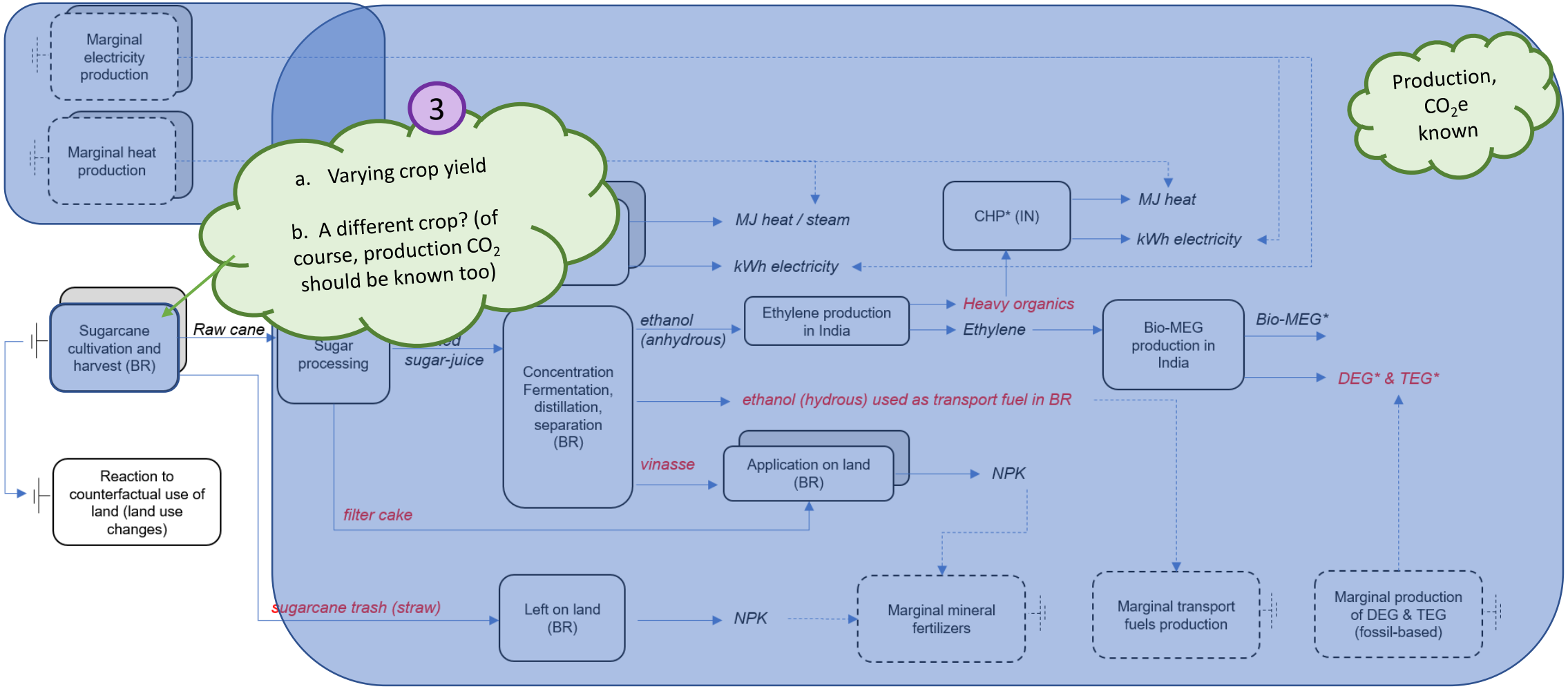

