

# ITM Power | Green H<sub>2</sub> @ Scale | Feb 2021

Graham Cooley, CEO, ITM Power plc



### Key Achievements in the period:

- Record Backlog: £124m (October 2020: £118m)
- Increasing Tender pipeline of £434.7m (Oct 2020: £324.9m)
- £172m fundraise in Oct 2020 | £30m investment by Snam
- Opened Bessemer Park | world's largest electrolyser factory
- Sale to Linde of 24MW | world's largest PEM electrolyser
- 100MW Humber FEED study in process
- Strategic partnership with Scottish Power
- Strong momentum with Linde in key strategic markets

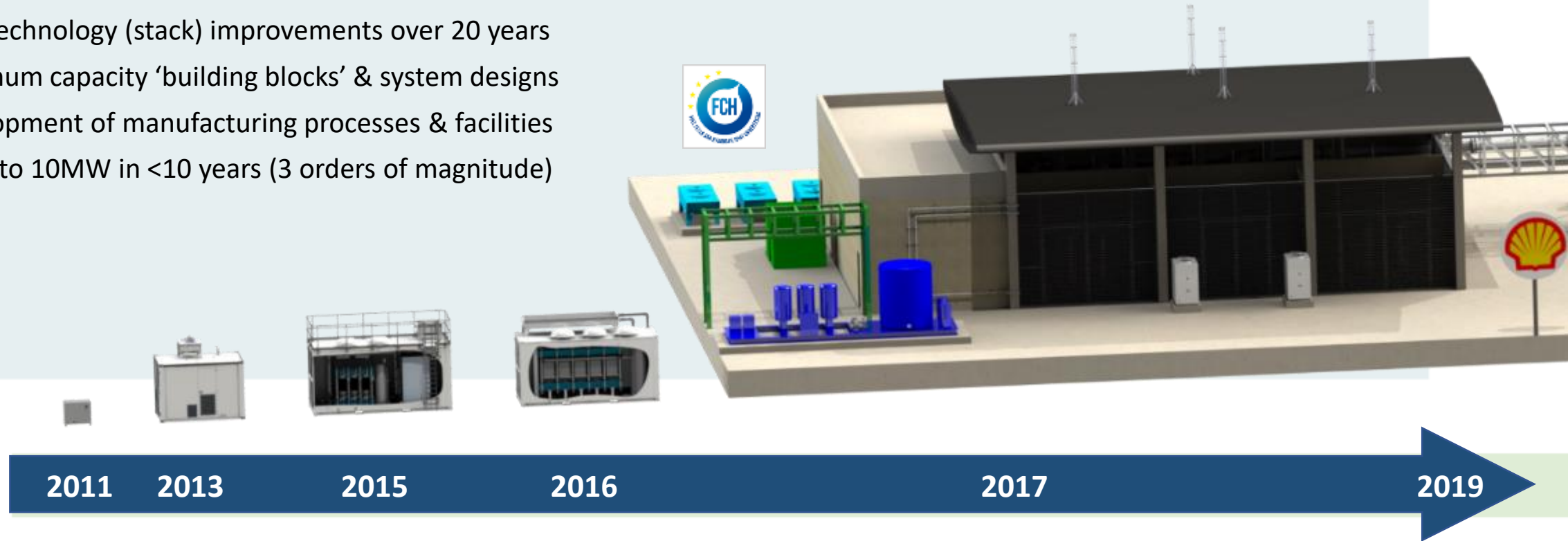


**ITM Power Bessemer Park | 1GW pa Capacity Electrolyser Factory**

**A strong platform for rapid future growth**

### ITM Power product evolution:

- The pace of PEM development is fast
- Core technology (stack) improvements over 20 years
- Maximum capacity 'building blocks' & system designs
- Development of manufacturing processes & facilities
- 10kW to 10MW in <10 years (3 orders of magnitude)





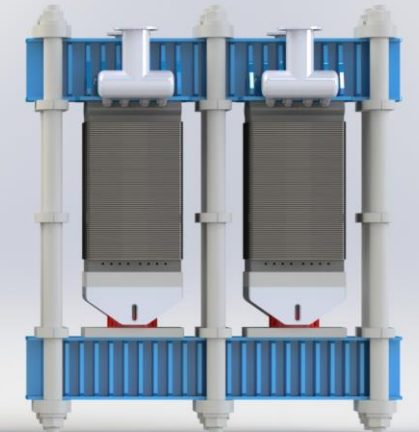
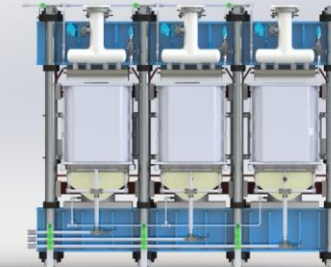
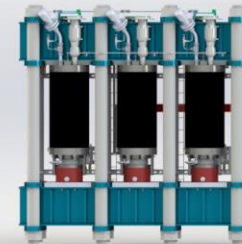
### Superior offering for the XL market:

