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Trends in U.S. Venture Capital Investments Related to Energy: 1980 through the Second Quarter of 2010

JJ Dooley

July 2010

Pacific Northwest
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ABSTRACT: This report documents trends in U.S. venture capital investments over the period 1980 through the second quarter of calendar year 2010 (2010Q1+Q2). Particular attention is given to U.S. venture capital investments in the energy/industrial sector over the period 1980-2010Q1+Q2 as well as in the more recently created cross-cutting category of CleanTech over the period 1995-2010Q1+Q2. During the early 1980s, U.S. venture capital investments in the energy/industrial sector accounted for more than 20% of all venture capital investments. However subsequent periods of low energy prices, the deregulation of large aspects of the energy industry, and the emergence of fast growing new industries like computers (both hardware and software), biotechnology and the Internet quickly reduced the priority accorded to energy/industrial investments. To wit, venture capital investments related to the energy/industrial sector accounted for only 1% of the $119 billion dollars invested in 2000 by the U.S. venture capital community. The significant increase in the real price of oil that began in 2003-2004 correlates with renewed interest and increased investment by the venture capital community in energy/industrial investment opportunities. Venture capital investments for 2009 for the energy/industrial sector accounted for $2.1 billion or slightly more than 13% of all venture capital invested that year. The total venture capital invested in energy/industrial during the first two quarters of 2010 is close to $1.8 billion accounting for 17% of all venture capital investments during the first two quarters of 2010. In 2009, the aggregate amount invested in CleanTech was $1.8 billion (30% of the total US venture capital invested in that lean year) and for the first two quarters of 2010 US venture capital investments in CleanTech have already exceeded $1.9 billion (19% of all US venture capital investments made during the first half of 2010). Between 2004 and 2009, U.S. venture capital investments in energy/industrial as well as CleanTech have more than quadrupled in real terms.

KEY WORDS: venture capital; energy; energy technology; cleantech; United States.

Venture Capital Investments Do Not Equal Private Sector R&D Expenditures

It is important to note that while "venture capital" investments are often seen to be exclusively about the development of advanced technologies, this is not necessarily true. The National Venture Capital Association (NVCA) states clearly on their website that "Venture capital focuses on investing in private, young, fast growing companies" (NVCA, 2010). It is therefore more appropriate to read the data presented in this report as first and foremost a measure of what sectors and companies in the US economy venture capital funds believe have the best prospects for rapid growth and less so as a robust input measure of future technological development.

U.S. Venture Capital Investments: 1980-2010Q1+Q2

Figure 1 shows total U.S. venture capital[1] investments over the period 1980 through the second quarter of 2010.[2] While US venture capital investments have grown in real terms over this 30 year period from $1.46 billion in 1980 to $16.5 billion dollars in 2009[3], there is significant year-to-year variability in the total investment made by the US venture capital community which is likely a reflection of expectations with respect to the health of the US economy as a whole.

The large spike in venture capital activity in the late 1990s to the early 2000s is the most striking feature of Figure 1. In 2000, U.S. venture capital investments reached a record level of $119 billion with $53.5 billion (45% of the total) of the funding in this peak devoted to "internet specific"[4] investments. Figure 2 shows how rapidly these "internet specific" U.S. venture capital investments rose and how quickly they declined in the run up to and subsequent aftermath of the bursting of the "dot com bubble."

[1] "U.S. venture capital investments are "defined here as investments made by U.S. controlled venture capital funds in U.S. based companies." The data here are believed to cover all stages of venture capital financing, e.g., Seed Stage, Later Stage, and Expansion Stage (NVCA, 2010).

[2] The principal data set used in this analysis represents the author's attempt to create a coherent and consistent temporal data set U.S. venture capital investments from 1980 to the present. Data describing these investments before 1980 are not publically available. The key data sources used to build this data set are: data on venture capital investments for the period 1980-1989 are from NSB (2002); data on venture capital investments for the period 1990-2004 are taken from NSB (2008); Data on venture capital investments for the period 2005 through the second quarter of 2010 are taken from PricewaterhouseCoopers/National Venture Capital Association (PWC/NVCA, 2010a).

[3] All financial data reported here are in inflation-adjusted, real 2005 U.S. dollars unless otherwise noted. The conversion of current, nominal, as-spent dollars to inflation-adjusted 2005 U.S. dollars was computed by using Gross Domestic Product Price Deflators taken from CEA (2006).