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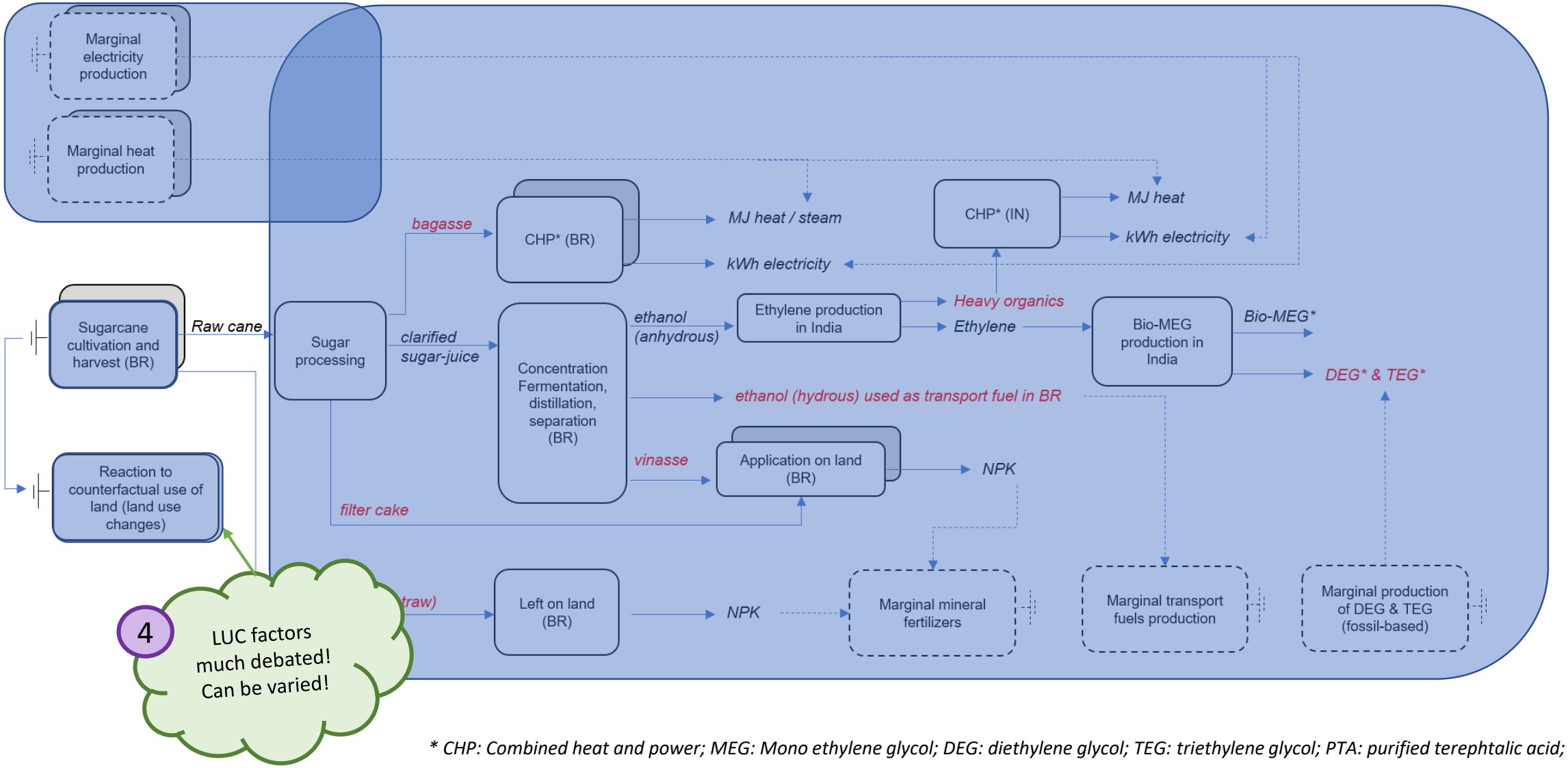
