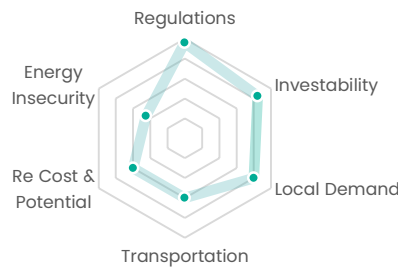
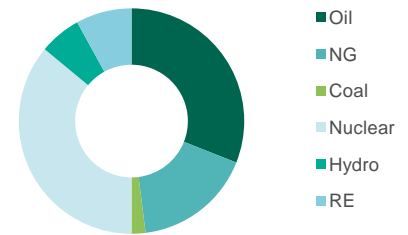


GDP - USD (trn):	2.6
GDP per capita - USD:	38,625
Land area ('000 km2):	633
Population density (per km ²):	123
Grid emissions factor (gCO ₂ /kWh):	47

Hydrogen Drivers Matrix



Primary Energy Mix



4.8 Regulatory commitment

- Aggressive plans to convert 10% of industrial hydrogen to low carbon sources by 2023, 20-40% by 2028
- EUR7bn committed funding for hydrogen through 2030

3.0 Transportation

- Some T&D initiatives on the ground but no overarching coordination
- Some salt cavern storage potential

4.2 "Investability"

- Rated AA by S&P
- 32nd in WB Ease of Doing Business

3.0 RE cost and potential

- Good solar resources in the south (by Europe standards)
- Average onshore wind resources
- Some offshore wind potential

4.0 Local demand potential

- 16th largest steel manufacturing
- 14th largest oil refiner
- 11th largest ammonia producer

2.3 Energy insecurity

- 44% net energy import

Strong regulatory progress and committed near-term funding

The French Hydrogen Strategy has ambitious near-term goals backed by substantive committed funding: its target, enacted into law via the National Energy and Climate Plan ("NECP"), is to convert 10% of industrial hydrogen consumption to low carbon sources by 2023, and 20-40% by 2028, backed by EUR7bn committed funding through to 2030 with EUR3.4bn invested in industry, transport and research by 2023. EUR2bn from the French COVID recovery plan will be made available to industrial electrolysis projects by 2022. An ordinance for hydrogen was issued in February 2021 that provides guidance on the broad hydrogen regulatory framework, including classification, support mechanisms, and guarantees of origin, the specific provisions of which will be published in 2021. There is extensive interest on hydrogen development on the ground—the first nationwide call for expressions of interest in June 2020 under the IPCEI framework netted 160 project submissions representing EUR32.5bn total investment.

2022 hydrogen tender expected

Under the July 2021 hydrogen ordinance hydrogen will be defined by its carbon intensity— (i) renewable, (ii) low-carbon or (iii) carbonaceous (CO₂ thresholds to be determined at EU level). Only renewable or low carbon production from electrolysis will benefit from state support through investment or revenue subsidy (latter max. 20 years). Thus, blue hydrogen by way of carbon capture will not be supported but the definition of "low carbon" will determine whether French hydrogen will be nuclear powered. A call for tender is anticipated in 2022.

Strong industrial base

France today uses 900kt of hydrogen annually primarily in the refining and chemicals sector, and through its NECP target, it has committed to provide funding for 90kt of low-carbon hydrogen by 2023. There is significant interest on the ground: Total and Engie are developing a solar-powered 1,800tpa green hydrogen project at the La Mede biorefinery in the South that is pending funding support. Lacq Hydrogen, under development by Teréga, Enagás, DH2 Energy and GazelEnergie is studying the large-scale export of green hydrogen from Spain to France.

Hydrogen valleys

A number of hydrogen valleys are in development, including the Auvergne Rhône Alpes "Zero Emission Valley" that has secured EUR70m EU funding, the Grand Ouest Hydrogen Valley that has secured ADEME¹ funding, the Normandy Hydrogen Valley, and the Bourgogne-Franche-Comté Club.

Electrolyser manufacturing base

Belgian electrolyser manufacturer John Cockerill is expecting to commission a 200MW electrolyser production facility in North-eastern France by 2022. Homegrown McPhy Energy SA will make FID in 2021 on a 1GW gigafactory in eastern France. Genvia, a first-of-its-kind PPP joint venture between CEA¹ and a consortium including Vinci Construction, Vicat and AREC is developing a Gigafactory for SOEC electrolysers in southern France.