



CleanTech Venture Capital Report 2024

FCF DeepTech Series

March 2024



EXECUTIVE SUMMARY

FCF OVERVIEW

CLEANTECH VENTURE CAPITAL
MARKET

CLEANTECH IPO EXITS

CLEANTECH M&A EXITS

The FCF DeepTech Series is a standardized set of reports, tracking European VC funding trends within four main DeepTech verticals and can be used as a quick reference for investors, corporates and professionals

More advanced, detailed and / or customized reports are available upon request

FCF DeepTech Series

FCF analyzes and tracks the European funding trends within four main DeepTech verticals. Each quarter, one of the four verticals is examined individually. FCF defines DeepTech companies as firms whose product or service offerings are based on heavy R&D, patent development, substantial scientific advances and high-tech engineering, creating real technological innovations (in contrast to Internet-Platform companies applying 'state-of-the-art' technology to transform a non-digital business model to a digital one)

FCF DeepTech Verticals



CleanTech

Developers of technologies that seek to reduce the environmental impact of human activities or to significantly reduce the amount of natural resources consumed through such activities



Advanced Manufacturing

Companies utilizing innovative and novel technologies to improve products or processes related to manufacturing



FoodTech

Companies that provide technological solutions for the food and agricultural sector to enhance productivity, automation and monitoring capabilities as well as to produce alternatives to currently common food products



Robotics and Drones

Automated or remote-controlled mechanical devices and technology. This includes machinery programmed to perform repetitive tasks, precision tasks and remote-operated movement or travel (e.g. UAVs, etc.)

Recipients

The FCF DeepTech Series targets the following recipients:

- Corporates / Executives
- Institutional Investors
- Venture Capital Investors
- Family Offices / HNWIs
- Advisors

Availability

The FCF DeepTech Series is available on FCF's website at '<https://www.fcf.de/de/research/>'

To recommend colleagues or fellow investors to be added to the mailing list, kindly send an email with the respective contact information

If you have questions, comments or ideas, please do not hesitate to contact us

This edition of the inaugural FCF DeepTech Series focuses on VC funding developments within the European Clean-Tech vertical

The European CleanTech vertical has been split into six main sub-sectors

- (i) Alternative Fuels & Materials,*
- (ii) E-Mobility,*
- (iii) Energy Efficiency,*
- (iv) Energy Generation,*
- (v) Energy Storage, and*
- (vi) Recycling, Waste & Environment*

CleanTech Subsectors

CleanTech companies develop and provide products or services that improve operational performance, productivity or efficiency, while reducing costs, input resources, energy consumption, waste and / or environmental pollution. For the purpose of this report, the CleanTech vertical is further divided into the following subsectors:



Alternative Fuels & Materials

Companies that provide solutions for environmentally-friendly alternatives to either conventional fossil fuels and nuclear materials or traditional engineering construction materials



E-Mobility

Innovators of technologies, contributing towards clean mobility solutions such as electric vehicles, clean drivetrains and non-fossil fuel-based fuelling stations



Energy Efficiency

Companies developing innovative technologies aimed to reduce the amount of energy required to provide products and services



Energy Generation

Developers and technology providers of alternative energy generating equipment, which includes technologies related to solar, hydroelectric, wind, etc.



Energy Storage

Companies engaged in energy storage technologies that include commercial and industrial batteries and capacitors



Recycling, Waste & Environment

Providers of environmental services, which include environmental management, waste management and pollution control services

Selection of Companies

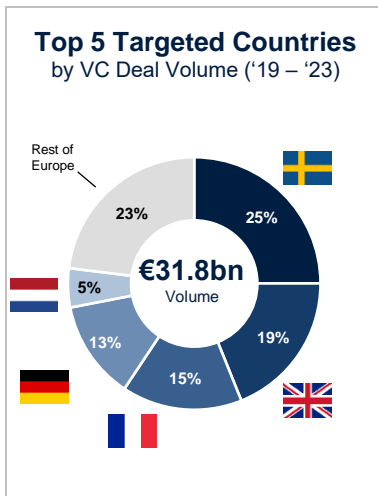
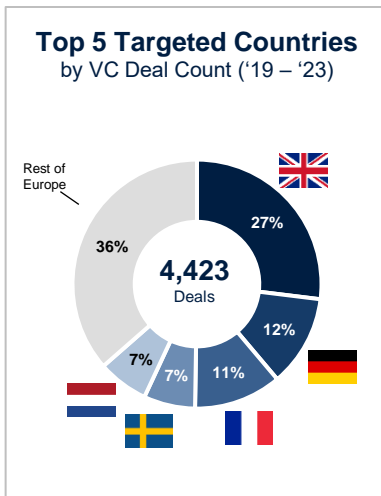
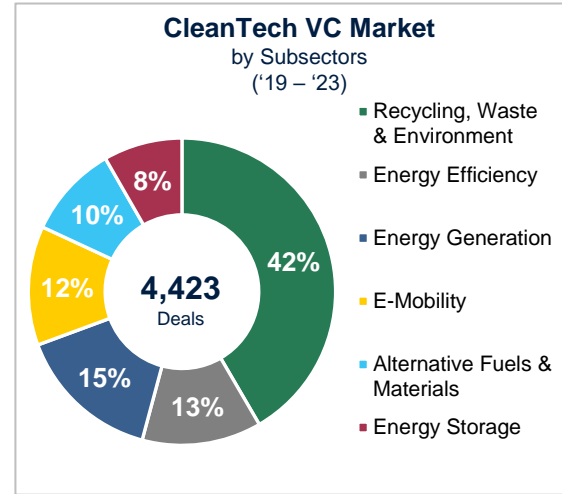
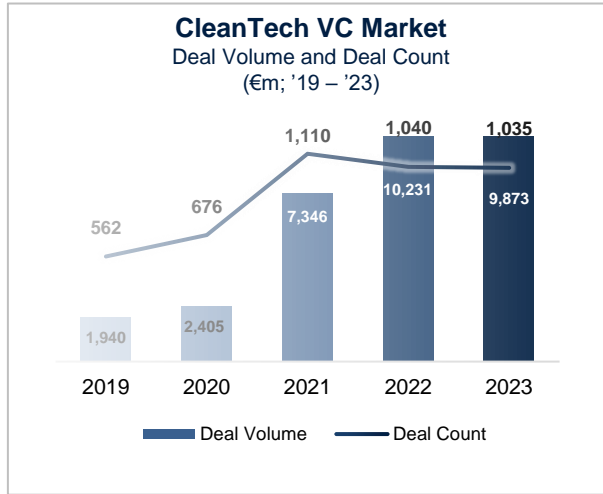
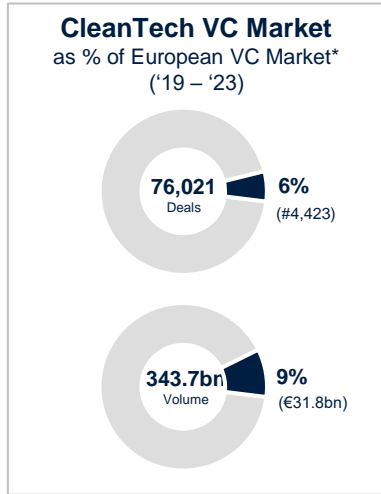
The companies were selected based on the following criteria:

- Companies with venture capital financings since 2016
- Venture capital funding round (for completeness, undisclosed deals also included)
- Company HQ located in Europe
- Company operating within CleanTech vertical*

Data

All input data is provided by Pitchbook and S&P Capital IQ and has not been independently verified by FCF. For additional information and disclaimer, please refer to the last page

European CleanTech – Venture Capital Facts & Figures



Top 3 CleanTech Companies by VC Volume Raised ('19 – '23)

#	Company	HQ	Vol. (€m)
1	northvolt	Sweden	5,940
2	VERIKOR	France	1,820
3	RIMAC	Croatia	720
Top 3 Total			8,480

Top 3 VC Investors by Deal Count ('19 – '23)

#	Investors	HQ	Deal Count
1	EIT (European Institute of Innovation & Technology)	EU	258
2	PLUGANDPLAY	USA	69
3	ENTERPRISE IRELAND (where innovation means business)	Ireland	67
Top 3 Total			394



A white wind turbine is positioned in the upper right quadrant of the image. It is set against a dark, textured background that resembles a night sky or a dark wall. A long, dark shadow of the turbine extends diagonally from the bottom right towards the center of the image. The overall composition is minimalist and modern.

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CLEANTECH M&A EXITS

FCF seeks to provide its clients with financing solutions

- (i) at the lowest cost,*
- (ii) with the highest flexibility,*
- (iii) in the shortest period of time,*
- (iv) with the highest closing probability, and with*
- (v) financing partners that integrate well into their strategy*

Who We Are

- Specialized Investment Bank and Financing Specialist
- Advising public and private small- / midcap companies
- Advisor for structuring and placement of financing transactions:
 - All instruments: Unbiased approach to all available corporate financing instruments (no product selling approach), allowing for customized financing structures
 - All investors: Close and trusted relationships with senior executives of virtually all relevant equity and debt investors
 - Fast process: Process management skills and direct / personal access to institutional debt and equity investors enable fast transactions
- More than 150 transactions with a total placement volume in excess of EUR 5.0 billion since foundation in 2005
- More than 15 professionals headquartered in Munich

Capital Markets Capabilities and Services

Equity	Private / Pre-IPO	<ul style="list-style-type: none"> ■ Venture capital ■ Growth capital 	<ul style="list-style-type: none"> ■ Private equity
	Public	<ul style="list-style-type: none"> ■ Initial Public Offering (IPO) / Capital increase ■ Dual-track (IPO and alternative transaction) 	<ul style="list-style-type: none"> ■ pursued in tandem ■ Private investment in Public Equity (PIPE) ■ Block trade
Debt	Short-term Debt	<ul style="list-style-type: none"> ■ Receivables / Factoring / Asset-backed securities ■ Borrowing base / Inventory 	<ul style="list-style-type: none"> ■ Working capital / Revolving credit facility ■ Guarantees / Letter of credit
	Long-term Debt	<ul style="list-style-type: none"> ■ Bank loan facility / Syndicated loans ■ Sale-and-lease-back / Leasing ■ Corporate bonds (public / private placement) ■ High yield / PIK bond 	<ul style="list-style-type: none"> ■ Promissory note (<i>Schuldscheindarlehen</i>) ■ Second lien / Subordinated loans ■ Venture debt ■ Unitranches
	Hybrid	<ul style="list-style-type: none"> ■ Mezzanine capital 	<ul style="list-style-type: none"> ■ Convertible bonds

Selected Transactions

<p>Syndicated Loan and Factoring Facility</p> <p>Altendorf Group GmbH</p> <p>[confidential]</p> <p>January 2024</p>	<p>Capital Increase</p> <p>LimmaTech Biologics AG</p> <p>[confidential]</p> <p>December 2023</p>	<p>European Investment Bank Debt Facility</p> <p>In Ovo B.V.</p> <p>EUR 40m</p> <p>August 2023</p>	<p>Debt Facility</p> <p>JORA Holding GmbH & Co. KG</p> <p>~ EUR 30m</p> <p>June 2023</p>	<p>Acquisition Loan Facility</p> <p>KKA Management GmbH</p> <p>EUR 20m</p> <p>May 2023</p>	<p>Capital Increase</p> <p>aerofoils GmbH</p> <p>[confidential]</p> <p>March 2023</p>	<p>M&A (Sell-Side)</p> <p>Energieinsel</p> <p>[confidential]</p> <p>March 2023</p>	<p>M&A (Sell-Side)</p> <p>PMG Projekttraum Management GmbH</p> <p>[confidential]</p> <p>March 2023</p>	<p>M&A (Sell-Side)</p> <p>SER / RUZ Group</p> <p>[confidential]</p> <p>February 2023</p>	<p>European Investment Bank Debt Facility</p> <p>German Bionic Systems GmbH</p> <p>EUR 15m</p> <p>December 2022</p>	<p>Financial Advisory</p> <p>Mitteldeutsche Flughafen AG</p> <p>[confidential]</p> <p>December 2022</p>	<p>Syndicated Loan</p> <p>ante Holding GmbH & Co. KG</p> <p>[confidential]</p> <p>December 2022</p>
<p>Working Capital Facility</p> <p>CHO-Time Group</p> <p>EUR 7m</p> <p>November 2022</p>	<p>Software-Leasing Facility</p> <p>Leading Global Device-as-a-Service Company</p> <p>EUR 10m</p> <p>October 2022</p>	<p>Interest Rate Hedging</p> <p>Mitteldeutsche Flughafen AG</p> <p>EUR 150m</p> <p>October 2022</p>	<p>European Investment Bank Debt Facility</p> <p>Evum Motors GmbH</p> <p>> EUR 12m</p> <p>September 2022</p>	<p>Factoring Facility</p> <p>JORA Holding GmbH & Co. KG</p> <p>EUR 25m</p> <p>September 2022</p>	<p>Equity Transaction – Joint Venture with Family Office</p> <p>Doppstadt Group</p> <p>> EUR 50m</p> <p>September 2022</p>	<p>Acquisition Loan and Working Capital Facility</p> <p>Bencis</p> <p>> EUR 20m</p> <p>May 2022</p>	<p>Acquisition Loan Facility</p> <p>Lloyd Fonds AG</p> <p>[confidential]</p> <p>April 2022</p>	<p>Syndicated Loan</p> <p>Schnellecke Logistics SE</p> <p>EUR 70m</p> <p>December 2021</p>	<p>Syndicated Loan</p> <p>KWD Automotive AG & Co. KG</p> <p>EUR 70m</p> <p>December 2021</p>	<p>Syndicated Loan, Factoring, Real Estate Sale & Lease-Back</p> <p>Top 10 German Food Company</p> <p>EUR 85m</p> <p>October 2021</p>	<p>Syndicated Loan</p> <p>Ziegler Holzindustrie GmbH & Co. KG</p> <p>EUR 230m</p> <p>August 2021</p>



1

financing advisor in Germany, purely focusing on corporate financing transactions



More than
15

investment banking professionals



More than
100

years of aggregated, investment banking / financing experience



More than
150

completed transactions



More than
5 bn

total volume of advised & closed transactions since 2005



Network

access to more than 4000 international financial institutions



2000

contacts to family offices and ultra-high-net-worth individuals worldwide



More than
25

international conferences organized



More than
150

articles and research papers published



Leading

advisor for financing transactions with EIB in the DACH region

Case Study: In Ovo B.V.

