



# CertifHy– Developing a European guarantee of origin scheme for green hydrogen

## Definition of Green Hydrogen

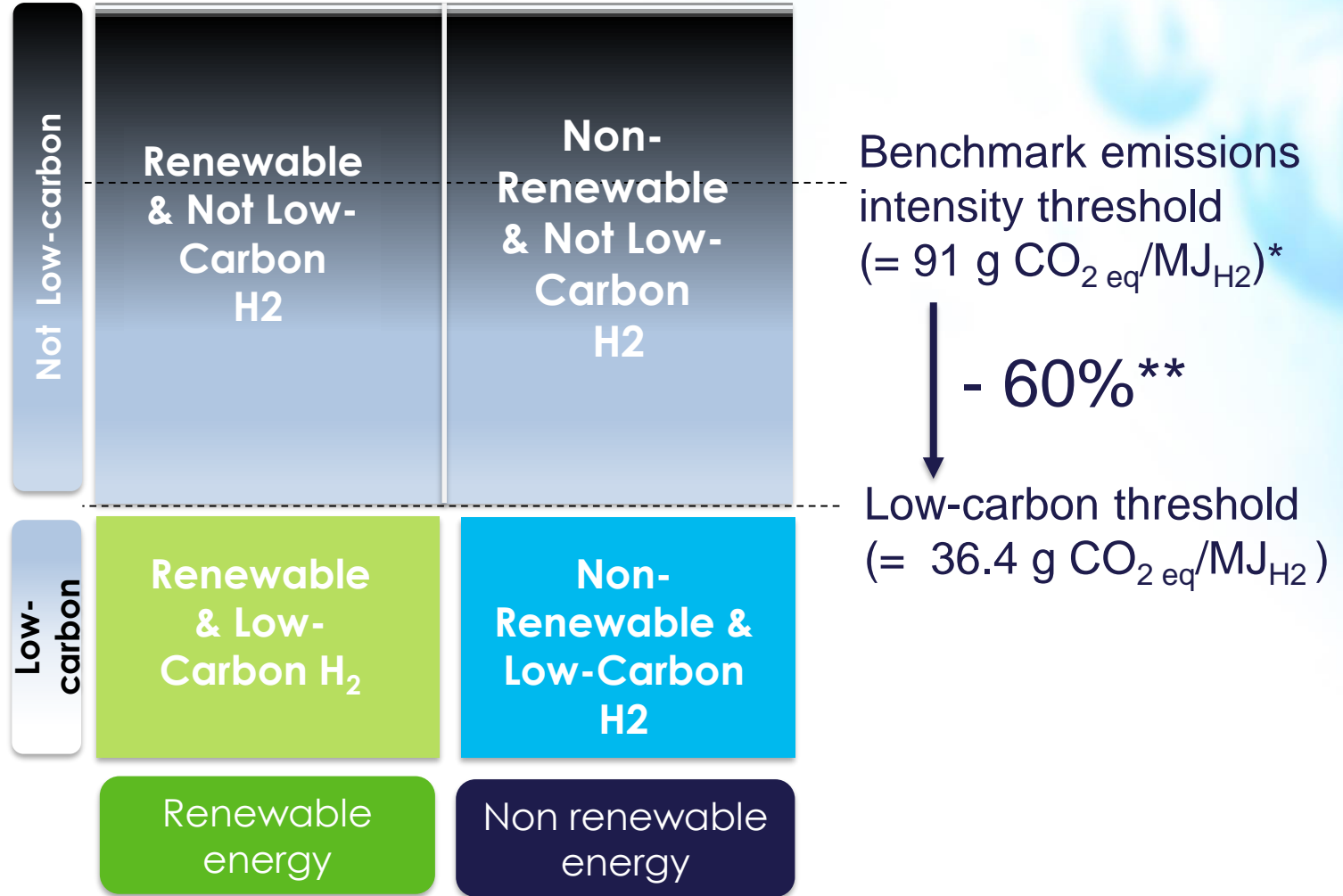
**Frederic Barth**  
**Hinicio**

Project co-finance by the FCH JU under FP7:



- Definition of green hydrogen
  - ➔ – Input from stakeholder consultation
  - Renewable share: definition and illustrations
  - Application of the two GHG thresholds
  - Examples

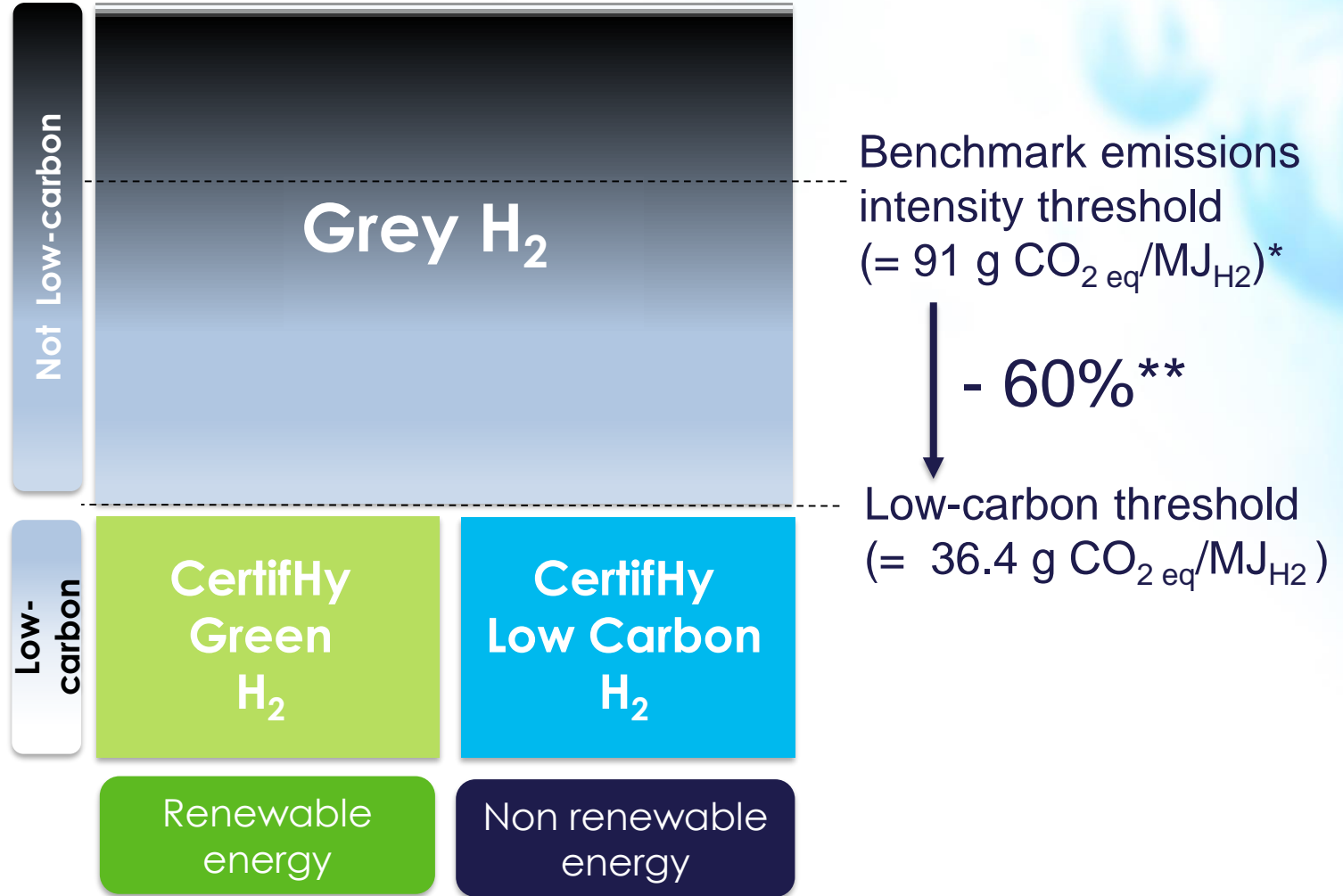
“GHG emissions need to be considered”:  
 “Low carbon” = at least 60% less emissions than BAT benchmark



\* Best Available Technology = Natural gas steam methane reforming >95% of hydrogen market

\*\* cfr RED reduction requirement for biofuels in 2018

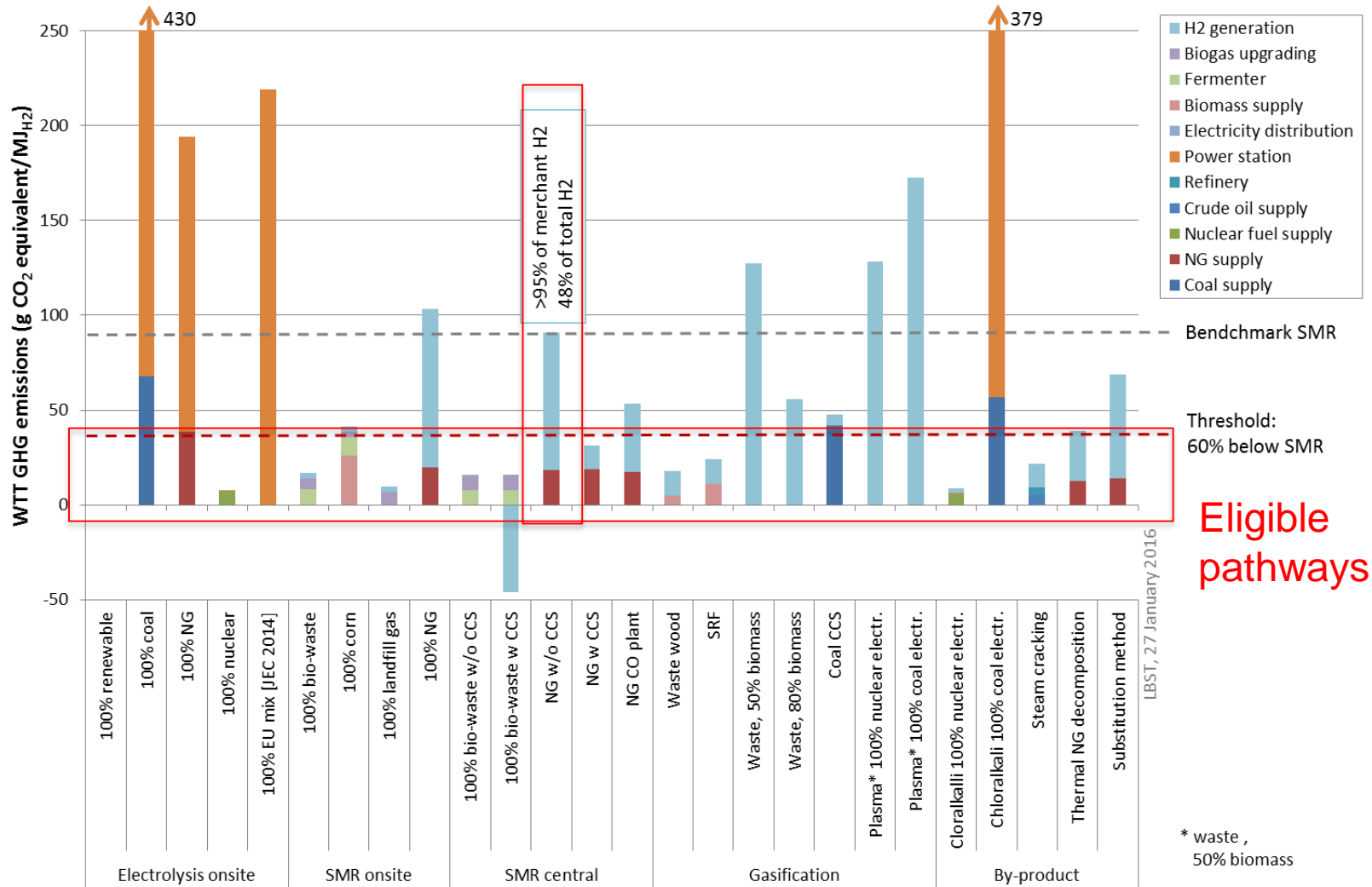
“Both Renewables and GHG Emission targets of hydrogen users need to be addressed”