[4] The venture capital category Internet-specific is defined as "a discrete classification assigned to a company whose business model is fundamentally dependent on the Internet, regardless of the company's primary industry category (PWC, 2010)."

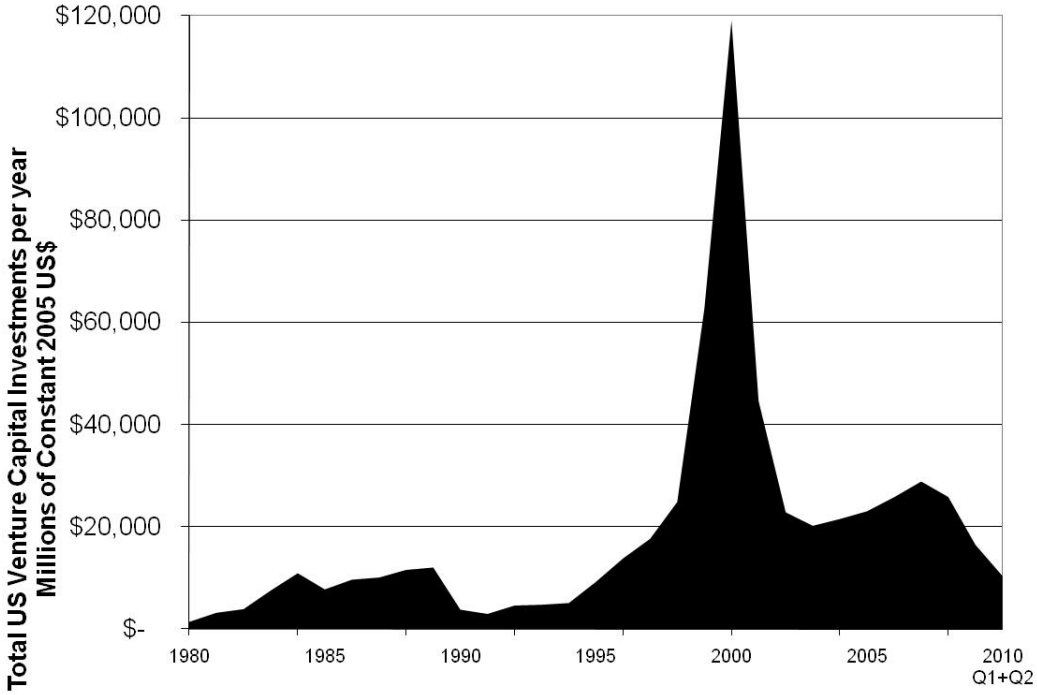

Figure 1: Total U.S. Venture Capital Investments in All Fields: 1980-2010Q1+Q2 (millions of constant 2005 U.S. dollars)

