# Classification and sustainability criteria for renewable fuels in the EU - what actually applies?

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# Classification and sustainability criteria affect which facilities are actually invested in!

How a fuel is **classified** affects, for example, which targets and quotas it can help fulfill, as well as the possibility of double counting—and thus also the demand for and market for the fuel.

How **climate impact is quantified** can also affect the demand for and willingness to pay for different fuels when applying reduction targets, as high GHG performance (according to the RED) results in a higher willingness to pay.

# Background

- To promote increased use of renewable energy, including sustainable fuels, the EU introduced the Renewable Energy Directive (RED).
- To ensure that fuels are sustainable, RED includes a standardized methodology for classifying and calculating greenhouse gas emissions from fuels.
- However, there are uncertainties about how the method should be applied in several cases, such as when mixing feedstocks or for integrated facilities.

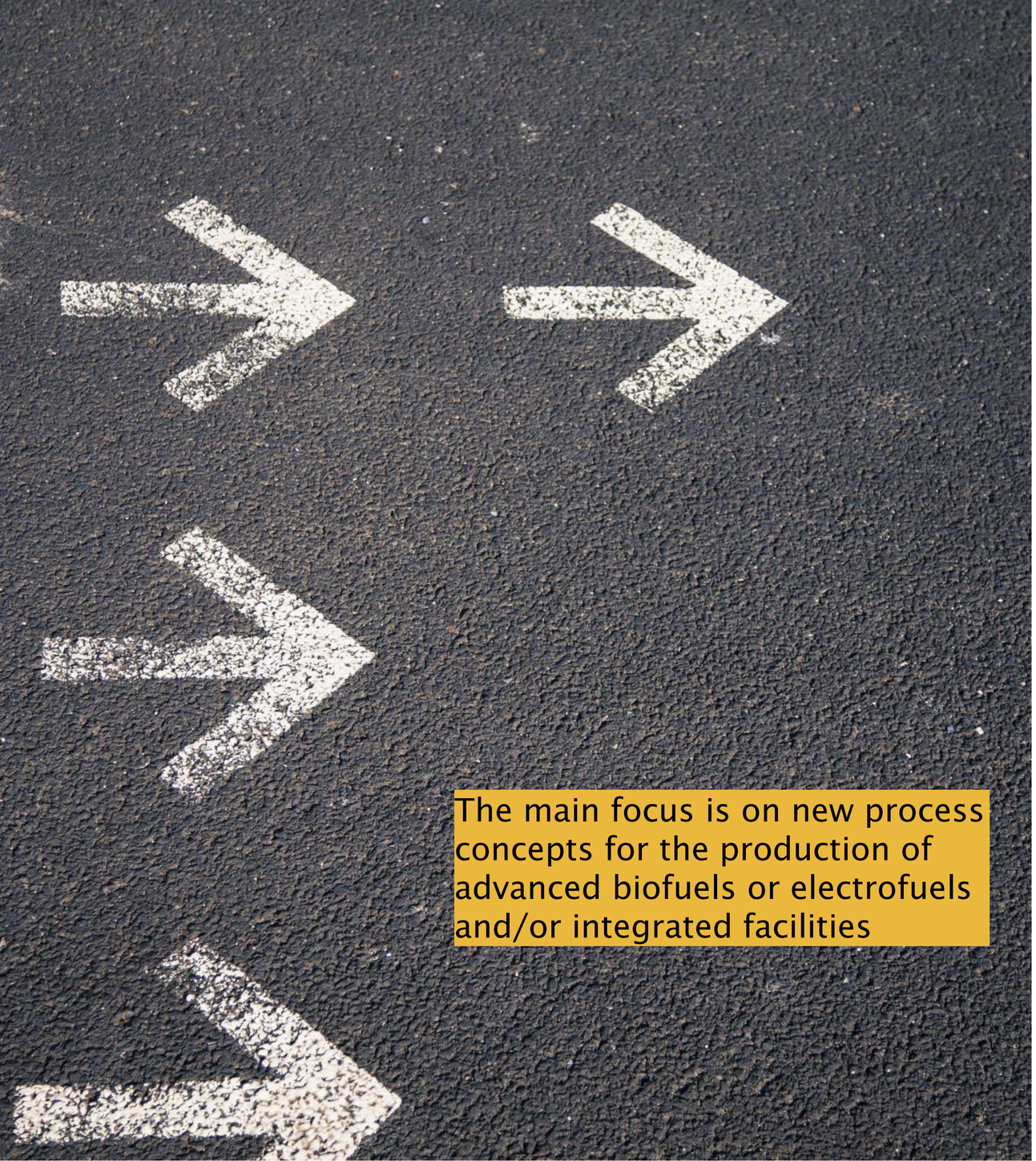
# Background

- For standalone and single feedstock facilities that produce specific fuels, RED is relatively straightforward to interpret.
- However, in a future where carbon and energy efficiency must be prioritized and resource use minimized, processes are rarely that simple.
- Often necessary to utilize a mix of different feedstocks and heavily integrated processes with existing facilities, to achieve an energy-, cost-, and environmentally efficient system.



