

# HydrogenOne Capital Growth plc

## FY23 Annual Results presentation



Signatory of:



Investing in clean hydrogen  
for a climate-positive impact

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- **Full year results for the year ending 31st December 2023**
- Portfolio update and outlook
- Appendix: Market update
- Appendix: Invested companies update

# 2023 highlights and outlook

**£133m**  
NAV

**103p**  
NAV per share

**+5.8%**  
YoY NAV  
growth

**+125%**  
Portfolio  
revenue growth

**£114m**  
Deployed in  
low carbon  
growth

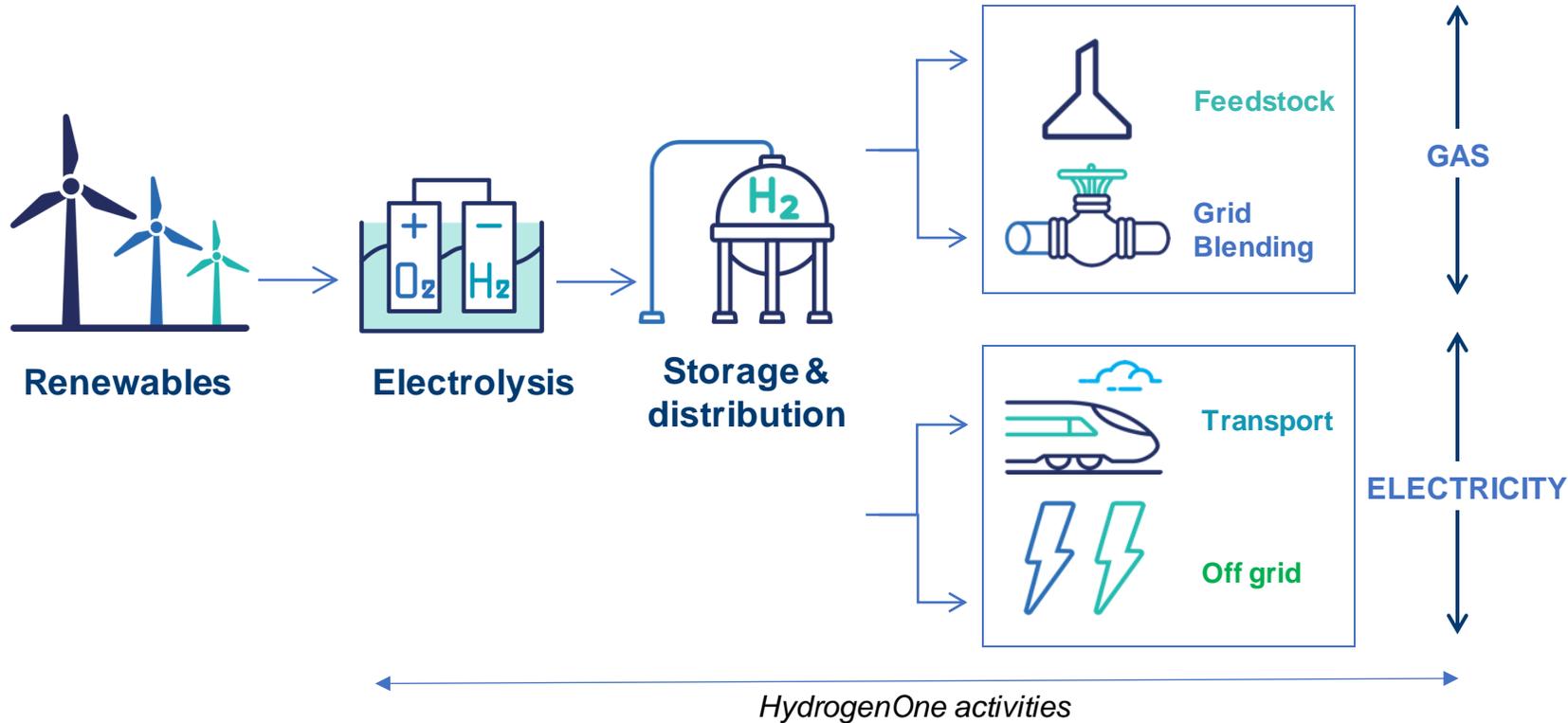
**£10m**  
New  
investment

**91,116**  
tCO<sub>2</sub>e GHGs  
avoided

**Article 9**  
SFDR

- NAV increased by 5.8% to £132.7 million at 31 Dec 2023. NAV per share increased by 5.8% to 102.99p at 31 Dec 2023
- Positive revenue growth from portfolio companies, delivering £74.0 million in total revenue in the year to 31 Dec 2023, an increase of 125% compared to 31 Dec 2022
- Investment activity centred on follow-ons, with one new position, totalling £10.6 million
- Strategic industrial investors have backed HydrogenOne portfolio companies, including Cemex, HD Hyundai and Baker Hughes
- Funding for Sunfire and Elcogen c. EUR 600 million announced Q1 2024
- Consolidation of HH2E adds interest in Lubmin project for HGEN, Q1 2024
- Cash position of £4.6 million as at 31 Dec 2023, and £2.3 million of listed hydrogen companies
- The clean hydrogen sector continues to strengthen, with \$17 billion of investment in 2023, a 400% increase to 2022 levels

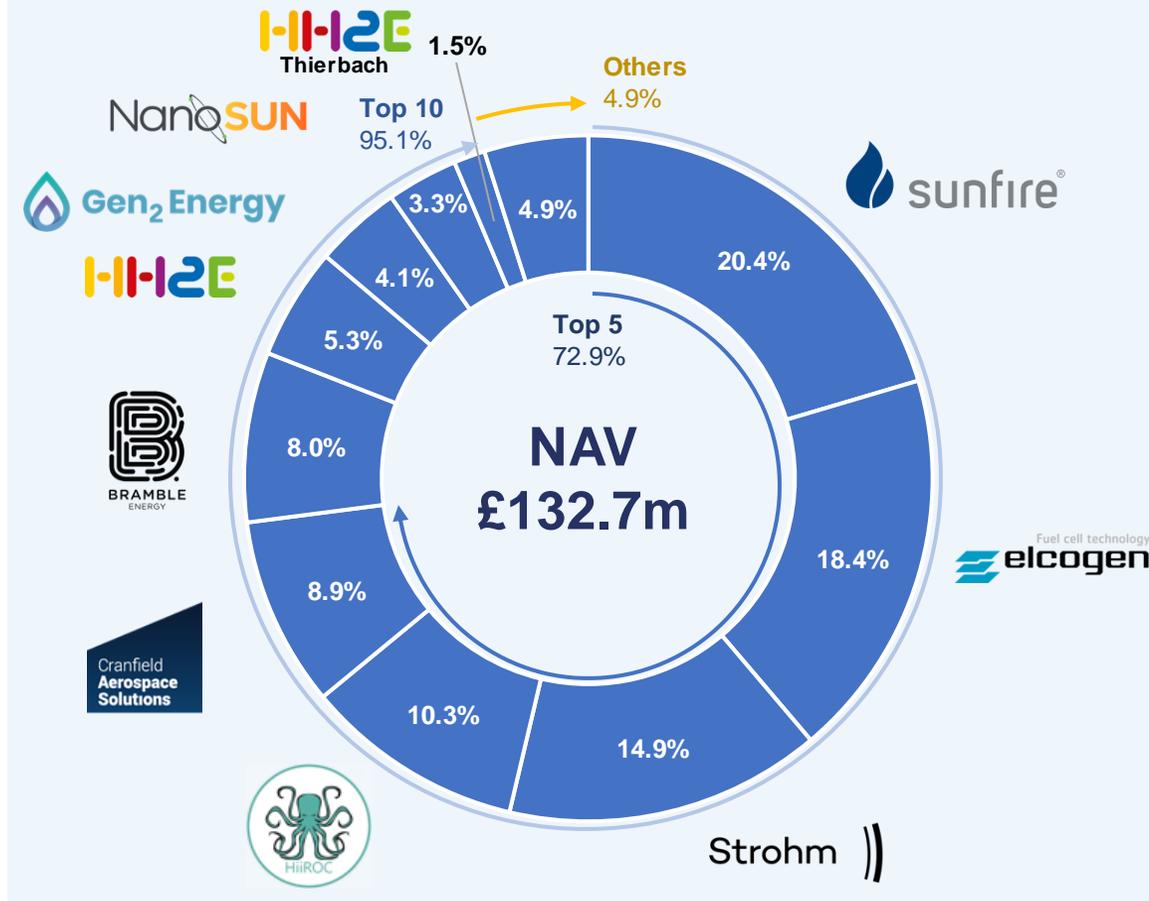
# How our portfolio contributes to clean hydrogen



- Conversion of renewables to hydrogen
- Multiple hydrogen applications to replace fossil fuels
- 20 billion tonnes/yr GHG reduction potential

# HydrogenOne has a distinctive and concentrated portfolio, invested across the hydrogen value chain

## Access to a distinctive portfolio of private hydrogen businesses



## Where we invest

- Revenue-generating equipment businesses
- Hydrogen production projects
- Co-investing with industrial strategics and institutions
- Portfolio diversified by investment, geographical exposure and sector application
- Clear strategies to exit via IPO or trade sale

# Financial and operational highlights 2023

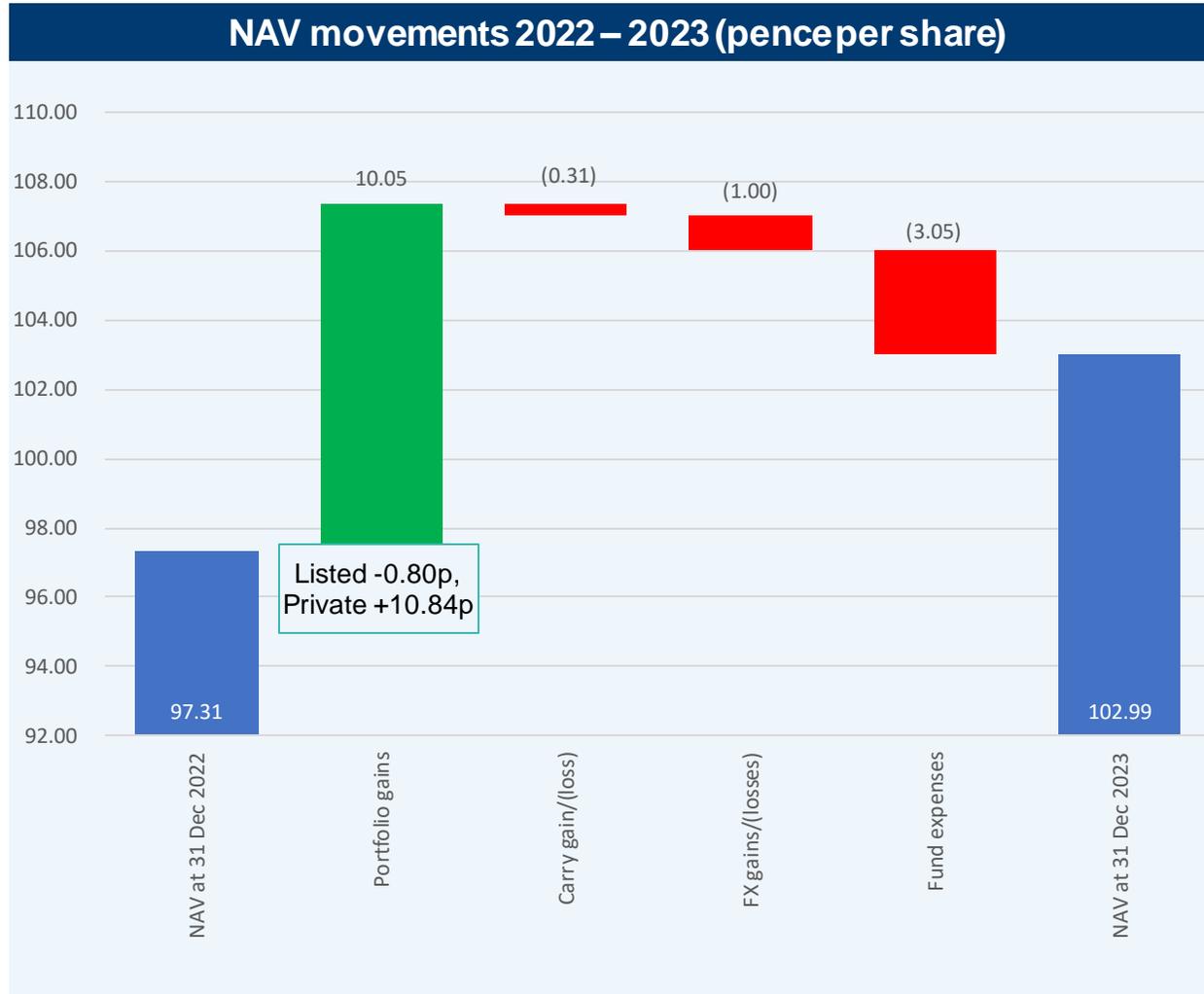
	31 Dec 2023 <sup>2</sup>	31 Dec 2022
NAV per Ordinary Share	102.99p	97.31p
NAV	£132.7m	£125.4m
Ordinary Share price	49.65p	79.30p
Market cap	£64.0m	£102.2m
Share price premium/ (discount) to NAV <sup>1</sup>	(52.8)%	(18.5)%
Ongoing Charges <sup>1</sup>	2.6%	2.5%
Cumulative capital deployed in low-carbon growth (since inception)	£113.7m	£102.9m
GHG emissions avoided	91,116 tCO <sub>2</sub> e	42,716 tCO <sub>2</sub> e

