

Making Hydrogen Happen

Carlton Power is a market leader in the development of electrolytic hydrogen projects across the UK



Carlton Power

- Founded in 1995
- Proven track record with over 3.5GW of thermal and renewable generation projects delivered and operational, including: Enfield, Langage, and Carrington CCGT's which have a combined capacity of 2.2GW and a capital cost of over £1bn.
- Expertise in:
 - Early-stage development of complex nationally significant projects and diverse, multi-site portfolios.
 - Construction and operations management, trading and optimization of large power generation portfolios.
 - Equity and Debt financing of development and construction.

Hydrogen Development

- Three highly mature projects submitted into first subsidy allocation round for green hydrogen.
- Focus on large industrial gas users with low barrier to making dual-fuel switch.
- Supporting the government's target for 5GW of electrolytic production by 2030 and 1GW by 2025/26.
- Subsidy mechanism allows hydrogen supply at cost equivalence with natural gas for up to 15 years.



Hydrogen Production Challenges



Commercial Considerations

- Capital Cost
 - Manufacturer production scale
 - Construction delivery model
- Energy Costs
 - Availability of true cost renewable electricity

Production Infrastructure

- Grid connection
- Development sites
 - Proximity to offtaker
 - Scalable

Transportation Infrastructure

- Pipeline
- Tanker

Hydrogen Usage Challenges



Energy Security

- Priority consideration
 - Industry – back up
 - Transport – fuelling network

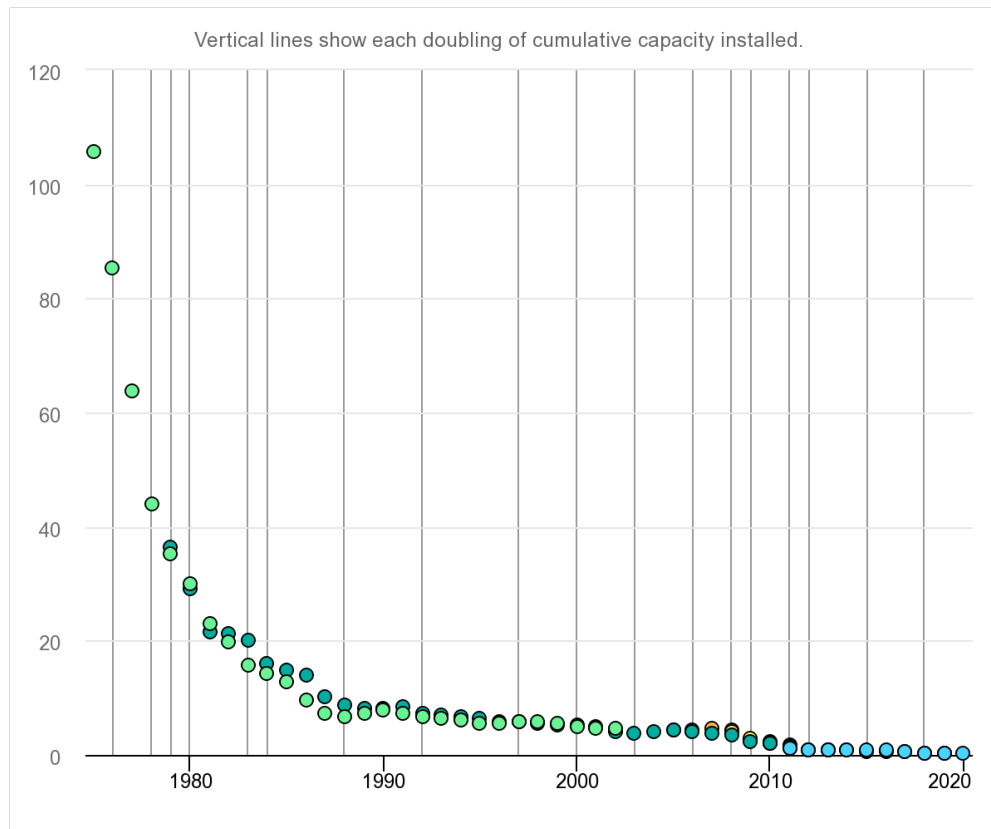
Equipment

- Availability of equipment
 - Industry - readily available
 - Transport - Manufacturer production scale

