February 2009

Climate Prosperity

A Greenprint for Silicon Valley

Joint Venture
SILICON VALLEY NETWORK

Joint Venture
SILICON VALLEY NETWORK

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February 2009

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Climate Prosperity

A Greenprint for Silicon Valley

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ABOUT THE SILICON VALLEY GREENPRINT PROJECT

At Joint Venture's annual *State of the Valley* conference in 2007, former vice president Al Gore issued a challenge to Silicon Valley: invent the technologies needed to reduce greenhouse gas emissions and blaze a path the world could follow to long-term sustainability.

Joint Venture's board of directors took up the challenge, launching local climate protection programs and partnering with other organizations to support the growth of the Valley's clean and green tech sectors. Joint Venture's 2008 *Index of Silicon Valley* was expanded to include new measures of the Valley's innovations in clean technology and its progress in reducing greenhouse gas emissions.

In 2008, the Rockefeller Brothers Fund and Global Urban Development selected Joint Venture to be the vanguard of a new national initiative, the Climate Prosperity Project, and designated Silicon Valley as one of seven pilot regions. The project promotes the view that protecting the environment need not come at the expense of economic growth or living standards. In fact, "Climate Prosperity" argues the opposite is true—that the climate crisis is an opportunity to build new industry clusters, create whole new classes of jobs, and grow the economy, while at the same time enhancing our quality of life and solving the world's most pressing problem, climate change.

In order to take up the effort, Joint Venture formed the Silicon Valley Climate Prosperity Working Group, chaired by San José Mayor Chuck Reed and Chris DiGiorgio, California Managing Director of Accenture, who also serve as co-chairs of the Joint Venture board.

We then turned to Collaborative Economics, the team that developed the *Blueprint for Silicon Valley* in 1992 that gave birth to Joint Venture and ushered in a new phase of the Valley's development. Collaborative Economics interviewed many of the Valley's leaders to compile an inventory of the work that is already underway, and to identify new strategies to make our economy more sustainable.

This Greenprint reflects what we learned from those interviews and serves as a first draft of a new Climate Prosperity strategy for Silicon Valley. In the same way that Joint Venture's 1992 blueprint opened a new chapter for the region, we hope this Greenprint marks the start of a new era for Silicon Valley and models a new path to global sustainability.

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EXECUTIVE SUMMARY

THE CHALLENGE: PROTECTING THE CLIMATE AND GROWING THE ECONOMY

What if we could turn the climate change crisis into an opportunity to build a better world? That is the promise of Climate Prosperity—creating a better, more sustainable world for our children and grandchildren—and what this Greenprint for Silicon Valley is all about.

We know the climate is changing. We know we need to reduce our use of fossil fuels and prepare for the consequences of a less predictable world. The new administration in Washington is likely to make climate change a priority, but it is up to us to take advantage of the new programs. It is up to us to turn the crisis into an opportunity to create new jobs, invent new products, save money, improve public health, and make Silicon Valley a highly attractive region to pursue these objectives. Together, we can show the nation the way out of the current recession and establish America's global leadership position.

Climate Prosperity says we can have it all: growth in the economy, a thriving business environment, and a solution to the climate crisis. We can innovate, create jobs, train workers for new careers *and* we can reduce greenhouse gas (GHG) emissions, reduce air pollution, introduce meaningful transportation improvements, and save money.

Silicon Valley is one of seven regions in the country that have agreed to develop Climate Prosperity strategies and prove the concept. Our region is uniquely qualified to show that Climate Prosperity works. We are blessed with talented, energetic leaders and a long list of assets, including:

- A thriving, diverse, clean tech cluster supported by entrepreneurs and venture capitalists who see very large, global markets for new technology products
- Major corporations such as Applied Materials and Google that are diversifying their business to serve the clean and green markets, and companies like Nanosolar, Better Place, Tesla Motors and others that are introducing world-changing clean tech products
- Research programs at Stanford University, UC Santa Cruz, UC Berkeley, Lawrence Livermore and Lawrence Berkeley National Labs, and the Electric Power Research Institute
- Utilities that are leading the way in reducing the use of fossil fuels for electricity generation and developing a "smart grid" to revolutionize how and where electricity is produced and delivered
- Local government agencies that are developing innovative policies to promote economic growth, reducing their energy consumption, tightening building codes for sustainability, and adjusting general plans to encourage public transit

- Numerous nonprofits and volunteers that are championing the cause of environmental protection, recycling, energy and water conservation, and more
- Community colleges, labor unions, and workforce development programs that are already helping people prepare for a full range of clean and green jobs, from solar panel and smart meter installers to scientists and engineers

In Silicon Valley we have a unique advantage. We both produce *and* consume the technologies, products, and services needed to achieve Climate Prosperity. Our strategy is to stimulate local demand for clean and green technology *and* supply those solutions to global markets. We are singularly prepared to help the world address the greatest challenge to face civilization.

GREENPRINT FOR SILICON VALLEY: ACTION INITIATIVES AND PUBLIC SUPPORT

To take maximum advantage of these assets on a regional scale, Joint Venture brought together leaders from business, government, academia, labor, and the community to develop the strategy we call the Greenprint for Silicon Valley. The strategy provides an overarching framework to coordinate and accelerate the many disparate activities already taking place throughout the Valley.

The program has two major elements:

1. Grow the base of clean and green industries

The team identified six areas of opportunity to grow local businesses that are developing products and services that reduce dependence on fossil fuels and emissions of greenhouse gases.

- Ensure **access to financing** that supports business expansion and the purchase of green products
- Help businesses find the **land and buildings** they need to incubate, launch, and grow
- **Promote** Silicon Valley's products for export and to attract a talented workforce
- Attract funding for **research and development**, testing, and commercialization.
- Align **workforce training** programs with the needs of industry, utilities, and public agencies
- Ensure that the **regulatory** environment supports innovation and production, and encourages green practices

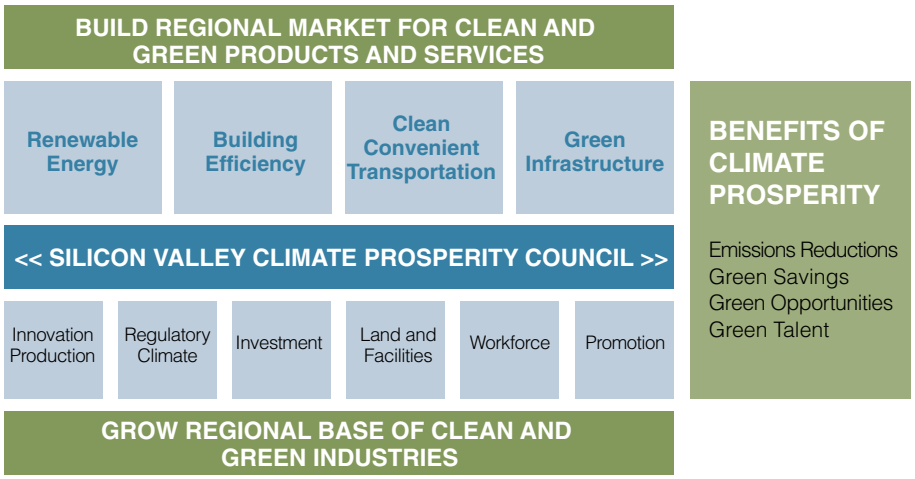
2. Build a regional market for clean and green products and services

There are many opportunities to improve energy efficiency, reduce greenhouse gas emissions, and protect the environment. To begin, the team chose four areas of focus based on the priorities in the California Global Warming Solutions Act (AB 32) and the opportunity to leverage local resources.

