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New Firms, New Models, New Hope

ARTICLES FROM:

Bill Draper

Kef Kasdin

Andy Lower

Forrest Hill

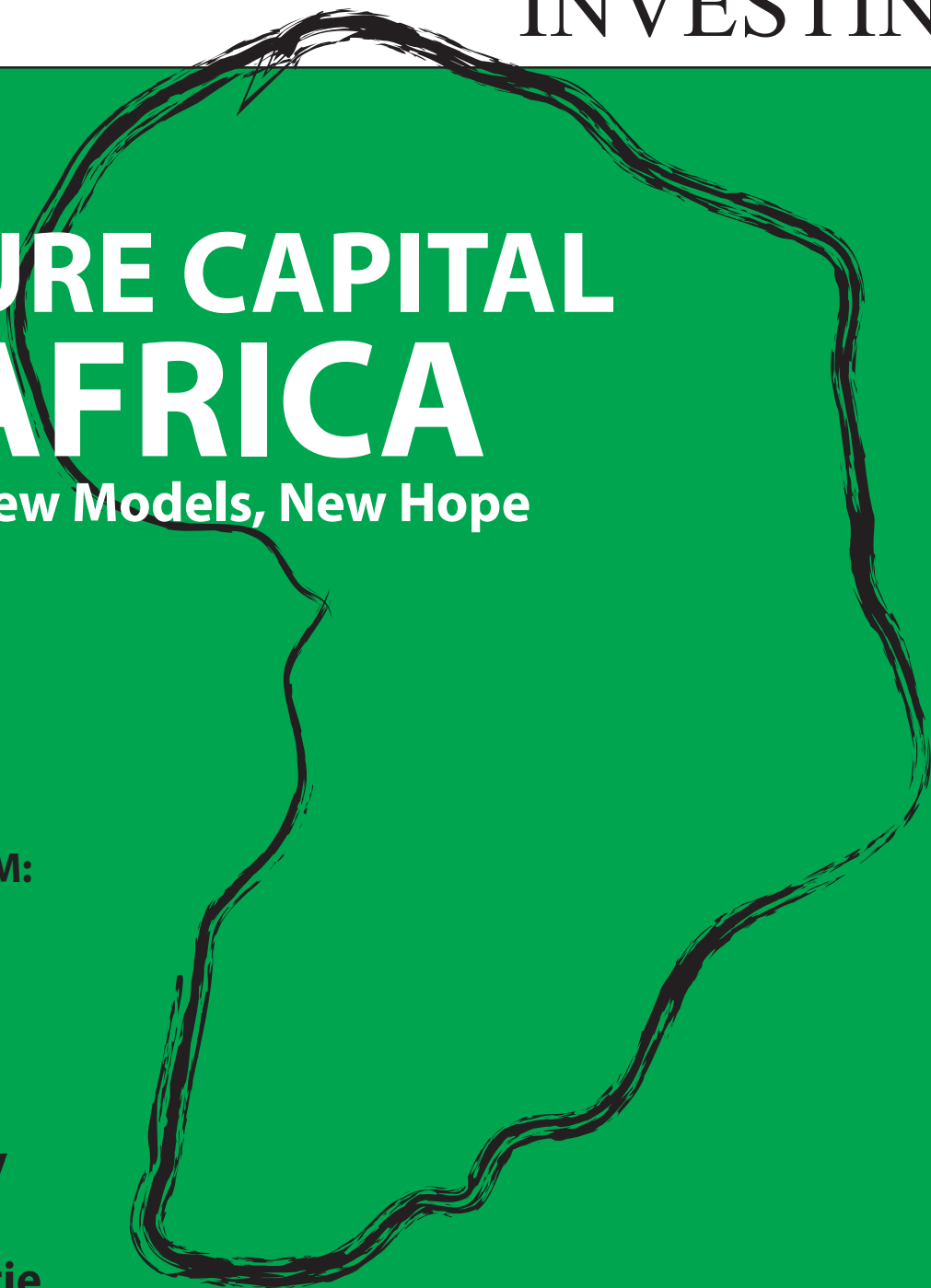
George Petty

Jerry Knotts

Gillian Christie

Lewis Hower & Taylor Randall

Mike Murray & Chester Woolley



TARGETING TRANSFORMATIONAL CHANGE IN THE ENERGY SECTOR

Working with labs, creating virtual companies and impacting one of the world's biggest industries



Kef Kasdin

Since 2003, Princeton, N.J.-based Battelle Ventures has been creating and accelerating the development of technology companies with breakthrough solutions to key market problems, including those in the energy sector. We target technology advances that can leapfrog the status quo to address the needs of large and growing markets. Our goal is to create businesses with value in excess of \$100 million that have a major impact on established industries.

Together with our affiliate fund, Knoxville, Tenn.-based Innovation Valley Partners, we have a combined \$255 million under management to invest in technologies with the potential to deliver transformational, rather than incremental, changes. We have a unique process to find and nurture such opportunities in the early proof-of-concept stages.

Finding Opportunities, Making Investments

We begin our search for an investment by identifying a particular “pain” in the marketplace—where a new technology is needed to solve significant problems, such as performance, cost and scalability. Then we narrow our focus to specific, proprietary technology that can take the pain away and scrutinize the approaches taken by other early stage companies. To advance this process, we have cultivated close relationships with scientists and researchers at R&D laboratories throughout the country.

