

ENERGY REPORT:
**Taking a leap of faith on
pioneering commercial projects**

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How to get investors to take a leap of faith on FOAK projects

As more energy transition projects struggle to progress to the scale-up phase, where can the “catalytic capital” come from to take them to the next level and what role can corporate investors play in pushing progress forward?



BY **FERNANDO MONCADA RIVERA**
Senior reporter

“Everyone is eager to be second or third, but no one is eager to be first,” says Sarah Jewett, VP of strategy at Fervo Energy.

The Houston-based startup is trying to scale up its new geothermal energy system for commercial customers. But is coming up against the problem that many energy transition startups face: trying to find investors willing to take a risk on an unproven technology.

Not only is its method of drilling horizontally to fracture underground hot rocks something that has not been tried before, Jewett and the rest of the team have to contend with geothermal energy’s poor past record on big projects.

“Fervo is having to atone for the sins of geothermal operators past. The narrative that geothermal has never done well before is a heavy weight over everything,” says Jewett.

The company has raised \$420m in investment over multiple funding rounds but is now finding it difficult to convince >

financial backers to put up funding for the company's first large-scale, greenfield project, says Jewett. There is a conventional narrative that geothermal is not scalable, which Fervo had to battle.

SCALING UP

This is the classic problem that faces any industrial or hardware-heavy startup that is trying to scale up a first-of-a-kind (FOAK) project. A pilot project may have proven the technology, but scaling it up by 10x to the point where it can actually make an impact means bringing in a different type of investor with a much lower risk tolerance.

"We had so much interest in our fundraising for this, but because this is a first-of-a-kind thing, it's amazing how many investors fell away," says Suvi Sharma, the co-founder and CEO of Solarcycle, a solar recycling startup also looking to build its first commercial facility.

Scaling up an energy startup is a different prospect to scaling up a software company, says Tina Tosukhowong, investment director at TDK Ventures.

"You don't hear the word FOAK in software – the design-build-test cycle is so short. For, the cycle is long and very costly," she says.

Climate tech and energy transition

startups, in particular, find themselves in a Catch-22 of needing to prove they can scale the business in order to raise the money to scale the business.

Getting out of the bind may mean taking a creative approach and finding ways to be very frugal. Fervo, for example, found a way to test the system with a first client in a low-cost way that required little infrastructure build-out. A deal with a big name customer, Google, also helped allay investor concerns.

Solarcycle, meanwhile, took a modular approach, finding a way to build out its recycling facility in stages rather than needing a large capital outlay all at once. Securing

hard about raising startup funding suddenly becomes even harder. Proof points become more important to investors.

Though the technology may have been proven at large lab scale or pilot scale, growth investors want to know that it can credibly grow 10x.

Will it become more expensive per unit of output as it scales? Will the process be as efficient?

On top of that, is the market real and is it strong? Does it have real customers who want it, or does the technology depend too much on government or other support?

"We'll take subsidies and green premiums to help get over that gap

"We had so much interest in our fundraising for this, but because this is a first-of-a-kind thing, it's amazing how many investors fell away"

Suvi Sharma, Co-founder and CEO of Solarcycle

offtake agreements also helped build confidence.

Corporate investors, trying to guide their portfolio companies on the scaling journey can play a role in taking them through this first-of-a-kind bottleneck. Often they have the advantage in understanding how new technologies scale. The parent company may be able to help with the testing or can plug the startups into their networks to find first customers and growth-stage investors.

The case studies of Fervo (see page 7) and Solarcycle (see page 12) in this report can offer insight on how energy transition startups – and their corporate investors – can navigate through the so-called valley of death for first-of-a-kind projects.

GROWTH FUNDING RULES

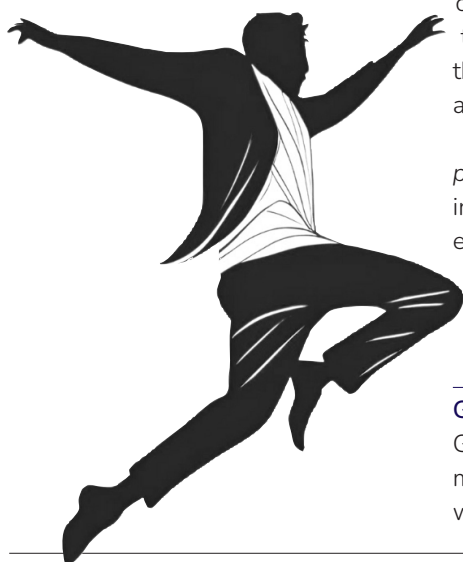
Getting a FOAK project off the ground means raising growth capital, this is when everything that was already

all day long but it cannot be what you need structurally," says Rachel Slaybaugh, partner at venture capital firm DCVC, which led Fervo's series B round in 2022.

Because of the large amount of capital needed at the scaling stage, investors also want to see a strong team that's financially competent and able to attract project finance. If they don't quite have the financial know-how, do they have solid plans to bring a good CFO on board?

Startups also need to look at unit economics, especially in the type of B2B markets into which cleantech FOAK projects will likely be selling.

"These legacy industries are already seeing their margins squeezed by commodity pricing and supply chain costs. We need to see both enough feasibility with equipment that we know could be scaled the right way, which equates to appropriate unit economics," says



Ginger Rothrock, senior director at HG Ventures, the CVC arm of The Heritage Group, which co-led a series A round for Solarcycle as it built out its FOAK in iterative stages.

“Some people will say that project finance is this thing we will figure out later without necessarily thinking about what you have to prove to get that finance. Sometimes, people don’t dig in enough and try to validate the assumptions of how will this get cost competitive,” says Slaybaugh.

There sometimes tends to be a fingers-crossed attitude that the costs will just come down eventually, she adds, with the underlying reasoning not necessarily being played out.

Growth investors will want predictability, proof from processes that have run for tens of thousands of hours, with significant uptime, throughout much of the year.

One way to do this is to systematically identify where the bottlenecks in the process are and prioritise them.

“We want to see that the yield of the process in every unit operation being measured so that you can say which unit has the highest risk and [which], therefore, you need to put the focus and effort on improving,” says Tosukhowong.

That data would go into a front-end engineering design (FEED) study to define the parameters, the risk mitigation processes, and the cost estimations for the FOAK, which can proceed from there.

DIFFERENT POTS OF CAPITAL

First-of-a-kind projects are usually financed by some combination of equity, debt and grant funding – the more of the latter two, the better. Such a big capex commitment financed entirely from the company’s equity would be painful in terms of cost of capital and dilution.

Existing investors have a big



“Our job is providing the catalytic capital to really help them build good sets of data and bring in additional co-investors that can write bigger checks and de-risk the technologies so that we can get them ready to build the FOAK”

Tina Tosukhowong,
Investment director,
TDK Venture

role to play here in helping source those diverse pockets of money, including lenders. Investors such as TDK Ventures may come in when a startup finishes its proof of concept and is about to build the pilot that will provide the data to prove to lenders that the process is bankable. Tosukhowong says the plan is always to participate in the following fund round and to help bring more people on board.

“Our job is providing the catalytic capital to really help them build good sets of data and bring in additional co-investors that can write bigger checks and de-risk the technologies so that we can get them ready to build the FOAK,” says Tosukhowong.

Ideally, traditional infrastructure

investors will also come into first-of-a-kind projects to put money in at the asset level – not taking equity in the startup, but taking a share of the project’s upside. Infrastructure investors appear to have become more willing to take on more scale-up risk and come in earlier, at the FOAK stage, as opposed to the de-risked nth-of-a-kind (NOAKs) that are usually their bread and butter. Two of the largest infrastructure investors in the world, Brookfield and BlackRock, for example, have invested asset-level cash in FOAKs for sustainable aviation fuel producer Infinium and carbon capture company Carbon Engineering, respectively.

In terms of grants, cleantech has a built-in advantage of being a high-priority area for public sector bodies. Grants, tax credits and production tax credits are up for grabs and are hard policies to row back on. However, to get these, startups will often have to show that a good portion of the project funding is already in place.

WHAT LENDERS WANT TO SEE

Debt and lenders add another challenge. While banks may be willing to fund as much as 80% of a project involving a well-known proven technology, for something novel it is likely to be less than half.

Like many large infrastructure projects, FOAKs are often structured as special-purpose vehicles (SPVs) – subsidiaries of a company that exist only to own the project, owe the associated debt, and would bear the brunt of any potential bankruptcy. The project assets serve as collateral – but no bank wants to have to try to sell a motley array of assets to recover part of its loss.

So, what they usually want is data, and a lot of it, on every aspect of the technology and proposed project. They want to see that it is reliable, and they will want numbers from the pilots and demonstrations to back

that up, as well as proof that there are customers ready to buy the product.

This is especially true when it comes to an area such as geothermal energy, where many investors have lost money in the past.

In the case of geothermal startup Fervo, for example, which recently signed the biggest geothermal power-purchase agreement in history and also got a \$100m bridge loan to construct its new facility, lenders wanted to see everything.

“Fervo needed the drilling data from all of the wells that it has drilled – it has shown really rapid improvement in drilling speeds and cost reduction - it needed all of the commercial offtake,” says Slaybaugh.

“Fervo’s first project in Nevada has now been producing for more than a year, so it needed a year’s worth of data showing that the well quality did not degrade. It needed flow tests at its new site showing that the steam production is what it needed to be. So it was really a lot of investment and data to get these

“Fervo’s first project in Nevada has now been producing for more than a year, so it needed a year’s worth of data showing that the well quality did not degrade. It needed flow tests at its new site showing that the steam production is what it needed to be. So it was really a lot of investment and data to get these groups to have confidence that you are probably right”

Rachel Slaybaugh, Partner
DCVC

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Lenders also want to see that there are enough equity investors and that they are committed and reserving enough capital to cover possible spending overruns. Banks do not want to take on these risks themselves.