EUR 40m European Investment Bank Growth Finance Facility

FCF advised In Ovo B.V. on a EUR 40m development debt facility from the European Investment Bank (EIB) to fund the manufacturing of new machines as well as R&D activities and further product developments



EIB Debt Facility

In Ovo B.V.

EUR 40m

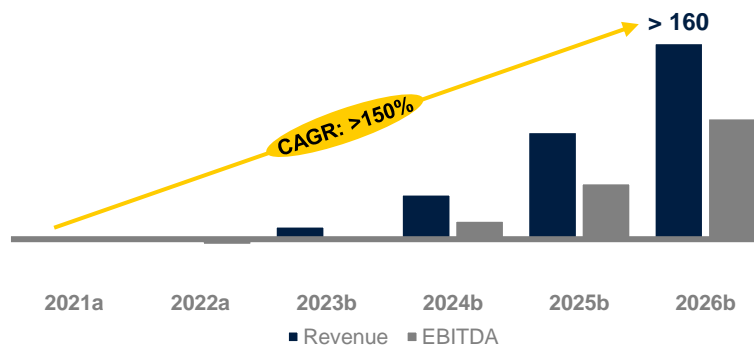
August 2023

Company Description

- In Ovo B.V. is the leading European producer and provider of chicken gender-typing machines, sorting male and female eggs before hatching
- The lead product, named Ella, determines the gender of chickens by employing proprietary biomarkers
- By using In Ovo's machines, hatcheries stop suffocating or shredding male chickens as they only hatch female chicks
- Each Ella machine can perform more than 11 million tests per year, saving more than 5 million male chicks p.a.
- In Ovo significantly contributes to animal welfare by ending the culling of chicks and revolutionizing the poultry industry
- By only hatching female chicks, CO₂ emissions are drastically decreased, leading to a more sustainable production of eggs
- In Ovo was founded in 2013 and is headquartered in Leiden, Netherlands, with subsidiaries in Belgium and Germany

Key Financials

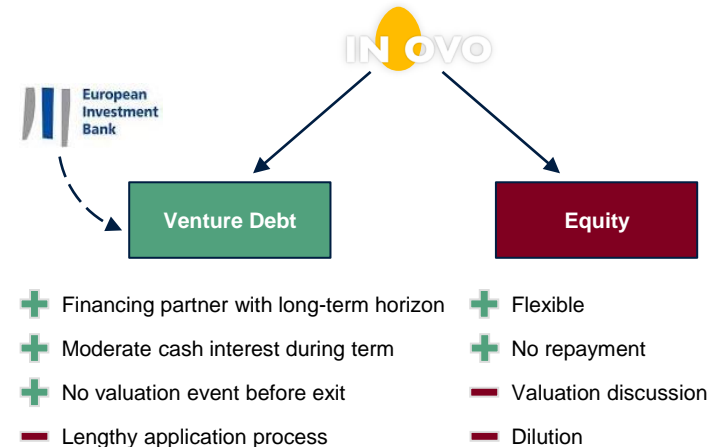
Revenue & EBITDA (2021a - 2026b)
(in EURm)



Financing Options

- In 2018, before the EIB financing, In Ovo raised a first Series A with Evonik Venture Capital, VisVires New Protein and Leiden University
- In order to finance further development, In Ovo secured a Series B of EUR 34m with ECBF, ABN AMRO and existing shareholders in 2022
- After the successful prototyping of their machines, In Ovo decided to leverage a large EUR 40m venture loan from the EIB as growth capital
- The funds will be used for further development, additional R&D, as well as CAPEX financing related to rollout and set-up of the Ella machines
- The EIB financing provided funding:
 - Without dilution / valuation discussion
 - In tranches tailored to the business & liquidity needs

Transaction Highlights



FCF advised Quantum-Systems GmbH on a > € 10m development debt facility from the European Investment Bank (EIB) to fund the strong growth of the firm subsequent to an equity financing round



EIB Debt Facility

Quantum-Systems GmbH

> € 10m

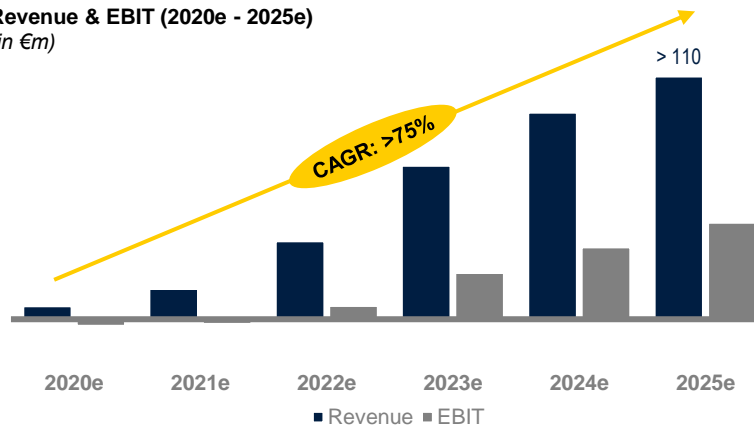
July 2021

Company Description

- Quantum-Systems GmbH (Quantum) is a developer and global leader in the automatic transition, eVTOL¹ fixed wing UAS² technology with applications in the surveying and defense and security sector
- The drones' hybrid functions combine eVTOL and common aircraft characteristics, thereby achieving long range and silent flights
- The highly efficient UAS are fully autonomous and powered with AI technology, enabling clients to benefit from the megatrend autonomous data collection solutions
- Clients – governments and firms operating in the areas of smart farming, surface mining, surveying and infrastructure – benefit from the best-in-class data quality, enabling real-time position detection
- Quantum was founded in 2015 and is headquartered in Oberpfaffenhofen (west of Munich) at a special-purpose airfield and currently employs more than 60 staff

Key Financials

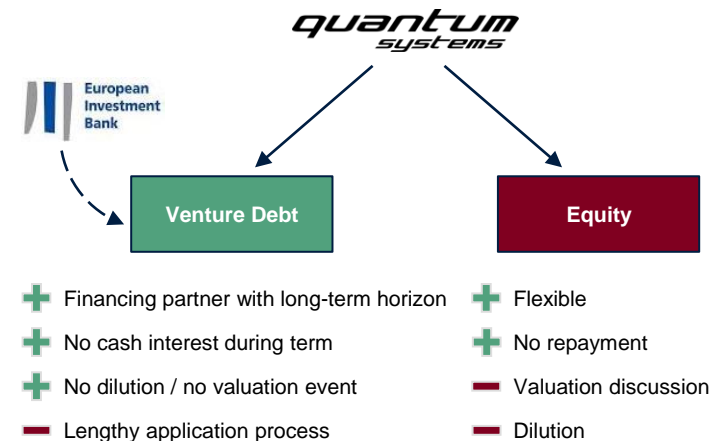
Revenue & EBIT (2020e - 2025e)
(in €m)



Financing Options

- Prior to the EIB financing, Quantum was able to secure equity financing from several top-class strategic investors
- In addition to the equity financing, the venture debt instrument was taken up by Quantum to secure additional firepower to support the strong growth trajectory whilst minimizing the dilution to existing investors and the founders
- The secured funds will be aimed at further expanding R&D capabilities in autonomous flight and AI technology alongside strengthening integration of system-critical components of eVTOL UAS within clients' operating infrastructure
- The EIB financing provided the required funding:
 - Without dilution / valuation discussion
 - Already available during pre break-even growth phase

Transaction Highlights



¹ electric Vertical Take-Off & Landing, ² unmanned aerial systems

Case Study: ROBART GmbH

€ 9m European Investment Bank Growth Finance Facility

FCF advised ROBART GmbH on a € 9m development debt facility from the European Investment Bank (EIB) to fund the scale up of the business

Company Description

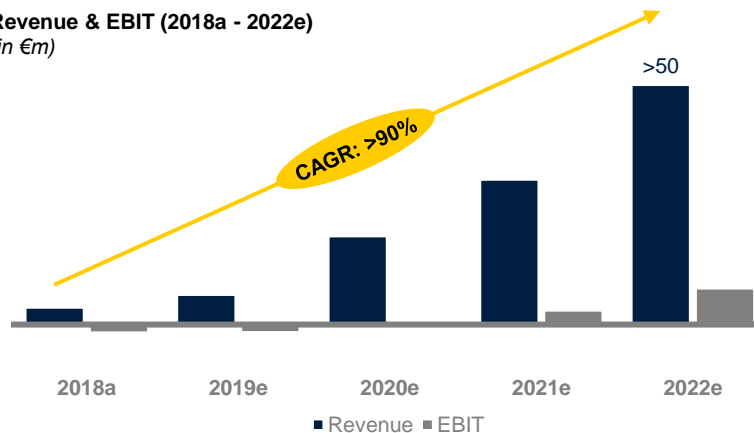
- ROBART GmbH (ROBART) is the technology leader in the field of AI-navigation systems for home appliance robots
- The company develops innovative navigation solutions, combining AI software, patented LIDAR technology and IoT services, enabling intelligent robotic navigation and human-robot interaction
- ROBART's products and services help its customers - blue-chip home appliance manufacturers - to accelerate the product development of intelligent robotic products
- Customers can choose from development services, plug & play navigation kits or entire private-label produced robotic products
- The company's expertise is planned to be rolled-out in other up-coming fields of mobile robotics (security, homecare, professional cleaning etc.)
- ROBART, located in Linz, Austria and branches in the US, China and Germany, was founded in 2009 and employs approx. 50 employees

Financing Options

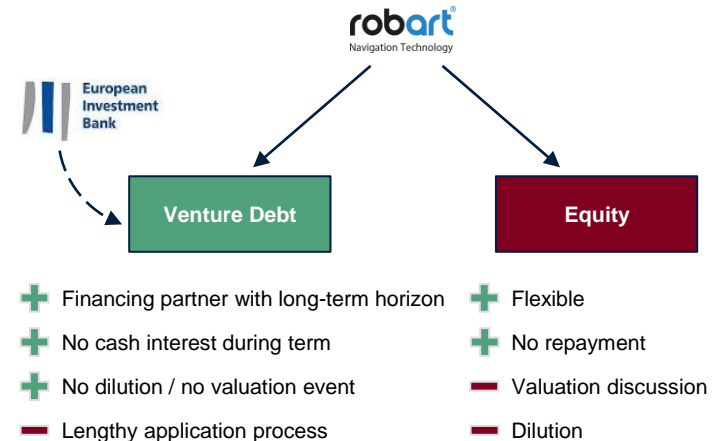
- Up to the transaction, ROBART was financed with venture capital by several blue chip venture capital / corporate venture firms
- In order to accelerate growth, the company intended to raise further financing, especially to fund the expansion of its sales & marketing efforts, working capital requirements and further R&D spending
- Equity financing with existing and new investors was considered but the combination of the amount required and the valuation obtainable would have resulted in high dilution for the founders
- The EIB financing provided the required funding:
 - Without dilution / valuation discussion
 - In tranches tailored to the business liquidity needs
 - Without cash interest during the term of the loan
 - With a five year term long enough to reach break-even

Key Financials

Revenue & EBIT (2018a - 2022e)
(in €m)



Transaction Highlights



EIB Debt Facility

ROBART GmbH

€ 9m

February 2020

Case Study: Hydrogenious LOHC Technologies GmbH

Capital Increase

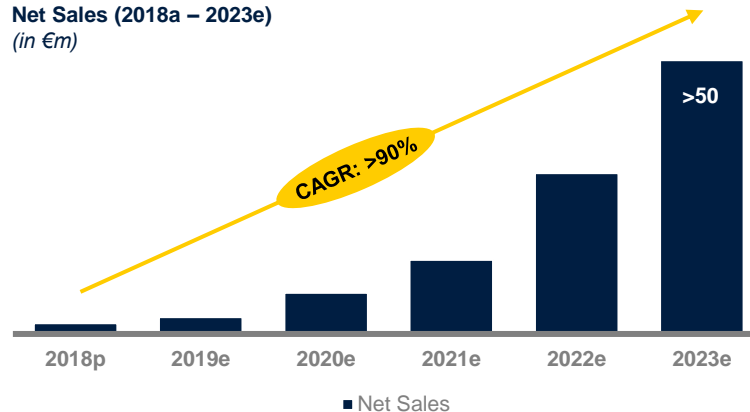
FCF advised Hydrogenious Technologies GmbH and its shareholders on the successful completion of a capital increase (total volume € 17m), further funding the scale up

Company Description

- Developer of a hydrogen storage technology designed to store hydrogen in Liquid Organic Hydrogen Carriers (LOHC) – the revolution in hydrogen storage and transport
- Disruptor of the hydrogen logistics markets, enabling hydrogen to be transported in a non-toxic, non-flammable and non-explosive state
- Innovator, capitalizing on the emerging megatrend of hydrogen mobility, enabling the efficient the transport and distribution of hydrogen to Hydrogen Refueling Stations (HRS)
- Global leader in 'next-generation' mobile, 'on-board' LOHC technology
- Key partners (e.g. Clariant, MAN, Sasol, United Hydrogen, etc.) have been brought onboard to support in the development / testing phase
- Hydrogenious was founded in 2013 by Dr. Daniel Teichmann and Profs. Arlt, Schlücker and Wasserscheid in Erlangen, Germany. At present, the company employs ~65 FTEs

Key Financials

Net Sales (2018a – 2023e)
(in €m)



