



2 x 40 GW Electrolyzer Initiative

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Flow

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2. Role of hydrogen in the Energy Transition
3. The Hydrogen Economy in North Africa
4. Hydrogen as an export product
5. EU Green Deal
6. 2x40 GW as part of the Green Deal
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Energy in Europe



Europe's aim to be net zero carbon by 2050

Europe's final energy demand 2020:

- Electricity = 21%
- Rest = oil, gas, other

Europe's final energy demand 2050:

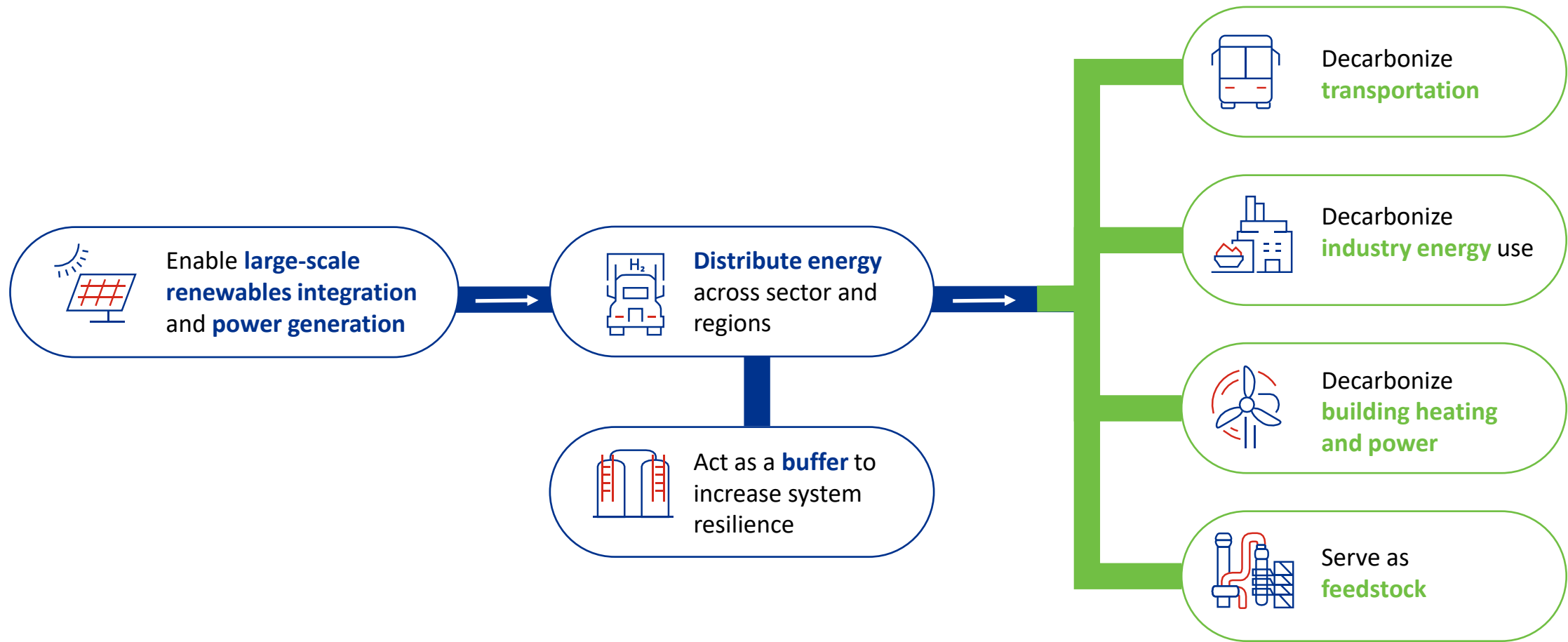
- Electricity = 50%
- Rest = ????