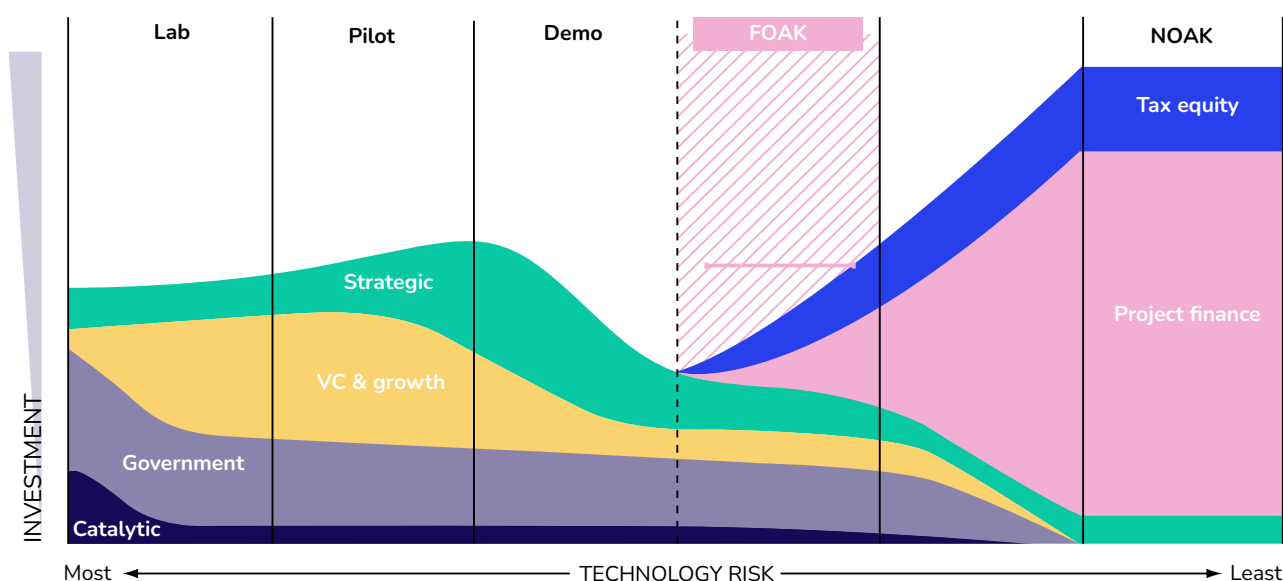
WHERE CORPORATES CAN HELP

One of the ways that corporate investors say they often help on first-of-a-kind projects is by providing intelligence about the market.

“You can give them comfort with the market,” says one growth investor who backed a FOAK in the plastics recycling space. “In the case of our market, this is all about regulation and it is almost a perfect spot,” he says, pointing out that by around 2030, almost overnight, people will need to have anywhere between 20%-30% recycled plastics in the products, which are often currently at zero.

Narrative-shaping is a big part of what investors can contribute here. Every technology was a FOAK at >

FIG 1: THE BLENDED CAPITAL STACK FROM FOAK TO NOAK



Source: Sightline Climate

one point, including the clean energy technologies that reign supreme today. Investors with a background in industry can remind bankers of how risky solar and wind power were once considered, and how the incumbents were of them.

"We typically provide the narrative," says the plastics investor. "You need to explain to them that these are the risks, this is how we can mitigate these risks, and this is why you probably should accept those risks."

On a more practical level corporate investors can often help startups secure the supply chains needed for their first-of-a-kind projects. FOAKs often use much of the same supply chain as existing industries, for example oil and gas, and corporate investors can help with access to equipment and know-how.

"You want relationships with that supply chain so that you can make sure you can get access to the equipment you need. If we are going to be using the drill rigs from H&P, we want them on the cap table so that they share in the upside, so they are really motivated to supply those drill rigs and a good crew," says DCVC's Slaybaugh.

Corporates can also be a source of feedstock, an offtake customer, or other stakeholder in the project – but these will nearly always be a separate and independent agreement from the investment by the venture arm.

MODULARITY

Not everything needs to be huge, though. Modularity is an increasingly popular approach – building things at a smaller, more distributed, or iterative scale. The advantage is that it makes things more repeatable and predictable. Each modular unit carries a lower risk and each produces data you can use.

The fact that small plants can be located close to where the product

"If you talk about a first of a kind, there are probably two truths. It takes longer and it will cost more. There is never going to be a project that will be delivered on budget and on time unless the contingencies are such that there are enough buffers, but, typically, that is not the case"

Growth investor

might be used can bring what HG Ventures's Rothrock calls "economies of logistics", as opposed to the economies of scale that come from a huge facility.

"With things such as localisation and decentralisation, your cost of logistics goes down. If you can de-risk enough to know that a small-scale plant will work, you do not have to spend a billion dollars to create your FOAK. Instead, your FOAKs are containers or small pads of equipment that are in the \$1m-40m range, not a \$1bn plant," she says.

A modular approach will not work for every project, as some pieces of equipment are either very difficult to scale down, or get significantly cheaper as you scale up. Large new cement or certain chemical plants, for example, as hard to do piecemeal. But many types of recycling, hydrogen and renewable generation projects can be distributed or built bit by bit, without a massive capital commitment to begin with.

Running multiple smaller plants can also help on the data gathering side, as you can test improvements more quickly.

PLAN EARLIER, BUDGET MORE

Getting a first-of-a-kind project off the ground is an undertaking that begins long before startups even start talking to growth investors.

Even choosing the size of the pilot project that precedes the FOAK needs careful thought. Large pilots are costly, but a pilot that is too small might not provide enough data to move on to a FOAK.

And when startups move to scale up 10x, new problems crop up that were not apparent in the pilot. "Sometimes engineers don't know what they don't know when they scale 10x," says TDK's Tosukhowong.

The best way to prepare, say investors, is to overprepare in terms of cost and timing.

"If you talk about a first of a kind, there are probably two truths. It takes longer and it will cost more. There is never going to be a project that will be delivered on budget and on time unless the contingencies are such that there are enough buffers, but, typically, that is not the case," says one growth investor.

"If it normally takes 12 months, then add a few months to it. If it takes \$10m, then add a few million to it. And it does not mean you become lax in the way you manage a project, but it does mean that you are in a strong position when you ask for more money. ■



CASE STUDY: FERVO ENERGY

CLEVER WAYS TO DERISK EARLY PROJECTS



COMPANY OVERVIEW

Fervo Energy was founded in 2017 and uses methods from the oil and gas industry to open up new places where geothermal power extraction is viable.

In particular, its horizontal drilling technology – which has been successful in other applications such as extracting shale gas – means it can extract from a far wider surface area than is possible with traditional vertical drilling methods. Hydraulic stimulation – a method similar to hydraulic fracturing, making hot rocks more permeable for water to flow through – also makes it possible to produce geothermal

energy from dry, hot rock, injecting cold water down and bringing the heated water back up.

Geothermal energy has great potential for renewable energy baseload generation – offering a constant energy source to balance more intermittent wind and solar. But investors have historically had trouble backing geothermal projects, which tended to be restricted to the few places where natural geothermal resource was available.

Even drilling to discover thermal energy required heavy capital spending, development timelines were long, and wells tended to degrade over time. All of this made debt and equity

investors uncomfortable with geothermal projects.

But now companies such as Fervo Energy, with geothermal systems (EGS) technologies, are challenging this view. Fervo does not need to rely on discovering naturally occurring hydrothermal reservoirs, because it can manipulate hot subsurface rock to create heat sources. Using fibre optic sensors it can also carry out much higher-precision monitoring of sub-surface conditions than was possible before.

EGS technologies has expanded the potential of geothermal power, and the US Department of Energy (DOE) predicts that



there could be 90GW of next-gen geothermal capacity by 2050. An ever-increasing pool of large offtake customers are emerging, on the hunt for clean, “always-on” energy.

Fervo has been operating its first large-scale commercial pilot, Project Red, in Nevada for close to a year and is currently in the process of building its first major greenfield project from scratch in Utah.

VALIDATION

Fervo’s validation process can be roughly split into a few phases, according to Sarah Jewett, VP of strategy at Fervo Energy. The first phase, between 2017 and 2019, was about building desktop models to show that

of money to build a full-scale demonstration or build a smaller one that does not need as much capital. It chose the latter, piggybacking off the existing facilities of another geothermal operator.

Fervo offered a win-win proposal. “We said: we have a proposal to increase the power production at your site. You will put no capital to work. You will only pay us in the event that we actually do produce hot geothermal fluid that you can generate power with, on a metered basis. You will pay us for that fluid on a metered basis. We are going to go test our technology on the outside of your field,” says Jewett. “They didn’t have to put anything at risk at the front, but they were able to benefit from the upside at back.”

“We can predict the temperature at depth and create a long lasting, geothermal subsurface unit that does not show signs of immediate temperature decline. So far we’ve been producing for 11 months with no temperature decline”

Sarah Jewett, VP of strategy, Fervo Energy

the technology would work from first principles and engineering fundamentals perspective.

Phase two was about proving that these simulations could translate to the real world.

“There are a bunch of things that people just don’t believe you can lift from a shale basin and put into a geothermal basin,” says Jewett. Things like drilling horizontally as opposed to just vertically or deviated – at an angle – or being able to stimulate rock above the fracture gradient.

Fervo also had to decide if it should raise a substantial amount

Usually what happens next in an energy project is a large-scale technical demonstration followed by commercial demonstration. But Fervo was getting strong signals from the market about an imminent need for geothermal energy. So, to speed things up, it rolled those two phases into one, which became Project Red.

“We said we can predict the temperature at depth and create a long lasting, geothermal subsurface unit that does not show signs of immediate temperature decline,” says Jewett. “So far we’ve been producing for 11 months with no temperature decline.”

FUNDRAISING HISTORY:

Series B:

April 2021 – \$28m

- Capricorn Investment Group
- Helmerich & Payne
- Breakthrough Energy Ventures
- 3X5 Partners
- Congruent Ventures
- Elemental Accelerator

Series C:

August 2022 – \$138m

- DCVC (lead)
- CPP Investments
- Liberty Energy
- Macquarie
- Grantham Foundation for the Protection of the Environment
- Impact Science Ventures
- Prelude Ventures
- Helmerich & Payne
- Capricorn Investment Group
- Breakthrough Energy Ventures
- Congruent Ventures
- 3X5 Partners
- Elemental Accelerator

Corporate investment:

April 2023 – \$10m

- Devon Energy

Series D:

February 2024 – \$244m

- Devon Energy (lead)
- Galvanize Climate Solutions
- Liberty Mutual Investments
- Mitsubishi Heavy Industries
- Marunochi Innovaition Partners
- Mercuria
- John Arnold
- Helmerich & Payne
- Congruent Ventures
- DCVC
- Impact Science Ventures
- Elemental Accelerator

Grant funding:

February 2024 – up to \$25m

- Department of Energy

PROJECT RED

Situated in northern Nevada, Project Red is Fervo's first large-scale commercial pilot, which has been producing power since November 2023.

