



Global

Corporate

Venturing

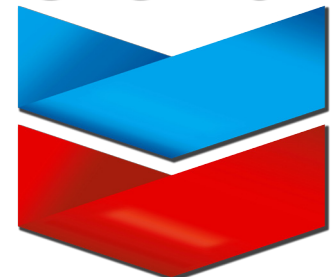
April 2019

Oil and gas sector review Q1 2019



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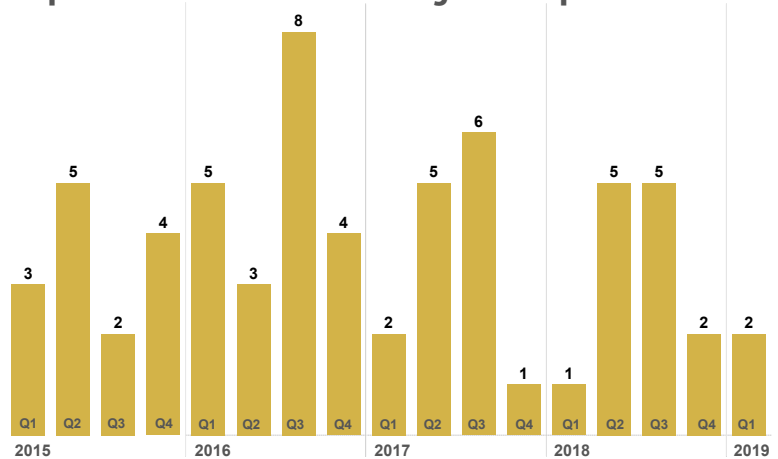
SPECIAL REPORT



Kaloyan Andonov, analyst at GCV Analytics

There has been a general shift in focus of oil and gas corporate venturers since 2014 and GCV Analytics continued to observe this in the first quarter of 2019. The majority of disclosed deals by oil and gas corporate investors went into non-core areas, such as cleantech, IT and, more recently, transport and mobility. On the whole, oil and gas corporate venturers are making more investments in low-carbon energy technologies, mobility and transport as well as in the digitisation of industrial activities, while somewhat ring-fencing bets on traditional upstream innovations.

Corporate-backed deals in oil & gas enterprises 2015-19



Despite this trend, investments in core oil and gas technologies will continue to be included in portfolios due to the inherently capital-intensive nature of the oil and gas business. The corporate venturing units of oil and gas companies usually aim to bring strategic rather than financial value through their investments. The latter may come in the form of building an ecosystem, finding suppliers or helping business units with specific technical and other challenges.

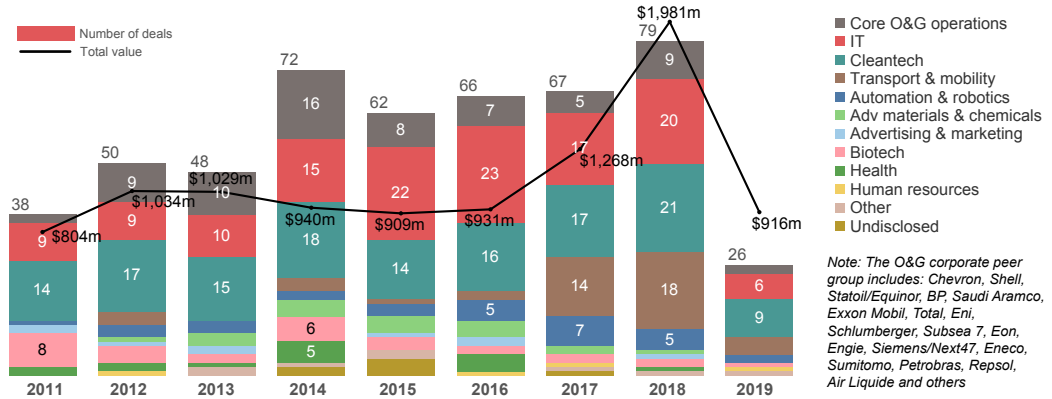
During the first quarter of 2019, cleantech, IT and transport received more attention from corporate investors than other areas. The number of disclosed deals by oil and gas investors was 26 and their total estimated value was \$916m. Disclosed core area commitments have declined over the past three years but were up slightly in 2017. Investments in information and communications technology startups decreased, while those in cleantech and transport rose.

