









Where does all the (woody) biomass and waste go?





Biomass Flows in the Flemish Economy, 2019



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In the past, ELIA's considered cogeneration plants as must-run units



2Valorise's cogeneration plant

Revoking the support led to shutdown of the waste-powered CHP unit in Ham



2Valorise's cogeneration plant

A historic day for the Belgian Energy Transition, a sad day for our Limburg subsidiary 2Valorise Ham: On the day that the Federal government announces an agreement regarding the extended opening of 2 nuclear power plants in the short term in order to guarantee security of supply, the Flemish government succeeds in bringing a renewable biomass plant in Flanders, which runs on local, woody waste streams, to a standstill. In parallel, many other renewable energy players in Belgium have to spend money on expensive lawsuits to avoid being overturned as well. Resources and human energy that are better invested in the necessary energy transition! It was with great sadness that we had to say goodbye to the driven & professional team of 2Valorise Ham today in all serenity. We support them all in finding an equal job and keep in touch. We are not giving up and continue to invest in the energy transition, but with the necessary delay. We continue to carry out the ongoing investments in Wallonia, the innovative projects continue and in parallel we conduct the dialogue with the Flemish and Federal authorities, counting on them to come to an understanding that the current approach is not the right one.

- Filip Lesaffer (CEO 2Valorise)

In which conditions have cogeneration plants a future in the energy transition?



2Valorise's cogeneration plant

future cogeneration plant



FOD Economie, K.M.O., Middenstand en Energie

FLEX-CHP

The contribution of biomass- and waste-fired CHP's to the security of supply and the stability of the electrical grid in Belgium









FOD Economie, K.M.O., Middenstand en Energie

How can we optimize cogeneration plants to take a flexible role in the future?







Create a framework that enables us to simulate the cogeneration system



Cover residential heat and power demand



Provide energy while reducing the emission, and allowing the cogeneration to benefit



(!) disclaimer: total emissions implies the use of any available resource

Every cogeneration plant is unique!





Via open literature, we model the cost and emissions based on power and heat production



This framework enables us to optimize any dynamic energy system



Renewable and demand data has been incorporated via open sources



vear



The genetic algorithm adapts the capacities to find a design which optimizes the objectives



The framework (RHEIA) is open source, published and fully documented

Available on Github documented on Read The Docs Published in Journal of Open Source Software

Used in 10+ applications

micro gas turbine, renewable hydrogen, building performance, biomass power plant, . . .



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Results of the design optimization of the traditional cogeneration plant



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What if we decouple our heat demand?





Would a battery stack help our cogeneration plant?

- minimize total emissions

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traditional CHP

-trade-off between resource utilization and profits

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• build representative model of biomass- and waste cogeneration plant

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- what is the potential of biomass and its role in the future energy landscape?

FOD Economie, K.M.O., Middenstand en Energie

How can we optimize cogeneration plants to take a flexible role in the future?

Examples of uncertainties that will be integrated in the analysis

- Gas price
- Electricity price
- Biomass price
- CO₂ grid
- CO₂ CHP
- Lower Heating Value
- Humidity
- Ambient temperature
- Investment cost
- Operational cost

• Effect on cash flow

Effect on total emissions

Effect on efficiency, cash flow, emissions

Effect on levelized cost