The cost of the project is undisclosed, but it was financed entirely using money raised via its funding rounds.

It did not take long for it to start hitting its milestones. An initial 30-day well test showed a flow rate of 63 litres per second and 3.5MW of electric production, which Fervo at the time said were records for both metrics for any enhanced geothermal system. It had achieved lateral drilling lengths of 3,250 feet (990 metres), reaching temperatures of 191°C.

Fervo was able to secure a major offtake customer for the Nevada site in tech giant Google, who in 2021 agreed to buy power from Project Red to supply its data centres and other infrastructure around the state. Google, which had set a goal to achieve "24/7" carbon-free energy by 2030, needed to find clean baseload suppliers and was willing to take risks on new technologies to get it.

"We are very lucky that there are corporate entities out there like the large tech companies that are saying: We see the long-term need for this. It's going to be a big part of our story going forward, so we are willing to put our necks out there," says Jewett.

"Google didn't put any capital at risk, it was really just a reputational risk for them. We're going to put our necks out there and we're going to say, we will buy power from Fervo's project if it produces any power, and we will be willing to pay a premium



Project Red in northern Nevada Fervo's first large-scale commercial pilot

for that power because we want to make a long-term investment in Fervo's long-term well-being."

This paved the way for more fundraising. "We raised our series C mid-Project Red – we had accomplished early technical milestones, we had signed our agreement with Google, and that allowed us to raise our Series C even though we were still in

construction," says Jewett.

The corporate investors on the cap table tend to be ones that have deep knowhow in the type of methods Fervo uses in its operation. H&P, which came in at series B, is a drilling rig contractor, Devon Energy was an early mover in horizontal drilling techniques, and Liberty Energy is an experienced oil fields services provider, which said it would be working in collaboration with Fervo on similar challenges as it has faced in the shale industry.

DCVC, the venture capital firm that led the series C funding raise, said it was helpful to have corporate investors join at this point because they provided advice and could even help with procuring equipment.

Immediately after Project Red was finished, Fervo moved onto raise a series D funding round. It now had a more de-risked business model, but not quite to the extent that it could raise money from private equity.

"We're very lucky that there are corporate entities out there like the large tech companies that are saying: We see the long-term need for this. It's going to be a big part of our story going forward, so we are willing to put our necks out there"

Sarah Jewett, VP of strategy, Fervo Energy



The Cape Station plant in Beaver County, Utah, will have a capacity of 400MW over its first two phases

CAPE STATION

Fervo is now in the process of developing its first greenfield project, built by the company from the ground up. This is the Cape Station plant in Beaver County, Utah, which will have a capacity of 400MW over its first two phases, the first of which will be 90MW. Construction is scheduled to begin in October 2024 and it is set to come online in 2026.

Overall, however, the site has the potential for 2GW of capacity. Fervo leased the site based on data from wells drilled by Utah Forge, a geothermal demonstration project sponsored by the Department of Energy.

More than half the well field for phase 1 has already been drilled and a 30-day test has been carried out on the first set of wells.

The transmission agreements have been finalised. Consequently, Fervo believes the subsurface is ready

for notice to proceed on full-scale construction work, while on the surface side, it expects to achieve limited notice to proceed shortly. The capital is the final piece of the puzzle.

“What Utah Forge's data did was it sort of de-risked the subsurface environment for us. It sort of built a geologic map for us. We had a high degree of confidence of what it looked like at depth, what the temperature looked like and what the geology looked like,” says Jewett. Fervo was also drawn to the fact that the site would allow them to scale the project over time.

In June 2024, Fervo secured the largest power-purchase agreement (PPA)

for a geothermal project – 320MW – with Southern California Edison, over 15 years. The 320MW is split across the first and second phases of the project.

It also secured another 53MW of offtake contracts with community choice aggregators – groups of local governments that collectively procure energy for their residents – in California. The extent to which these are also split across both phases is not yet publicly available.

The first phase of Cape Station will cost around \$500m to build. Fervo had initially anticipated covering this with equity funding, but the cost of capital involved in doing that would be excruciatingly high. The financing mix has now changed.

Fervo received a \$100m bridge loan in September 2024 from X-Calibur Rural Capital (XRC) – a lender specialising in rural real estate and infrastructure projects, for phase 1, \$65m of which is earmarked for sub-surface development

\$100m

Fervo received a \$100m bridge loan in September 2024 from X-Calibur Rural Capital (XRC) for phase 1...

\$65m

...of which is earmarked for sub-surface development including drilling and completing wells...

including drilling and completing wells. A year ago, before Fervo was able to demonstrate its technology at Project Red, it would have been hard to imagine lenders being comfortable with that. The remaining \$35m will go towards surface development.

It is now looking at securing project-level equity, which it hopes to close over the next two quarters, followed by project-level term loans, which have far longer tenures than the type of construction bridge loan from XRC.

INVESTOR/LENDER CONCERNS

Investors still have a few questions about the project. There is a general fear that geothermal energy cannot scale, and concerns about the longer-term viability of the wells. Increasingly, however, people are getting more comfortable with the idea that, at the very least, the outcome is no longer as binary as it used to be. It is not that the well will not produce at all, but that it will fall somewhere in a designed range.

Even experienced sub-surface investors will be asking how long Fervo can keep up its level of production. Project financiers who back the company will have to be comfortable with the idea that there is relatively little data to work on.

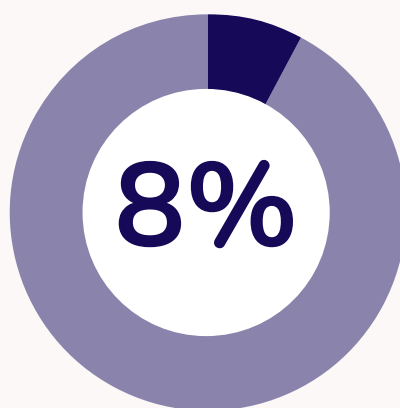
“We simply will not have 10 years of data. We have 11 months of data from a single well pair. And that is really helpful, but for many investors that is not enough.”

GOING FORWARD

Eventually, Fervo wants to get its cost of capital down – the rate of return needed to justify a capital expenditure – to a level on par with

“Right now we are in the realm of 50-60% loan-to-value, but in an ideal world they will be at solar levels of project financing in the future”

Sarah Jewett, VP of strategy, Fervo Energy



Fervo wants to get its cost of capital down to a level on par with solar – the gold standard of approximately 8%

solar, the gold standard of roughly 8%, reflecting a relatively very low risk venture.

A crucial part of achieving that is to increase the amount of debt that the company is able to raise for each project relative to the equity, which tends to be more expensive money, as equity investors expect higher returns than lenders.

“Right now we are in the realm of 50-60% loan-to-value, but in an ideal world they will be at solar levels of project financing in the future,” says Jewett.

With proper project financing in place, it hopes to be in a position to build multiple giga-scale projects with mostly debt. Fervo has already identified and acquired leases to multiple sites, with potentials of 2GW-3GW, across various states.

“By 2035, I imagine we will be a company that has a number of giga-projects under construction in various locations,” says Jewett. ■



By 2035, Fervo Energy hopes to have a number of giga-projects under construction

CASE STUDY: SOLARCYCLE

MODULAR APPROACH TO PROJECT FINANCE



COMPANY OVERVIEW

Founded in 2022, Solarcycle is a US-based startup that developed a method to recycle solar photovoltaic (PV) panels more efficiently than the prevailing current technologies.

The company is targeting a growth market as an increasing number of solar assets come to the end of their usable life. By some estimates, around one million metric tonnes of PV modules could be decommissioned by 2030 in the US, rising to 10 million by 20250. Globally, this would amount to more than 60 million metric tonnes.

“The problem of end-of-life solar was growing faster than people realised, and no one was tackling this problem in a serious way,” says Suvi Sharma, Solarcycle’s co-founder and CEO.

Policy in the US has also pushed for the development of the domestic supply chain to reduce dependence

on imported materials and promote domestic resource recovery.

Solarcycle is currently able to extract 95% of the value of the solar panel during recycling – compared with roughly 50% elsewhere in the market. Over time, it aims to be able to recover 99% of materials.

After a year the startup was able to raise nearly \$37m across two funding rounds, partly because of excitement over the new technology and partly due to investor confidence in CEO Suvi Sharma’s track record in the solar industry over 20 years, having previously founded and led solar technology companies such as Solaria (acquired by Maxeon) and Nextracker.

CORE CAPABILITIES

Recycling: Solarcycle’s proprietary technology is the first patented process to be able to recycle virtually the entire solar panel.

It is the metals in the panel that

FUNDRAISING HISTORY:

Seed:

May 2022 – \$6.6m

- Urban Innovation Fund
- Closed Loop Partners
- Peter and Lyndon Rive (founders of SolarCity)
- Tom Dinwoodie (CEO/CTO of Sunpower Corporation Systems)

Series A:

Announced March 2023 – \$30m

- Fifth Wall (co-lead)
- HG Ventures (co-lead)
- Prologis Ventures
- Urban Innovation Fund
- Closed Loop Partners

Grant funding:

April 2023 – \$1.5m

- Department of Energy

Tax Credits:

April 2024 – \$64m

- Department of Energy
- For use in Georgia plant – 2026

hold most of the value. There is a high demand for high-quality aluminium and it is very easy to sell silver. The glass and the plastic, however, are very difficult to sell and amount to around 90% of any solar panel.

Glass manufacturing: Solarcycle concluded that if it wanted to create a truly circular supply chain – as well as a larger company – it needed to turn some of these lower-value materials into new high-value materials itself. In other words, it needed to build a glass manufacturing facility.

The first manufacturing facility will be part of its upcoming plant in Georgia, using virgin feedstock to make the glass. Over time, it will introduce its recycled glass into the manufacturing process.

Solar-quality glass manufacturing is not itself novel – there are many comparable facilities in China. But this will be a first-of-a-kind in the US and project financiers – while recognising its de-risked nature – are being cautious.

VALIDATION

Some parts of Solarcycle's proposition were easier to validate than others. The glass factory itself uses existing technology, so it does not pose much by way of technology risk. The recycling plant carried some technology risk but not too much for VC investors.

Solarcycle had to reassure investors about market risk and execution risk. A spate of commercial agreements it already had mostly took care of the former, while getting competent contractors and equipment suppliers assuaged concerns of the latter.