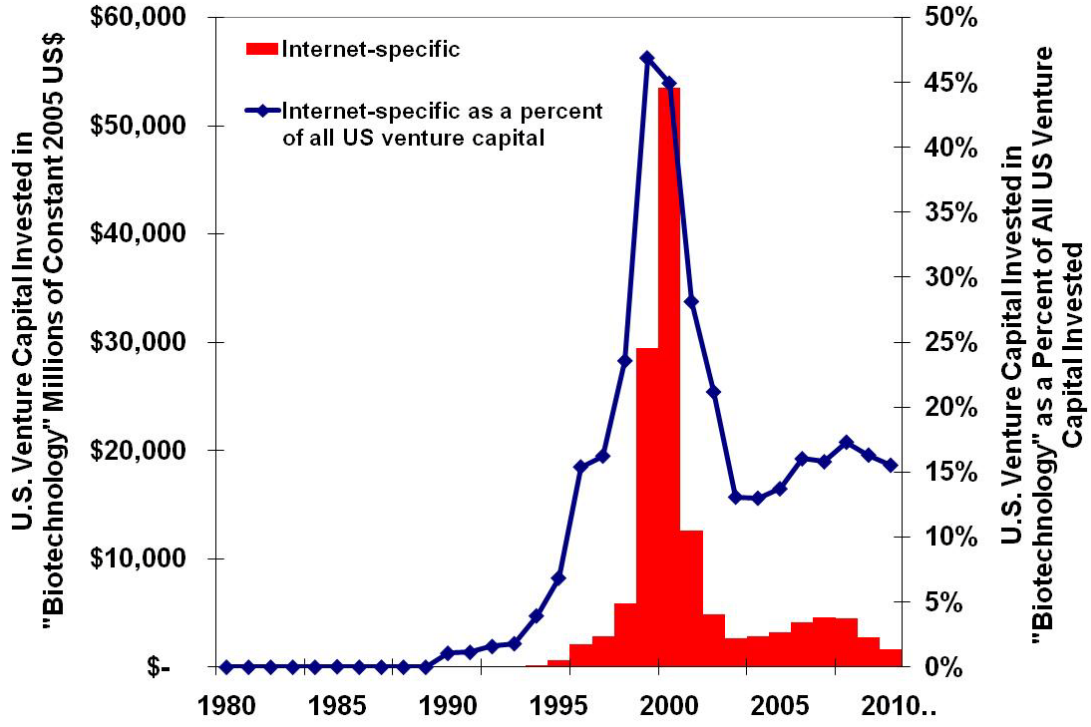

Figure 2: U.S. Venture Capital Investments in "Internet-specific" Firms: 1980-2010Q1+Q2 (millions of constant 2005 U.S. dollars)

Figure 3 shows venture capital investments in the biotechnology sector, another prominent recipient of US venture capital funding.[5] In real inflation-adjusted terms, venture capital investments in biotechnology have been on a mostly uninterrupted growth trajectory since 1980. Since 2005, biotechnology has consistently commanded more than 15% of all US venture capital investments.

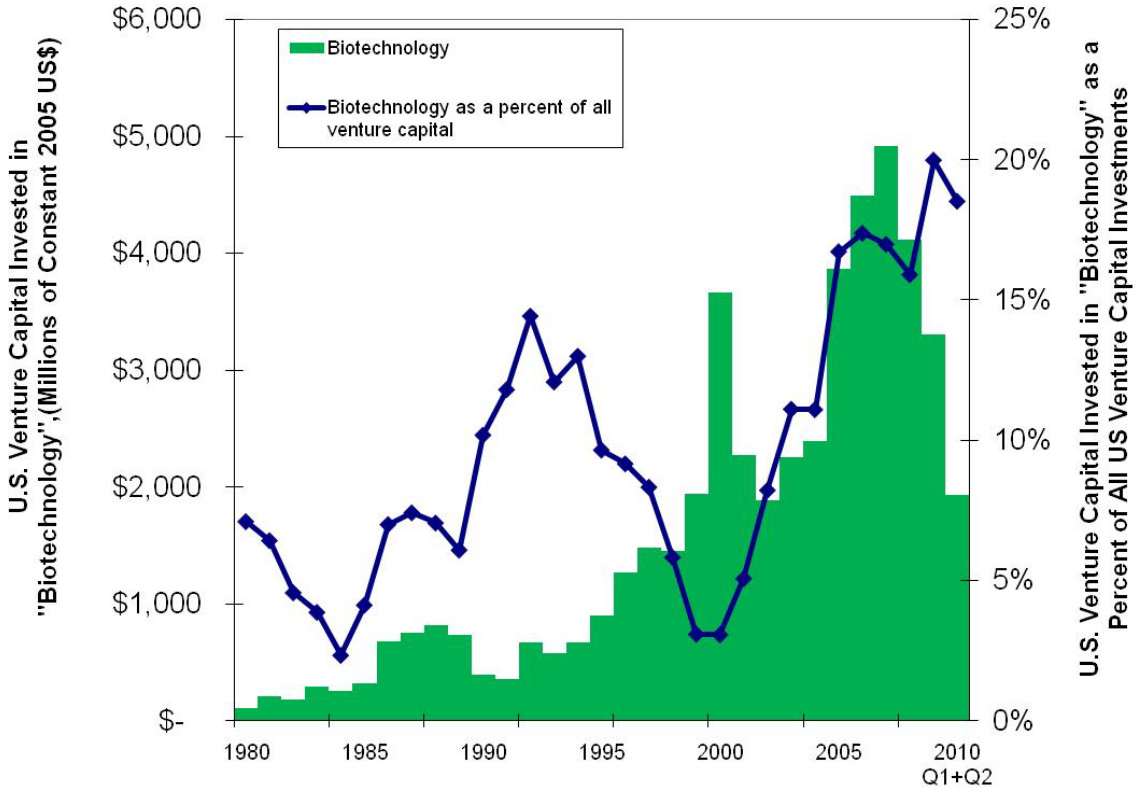

Figure 3: U.S. Venture Capital Investments in Biotechnology: 1980-2010Q1+Q2 (millions of constant 2005 U.S. dollars)

