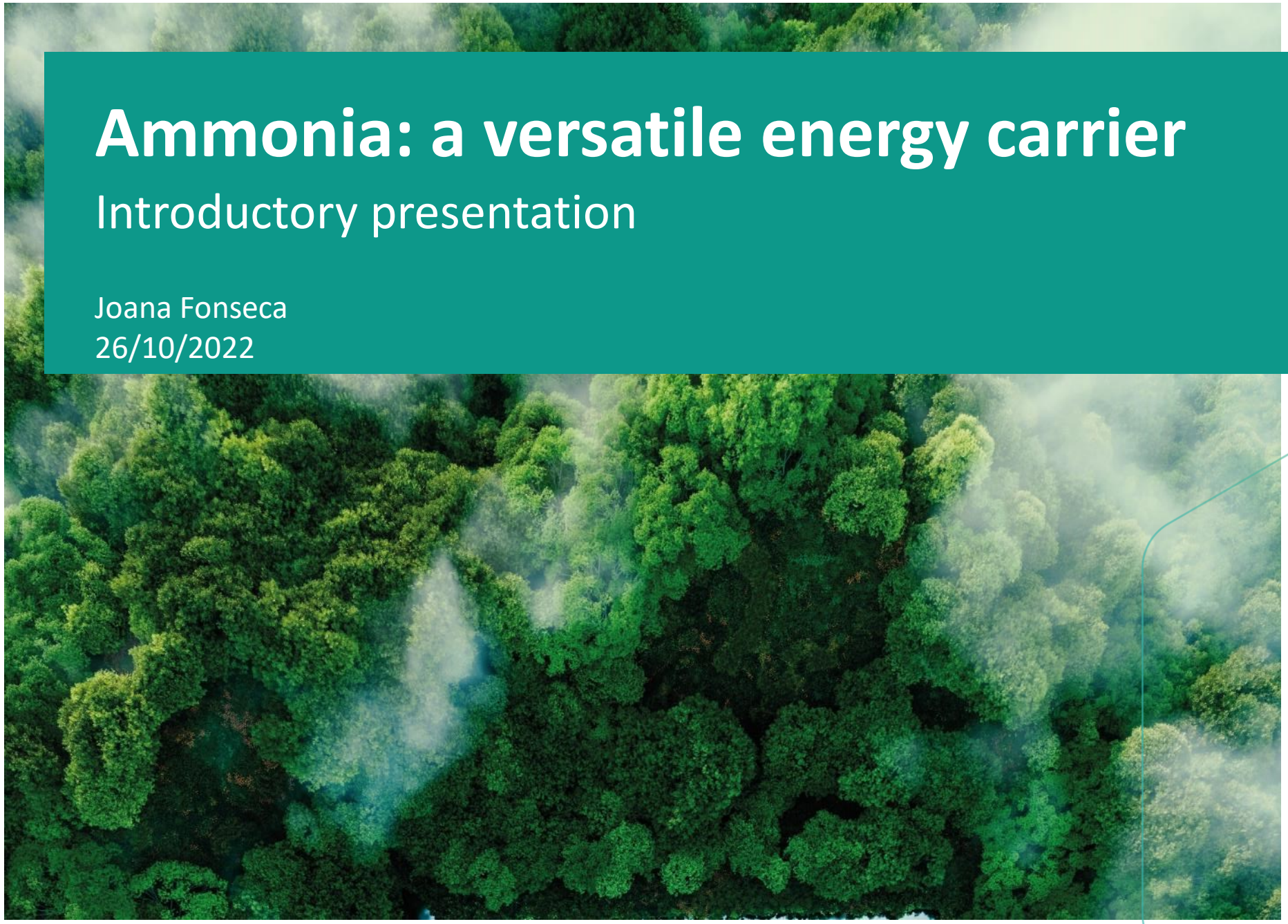


# Ammonia: a versatile energy carrier

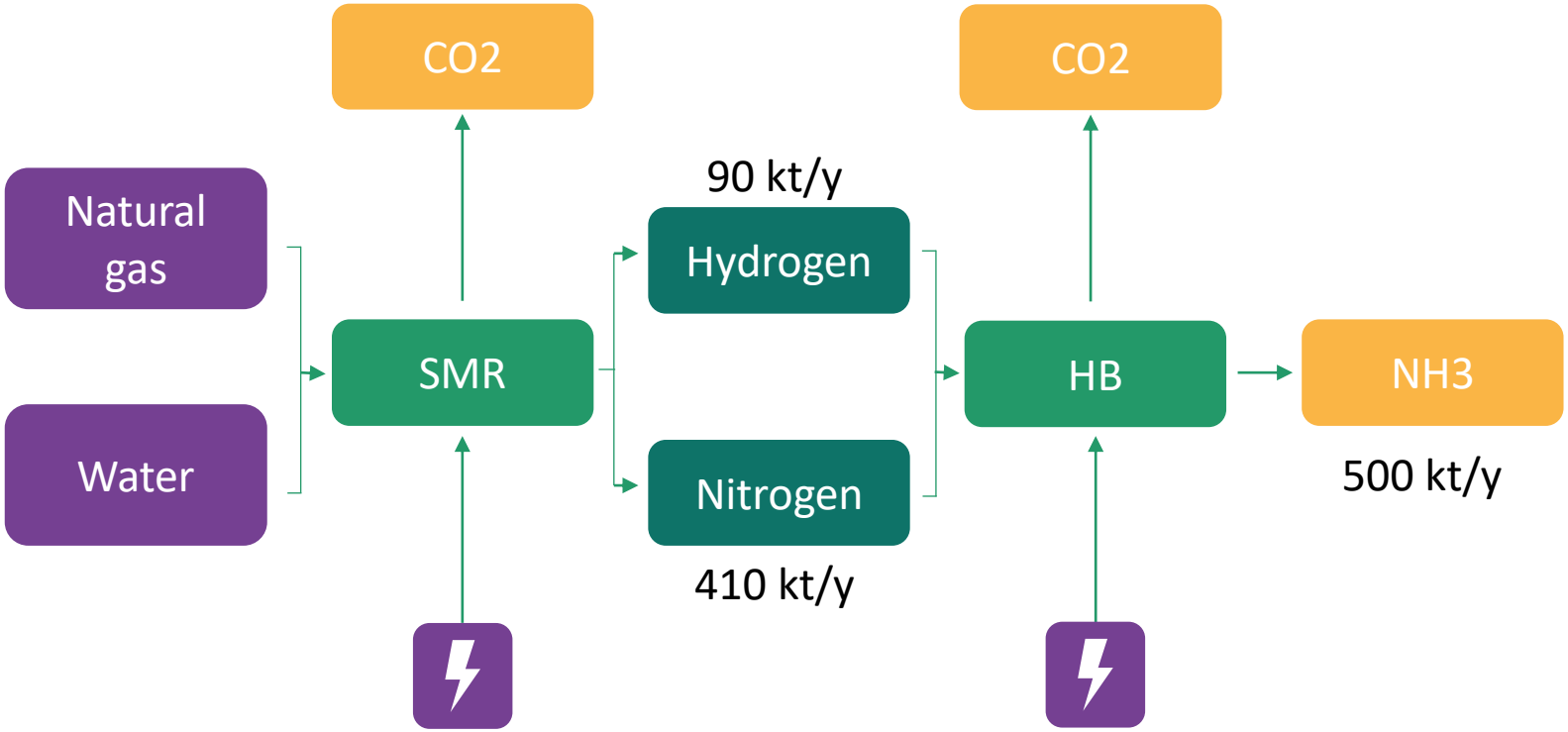
## Introductory presentation

Joana Fonseca
26/10/2022