Rather than wait for an idea to come to us, we determine where there is the greatest need for breakthrough technology. We look for an opportunity where innova-

tion can have a major impact. Effecting transformational change in new or underserved energy-sector markets has frequently led us to create new companies built around technologies developed elsewhere.

Sometimes the technology pops up in university, industrial or government laboratories. The Department of Energy (DOE) National Laboratories—managed or co-managed for the DOE by our sole limited partner, Battelle Memorial Institute (Battelle)—have been particularly fertile ground for us. Those laboratories include the National Renewable Energy Laboratory (NREL), Pacific Northwest National Laboratory (PNNL) and Oak Ridge National Laboratory (ORNL).

To evaluate potential and risk for promising technologies identified at the various labs, we research energy markets to understand their needs and specific market drivers. Then we compare our spinout idea with existing alternatives.

Breakthrough technology faces risks on the path to commercialization, so we look carefully at what other companies have done and are doing and then set measurable milestones that allow for continuous assessment of risk, value-creation, opportunity and partnership possibilities.

Capital requirements tend to be significantly higher in the energy sector than in other areas, making financial considerations paramount in each investment. When promising technologies are in the early, proof-of-concept stage, Battelle Ventures creates companies that operate in the capital-efficient “virtual company” model that our firm has pioneered. The model calls for minimizing typical early-stage infrastructure expenses during a company’s initial high-risk phase, in which “go/no go” decisions are

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made. We leverage the capabilities and equipment at outsourced labs that we would otherwise not be able to afford to replicate in-house.

Exit opportunities, of course, play a significant role in investment decisions. Could the company eventually go public? Could partners be potential acquirers? Could customers become M&A suitors? We research companies that are already in the sector, factoring what they trade for in the public markets or how much they were acquired for into our decision-making. Ultimately, anticipated revenue and return-on-investment (ROI) are key drivers of investment decisions.

Once a technology is determined risk worthy and we’ve established a capital-efficient entity to commercialize it, we need to decide who will head the effort to take it to market. We assume that the inventor behind the technology is not necessarily the person with the requisite skills to lead a

fledgling company. Sometimes one of our fund's partners becomes CEO until early milestones are achieved.

That's the position that I'm in now with one of our most interesting new portfolio companies.

Impact in Ethanol

Proterro, Inc., is the developer of fermentation-ready fortified sugar feedstock that will enable economical and scalable production of biofuels and chemicals. We created this company by spinning it out of the laboratory of another company, Lybradyn.

Renewable energy became a sector of heightened public interest in 2006 due to fossil-fuel price fluctuations. The biofuels subsector became a hot area for cleantech venture capital investing; several start-ups had already been funded and more were making the rounds. Battelle Ventures began reviewing the biofuels market needs and I identified several potential "white spaces"—problem areas not yet addressed by existing players.

Armed with a market-analysis presentation and supporting materials, I hit the road and visited the Battelle-managed DOE Labs, as well as Battelle's own research facility in Columbus, Ohio. I met with researchers who were either interested in biofuels or who had a particular expertise in solving the identified problems. We brainstormed about how research at the Labs might fit into the biofuels puzzle and address the market pain points.

Recognizing the need for additional expertise to evaluate various technologies, I reconnected with entrepreneur John Aikens. John is the founder and CEO of Lybradyn, a biotechnology discovery/development company focused on genetic engineering and protein expression research tools. Since the lab technologies under consideration involved several approaches to using microorganisms in a biofuels process, John's expertise proved instrumental in evaluating them and determining paths forward.

Yet, by late 2007, ongoing examination of numerous opportunities hadn't led to a single compelling platform for a biofuels investment. Then, John advanced an idea he had developed during subsequent Lab visits: because the core need of many biofuels processes we'd considered was for fermentation-ready sugar at a lower cost than sugarcane, an alternative was needed to growing, harvesting and then transporting agricultural crops for biofuels processing. He proposed using an organism to make sugar directly in a non-agriculture-based process.

Out of this idea, Proterro was born. We conducted diligence on the idea and, early in April 2008, established the company using our "virtual company" model. John is our CTO and I serve as CEO; there are no full-time employees. Braemar Energy Ventures joined Battelle Ventures as a coinvestor in August 2008. Advancing with a development plan to prove the company's technology, the company's progress has been encouraging.

We've since hit some major milestones. We genetically modified cyanobacteria to produce a new strain that is a sustainable, geoflexible and an economical feedstock. Significantly, we also have developed an advanced high-density, modular solid-phase bioreactor, which cultivates the photosynthetic microorganism to produce Protose, the

company's branded fermentation-ready fortified sucrose. The cyanobacteria is already producing production-worthy levels of Protose that our economic model predicts will allow for sucrose at a lower cost than Brazilian sugarcane.

Emerging from stealth mode, Proterro began presenting its technology at industry forums in November 2010, quickly gaining recognition and interest. John and I believe that Proterro's patent-pending biosynthetic process could boost an existing ethanol plant's capacity by 25-50% by using its own CO₂ in the process. If our progress continues, the company may fundamentally change the biofuels landscape and could also impact the production of chemicals from bio-based feedstocks. ■

Kef Kasdin is a general partner and cofounder of Battelle Ventures and currently runs Proterro, Inc. as the startup's CEO. She serves on the Boards of Aldis, Inc., Ampulse Corp., Planar Energy and Rajant Corp. Active in the venture community, Kasdin sits on the Board of the National Association of Seed and Venture Funds and Ben Franklin Technology Partners of Southeastern Pennsylvania, and is a coauthor of Inside the Minds: Green Venture Capital (<http://amzn.to/i46gh>).

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