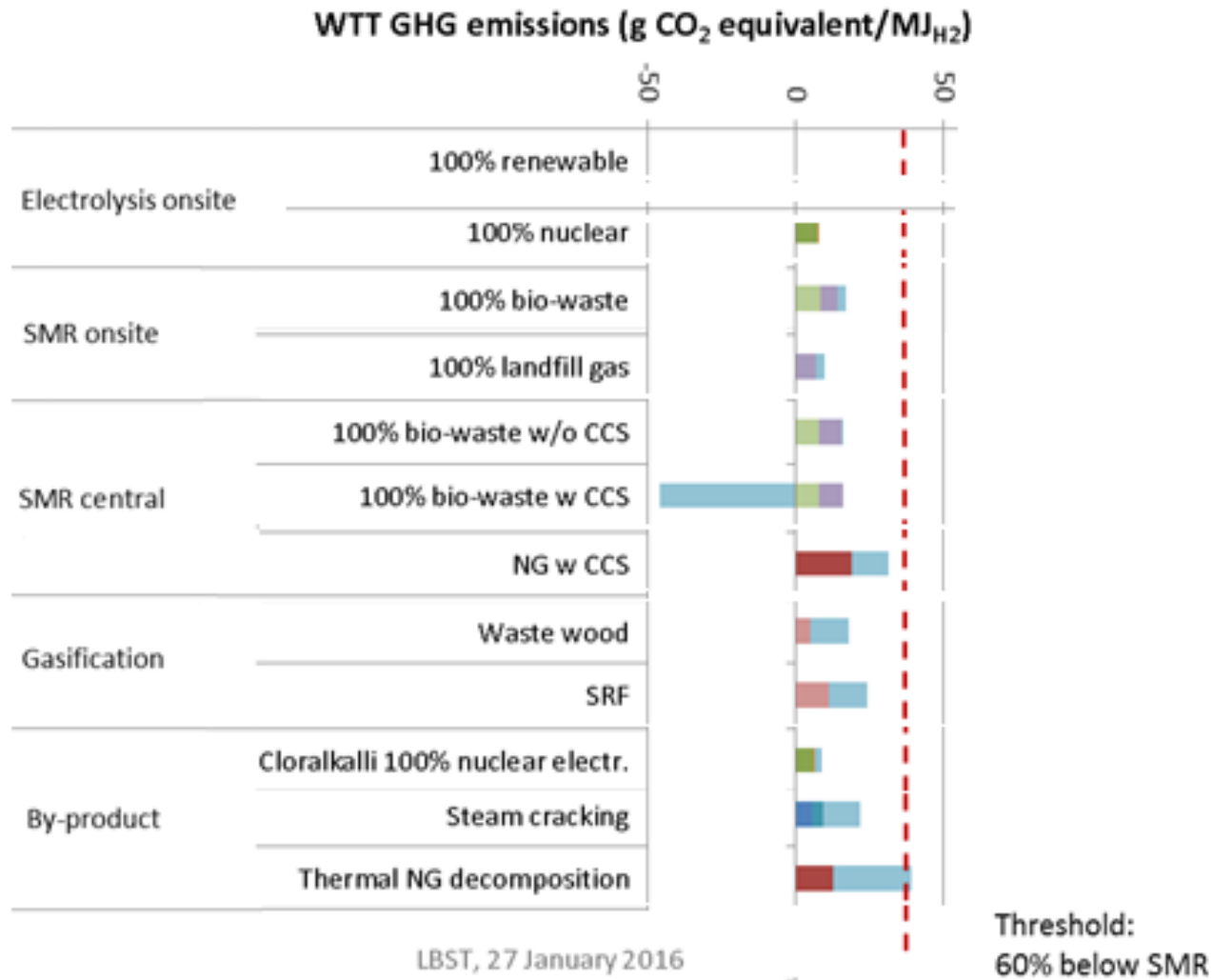
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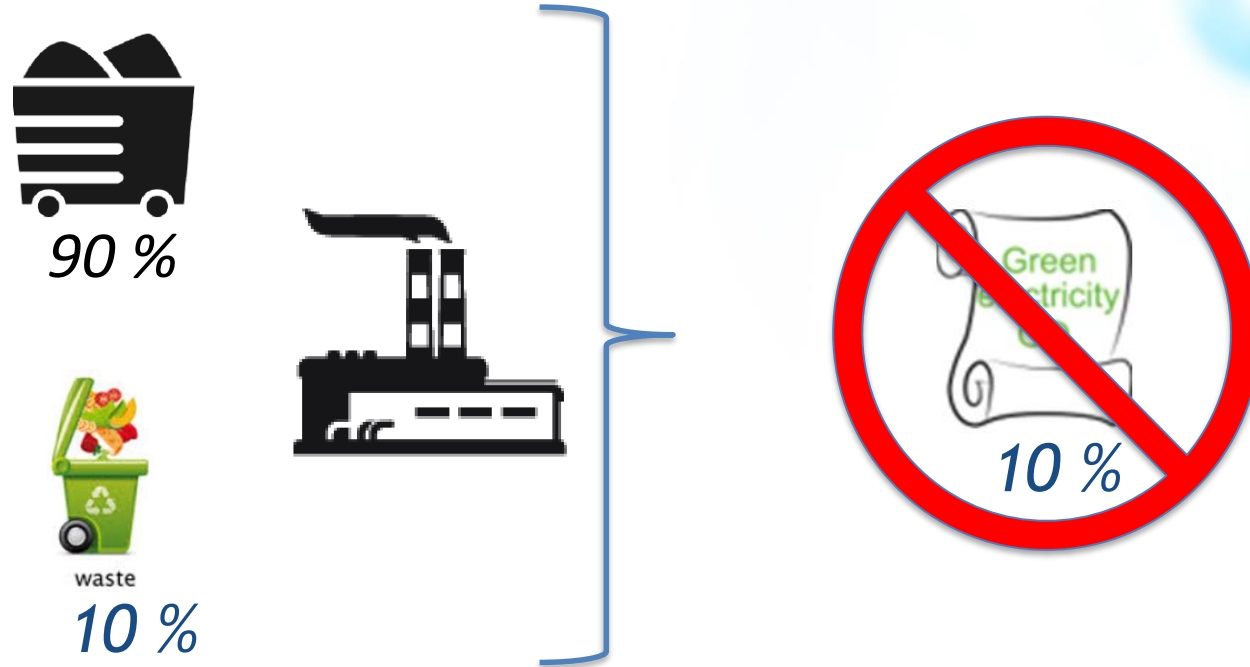
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# The low carbon benchmark has been set at an ambitious level



