



VENTURE CAPITAL & THE ENVIRONMENTAL INDUSTRY

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VENTURE CAPITAL & THE ENVIRONMENTAL INDUSTRY

Prepared by Sarah M. Diefendorf for the Alameda Center for Environmental Technologies and the Environmental Finance Center, Region IX, updated June 2000.

Venture capitalists are waiting for a few really true success stories to drag in more capital. Right now, there's so much fear of environmental technology that it's almost legend.

Frank Pope, Verdegris Capital, February, 1999.

VENTURE CAPITAL

Introduction

Most new businesses cannot afford to either 1) support their own expansion and development or 2) take on more debt to promote growth. As a result, equity capital is extremely important to any growing business. Many of the most successful industries of today have been launched on infusions of equity capital, including the computer, internet and communications industries, and it is presumed that in order for an industry to “take off” some form of equity capital, most likely venture capital, must support that expansion. Unfortunately, for a variety of reasons, equity investment in the environmental industry is severely limited and this lack of equity capital is a major barrier to the growth of the industry.

California Venture Capital

From 1995 to 1998, more venture capital was invested in California than any other state in the country. In 1995, 35 percent of all venture capital was invested in California and by 1998 that number had risen to 40 percent.¹ Between 1995 and 1998, over \$15 billion was invested in the State, from roughly \$2 billion in 1995 to almost \$6 billion in 1998.² Massachusetts, ranking second in venture capital investment during these same years, averaged 11 percent of total investment, followed by Texas with 6 percent, New York with 3.5 percent and Colorado with 3 percent.³ Chart 1 below presents an overview of annual venture capital investment in the top five states from 1995 to 1998.

The majority of venture capital is invested in Northern California in Silicon Valley and the most attractive industries include software and information and communications.⁴ However, the venture

¹ Price Waterhouse Coopers MoneyTree Report, 1999.

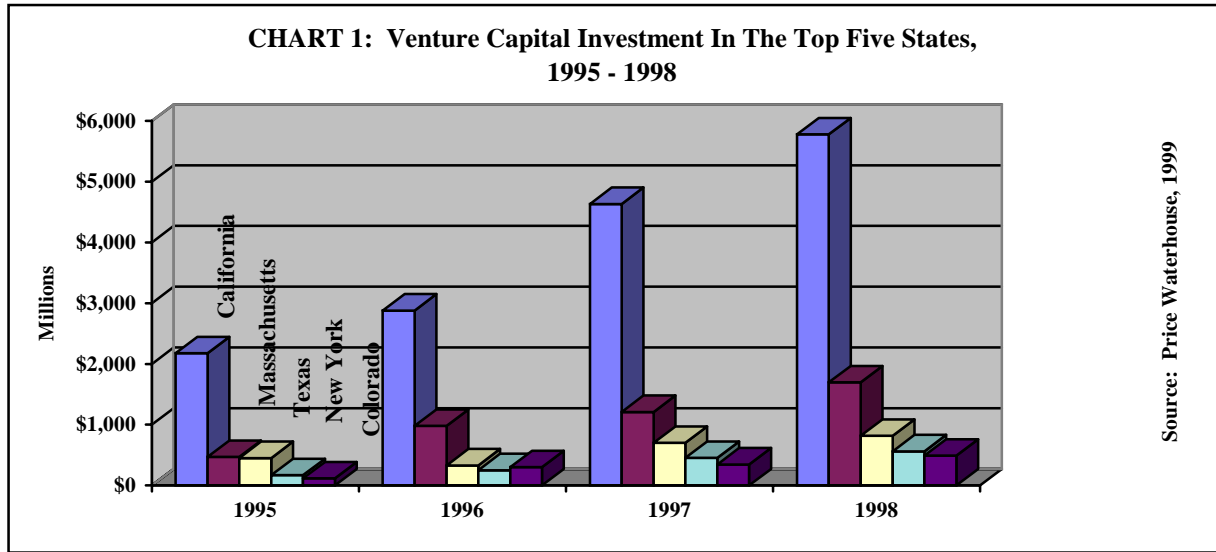
² Ibid.

³ Ibid.

⁴ Ibid.

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capital wealth that is annually visited upon the State has not trickled down to the environmental industry. Indeed, between the third quarter 1997 to the first quarter, 1999, *not one venture capital investment in the environmental industry was made in California.*⁵ During that time, of the 31 investments in the environmental industry, seven were made in Pennsylvania, three in Indiana and two each in Virginia, South Carolina, New York, Connecticut and Georgia. The remainder were made throughout the United States, only one in the Southwest.⁶



VENTURE CAPITAL INVESTMENT IN THE ENVIRONMENTAL INDUSTRY: FIRST QUARTER 1999 & 2000

In the first quarter of 1999, five environmental companies received venture capital for an approximate total of \$3,000,000. This accounted for less than one percent of over \$3 billion in venture capital invested in the United States. In addition, the average investment for all industries was approximately \$6 million, while the average investment in the environmental industry was about \$600,000. Chart 2 below presents a breakdown by industry of venture capital investment in the United States in the first quarter of 1999.

Again, of the five environmental companies receiving venture capital in 1999, none was located in California, even though roughly 35 percent of all venture capital flowed into California businesses. Clearly the fact that the majority of investment occurs in California is more of an impediment than an advantage to the environmental industry. One can probably infer that the dominant presence of such high return industries such as computer software, communications and the internet overshadow lesser known and much less profitable industries. As a result, the investment in the environmental industry suffers under the weight of Silicon Valley.

