

# California's Cleantech Industry: Annual Venture Capital Investment Update 2006

*Creating Jobs and Promoting a Healthy  
Environment*

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## WHAT IS “CLEANTECH”?

The cleantech industry encompasses a broad range of products and services, from alternative energy generation to wastewater treatment to more resource-efficient industrial processes. Although some of these industries are very different, all share a common thread: they use new, innovative technology to create products and services that compete favorably on price and performance while reducing humankind’s impact on the environment. To be considered “cleantech,” products and services must:

- Economize use of natural resources, offering a cleaner or less wasteful alternative to traditional products and services;
- Have their genesis in an innovative or novel technology or application;
- Add economic value compared to traditional alternatives.

The ten cleantech categories, as defined by the Cleantech Venture Network, are: Agriculture and Nutrition; Air Quality; Enabling Technologies; Environmental IT; Material and Nano-Technology; Energy-Tech (Energy-related Generation, Storage, Efficiency and Infrastructure); Materials Recovery & Recycling; Manufacturing/Industrial; Transportation & Logistics; and Water Purification & Management. Firms in these categories may not market themselves specifically as “cleantech,” and investors who place capital into these firms likewise may not necessarily consider themselves to be cleantech investors. The Cleantech Venture Network ([www.cleantech.com](http://www.cleantech.com)) tracks the activity of investors and entrepreneurs in the cleantech space and aggregates that information to create a holistic picture of the industry.

## EXECUTIVE SUMMARY

### ***2005: A Great Year For Cleantech in California***

California's cleantech industry continued its growth in 2005, attracting \$484 million in venture capital (VC) to the State in 57 cleantech deals<sup>1</sup> - a 36% increase in funding over 2004. Forty percent of that capital went to startups in the energy generation and energy efficiency ("energy-tech") sectors. (For the purposes of this report, "energy tech" refers specifically to investments in clean energy technologies rather than investments in all types of energy technologies.) The increase in California investment mirrored a sector-wide increase in cleantech venture capital: across North America, cleantech VC investing rose an estimated 43% over 2004, to nearly \$1.6B in 2005.

### ***Four major trends appear to be driving the increase in cleantech VC investing:***

- The ongoing recovery of the venture capital industry from the post-dot.com bust.
- Increasingly broad acceptance of "cleantech" as a distinct and viable investment category, as evidenced by several high-profile IPOs, the successful funding of specialized cleantech VC firms, and increasing interest from the media and public.
- High energy prices, which have catalyzed interest in alternative technologies and improved the relative economics of some cleantech offerings.
- Increasing recognition by policy-makers at the national and state level that cleantech can be a valuable asset in creating jobs, improving environmental performance, and promoting national resource independence.

### ***California Still Leads the Nation, but the Northeast is Closing the Gap***

With its strong technology and entrepreneurial heritage, progressive public policy, and world-class capital infrastructure, California continues to lead the nation in cleantech VC investment. The State captured 31% of North American cleantech VC funding and 23% of deals in 2005. However, these represented modest share declines (1 point and 2 points respectively) from 2004. Meanwhile, the Northeast gained ground in 2005, improving its share of funding from 21% to 26%, and its share of deals from 20% to 23%. In energy-tech, California captured an industry-leading 26% of energy-tech VC investment (up from 20% in 2004). For the first time, however, more energy-tech financings occurred in the Northeast than in California (27 versus 22 deals).

### ***Cleantech Still Lags Other California VC Sectors***

Although California leads the nation in cleantech VC investment, California's cleantech industry still does not attract proportionately as much VC investment as other California industries (see figure 5). For instance, California received 69% of US VC investments in semiconductors, and 47% of all US VC investment across all sectors, versus 36% for cleantech.

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<sup>1</sup> See Appendix

***California Not Getting Its Fair Share of Early-Stage Startups***

If there is a troubling aspect to California's cleantech VC investment in 2005, it is that the State received proportionately fewer early-stage financings than other regions. While 37% of California's financings were early-stage, 43% of financings in the rest of the country were early-stage. Put another way, California received 25% of North American follow-on financing deals, but only 21% of North American early-stage financings.