Investor Profiles



AP Ventures, formerly part of Anglo American Platinum, is a venture capital firm backed amongst others by Anglo American Platinum, a major global mining company



Covestro is a major German company which produces specialty chemicals for heat insulation foams and transparent polycarbonate plastics



Mitsubishi Corporation is Japan's largest trading company / conglomerate and a member of the Mitsubishi keiretsu



Vopak is the world's leading tank storage company that stores and handles various oil, chemicals, edible oils and natural gas-related products

Transaction Highlights

- The Company mandated FCF to structure and place a €17m Series B financing round aimed at launching further commercial pilot projects and scaling up the technology
- FCF identified and approached a extensive list of relevant international venture capital, strategic and selected Family Office investors
- Hydrogenious received strong interest from investors, securing a strong negotiating position in terms of valuation and contractual terms, all the while ensuring closing probabilities were maximized
- Hydrogenious and FCF were able to secure the investment of three new strategically valuable investors, in addition to a further commitment from its anchor investor AP Ventures, that offer new joint commercialization projects whilst providing substantial firepower in future financing rounds

Capital Increase



Hydrogenious LOHC Technologies GmbH

€ 17m

July 2019

Case Study: Synapticon GmbH

~ € 10m Capital Increase with Family Office

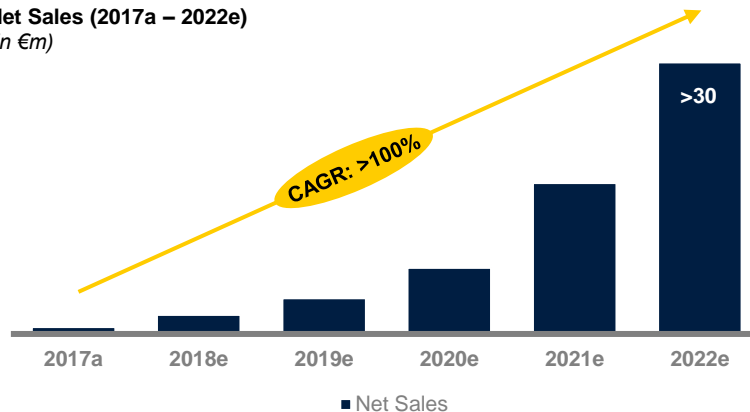
FCF advised Synapticon GmbH and its shareholders on the successful completion of a capital increase (total volume ~ € 10m), further funding the company's successful growth strategy and global commercialization plans

Company Description

- Provider of motion control solutions for the Advanced Manufacturing industry, combining advanced software and electromechanics to deliver high performance servo drives (key electromechanical robotic motion control component)
- Comprehensive product portfolio spanning servo drives, integrated drive units and SoC (System on Chip) based on proprietary software SOMANET and sold as either customized or off-the-shelf solutions
- Clients are blue chip Advanced Manufacturing and automation machinery OEMs (KUKA, Comau, Schunk, etc.) as well as emerging Asian Advanced Manufacturing companies
- Acting as a one-stop supplier, the company offers turn-key solutions that drastically reduce the overall time-to-market
- Founded in 2012, based in Schönaich, Germany, the company currently employs 50 people in four locations (Germany, Serbia, USA and China)

Key Financials

Net Sales (2017a – 2022e)
(in €m)



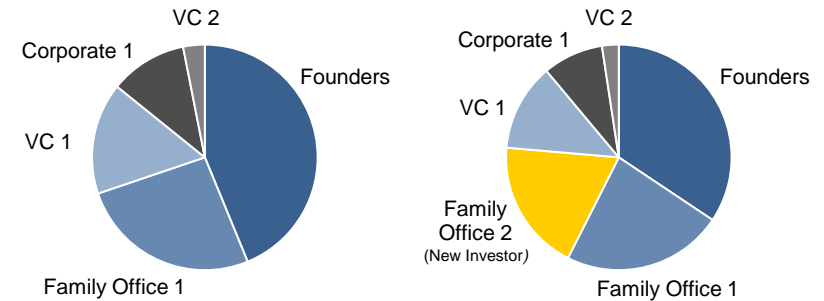
Capital Increase

Synapticon GmbH

~ € 10m

January 2019

Shareholdings (pre & post)



Transaction Highlights

- Synapticon is the innovation leader in robotic motion control and is scaling its operations in order to further develop / commercialize its product portfolio
- To finance and realize its business strategy, Synapticon mandated FCF to structure a ~ € 10m financing round
- FCF identified and approached a competitive list of relevant international venture capitalists as well as selected family offices
- Synapticon received a high number of submitted Lols, enabling a strong negotiating position with regards to valuation and contractual terms, while at the same time maximizing closing probability
- FCF and Synapticon were able to onboard a value-added family office as a new financing partner with strong industrial 'know-how' while also securing pro-rata participation from the existing shareholders

A white wind turbine is positioned in the upper right quadrant of the image. It is set against a dark, textured background that resembles a night sky or a dark surface. A long, dark shadow of the turbine extends diagonally from the bottom right towards the center of the image. The overall composition is minimalist and modern.

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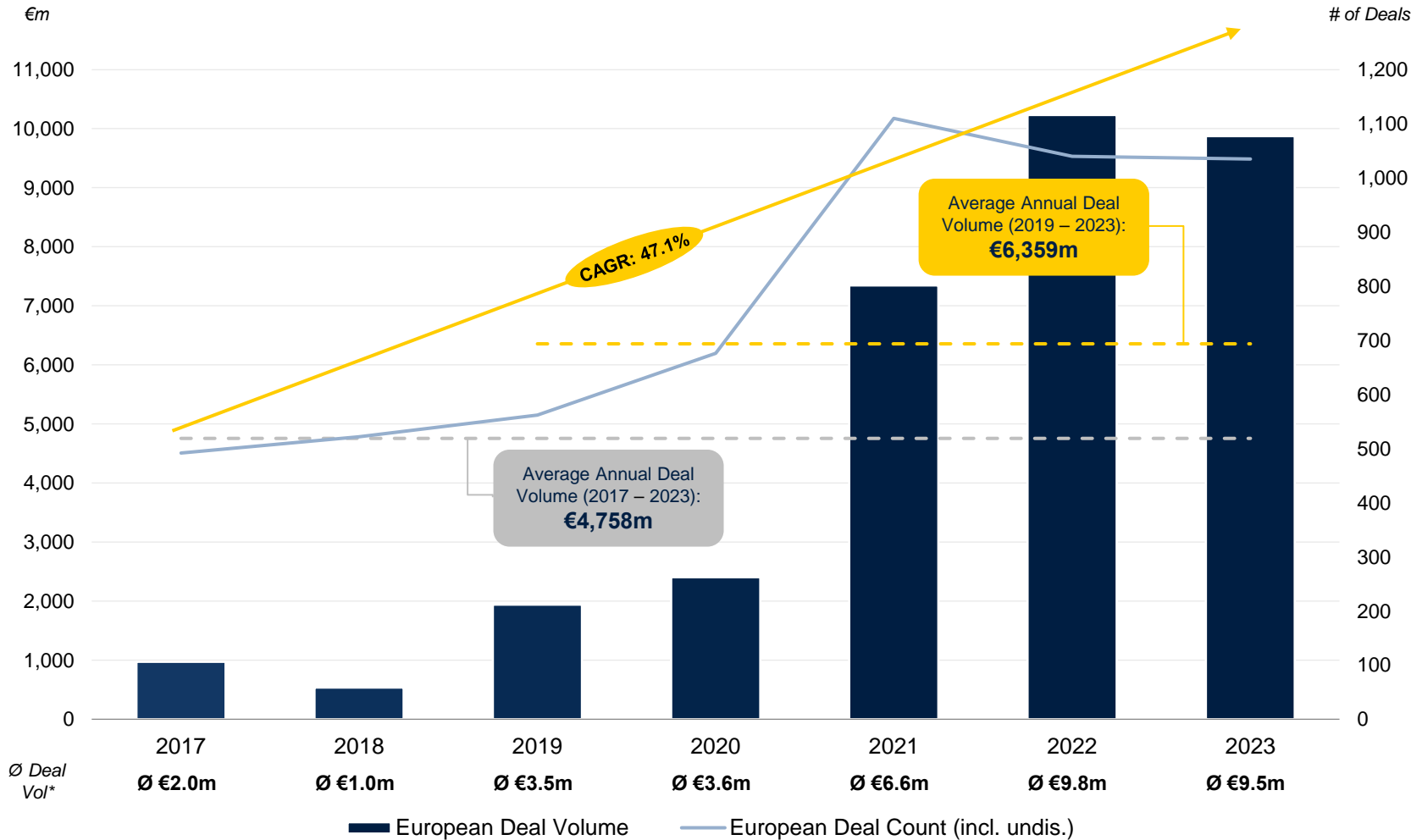
CLEANTECH M&A EXITS

European CleanTech Venture Capital Market Development

Financing volumes peaked in 2022 with €10.2bn investments in CleanTech start-ups (>10x higher than in 2017)

In 2023, deal volume slightly fell behind 2022 with €9.9bn and a lower average deal sizes

The strong increase in annual deal volume in recent years is driven by higher average transaction sizes ("megadeals"), e.g., Northvolt with €886m, €509m, €2.3bn, €1.0bn and €1.1bn in 2019-2023

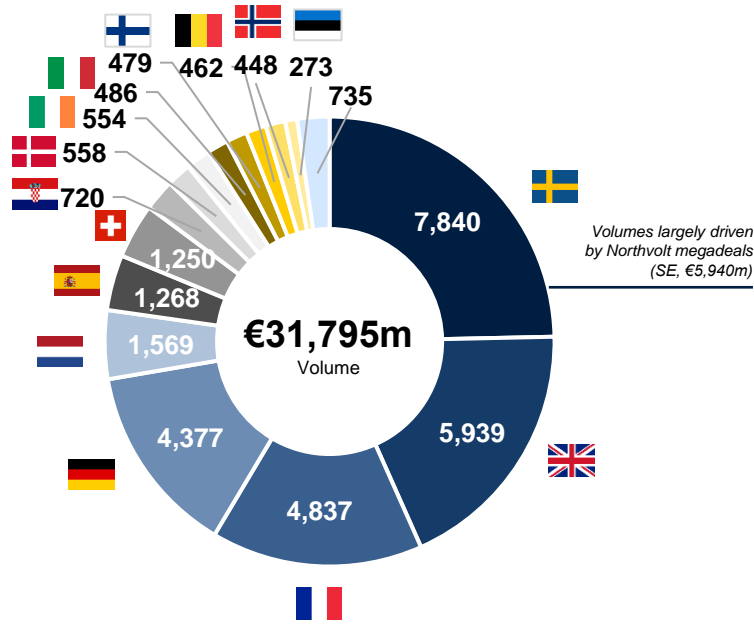


European CleanTech Countries ('19 – '23) by Deal Count & Volume

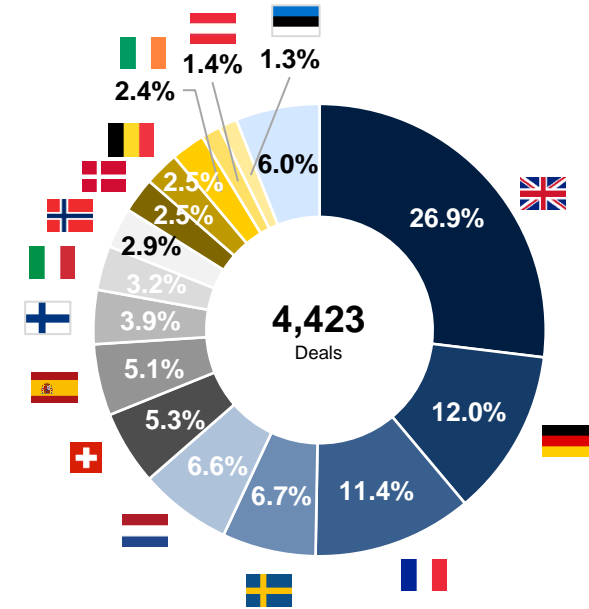
While the United Kingdom represents by far the largest deal count over the past 5 years, Sweden leads the ranking by deal volume due to the large transactions of Northvolt. Without Northvolt, Sweden would only be on rank 4 (with €1.9bn deal volume) after Germany

The Top 10 countries represent approx. 85% of the total European CleanTech market (deal count & volume)

Deal Volume (in EURm)



Deal Count (incl. undisclosed deals)