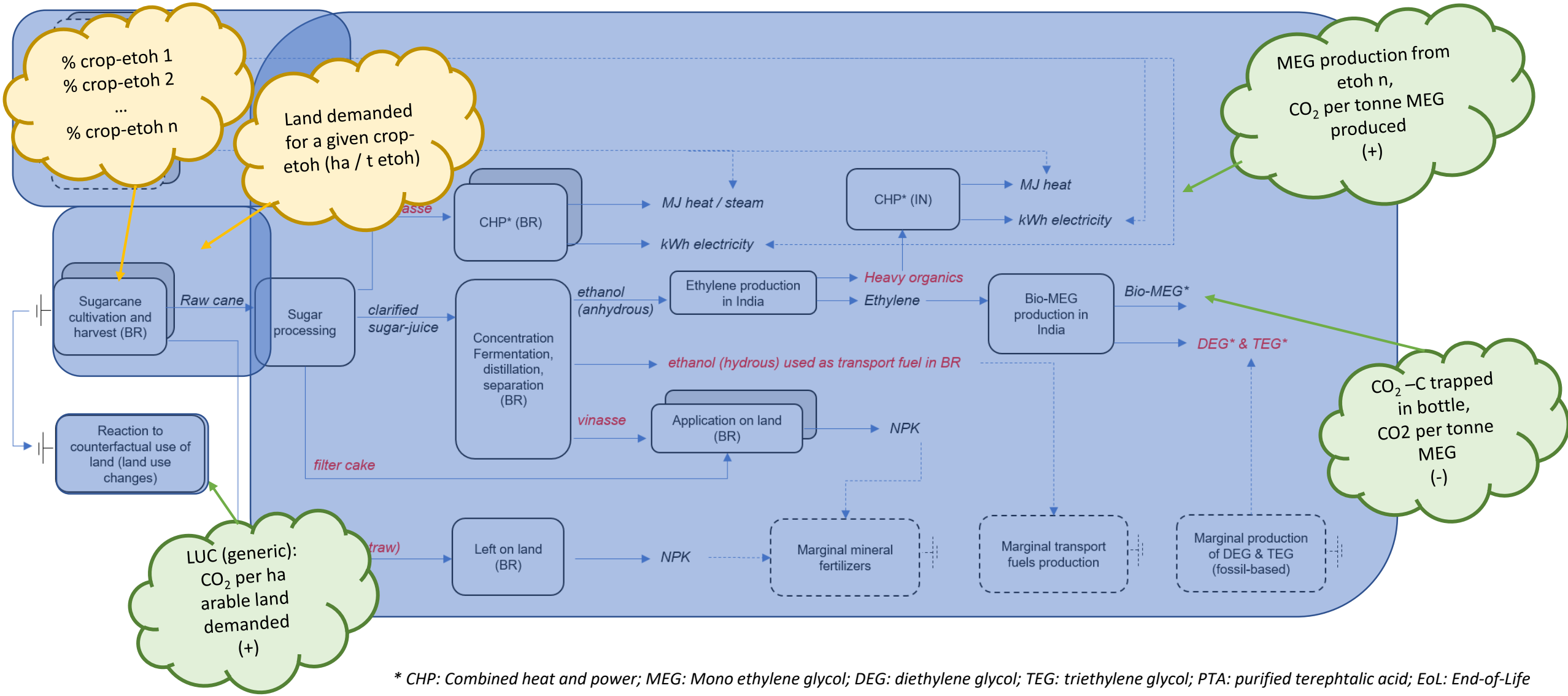


