



Venture Capital's Role in the US Renewable Energy Sector

Abstract: This white paper describes the venture capital industry, its role in the development of a U.S. renewable energy sector, and the aspects of government policy that have the greatest impact on venture capital investing in renewable energy.

Context: Renewable energy encompasses wind power, solar energy, hydro/ocean power, geothermal energy, biomass energy, biofuels, and many forms of waste-energy. The financing of renewable energy includes investment in technology and development companies and the financing of power generation and fuel-producing projects that use these renewable energy technologies. It also includes investments in technologies that improve energy efficiency. Many commercial renewable energy projects in the pipeline today, and proposed as applicants under the American Recovery and Reinvestment Act (ARRA), are stalled due to lack of financing from constrained capital markets. The objective of US PREF is to share private sector financial expertise with government leaders, to help them to effectively unlock private capital flows to new, large-scale and distributed renewable energy projects.

About venture capital

Venture capital as an asset class has existed for ages, typically in the form of high risk capital provided by wealthy families or institutions to help early-stage entrepreneurial businesses get off the ground. Whether funding the voyages of Christopher Columbus, the light bulbs of Thomas Edison or the cars of Henry Ford, the notion has been to provide capital for which there is simply no other viable source. The expectation is generally that a significant number of venture capital-funded businesses will fail, or at least fail to meet the expectations of their founders and funders. But a small number will succeed and some of these will succeed spectacularly. These spectacular successes will then provide the return of funds that allows the process to begin again.

Some have argued that during the late 1990s and early 2000s in the U.S., there was so much venture capital available that it no longer limited itself to serving as the funder of last resort, and that as the availability of venture capital financing exceeded real opportunity, returns to investors fell to the point where they were no longer sufficient to fund the next generation of start-ups. Others, however, have recognized that investing opportunities ebb and flow, and over time they shift from sector to sector as industries grow and mature. This is happening today as the maturing industries of information technology, biotechnology and telecommunications give way to growing venture capital investment opportunities in energy, water and materials.

A recent study by the Ewing Marion Kauffman Foundation¹ concluded that: (i) challenging economic times can serve as a rebirth of entrepreneurial capitalism; and (ii) new firms are better than their more mature counterparts at creating new jobs and at fueling economic growth – so policies that support entrepreneurship support economic recovery. Consequently, it is precisely in hard economic times, when large companies are often shedding jobs and calling for relief from taxation and other government burdens, that the need is greatest for new entrepreneurial activity and support of that activity.

Today's venture capital (VC) firms raise money from large institutional investors (like banks, large pension funds, mutual fund companies, etc.) and from high-net worth individuals. They then identify promising entrepreneurial companies in which to invest that money for typically 5-8 years (sometimes longer, but generally for no more than 10 years). The ultimate goal of making these investments is to earn significant financial returns for both the institutional investors and the VC firm.

The primary roles of a VC firm are to find the new, emerging companies with the greatest growth potential and to actively help these companies to grow and succeed – not only by investing cash at a critical point in time, but also by sharing management and technology expertise, providing useful introductions, and helping with tasks like recruiting for key management positions as companies grow. VC firms are highly selective, typically funding only about 1% of the business plans that they consider.ⁱⁱ When analyzing a potential investment, VC firms look closely at the technology, business model, management team, potential market size, capital requirements, how long it will take to scale, and more.

The average VC firm manages at least several hundred million dollars at a time (larger firms may manage up to several billion dollars), and a typical first venture investment in a new company has historically been somewhere between \$1 million and \$10 million. Most firms also make "follow-on" investments as the company grows, thus often investing \$10-50 million over the life of a successful company. Often multiple VC firms will invest in a company at the same time, pooling their resources together.

VC firms invest in companies at a stage in their development when other sources of institutional financing cannot or will not invest because the technology and/or business model is still seen as too risky and unproven. VC investments are also quite illiquid, compared to many other forms of investing. VC firms earn their financial returns by "exiting" the companies in which they have invested; typically this happens after an IPO (initial public offering, in which members of the public can buy stock in a company) or through an acquisition by another company. Until and unless one of these events occurs, the VC firm's equity in a company represents a sunk cost with little current tangible financial value.

Role of venture capital in promoting economic growth

While "venture capital" in the broadest sense has been an essential part of global economic growth for centuries, what is today considered the "U.S. venture capital industry" emerged during the 1970s and has been a key driver of U.S. economic growth. During the last three decades, the U.S. venture capital industry has invested approximately \$456 billion in approximately 27,000 companies, including industry leaders like Amazon, Google, Apple, Cisco, Staples, eBay, Amgen, and Genentech, and it has supported the growth of entire new industries such as information technology (both software and hardware), semiconductors, and biotechnology. In 2008, U.S. companies that were at one point supported by VC firms employed approximately 12 million people (about 11% of private sector employment) and generated approximately \$3 trillion in revenue (about 21% of U.S. GDP that year). Venture-backed companies also tend to disproportionately contribute to economic growth rates. From 2006 to 2008, jobs in VC-backed firms grew at 1.6% (vs. 0.2% for the overall private sector – a jobs growth rate 8 times higher for VC-backed firms), and revenue earned by VC-backed firms grew at 5.3% (vs. 3.5% for the overall private sector – a revenue growth rate 1.5 times higher for VC-backed firms).ⁱⁱⁱ

Venture capital as part of a broader financing ecosystem

Venture capital firms function within a broader financing ecosystem, and the other components of that system are also critical for generating economic growth. Prior to the point where most VC firms invest, public money can support the initial creation of new technologies and business ideas through government-funded research and technology development.

