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Q2 2024

Look beneath the surface

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Aramco targets AI investments to aid energy transition

Startups changing what is possible below Earth's surface

Data centre energy startup scene is heating up

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Global Corporate Venturing

Address: PO Box 77202, London, SW17 1HJ

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Global Corporate Venturing

A 2021 recipient of The Queen's Award for Enterprise for international trade

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Aramco targets AI investments to aid energy transition

> Aramco Ventures believes generative AI will be part of helping the Saudi oil major meet its 2050 net zero target.

BY **EDISON FU**
Reporter and Asia liaison

"AI capabilities are a major disruption force that can enhance the energy industry. Part of the challenge is deciphering what is differentiated from the rest"

Mahdi Aladel
Chief executive, Aramco Ventures

"We are looking at AI that can be applied in the sustainability and energy transition domains," says Mahdi Aladel, chief executive of Aramco Ventures, the $7.5bn corporate venture arm of Saudi Aramco. "A lot of it is hardware, but all hardware today has some software, algorithms and AI components to it."

Saudi Aramco has increased investments in energy transition technologies. The company, which is responsible for nearly 10% of the world's oil supplies, has pledged to reach net zero on operational emissions by 2050. Accordingly, Aramco Ventures' focus has shifted from investing in core oil and gas tech to IR4.0 (the fourth industrial revolution), digital, sustainability and AI technologies.

AI will increasingly be part of the mix, transforming areas such as smart grids, renewable energy forecasting, predictive maintenance and carbon capture.

Aramco now has 105 active portfolio companies including Dendra Systems, an AI-equipped data platform to restore biodiversity and measure carbon footprint.

Aladel is cautious about the hype around generative AI, which is inflating funding rounds. Some generative AI companies have billion-dollar valuations from an early stage and require larger ticket sizes from the start. Aladel is keen to cut through the noise and focus just on those that are a good fit for Aramco.

"AI capabilities are a major disruption force that can enhance the energy industry," says Aladel. "Part of the challenge is deciphering what is differentiated from the rest because everyone is now slapping the words AI and generative AI on their solutions, products or startups."

A key consideration is how AI companies can have strategic impact to Aramco's businesses. "That impact could help us do things quicker, safer, cheaper or better," says Aladel. "We should be able to convert that strategic value into dollar figures. We then get that vetted externally through a consulting group to validate the value captured."

Aramco's VC initiatives include the $500m Wa'ed Ventures fund that targets Saudi startups; the $500m Digital/Industrial Fund, investing in areas strategic to the firm; the $1bn Prosperity7 Fund I and the $2bn Prosperity7 Fund II that invests beyond the energy sector with a financial goal; the $1.5bn Sustainability Fund; and the $2bn Late-Stage Fund. ■

Startups changing what is possible below Earth's surface

> From geothermal energy and mining tech to subterranean delivery systems, here are some of the most exciting startups focusing on what is underground.

BY **ROBERT LAVINE**
Features editor

Earth's underground regions remain relatively unexplored, but are becoming increasingly important commercially, with geothermal energy, for example, a potentially bountiful source of renewable power that is still mostly untapped. Mining technology is also becoming more prominent, as rare earth minerals make up a crucial part of more electronic products, and underground space could prove a more efficient way of building out infrastructure.

Technological development is making it increasingly possible to tap into previously unreachable subterranean regions.

Here, we look at some of the startups that have emerged recently in this area, from the creator of the first geothermal energy panel and the developer of a system that uses electricity to break down rocks, to a company that wants to build city-wide underground delivery networks.

SAGE GEOSYSTEMS

- Location: US
- Founded: 2020
- Funding to date: $41m+

Photo: © Sage Geosystems

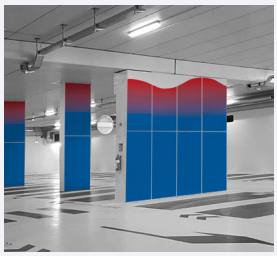
Although several countries, most notably Indonesia, Iceland and Kenya, source a significant amount of their power from geothermal energy, those countries tend to be the ones situated in volcanic regions where heat and water are both close to the earth's surface.

Sage Geosystems believes that represents only 2% of the overall geothermal energy resource. The company has adapted oil and gas exploration technology to create artificial reservoirs underground, using pressurised water to create the steam necessary for energy. The company has also secured a contract to develop an underground energy storage system for renewable power for the Pentagon in the US.

Geothermal project developer Ignis H2 Energy and sister company Geolog International supplied an undisclosed amount of investment for Sage in late 2022, before Chesapeake Energy Corporation led a $17m series A round disclosed in February this year. That was increased to $41m shortly afterwards, according to a regulatory filing.

ENERDRAPE

- Location: Switzerland
- Founded: 2019
- Funding to date: $2.7m



Enerdrape, a spinout from the Swiss Institute of Technology of Lausanne, is working on technology that would expand the sources of geothermal energy. It has created what it claims is the world's first geothermal panel technology, which is being piloted in a project shortly set to be deployed in the town of Aigle.

The system is modular and prefabricated and is designed to be installed in existing subsurface infrastructure such as tunnels or parking garages. In theory, they could capture shallow geothermal energy that is then used to heat or cool the buildings above, without the need for drilling or boring.

Most of Enerdrape's earlier financing came from grants, in addition to a $170,000 convertible note from Venture Kick. Its first full funding round was closed in January this year, as Swiss energy utility Romande Energie joined investment firm Après-demain to provide $1.5m in seed capital for the startup.

Photo: © Enerdrape

EDEN

- Location: US
- Founded: 2017
- Funding to date: $22.7m

Co-founders Ammar Alali (l) and Paris Smalls.

Eden is developing technology it calls Electrical Reservoir Stimulation, which uses electricity to break underground rocks. The company says the technique has the potential to cut water consumption and carbon emissions from drilling, while simultaneously reducing the earthquake risks from fracking. The system could be used to secure geothermal and hydrogen energy, as well as for rock-based carbon storage and mining.

Petroleum drilling contractor Helmerich & Payne and TechEnergy Ventures, the investment arm of oil and gas producer Tecpetrol, co-led Eden's $12m seed round last October with help from mining group Anglo American. The rest of its funding came from grants, most notably from the National Science Foundation. The US Department of Energy also put up $1.4m for a pilot geologic hydrogen project in Oman.

Photo: © Eden

RIGID ROBOTICS

- Location: Canada
- Founded: 2013
- Funding to date: N/A

Rigid Robotics is a pioneer in the use of AI in the mining industry, having developed an industrial internet-of-things system that combines AI with advanced data analytics from sensors in mining equipment. The company's platform can host several mining software applications and is intended to be the bridge between them, meaning it could automate the loading process in mines. But in a more immediate sense, it can track the performance of vehicle operators and maintenance for machinery, as well as analysing conditions for drilling or blast engineers before they go to work on an area.

Rigid has not revealed any funding details thus far, but University of British Columbia's entrepreneurship@UBC venture incubator counts it as a portfolio company.

ROCKMASS TECHNOLOGIES

- Location: Canada
- Founded: 2016
- Funding to date: $2.8m+

RockMass Technologies has developed mining analytics technology based on research at Queen's University in Ontario, Canada. It provides detailed ongoing geological data to help industrial and mining customers optimise digging models and increase efficiency.

The tech allows users to access geological mapping through a handheld lidar device called the RockMass Eon, a system the startup says is up to nine times faster than manual mapping techniques. It has been utilised by geotechnical software producer Rocscience and engineering consulting firm Golder.

SOSV and BDC Capital were joined by Maple Leaf Angels and the Creative Destruction Lab in the company's $2m seed round in 2020. Co-founders, Shelby Yee and Matthew Gubasta, have both been part of *Forbes*' 30 Under 30 for manufacturing and industry list.

Photo: © RockMass Technologies

HYPERTUNNEL

- Location: UK
- Founded: 2018
- Funding to date: N/A

HyperTunnel is looking to bring together a range of technologies from mining, surveying, boring and 3D printing in an innovative tunnelling system it believes could be faster and cheaper than existing methods.

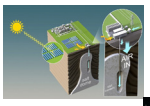
The company combines AI and swarm robotics, which are fed through a grid of pipes to carve chambers in the ground and install access points, while supplying survey data that can be used to form a digital twin of the planned tunnel - essentially building a 3D-printed structure in the ground that forms the basis of the structure.

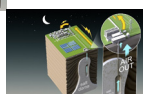
HyperTunnel's strategic partners include Network Rail, which operates the UK's rail infrastructure, and it has received grant funding from the UK government to build an underpass at the Global Centre of Rail Excellence in Wales this year.