- Clean transportation
- Building efficiency
- Renewable energy
- Green infrastructure

To preside over the effort, Joint Venture is forming a **Silicon Valley Climate Prosperity Council** to lead the Climate Prosperity Initiative. The members of the Council will represent business, government, academia, labor, and community organizations, and the Council will have four major roles:

- Coordinating and maximizing the impact of our current activities
- Generating new ideas
- Launching new initiatives, and linking them to supportive public policies, research programs, incubators, workforce programs, and other resources
- Reporting outcomes and tracking progress, using quantifiable measures such as the reduction in GHGs, energy savings, jobs created, and economic growth



THE VISION: GREEN SAVINGS, GREEN OPPORTUNITIES, GREEN TALENT

Achieving Climate Prosperity will take hard work and time, but the benefits are powerful:

- More energy efficient homes and cars means less money spent on energy and more disposable income that is likely to stay in the community.
- Adding solar and other renewable energy sources on local homes and offices accomplishes important energy goals, expands a newly emerging sector, and stimulates the local economy.
- Retrofitting homes and offices to be more energy efficient creates new jobs for construction workers, energy auditors, efficiency monitoring tools, network installers, and manufacturers of products ranging from temperature sensors to building components made from sustainable materials.
- Our ongoing search for transportation alternatives reduces our use of fossil fuels, cleans up the air, and has important lifestyle and health benefits.
- Livable, walkable, sustainable communities are more appealing to the rising generation of talent that we need to locate here.
- Progress on all of these fronts helps California achieve its goal of reducing emissions by 80% from 1990 levels by 2050.

Climate Prosperity also offers Silicon Valley the opportunity to add manufacturing jobs back into the mix, and to engage the full range of skills and talents in the community. The global competition will be intense, but by acting now we can capitalize on first-mover advantage.

The leaders of the national Climate Prosperity Project say that if it can't be done in Silicon Valley, it can't be done. The new Silicon Valley Climate Prosperity Council aims to prove we *can* turn our worst crisis into our greatest accomplishment yet, and provide a role model for the nation.

A GREENPRINT FOR SILICON VALLEY

GETTING FROM CLIMATE CHANGE TO CLIMATE PROSPERITY

CONFRONTING CLIMATE CHANGE

That our climate is changing is now widely recognized as scientifically proven. A survey by the California Opinion Index in 2007 found that 82% of Californians see global warming as a very serious or somewhat serious threat to California's overall quality of life.

What is less clear is what we should do about climate change. Some argue that we need to cut back drastically on our lifestyles, trade in our cars for bicycles, grow food locally, insulate our homes and offices, and unplug all of our appliances when not in use. Others argue we need to accelerate research into renewable energy technologies, figure out how to capture and sequester CO_2 coming out of coal-fired plants, convert our transportation infrastructure from carbon-based fuels to electricity and hydrogen, and invent a wide range of energy efficiency solutions.

While most would agree that we need to embrace both strategies, no one knows how much they would cost. In fact, there are those who argue that we cannot afford to reduce greenhouse gas emissions; that the costs dramatically exceed the benefits, and that we will simply have to adapt. Sir Nicholas Stern, former chief economist at the World Bank, came to the opposite conclusion. In his analysis *The Economics of Climate Change*, he found that *failing* to act will be highly costly and detrimental to long-term economic growth. He also concluded that by acting now we can keep the costs of adapting to climate change manageable, while delaying will likely create economic disruptions as climate change becomes more severe.[1]

Nationally, the debate between these opposing viewpoints is proving to be a major stumbling block to taking action at the community level.

Joint Venture's discussions with economists and business and public sector leaders have convinced us that protecting the environment can be an economic driver for Silicon Valley, that it is time to build a sustainable economy on a sustainable environment, and that we need to move quickly. Protecting the climate can create jobs, enhance our quality of life, and lead to Climate Prosperity.

ACHIEVING CLIMATE PROSPERITY

In November 2007, the Rockefeller Brothers Fund[2] and Global Urban Development[3] convened some of the nation's leading minds in economic development at Pocantico Hills, New York. There, they took up the following proposition:

[1] Sir Nicholas Stern, *The Economics of Climate Change, The Stern Review,* Cambridge University Press, 2006.

[2] The Rockefeller Brothers Fund is a charitable foundation based in New York City. Its mission is to "promote social change that contributes to a more just, sustainable and peaceful world." www.rbf.org

[3] Global Urban Development brings together leaders in urban affairs from around the world. The mission is "to find new, innovative, and practical solutions for the world's urban problems, from conception to implementation." www.globalurban.org

> Policymakers worry that climate action may cost too much, hurt the economy, eliminate jobs, and become politically unpopular. Yet many of those who are currently working to reduce emissions inside companies and in governments find they are saving money and fostering economic opportunity and competitiveness. Real-world experiences and lessons suggest that we now have win-win options for climate policy that can minimize economic harm and produce significant benefits by generating increased prosperity and improved quality of life.

The group concluded the time has come to demonstrate that environment and economy are not the antagonists they once seemed; that taking action against the threat of global warming at the community level not only reduces the economic costs of adaptation, but can actually stimulate economic growth. A well-designed strategy can increase the number and quality of jobs in the region, enhance competitiveness, improve public health and social equity, and leave money in peoples' pockets that can be spent in the community instead of being sent out of the region to oil producers.

Proof of the power of this approach already exists here in California. In 1978 our worries about air pollution and the cost of oil led us to approve Title 24, a set of tough energy efficiency standards for appliances and residential and nonresidential buildings. In 1982, the California Public Utilities Commission adopted decoupling policies to remove disincentives for utilities to promote energy conservation and efficiency among users by ensuring that utilities retain expected earning despite reduced sales. The California Energy Commission estimates these standards and policies have saved residents and businesses $56 billion through 2003 and will save another $23 billion by 2013.[4] Today California's per capita greenhouse gas emissions are among the nation's lowest, while the state's per capita gross domestic product is among the highest. We pay a lot for electricity, so we have learned to use it very efficiently.

Portland, Oregon also made a commitment to protecting the environment and reaped economic benefits. In 1980 Portland drew an urban growth boundary around the city and began investing in mass transit. Since 1996 vehicle miles traveled per capita fell 10%, with the aid of compact development and easier access to shopping and work. Today, the 2 million people living in Portland drive 8 million fewer miles per day. At an estimated 40 cents a mile, that's $1.1 billion a year that did not leave the region and go into the pockets of the oil companies.[5] When asked what they did with the money they saved, many Portlanders reported spending more time in coffee shops, eating out, and enjoying local entertainment. The savings, a green dividend from protecting the environment, stayed in the community.

