



 EMERGING TECH RESEARCH

Clean Energy Report

VC trends and emerging opportunities

Q2
2023

REPORT PREVIEW

The full report is available through the PitchBook Platform.





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We are adding PitchBook Exit Predictor probabilities to our Emerging Technology Research reports. PitchBook's proprietary [VC Exit Predictor](#) estimates the probability that a startup, or VC-backed company, will successfully IPO, be acquired, or merge. The tool is available exclusively to PitchBook subscribers.

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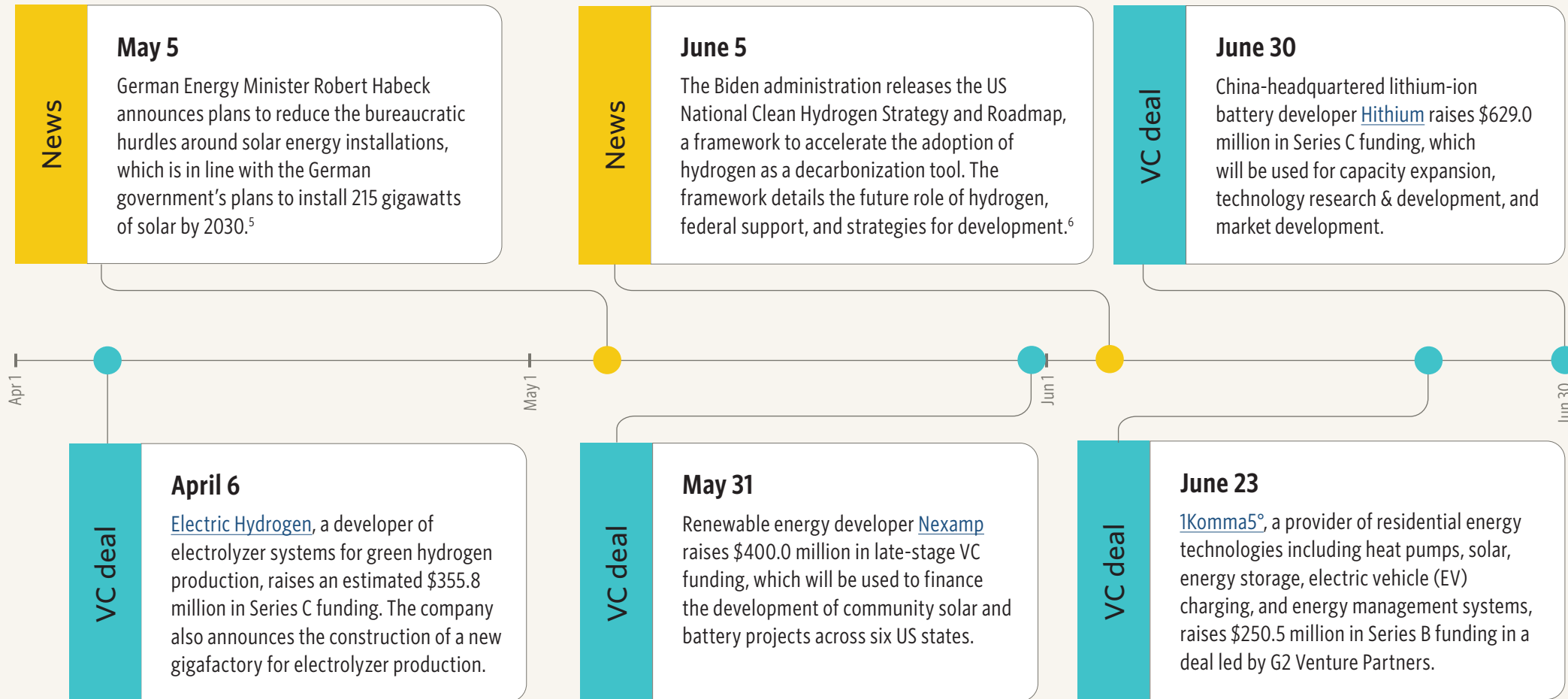
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Q2 2023 timeline



5: "Germany to Ease Solar Rules as New Installations Surge," AP, May 5, 2023.