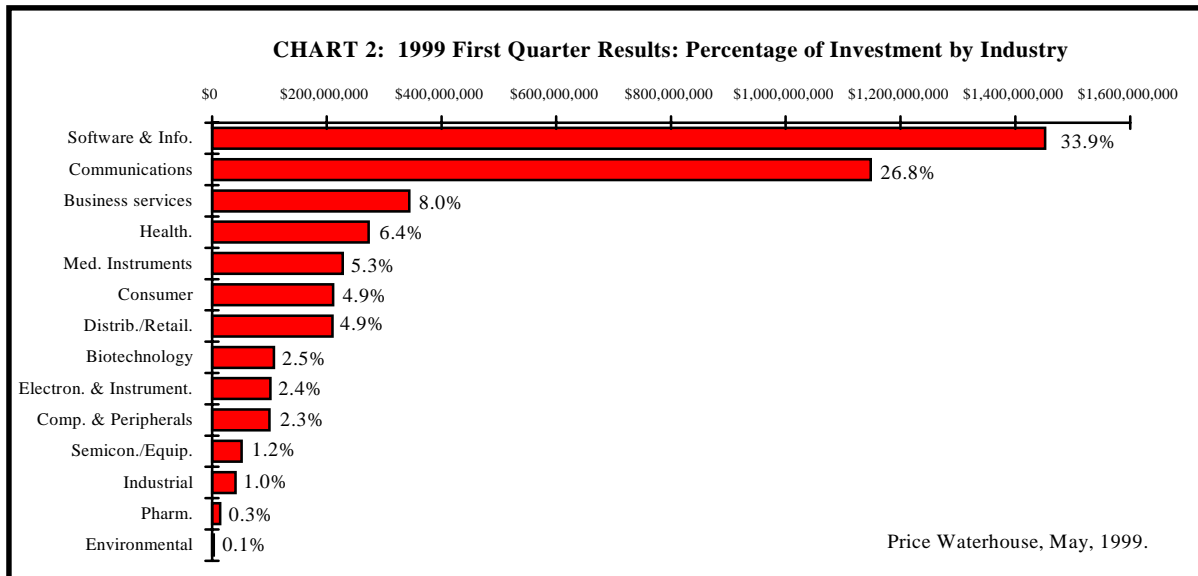
Even more telling, as of the fourth quarter, 1999, PriceWaterhouse Coopers no longer tracks the environmental industry as an individual segment in their quarterly venture capital survey. The companies in the "Environmental" industry category were rolled into the "Industrial" category. Furthermore, in the

⁵ Ibid.

⁶ Ibid.

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first quarter of 2000, of the \$17.22 billion that was invested (up over \$13 billion from the first quarter 1999), only about \$20 million was invested in environmental companies. This amounted to seven investments, three of which were internet related.⁷



VENTURE CAPITAL INVESTMENT IN ENVIRONMENTAL INDUSTRY: 1990 - 1998

While total venture capital investment in American industry has grown more than three-fold since the beginning of the decade, from almost \$3 billion in 1990 to over \$14 billion in 1998, the environmental industry has consistently lagged behind. Indeed, of the 796 venture capital deals in 1990, only 20 (2.51 percent) involved the environmental industry. By 1998, only 14 out of 2,856 venture capital deals involved the environmental industry. Translated into dollars, investment in the environmental industry has declined in recent years, from a high of \$88 million (2.26 percent) in 1992 to a low of 13 million (0.09 percent) in 1998. 1997 looked a bit more promising with venture capital investment in the environmental industry climbing to \$61 million, although, this still only accounted for 0.53 percent of total investments. Table 1 below presents an overview of total deals and total amount of venture capital invested in the environmental industry from 1990 to 1998.

TABLE 1: VENTURE CAPITAL INVESTMENT IN ENVIRONMENTAL INDUSTRY: 1990 - 1998 OVERVIEW				
	Total Deals	% Of Total	Total Amount Invested (In \$ Millions)	% Of Total
1990				
Environmental Industry	20	2.51%	\$47	1.65%
All Industries	796	100%	\$2,843	100%
1991				
Environmental Industry	17	2.04%	\$67	2.15%
All Industries	834	100%	\$3,115	100%

⁷ Pricewaterhouse Coopers MoneyTree Survey Report, Q1 '00. custom search, www.pwcmoneytree.com.

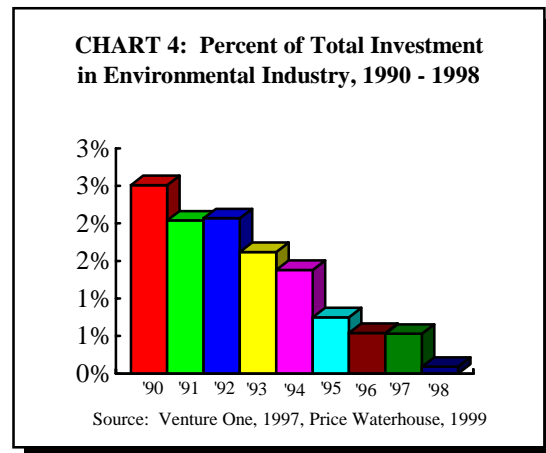
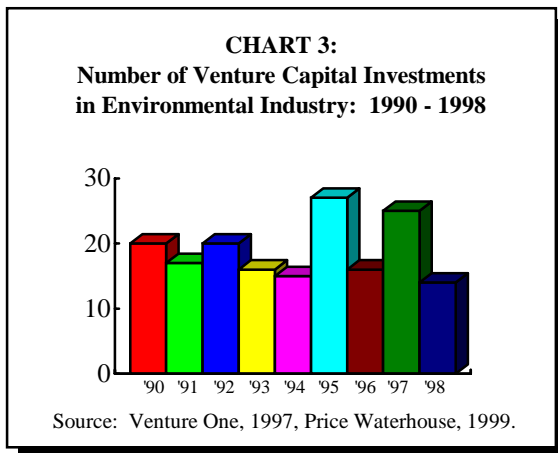
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TABLE 1: VENTURE CAPITAL INVESTMENT IN ENVIRONMENTAL INDUSTRY: 1990 - 1998 OVERVIEW				
	Total Deals	% Of Total	Total Amount Invested (In \$ Millions)	% Of Total
1992				
Environmental Industry	20	2.07%	\$88	2.26%
All Industries	965	100%	\$3,897	100%
1993				
Environmental Industry	16	1.62%	\$73	1.72%
All Industries	987	100%	\$4,252	100%
1994				
Environmental Industry	15	1.38%	\$47	0.96%
All Industries	1,090	100%	\$4,908	100%
1995				
Environmental Industry	27	1.69%	\$47	0.75%
All Industries	1,594	100%	\$6,216	100%
1996				
Environmental Industry	16	0.79%	\$43	0.54%
All Industries	2,022	100%	\$8,018	100%
1997				
Environmental Industry	25	0.94%	\$61	0.53%
All Industries	2,669	100%	\$11,482	100%
1998				
Environmental Industry	14	.49%	\$13	0.09%
All Industries	2,856	100%	\$14,266	100%

Source: 1990-1994, Venture One, 1997; 1995-1998, Price Waterhouse Coopers Money Tree Report, May, 1999.