Most of the benefits of Climate Prosperity fall into three groups: green opportunity, green talent, and green savings.

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[4] Susan Brown, *Global Climate Change*. In support of the 2005 Integrated Energy Policy Report. Staff paper, California Energy Commission, 2005.

[5] J. Cortright, *Portland's Green Dividend*, a white paper from CEOs for Cities, 2007.

GREEN OPPORTUNITY

Climate change is creating new opportunities for innovation and entrepreneurs. Our various individual and collective efforts to reduce greenhouse gas (GHG) emissions create demand for new technologies, products, and services that generate energy from renewable sources, use less energy, conserve fossil fuels, and make more efficient use of the resources we consume. With 51% of the Bay Area's GHG emissions coming from transportation, there is a special need for better car batteries, biofuels, and a network of charging stations for all-electric vehicles. There is also demand for services that evaluate the efficiency of buildings and equipment, retrofit buildings with energy-conserving technologies, and conserve water usage. Research centers are winning grants to find solutions, businesses are springing up to solve problems today, and schools and training programs are recruiting students for classes in the environmental fields.

The new Obama administration is expected to direct portions of the economic stimulus plan to the energy infrastructure, creating more opportunities for Silicon Valley's clean technology companies.

Climate change is also giving us the opportunity to improve the environment. As we convert our vehicles to low carbon fuels, the air will become cleaner and healthier. As we link housing, work, and public transit, people will walk and bicycle more, addressing the epidemics of obesity and diabetes we now face. We have the opportunity to reduce solid waste through better packaging and making products easier to recycle. We can clean up our rivers and streams, and plant trees to soak up CO_2 from the atmosphere.

GREEN TALENT

Climate change is creating jobs at all levels. Many of these are in established occupations like electricians and facilities maintenance engineers, who would need to update their skills and take additional training. Demand is already strong for architects, engineers, and builders that know how to use environmentally sustainable building materials, construct living roofs, and incorporate renewable energy technology. Our electrical grid needs updating, the utilities want to install "smart" meters everywhere, and there is almost unlimited work ahead to retrofit existing buildings to be more energy efficient.

These are good jobs. SolarTech, the local association of solar companies, expects that 10,000 to 20,000 new jobs will generated by the solar industry in Silicon Valley over the next decade. Up to 60% of those jobs will be in manufacturing and for installers, technicians, assemblers or solar system designers.[6] A 2008 study[7] by the Bay Area

[6] *Creating a Solar Center of Excellence*, white paper, Solar Tech, June 2007. www.solartech.org

[7] *Environmental Scan: Solar Industry, San Francisco Bay and Greater Silicon Valley Regions*, April 2008. www.coeccc.net

centers of excellence with the California community colleges found that Bay Area solar employers are having trouble finding qualified workers for many of these positions. For most occupations, employers prefer applicants with a two-year associate degree in an area specific to the solar industry rather than a more general four-year bachelor's degree. With the development of appropriate training programs we can create opportunities for people who were not able to participate in the Internet-driven dot com boom.

The great majority of these clean and green jobs are "jobs of place," i.e., jobs that cannot be done by low-cost operations in other parts of the world. They are jobs that support the local workforce, attract new wealth into the community, and recycle more money within the community.

Protecting the climate attracts "green talent." Today's young, talented workers want to settle in sustainable communities. They want to walk or bicycle to work, breathe clean air, and enjoy parks and outdoor recreational facilities.

For the first time since the Industrial Revolution began three centuries ago, economic growth is no longer the enemy of environmental protection. Increasingly, a good environment is essential for a good economy.[9]

—**Marc Weiss**, Global Urban Development

GREEN SAVINGS

As the Portland Green Dividend study shows, reducing energy consumption saves money; instead of leaving the community, those savings are reinvested in local restaurants, cafes, and stores. Silicon Valley has the opportunity to go well beyond the Portland example. We can help people of all income levels lower their electricity bills by insulating their homes, fixing leaks, and even generating their own power with photovoltaic panels and solar heaters on the roof. More fuel efficient cars, more convenient public transit, and more bicycle-friendly commute routes means less money spent on gasoline. Energy savings at businesses go straight to the bottom line, providing more capital for growth and innovation.

Green savings make us more competitive. The California Green Innovation Index sponsored by Next 10 found that California is one of the five most energy efficient economies in the world.[8] Our energy efficiency standards and utility policies have saved us $56 billion since the 1970s, and eliminated the need to build 24 new power plants. California uses less energy per capita today than in 1975. That efficiency allows us to compete against economies with low labor costs despite our high standard of living. Investing in renewables and converting to a low-carbon economy will further drive down the costs of our products and strengthen our competitive position.

[8] *Green Innovation Index*, Next 10, 2008.

[9] Marc Weiss, *Climate Prosperity Project Whitepaper*, 2008. www.globalurban.org/projects.htm

THE NATIONAL CLIMATE PROSPERITY PROJECT

Over the six months following the meeting in New York in November 2007, the national Climate Prosperity team developed a two-part strategy:

1. **Develop a Climate Prosperity guidebook for policy makers and economic development managers.**
2. **Launch a set of pilot projects around the country.**

The guidebook will be released in the first half of 2009. The seven pilot regions are:

Silicon Valley/San José	Southwest Florida
State of Delaware	King County/Seattle
Metropolitan Denver	Montgomery County, Maryland
Metropolitan St. Louis	

Because of its strong economy, high-tech orientation, innovation in clean technology, community support, and strength of leadership, hopes are high for Silicon Valley to become the first region in the world to achieve full Climate Prosperity.

For additional information on the national project visit www.climateprosperity.com.

THE OPPORTUNITY: SILICON VALLEY AS A LEADER IN CREATING A GREEN ECONOMY

Silicon Valley is perfectly positioned to lead the world in developing the green economy. Located in California, we benefit from a long tradition of public policy support for the environment. We have a history that paves the way for innovation in the technologies the world needs. And we have leadership.

CALIFORNIA SETS THE STAGE

The governor, legislature, and people of California have created a system of goals, regulations, incentives, and enforcement mechanisms that support Climate Prosperity. These are the major milestones so far:[11]

1978	Title 24	Sets energy efficiency standards for buildings and appliances.
1978	CPUC Policy	Decoupled investor owned utility sales and revenues for natural gas and for electricity in 1982.
2001	SB 1771 SB 527	Created California Climate Action Registry to track and report GHG emissions.
2002	AB 1493	Limits greenhouse gas emissions from new cars sold in the state.
2002	SB 1078 SB 107	Requires electric corporations to increase procurement from eligible renewable energy resources (the Renewable Portfolio Standard) by at least 1% of their retail sales annually, until they reach 20% by 2010.
2006	Executive Order S-3-05	Sets goal of reducing GHG emissions to 1990 levels by 2020 and 80% below 1990 levels by 2050.
2006	AB 32 Global Warming Solutions Act	Codifies goal of reducing GHG levels to 1990 levels by 2020; gives responsibility for the implementation of the plan to the California Air Resources Board.
2006	SB 1368	Sets limits on GHG in electricity produced outside of the state.
2006	SB 1 Million Solar Roofs	Sets goal of installing photovoltaic systems on 1 million roofs in California by 2017. Provides rebates.
2008	AB 32 Scoping Plan	Outlines how the state will reach the 2020 emissions target.
2008	SB 375	Requires Metropolitan Planning Organizations to develop "sustainable communities strategies" with reductions in vehicle emissions consistent with the goals of AB 32. Provides some relief from requirements in the California Environmental Quality Act (CEQA).
2008	SB 732	Establishes Strategic Growth Council. The Council will award grants and loans to aid the development of sustainable community strategies.