"We put together a very detailed financial model that was very vetted. We didn't put in there, ourselves,



Solarcycle's proprietary technology is able to recycle virtually the entire solar panel

what type of financing was assumed in there. We just did a *pro forma*, here's how much cash the factory is going to spit out, here's the profitability, the EBITDA, etc," says Sharma.

"We just showed what we believe to be a realistic case of what we can do and that this was ultimately financeable because there was enough gross margin and EBITDA in the project. We felt as though

top management, who needed a recycling solution.

Having a well-respected brand on board at such a nascent stage teed them up for more big-name customers, and made investors much more at ease with putting in their money.

At the same time, Solarcycle worked hard to remove any obstacles to customer acquisition.

"We just showed what we believe to be a realistic case of what we can do and that this was ultimately financeable because there was enough gross margin and EBITDA in the project"

Suvi Sharma, CEO, Solarcycle

we had reduced or mitigated a lot of the key market, technology and execution risks."

One initial marker that helped from the beginning was when Solarcycle came out of stealth, already having an agreement with residential solar provider SunRun. Sharma was able to strike the deal leveraging his existing relationships with SunRun's

The larger Fortune 500 companies, for example, tend to carry out a series of audits on quality, safety, environmental health and others. For Solarcycle, getting their ISO certifications and making sure they were early to tick off what they knew would be the boxes big companies were looking for was a priority.

FIRST FACILITY

Solarcycle began building its first recycling facility in Odessa, Texas, in 2022. The project cost \$8m so the company did not need project financing. Instead, the facility was financed with a combination of equity finance and equipment financing, in where debt is taken out to make or buy equipment, which may itself be used as collateral. The facility was built in a modular way – in phases as capacity increases, meaning it was not a big capital commitment at the beginning.

The equity portion came partially from Solarcycle's balance sheet, while a portion was provided by Fifth Wall, the venture capital firm that also led the series A round. HG Ventures, the investment arm of the Heritage Group, an industrial conglomerate, also came on board at this stage as the other series A leader. Ginger Rothrock, senior director at HG Ventures says it was easier to back a company such as Solarcycle that was taking a modular approach on its FOAK, rather than one that was looking for a single, large capital injection to build a capital facility.

"With the Odessa facility, we didn't need to spend all \$8m at once – just around \$1.5m at a time. We can just grow as we need and as our cash flows increase. With the glass factory, it's all or nothing. You've got to build at a very large scale to begin with," says Sharma.

Not having debt for the recycling part of it meant that Solarcycle has been able to move quickly. Sharma says that in two-and-a-half years the company has signed up 70 of the 120 largest solar companies as customers,

For future recycling facilities, the company wants to rely increasingly

"With the Odessa facility, we didn't need to spend all \$8m at once – just around \$1.5m at a time. We can just grow as we need and as our cash flows increase. With the glass factory, it's all or nothing. You've got to build at a very large scale to begin with"

**Suvi Sharma, CEO,
Solarcycle**

on equipment financing so that it does not even need to use equity fundraising, let alone debt.

GEORGIA FACILITY:

Solarcycle's newest and largest facility will be sited in Cedartown, Georgia, and will comprise a recycling plant and a glass

manufacturing plant next to each other. When announced, the cost was expected to be \$344m, but in reality it will come in at slightly more than \$400m.

Like the Odessa plant, the recycling facility in Georgia will be financed using equity and equipment debt. Unlike the Odessa plant, the glass manufacturing part will be project financed, with a combination of equity and debt.

While there are a number of glass manufacturing facilities in China that specialise in glass for solar panels, Solarcycle's will be one of, if not the, first in the US to do it for the domestic market. For that reason, it was not able to achieve the same type of debt-equity ratio as other infrastructure projects.

Whereas some infrastructure projects are built with 70-80% debt – and some energy generation projects get 90% or more – the Georgia glass factory will be going in at roughly 50-50.

Lenders wanted to see a number



Solarcycle began building its first recycling facility in Texas in 2022 at a cost of \$8m

of things, including that there was substantial equity on board to balance out the debt, that there was enough contracted offtake to keep revenue coming in, and that the project would be able to service its debt.

As it stands, the plant has virtually all of its offtake contracted with customers for the first five years, and while lenders were not yet willing to go much beyond a 50-50 debt-to-equity ratio, they were willing to set some of their debt terms roughly in line with a traditional infrastructure project. The accepted debt service coverage ratio – the metric to assess whether a project can make enough money to pay back its debt, arrived at by dividing

needed for the glass manufacturing plant. Initially, this will come from virgin material, with a shift over time to using the recycled glass into its own operations.

THE FOAK EFFECT

Creating a glass manufacturing process that had not been done before in the US meant some investors were more hesitant to put up the cash.

“There is a knee-jerk reaction to a FOAK that does not need to be there” says Sharma. “Luckily, we still had several [investors] that ended up putting term sheets on the table, but if this was not a FOAK, we could have got 20 term sheets.”

Consequently, some of the term sheets Solarcycle got for the equity

“There is a knee-jerk reaction to a FOAK that does not need to be there. Luckily, we still had several [investors] that ended up putting term sheets on the table, but if this was not a FOAK, we could have got 20 term sheets”

Suvi Sharma, CEO, Solarcycle

net operating income by total debt service – is within the typical 1.2-1.5 range. The interest rates on the debt are also broadly consistent with where they tend to be with infrastructure projects.

The details on the payback period are still being worked out, but will likely fall in the range of 10-15 years, again broadly in line with similar infrastructure projects. Financial close – the milestone at which all the financing and loan agreements are finalised before construction begins – is anticipated before the end of the year.

Solarcycle has also already secured the bulk of the feedstock

side of project financing were quite expensive, in large part because of the high internal rate of return requirements of private equity investors.

“We ideally would have loved to have a 30-70 split between equity and debt, but we saw fairly early on that was not going to happen. It needed a higher equity-to-debt ratio, at least for this first project.”

Investors would do well to be more pragmatic and see what the real risks are without being scared off by FOAK, says Sharma. Focusing on the ways that risks can be mitigated from first principles will make a lot more of these technologies more attractive whether they are FOAK or not. ■

PARTNERSHIPS AND CONTRACT AGREEMENTS:

2023:

- January: Selected as a national recycling partner of Solar Energy Industries Association (SEIA)
- June: Orsted – agreement to recycle 100% of end-of-life panels
- September: Greenbacker – agreement to recycle panels from decommissioned plants
- November: EDF Renewables North America - agreement to recycle solar modules

2024:

- February: QCELLS – agreement to recycle solar modules
- March: Silfab – agreement to buy low-carbon glass
- April: Sol Systems – agreement to recycle solar panels
- August: RNWBL – agreement to recycle glass from decommissioned from commercial and industrial projects.
- September: Canadian Solar – “Cradle to cradle” agreement to be preferred recycling partner.
- September: Heliene – agreement to buy recycled glass

O&G investors pull back in Q3 – except in transport

Oil and gas companies slowed down their rate of backing startups in Q3, except for in the transport sector. The few funding rounds that they are participating in, however, are larger than ever, in part due to the increasing size of energy sector corporate funds

BY **KALOYAN ANDONOV**
Analyst and reporter

The dollar value of startup funding rounds backed by oil and gas companies fell to \$1.07bn in the third quarter of 2024, down 32% from the same period last year (\$1.58bn).

This cohort backed just 34 funding rounds in the three months to the end of September, down from 41 in the same period last year. This follows a general pattern of decline in funding round numbers since 2022.

Investments in cleantech companies stayed flat versus the same quarter in 2023, while those in IT declined from last year. There was, however, a notable rise in the number of startups in the transport space receiving backing from the oil and gas peer group.

For example, Twin Towers Ventures, the

investment arm of Malaysian state energy company Petronas backed the \$100m series E funding round raised by Chinese new energy-focused fleet manager DST.

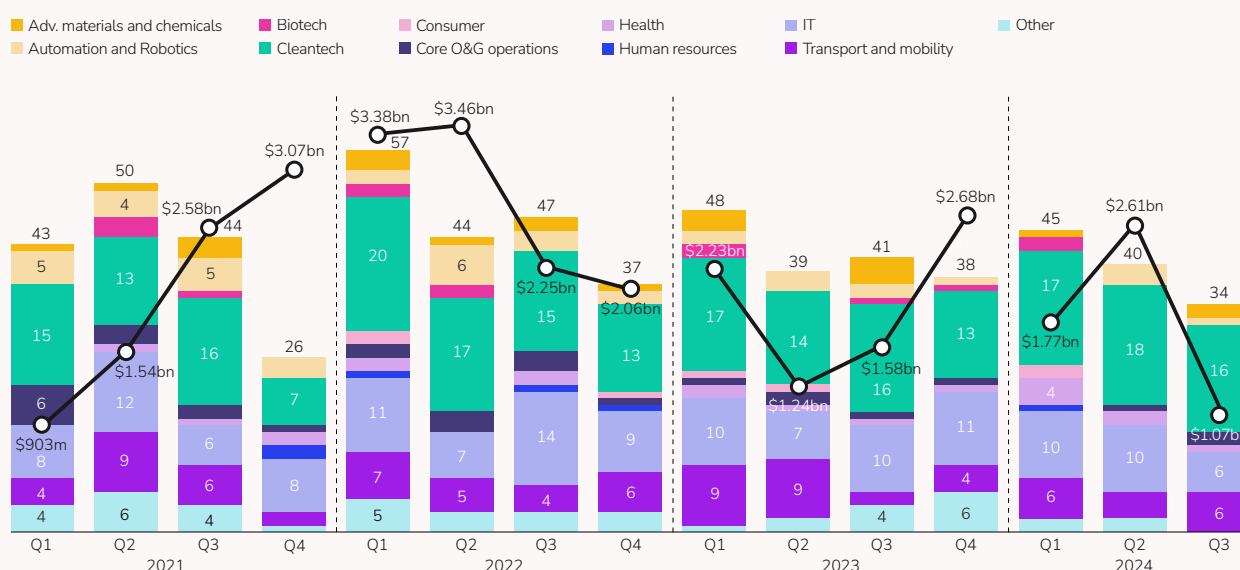
Sustainable aviation and ship fuel developer Aether Fuels raised a \$34m series A round, backed by Chevron and Doral Energy, among others.

Meanwhile XCharge, a provider of fast-charging technology for electric vehicles, listed on the Nasdaq. The company, which operates from China and Germany, has been backed by Shell Ventures.