# A CO<sub>2</sub> audit will tell you what's low carbon and what's not



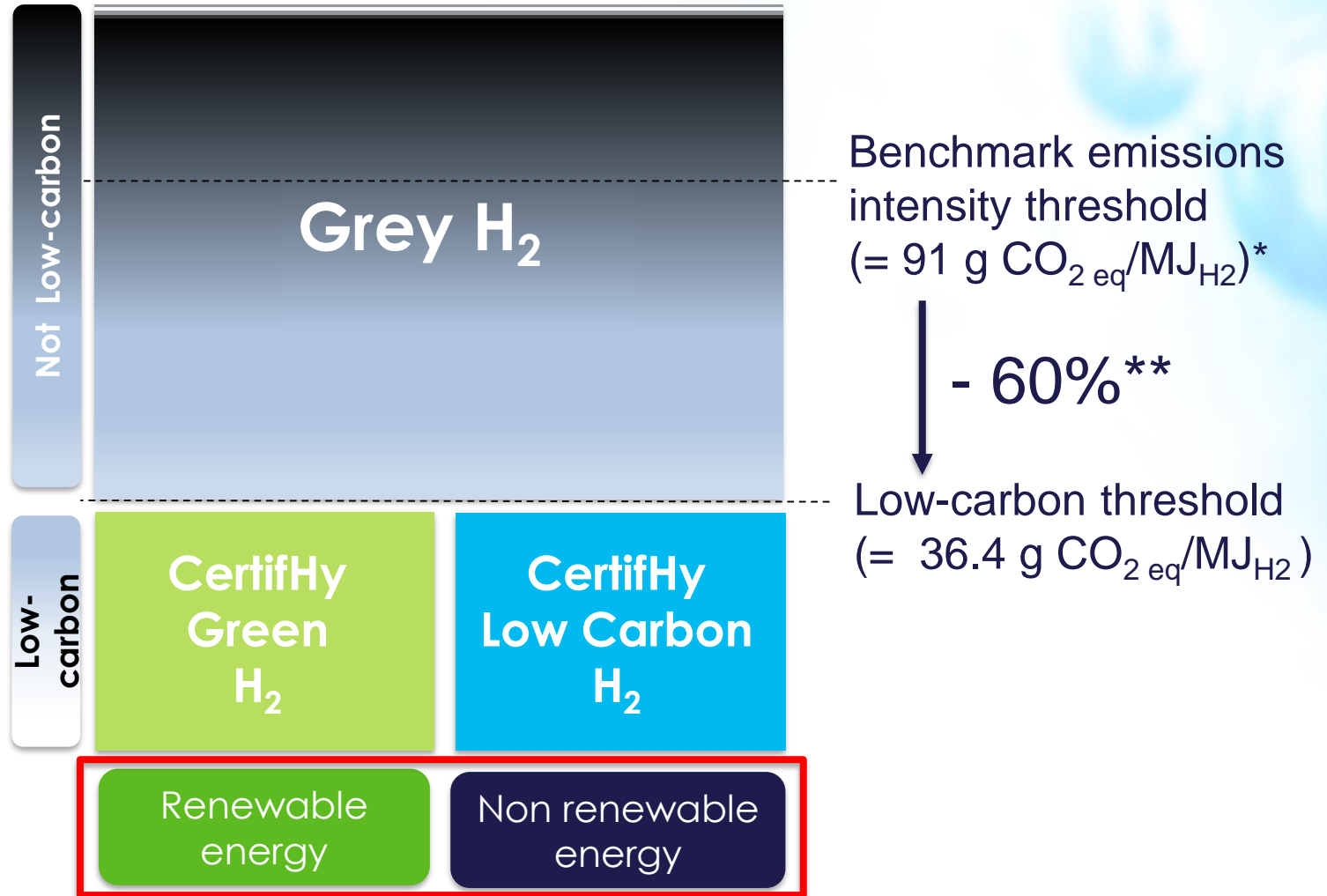


→ Overall emissions of a production facility issuing GO's should not exceed benchmark

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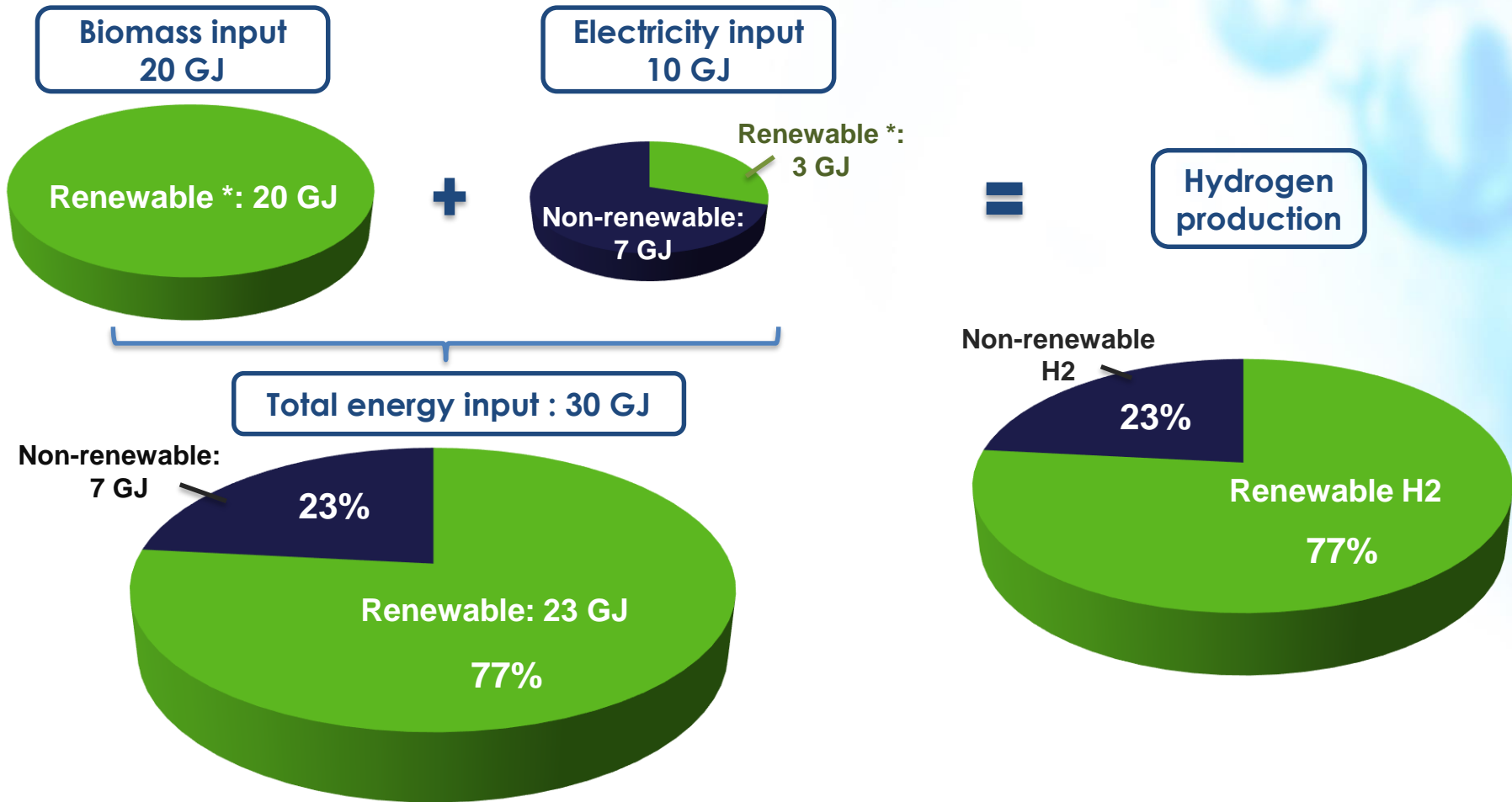
# Need to define the amount of Renewable Hydrogen produced by a process using multiple energy inputs



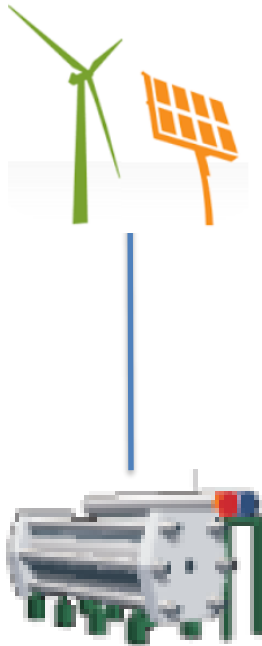
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# Renewable hydrogen will be as green as the energy used for its production

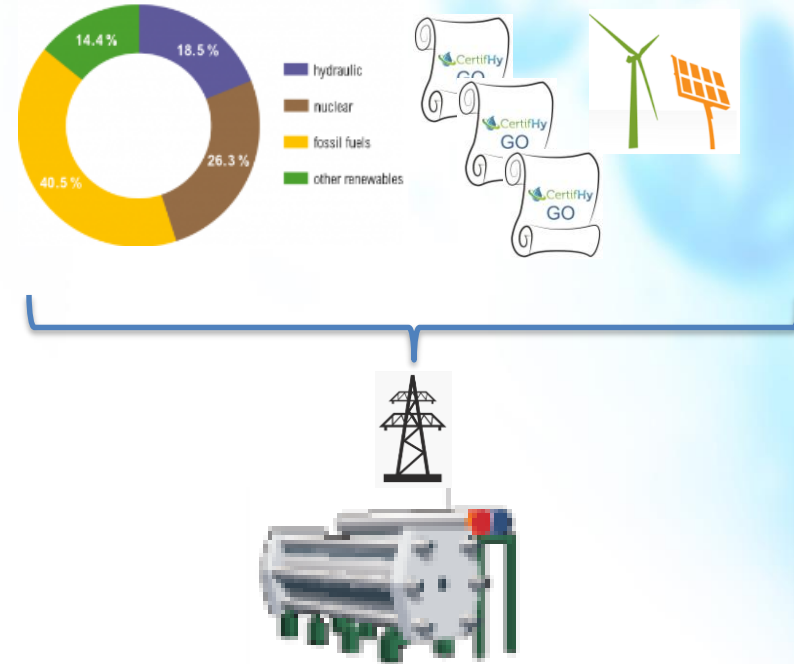


## Electrolysis – Direct Connection with Renewable Energy



Input	Output
100% Renewable Wind, PV, ..	100% Renewable H2

## Electrolysis – Grid Connected: EU mix + RE



Input	Output
60% Renewable (Wind, PV, Green elec GO...)	60% Renewable H2
40% EU Mix	