Commercial Requirements

- Level of commitment
- Contract term

Scaling the opportunity - equipment



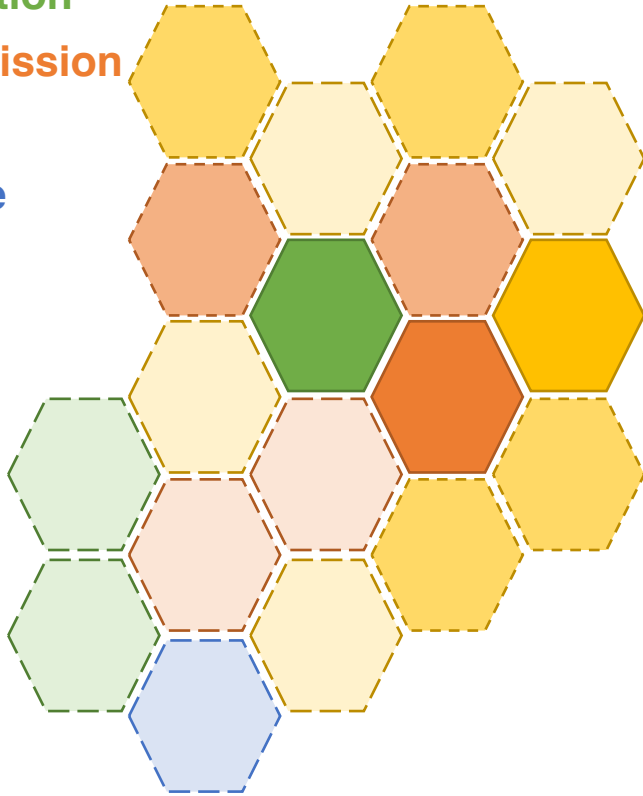
Projects deliver cost reductions

- Production scaling
- Reduced equipment cost
- Reduced delivery cost
- Improved efficiency
- Improved reliability

Scaling the opportunity - infrastructure



Production
Transmission
Offtake
Storage



Projects underpin infrastructure investment

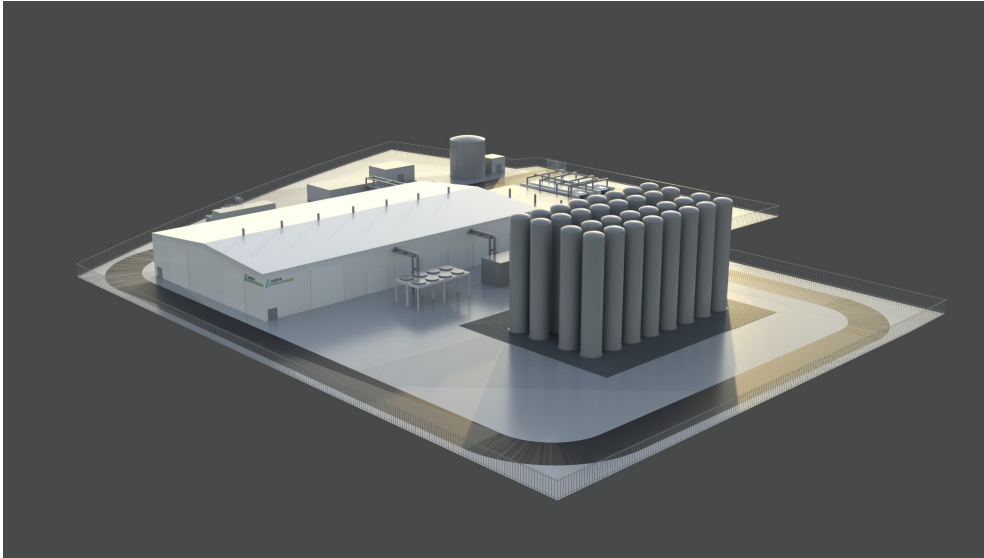
- Phase 1
 - Use existing infrastructure
 - Minimise new equipment
 - Prove reliability
- Phase 2
 - Expand distribution network
 - Expand offtaker types
 - Improve resilience
- Phase 3+
 - Network interconnection
 - Connect “mega” infrastructure (transmission and storage)

