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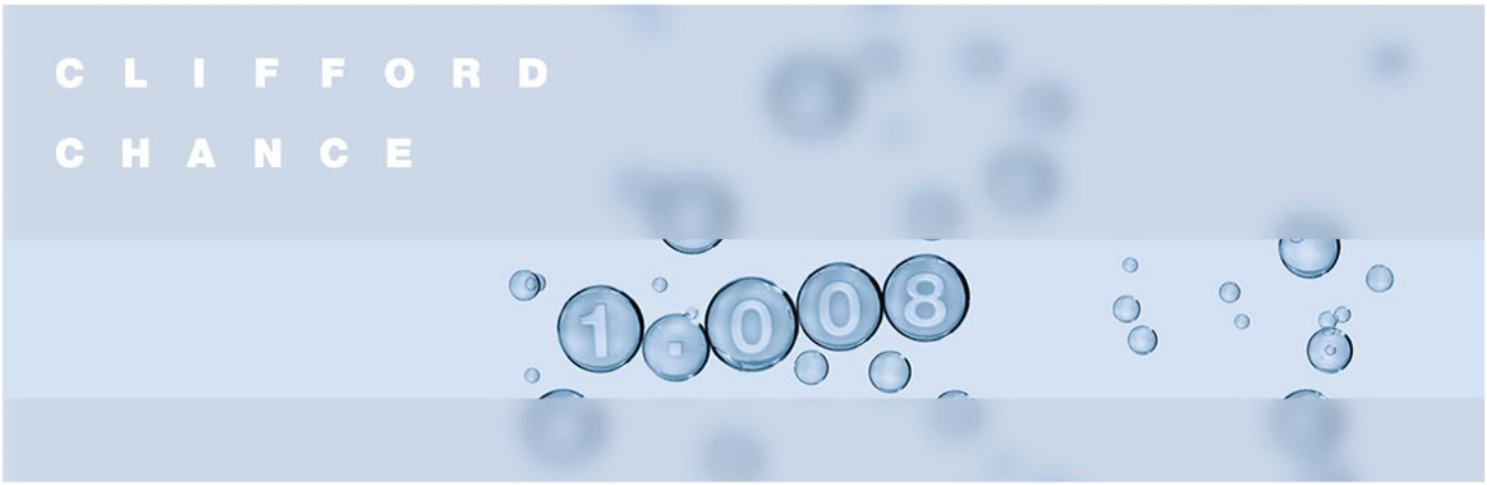

FOCUS ON HYDROGEN: FIVE KEY ENERGY TRENDS IN EUROPE

As part of **#EUHydrogenWeek** the Clifford Chance Clean Hydrogen Taskforce has highlighted the top five hydrogen trends they are seeing across Europe.

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TREND 1: INCREASING GOVERNMENTAL SUPPORT

- Governments across the globe increasingly perceive green hydrogen as a promising technology to accelerate their climate change objectives and to decarbonise the hard to abate sectors (such as industry, heating and heavy transport).
- Such support is backed by a concrete agenda to legislate towards net zero carbon emissions and introduce specific capacity targets to promote investments and boost confidence in the emerging green hydrogen market.
- The European Commission is at the forefront of this agenda, having set out its vision in June 2020 as to how the EU can turn clean hydrogen into a viable solution to decarbonise different sectors over time, installing at least 6GW of renewable hydrogen electrolysers in the EU by 2024 and 40GW of renewable hydrogen electrolysers by 2030.
- Hydrogen is featured as a key sector that should receive support under the EU Recovery Plan, which is to comprise a EUR 750 billion temporary recovery instrument, NextGenerationEU as well as a EUR 1.074 billion long-term budget or "MFF" for the period 2021-2027. The EU Recovery Plan includes a clear commitment that 30% of the EU budget, under both Next Generation EU and the MFF, will be spent to fight climate change.
- Several EU Member States have developed (e.g. France, Germany and the Netherlands) or are in the process of developing (e.g. Belgium and the UK) their own national hydrogen strategy complementing the initiatives at EU level.