# Aim

- This project maps RED to identify which types of value chains that allow room for interpretation and what consequences this may have.
- Based on a number of example process concepts, the project examines:
    - Different interpretations and their consequences.
    - RED's ability to reward resource efficient concepts.
    - How classification and methodology for quantifying climate impact affect the incentives for different process concepts.
- The aim is to support stakeholders in assessing their value chains in accordance with RED.






# Methodology – Mapping

**General Review of Documents**

RED, along with relevant delegated acts and related documents, is used to map the RED methodology.

**The mapping focuses on identifying areas where there may be room for interpretation**

**Review based on a number of feedstocks and processes – both specific examples of processes/concepts and different types of fuels**

For various types of fuels and specific concepts, the regulations are mapped to see how the fuels are classified, how climate impact should be quantified/calculated, and how the fuels can contribute to achieving targets within RED and related directives.

# Conclusions

i. RED lacks clarifications and concrete examples and is therefore generally difficult to interpret

ii. RED is inconsistent

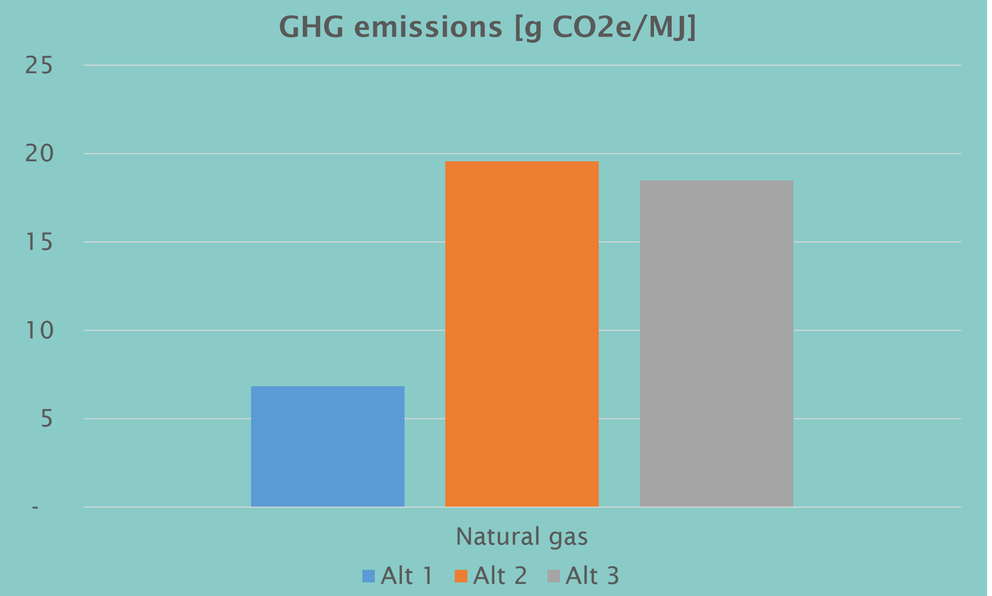
iii. RED does not always reward resource-, energy-, and climate-efficient concepts

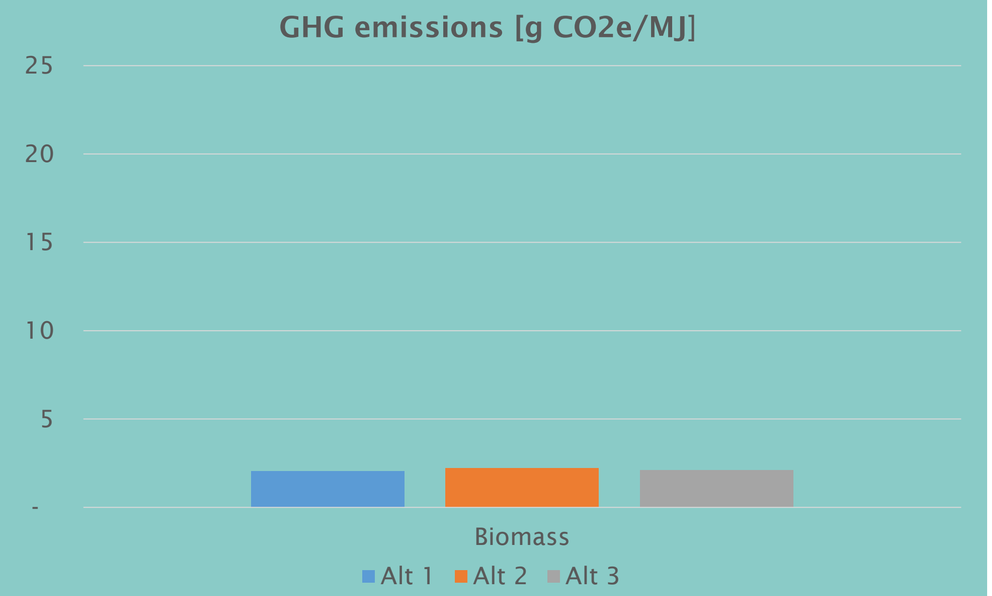
# Conclusions

i. RED lacks clarifications and concrete examples and is therefore generally difficult to interpret

There are uncertainties and room for interpretation, for example regarding:

- How excess heat/steam from a biofuel facility is handled in the calculation of the biofuel's climate performance.
- Unclear how the methodology in RED for biofuel should be applied together with the methodology in the delegated acts (DA) for RFNBO and RCF. For example, in the case of a mixed stream (waste) generating both biofuel and recycled carbon fuels (RCF), both should have the same emission intensity – but which methodology should be applied?
- Unclear which emission factors and methodological choices should be made in certain cases, such as concerning electricity, production losses for inelastic goods, and the allocation of oxygen.