U.S. Energy Venture Capital Investments

Figure 4 reports U.S. venture capital investments in the energy/industrial sector[6] over the period 1980-1980-2010Q1+Q2. The data in Figure 4 is best interpreted by breaking down this 30 year period into three different eras:

[5] Venture capital investments in "biotechnology" encompasses "Developers of technology promoting drug development, disease treatment, and a deeper understanding of living organisms. Includes human, animal, and industrial biotechnology products and services. Also included are biosensors, biotechnology equipment, and pharmaceuticals" (PWC, 2010).

[6] U.S. venture capital investments in the "energy/industrial" sector are targeted at "Producers and suppliers of energy, chemicals, and materials, industrial automation companies and oil and gas exploration companies. Also included are environmental, agricultural, transportation, manufacturing, construction and utility-related products and services (PWC, 2010).

- During the early 1980s, U.S. venture capital investments in the energy/industrial area accounted for more than 20% of all venture capital investments. As can be seen from Figure 5, this was during a period of high energy prices brought about by two significant global oil crises as well as repeated high level pronouncements from the U.S. government on the need to reduce U.S. dependence on imported energy and more importantly significant commitments of public and private sector funding for the development of new energy technologies.[7]

- However the period from the mid 1980s to the early 2000s was an era characterized by low energy prices, a determined effort by the Regan Administration as well as subsequent Administrations to deregulate many aspects of the energy industry,[8] along with significant reductions in public and private sector support for energy R&D -- and in particular the termination of a number of marquee "energy independence" technology development programs that were initiated in the 1970s during the height of the oil crises. Compounding these fundamental changes within the energy sector, this period also saw the emergence of fast growing new industries like computers (both hardware and software), biotechnology and the Internet which were clearly seen as more attractive investments by the US venture capital sector. By the early 1990s, energy/industrial investments were attracting less than 3% of all U.S. venture capital and by 2000 these investments accounted for only 1% of the $119 billion dollars invested that year by the U.S. venture capital community.

- The significant increase in the real price of oil that began in 2003-2004 correlates with renewed interest and increased investment by the venture capital community in energy/industrial investment opportunities. Venture capital investments in 2009 for the energy/industrial sector accounted for $3 billion or slightly more than 10% of all venture capital invested that year. The total venture capital invested in energy/industrial during the first two quarters of 2010 is close to $1.8 billion accounting for 17% of all venture capital investments during the first two quarters of 2010.

[7] For a detailed discussion of the federal government's response to these energy crises and in particular how this spurred large federal energy R&D programs, readers are encouraged to consult Dooley (2008).

[8] For a more detailed discussion of how efforts to deregulate the energy industry led to significant reductions in public and private sector energy R&D in the US as well as in many other advanced industrialized countries during this period, readers are encouraged to consult Dooley (1998).