Hydrogen Europe

# Conventional production pathway for ammonia (SMR)

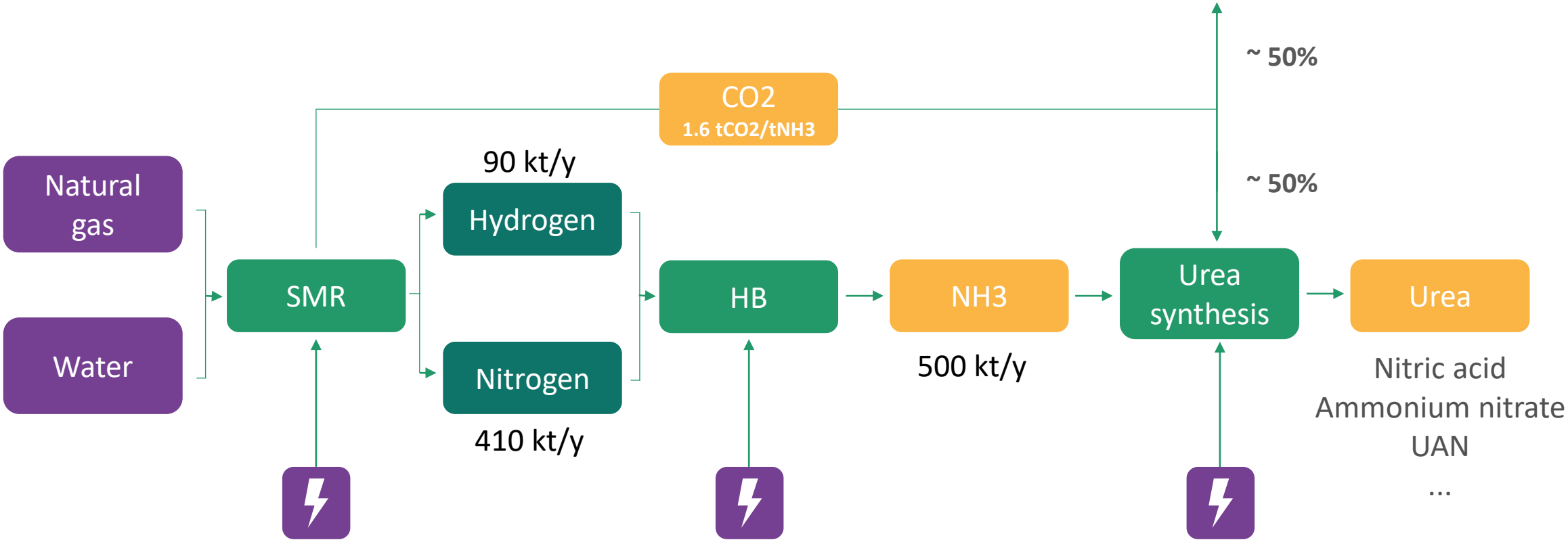
72% of global ammonia production comes from natural gas steam methane reforming.