The average size of deals in which oil and gas corporate venturing peers participated in the first quarter was \$54.44m, ➔

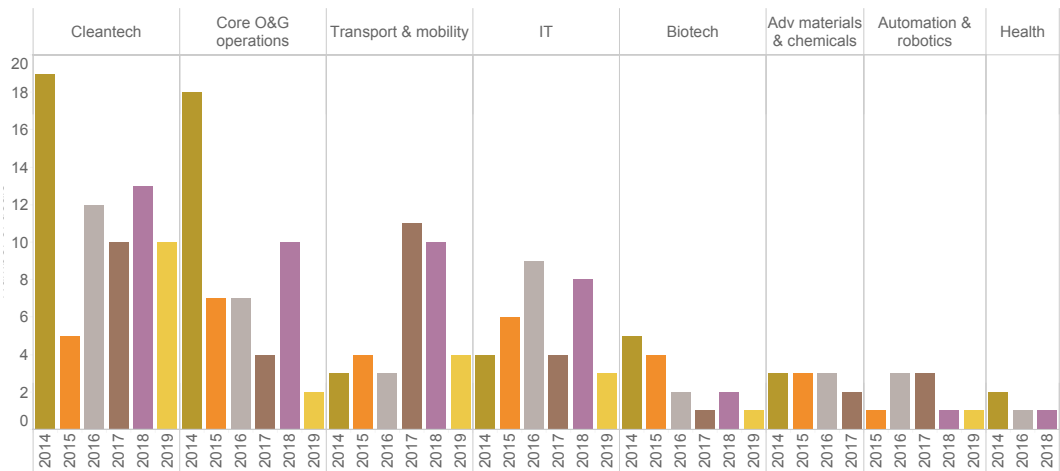


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Investments by O&G corporate peer group 2011 - Q1 2019



Type of oil & gas venturing investments by year

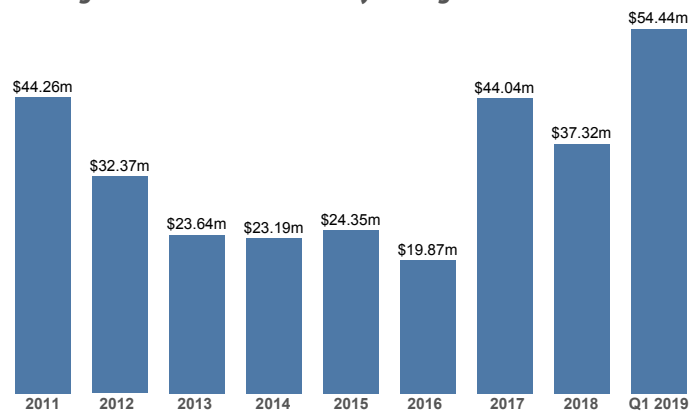


considerably higher than the levels in 2017 and 2018, due to the outlier effect of one particularly large deal. Many oil and gas corporate venturers are focused on investing in a digitised future of disrupted mobility and transport, with emerging opportunities in renewable and sustainable sources. As valuations in these areas of innovation have been growing, it is no surprise that the average deal size among oil and gas corporates has increased over the past few years.

UK-based BP has disclosed a significant number of rounds in biotechnology and cleantech businesses since 2014, along with investments in core operation technologies and, more recently, mobility and transport. The mobility space is also of interest to Spain-based Repsol.

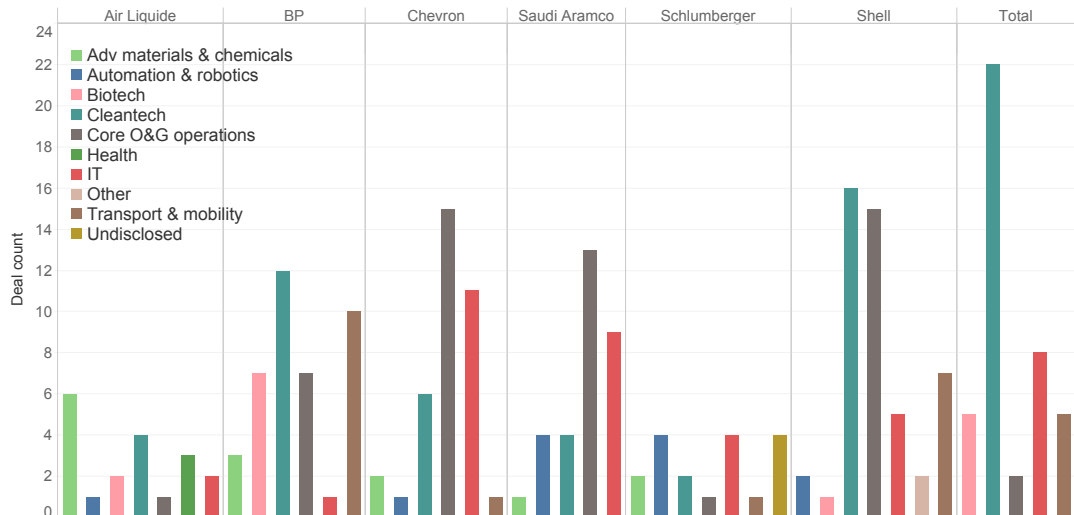
Norway-based Statoil, recently rebranded as Equinor, has been active in cleantech, but more so in gas core operation technologies. France-based Total has placed heavy bets on cleantech, while Anglo-Dutch company Shell has been focused on both cleantech and core oil and gas technologies. US-based Chevron's publicly disclosed commitments revolve around core energy operations and the digital dimension of its operation, as do the investments of Saudi Arabia-based Saudi Aramco. However, nearly all oil and gas majors are involved in some way in low-carbon and advanced mobility opportunities.