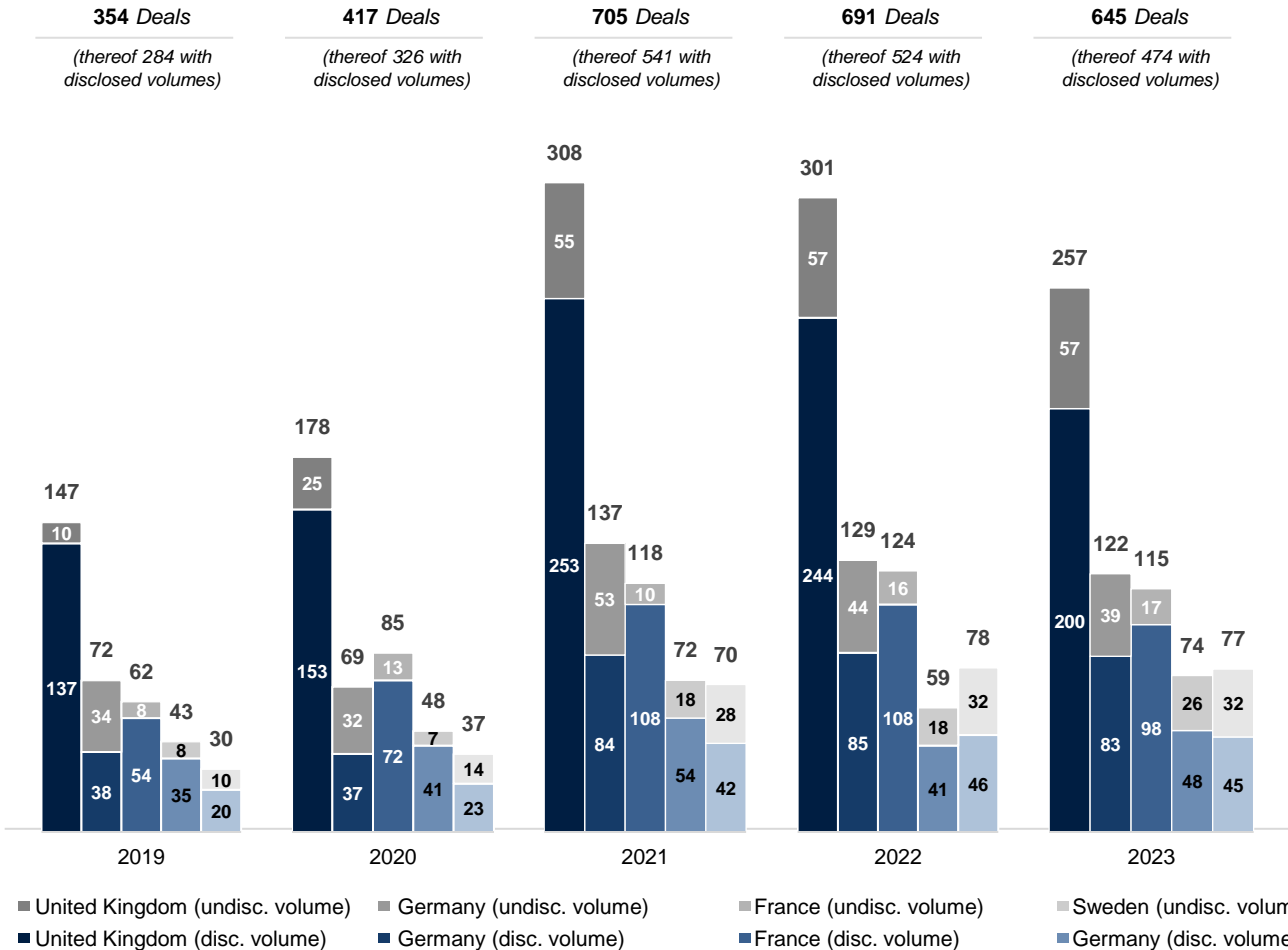
Top 5 Targeted European CleanTech Countries ('19 – '23) – Part I

by Deal Volume per year

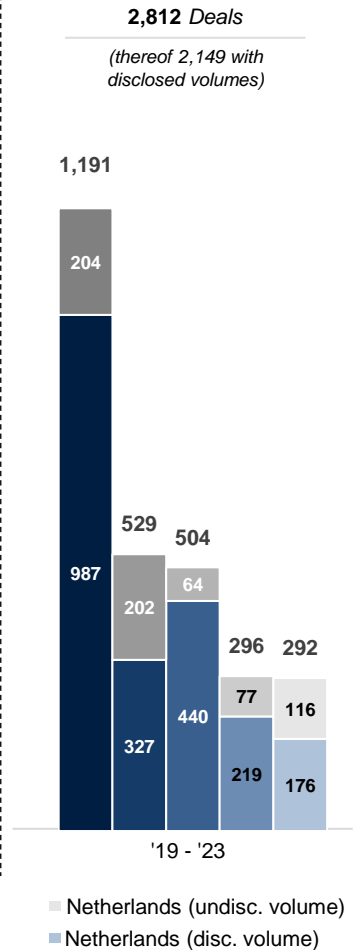
Since 2019, the UK has recorded the largest number of deals with a total of 1,191 VC funding rounds, followed by Germany with 529 deals and France with 504 deals and Sweden with 292 deals

German and Dutch companies appear more secretive in terms of disclosing VC funding volumes. Approx. 60% of recorded deals have a disclosed deal volume, compared to approx. 85% for British and French companies

Deal Count (incl. deals with undisclosed deal volumes)



Total Deal Count



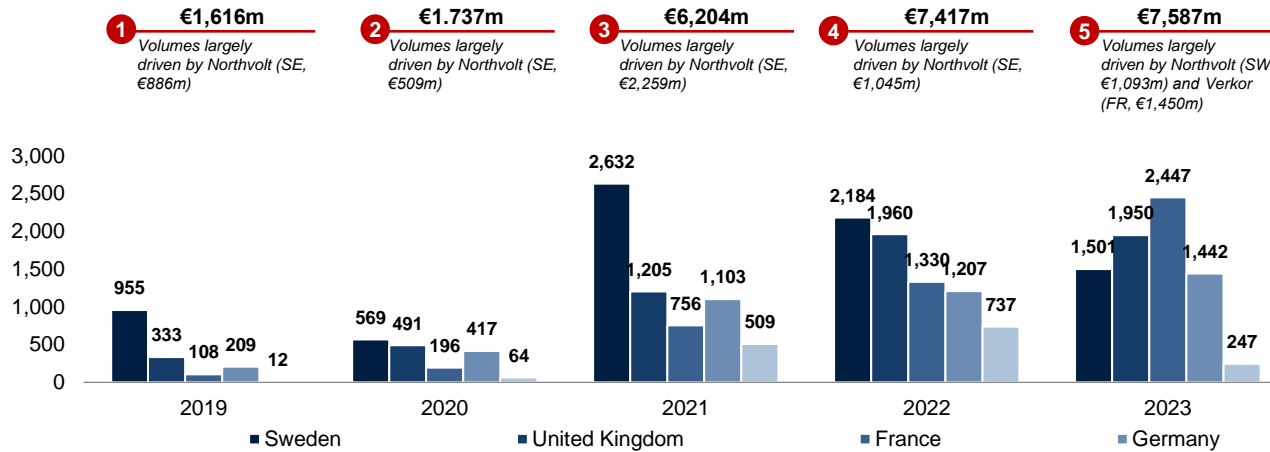
Top 5 Targeted European CleanTech Countries ('19 – '23) – Part II

by Deal Volume per year

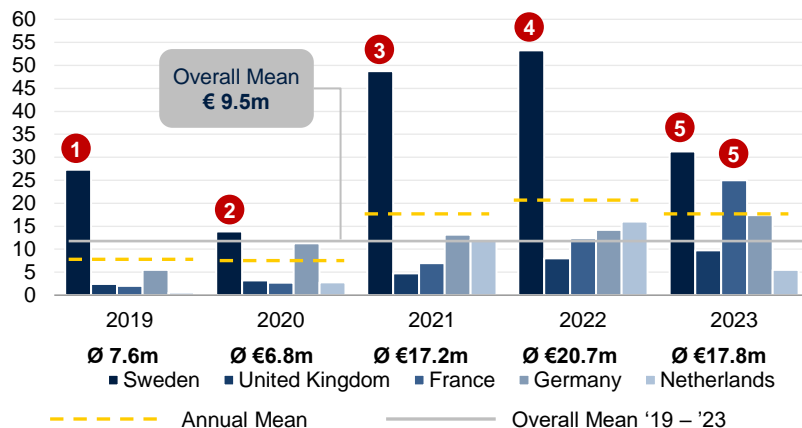
Sweden takes the lead in deal volumes, mainly driven by the megadeals of Northvolt

The significant increase in Mean Deal Size in France in 2023 is mainly driven by Verkor's closing of a €1.5bn funding round

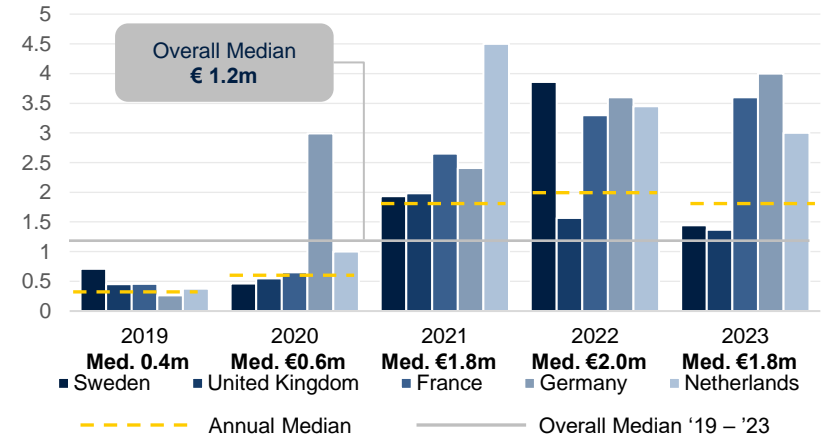
Deal Volume (in €m, excl. deals with undisclosed deal volumes)



Mean Deal Size (in €m, excl. deals with undisclosed deal volumes)



Median Deal Size (in €m, excl. deals with undisclosed deal volume)



European CleanTech Subsector Analysis ('19 – '23)

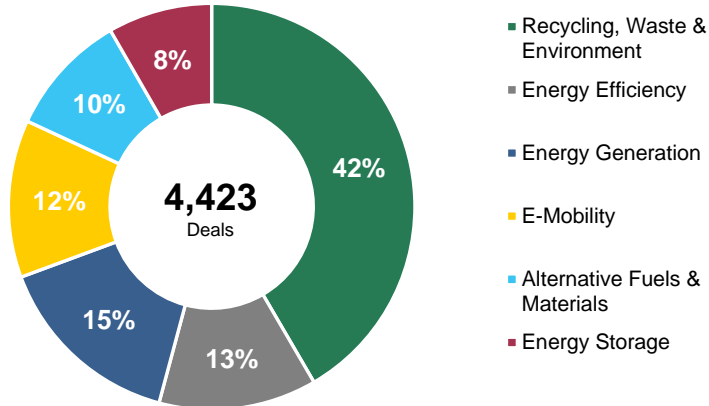
by Deal Count & Volume

Recycling, Waste & Environment is the largest subsectors by deal count, representing 42% of the overall deal count

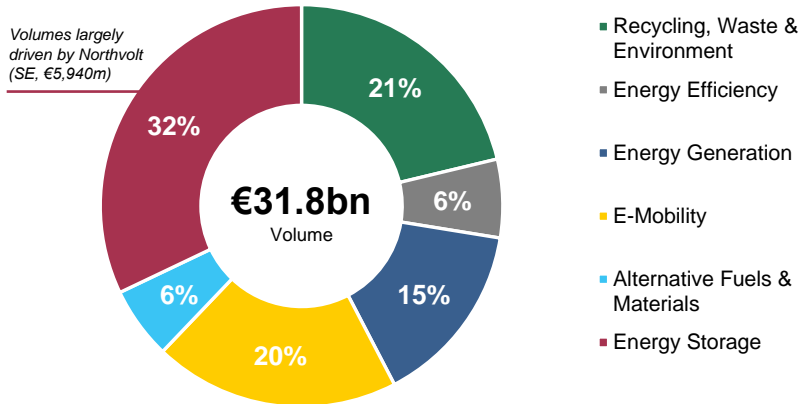
With €10.2bn deal volume, Energy Storage is the largest subsector, accounting for 32% of the total volume

Adjusting for megadeals of Northvolt (in total €5.9bn), Energy Storage would be the 4th largest subsector (€4.3bn) and Recycling, Waste & Environment would rank as largest subsector with €6.8bn

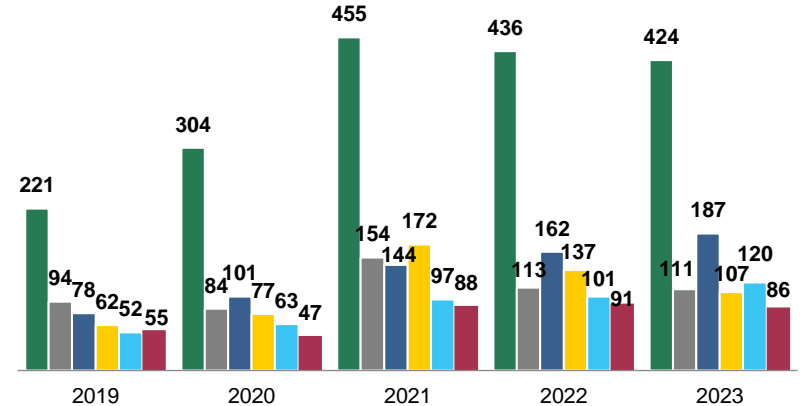
Deal Count (incl. undisclosed deals)



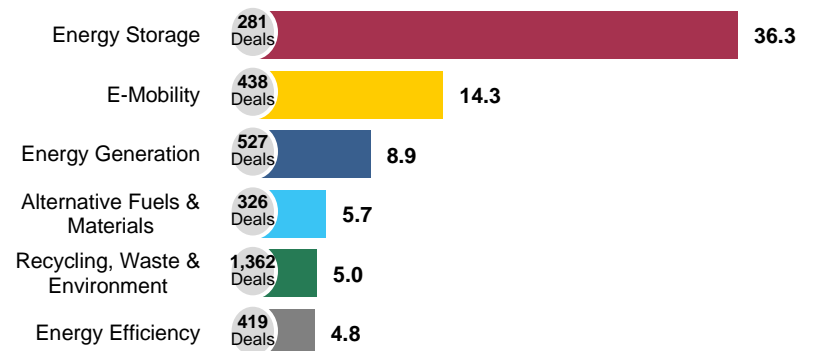
Deal Volume (excl. undisclosed deals)



Deal Count over Time (incl. undisclosed deals)



Average Deal Volume (in €m; excl. undisclosed deals)