As VC-funded firms continue to grow, they turn to other players in the financing ecosystem for continued cash support. An IPO enables a private company to access cash held by individual members of the public, as those individuals buy shares in the company. An acquisition enables access to the cash resources of the acquiring company. If a private company continues to grow independently without an IPO, other investment firms may step in to provide additional capital (in larger sums than the typical VC firm is able to invest due to the size of their own funds and their need to diversify). Such firms may include both private equity and hedge funds, but also typically include banks and insurance companies, particularly when project finance is concerned.

Venture capital investment in renewable energy

During the last several years in particular, venture capital investment in emerging U.S. companies in the renewable energy sector has grown substantially. From 1995 through 2005, the renewable energy sector accounted for less than 2% of total VC investments into U.S. companies. In 2006, that percentage jumped to 6%, then to 9% in 2007, and then to 15% in 2008. (During 2008, more than \$4 billion of venture capital was invested in emerging U.S. renewable energy companies, out of nearly \$28 billion of total VC investment.)^{iv} A growing number of venture capital investors see renewable energy as a significant opportunity and the next major economic transformation frontier, and they have been allocating their time and money accordingly, seeking to fund the most transformative technologies and ideas in this space. Initial VC investments in renewable energy are generally made at the “technology risk” stage, as entrepreneurs are testing, refining, and developing their core technologies (for example, refining the exact materials used for a solar panel or tweaking the design of an advanced battery). VCs often support commercialization and scale-up as well, through later-stage investments.

It is important to note that many renewable energy investments require a different type and level of support from VC firms than have companies in previous VC-funded industries. Early-stage companies in the renewable energy sector often require significant amounts of time, capital, and operating expertise in order to scale up – far more than a typical IT company does, for instance. In response to this, VC firms investing in renewable energy companies are tending to invest larger amounts of money, in a larger number of rounds, and over a longer period of time, than was historically the norm, as they help these companies to grow. VC firms are also becoming more actively involved in helping emerging companies to work closely with industry incumbents (i.e. utilities), who are a critical part of the energy landscape.

How government policies affect venture capital investments in renewable energy

There are two primary ways in which government policies impact the effectiveness of venture capital in promoting the growth of the renewable energy sector: 1) by shaping the market demand for renewable energy and 2) by influencing the flow of later-stage capital into renewable energy companies *after* venture capital has been invested. See below for brief commentary about each.

There is also a critical factor which affects venture capital investment across the board: the clarity and “reliability” of government policies and programs. Given the long-term, illiquid nature of venture capital investments, VC investors need to be confident about the basic parameters of the future markets in which their companies will be growing. Uncertainty about the content or stability of core market rules can lead to significant hesitation and delay in VC investing, which in turn can result in early-stage companies failing for lack of funding at critical points in their development. (For example, the diversion of money for the “Cash for Clunkers” program caused significant concern within the VC community, because it indicated that government financial allocations might not be safe to “count on” in the future.)

Shaping market demand for renewable energy

There are three ways in which government can encourage the growth of a market for renewable energy:

- 1) By implementing policies that indirectly encourage the purchase of renewable energy** (examples: pollution reduction targets, carbon cap-and-trade program). These are policies which broadly encourage an overall outcome – e.g., reduced carbon emissions – for which increasing the purchase of renewable energy is one of a number of potential means to the end. (Other means include reducing use, increasing efficiency, etc.)
- 2) By implementing policies that directly encourage the purchase of renewable energy** (examples: state-level Renewable Portfolio Standards, proposed Renewable Electricity Standard). These are policies which directly require an increase in the purchase of renewable energy (e.g., by utilities).
- 3) By directly purchasing renewable energy** (examples: buying and installing solar panels on federal rooftops; installing wind turbines on military bases). In this approach, government entities act as consumers, buying directly from renewable energy companies.

Any government policy which ensures or encourages growth in market demand for renewable energy will also encourage venture capital investment in renewable energy generation. As described above, the venture capital model requires finding and investing in companies which will grow rapidly, in a fairly short period of time, so that VC firms can exit and earn sufficient returns to start the investing cycle over again. Consequently, a VC firm will only invest in a new company when it feels comfortable that there will be enough market demand to enable that company to grow rapidly – and the more demand the better. So the more strongly government policies encourage growth in demand for renewable energy, the more incentive VC firms will have to invest in the sector.