# Conventional production pathway for ammonia (SMR)

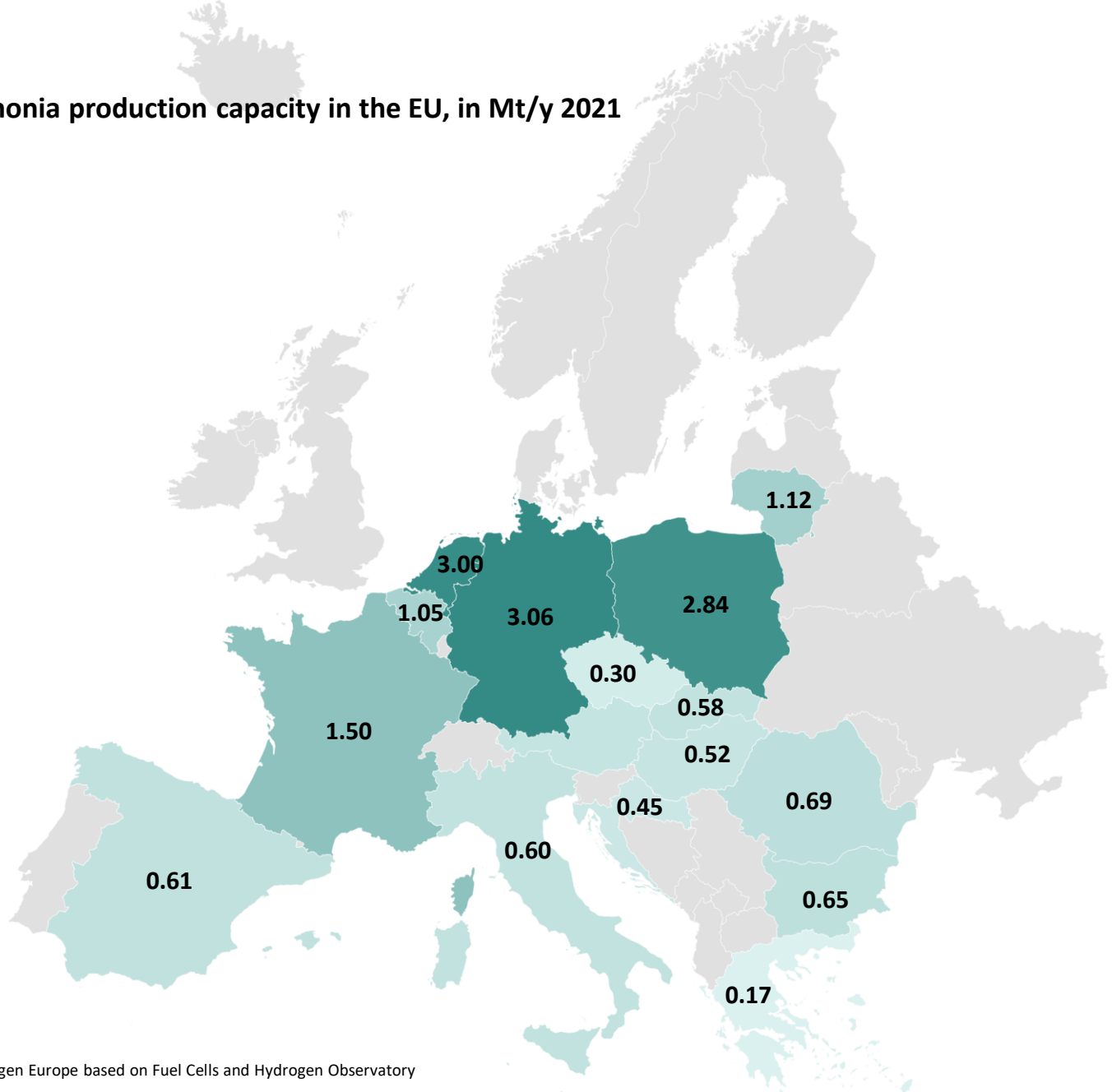
**Avg emission rate:** 1.7 tCO2/tNH3 (whole process)

