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CYPRUS HYDROGEN ASSOCIATION

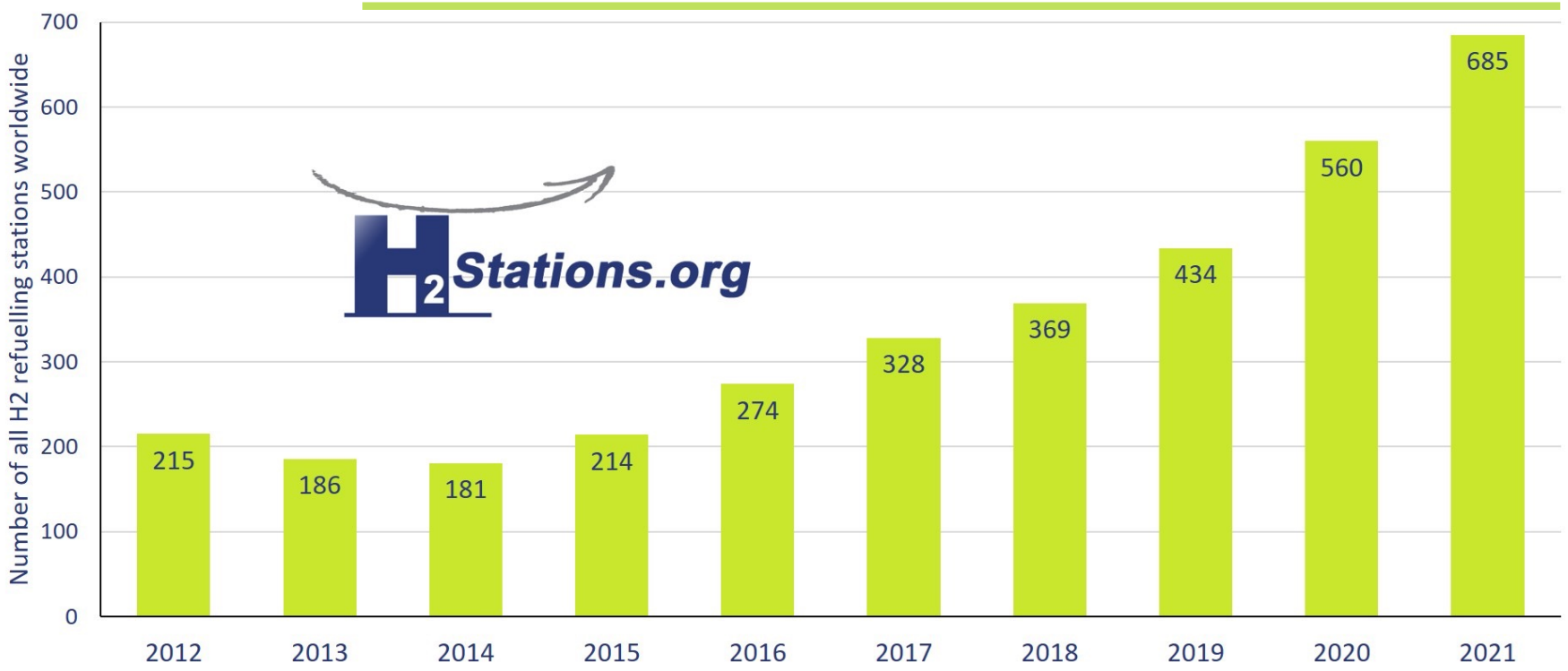
ΗΜΕΡΙΔΑ ΕΤΕΚ , 28.05.2022

«Πράσινη Ανάπτυξη στην Κύπρο»