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Hydrogen in the Energy Transition



The role of hydrogen in the energy transition

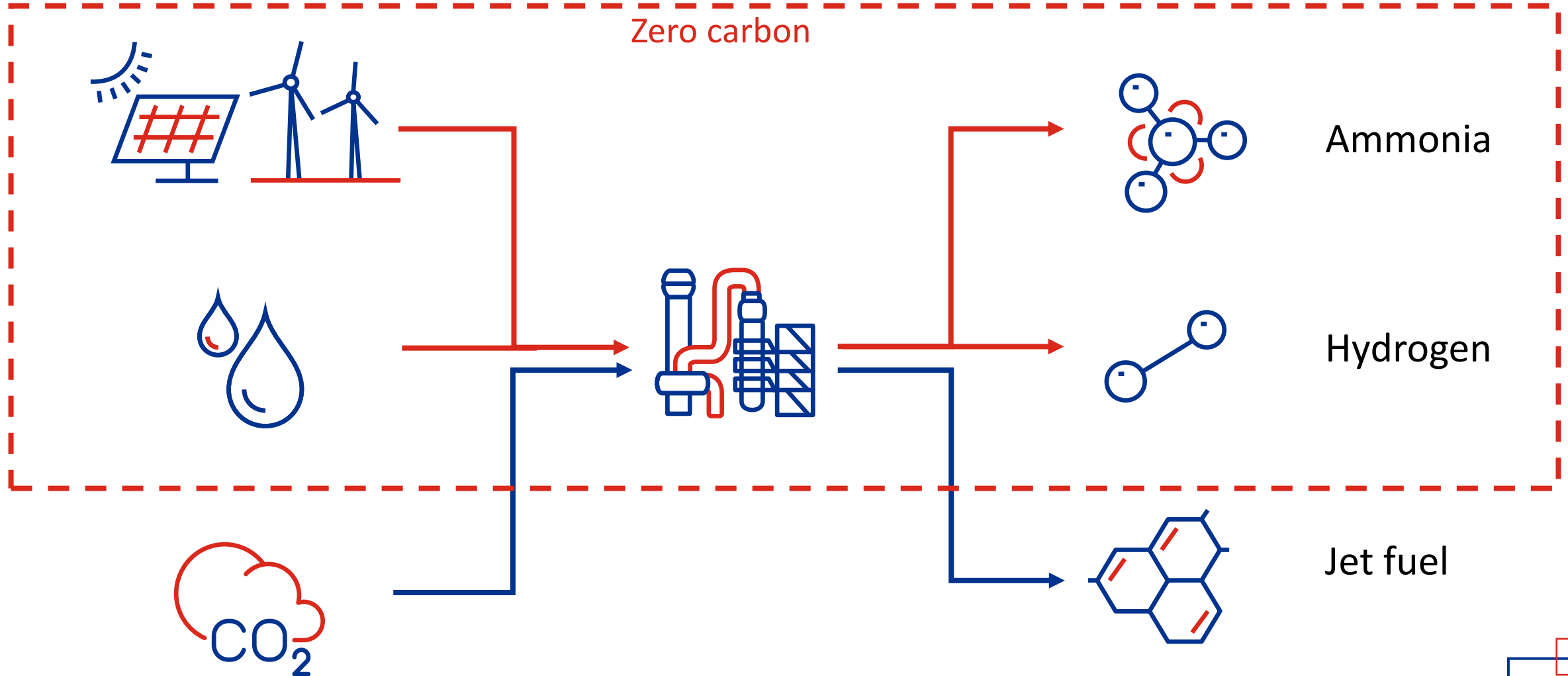


Enable the renewable energy system



Decarbonize end uses

How to make hydrogen fuels?



3

The hydrogen economy in North Africa



Energy in North Africa



- IRENA estimates that North Africa has a feasible potential for renewable energy of almost 120 GW, with 70 GW wind and the rest solar PV and CSP by 2030
- Competitive green hydrogen produced in North Africa can replace fossil fuels, benefitting both importers (Morocco, Tunisia) and exporters (Algeria, Libya)
- North Africa supplies 13% of Europe's natural gas demand and 10% of oil demand. More than 60% of North Africa's oil and gas exports are sent to Europe (Eurostatgas)

OCP - Morocco



one of the leading exporters of phosphate rock, phosphoric acid and phosphate fertilizers in the world. Established in 1920, HQ in Casablanca. Currently employs 20,000 staff, majority owned by Government of Morocco (95%)