A combination of small AND large projects will be needed



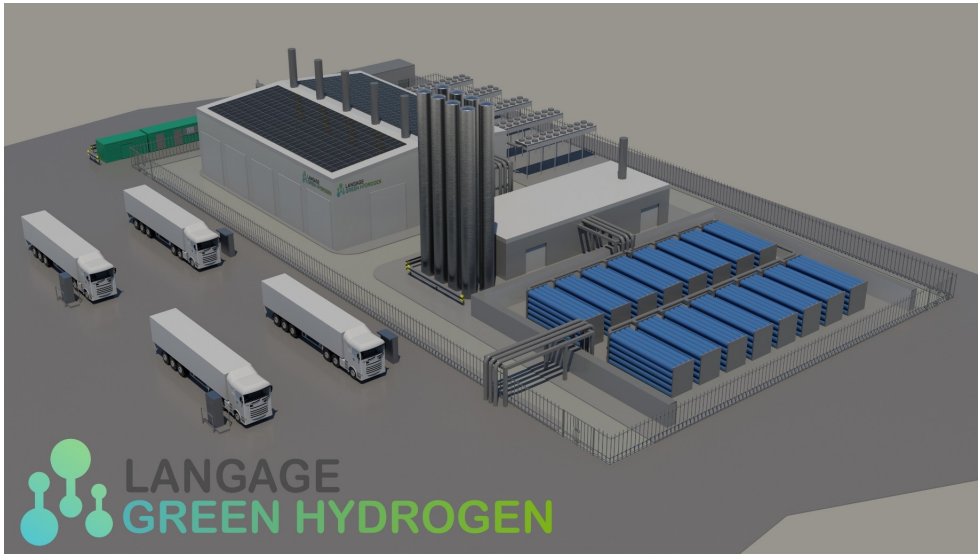
Summary

- 15 MW project with expansion up to 200 MW.
- Land secured, planning granted
- Large utilities anchor offtaker ready to take hydrogen via direct pipeline
- Additional offtakers ready to take hydrogen via road
- Secondary offtakers engaged to rapidly expand scale
- Further expansion via HyNet
- Grid connection secured, private wire renewable opportunities available
- MoU with Greater Manchester Combined Authority, Trafford Council, Cadent Gas, Electricity North West and Manchester Metropolitan University



Summary

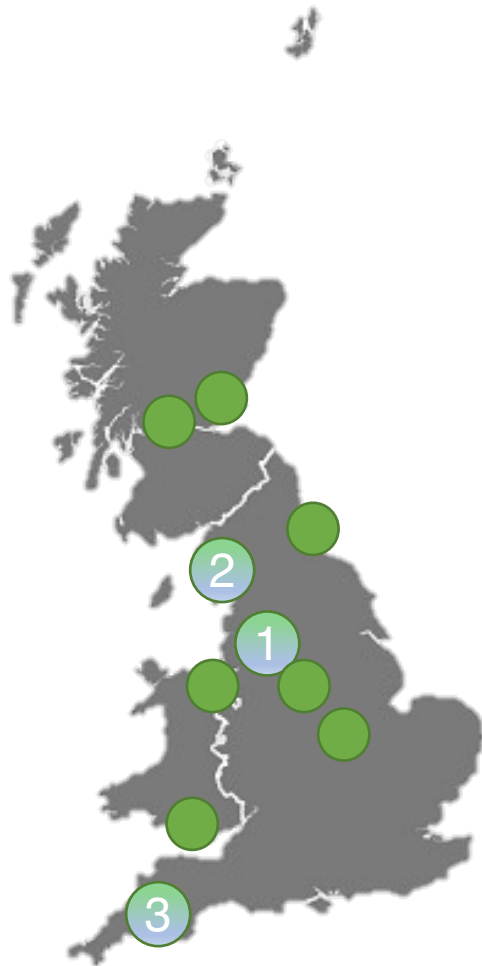
- 30MW plant underpinned by large multinational anchor offtaker, Kimberly Clark, who are committed to taking 100% of the hydrogen initially produced.
- Grid connection and land rights secured
- Growth potential for up to 200MW with known offtakers engaged.
- MoU signed with Cadent Gas, Electricity North West and Cumbria Local Enterprise Partnership and Barrow Borough Council