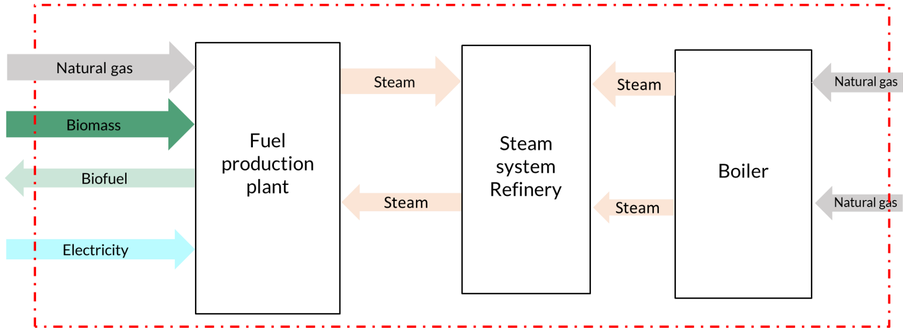



# Excess heat/steam

## RED opens up for different interpretations

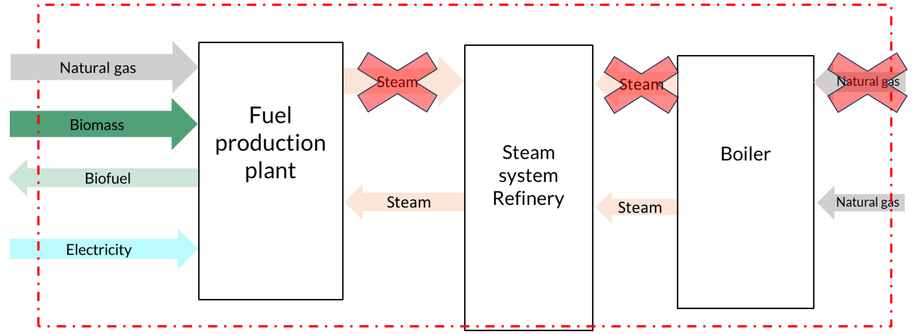
Alt 1




Net flows

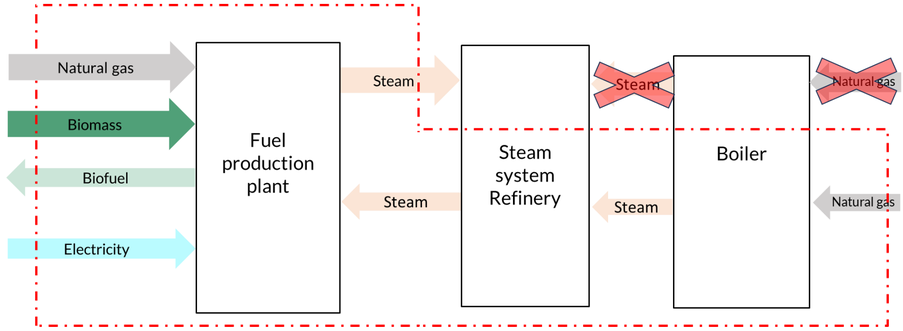
The steam replaces steam produced from natural gas