Number of Investments

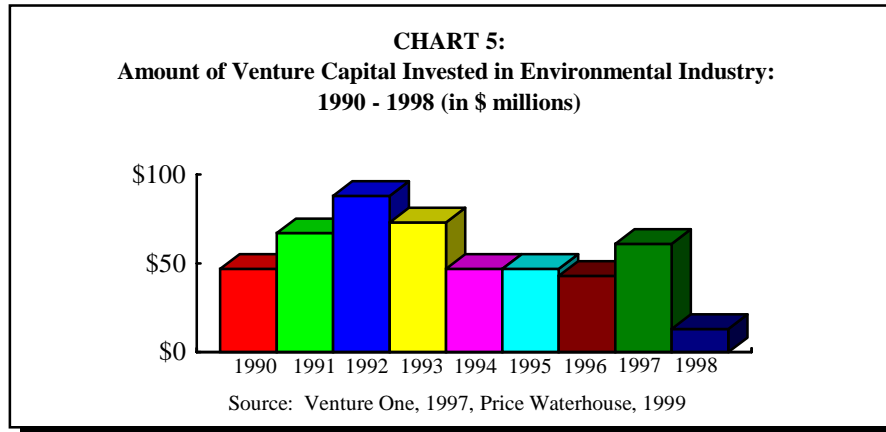
As shown in Chart 3 below, the number of venture capital investments has declined overall since 1990, with the exception of 1995 and 1997. (However, data on number of investments for either year should not be considered exceptional because, as Chart 5 below shows, while the number of investments may have been higher, the actual overall dollar amount was still declining.) From 20 investments in 1990, venture capital deals have declined to just 14 in 1998. Chart 4, presents a clearer picture of the decline in number of investments as percent of total investments from 1990 to 1998.



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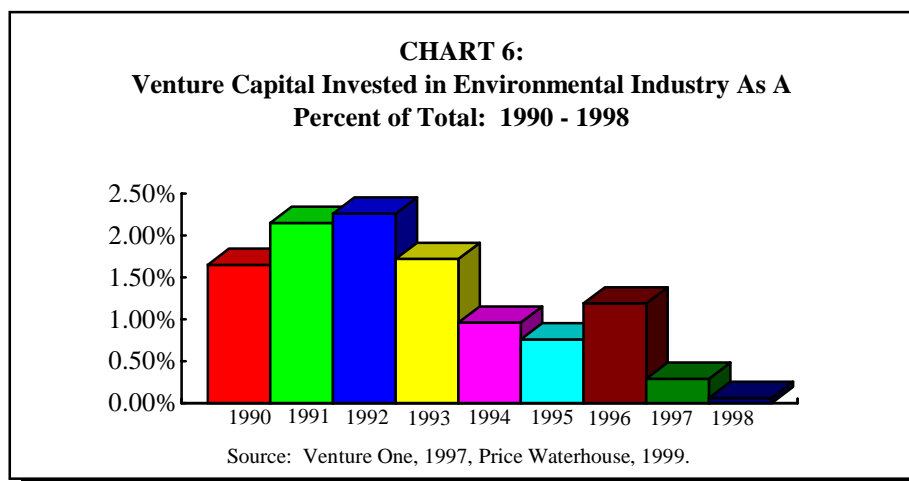
Amount Invested

As Chart 5 below presents, the amount of venture capital invested in the environmental industry showed steady growth from \$47 million in 1990 to \$88 million in 1992. However, by 1993, investment in the industry was on the decline, and by 1998 had dipped to only \$13 million.



Investment in The Environmental Industry as A Percent of Total Investment

Finally, when compared to overall industry investment, the environmental industry captures an insignificant amount of the total. From a high of almost 2.5 percent in 1992, the percentage of investment in the industry has declined to 0.06 percent in 1998. For the sake of comparison, it should be noted that the software, information, communications and biotech industries, have traditionally taken the lion's share of investment, accounting for between 40 and 50 percent of total venture capital investment from 1990 to 1998. Chart 6 below, presents the percent of venture capital invested in the environmental industry from 1990 to 1998.

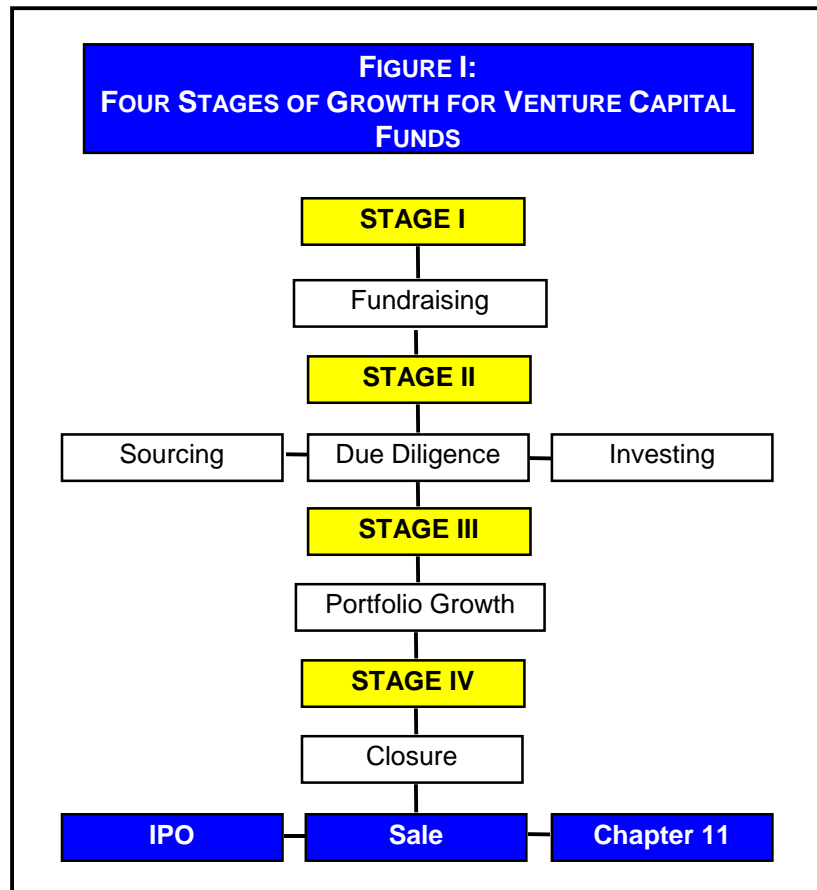


VENTURE CAPITAL - OVERVIEW

THE MECHANICS OF VENTURE CAPITAL

Generally, the structure of a venture capital fund is a limited partnership. Those who invest money in the fund are known as *limited partners* (LPs), while those who invest the fund's money in developing companies, the venture capitalists, are known as *general partners* (GPs). Usually, the LPs contribute about 99 percent of the committed capital while the GPs contribute approximately one percent. A venture fund passes through four stages of development. The first stage is fundraising.