6: "Biden-Harris Administration Releases First-Ever National Clean Hydrogen Strategy and Roadmap to Build a Clean Energy Future, Accelerate American Manufacturing Boom," Department of Energy, June 5, 2023.

Q2 VC deal count summary

153
total deals

-1.9%
QoQ growth

-22.3%
YoY growth

-23.7%
YTD growth

Q2 VC deal value summary

\$5.4B
total deal value

62.6%
QoQ growth

10.2%
YoY growth

-9.6%
YTD growth



Clean energy landscape

- 1** Intermittent renewable energy sources
- 2** Dispatchable energy sources
- 3** Clean fuels
- 4** Grid infrastructure

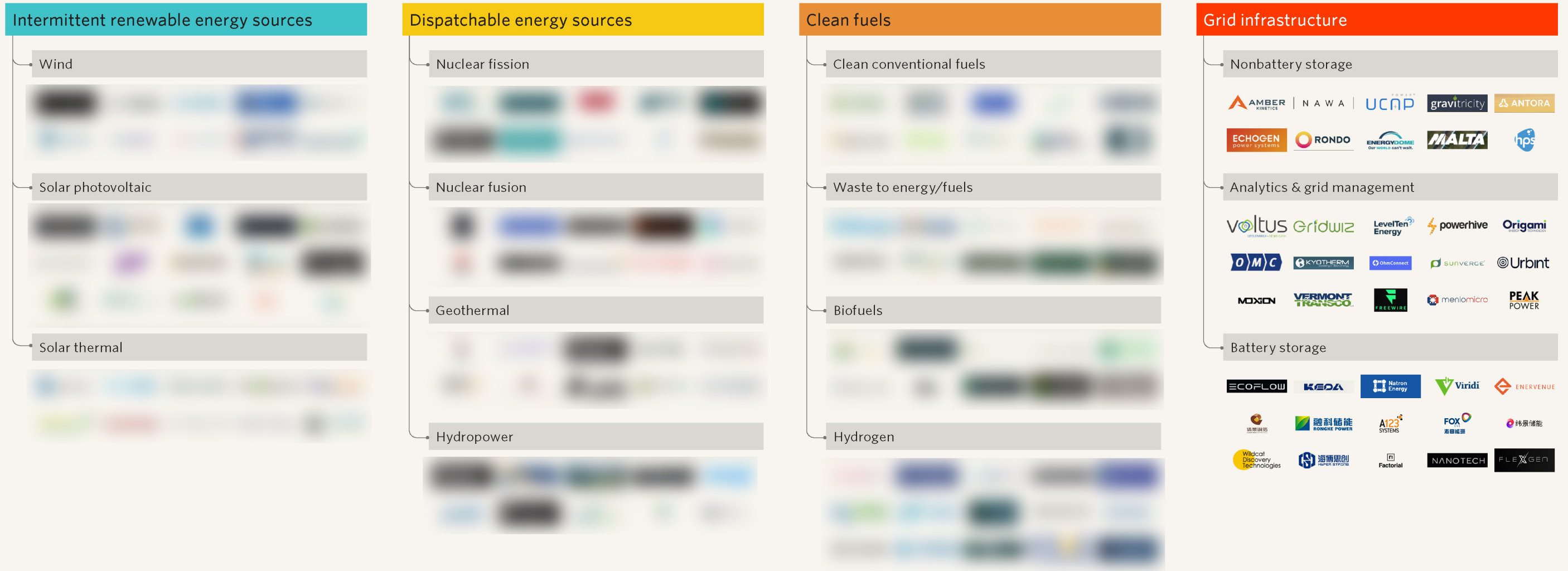




Clean energy VC ecosystem market map

Click to view the interactive market map on the PitchBook Platform.

Market map is a representative overview of venture-backed or growth-stage providers in each segment. Companies listed have received venture capital or other notable private investments.