- NAV and NAV per share increased by 5.8%
- The NAV increase was driven primarily by valuation uplifts to the Company's portfolio of private investments, positively contributing 10.8 pence (+11.1%) per share to the NAV movement, partly offset by fund costs
- Diversified portfolio of hydrogen assets, delivering growth for investors across the portfolio
- SFDR Article 9 classification and signatory of UN PRI. £113.7m capital deployed in low carbon growth has resulted in 141,695 tonnes of CO<sub>2</sub> equivalent of avoided GHG emissions since IPO

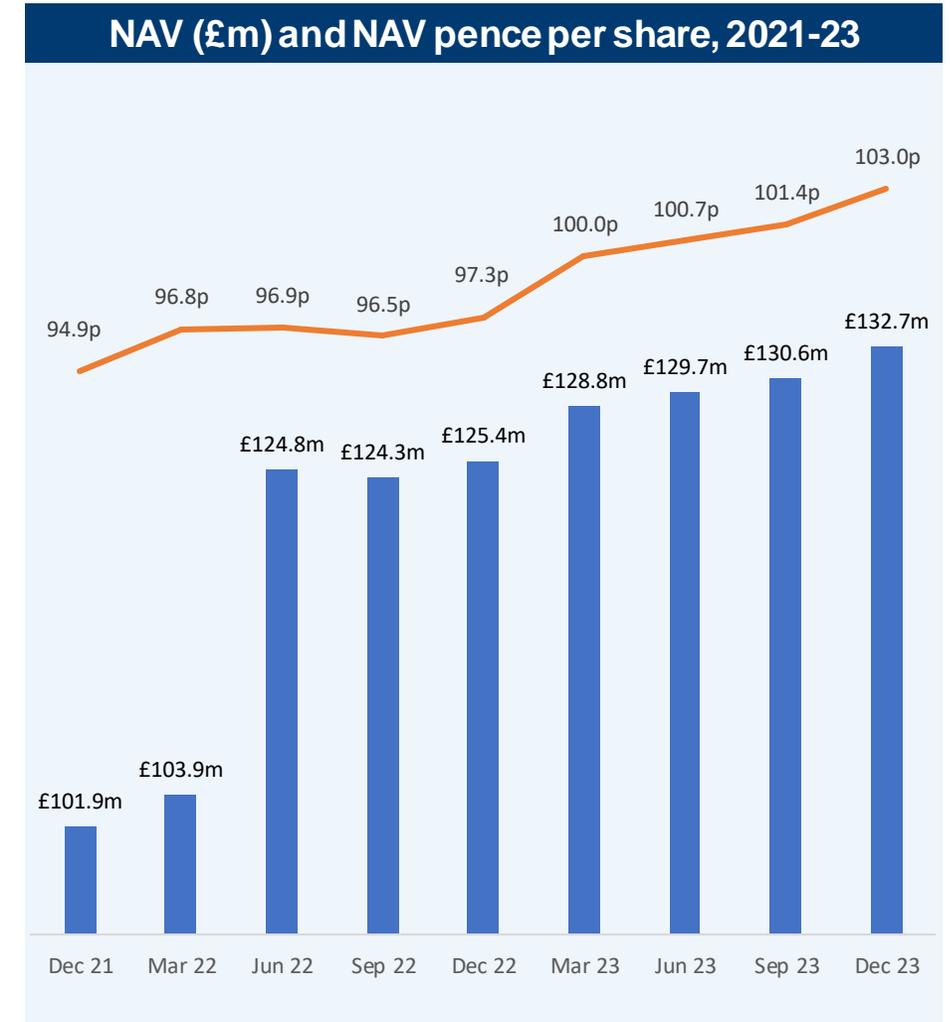
<sup>1</sup> Alternative Performance Measures ("APMs")

<sup>2</sup> Total returns in sterling for the 12 months to 31 December 2022

# Growing our NAV and NAV/share in 2023

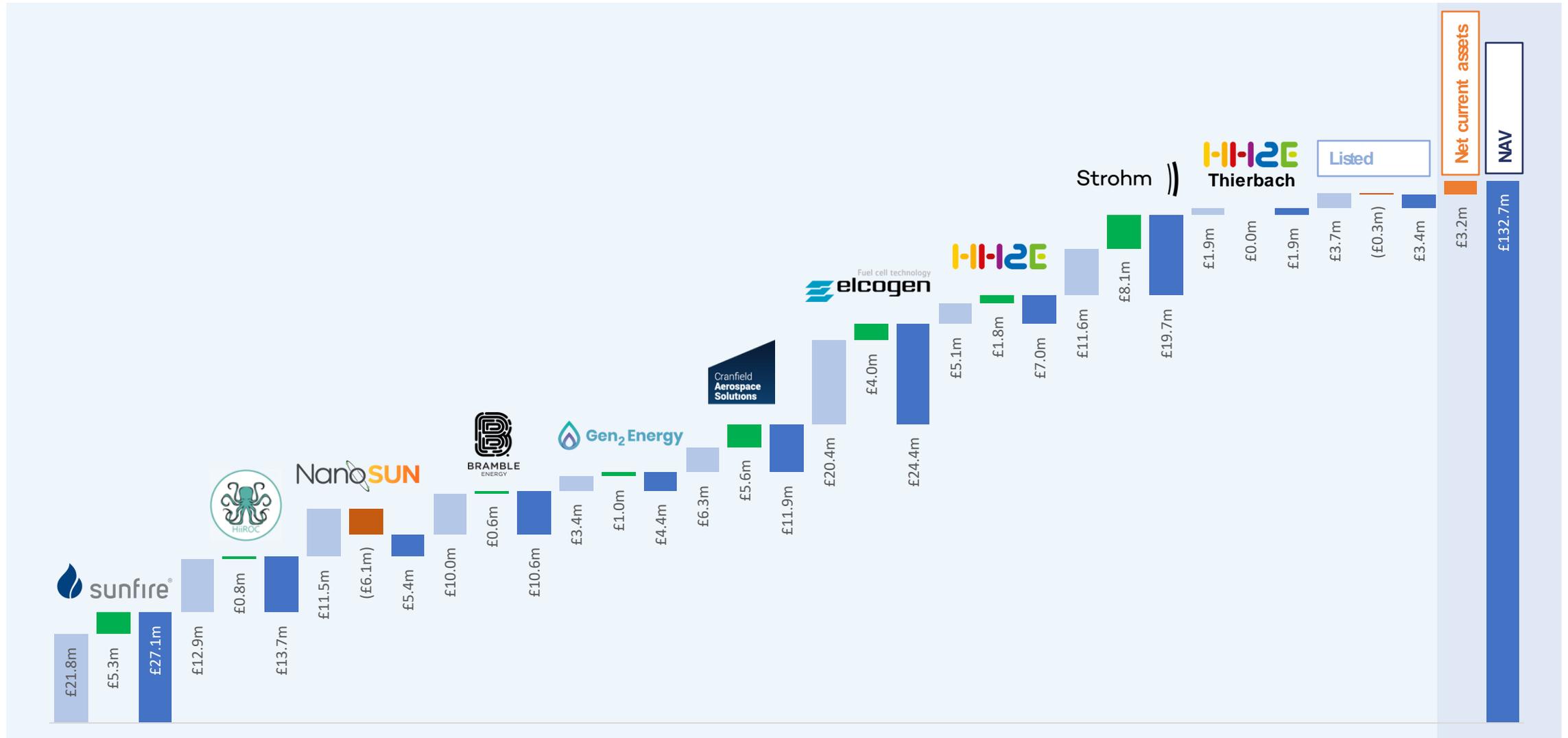


- Increased NAV in private assets; includes 6.7 pence per share reduction from higher discount rates (14.2% 31 Dec 2023 vs 13.0% 31 Dec 2022)

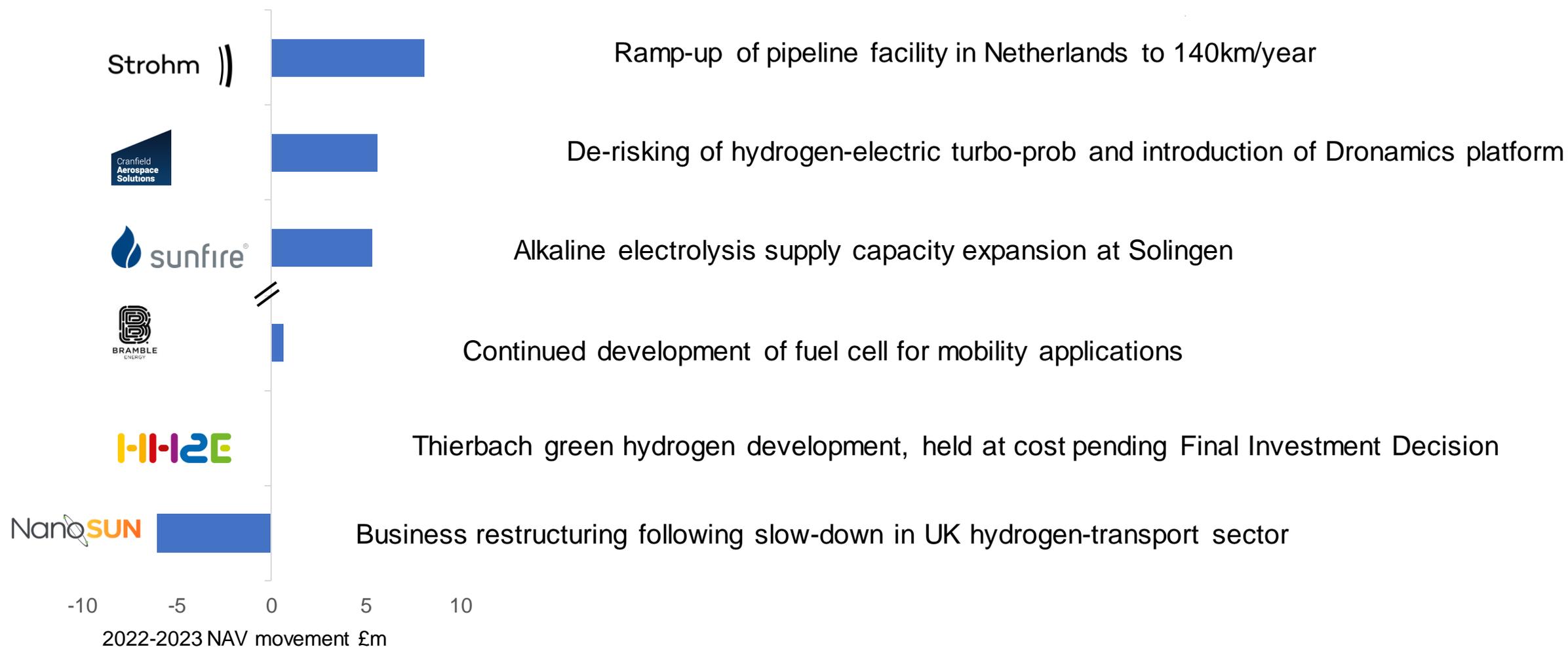


- Steady progression in NAV/share

# Portfolio valuation changes 2022-23



# Top 3 and bottom 3 NAV performers 2022-2023



# Five follow-on private investments and first investment in a private hydrogen project in 2023



£1.9m

Funding for an industrial-scale green hydrogen production facility. 100 MW by 2025.

Pre-FID scoping and land purchase in Germany.

£3.5m

Follow-on funding with strategic investors for hydrogen-powered turboprop passenger flight and cargo drones.

£1.8m

Follow-on funding alongside existing Series D investors.

Continued build-out of alkaline electrolyzer facilities in Germany.

Bridging round into Series E (completed in Q1 24)

£0.4m

Funding alongside existing strategics and institutions for pre-FID activities on Norway green hydrogen projects.

£0.5m

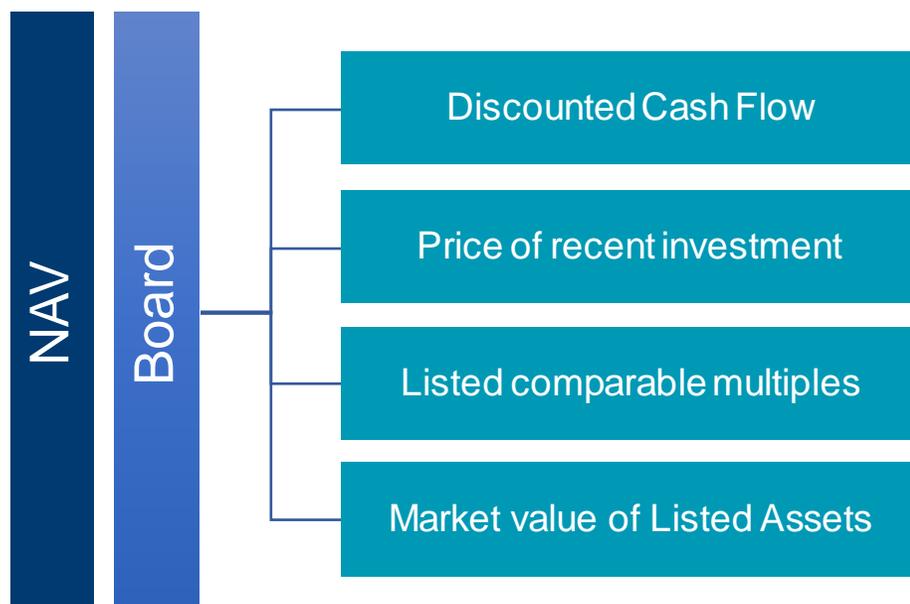
Follow-on funding with existing strategic and institutional investors for Ijmuiden plant expansion.

£2.5m

Follow-on funding with strategic investor and management for development of Pioneer hydrogen distribution systems.