[11] Ellen Hanak, Louise Bedsworth, Sarah Swanbeck, and Joanna Malaczynski, *Climate Policy at the Local Level: A Survey of California's Cities and Counties,* Public Policy Institute of California, November 2008. California Public Utilities Commission.

Of these many policy actions, the most sweeping and historic by far is Assembly Bill 32, The Global Warming Solutions Act of 2006, which commits California to reducing GHGs to 1990 levels by the year 2020. It was followed in 2008 by the AB 32 Scoping Plan, which sets the specific goal of reducing GHG emissions by 169 million tons per year by 2020. This goal represents a reduction of 30% from the expected emissions in 2020, assuming California's economy and population grow at a moderate rate. The California Air Resources Board (CARB) targets the following sectors for the majority of the reductions (in millions of metric tons of CO_2 equivalent, or CO_2e, gases[12] per year):

Light-Duty Vehicles	31.7 MMT CO_2e/yr.
Energy Efficiency, Combined Heat and Power, Solar Water Heating	26.3
Green Buildings	26.0
Renewables Portfolio Standard	21.3
High Global Warming Potential Gases (e.g., Methane)	20.5
Low-Carbon Fuel Standard	15.0
Recycling and Waste	9.0
Sustainable Forests	5.0
Water	4.8

CARB recommends that California create a cap and trade program for GHG emissions in partnership with other western states and provinces in Canada.

In addition, California's attorney general has begun filing comments on climate protection issues in general plan updates from cities and counties. The attorney general filed and settled lawsuits on failures to include climate-related elements in general plans submitted by San Bernardino County and the City of Stockton.

ACCELERATING A "THIRD REVOLUTION" IN SILICON VALLEY

Silicon Valley has a history of innovation, starting with early electronics, radio, and aviation. After World War II, our region was a pioneer in information technology built on the strength of our semiconductor, computer, software, and networking industries as well as the intellectual power of our universities. In the 1970s, our region helped launch a second parallel revolution that combined our research strength in biology with venture capital to create a world-class biotechnology cluster. Today, we are on the verge of creating a third technology revolution in clean energy to meet our current economic, environmental and energy challenges.

The volatility in energy prices and recognition of the need to reduce greenhouse gas emissions have combined to create an opportunity to grow clean energy based on our strengths in information and biotechnology in such areas as solar, wind, batteries,

[12] CO_2e combines all greenhouse gases using conversion factors to adjust for the impact of each gas on global warming as compared to carbon dioxide (CO_2). Methane, for example, has 25 times the impact of CO_2 over 100 years.

Looking back from 2028

In the early years of the Energy-Climate era, we progressed to…an Energy Internet in which every device—from light switches to air conditioners to basement boilers to car batteries and power lines and power stations—incorporated microchips that could inform your utility of the energy level at which it is operating, take instructions from you or your utility as to when it would operate and at what power level, and tell your utility when it wanted to purchase or sell electricity… So there is now a direct correlation between how smart your grid is, how much energy efficiency it can generate and how much renewable power it can use.[13]

—**Thomas Friedman,** *Hot, Flat, and Crowded*

high-power electronics, and biofuels. These clean technologies are now being applied to existing industries, including green buildings, transportation, and electric power generation, as well as manufacturing.

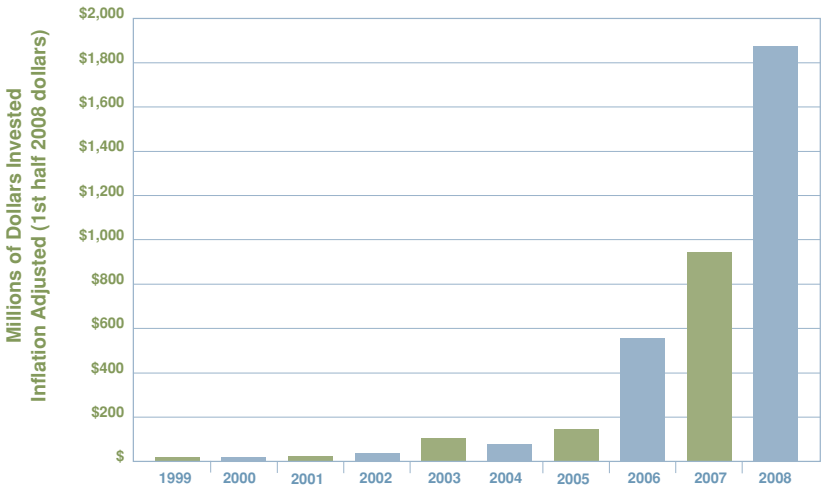
SILICON VALLEY IS AN EMERGING CENTER FOR INNOVATION IN ENERGY TECHNOLOGIES

Silicon Valley is now at the epicenter of this green revolution based on renewable energy technologies. Totaling nearly $1.9 billion in 2008, venture capital investment in clean technology in Silicon Valley increased 94% over 2007. The region accounts for 31% of all clean tech investment in the United States and 55% in California. In 2007, our region accounted for 20% of California patents in green technologies, and since 2005, 9% of all U.S. patents in solar technology were registered here. Between 2005 and 2007, green jobs in Silicon Valley grew 23% compared to 15% in California (see Appendix III).

Several exciting new venture-backed firms have been created in Silicon Valley, including Nanosolar and Miasolé, which are developing thin film solar; Bloom Energy, which is developing fuel cells to allow homes to generate their own electricity; Tesla Motors, which is developing an electric car that will be manufactured in this region; and Better Place and Coulomb, two companies that are building the infrastructure required for the widespread use of electric cars (for a complete list for 2008, see Appendix I).

Some of our long-established firms—such as Cypress Semiconductor, which invested in SunPower Corporation, and Applied Materials—are moving rapidly into growing global solar markets. Leading information technology firms such as Google and

Venture Capital Investment in Clean Technology



Includes data for San Mateo and Santa Clara Counties, and cities of Fremont, Union City, and Scotts Valley
Data Source: Cleantech Group™, LLC (www.cleantech.com)
Analysis: Collaborative Economics

[13] Thomas Friedman. *Hot, Flat, and Crowded: Why We Need a Green Revolution—and How It Can Renew America,* Farrar, Straus & Giroux, 2008, page 225

We need urgently to find alternatives to fossil fuels, invest in a smart electricity grid and make our cars, our homes and our offices more efficient. Rising unemployment should also force us to look to the environmental sector, where it is estimated that an extra 2–3 million well-paid, high-tech jobs could be created by 2030. These green jobs have the potential to create tremendous economic opportunities.[14]

—**Eric Schmidt,**
Chief Executive Officer, Google

Cisco are exploring ways to support clean energy markets and promote energy efficiency, including assisting with the development of a smart grid. Pacific Gas & Electric Company has become a leader in renewable energy and is promoting the adoption of smart metering and plug-in vehicles.