***Progressive Policy Still Needed to Drive Job Growth and a Healthier Environment***

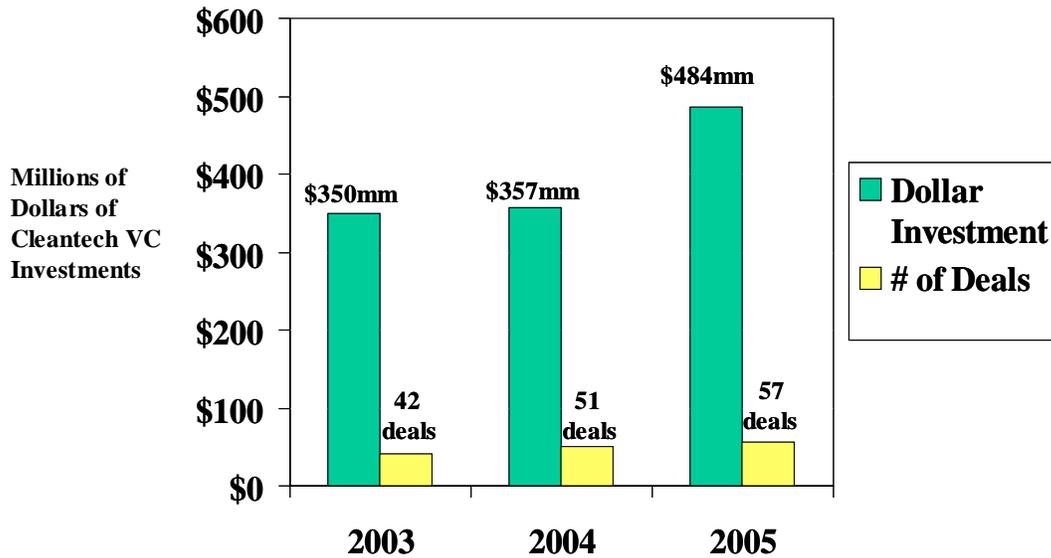
An earlier report by E2 and NRDC, "Creating the California Cleantech Cluster," indicated that California public policy is a crucial factor driving VC investment in the State: for instance, 91% of VCs surveyed say that a pro-environmental public policy stance can be a driver in bringing new business and investment to the State. Initiatives such as CalSTRS and CalPERS cleantech investment initiatives, Hydrogen Highways, and Executive order S-3-05 (Climate Action Team) which investigated greenhouse gas reduction targets, have undoubtedly contributed to California's strong standing in cleantech.

We believe enforceable limits on greenhouse gas emissions would further stimulate all Cleantech sectors. Thus a legislative mandatory cap on California greenhouse gas emissions (such as AB 32 – Pavley) would accelerate cleantech investments in the State.

## CALIFORNIA CLEANTECH AND ENERGY-TECH VC INVESTMENT (2003-2005)

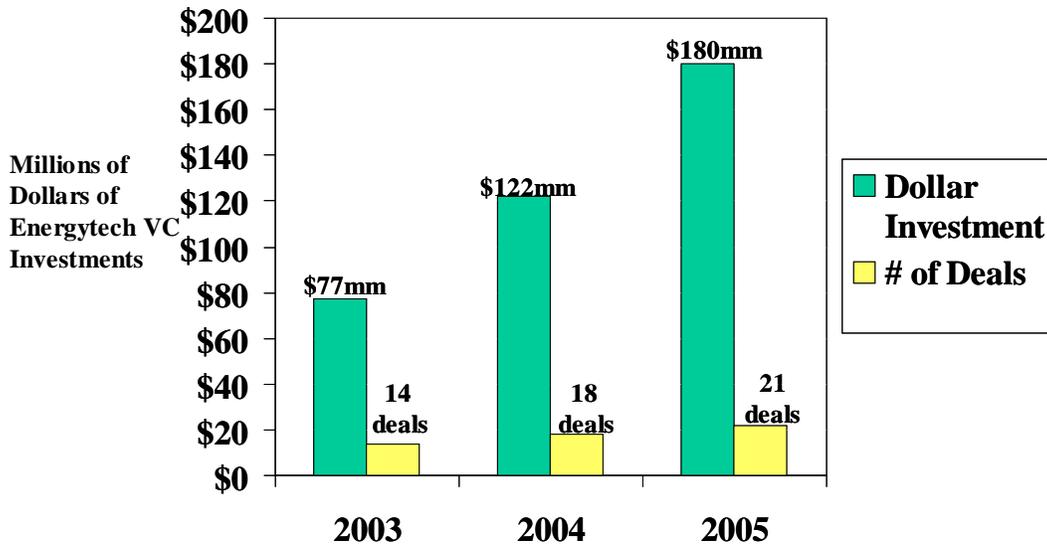
California's cleantech industry continued its growth in 2005, attracting \$484 million in venture capital funding, a 36% increase over 2004. The number of deals increased to 57 in 2005, up from 51 in 2004 and 42 in 2003 (Figure 1). Energy-tech (a subset of cleantech) was the largest investment sector, receiving \$180 million in VC funding, a 61% increase from 2004 (Figure 2).