VC activity

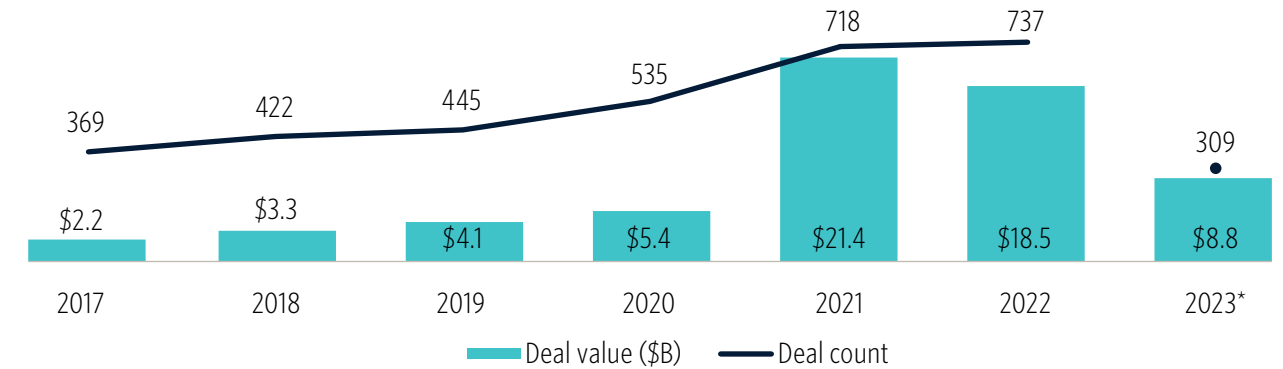
Q2 2023 saw high VC investment into clean energy technologies, at \$5.4 billion, which represents the highest total deal value since Q4 2021. This follows Q1 2023's low of \$3.3 billion, which saw a similar number of deals but fewer deals above \$100.0 million. Broken out into segment, Q2's clean energy deal value included:

- \$1.9 billion invested into grid infrastructure.
- \$1.7 billion into intermittent renewable energy.
- A higher-than-usual \$1.5 billion into clean fuels.
- \$0.8 billion, the lowest amount, into dispatchable energy.

Relative to each other, these values broadly mirror the trends seen over the last 12 months, though clean fuels was higher than usual. The median deal size continues to climb, from \$6.7 million in 2022 to \$8.6 million in H1 2023.

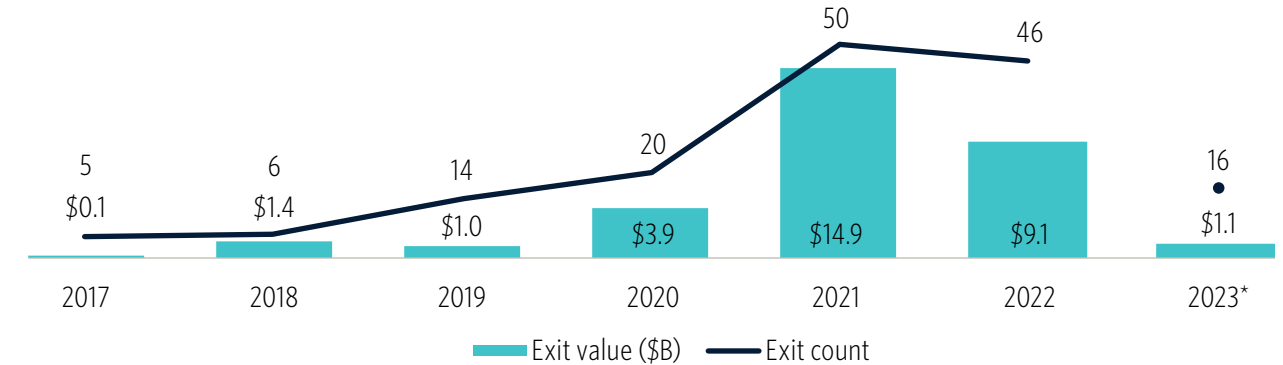
Driving the high deal value for Q2 2023 is record investment into both solar PV and hydrogen technologies. The investment into solar PV is largely divided into two categories: Asia-based module production companies, and residential/commercial solar providers. US-based solar installer [Nexamp](#) had the largest solar PV VC deal of the quarter, raising \$400.0 million in late-stage VC, followed by [1Komma5°](#)'s \$250.5 million Series B. Investment into hydrogen technologies is broad, but it is partly driven by large deals for green hydrogen companies, including [Electric Hydrogen](#)'s \$355.7 million Series C, [Ohmium](#)'s \$250.0 million Series C, and [Ambient Fuels](#)' \$250.0 million early-stage VC funding. The largest clean energy deal of Q2 2023 was battery energy storage system developer [Hithium](#)'s \$629.0 million Series C, which accounted for 40.4% of the quarter's deal value into battery storage technologies.