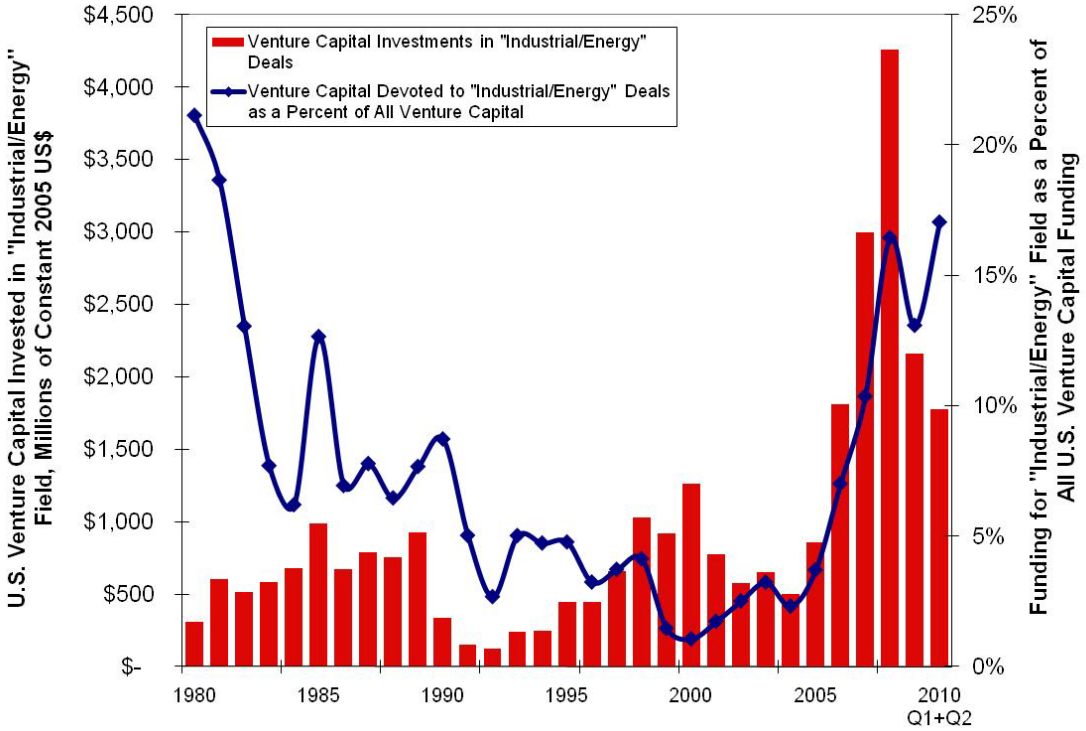

Figure 4: U.S. Venture Capital Investments in Energy/Industrial Sectors: 1980-2010Q1+Q2 (millions of constant 2005 U.S. dollars)

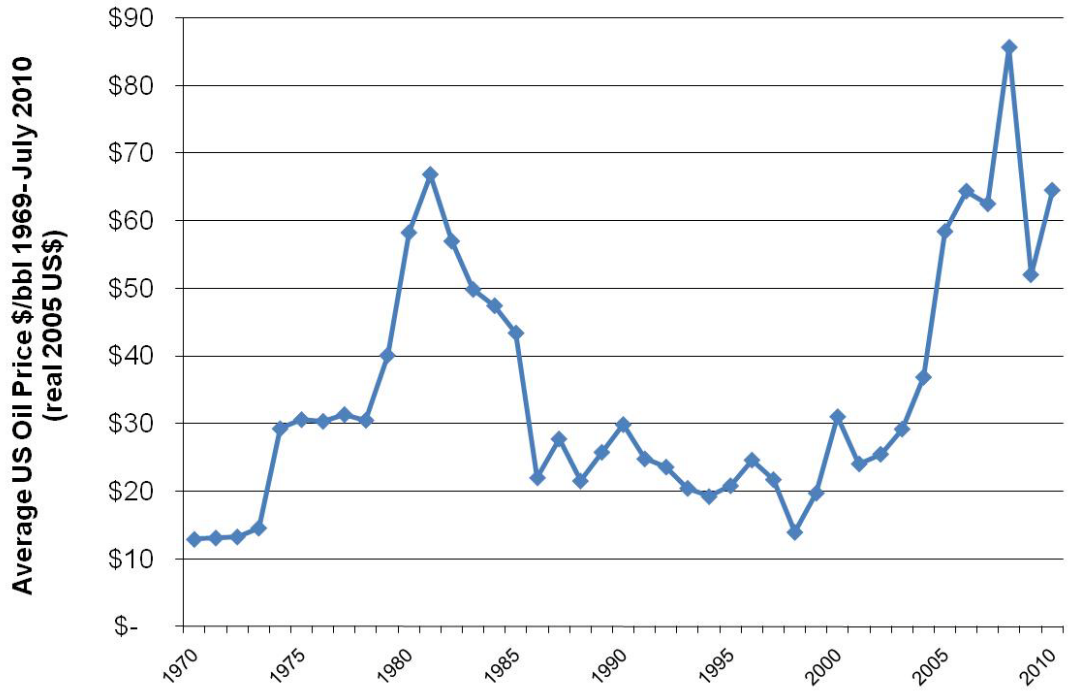

Figure 5: Average U.S. Oil Prices: 1970-July 2010 ($/bbl in constant 2005 U.S. dollars)