The second stage is comprised of sourcing (locating a prospective company), due diligence (researching the company and the market) and investment. The third stage involves helping the portfolio company grow, and the fourth and final stage in the life of a venture fund is closing, which may be through an Initial Public Offering (IPO), the sale of the company, or Chapter 11. Typically, an IPO realizes the greatest return on investment. The four stages of growth for a capital fund are presented below in Figure 1.

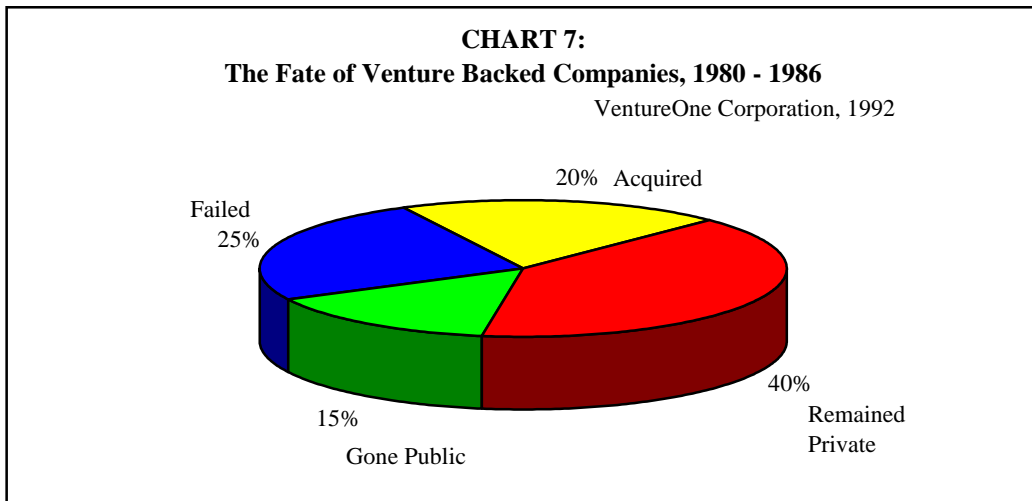


Most venture capitalists are essentially money managers who expect to return huge profits to the private and institutional clients investing in their funds. Investing venture capital is like raising a family, the

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amount of attention you can give each child is directly proportional to the number of children you have.⁸ There are over 1000 venture capital firms in the United States looking, on average, to invest approximately \$70 million each. The firms maintain roughly four deal-making professionals, each responsible for investing over \$15 million. Each of those investors must play an active role in the companies in which he or she chooses to invest, which means that only a handful of companies can be monitored by any one person at any given time. As a result, each capital investment is necessarily in the millions, and the entrepreneur that shows up proclaiming that “we only need a few hundred thousand” clearly does not understand the economics of venture capital and will most likely walk away empty handed. According to Coopers & Lybrand, the average size of each venture capital financing in 1996 was \$4.7 million.⁹ By the first quarter 2000, the average investment has swelled to 12.1 million.¹⁰

In addition, according to *VentureOne Corporation*, and as presented in **Chart 7** below, in examining over 1,000 venture backed companies between 1980 and 1986, they found that 25 percent had failed, 15 percent had gone public, 20 percent had been acquired and 40 percent were still privately owned. These may appear to be excellent statistics, but the fact remains that, in general, only successful IPOs provide the exceptional returns (in excess of 20 percent per year) necessary to make venture capital investment worthwhile. Companies still under private ownership are a continuing drain on the venture fund and venture capitalists who must continue to monitor and help manage each company’s progress. This does not bode well for the environmental industry where mergers and acquisitions tend to dominate most exit strategies as opposed to public offerings.¹¹ In terms of IPOs and the environmental industry, according to Tim Woodward, a venture capitalist with Liberty Environmental, “no one has seen any real success for at least seven years.”¹²



⁸ *Upside Magazine*. “The Economics of Venture Capital.” VentureOne Corporation, June, 1992.

⁹ *Business Wire*. “Venture Capital Investment Tops \$10 Billion Mark.” Individual Inc., February 6, 1997.

¹⁰ Walden, Kirk. *MoneyTree US Report: Q1 2000 Results*. PricewaterhouseCoopers, April, 2000, www.pwcmoneytree.com.

¹¹ Conversation with Raymond DiPrinzio, Scully Capital, February, 1999.

¹² Conversation with Tim Woodward, Liberty Environmental, February, 1999.

THE NATURE OF THE FIRM

In general, venture capital firms are most interested in new technology in a large unsaturated market. They prefer a business with a strong and highly focused management team that is offering a unique product which can move effectively through the marketplace. Venture capitalists also look for watertight business plans prepared by entrepreneurs that have a record of meeting their milestones and doing what they said they would do.

Venture capitalists are aggressive investors. They play an active role in the strategic planning phase of the business and seek continued involvement. Indeed, if the business is not meeting expectations, it is not unlikely for the venture capital firm to step in and take over. In a recent survey, prepared by *Upside Magazine*, 400 venture backed firms were reviewed since 1985.¹³ After five years, only a minority of founding CEOs remained at the helms of their companies. Some of the founding CEOs were still with their companies, but in other capacities and others had left altogether.

Savvy venture capitalists invest in businesses, not products. There are five general characteristics that venture capitalists look for in entrepreneurs:

- leadership,
- vision,
- integrity,
- openness, and
- dedication.¹⁴

Put another way, according to Bill Joos, CEO with garage.com an online angel investment service, "the racetrack is the business, the business idea is the horse and the smart bettors bet on the jockies."¹⁵

Venture capitalists rarely respond to unsolicited advances. According to Kevin Compton with *Kleiner, Perkins, Caufield and Byers*, none of the 150 deals that they have funded have come "over the transom."¹⁶ Venture capitalists rely on industry contacts and entrepreneurs that they have financed in the past to introduce them to potential new business. Indeed, in most successful cases, venture capitalists will come to the entrepreneur. Many venture capital firms receive thousands of business plans per year, and of those, they may seriously look at roughly 100 and then finance maybe one dozen.¹⁷

VENTURE CAPITAL INDUSTRY MODELS

So what captures a venture capitalist's eye. Why, how and when do they invest? Are there any successful models that the environmental industry may follow to attract venture capital? Unfortunately, it appears not. While it pays to understand when (at what stage of a company's growth) and how (who or what to approach) to seek funding, most venture capitalists agree that their success with one industry or company cannot be cloned. According to Roger McNamee, a general partner with *Integral Capital*

¹³ *Upside Magazine*. "CEO Survival." VentureOne Corporation, September, 1992.