Πράσινη ενέργεια στην Κύπρο

by Makis Ketonis
President of the Cyprus Hydrogen Association

Development of H2 refuelling infrastructure worldwide



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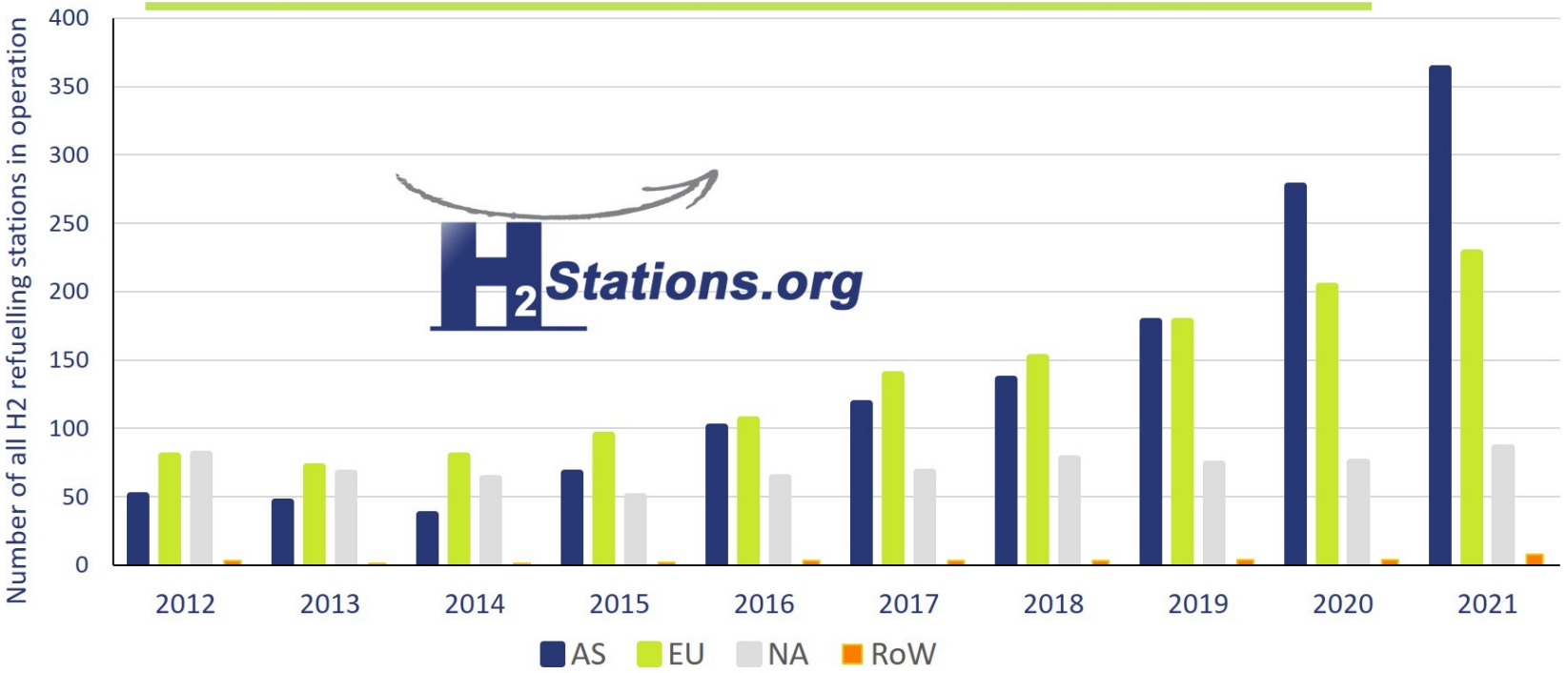
Development of H2 refuelling infrastructure split by region



EU "Fit for 55" target:

1,000
H_2 fuelling stations

by 2025

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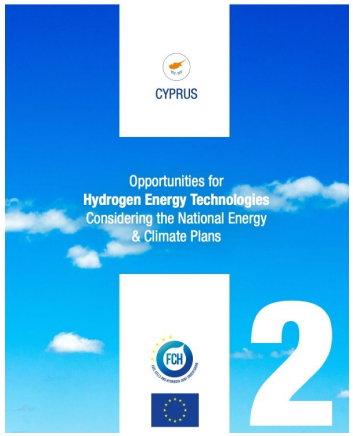
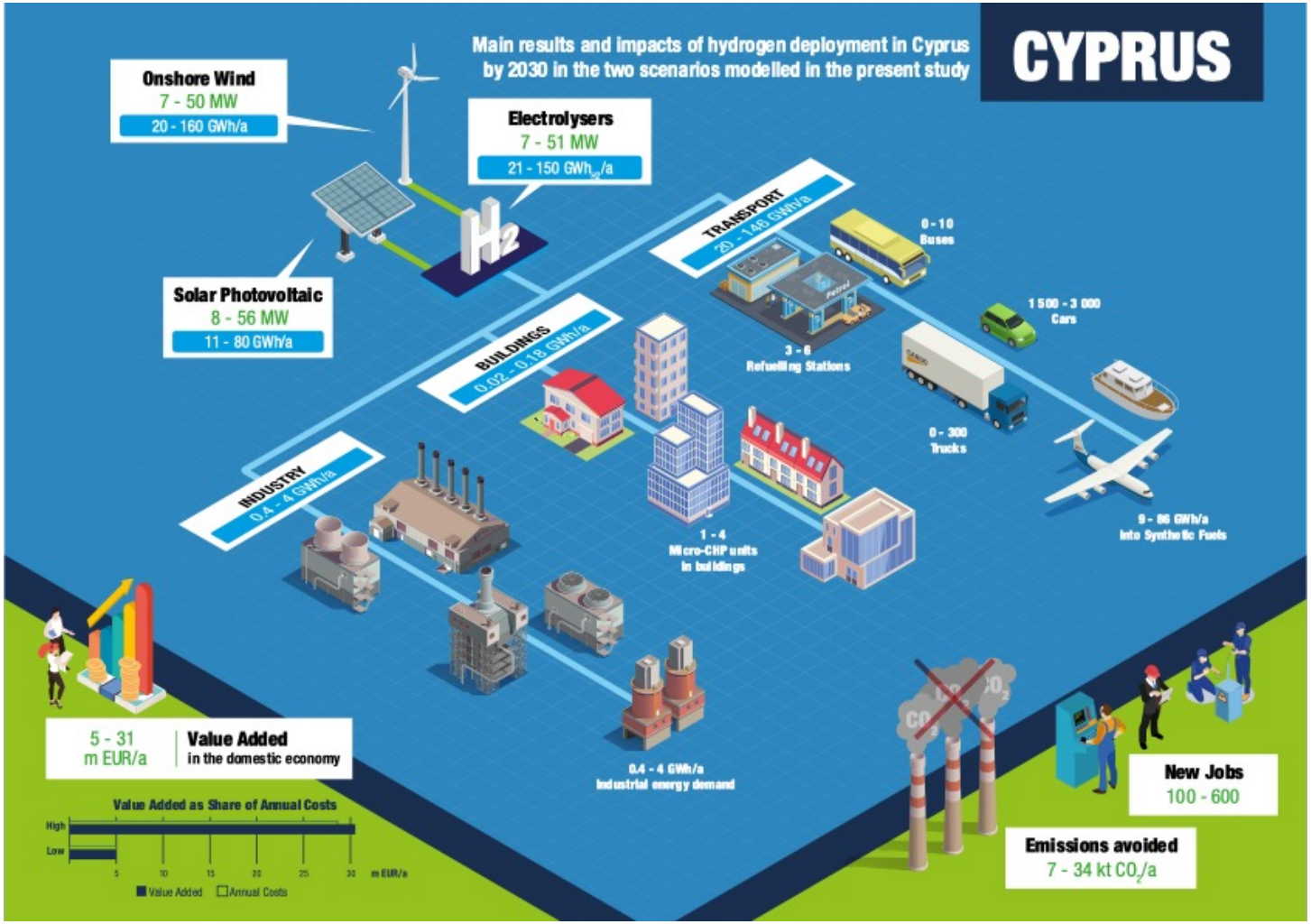
Opportunities for Hydrogen Energy Technologies in Cyprus

Source:



FUEL CELLS AND HYDROGEN
JOINT UNDERTAKING



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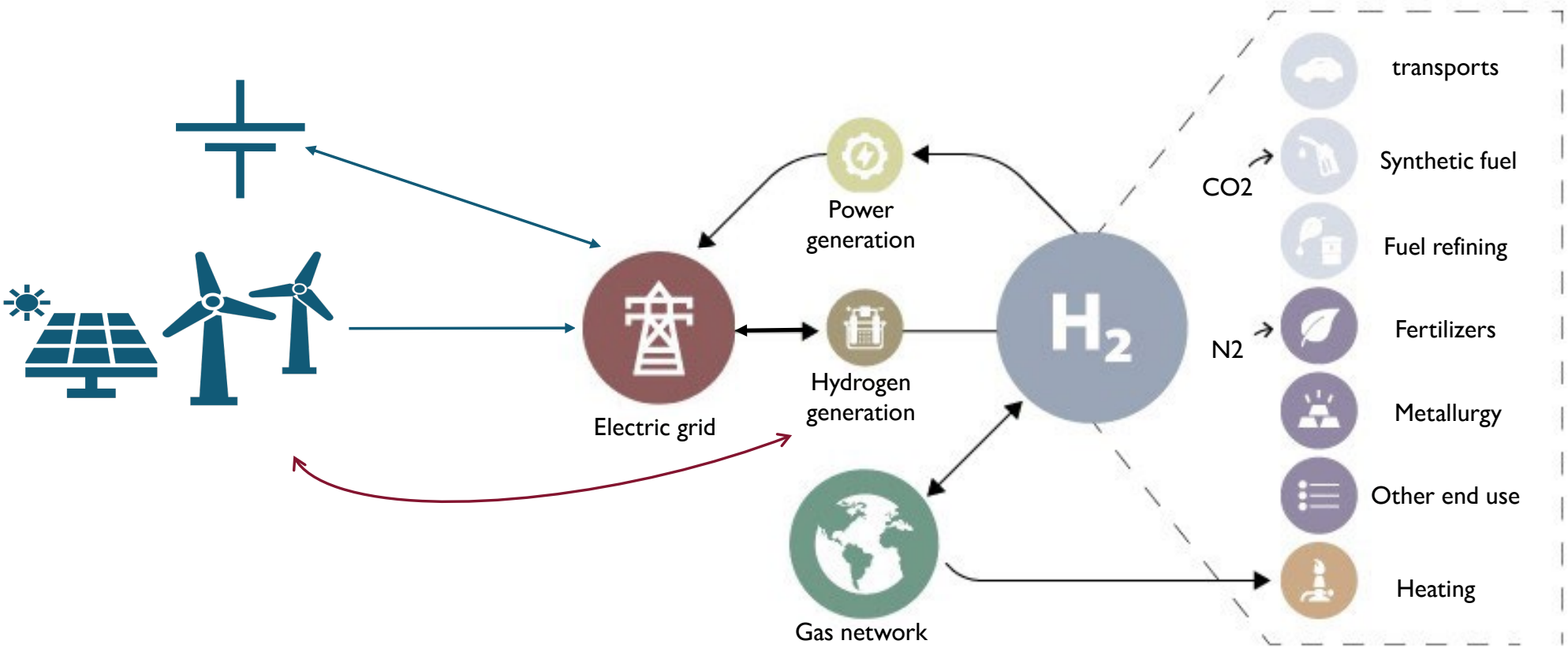
The value chains of green hydrogen



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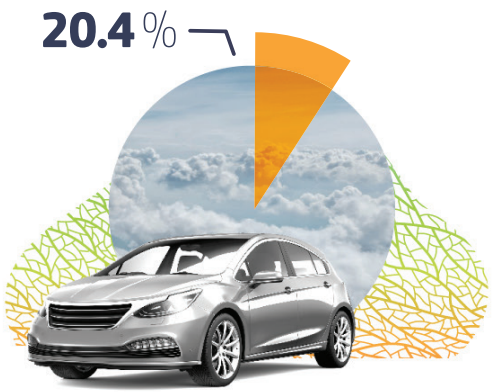
European Commission: “Make transport greener”