Photo: © hyperTunnel Limited

TERRASTOR

- Location: US
- Founded: 2021
- Funding to date: N/A





TerraStor is working on grid-scale energy storage infrastructure that would house energy in underground caverns like the ones created by salt domes, a process where salt or other minerals move into underlying rock.

The advanced compressed air energy storage plants would use a large electric compressor to push highly pressurised air into a storage cavern until it is needed *(see diagram left)*. The caverns are expected to be able to store energy from eight hours to a full day and would offer more than 100MW in output.

The company has yet to announce a full-scale funding round, but it passed through the Startupbootcamp Australia accelerator in 2022. It was incubated by Harvard University's Harvard Innovation Labs.

DELTA.G

- Location: UK
- Founded: 2023
- Funding to date: $2.6m

Spun out of University of Birmingham last year, Delta.g is looking to build what it describes as 'Google Maps for the underground space,' made possible by its portable gravity gradient sensors, which have been designed to accurately detect buried features.

The sensors use quantum technology to detect underground features by their gravitational profile. They are intended to map complex underground locations quickly and accurately without requiring excavation and are unaffected by vibrational noise, hypothetically reducing the disruption caused by road repairs.

The startup emerged with $2m from a pre-seed round led by Science Creates Ventures and backed by Quantum Exponential Group, Newable Ventures, Bristol Private Equity Club and various angel investors, with the UK government's Innovate UK agency adding a $600,000 grant.

PIPEDREAM LABS

- Location: US
- Founded: 2020
- Funding to date: $15m

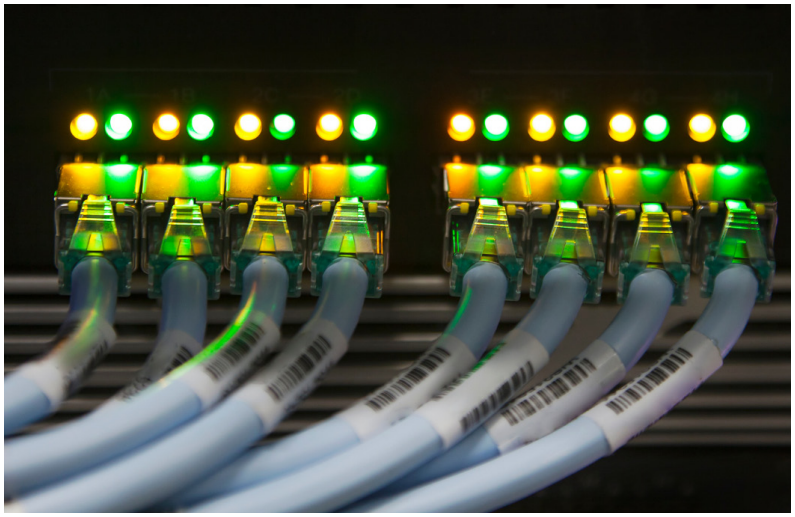
Pipedream Labs is developing an underground network for deliveries, a model it calls hyperlogistics. The network would consist of subterranean tunnels one to two metres under cities, linked by automated pick-up points, where an electrically powered vehicle can send goods back and forth. It could hypothetically be used for food and last-mile ecommerce delivery. A pilot project is currently underway in the suburbs of Atlanta.

Pipedream graduated from Techstars in 2021 and closed $1.6m in seed funding the following year. Starship Ventures then led a $13m series A round in April 2024 that also featured Cortado Ventures and Myelin Ventures. It plans to choose a city for the first iteration of its large-scale delivery network later this year.

Photo: © Pipedream Labs, Inc.

Data centre energy startup scene is heating up

> From radiators that run on compute energy waste to new liquids for immersion cooling, here are the novel solutions that startups are developing to run data centres more efficiently.



BY **ROSHINI BAINS**
Reporter

Data centres globally use around 240-340 terawatt-hours of electricity, about 1% of total global energy demands, according to the International Energy Agency. And they are becoming ever more power-hungry, as AI dramatically increases the need for computing power.

So, there is an urgent need to find new ways to run data centres more efficiently and in more environmentally friendly ways. This can be through storing energy, recycling or developing new forms of technology that can ensure no energy is wasted.

REPURPOSING AND RECYCLING

There is buzz around the concept of circular economy within the data centre industry. The large amounts of heat that data centres produce has an incredible value when it comes to energy. But how best can it be harnessed and repurposed?

Currently, data centres produce significant amounts of wasted heat that has detrimental impacts on the environment. Amid a global energy crisis and a climate crisis, finding ways to manage and store this heat will have an outsized and positive impact on how we live.

Heat repurposing in data centres works by capturing wasted heat through a chamber or other form of technology and rerouting it to another specific area.

In addition, many data companies are looking for ways to avoid waste by repurposing their computer products – whether it be computer boards or chips.

With the adoption of this technology has come an array of startups tackling this issue. Here are some of the startups that are coming up with new energy ideas for the data centre sector and for repurposing data centre heat and technology. >

DEEP GREEN

- Location: UK
- Founded: 2016
- Funding to date: $264m

UK-based Deep Green is a data centre company that recaptures and repurposes the heat generated by computers. The startup installs tiny data centres at energy-intensive sites, such as swimming pools, which turn waste heat from the computers into hot water for the sites. In return, cold water from the pool cools the cloud servers.

Deep Green was founded in 2016 by chief executive Mark Bjornsgaard, who is also a managing partner at System Two, a venture capital firm. Bjornsgaard also is the co-founder and a board member, and has been an investor for 12 years at Secret Source, a Spanish technology outsourcing agency.

Since its launch, Deep Green has raised $264m in a growth equity round in 2024 by Octopus Energy, a UK-based renewable energy company through its investment arm Octopus Energy Transition Fund.

INFINIDIUM

- Location: Canada
- Founded: 2018
- Funding to date: N/A

Calgary-based Infinidium has developed a simple and next-generation data centre cooling and power supply infrastructure. The company's technology, The Vortex Vacuum Chamber, is an enclosed, floor-to-ceiling chamber that sucks cool air into a bell-shaped chamber where server boards are arranged in circular racks. The chamber generates power by allowing the air to rise to a vent where it drives a turbine on its way out.

Infinidium was founded in 2018 and is headed by chief executive and director Paul Grist. Grist is an entrepreneur with more than 25 years in natural resource development and green energy. He was the president of Archon Energy and has previously founded three companies.

HESTIIA

- Location: France
- Founded: 2016
- Funding to date: $1.4m

Paris-based startup Hestiia is a developer of a smart heater called MyEko that helps consumers save money on energy bills. The computing technology from the smart radiator ensures houses stay warm. In addition, the radiator itself is made from recycled chips from data centres. Once installed, these heaters can then be used as a distributed computing device for data processing projects such as cryptocurrency mining or even SETI, the US research project searching for extraterrestrial life.

The startup raised around $1.4m in 2023 from venture capital firm Bpifrance, alongside several business angels. Other investors include NOIA Capital, a Luxembourg-based, multi-family office and New Layer Capital, a venture capital firm.

VERRUS

- Location: US
- Founded: 2024
- Funding to date: N/A

Sidewalk Infrastructure Partners spinout Verrus is a US-based company that develops and builds highly optimised data centres that collaborate with utilities to offer flexible required grid support at any one time. Verrus's data centres have adaptable elements like cooling architecture and comprehensive energy management systems that make them highly 'carbon-aware' and able to deal with complex AI systems.

Co-chief executives Brian Barlow and Jonathan Winer founded Verrus and also helped launch Sidewalk Infrastructure Partners in 2019. Sidewalk Infrastructure Partners is a spinout of US-based conglomerate Alphabet.

Backers in Verrus so far include Alphabet, Toronto-based pension fund company Ontario Teachers' Pension Plan and StepStone, a job platform and subsidiary of media corporation Axel Springer.

ZUTACORE

- Location: US
- Founded: 2016
- Funding to date: N/A

Sitting in the middle between heat repurposing and cooling, Zutacore does both. The startup's HyperCool technology is a direct-on-chip, waterless liquid cooling system that repurposes 100% of the heat produced.

It is a complete hardware system (with optional software), which is fully effective while taking up a fraction of the space traditionally required. This means data centres can take up less space, which also means they use less energy, resources, land and construction, as well as maximising real estate assets.

> In order to function, data centres need to be tightly temperature controlled. Many rely on liquid cooling technology to offset the heat produced by the data processing, and prevent malfunction. But cooling is not only expensive, it is bad for the environment. Current methods of liquid cooling take up a lot of space and can be impractical. The sector is calling out for better innovations. Here are some of the startups innovating data centre liquid cooling technology.