Deploying £10.6m in low-carbon growth in 2023

## Valuations using IPEV guidelines



## Consistent approach to valuation

- Valuations updated for the entire private portfolio on a quarterly basis, reviewed and approved by the AIFM and Board. HGEN's valuation is audited annually by KPMG
- The private portfolio is principally valued using either the DCF method, or a combination of the DCF method and the price of recent investment. The DCF valuations are also benchmarked against listed peer group valuations
- Discount rates are calculated using market parameters for each investment domicile
- Investments come with downside protections such as anti-dilution, liquidation preferences and delivery milestones
- HGEN is represented on 100% of private portfolio boards

# Valuation basis and performance since investment

Valuation basis	At investment	Q4 21	Q1 22	Q2 22	Q3 22	Q4 22	Q1 23	Q2 23	Q3 23	Q4 23
Sunfire GmbH investment (Supply Chain)	PORI	PORI	PORI	PORI	POR/DCF	POR/DCF	POR/DCF	DCF	DCF	DCF
Ecogen Plc investment (Supply Chain)	PORI			PORI	PORI	POR/DCF	POR/DCF	DCF	DCF	DCF
Strohm Holding B.V. investment (Storage & Distribution)	PORI				PORI	POR/DCF	POR/DCF	POR/DCF	DCF	DCF
HiiROC Limited investment (Supply Chain)	PORI	PORI	POR/DCF	POR/DCF	POR/DCF	DCF	DCF	DCF	DCF	DCF
Cranfield Aerospace Solutions Ltd (Hydrogen Applications)	PORI			PORI	POR/DCF	POR/DCF	POR/DCF	DCF	DCF	DCF
Bramble Energy Limited (Supply Chain)	PORI	PORI	PORI	POR/DCF	POR/DCF	POR/DCF	DCF	DCF	DCF	DCF
HH2E (TopCo) (Hydrogen Production)	PORI			PORI	PORI	POR/DCF	POR/DCF	DCF	DCF	DCF
NanoSUN Limited (Storage & Distribution)	PORI	PORI	PORI	POR/DCF	POR/DCF	POR/DCF	DCF	DCF	DCF	DCF/Indicative offers/Net Assets
Gen2 Energy (Hydrogen Production)	PORI			PORI	PORI	POR/DCF	POR/DCF	POR/DCF	DCF	DCF
HH2E Thierbach Project (Hydrogen Production)	PORI						At cost	At cost	At cost	At cost + accrued interest

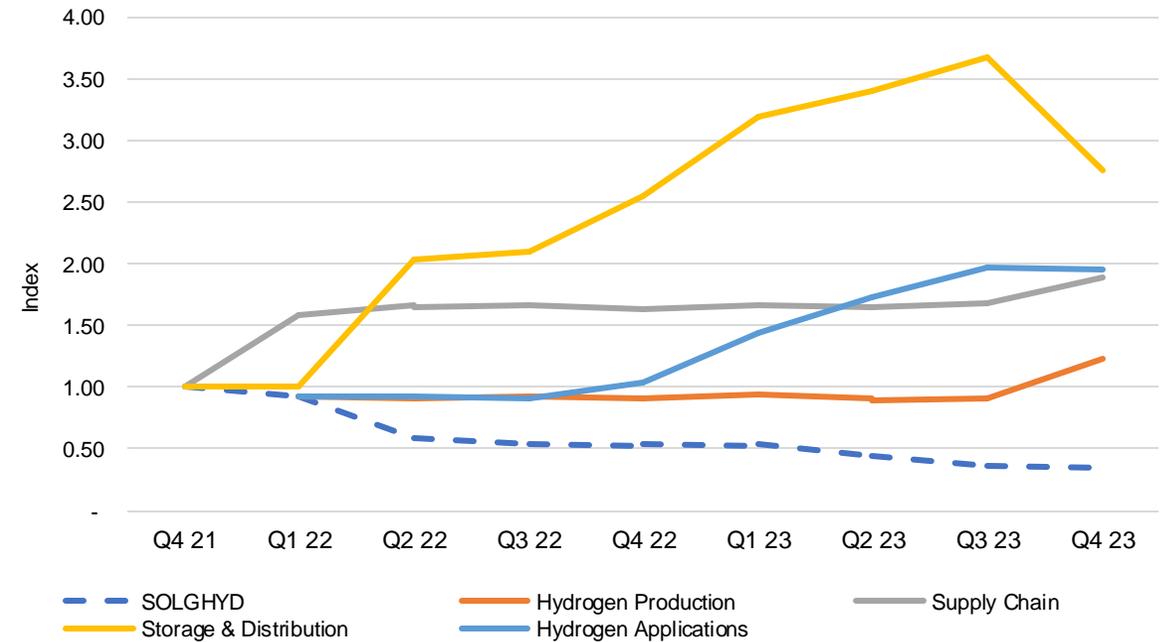
Valuation movement	At investment	Q4 21	Q1 22	Q2 22	Q3 22	Q4 22	Q1 23	Q2 23	Q3 23	Q4 23
Sunfire GmbH investment (Supply Chain)	-	-	-	↑	↑	↑	↑	↑	↓	↑
Ecogen Plc investment (Supply Chain)	-			↑	↑	↓	↑	↑	↑	↑
Strohm Holding B.V. investment (Storage & Distribution)	-				↑	↑	↑	↑	↑	-
HiiROC Limited investment (Supply Chain)	-	-	↑	↑	↓	↑	↓	↓	↑	↑
Cranfield Aerospace Solutions Ltd (Hydrogen Applications)	-			-	↓	↑	↑	↑	↑	-
Bramble Energy Limited (Supply Chain)	-	-	-	↑	-	↓	↓	-	-	↑
HH2E (TopCo) (Hydrogen Production)	-			↑	↑	↓	↓	↓	-	↑
NanoSUN Limited (Storage & Distribution)	-	-	-	↑	↑	↑	↑	↓	↑	↓
Gen2 Energy (Hydrogen Production)	-			↓	↓	↑	↑	↓	-	↑
HH2E Thierbach Project (Hydrogen Production)	-						-	↑	-	↑

# The Company's approach to valuation remains consistent while the market has seen a strong rise and correction

HydrogenOne NAV/share vs listed hydrogen shares (SOLGHYD)



Portfolio companies' performance vs listed hydrogen shares (SOLGHYD)



- Listed hydrogen company valuations have decreased in 2022-23, whereas HGEN NAV has been steady, reflecting steady company performance and consistent valuation methodology
- Forward revenue multiple of c. 9.8X (2025E) in private portfolio is in line with listed hydrogen companies

# ESG principles 2023 impact

<b>Our impact</b>	<b>£114 million</b> deployed in low-carbon growth	<b>92%</b> EU taxonomy-aligned portfolio	<b>91,116 tCO<sub>2</sub>e</b> emissions avoided in 2023. Carbon neutral	<b>141,695 tCO<sub>2</sub>e</b> emissions avoided since IPO	<b>571,294 MWh</b> potential clean energy capacity in 2023
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<b>Our credentials</b>		Signatory of:  Principles for Responsible Investment	Aligned to: 	Aligned to:  GREENHOUSE GAS PROTOCOL
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<b>Our reporting standards</b>	<b>Article 9 - SFDR framework</b>	<b>ISSB framework</b>	<b>Greenhouse Gas Protocol</b>
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<b>Our SDG mapping</b>	<b>Sustainable development goals</b>	 3.9	 7.1, 7.2, 7.3	 9.4, 9.5	 11.6	 12.6	 14.3	 15.3
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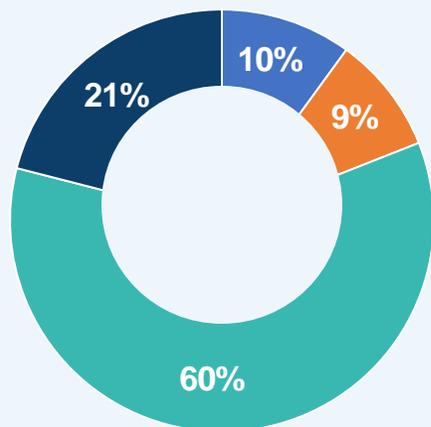
<b>Our ESG principles</b>		<b>Low-carbon Growth</b>	<b>Screening and Due Diligence</b>	<b>Effective Board</b>	<b>Sustainable Business Practices</b>	<b>ESG at HGEN</b>
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- **Portfolio update and outlook**
- Appendix: Market update
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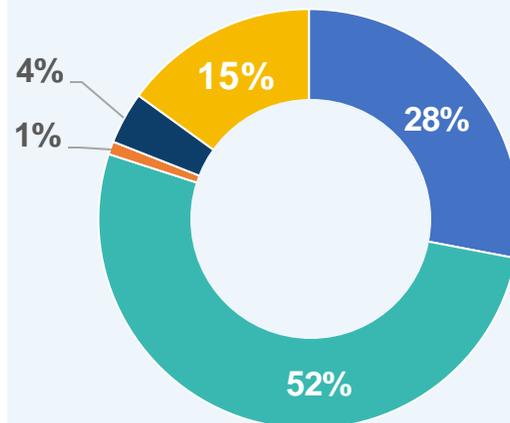
# Distinctive and unique hydrogen portfolio

Portfolio segmentation by theme



- Hydrogen production
- Hydrogen applications
- Supply chain
- Storage and distribution

Portfolio segmentation by geography



- Germany
- UK
- Other
- Scandinavia
- Netherlands

## Fund holdings (as of 31 Dec 23)

Private portfolio	NAV £m	NAV %
Sunfire GmbH	27	20%
Elcogen Plc	24	18%
Strohm Holding B.V.	20	15%
HiiROC Ltd	14	10%
Cranfield Aerospace Solutions	12	9%
Bramble Energy Limited	11	8%
HH2E AG	7	5%
NanoSUN Limited	5	4%
Gen2 Energy	4	3%
HH2E Thierbach Project	2	1%
<b>Private portfolio</b>	<b>*127</b>	<b>*95%</b>
<b>Listed portfolio</b>	<b>2</b>	<b>2%</b>
<b>Total investments</b>	<b>129</b>	<b>97%</b>
Cash and cash equivalents	5	4%
Other assets/(liabilities)	(1)	(1)%
<b>Net Asset Value</b>	<b>133</b>	<b>100%</b>

\*Figures rounded to the nearest whole number

# Investing alongside blue-chip industrials and funds

## Invested companies

Hydrogen production




Storage & distribution



Supply chain






Hydrogen applications



## Co-investors































# 2023 portfolio newsflow

## Q1 2023

- HH2E launches 100MW green hydrogen production project at Thierbach
- Strohm plant expansion in the Netherlands, for 140km/year of TCP pipeline
- Sunfire launches new alkaline electrolysis plant in Solingen, 500MW capacity

## Q3 2023

- Sunfire contract awarded for 100 MW alkaline electrolyser to a European refinery, and received €169m grant from IPCEI
- Elcogen awarded funding from IPCEI for €25.4m
- Strohm installs its first deep-water TCP in Guyana at water depths of 1,700m
- HH2E, DHL Group, and Sasol announce collaboration on sustainable aviation fuels in Germany

## Q2 2023

- Sunfire installs a 2.6MW solid oxide electrolyser in Rotterdam
- Strohm selected for 10MW offshore hydrogen facility in Belgium "HOPE"
- Cranfield Aerospace appoints Evolito for its hydrogen-powered aircraft demonstrator
- Bramble Energy receives £12.0 million UK Government funding
- Gen2 Energy zoning plan approval for a 100MW green hydrogen facility in Mosjøen

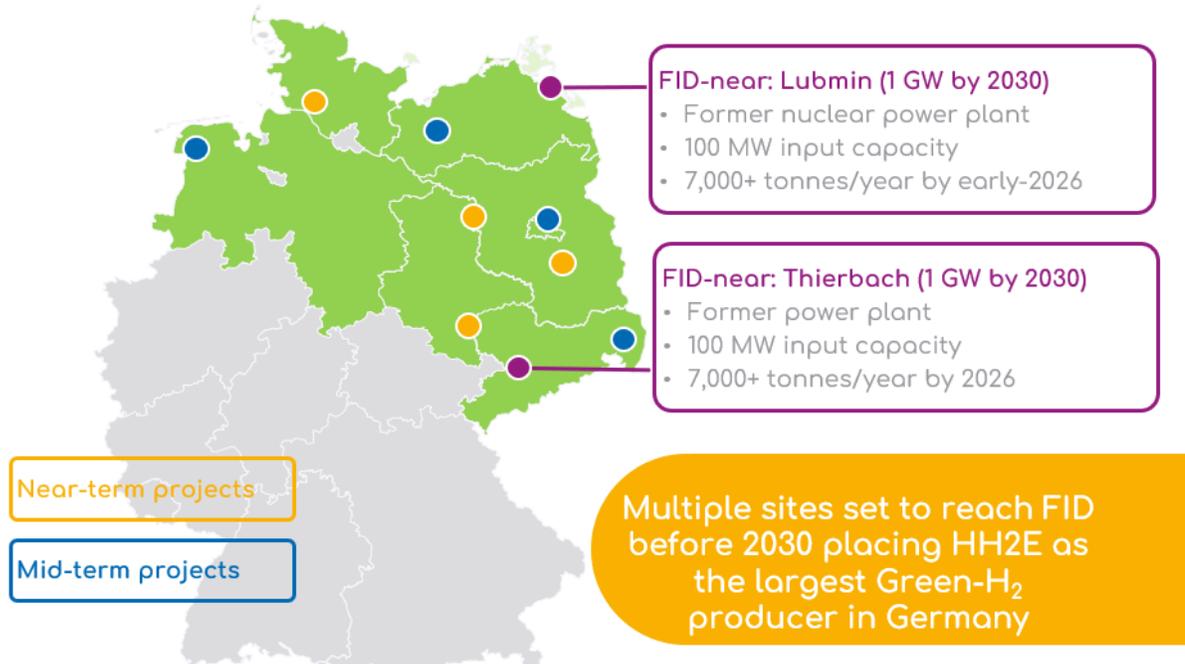
## Q4 2023

- Sunfire construction of €30m Research and Development Centre at Dresden
- The GET H2 TransHyDE joint project start-up, using a 250 KW solid oxide electrolyser from Sunfire
- Elcogen receives €45m investment from strategic investor Hyundai, and groundworks commenced at 100MW facility in Estonia
- HiiROC investment from strategic investor Cemex Ventures, who will deploy HiiROC equipment in the UK
- Cranfield Aerospace and Dronamics announce plans for hydrogen-electric propulsion system to the Black Swan cargo drone aircraft
- Bramble Energy wins The Gateley Business Transformation of the Year Award 2023 and included in the Deloitte UK Fast 50
- HH2E and Gen2 Energy supply agreements for green hydrogen in Germany