# Renewable hydrogen will be as green as the energy used for its production - example Steam Methane Reforming

## Biogas from bio-waste with non-renewable heat



**On-Site SMR**

Input	Output
81% biowaste	81% renewable H2
19% non renewable heat	

## Bio-methane from biowaste and Natural Gas

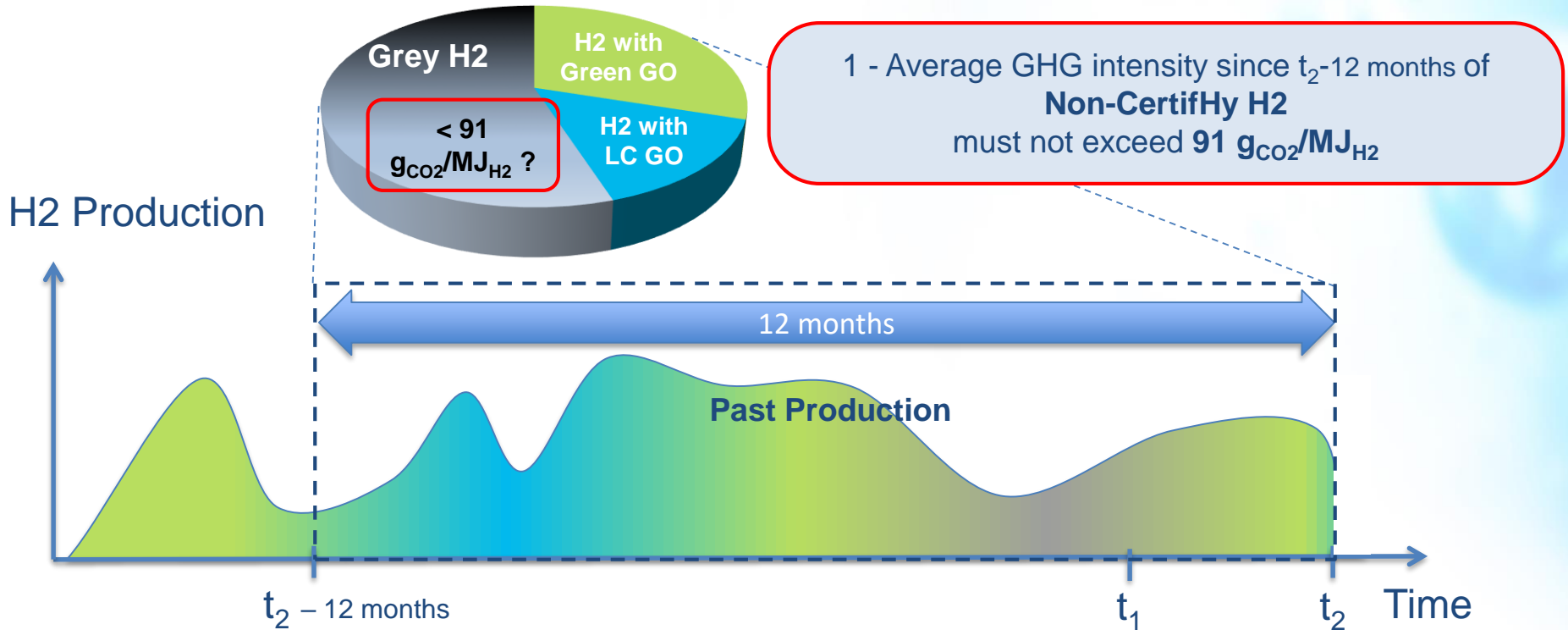


**Central SMR**

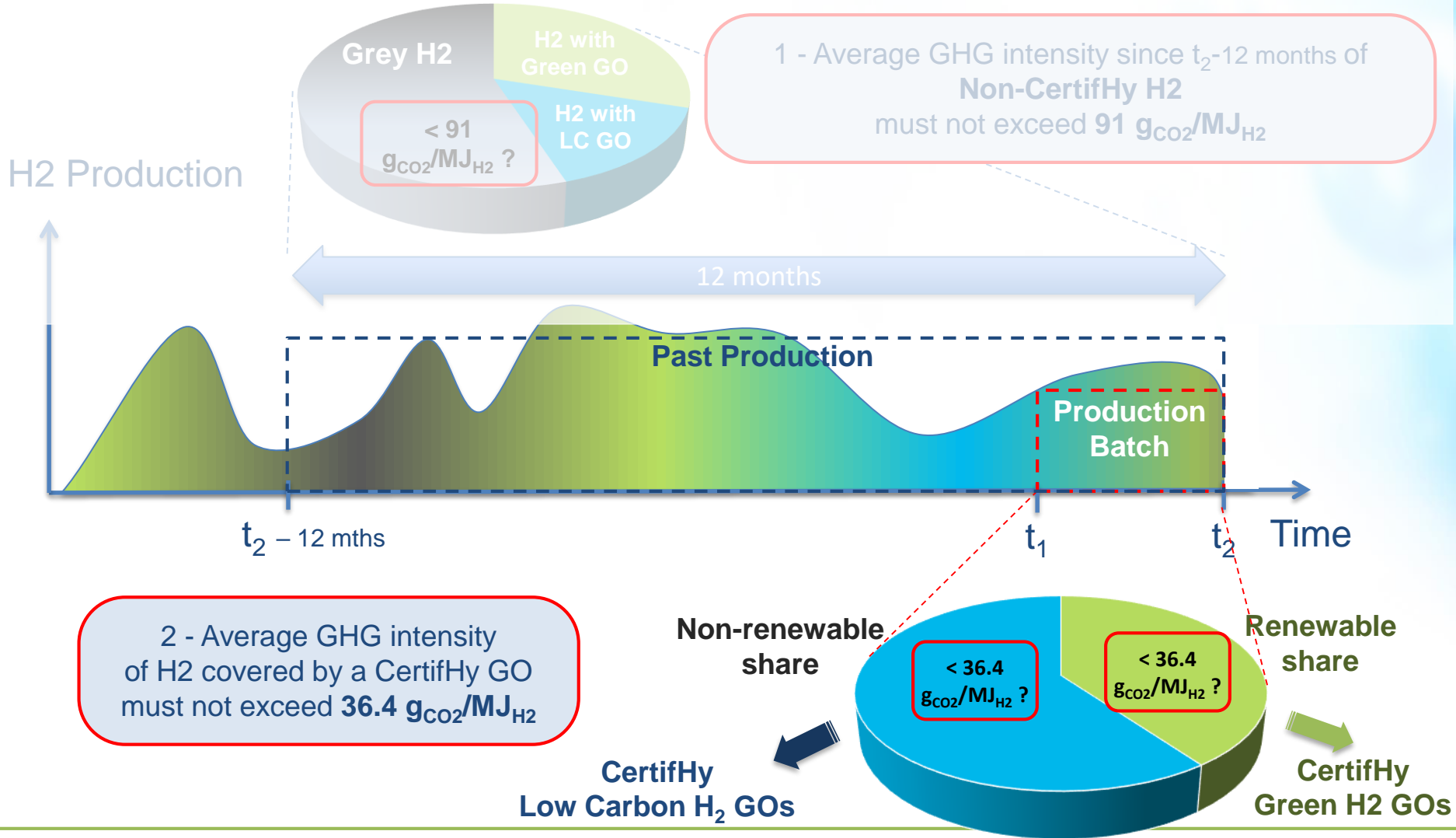
Input	Output
60% bio-methane from bio-waste (GOs)	60% renewable H2
40% natural gas	

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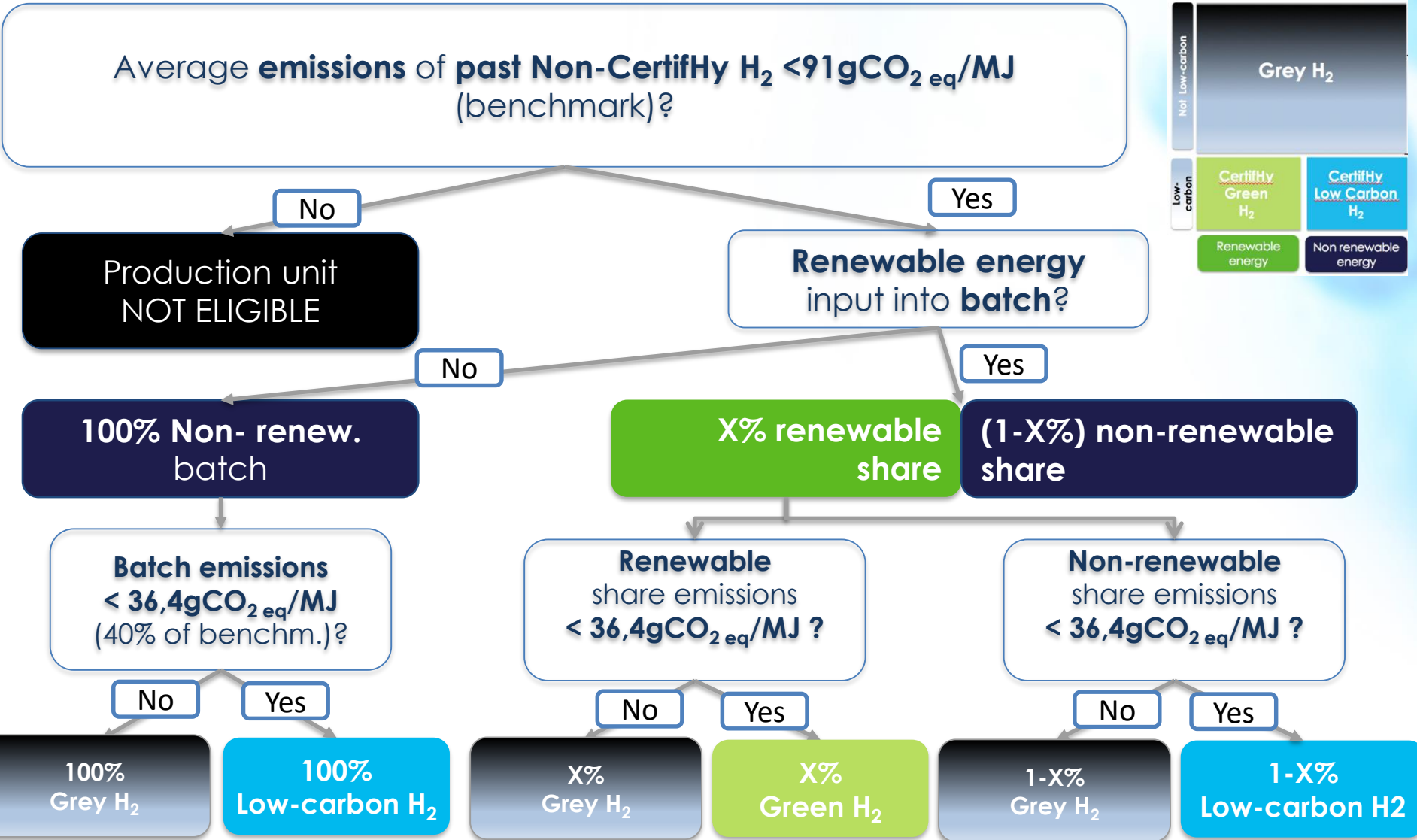
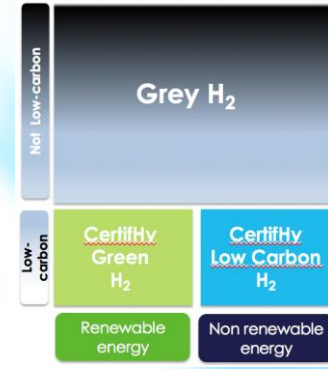
# 1- Benchmark threshold applied to Past Production of the Hydrogen Plant