**Figure 1. California Cleantech VC Investment  
2003-2005**



Source: Cleantech Venture Network 2006

**Figure 2. California Energytech VC Investment  
2003-2005**

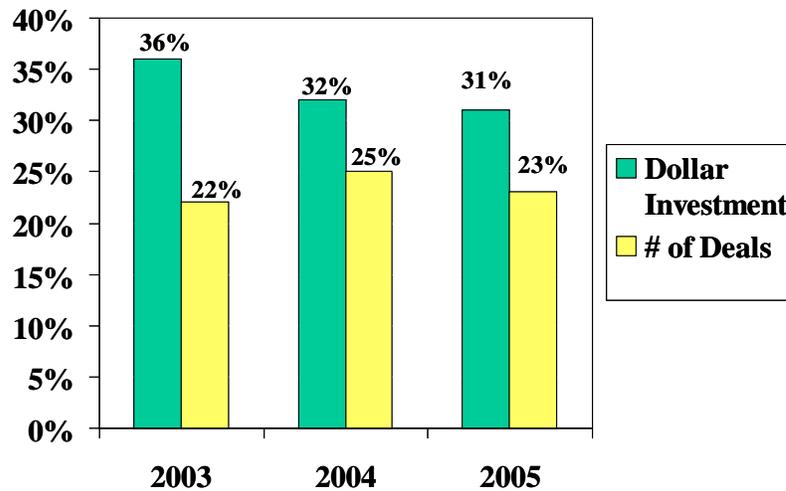


Source: Cleantech Venture Network 2006

### CALIFORNIA SHARE OF NORTH AMERICAN CLEANTECH VC FUNDING (2003-2005)

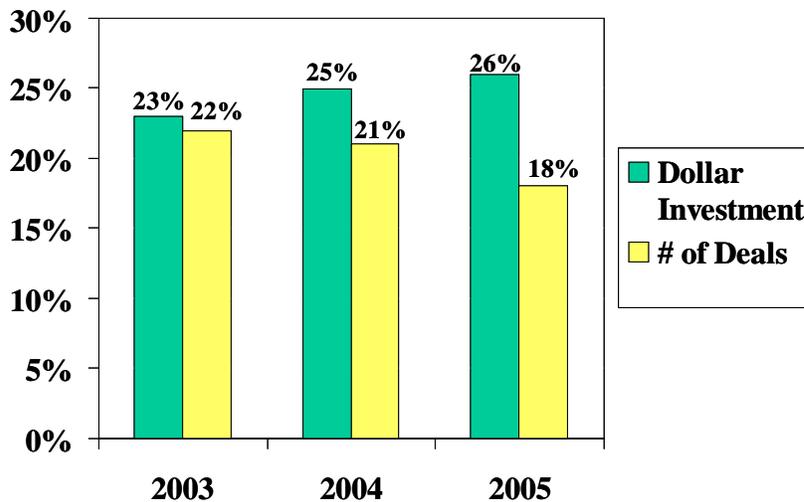
California’s “market share” of North American cleantech venture capital investment declined 1 point to 31%. The State’s share of cleantech deals declined 2 points to 23% (Figure 3). More interestingly, while California’s share of energy-tech investment dollars climbed 1 point to 26%, the State’s share of energy-tech deals fell for the second straight year, to 18% (Figure 4). These diverging trends reflect in part the more mature nature of California’s cleantech sector – companies that were true “startups” a few years ago are now expanding rapidly and raising much larger sums of capital.