Within cleantech, carbon capture, energy storage, hydrogen and solar tech continued to account for most of the investments in the first three quarters of 2024, including some of the largest rounds.



FIG 1: QUARTERLY INVESTMENTS BY OIL & GAS CORPORATES PEER GROUP 2021-2024 BY QUARTER



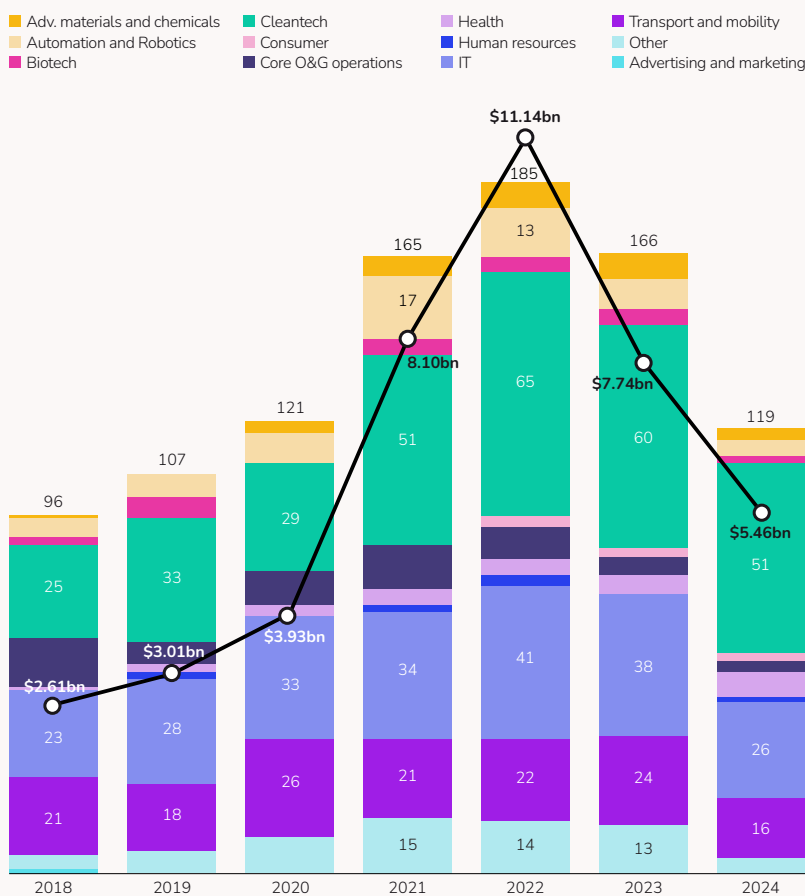
Since 2014, Shell, Chevron and Equinor have led the way in cleantech investments, with Saudi Aramco rapidly closing the gap in recent years. Aramco and Chevron have also been at the forefront of IT technology investments, while Shell and BP have been the most active in backing transport and mobility startups.

DEAL SIZE IS AT A RECORD LEVEL

Though oil and gas companies have backed a diminishing number of funding rounds, the size of the deals they participate in is getting larger. The median dollar volume of rounds backed by energy investors now stands at \$30m for 2024 so far, 36% higher than in 2023 (\$22m). This is also the highest level we have seen to date.

Larger rounds are being enabled by the increasing size of oil and gas sector investment funds. In early 2024, Saudi Aramco added \$4bn to its CVC unit, while Chevron recently launched a third investment fund of \$500m, more than double the size of its previous two funds.

FIG 2: ANNUAL INVESTMENTS OF OIL & GAS CORPORATE PEER GROUP 2018-2024



VOLATILE COMMODITY PRICES

The West Texas Intermediate crude benchmark price ranged between approximately \$65 and \$84 per barrel during Q3 2024.

OPEC+ countries have been cutting output since late 2022, but this may be changing soon. According to sources originally cited by the *Financial Times*, Saudi Arabia is likely to abandon its informal target of \$100/bbl for crude oil, as it plans to increase production. Part of the volatility in oil prices in recent times has also been related to the conflict in the Middle East and growing tensions between Israel and Iran.

Futures contracts indicate that markets generally anticipate the WTI price to average within the \$60-\$80

Outlook report (from early October 2024) expects the Brent benchmark to average \$78 per barrel throughout next year, discounting a "reduction for global oil demand growth in 2025". This forecast does not contemplate further escalation of the conflict in the Middle East.

The EIA has revised its previous forecasts on natural gas prices and now expects them to rise to \$2.80/MMBtu (million British thermal units) by the end of this year and to \$3.10 in 2025.

This is up from a previously expected \$2.50. This prediction has much to do with an expectation of liquefied natural gas exports to go up with the addition of capacity. ■

\$1.07bn

The dollar value of startup funding rounds backed by oil and gas companies, down **32%** from the same period last year

\$30m

The median dollar volume of rounds backed by energy investors in 2024, up **36%** on last year's \$22m

range, though with broad confidence intervals ranging from \$40 to \$120.