Clean energy VC deal activity



Source: PitchBook • Geography: Global • *As of June 30, 2023

Clean energy VC exit activity



Source: PitchBook • Geography: Global • *As of June 30, 2023



VC ACTIVITY

Key clean energy early-stage VC deals in Q2 2023*

Company	Close date (2023)	Category	Stage	Deal value (\$M)	Post-money valuation (\$M)	Lead investor(s)	Valuation step-up (post to pre)
1Komma5°	June 23	Solar - photovoltaic	Series B	\$250.5	\$1,009.1	G2 Venture Partners	N/A
Ambient Fuels	May 2	Hydrogen	Early-stage VC	\$250.0	N/A	Generate	N/A
Qingdian Photovoltaic	May 9	Solar - photovoltaic	Series A	\$217.5	N/A	Hefei Industry Investment Group	N/A
Fox ESS	May 26	Battery storage	Early-stage VC	\$143.7	\$1,436.6	Chaoxi Capital	N/A
China National Energy	May 29	Nonbattery storage	Series A	\$143.3	N/A	China Development Bank Capital, Xinda Kunpeng Investment	N/A
Focused Energy	June 22	Nuclear - fusion	Series A	\$82.0	N/A	Prime Movers Lab	N/A
Baobi New Energy	June 13	Solar - photovoltaic	Series A1	\$70.7	N/A	N/A	N/A
BAJ Solar	May 4	Solar - photovoltaic	Early-stage VC	\$67.3	\$212.4	N/A	N/A
Energy Singularity	April 28	Nuclear - fusion	Early-stage VC	\$58.1	N/A	N/A	N/A
SolarMente	April 14	Solar - photovoltaic	Early-stage VC	\$54.2	N/A	N/A	N/A

Source: PitchBook • Geography: Global • *As of June 30, 2023



VC ACTIVITY

Key clean energy late-stage VC deals in Q2 2023*

Company	Close date (2023)	Category	Stage	Deal value (\$M)	Post-money valuation (\$M)	Lead investor(s)	Valuation step-up (post to pre)
Hithium	June 30	Battery storage	Series C	\$629.0	\$4,193.3	Beijing Financial Street Capital Operation Center, China Life Private Equity	N/A
Electric Hydrogen	April 6	Hydrogen	Series C	\$355.7	\$970.0	N/A	1.5x
Ohmium	April 11	Hydrogen	Series C	\$250.0	N/A	TPG	N/A
Braven	April 4	Waste to energy/fuel	Late-stage VC	\$200.0	N/A	Arosa Capital Management, Avenue Capital Group, Fortistar	N/A
CORE POWER	May 24	Nuclear - fission	Late-stage VC	\$100.0	N/A	N/A	N/A
Charm Industrial	June 6	Hydrogen	Series B	\$100.0	\$630.0	General Catalyst	4.2x
Eavor	June 20	Geothermal	Series B	\$80.0	N/A	OMV	N/A
Kyoto Fusioneering	May 17	Nuclear - fusion	Series C	\$77.8	\$355.1	JIC Venture Growth Investments	5.3x
NEXT Renewable Fuels	April 28	Waste to energy/fuel	Late-stage VC	\$75.0	N/A	N/A	N/A
Iontra	May 2	Battery storage	Series B	\$67.0	N/A	Riverstone Holdings, Volta Energy Technologies	N/A