**Figure 3. California Share of N.A. Cleantech VC Investment and Deals**



Source: Cleantech Venture Network 2006

**Figure 4. California Share of N.A. Energytech VC Investment and Deals**



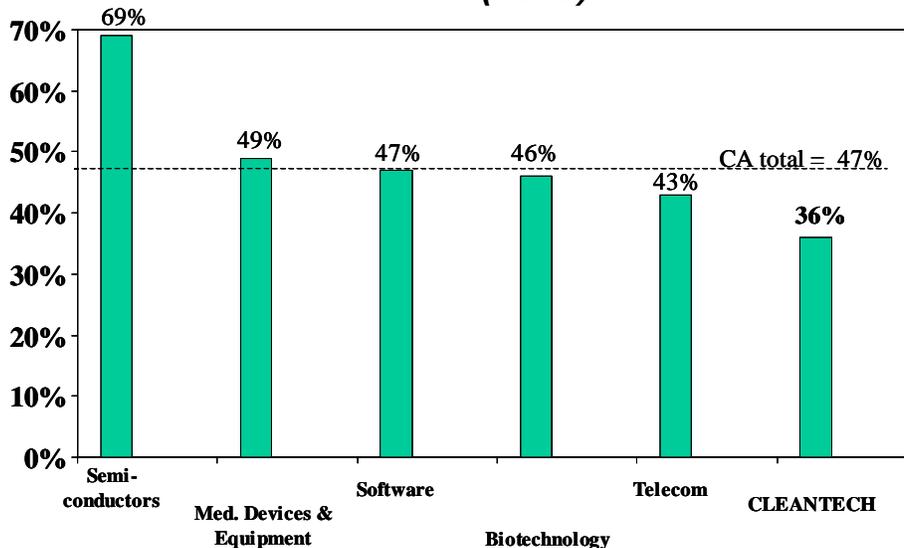
Source: Cleantech Venture Network 2006

## VC INVESTMENT IN CLEANTECH VERSUS OTHER SECTORS

California enjoys a leading - and still growing - position in the nation's cleantech industry. However, relative to the State's dominant share of VC investment in so many other sectors, cleantech is below average in attracting venture capital (Figure 5).

This is not necessarily bad news. One way to interpret this is to consider the unfulfilled potential of California's cleantech industry. If cleantech could reach the cross-sector average of 47% of national VC investment received by California, it would mean another \$130-\$140 million per year in venture capital investment for the State, even assuming no additional growth in national cleantech investing.

**Figure 5. California's share of US VC Investment, by sector (2005)**



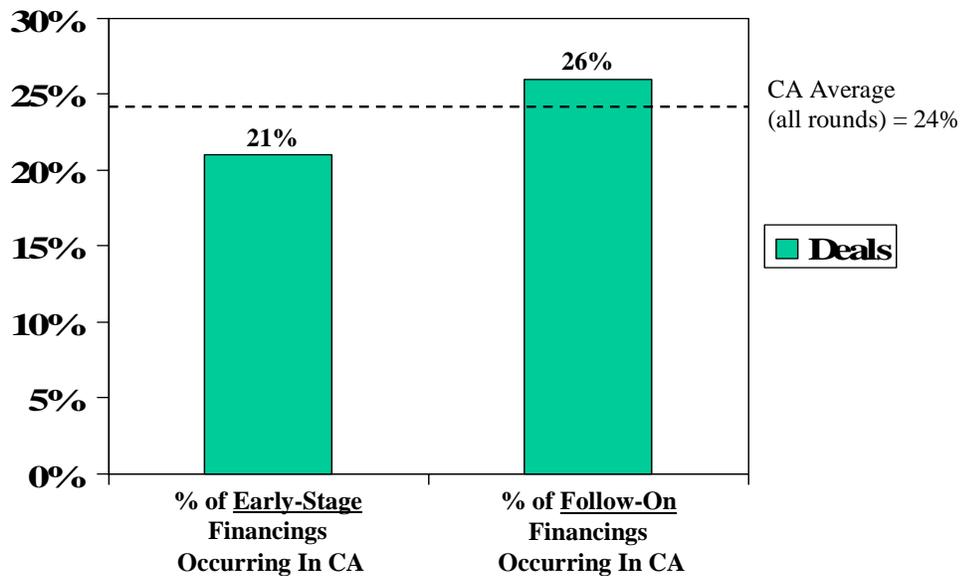
Source: Cleantech Venture Network 2006

*Note: the apparent disparity in California's share of cleantech VC in this figure versus Figure 3 (36% versus 31%) is due to a difference in context. Figure 5 reflects only VC investment in the 50 United States, while Figure 3 reflects investment throughout North America, including Canada. This is necessary because PWC/Thompson Venture Economics/Moneytree only publishes data for investments in US-based companies.*

