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# *Interview with Ira Ehrenpreis of Technology Partners*

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For this article, PwC interviewed Ira Ehrenpreis, General Partner of Technology Partners and a recognized leader in both the venture capital industry and the cleantech sector. Ira has been with Technology Partners since 1996, where he leads the firm's Cleantech investment practice, investing in energy technology, water technology, and advanced materials opportunities.

***PwC: Venture capital investment activity in the cleantech sector has fallen this year. Do you think investors are feeling skittish for any particular reason?***

***Ira:*** Given the long-term nature of venture investing, it can often be misleading to get too caught up in quarter-to-quarter or even year-to-year fluctuations. Technology Partners has the benefit of more than twenty years of experience investing in the cleantech sector -- we made our first energy investment long before the moniker “cleantech” even existed. With more than two decades of hindsight, far from being disheartened by the recent percentage drop in cleantech numbers, we are instead encouraged by the clear long-term trend of upward growth.

This year was not just the year of the 7 billionth person, it also marked the 1 trillionth dollar invested in the cleantech sector since 2004. And this trillionth dollar has come on top of tremendous growth in cleantech outlays: investment has grown 29% annually since 2004, from $52 billion to $243 billion. Indeed, the total investment in cleantech startups during the so-called down years of 2009-2010 was still greater than the cumulative investment from 1995-2005, and cleantech saw $9 billion in VC investments and $41 billion in M&As in 2011, the highest M&A volume ever for the sector. The last few years also saw the greatest increase in corporate commitment to cleantech innovation in the history of the energy industry.

More importantly, the momentous migration of top entrepreneurs and executives into the cleantech sector provides the most significant barometer behind our enthusiasm. What is telling is that some of the best and brightest in the world are choosing to bet their careers on cleantech companies. Many of these cleantech newcomers hail from traditional energy companies, a transition unheard of in the past. The extraordinary improvement in the quality of leaders we see today compared to just a few years ago is perhaps the single most significant driver of cleantech growth. With strong entrepreneurial leadership, enhanced corporate development activity and heightened global government support we are bullish as we look

ahead. When we look back at this era, it will not be judged by quarterly vacillations in dollars invested, but rather as a renaissance period for the cleantech sector.

**PwC:** ***What are your thoughts about cleantech's seeming reliance on government subsidies?***

**Ira:** There is nothing new or concerning about the federal government's support for clean technology. Assistance to energy companies through federal funding has helped drive the U.S.'s growth and dominance in the global markets for nearly two centuries. Starting in the 1800's, the government began federal support for this country's energy infrastructure by offering land grants for timber and coal, and later helped move energy innovation forward by giving tax incentives and R&D dollars to the oil and gas and nuclear energy sectors, respectively. From this perspective, clean technology companies are no more reliant on federal dollars than other energy innovators have been throughout history. In fact, the irony of recent criticism leveled at the current administration for providing "too much" support to clean tech companies is that government assistance to clean technology trails historical federal assistance to industry competitors by a significant margin. As a percentage of inflation-adjusted federal spending, the nuclear and oil and gas industries have benefitted from subsidies as high as 1/2 to 1 percent, respectively, of the federal budget in the early years of their existence compared to only 1/10 of one percent going to aid clean technology companies today. In hard and fast dollars, federal subsidies reached an average high of $3.3 billion and $1.8 billion, respectively, for the nuclear and oil and gas industries over their nascent first 15 years, whereas subsidies to the renewables market have averaged less than $0.4 billion to date. The reality is that current renewable energy subsidies are not out of line with historical spending in the energy sector and the recent criticism over government spending on cleantech is unfounded. Viewed more broadly, the U.S. government has stepped in and aided virtually every nascent industry providing critical infrastructure to our nation -- utilities, telecommunications and transportation -- and its modest support of clean tech today is no different.

**PwC:** ***In the past, venture capitalists have funded everything from electric vehicle start-ups to utility-scale solar. Which cleantech sectors do you think VCs will focus on in the future?***

**Ira:** At Technology Partners, our portfolio is a microcosm of the full breadth and diversity of the cleantech sector. We have invested in a vast array of innovative companies developing everything from novel approaches to renewable energy generation, new technologies for making cleaner and more efficient use of coal and natural gas, innovative techniques for materially improving storage capability, and the next generation of automobiles and automotive applications.