Imports: 1,000 kton NH_3 per year

Opportunity: Replace ammonia imports with green ammonia

Scale Phase 1:

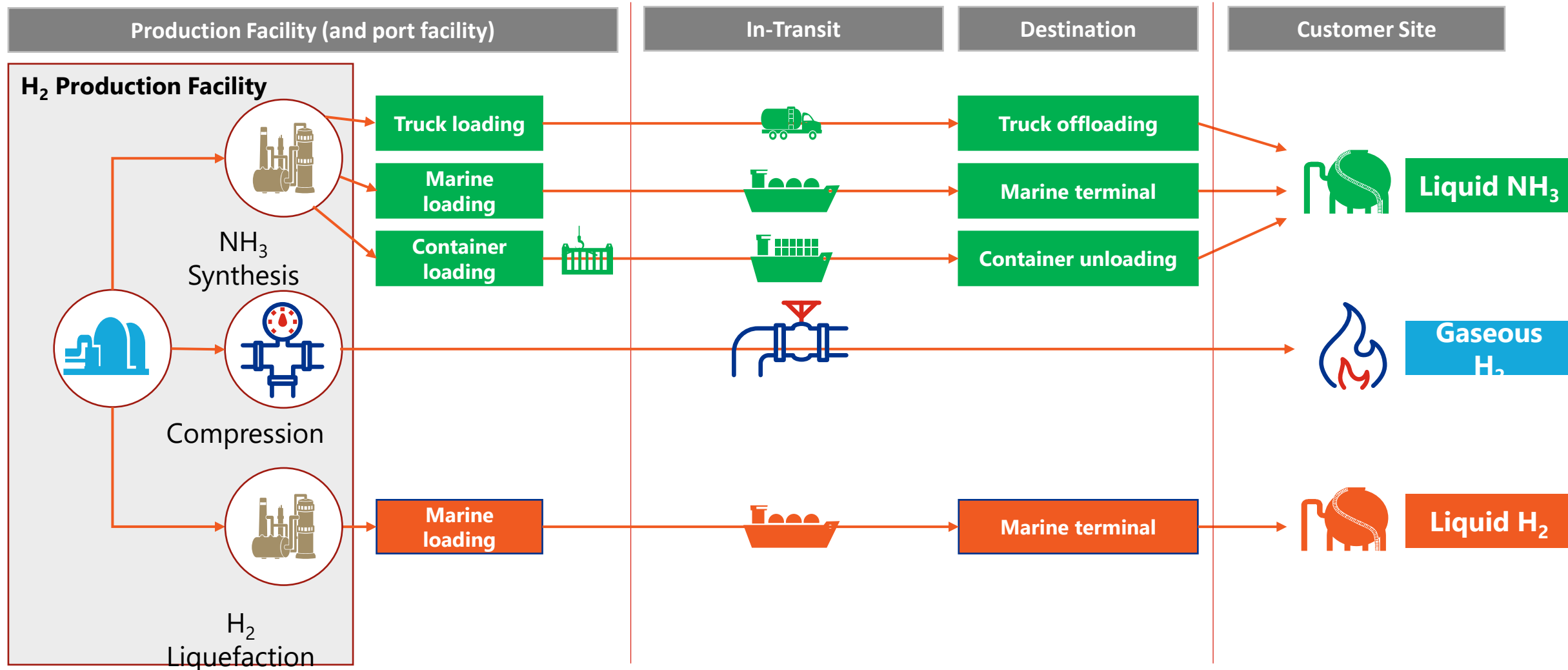
- 600 ktpy NH_3 synthesis plant
- 900 MW solar/wind + electrolyser
- CAPEX (RE+ NH_3) = \$2.6 bn