# HH2E: new corporate structure and access to Lubmin project (6% HGEN NAV)

## HH2E Germany; 4GW 2030E

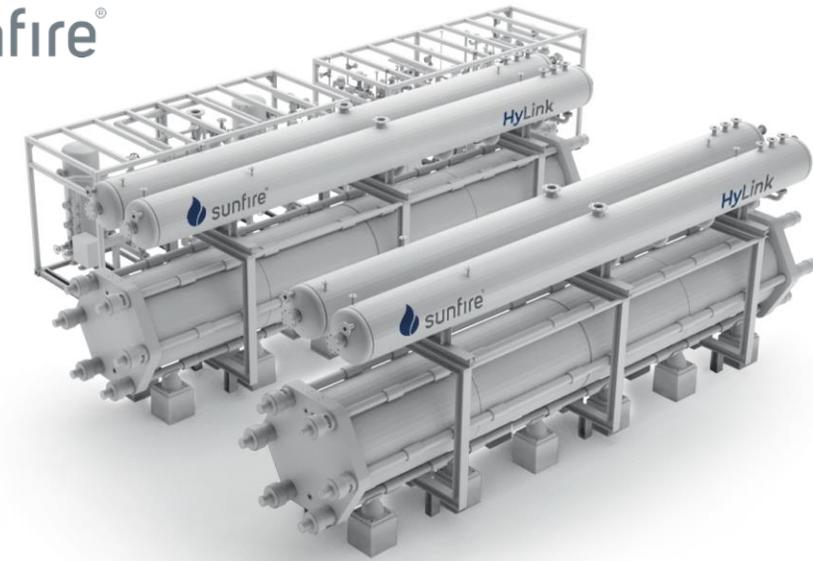


## Corporate restructuring early 2024

- Simplified corporate structure to facilitate future funding rounds:
  - Previous HGEN interests in project SPVs including Thierbach swapped for HH2E 'topco'
  - Lubmin SPV to be combined with new structure, giving HGEN direct exposure to new FID, and aligning interests with Foresight Group
  - HGEN equity share unchanged at c. 11% in larger entity
- **Expected to be accretive to HGEN carrying as projects are developed**

# Sunfire: EUR 0.5 billion investment secured (20% HGEN NAV)

## Sunfire: alkaline and solid oxide electrolyzers



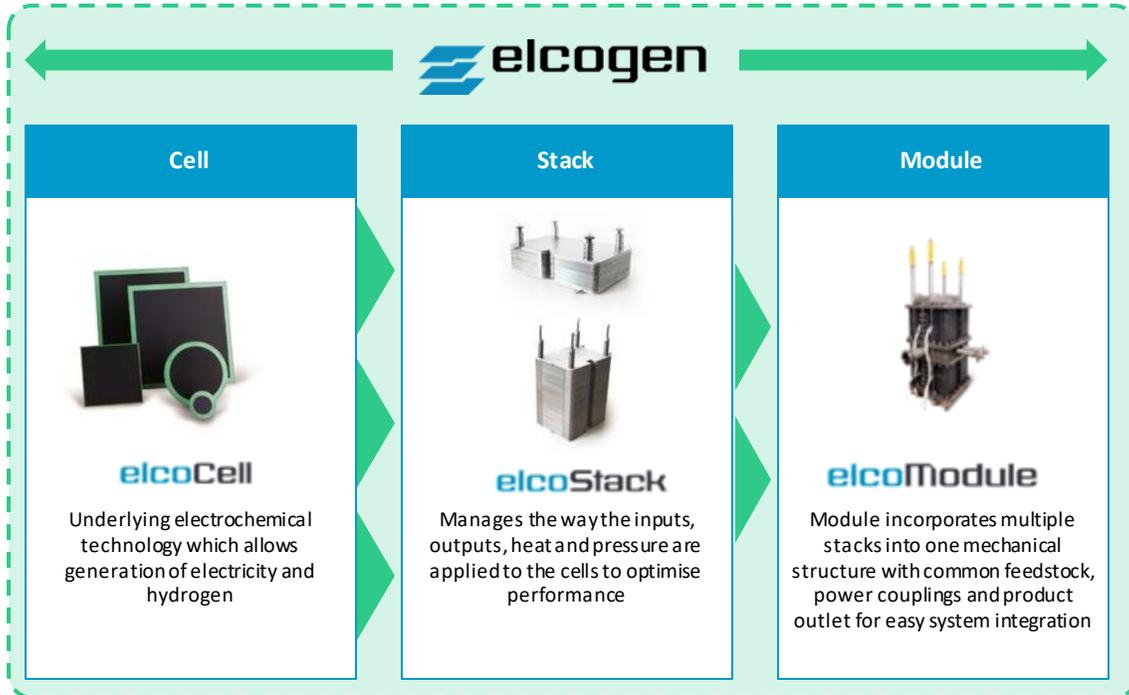
- Industry-leading electrolyser manufacturer based in Germany and Switzerland; 500+ staff
- Revenues from a growing global customer base
- Strong product credentials with top in-house engineering and product design
- 500MW / annum electrolyser production at three sites in EU, expanding to GW scale

## Recent developments

- Launched new alkaline electrolysis plant in Solingen, 500MW capacity
- Started construction of €30m Research and Development Centre at Dresden
- Post year end, €0.5bn investment secured: €215m from investors, including HGEN, €200m in grants and €100m from European Investment Bank

# Elcogen: EUR 140 million funding secured (18% HGEN NAV)

## Solid oxide cell and stack innovation



- Fuel cell and electrolysis: 160 customers in 30 countries
- “Elcogen Inside” business model

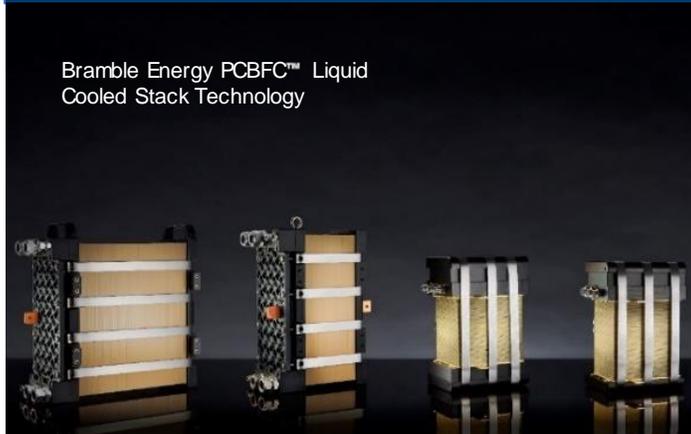
## Strategic investor unlocks new growth



## Recent developments

- Strategic investors HD Hyundai Group 2023 and Baker Hughes (2024)
- Site works commenced on new manufacturing facility in Tallinn, Estonia. 100MW Phase 1, increasing to 360MW
- Assessing new cell and stack manufacturing JV in South Korea

## Bramble: fuel cells



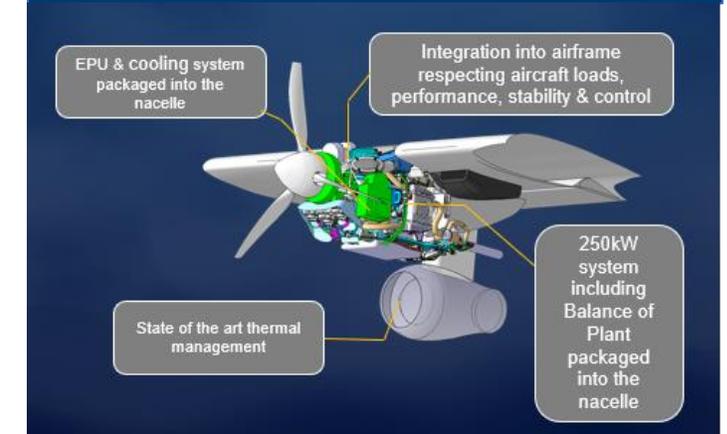
- Bramble Energy and EDAG Group signed MOU to collaborate into using a hydrogen PCBFC™
- Won The Gateley Business Transformation of the Year Award 2023
- Secured £12m funding to provide fuel cell technology to hydrogen buses

## HiiROC: plasma electrolysis



- Installed pilot unit on Centrica UK site during 2023
- HiiROC's technology in scope for UK Government's Low Carbon Hydrogen Standard (LCHS)
- CEMEX to decarbonise Rugby UK cement kiln using HiiROC technology

## Cranfield Aerospace: hydrogen flight



- Technology advanced to packaging hydrogen-electric engine into nacelle
- Adjusted its strategy to deploy hydrogen flight technology across multiple platforms (Britten Norman, Dronamics, other)
- CAeS unveiled its newly refurbished hangar and R&D facility

# Progressing green hydrogen projects and supply chains

## HH2E: Germany developer



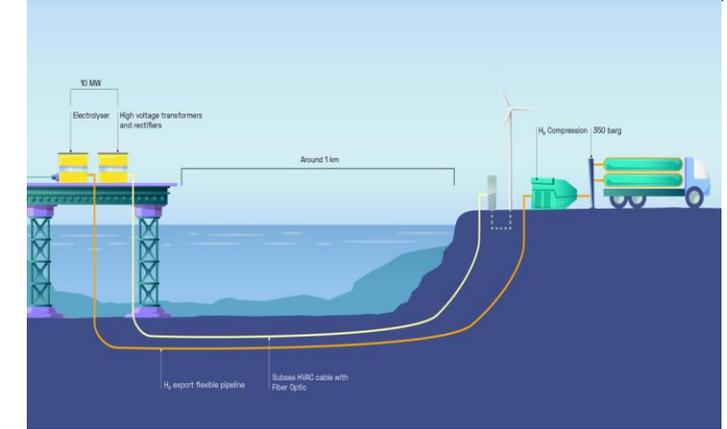
- Progressing projects at Thierbach and Lubmin
- Agreements for power procurement, hydrogen distribution and strategic alliances with 50hertz, Gascade, DHL, BASF, NEL
- Hydrogen offtake with H2 Mobility