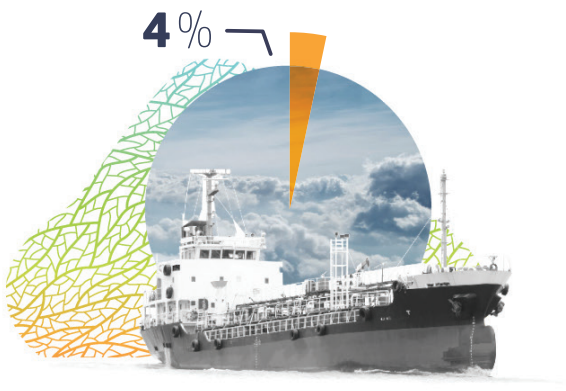
TRANSPORT NEEDS TO CUT EMISSIONS BY 90% BY 2050

Share of total EU Greenhouse Gas (GHG) emissions, per mode



Road

Aviation



Maritime

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EU Commission: Clean transport fuels and sustainable fuel use

Targeted reduction in transport GHG intensity

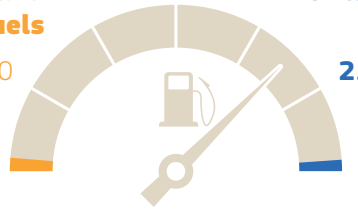
13 % by 2030

Targeted share of renewable H2 and synthetic fuels

2.6 % by 2030

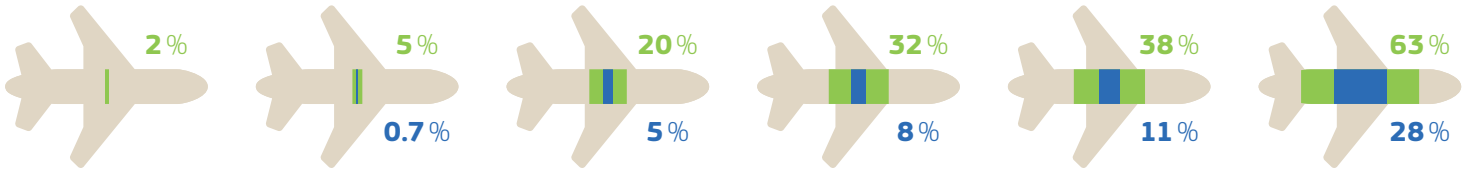
Targeted share of advanced biofuels

2.2 % by 2030



New targets for sustainable aviation fuels (as % of fuel mix)

Sustainable aviation fuels Specific sub-mandate on e-fuels



Maritime targets on the limits on greenhouse gas intensity of the energy used on-board compared to 2020

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Opportunities for Hydrogen Energy Technologies in Cyprus

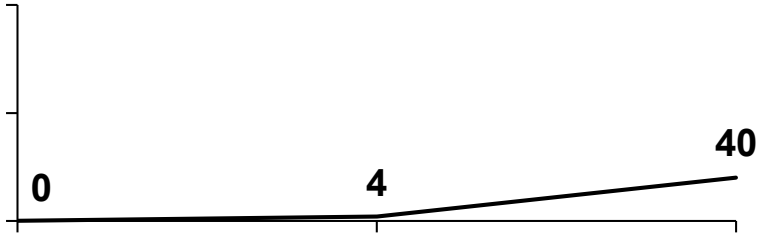
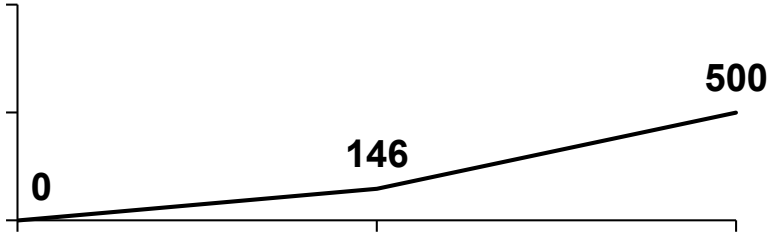
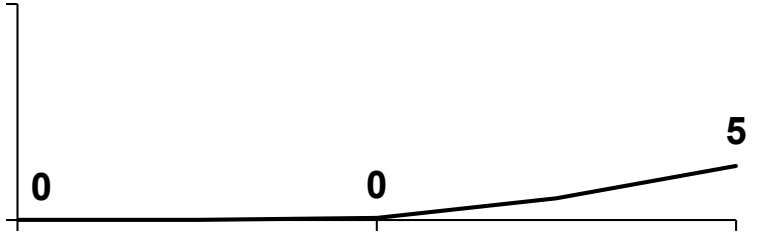
Source:

KEY FINDINGS

1. Main **consumption sectors** for hydrogen in 2030 are:
   - **transportation** (146 GWhH2 ≙ 3,705 tonnes of H2),
   - **industry** (4 GWhH2 ≙ 101.5 tonnes of H2) and
   - **buildings** (0.18 GWhH2 ≙ 4.6 tonnes of H2)
2. A **dedicated installed renewable electricity capacity** of **15 to 100 MW** is required to produce green hydrogen and cover its estimated hydrogen demand by 2030
3. The **NECP** of Cyprus estimates a production of about 1.5 TWh of renewable electricity in 2030 but **does not consider H2 deployment** for the period from 2021 to 2030
4. According to the estimated renewable electricity production in 2030, approx. **15 % of renewable electricity** will be used for **production of hydrogen** via electrolysis
5. **Annual costs** for green hydrogen production, development of its transport infrastructure and end-user applications in Cyprus are estimated to amount between **5 to 28 million Euro**
6. The deployment of hydrogen in Cyprus can add value to its economy e.g. by creating ≈ **600 potential jobs** in manufacturing, construction and operation of H2 technologies
7. The deployment of hydrogen in Cyprus can further **reduce greenhouse gas emissions (7-34 kt CO2/a)** and **fossil energy import dependence (0.03-0.14 TWh/a)** provided we reach our targets.
8. It is currently not possible to use an existing methane infrastructure to transport or distribute hydrogen in Cyprus, as there is **no gas natural network** available
9. **Neither salt cavern natural gas storage sites nor underground salt layers** that could provide **suitable storage** opportunities for hydrogen can be used or found in Cyprus

Cyprus roadmap until 2040

Source:

	H_2 demand development (GWh_{H_2})	Key assumptions / findings
Industry		▪ 4 GWh_{H2} industrial energy demand in 2030 ▪ Limited level of opportunity for hydrogen use in industry (currently no natural gas use in Cyprus) ▪ Potential application: High-temperature process heat (>200°C) as industrial energy demand
Transportation		▪ 146 GWh_{H2} demand for transport sector in 2030 ▪ Hydrogen can be a suitable alternative to electric battery driven cars, trucks and buses ▪ On the medium to long run, hydrogen and derived fuels can be deployed to decarbonize the aviation sector
Buildings		• 0.18 GWh_{H2} demand for heating and cooling in 2030 • Cyprus has no natural gas in its energy mix. However, space cooling is an important energy end-use for buildings • Hydrogen-based technologies (reversible systems producing electricity and heating/cooling) can be an alternative e.g. for the services sector
	2020 2030 2040	
Total	Σ 0 GWh_{H_2} Σ 150 GWh_{H_2} Σ 545 GWh_{H_2}	▪ **150 GWh_{H2} in 2030 (0.8% of 2030 final total energy demand)** ▪ **545 GWh_{H2} in 2040 (2.9% of 2030 final total energy demand)**