In addition, Silicon Valley is home to five of the six winners of the 2008 California Clean Tech Open Awards—a competition that provides $100,000 to innovative clean tech entrepreneurs and early-stage companies to help them successfully go to market.

- *Energy Efficiency Award:* **Viridis Earth** (San José), which develops environmentally effective technologies to reduce the energy consumption of air conditioners
- *Green Building Award*: **BottleStone** (Los Altos), which manufactures green surface material made of 80% post-consumer recycled glass
- *Renewables Award:* **Focal Point Energy** (Mountain View), which makes solar hot water and steam generators for industrial applications
- *Smart Power Award:* **Power Assure** (Santa Clara), which makes on-demand energy efficiency management software for data centers
- *Transportation Award:* **ElectraDrive** (San José), which adds electrical power to multiple types of internal combustion engine vehicles

OUR CURRENT REGIONAL ACTIVITIES: ELEMENTS OF A "GREEN INNOVATION HABITAT"

Silicon Valley's long history of success at turning ideas into products stems from our innovation "habitat." Documented in "The Silicon Valley Edge,"[15] the habitat includes supportive public policies, the venture capital community, research centers, training programs, and a talented workforce. We now need to review our resources and infrastructure, and develop a plan to create a "Green Innovation Habitat" for the region.

Much of the work is already underway:

Cities and counties of Silicon Valley are supporting residents and businesses in energy efficiency improvements and innovative waste reduction programs. Some cities have set ambitious targets for renewable energy generation and public procurement of alternative fuel vehicles. In addition, various cities and counties in Silicon Valley are improving water conservation by delivering recycled water to city parks, landscapes, and major businesses. Some cities have also funded the creation of business incubators to help entrepreneurs launch with a strong foundation.

Note San José's Green Vision and Goals on page 20.

[14] Eric Schmidt. "America will find opportunity in scarcity." Comment in *Financial Times* (November 2, 2008). www.ft.com/cms/s/0/8bd131d0-a8f5-11dd-a19a-000077b07658.html

The Silicon Valley Leadership Group is leading numerous transportation and energy initiatives, and facilitating the Bay Area Climate Change Collaborative. Formed by the mayors of San José, San Francisco, and Oakland in partnership with regional agencies and business groups, the collaborative is identifying specific greenhouse gas emissions targets and timelines in 10 action areas, including building standards, transportation, and renewable energy.

Business associations in the region, such as SolarTech, are at the forefront of helping businesses improve their energy productivity as well as bringing industry leaders together to resolve technical and political barriers to wide-spread adoption of clean technology. Activities aim to help businesses "retrofit" and "retro-commission" their buildings and production plants to be more energy efficient. These groups also create energy strategy plans, advocate sustainable transportation models, and contribute to the development of green building standards. In addition, some organizations create friendly commuter competitions between public and private employees to reduce the number of solo drivers.

Community organizations like Sustainable Silicon Valley and the Sierra Club's Cool Cities are bringing a wide range of stakeholders together to engage collaboratively on the development of carbon reduction policies and the implementation of effective solutions such as building retrofit programs, installing low-energy lighting, purchasing hybrid and plug-in vehicles and installing solar energy on public buildings and parking lots.

Universities and research centers in and near Silicon Valley are producing informative research on the environmental and economic impacts of climate change. They are also developing partnerships in the development and promotion of energy efficient technologies, systems, and practices with an emphasis on economical deployment.

Energy utilities serving the Valley are making rapid strides toward the use of power from renewable sources and energy efficiency. Silicon Valley Power (City of Santa Clara) and City of Palo Alto Utilities have already made 100% green power available to customers while Pacific Gas & Electric Company offers a carbon-offset tariff and is in the process of developing a 100% green power tariff. They also provide educational programs and incentives to encourage energy efficiency in businesses and homes.

A table providing a detailed overview of climate protection activities currently underway in Silicon Valley appears in Appendix II.

[15] Chong-Moon Lee, Marguerite Gong Hancock, William F. Miller, and Henry S. Rowen, editors, *The Silicon Valley Edge: A Habitat for Innovation and Entrepreneurship,* Stanford Business Books, 2000.

San José's Green Vision and Goals

San José's Green Vision is a comprehensive strategy that will show the world how environmental responsibility makes financial sense and stimulates economic opportunity. We will lead the nation in becoming more energy efficient, producing and using electricity from clean renewable sources, creating green buildings, diverting waste from landfills, creating greener street systems, delivering recycled water, and reducing greenhouse gas emissions.

This vision includes 10 bold goals that will serve as a roadmap to reduce the carbon footprint of the tenth largest city in the nation by more than half. Within 15 years, the City of San José in tandem with its residents and businesses will:

1. Create 25,000 clean tech jobs as the world center of clean tech innovation.
2. Reduce per capita energy use by 50 percent.
3. Receive 100 percent of our electrical power from clean renewable sources.
4. Build or retrofit 50 million square feet of green buildings.
5. Divert 100 percent of the waste from our landfill and convert waste to energy.
6. Recycle or beneficially reuse 100 percent of our wastewater (100 million gallons per day).
7. Adopt a General Plan with measurable standards for sustainable development.
8. Ensure that 100 percent of public fleet vehicles run on alternative fuels.
9. Plant 100,000 new trees and replace 100 percent of our street lights with smart, zero emission lighting.
10. Create 100 miles of interconnected trails.

Successfully realizing this vision will require a focused direction for action and a means of regularly measuring progress. By pushing the limits of what is possible, we will all achieve our vision and inspire change globally.

Source: San José's Green Vision, 2008, www.sanjoseca.gov

BARRIERS TO CLIMATE PROSPERITY IN THE VALLEY

The Valley has many assets, but there is still a lot of work to do. Interviews with business, government, and community leaders have identified a number of barriers to creating full Climate Prosperity.

Land use. As Silicon Valley grew and evolved, our housing spread out, far from our work centers and public transit arteries, leading most of us to drive to work alone. Today there is very little open land available for development, so we have few opportunities to build energy-efficient buildings around transit points. Finding enough space for a large-scale manufacturing plant is almost impossible without collaboration and creativity.

Transportation. Our public transit system serves only a small percentage of the population. Caltrain gets a lot of use, but our bus and light rail systems are under utilized. BART is coming, but it is years away and will only serve one side of the Valley. A number of cities have built bicycle lanes that are very popular, but we have barely scratched the surface of the potential. All-electric and plug-in hybrid vehicles are coming on the market, but finding a parking place with a charging station is a challenge. The infrastructure needed to support hydrogen-fueled vehicles is still a dream.

Financing. Many renewable and energy efficiency projects require an up-front investment in new equipment. We need to make it easier to find affordable financing. The City of Berkeley has pioneered an innovative approach that is based on creating tax assessment districts. Our jurisdictions need to evaluate the program and roll it out here.