## VC INVESTMENT IN EARLY-STAGE CLEANTECH COMPANIES (2005)

If there is a weakness in California's cleantech industry, it is in the funding of early-stage startup companies. California appears to be slightly under-represented in the number of early-stage deals it receives compared to its share of total North American cleantech deals (all rounds). California received 21% of early-stage cleantech deals in North America in 2005, versus 26% of follow-on deals over the same period.

**Figure 6. California Share of North American Cleantech Deals, By Stage**



Source: Cleantech Venture Network

This is potentially significant, because the startup companies receiving early-stage (\$300,000 to \$3,000,000) investments today are the companies that will receive the five, ten, and twenty million dollar investments in a few years that will generate hundreds of new jobs. Without a fresh, renewing crop of cleantech startups receiving funding, California will have a difficult time retaining its position as the nation's cleantech leader.

It is difficult to say whether California's lower share in early-stage funding reflects a lower rate of new company formation in California, or simply an aberration in financing patterns. However, this shortfall should give policy-makers pause, as prior E2/NRDC research indicated that for all its advantages, cleantech entrepreneurs and venture capitalists also see disadvantages to locating in California, such as the high cost of living, high taxes, and some cumbersome regulations. We suggest that further research be conducted to better understand the disparity in early-stage funding versus overall funding.

## **CONCLUSION: POLICY AS A LEVER TO DRIVE CLEANTECH INVESTMENT AND JOB GROWTH**

Numerous factors have contributed to California's position as the nation's leading cleantech cluster: a world-class technology industry, excellent higher education institutions, an entrepreneurial culture, and access to capital, to name a few. But another factor also plays a huge role: thoughtful, progressive public policy. In a 2004 survey of venture capitalists (conducted by E2 and NRDC)<sup>2</sup>, investors were asked to identify key factors influencing their investment decisions. The vast majority indicated they think the California government can have a significant impact on the growth of the State's cleantech industry by 1) attracting and fostering cleantech start-ups through its policies and programs, and 2) encouraging cleantech VCs to invest in California companies. To wit:

- 79 percent of VCs surveyed (representing more than \$7 billion in private capital) said that current California public policy is a factor in their cleantech investment decisions;
- 91 percent said that a pro-environmental public policy stance can be a driver in bringing new business and investment to the State;
- Regulatory climate/public policy ranked second in the list of reasons why VCs like investing in California cleantech companies.

California has repeatedly taken the lead in adopting environmentally-conscious, business-friendly policy. The PIER (Public Interest Energy Research) program, the CalPERs and CalSTERS cleantech initiatives, California's Renewable Portfolio Standard, and various State incentives for solar and wind energy have all made California an attractive place for cleantech businesses. Now, we urge California to build on its role as a national policy leader by adopting a mandatory cap on greenhouse gas (GHG) emissions. Energy-tech as well as all cleantech sectors can help reduce greenhouse gas emissions. By creating market certainty for low-emission solutions, California would attract more investment which in turn would generate more jobs and economic growth.

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<sup>2</sup> See *Creating the California Cleantech Cluster*, available at [www.e2.org](http://www.e2.org)

## **ABOUT E2**

Environmental Entrepreneurs (E2) is a national community of professionals and business people who believe in protecting the environment while building economic prosperity. Working with its environmental partner, the Natural Resources Defense Council (NRDC), E2 works through bipartisan efforts to shape state and national policy. E2 serves as a champion on the economic side of good environmental policy by taking a reasoned, economically sound approach to environmental issues.

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## **ABOUT NRDC**

NRDC (Natural Resources Defense Council) is one of the nation's most effective environmental organization. Founded in 1970, NRDC uses law, science and the support of 1.2 million members and online activists to protect the planet's wildlife and wild places and to ensure a safe and healthy environment for all living things. Today, with over 300 employees nationwide, NRDC has built upon its continued legal successes to bring its core programmatic and scientific expertise to bear on issues spanning global warming, clean air, clean water and oceans, public lands, endangered species, and energy.