Influencing the flow of post-VC capital into renewable energy companies

Within the renewable energy sector, the biggest current challenge for bringing promising new technologies to commercial scale is funding the gap between what VC investors can provide and what traditional project finance investors are accustomed to providing. Often this takes the form of difficulty in funding the first several plants, projects or factories for new renewable energy companies. These often cost from hundreds of millions up to several billion dollars to get up and running – an amount that is beyond the size that VC firms have been resourced to fund. They also involve the first commercial-scale application of cutting-edge new technologies, and this is a type of technology risk that energy and other project finance investors (who have spent the last several decades investing in traditional energy and infrastructure projects with much greater experience records) are not used to taking. Government policies can play a pivotal role in helping to “put the necessary pieces together” to bridge these resource and risk-profile gaps, in order to enable the flow of investment capital at this critical stage of financing. One way to view VC firms is as highly efficient private sector mechanisms for “picking future economic growth leaders.” VC firms seek out the new businesses with the highest potential, provide them with

capital and expertise at the most critical point in their growth trajectories, and help them to reach scale. VC firms have begun to play this role for renewable energy just as they have with previous emerging industries. However, if there is insufficient financing in the system to “pick up where VCs” leave off, in order to continue supporting the best new technologies and ideas, then the full benefits of VC expertise and investments will not flow into the broader economy, and venture capital firms will have limited ability to support the renewable energy sector going forward.

There are three ways that government can enable the flow of post-VC-capital into renewable energy:

- 1) **By providing government financing support directly to renewable energy companies or renewable energy generation projects** (examples: Section 1603 Temporary Grants in Lieu of the Investment Tax Credit, Section 1703 and 1705 loan guarantees, Section 1302 Advanced Energy Manufacturing Tax Credit, Production Tax Credit, Investment Tax Credit, proposed CEDA, etc.)
- 2) **By providing public funds to private sector intermediaries to use for investing.** This approach provides government money to fuel the sector, but uses private sector mechanisms for selecting the best recipients for this money. One example is the Financial Institution Partnership Program, FIPP.
- 3) **By creating incentives for private sector financiers to invest their own money.** This approach includes any policies that reduce risk or increase returns to private sector financiers who invest in renewable energy. This could be stand-alone incentives for private sector financing, or government funding programs that define the terms for co-investment between public and private entities.

Increasing the availability of follow-on funding which helps emerging renewable energy companies to build out their first few plants, projects or factories will create a significant incentive for further VC investment in renewable energy. Among the multiple funding support options laid out above, those in which investment decisions are made the most quickly and in the most market-based way are those which will create the greatest incentive for VC investment. **Time is of the essence both in decision-making and in dedication of resources.**

Renewable energy companies tend to burn through significant amounts of capital quite quickly, as they grow. Generally, these companies need to raise additional sums of money every 12 to 18 months. As a result, almost any delay (even of a month or two) in reaching critical next steps in financing – e.g., while waiting to hear about whether a government application has been accepted – can cause a highly promising company to fail simply because time has run out.

Completing and following up on applications for government funding can require significant dedication of limited resources from early-stage renewable energy companies. This use of resources can in essence increase the cost of doing business for early-stage companies, which can in turn lead to diluted returns for VC firms as well. Government financing support is highly valuable, in some cases critical, especially when private sector capital is not flowing. But to the extent that it is possible to leverage existing market-based selection mechanisms for distributing funding for the initial scale-up of new renewable energy companies, the incentive for further VC investment into the renewable energy sector will increase, as existing market-based mechanisms are already well understood, and they tend to have been developed to address the time-criticality of meeting the cash flow requirements of new companies.

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ABOUT US PREF

The objective of the US Partnership for Renewable Energy Finance (US PREF) is to unlock private capital flows to new, large-scale and distributed renewable energy projects in the United States. To achieve this objective, a balanced and credible group of highly experienced renewable energy financiers from financial institutions, investors, professional services firms, utilities and others, working with leading non-government organizations, have convened as US PREF. US PREF, founded in 2009 with support from the consulting firm Green Order, is a program of the American Council On Renewable Energy (ACORE), a Washington, DC - based 501 (c)(3) non-profit organization whose mission is to bring renewable energy into the mainstream of the US economy and lifestyle through research, education, convening, and communications.

ⁱ Dane Stangler, "The Economic Future Just Happened." Kauffman Foundation Research Report, June 2009, at <http://www.kauffman.org/uploadedFiles/the-economic-future-just-happened.pdf>.

ⁱⁱ National Venture Capital Association (NVCA), "Yearbook 2009," March 2009, available at <http://www.nvca.org>.

ⁱⁱⁱ All statistics in this paragraph from National Venture Capital Association (NVCA), "Venture Impact," 2009, based on research done by IHS Global Insight. Available at <http://www.nvca.org>.

^{iv} National Venture Capital Association (NVCA) / PricewaterhouseCoopers MoneyTree Report. "National Aggregate Data" spreadsheet, available at <http://www.pwcmoneytree.com>. The report tracks total investment by the professional venture capital community into private emerging companies in the U.S. in what NVCA defines as the "CleanTech" sector. More detail on report methodology is available on the website.