



 EMERGING TECH RESEARCH

# Clean Energy Report

VC trends and emerging opportunities

**Q4**  
2022

## REPORT PREVIEW

The full report is available through the PitchBook Platform.





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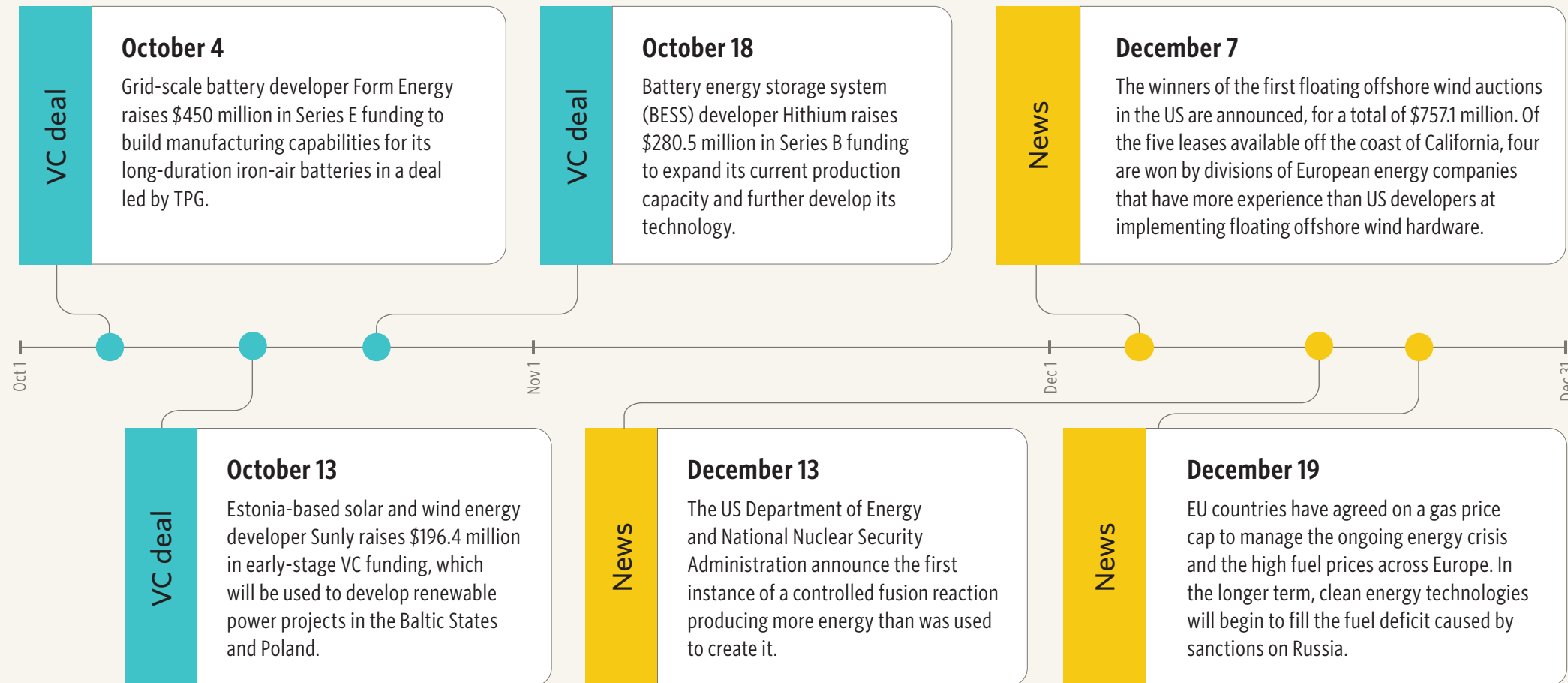
## Publishing