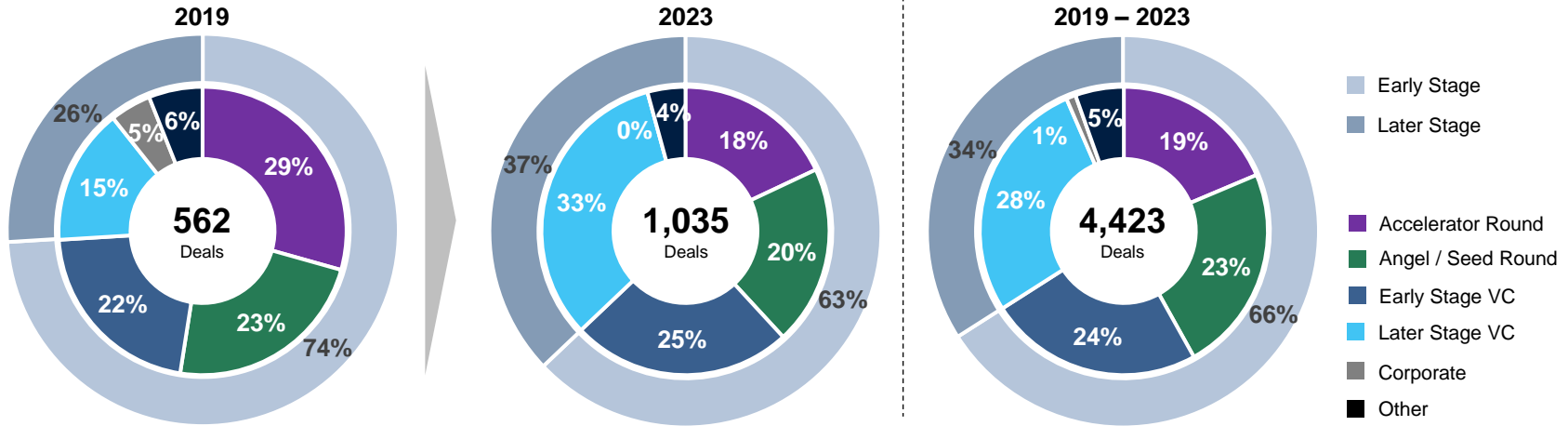
European CleanTech Stage Analysis ('19 – '23)

by Deal Count

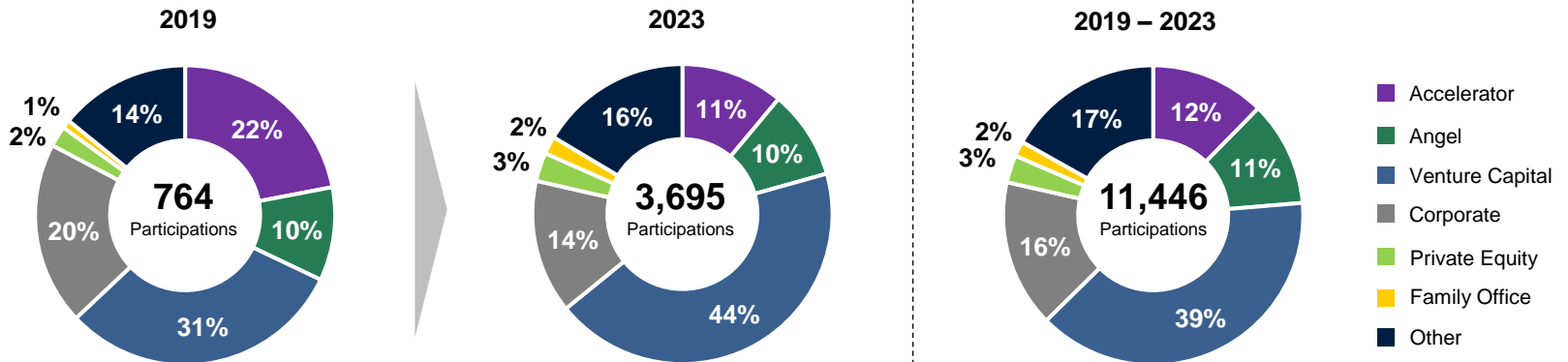
The CleanTech industry has matured in the last 5 years. The share of Later Stage VC deals increased by more than 40pp from 26% in 2019 to 37% in 2023

The shift to later stage deal types is also reflected by the investor type. Participation of Accelerators has decreased from 22% in 2019 to 11% in 2023, whereas proportion of VC investors across all transactions increased from 31% in 2019 to 44% in 2023

Deal Type by Deal Count



Investor Type by Participations

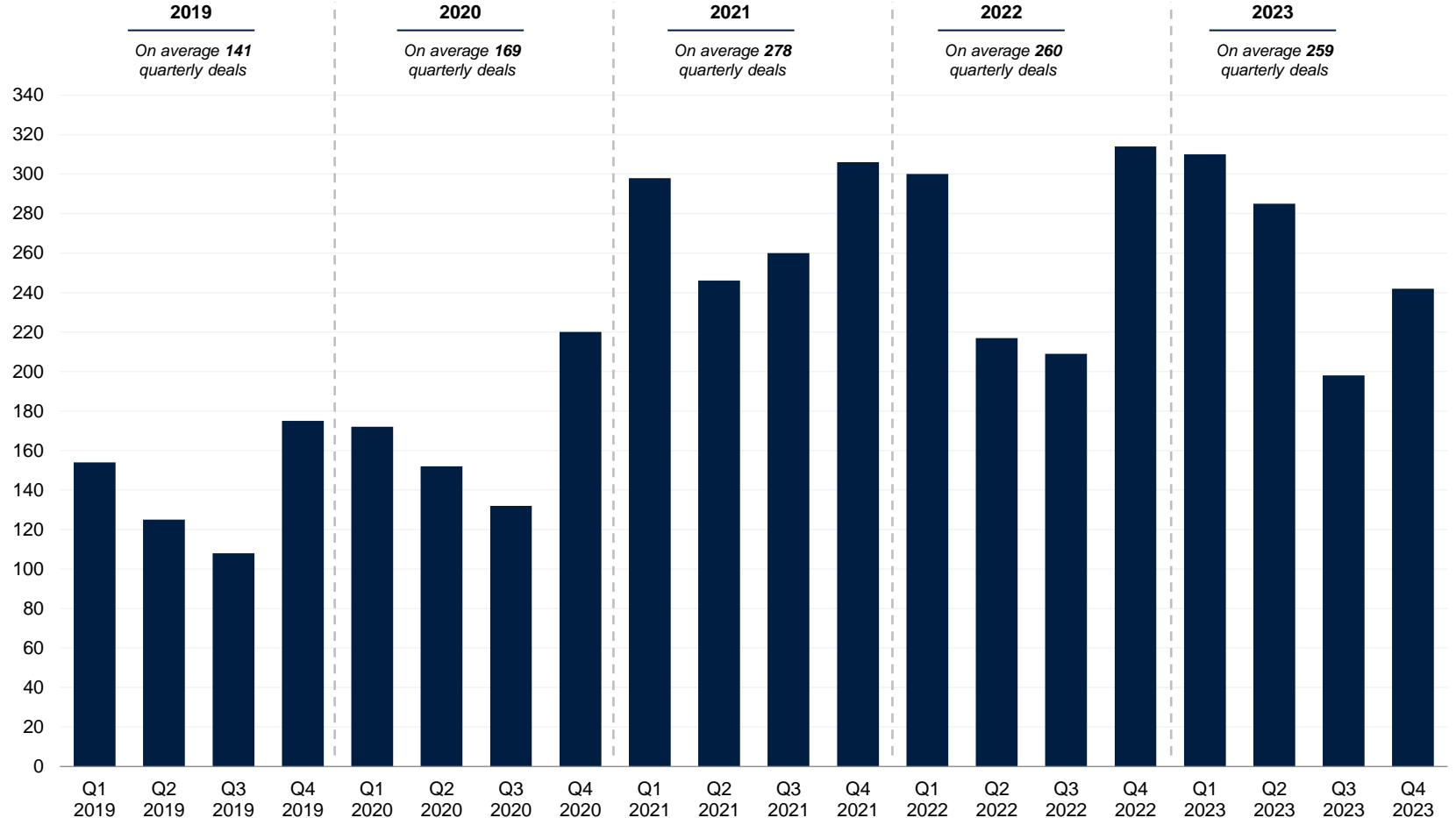


Quarterly CleanTech Venture Capital Deal Count ('19 – '23)

Between 2021 and 2023, the deal count has been significantly higher than in previous years.

The first and last quarters were always the strongest periods in terms of deal activities between 2019 and 2023

Deal Count (incl. deals with undisclosed deal volumes)

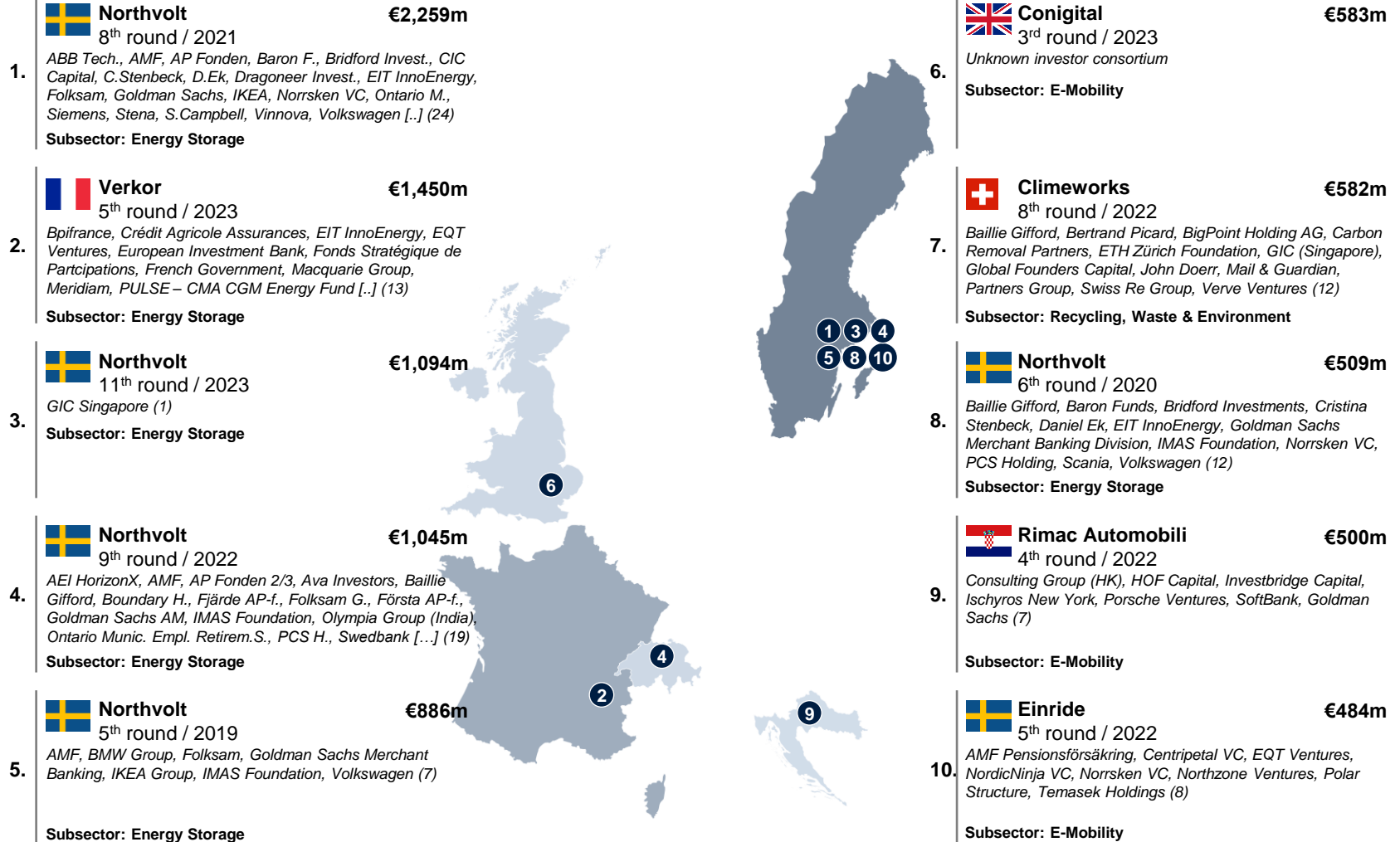


Top 10 European CleanTech Deals ('19 – '23)

by Deal Volume

6 Deals / 2 companies from Sweden (Northvolt & Einride) in the Energy Storage & E-Mobility sector dominate the Top 10

Besides those Swedish deals in E-Mobility and Energy Storage, 2 other deals in that subsector (Conigital & Rimac Automobili) made it to the Top 10, underlining the interest in this subsector