- Acceleration of 5MW stack module underway
- Market leading electrolyser performance
- Responding to the market demand for large scale
- Standardisation and modularity at scale
- Pre-engineer into 20MW packages for rapid deployment
- Exposure to larger projects faster | Minimise on site works

0.2MW  
80kg/day

2MW  
800kg/day

5MW  
2100kg/day



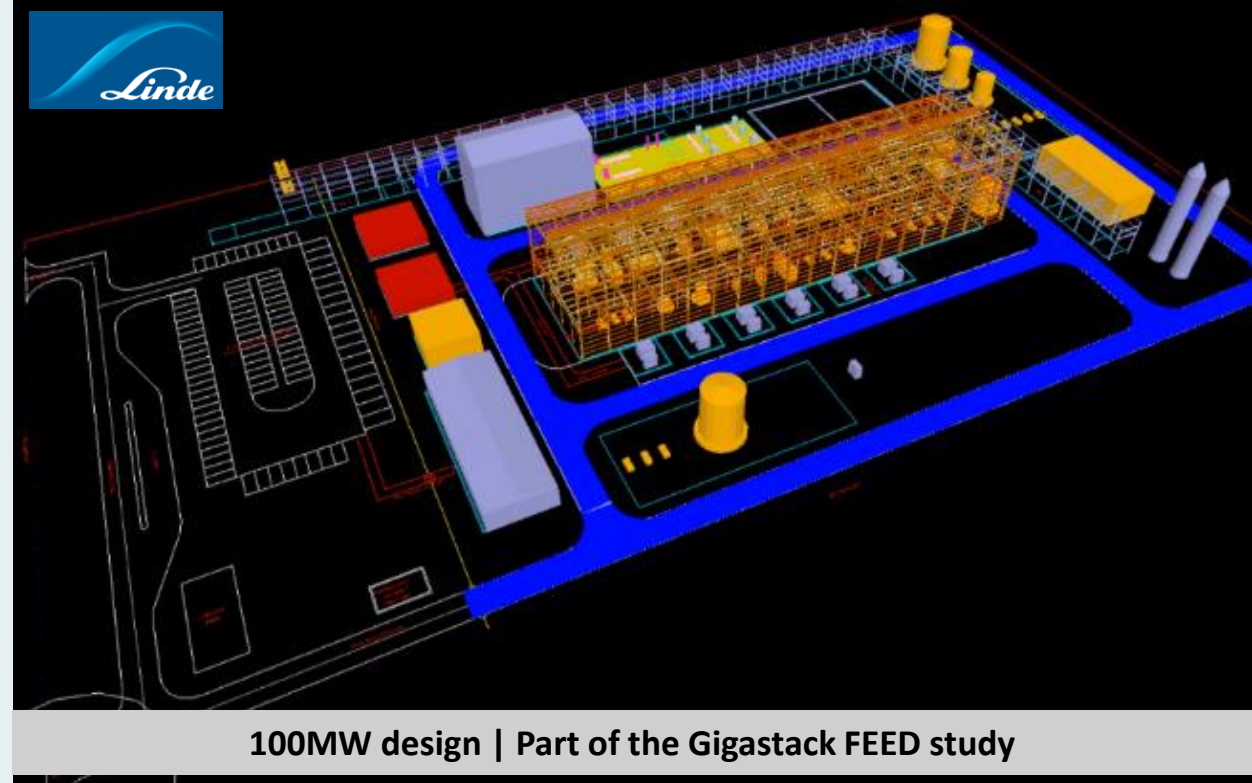
5MW module design evolution

**Best in class | available 2 years earlier**



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### Sale to Linde of World's Largest PEM Electrolyser:

- A 24MW industrial turn key plant
- Linde Engineering designed the BoP
- First ILE industrial scale project
- Demonstrates Linde's commitment to the technology
- Important new German reference plant
- World leading deployment



**Best in class | new Linde engineered BoP | First major EPC**





### Double Capacity | Half Lead Times:

- Enhance 1GW capacity of Bessemer Park through automation
- Eliminates bottleneck of testing with 5MW power supply
- Use blueprint to set up **new factory** to increase capacity
- New factory in **strategic location** to optimise cost, quality, supply
- Increase minimum stock | Reduce lead times | Project wins
- Market supply capacity to show ability to respond



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**Double capacity (1 to 2GW/year) | Halve lead time (14 to <8 months)**



