



Global

Corporate

Venturing

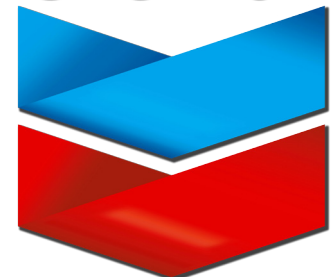
January 2020

Oil and gas sector review 2019



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Kaloyan Andonov, analyst

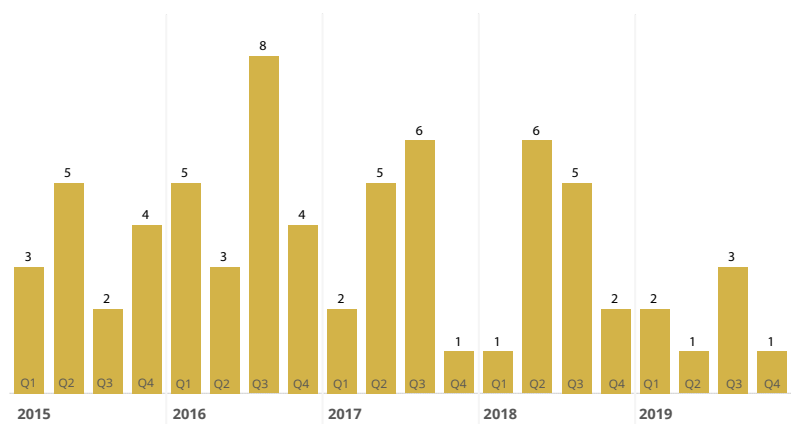
There has been a general shift in focus of oil and gas corporate venturers we have been observing since 2014 until the end of 2019 and the end of the already past decade.

Expectedly, most of the disclosed investments by oil and gas corporate investors went into non-core areas, such as cleantech, IT and, most recently, mobility and transport technologies.

As a whole, oil and gas corporate venturers now tend to make more investments in low-carbon energy technologies, mobility and transport as well as in “datafication” and digitisation of their complex industrial activities, while somewhat ring-fencing bets in core upstream and downstream innovations.

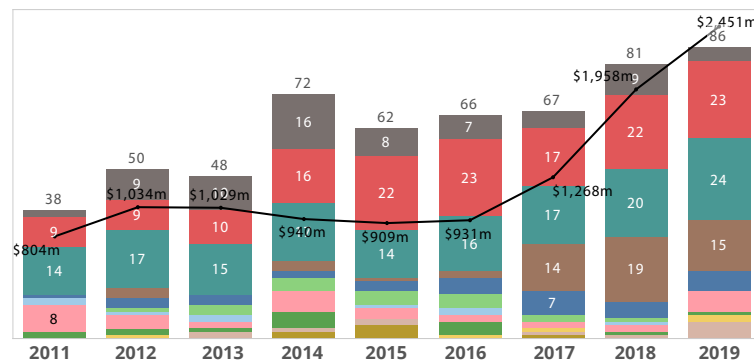
However, investments in core oil and gas tech will continue to form part of the investment theses, as the oil and gas business is capital intensive, riddled with uncertainties and sensitive to commodity prices, so reducing capital expenditures in times when oil prices go down and margins get tighter remains crucial. The corporate venturing subsidiaries of oil and gas companies generally look to bring strategic rather than financial value through their investments – whether this is in the form of finding new suppliers, building an ecosystem, helping specific existing business units or even establishing new ones.

Corporate-backed deals in oil & gas enterprises 2011-19



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Investments by O&G corporate peer group 2011-19

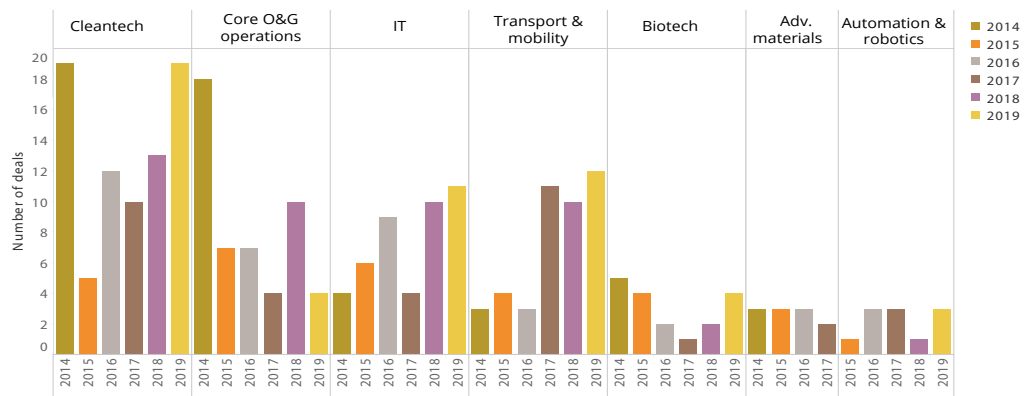


Category

- Core O&G operations
- IT
- Cleantech
- Transport & mobility
- Automation & robotics
- Adv. materials & chemicals
- Advertising & marketing
- Biotech
- Health
- Human resources
- Other
- Undisclosed

Note: The O&G corporate peer group includes: Chevron, Shell, Statoil/Equinor, BP, Saudi Aramco, Exxon Mobil, Total, Eni, Schlumberger, Subsea 7, E.On, Engie, Siemens/Next47, Eneco, Sumitomo, Petrobras, Repsol, Air Liquide et al.

Type of oil & gas venturing investments by year



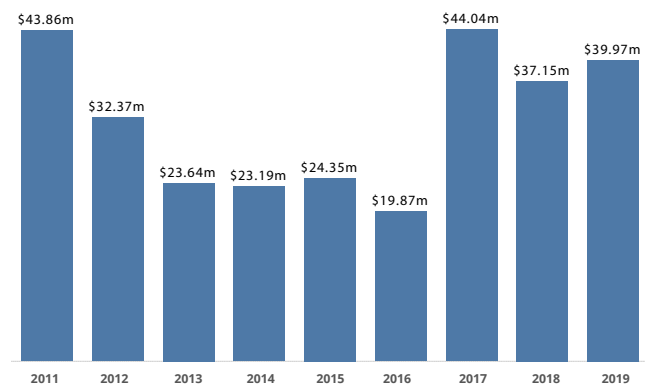
Most of the capital commitments went to companies based in the US and Europe but, notably Asia-based companies are beginning to catch up.

The average size of deals in which oil and gas corporate venturers participated throughout 2019 was \$39.97m, slightly higher than the estimated figure for 2018 of \$37.15m. Many oil and gas corporate venturers are focused on investing in a future dominated by renewable and sustainable energy sources as well as a disrupted mobility and transport space.

Throughout 2019, we tracked a total of 86 deals by the broader peer group of oil and gas corporates and industrials that were worth an estimated \$2.45bn. Both the deal volume and dollar value figure represented an increased over the previous year, when we registered 81 deals, worth an estimated \$1.96bn.

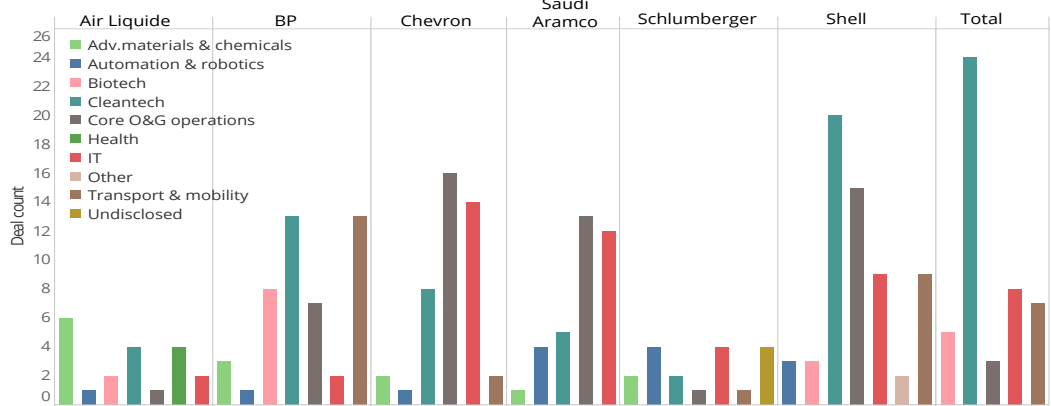
UK-based BP has backed a significant number of rounds in biotechnology, cleantech and transport companies since 2014, along with investments in core operation technologies. France-based Total has bet heavily on cleantech and transport, while Anglo-Dutch company Shell has been focused on both cleantech and core oil and gas technologies. US-based Chevron's has publicly disclosed commitments revolving around core energy operations, the digital dimension of its operation and in most recent times cleantech as well. Saudi Arabia-based Saudi Aramco has

Average size (\$m) of deals backed by oil & gas CVCs



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Type of investments by company 2014-19



historically focused its minority stake investment in core technologies, IT, automation and increasingly cleantech. Nearly oil and gas major are involved in some way in the low carbon and the advanced mobility opportunities on the venturing scene. Norway-based Equinor actually has two different active venturing units – one for low carbon and cleantech investments, dubbed Equinor Energy Ventures (previously known as Statoil Ventures) and another in oil and gas venturing Equinor Technology Ventures (formerly Statoil Technology Invest).

Deals

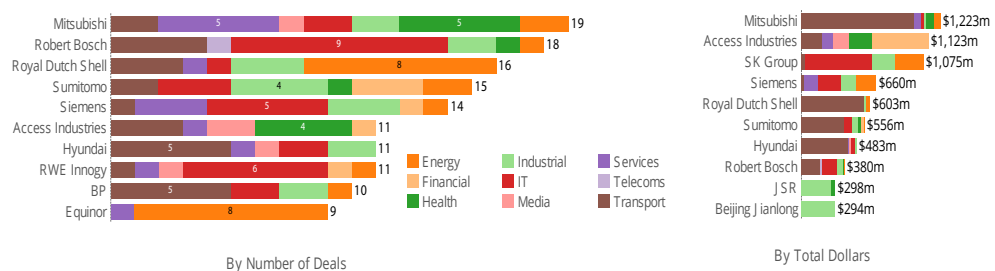
Oil and gas companies among the top corporate venture investors in the industrial and energy sectors for 2019 were Shell, BP and Equinor.

First quarter

US-based autonomous driving technology developer Aurora Innovation secured \$530m in funding from investors including Shell and e-commerce platform and cloud services provider Amazon. The round was led by venture capital (VC) firm Sequoia Capital and also featured Lightspeed Venture Partners, Geodesic, Reinvent Capital, Greylock, T Rowe Price Group and Index Ventures. The round reportedly valued the company at more than \$2.5bn. Aurora is working on software, hardware and data technology that will be utilised in driverless vehicles. It has built a 250-strong team and struck partnerships with automotive manufacturers including Hyundai, Volkswagen and Byton.