Alt 2




The steam is not counted at all

Alt 3



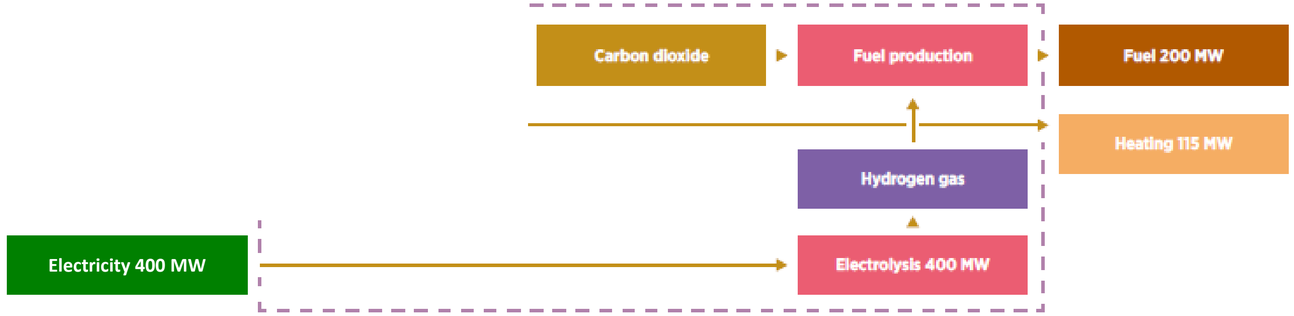

Allocation of the steam

# Conclusions

ii. RED is inconsistent

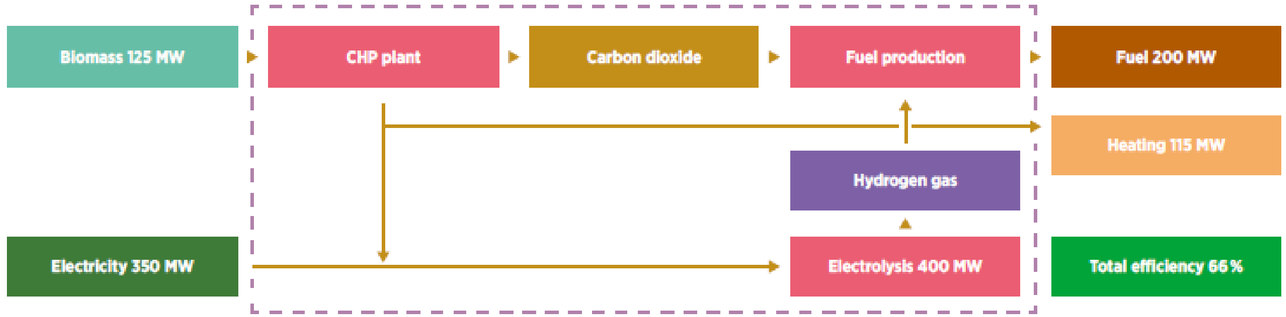
- The climate impact from electricity use should be calculated differently depending on if it is a biofuel, RFNBO, or RCF.
- Several concepts and calculation methods from the delegated acts (DA) are only to be applied to RFNBO and RCF, even though they could also be applied to biofuels—for example, inelastic input materials.
- In certain situations, RED classifies different processes that use the same types of feedstocks (to produce the same product) in different ways, which can significantly affect the conditions and incentives for different process concepts.
- There are contradictions with other EU directives, for example regarding rules for allocation of biogenic and fossil carbon atoms in the EU ETS.

# Bioelectrofuels and electrofuels – classification according to RED



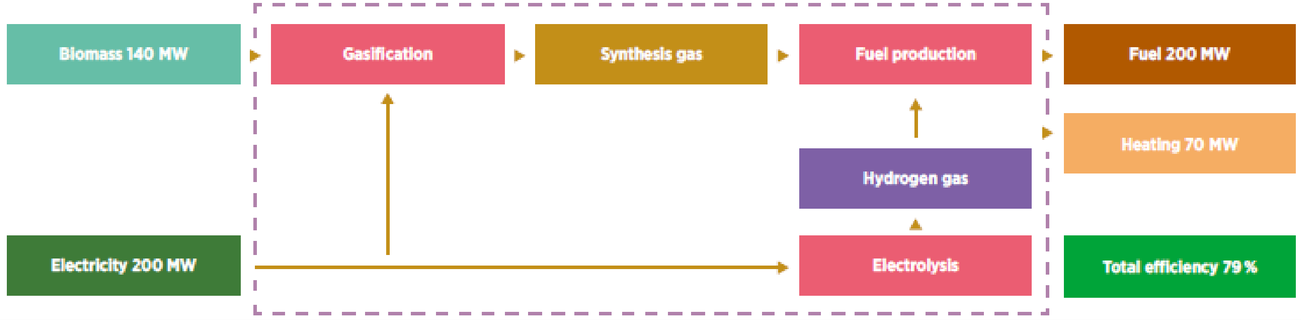

**Electrofuel plant at an existing CHP plant**
– a plant that produces fuel, heat, and oxygen from carbon dioxide and electricity.