Average size of deals backed by oil & gas CVCs 2011- 19



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Type of investment by company 2014-Q1 2019



Deals

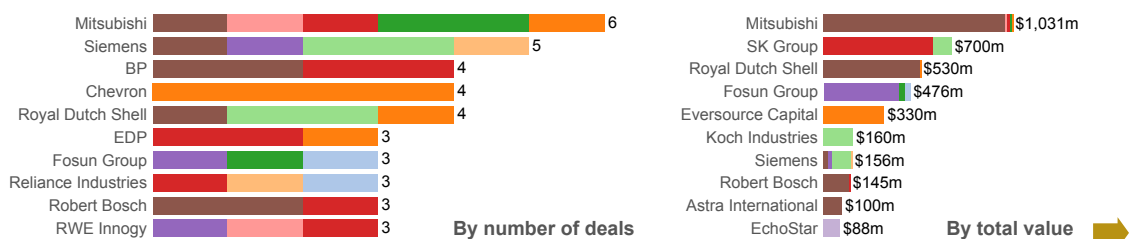
Oil and gas companies among the most active corporate venture investors from the industrial and energy sectors were BP, Chevron and Shell. In the first quarter of 2019, there were a number of notable deals.

US-based autonomous driving technology developer Aurora Innovation secured \$530m from investors including Shell and e-commerce platform and cloud services provider Amazon. The round was led by venture capital firm Sequoia Capital and also featured Lightspeed Venture Partners, Geodesic, Reinvent Capital, Greylock, T Rowe Price and Index Ventures. The round reportedly valued the company at more than \$2.5bn. Aurora is working on software, hardware and data technology for driverless vehicles. It has a team of 250 and has 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 to power cars, trucks and airplanes. The company claims its direct-air-capture technology can capture and purify atmospheric carbon dioxide for less than \$100 per tonne. The funding will support the expansion of its pilot plant and the engineering of its first commercial facilities.

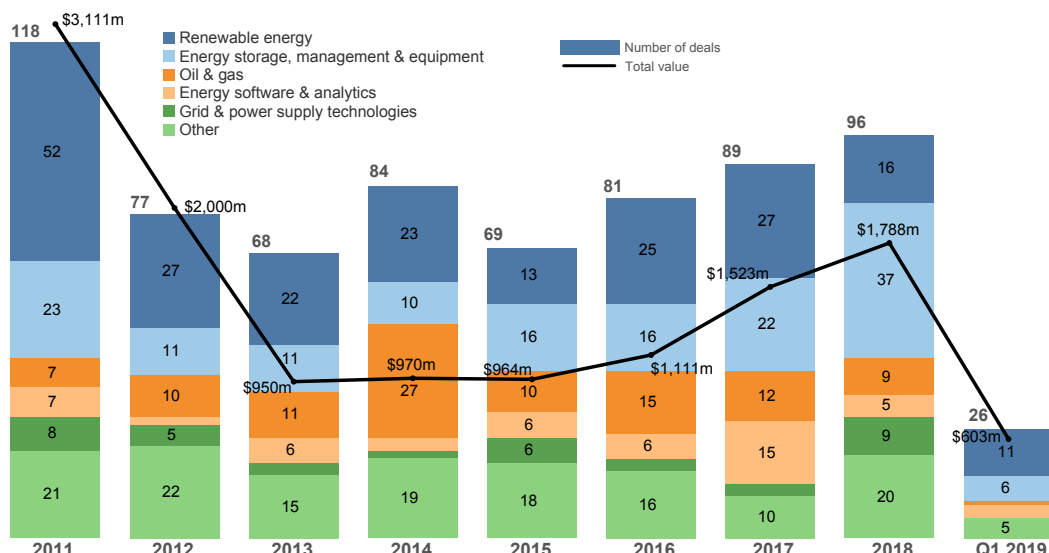
United Arab Emirates-based solar power provider Yellow Door Energy secured \$65m in a series A round that included Equinor and diversified conglomerate Mitsui. The round also featured the International Finance Corporation, the private investment arm of the World Bank, as well as development bank Arab 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 for corporate customers in the Middle East and Africa who pay for power on a monthly basis. The company also installs energy-efficiency equipment for businesses, taking a proportion of cost savings. The series A funding will support construction of 300MW of solar capacity.