4 LUC factors much debated! Can be varied!

** CHP: Combined heat and power; MEG: Mono ethylene glycol; DEG: diethylene glycol; TEG: triethylene glycol; PTA: purified terephtalic acid; EoL: End-of-Life*

The Open Analyzer version

Inputs to Open Analyzer, in a nutshell



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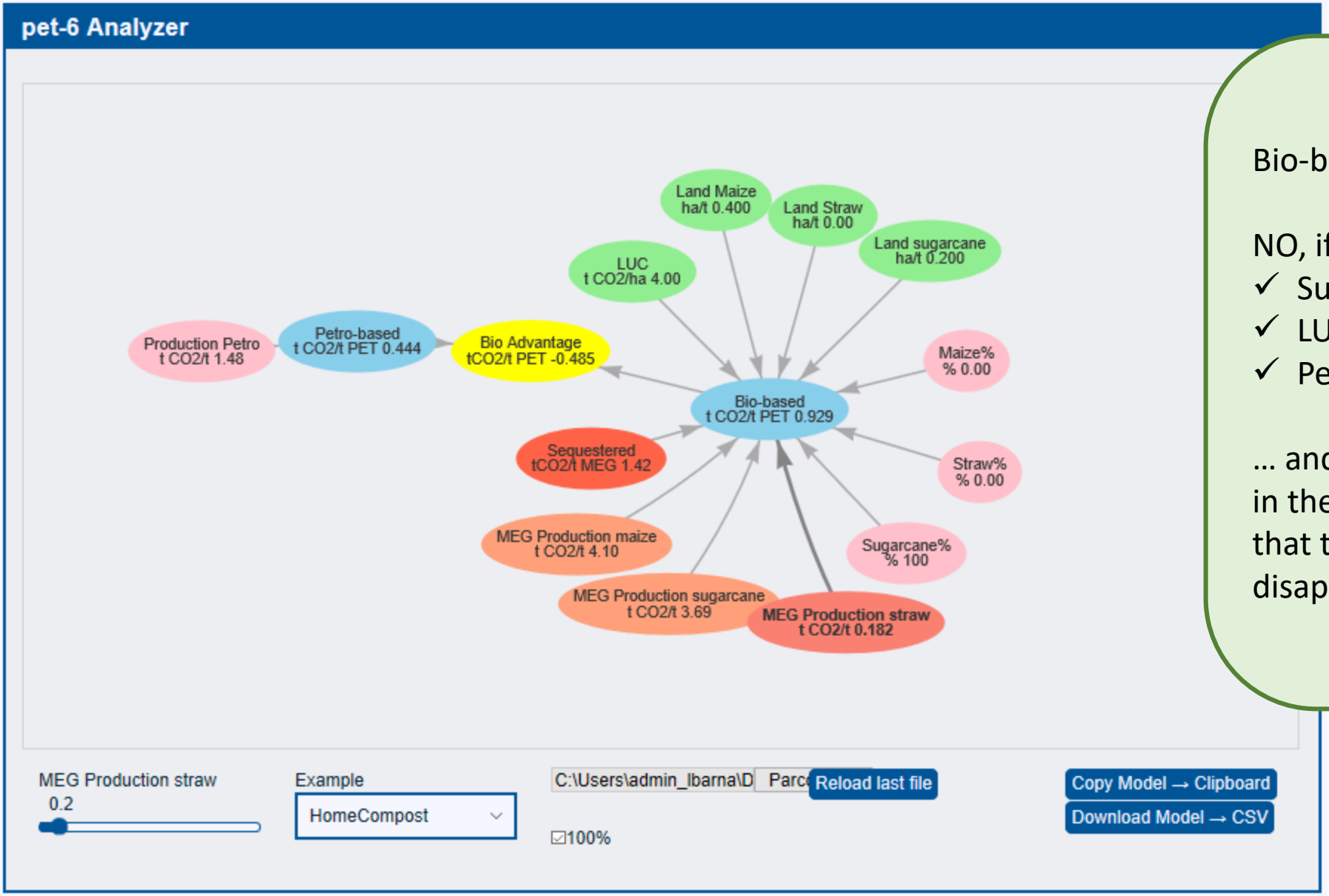
Open Analyzer says….