The latest US Energy Information Agency (EIA) *Short Term Energy*

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

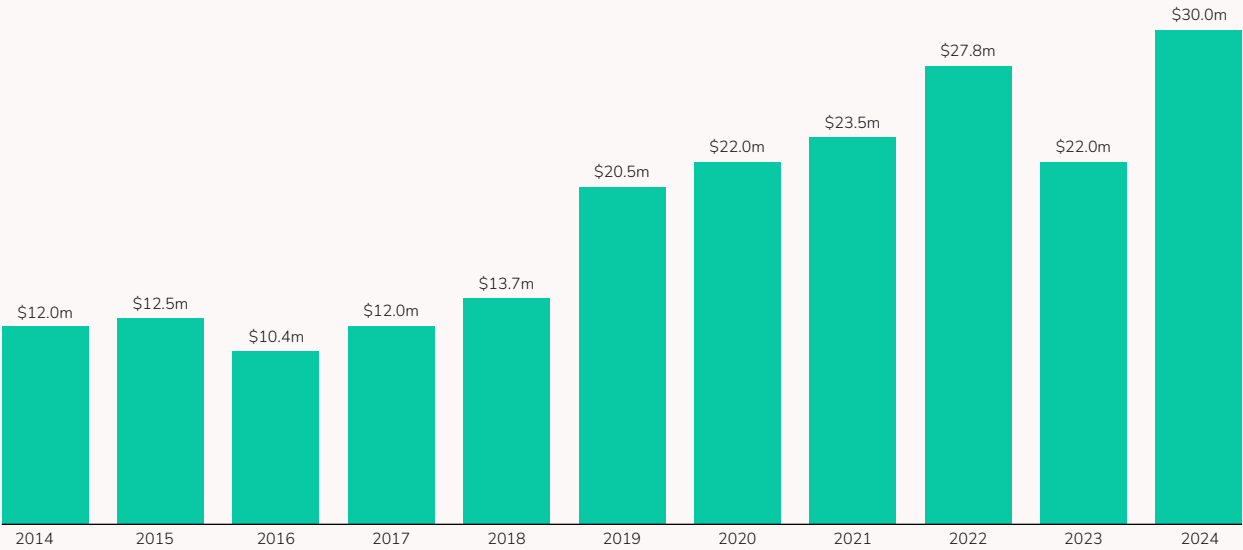


FIG 4: TYPE OF OIL & GAS CORPORATE VC INVESTMENTS BY YEAR

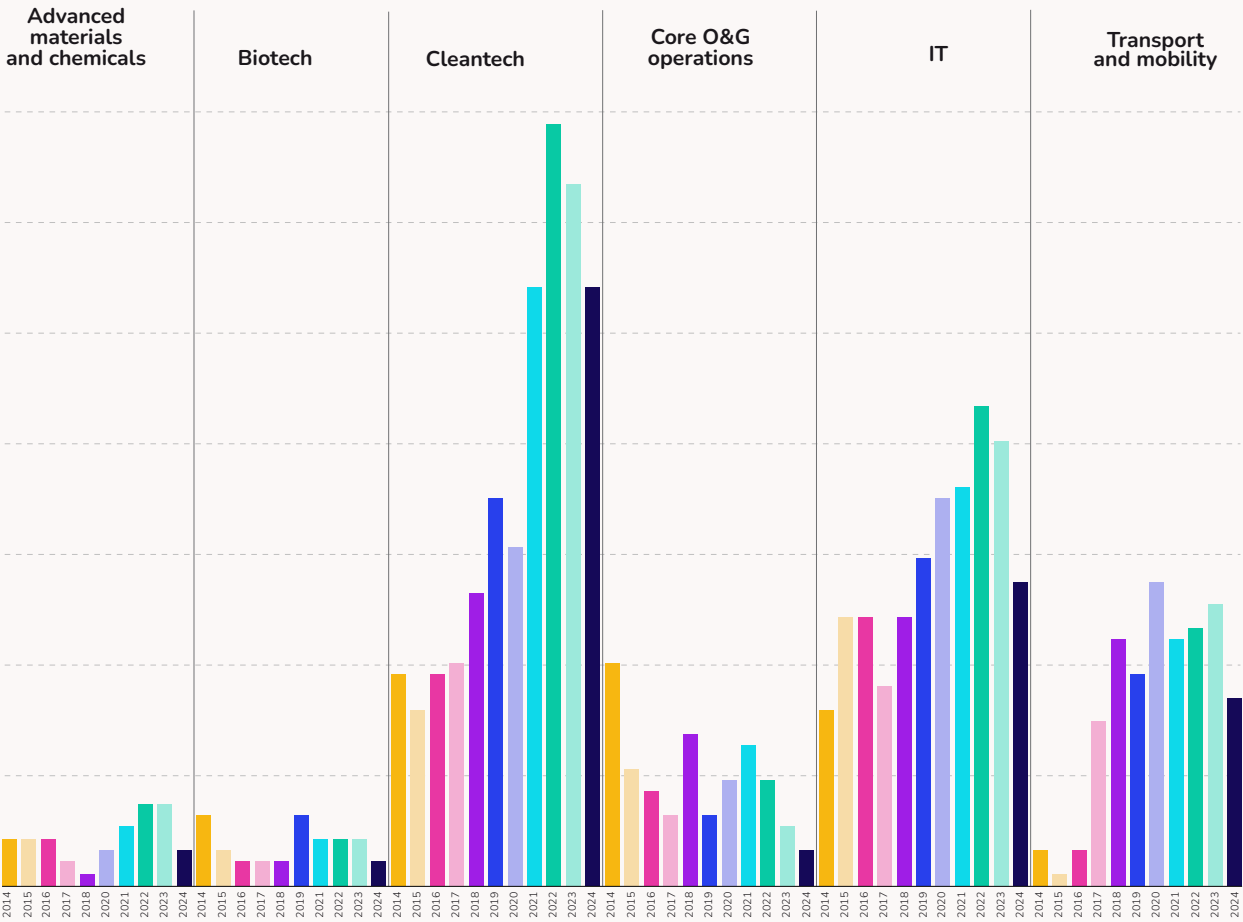


FIG 5: TYPE OF OIL & GAS CORPORATE VC INVESTMENTS – Q2 2023 VS Q2 2024

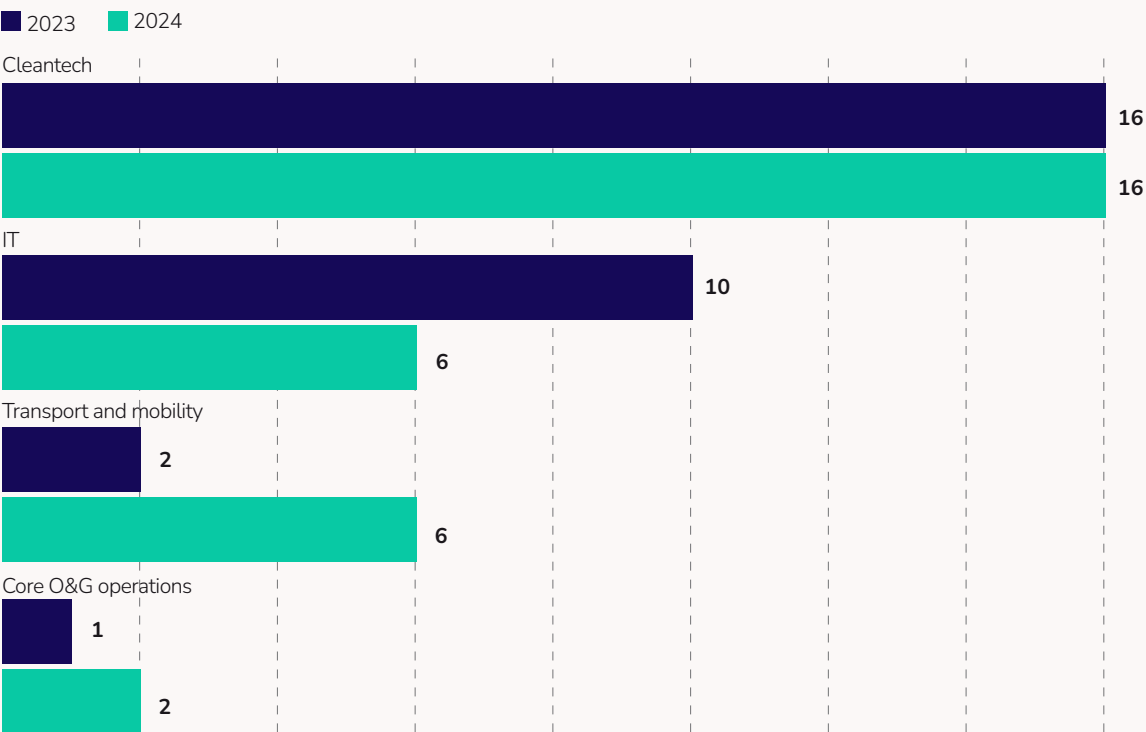


FIG 6: WTI CRUDE OIL PRICE AND NYMEX CONFIDENCE INTERVALS (DOLLARS PER BARREL)