ASPERITAS

- Location: Netherlands
- Founded: 2014
- Funding to date: N/A

Asperitas has developed a new type of immersion liquid cooling system for data centres. The company has innovated a synthetic oil that naturally circulates as it heats and cools.

Asperitas was founded by chief executive Rolf Brink, in 2014. Brink has more than 20 years of experience in the IT sector where he focuses particularly on product development for cloud architectures and datacentre infrastructure.

In January of this year, Asperitas, alongside seven other Dutch companies, received funding from the Ministry of Economic Affairs and Climate under the Modular Integrated Sustainable Datacenter Project.

JETCOOL

- Location: US
- Founded: 2019
- Funding to date: $36.2m

JetCool, has developed a patented technique that uses an array of fluid jets to cool the highest power devices – called microconnective cooling®.

Whereas most cooling techniques use heat sinks or cold plates that pass fluid over a surface, JetCool's precision technology routes fluid directly onto a surface, focusing and vastly improving heat transfer. The technology underpins the entire product range, offering specially designed and highly effective methods for various applications.

JetCool is an MIT spin-out that was formed in 2019 after five years of development work in the cooling technology sphere. Led by founder and CEO Bernie Malouin, since 2019, the team has worked with leading innovators worldwide to transform and develop this area, focusing on improving efficiency and performance.

Malouin founded JetCool Technologies after eight years at MIT Lincoln Laboratory, where he served as chief engineer, leading the technical development of a $100m+ airborne payload programme for the US Government. Malouin has a BSc in Mechanical and Aeronautical Engineering (RPI) and a PhD in Mechanical Engineering (RPI).

>

VIRTUS

- Location: UK
- Founded: 2008
- Funding to date: $66m

Virtus is a provider of intelligent data centre co-location for the financial, media, cloud and digital economy in London. The UK-based startup designs and operates data centres that are run with renewable energy and use advanced liquid and immersive cooling solutions. The technology used allows high performance computing and traditional networking IT equipment to be in very close proximity, while supporting large generative AI workloads. This means the centres use less space, as well as being more climate friendly.

Since 2008, Virtus has raised $66m in total funding. Investors in the company include Deutsche Bank, LMS Capital and Brock Capital. Corporations have also invested, including ST Telemedia, a Singapore-based communication company.

LIQUIDSTACK

- Location: US
- Founded: 2012
- Funding to date: $10m

LiquidStack is a liquid cooling company that helps cool servers without the need for air conditioning, IT fans and bulky heat sinks. LiquidStack's two-phase immersion cooling system means computers are submerged in dielectric heat-transfer liquid instead of mineral oils. It also produces a single-phase immersion cooling DataTank which performs better than the advisory guidelines for high-performance applications such as AI. Eliminating the need for air conditioning or fans improves climate impact and reduces energy costs.

LiquidStack was founded in 2012 by chief executive Joseph Capes, chief technology officer Kar-Wing Lau and co-founders Suzanne Su and Jim Setterholm.

The US-based startup has raised $10m in funding. In March 2023, LiquidStack raised for its series B round, backed by US-based manufacturing corporation Trane Technologies. Taiwan-based computer manufacturing company Wiwynn also invested.

SUBMER TECHNOLOGIES

- Location: Spain
- Founded: 2015
- Funding to date: $45.9m

Submer Technologies is a Spain-based computing immersion cooling system developer for data centres. The company develops SmartPod and CryptoPod, which are next-generation horizontal immersion cooling tanks. It has accelerated its design cycle by incorporating a cloud-based simulation tool into its system, which provides a more efficient cooling process.

Submer Technologies was founded in 2015 by chief technology officer Daniel Pope and chief scientific officer Pol Valls. The company has raised close to $46m in funding. In 2022, the startup raised $34m in a funding round from venture capital firms including Mundi Ventures, Norrsken VC and Planet First Partners.

IMMERSION4

- Location: Switzerland
- Founded: 2017
- Funding to date: N/A

Switzerland-based startup Immersion4 is a provider of liquid-immersion cooling systems for data centres. The company's cooling technology, Immersion4 DTM Cooling, eliminates the need for fans and other mechanical components.

Immersion4 was founded in 2017 by chief executive Serge Consea, who is also a senior partner at VCG International, a technology and IT transformation services provider. He spent eight years at France-based consumer electronics company Alcatel as a corporate account manager and director of strategic alliances.

Immersion4 has not disclosed its total funding. The company has raised a seed funding round from Arion Venture Capital, a French venture capital firm and Hewlett Packard Enterprises the US-based multinational IT company.

O&G investors take bigger bets in cleantech in Q2 2024

> The median size of startup funding deal backed by energy investors is at a record level as oil and gas majors double down on fewer – but larger – bets on cleantech.

BY **KALOYAN ANDONOV**
Analyst and reporter

The dollar value of startup funding rounds backed by oil and gas companies ($1.36bn) went up by 7% in the second quarter of 2024, compared with the previous year ($1.24bn), as energy sector investors doubled down on bigger rounds, especially in the cleantech sector.

For example, Australian startup Hysata secured a $110m series B round from investors including oil major BP and South Korean steelmaker Posco, to help it expand the production of its ultra-efficient hydrogen electrolysers.

The median size of startup funding deal backed by energy investors is now $27.60m, the highest level we have seen to date.

Larger rounds are being made possible as oil and gas companies increase the firepower of their corporate venturing units. Saudi Aramco injected a further $4bn into its CVC unit at the start of 2024 and more recently, Chevron launched a third investment fund with $500m, more than doubling the size of its previous two funds.

However, the number of startup funding deals by the energy sector cohort we track has been trending downwards during the past two years, and continued to drop, with 35 funding rounds backed in Q2, compared with 39 in the same period last year.

Oil and gas companies have continued to lean into investing in cleantech, while investments in core oil and gas technology and transport have fallen. IT has also become an area of increasing interest for the sector, as energy companies explore the possibilities of AI and also invest in software and platform to help improve sustainability.

Within cleantech, carbon capture, energy storage and hydrogen tech continue to account for most of the investments in the first half of 2024. This can also be seen in some of the largest rounds.

In the transport and mobility space, we are seeing a slowdown in deal making. The few tracked rounds from the peer group in H1 revolved around logistics and supply chain services and other mobility-related services, but less so around electric and autonomous vehicles and advanced autotech.

Funding rounds became smaller last year but this trend appears to be reversing. The median size of funding rounds backed by the oil and gas corporate peer group >

$1.36bn

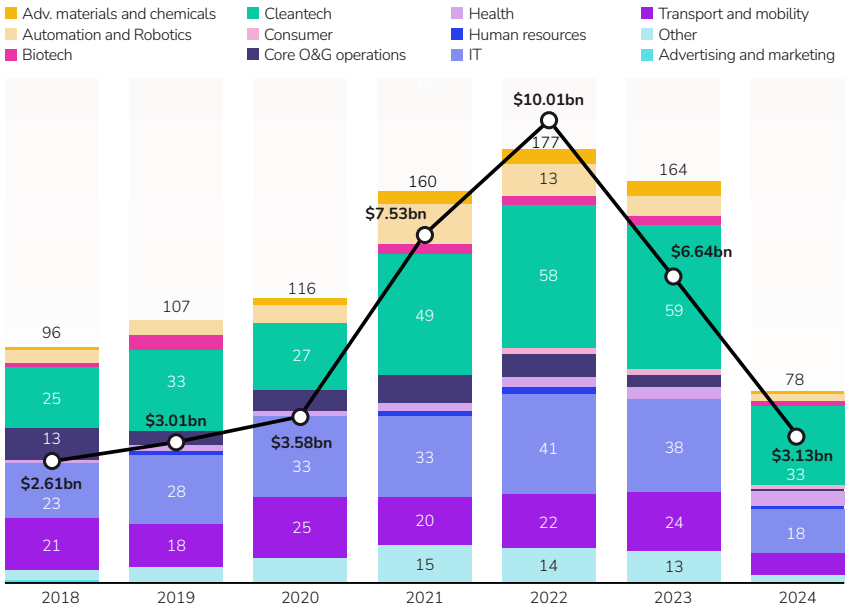
The dollar value of startup funding rounds backed by oil and gas companies, up 7% in Q4 2024

was $27.6m in the first half of 2024, around 25% higher than in 2023 ($22m).

Of course, we only have the half-yearly figure for 2024, but so far this is a higher median deal size than we have seen in the industry, even at the height of the 2021 boom.

Shell, Chevron and Equinor have been taking the lead in cleantech investments since 2014, while Saudi Aramco has been catching up quickly in recent years. Aramco and Chevron have also been leading on investments in IT technologies, whereas Shell and BP have had the most investments in transport and mobility startups.