# 2 - Low Carbon threshold applied to Production Batch

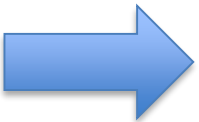


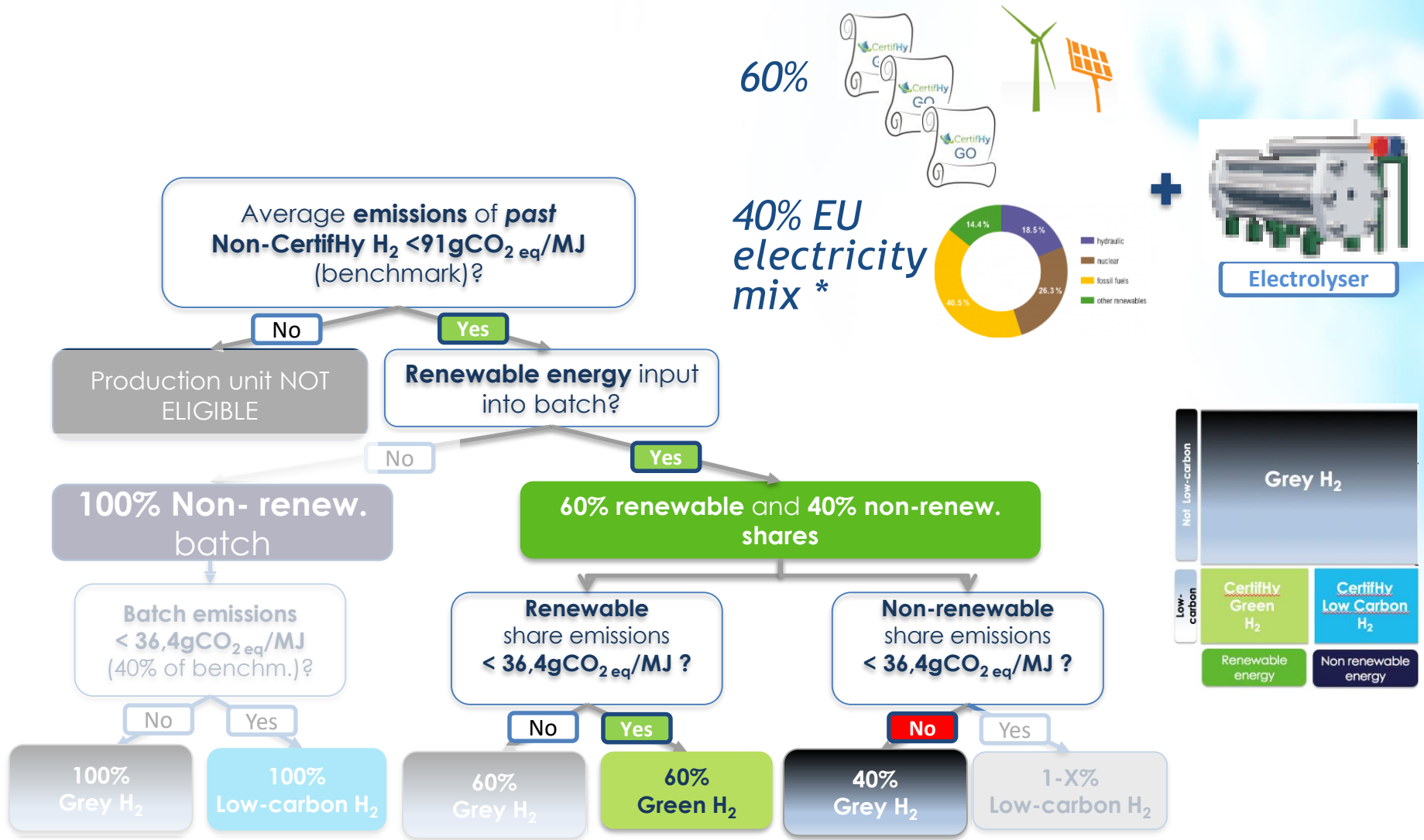
# Decision tree presenting the criteria for producing Low-Carbon and CertifHy Green H<sub>2</sub>



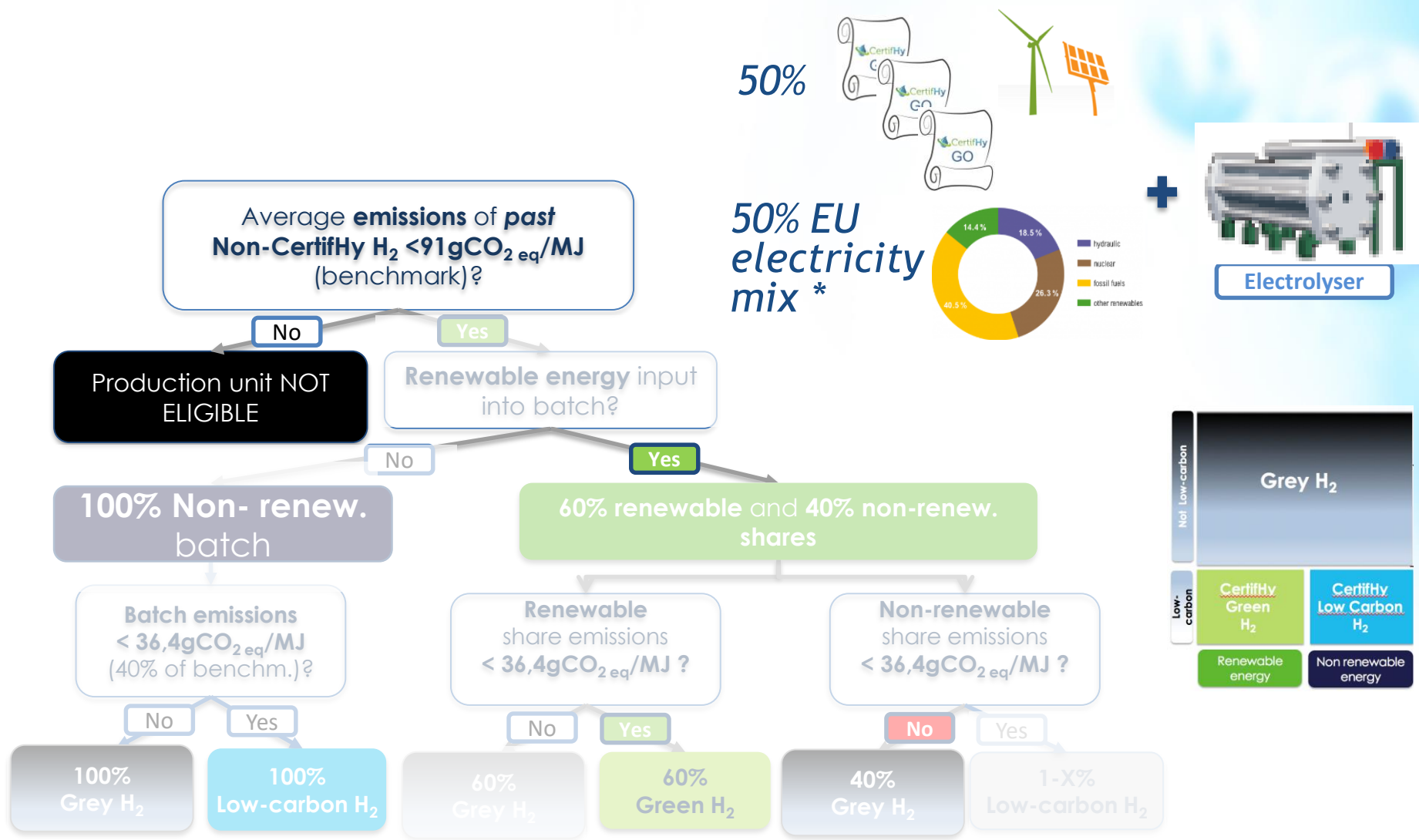


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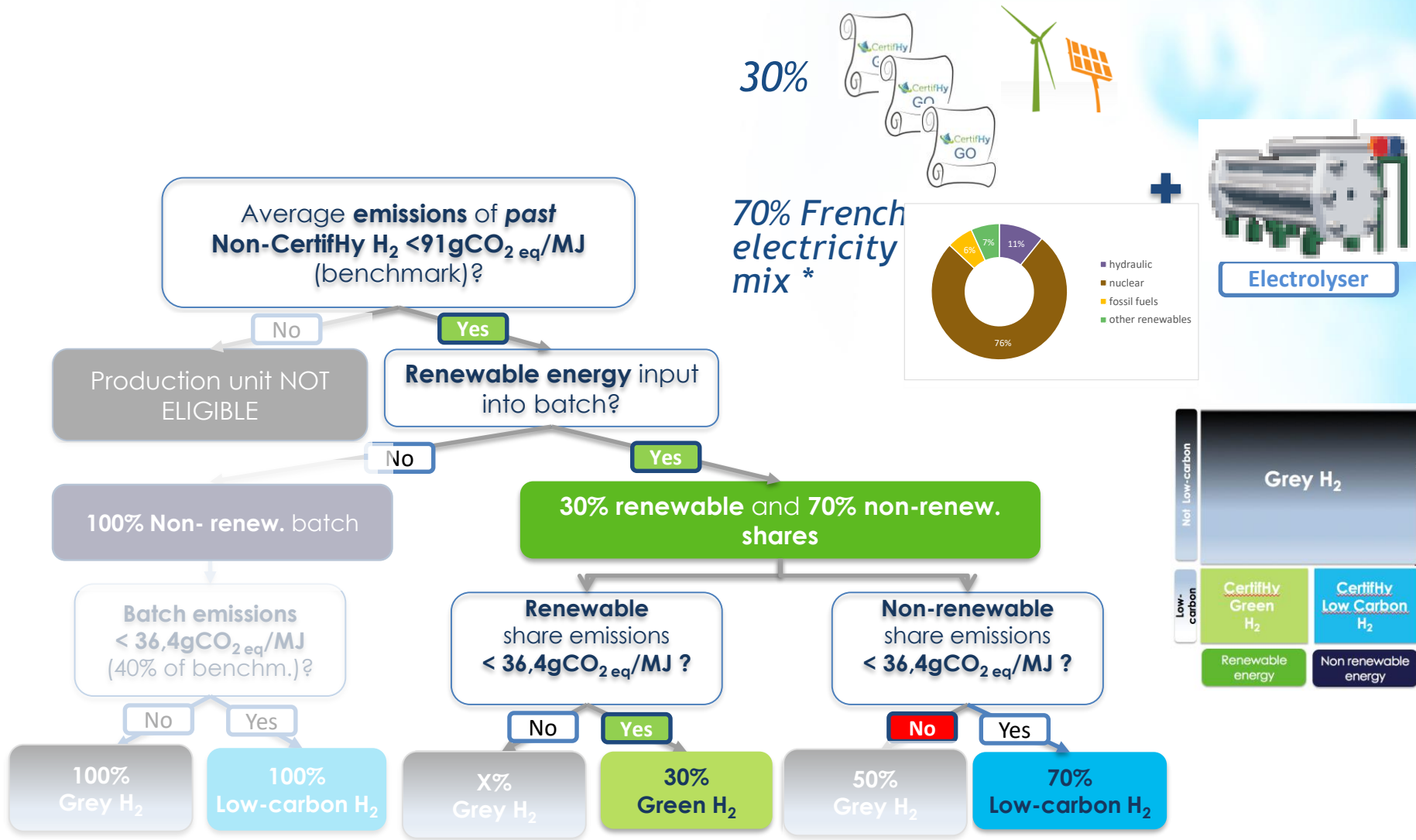