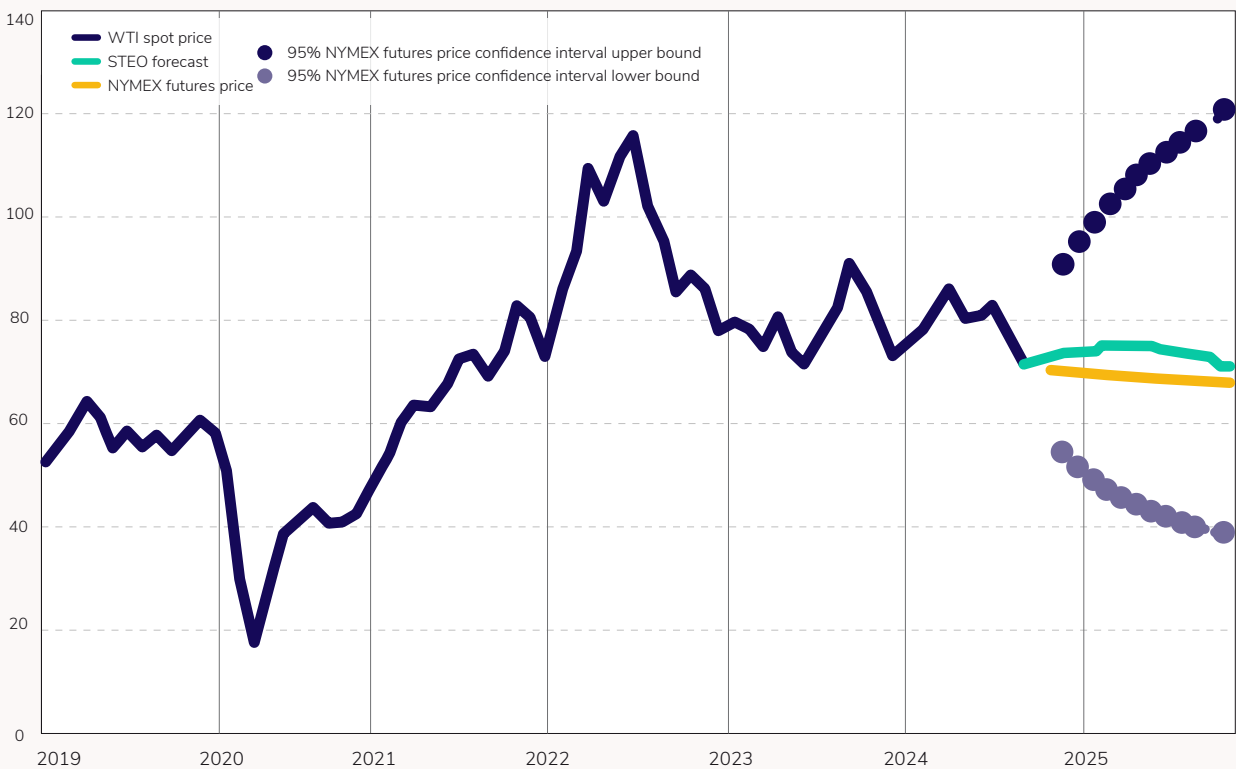


FIG 7: CLEANTECH INVESTMENT BY OIL & GAS CORPORATES 2020-2024

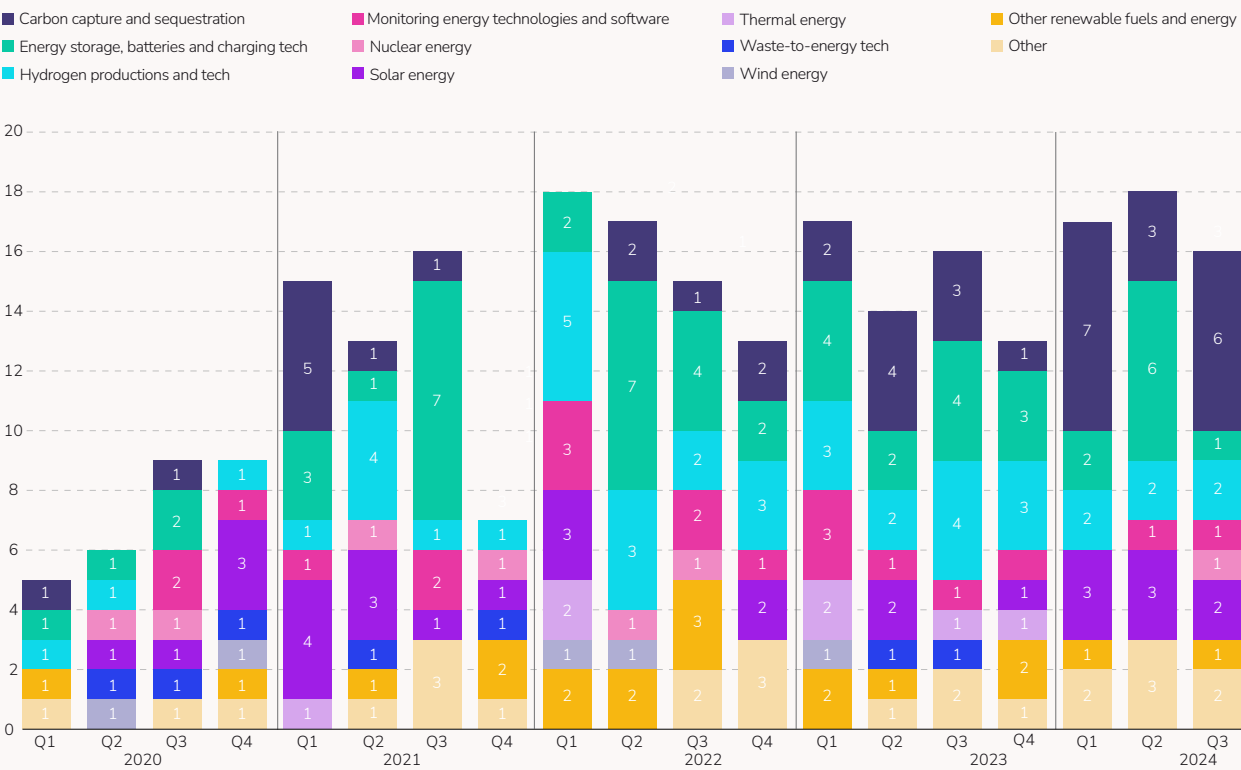


FIG 8: TRANSPORT AND MOBILITY INVESTMENTS OF OIL & GAS CORPORATES 2020-2024

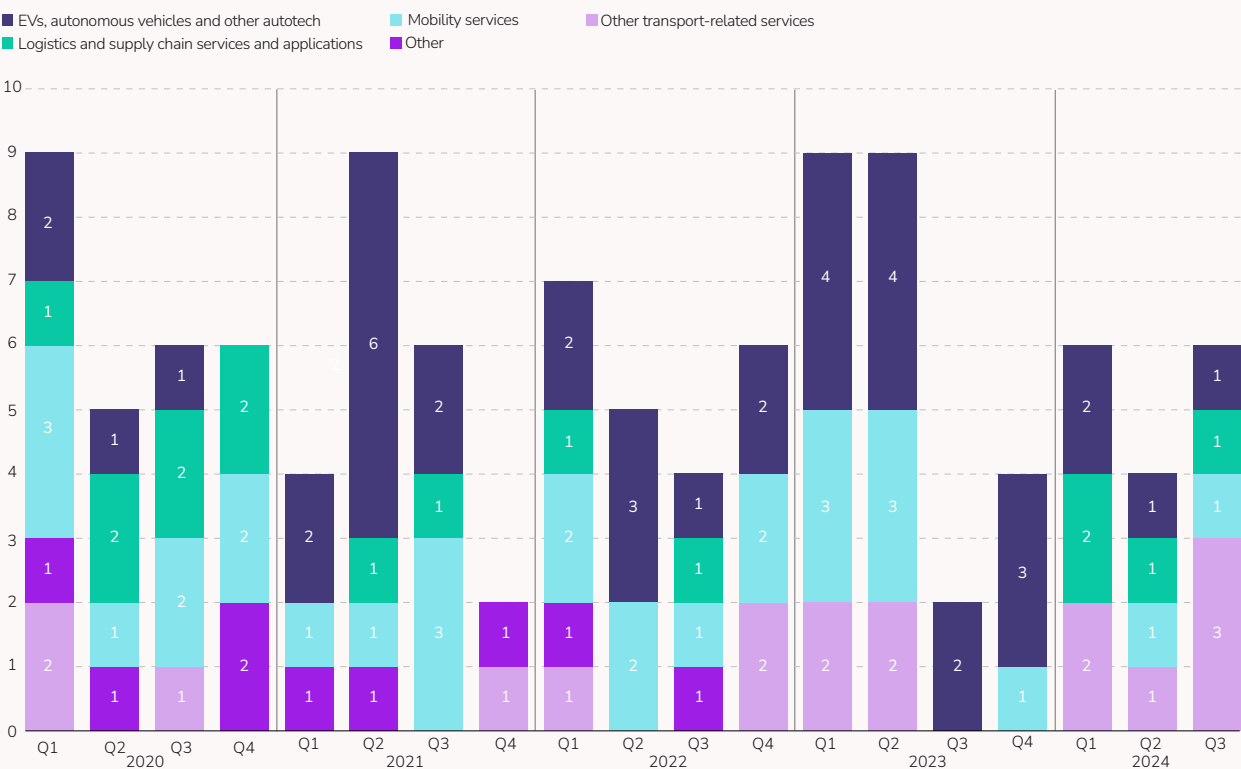
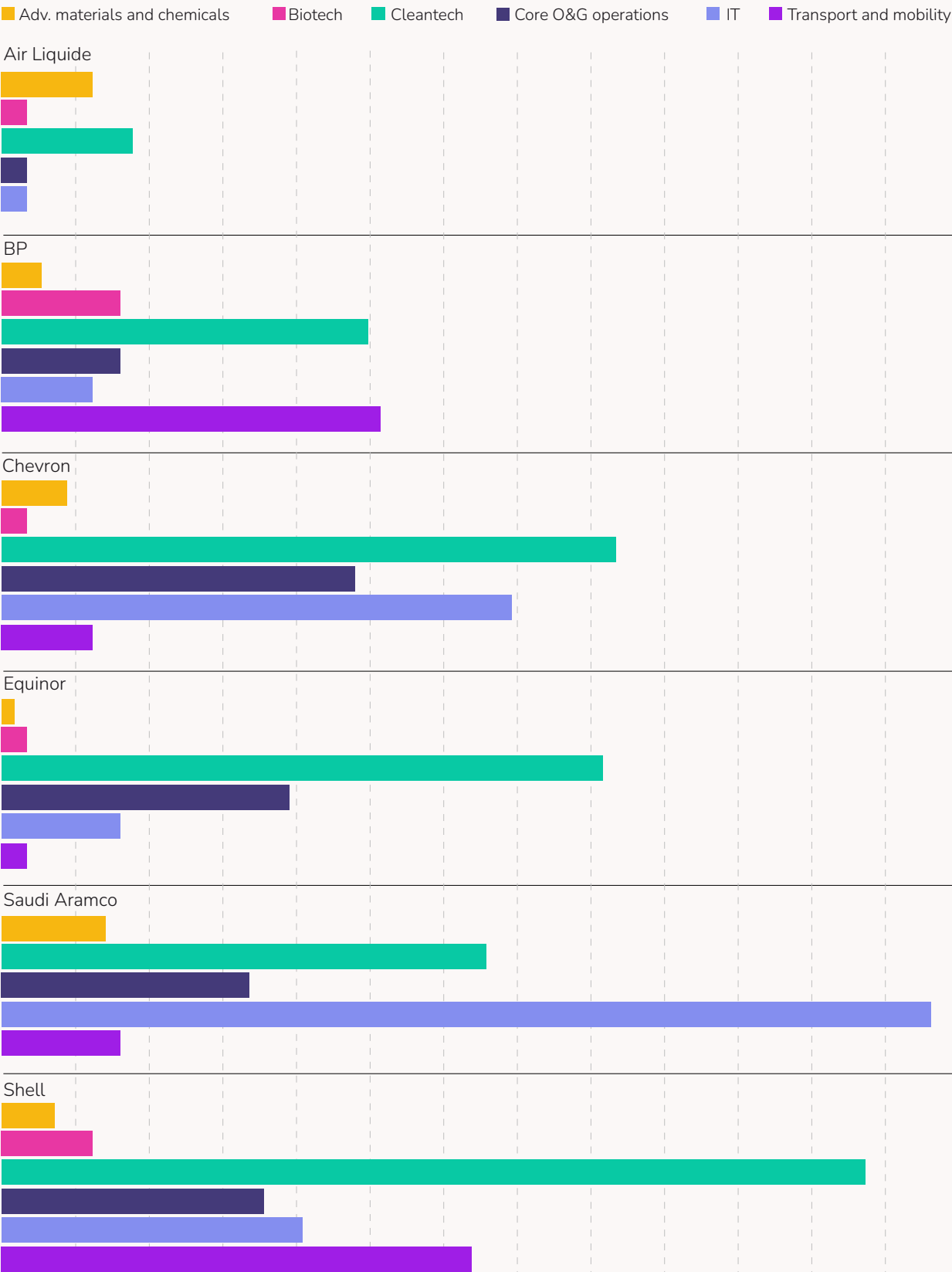


FIG 9: TYPE OF INVESTMENTS BY COMPANY 2014-2024



DEALS

Saudi Aramco, Chevron, Petronas and Equinor were investors in some of the largest funding rounds by dollar size in the third quarter of 2024. The largest funding rounds were for startups operating across diverse areas – from carbon removal tech and sustainable aviation fuel through data management and EV charging solutions to hydrogen tech.

TABLE 1: TOP DEALS OF OIL AND GAS CORPORATE PEERS Q3 2024

Portfolio	Round	Sector	Size	Investors
Zap Energy	C	Cleantech	\$130m	BAM Elevate, Breakthrough Energy Ventures, Chevron, DCVC, Emerson Collective, Energy Impact Partners, Lowercarbon Capital, Mizuho Financial, Plynth Energy, PTTOR International Holdings, Shell, Soros Fund Management.
DST	E and beyond	Transport & mobility	\$100m	Petronas, undisclosed investors.
Fortera	C	Cleantech	\$85m	Alumni Ventures Group, Khosla Ventures, Saint-Gobain, Sumitomo, Temasek, Wollemi Capital.
LevelTen	D	Cleantech	\$65m	Alphabet, Aster Group, B Capital Partners, Constellation Technology Ventures, Equinor, Intercontinental Exchange, Microsoft, NGP Energy Technology Partners, Prelude Ventures, Zoma Capital.
Baseload Capital	B	Core O&G operations	\$59m	Baker Hughes, Breakthrough Energy Ventures, ENGF, Gullspång Re: food Invest, Nefco.
Thinkre	C	Cleantech	\$56m	Bridge Capital, China Construction Bank, FengHe Group, Sinopec Engineering Group.
Utility Global	C	Cleantech	\$53m	Ara Partners, ArcelorMittal, Ontario Power Generation, Saint-Gobain, Saudi Aramco.
Iliad Technologies	Undisclosed	Cleantech	\$50m	Arcadium Lithium, SLB.
Seeq Corporation	D	IT	\$50m	Altira Group, Insight Partners, Saudi Aramco, Second Avenue Partners, Sixth Street
Loglass	B	IT	\$47m	All Star SaaS Fund, Angel Bridge, Massachusetts Institute of Technology, Mitsubishi UFJ Financial, Mizuho Financial, Moore Strategic Ventures, Nippon Life, Persol Holdings, Sequoia Capital, Spiral Capital Japan Fund, Sumitomo, Sumitomo Mitsui, Yamaguchi Capital.

ZAP ENERGY

Series D:

\$130m

US-based nuclear fusion reactor developer Zap Energy raised a \$130m series D round led by Soros Fund Management, putting the company's pre-money valuation at \$970m, according to PitchBook. Chevron Technology Ventures and Shell Ventures participated in the round, alongside Mizuho Financial Group, Breakthrough Energy, Xplor Ventures Company, BAM Elevate, the government of Abu Dhabi and others.

DST

Series E+:

\$100m

China-based new energy-focused fleet manager DST completed a \$100m series E+ round, which featured Twin Towers Ventures, the corporate venture capital arm of Malaysia's oil and gas company Petronas. DST defines itself as a new energy vehicle (NEV) fleet management company. It boasts 100,000 NEVs under management, serving more than 5,000 enterprise clients and 400,000 drivers. It plans to invest the funding in R&D on its real-time computational analytics.

FORTERA

Series C:

\$85m

US-based advanced materials manufacturer Fortera secured \$85m in a series C funding round to scale the deployment of its low-carbon cement technology that integrates with existing infrastructure. Presidio Ventures, venturing arm of Sumitomo, and chemical producer Saint-Gobain's NOVA venturing arm. Fortera's ReCarb technology integrates with existing cement production facilities and leverages current feedstocks and infrastructure to decarbonise cement at scale. It captures CO₂ emissions directly from production and converts it to ready-to-use low-carbon cement.