FIG 1: ANNUAL INVESTMENTS OF OIL & GAS CORPORATE PEER GROUP 2018-2024



VOLATILITY IN COMMODITY PRICES

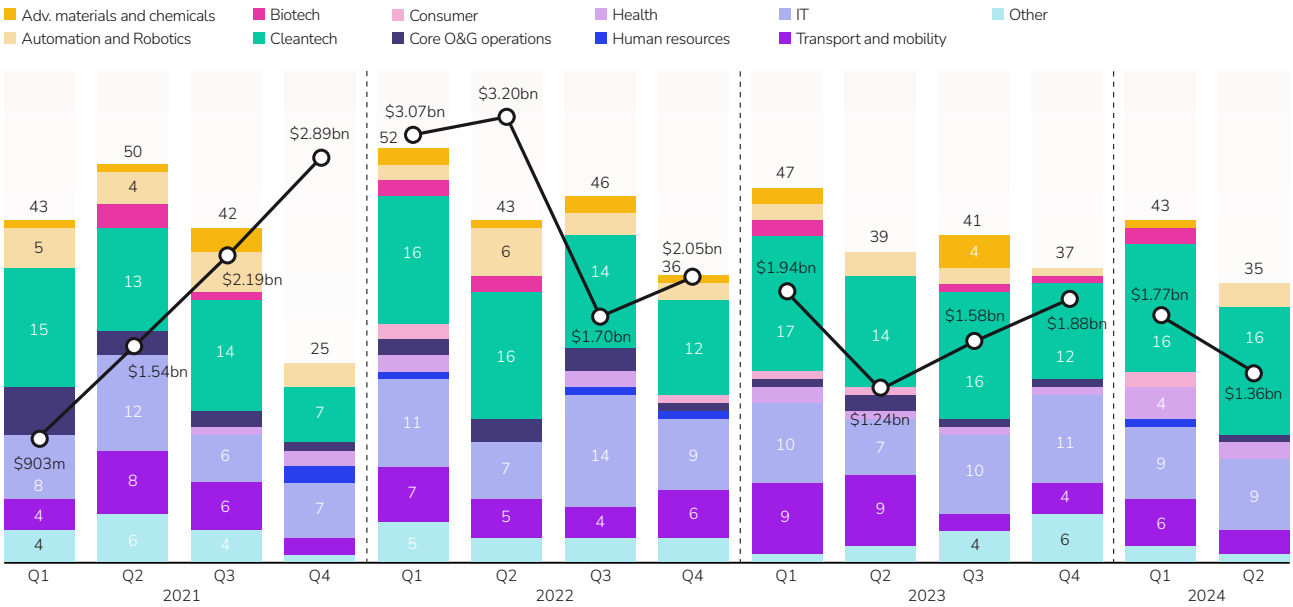
The oil and gas sector remains inextricably linked to developments in commodity prices, which may at times be subject to more or less extreme fluctuations.

The West Texas Intermediate crude benchmark price fluctuated from around $73 to $86 a barrel throughout Q2 2024, a relatively usual level of volatility.

OPEC+ countries have been cutting output since late 2022 and according to Reuters, these countries are currently cutting output by a total of 5.86 million barrels per day, or about 5.7% of global demand. These countries have also indicated they would extend cuts by the end of 2025. On top of that, geopolitical tensions in the Middle East and Ukraine continue, which could only portent more volatility on the cards for crude prices in the short run.

Futures contracts suggest that markets are largely expecting the WTI price to average somewhere in the $60-$80 range, though with wide confidence intervals, spanning from $40 to $120.

FIG 2: QUARTERLY INVESTMENTS BY OIL & GAS CORPORATES PEER GROUP 2021-2024 BY QUARTER



The latest US Energy Information Agency (EIA) *Short Term Energy Outlook* report (from early July 2024) expects the WTI benchmark to peak at around $81.50 a barrel and Brent to average $86 per barrel throughout this year.

The authors of the report also expect supply cuts to ease: "We now expect OPEC+ will begin relaxing voluntary cuts in Q4 2024. As a result, we expect that the extension of voluntary OPEC+ production cuts will cause global oil inventories to continue falling through Q1 2025." US crude production is also expected to increase.

The EIA also forecasts natural gas prices to average $2.50/MMBtu (million British thermal units) in 2024, somewhat higher than the $2.40 previously expected. This prediction has much to do with an ongoing drop in natural gas production in the US, which is expected to continue putting upward pressure on prices. ■