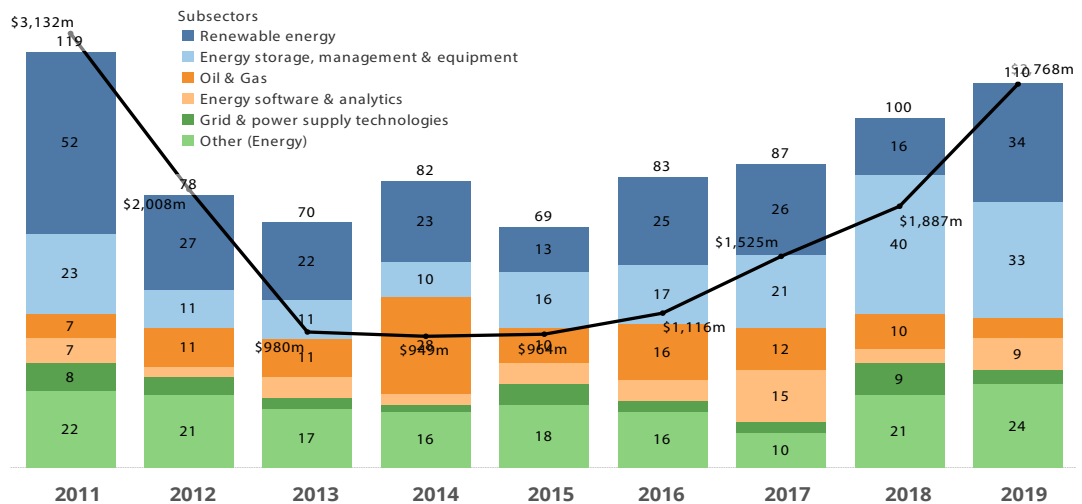
Canada-based carbon capture technology developer Carbon Engineering closed a \$68m funding round featuring petroleum suppliers Occidental Petroleum Corporation and Chevron, along with mining group BHP and property developer Bethel Lands Corporation. The round also included First Round, Lowercase Capital, Rusheen Capital Management, Starlight Ventures, Thomvest Asset Management, Carbon Order, private investors Bill Gates and Murray Edwards as well as the Benjamin, Hodgkinson and Hutchison families. Occidental and Chevron participated through their respective subsidiaries Oxy Low Carbon Ventures and Chevron Technology Ventures. BHP reportedly contributed \$6m. Founded in 2009, Carbon Engineering is developing technology intended to capture carbon dioxide directly from the atmosphere and convert it into ultra-low carbon fuels that could be used to power cars, trucks

Top energy and industrial corporate investors 2019



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Energy deals by subsector 2011-19



and airplanes. The company claims its direct air capture (DAC) technology can capture and purify atmospheric carbon dioxide at a price of less than \$100 per tonne. The funding will support the expansion of its pilot plant and the engineering of its first commercial facilities.

United Arab Emirates-based solar power provider Yellow Door Energy secured \$65m in a series A round that included Equinor and diversified conglomerate Mitsui. The round also featured International Finance Corporation, the private investment arm of the World Bank, as well as development bank Arab Petroleum Investments Corporation and private equity firm Adenium Energy Capital, while Equinor invested through its Equinor Energy Ventures unit. Founded in 2015 as a spinoff from founding investor Adenium, Yellow Door designs, builds and maintains solar energy plants on behalf of corporate customers in the Middle East and Africa who then pay for their power on a monthly basis. The company also installs energy efficiency equipment for businesses, in effect charging them a proportion of the money they save each month. The series A funding will support the planned construction of 300 MW of solar capacity.

Energy company Exelon and communications, media and automotive conglomerate Cox Enterprises took part in \$60m round for US-based sensor technology developer Ouster. Investment firm Runway Growth Capital led the round, which also included Silicon Valley Bank, among other investors. Exelon took part through its corporate venturing unit, Constellation Technology Ventures. Founded in 2016, Ouster is developing light detection and ranging (lidar) technology that will help automotive vehicles, industrial robots and unmanned aerial vehicles sense

Top deals backed by oil & gas corporate venturers 2019

Company	Round	Sector	Size	Venture investors
Aurora Innovation	Undisclosed	Transport	\$530m	Amazon Geodesic Capital Greylock Partners Index Ventures Lightspeed Venture Partners Relnvent VC Royal Dutch Shell Sequoia Capital T Rowe Price
Carbon Engineering	Undisclosed	Energy	\$68m	Benjamin family office Bethel Lands Corporation BHP Billiton Carbon Order Chevron First Round Capital Hodgkinson family office Hutchison family office Lowercase Capital Occidental Petroleum private investor Rusheen Capital Management Starlight Ventures Thomvest Ventures
Ouster	Undisclosed	Transport	\$60m	Carthona Capital Cox Enterprises Exelon Fontinalis Partners Runway Growth Capital Silicon Valley Bank undisclosed investors
Booster	C	Transport	\$56m	Conversion Capital Enterprise Holdings Invus Opportunities Madrona Venture Group Maveron Perot Jain Total Vulcan
Orbital Insight	D	IT	\$50m	Alphabet Bunge Chevron Clearvision Ventures Geodesic Capital Goldman Sachs Intellectus Partners Invicta Growth Lux Capital Sequoia Capital Sky Perfect Jsat Tech Pioneers Fund
Lightning Systems	Undisclosed	Transport	\$41m	BP Cupola Infrastructure Income Fund undisclosed investors
Heetch	B	Transport	\$38m	Allianz Alven Capital Cathay Innovation Felix Capital Iinvest Partners Mobivia Group (Via-ID) Total
Voyage	B	Transport	\$31m	Chevron Franklin Templeton Jaguar Land Rover Khosla Ventures
Calysta Energy	Undisclosed	Industrial	\$30m	BP
ESS	C	Energy	\$30m	BASF Breakthrough Energy Ventures Cycle Capital Evergy IPM Potato Group Pangaea Ventures Presidio Partners PTT Public Company Limited SoftBank



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surrounding objects. The sensors, which calculate distances to objects by utilising laser light to measure reflected pulses, are also used in the mapping, defence, mining and agriculture sectors. Ouster will use the proceeds to expand its production facilities, including a newly opened quality assurance testing and sensor calibration centre in California.

Industrial product manufacturer Paul Wurth led a €25m (\$28.8m) series C round for Germany-based electrolyser and fuel cell developer Sunfire. Inven Capital, the corporate venturing arm of energy utility CEZ, and Total Energy Ventures also provided capital in the round, as did investment firm Idinvest Partners and angel investment group Sunfire Entrepreneurs Club. Founded in 2010, Sunfire produces high-temperature electrolysers and fuel cells that are used to produce clean energy, hydrogen and synthesis gas for customers in industries that currently rely on fossil oils and natural gases, such as transportation, aviation and chemical production. The series C proceeds will be used to implement commercial projects that apply high-temperature electrolysis and power-to-liquid technology.

Ghana-based solar energy provider PEG Africa secured \$5m from Total Energy Ventures, which joined Energy Access Ventures, Blue Haven Initiative and Renewable Energy Performance Platform, alongside \$20m in debt financing from investors including CDC Group, Disrupt Africa has reported. It had initially raised \$7.5m across two rounds from backers including energy utility Engie's Rassembleurs d'Energies initiative, the corporate returning to help provided \$13.5m in series B equity and debt financing in late 2017. Founded in 2013, PEG Africa offers solar energy products to off-grid customers in Ghana, and Senegal on a pay-as-you-go basis. Its solar systems provide its customers power for lighting, mobile phone charging as well as appliances like radios and televisions.

Xage Security, a US-based developer of blockchain-protected security technology for industrial internet-of-things (IoT) systems, raised approximately \$4.5m from investors including Saudi Aramco Energy Ventures to its series B round, which now totals \$16.5m. It had raised the first \$12m from GE Ventures, a subsidiary of power and automation technology producer General Electric, as well as March Capital Partners, City Light Capital and NexStar Partners in July 2018. Xage has created a blockchain-based platform that secures IoT systems by spreading authentication and private data across a network of different devices.

Xpansiv, the US-based creator of a software platform that manages commodities production, closed a \$10m series A round featuring ratings agency S&P Global, blockchain investment fund Reflective Ventures and investment firm Energy Innovation Capital as well as Avista Development and BP Ventures, respective subsidiaries of energy utility Avista and BP. It is also working with BP to convert some of the corporate's gas production data into its Digital Feedstock format.

Saudi Aramco Energy Ventures joined investment vehicle Innovation Fund and an undisclosed angel investor in a CHF4.9m (\$5m) round for Daphne Technology, a Switzerland-based provider of filtration technology for shipping emissions. Founded in 2017, Daphne Technology develops a catalyst-free, nanotechnology helping the petrochemical, power and transportation industries lower air emissions to the levels required by international and national regulations. Daphne Technology's patented solution is also able to meet the requirements of marine vessels, providing a substantial reduction in operating costs.

BP Ventures also provided \$5m of series A funding for Belmont Technology, a US-based developer of artificial intelligence (AI) technology for oil and gas exploration. The company, which revealed through a regulatory filing that it had raised almost \$3.3m for the round from four investors, will use the capital to enhance its core product, Sandy, as well as to commercialise the platform and increase the size of its workforce. Founded in 2017, Belmont Technology has built a cognitive system to augment human intelligence for oil and gas exploration as well as production activities. Its technology is using advanced AI to reveal patterns and relationships within heterogeneous geoscience data sets.

Canada-based carbon technology company Inventys raised about C\$6.6 million (\$5m) from BDC's cleantech practice as well as a follow-on investment from Chevron Technology Ventures. The investment reportedly added to the Series C financing raised by Inventys in 2018, bringing the total to about C\$21 million (\$16m). The round's first tranche was led by OGC Climate Investments. Founded in 2007, Inventys develops an energy and capital-efficient technology for capturing carbon dioxide from industrial flue gas streams in addition to building a CO₂ marketplace by matching CO₂ emitters with CO₂ users. Its VeloxoTherm process reduces in half the cost of existing post-combustion CO₂ capture technologies. The funds raised will help Inventys complete and commercialize a CO₂ capture demonstration plant project with Husky Energy Inc.

US-based connected car and telematics technology developer Zubie received an undisclosed amount from BP Ventures, the corporate venturing arm of oil and gas supplier BP, and investment firm Melody Capital. The company had previously raised \$32m from NGP Capital, the VC firm since spun out of communications technology producer Nokia, as well as communications equipment maker Comporium, automotive components manufacturer Magna International, lubricants provider Castrol, Melody Capital and OpenAir Equity Partners. Zubie is the creator of the Zubie Key, a hardware dongle that plugs into a diagnostic port under a car's dashboard and analyses system functions to provide suggestions on car maintenance, driving habits and methods of lowering driving costs.

BP Ventures also led a series A round of undisclosed size for Powershare, a China-based developer of electric-vehicle charging software and hardware. Private equity firm Detong Capital Partners also participated in the round, which represented BP Ventures' first direct investment in China.



ANNUAL SPECIAL REPORT

Shell Ventures, petroleum supplier Shell's strategic investment arm, added an undisclosed amount to a series D round being raised by US-based energy management software provider Autogrid that stood at \$32m by September 2018. Oil and gas provider Total's corporate venturing arm, Total Energy Ventures, had also joined the round along with renewable power producer Orsted and energy utilities CLP, Innogy, Tenaska and Eon, among other investors, in 2018. Founded in 2011, Autogrid has developed a software platform that helps utilities, electricity retailers, renewable energy power providers and energy service providers manage their resources. The company's Energy Data Platform utilises AI, machine learning, big data and IoT technology to help users supply cleaner and more cost-effective energy.

Saudi Aramco Energy Ventures, the venturing unit of Saudi Aramco, supplied an undisclosed amount of series A funding for Earth Science Analytics, a Norway-based provider of AI technology for the petroleum geoscience sector. The company did not disclose details of its earlier funding but stated it had received funding and support from oil and gas suppliers ConocoPhillips, DEA, Lundin Petroleum and Spirit Energy. Founded in 2016, Earth Science Analytics (ESA) develops geoscience-driven machine learning workflows and software, aiming to provide data-driven forecasts to clients with greater precision and at lower cost compared to traditional methods.

Chevron Technology Ventures invested an undisclosed amount in sodium-ion battery technology developer Natron Energy. Formerly known as Alveo Energy, Natron received \$15.1m in funding across three rounds between 2013 and late 2017 according to securities filings, from investors including Fluxus Ventures, Prelude Ventures, NanoDimension and Khosla Ventures. Founded in 2012, Natron Energy is developing a long cycle life, low-cost battery technology meant for stationary and select transit applications.

Shell provided an undisclosed amount of funding for Nordsol, a Netherlands-based producer of liquified biomethane, investing through its Shell Ventures unit. The capital will help Nordsol expand from being a technology provider into a full-fledged producer that will build and operate its own biogas plants together with strategic partners. Founded in 2009, Nordsol produces liquified biomethane in combination with financial backing and guaranteed offtake volumes.