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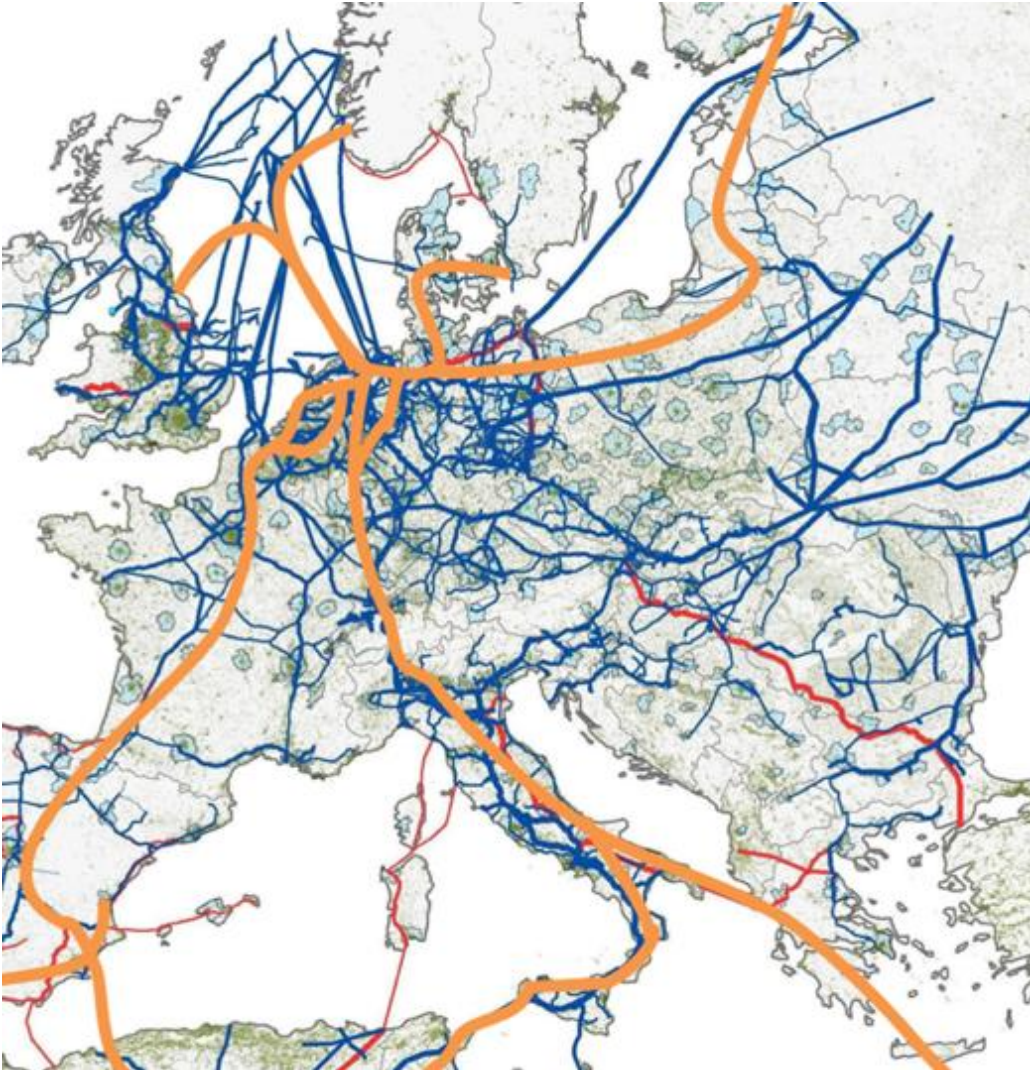
Hydrogen as an export product



Hydrogen export pathways



Connecting the gas grid



- 2 pipelines of 48 inch each, with similar capacity as the Nordstream (66 GW)
- 300 TWh or 7.6 million ton hydrogen per year can be transported, which is equivalent to more than 10% of all currently manufactured hydrogen globally.
- At \$1.5/kg, this represents potential revenue of \$11.4 billion per year

