

FDE

Insights from Natural Hydrogen Conference Highlight
FDE's Significant Value Creation Opportunity**Developments in the natural hydrogen sector at HNAT 2024**

H&P attended HNAT, the flagship Natural Hydrogen ("NatH₂") conference held in Paris this week. The conference had a large attendance of ~400 people in person and more online, reflecting growing interest in this nascent sector with only a handful of exploration wells drilled. We estimate that there are over 50 companies pursuing NatH₂ and there are dozens of countries that have been identified as having prospectivity for natural hydrogen. The industry has raised ~US\$500mm to date with the vast majority by private company Koloma. While most of the projects are in the hands of the small E&P companies, there was a large presence of major energy companies (e.g. Shell, bp, TotalEnergies) and we anticipate more investment from these larger companies in 2025, after seeing Fortescue and Mitsubishi participating in projects this year. France was highlighted an area where there was significant exploration activity. There were several companies present which are advancing their natural hydrogen prospects in France including TBH2 Aquitaine, Storenergy and 45-8 Energy. Given the number of companies, France is one of the few regions globally where there has been sizeable geologic data collected. Notably there are many projects held at 100% interests by various players and we see the potential for asset swaps as a means for companies to diversify and reduce risk.

Technical insights into hydrogen accumulation and monitoring

Technical analysis presented by FDE's state-owned research partner, Centre national de la recherche scientifique ("CNRS"), reveals that the Lorraine Basin harbours a potential NatH₂ resource of 34mmt, with low methane and nitrogen content and importantly, free of CO₂ or H₂S. Advanced monitoring systems facilitate precise measurement and analysis of hydrogen and other gases up to depths of 3km. These tools use semi-permeable membranes to separate gases from water, efficiently extracting gas without affecting the subsurface water table. This technology boosts FDE's operational efficiency, enhances gas management, and offers a competitive edge in resource management.

FDE's natural hydrogen license and future outlook

FDE holds a licence for what could be one of the largest NatH₂ fields in Europe. In May 2023, it discovered high H₂ concentrations at the Folschviller well site across various depths in the Carboniferous aquifer. FDE then applied for the Trois-Évêchés Permit to explore for natural hydrogen over 2,254 km² in the Lorraine basin. FDE plans to expand its exploration efforts, particularly with the anticipated drilling of a new NatH₂ well designed to reach depths of 4km. FDE intends to distribute hydrogen directly from the plant, initially via truck deliveries and, in the future, by connecting to the nearby MosaHYc pipeline which is a 17mmcf/d dedicated hydrogen pipeline currently under development and is situated within 5km of FDE's proposed well sites. However, we note that FDE had mentioned during its 2024 annual results call that it is adjusting its strategy for the natural hydrogen project by seeking additional capital investments from partners, rather than solely relying on university resources and government grants. The company has already secured a €5mm subsidy for the first phase and is currently negotiating a €7mm grant for the second phase.

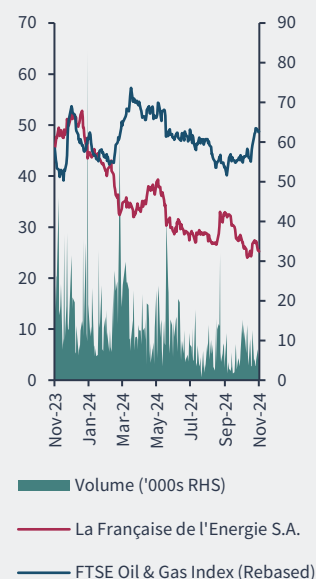
Valuation: risked NAV of €94/sh (+282% from current share price)

Our risked NAV of € 94/sh remains unchanged since our last update. Currently, we are not assigning any value to the company's NatH₂ business as permitting is still in progress and FDE has not released a resource report for the hydrogen potential in the Lorraine Basin. However, we see the potential for considerable upside if FDE is able to successfully commercialise its NatH₂.