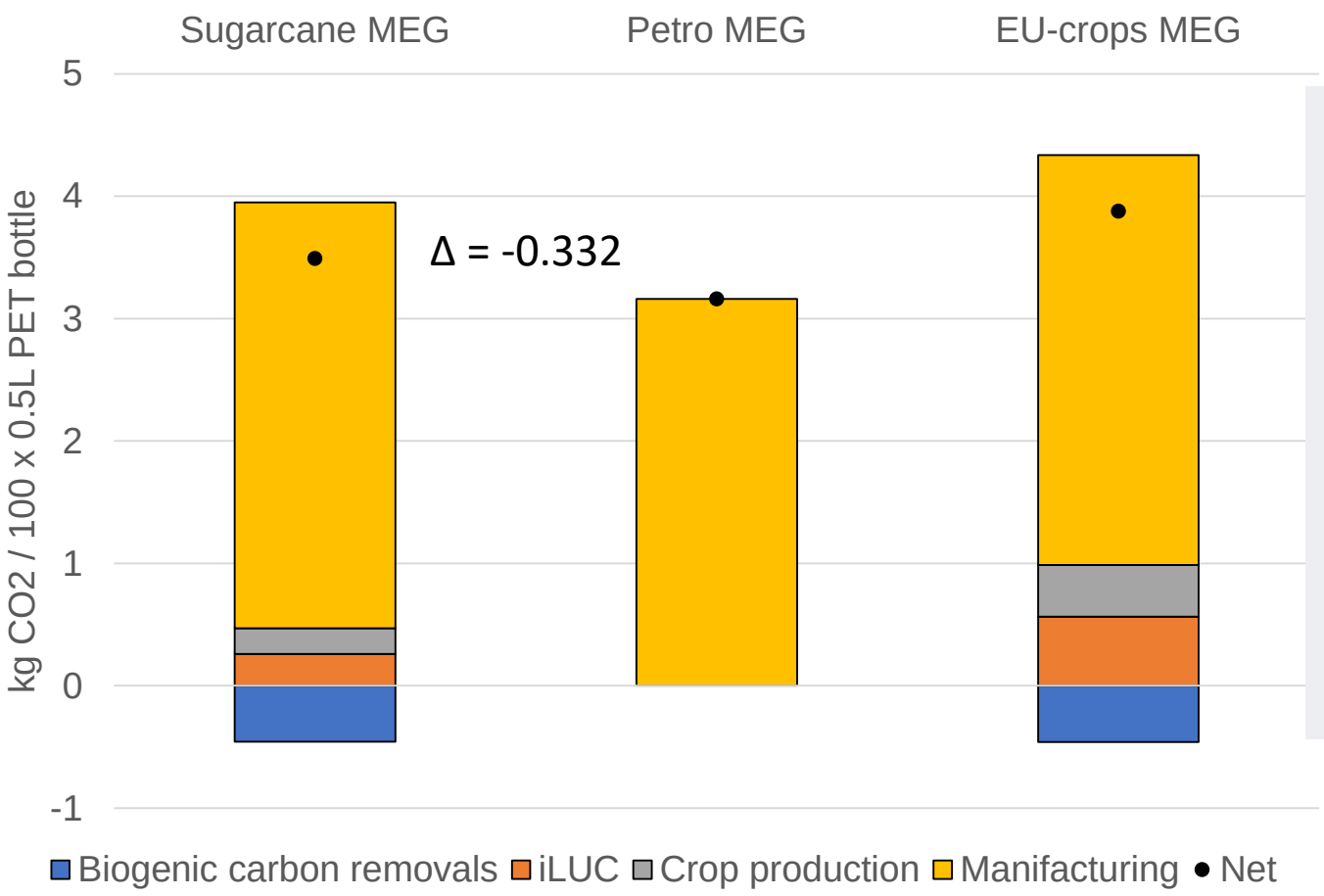
Bio-based PET?