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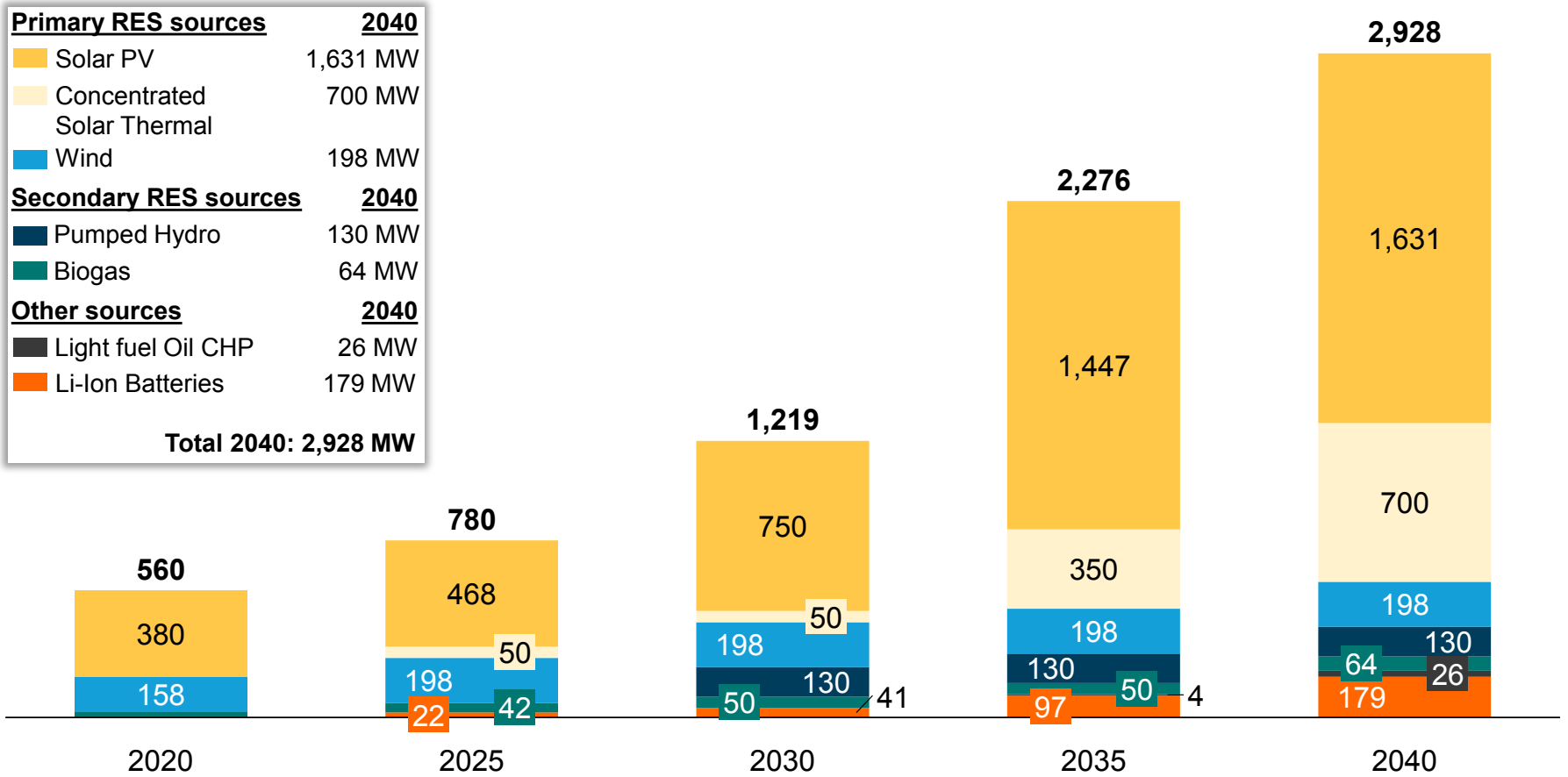
Green Hydrogen in Cyprus: RES Capacity in the electricity sector until 2040