More importantly, we believe it is important to stay open to investing in innovations across cleantech sectors and to lead, rather than to follow, investment trends. Through our 28 year history, Technology Partners has proven itself a front runner in investing in sectors before they become fashionable: Technology Partners invested in Tesla at a time when others questioned the wisdom of a venture firm investing in an auto company and now "electrification of the vehicle" is a well-defined sector in its own right; likewise, Technology Partners made its first battery investment so long ago the moniker "storage" did not yet even exist. There is no doubt that the opportunities to invest in cleantech are greater and more promising than they've ever been and that entrepreneurs are bringing their smarts and experience to bear in cleantech in ever-increasing numbers. We believe that the coming years will prove to be an exciting time for the cleantech sector generally and will set the stage for some of this century's most promising cleantech innovations. We remain committed to being open-minded, to exploring new ideas and sectors, and to partnering with the creative entrepreneurs whose vision and dedication will provide the next wave of solutions to our mounting energy challenges.

**PwC:** ***If a cleantech start-up has a really promising technology, but it requires significant capital and scale to prove out/commercialize, how would you recommend that this company approach growing their business?***

**Ira:** There are multiple ways that young cleantech startups are dealing with the capital-intensive nature of developing and commercializing new technologies.

First, it's critical for startups to bifurcate the risk phase of technology development from the growth phase of the company's maturation. Cleantech capital focuses on the former, while traditional forms of energy capital, such as project finance, fund the latter. The good news for cleantech startups is that once they've passed the risk phase, there's more money flowing into the energy industry than is being deployed in the IT and Life Sciences sectors combined. But, because risk-stage capital is more limited, the focus of an entrepreneur should be on how to minimize the costs of solving technology risks to most efficiently arrive at the steps of commercialization. Once the company's technology is proven, project finance and other low-cost forms of capital should be available to support the company's growth.

One path to funding a start-ups' risk phase is to go after corporate dollars. Investment by corporations in cleantech start-ups has historically been a low priority. At its best, corporate interest in cleantech was a matter of social responsibility. At its worst, it was nothing more than greenwashing. Today, however, corporate investment is proving essential to the funding of cleantech start-ups. Corporate leaders are turning to the cleantech sector for innovations to fuel their own businesses. Like never before, corporations are recognizing that investing in new technologies is not only 'green' for the environment, but also 'greens' their bottom line. In recent years,

corporations have not only partnered with cleantech start-ups to leverage emerging technologies, but have gone so far as purchasing cleantech start-ups as a way of supplementing their R&D efforts internally. Start-ups seeking capital to fund risk-phase projects and product development should therefore carefully consider the possibility of a corporate investment.

Beyond corporate help, governments around the world are providing assistance to clean-tech start-ups seeking aid. Although the United States lacks a comprehensive federal funding program, other nations are funding cleantech at an impressive rate.

**PwC:** ***There has been some controversy about whether the venture capital model is a good fit with the cleantech industry. What are your thoughts on this? If VCs do not fund the industry, who will?***

**Ira:** We see no controversy. We see only the opportunity to create some of the most successful companies of this century. Venture capital has always looked for huge markets that have been historically under-innovated where technology will play a critical role in ushering in change and providing a foundation for the next generation of pioneering companies. The semiconductor, biotech, enterprise software, personal computing, and consumer medicine industries have all fit this bill and been past beneficiaries of venture innovation and entrepreneurship.

The energy industry, from this perspective, is ripe for venture dollars. The energy industry has been a dinosaur in terms of innovation with little historical focus by incumbents on finding new ways to produce and consume energy. Venture capital has always stepped in to fund the technology and risk phases of innovation. Today, with the help of venture dollars, entrepreneurs across the globe are developing improvements to the overall way we produce and consume energy and are spearheading companies whose innovations are poised to solve some of the world's most fundamental and pressing problems of our time. In this sense, the energy industry is the new beneficiary of venture interest and enthusiasm.

Beyond the opportunity for innovation, the venture community's interest in cleantech is heightened by the sheer size of the market opportunity. The energy market is among the largest markets in the world: global demand for energy tops 500 quadrillion BTUs every single year. Putting the enormity of this market into perspective, in the US alone, consumers spend more on energy every single year than they do on wireless communication, e-commerce, and medical devices combined.

Furthermore, the energy market, and the cleantech sector in particular, are on the cusp of explosive growth. The IEA projects that global energy demand will increase 40% by 2035, and that electricity demand in particular will grow to just over 9 Terawatts over the coming decades. Combined with replacements to retiring power plants, this growth represents 6 Terawatts of

generation capacity that must be built in the next 25 years - more electricity generation than currently exists worldwide.

And we can expect renewables to provide over half of that new generation capacity: nearly 3 Terawatts of clean energy, representing over $5 trillion of investment in the next 25 years. In fact, so much renewable power is projected to come online in the next 20 years that if we lined up enough solar panels end to end to meet this expected growth, our array would circle the earth over 900 times.

With so much room for growth and innovation, there is the vast potential for venture capitalists to fund companies that will help solve the world's emerging energy crisis while delivering returns to investors at the same time. Far from viewing the energy industry as a poor fit for venture dollars, we at Technology Partners see the energy industry, and cleantech in particular, as a prime target for venture investment and a perfect fit for our objectives.