Salesforce Ventures, the venturing unit of cloud service provider Salesforce, invested an undisclosed amount in Kespry, a US-based provider of aerial information secured through drones. Kespry had previously raised \$61.3m as of December 2017, from investors including networking technology provider Cisco, Shell, power and automation technology producer ABB, law firm Wilson Sonsini Goodrich and Rosati across three rounds. Founded in 2013, Kespry allows organisations to source specialised aerial data through its unmanned aerial vehicles on demand. Clients can program a "mission" using a tablet provided by the company, and a Kespry drone plots a flight path, using lidar technology to avoid obstacles, before the data it films is transferred to the Kespry app where it can be processed.

Shell agreed to acquire one of its portfolio companies, Germany-based energy storage technology provider Sonnen, for an undisclosed amount. Founded in 2010 as Sonnenbatterie, Sonnen produces smart energy storage systems for customers in Europe, the US and Australia, allowing them to store surplus energy from home solar systems to be used at times when the sun is not out. Users in some European markets can also band together into a local community to pool their energy through what the company refers to as a virtual battery. Sonnen will operate as a subsidiary of Shell, working with its New Energies division, and expand its virtual battery system into grid services.

RigUp, a US-based oilfield services marketplace operator backed by General Electric (GE), collected \$60m in a series C round led by VC firm Founders Fund. The round also featured private equity firm Quantum Energy Partners, VC firm Bedrock Capital and advisory and investment firm Global Reserve Group, reportedly valuing RigUp at \$300m. Founded in 2014, RigUp has created a mobile app that enables oilfield operators and service providers to find and connect with independent prequalified contractors operating in the industry. Contractors have to pass drug screenings and background checks before they can join the company's network, and the platform can also be used to handle invoicing and accounting tasks related to worker payment.

Second quarter

In the second quarter, there were also plenty of notable deals involving oil and gas corporate venturers.

China-based electric car developer Bordrin Motor collected RMB2.5bn (\$362m) in funding from a consortium led by Silver Saddle Equity Investment Management, an investment arm of chemicals, oil and fertiliser conglomerate Sinochem International. The round also included power tools manufacturer Positec and Sumitomo Corporation Equity Asia, a corporate venturing division of diversified conglomerate Sumitomo. Prosperity Investment, Pukou High Investment, Yuanxing Investment, China Science & Merchants Investment Management and other, unnamed investors also contributed to the round. Founded in 2016, Bordrin Motor is developing smart electric vehicles and has unveiled two models to date: a five-seat sports utility vehicle called iV6 that is set for commercial release in early 2020, and a larger SUV model dubbed iV7. The new funding from this round will go to product development and marketing activities.

Automotive manufacturer Daimler led a \$170m series E round for US-based advanced battery materials developer Sila Nanotechnologies, which also featured industrial technology and appliance producer Siemens' Next47 unit. The round also included venture firms 8VC, Bessemer Venture Partners (BVP), Chengwei Capital, Matrix Partners



ANNUAL SPECIAL REPORT

and Sutter Hill Ventures. Sila Nano is developing materials for use in lithium-ion batteries that are intended to be lighter and safer than existing batteries that use graphite, while also providing higher energy density.

US-based fusion power technology developer Commonwealth Fusion Systems (CFS) closed a \$115m series A round that included oil and gas producer Eni, which invested \$50m. Eni joined Breakthrough Energy Ventures and the Massachusetts Institute of Technology (MIT)-owned The Engine as existing backers in the second close, alongside new investors including Future Ventures, Khosla Ventures, Lowercase Capital, Moore Strategic Ventures, Safar Partners, Schooner Capital and Starlight Ventures. Founded in 2017, CFS is working on high-temperature super-conductor magnets that are expected to facilitate the creation of smaller and less expensive fusion power plants. It is collaborating with MIT's Plasma Science and Fusion Center (PSFC) to develop the technology. The funding will enable CFS to demonstrate its technology at full scale as it aims to build the world's first net-energy gain fusion system, Sparc, by 2025. Sparc will serve as the basis for a fusion power plant, dubbed Arc, that is expected to provide electricity to the grid.

US-based data management technology developer Yellowbrick Data received \$81m in a series C round featuring Siemens, internet technology group Alphabet and carmaker BMW. DFJ Growth led the round, which included another offshoot of VC firm DFJ – Threshold Ventures – as well as Menlo Ventures and Third Point Ventures. Siemens, Alphabet and BMW invested through subsidiaries Next47, GV and BMW i Ventures respectively. Founded in 2014, Yellowbrick has launched a data warehousing product that aggregates vast quantities of structured data held by its enterprise clients, allowing the information to be analysed and compared to other datasets. The Yellowbrick Data Warehouse works across on-premises, edge and cloud-hosted networks. The company claims to offer superior processing speeds to competitors and has implemented fixed pricing to help client monitor the cost of using its service.

US-based same-day car refuelling service Booster secured \$56m in a series C round featuring Total Ventures and Enterprise Holdings Ventures, subsidiaries of Total and car rental service Enterprise Holdings. The round was led by VC firm Invus Opportunities and also included Madrona Venture Group, Vulcan Capital, Maveron, Conversion Capital and Perot Jain. Founded in 2014, Booster operates a network of small fuel tankers that deliver competitively-priced petrol and diesel to personal and commercial fleet vehicles across more than 20 cities, removing the need for owners to drive to a petrol station. The company offers same-day delivery and does not charge membership fees. It will use the series C funding to expand into additional markets.

US-based log-analysis technology provider Logz.io secured \$52m in a series D round that included Siemens' Next47 unit. VC firm General Catalyst led the round, which also featured OpenView Venture Partners, 83North, Giza Venture Capital, Vintage Investment Partners and Greenspring Associates. Founded in 2014, Logz.io has developed a platform that bundles together open source tools to help developers monitor, troubleshoot and secure applications through AI and machine learning technology.

US-based wide area networking technology provider Aryaka completed a \$50m series F round that included corporate venture capital (CVC) subsidiaries of telecoms firm Deutsche Telekom and Sumitomo. The round was led by investment bank Goldman Sachs through its Private Capital Investing unit and also featured Trinity Ventures, Mohr Davidow Ventures, Nexus Venture Partners, InterWest Partners and Third Point Ventures. Deutsche Telekom and Sumitomo participated through Deutsche Telekom Capital Partners (DTCP) and Presidio Ventures respectively. The round took the company's overall funding to \$184m. Founded in 2009, Aryaka manages software-defined wide area networking (SD-WAN) integration for businesses, allowing them to manage their networks over long distances at a lower cost than traditional methods. The company builds private networks for clients that is equipped with connectivity, security, optimisation and acceleration technology, and tailored to their needs.

US-based connected video security technology developer Verkada secured \$40m in a series B round that included Next47. Growth equity firm Meritech Capital and VC firm Sequoia Capital co-led the round, which also featured VC firm First Round. It valued the company at \$540m post-money. Founded in 2016, Verkada combines security cameras with cloud-based software to provide smart security systems that enable organisations to access and store live surveillance footage. The company counts more than a dozen Fortune 500 companies among its customers, which span areas such as education, retail, hospitality, banking and healthcare.

France-based ride hailing platform operator Heetch collected \$38m in a series B round that included insurance group Allianz and auto servicing and parts provider Mobivia. Mobivia's Via ID fund and InnovAllianz, a strategic investment vehicle for Allianz, were joined by Total Ventures as well as VC firm Felix Capital, Alven and private equity firm Idivest Partners and Cathay Innovation, an affiliate of private equity firm Cathay Capital. Founded in 2013, Heetch provides an app-based on-demand ride platform that spans the French cities of Paris, Lyon, Lille, Nice, Marseille, Toulouse, Bordeaux, Strasbourg and Nantes as well as Casablanca, Morocco. It has tested the service in Cote d'Ivoire and plans to launch in Algeria, Cameroon and Senegal later in 2019.

BP Ventures made a \$30m investment in Calysta, a US-based alternative protein producer, which will use BP's natural gas to produce protein for fish, livestock and pet feeds. Founded in 2011, Calysta has developed a proprietary gas fermentation technology that produced what the company has dubbed FeedKind protein, a sustainable feedstock that can be used for fish, livestock and pet nutritional products. Calysta claims its solution has the potential to help meet the growing demand for feed in the aquaculture and wider agriculture markets without some environmental impacts of current sourcing methods.



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US-based lidar technology developer Sense Photonics completed a \$26m series A round featuring Samsung Ventures and Shell Ventures, subsidiaries of electronics producer Samsung and Shell. The round was co-led by VC firms Acadia Woods and Congruent Ventures, the latter backed by University of California, and included fellow VC firms Prelude Ventures and Hemi Ventures, and private equity and VC sponsor IPD Capital. Founded in 2016, Sense Photonics has developed lidar technology for use in autonomous vehicles that analyses surroundings by flashing light and using a sensor to detect obstacles. The camera-inspired technology is expected to provide an ultra-wide field of vision and be easier to install than rival offerings, which typically require scanning the car's environment by sweeping a laser beam rather than capturing everything simultaneously.

US-based online clean energy marketplace operator LevelTen Energy secured \$20.5m in a series B round that included Equinor, Total as well as energy utilities Exelon and Avista Corporation. The corporates invested through Equinor Energy Ventures, Total Ventures, Constellation Technology Ventures and Avista Development respectively. Founded in 2016, LevelTen operates an online platform that facilitates negotiations between buyers and sellers for the supply of renewable energy from sources such as wind farms or solar power plants. It also provides software that helps users find, evaluate and procure renewable power purchase agreements.

Innowatts, a US-based AI-enabled retail energy technology platform, closed a series B funding round, led by Energy Impact Partners (EIP). Returning investors included Shell Ventures, Spain-based public utility company Iberdrola as well as investment firm Energy and Environment Investment (EEL Japan). Those investors were joined by Energy Ventures, the venturing subsidiary of energy company Great Plains Energy. The fresh funding is expected to enable Innowatts to extend application of its eUtility™ platform. Innowatts has built a software platform that uses data generated from more than 12 million smart meters to measure and analyse energy consumption, helping users optimise costs, forecast energy use patterns and create specialised energy products or services.

Mexico-based waste management system manufacturer Sistema.bio secured \$12m in funding from investors including energy utility Engie's RDE Fund and Shell. Financial services firm Triodos Bank, the European Union's Electrifi scheme and crowdfunding platform Lendahand also took part in the round, as did Dila Capital, EcoEnterprise Fund, CoCapital, Endeavor Catalyst Fund and Alpha Mundi. Shell participated through its social investment initiative, Shell Foundation. Sistema.bio builds and distributes affordable biodigesters to help smallholder farmers convert animal waste into energy and fertiliser. It was founded in Mexico in 2010 and has since installed more than 5,500 systems across 15 countries that also include India, Colombia and Kenya.

US-based transport passenger data provider Swiftly received \$10m in series A funding from investors including Via ID, Total Energy Ventures, RATP Dev and Samsung Next, respective subsidiaries of automotive servicing company Mobivia, Total, transport operator Groupe RATP and consumer electronics producer Samsung. The round included corporate joint venture Aster Capital, Wind Capital, 1776, Plug and Play Group, Elemental Excelsator and Stanford StartX-Fund. Founded in 2014, Swiftly has developed enterprise software which assists transit agencies and cities improve urban mobility, harnessing billions of data points and advanced algorithms to improve transit system performance.

SAEV and Equinor Technology Ventures, the subsidiaries of Saudi Aramco and Equinor, co-led a \$6m series A round for US-based, industrial sector-focused smart contract technology provider Data Gumbo Corp. The round took Data Gumbo's total funding to \$9.3m, \$1.35m of which came from Carnrite Ventures, Plug and Play and unnamed angel investors in August 2018. Founded in 2016, Data Gumbo has developed blockchain-based smart contracts to automate contract execution between companies.

Industrial, mining and petroleum group JXTG invested ¥1bn (\$9.3m) in Japan-based deep learning technology developer Preferred Networks in connection with a strategic partnership deal. Preferred Networks has now raised more than \$119m altogether, from investors including automotive manufacturer Toyota, diversified conglomerate Mitsui and telecoms firm NTT. Founded in 2014, Preferred Networks has developed software focused on applying real-time machine-learning technologies to new applications in the emerging field of. The company is also engaged in the research, development and sales of computer software, hardware and network aspects.