## Gen2 Energy: Norway developer



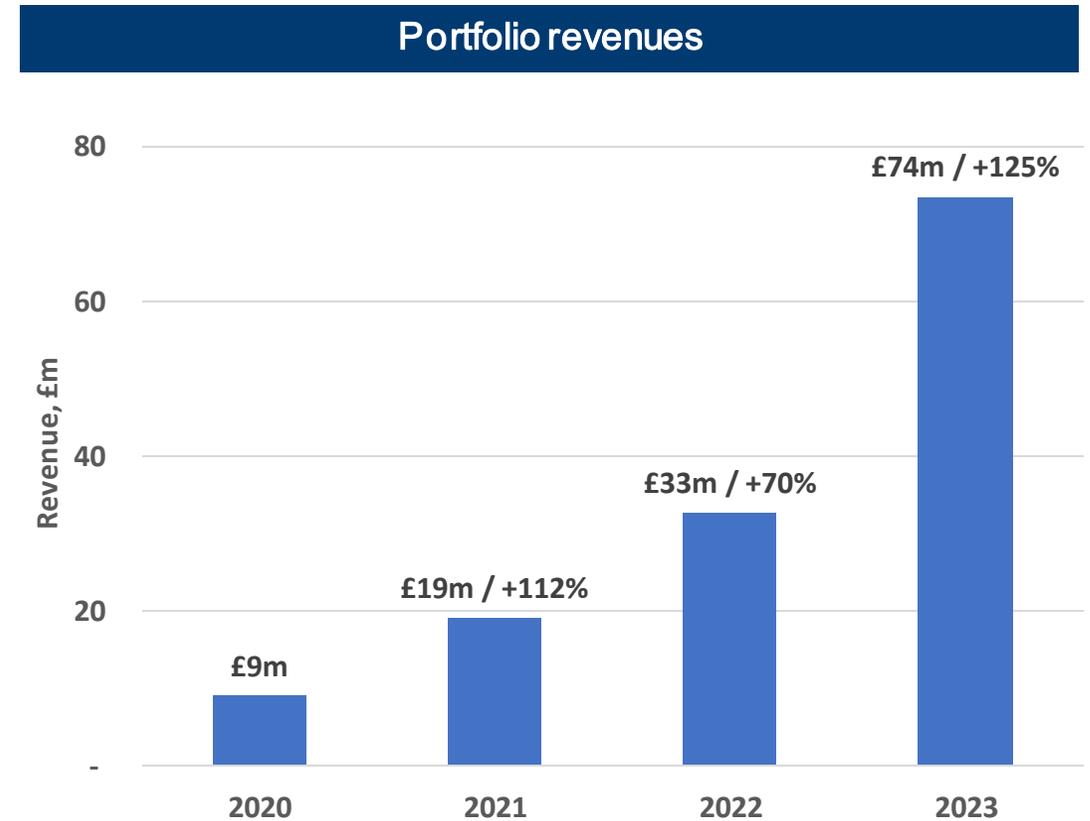
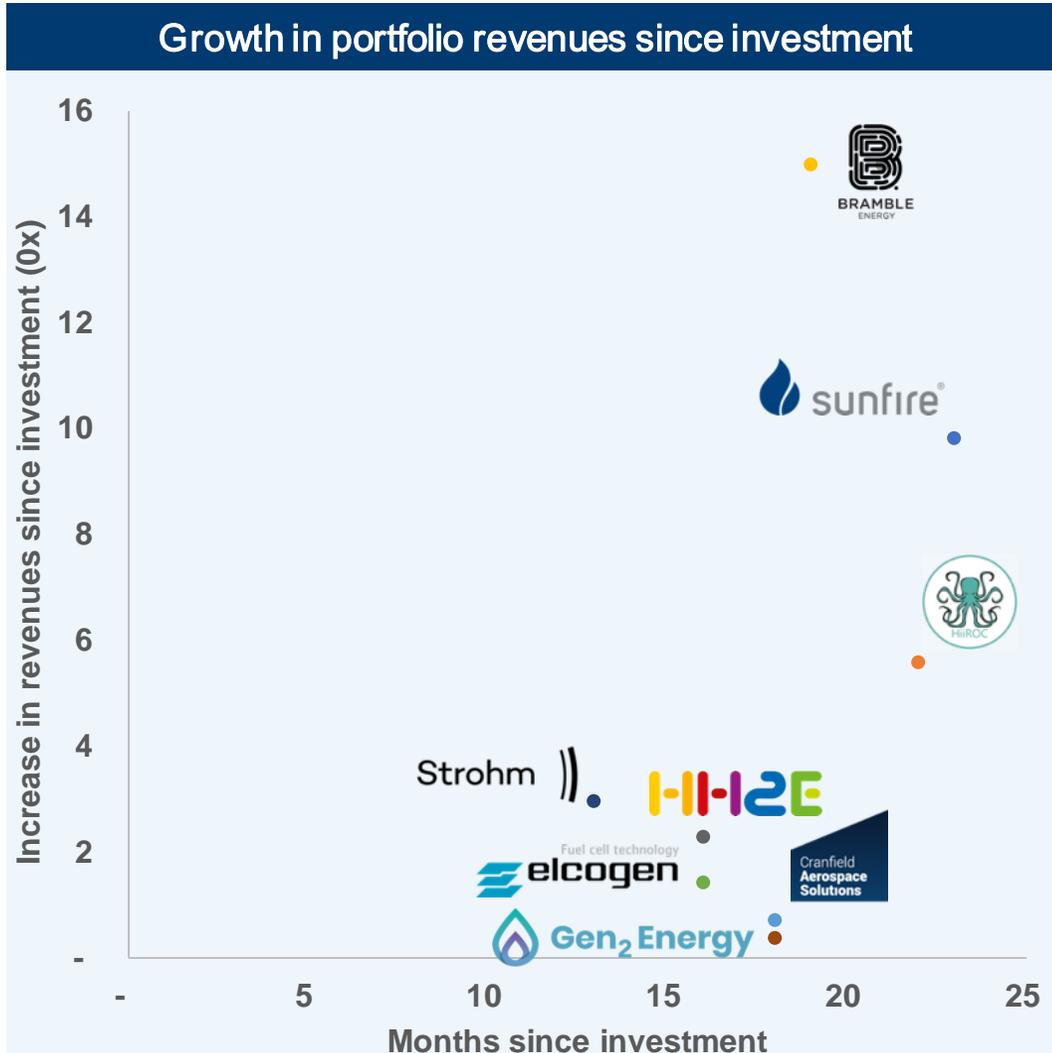
- Approved detailed zoning plan for 100MW hydrogen facility in Mosjøen
- Agreement with Port of Helgeland on planning and design of a new quay
- Hydrogen offtake with SEFE for the delivery of green hydrogen to Germany.

## Strohm: pipeline innovator



- Plant expansion to produce 140km of TCP pipeline per year
- Received DNV qualification for deepwater TCP Flowline
- Partner for the Hydrogen Offshore Production for Europe (“HOPE”) project and OFFSET, an industrial scale floating green hydrogen and ammonia project

# The portfolio is revenue generating and has produced consistent growth



- 8 private companies are revenue-generating
- 2023 revenue growth +125% to £74m. Robust demand especially transportation and distribution equipment, and electrolyzers

Revenue 100% basis for private portfolio companies

# Growing value for investors

	% of invested portfolio (31 Dec 23)	Activity	Investments	2022-23 revenue growth (%)
<b>Early stage</b>	33%	<ul style="list-style-type: none"> <li>IP demonstrators</li> <li>Project developers</li> </ul>	<ul style="list-style-type: none"> <li>Cranfield</li> <li>HiiROC</li> <li>HH2E</li> <li>Gen2</li> <li>NanoSUN</li> </ul>	+76%
<b>Mid stage</b>	10%	<ul style="list-style-type: none"> <li>Manufacturing roll-out</li> <li>Production project delineation</li> </ul>	<ul style="list-style-type: none"> <li>Thierbach</li> <li>Bramble</li> </ul>	>+1,000%
<b>Growth</b>	55%	<ul style="list-style-type: none"> <li>Significant capacity growth</li> <li>Industrial scale and EBITDA</li> </ul>	<ul style="list-style-type: none"> <li>Elcogen</li> <li>Sunfire</li> <li>Strohm</li> </ul>	+119%
				<b>2023: £74m (+125% vs 2022)</b>

## Growing value for our investors

- Business plan delivery in invested companies
- Follow-on investment by 3<sup>rd</sup> parties at higher valuation
- Exit via IPO or trade sale, across all stages of the portfolio
- Portfolio companies have investment banks appointed for HGEN exit

## Identifying the best investment opportunities

Specialist team

Active  
stewardship

Grow EBITDA  
and exit

>£500m pipeline



Revenue-  
generating  
equipment  
suppliers

Distinctive  
project  
developers

Avoided GHG  
potential

10-15% target  
return including  
exits<sup>1</sup>

## Clear strategy to grow NAV

(1) For an investor in HGEN at IPO, the total NAV return target is a target only and not a profit forecast. There can be no assurance that this target will be met, or that the Investment Trust will make any distributions or returns at all and it should not be taken as an indication of the Investment Trust's expected future results. The Investment Trust's actual returns will depend upon a number of factors, including but not limited to the size of the Investment Trust, currency exchange rates, the Investment Trust's net income and level of ongoing charges. Accordingly, potential investors should not place any reliance on this target in deciding whether or not to invest in the Investment Trust and should decide for themselves whether or not the target total NAV return is reasonable or achievable. The illustrative returns has been calculated on the basis of various assumptions and inputs. There can be no assurance that these assumptions and/or inputs will be correct or that the associated potential revenues and returns will be generated.

## 2023 highlights

- NAV increased by 5.8% from £125.4 million at 31 Dec 2022 to £132.7 million at 31 Dec 2023
- 2023 revenue from portfolio companies £74.0 million, an increase of 125% compared to 2022
- Strategic industrial investors have backed HydrogenOne portfolio companies in 2023
- Funding for Sunfire and Elcogen c. EUR 600 million announced; HHE2 consolidation adds Lubmin project
- Cash position of £4.6 million as at 31 Dec 2023, and £2.3 million of listed hydrogen companies
- The fundamentals of the clean hydrogen sector continued to strengthen, with \$17 billion of financial investment in green hydrogen in 2023

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# What is driving the hydrogen economy?



Energy  
Transition

Hydrogen  
policies in 39 countries  
for Net Zero



Air  
Quality

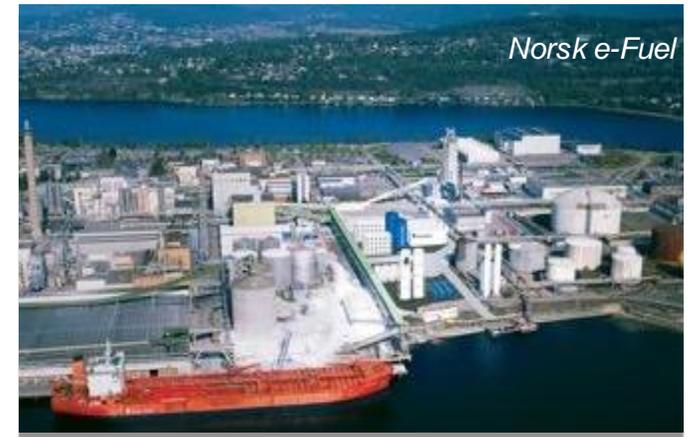
Hydrogen fuel in heavy  
transport and power



Energy  
Security

Distributed renewables  
and storage

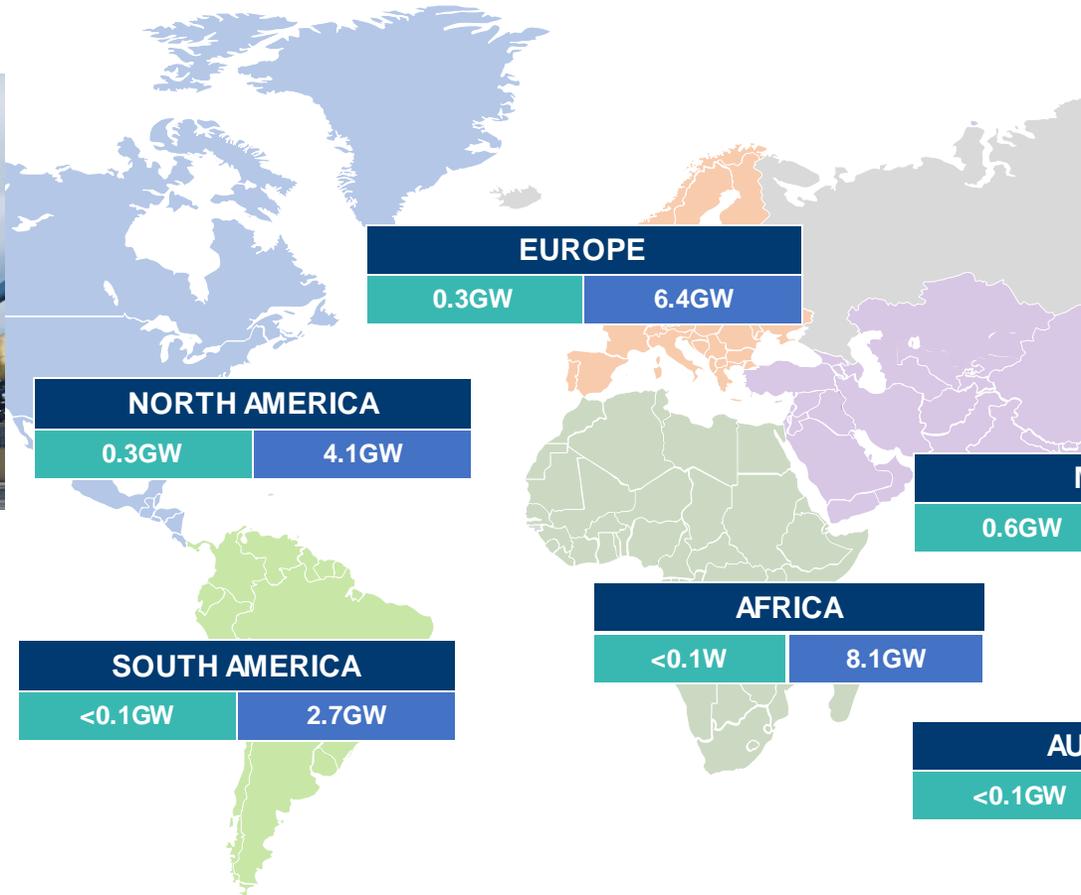
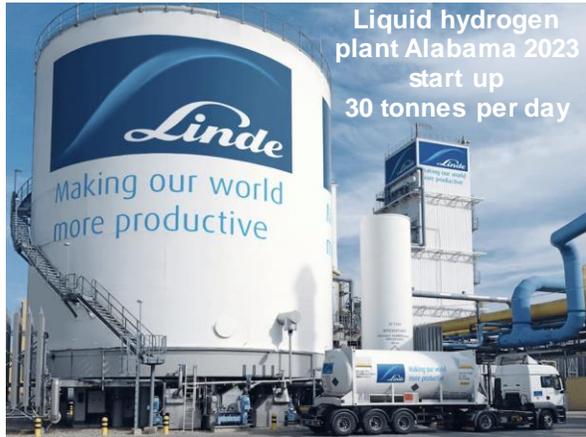
## ...projects