TREND 2: DEDICATED SUPPORT SCHEMES IN THE PIPELINE

- To become cost-competitive with fossil fuels and scale-up production, green hydrogen requires dedicated support schemes and a supportive policy framework. At the EU level, several proposals are being contemplated, including:

  - the creation of a tendering systems for Carbon Contracts for Difference (CCfD), which are long-term contracts whereby a public counterparty supports an investor by paying the difference between the CO2 strike price and the actual CO2 price in the EU's Emission Trading System (ETS);
  - direct and transparent market-based support schemes, allocated through competitive tenders; and
  - a revision of the State aid framework, including the state aid guidelines for energy and environmental protection, foreseen in 2021.
- The national and regional hydrogen strategies that are gradually taking shape across EU member states should be complementary with these proposals and target the entire hydrogen value chain to be successful and avoid fragmentation of the EU Single Market.

TREND 3: STRATEGIC PRIVATE SECTOR INITIATIVES CREATING FIRST HYDROGEN VALUE CHAINS

- Market players seek to bolster the business case for innovative green hydrogen pilot projects through progressive scaling up of electrolysis technology and strategic collaborations with established players in the renewable energy space and industrial off-takers.
- Pilot projects are often embedded in existing industrial clusters to benefit from onsite or near site renewable energy production, reduced transportation costs and stable demand from adjacent pre-existing industrial off-takers.
- There is a clear potential to procure necessary renewable energy input from newly constructed offshore wind projects (e.g. in Northern European countries bordering the North Sea and Baltic Sea) or large-scale solar plants (e.g. in Southern European countries). There is an ongoing debate as to what extent such sources can be complemented by "blue" hydrogen produced from natural gas with capture of carbon dioxide emissions (with only a few countries in Europe, including the UK, enthusiastic about blue hydrogen).
- There is an emerging demand for green hydrogen conceivable from myriad sectors and applications, including industrial and chemical applications currently deploying natural gas-based hydrogen (such as certain refineries), electricity generation and storage, transport (including aviation) and sectors hard to electrify (e.g. steelmaking and cement production).
- The intermittent nature of renewable energy sources triggers additional demand for large-scale electricity storage solutions such as the conversion of renewable energy into green hydrogen to ensure security of supply, grid balancing and to better manage seasonal peak demand.

TREND 4: GRADUAL DEVELOPMENT OF A STRONG HYDROGEN BACKBONE TO BRIDGE SUPPLY AND DEMAND

- Transportation infrastructure for hydrogen gas is crucial for the creation of a liquid hydrogen economy connecting a wide variety of production facilities with a multiplicity of end-users.

- To this end, gas TSOs are actively investigating how they can build a strong hydrogen backbone by reconverting considerable parts of their existing natural gas infrastructure.
- First parts of such hydrogen backbone are likely to emerge around local hydrogen valleys and regional industrial clusters with port-to-port interconnections between neighbouring countries like, for example, Belgium, the Netherlands and France being further developed.
- But large scale development of clean hydrogen allowing better pricing through scaling and using Southern European or North African solar resources faces a transportation bottleneck based on the limited availability of natural gas pipes for reconversion, the lack of a regulatory framework for transporting hydrogen and the timing required for reconversion, new builds and clarification of the regulatory issues.

TREND 5: IMPROVING BANKABILITY THROUGH CONTRACT RISK MANAGEMENT

- It is clear that contract risk management from an early procurement stage to O&M phase can improve a pilot project's bankability by mitigating technology-related risks and overcoming cashflow uncertainties.
- At a procurement stage, we expect two different types of emerging strategies to efficiently manage project risks:
  - An integrated project approach combining renewable energy and hydrogen/electrolyser workstreams – with the ensuing timing and interface risks being managed by an appropriate corporate structure (e.g. concentrating certain project risks in different SPVs to the fullest extent allowed by the Project Lenders) and tailored construction contracts (e.g. aligning realistic project timing schedules for both workstreams and sanctioning the failure to meet crucial key milestones); and
  - A two-stage process combining a newly constructed hydrogen project with an existing renewable energy project – this reduces timing and interface risks during construction phase but requires adequate endorsements or carve-outs from availability guarantee given by electrolyser EPC contractor relating to renewable energy sponsor responsibilities.
- At the O&M phase, when a project is operational, a comprehensive availability guarantee by the O&M contractor could incentivise a high degree of plant or equipment uptime and mitigate the project company's liability exposure to its off-takers in case of unavailability. While market standards are still to be established giving the early and developing nature of the green hydrogen sector, we already see that project developers are requesting availability guarantees and contractors are making analogies with other sectors using different technologies (including oil and gas processing plants, gas turbine plants, offshore/onshore wind and solar) when accommodating such requests.

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