Sorabito, a Japan-based operator of an online trading platform for heavy machinery, secured approximately ¥900m (\$8.2m) in funding from diversified trading groups Sumitomo and Itochu. The company raised \$820,000 in 2015 from investors including GMO Venture Partners, a subsidiary of internet company GMO, and the latter joined subsidiaries of online media company Gree, marketing firm Opt and financial services firm Sumitomo Mitsui Banking Corporation in a \$4.6m round the following year. Founded in 2014, Sorabito operates a heavy machinery e-marketplace in Japan dubbed Allstocker.

Sumitomo and Engie New Ventures, the strategic investment arm of energy utility Engie, joined additional investors including financial group Macquarie Group and merchant bank Turquoise International to invest £5m (\$6.3m) in UK-based integrated energy storage system developer Connected Energy. Engie New Ventures and Macquarie Group supplied \$4.1m in funding for the company in January 2018, and Turquoise also advised it for the latest funding round it raised.

Shell's New Energies unit supplied an undisclosed amount of funding to EcoSmart Solution, a subsidiary of US-based, real estate-focused private equity firm Taurus Investment Holdings that installs solar energy, energy effi-



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ciency and home automation products in housing communities. The company is initially installing its systems in Whisper Valley, a large-scale housing community Taurus is developing in the state of Texas.

US-based AI technology and services provider Hypergiant Industries secured an undisclosed amount from investors including Sumitomo Corporation of Americas, a subsidiary of diversified conglomerate Sumitomo. VC firm Perot Jain, private equity firm Align Capital and angel investors Tom Meredith and Steve Adler also participated in the round. Founded in 2018, Hypergiant Industries defines itself as the “the AI industrial complex for leading global enterprises and governments”, as its solutions aim to help corporate customers with breakthrough machine intelligence-driven technology, and make sense of data at the intersection of critical infrastructures.

Sumitomo also led a series A round of undisclosed size for Indonesia-based payment app developer Cashlez. Mandiri Capital, the strategic investment subsidiary of financial services firm Bank Mandiri, also participated in the round, having reportedly led a \$2m seed round for Cashlez in 2017. Founded in 2015, Cashlez has created an mPOS system, a concept of receiving credit card and debit card-based applications on smartphones (android and iOS) connected to a card reader via bluetooth. This system can monitor all sales transactions of a business in real time and to receive cashless payments.

Israel-based vehicle-inspection technology developer Ravin.ai completed a \$4m seed round that included Shell Ventures. VC firm Pico Venture Partners led the round, which also featured angel investor Adam Draizin. The startup's co-founder and chief executive, Eliron Ekstein, was formerly head of new business development for Shell subsidiary Shell Digital Ventures for three years up to early 2018. Founded in 2018, Ravin.ai employs AI to inspect vehicles using everyday mobile or stationary cameras.

Typhon Treatment Systems, UK-based developer of an energy efficient water treatment technology, closed a financing round of undisclosed size led by SAEV. Other investors in the round were not disclosed. Founded in 2014, Typhon has developed water treatment equipment which uses ultraviolet (UV) light emitting diode (LED) water treatment technology used for industrial and municipal water disinfection. Typhon's solution enables treatment of large volumes of water with low electricity consumption, no use of chemicals, and significantly simplified operations. The company claims its technology provides lower lifetime cost of ownership as well as environmental health and safety benefits, compared to mercury-based UV systems or chlorination currently in use.

Japan-based cryptocurrency exchange developer FXcoin received an undisclosed amount of funding from diversified trading group Sumitomo. The startup raised the cash as it looks to get registered by Japan Virtual Currency Exchange Association as a virtual currency exchange.

Third quarter

UK-based solar cell developer Oxford PV completed a £65m (\$81.8m) series D round after adding £34m from investors including solar semiconductor technology producer Meyer Burger. Meyer Burger, which made its investment to take an 18% stake in the company, was joined by undisclosed new and existing investors. In addition to its direct investment, Meyer Burger is also installing a customised production line at Oxford PV's Germany site that will begin manufacturing perovskite-on-silicon cells from next year. Wind turbine producer Goldwind led the £31m first tranche, investing together with Equinor and Legal & General Capital, insurance firm Legal & General's CVC arm. Oxford PV produces solar cells that make up larger photovoltaic modules for use in solar power generation. It utilises perovskite, a mineral that gives the cells a larger theoretical efficiency limit than traditional silicon-only cells, making them potentially more efficient.

Germany-based logistics software developer Sennder has secured \$70m in a series C round that included Siemens as well as automotive manufacturer Scania. VC firm Lakestar led the round, which reportedly valued the company at approximately \$300m. It included also venture firms Accel, H14, HV Holtzbrinck Ventures and Project A, while Siemens and Scania took part through investment subsidiaries Next47 and Scania Growth Capital. Founded in 2015, Sennder provides software that helps large commercial shippers access a fleet of more than 7,500 vehicles for local delivery services covering e-commerce, consumer goods, express, same-day delivery, refrigerated delivery, oversized loads and special needs deliveries. The company also offers a mobile app for drivers and a fleet management platform for shippers in addition to live tracking and invoice tools.

UK-based solar power system producer Bboxx raised a \$50m series D round, led by Mitsubishi Corporation. Engie Rassembleurs d'Energies, an affiliate of Engie that promotes sustainable energy access, also took part in the round along with impact investors Bamboo Capital Partners and Doen Participaties and growth equity firm MacKinnon, Bennett & Company (MKB). Bboxx supplies plug-and-play solar systems to customers in some 35 developing nations, with the company's focus predominantly on Africa. They are packaged with appliances and work on a pay-as-you-go basis. The company also provides a remote management system for use with larger solar energy projects, and an electricity management platform for grid operators.

Built Robotics, a US-based developer of robotic construction tools, completed a \$33m series B round led by Next47. Presidio Ventures, a corporate venturing vehicle for conglomerate Sumitomo, also took part in the round, as did hardware-focused VC fund Lemnos and VC firms Building Ventures, Founders Fund and New Enterprise Associates (NEA). Founded in 2016, Built Robotics produces and supplies automated guidance systems that can be affixed to pieces of construction equipment in order to convert them into autonomous robots, supervised by the customer



ANNUAL SPECIAL REPORT

through its web-based software. The systems are designed to function irrespective of who made the construction equipment and can automate routine tasks such as the digging of trenches and excavations.

US-based autonomous vehicle developer Voyage completed a \$31m series B round featuring InMotion Ventures and Chevron Technology Ventures, investment vehicles for carmaker Jaguar Land Rover and Chevron. Investment firm Franklin Templeton led the round, which included VC firm Khosla Ventures, and reportedly boosted the company's overall funding to \$52m. Founded in 2017, Voyage has developed a small-scale autonomous taxi capable of travelling at up to 40 kilometres per hour, for use in areas where there are limited transportation options. The startup, which was spun out of work conducted by students at for-profit education provider Udacity, plans to use the cash to beef up its fleets in the states of California and Florida and complete development of the next iteration of its vehicle.

US-based employee performance management platform 15Five closed a \$30.7m series B round led by Next47. Matrix Partners, PointNine Capital, Launch Fund, Newground Ventures, Bling Capital, Chaifetz Group and Origin Ventures also contributed to the round. Founded in 2011, 15Five has created a continuous performance management platform that enables managers to give feedback to employees, track objectives, award recognition, offer one-on-one chats and hold reviews. The capital will allow 15Five to accelerate business growth, increase sales and marketing activities and drive product development.

US-based grid management technology developer Sunverge received \$11m in funding from investors including Equinor Energy Ventures and Evergy Ventures, subsidiaries of Equinor and energy utility Evergy. The round was led by sustainability-focused investment firm Ecosystem Integrity Fund and it increased the total raised by Sunverge to \$64.5m since it was founded in 2009. Sunverge has built a software platform that enables utilities to effectively monitor and manage distributed energy resources (DERs): energy sourced from localised renewable energy systems that is dispatched to the main grid and to customers in the immediate vicinity. The cash influx will help Sunverge mature its platform, which it aims to market to energy utilities looking to integrate DER into their core business operations.

Israel-based soil and crop analysis software developer CropX completed a \$10m funding round, which featured Sumitomo Corporation Europe, part of Sumitomo. The round also featured Armada Investments, Tal Capital, Finistere Ventures, Germin8 Ventures, GreenSoil Investments, Innovation Endeavors and OurCrowd, and it took CropX's total funding to \$20.5m. Earlier backers of the company include Robert Bosch Venture Capital and Lab IX, subsidiaries of industrial product maker Bosch and supply chain services firm Flex. Founded in 2013, CropX offers a software service, integrated with wireless sensors, which saves water and energy in agricultural production, while improving significantly crop yields.

UK-based parking app developer AppyParking received £7.6m (\$9.9m) in funding from carmaker Hyundai Motor Company, Sumitomo and insurer Aviva's corporate venturing division Aviva Ventures, along with Breed Reply, the investment arm of systems integration and digital services provider Reply, as well as West Hill Capital, which led the round. Founded in 2013, AppyParking has developed a kerbside management technology, making intelligent mobility for cities possible. It claims that its solution is set to be a conduit between the private and public sector, ensuring standardised kerbside data flow between local authorities and mobility operators, thus enabling the adoption of intelligent mobility solutions.

Powerhive, a US-based company building microgrids in developing nations, closed a \$9.3m series B round backed by diversified conglomerate Toyota Tsusho as well as Caterpillar Ventures and Total Energy Ventures, respective corporate venturing units of heavy machinery producer Caterpillar and Total. The round also featured venture firms Kouros, To:org, Tao Capital Prelude Ventures and private investor James Sandler. Founded in 2011, Powerhive builds microgrid systems for use in developing nations in Africa and the Asia-Pacific region, and it operates offices in Kenya and the Philippines. The microgrid model enables rural communities not connected to a large grid to generate their own power.

Shell provided Rs 550m (\$7.7m) of series B funding for India-based biomass briquette producer Punjab Renewable Energy Systems. The company had previously raised an undisclosed sum in 2013, before private equity fund Neev Fund supplied \$5m to it in March 2019. Founded in 2011, Punjab Renewable Energy Systems supplies loose biomass and biomass briquettes to local biomass-based power plants and process industry.

SteamCo, a UK-based developer of a data-efficient energy management system for utilities in Africa and Asia, received \$5m in a series B round co-led by Shell, venture firm Praetura Ventures as well as from unnamed existing shareholders. SteamCo has developed a smart metre and cloud platform that requires less than 100kB of data transfers per month, making it particularly suitable for areas with limited internet access. Shell previously led a \$2.9m series A round in 2017, with commitments from Green Investor Group and Ashden Trust. ClearlySo led a £640,000 (\$925,000) seed round in 2016.

Equinor and accelerator operator Techstars provided \$4.5m of series A funding to Interface Fluidics, a Canada-based developer of nanotechnology for the oil production industry. The company's existing investors include Valhalla Angels. The company raised this funding after graduating from the Equinor-backed Techstars Energy Accelerator in December 2018. Originally founded in 2015, Interface Fluidics has developed a solution providing innovative reservoir fluid analysis services to the petroleum industry. Its proprietary nanofluidic technology platform enables



ANNUAL SPECIAL REPORT

companies to better understand their reservoirs, including services such as performance screening, flow assurance, fluid compatibility, chemical optimisation and hydraulic fracturing recovery optimisation among other.

BP Ventures invested \$3m in Partstech, the US-based operator of an e-commerce platform for aftermarket automotive parts. The cash was supplied as part of a series A round that is being supported by Castrol, the lubricant producer acquired by BP in 2000. Partstech had raised \$3.5m of a round with a \$7.5m targeted close as of January this year, according to a regulatory filing, but did not reveal whether that constituted series A funding. Founded in 2013, PartsTech runs an ordering platform designed to help professional technicians save time and reduce difficulties with wholesale automotive parts procurement. Technicians can locate, evaluate and order parts from both local suppliers as well as national warehouses.