## ...supply chains



# 50% growth in green hydrogen production in 2023

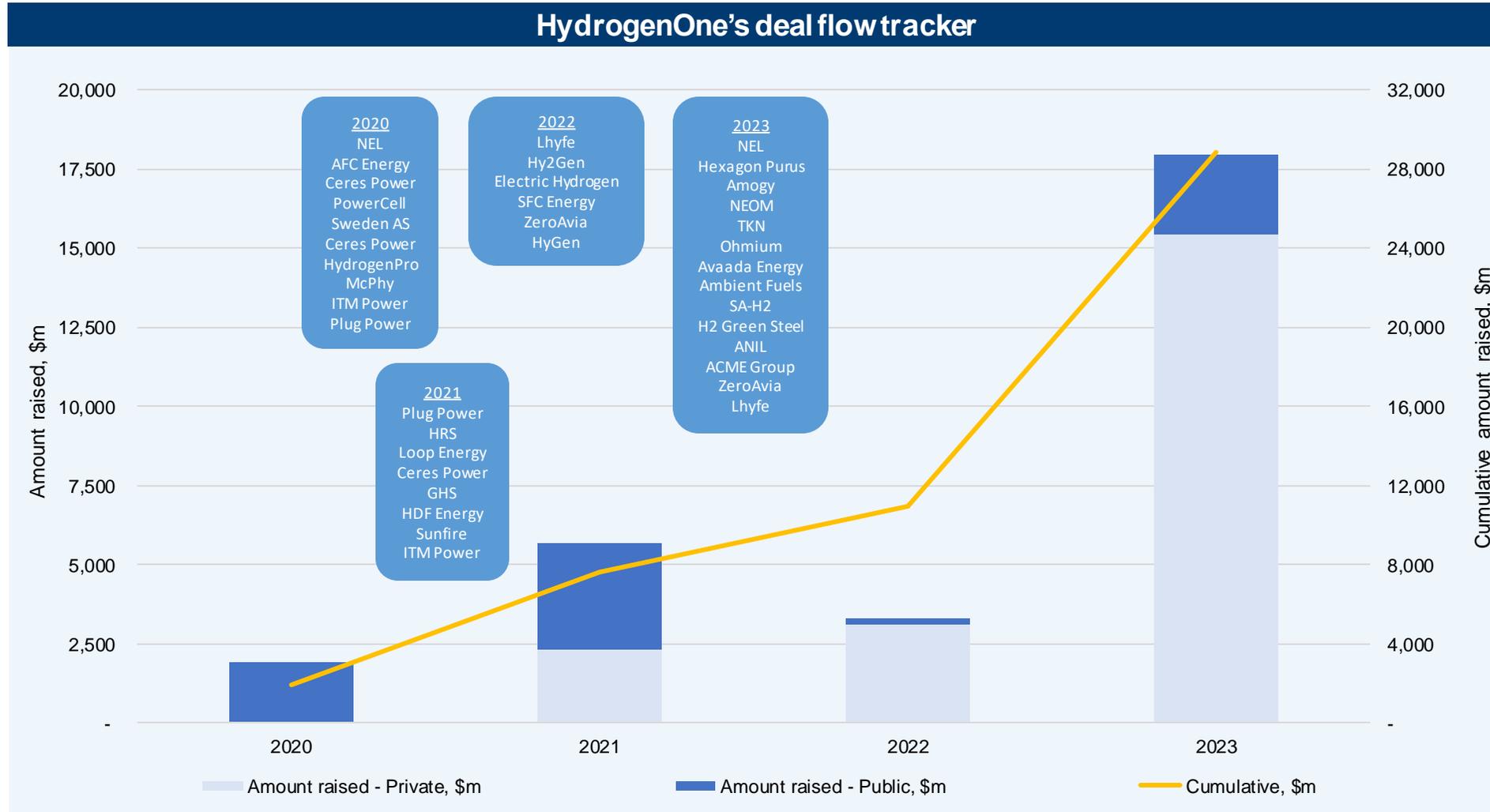


KEY		
>850 GREEN HYDROGEN PROJECTS:	OPERATIONAL: 1.2GW (+0.4GW vs 2022)	UNDER DEVELOPMENT: 35.2GW (+29.2GW vs 2022)
AVOIDED GHG (MTPA)	1.5	43.4

**\$28.9 billion (c. £23 billion) of new investment has been committed into clean hydrogen in 2023 (+440% vs FY 2022)**

**1.2GW green hydrogen in production (+50% vs FY 2022)**

# Strong increase in investment in clean hydrogen in 2023



**A total of \$28.9 billion (c. £23 billion) of new investment has been committed into clean hydrogen in 2023 (+440% vs FY 2022)**

# Contents

- Full year results for the year ending 31st December 2023
- Portfolio update and outlook
- Appendix: Market update
- **Appendix: Invested companies update**

# Fund holdings

	As at 31 Dec 2023		As at 30 Sep 2023	
	NAV £m	NAV %	NAV £m	NAV %
<b>Private portfolio</b>				
Sunfire GmbH	27	20%	22	17%
Elcogen Plc	24	18%	20	16%
Strohm Holding B.V.	20	15%	12	10%
HiiROC Ltd	14	10%	13	9%
Cranfield Aerospace Solutions	12	9%	8	6%
Bramble Energy Limited	11	8%	10	8%
HH2E AG	7	5%	5	4%
NanoSUN Limited	5	4%	11	9%
Gen2 Energy	4	3%	3	3%
HH2E Thierbach Project	2	1%	-	-
<b>Private portfolio</b>	<b>*127</b>	<b>*95%</b>	<b>104</b>	<b>*83%</b>
<b>Listed portfolio</b>	<b>2</b>	<b>2%</b>	<b>4</b>	<b>3%</b>
<b>Total investments</b>	<b>129</b>	<b>97%</b>	<b>108</b>	<b>86%</b>
Cash and cash equivalents	5	4%	18	15%
Other assets/(liabilities)	(1)	(1)%	(1)	(1)%
<b>Net Asset Value</b>	<b>133</b>	<b>100%</b>	<b>125</b>	<b>100%</b>

\*Figures rounded to the nearest whole number

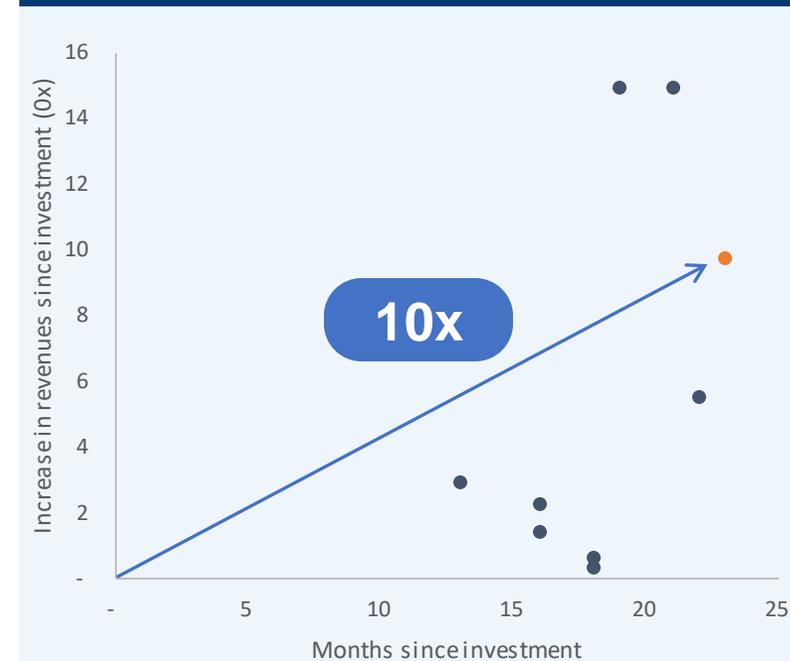
E	S	G
<p><b>Capital invested in low-carbon growth:</b></p> <ul style="list-style-type: none"> <li>✓ £113.7m since IPO to 31 Dec 2023</li> </ul> <p><b>EU taxonomy alignment in private portfolio:</b></p> <ul style="list-style-type: none"> <li>✓ 92% as of 31 Dec 2023</li> </ul> <p><b>GHG emissions avoided:</b></p> <ul style="list-style-type: none"> <li>✓ 91,116 tCO<sub>2</sub>e in FY2023 and 141,695 tCO<sub>2</sub>e since IPO</li> </ul> <p><b>GHG emissions on a look-through basis (aggregate scope 1 and 2 of portfolio companies):</b></p> <ul style="list-style-type: none"> <li>✓ 99 tCO<sub>2</sub>e (scope 1 - 18 tCO<sub>2</sub>e and scope 2 - 81 tCO<sub>2</sub>e) during FY2023</li> </ul> <p><b>Potential lifetime clean energy capacity:</b></p> <ul style="list-style-type: none"> <li>✓ 571,294 MWh in FY2023 and 797,294 MWh since IPO</li> </ul> <p><b>HGEN's share of MW capacity sold in fuel cells and electrolyzers:</b></p> <ul style="list-style-type: none"> <li>✓ 0.6 MW of units sold (fuel cells and electrolyzers) in FY2023 and 4.98 MW since IPO</li> </ul>	<p><b>Jobs supported:</b></p> <ul style="list-style-type: none"> <li>✓ Over 1,400 full-time staff employed by private portfolio</li> </ul> <p><b>Board Independence and Diversity:</b></p> <p><b>HGEN:</b> HGEN's Board independence and 50% diversity (female directors)</p> <p><b>Private portfolio:</b></p> <ul style="list-style-type: none"> <li>✓ 89% with at least one independent Board member, 56% with female representation</li> <li>✓ Women account for 21% of senior roles (excludes directorships)</li> </ul>	<p><b>Positive and proactive engagement with private portfolio to deliver effective Boards:</b></p> <ul style="list-style-type: none"> <li>✓ 100% representation on Boards</li> <li>✓ 100% voting and Board meetings attendance</li> </ul> <p><b>Encouraging sustainable business practices and ethics:</b></p> <ul style="list-style-type: none"> <li>✓ A review covering supply chain due diligence, waste management and circular economy completed for all companies</li> </ul> <p><b>Oversight and stewardship within private portfolio:</b></p> <ul style="list-style-type: none"> <li>✓ Site visits to 100% of private invested positions were made during the year</li> <li>✓ Reporting on PAIs and key metrics to support HGEN's climate change mitigation investment objective</li> <li>✓ Review of the governance structures and policy recommendations made to strengthen safeguards, including anti-bribery/corruption, human rights and tax risk</li> </ul>

(as at 31 Dec 23)

# Sunfire GmbH investment (Supply chain)

<p><b>Description</b></p>  <p>www.sunfire.de</p>	<p><b>German industrial electrolyser producer of pressure alkaline (AEL) and solid oxide electrolysers (SOEC)</b></p>
<p><b>Investment size / date / % of NAV</b></p>	<ul style="list-style-type: none"> <li>£22m / Oct 21 &amp; Jan 23 / 20% of NAV</li> </ul>
<p><b>Co-investors</b></p>	<ul style="list-style-type: none"> <li>Planet First Partners, Lightrock, SMS, Neste, CIP, Carbon Direct Capital Management, Blue Earth Capital, Amazon</li> </ul>
<p><b>Why we invested</b></p>	<ul style="list-style-type: none"> <li>Industry-leading electrolyser manufacturer</li> <li>Revenues from a growing global customer base</li> <li>Strong product credentials with top in-house engineering and product design</li> <li>500MW / annum electrolyser production at three sites in EU</li> </ul>
<p><b>Milestones delivered</b></p>	<ul style="list-style-type: none"> <li>Secured large scale order of 100MW electrolyser for EU refinery</li> <li>FID of 30MW green hydrogen at Bad Lauchstädt Energy Park</li> <li>New serial alkaline electrolysis production facility in Solingen, Germany with investment of EUR 30m at the facility + Vitseco JV</li> <li>E169m IPCEI grant to support production technologies</li> </ul>
<p><b>Strategy for value creation</b></p>	<ul style="list-style-type: none"> <li>Building up alkaline capacity to &gt;GW scale to match order book</li> <li>Conversion of strong revenue growth to EBITDA to underpin exit for investors</li> </ul>