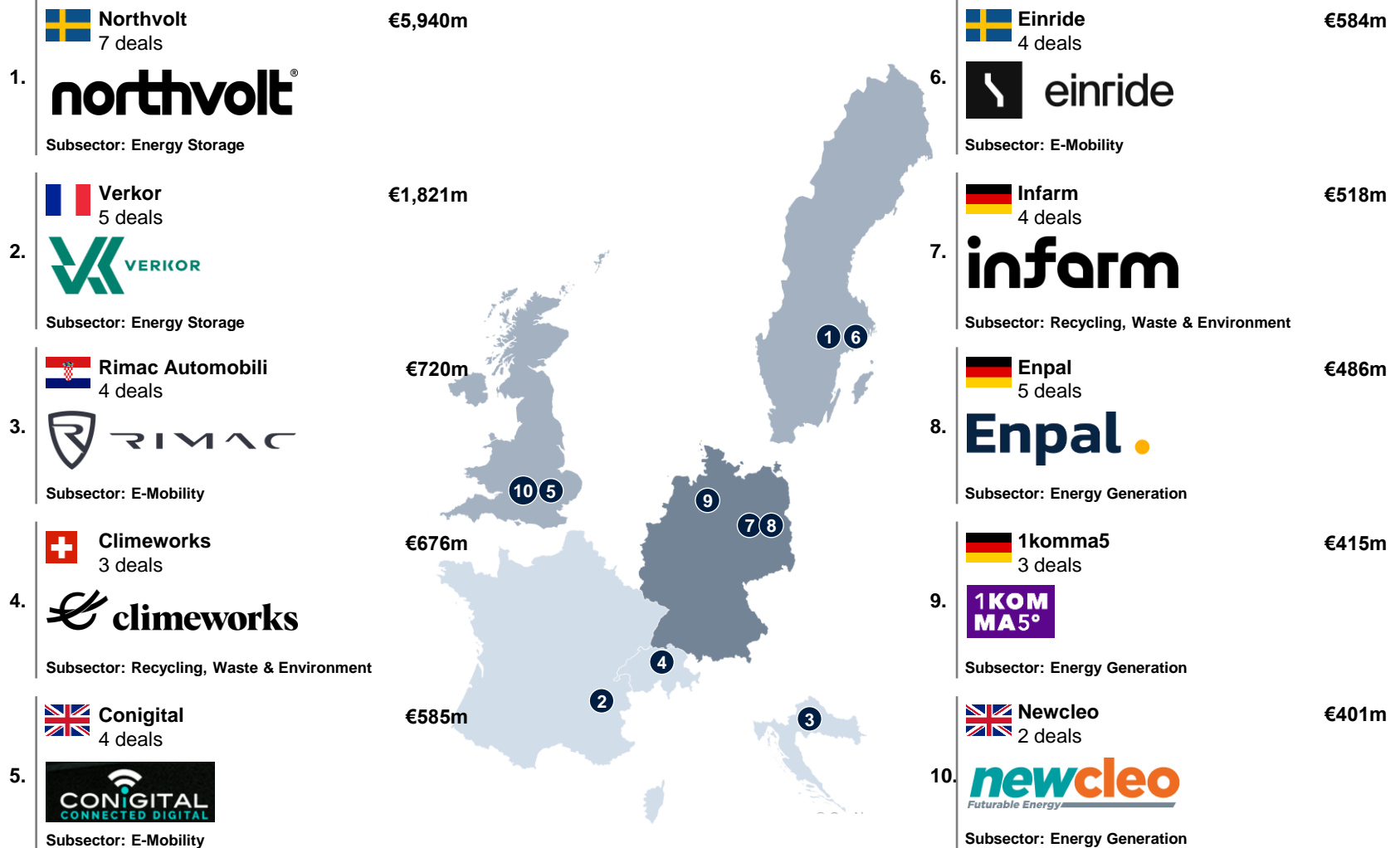


Top 10 European CleanTech Companies ('19 – '23)

by Cumulated Deal Volume

Northvolt dominates the Top 10 with a total raised financing volume of € 5.9bn in 7 transaction over the past 5 years

60% of the companies in the Top 10 are engaged in the segment of E-Mobility and/or battery production, which emphasizes the maturity of & focus on that sector



Annual Top 10 European CleanTech Deals ('19 – '21)

by Deal Volume

2019 (Top 10 account for 70% of annual deal volume)

1.		Northvolt AMF, BMW Group, Folksam, Goldman Sachs Merchant Banking Division, IKEA Group, IMAS Foundation, Volkswagen (7)	€886m / 5 th round
2.		Energy Vault SoftBank Investment Advisers (1)	€94m / 3 rd round
3.		Infarm Archimedes Studio, Astanor Ventures, Atomico, Balderton Capital, Cherry Ventures, DreamVision (Japan), TriplePoint Capital (7)	€88m / 3 rd round
4.		Oxford PV Equinor, Legal & General Capital, Meyer Burger Technology, Oxford Investment Consultants, Xinjiang Goldwind Science & Technology (5)	€83m / 7 th round
5.		Rimac Automobili Hyundai Motor, Kia Motors (2)	€80m / Corporate
6.		Zenobe Energy Jera Co., TEPCO Power Grid (2)	€29m / Corporate
7.		Faraday Grid Adam Neumann (1)	€28m / 2 nd round
8.		Sunfire Idinvest Partners, Inven Capital, Paul Wurth, Sunfire Entrepreneurs Club, Total Energy Ventures (5)	€25m / 4 th round
9.		Azuri Technologies IP Group, Marubeni (2)	€23m / 6 th round
10.		Afyren AFY Partners, Cr�dit Agricole Centre France D�veloppement, Cr�dit Agricole Cr�ation, Sofimac Investment Managers, Sofinnova Partners, Supernova Capital, Valquest Partners (7)	€21m / 5 th round

2020 (Top 10 account for 55% of annual deal volume)

		Northvolt Baillie Gifford, Baron Funds, Bridford Investments, Cristina Stenbeck, Daniel Ek, EIT InnoEnergy, Goldman Sachs Merchant Banking Division, IMAS Foundation, Norrsken VC, PCS Holding, Scania, Volkswagen (12)	€509m / 6 th round
		Infarm Astanor V., Atomico, Balderton Cap., Bonnier V., Cherry V., East Japan Railway, Fr. Haniel&Cie, Good Harvest, Hanaco Vent. Cap., Latitude V., Lightrock, Mons Investm., Phoenix Court, Haniel Gr., TriplePoint C. (15)	€170m / 4 th round
		Amarenco IDIA Capital Investissement, Tikehau Capital (2)	€162m / 5 th round
		Arrival Blackrock Innovation Capital Group, UPS Ventures, Winter Capital (3)	€100m / 3 rd round
		Arrival Hyundai Motor, Kia Motors (2)	€100m / Corporate
		Climeworks undisclosed	€93m / 6 th round
		Afyren 777 CORP (1)	€55m / 6 th round
		Sono Motors ELFH Holding, Wi Ventures (2)	€53m / 5 th round
		Sono Motors Bollinger Group, DNCA Investments, e.ventures, ELFH Holding, Felunic Verm�gensverwaltung, Seedrs, Swedbank Robur, Wi Ventures (8)	€45m / 6 th round
		Highview Power Sumitomo Heavy Industries (1)	€42m / Corporate






2021 (Top 10 account for 45% of annual deal volume)

		Northvolt ABB Tech. V., AMF, AP Fonden, Baron Funds, Bridford Invest., CIC Capital C., C. Stenbeck, D. Ek, Dragoner Invest., EIT InnoEnergy, Energimyndigheten, Fj�rde AP-fonden, Folksam, [...] (24)	€2,259m / 8 th round
		Infarm Atomico, Bonnier Ventures, Hanaco Venture Capital, Lightrock, Partners in Equity, Qatar Investment Authority (6)	€177m / 6 th round
		Enpal SoftBank Investment Advisers, TA Ventures (7)	€150m / 4 th round
		Rimac Automobili Porsche Ventures (1)	€140m / 3 rd round
		VanMoof Balderton Capital, Felix Capital, Gillian Tans, Hillhouse Capital Group, Norwest Venture Partners, TriplePoint Venture Growth BDC (6)	€109m / 6 th round
		Newcleo Club degli investitori, Elysia Capital, EXOR Seeds, Heritage Group, LIFTT (5)	€101m / 1 st round
		Enpal Christopher Muhr, E.R. Capital, FRIBA Investment, Heliad Equity Partners, HV Capital, Peter Rive, Thomas Griesel (7)	€100m / 3 rd round
		Hype Eiffel Investment Group, Holding Hr, Hydrogen Refueling, McPhy Energy, Mirova, RAISE, Rgreen Invest (7)	€100m / 5 th round
		Verkor Eiffel Arkema, Capgemini, Demeter, EIT InnoEnergy, EQT V., Fonds R�g. d'Investissem. Auv. Rh�ne-Alpes, French Gov., Fund f. Ecologic Moderniz. of Trans., Renault, IDEC G., Schneider Electric, Tokai (12)	€100m / 2 nd round
		Skeleton Technologies EIT InnoEnergy, Federal Ministry for Economic Affairs and Energy, FirstFloor Capital, Harju Elektor, Marubeni, MM Grupp, Saxony State Government, Startup Wise Guys (8)	€99m / 6 th round











Annual Top 10 European CleanTech Deals ('22 – '23)

by Deal Volume

2022 (Top 10 account for 42% of annual deal volume)

1.	 Northvolt AEI HorizonX, AMF, AP Fonden 2/3, Ava Investors, Baillie Gifford, Boundary H., Fjärde AP-f., Folksam G., Första AP-f., Goldman Sachs AM, IMAS Foundation, Olympia Group (India), [...] (19)	€1,045m / 9 th round
2.	 Climeworks Baillie Gifford, Bertrand Picard, BigPoint Holding AG, Carbon Removal Partners, ETH Zürich Foundation, GIC (Singapore), Global Founders Capital, John Doerr, Mail & Guardian, [...] (12)	€582m / 8 th round
3.	 Rimac Automobili Consulting Group (HK), HOF Capital, Investbridge Capital, Ischyros New York, Porsche Ventures, SoftBank, Goldman Sachs (7)	€500m / 4 th round
4.	 Einride AMF Pensionsförsäkring, Centripetal VC, EQT Ventures, NordicNinja VC, Norrsken VC, Northzone Ventures, Polar Structure, Temasek Holdings (8)	€484m / 5 th round
5.	 Perpetual Next Momentum Capital (1)	€320m / 2 nd round
6.	 Newcleo Indaco Venture Partners, Liftt, Nova Capital (VC), Progress Tech Transfer, RoundCapital (5)	€300m / 2 nd round
7.	 Volta Trucks Agility (Kuwait), B-FLEXION, BioInflEXion Point Partners, BlackRock, Byggmastare Anders, Luxor Capital Group, Proterra (7)	€290m / 4 th round
8.	 Verkor Agence des participations de l'État, Bpifrance, Bpifrance Assurance Export, Demeter Partners, EIB, IDEC Group, Plastic Omnium, Santander CIB, Schneider Electric, Sibanye Gold, Siemens, Societe Generale (12)	€250m / 4 th round
9.	 Zeplug Intermediate Capital Group (1)	€240m / 3 rd round
10.	 Sunfire Blue Earth Capital, Carbon Direct Capital Management, Copenhagen Infrastructure Partners, HydrogenOne Capital Growth, Lightrock, Planet First Partners, Vidia Ventures (7)	€210m / 6 th round

2023 (Top 10 account for 45% of annual deal volume)

 Verkor Bpifrance, Crédit Agricole Assurances, EIT InnoEnergy, EQT Ventures, European Investment Bank, Fond Stratégique de Participations, French Government, Macquarie Group, Meridiam, [...] (13)	€1,450m / 5 th round
 Northvolt GIC Singapore (1)	€1,094m / 11 th round
 Conigital Undisclosed	€583m / 3 rd round
 HUMARA Undisclosed	€281m / 2 nd round
 Enpal Activate Capital Partners, Blue Impact Ventures, Climb Ventures, HV Capital, Princeville Capital, SoftBank Investment Advisers, The Westly Group, TPG (8)	€215m / 4 th round
 1komma5 2150, eCAPITAL entrepreneurial Partners, Eurazeo, Franz Haniel & Cie, G2 Venture Partners, Porsche Ventures (5)	€215m / 3 rd round
 Cornish Lithium Ace Ventures, TechMet, The Energy & Minerals Group, UK Infrastructure Bank (4)	€196m / 6 th round
 QEV Technologies Euronext, Invenergy Asset Management (2)	€175m / 4 th round
 Alter Enersun Banco Santander, BBVA Peru, CaixaBank (3)	€160m / 3 rd round
 JOLT Energy Infrared Capital Partners (1)	€150m / 1 st round

Top 10 German CleanTech Deals ('19 – '23)

by Deal Volume*


Enpal's 4th financing round (€215m) in 2023 leads the Top 10 ranking of German CleanTech deals since 2019

Enpal, 1komma5 & Infarm have each successfully closed two large funding rounds in the Top 10. Thereby, Enpal, 1komma5 & Infarm dominate the German CleanTech ranking by deal volume with €465m, €415m & €247m, respectively


The subsector Energy Generation contributes the largest share to the Top 10, with 5 deals and €1.1bn volume (64%)

- 
Enpal €215m
 Berlin / 4th round / 2023
 Activate Capital, Blue Impact Ventures, Climb Ventures, HV Capital, Princeville Capital, SoftBank Investment Advisers, The Westly Group, TPG (8)


Subsector: Energy Generation

- 
1komma5 €215m
 Hamburg / 3rd round / 2023
 2150, eCAPITAL entrepreneurial Partners, Eurazeo, Franz Haniel & Cie, G2 Venture Partners, Porsche Ventures (6)

Subsector: Energy Generation

- 
Sunfire €210m
 Dresden / 6th round / 2022
 Blue Earth Capital, Carbon Direct Capital Management, Copenhagen Infrastructure Partners, HydrogenOne Capital Growth, Lightrock, Planet First Partners, Vidia Ventures (7)

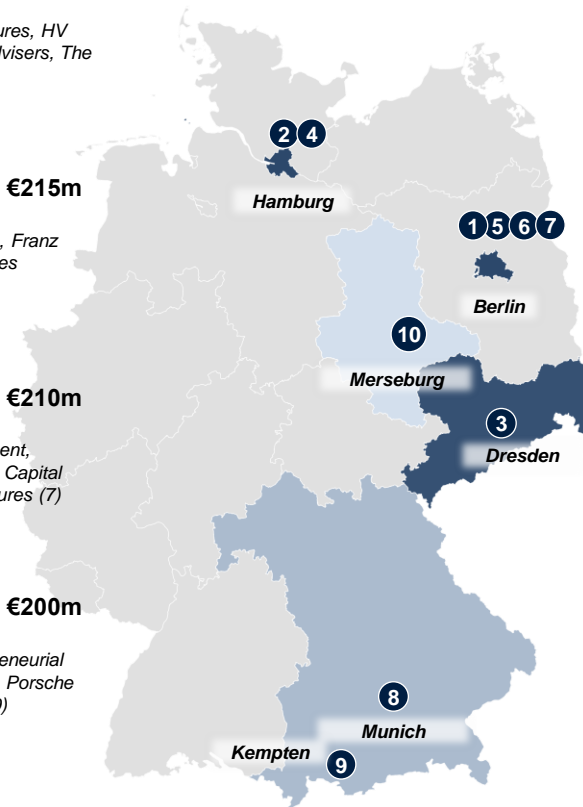
Subsector: Energy Generation


- 
1komma5 €200m
 Hamburg / 2nd round / 2022
 btov Partners, CoastCap Group, eCAPITAL entrepreneurial Partners, Eurazeo, Franz Haniel & Cie, Jan Klatten, Porsche Ventures, Susanne Klatten, The Schürfeld Group (9)