**Total emissions in Europe:** 28 MtCO2/y



# Production of ammonia in Europe

**Ammonia production capacity in the EU, in Mt/y 2021**




Source: Hydrogen Europe based on Fuel Cells and Hydrogen Observatory

## Europe

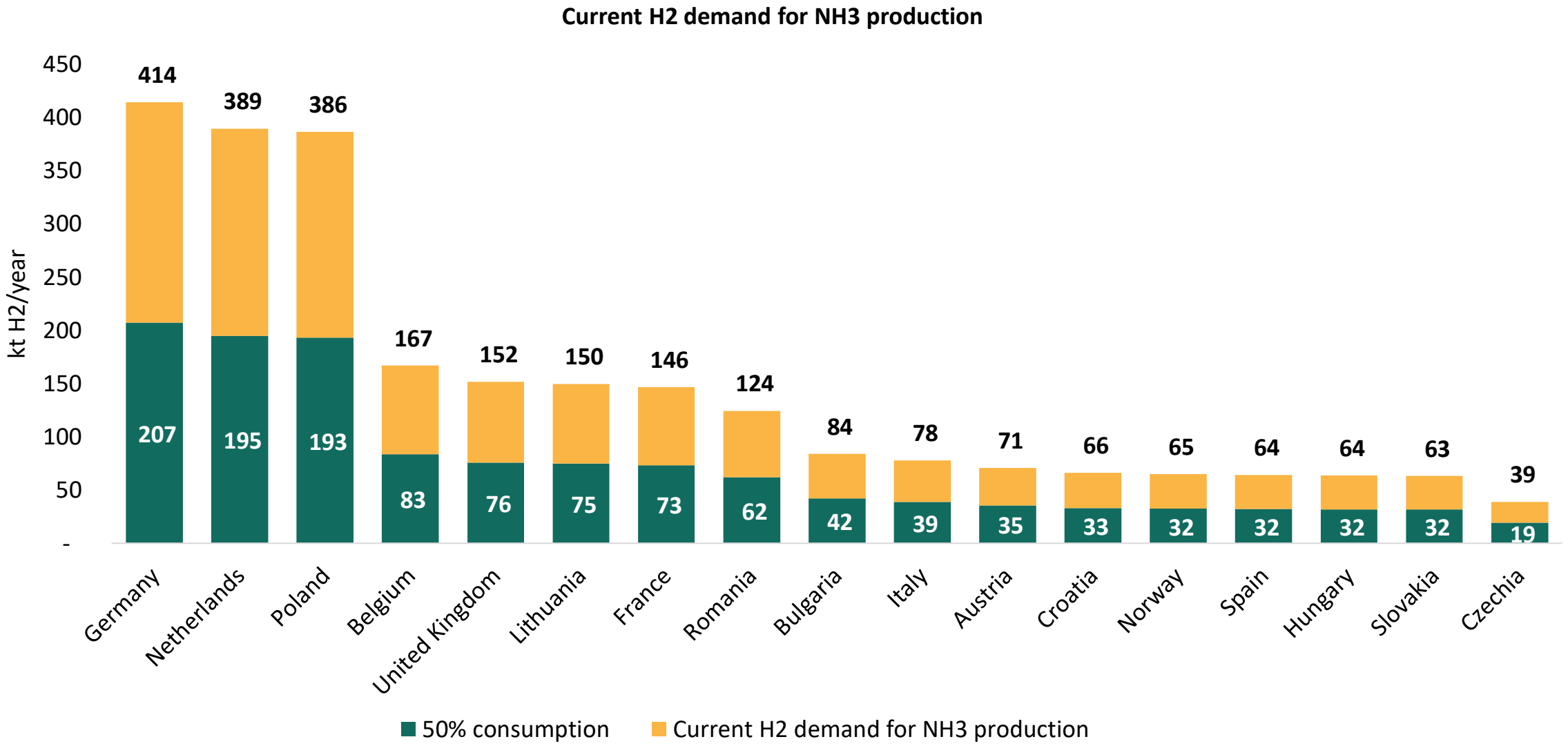