While it is clear that the US venture capital community is committing substantial resources to the energy/industrial sector, Figure 6 shows that for the entire period since 1980 the average venture capital investment made per deal in the energy/industrial sector has never exceeded $15 million. It is worth stressing that the data in Figure 6 are literally representing the mathematical average invested per energy/industrial deals during each of these years and there is significant variability in the amount invested for specific deals. As documented in PWC/NVCA (2010b), 5 of the top 10 venture capital investments during the second quarter of 2010 were for companies in the energy/industrial sector and the amount invested in these five companies ranged from $350 - $55 million (in current 2010 US$). However given the capital intensive nature of many energy technologies and energy systems, the fact that the average invested per deal in the energy/industrial sector has not exceeded $15 million over a 30 year period is likely noteworthy.

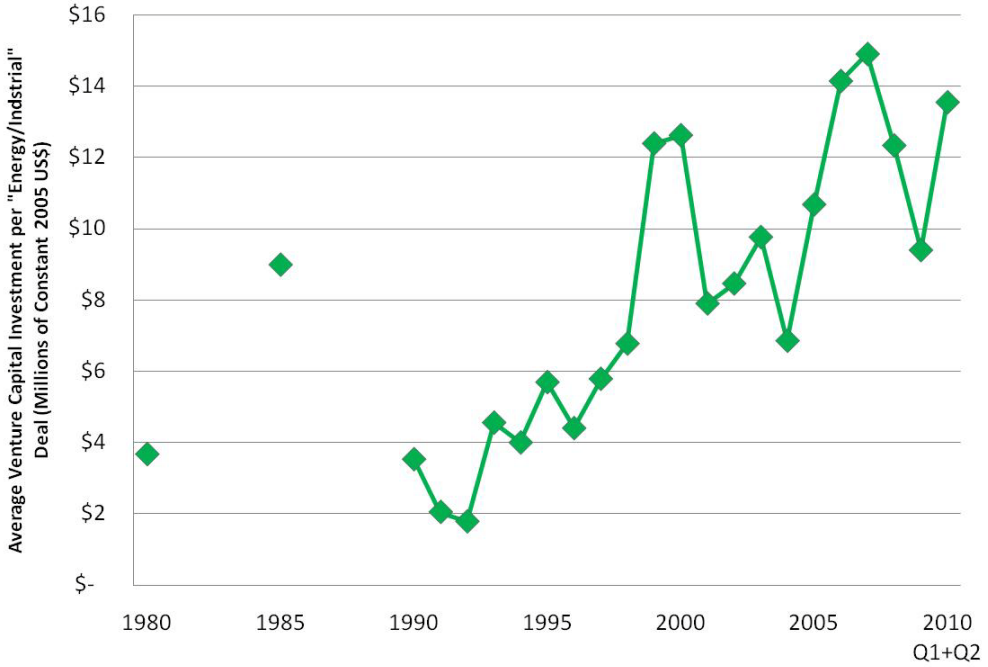

Figure 6. Average U.S. Venture Capital Investment per deal within the Energy/Industrial Sector 1980-2010Q1+Q2 (million of constant 2005 US dollars)

Figure 7 presents data on US venture capital investments in the so called CleanTech sector. It is important to note that the CleanTech sector is a crosscutting accounting of US venture capital activity and that many of the investments counted under "energy/industrial" are also counted under CleanTech. Data for CleanTech investments from 1995-2010Q1+Q2 are presented in Figure 7.[9] US venture capital investments in the CleanTech sector closely follow the pattern seen in the more specific energy/industrial category discussed above. In 1995, CleanTech venture capital investments were less than $100 million dollars and accounted for 1% of all U.S. venture capital. By 2008, CleanTech accounted for approximately $3.7 billion which was approximately

[9] PWC (2010) describes CleanTech as follows: "The cleantech sector is not one tidy group, but rather an array of distinct sub-sectors: solar, wind, and geothermal energy generation, biofuels, energy storage (power supplies such as batteries and uninterruptible power supplies), nuclear, new pollution-abatement, recycling, clean coal, and water technologies. The common thread is that all of these sub-sectors represent technologies, services, or products aimed at reducing greenhouse gas emissions and other pollutants and promoting energy efficiency and the conservation of natural resources."