Public policy. Technology has raced ahead of public policy. Installing a photovoltaic system is challenging; the rules, regulations, and fees vary considerably from one jurisdiction to the next. The California Public Utilities Commission is under pressure to revamp the regulatory system to allow for a distributed power generation system where homeowners and businesses can deliver surplus power onto the grid and be appropriately compensated.

Market confusion. Consumers and businesses are struggling to find, evaluate, and choose products and services that preserve the environment and climate. There is conflicting information in the media, product packaging is uninformative, and there is a lack of facilities for objectively testing and certifying new products.

Buildings. Silicon Valley is largely built-out. Our opportunities for reducing energy waste in buildings lie in retrofits, rather than new structures built using the latest research and materials. Older plants and facilities lack today's automated energy management systems. Most of our commercial structures and apartment buildings are owned by landlords who can pass on increases in the price of utilities, but not the cost of installing solar panels, a new air conditioning system, or adding chargers for electric cars in the garage. We waste a lot of water through building designs that were based on cheap water and a lack of maintenance of irrigation systems.

Utilities. The electrical grid was designed to carry power for long distances from power plants to homes. Today we need a "smart grid" that is able to purchase power from hundreds of thousands of small generators that may be subject to a drop in output from a cloud passing over a photovoltaic panel, or a jump from a burst of wind hitting a wind turbine. The grid also needs to provide customers with more information on pricing and rapid feedback on conservation programs.

In determining the right mix of strategic actions, Silicon Valley must understand its competitive position in the green economy. Silicon Valley clearly has a head start on many regions, but we remain a high-cost location in a high-cost state. Green technology firms have told local officials that they would like to remain in Silicon Valley for manufacturing and other operations, but are concerned about the region's cost competitiveness.

Silicon Valley's formula may be found in a combination of value-adding and cost-reducing actions that are tailored to the needs of specific sectors of the green economy. We need to connect our public agencies, clean and green companies, construction companies, schools, research centers, and utilities more closely to solve these challenges and achieve Climate Prosperity.

The challenge to the Valley today is to link and leverage our assets to accelerate Silicon Valley's transformation—to usher in the region's third revolution.

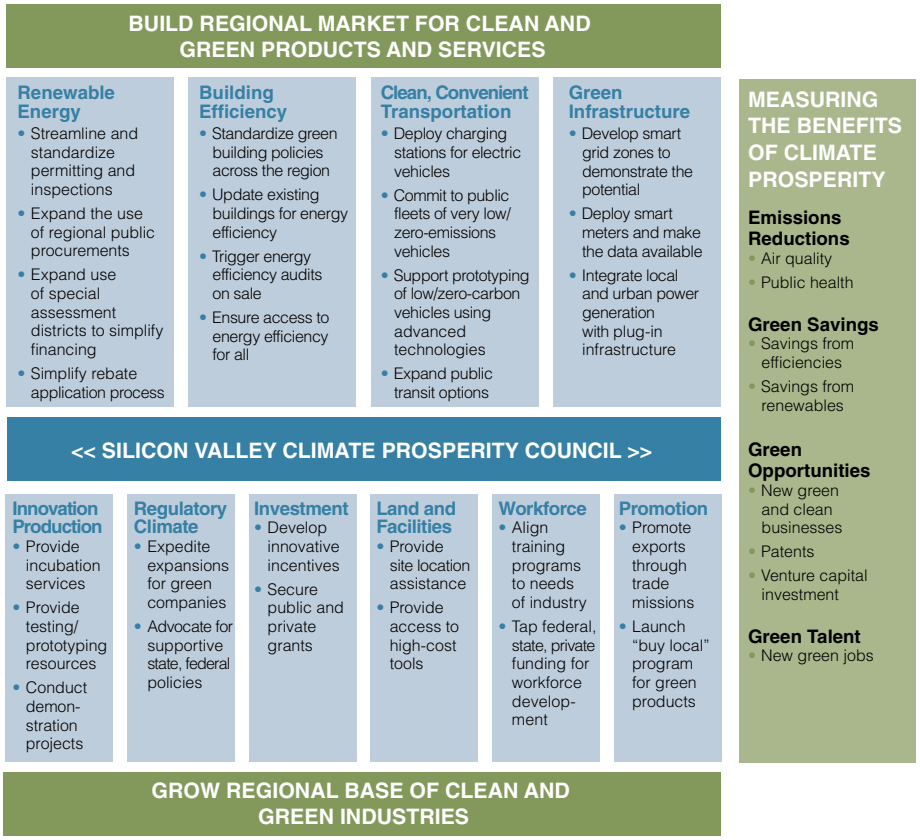
SILICON VALLEY'S CLIMATE PROSPERITY STRATEGY: ACTION INITIATIVES AND ENABLING INFRASTRUCTURE

While many regions are looking at ways to reduce greenhouse gas emissions, Silicon Valley is in a position to both reduce emissions and grow new industries. In this new era, "Climate Prosperity" is an approach that "fits" how our region works. Silicon Valley can generate substantial economic and employment growth by demonstrating that innovation, efficiency, and conservation in the use of all resources is the best way to increase jobs, income, productivity, and competitiveness.

STRATEGIC FRAMEWORK FOR ACTION

The strategy has two elements:

- Broaden the Valley's innovation infrastructure to make Silicon Valley the world's center for clean and green innovation



- Build a regional market for clean and green products and services through a series of action initiatives that bring together all of the elements of the habitat on a regional scale

A new leadership body, the Silicon Valley Climate Prosperity Council, will identify opportunities for action and provide coordination. Facilitated and supported by Joint Venture, the Council will also track and report on the action initiatives using measures of climate protection and economic development.

GROW THE REGIONAL BASE OF CLEAN AND GREEN INDUSTRIES

The following elements of the framework are the "soft infrastructure" needed for economic growth. Most of the elements are provided by public agencies and educational institutions, sometimes in partnership with community-based organizations that provide special expertise, leadership, and outreach.

Investment. With any new technology, financing is vital not only for R&D but for the commercialization process and the widespread adoption of the new technology. Several cities are now testing a financing model that creates tax assessment districts to simplify the purchase of photovoltaic systems and more energy-efficient equipment.

Land and Facilities. Much can be done on a regional level to encourage the agglomeration of clean technology companies. A number of cities are helping small and midsize businesses find good locations, and a few have supported the formation of business incubators to help new clean and green businesses succeed.

Promotion. In order to further bolster the region's role as a clean technology capital, Silicon Valley and its companies can be promoted internationally. Our cities and chambers of commerce have launched green business certification programs and "buy local" programs for green products and services. Farmers markets, which help reduce greenhouse gas emissions from imported foods, are growing in popularity.

Innovation, Production. A key requirement for establishing Silicon Valley as the clean technology capital is being the source of cutting-edge research and development. Clean technology companies need access to the universities, national labs, and research centers in the Valley, plus funding to help with converting unproven technologies into robust, marketable products. Local testing centers, such as the new Underwriters Laboratory in San José, speed time to market. Demonstration centers and prototyping facilities with the latest equipment help startups conserve capital.