**RFNBO**




**Electrofuel plant at a new CHP plant**
– a plant that produces fuel, heat, and oxygen from biomass and electricity.

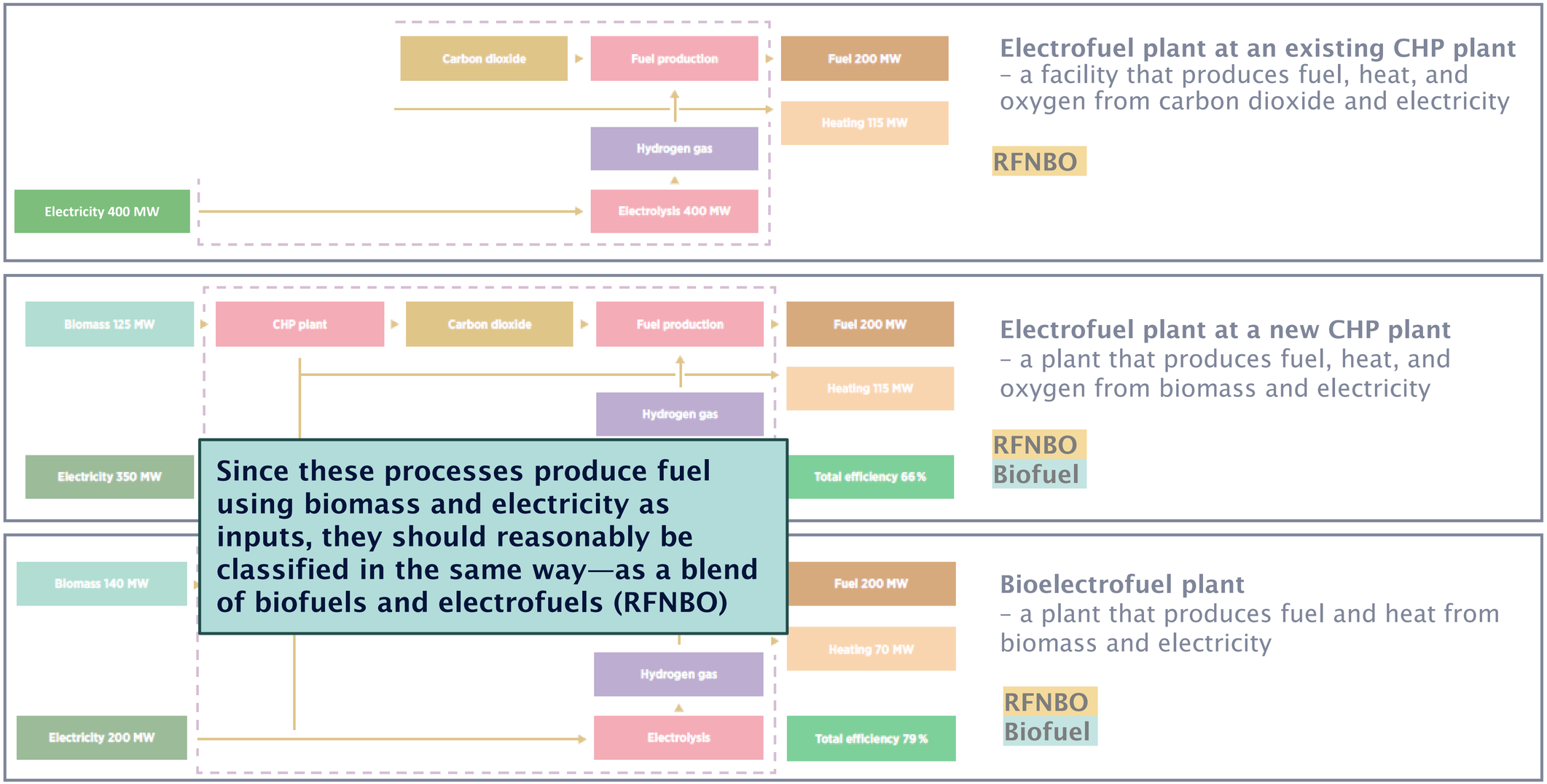
**RFNBO**




**Bioelectrofuel plant**
– a plant that produces fuel and heat from biomass and electricity.

**RFNBO**
**Biofuel**

# Bioelectrofuels and electrofuels – appropriate classification




**Electrofuel plant at an existing CHP plant**
– a facility that produces fuel, heat, and oxygen from carbon dioxide and electricity

RFNBO

**Electrofuel plant at a new CHP plant**
– a plant that produces fuel, heat, and oxygen from biomass and electricity

RFNBO
Biofuel

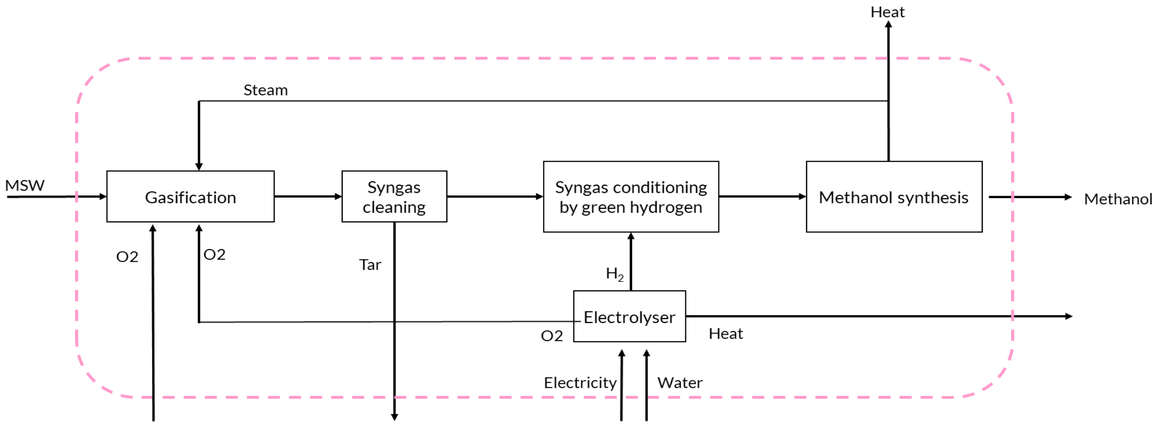
**Since these processes produce fuel using biomass and electricity as inputs, they should reasonably be classified in the same way—as a blend of biofuels and electrofuels (RFNBO)**