FIG 3: MEDIAN SIZE ($m) OF DEALS BACKED BY OIL & GAS CVCs 2014-2024

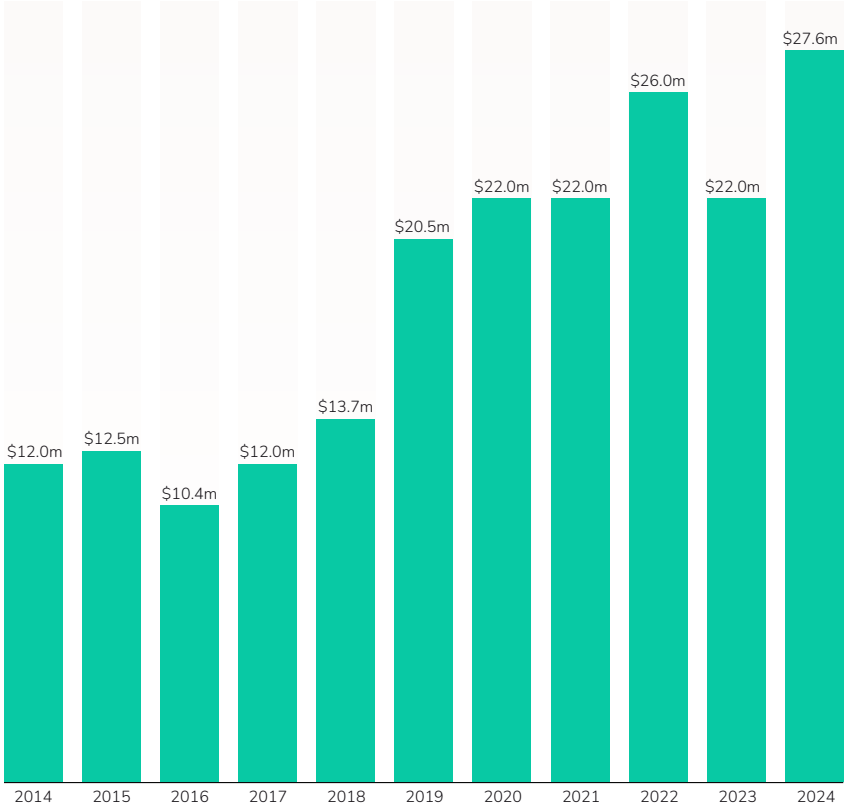


FIG 4: TYPE OF OIL & GAS CORPORATE VC INVESTMENTS BY YEAR

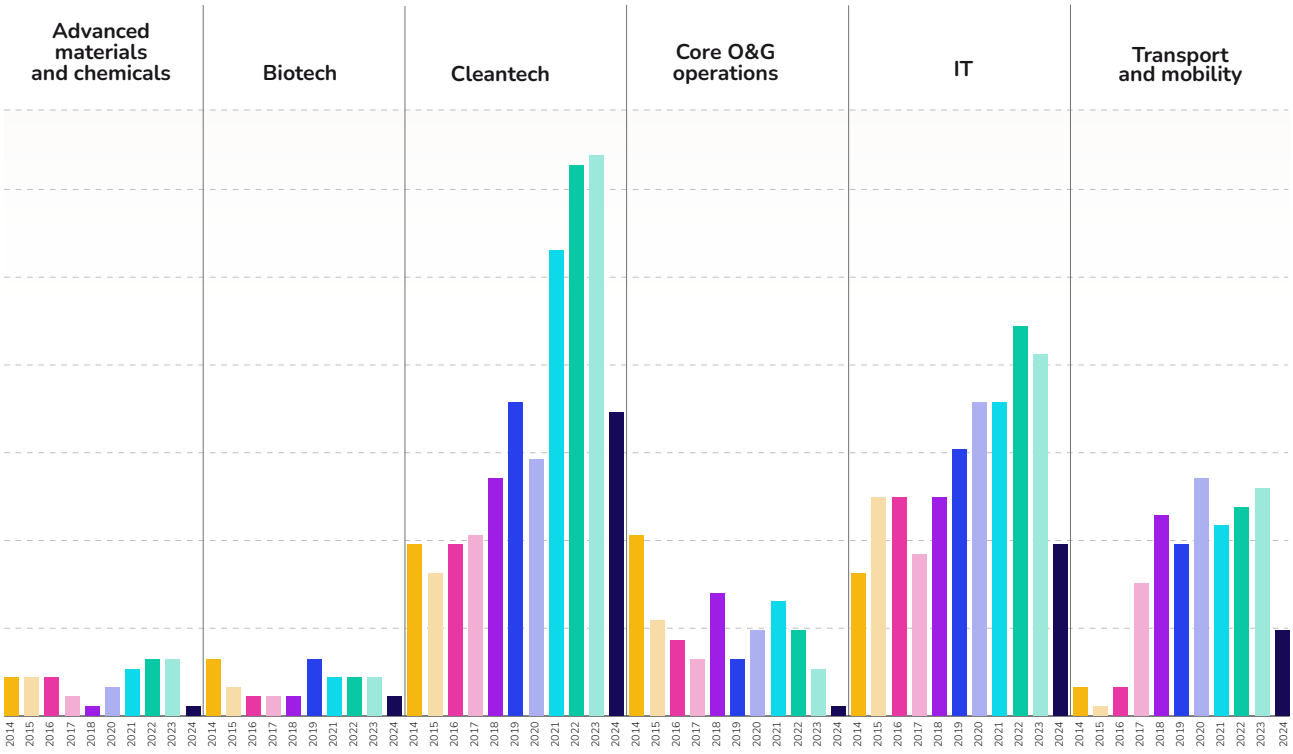


FIG 5: TYPE OF OIL & GAS CORPORATE VC INVESTMENTS – Q2 2023 VS Q2 2024

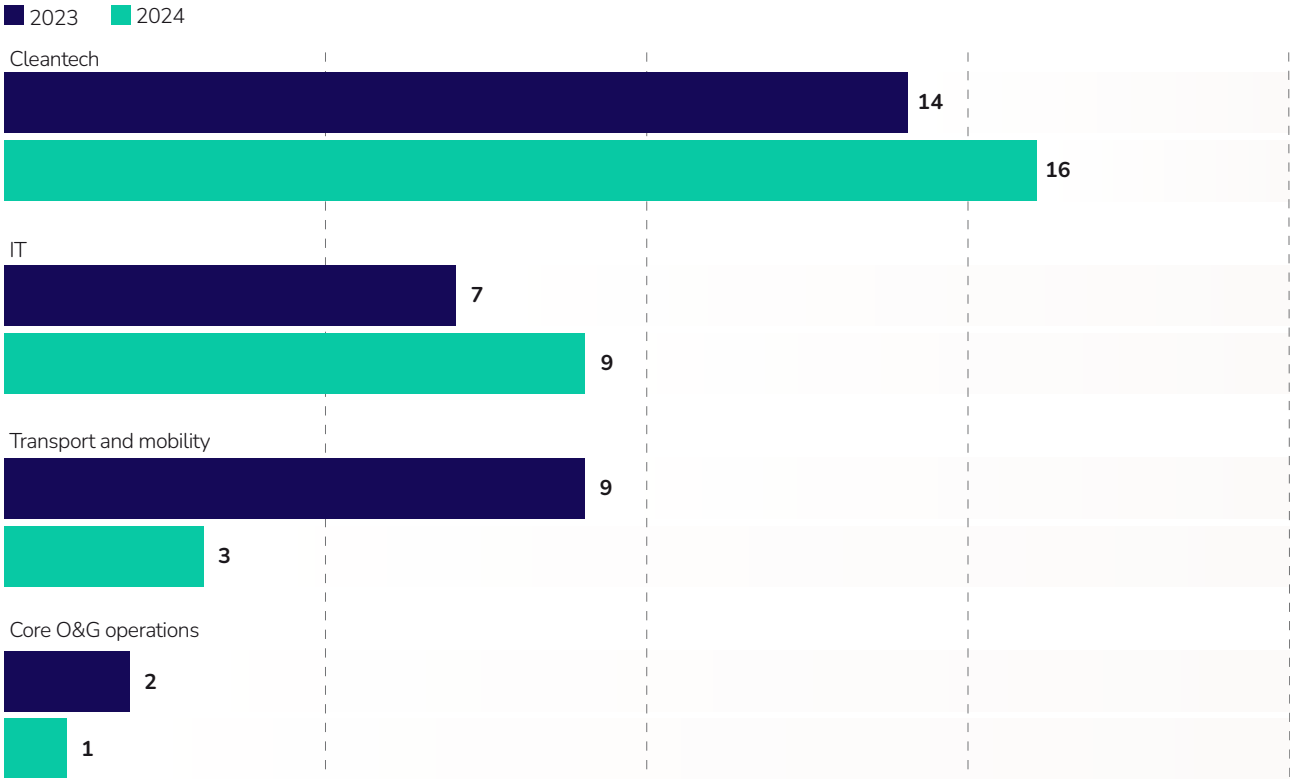


FIG 6: WTI CRUDE OIL PRICE AND NYMEX CONFIDENCE INTERVALS (DOLLARS PER BARREL)