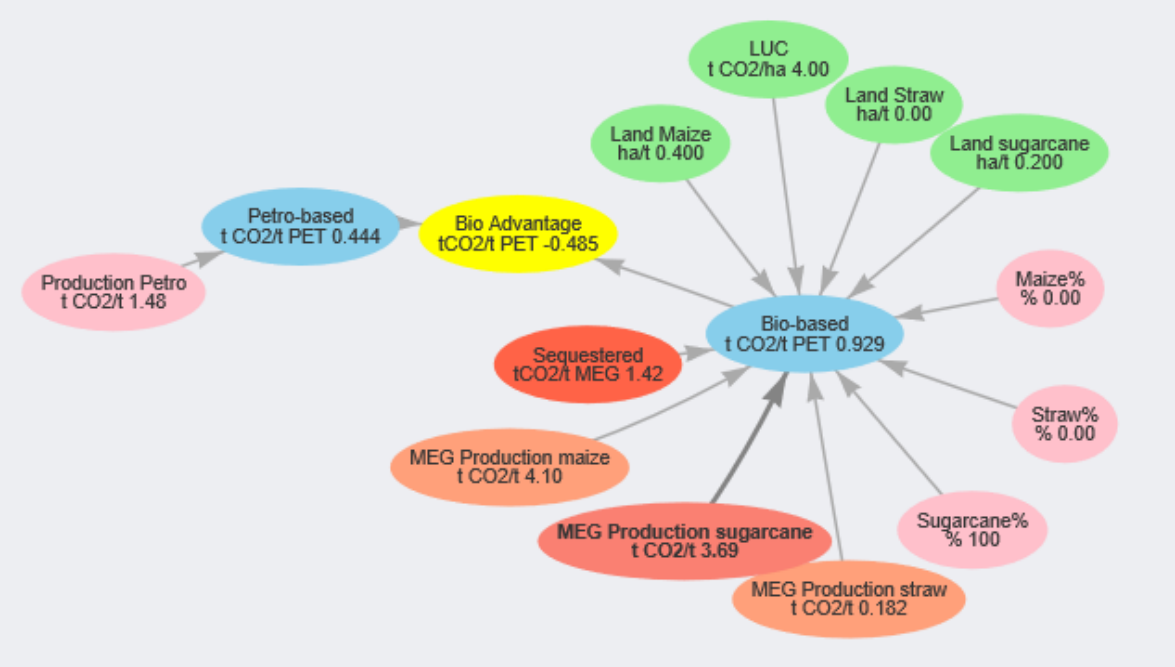
NO, if:

- ✓ Sugarcane 100%
- ✓ LUC = 4 t CO_2e/ha
- ✓ Petro-MEG = 1.48 kg CO_2e/kg MEG

… and this is as long as the bottle stays in the technosphere of course! After that the “sequestreted CO2” credit disappears!

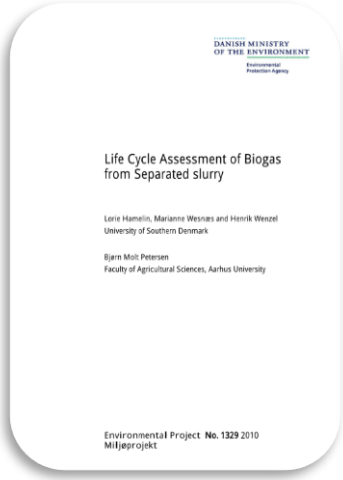
Comparing the results, 100% sugarcane





Take home

- LCA can be twisted to get desired outcome? Not if proper system model (and ethics)
- No tools will ever replace a good system model
- Open Analyzer useful for:
  - Screening
  - Translating LCA outcome to decision makers
  - Sensitivity analysis



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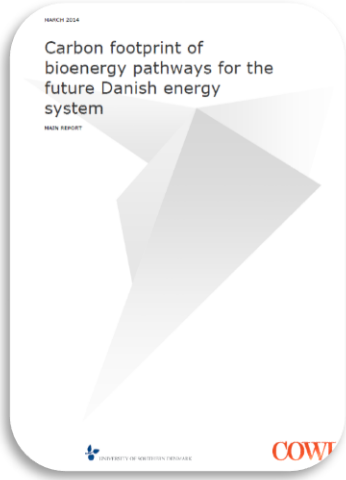

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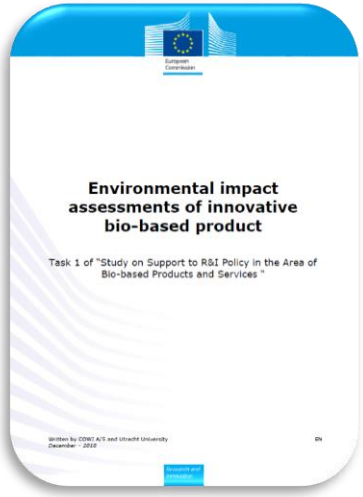

754 p.

What now?

- We want Open Analyzer to be used
- We will help to train you during breaks between sessions
  - Using our standard models
  - Or helping you to create yours
- You have till 09:00 Wednesday to submit your entry to the €500 prize competition: email steven@stevenabbott.co.uk
- After the Conference
  - Steven guarantees to fix bugs and add features if required
  - He will also offer email and WebEx-style support to users