**Bioelectrofuel plant**
– a plant that produces fuel and heat from biomass and electricity

RFNBO
Biofuel

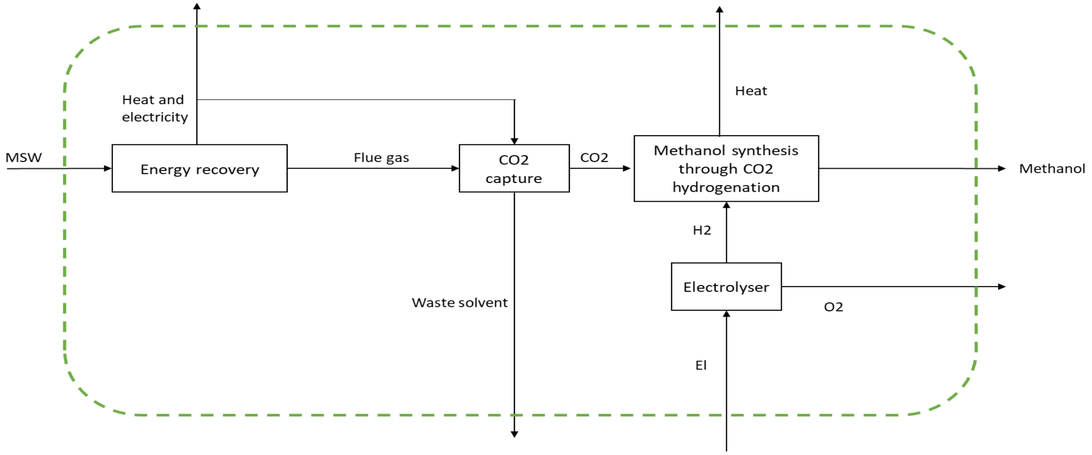
# Fuels from waste – classification according to RED