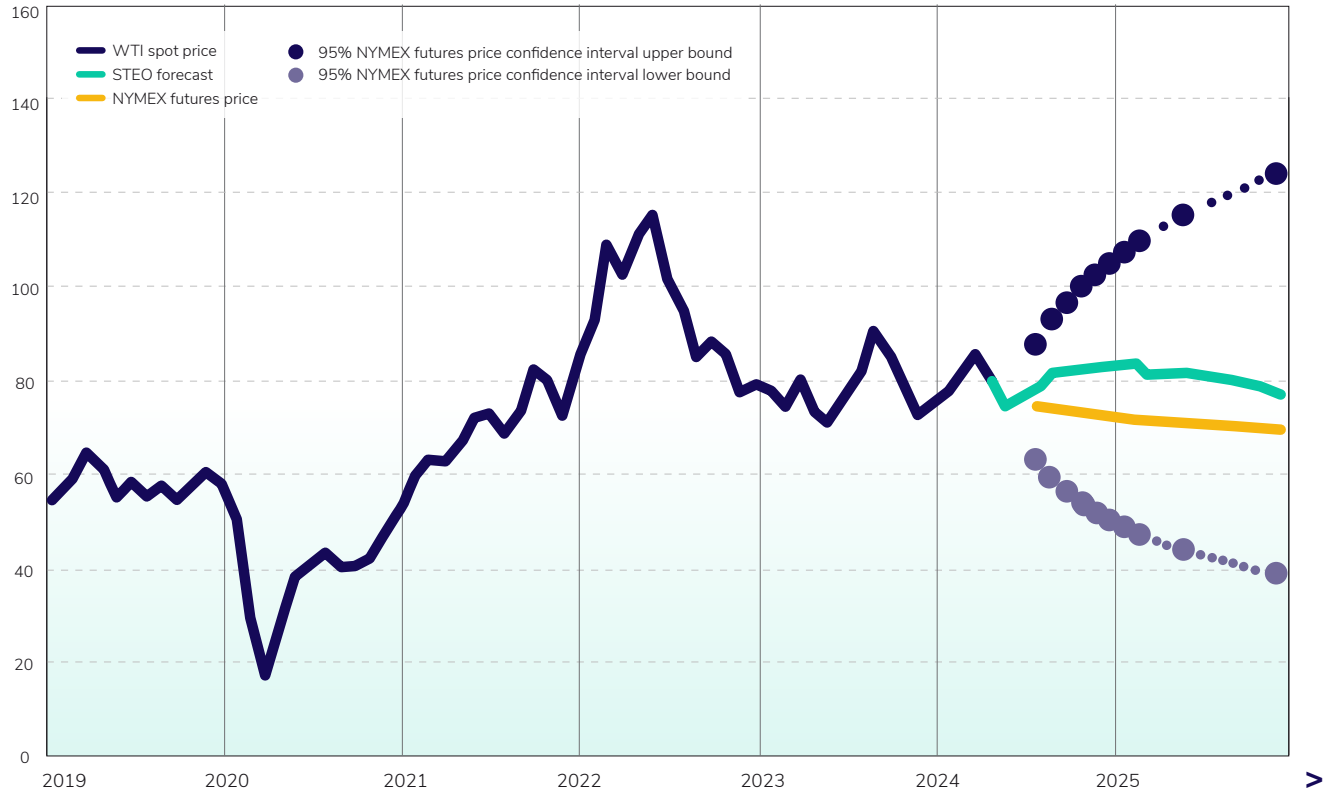


FIG 7: CLEANTECH INVESTMENT BY OIL & GAS CORPORATES 2020-2024

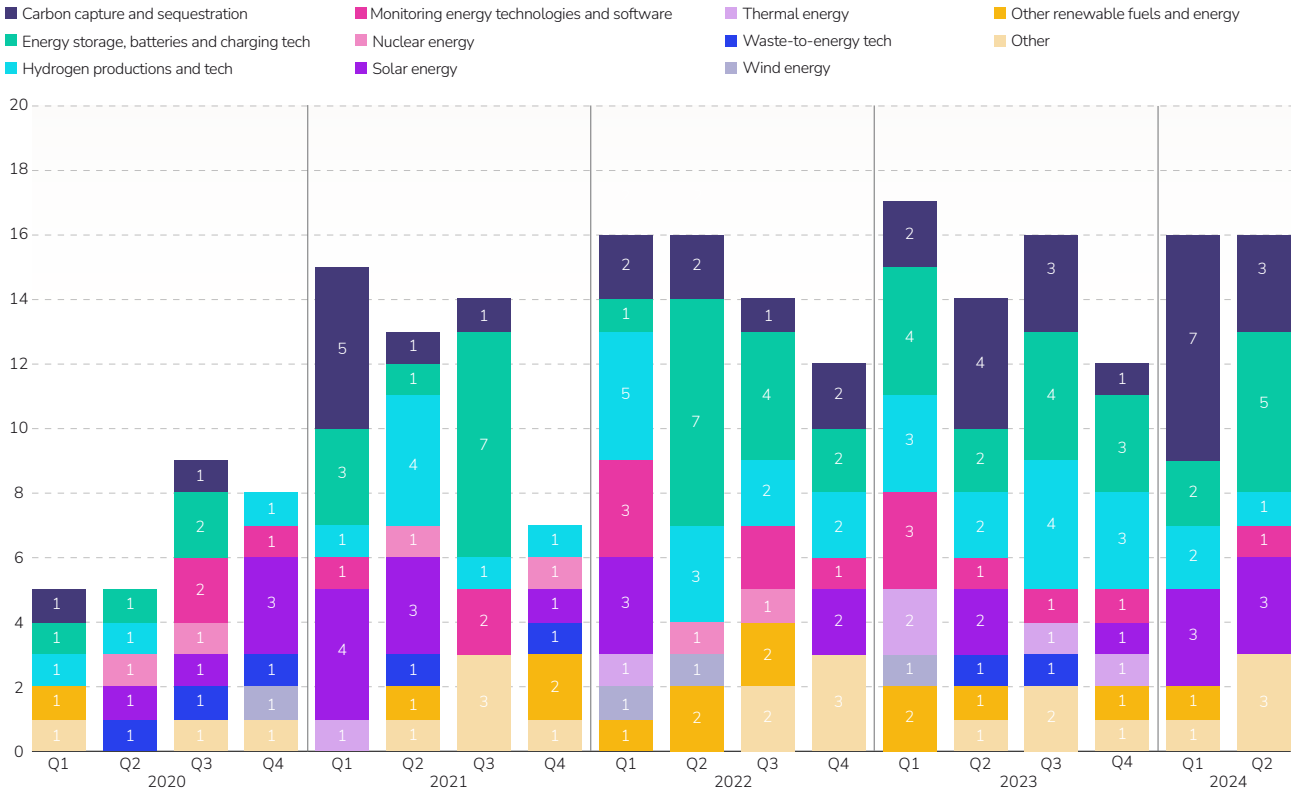


FIG 8: TRANSPORT AND MOBILITY INVESTMENTS OF OIL & GAS CORPORATES 2020-2024

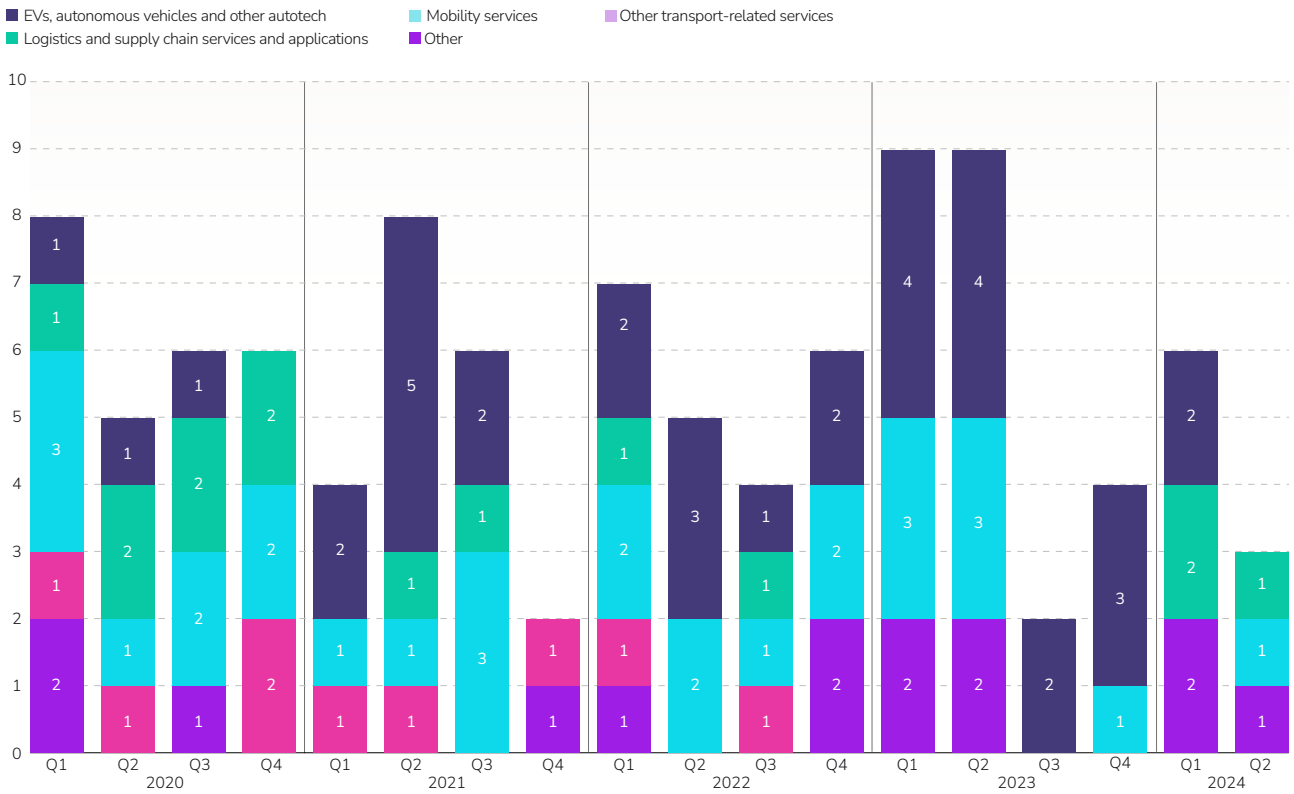
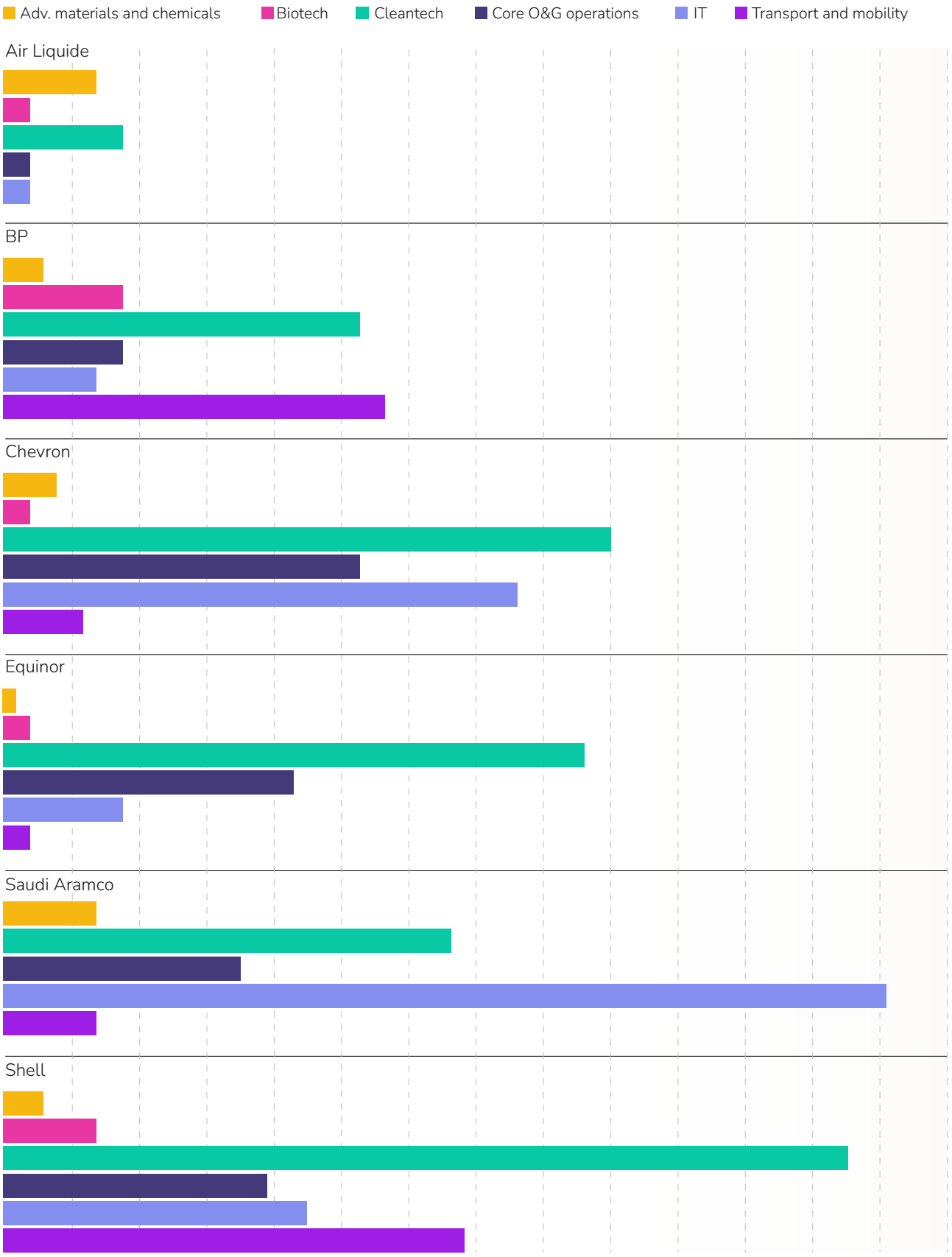


