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The Energy Industry's Renewed Emphasis on Venturing & Innovation

Broadening the Focus to Include Business Model Innovation and an Ecosystem Approach

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It is no secret that for technology innovation to create value, the right partnerships and business models are as important as the technology itself. This notion rings true in the energy sector, where large corporates–from oil majors like BP and Shell to service providers like TechnipFMC and Worley to equipment manufacturers like Caterpillar and Schneider Electric–have made focused investments in the technology of energy transition. Going forward, it will be important for energy CVCs to expand the aperture of their investing activity to include business model innovation by employing an ecosystem approach to innovation.

The following sections discuss three interrelated themes that emerged from the Global Corporate Venturing Energy conference held in Houston on November 22, 2019: technology advancing the energy transition, digital transformation, and the imperative to develop an innovation ecosystem.

Theme 1: The Energy Transition

Carbon is top of mind for corporate venture investors in energy, with oil majors and tech investors alike moving beyond carbon capture and carbon offsets into an extensive discussion of innovations advancing the energy transition. These innovations showcased scrappy, capital-efficient approaches and spanned three major categories: enabling technologies, mobility, and business model innovations.

ENABLING TECHNOLOGIES

Enabling technologies—from grid-enhancing software to efficiency technology to distributed generation—are the next important lever for the energy transition, especially given the significant cost reductions seen in wind and solar hardware over the last decade. Some illustrative examples are highlighted below below.

- **LO3 Energy**, which counts Shell Ventures as an investor, uses software to enhance grid flexibility and allow increased storage and EVs to stabilize intermittent renewable generation. Importantly, LO3 has approached the problem from the vantage point of the community, removing some of the financial risk for individual pro-sumers, which in turn allows entire energy communities to act more nimbly. In addition to bringing more renewables online, enabling technology can potentially reduce the energy intensity or carbon intensity of power applications.
- **Infinitum Electric** has done this for the traditional electric motor in applications as varied as HVAC and oil & gas; they may even bring their technology to aerospace propulsion eventually. Based on a ground-up redesign of the traditional electric motor and leveraging printed circuit boards instead of wound wires, Infinitum Electric advances motor technology across all attributes: size, cost, efficiency, noise, mechanical mountings, etc.
- **Intelligent Power Design** has made strides in distributed generation resources for parts of the world the grid may never reach affordably. The technology—flameless combustion in ceramic turbines—alters the form factor of turbine technology, bringing it from utility scale to human scale, allowing rural communities to gain massive efficiencies from their fuel-based generation.

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MOBILITY

Mobility solutions receiving attention from energy corporates vary from battery and drone hardware to software for fleet vehicles. According to Chris Smith, Managing Director of Energy Innovation Capital, battery technology, while advancing methodically in both price and performance, has only recently become investible from the perspective of venture capital return profiles. Some examples are illustrated below.

- **Cuberg**, a battery startup, serves as a model for investing in unproven hardware technology in a capital efficient way, by utilizing existing Li-ion manufacturing infrastructure to improve affordability and speed to commercialization and waiting for specific use-cases to emerge before investing in major product development decisions. While this initially narrowed the performance vectors Cuberg could pursue, it allowed the company (and Boeing's HorizonX Ventures, which invested in Cuberg's Seed round) to de-risk its technology with less dilutive capital investment.
- Drone company **ElRoy Air**, along with strategic investor **Total Ventures**, has ambitious growth goals, aiming to respond to the Amazon effect in logistics by using high-payload electric drones to effectively "skip" intermodal shipping and move goods directly from the point of production to that of consumption.
- At EV-fleet-optimization platform **eIQ** mobility, intrepid founders are simplifying the process of electrifying fleets—what kind of vehicles to procure, how fast charging infrastructure needs to be, etc.—and thereby accelerating the transition away from fossil-powered fleets, which emit nearly half the emissions of the transportation sector. As with many energy startups, regulatory fragmentation across US states is a hurdle for eIQ, which has to navigate charging incentives across multiple jurisdictions. However, this is also an opportunity for eIQ's founders and investor Schneider Electric Ventures to add value for fleet owners by utilizing their national presence.

ENGAGING EXTERNALLY AND WITH STARTUPS

Business model innovation is a critical factor in the energy transition. While focusing on technology is a natural fit for energy companies, the business model is often the bottleneck. If energy CVCs wait until the technology has been perfected to begin refining the business model, then they may be leaving money on the table as financial investors change the rules of the game. Just as Shell's investment in LO3 Energy has approached the business model of renewable energy and storage from the standpoint of reducing financial risk for pro-sumers and entire communities, energy CVC writ large must focus on financial and business model innovation. Satish Rao, Partner at Clareo, and Sayun Sakduang, President and CEO, Engie Resources, which has a €200M CVC fund, touched on the important topic of energy business models in a fireside chat. The business model of the energy industry has long been providing commoditized, packeted goods for a price; upstream it was a barrel of oil, downstream it was a gallon of gasoline, in the utility sector it was a kilowatt hour. Moving forward, the energy sector, ranging from oil majors to utilities, will benefit from exploring business models formulated to achieve the "jobs to be done". For instance, energy companies will be forced to deliver value in the form of outcomes like "year-round temperature control" instead of a monthly bill for kilowatt-hours delivered for HVAC systems.