Report designed by **Chloe Ladwig** and **Jenna O'Malley**

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# Q4 2022 timeline



## Q4 VC deal count summary

**119**

total deals

**-16.8%**

QoQ growth

**-25.2%**

YoY growth

**-8.9%**

YTD growth

## Q4 VC deal value summary

**\$3.4B**

total deal value

**-22.1%**

QoQ growth

**-46.5%**

YoY growth

**1.4%**

YTD growth





# Clean energy landscape

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



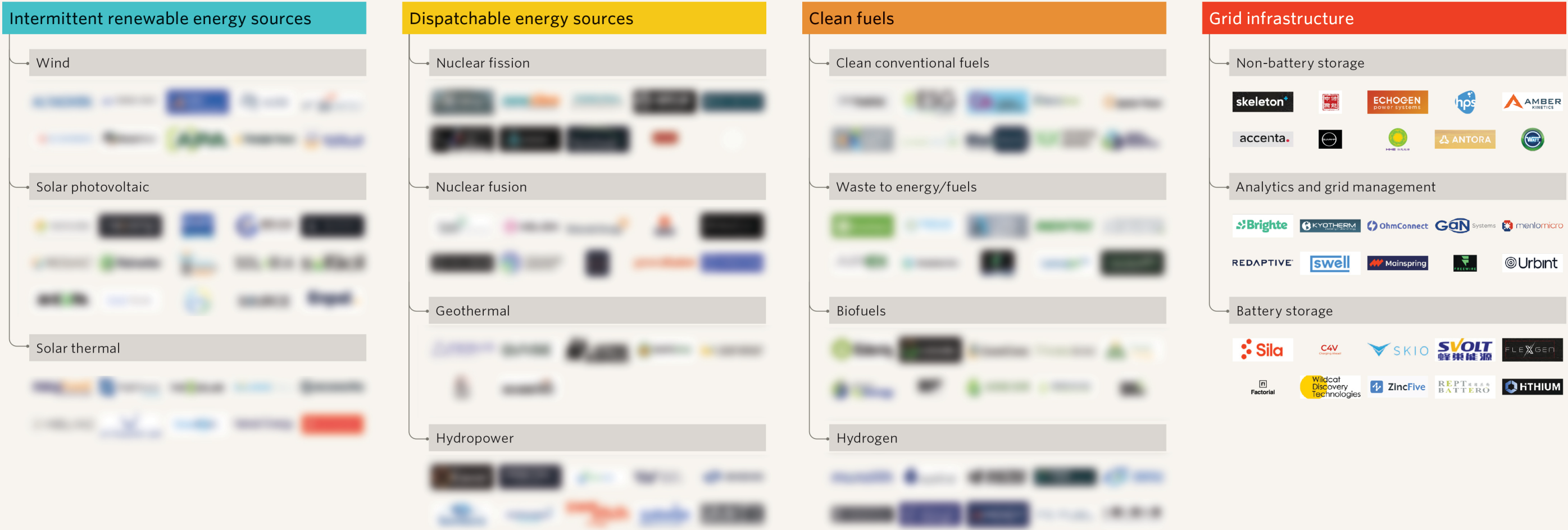




# Clean energy VC ecosystem market map

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

2022 was a strong year for VC investment in clean energy—full-year figures showed a record \$16.2 billion in VC deal value across 582 deals. In comparison, 2021, which was previously the highest year for both deal count and deal value, had slightly lower deal value at \$16.0 billion and a slightly higher deal count at 639. Within the clean energy space, 2022 was a record year for investment in both clean fuels and intermittent renewable energy sources,<sup>5</sup> with clean fuels VC investment growing 83.6% from 2021 to 2022, and intermittent renewable energy sources growing 65.6% over the same period. This strong 2022 deal activity is similar to the trend seen in the carbon & emissions tech vertical, but otherwise goes against trends seen across the VC space as a whole. Despite the strong 2022 deal activity, Q4 represented the lowest quarter for deal value in the clean fuels and intermittent renewable energy segments. The grid infrastructure and dispatchable energy segments showed lower 2022 investment metrics relative to 2021,<sup>6</sup> though still received higher investment than any other year before 2021.