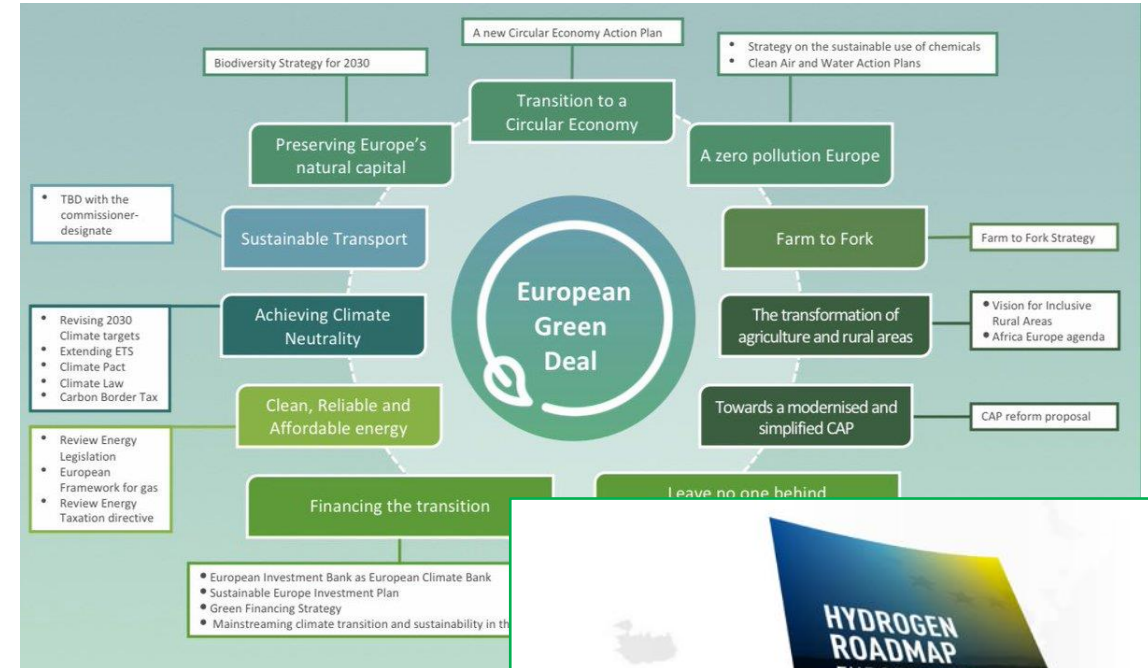
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The EU Green Deal



The EU Green Deal

- Make the European Union Climate Neutral by 2050
- Not just climate or energy policy, the aim is to fundamentally reshape the European economy
- 50 Policy elements, details to be determined
- Hydrogen is seen as a key energy vector across sectors
- 100% Energy independence not feasible
- Green Deal is likely to be part of stimulus package



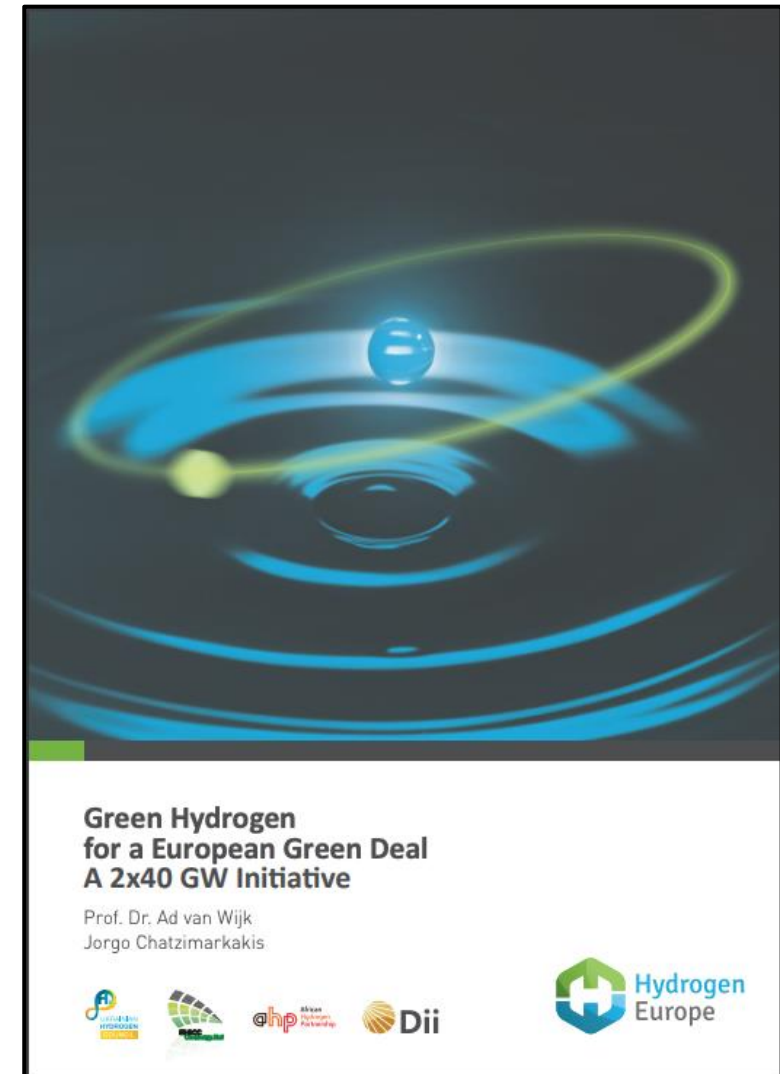
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The 2 x 40 GW Electrolyser Initiative