Workforce. Demand is growing for skilled workers across an array of occupations in industries providing products and services that reduce pollution or improve resource efficiency. Labor unions are partnering with community colleges and training centers to build a talented workforce that is productive and able to earn the kind of wages needed to live in a high-cost region.

Regulatory Climate. Public policy can play an effective role in streamlining the widespread adoption of new technology through project permitting, inspection processes, and expediting. Public procurements can emphasize the importance of solutions that emphasize the use of sustainable and renewable components. Efforts can also be taken to encourage the attractiveness of the region to clean technology companies.

BUILD A REGIONAL MARKET FOR CLEAN AND GREEN PRODUCTS AND SERVICES

Through action initiatives we can leverage our innovation habitat to stimulate the growth of our clean and green technology companies, and convert to a sustainable, low-carbon, energy infrastructure. The following four areas of opportunity have come together as a result of numerous meetings with regional leaders in green public policy and experts in the fields of renewable energy, green building, transportation alternatives, and energy infrastructure.

The Climate Prosperity Council will review these areas of opportunity and develop action initiatives in each segment.

1. Renewable Energy

We have an array of solar technologies, manufacturers, and installers. There is work to be done on permitting, workforce development, financing, and tariffs. Home owners and commercial building owners need help understanding how to buy and take advantage of photovoltaics and solar heating. Incentive and rebate programs need to be simplified and streamlined.

Utility-scale photovoltaic and hybrid systems are starting to come online. Our local government agencies need to look at available land and explore new partnerships with generators.

Wind today is limited to enormous towers isolated from communities. We need to explore smaller-scale systems that may make sense in urban environments without compromising the aesthetics we need to attract and retain a talented workforce.

2. Building Efficiency

Thanks to earlier efforts, the patchwork of green building codes and ordinances is growing more consistent. But many of the requirements are deliberately loose and not enforced. We need to move quickly to tighten the rules and to train engineers, construction workers, and building inspectors on new, environmentally sustainable, energy-efficient materials and equipment.

Home and business owners would welcome energy audits if they were free or cheap. The audits need to be accompanied by easy-to-use analysis of solutions, and information on rebates and subsidies. Those rebate programs need to be as simple as possible.

Buildings use water, an increasingly scarce resource in California and a generator of greenhouse gas emissions when pumped up hill or heated. Rooftop solar water heaters, so common in countries where energy is expensive, have yet to appear in the Valley except to heat some of our swimming pools. The technology exists to create water budgets for landscaping, and to connect the system to the Internet to minimize overwatering.

3. Clean, Convenient Transportation

Could Silicon Valley become the clean car capital of the world? The competition will be intense, but we already have Tesla Motors, a number of electric vehicle distributors, two companies building infrastructure for recharging electric vehicles, and exceptional research and talent in batteries and energy management. We even have a prototype electric school bus in the works at the Electric Transportation Development Center in San José.

Much can be done to transform travel by expanding public transit options, improving travel efficiency, and thoughtful land-use development. With public support, rail-based transit could grow in importance and accessibility. Over the next ten years, Diridon Station in San José could be transformed into the most sophisticated rail hub in the West, a junction for High-Speed Rail, BART, Amtrak, CalTrain and light rail. Employers can play a role in encouraging cleaner commute choices by paying for public transit passes.

Public agencies could further encourage the use of public transit by reducing ratios for parking spaces at stores and offices, and modifying general plans to allow people to work closer to where they live.

Bicycling and even walking can be encouraged through the construction of more bicycle lanes and storage facilities, and walkways that are safe and pleasant for school children.

4. Green Infrastructure

Utilities around the world are developing the concept of the "smart grid"—a combination of transmission lines and information network that allows for both the seamless integration of distributed and renewable sources of electricity, and customer participation in managing energy use. There should be a pilot installation in Silicon Valley that draws on our information technology companies and research centers at Stanford, SRI and EPRI, to name just three possibilities.

To make good decisions about energy efficiency, consumers and business people need more information about prices and usage. Our utilities are starting to deploy "smart meters" to meet that need. With all our measurement and information technology companies, Silicon Valley should be a priority region for deployment.

Construction of the smart grid and installation of smart meters is going to require a trained workforce. With the support of our unions, Silicon Valley could become the western regional center for training of construction workers.

MEASURING OUTCOMES AND BENEFITS

Success needs to be measured on the basis of both benefits to the environment and growth in the economy. The following four categories of outcome measures provide a framework for discussion by the Climate Prosperity Council. Joint Venture's *Index of Silicon Valley* already reports on some of these areas. The Council may decide to issue a separate report to go into additional detail.

Emissions reductions: Using tools from ICLEI—Local Governments for Sustainability (an international organization that helps local governments inventory GHG emissions) and data from the Bay Area Air Quality Management District, we will track greenhouse gas emissions by source, including electricity, natural gas, transportation, and renewables.

Energy savings: Using less energy means spending less money. We will report these savings and estimate the impact on the local economy.

Green opportunity: Climate change presents new business opportunities as residents, businesses, and governments must make adjustments in the kinds of products they purchase and the energy and natural resources they consume. Growing business opportunity can be tracked by business growth and venture capital investment in specific green business activities. Further, tracking patent registrations in clean technology provides an indication of future business opportunities.

Green talent: The growth in jobs and training programs related to green business activities is a direct indicator for the transformation of the green economy and for Climate Prosperity.

NEXT STEPS: CREATING THE CLIMATE PROSPERITY COUNCIL

Joint Venture consulted with numerous business, government, academic, labor, and community leaders to prepare this *Greenprint*. We're gratified that the response was enthusiastic, and that Silicon Valley's leaders are willing and eager to implement the plan.

The first step will be to form the Silicon Valley Climate Prosperity Council. The Council will have representation from all of the key sectors that have a stake in protecting the environment and growing the economy. To launch the Council, Joint Venture co-chairs Chuck Reed, Mayor of the City of San José, and Chris DiGiorgio, California Managing Director for Accenture, have agreed to chair the first meeting. Joint Venture will facilitate the meeting and provide ongoing support for the Council.

The Council will determine the range of its charter and expectations of members. Once established, the Council will have four major responsibilities:

- Coordinating and maximizing the impact of our current activities
- Generating new ideas
- Launching new initiatives, and linking them to supportive public policies, research programs, incubators, workforce programs, and other resources
- Reporting outcomes and tracking progress, using quantifiable measures such as the reduction in GHGs, energy savings, jobs created, and economic growth

Initially, we anticipate that the action initiatives will fall into the following four categories:

- Renewable energy
- Building efficiency
- Clean and convenient transportation
- Green infrastructure

Over time the council may decide to expand the program to include other programs such as the management of scarce water resources.

Joint Venture will help the council obtain the funding and expertise it needs to evaluate options, lead projects, and report outcomes to the community.

THE JOURNEY TO CLIMATE PROSPERITY BEGINS HERE AND NOW

The challenge we face is considerable, but Silicon Valley has the leadership and resources to protect the environment and grow the economy at the same time. Our habitat for innovation gives our region a unique advantage in the highly competitive world market. Our collaborative, entrepreneurial culture turns public agencies and organizations into partners with clean tech innovators in companies large and small. Our training programs, schools and universities can tailor their programs to meet the workforce and technology needs of their companies. Our community-based organizations spread the word, reach out, and support the effort.