**32 facilities**

**17.7 Mt capacity**

**2.54 Mt H2/year consumption**

# Policy framework: RED II targets

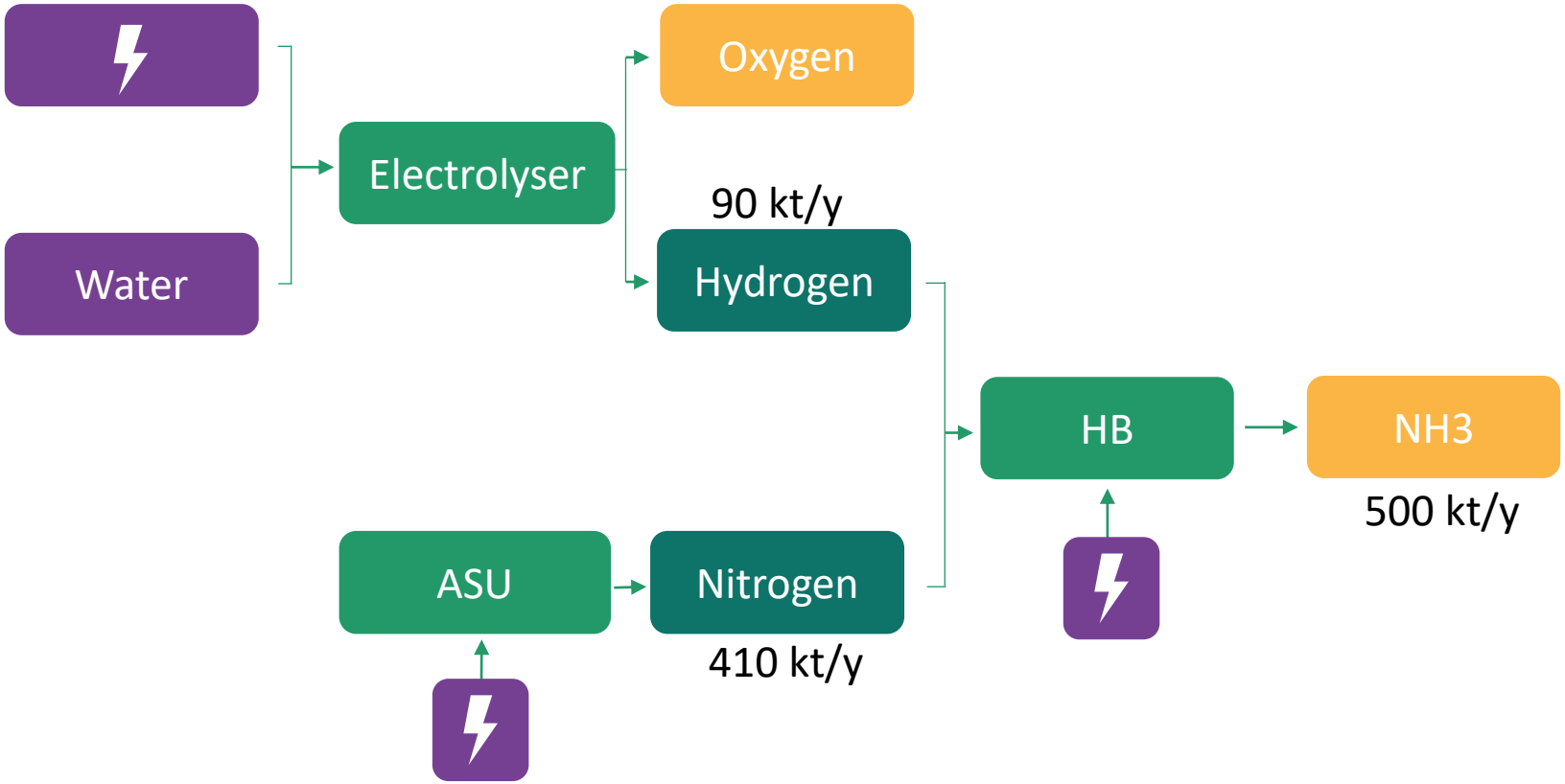
Proposals for an RFNBO target range between 35% and 75% of H2 production in industry