Subsector: Energy Generation


- 
Infarm €177m
 Berlin / 6th round / 2021
 Atomico, Bonnier Ventures, Hanaco Venture Capital, Lightrock, Partners in Equity, Qatar Investment Authority (6)

Subsector: Recycling, Waste & Environment




- 
Infarm €170m
 Berlin / 4th round / 2020


Astanor Ventures, Atomico, Balderton Capital, Bonnier Vent., Cherry Vent., East Japan Railway, Franz Haniel & Cie, Good Harvest, Hanaco Venture Cap., Latitude Vent., Lightrock, Mons Investm., Phoenix Court, Haniel Group, TriplePoint Capital (15)
 Subsector: Recycling, Waste & Environment

- 
Enpal €150m
 Berlin / 4th round / 2021
 SoftBank Investment Advisers, TA Ventures (2)


Subsector: Energy Generation

- 
JOLT Energy €150m
 Munich / 1st round / 2023
 Infrared Capital Partners (1)

Subsector: E-Mobility

- 
Numbat €140m
 Kempten / 2nd round / 2023
 DAL Deutsche Anlagen-Leasing (1)

Subsector: Energy Storage

- 
APK €129m
 Merseburg / 4th round / 2023
 KIRKBI, LyonellBasell Industries Holdings (2)

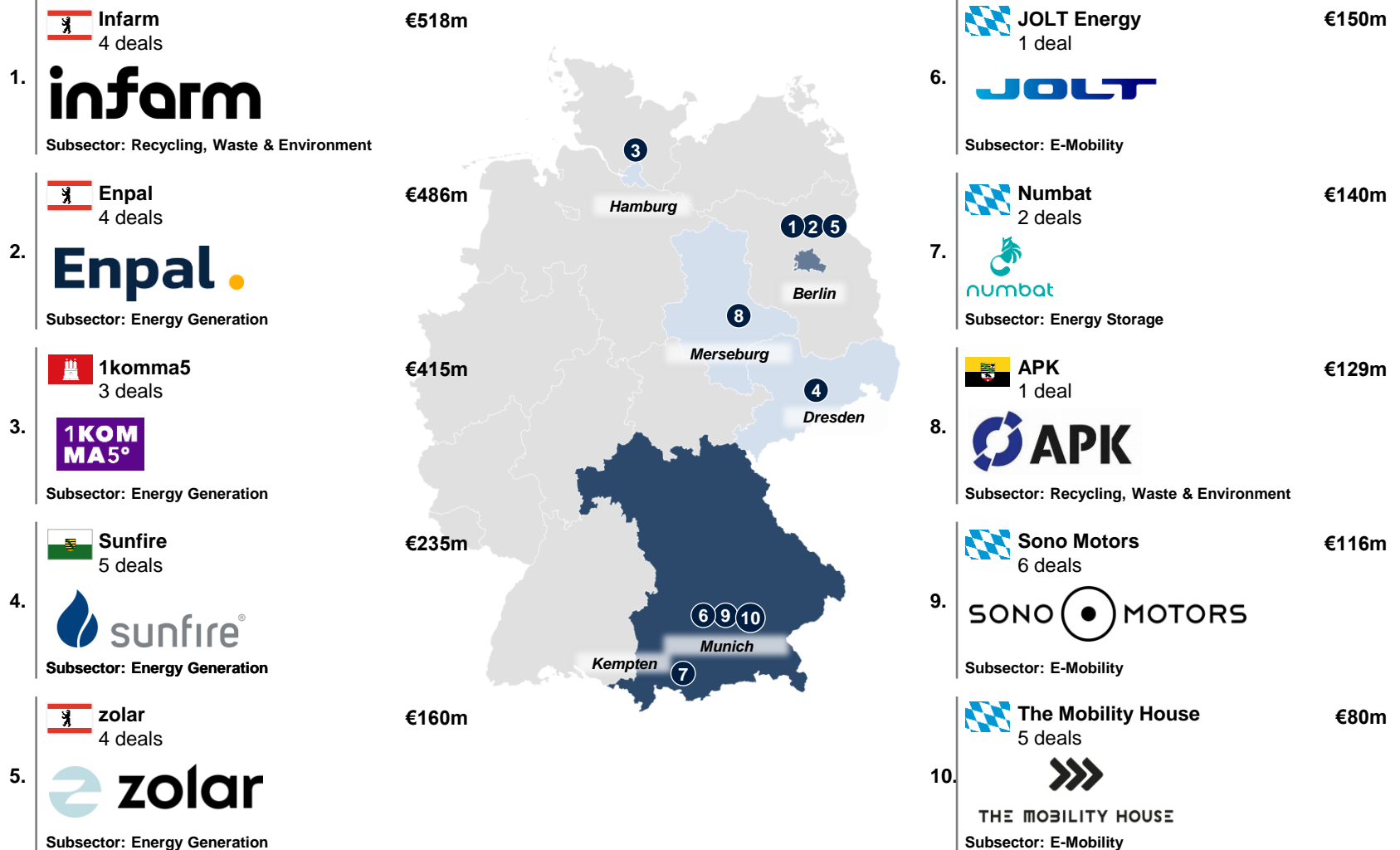
Subsector: Recycling, Waste & Environment

Top 10 German CleanTech Companies ('19 – '23)

by Cumulated Deal Volume*

Infarm leads the ranking of German companies with a cumulated deal volume of €518m over the past 5 years

The subsector Energy Generation contributes the highest share to the Top 10 with 4 deals and €960m deal volume




Source: PitchBook as of 12.03.2024, FCF Equity Research
 Note: Deal count includes deals with undisclosed deal volumes
 *Only equity raisings considered


Most Active Investors in European CleanTech Companies ('19 – '23) by Deal Count


The European Institute of Innovation & Technology (EIT) leads the ranking with 258 VC rounds via its various sub-entities (Climate, Food, Digital, etc.) and related EU-vehicles (e.g., Horizon 2020)


The European CleanTech Venture Capital market is dominated by European investors, with only two of the Top 10 investors with headquarters in US


The deal count is dominated by early stage, accelerator-like investors

- 

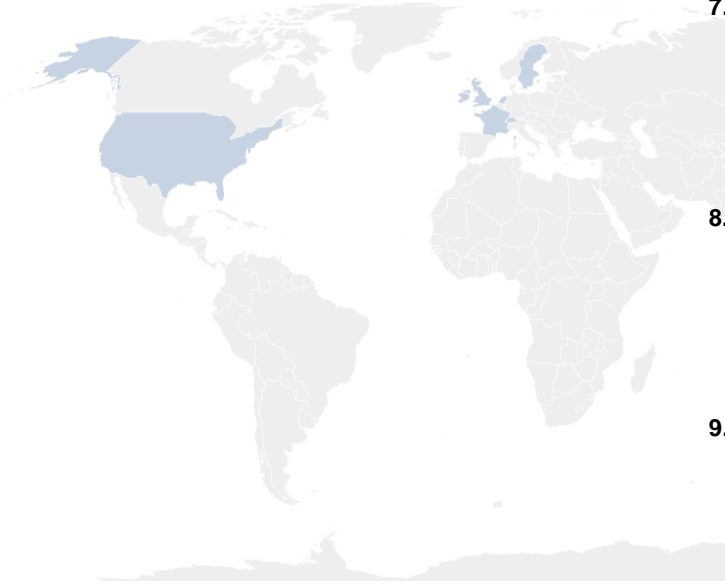
Deal Count: 258
 1. Deals: Northvolt (2), Verkor (4), Skeleton Technologies (3), NexWafe, Elestor (2), Twice, DePoly, Altris (3), Basquevolt, HPS, NAWA Technologies, Brill Power (2) [...]
- 


Deal Count: 69
 2. Deals: Einride (2), Sylvera (3), Circular (2), Epoch Biodesign, Minimum (2), Climatetrade, FuelSave, Greyparrot, Mellizyme, Earthly, Minimum (2), Ducktrain, Reefilla (3) [...]
- 


Deal Count: 67
 3. Deals: Acel Energy, Active Difference, Ambisense (3), Duugoong, Carbon Collect, Chargicity, ev.energy (3), Positive Carbon (3), Xerotech (4) [...]
- 


Deal Count: 54
 4. Deals: Verkor (2), EasyMile, NAWA Technologies (2), Qairos Energies, Moulinot, Elicit Plant, Phenix, CarbonWorks, K-Ryole, Adionics, CarbonFarm, Fractal Energy [...]
- 


Deal Count: 50
 5. Deals: Kumulus Water (2), FoodSteps, BIB, BoxxDocks, Enco, Eneryield (2), FuelSave, Hive Power (2), Terrawaste, Chargd, Einride, HelioRec, Sirius (2), Savvy, LOWR [...]




- 

Deal Count: 47
 6. Deals: LIBREC, SmartHelio (2), Composite Recycling, Antefil (2), Biosimo, Enerdrape, Inergio, CompPair, Pallon, WattAnyWhere, Bloom Biorenewables, Gaia Tech [...]
- 

Deal Count: 36
 7. Deals: GreenIron, Epishine, Re:Newcell, Peafowl Plasmonics (3), Hoting Innovations, Elonroad, Spowdi, Bintel (3), EnJay, Nitrocapt (2), Relieved Technologies, Klimato [...]
- 

Deal Count: 35
 8. Deals: AIRMO (2), Carbon Centrum, BetterChoice, Ecolynx, Insutex, Infrared City, NeoCarbon (3), Ocean Oasis (2), Quantitas, Sustainly, Xwatts, Klimato, co [...]
- 

Deal Count: 35
 9. Deals: Aeon Energy, Windscope, Plastic-I, Plant Sea, Naeo, Myriad Wind Energy Systems, Halocycle (2), Spintex (2), Future Greens, Ecoroots, Cleaner Seas Group [...]
- 

Deal Count: 32
 10. Deals: Circardian (2), Planboo, IM Efficiency (3), Klimato.co, Contribute, Hello, Organifarms, Gridhound, Circular IQ Bright Energy, Holy Technologies, Lyfa [...]

A white wind turbine is positioned in the upper right quadrant of the image. It is set against a dark, textured background that resembles a night sky or a dark wall. A long, dark shadow of the turbine extends diagonally from the bottom right towards the center of the image. The overall composition is minimalist and modern.

EXECUTIVE SUMMARY

FCF OVERVIEW

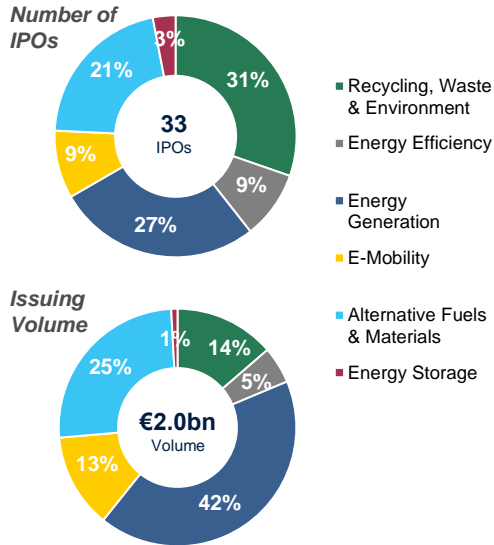
CLEANTECH VENTURE CAPITAL
MARKET

CLEANTECH IPO & SPAC EXITS

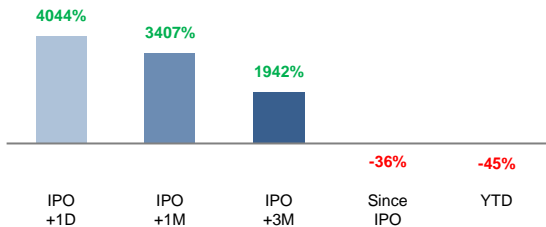
CLEANTECH M&A EXITS

European CleanTech VC-Backed IPO Market Overview ('19 – '23)

IPOs by Subsector



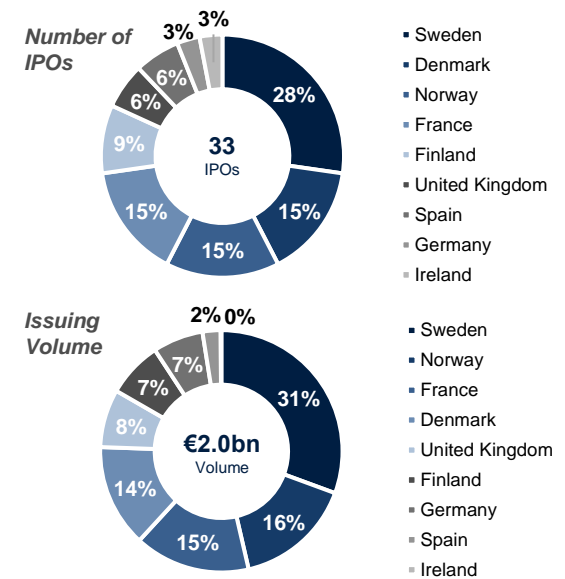
Mean IPO Performance



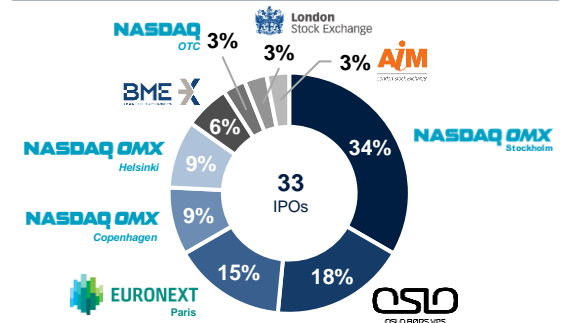
Top 10 CleanTech IPOs by Volume

IPO Date	Company	Exchange	HQ	Volume (€m)	IPO MCap (€m)	Since IPO %
23/06/2021	OX2 AB	NASDAQ OMX Stockholm	Sweden	394	1,503.8	-8.8%
10/02/2021	Skandia GreenPower AS	OSLO	Norway	150	265.0	-99.6%
17/06/2021	Green Hydrogen Systems A/S	NASDAQ OMX Copenhagen	Denmark	148	433.4	-84.9%
17/11/2021	Sono Group N.V.	Nasdaq	Germany	133	936.6	-99.6%
09/11/2021	Pod Point Group Holdings Plc	London Stock Exchange	United Kingdom	117	403.3	-90.5%
26/10/2021	Waga Energy Société anonyme	EURONEXT Paris	France	110	465.0	8.1%
20/05/2022	Lhyfe SA	EURONEXT Paris	France	110	419.1	-42.2%
23/06/2021	Spinnova Oyj	NASDAQ OMX Helsinki	Finland	100	390.0	-68.5%
19/10/2020	Volue ASA	OSLO	Norway	91	410.6	-35.1%
26/11/2020	Re:NewCell AB	NASDAQ OMX Stockholm	Sweden	79	230.6	n/a*