¹⁴ *Computer Systems News*. "How to Win a Venture Capitalist." July 30, 1990.

¹⁵ Presentation by Bill Joos at the Alameda Center for Environmental Technologies, November, 1999.

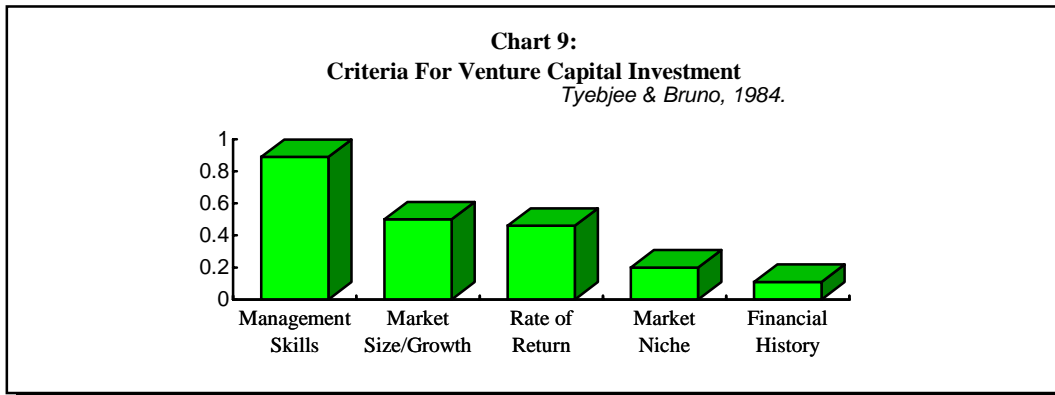
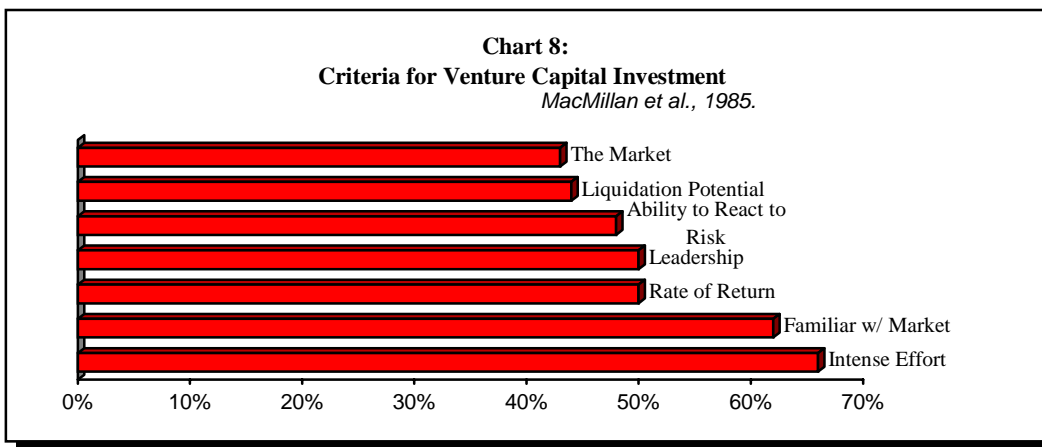
¹⁶ Perkins, Anthony B. "The Young and The Restless of Technology Finance." *The Red Herring*. November, 1993.

¹⁷ Mamis, Robert A. "Venture Capital in the 90s." *Inc Magazine*. February, 1991.

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Partners in Silicon Valley, “there isn’t one single strategy for success. Investment firms have produced great returns in the technology sector with *very* different strategies.”¹⁸

However, some models have been developed which attempt to find the most important evaluation criteria used by venture capitalists to evaluate firms. The results stress strong management, entrepreneurial character, and the importance of the market (see, Burch, 1986¹⁹, Ruby, 1984²⁰, MacMillan et al., 1985²¹, Tyebjee and Bruno, 1984²²). According to J. Burch in a 1986 descriptive study, a venture capitalist will prefer an average product/service idea with a top management team to a good product/service idea with a mediocre management team. In two empirical studies carried out in 1987 and 1984 respectively, the ability of the entrepreneur to sustain intense effort, and the management skills of the venture were deemed the most important investment criteria. The results of these empirical studies are presented in Charts 8 and 9.



¹⁸ Perkins, Anthony B. “Placing Your Technology Bets on the Table.” *The Red Herring*. Issue #12, July, 1994.

¹⁹ Burch, J. *Entrepreneurship*. John Wiley and Sons, New York, 1986.

²⁰ Ruby, L. “The Role of The Venture Capitalist in The Venture Capital Process.” in Khun, R. and Smilor, R. eds., *Corporate Creativity*. Praeger Editorial, New York, 1984.

²¹ MacMillan, I.C., et al. “Criteria Used by Venture Capitalists to Evaluate New Venture Proposals.” *Journal of Business Venturing*. Number 1, 1985.

²² Tyebjee, T.T. and A.V. Bruno. “A Model of Venture Capitalist Investment Activity.” *Management Science*. Vol. 30, No. 9, 1984.

Stages of Investment

In general, venture capitalists have developed their own model for categorizing the six stages of growth and financing. Depending on when they choose to invest, venture capitalists expect to stick with a company for approximately one to ten years. These six stages are listed as follows.²³

- **Seed Stage: Plan.** Entrepreneurs receive venture backing to develop a business plan specifying products, goals and strategy. Investing early in a company's life costs less and potentially offers the highest return, however, it also carries a higher risk. When investing at this stage, venture capitalists expect to be with the firm for five to ten years.
- **First Stage: People and Prototype.** Key managers and technical experts are assembled to produce prototype products. Venture funding pays salaries and development costs. Venture capitalists expect to be with the firm for four to seven years.
- **Second Stage: Product.** Venture capital finances the testing and refinement of prototypes, as well as initial manufacturing and sales. Venture capitalists expect to be with the firm for three to five years.
- **Third Stage: Positive Cash Flow.** With backing from venture funds, marketing efforts aim at achieving the market presence needed for positive cash flow. Development of second-generation production often begins at this stage. Venture capitalists expect to be with the firm for two to three years.
- **Mezzanine Stage: Profitability.** The goal now is to achieve and sustain profitability. The management team, aided by the last anticipated venture financing, builds the business in preparation for an initial public offering of stock or for acquisition by another company. Venture capitalists expect to be with the firm for one to two years.
- **Exit Stage: Public Market.** The company has grown strong enough to sell its stock publicly or to be acquired by another firm. Venture investors profit by selling their stake in the company.