Zippity, the US-based operator of car repair services, raised \$3m in seed capital from BP Ventures and investment firm Schooner Capital, which led the tranche. The round also included angel network LaunchPad Ventures. The company had previously secured \$3.2m in total, \$2.7m of which came from BP Ventures. Founded in 2016, Zippity offers full-service car maintenance to customers while they are at work, including oil changes, tire replacement and repair, brake services, diagnostics, batteries, bulbs, wipers, filter replacements etc.

Norway-based downhole technology company Well Conveyor received an equity investment sized at 15.7 NOK (\$1.8m) from Chevron Technology Ventures, along with additional commitments from existing investors ProVenture and Investinor. VC firms ProVenture and Investinor had invested in the company in 2018, and Chevron Technology Ventures invited Well Conveyor to participate in its Catalyst Program, which was created to support early-stage that can directly benefit the oil and gas industry. The money from this financing round will be used to support the qualification and commercialisation phases for the company's innovative Slim Battery-powered Conveyor. Founded in 2015, Well Conveyor has developed a novel downhole tractor that would be more cost-effective, slimmer, simpler to operate and more power efficient than existing offerings, allowing for the utilisation of downhole battery power.

Cemvita Factory, a US-based company working on a method to convert carbon into chemicals and polymers, received an undisclosed amount of funding from Oxy Low Carbon Ventures, a corporate venturing subsidiary of petroleum supplier Occidental. The funding will support the development of Cemvita Factory's technology into a pilot project that can be physically tested. Founded in 2017, Cemvita Factory has developed a CO2 utilisation platform which mimics photosynthesis in order to produce nutrients and pharmaceuticals for deep space exploration, industrial chemicals and polymers for energy sustainability.

Shell Ventures invested an undisclosed amount in Canada-based grid-scale battery provider Corvus Energy. Corvus had previously raised undisclosed sums from Green Marine Capital, a vehicle founded by maritime services providers BW Group, as well as from Statoil Technology Invest, the subsidiary of Equinor now known as Equinor Technology Ventures, in 2015, as well as and aluminium supplier Norsk Hydro in 2017. Corvus designs and produces modular, scalable lithium-ion battery systems that are mainly used offshore by industrial service providers and merchant marine operators, though the batteries have also been utilised for prototype versions of electric vehicles.

US-based gas sensor technology developer SeekOps received an undisclosed amount of series A-1 funding from Equinor Technology Ventures and energy investment fund OGCI Climate Investments. Spun off from government agency Nasa's Jet Propulsion Laboratory, SeekOps has developed a proprietary sensor technology combined with unmanned aerial system (UAS) deployment for asset monitoring by customers in the oil and gas industry, which helps them to enhance asset integrity and preserve valuable product.

Power utility company Eon committed an undisclosed amount to US-based construction technology developer HoloBuilder, which employs AI to visualise construction sites. The investment was made in conjunction with a collaboration agreement with HoloBuilder to further digitise the energy industry, optimise construction processes and simplify customer communication during the construction phase. Founded in 2016, HoloBuilder has developed construction enterprise software, which offers reality capturing solutions for progress documentation and construction project management, making use of 360° imagery data, computer vision and AI. Its solution provides virtual construction site inspections and 360° live streaming from the construction site.

Shell invested an undisclosed amount in Travis Road Services, a Netherlands-based provider of road-services automation software for fleet managers. The company is present in nine European countries and the funding will help it expand throughout the continent in the coming years. Founded in 2018, Travis Road Services offers a road service management software solution for wide range of services to both service providers and fleet owners. It claims that its network consists of more than 450 truck service providers and over 55,000 registered vehicles.

Germany-based enterprise sustainability services provider Thinkstep was acquired by risk management services firm Sphera in a deal enabling Siemens to exit. The financial terms of the transaction were not disclosed, and the deal requires customary regulatory approvals to close. Founded in 1991 and previously known as PE International, Thinkstep provides a software-as-a-service (SaaS) platform to enterprises looking to make their operations more environmentally sustainable. The software allows clients to conduct sustainability audits and forecast the environmental implications of new products. The company also offers consulting services. Sphera intends to integrate Thinkstep's product range with its own environmental health and safety risk management services once the acquisition closes.



ANNUAL SPECIAL REPORT

US-based battery maker Spear Power Systems raised an undisclosed amount from a global syndicate of advanced energy investors to fund expansion of its global footprint, production capacity, and continued research and development. The round was led by Emerald Technology Ventures with significant participation from Chevron Technology Ventures, Energy Innovation Capital, Nabtesco Technology Ventures – the venturing arm of engineering company Nabtesco, KCRise Fund, and Foley Industries along with existing investors Evergy Ventures and Demetree Investors. Founded in 2014, Spear designs and manufactures safe, high performance energy storage systems (ESS) for clients from marine, industrial, and defense industries.

US-based sustainable chemicals and fuel producer LanzaTech received a \$72m series E investment from pharmaceutical firm Novo in connection with a strategic partnership. LanzaTech has created a system that converts waste and residues into fuels such as ethanol, as well as chemicals such as butadiene and propylene using a gas fermentation process. Proceeds from the investment will be used to accelerate the development of LanzaTech's carbon recycling platform and commercialise its carbon smart products.

Netherlands-based cooling solution developer Asperitas attracted an investment from Shell Ventures and the Participation Fund for Sustainable Economy North Holland (PDENH). The investment, led by Shell Ventures, is meant to support the acceleration of Asperitas' mission to enable sustainable datacentres on a global scale. Founded in 2014, Asperitas has developed a technology based on immersion liquid cooling to enable datacentres to become more energy efficient. The company claims its solution allows for efficient cooling regardless of the datacentres' external environment.

US-based community energy platform LO3 Energy raised a funding round of undisclosed size with backing from two corporate venturers – Shell Ventures and Sumitomo. Founded in 2012, LO3 Energy has developed a blockchain-based energy platform that allows for the integration of distributed energy resources (DERS) including renewables like solar and wind, and battery storage with supply networks on the grid. The company claims to be the first in the US to enable peer-to-peer energy sharing. The system promises to democratise the energy industry, allowing people to both consume and produce electricity at their home and business. LO3 already had previously attracted investments from other corporates like Braemar Energy Ventures, Centrica, and Siemens.

Fourth quarter

US-based geospatial software technology provider Orbital Insight closed a \$50m series D round backed by the corporate venturing units of Chevron and technology conglomerate Alphabet. Broadcaster Sky Perfect JSAT also contributed to the round, which was co-led by Sequoia Capital and Clearvision Ventures. Investment bank Goldman Sachs, Invicta Growth, Bunge Ventures, Tech Pioneers Fund, Geodesic Capital, Intellectus Partners and Lux Capital filled out the round. Chevron and Alphabet joined the round through Chevron Technology Ventures and GV, respectively. Orbital Insight uses AI and computer vision technologies to analyse geospatial data gathered from a variety of sources, such as satellite imagery and vessel traffic data, enabling clients to monitor geopolitical and economic activities. Applications for the software include supply chain monitoring, real estate analysis, infrastructure mapping and defence. The company, which has raised more than \$128m in capital to date, will use the latest cash injection to grow its market share by driving product innovation and expanding its software.

BP Ventures led a \$41m financing round for US-based electric automotive drivetrain provider Lightning Systems. The full amount consisted of equity funding, debt financing and a working capital line, and the round included private equity fund Cupola Infrastructure Income Fund and unnamed existing investors. Lightning Systems manufactures electric powertrains for use by fleets of commercial vehicles such as transit vans, work trucks and buses. CEO Tim Reeser said the company had \$25m worth of orders, predominantly for Ford vans, Chevrolet trucks and municipal buses. In addition to the drivetrains themselves, Lightning also provides charging infrastructure, telematics and analytics for customers. David Hayes, BP Ventures' chief investment officer, said: "The global electric vehicle market is growing at an unprecedented rate, and we are seeing the electrification of more and more commercial fleets."

France-based medical device developer Diabeloop completed a €31m (\$34.1m) series B round featuring home healthcare provider Agir à dom and Aliad, the investment arm of industrial gases supplier Air Liquide. The €22m equity portion of the round was led by family office Cemag Invest and included financial services firm Crédit Agricole, which participated through its Crédit Agricole Sud Rhône Alpes Capital and Crédit Agricole des Savoie Capital units. Ceritd, Odyssée Venture, Adag, Sofimac Innovation, Kreaxi and unnamed members of Diabeloop's management filled out the equity investors along with Supernova Invest's Supernova 2 fund. Financial services firms Caisse d'Epargne, BNP Paribas and Société Générale supplied the debt. Diabeloop has developed a closed-loop automated insulin delivery system that relies on an insulin pump connected to an AI platform to automate the treatment of type 1 diabetes. The technology has gained regulatory approval in the European Economic Area.

SB Energy, a renewable energy-focused subsidiary of telecoms and internet conglomerate SoftBank, co-led a \$30m series C round for US-based energy storage system provider ESS. The round was co-led also by energy investment fund Breakthrough Energy Ventures and included chemical producers PTT Global and BASF, the latter through its BASF Venture Capital unit, as well as Evergy Ventures, an affiliate of energy utility Evergy. Cycle Capital Management, Presidio Partners Investment Management, IPM Group and Pangaea Ventures filled out the round. ESS produces grid-scale energy storage systems for use with renewable energy sources like wind or solar. They rely on iron-flow batteries, which ESS claims are sustainable and contain no hazardous waste. ➔



ANNUAL SPECIAL REPORT

The company plans to use a portion of the series C funds to expand manufacturing of the second iteration of the battery as it expands into the provision of utility-scale systems for use with larger energy installations.

Avia, a US-based healthcare consulting services provider backed by several healthcare systems, secured \$22m in funding from investors including Sumitomo Corporation of Americas. VC firm First Trust Capital Partners led the round, which also featured investment bank Ziegler and undisclosed healthcare systems and strategic investors. Founded in 2012, Avia offers consulting services to healthcare companies and also runs a platform called Avia Innovation Network which allows healthcare systems to collaborate on digital innovation practices.

Citrine Informatics, a US-based developer of an advanced materials development platform, raised \$20m in series B funding from investors including Siemens' Next47 unit. Low carbon-focused investment platform Prelude Ventures and VC firm Innovation Endeavors co-led the round, which also featured investment firm Moore Strategic Ventures and undisclosed additional participants. Founded in 2013, Citrine has created a platform that uses AI technology with data handling and processing tools to predict how certain materials or chemicals will react under certain conditions, facilitating the creation of new industrial products. The cash will go to enhancing the Citrine Platform and boosting the company's market presence across the US, Europe and Asia.

BP supplied \$5m in funding for Finite Carbon, a US-based provider of forest-focused carbon offsetting services. Finite Carbon raised a reported \$2m from VC firm TL Ventures in 2009 and the latest funding comes after more than \$600m in compliance forest offsets provided by the company. Founded in 2009, Finite Carbon provides landowners with an all-in-one carbon offset monitoring system. Its solution is designed for creating and monetizing carbon offsets and the company claims it is the most comprehensive forest carbon project development and commercialisation service in the US.

US-based solar-powered appliance provider Amped Innovation completed a series A round led by Engie Rassembleurs d'Energie, an investment vehicle for energy utility Engie, having raised more than \$3.3m. The round included Schneider Electric Ventures and impact investment vehicle Finca Ventures, both of which were described by the company as existing backers. Founded in 2015, Amped Innovation has developed a solar home power system dubbed the Blossom for people living with less than four dollars a day, which it claims to be the lowest-cost and highest performance products in its class. Blossom has a software-enabled pay-as-you-go interface, which allows customers to purchase in instalments that are equivalent to what they currently spend on kerosene, while providing much more light, cell-phone charging, and ability to run appliances like televisions and sewing machines.

Saudi Arabia supercomputing technology developer UnitX received \$2m in funding from oil and gas supplier Saudi Aramco's Wa'ed Ventures Fund and Kaust Innovation Fund, the VC arm of King Abdullah University of Science and Technology. Salman T. Jaffrey, chief investment officer for Wa'ed Ventures, is joining the startup's board of directors in connection with its investment. Founded in 2018, UnitX Technologies has developed platforms that manage and continually update software and hardware infrastructure for corporate clients which includes a network of supercomputers and public clouds worldwide.