**PwC:** ***Do you think traditional automotive companies will dominate the EV space or do start-ups have a chance?***

**Ira:** Technology Partners believes that innovative start-ups, like our own Tesla Motors, will play a key role in the future of EVs. Time and again, innovators have leapfrogged industry incumbents and paved the way for change and adoption of new technologies. The photography, music and computing industries are all examples: the landscape of each has changed dramatically over the last 30 years as incumbents have been forced to innovate in the face of innovating start-ups. In a similar fashion, Tesla is widely credited as having catalyzed the traditional auto companies to start, or in some cases to resurrect, their own EV programs. In 2007, Robert Lutz, then Vice Chairman of General Motors, said that the Tesla Roadster inspired him to push GM to develop the Chevrolet Volt, a plug-in hybrid sedan.

Beyond a cleantech start-ups' potential to leapfrog and inspire the incumbents, we expect more incumbent "disruption" in the coming years. To begin with, Tesla's successful deployment of its battery-powered drivetrain has disproved the incumbent view that the development of a fully electric, battery-powered drivetrain supportive of long distance travel could not be achieved. Ford famously abandoned the more efficient EV for ethanol when its engineers determined that the battery and battery management systems of its cars could not give its vehicles the needed range. Tesla's innovation, along with those of other auto industry start-ups, have begun the process of closing the technology gap and have put added pressure on incumbents to innovate. Perhaps in the face of this, incumbents are stepping forward to partner with start-ups and leverage their skill and innovation. In the case of Tesla, Daimler, Toyota, and Panasonic have all entered into partnerships with the company, exemplifying the way in which startups are partnering with incumbents.

Henry Ford once said that if he asked his customers what they wanted they would have said "faster horses." So yes, entrepreneurship and innovation have always played a critical role in developing the future – in general, in the auto industry historically, and in the auto industry today.

**PwC:** ***Some people are bearish on the U.S. cleantech industry, but bullish on the global one. How do you feel?***

**Ira:** It is inexcusable that the US still lacks a long-term, strategic federal energy policy. Eight straight presidents have bemoaned the dangers of imported oil and pledged to change course, yet in that time frame foreign crude imports have increased by a factor of ten, and still no comprehensive energy legislation has ever emerged from Congress. A venture capitalist would show the door to an entrepreneur without a long-term business plan. Savvy investors are similarly reluctant to invest amidst an unpredictable policy environment.

While American clean energy policy languishes in congressional gridlock, a global cleantech arms race has begun in earnest overseas. Globally, policy support for cleantech has never been stronger and nations across the globe are scurrying for investment dollars. In Europe, strong government support has led to progressive and successful renewable energy programs which have resulted in dramatic developments, like the near grid-parity cost of solar production today. Remarkably, Germany has managed to create one of the largest solar markets in the world despite receiving less sunshine than Minnesota. And the story doesn't end in Europe: in Brazil, for example, clean technology has become so mainstream that in their parlance the term "alternative energy" refers to gasoline rather than to clean technology and the Brazilian government has set its sights on tripling the nation's installed renewables base by 2020.

But the front runner in the cleantech race has clearly been China. After opening the door to clean technology by enacting comprehensive reforms to encourage investment, China has seen the lion's share of cleantech growth and is rapidly reshaping the global playing field. In the past year, China overtook the US as the global leader in wind energy, with 42 gigawatts of installed capacity. 41 of those 42 gigawatts were installed in just the last five years. By 2014 China will account for 20% of all clean energy investments globally, matching the combined $50 billion annual investment by the US and Canada. Beyond 2014, it is clear that China is poised to continue its rapid expansion while America appears likely to stagnate.

For many cleantech firms, remaining competitive means establishing production facilities overseas. My own portfolio is exemplary as several of the cleantech firms we've invested in are either selling or manufacturing globally from their US headquarters.

Deeya, based 17 miles from my own office in Palo Alto, manufactures in Gurgaon, India and sells its flow batteries into rural India.

CoalTek, with its lab in Atlanta and pilot-facility in Peducah, Kentucky, is focused on product deployment in Inner Mongolia, China.

Powergenix manufactures its nickel-zinc batteries in Shenzhen and is focusing on the Chinese market for its rollout.

Tesla sold a large percentage of its Roadsters into the international market.

Solexel, based in Milpitas, California, is successfully partnering with Asian governments and other corporates to focus its manufacturing efforts there.

Accelergy has a dual focus on both China and US.

FloDesign, based in Boston, is focused on Brazil and other international markets for the deployment of its next generation wind turbine.

In short, while US policy seems trapped somewhere between fiscal austerity and partisan gridlock, it is a renaissance moment for the cleantech industry globally – in terms of both innovation and deployment.

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