IPOs by Country (HQ)

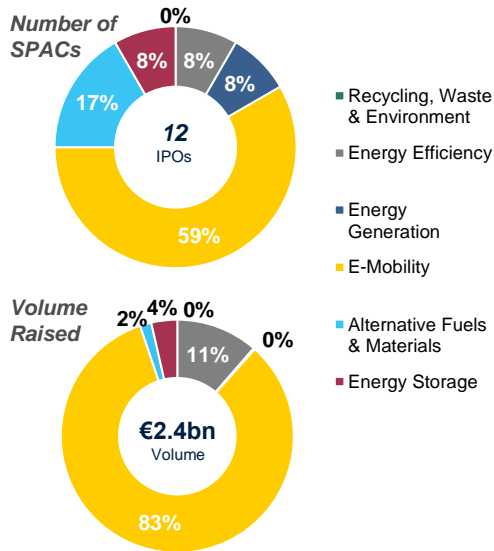


IPOs by Stock Exchange

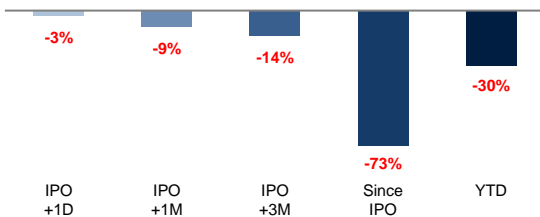


European CleanTech VC-Backed SPAC Market Overview ('19 – '23)

SPACs by Subsector



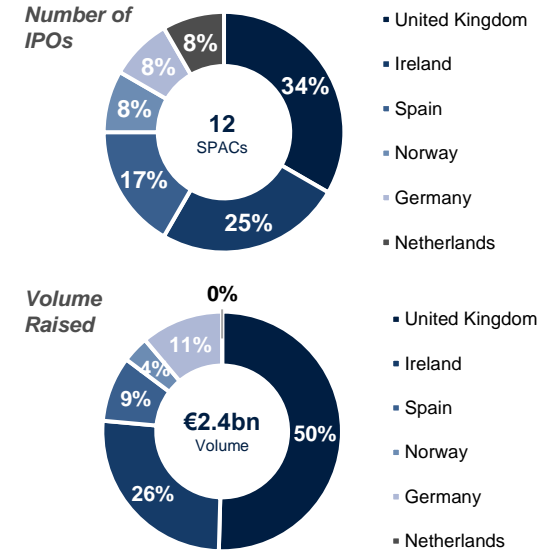
Mean SPAC Performance



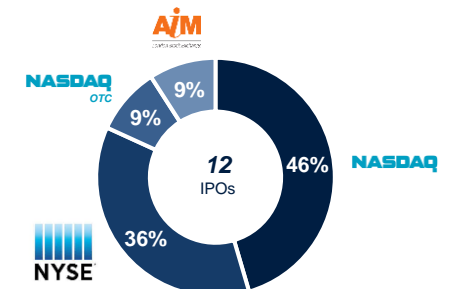
Top 10 CleanTech SPACs by Volume

SPAC Date	Company	Exchange	HQ	Volume (€m)	SPAC MCap (€m)	Since SPAC %
28/04/2023	Zapp Electric Vehicles Group Limited	NASDAQ	United Kingdom	649	297.7	-97.2%
16/12/2021	Vertical Aerospace Ltd.	NYSE	United Kingdom	349	2,200.0	-93.5%
02/01/2022	ADS-TEC Energy PLC	NASDAQ	Ireland	315	484.0	-21.5%
19/10/2021	Navitas Semiconductor Corporation	NASDAQ	Ireland	275	283.7	-18.6%
20/10/2023	Next.e.GO N.V.	NASDAQ	Germany	270	227.1	-82.7%
24/03/2021	Arrival	NASDAQ OTC	United Kingdom	217	11,065.3	-99.9%
07/10/2021	Wallbox N.V.	NYSE	Spain	213	1,390.5	-81.7%
08/07/2021	FREYR Battery, Inc.	NYSE	Norway	87	286.7	-78.8%
10/12/2020	Fusion Fuel Green PLC	NASDAQ	Ireland	38	57.2	-87.6%
20/12/2023	EnergyPathways plc	AJM	United Kingdom	5	2.3	-53.5%

SPACs by Country (HQ)



SPACs by Stock Exchange



A white wind turbine is positioned in the upper right quadrant of the image. It is set against a dark, textured background that resembles a night sky or a dark wall. A long, dark shadow of the turbine extends diagonally from the bottom right towards the center of the image. The overall composition is minimalist and modern.

EXECUTIVE SUMMARY

FCF OVERVIEW

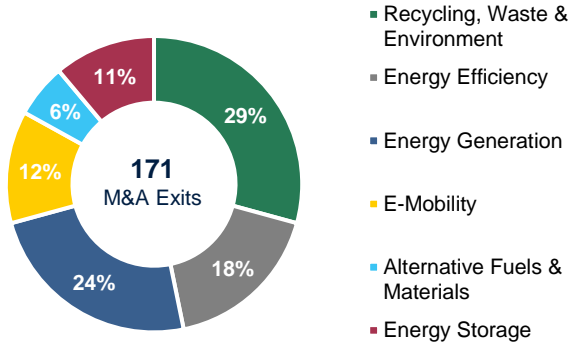
CLEANTECH VENTURE CAPITAL
MARKET

CLEANTECH IPO EXITS

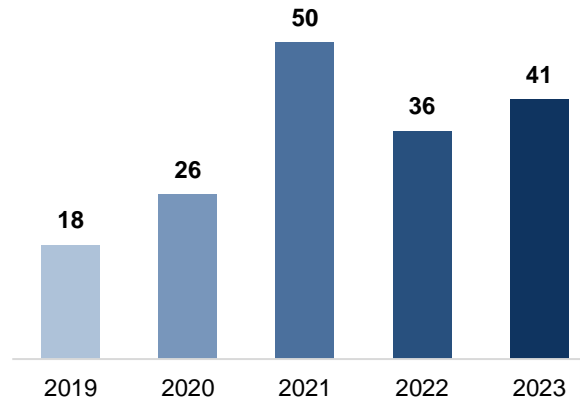
CLEANTECH M&A EXITS

Overview of CleanTech VC-Backed M&A Exits ('19 – '23)

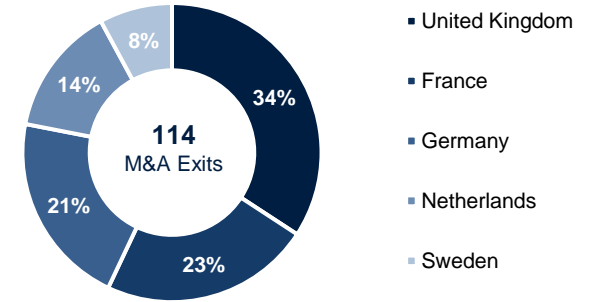
Number of M&A Exits by Subsector



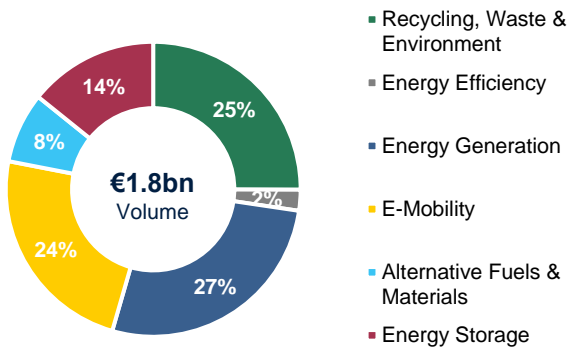
Number of M&A Exits over Time



Top 5 Target Countries (# of M&A Exits)



Disclosed Volume of M&A Exits by Subsector

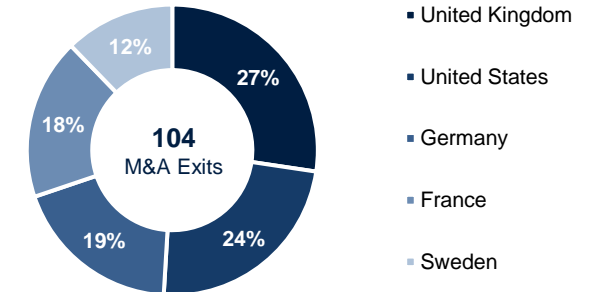


Top 3 Acquirers by Volume (in €m)

#	Investor	HQ	Volume (€m)	# Deals
1			359	2
2			325	2
3			150	3

Total Top 3 Acquirers: 834 Volume, 7 Deals

Top 5 Acquirer Countries (# of M&A Exits)

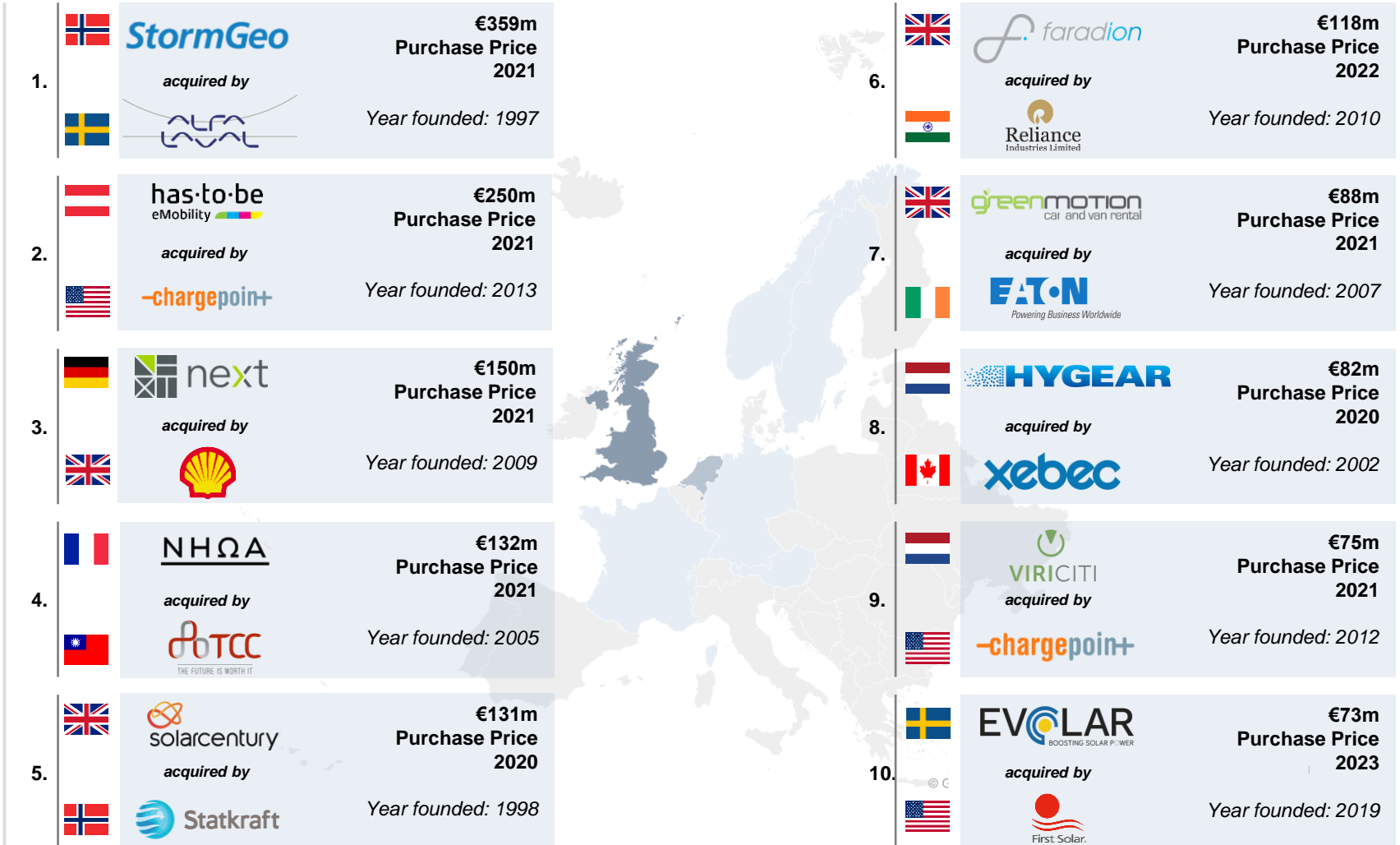


Top 10 Venture-Backed CleanTech M&A Exits ('19 – '23)

by Purchase Price

Alfa Laval's acquisition of StormGeo leads the league table of Top 10 CleanTech M&A Exits over the last five years with a transaction volume of €359m, followed by the acquisition of has.to.be by CharePoint

Only 40% of acquirers in the Top 10 are Europe-based, while the remainders is headquartered in North America (4 deals) or Asia (2 deals)



CONTACT DETAILS & DISCLAIMER



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