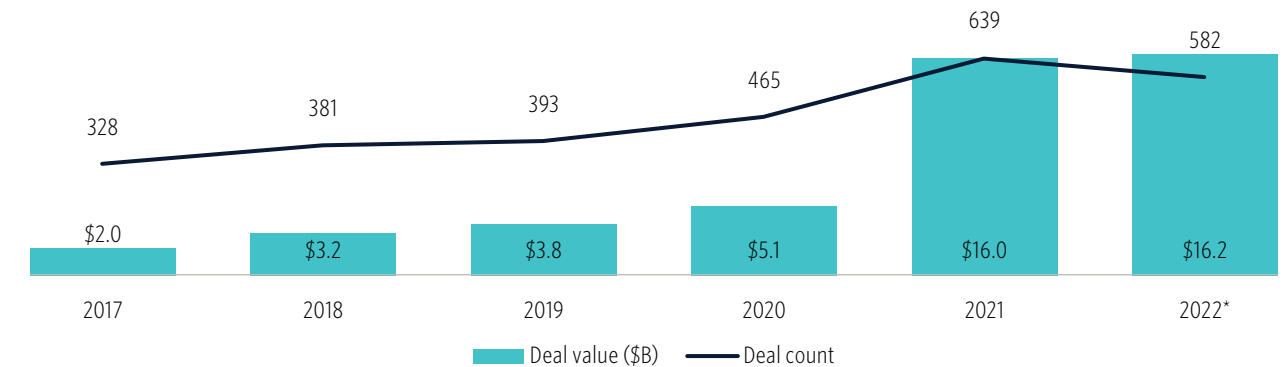
Q4 had lower deal activity than the first three quarters of 2022 at \$3.4 billion invested across 119 deals compared with an average of \$4.3 billion invested across 154 deals per quarter for the first three quarters of 2022. The largest deals in Q4 include grid-scale battery developer Form Energy's \$450.0 million Series E, lithium-ion battery developer Hithium's \$280.5 million Series B, and energy-as-a-service provider Redaptive's \$200.0 million Series E.

In 2022, the highest levels of VC investment were in solar photovoltaic technologies and chemical batteries, with investments in hydrogen and power grid analytics & management attracting the next-highest level of VC investment.

5: Including solar and wind technologies.

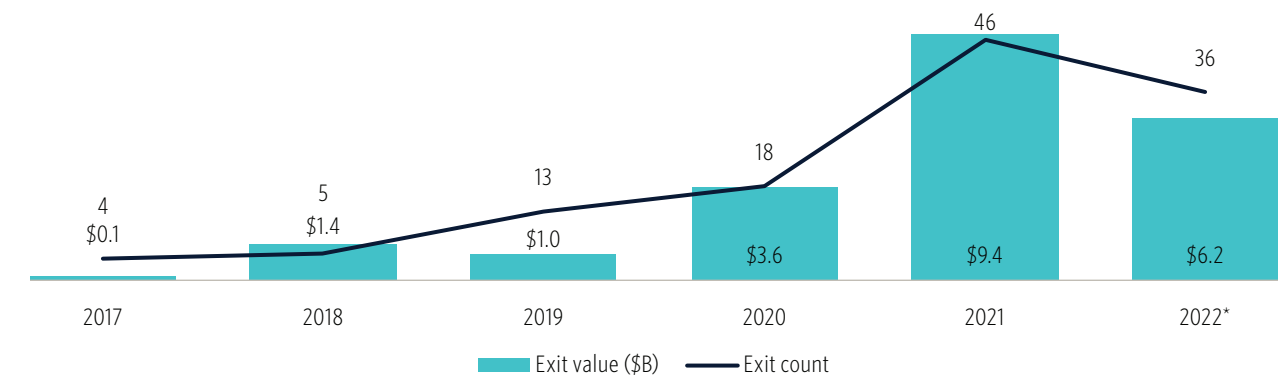
6: Including hydropower.