In the energy sector, rents derived from traditional energy production will continue to decline, spurring this change. But even in other industries, a similar shift is afoot: in IT, the megabyte could transform into a more outcomes-oriented service like "video-hours streamed"; in mobility, the model has already begun to move from cars sold to passenger-vehicle-miles-traveled. What's more, combining electricity and data may be a critical advance in the business model of both sectors. The electron only has extrinsic value. A megabyte is similar. If you are able to connect these two, in the future you may be able to more easily achieve cost efficiencies. One such example will be the improved coordination of the demand-side of energy, which will have a significant impact on energy production.

Moving forward, it is critical that energy CVCs experiment with these kinds of business model shifts as early as possible, well before the technology underlying them is perfected or fully deployed. For instance, how can energy companies begin to experiment with selling passenger-vehicle-miles-traveled before autonomous vehicles and EVs are widespread?

Combining electricity and data may be a critical advance in the business model of both sectors. The electron only has extrinsic value. A megabyte is similar. Connecting the electron and the megabyte can unleash new innovations and business models. – Sayun Sukduang, President & CEO, Engie Resources

Theme 2: Digital Transformation

The conference also generated discussion on how companies can take advantage of the digital transformation wave. In most instances, the approach favored was digital transformation with an application and existing business model in mind first. As one speaker noted, the sales cycles in energy tend to be long due to the preference for new technologies to be validated and proven before adoption.

Start-ups showcased a variety of new technologies such as:

- Visualization, analytics, control - HyperGiant (visualization and AI/ML)
- Digital twins - Akselos (RB-FEA technology to create digital twins of assets)
- Sensors, IoT - DotProduct (handheld 3D sensors), GuardHat (IoT sensors to manage safety), ARIX Technologies (robots built to better measure and manage pipe corrosion in petrochemicals)
- SW, AI, ML - Belmont Technologies (AI for seismic model iterations)

We observed that many new technologies looked for incremental gains, focused on helping energy companies to continue doing what they do today, just more efficiently. There were applications to safety, efficiency, maintenance, and automation to improve existing ways of working in the industry.

We did not see many companies or approaches that would serve the industry in a world that was dramatically reshaped. But, as Sayun Sukduang, President and CEO of Engie Resources, observed, there are great opportunities for those who are able to create new business models that combine the electron and the megabyte (i.e. improve the understanding of the generation and consumption of energy through data), and benefits are likely to accrue to those with network and scale.

Theme 3: Building an Innovation Ecosystem

Another key discussion topic was the need to develop an innovation ecosystem for the oil & gas industry. Corporate innovation and venturing teams seek external innovation, from both startups and companies outside the energy sector. Their ultimate objective is to generate business value through successful deployment and operationalization of new technologies and business models, starting with pilots and trials to validate new approaches. However, industry structure and roles of the players within the ecosystem can create challenges. While tech startups can be adept at fast and lean approaches, they often lack domain knowledge and the ability to scale to broader deployment. Large incumbent oil & gas operators and service providers can deploy at scale, but look to minimize technology and operational risk. This can stymie progress of a promising new technology - it can get stuck in pilots and trials, never reaching its full potential even though it may have been validated through a pilot.

Addressing this requires an innovation ecosystem, starting with the end goal in mind: the creation of business value through broader deployment and operationalization of new approaches. Collaboration between ecosystem players, namely oil & gas operators, service providers, and tech startups is required, starting with the recognition that initial investigation and validation is just a first step, and that a commercial and organizational pathway should be developed for adoption and scaling of the technology. Key questions to ask early include:

1. Have critical uncertainties and assumptions of the new technology been adequately addressed and validated? Are there sufficient metrics to prove business value? Is there a vision for the product in operational deployment and a roadmap for future technology development?
2. What are potential commercial models for future deployment? What organizational aspects are required to nurture the technology and commercial model to scale?

If these questions are addressed early through a collaborative effort, oil & gas operators will be able to test and validate new technologies rapidly, while tech startups and incumbent service providers may be able to address scale and deployment.
An innovation ecosystem can also benefit industry collaboration, for example through data sharing. While many aspects will remain competitive, current structure prevents collaboration around obvious areas of benefits such as safety and standardization. Service providers often work with multiple operators, and can often see opportunities for value creation that others may not be able to do so. If the industry can create forums around topics they are willing to cooperate, it can create enormous potential for collective value creation. A first step to this collaboration is for key players in the ecosystem to come together and identify areas of common interest and create a forum to share data and practices in an appropriate way.

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ENERGY TRANSITION VENTURING: THE PATH FORWARD

Energy transition is a key focus for CVC investors in the energy sector. The opportunity exists for CVC to succeed in energy technology innovation, but in order to do so it must combine both business model innovation and technology innovation early in the corporate venturing process, by finding inexpensive, efficient ways to test business models before new energy technology is deployed at scale. Energy CVCs have reached down the value chain to leverage the providers of support services to find innovation, taking advantage of the uniquely well-networked position of those service providers within the value chain. Energy CVCs that keep employ these approaches can drive value-creating innovation for their core businesses and accelerate the energy transition.

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Our clients choose Clareo when they want bold new ideas that get to market faster. Working alongside our clients, we create compelling strategies that lead to action.

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