Top energy and industrial investors Q1 2019



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Energy sector deals by subsector 2011- Q1 2019



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 others. Exelon took part through its Constellation Technology Ventures unit. Founded in 2016, Ouster is developing light detection and ranging (lidar) technology for automotive vehicles, industrial robots and unmanned aerial vehicles. The sensors, which use lasers to calculate distances to objects, are also used in mapping, defence, mining and agriculture. Ouster will use the proceeds to expand production facilities, including a new 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, as did investment firm Idivest Partners and angel investment group Sunfire Entrepreneurs Club. Founded in 2010, Sunfire produces high-temperature electrolysers and fuel cells that produce clean energy, hydrogen and synthesised gas for customers in industries that currently rely on fossil oils and natural gases, such as transport, 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, according to Disrupt Africa. 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 provide \$13.5m

Top deals backed by oil & gas corporate venturers Q1 2019

	Round	Sector	Size	Venture investors
Aurora Innovation	-	Transport	\$530m	Amazon Geodesic Capital Greylock Partners Index Ventures Lightspeed Venture Partners Relinvent VC Royal Dutch Shell Sequoia Capital T Rowe Price
Carbon Engineering	-	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 Rusheen Capital Management Starlight Ventures Thomvest Ventures private investor
Yellow Door Energy	A	Energy	\$65m	Mitsui Equinor International Finance Corporation Arab Petroleum Investments Corporation Adenium
Ouster	-	Transport	\$60m	Carthona Capital Cox Enterprises Exelon Fontinalis Partners Runway Growth Capital Silicon Valley Bank undisclosed investors
Sunfire	C	Energy	\$28.8m	Paul Wurth Cez Total Idivest Partners Sunfire Entrepreneurs Club
PEG Africa	-	Energy	\$25m	Blue Haven Initiative Energy Access Ventures Renewable Energy Performance Platform Total
Xage Security	B	IT	\$16.5m	Saudi Aramco General Electric March Capital Partners City Light Capital NexStar Partners
Xpansiv	A	IT	\$10m	S&P Global Reflective Ventures Energy Innovation Capital Avista BP
Daphne Technology	-	Industrial	\$5m	Global Innovation Fund Saudi Aramco angel investors
Belmont Technology	A	IT	\$5m	BP



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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, Cote d'Ivoire and Senegal on a pay-as-you-go basis.

Xage Security, a US-based developer of blockchain-protected security technology for industrial internet-of-things systems, raised about \$4.5m from investors including Saudi Aramco Energy Ventures for 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 platform that secures internet-of-things systems by spreading authentication and private data across a network of devices.

Xpansiv, a 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 \$4.9m (\$5m) round for Daphne Technology, a Switzerland-based provider of filtration technology for shipping emissions. Founded in 2017, Daphne Technology develops a catalyst-free nano-technology helping the petrochemical, power and transportation industries lower air emissions to regulation levels.

BP Ventures also provided \$5m of series A funding for Belmont Technology, a US-based developer of artificial intelligence 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 the 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 artificial intelligence to reveal patterns and relationships within heterogeneous geoscience data sets.

Canada-based carbon technology company Inventys raised about C\$6.6m (\$5m) from Business Development Bank of Canada'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\$21m. The round's first tranche was led by OGC Climate Investments. Founded in 2007, Inventys is developing 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. It claims its VeloxoTherm process reduces the cost of existing post-combustion CO₂ capture technologies. The funds raised will help Inventys complete and commercialise a CO₂ capture demonstration plant project with Husky Energy.

US-based connected car and telematics technology developer Zubie received an undisclosed level of funding 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.