Measure	Atlas Way	Bessemer	Change
Production capacity	100MW	1GW+	10x
Effective capacity	<30MW	1GW+	30x
Test Zone	0.5MW (outside)	5MW ATEX (inside)	10x
Automation	None	Semi Automated	Confidential
Control room	24hr UK	24hr Worldwide	Systems
IT   Connectivity	100Mbps	1Gbps	10x
Office + lab space	80 staff	320 staff	4x
Marketing suite	None	World Class	Conferences



**ITM Power Bessemer Park | 1GW pa Capacity Electrolyser Factory**

**From Atlas Way to Bessemer Park | Unlocking Scale**



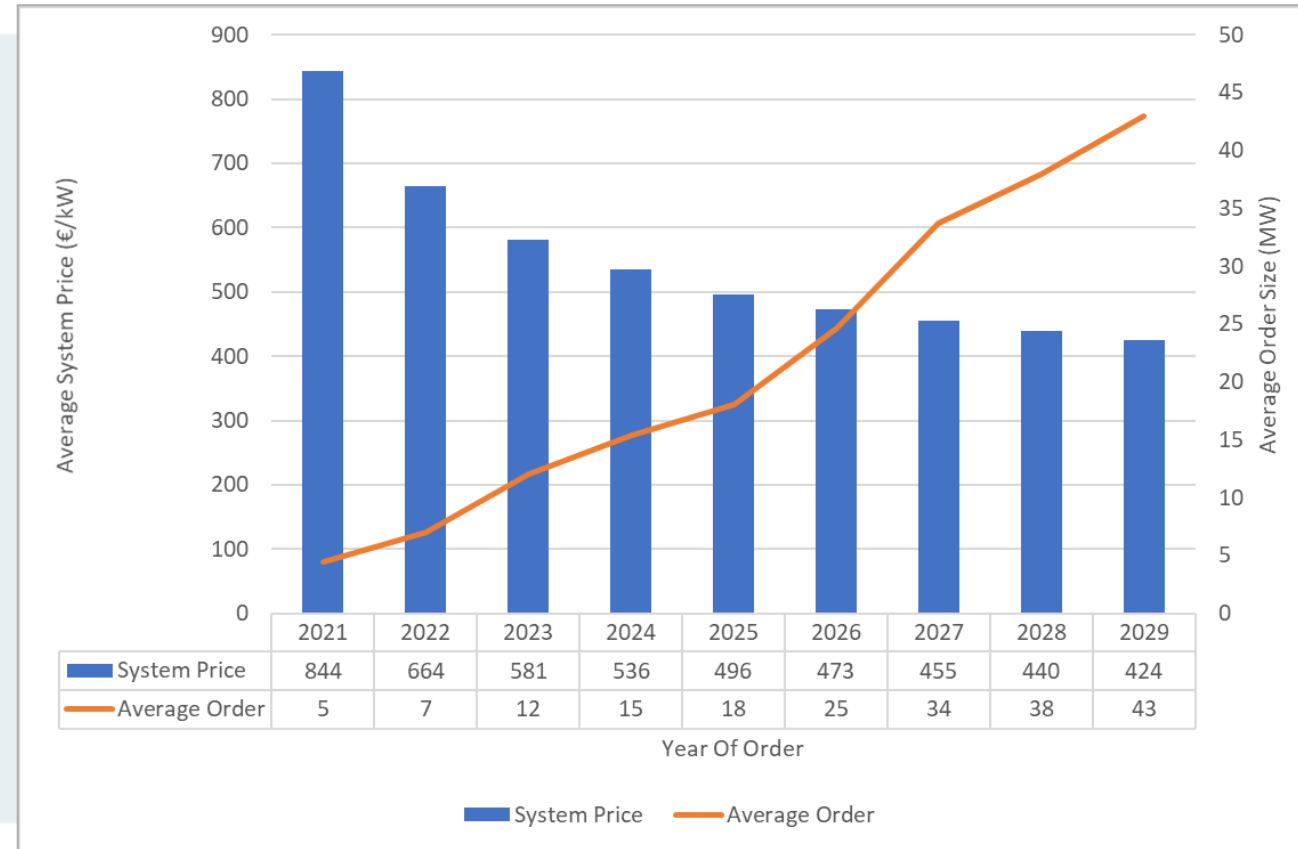


### ITM Electrolyser Cost Reduction

- Target **50% electrolyser cost reduction** within 5 years
- Biggest gains available in PEM stack & power conversion
- Based on product **standardisation & modularisation**
- Product control enables improvement in all areas
- Leveraging buying power of partners (Linde)
- Currently **tracking ahead of target**

#### Enablers for cost reduction:

- Manufacturing volume | Semi-automation | Procurement
- Application of technology improvements
- Provision of larger systems