Summary

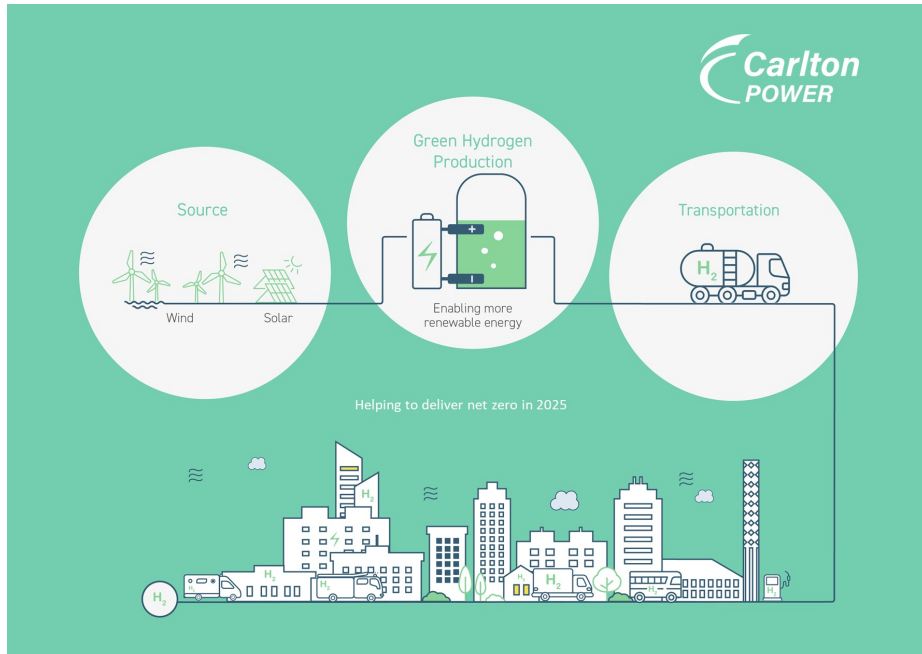
- 10MW project, land secured, planning granted
- Underpinned by agreement with two large minerals producers requiring gas for high-heat processes
- Direct pipeline supply
- Secondary offtakers engaged to rapidly expand scale
- Grid connection secured and up to 10% of electricity generated by CP owned Langage Solar Park

Portfolio Development



- Further hubs being developed targeting future allocation rounds, with the second round due to open in Q2 2023
- Offtakers engaged with hydrogen demand to support 20-200MW projects.
- National Grid and local DNOs are currently engaged across all sites to determine grid connection availability.
- Second phase of funding is expected to allocate capex and revenue support for over 1000MWe of electrolytic hydrogen projects.

Summary

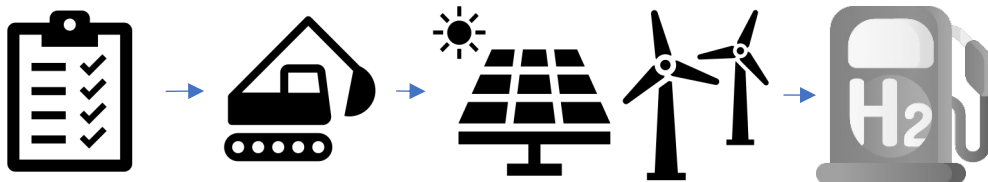


Key Dates

- Q3 2023: Final Investment Decision
- Q2 2025: First Hydrogen

Key Metrics

- Direct Capital Investment - £200m secured
- 70MW Electrolyser capacity
- 5600-7000 tonnes per annum H₂ production capacity



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