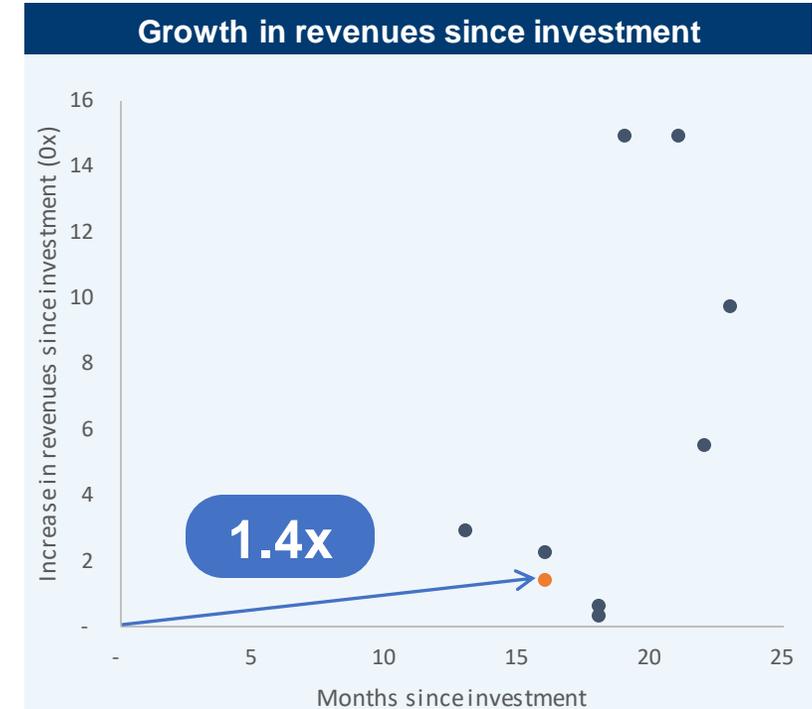
## Growth in revenues since investment



FV movement includes £1.8m further investment in Jan 23

# Elcogen Plc investment (Supply chain)

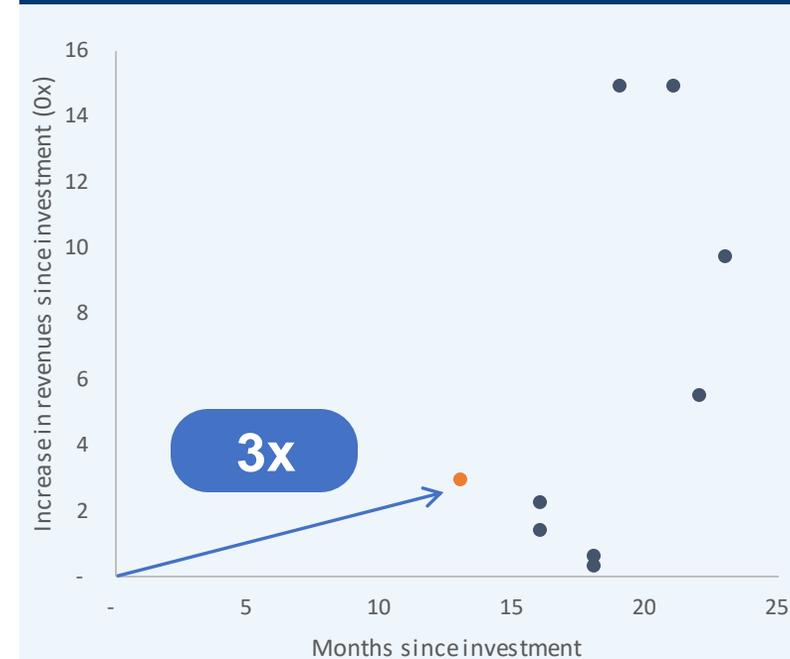
<p><b>Company description</b></p>  <p>www.elcogen.com</p>	<p><b>Solid oxide fuel cell and electrolyser manufacturer with presence in Estonia and Finland</b></p>
<p><b>Investment size / date / % of NAV</b></p>	<ul style="list-style-type: none"> <li>£20m / May 22 / 18% of NAV</li> </ul>
<p><b>Co-investors</b></p>	<ul style="list-style-type: none"> <li>Biofuel OÜ, VNTM Powerfund II</li> </ul>
<p><b>Why invested</b></p>	<ul style="list-style-type: none"> <li>Industry-leading innovator and supplier of solid oxide cells and stacks, with manufacturing facilities in Finland and Estonia, ready for expansion</li> <li>Over 60 established industrial customers worldwide, and &gt; 10 year track record</li> <li>High-end offering based on advanced solid oxide technology with low operating temperatures and superior economics</li> <li>Developed a reversible ceramic technology that converts hydrogen into emission-free electricity and vice versa</li> </ul>
<p><b>Total addressable market</b></p>	<ul style="list-style-type: none"> <li>&gt;£40bn (by 2030)</li> </ul>
<p><b>Recent developments</b></p>	<ul style="list-style-type: none"> <li>IPCEI grant E25m for technology development</li> <li>Site selection and detailed design for new production site in Tallinn for annual capacity 360MW cells / 200MW stacks (SOEC mode)</li> <li>Strategic investment from HD Hyundai + Baker Hughes</li> </ul>
<p><b>Key milestones</b></p>	<ul style="list-style-type: none"> <li>Pending onset of construction of greenfield plant in Tallinn</li> </ul>



# Strohm Holding B.V. investment (Storage & Distribution)

Company description	<p><b>Strohm</b> ))</p> <p>www.strohm.eu</p> <p><b>Netherlands-based hydrogen pipeline company</b></p>
Investment size / date / % of NAV	<ul style="list-style-type: none"> <li>£10m / Aug 22 &amp; Dec 22 &amp; Nov 23 / 15% of NAV</li> </ul>
Co-investors	<ul style="list-style-type: none"> <li>Shell Ventures, Chevron Technology Ventures, Evonik Venture Capital, ING</li> </ul>
Why invested	<ul style="list-style-type: none"> <li>Industry leaders in offshore hydrogen and CO2 pipelines, where HGEN sees significant market growth</li> <li>Thermoplastic Composite Pipe (“TCP”) has c.50% less greenhouse gas emissions than metal. Can transfer up to nine times the amount of hydrogen energy compared to a cable.</li> <li>TCP’s flexibility, lack of corrosion, fatigue and embrittlement make it the superior pipeline solution for offshore wind farms, generating hydrogen</li> </ul>
Total Addressable Market	<ul style="list-style-type: none"> <li>c. £700m (2030) to &gt;£1.7b (2040)</li> </ul>
Recent developments	<ul style="list-style-type: none"> <li>Netherlands plant expansion completed: 140km/year capacity</li> <li>Launched Field Service Group following contract of over EUR 30m</li> <li>Selected for 10MW offshore green hydrogen “HOPE”, Belgium</li> <li>Increased orderbook- orders from ExxonMobil, TotalEnergies, PRIO</li> </ul>
Key milestones	<ul style="list-style-type: none"> <li>Grow revenues from energy transition (CO2 and Hydrogen)</li> <li>Positive EBITDA 2024</li> </ul>

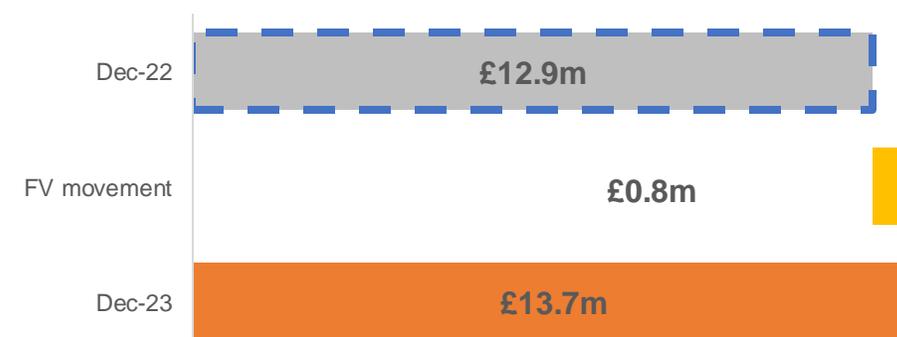
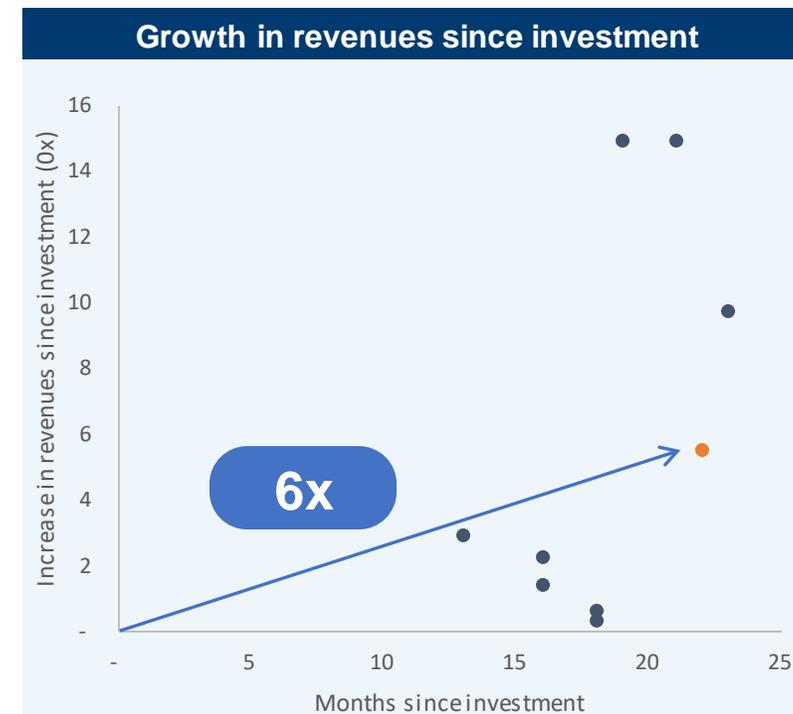
## Growth in revenues since investment



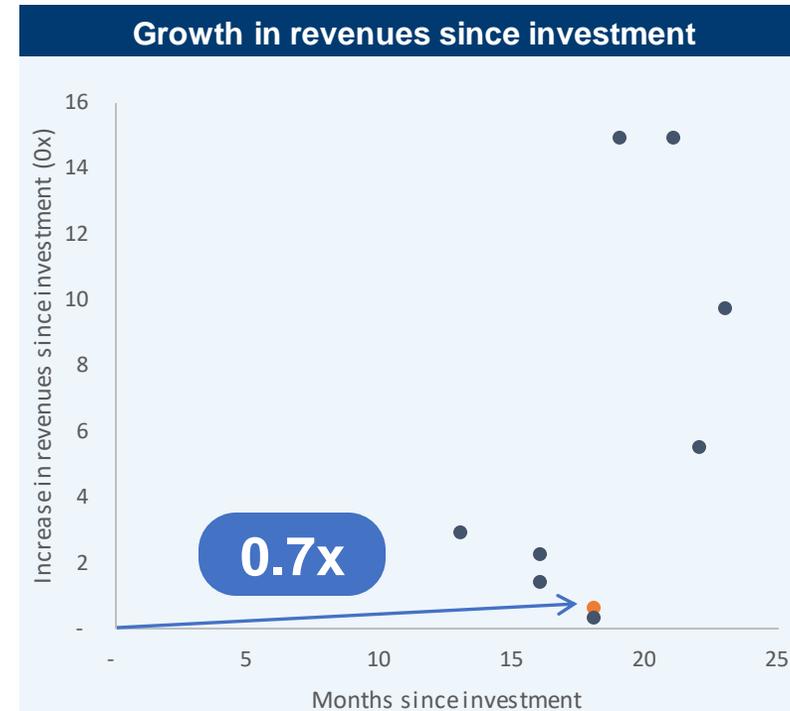
FV movement includes £0.5m further investment in Nov 23

# HiIROC Limited investment (Storage & Distribution)

<p><b>Company description</b></p>  <p>www.hiirroc.com</p>	<p><b>UK-based thermal plasma electrolysis developer, with world-leading (IP-protected) technology for low-cost, zero-emission hydrogen, also enabling flare/waste gas mitigation and CO2 capture using biomethane</b></p>
<p><b>Investment size / date / % of NAV</b></p>	<ul style="list-style-type: none"> <li>£10m / Nov 21 / 10% of NAV</li> </ul>
<p><b>Co-investors</b></p>	<ul style="list-style-type: none"> <li>Melrose Industries, Centrica, Hyundai, Kia, Wintershall Dea, VNG, Cemex</li> </ul>
<p><b>Why invested</b></p>	<ul style="list-style-type: none"> <li>Proprietary technology to convert natural gas, flare gas and biomethane into hydrogen and solid carbon black</li> <li>Industrial off-takers of the product such as Centrica, Hyundai and CEMEX also on the shareholder register</li> <li>Highly scalable modular solution, producing 100kg / day of hydrogen from a single unit through to large plants capable of 100's of tonnes / day of hydrogen, alongside carbon black</li> </ul>
<p><b>Total Addressable Market</b></p>	<ul style="list-style-type: none"> <li>&gt;£40bn (by 2030)</li> </ul>
<p><b>Recent developments</b></p>	<ul style="list-style-type: none"> <li>Setting up US and Middle East offices for sales expansion</li> <li>Won the first UK project with Centrica to inject hydrogen at Brigg Gas Fired Power station, as part of the Net Zero Technology Centre's £8m Open Innovation Programme</li> <li>Cemex CVC increased stake, underpins HGEN valuation</li> <li>HiIROC technology in scope for UK LCHS</li> </ul>
<p><b>Key milestones</b></p>	<ul style="list-style-type: none"> <li>Pilot units contracted for deployment</li> </ul>