# Alternative production pathways: electrolysis

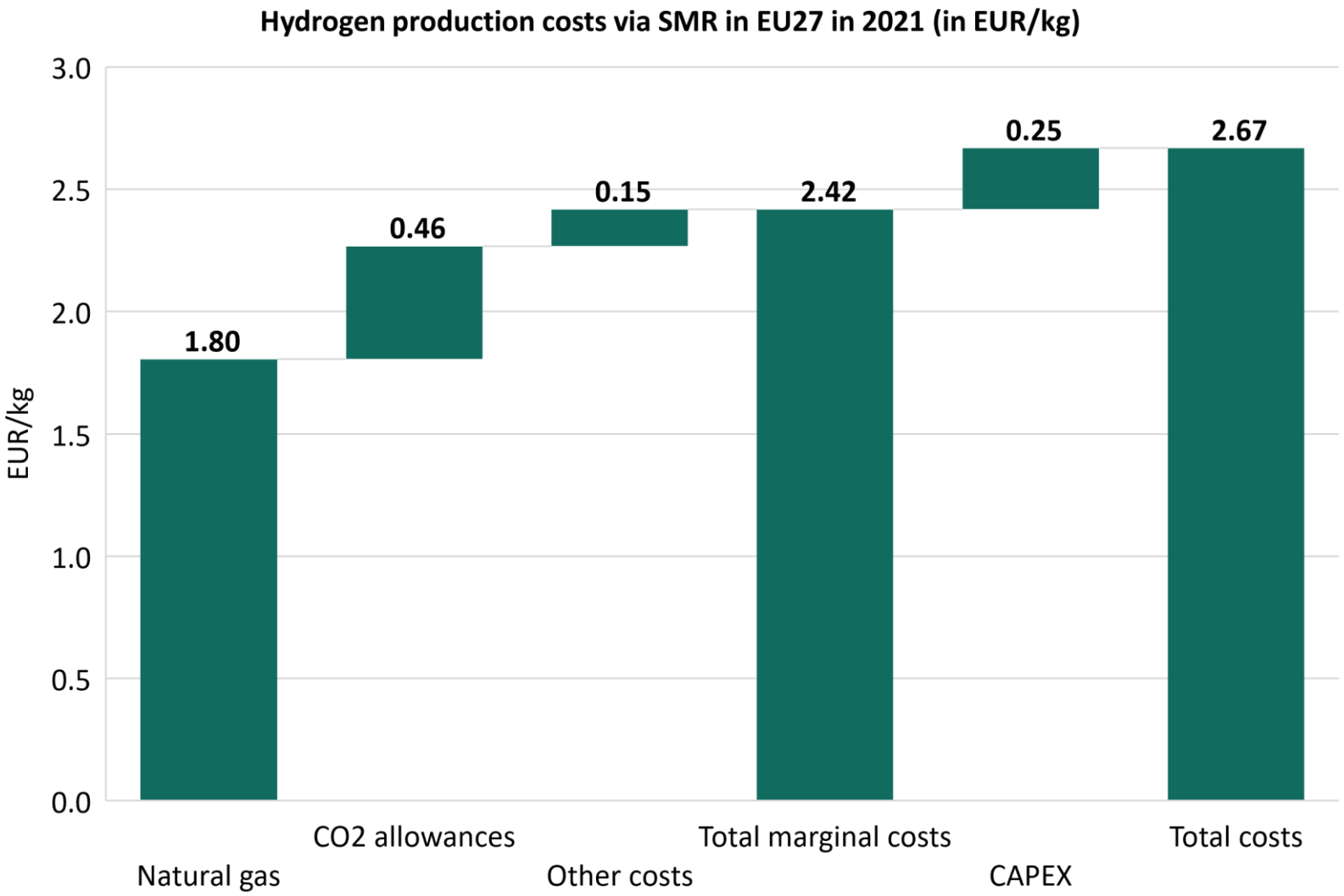
New ASU and Electrolyser equipment is necessary