## Clean energy VC deal activity



Source: PitchBook | Geography: Global | \*As of December 31, 2022

## Clean energy VC exit activity



Source: PitchBook | Geography: Global | \*As of December 31, 2022



## VC ACTIVITY

### Key clean energy early-stage VC deals\*

Company	Close date (2022)	Category	Stage	Deal value (\$M)	Post-money valuation (\$M)	Lead investor(s)	Valuation step-up (post to pre)
Hithium	October 18	Battery storage	Series B	\$280.5	N/A	ABCI Securities, CCBT Private Equity	N/A
Sunly	October 13	Solar - photovoltaic	Early-stage VC	\$196.4	N/A	N/A	N/A
Tree Energy Solutions	October 5	Hydrogen	Early-stage VC	\$128.7	N/A	N/A	N/A
FTXT Energy Technology	November 30	Hydrogen	Series B	\$77.3	N/A	Zhongjian Caixin	N/A
GCL Perovskite	December 14	Solar - photovoltaic	Series B1	\$70.6	N/A	IDG Capital, Sequoia Capital China, Temasek Holdings	N/A
SinoHyKey	October 20	Hydrogen	Series B	\$42.0	\$461.9	N/A	N/A
GreenLab	December 22	Analytics and grid management	Early-stage VC	\$35.3	N/A	N/A	N/A
Fairmat	October 1	Wind	Series A	\$35.0	N/A	Compagnie Nationale Å Portefeuille, Temasek Holdings	N/A
Element Energy	December 14	Battery storage	Series B	\$28.0	\$320.0	Cohort Venture Capital	5.3x
Noon Energy	November 29	Battery storage	Series A	\$27.7	\$77.7	Clean Energy Ventures, Saudi Aramco Energy Ventures	5.6x

Source: PitchBook | Geography: Global | \*As of December 31, 2022





## VC ACTIVITY

### Key clean energy late-stage and venture growth VC deals\*

Company	Close date (2022)	Category	Stage	Deal value (\$M)	Post-money valuation (\$M)	Lead investor(s)	Valuation step-up (post to pre)
Form Energy	October 4	Battery storage	Series E	\$450.0	\$1,950.0	TPG	1.3x
Redaptive	December 19	Analytics and grid management	Series E1	\$200.0	\$950.0	N/A	N/A
Swell	November 22	Analytics and grid management	Series B	\$120.0	N/A	Greenbacker Group, SoftBank Group	N/A
WATT Fuel Cell	December 7	Non-battery storage	Late-stage VC	\$82.3	\$152.4	N/A	N/A
Syzygy Plasmonics	November 16	Hydrogen	Series C	\$76.7	\$246.7	Carbon Direct Capital Management	2.7x
Dabbsson	December 16	Battery storage, solar - photovoltaic	Late-stage VC	\$75.0	N/A	N/A	N/A
Natron Energy	December 20	Battery storage	Series AA	\$57.7	\$106.5	N/A	0.4x
Sunfolding	December 16	Solar - photovoltaic	Late-stage VC	\$49.7	N/A	N/A	N/A
The Mobility House	November 3	Battery storage	Series C	\$47.7	N/A	Mercuria Energy Trading, Ventura Capital, Wermuth Asset Management	N/A
5B	December 15	Solar - photovoltaic	Series B	\$37.1	N/A	AES, Artesian Capital Management	N/A

Source: PitchBook | Geography: Global | \*As of December 31, 2022



SELECT COMPANY HIGHLIGHTS: TREE ENERGY SOLUTIONS



Founded  
**2019**  
  
**33** employees

**Total raised:**  
\$195.6M over two deals

**Last financing:**  
\$128.7M in early-stage VC funding

**Post-money valuation:**  
Undisclosed

**First institutional round:**  
\$67.0M early-stage VC funding

Overview

Tree Energy Solutions is a Belgium-based producer of green hydrogen and other derived green chemicals and fuels. At its core, it produces green hydrogen through electrolysis of water using renewable power, but it also uses this hydrogen to produce green natural gas which is used to produce power. It focuses on European markets, but is also developing energy supply and import hubs in Canada and the US. Tree Energy Solutions’ first green energy hub will be in Germany. It will produce green hydrogen and electrical power, and it will include a 500 MW electrolyser for hydrogen production. Its green hydrogen is also viable as a transport fuel, particularly for larger commercial vehicles. Though in early stages of development, Tree Energy Solutions is aiming to produce 5.5 million metric tons of hydrogen per year by 2045 and up to 250 TW-hours of green natural gas.<sup>9</sup>

Leadership

- CEO: Marco Alverà
- Chief Technology Officer: Jens Schmidt
- Chief Strategy Officer and Americas CEO: Cynthia Walker
- Chief Corporate Officer: Yves Vercammen
- Chief Privacy Officer: Alexandra Pieton
- Chief Commercial Officer: Otto Waterlander

9: “Wilhelmshaven Green Energy Hub,” Tree Energy Solutions, n.d., accessed February 27, 2023.



# About PitchBook Emerging Tech 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 Emerging Tech 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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**Coming soon**  
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