Source: PitchBook • Geography: Global • *As of June 30, 2023



SELECT COMPANY HIGHLIGHTS: ELECTRIC HYDROGEN



Founded 2020	Total raised \$577.6M over three deals	Post-money valuation \$970.0M
Employees 225	Last financing \$355.8M Series C	First institutional round \$23.9M Series A

Overview

Based in California, [Electric Hydrogen](#) focuses on industrial-scale electrolyzer development for green hydrogen production. Hydrogen production is divided into several different methods, with different inputs and outputs—including varying carbon emissions. Whilst hydrogen does not release carbon during combustion or when used in a fuel cell, the production of hydrogen can create a significant carbon dioxide source. At the end of 2021, 96% of global hydrogen production was from fossil fuel feedstocks, with only 4% from electrolysis.¹³ Approaches using fossil fuel

¹³: "Hydrogen," International Renewable Energy Agency, n.d., accessed on August 1, 2023.

feedstocks either emit carbon dioxide into the atmosphere or rely on carbon-capture hardware to reduce emissions—for example, steam methane reforming combined with carbon capture to produce blue hydrogen. We have seen growing VC investment into green hydrogen production using electrolyzers and renewable energy as a method to produce low-carbon fuels. A core driver of this growth is the falling costs of renewable electricity and improved electrolyzer efficiency and availability.

In May, [Electric Hydrogen](#) announced the location of its first large-scale factory, in Devens, Massachusetts. This factory will have an electrolyzer manufacturing capacity of 1.2 gigawatts per year and will begin producing [Electric Hydrogen's](#) 100 megawatt electrolyzers in Q1 2024.¹⁴ The company focuses on modular technology, thereby allowing varied implementations without extended planning and construction periods.

PitchBook's VC Exit Predictor gives [Electric Hydrogen](#) a 98% probability of a successful exit, with a 43% probability of IPO, and 55% probability of an exit via M&A.

Leadership

- CEO: Raffi Garabedian
- CFO: Derek Warnick
- CLO: Beth Deane
- CTO: David Eaglesham
- CPO: Renata Naoumov

¹⁴: "Electric Hydrogen Announces New Gigafactory to Produce Next-Generation Electrolyzer Equipment," [Electric Hydrogen](#), May 4, 2023.



SELECT COMPANY HIGHLIGHTS: ELECTRIC HYDROGEN

Competing technologies

Green hydrogen can be used in many applications, but it mostly competes with low-carbon hydrocarbon fuels such as biofuels and electrofuels; hydrogen carriers such as ammonia and methanol; and other types of low-carbon hydrogen. Electrification is also a competing technology, but energy density limitations reduce the viability of electrification in certain situations, as exemplified by the rise of short-range battery EVs but continued reliance on liquid fuels for long-

distance transport, like aviation and shipping. Hydrogen has benefits over other fuel types in that it has the highest gravimetric energy density of all combustion fuels—a kilogram of hydrogen contains more energy than the same weight of gasoline, diesel, natural gas, or kerosene.¹⁵ The disadvantage is that by volume, its energy density (volumetric energy density) is very low when stored as a gas, even under compression. We are therefore seeing developments in hydrogen storage and transport technologies, either using physical approaches such as compression or low temperatures, or via chemical means such as storing hydrogen bound in carrier chemicals.

¹⁵: "Hydrogen: A Sustainable Energy Carrier," ScienceDirect, Progress in Natural Science: Materials International, Kasper T. Møller, et al., February 2017.

Financing history

Series A	Series B	Series C
June 23, 2021	May 10, 2022	April 6, 2023
Total raised: \$23.9M	Total raised: \$198.0M	Total raised: \$970.0M
Post-money valuation: \$70.0M	Post-money valuation: \$420.0M	Post-money valuation: \$970.0M
Lead/sole investor: Breakthrough Energy	Lead/sole investor: Fifth Wall	Lead/sole investor: Energy Impact Partners

About PitchBook Industry and Technology Research

Independent, objective, and timely market intel

As the private markets continue to grow in complexity and competition, it's essential for investors to understand the industries, sectors and companies driving the asset class.

Our Industry and Technology Research provides detailed analysis of nascent tech sectors so you can better navigate the changing markets you operate in—and pursue new opportunities with confidence.

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