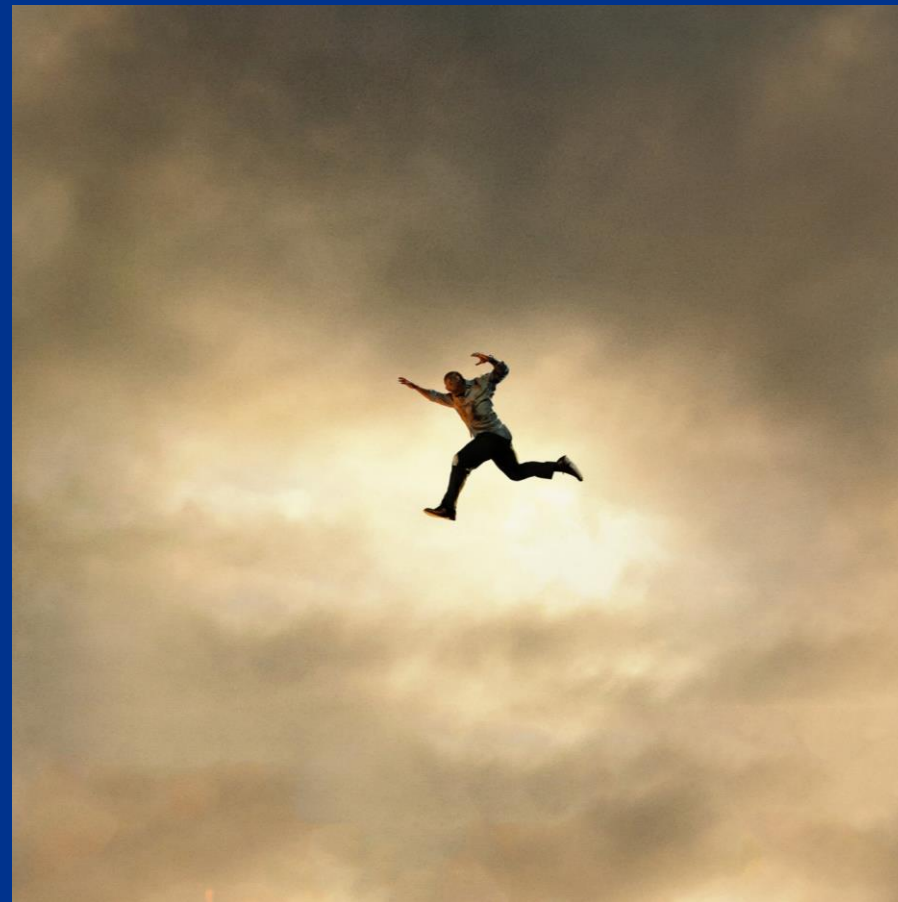
2 x 40 GW Electrolyzer Initiative

- Initiative by Hydrogen Europe and several other organisations to have 2x40GW electrolyzers installed by 2030:
 - 40GW in Europe
 - 40GW in Ukraine and North Africa
- Aim is to make hydrogen competitive:
 - 1.5 - 2.0 €/kg by 2025
 - 1.0 - 1.5 €/kg by 2030
- Other benefits include technology leadership, 82 Mton CO₂ emission reduction and creation of up to 170,000 jobs
- In North Africa and Ukraine, 7.5GW could be domestic (ammonia), and 32.5GW for export, covering 17% of EU's hydrogen market in 2030