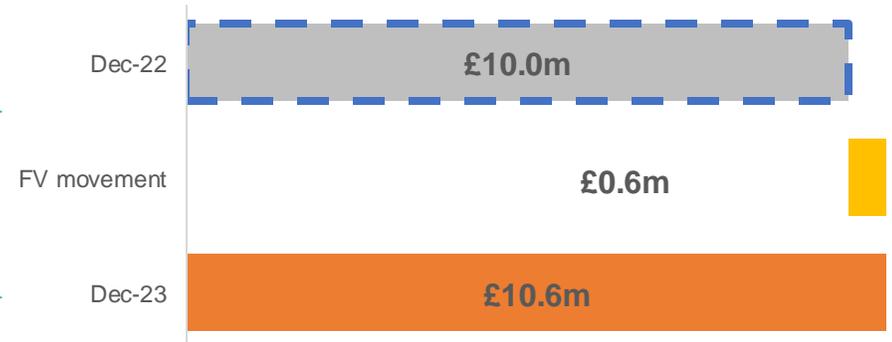
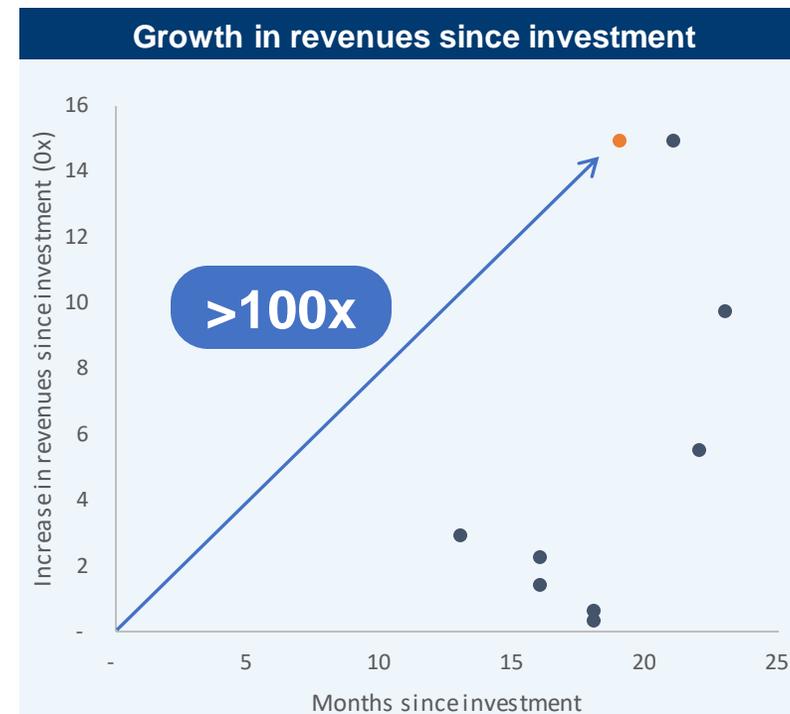
<p><b>Company description</b></p>  <p><a href="http://www.cranfieldaerospace.com">www.cranfieldaerospace.com</a></p>	<p><b>UK-based passenger flight innovator, powering turboprop flight with hydrogen</b></p>
<p><b>Investment size / date / % of NAV</b></p>	<ul style="list-style-type: none"> <li>£9m / Mar 22 &amp; Apr 23 &amp; Sep 23 / 9% of NAV</li> </ul>
<p><b>Co-investors</b></p>	<ul style="list-style-type: none"> <li>Safran Ventures, Tawazun Strategic Development Fund, Motus Ventures</li> </ul>
<p><b>Why invested</b></p>	<ul style="list-style-type: none"> <li>Technology leader in delivering hydrogen powered turboprop flight</li> <li>Aerospace market leader in the design and manufacture of new aircraft design concepts, complex modifications to existing aircraft and integration of cutting-edge technologies</li> <li>Working on certification of the Britten-Norman Islander passenger aircraft using hydrogen</li> </ul>
<p><b>Total addressable market</b></p>	<ul style="list-style-type: none"> <li>£1.4bn (by 2030)</li> </ul>
<p><b>Recent developments</b></p>	<ul style="list-style-type: none"> <li>Achieved the preliminary design milestones for Project Fresson</li> <li>Welcomed Evolito as the motor &amp; inverter supplier for its hydrogen-powered aircraft demonstrator</li> <li>MOU with Dronamics opens up second platform for hydrogen-electric flight, alongside Britten Norman</li> </ul>
<p><b>Key milestones</b></p>	<ul style="list-style-type: none"> <li>Test flight 2024/25</li> <li>Commercial certification 2026</li> </ul>



FV movement includes £1.4m investment in Jan 23, £1.5m investment in Apr 23, and £0.6m investment in Sep 23

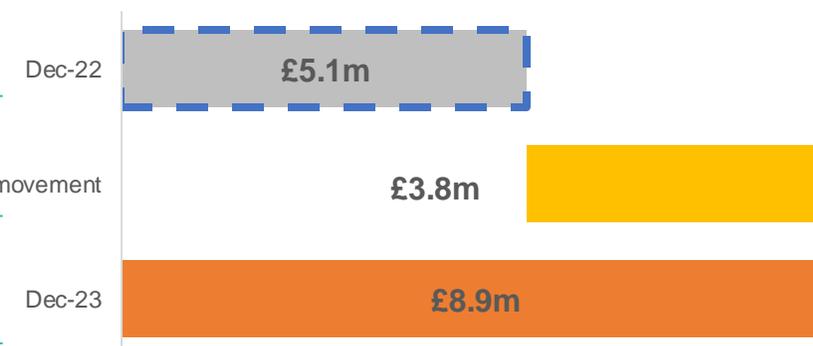
# Bramble Energy Limited

<p>Company description</p>  <p>www.brambleenergy.com</p>	<p><b>UK-based fuel cell and portable power solutions company</b></p>
<p>Investment size / date / % of NAV</p>	<ul style="list-style-type: none"> <li>£10m / Feb 22 / 8% of NAV</li> </ul>
<p>Co-investors</p>	<ul style="list-style-type: none"> <li>IP Group, BGF, Parkwalk, UCL Technology Fund</li> </ul>
<p>Why invested</p>	<ul style="list-style-type: none"> <li>Pioneering revolutionary fuel cell design and manufacturing techniques</li> <li>Novel printed circuit board design - low cost, scalable and recyclable</li> <li>Working with leading global automotive businesses to scale-up high-power density, mobility fuel cell systems</li> </ul>
<p>Total addressable market</p>	<ul style="list-style-type: none"> <li>&gt;£100bn (by 2030)</li> </ul>
<p>Recent developments</p>	<ul style="list-style-type: none"> <li>New facility with state-of-art hydrogen innovation hub</li> <li>Testing high powered PCBFCE with Tier 1 Automotive Manufacturers</li> <li>Awarded £12 million UK Government funding to provide fuel cell technology to hydrogen buses</li> </ul>
<p>Key milestones</p>	<ul style="list-style-type: none"> <li>Upgraded to a new facility as part of scaling up of units to 30kw-100kw</li> <li>Mobility technology development and testing of novel printed circuit board design by end users in automotive</li> </ul>



# HH2E & Thierbach investments (Hydrogen Production)

<p><b>Description</b></p>  <p><a href="http://www.hh2e.de">www.hh2e.de</a></p>	<p>German green hydrogen project developer with a focus on industrial customers. Operator of the Thierbach green hydrogen development project, in which HGEN has a direct investment.</p>
<p><b>Investment size / date / % of NAV</b></p>	<ul style="list-style-type: none"> <li>• HH2E: £5m / May 22 / 7% of NAV</li> <li>• Thierbach project (invested to date): £2m / Jan 23 &amp; May 23</li> </ul>
<p><b>Co-investors</b></p>	<ul style="list-style-type: none"> <li>• Foresight Group LLP</li> </ul>
<p><b>Why invested</b></p>	<ul style="list-style-type: none"> <li>• A prominent leader in Germany focused on green hydrogen and battery storage project development</li> <li>• Assessing 5 new projects for Final Investment Decision (“FID”)</li> <li>• Provides HGEN with investment rights in multiple large-scale industrial decarbonization projects, with first project investments underway (Thierbach &amp; Lubmin)</li> </ul>
<p><b>Total Addressable Market</b></p>	<ul style="list-style-type: none"> <li>• &gt;£100bn (based on German government forecasts for green hydrogen demand by 2045)</li> </ul>
<p><b>Recent developments</b></p>	<ul style="list-style-type: none"> <li>• EUR 13m spend (HGEN EUR 2.8m) on Front End Engineering and Design (FEED), land purchase, key equipment (<i>Thierbach</i>)</li> </ul>
<p><b>Key milestones</b></p>	<ul style="list-style-type: none"> <li>• FID – 24 (<i>Thierbach and Lubmin</i>), subject to funding</li> </ul>



FV movement includes £1.9m investment in H1 23 for Thierbach project

## Company description



UK-based developer of hydrogen distribution and mobile refueling equipment

www.nanosun.co.uk

## Investment size / date / % of NAV

- £11m / Dec 21 & Feb 23 & Jul 23 / 4% of NAV

## Co-investors

- Westfalen Group

## Why invested

- Provides flexible and low-cost connection between hydrogen customers such as truck stops, and concentrated hydrogen supply sources
- Flat-bed solution with 60% lower cost than alternative systems
- Accelerating large-scale roll out of fleets of hydrogen buses, trucks, vans and forklifts

## Total addressable market

- £800m (2025 UK/EU) to >£20bn (2030 globally)

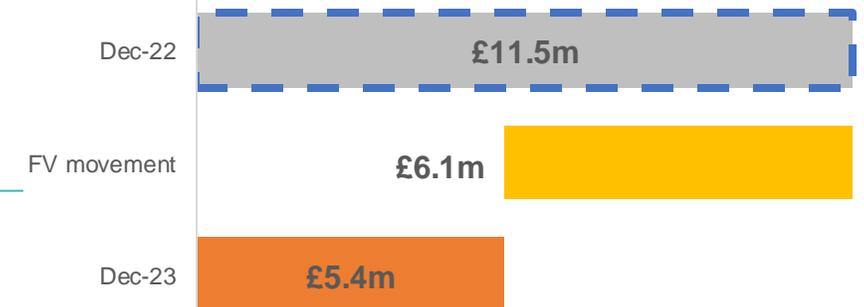
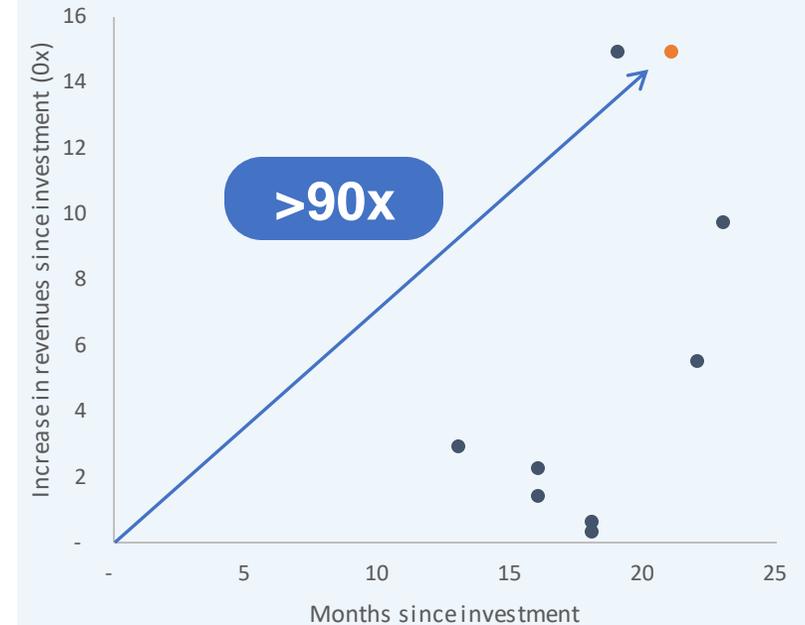
## Recent developments

- Business restructured early 2024 and relaunched as Swift Hydrogen

## Key milestones

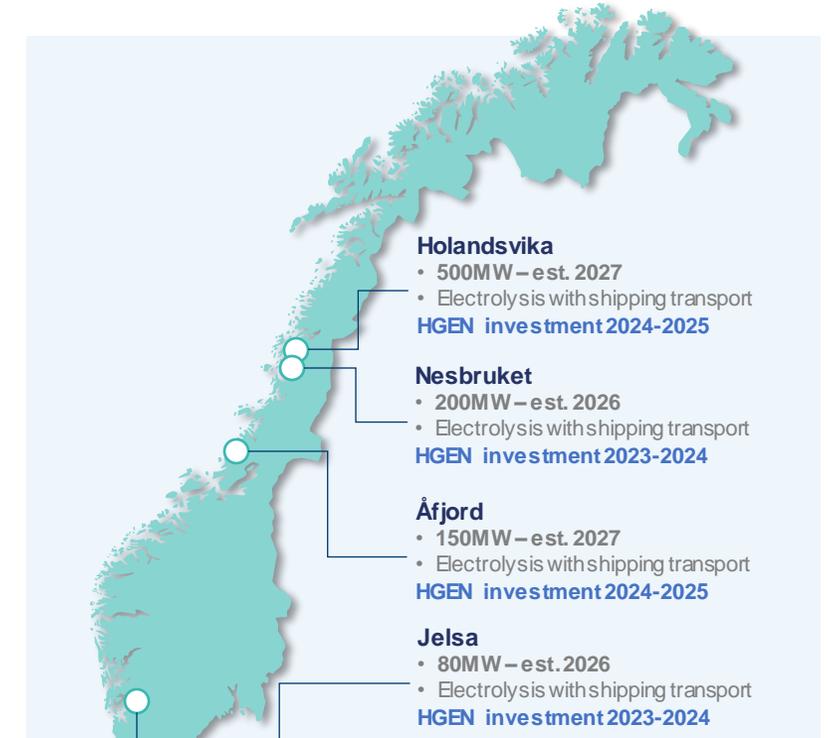
- Continued roll out and delivery of Pioneer units to hydrogen refuelling customers, driving financial growth

## Growth in revenues since investment



FV movement includes £1.5m investment in Feb 23 and £1.0m investment in Jul 23

<b>Company description</b>	
 <a href="http://www.gen2energy.com">www.gen2energy.com</a>	<b>Norwegian green hydrogen project developer</b>
<b>Investment size / date / % of NAV</b>	<ul style="list-style-type: none"> <li>£4m / Mar 22 &amp; Nov 23 / 3% of NAV</li> </ul>
<b>Co-investors</b>	<ul style="list-style-type: none"> <li>HyCap, Vitol, Hoegh LNG, Knutsen Group</li> </ul>
<b>Why invested</b>	<ul style="list-style-type: none"> <li>Leading green hydrogen project developer, with solid plans to convert low-cost hydroelectric power to hydrogen for export</li> <li>Up to 925MW green hydrogen projects in Norway, with expected production in 2025-2027</li> <li>Co-invested with Norwegian LNG and ship operators that provide input to the Gen2 hydrogen export solution</li> <li>HGEN has follow-on investment rights in multiple project SPVs</li> </ul>
<b>Total addressable market</b>	<ul style="list-style-type: none"> <li>&gt;£100bn</li> </ul>
<b>Recent developments</b>	<ul style="list-style-type: none"> <li>Entered agreement with Port of Helgeland on planning and design of a new quay</li> <li>Provaris Energy collaboration agreement for marine storage and shipping solutions</li> <li>Detailed zoning plan for Gen2 Energy's hydrogen facility in Mosjøen approved, hydrogen offtake being signed</li> <li>Term sheet agreed with SEFE for Germany hydrogen offtake</li> </ul>
<b>Key milestones</b>	<ul style="list-style-type: none"> <li>First hydrogen project FID at Mosjøen in 2024</li> </ul>



## Contact us

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