14% of all venture capital investments that year. In 2009, the aggregate amount invested in CleanTech declined to $1.8 billion which accounted for fully 30% of the total US venture capital invested in that lean year. For the first two quarters of 2010, US venture capital investments in CleanTech have already exceeded $1.9 billion and account for 19% of all US venture capital investments made during the first half of 2010. As was the case for investments in energy/industrial sector, the average US venture capital investment per CleanTech deal over the period 1980-2010Q1+Q2 has not exceeded $15 million.

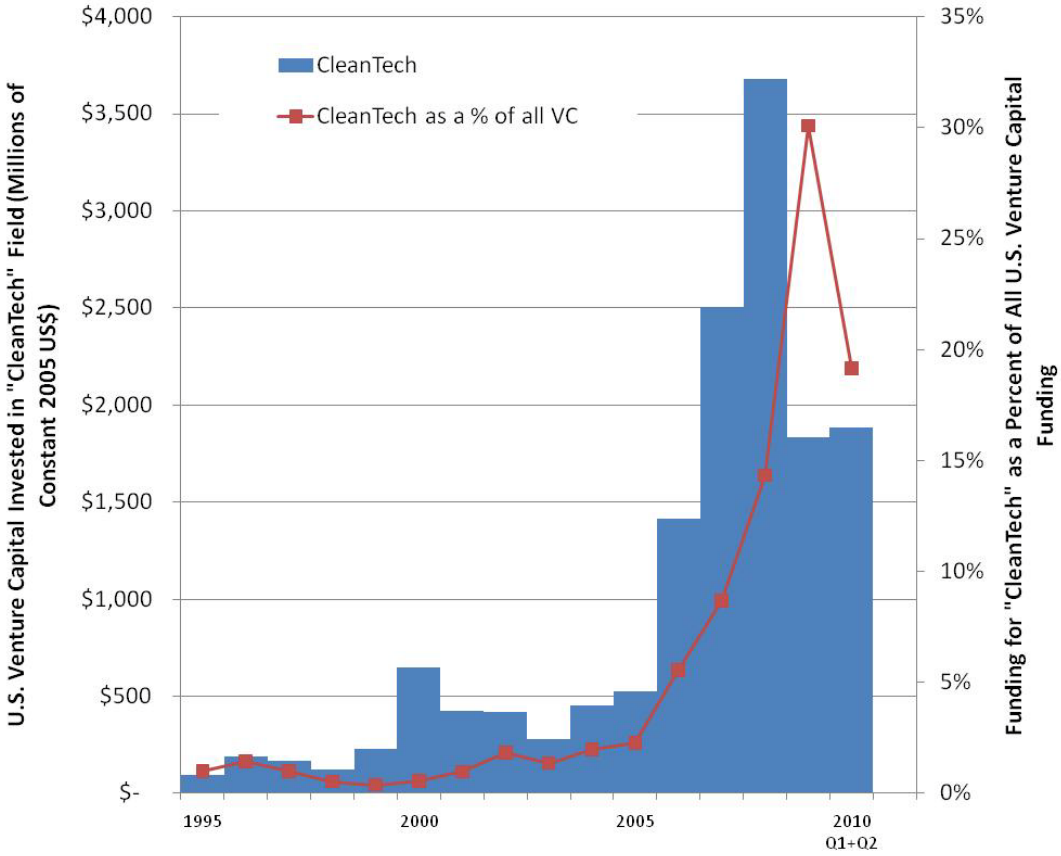

Figure 7. U.S. Venture Capital Investments in CleanTech: 1995-2010Q1+Q2 (millions of constant 2005 U.S. dollars)

Conclusions

The U.S. venture capital community and the financial resources it controls have grown significantly since 1980. The focus of U.S. venture capital investments has shifted significantly over this nearly 30 year period as this class of investors has sought out dynamic, fast growing, high potential return on investment opportunities. Computer hardware, computer software, medical devices, biotechnology companies and internet-specific companies have all for relatively brief periods of time been the single largest recipient of U.S. venture capital investments. Energy related venture capital investments can only claim to have been the largest recipient of U.S. venture capital funds in the early 1980s, that is in the immediate aftermath of the energy crises of the 1970s and early 1980s. Recent significant increases in the price of oil correlate well with increased venture capital support for energy/industrial firms as well as in the so called

"CleanTech" sector. Between 2004 and 2009, U.S. venture capital investments in energy/industrial as well as CleanTech have more than quadrupled in real terms.

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