\* GHG content as reflected by electricity supplier's mix



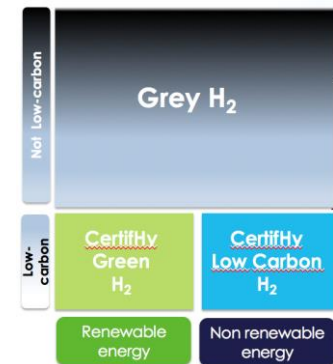
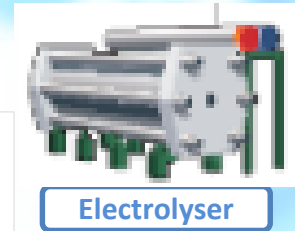
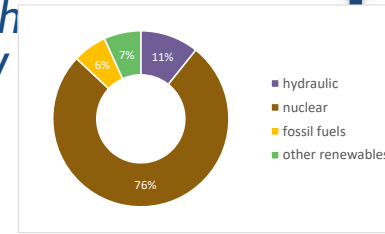
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30%

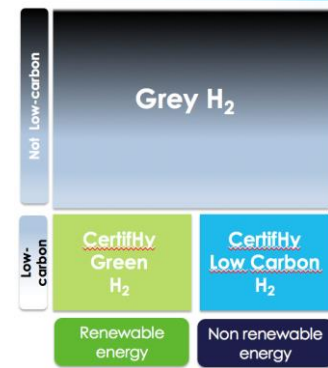
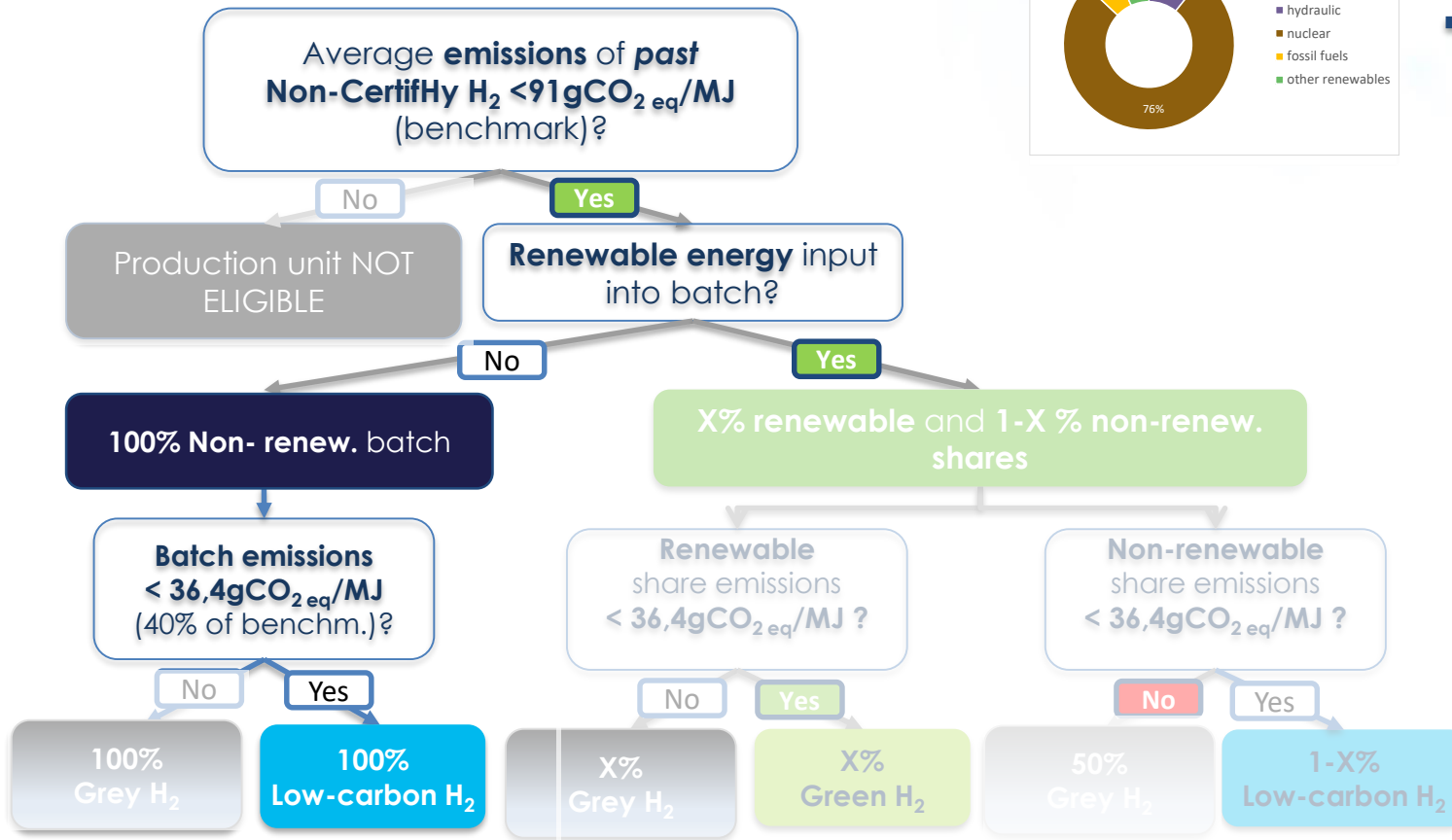
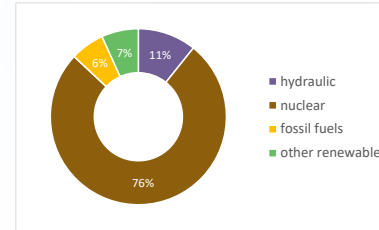


70% French electricity mix \*



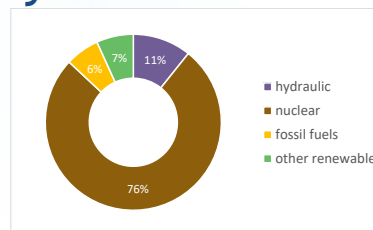
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100% French electricity mix \*

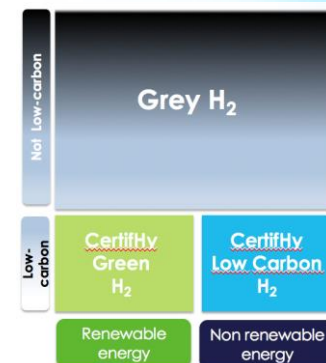
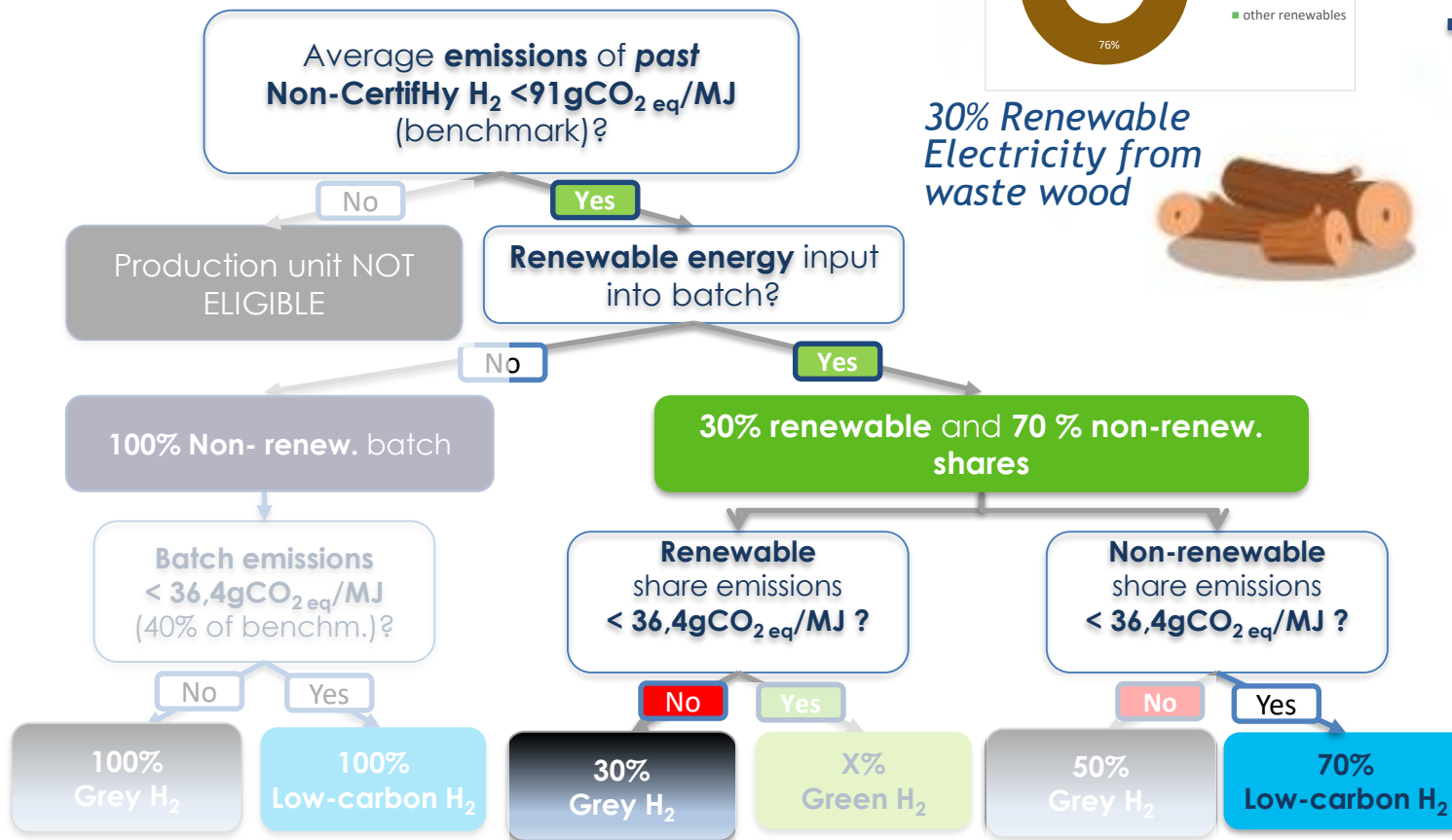