FIG 10: TYPE OF INVESTMENTS BY COMPANY 2014-2024



Deals

> Oil and gas majors Saudi Aramco, Shell, BP, and Chevron were investors in the largest funding rounds by dollar size in the second quarter of 2024.
> The largest funding rounds were for startups spanned across a number of areas – from hydrogen and carbon removal tech through car repair services and EV charging networks to post-quantum cryptography and electronics cooling solutions.

TABLE 1: TOP DEALS OF OIL & GAS CORPORATE PEERS Q2 2024

Portfolio	Round	Sector	Size	Investors
Zhipu AI	Undisclosed	IT	$400m	Saudi Aramco, undisclosed investors.
Hysata	B	Cleantech	$111m	BlueScope, BP, Clean Energy Finance Corporation, Hostplus, Investec, IP Group, Vestas.
Frore	Undisclosed	IT	$80m	Addition Capital, Alumni Ventures Group, Clear Ventures, Fidelity, Mayfield Fund, MVP Ventures, Qualcomm, Saudi Aramco, StepStone Group.
Neustark	Undisclosed	Cleantech	$69m	Ace Ventures, Blume Equity, Decarbonization Partners, Holcim, Siemens, Temasek, Verve Ventures.
Bumper	B	Transport & mobility	$50.5m	AutoTech Ventures, InMotion Ventures, Marubeni, Porsche, Revo Capital, Shell, Suzuki Motor.
Statiq	B	Cleantech	$50m	Astir Ventures, Oyster Ventures, Shell, Y Combinator.
Ion Clean Energy	Undisclosed	Cleantech	$45m	Carbon Direct Capital Management, Chevron.
Xpansiv	Undisclosed	IT	$43.2m	Aware Super, Blackstone, BofA Securities, BP, Clean Energy Finance Corporation, Commonwealth Bank of Australia, Goldman Sachs, Macquarie, S&P Global, Saudi Aramco.
M2X Energy	B	Cleantech	$40m	Autodesk, Breakthrough Energy Ventures, Conifer Infrastructure, Eni Group, Siam Cement Group.
PQShield	B	IT	$37m	Addition Capital, Braavos, Chevron, Legal & General, Oxford Science Enterprises.

ZHIPU AI

China-based AI-powered knowledge graph platform developer Zhipu AI raised approximately $400m in May 2024 from venture funding from Prosperity7 Ventures, one of Saudi Aramco's venturing units. The transaction reportedly put the company's pre-money valuation at $2.6bn. The funding will help the company to explore new markets outside its own country. Zhipu AI's platform includes a number of smart application tools, such as the scientific and technological information analysis engine "AMiner", as well as AI cognitive engines CodeGeeX and CogView, enabling users to leverage AI-powered tools to reduce menial digital tasks.

HYSATA

Australian hydrogen tech developer Hysata raised A$173m ($111m) in its series B funding round, co-led by bp Ventures, the venturing unit of BP, and Templewater. Other investors participating in the round included University of Wollongong, BlueScopeX, Vestas Ventures, Posco, Telstra Superannuation Fund and Clean Energy Finance. Hysata is developing a new type of hydrogen electrolyser with the potential to significantly shift the economics of green hydrogen production, bringing $2/kg green hydrogen within reach. The company will use the funds to expand production capacity at its manufacturing facility near Wollongong in New South Wales.

FRORE

US-based electronics cooling chip developer Frore raised $80m in its series C round, led by Fidelity Management & Research, reportedly putting its pre-money valuation at $600m, according to PitchBook. The round included Prosperity7 Ventures, Qualcomm Ventures, MVP Ventures, Addition, Clear Ventures, Alumni Ventures, Mayfield Fund and StepStone Group. Frore develops cooling chips designed to cool consumer devices silently and efficiently. Its piezoelectric micro-electromechanical systems are based on active cooling for heat dissipation in computing devices and solid-state thermal solutions, which – it claims – outperform fans. The funds will be used to expand the company's operations and product line to tap into the growing demand for cooling AI chips.

NEUSTARK

Swiss concrete-based carbon removal technology provider Neustark raised $69m in a round led by Decarbonization Partners. The round also included raw materials company Holcim Group and industrial conglomerate Siemens through its Siemens Financial Services subsidiary. Neustark has developed a technology to reverse carbon dioxide emissions by turning construction waste into fresh concrete. The company's services decompose concrete waste into original carbonate powder and gravel components, enabling clients to recycle and produce fresh concrete. The funds will be used to expand its portfolio of global projects and the growth of its team.

BUMPER

UK-based car repair-focused financing service Bumper received £40m in its series B round through a combination of debt and equity, which featured Shell Ventures, the corporate venturing arm of oil major Shell. The equity portion of the series B round (£15m) was led by Autotech Ventures, also including InMotion Ventures, Porsche Ventures, Itochu and Revo Capital. The debt financing of £25m came from undisclosed lenders. Bumper runs a vehicle finance platform that helps drivers spread the cost of their repairs and servicing. Its platform focuses on flexible payment options, works with trusted authorised repairers and helps drivers avoid paperwork.

STATIQ

Shell Ventures is also reportedly backing India-based EV charging network operator Statiq. According to PitchBook, the company is in the process of raising $50m for its series B round, which also features Oyster Ventures, Astir Ventures, Y Combinator and other undisclosed investors. Statiq is an EV charging network that enables customers to locate the nearest charging station, book a slot and make digital payments.

ION CLEAN ENERGY

US-based carbon capture technology developer Ion Clean Energy raised $45m in a series A round, led by Chevron Technology Ventures, putting the company's pre-money valuation at $180m. Carbon Direct Capital Management and other undisclosed investors also participated in the round. The company's carbon dioxide capture technology uses an advanced liquid absorbent system to capture CO_2. The fresh funding will be used for growth and commercial deployment of its ICE-31 liquid amine carbon capture technology for hard-to-abate emissions.

XPANSIV

US-based trading platform company Xpansiv raised $43.2m in a deal led by Aramco Ventures. The round also included bp Ventures, Commonwealth Bank of Australia, S&P Global, research firm Blackstone Group, Macquarie Group and Clean Energy Finance, among other investors. Xpansive runs a global commodity exchange platform designed to provide a clear path to net zero via transactions of ESG-inclusive commodities, including carbon credits, renewable energy certificates and other energy solutions. The new funding will be used to support further development of Xpansiv's global energy and environmental markets infrastructure solutions, as well as the company's investment and acquisition strategy.

M2X ENERGY

US-based gas-to-liquid modular system developer M2X Energy raised $40m in its series B round in late June, led by Conifer Infrastructure Partners, which featured Eni Next. The funds will be used to accelerate in-house manufacturing and deployment of its first commercial fleet of low-carbon methanol production systems. M2X Energy has developed a carbon offsetting technology to minimise gas flaring and reduce its environmental impact. It accepts a variety of feedstocks including landfill gas, biogas and well gas, enabling businesses to convert a waste stream of natural gas.