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## **ABOUT CLEANTECH VENTURE NETWORK LLC**

The Cleantech Venture Network™ LLC is a for-profit membership group that connects venture, corporate and institutional investors, entrepreneurs and service providers interested in clean technology through related information products, online services and the Cleantech Venture Forum series of events. The organization's mission is to accelerate the next and necessary wave of venture innovation and investment. Cleantech Venture Network serves more than 900 affiliate investor member firms worldwide. The organization has tracked more than \$8.2 billion invested in cleantech ventures since 1999, of which over \$400 million has been raised by Cleantech Venture Forum presenting companies. Cleantech Venture Network has offices in Canada, Europe and the US.

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## **ABOUT THE AUTHORS**

**Patrick R. Burtis** is an independent consultant in the cleantech and environmental fields.

**Bob Epstein** is co-founder of Environmental Entrepreneurs, Sybase, and GetActive Software

**Nicholas Parker** is Chairman and co-founder of Cleantech Venture Network LLC.

**Anastasia R. O'Rourke** is a Project Director with the Cleantech Venture Network LLC and is completing her Ph.D. at Yale University.

No.	Company Name	City	Cleantech Segment	Description
1	<b>XsunX, Inc.</b>	Aliso Viejo	Energy Generation	Developer of an innovative solar energy technology that allows glass windows to produce electricity from the power of the sun.
2	<b>Enerage, Inc.</b>	Arcadia	Energy Generation	Developer of micro fuel cells for notebooks and cellular phones.
3	<b>PowerLight Corporation</b>	Berkeley	Energy Generation	Provider of grid-connected solar electric systems & energy efficiency services.
4	<b>Enviance</b>	Carlsbad	Environmental IT	Provider of environmental management systems to global industries and governmental markets.
5	<b>Yulex Corporation</b>	Carlsbad	Materials & Nanotechnology	Manufacturer and marketer of a safe, natural rubber latex for medical products.
6	<b>Vycon</b>	Cerritos	Energy Generation	Manufacturer of flywheel based energy systems.
7	<b>Pentadyne Power Corporation</b>	Chatsworth	Energy Generation	Provider of advanced flywheel power systems that provide high-quality, reliable power.
8	<b>AgraQuest, Inc.</b>	Davis	Agriculture & Nutrition	Producer of environmentally friendly pest management products.
9	<b>SpectraSensors, Inc.</b>	El Monte	Manufacturing/ Industrial	Manufacturer of laser and LED-based gas sensors for industrial, energy, and environmental applications.
10	<b>Nanomix, Inc. (FKA: Covalent Materials, Inc.)</b>	Emeryville	Materials & Nanotechnology	Commercializer of nanoelectronic sensors and developer of IP in hydrogen storage technology.
11	<b>Jadoo Power Systems, Inc.</b>	Folsom	Energy Generation	Developer of portable fuel cell power solutions.
12	<b>Dust Networks</b>	Hayward	Energy Efficiency	Provider of low-power wireless mesh networking systems.

No.	Company Name	City	Cleantech Segment	Description
13	<b>ORYXE Energy International, Inc.</b>	Irvine	Air Quality	Developer of a diesel additive that reduces ozone- and smog-forming emissions without reducing engine efficiency.
14	<b>RiverOne</b>	Irvine	Environmental IT	Provider of supply chain management software to reduce inventory, eliminate wasteful processes and manage compliance.
15	<b>EnviroClean Technologies</b>	La Jolla	Manufacturing/ Industrial	Deliverer of environmentally responsible industrial surface cleaning services.
16	<b>Novazone, Inc.</b>	Livermore	Water Purification & Management	Developer of ozone based purification technologies for food and water.
17	<b>Sub-One Technology</b>	Livermore	Materials & Nanotechnology	Developer of high performance carbon film coatings for interior surfaces, improving existing in-service life expectancy of high-wear critical components.
18	<b>UltraCell Corporation</b>	Livermore	Energy Generation	Manufacturer of a high power density fuel cell system for portable electronics applications.
19	<b>Solazyme, Inc.</b>	Menlo Park	Enabling Technologies	Developer of commercially relevant, sunlight-driven biochemical pathways by exploitation microbial photosynthesis.
20	<b>Cambrios Technologies</b>	Mountain View	Materials & Nanotechnology	Developer of biological technology to transform the way commercial electronic products are made and reduce their environmental cost.
21	<b>Catalytic Solutions, Inc.</b>	Oxnard	Air Quality	Developer and manufacturer of catalytic converter products.