## Similar example using MSW instead of biomass




Hydrogen boosted gasification of MSW

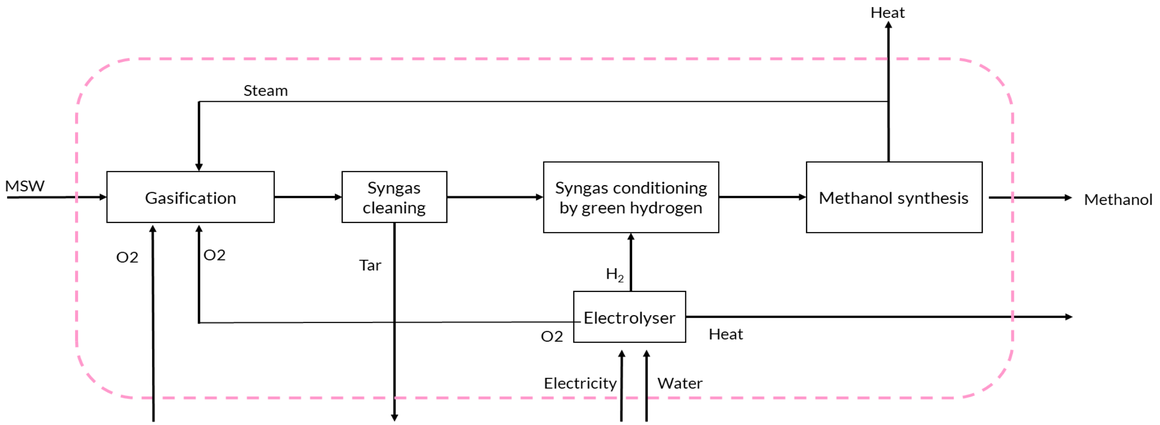
RCF
Biofuel
RFNBO




New CHP + CCU plant based on MSW

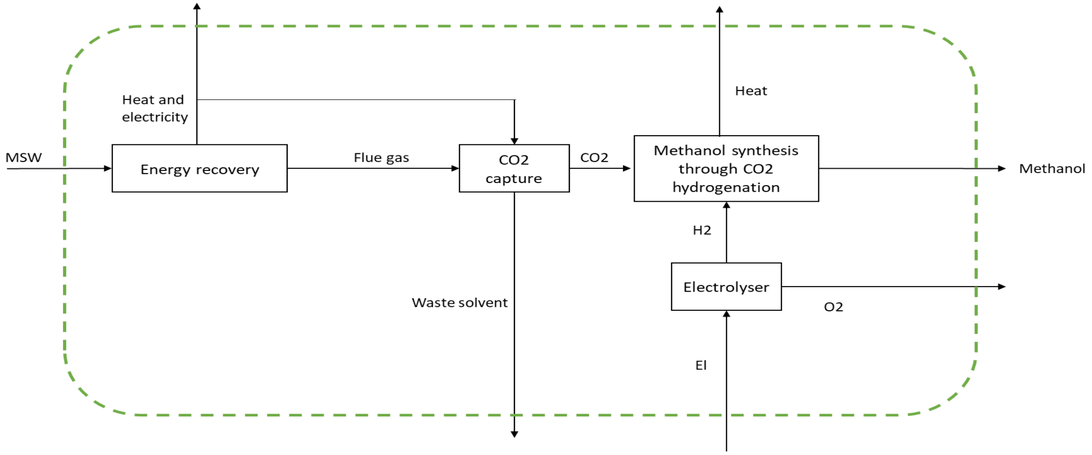
RFNBO

# Fuels from waste – appropriate classification




## Hydrogen boosted gasification of MSW

**RCF**
**Biofuel**
**RFNBO**



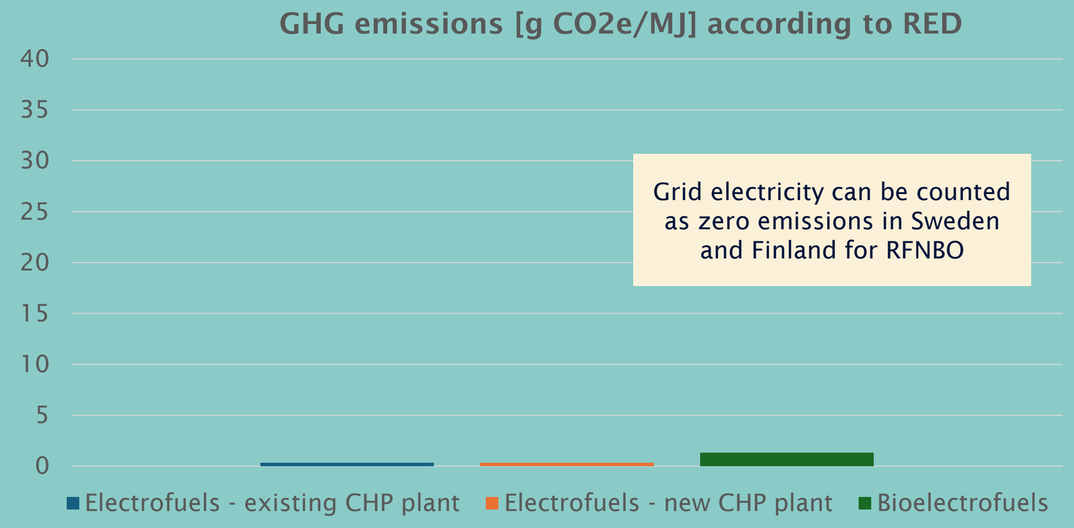

## New CHP + CCU plant based on MSW

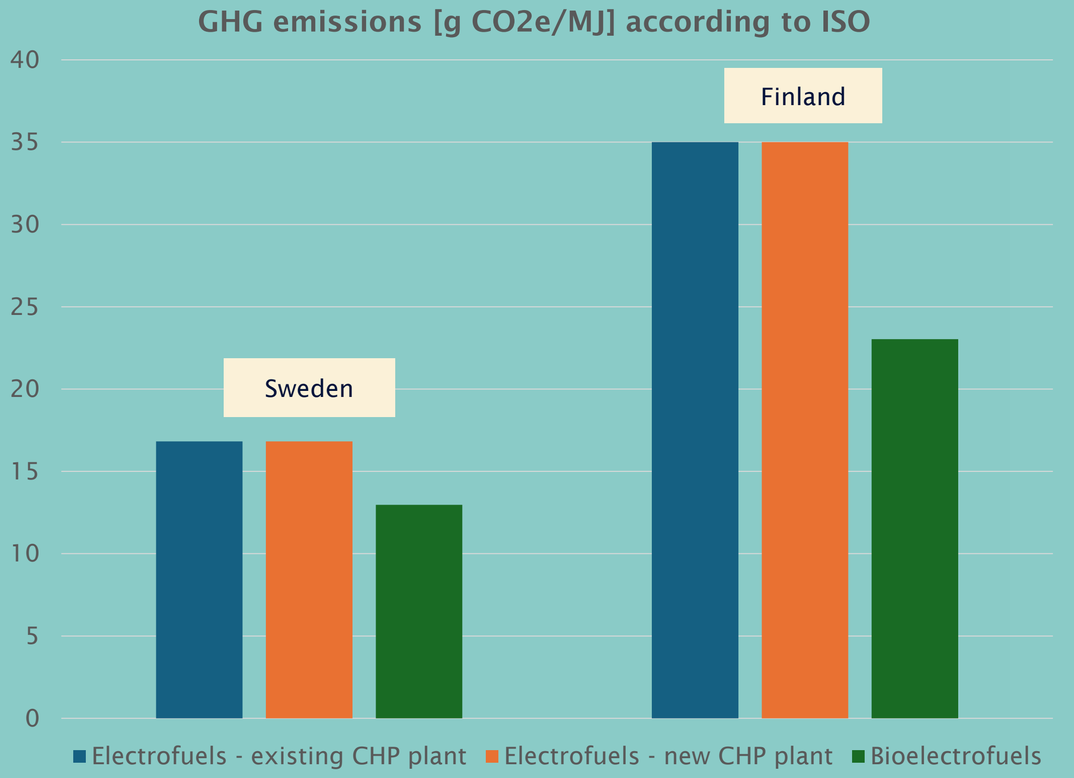
**RFNBO**
**RCF**
**Biofuel**

# Conclusions

iii. RED does not always reward resource-, energy-, and climate-efficient concepts

- The RED methodology efficiently promotes the use of renewable energy and residual streams—but is less effective when comparing the sustainability of different solutions or cases, such as in the context of new investments.
- There is very low, or no, climate burden assigned to biomass and electricity in some cases. Measures that reduce the use of biomass or electricity is hence not reflected or rewarded.
- Calculations according to ISO apply a lifecycle perspective to a greater extent and, for example, include indirect emissions related to renewable electricity and land use. In some cases, ISO-based results lead to different conclusions than calculations made with RED.