For the production of urea, a new source of CO2 is necessary



# Cost of conventional hydrogen production

Marginal costs represent 90% of the total cost for steam methane reforming



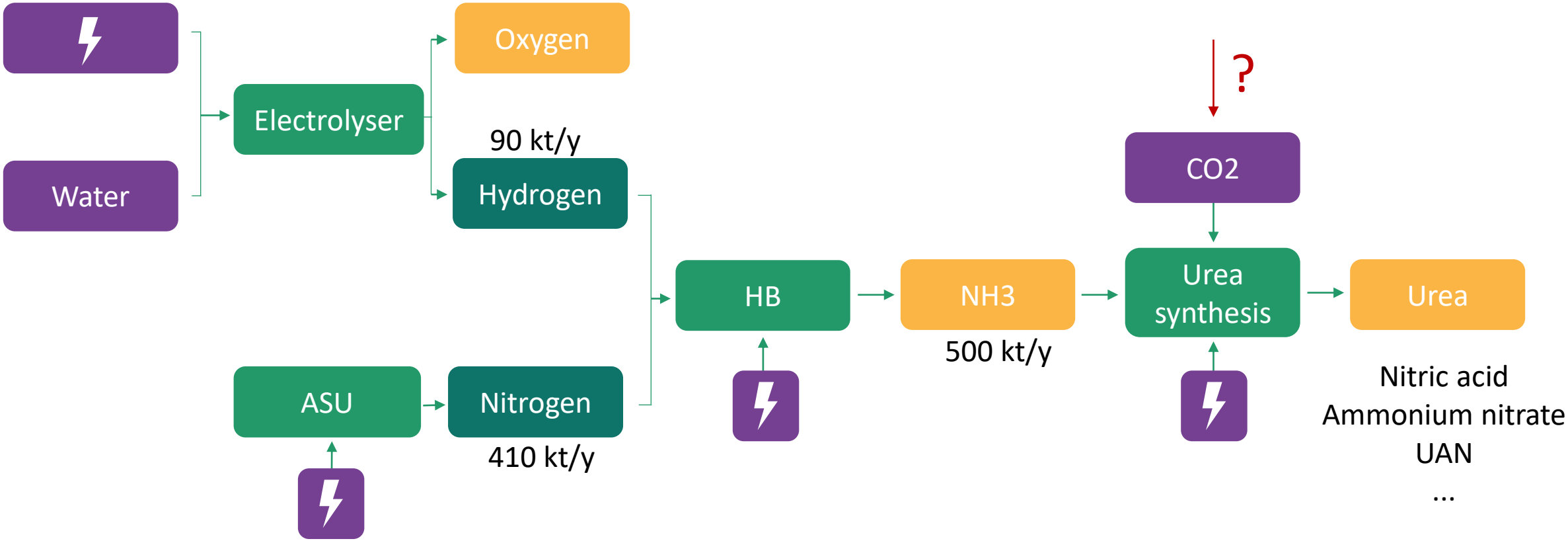

- Average estimated costs of „grey Hydrogen" production in the EU in 2021 was around **2.67 EUR/kg**
- Long-term average of the last 5 years is **1.5 – 2 EUR/kg**
- Average estimated costs of „grey Hydrogen" production in the EU in 2022 is around **10 EUR/kg**
- Grey hydrogen carbon footprint is on average around **9-10 t CO2 per t H2**

Source: Hydrogen Europe

# Alternative production pathways: electrolysis

New ASU and Electrolyser equipment is necessary

For the production of urea, a new source of CO2 is necessary



# Thank You

Hydrogen Europe

Av. de la Toison d'Or 56-60
Brussels / Belgium

secretatariat@hydrogeneurope.eu
hydrogeneurope.eu