Some venture capital firms invest at the very beginning, at the seed stage, before a business plan has even been developed, others prefer to wait until a company is older and has established a niche in the market. In 1999, "companies in the start-up and early stages of development phases received the most funding in 1999, capturing \$15 billion or 42 percent of total dollars."²⁴ However, this recent proclivity for start-ups may not last through the more recent downturns in the stock market.

A fundamental shift in venture capital investment has come about as institutions replace individuals as the primary investors in venture funds. As returns on venture capital investments have grown over the years, money has been flooding in from pension funds and other institutions eager to share in the profits.²⁵ As a result, "megafunds" have come to dominate the fund raising business. By 1990, the average deal had increased to over \$1 million, and the focus of venture funds in these deals shifted away

²³ Technology Funding. "Development of Venture Investments." <http://www.techfunding.com:80/sixpeas.html>.

²⁴ Weaver, Paul E. "Venture Capital Investments Reach All-Time High in '99." in KnowledgeLine. PriceWaterhouse Coopers, March 2000.

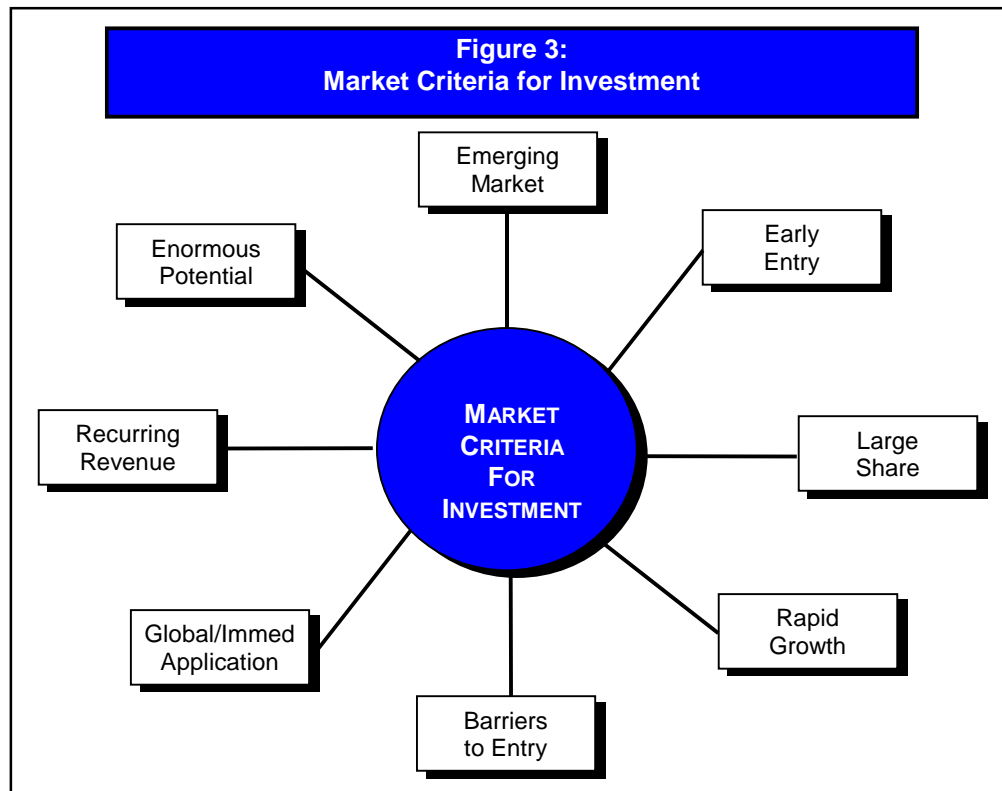
²⁵ *The Economist*. "A Really Big Adventure." January 25, 1997.

from small-dollar equity stakes in high technology start-ups.²⁶ Indeed, by 1994, the average financing size grew to \$5.3 million and, as discussed above, by 2000 average financing has reached almost \$9 million.²⁷

The Market

When looking at a potential investment, venture capitalists are concerned less with the product and more with the market. Each General Partner within a venture capital firm usually has a specific technology expertise and each GP expects a potential entrepreneur to have an equally acute understanding of the market in which he expects to launch his technology. Entrepreneurs seeking venture capital must have a sound knowledge of their marketplace. According to Frederick J. Beste with NEPA Venture Fund, “when a team has segmented the overall market to isolate their specific opportunity, when their claims are anchored to solid, third party observations, when their objective is clear and concise, it becomes obvious that they have a dead aim on their target.” In other words, if an entrepreneur does not know the marketplace, the intimacies of its buyers, trends, relationships, competitors, etc., he is unlikely to find venture capital.

In venture capitalist terms, if the entrepreneur has done his job, his product will be capable of enormous potential within the marketplace. Specifically, (as presented in Figure 3 below) venture capitalists are looking for rapid growth within the market, and broad, immediate (it should not be necessary to educate the market about a product) and global application.



²⁶ Beltz Cynthia A., ed. *Financing Entrepreneurs*. The American Enterprise Institute Press, Washington, DC, 1994.

²⁷ *Upside Magazine*. “VC Warning Signs.” VentureOne Corporation. <http://www.v1.com/up595.htm>. 1995.

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In addition, there should be medium to high barriers to entry which can impede competitors from snatching the entrepreneurs early lead.²⁸ The market should be new and emerging, and the product should be poised for early entry in order to take a large market share. Finally, the product should be capable of recurring revenues. Venture Capitalists are not interested in one shot deals, they want a product with longevity which can maintain a significant niche in the marketplace over the long term.

And Finally.....Management! Management! Management!