PQSHIELD

UK-based post-quantum cryptography developer PQShield raised $37m in a series B round from Chevron Technology Ventures, Legal & General Group and Bravos Capital. Oxford Science Enterprises and other undisclosed investors also participated in the round. PQShield's post-quantum cryptography system is designed to secure messaging applications protected by post-quantum algorithms and protect data. The company's system offers quantum-secure cryptographic assistance for software, hardware co-design and data in transit. The fresh funds will be used for hiring more talent and working more closely with the company's current and new customers and partners.

Exits

> As VC markets appear to make a gradual recovery, we tracked three exits in Q2 this year.

NONAME SECURITY

US-based cybersecurity platform Noname Security, which counts Siemens and Samsung among its backers, was acquired by Akamai Technologies for $450m. Noname has built an online platform, which specialises in protecting APIs in real-time and detecting vulnerabilities and misconfigurations before they are exploited, and that does not require agents or network modifications.

GLOBAL THERMOSTAT

US-based carbon dioxide removal tech developer Global Thermostat was bought by Zero Carbon Systems for an undisclosed amount. The company counted Japanese corporates Sumitomo and Tokyo Gas among its backers. Global Thermostat has developed direct air-capture carbon dioxide removal technologies designed to unlock new, air-based sources of carbon for the global economy and address climate change at scale.

T-REX

US-based data analytics platform T-Rex was acquired by Finsight Group for an undisclosed amount in April, according to PitchBook. The company counted Future Energy Ventures (backed by German utility company E.On) and Innogy among its backers. T-Rex has developed a data management and cashflow analytics platform for modelling and managing complex investments across private credit and structured finance markets. The company's platform automates the collection, validation and digitisation of all performance data from various sources.

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Funds

> We saw several new funding initiatives involving corporate investors in the energy sector in the second quarter of 2024.

CHEVRON FUTURE ENERGY FUND III

Oil and gas major Chevron formed a third fund sized at $500m, Future Energy Fund III, to invest in renewable energy technology companies. Its first Future Energy Fund was created in 2018 before a second one three years later, managing $400m in capital altogether. More than 30 companies have received funding from the first two funds, including emissions-free hydrogen producer Aurora Hydrogen, electric vehicle charging station operator Electric Era and Carbon Clean Solutions, which is developing carbon capture technology. Founded in 1999, Chevron's corporate venture capital arm, Chevron Technology Ventures, will oversee the new fund, whose focus areas include decarbonisation, mobility, energy decentralisation, fusion energy, direct air capture and batteries.

360 LIFE II FUND

Italian utility company A2A formed 360 Life II, an energy transition-focused corporate venture capital fund with a target size of €200m. A2A is the initiative's anchor investor and industrial partner, in partnership with deeptech venture capital firm 360 Capital. Besides clean energy, the new fund will target European startups developing circular economy-related technologies. The programme follows 360 Life I, which was launched in 2020.

ORANO VENTURE FUND

French nuclear energy provider Orano set aside €50m to launch a corporate venture capital subsidiary dubbed Orano Venture Fund. Formed in partnership with deeptech venture capital firm Supernova Invest, the fund will focus on industrial startups developing technologies strategic to Orano. Key investment areas include industrial performance and safety, advanced engineering technologies, sustainable chemistry and new materials. The fund will invest in around 20 startups at pre-seed to series A stages based in France and other European countries, providing between €100,000 and €3m per deal. The capital will be deployed over five years.

ENERGY VENTURES ACCELERATOR

UK sea ports operator Associated British Ports (ABP) partnered with US venture capital firm Plug and Play to launch a startup accelerator named Energy Ventures Accelerator. The programme will focus on startups working on sustainable energy-related technologies and products such as hydrogen, floating wind and low-carbon fuels. Entrepreneurs will have access to Plug and Play's global network, which includes more than 550 corporate partners and 65,000 startups, and ABP's port infrastructure to test their products. ABP will develop hubs for industrial decarbonisation in the Humber in northeastern England, floating offshore wind energy in South Wales and maritime decarbonisation in Southampton.

FUJITSU IMPACT INVESTING MANDATE

Fujitsu Ventures, the corporate venture capital arm of Japanese IT and electronics group Fujitsu, added impact investing to its mandate. Fujitsu Ventures will additionally support companies working on solving social issues and sustainability challenges, not necessarily directly related to Fujitsu's main businesses. The impact investment initiative came a year after Fujitsu defined its sustainability goals. Key themes are solving global environmental issues, developing digital societies and improving people's well-being. In May 2024, the unit invested in Gojo & Company, a Tokyo-based microfinance company serving underbanked and low-income households in countries such as Sri Lanka, Myanmar, Cambodia, India and Tajikistan.

CICC PORSCHE (SHANGHAI) VENTURE CAPITAL INVESTMENT PARTNERSHIP

Porsche Ventures, the corporate venture capital subsidiary of German carmaker Porsche, reached a first close of undisclosed size for its new China-based fund called CICC Porsche (Shanghai) Venture Capital Investment Partnership. Launched in partnership with investment bank China International Capital Corporation, the fund counts Porsche Investments Management and Anting Shanghai International Automobile City among its limited partners. While the amount committed was undisclosed, business data aggregator Tianyancha suggested RMB850m ($118m) were injected into it. The fund will invest in energy and smart connected vehicles in China. Porsche Ventures has a team member in Shanghai, Ostin Gong, who leads partnering and venturing in the country.

People moves

> We reported a few people moves in the energy sector over the second quarter of 2024.

KEVIN RODRIGUES

BP Ventures, the corporate venture capital arm of UK oil and gas producer BP, named Kevin Rodrigues as regional managing director of Europe. Rodrigues will lead bp Ventures' investments and manage its existing portfolio in Europe. He comes from a finance and venture capital background, having worked at companies including Credit Suisse, International Finance Corporation and Lightrock for nearly two decades.

LUISA MAROTTA

Luisa Marotta left her Rome-based role as an investor at Terna Forward, the corporate venture capital fund of Italian utilities company Terna Group. Marotta will now be based in Silican Valley, where she will work as an international innovation specialist, helping to establish relationships with local VCs and help promote Terna Forward's portfolio in the US. Before Terna, Marotta spent six months from May 2021 as a senior IT analyst at Enea Tech e Biomedical, a private foundation supervised by Italy's Ministry for Business and Made in Italy.

SABEEHA ISLAM

Germany-headquartered reinsurance firm Munich Re promoted Sabeeha Islam to vice-president of portfolio development. She will help manage the unit's climatetech and transportation investments. Islam has been with the unit since late 2021. Before joining Munich Re, she worked as a consultant at Deloitte and as a clean energy associate at the Austin Technology Incubator, among other roles.

IRIS JENSEN

German clean energy producer BayWa Renewable Energy (BayWa RE) promoted Iris Jensen to investment manager for its corporate venture capital subsidiary, BayWa RE Energy Ventures. Jensen joined the unit in late 2021 as an investment associate, before moving to senior investment associate in March 2023. Previously, she was part of utility E.On for more than three years, where she held positions including innovation manager and e-mobility solutions developer.

LUÍS FÁBRICA

Portuguese utility company EDP promoted Luís Fábrica to investment manager for its corporate venture capital arm, EDP Ventures. Fábrica joined EDP Ventures in early 2020 as an investment associate. Before joining EDP Ventures, Fábrica spent nearly four years at professional services firm EY, where he advised on financial transactions. Founded in 2008, EDP Ventures invests in early to late-stage companies in the renewable energy and sustainability sectors.

>

MARC BOUCHET

TDK Ventures promoted Marc Bouchet to senior investment associate. The unit hired Bouchet in 2021 as an analyst, before naming him an associate nine months later. He invests in deeptech startups, especially those working on low or zero-carbon energy production and industrial growth. Previously, Bouchet spent nearly three years at venture capital firm Plug and Play Tech Center, where he focused on mobility, industrial, aerospace and enterprise SaaS sectors.

DAVID DELFASSY

Another new member of the TDK Ventures team in Europe is investment director David Delfassy. Delfassy joined TDK Ventures after four years as a senior investment associate at deeptech investment firm Ahren Innovation Capital. He will make energy transition and decarbonisation investments through Fund EX1.

SAM HILL

TDK Ventures also hired investment analyst Sam Hill for its London office. Hill will support Delfassy's Fund EX1 team. He spent two and a half years as an investment analyst at cleantech venture capital firm Clean Growth Fund.

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Siemens Energy Ventures

Chad W. Bown
Managing partner
BP Ventures

Kemal Anbarci
GM, venture capital
Chevron Technology Ventures

Varun Rikhi
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