Sumitomo Chemical, a subsidiary of Sumitomo, invested \$2m in Israel-based scent-recognition technology startup NanoScent in a deal in which it was advised by Aniw Innovation Advisory. NanoScent said in a press release that it has been collaborating with Sumitomo Chemical for the past year. Founded in 2017, NanoScent has developed a scent recognition platform employed by industrial plants to prevent environmental disasters.

Engie Rassembleurs d'Energies, a corporate venturing subsidiary of Engie, led a \$1.6m series B round for Australia-based pay-as-you-go biodigester service provider Atec* Biodigesters. Impact Investment Exchange's IIX Growth Fund, Fondation Ensemble and Phitrust Asia also contributed to the round, which came in the wake of a \$700,000 series A investment by IIX in August 2017. Founded in 2016, Atec* Biodigesters has developed biodigesters for rural households that provide 500-1500 litres of biogas for cooking per day plus 20 tons of organic fertilizer for farming on an annual basis. The company claims its product can be installed even in challenging environments with flooding, earthquakes, cyclones etc.).

Engie Factory, a subsidiary of energy utility Engie has joined Alaya Capital Partners and Albi Investments to invest an undisclosed amount in Inti Tech, a Chile-based creator of an autonomous solar module-cleaning system. Founded in 2016, the company has developed a technology which combines robotics and AI and utilises a dry cleaning process.

Shell invested an undisclosed sum for a 20% stake in India-based solar energy system producer Orb Energy. Cleantech investment manager Zouk Capital was an existing investor when it provided an undisclosed amount for Orb in 2016, before the company raised \$5m in equity funding from investors development institutions FMO and DEG in January 2018 together with \$10m in debt financing from Overseas Private Investment Corporation. Founded in 2006, Orb Energy designs, manufactures, sells and installs solar photovoltaic (PV) systems for reliable power, solar thermal systems for hot water, and solar street lighting, serving both residential and commercial customers. The company boasts 125 branches across India and employs more than 500 people and claims to have sold nearly 100,000 systems since its inception.

Canada-based pipeline inspection technology developer Ingu Solutions raised an undisclosed amount from Chevron Technology Ventures and VC firm Energy Innovation Capital. The funding round will enable Ingu to grow its team, scale its



ANNUAL SPECIAL REPORT

data collection platform and analysis, and expand its global presence. Founded in 2018, Ingu has developed a technology dubbed Pipers, which is a pipeline screening tool that detects leaks, geometric defects, magnetic anomalies, and deposits. The unique self-service business model reduces inspection costs while strengthening preventive maintenance.

BP led a series A round of undisclosed size for Grid Edge, a UK-based creator of an AI-infused building energy optimisation system, through strategic investment subsidiary BP Ventures. The round also featured family office Goldacre and came in the wake of approximately \$260,000 from Ignite, an investment vehicle run by energy utility Centrica, in 2017. Formed as a spin-out company from Aston University in 2016, Grid Edge has developed cloud-based AI software that empowers commercial energy consumers to intelligently control and optimise their building energy loads. The software deploys predictive machine-learning algorithms and advanced data analytics to reduce energy costs, cut carbon emissions and unlock the revenue-generating potential of flexible energy assets.

Canada-based pipeline inspection technology developer Ingu Solutions raised an undisclosed amount from Chevron Technology Ventures and VC firm Energy Innovation Capital. The funding round will enable Ingu to grow its team, scale its data collection platform and analysis, and expand its global presence. Founded in 2018, Ingu has developed a technology dubbed Pipers, which is a pipeline screening tool that detects leaks, geometric defects, magnetic anomalies, and deposits. The unique self-service business model reduces inspection costs while strengthening preventive maintenance.

US-based motor technology company Infinitem Electric closed a \$12.5 million Series B round of financing. The round was led by VC fund Cottonwood Technology Fund and also includes participation from Chevron Technology Ventures, VC firm AJAX Strategies as well as individual investors. Founded in 2016, Infinitem Electric has developed a leading motor technology company delivering ultra-high-efficiency, durable, lightweight and IoT-enabled electric motors, built with patented printed circuit board stator technology and integrated motor controls. The company's patented printed circuit board stator technology enables light weight, lower-cost electric motors.

Funding initiatives

First quarter

US government-owned research laboratory Argonne National Laboratory formed a research agreement with a \$180m US-based battery technology fund backed by speciality chemicals supplier Albemarle and energy companies Equinor and Exelon. Hanon Systems, a distributor of energy management technologies for automotive vehicles, has also committed to the fund, which was founded in 2017 under the moniker Volta Energy Technologies. Volta was launched to uncover promising battery-related technologies which could potentially be of use to its LPs, which hope to complement their in-house research and development in this space. Argonne's role includes providing resources to help Volta's portfolio companies develop their applications. Volta also claims to have access to research from prominent US national laboratories and major universities in the country, in addition to institutions in the UK, Germany, Japan and China.

China-based appliance manufacturing group Midea raised \$104m for an investment fund with a targeted close of RMB1bn to RMB2bn (\$147m to \$293m). The Guangdong Midea Smart Technology Industrial Investment Fund's initial raise included a \$44m commitment from an unnamed, wholly-owned investment arm of Midea. The other LPs remained undisclosed. The fund will focus on areas such as intelligent manufacturing, smart home, retail and new energy. It will be managed by an asset management vehicle formed in 2018. Founded in 1968, Midea has grown into a conglomerate with more than 200 subsidiaries covering consumer appliances, heating, ventilation and air-conditioning systems, supply chain logistics and robotics as well as industrial automation.

Japan-based electronics manufacturer Toshiba has set up a ¥10bn (\$89m) CVC fund. The vehicle is part of a plan by Toshiba that will involve it investing up to \$8.3bn over the next five years, focusing on areas such as renewable energy technologies, power electronics, robotics and medical technologies covering treatment, screening and diagnostic testing. Part of the investment mandate will also go towards bolstering the company's rechargeable battery technology, dubbed SCiB, which has been used for vehicle, industrial and infrastructure applications such as buses, railroad cars, elevators and power plants.

Netherlands-based VC firm Set Ventures secured commitments from Shell, energy utility PTT Group and banking group BNP Paribas for a fund with a €75m (\$85.5m) target. The fund, Set Fund III, also counts Energiq and BOM Brabant Ventures, funds managed by Dutch development agencies Innovation Quarter and De Brabant Development Agency, as LPs, along with family office Korys, the Finnish-state backed fund Sitra and the European Investment Fund. Shell made its contribution to the fund through Shell Ventures. Founded in 2007, Set Ventures is an energy technology-focused vehicle that invests up to €6m a time in European businesses that are focused on energy generation, distribution, storage and efficiency. Set Fund III, the firm's third fund, will make early growth-stage investments in startups that are using smart software and service-based business models.

Great Plains Energy, the US-based energy utility that now operates under umbrella company Evergy, rebranded its investment affiliate, GXP Investments (GXPI), to Evergy Ventures. Founded in 2015, GXPI provides funding for North America-based developers of emerging technologies with the potential to transform the



ANNUAL SPECIAL REPORT

electricity sector. The unit's core focus has been on digital utility technology such as smart sensors and analytics platforms, connected mobility services, smart cities technology, distributed energy resources and intelligent connected buildings. Over the past three years, GXPI has invested more than \$50m across a total of 13 companies including smart thermostat maker Ecobee, cybersecurity software developer Claroty, energy storage operator Axiom Energy and safety communications technology provider LiveSafe. Great Plains Energy merged with electric utility company Westar Energy in a May 2018 deal to form an umbrella company dubbed Evergy, a move the company said reflected its commitment to moving energy forward.

Second quarter

Chevron Technology Ventures launched a \$90m fund called Fund VII. Fund VII will invest in early and mid-stage, high-growth companies developing innovative oil and gas technologies, and will continue to participate in external funds as an LP. Barbara Burger, president of Chevron Technology Ventures, said: "CTV serves as an excellent source within Chevron for new business models and novel technologies that can deliver value to the enterprise through their integration. We are using venture capital as a conduit for early access to innovation and to build a pipeline of innovation for Chevron."

National Grid Partners (NGP), the corporate venturing arm of energy supplier National Grid, has reportedly invested a total of \$90m from its initial \$250m budget, after backing four new portfolio companies and two strategic funds. NGP has become an LP in VC firm IQ Capital's third fund, which concentrates on deep tech and which had raised \$121m for a \$165m targeted close as of June 2018, and the eighth fund of Israel-focused VC firm Jerusalem Venture Partners, which closed at \$220m in February 2019. The unit is also LP in sustainable energy generation-focused vehicle Energy Impact Fund, which had raised \$150m of its \$400m ceiling from investors including National Grid as of 2015, according to a regulatory filing.

Argentina-based oil and gas producer Yacimientos Petrolíferos Fiscales (YPF) set up a corporate venturing arm called YPF Ventures that will invest through two vehicles: Argentina Energy Bridge and YPF Early Stage Fund. Growth equity fund Argentina Energy Bridge will focus on cross-border investments while the seed-stage YPF Early Stage Fund will partner local entrepreneurs to strengthen the energy and cleantech innovation ecosystem in Argentina. YPF Ventures intends to provide up to \$4m for each deal, having already invested in Argentina-based renewable energy provider Sustentator and US-based micro-mobility company Bird Technologies.

Canada-based VC firm Pangaea Ventures reached a C\$95m (\$70m) final close for its fourth advanced-materials fund, having sourced LP commitments from several corporates. Chemicals producers Mitsubishi Chemical Holdings, Shin-Etsu, Sekisui and Tosoh are all among the fund's LPs, as are petrochemical product manufacturers JSR and PPT Global, consumer goods provider Henkel and semiconductor technology supplier Lam Research. Apparel and footwear producer Adidas, diversified conglomerate Doosan, ceramics product maker CoorsTek and steel, energy and mining group Severstal also made commitments to the vehicle, as did credit union VanCity and investment firm Kensington Capital Partners' BC Tech Fund. Founded in 2001, Pangaea targets advanced materials technology developers in the energy, electronics, health and sustainability sectors. Pangaea Ventures Fund IV has already completed six investments and the firm expects to add up to eight other companies to the vehicle's portfolio.

Solvay Ventures, the strategic investment arm of chemicals producer Solvay, provided funding for Longwater Advanced Materials Fund, a VC fund formed by China-based equity fund manager Longwater Investment. Longwater provides funding for advanced materials and chemistry technology developers and service providers. Solvay Ventures runs an €80m (\$91m) evergreen fund, targeting opportunities in sustainable resources including energy transition and clean mobility. Solvay already has a research and innovation centre in Shanghai, China, partnering local entrepreneurs to foster innovation in the chemical industry. Stéphane Roussel, managing director (MD) at Solvay Ventures, said: "Thanks to this new partnership with Longwater Investment, we will support the development of innovative companies in the advanced material industry in the country, while gaining more in-depth local market insight."

Third quarter

Canada-based VC firm ArcTern Ventures reached a C\$165m (\$124m) second close for its Fund II having raised capital from LPs including crude oil producer Suncor. Financial services firm TD Bank also contributed to the second close, along with the Canadian government-owned BDC Capital, family offices including The Ivey Foundation and an undisclosed pension fund. ArcTern Fund II is anchored by energy company Equinor and pension fund manager Omers, and ArcTern announced the extra capital along with news it has increased the vehicle's target size from C\$150m to C\$200m. The firm had secured \$46m for its first close in October 2018. ArcTern invests in clean technology developers and has built up a 13-strong portfolio. Areas of interest for the firm include clean energy, energy efficiency and management systems, advanced manufacturing, mobility, resource efficiency, food and agriculture.