No.	Company Name	City	Cleantech Segment	Description
22	<b>Nanosolar, Inc.</b>	Palo Alto	Energy Generation	Developer of cost-efficient solar panels with process technology of unprecedented production volume scalability.
23	<b>Energy Innovations</b>	Pasadena	Energy Generation	Developer of low-cost rooftop photovoltaic solar concentrator systems.
24	<b>Heartland Resource Technologies</b>	Pasadena	Agricultural & Nutrition	Developer of a low-cost soy protein-based adhesive technology for use in engineered wood products & other industrial applications.
25	<b>Methanotech Inc.</b>	Pasadena	Energy Generation	Producer of methanol through the use of biological processes.
26	<b>HydroPoint Data Systems, Inc.</b>	Petaluma	Water Purification & Management	Provider of weather controlled irrigation management systems.
27	<b>Nanostellar, Inc.</b>	Redwood City	Materials & Nanotechnology	Developer of highly efficient Platinum Nano-Composite catalyst solutions for applications in emissions control and fuel cells.
28	<b>Nanosys, Inc.</b>	Redwood City	Materials & Nanotechnology	Manufacturer of ultra-small technology making devices more efficiency.
29	<b>Agoura Technologies</b>	Sacramento	Materials & Nanotechnology	Developer of proprietary nanotechnology-based optical films.
30	<b>Pionetics</b>	San Carlos	Water Purification & Management	Developer of innovative ion-exchange water purification products.
31	<b>CEYX Technologies, Inc.</b>	San Diego	Environmental IT	Provider of software-enabled control systems for light emitting devices.

No.	Company Name	City	Cleantech Segment	Description
32	<b>Clean Air Power, Inc.</b>	San Diego	Air Quality	Developer of technology that delivers cost-efficient, clean power to the diesel vehicle, power generation and after treatment markets.
33	<b>PowerGenix Systems</b>	San Diego	Energy Storage	Developer of high discharge rate rechargeable nickel-zinc (NiZn) batteries.
34	<b>Ardica Technologies, Inc.</b>	San Francisco	Energy Generation	Developer of fuel cell applications.
35	<b>HelioVolt Corporation</b>	San Francisco	Energy Generation	Developer of Copper Indium Selenide, a thin film material for generating electricity from sunlight.
36	<b>Method Products, Inc.</b>	San Francisco	Air Quality	Developer of products to remove chemicals that pollute the water and air.
37	<b>Applied MicroStructures, Inc.</b>	San Jose	Materials & Nanotechnology	Provider of tools and technologies to enable deposition of molecular-level films for nanotechnology applications.
38	<b>Crossbow Technology Inc.</b>	San Jose	Enabling Technologies	Provider of wireless sensor networks for applications such as environmental monitoring.
39	<b>Golden Gate Technology, Inc.</b>	San Jose	Energy Efficiency	Provider of software solutions that reduce power consumption in designing.
40	<b>NeoPhotonics Corporation (FKA: NanoGram Corporation)</b>	San Jose	Materials & Nanotechnology	Developer & manufacturer of optical components for industries including electronic and photonic materials, energy storage and the manufacture of catalysts, ceramics and semiconductors.
41	<b>CerOx Corporation</b>	Sant Maria	Materials Recovery and Recycling	Designer and manufacturer of on site hazardous waste treatment systems as an alternative to incineration.

No.	Company Name	City	Cleantech Segment	Description
42	<b>Innovative Micro Technology</b>	Santa Barbara	Enabling Technologies	Manufacturer of MEMs projects and products including applications in gas, chemical, and environmental/hazard detection.
43	<b>Miasole, Inc.</b>	Santa Clara	Energy Generation	Manufacturer of thin-film solar cells for the direct conversion of sunlight to electricity.
44	<b>eLite Optoelectronics</b>	Sunnyvale	Energy Efficiency	Developer of high power indium gallium nitride light emitting diodes used in various solid state lighting applications.