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 uses artificial intelligence, machine learning, big data and internet-of-things 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 artificial intelligence technology for the petroleum geoscience sector. The company did not disclose details of its earlier funding but said it had received funding and support from oil and gas suppliers ConocoPhillips, DEA, Lundin Petroleum and Spirit Energy. Founded in 2016, Earth Science Analytics develops geoscience-driven machine learning workflows and software, aiming to provide data-driven forecasts to clients with greater precision and at lower cost.

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



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Khosla Ventures. Founded in 2012, Natron is developing long-life low-cost battery technology.

Shell provided an undisclosed level of funding for Nordsol, a Netherlands-based producer of liquified biomethane, investing through Shell Ventures. The capital will help Nordsol expand from technology provider to full-fledged producer building and operating its own biogas plants with strategic partners. Founded in 2009, Nordsol produces liquified biomethane.

Salesforce Ventures 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 & Rosati across three rounds. Founded in 2013, Kespry allows organisations to source specialised aerial data through its unmanned aerial vehicles. Clients can program a mission using a tablet provided by the company, and a Kespry drone plots a flight path, using lidar technology, before the data it films is transferred to the Kespry app for processing.

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. Users in some European markets can also form a local community to pool 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 venture capital 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 contractors who have to pass background checks before they can join the company's network. The platform can also be used to handle invoicing and accounting tasks related to worker payment.

Funds

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 name Volta Energy Technologies. Volta was launched to uncover promising battery-related technologies which could be of use to its limited partners, which hope to complement their in-house research and development. 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 universities, 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 (\$147m) to RMB2bn. The Guangdong Midea Smart Technology Industrial Investment Fund's initial commitments included \$44m from an unnamed wholly-owned investment arm of Midea. Other limited partners were not disclosed. 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, robotics and industrial automation.

Japan-based electronics manufacturer Toshiba has set up a ¥10bn (\$89m) corporate venturing 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, which has been used for vehicle, industrial and infrastructure applications such as buses, trains, elevators and power plants.

Netherlands-based venture capital firm Set Ventures secured commitments from Shell, energy utility PTT Group and banking group BNP Paribas for a fund targeting €75m. Set Fund III is also backed by Energiq and BOM Brabant Ventures, funds managed by Dutch development agencies InnovationQuarter and De Brabant Development Agency, along with family office Korys, Finnish-state backed fund Sitra and the European Investment Fund. Shell invested through Shell Ventures. Founded in 2007, Set Ventures is an energy technology-focused vehicle that invests up to €6m in European businesses focused on energy generation, distribution, storage and efficiency. Set Fund III will make early growth-stage investments in startups using smart software and service-based business models.

Great Plains Energy, a US-based energy utility that now operates under umbrella company Evergy, rebranded its invest- ➔



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ment affiliate, GXP Investments (GXPI), as Evergy Ventures. Founded in 2015, GXPI provides funding for North America-based developers of emerging technologies with the potential to transform the 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 in 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 May 2018 to form umbrella company Evergy.

People

Engie Electro Power Systems (EPS), the energy storage subsidiary of France-headquartered energy group Engie, promoted its Italy-based chief of staff and head of new business, Giovanni Ravina, to chief innovation officer. Before joining Engie EPS in March 2018, Ravina spent four years as part of the founding team of Engie's corporate venturing initiative, Engie New Ventures. During his time there, he led financing efforts for smart grid technology developer Opus One, geo-spatial data technology developer StreetLight Data, nanosilicon-based multigas analysis system provider Apex 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 joined Eneco as an M&A adviser in 2014 before 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, she has helped it invest in digital heating installation service provider Thermondo, electric mobility management platform GreenFlux and virtual power plant operator Next Kraftwerke.

US-based hardware product maker Stanley Black & Decker promoted investment manager Michael Mahan to managing director of its corporate venturing unit, Stanley Ventures. Selected as a GCV Rising Star 2018, Mahan was the first member to join the unit on 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 Aris Technologies. Stanley Ventures typically invests from seed to series B stage in startups with a focus that is compatible with Stanley Black & Decker in areas such as oil and gas and hydraulics technology.



Mahan

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 managing director. The first deal it KDT 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 Israeli prime minister and various government departments. In this capacity, Groner advised on national budget negotiations and economic policies. He also co-chaired the China-Israel joint economic taskforce and oversaw the National Cyber Bureau and the National Program for Smart Mobility launched by Israel in January 2017.



Groner

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 the development of its industrial internet-of-things 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 to support NGIF's initiative to back companies developing cleaner methods of power generation using gas. □