Israel-based VC fund Maniv Mobility closed a \$100m fund with a total of 12 corporate LPs including Alliance Ventures, the VC fund formed by automotive group Renault-Nissan-Mitsubishi. Shell Ventures, auto parts manufacturers Aptiv and Valeo, carmakers Hyundai Motor and BMW, through its investment unit BMW i Ventures, and consumer electronics producer LG Electronics have also backed the fund. Deutsche Bahn Digital Ventures, the investment subsidiary of rail and logistics operator Deutsche Bahn, and car importer Carasso Motors are also among the LPs. The



ANNUAL SPECIAL REPORT

involvement of Lear Innovation Ventures, the CVC fund of automotive component manufacturer Lear Corporation, were also revealed. The identity of the two remaining LPs could not be ascertained. Maniv Mobility targets early-stage companies in the mobility sector, making investments in areas such as autonomous driving software and ride hailing technology. It has invested in 27 startups to date, having closed a \$40m inaugural fund in 2017.

Canada-based VC firm McRock Capital's second fund has reached a C\$80m (\$60.9m) initial close backed by LPs including networking technology provider Cisco and Shell. McRock Fund II is targeting a C\$100m final close and its LPs also include Business Development Bank of Canada's BDC Capital vehicle, Alberta Enterprise Corporation, Export Development Canada and HarbourVest, while Cisco participated through its Cisco Investments unit. McRock Capital backs developers of industrial IoT technology based in North America and Europe. Its portfolio companies include smart city-focused IoT technology provider Worldsensing, in which it co-invested with Cisco Investments in 2017.

Spain-based oil and gas supplier Repsol's foundation has set up a €50m (\$55.5m) impact investment fund, which would remain separate from its venturing unit, Repsol Energy Ventures. The new impact fund will be headed by Luis Casado Padilla, who will no longer manage the corporate venturing subsidiary (please read more on this further below).

Japan-based VC firm DNX Ventures added corporates including insurance provider Tokio Marine Holdings to the LPs of its third fund, which has a target size of ¥30bn (\$277m). Corporates having signed up to the fund also include industrial mining and petroleum group JXTG Holdings as well as financial services firm Mizuho Bank. They were joined by the Japanese state-mandated Organisation for Small & Medium Enterprises and Regional Innovation, which provided ¥4bn (\$37m), roughly 15% of the target, making it the largest LP to date. Payment services firm JCB, electronics manufacturer Hitachi and investment management firm First Brothers already committed capital, along with IT systems integrators Kyocera Communication Systems and Hitachi Solutions. Founded in 2011 as Draper Nexus Ventures, DNX Ventures invests in business-to-business startups based in the US and Japan in sectors such as construction, healthcare and education. The third fund will focus on early-stage developers of cybersecurity, artificial intelligence, autonomous driving, cloud SaaS, industrial IoT and financial technologies.

Scotland-based legal services provider Anderson Strathern launched an investment vehicle called AS Capital. AS Capital will focus on the energy and renewable energy sectors and expects to conduct several deals alongside syndicate Equity Gap. The unit has concluded its inaugural deal, a co-investment with Equity Gap, in Synaptech, a Scotland-based fibre network sensor developer spun out of University of Strathclyde. The size of the investment has not been disclosed. Bruce Farquhar, chairman of Anderson Strathern, said: "We are keen to promote ambitious high-growth companies and our involvement as an investor will lead to both the possibility of capital gains on exit while, just as importantly, enhancing our ability to advise on investment transactions for other companies. The energy and renewables sectors are areas of particular strength at Anderson Strathern and we are excited about Synaptech's market credentials, outlook and next phase of growth."

Evonik Venture Capital, the corporate venturing subsidiary of Germany-based chemicals producer Evonik, revealed a single-digit million dollar commitment to US-based VC capital firm Tech Council Ventures' second fund. Tech Council Ventures is a sector-agnostic investment firm that targets early and expansion-stage companies based in the mid-Atlantic region of the US east coast. The firm's second fund, Tech Council Ventures II, will back startups in the materials, life sciences, healthcare, IoT and energy sectors, making initial investments ranging from \$500,000 to \$2m. Tech Council's previous investments include deals for telehealth system provider Forefront Telecare, blood purification system producer CytoSorbents, IoT software provider Stratis and video content creation platform Vydia.

Fourth quarter

Total plans to invest up to \$400m in carbon neutrality technology developers through an investment vehicle it launched. Total Carbon Neutrality Ventures (TCNV) will deploy the capital over a five-year period, targeting developers of technology or products that can help businesses cut their energy consumption or the intensity of their carbon emissions. The unit will operate out of offices in Europe and the US, and its areas of interest include energy storage, smart energy and mobility products, bioplastics and recycling technology. Patrick Pouyanné, Total's chairman and CEO said: "The Total Carbon Neutrality Ventures fund will fully support Total's ambition to become the responsible energy major. It will allow us to expand the reach of our low-carbon businesses beyond our own borders." The corporate already operates a corporate venturing unit that was formed as Total Energy Ventures before rebranding to simply Total Ventures. Its portfolio now appears to be under the supervision of TCNV while Total Ventures president Girish Nadkarni is now listed as TCNV's CEO.

Malaysia-based oil supplier Petrolia Nasional (Petronas) has set up another CVC unit with \$350m, having created a Europe and US-based CVC subsidiary earlier in 2019. State-owned Petronas has announced that Petronas Corporate Venture Capital (Petronas CVC) will make direct investments in technology startups developing industry 4.0, advanced materials, specialty chemicals and futuristic energy technology as well as access into new markets. The company said in a statement: "Petronas CVC's global coverage will focus not only in North America and Europe, managed by its recently launched VC arm PTV International Ventures America (PIVA), but also in the Asia Pacific and Malaysian startups, to spur local entrepreneurship and the venture capital ecosystem."



ANNUAL SPECIAL REPORT

Chemicals, oil and fertiliser conglomerate Sinochem plans to raise RMB1bn (\$143m) for a China-based fund targeting new energy, materials, and chemicals for the electronics industry. Agreements for the fund are still to be formalised. The corporate will begin investing once it has secured 50% of its overall target as a first close. Founded in 1950, Sinochem primarily produces refined chemical, fertiliser and oil-based products. About 80% of the capital raised for the fund will be invested in energy, materials and electronic chemicals, areas strategically aligned with its operations. Sinochem is committing up to \$28.5m to the fund through its Sinochem Capital Investment Management subsidiary. An unnamed investment manager, in which Sinochem owns a 40% interest, will manage the fund's activities.

Volvo Group Venture Capital, the corporate venturing subsidiary of automotive vehicle manufacturer Volvo, provided an undisclosed amount of capital for ground mobility-focused VC firm Autotech Ventures. Founded in 2015, Autotech Ventures backs startups in areas related to ground transportation, such as autonomous vehicles, connectivity and online retail. The firm currently has more than \$200m under its management, having raised \$77.5m for a second fund with a target size of \$225m, according to a regulatory filing. The ground mobility-focused vehicle follows a fund sized at more than \$120m that was launched in mid-2017 with commitments from vehicle component providers BorgWarner, Denso and Mahle, car safety equipment producer Autoliv and electronics parts supplier Murata Manufacturing. Another automotive parts manufacturer, Stoneridge, disclosed a \$10m commitment from December 2018, and oil and gas supplier Shell is also LP in the fund.

Circulate Capital Ocean Fund, a US-based investment fund targeting technologies that could mitigate plastic pollution, raised \$106m in capital from backers that include several corporate investors. Chemicals and plastics producer Chevron Phillips Chemical Company was among the LPs, having provided \$15m. The other corporate LPs are beverages producers PepsiCo and Coca-Cola, chemicals supplier Dow Chemicals, food product provider Danone and consumer product manufacturers Unilever and Procter and Gamble. Circulate Capital intends to provide debt or equity financing for developers of technologies or infrastructure intended to reduce the flow of plastic waste into the world's oceans. Areas of interest include circular supply chains, waste management and recycling. The firm will also incubate startups through a vehicle called Circulate Initiative that will also create open source metrics which will measure the social and environmental impact of investments.

Emerald Technology Ventures announced additional strategic commitments by Chevron Technology Ventures and GC Ventures in its Industrial Innovation Fund, award-winning evergreen fund. By joining the fund, Chevron Technology Ventures and GC Ventures became part of an LP base comprising 22 industrial multinational corporations from across Europe, North America and Asia. "We look forward to joining Emerald Ventures' Industrial Innovation Fund and supporting the robust innovation ecosystems in Europe and Israel. Our investment expands our geographic reach to innovative technologies that will be important in the energy transition. In addition, it reflects our commitment to both lower emissions in oil and gas and low carbon value chains," said Barbara Burger, president of Chevron Technology Ventures.

People

First quarter

Engie Electro Power Systems (EPS), the energy storage subsidiary of France-headquartered Engie, promoted its Italy-based chief of staff and head of new business, Giovanni Ravina, to chief innovation officer. Prior to joining Engie EPS in March 2018, Ravina had spent four years as part of the founding team of Engie's corporate venturing initiative, Engie New Ventures. During his time at Engie New Ventures, Ravina led financing efforts for smart grid technology developer Opus One, geospatial data technology developer StreetLight Data, nanosilicon-based multi-gas analysis system provider Apix Analytics and electric scooter provider Gogoro.

Eneco Innovation & Ventures, Netherlands-based energy utility Eneco's corporate venturing arm, promoted investment director Leonie Baneke to head of the unit. Baneke had joined Eneco as an M&A adviser in 2014 prior to becoming an investment director at Eneco Innovation & Ventures in 2016, six months after its launch. The vehicle focuses on investments in smart home, intelligent building and domestic renewable energy technology developers. During her time at the unit, Baneke has helped it invest in digital heating installation service provider Thermondo, electric mobility management platform GreenFlux and virtual power plant operator Next Kraftwerke.



Leonie Baneke

US-based hardware product maker Stanley Black & Decker promoted investment manager Michael Mahan to MD of its CVC unit, Stanley Ventures. Selected as one of GCV's 2018 Rising Stars, Mahan was the first member to join the unit upon its launch in 2016. In his role as investment manager, he was involved in deals for robotic companion developer Pillo Health and oil and gas refinery system provider Arix Technologies. Stanley Ventures typically invests from seed to series B stage in startups with a focus that is compatible with SBD in areas such as oil and gas and hydraulics technology.

Eli Groner, previously director-general of the Israeli prime minister's office, joined Koch Disruptive Technologies (KDT), an investment subsidiary of US-based chemicals and energy conglomerate Koch Industries. KDT hired Groner as an Israel-based MD. It finances companies in diverse industries in the US and abroad. The first deal it



ANNUAL SPECIAL REPORT

led was a \$150m series E round for Israel-based ultrasound surgery technology developer InSightec in 2017, a month after the unit was launched. Groner assumed his previous position in 2015 after confirmation from the Israeli cabinet, and liaised between the incumbent prime minister of Israel, Benjamin Netanyahu, and various government departments. In this capacity, Groner advised Netanyahu on national budget negotiations and economic policies. He also co-chaired China-Israel joint economic task force and oversaw National Cyber Bureau as well as the National Program for Smart Mobility launched by Israel in January 2017.

Tyler Williams left Shell Ventures to become an executive committee member of Canada-based investment partnership Natural Gas Innovation Fund (NGIF). Williams had been an investment principal at Shell Ventures since 2017, having joined the corporate in 2013 before taking a Canada-based global technology leader position in 2015 to lead the development of its industrial IoT strategy. Deals in which Williams was involved include a \$2.8m round for Canada-based oil and gas infrastructure platform developer Osprey Informatics. Shell Canada joined six other Canada-based gas producers to pledge C\$3m (\$2.26m) to support NGIF's initiative to back companies attempting to develop cleaner methods of power generation using gas.

Second quarter

Argentina-headquartered oil and gas producer Yacimientos Petrolíferos Fiscales (YPF) chose Tomás Ocampo to lead its corporate venturing arm, YPF Ventures, as US-based MD. Ocampo has helped the corporate set up YPF Ventures, after having served previously as a US-based adviser to Japan-headquartered utilities J-Power and Osaka Gas on corporate venturing initiatives in advanced mobility and renewable energy in 2018.