LEVELTEN ENERGY

Series D:

\$65m

US-based Power purchase agreement (PPA) marketplace LevelTen Energy raised \$65m in a series D funding round to support growth of its platform and expansion into new markets. The round, comprised of both growth capital and the convertible notes, featured multiple corporate investors including Equinor Ventures, the venturing arm of Norwegian oil company Equinor, Microsoft's Climate Innovation Fund, Google, consulting firm Aster, as well as clearing house and securities exchange provider Intercontinental Exchange. Founded in 2016, LevelTen claims to have facilitated more than \$14.8bn in PPAs, asset sales and other clean energy transactions.

BASELOAD CAPITAL

Series B:

€53m

Sweden-based geothermal development company Baseload Capital raised a €53m series B round, backed by oil and gas technology company Baker Hughes. The round was led by Ingka Investments – the investment arm of Ingka Group, the largest IKEA retailer. It also featured Nefco, Breakthrough Energy Ventures and Gullspång Invest. Baseload Capital specialises and invests in geothermal projects worldwide. Its subsidiaries – the Baseload Power companies – build, commission and operate geothermal heat and power plants funded by Baseload Capital.



THINKRE MEMBRANE

Series C:
\$56m

China-based material company Thinkre Membrane raised a \$56m series C round that featured oil and gas services company Sinopec Engineering's investment arm Sinopec Capital. Thinkre is developing perfluorinated ion-exchange membrane products designed for hydrogen fuel batteries. Its products aim to solve the core membrane material problem in the hydrogen fluoride flow battery and hydrogen fuel-cell field, making storage more efficient and hydrogen vehicles possible.

UTILITY GLOBAL

Series C:
\$53m

US-based hydrogen tech developer Utility Global raised \$53m in its series C round, led by the OPG Pension Plan and joined by multinational steel company ArcelorMittal, via its XCarb Innovation Fund. Aramco Ventures also participated in the round. ArcelorMittal and Utility Global also entered into a collaboration agreement to develop a commercial facility at one or more of ArcelorMittal's integrated steel plants. Utility Global has developed a proprietary reactor which processes industrial gases, without the use of electricity, into high-purity hydrogen and a concentrated CO₂ stream that can be captured on site.

ILIAD TECHNOLOGIES

Funding closed:
\$50m

US-based lithium mining company ILiAD Technologies closed a \$50m funding round, featuring oil and gas services company SLB (NYSE: SLB) and Arcadium Lithium. This investment unlocks funding to build upon the technological advantages of ILiAD's direct lithium extraction technology platform and expands its reach for deployment at lithium production sites across the world. SLB has integrated ILiAD technology into its sustainable lithium production solution, which is currently undergoing technical trials. SLB plans to use ILiAD technology as part of its commercial offering for sustainably producing lithium from brine at scale.

SEEQ

Series D:
\$50m

US-based industrial analytics company Seeq closed a \$50m series D funding round led by leading global investment firm Sixth Street Growth, with participation from existing investors, including Aramco Ventures. The round reportedly brings Seeq's total funding to approximately \$165m. Founded in 2013, Seeq has developed a software platform that enables customers in the manufacturing and industrial industries, including oil and gas, chemicals and pharmaceuticals, to get data from connected systems and share it quickly and easily.

LOGGLASS

Series B:
\$46.6m

Japanese cloud-based business management system provider Loglass raised ¥7bn (\$46.6m) in a series B funding round, featuring Sequoia Heritage and All Star Saas Fund as co-lead investors. Sumitomo Corporation Venture Partners, a venturing arm of industrial conglomerate Sumitomo was also on the cap table as a new investor. Loglass provides data management services, with its Loglass Business Management product, streamlining the collection, integration and centralisation of management data held throughout a company.



EXITS

As VC markets appear to make a gradual recovery, we tracked a number exits in Q3 this year – one of them was an IPO, two leveraged buyouts and one possible acquisition of a company that has gone into administration

XCHG (X-CHARGE)

China-based EV charging tech developer XCHG (X-charge) raised \$20.67m in its initial public offering on the NASDAQ stock exchange under the ticker symbol of XCH. It sold 3.3 million shares at \$6.2 per share. The company was previously backed by Shell Ventures and Samsung Venture Investment.

HEATEN

Norway decarbonisation tech develop Heaten, previously backed by Shell Ventures, was acquired by INNIO, through its financial sponsors Advent International and Abu Dhabi Investment Authority, in a leveraged buyout for an undisclosed amount. Heaten has developed very high temperature heat pumps (VHTHP) for more efficient and deep de-carbonisation of industrial heating processes.

PARSABLE

US-based industrial collaboration technology developer Parsable was acquired by CAI Software, via its financial sponsor STG Partners, through a leveraged buyout for an undisclosed amount. The company counts Aramco Ventures, SLB, Airbus, Cysco Systems and Honeywell among its previous backers.

FULCRUM BIOENERGY

Sustainable fuel maker Fulcrum Bioenergy is reportedly in talks to be acquired by Swift for \$15m, according to PitchBook. The company, which counts BP Ventures, United Airlines Ventures, Japan Airlines, Marubeni and SK Group among its backers, entered into administration on 9 September 2024. Fulcrum's technology involves a process of converting municipal solid waste into low-carbon transportation fuel, including sustainable aviation fuel and diesel



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FUNDS

We saw a few new funding initiatives involving corporate investors in the energy sector in the third quarter of 2024

IDEMITSU KOSAN UNNAMED FUND

Fund size:
\$66m

Japanese energy and materials company Idemitsu Kosan launched an unnamed fund sized at \$66m to target energy and materials tech. The new vehicle will focus on decarbonisation technologies, including circular economy, biofuels, battery materials, green hydrogen and synthetic fuels.

EMERALD VENTURES ENERGY FUND

Launched:
2023

Swiss energy-focused VC firm Emerald Ventures has welcomed Japanese power generation company JERA as a limited partner (LP) in its Energy Fund. The collaboration aims to help JERA achieve its zero carbon emissions goals by 2050, amid a global push for decarbonisation. Jera also has a corporate venturing arm, JERA Ventures, which was launched in 2023, with \$300m to deploy. Its investment mandate encompasses transformative technologies for the energy system, combating climate change. Emerald's fund will invest in alternative energy sources, including blue hydrogen to achieve the LP's (Jera) decarbonisation goals.

BHARAT PETROLEUM CORPORATION UNNAMED FUND

Capital outlay:
\$2.2bn

Bharat Petroleum Corporation (BPCL), the Indian state-backed oil and gas company, announced a new \$2.2bn capital outlay, some of which will go towards a new corporate venture capital fund targeting renewable energy startups, along with petrochemicals, non-fuel retail and digital products. Bharat Petroleum said it is establishing a corporate venture capital fund, according to Indian business publication *The Economic Times* but no further details were provided. The company has a target of net zero carbon emissions from its operations by 2040.



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PEOPLE MOVES

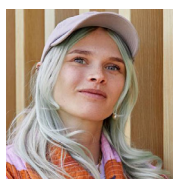
We reported a few people moves in the energy sector over the third quarter of 2024

RAMKUMAR KRISHNAN LG NOVA



Ramkumar Krishnan joined LG Nova, an incubation arm of South Korean consumer electronics firm LG Electronics, as head of cleantech incubation. He will identify hardware and software business ideas and projects that can help LG achieve sustainability. Krishnan spent nearly seven years at lithium-ion battery developer BattGenie, where he was business lead and acting chief marketing officer. Before that, he was chief technology officer at renewable energy companies BrightNight, NantEnergy and Fluidic Energy.

MARIA EMILIE DANØ HOFFMANN ØRSTED VENTURES



Maria Emilie Danø Hoffmann has left her managing director role at Danish energy group Ørsted's corporate venture capital arm, Ørsted Ventures. Copenhagen-based Hoffmann joined Ørsted's offshore unit as senior business developer of innovation in 2018. In March 2022, she became managing director of Ørsted Ventures and Open Innovation. Under her leadership, the CVC unit backed companies including Spoor, a Norwegian startup that built an AI system to monitor birdlife on windfarms, and Amperon, which produces energy forecasts for grid monitoring.

TILL WYSZYNSKI ENECO VENTURES



Till Wyszynski, former investment principal at E.on's CVC fund, joined the investment arm of Dutch energy company Eneco as investment director. Wyszynski will invest in European startups and scaleups that accelerate the energy transition. Startups in Eneco Ventures' portfolio include 42Watt, Klimate.co and Fusebox. During the past three and a half years, Wyszynski has worked with startups as an adviser and interim CFO. He was the founder and CEO of startup Muvon, an operating system for electric vehicle charging, which was bought by European energy company E.on.

IONEL NECHITI ARAMCO VENTURES



Saudi Arabian oil and gas producer Aramco hired Ionel Nechiti as an investment director for its corporate venture capital arm, Aramco Ventures. Based in Houston, Nechiti will help Aramco Ventures with VC investments and portfolio management. He joins the 13-person North America team led by managing directors Jim Sledzik and Daniel Carter, the latter of whom was a GCV Emerging Leader in 2021. Nechiti spent nearly six years at renewable energy-focused asset management firm Platform Investment from 2019, most recently as chief executive and managing director.

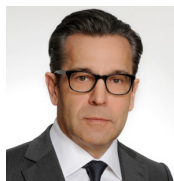
GLOBAL ENERGY COUNCIL

**TONY SUN**

Director of corporate venture capital
**GC Ventures and chair of the
Global Energy Council**

**FUNDA ÇENTIN**

Head of innovation
and venture capital
Tupras Ventures

**STEFAN GABRIEL**

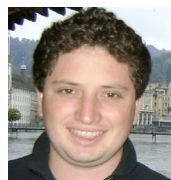
Managing director and CEO
Hitachi Ventures

**TAHA HUSSAIN**

Head of strategic VC investments
Aramco Ventures

**TINA TOSUKOWONG**

Investment director
TDK Ventures

**BRUNO ARCADIER**

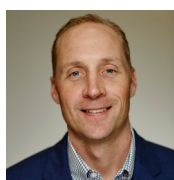
Investment leader
Vale Ventures

**TOBIAS JAHN**

Partner
Hitachi Ventures

**KENDRA RAUSCHENBERGER**

General partner
Siemens Energy Ventures

**CHAD W. BOWN**

Managing partner
BP Ventures

**KEMAL ANBARCI**

GM, venture capital
Chevron Technology Ventures

**VARUN RIKHI**

Implementation manager
Shell Ventures

**FEDERICO CRISTOFANI**

VX ventures manager
Vista Energy