GICS Sector	Energy
Ticker	FP:FDE
Market cap 29-Nov-24 (US\$m)	137
Share price 29-Nov-24 (€)	24.55

NAV summary (€/sh)

Asset	Unrisked	Risked
Cash and other	-9.7	-9.7
AMM	75.1	59.5
Solar	4.1	3.7
Lorraine - Pyrolysis	29.2	14.6
Cryo Pur	39.7	19.8
Green Hydrogen	13.2	6.6
Total NAV	152	94



Source: S&P CapIQ

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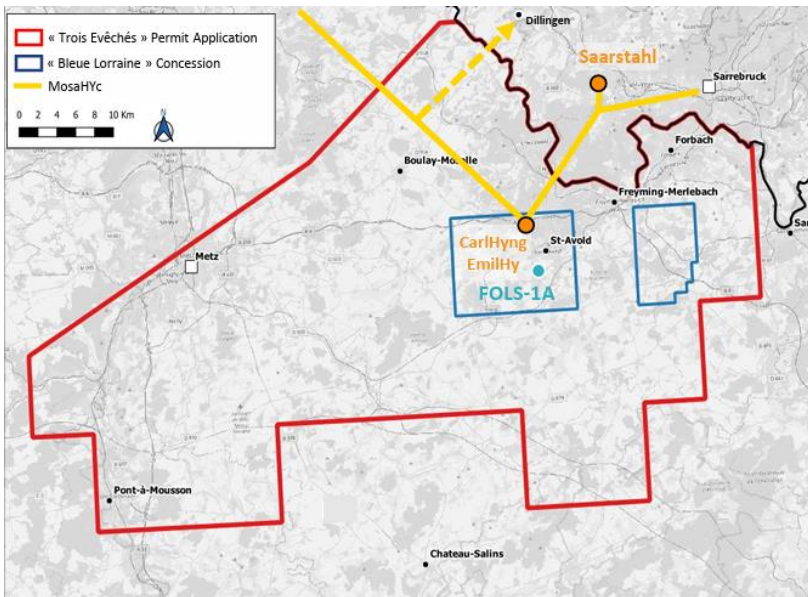
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Natural hydrogen (gold/white hydrogen)

FDE permit areas



Source: Company data

FDE is one of the only European listed companies with exposure to natural hydrogen (NatH₂), which we think could transform the hydrogen sector if it is able to be commercialised with the expectation that cost of production could fall to <\$1/kg. FDE has had some initial promising results with a well containing close to 20% hydrogen.

FDE announced its natural hydrogen discovery in May 2023, which was in collaboration with the University of Lorraine and the CNRS, which conducted innovative measurement programmes at the Folschviller well site. Research revealed high concentrations of dissolved hydrogen in the Carboniferous aquifer, with measurements showing 6.8% measured at 808m depth, 15% at 1,093 meters and is estimated at 98% at 3,000 meters depth. Based on these findings, FDE applied for the Trois-Évêchés Permit, which it is still awaiting, to explore for natural hydrogen over an area of 2,254 km² in the Lorraine basin, with plans for further studies and the development of a pilot site for local production.

FDE's acreage is strategically located very close to a planned major hydrogen infrastructure network in France and Germany. FDE is <5km away from MosaHYc (Mosel Saar Hydrogen Conversion), which will focus on the conversion of two existing pipelines into a 70-km pure hydrogen infrastructure, connecting Völklingen (Germany), Carling (France), Bouzonville (France) and Perl (Germany), capable to transport up to 20,000 m³/h (60 MW) of pure hydrogen.

Separately, FDE also noted the possibility producing e-fuels which are alternative fuels manufactured by synthesising CO₂ and H₂. Initially, FDE would partner with a manufacturer but may consider developing its own business segment in the long run if it proves profitable. However, we believe that this is highly uncertain given the state of the e-fuels market and the higher development cost compared to its peers such as biofuels.

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