Johanna Schmidtke has stepped down from her position as investment director at Saudi Aramco Energy Ventures. Schmidtke joined private equity firm Ara Partners Group. During her time at SAEV, she focused on investments in companies developing technologies for upstream and downstream oil and gas exploration, petrochemicals, water, energy efficiency and renewable energies. SAEV hired Schmidtke in 2013 and she has held board seats at portfolio companies ConXtech, Novomer, Vere Technology, Maana and Siluria Technologies on behalf of the unit. Schmidtke had come to the unit from professional services firm PricewaterhouseCoopers, having previously worked on corporate development and strategy at solar module producer First Solar and as an analyst at research and advisory firm Lux Research.



Johanna Schmidtke

Marc Sabas, previously head of business development and partnerships of global core innovation at telecoms firm Telefónica, became venture principal at Centrica Ventures, UK-based energy utility Centrica's corporate venturing subsidiary. Prior to joining Telefónica, Sabas had been investment adviser for Europe and the US regions at Spain-based business-to-business (B2B) technology VC fund Mundi Ventures from 2015 to 2017, helping to structure and launch its fund management firm and raise two funds.

Andrea Course left US-based oil and gas services provider Schlumberger to join Shell Ventures as a venture principal. Course had spent approximately 18 months in the same position at Schlumberger and was named one of Global Corporate Venturing Rising Stars in January 2019, three months before her departure. During her time at Schlumberger, Course sat on the board of Norway-based cable condition monitoring products provider WireScan and participated in a deal for US-based cybersecurity software provider Onapsis.

René Pompl left his position as principal at Next47. Pompl was appointed manager of venture technology role at Siemens' medical technology subsidiary, Healthineers. Its digital incubator targets companies developing precision medicine and care delivery technology. Pompl joined Next47 in June 2018 after spending two years heading Siemens' TTB Tel Aviv innovation hub in Israel. Siemens originally hired him in early 2014 as a senior innovator at its cleantech-focused Technology to Business Centre (TTB) accelerator in Germany.

Danilo Leite, formerly a strategy and innovation specialist at Brazil-based electricity supplier CPFL Energia, joined industrial conglomerate Votorantim Group's energy unit, Votorantim Energia, as an innovation manager. Leite told Global Corporate Venturing that in his previous role he was responsible for CPFL Energia's open innovation and CVC initiatives. Leite also oversaw the Emotive project, an electric mobility research and development (R&D) scheme backed by CPFL, along with telecoms and information technology R&D centre CPQD, University of Campinas and R&D-focused engineering firm Daimon.

Third quarter

David Hayes was promoted to chief investment officer and MD (Americas) for BP Ventures. Hayes had previously spent a decade at BP Ventures and has worked at the oil major since 2002. His promotion comes after a similar reorganisation elsewhere for BP



David Hayes

ANNUAL SPECIAL REPORT

Ventures over the past year with Ignacio Gimenez becoming MD for Europe and the Middle East and Graham Howes having the same role in Asia from Singapore. However, the Americas has been the largest portfolio for BP Ventures, which has invested \$450m in technology companies across more than 45 entities covering digital transformation, mobility, clean energy technologies, power and carbon management.

SE Ventures, the investment vehicle formed by France-headquartered energy and automation system provider Schneider Electric, hired two senior partners for its Silicon Valley-based team - Grant Allen and Varun Jain. Grant Allen left ABB Technology Ventures, the corporate venturing arm of power and automation technology producer ABB, to join the SE Ventures team. Having appeared repeatedly on GCV's Powerlists, Allen had been head of ventures for ABB since early 2017. Kurt Kaltenecker, a GCV Rising Star from 2017, was appointed head of ABB Technology Ventures in Allen's place. He joined ABB Group in 1991 as a development engineer before moving to ABB Technology Ventures in 2010, and was most recently head of technology at the fund.

The other new senior partner SE Ventures hired was Varun Jain, who had previously led the global early-stage practice at mobile chipmaker Qualcomm's corporate venturing unit. A GCV Rising Star in 2018, Jain's most prominent exit involved automotive manufacturer General Motors paying \$1bn to acquire portfolio company Cruise Automation in 2016.

PTV International Ventures Americas (Piva), the US-based CVC subsidiary of Malaysia-headquartered petroleum supplier Petronas, hired Bennett Cohen as a partner. Cohen had previously been a principal at Shell Ventures. He had joined the unit in 2015 and his areas of investment included blockchain, advanced cleantech and mobility technology. Piva's \$250m fund targets early-stage, North America and Europe-based developers of artificial intelligence, machine learning, applied robotics, specialty chemicals, advanced materials and clean technologies centred on the industrial and energy sectors.

Ricardo Angel will oversee Piva as CEO and managing partner, having set up the unit in January 2019 on behalf of Petronas. Angel had been MD at GE Ventures, the corporate venturing arm of industrial technology conglomerate General Electric, since 2013 before his departure from there. The Piva team also includes Adzmel Adznan, the former head of Piva's predecessor, Petronas Technology Venture Capital, who joined in May as partner and operating manager. Piva also hired Bennett Cohen, who had previously been a principal at Shell Ventures.

Florian Loebermann, head of corporate venturing at Germany-based chemicals producer Altana, became MD of 3D printing company DP Polar. Loebermann said Volker Mansfeld, head of corporate development at Altana, would maintain its corporate venturing after two years of operations. His deals at Altana included a \$32m round for Israel-based digital printing technology provider Velox in November 2018 in which he took a board seat. Loebermann had previously been a partner at VC firm Munich Venture Partners, where his deals included Sonnen, a battery provider sold to oil major Shell in the year after he had left the board.

Luis Casado Padilla, head of Spain-based Repsol's CVC unit, moved to the company's foundation to set up a €50m (\$55.5m) impact investment fund. Padilla said the Social Investment Fund at Repsol Foundation would support "startups with a double ambition: helping to solve relevant challenges around energy transition and environment and having a positive impact on the most vulnerable people in our society". His move came after nearly two and a half years as corporate venturing director for Padilla at Repsol, with his deals including 3D printing company Recreus. The existing venturing unit will remain independent of the new investment fund.



Luis Casado

Álvaro Reguera Ferrer and Elena de Benavides Jimenez joined Spain-based electricity grid operator Red Eléctrica de España as venture capital manager and open innovation and entrepreneurship lead, respectively. Ferrer had spent nearly four years as a senior investment associate at local oil major Repsol's venturing unit, which is now led by Jaime Martín Juez. Jimenez, in turn, had spent more than five years as investment director at VC firm Gala Ventures, working closely with corporate partners and improving their relationship with startups.

Mikko Huumo was promoted from startup investments and acquisitions manager to head of external venturing at Finland-based energy group Fortum. Huumo had spent about two and a half years in the position after nearly four years at Fortum as manager for research and development growth projects. His board roles at Fortum had included wave power producer AW-Energy and Stereoscape, a developer of virtual reality technology for industrial businesses.

Matthias Dill joined corporate-backed venture capital firm Energy Impact Partners (EIP) as managing partner after leaving Statkraft Ventures, the corporate venturing unit operated by Norway-headquartered energy provider Statkraft. Dill was MD at Statkraft Ventures, where his deals included Tado, Greenbird Integration Technology and Metron. He had spent almost four and a half years at Statkraft, having joined from early-stage investment firm High-Tech Gründerfonds in 2015. EIP has been building its portfolio under founder Hans Kobler, with recent deals including a \$44m round for electric vehicle charging service Volta Charging, a \$33m round for Cimcon Lighting and a \$100m round for data management technology provider Trifacta.



ANNUAL SPECIAL REPORT

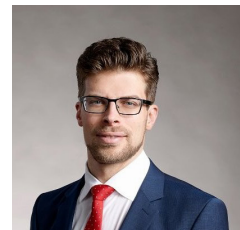
Fourth quarter

Chile-based energy and retail group Copec hired Brian Walsh to head its strategic venture capital unit, Wind Ventures. Walsh commented that the unit would “leverage Copec’s significant resources to accelerate startups and scaleups in realising new growth” across Latin America and the US. Walsh had been a senior expert for corporate startup engagement and corporate venturing at management consulting firm McKinsey and had spent more than two years advising Fortune 500 clients on “best fit” startup engagement models such as corporate VC, partnerships and accelerators. The McKinsey position had come after a brief stint overseeing office equipment supplier Konica Minolta’s innovation strategy and new venture development efforts for North America in 2017. Walsh had previously been co-founder and CEO of dairy data startup Vital Herd.

JSW Ventures, the corporate venturing unit for India-based steel and energy conglomerate JSW Group, hired Sachin Tagra as a partner ahead of a first close of its second fund. Tagra joins JSW Ventures from media house Network18 Group, where he headed its CVC subsidiary, Capital18. Gaurav Sachdeva, managing partner at JSW Ventures, commented: “Sachin has significant experience in scaling up businesses from their startup phase. This will be crucial as we build and launch a bigger fund as well as support our current portfolio companies in scaling up their businesses.” JSW Ventures reportedly received approval for the second fund from Indian market regulator SEBI in August 2019 and will look to raise external capital. Its Rs 1bn (\$15m) first fund in 2016 was entirely backed by the Jindal family, which owns JSW.

Server Agirman left energy management technology producer Schneider Electric’s corporate venturing unit to become director of new ventures at engine equipment manufacturer Mitsubishi Electric Automotive America. Agirman spent more than four years running Schneider Electric Business Incubation Program in Silicon Valley as a part of Schneider Electric Ventures along with the company’s Innovation at the Edge program. As part of the incubator, Agirman co-founded eIQ-Mobility, a US-based startup backed by Schneider Electric that is working on technology that could enable and accelerate electric mobility at scale.

Philipp Ulbrich was promoted to senior vice-president (SVP) of S4Hana transformation at Germany-based energy utility Eon, leaving Konrad Agustin and Ines Bergmann-Nolting to run corporate venturing at the company. Until his promotion, Ulbrich had spent three and a half years as vice-president of innovation scouting and co-investments, working alongside Frank Meyer, who remains overall SVP for innovation at Eon. Agustin is the only San Francisco-based corporate venturer at Eon while Bergmann-Nolting is based in its headquarters in Essen, alongside Niklas Roterling, an investment principal.

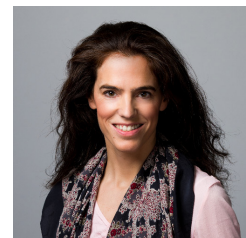


Philipp Ulbrich

Amy Francetic left Energize Ventures, the US-based corporate-backed VC firm formerly known as Invenergy Future Fund. Francetic became MD at what was initially known as Invenergy Future Fund when it was set up by renewable energy project developer Invenergy in 2016. She had previously been senior vice-president of new ventures for the company. Deals overseen by Francetic in the role included investments in Spark Cognition and Aquilon Energy Services. John Tough stepped up to be managing partner at Energize in September to lead investment and LP engagements on behalf of corporate investors including Invenergy, General Electric, Schneider Electric and WEC Energy Group. The firm’s anchor investor and founding partner, Invenergy, remains closely tied to the Energize Ventures team, with Michael Polsky, founder and CEO of Invenergy, and Jim Murphy, president and chief operating officer, on its investment committee.

Jérôme Joaug was promoted to partner at Aster Capital, a VC firm managing €520m (\$550m) through multiple funds raised with major corporations and institutional players. Joaug joined Aster in its UK office as a principal in March 2018, and his early deals included PacketAI, Hadean and Wluper. He had previously been a serial entrepreneur, co-founding Cambridge Nanosystems out of his research at the University of Cambridge, and Nymbly, a low-power IoT platform. Aster Capital was formed by Schneider Electric and Alstom in 2010, and received funding from another corporate, Solvay, in 2011 before restructuring in 2019, converting to a model that involved it being owned by its management team.

Itziar Estevez Latasa, a former principal at Siemens’ Next47 corporate venturing unit, joined France-headquartered VC firm Iris Capital as a Germany-based partner. The move comes after nearly a decade spent in corporate venturing at Siemens for Estevez Latasa, initially at Next47 predecessor Siemens Venture Capital. Estevez Latasa’s exits had included software management platform Black Duck, which was acquired by Synopsys for \$565m in late 2017, and Thinkstep, which was purchased by risk management services provider Sphera earlier.



Itziar Estevez Latasa