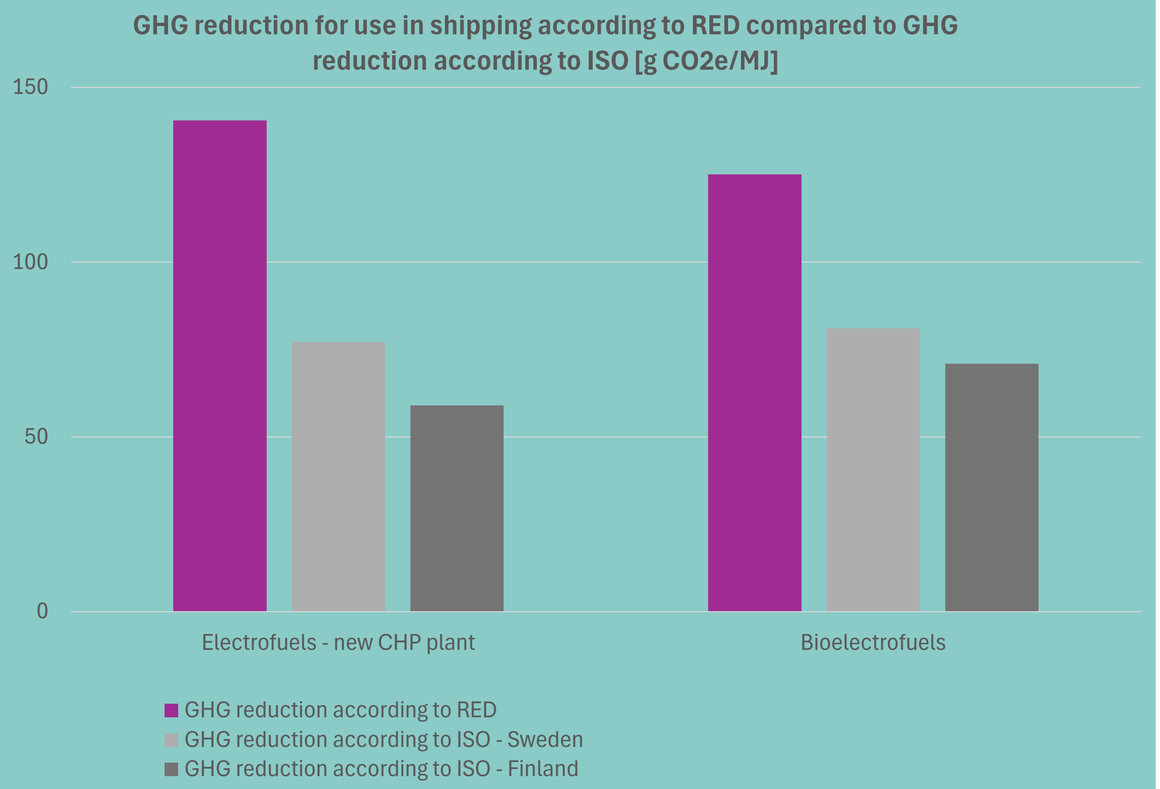

# Electrofuels vs Bioelectrofuels

According to RED:

- GHG emissions for electrofuels (in Sweden and Finland) are very low (almost negligible).
- Emissions for bioelectrofuels are also very low—though higher than for electrofuels.

According to ISO:

- GHG emissions differ in both absolute and relative terms compared to RED.
- For Swedish conditions, emissions for electrofuels are 30% higher than for bioelectrofuels.
- The corresponding figure for Finland is nearly 50% higher.




*Advanced biofuels and biogas for aviation and maritime transport shall be considered as 1.2 times their energy content, and RFNBO as 1.5 times their energy content*

# Electrofuels vs Bioelectrofuels

- The GHG reduction differs significantly in both absolute and relative terms between RED and ISO in this example.
- For target compliance according to RED, the counted GHG reduction is more than 10% higher for electrofuels than for bioelectrofuels.
- According to ISO, the GHG reduction is about 5% higher for bioelectrofuels in Sweden and about 20% higher for bioelectrofuels in Finland, compared to electrofuels.

# General Recommendations

i. RED lacks clarifications and concrete examples and is therefore generally difficult to interpret

ii. RED is inconsistent

iii. RED does not always reward resource-, energy-, and climate-efficient concepts

i. RED needs to be clarified and supplemented with concrete examples

ii. The RED framework should be made consistent

iii. RED should reward resource-, energy-, and climate-efficient concepts

# Thank you

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Project web page:
Bio+ | Classification and sustainability criteria for renewable fuels in the EU - what actually applies? - Bio+