**<€1,000/kW today @ MW scale | <€800/kW @ 10MW | <€500/kW by mid 2020's**

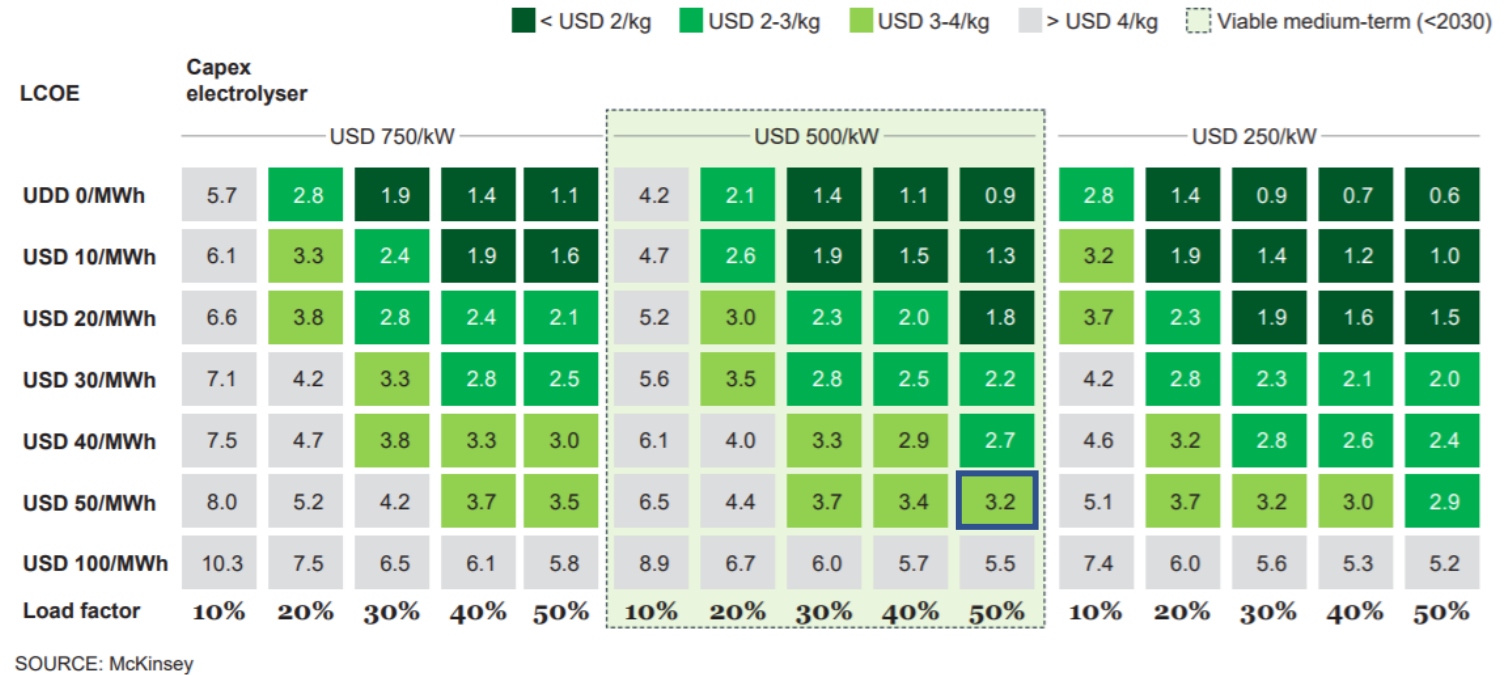
### Exhibit 14 | Renewable hydrogen from electrolysis production cost scenarios<sup>5</sup>, USD/kg hydrogen



Cost of renewable hydrogen with varying LCOE and load factors  
USD/kg H<sub>2</sub>

### Green Hydrogen Cost:

- Assumptions for 2025 deliveries
- Orders placed in 2023
- Capex \$500/kW (\$0.5m/MW)
- LCOE \$50/MWh (5c/kWh)
- 50% Load Factor
- Direct coupling to renewables



**Green Hydrogen Cost Dominated by LCOE, Electrolyser Capex and Load Factor**

## Green Hydrogen Cost:

- \$0.8 to \$1.60/kg before 2050
- Equivalent to gas at \$6-\$12/MMBtu
- Lower cost than NG
- Lower cost than CCS (Blue H<sub>2</sub>)
- Broad agreement from BNEF, Platts, Hydrogen Council and Hydrogen Europe

"If electrolyser manufacturing can scale up, and costs continue to fall, then our calculations suggest renewable hydrogen could be produced for \$0.8 to \$1.60/kg in most parts of the world before 2050. This is equivalent to gas priced at \$6-\$12/MMBtu, making green hydrogen competitive with current natural gas prices and cheaper than producing hydrogen from natural gas or coal with CCS." **BNEF**



**Green Hydrogen should be prioritised in the cost down journey because its Net Zero**





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