Ask just about any venture capitalist to define the most important criterion for investment and he will say — management. According to Mary Bechman, Managing Director of Baccharis Capital in Menlo Park, “if you invest in a concept, its the surest way to lose money because concepts don’t build companies, people do.”²⁹ Ultimately, every venture capitalist knows that the success or failure of a business lies with the intangible entrepreneurial spirit that guides the company. The model entrepreneur is one with inner confidence, incomparable drive and “a fire in the belly.”³⁰ A great idea with fantastic market potential will do nothing to persuade a venture capitalist if the management team lacks the heart of the entrepreneur. Frederick J. Beste with *NEPA Venture Fund* has defined the following eleven entrepreneurial characteristics that he deems necessary for financial success.

- A sound knowledge of the marketplace.
- A sound knowledge of the competition.
- A sound knowledge of the financial dynamics of the company. Time and again, venture capitalists have stated that they are not looking for a “boiler plated spread sheet, lifted from some book on how to write a business plan.” They want to understand your thought process and know that you have a clear understanding of the economic model of the business and the risks associated with it.
- A true understanding of the importance of cash flow. Entrepreneurs should think of cash as blood, and part with it only when it furthers their objectives.
- They have an internal loci of control. Entrepreneurs should see the success or failure of their business as a reflection of themselves. They should take everything personally.
- Entrepreneurs have an inner confidence based on knowledge of the industry, the market and their product.
- Entrepreneurs plan and execute their plans.
- They inject reality into their attacks. Entrepreneurs know that both success and failure awaits and they have contingencies for both.
- They hire smart. Entrepreneurs are not intimidated by partners smarter than they. A dynamic CEO is not enough for the venture capitalist, who wants to see talent in the entire management and production team.
- They work hard and they love it.
- For the true entrepreneur, winning is compulsive and giving up is unthinkable.

²⁸ If industry visibility is high and barriers to entry low, the growth rate of supply will in all probability exceed the growth rate of demand all too quickly.

²⁹ Alexandra Harris. “Venturing Out.” *Winning Strategies*. 1995.

³⁰ Frederick J. Beste III, NEPA Venture Fund in “The Twelve (Almost) Sure Fire Secrets to Entrepreneurial Success.” Venture Capital Institute, 1995.

PROSPECTS: VENTURE CAPITAL AND THE ENVIRONMENTAL INDUSTRY

If regulations weren't there, there wouldn't be a market and venture capitalists have no interest in technologies that are completely regulatory driven.

Tony Lenz, Venture Capitalist, EA Capital³¹

Raymond Diprinzio, Venture Capitalist, Scully Capital³²

Venture capital is neither straightforward nor simple to obtain. The competition is extreme, and only those entrepreneurs with the rare and elusive qualities that the venture capitalists seek, may attract the investor's lucrative eye. The environmental industry as a whole, and environmental technology in particular, have been struggling to attract venture capital, for the most part, to no avail. Indeed, according to a 1993 *Environmental Business Journal Survey*, only five percent of US venture capital firms invest in the environmental industry.

In addition, environmental technology faces significant barriers which impede entry into the marketplace. Financing for commercialization is difficult to find, and many projects die in the prototype phase. The permitting process is uncertain, the market is fragmented, regulations are sporadically enforced, and frequent, required testing is costly. Technology transfer from the federal level to the entrepreneur is often confusing and laborious. Most industries are not interested in trying new technology as long as the old technology meets the existing standard, or even worse, industry is often unaware of the regulations with which they need to comply. As a result, these barriers, and others, impede urgently needed equity investment in the environmental technology industry. According to Nick Parker, a venture capitalist with Crane Capital, venture capitalists have been consistently disappointed with the lack of enforcement of environmental regulations in the past. In addition, the fragmentation of the market across state lines is a constant deterrent to investment.³³

After reviewing a variety of criteria venture capitalists use to assess potential investments, from the personal to the financial, we discover that many of these criteria are not exclusive to any one industry — from hog farming to computer software the best entrepreneurs manage to attract investors. However, as venture capitalists invest larger and larger sums, the market becomes more and more important. Indeed, most general partners now stress the market over the product when considering a new venture. As a result, according to Frank Pope, the bulk of the money invested in environment technologies goes towards renewable energy which does not depend on regulations for its market, and there's not much left for the rest of the industry.³⁴

As discussed above and presented in Figure 3.3, there are certain market criteria that a product must meet in order to attract most venture capitalists. In some areas, such as emerging markets, early entry, barriers to entry and global markets, environmental technology does quite well. Unfortunately, the barriers behind which environmental technology is forced to operate, inhibit the industry's ability to meet the majority of criteria for venture capital investment. Commanding a large market share is almost impossible when new and improved (and in many cases, cheaper) technology must compete with existing older technology that meets government approved standards. When technology users have no incentive

³¹ Conversation with Tony Lenz, Venture Capitalist, EA Capital, February, 1999.

³² Conversation with Raymond Diprinzio, Venture Capitalist, Scully Capital, February, 1999.

³³ Conversation with Nick Parker, Venture Capitalist, Crane Capital, February, 1999.

³⁴ Conversation with Frank Pope, Venture Capitalist, Verdegri Capital, February, 1999.

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to improve compliance performance, environmental technology producers have no incentive to improve their products, which reduces recurring revenue. In addition, rapid growth and immediate application are unlikely when the testing, permitting and technology transfer processes are so laborious. One possibility that, unfortunately is almost always overlooked, is the overseas market where market penetration may not be as difficult (from a regulatory viewpoint). Environmental companies that have moved swiftly into the international arena are more likely to catch an investor's eye.³⁵

As discussed above and as shown in Table 3 below, capturing venture capital takes more than a great idea. Impediments to market entry for environmental technology are severe, and will likely inhibit any *significant* venture capital investment in the industry for the near future. Right now, most venture capitalists are waiting for someone else to take the plunge, to prove that money can be made on the industry, and until there are at least a few real success stories, more money will not be forthcoming.³⁶

