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Efficient Energy Use

PeXa – Primary Exergy Analysis

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PeXa combines exergy analysis and primary energy analysis.

PeXa uses exergy analysis inside a process and primary energy based factors for the surrounding society.

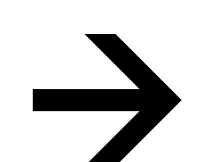
Background and need

Primary Energy analysis (PEE)

- based on the first law of thermodynamics
- considers all the primary energy input to a production system that is required for yielding a certain product at the system boundary.
- Individually PEE does not work well inside production processes especially because the factors are calculated only for products of interest not for semi-products.

Exergy analysis (EXE)

- based on the second law of thermodynamics
- very suitable for analyzing the energy efficiency of a process both quantitatively and qualitatively
- tedious to calculate for an energy chain having multiple production processes and production routes

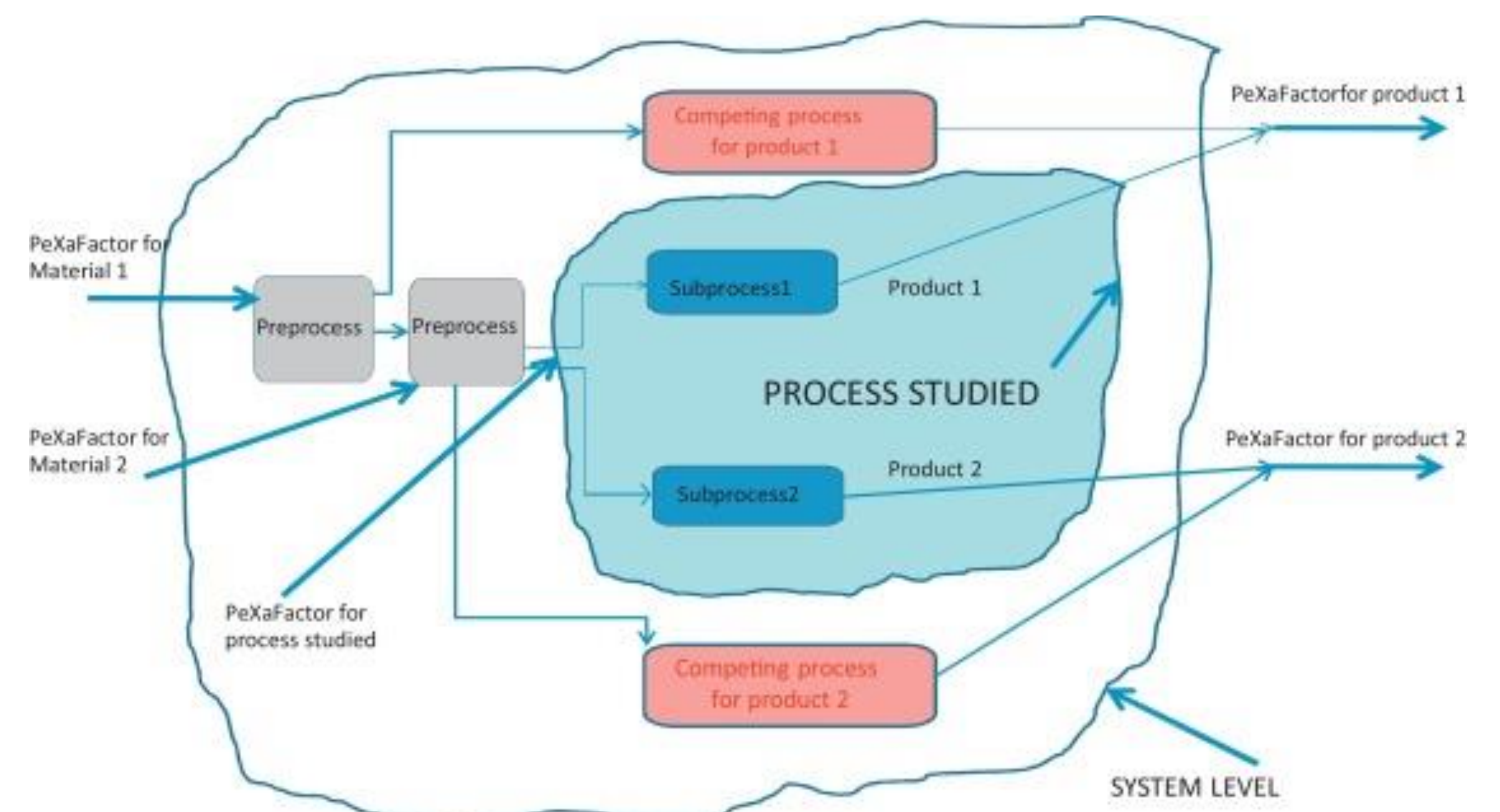


There is a need for an energy assessment method that is able to validate the energy efficiency of the overall energy chain both quantitatively and qualitatively and to objectively compare the overall energy efficiency of different products.

→ PeXa

Method

PeXa method combines the benefits of EXE analysis and PEE analysis. Inside a process it uses the benefits of EXE as a second law efficiency method defining the process efficiency. It also uses the holistic and product approach of PEE so that a comparison of different production paths can be made.



PeXa should be used when

- an owner of a process wants to improve the process by minimizing primary energy consumption
- there is a need to compare different production routes from an energy efficiency perspective
- an owner of a process wants to improve the process by minimizing the process energy consumption (PeXa-factors = 1)

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