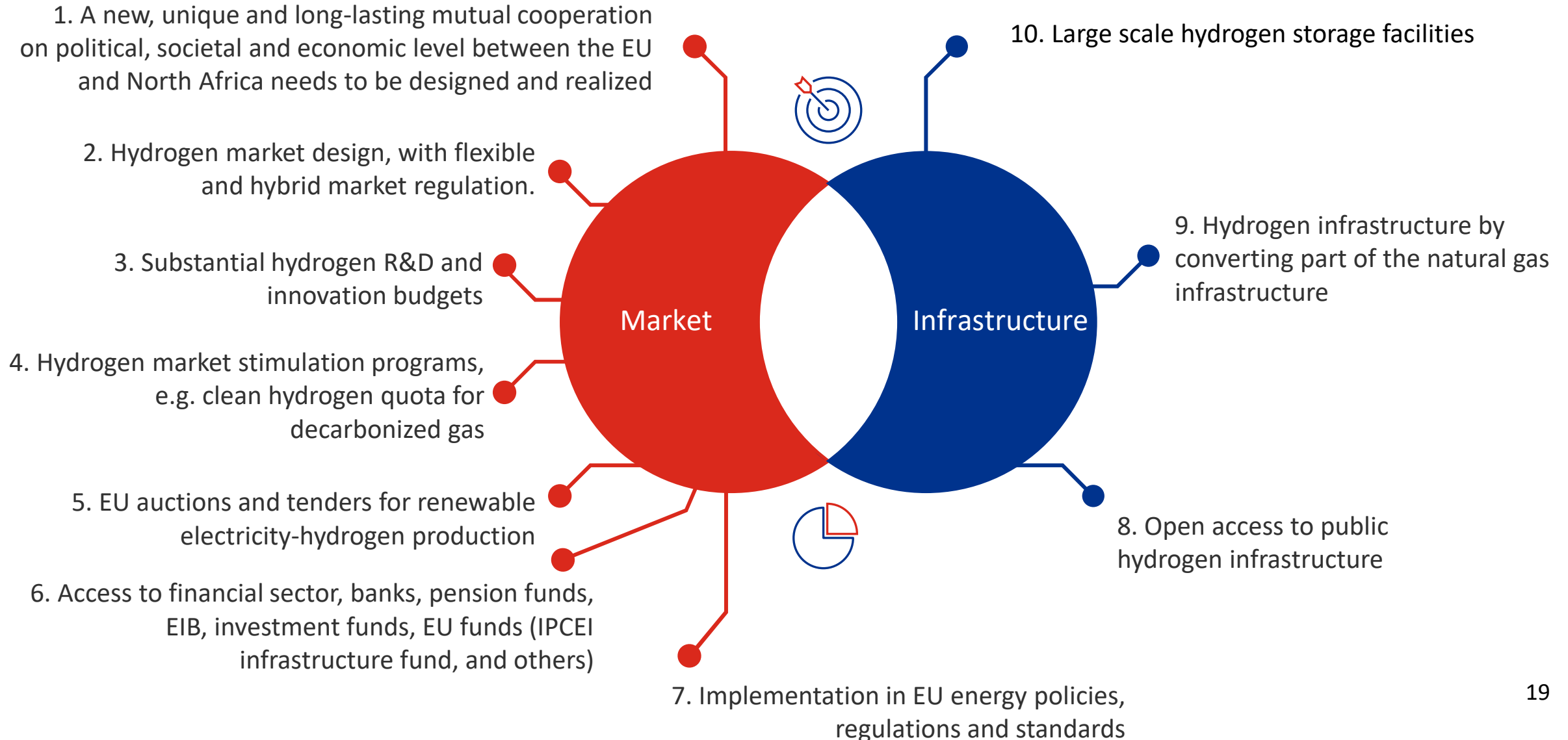


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Action agenda



Elements of the 2 x 40 GW Initiative



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