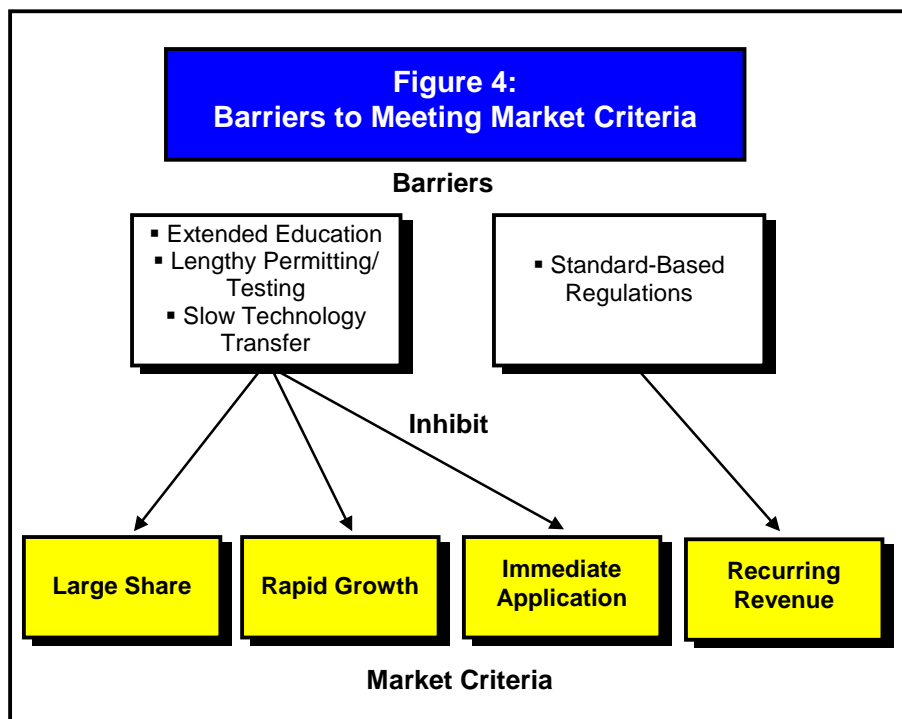
TABLE 3: CAN ENVIRONMENTAL TECHNOLOGY MEET VENTURE CAPITAL CRITERIA FOR INVESTMENT?		
Criteria	Meets Criteria	Discussion
Emerging Market	Yes	Environmental Technology is generally regarded as an emerging technology worldwide, especially in the area of pollution prevention. Some experts expect the environmental technology market to increase from \$427 billion in 1995 to \$543 billion by 2000, worldwide.
Early Entry	Yes	The environmental technology industry is relatively new, and expected to grow, largely through an expected increase in environmental regulations. Again, pollution prevention technology, a relative newcomer, is expected to be in increasing demand worldwide.
Large Share	No	Commanding a large share will be difficult for any new environmental technology since the user industry tends to favor existing technology. In addition, because new technology must be tested on a state by state, and often, site by site basis, capturing a large share of the market is difficult. Where exports are concerned, environmental technology will have to meet new international standards as well.
Rapid Growth	No	In most cases, environmental technology users need to be educated about specific regulations and the individual products that may help them comply. Often hostile to the environmental industry, users must also be taught that pollution prevention technology should be viewed as an investment which can reduce future cleanup costs. In addition, the testing, permitting and technology transfer processes can be long and tedious.
Barriers To Entry	Yes	In general, environmental technology is highly engineered and barriers to entry into the industry are relatively high.
Global Application	Yes	The international market is in place both in the developed and the developing world, and it is expected to expand significantly.
Immediate Application	No	Again, the market needs to be educated, and the testing, permitting and technology transfer processes are too long and fragmented.
Recurring Revenue	No	Because most environmental regulations are driven by standards, there is little incentive for industry to improve environmental performance beyond accepted standards. As a result, adapting new, improved or innovative technology is not seen as economically viable or necessary.
Enormous Potential	Yes & No	Many environmental technologies are broadly applicable in the manufacturing sector and are not limited to specific industries. However, other technologies serve a particular niche and are unlikely to return the level of profits to which venture capitalists have become accustomed.

³⁵ Conversation with Nick Parker, Venture Capitalist, Crane Capital, February, 1999.

³⁶ Ibid.

Filling The Gap

When considering the general models for criteria for venture capital investment, there is no reason why an industry could not attract venture capital, including environmental technology. Inspired entrepreneurs with talented management teams are not limited to the computer and biotechnology industries. However, as Table 1 above shows, there are significant gaps between what venture capitalists look for in the market and what environmental technology can offer. As it stands now, environmental technology suffers when a large market share, rapid growth, immediate application and recurring revenue are necessary for substantial investment. These criteria will be extremely difficult to meet as long as both the market and the consumer must be educated, testing requirements are extensive, regulations are standard based, permitting is lengthy and technology transfer is slow. Based on Table 3, Figure 4 below presents a breakdown of these barriers and the market criteria to which they apply.



To a large extent these barriers will remain in place until the Federal Government and the EPA develop new regulations and standards by which we judge both pollution and pollution cleanup and prevention technology. Regulations must provide incentive to improve performance, and the testing and permitting processes should be standardized at a federal level, with a certification of authorization for approved technology. To be fair, there are a variety of standard and not-so-standard mechanisms that can help finance environmental ventures. From public sector programs and grants, to credit cards, loans, factoring, strategic partnerships, employee stock ownership plans and divestiture, there are many existing models to help young businesses survive. A very few venture capitalists see great potential within the environmental industry in the near future. Some feel that the market is underserved and, as a result, venture capitalists who look at the environmental industry can take the “pick of the litter” and will find decent returns.³⁷ Others suggest that by following the industry they are at the beginning of the

³⁷ Conversation with Tim Woodward, Venture Capitalist, Liberty Environmental, February, 1999.

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environmental wave, poised to invest when the industry explodes.³⁸ In addition, there are a handful of venture capitalists who hope that the industry will rebound because they believe it is important to the environment. They want to invest in the industry because it is the good and right thing to do, but they also need to make a profit.³⁹

However, venture capitalists who invest in the environmental industry are few and far between, and no matter how socially conscious a venture capitalist may be, they are not investing their own money, but +investors' - who want out with a healthy profit in, maximum, seven to ten years.⁴⁰ As a result, since it is often equity capital and, for the most part, venture capital that is pivotal to the successful and rapid growth of an industry, the environmental goods and services industry suffers. When reviewing the barriers that inhibit venture capital, there is little that can be done at the private level to provide a stronger market for the environmental industry. Resolution of those problems is largely up to the federal and state governments and the EPA.

³⁸ Conversation with Ray Sebastian, Venture Capitalist, Entegrity Partners, February, 1999.

³⁹ Frank Pope, Verdegris Capital, Jeff Keimer, Unison Capital, Ray Sebastian, Entegrity Partners, Tom Woodward, Liberty Environmental, Jamie Smith, Enertech Capital, Tony Lenz, EA Capital, Nick Parker, Crane Capital, Raymond DiPrinzio, Scully Capital, Stacy Grey, First Analysis Corporation, February, 1999.

⁴⁰ Conversation with Frank Pope, Verdegris Capital, February, 1999.