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70% French electricity mix \*



30% Renewable Electricity from waste wood



\* GHG content as reflected by electricity supplier's mix

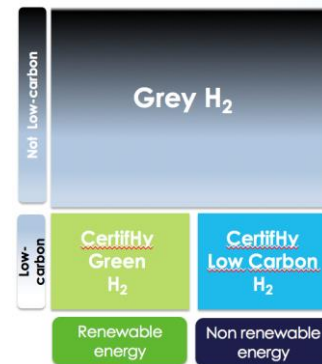
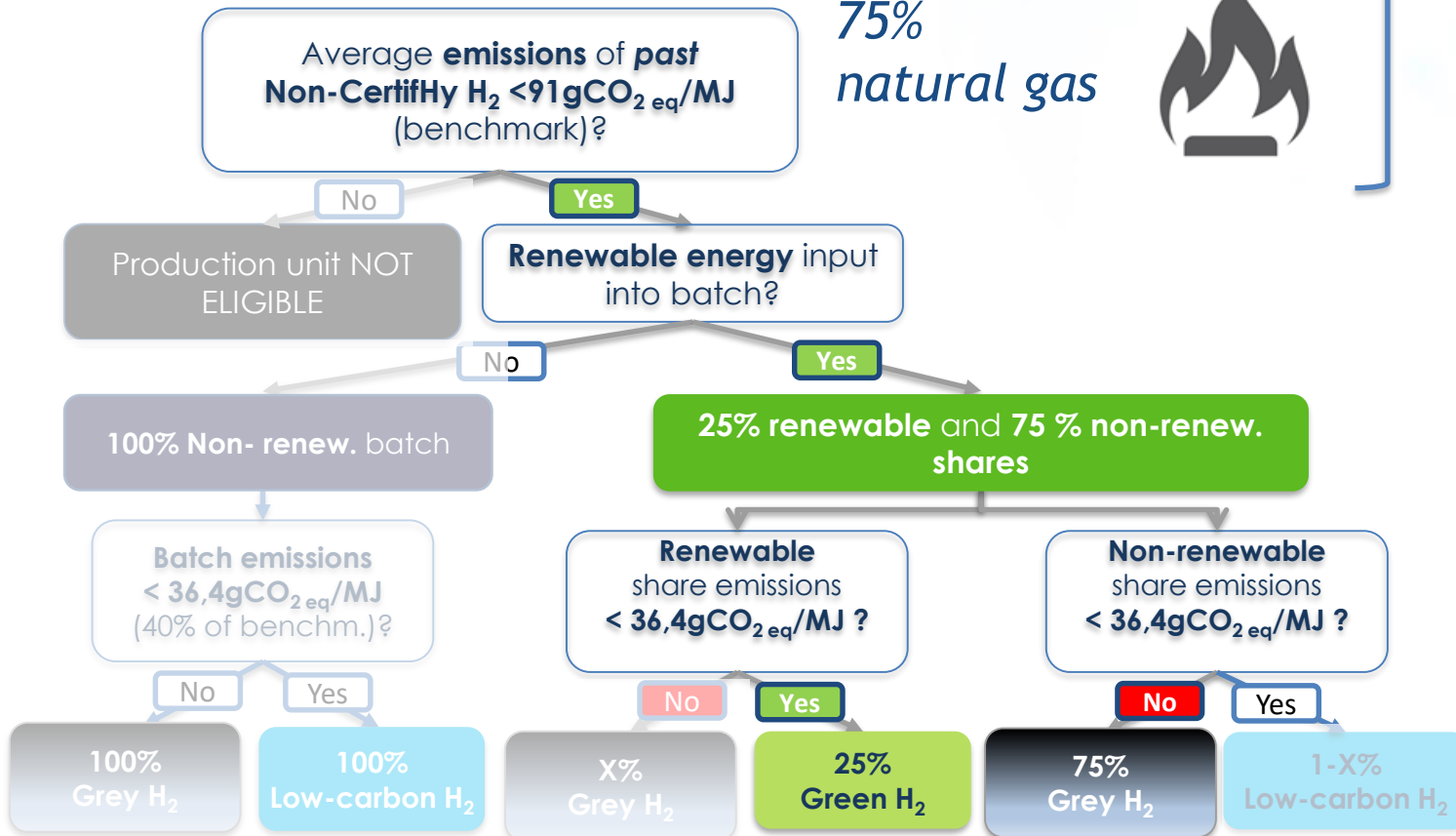
25% bio-methane from bio-waste