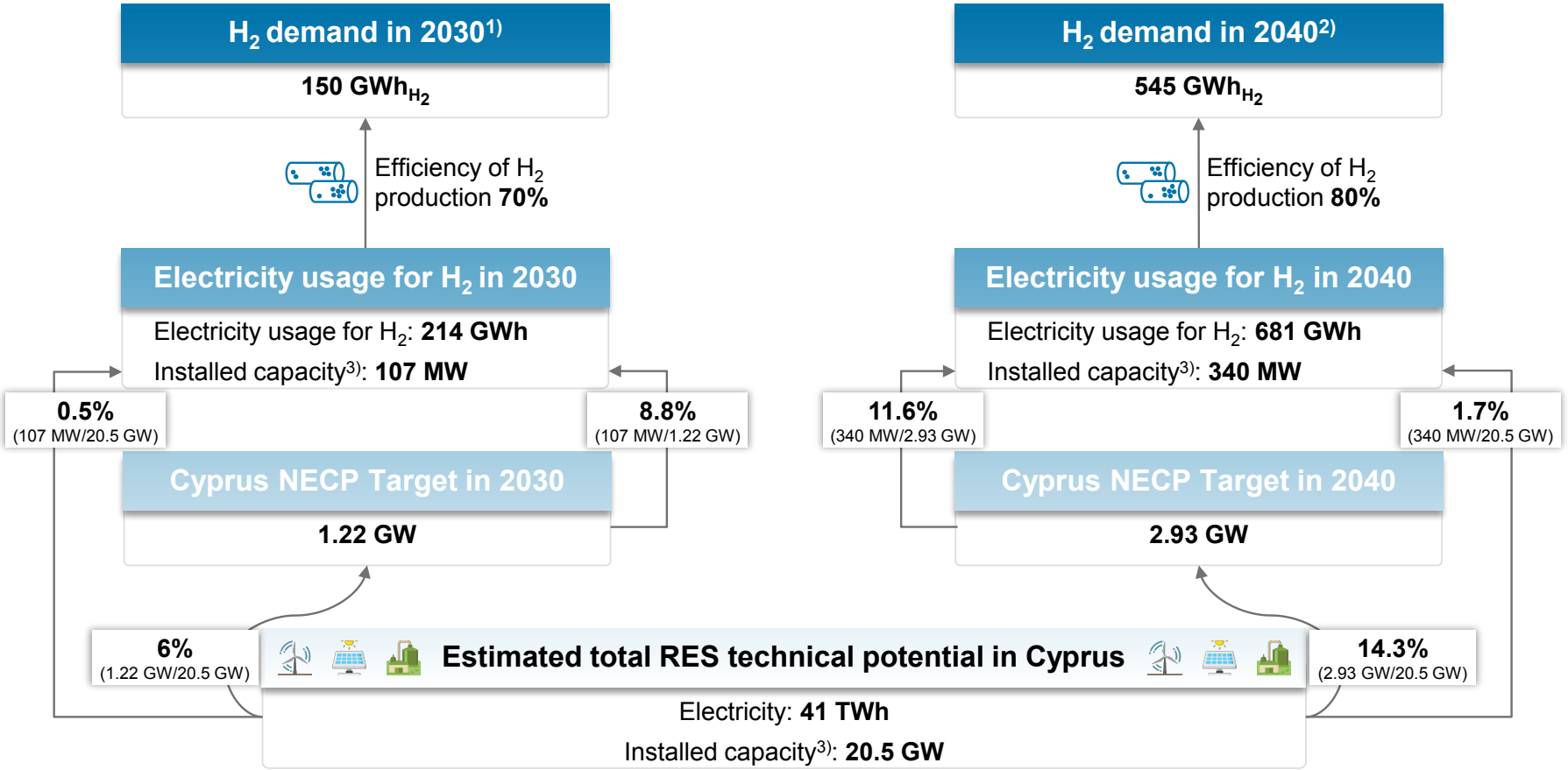
The projected / planned RES capacity in Cyprus by 2040 is of 2,928 MW according to the NECP. These are:



RES: Renewable Energy Sources | NECP: National Energy and Climate Plan | PV: Solar Photovoltaic Systems | CHP: Combined Heat and Power

Green Hydrogen in Cyprus: H2 production for Cyprus in 2030 and 2040

About 9% of RES installed capacity defined in the Cyprus NECP targets would be required to cover the hydrogen demand of Cyprus in 2030, whereas around 12% would be required in 2040



RES: Renewable Energy Sources | NECP: National Energy and Climate Plan

Source:

Thank you very much for your attention

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