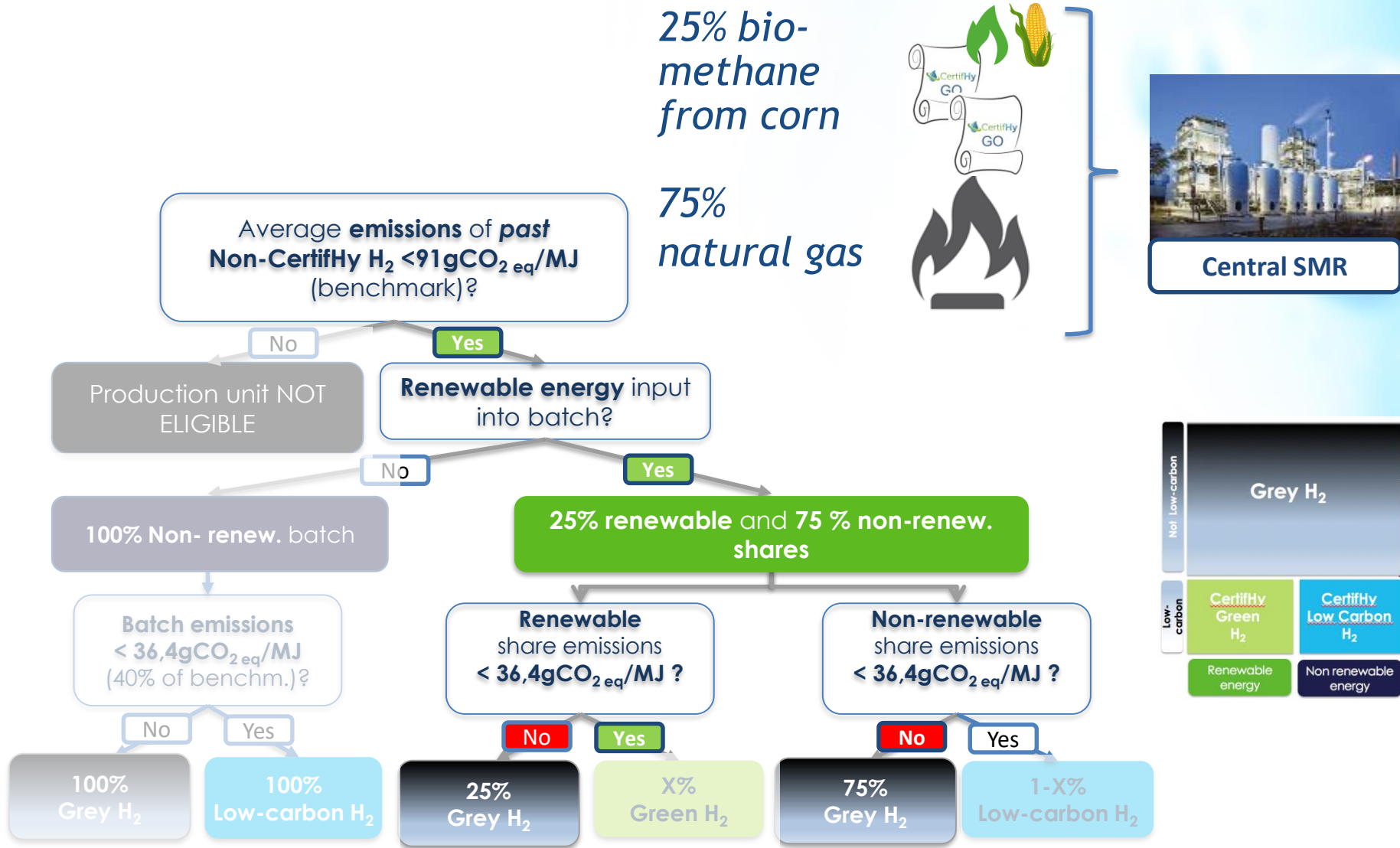


75% natural gas



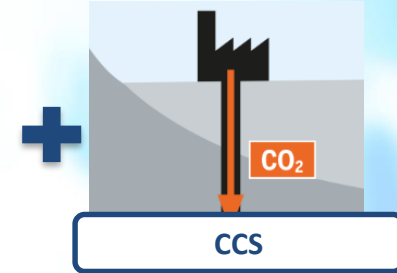
Central SMR



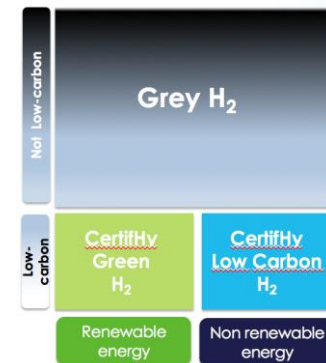
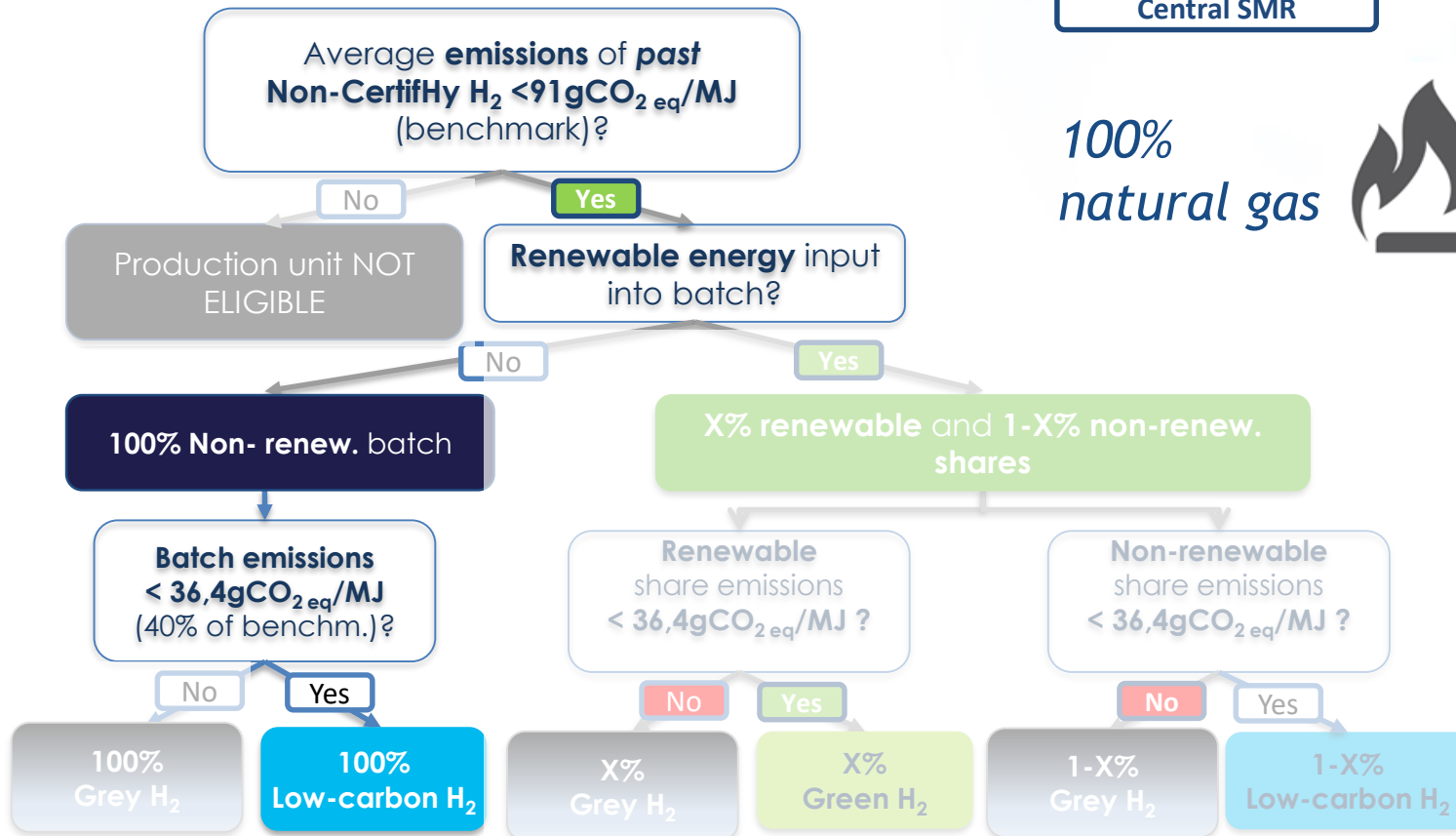


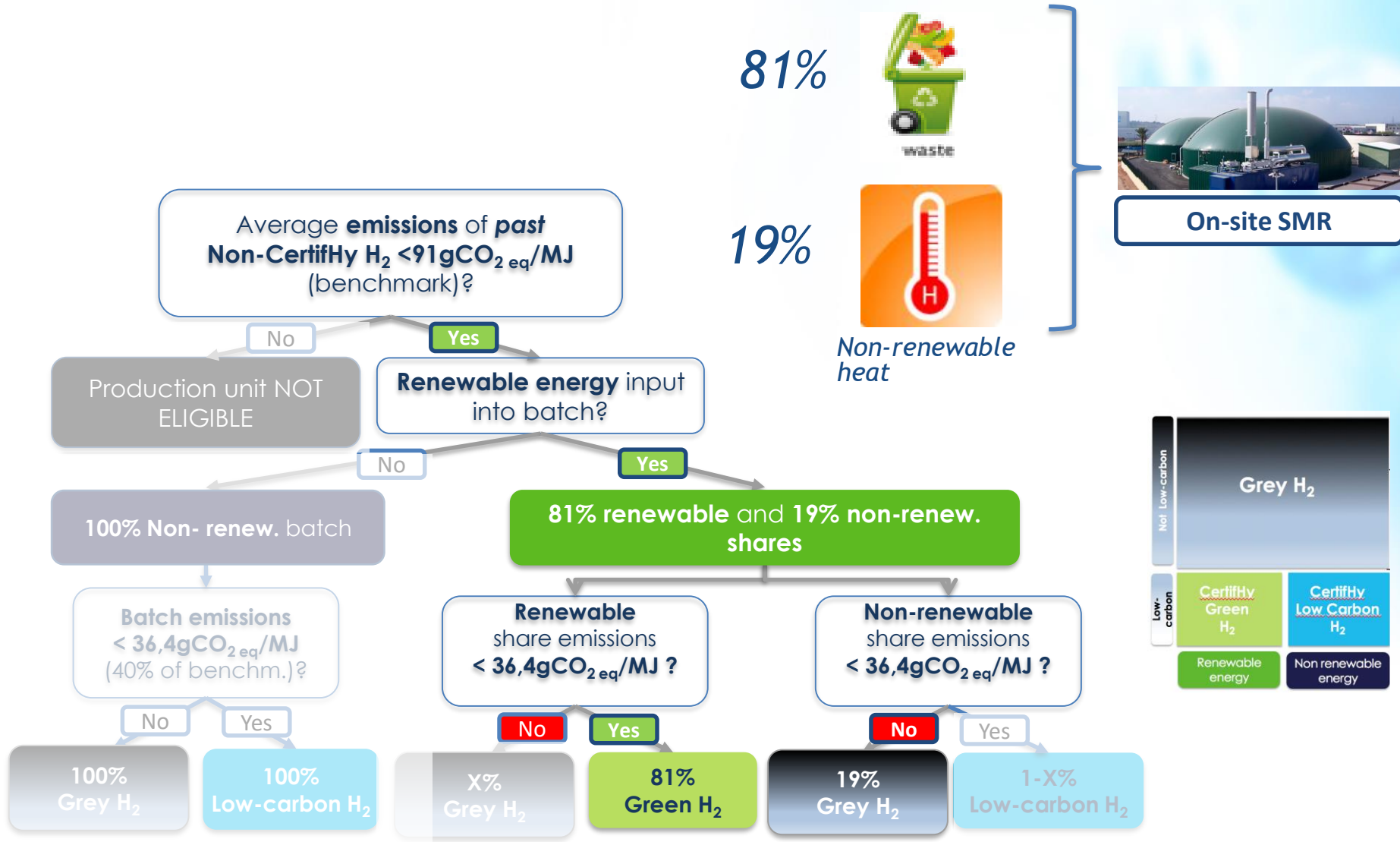
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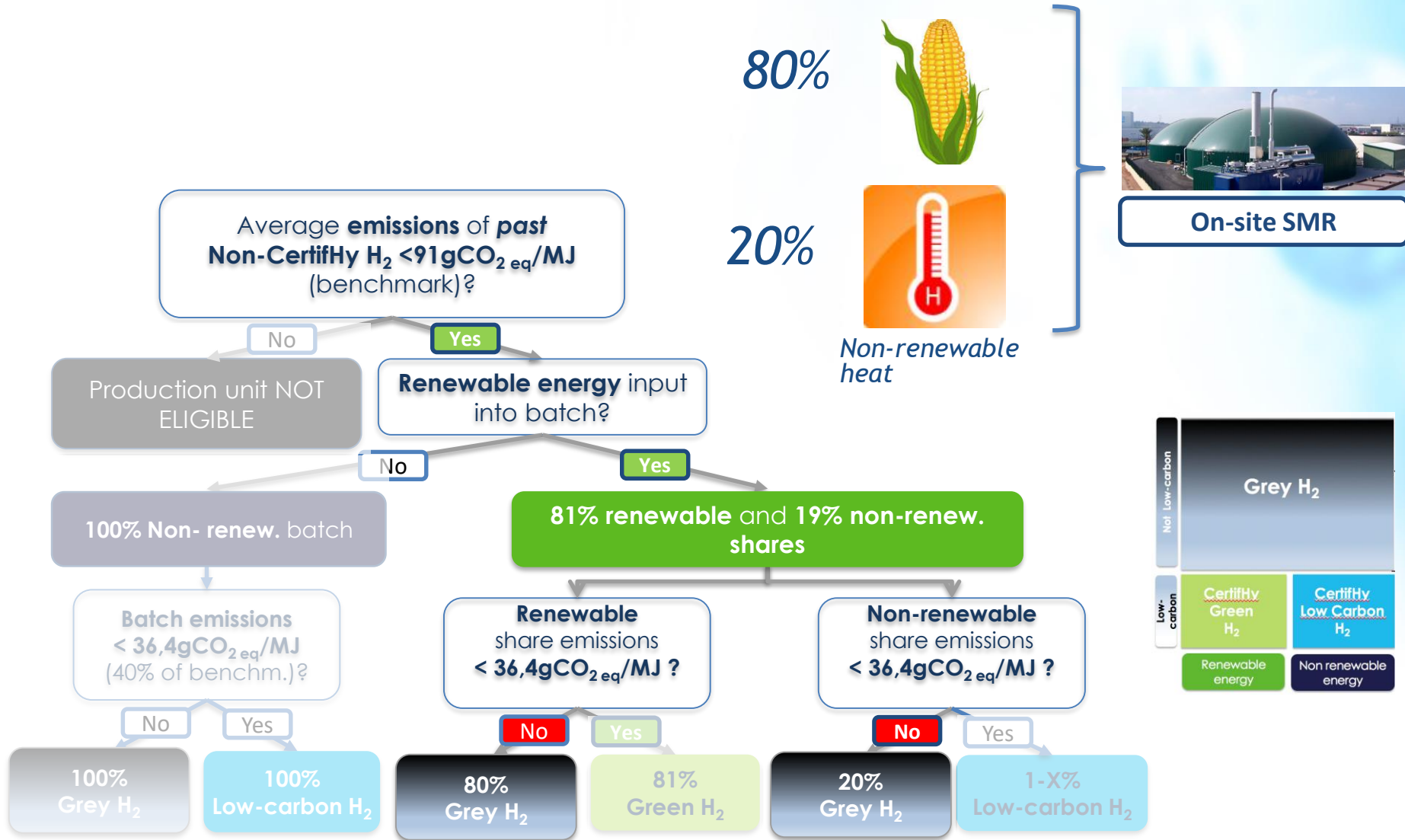




100%  
natural gas







Q & A

Before GO transfer

After GO transfer