There is much to be done. Policies need to change. Land use plans need to account for the implications of global warming. We must keep working on meaningful transportation alternatives. Tens of thousands of buildings need upgrading. And, we are going to need some major technological breakthroughs.

It's conceivable that without this Greenprint, and without a coordinated effort, some of these things might happen anyway. At best, however, they would happen in piecemeal fashion, over a much longer period of time. *This we cannot allow.* Our time is too short. Great regions plan for success, order their priorities, solve problems, and track their progress every step of the way. When the matter is urgent, great regions do these things even faster and more effectively.

Matters have never been more urgent than they are today.

Silicon Valley can do this. Silicon Valley ***will*** do this. If not here, where?

We urge you to join us.

APPENDIX I

VENTURE CAPITAL INVESTMENT IN SILICON VALLEY CLEAN TECHNOLOGY COMPANIES, 2008

Company	City	Industry	Detailed Industry	2008 Deal Amount (Million Dollars)
Nanosolar, Inc.	San José	Energy Generation	Thin Film Solar	$350
Solyndra, Inc.	Fremont	Energy Generation	Thin Film Solar	$338
SoloPower, Inc.	San José	Energy Generation	Thin Film Solar	$200
CaliSolar	Menlo Park	Energy Generation	Solar Cells & Modules	$102
Sapphire Energy, Inc.	Redwood City	Energy Generation	Algae Biodiesel	$100
Silver Spring Networks, Inc.	Redwood City	Energy Infrastructure	Smart Grid	$92
Tesla Motors, Inc.	San Carlos	Transportation	Electric & Hybrids	$80
Ausra, Inc.	Palo Alto	Energy Generation	Concentrated Solar Thermal	$61
Plastic Logic Inc	Mountain View	Materials	Nano	$50
Solazyme, Inc.	S. San Francisco	Energy Generation	Algae Biodiesel	$45
Trilliant Inc.	Redwood City	Energy Infrastructure	Smart Grid	$40
Miasolé, Inc.	Santa Clara	Energy Generation	Thin Film Solar	$35
NanoGram Corp.	San José	Materials	Nano	$32
SolarCity Corporation	Foster City	Energy Generation	Solar Systems	$30
BridgeLux, Inc. (FKA eLite Optoelectronics)	Sunnyvale	Energy Efficiency	Solid State Lighting	$30
Cobalt Biofuels, Inc.	Mountain View	Energy Generation	Cellulosic Ethanol	$25
SiliconBlue	Sunnyvale	Energy Efficiency	Appliances	$24
Luxim Corp.	Sunnyvale	Energy Efficiency	Solid State Lighting	$21
Fat Spaniel Technologies, Inc.	San José	Energy Infrastructure	Power Monitoring & Metering	$18
Solexant Corp.	San José	Energy Generation	Thin Film Solar	$18
Glacier Bay, Inc.	Union City	Energy Efficiency	Efficient Motors	$18
GreenRoad Technologies	Redwood City	Transportation	Transportation Efficiencies	$18
ZeroG Wireless	Sunnyvale	Energy Efficiency	Appliances	$17
APX, Inc.	Santa Clara	Air & Environment	Carbon/Emissions Trading & Offsets	$14
Azuro, Inc.	Santa Clara	Energy Efficiency	Appliances	$14
eMeter Corp.	Redwood City	Energy Infrastructure	Smart Grid	$13
iWatt Inc.	Los Gatos	Energy Infrastructure	Power Quality & Testing	$12
Helix Micro	Milpitas	Energy Storage	Advanced Batteries (Charging & Management)	$12
Imara Corp (FKA Lion Cells, Inc.)	Menlo Park	Energy Storage	Advanced Batteries (Lithium-Ion)	$12
Quantance	San Mateo	Energy Efficiency	Appliances	$12
Tigo Energy, Inc.	Los Gatos	Energy Generation	Solar Systems	$6
Zero Motorcycles, Inc.	Scotts Valley	Transportation	Bicycles & Scooters	$6

Data Source: Cleantech Group™, LLC (www.cleantech.com)

VENTURE CAPITAL INVESTMENT IN SILICON VALLEY CLEAN TECHNOLOGY COMPANIES, 2008 *(continued)*

Company	City	Industry	Detailed Industry	2008 Deal Amount (Million Dollars)
InnovaLight, Inc.	Santa Clara	Energy Generation	Thin Film Solar	$5
EoPlex Technologies, Inc.	Redwood City	Materials	Ceramics	$4
Potter Drilling	Redwood City	Energy Generation	Geothermal (Hardware)	$4
PlantSense, Inc.	San José	Agriculture	Precision Agriculture	$4
Solar Junction	San José	Energy Generation	Advance Material for Solar	$3
LS9, Inc.	San Carlos	Energy Generation	Cellulosic Ethanol	$3
Planet Metrics	Burlingame	Air & Environment	Software/Systems (Monitoring/ Compliance)	$2
Advanced Power Projects, Inc.	Fremont	Energy Generation	Combined Heat/Power	*
Adura Systems, Inc.	Los Altos	Transportation	Electric & Hybrids	*
HID Labs, Inc.	Menlo Park	Energy Efficiency	Solid State Lighting	*
Unidym, Inc.	Menlo Park	Materials	Nano	*

*Investment values are undisclosed
Data Source: Cleantech Group™, LLC (www.cleantech.com)

APPENDIX II

INVENTORY OF CURRENT CLIMATE PROTECTION ACTIVITIES IN SILICON VALLEY

Activity Area	Title	Activities	Organization	Geography	Target Sectors
BUILT ENVIRONMENT	The Business Council on Climate Change (BC3)	A business member–driven organization committed to reducing greenhouse gas emissions.	Bay Area Council, the United Nation's Global Compact, and the San Francisco Department of the Environment for San Francisco Bay Area businesses	Counties of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma	Business
	Bay Area Climate Change Compact	Creating a standard for green building, adopting regional climate change plans, increasing public transit use, decreasing water and energy consumption, and expanding the available green workforce.	Mayors of San Francisco, San José, and Oakland; Silicon Valley Leadership Group, Association of Bay Area Governments, and others	Counties of Alameda, Contra Costa, San Francisco, San Mateo, Santa Clara	All Sectors
	Green Building Collaborative	Encouraging adoption of green building codes.	Santa Clara County Cities Association	Santa Clara County	Government
	Sustainable Buildings	Provide tools, training, and resources that the construction industry, the counties, and the cities need to successfully move toward sustainable buildings and development practices.	Joint Venture: Silicon Valley Network (JVSVN)	San Mateo and Santa Clara Counties and parts of Santa Cruz and Alameda Counties.	Government Construction Industry
BUILT ENVIRONMENT (WATER CONSERVATION)		Water reclamation, use of recycled water for irrigation systems and manufacturing.	Intel	Intel Campuses	Business
		Water management, policy actions, and conservation strategies to reduce flood risks, improve water supply reliability and quality.	Regional Economic Association Leaders (R.E.A.L.) Coalition	Sacramento–San Joaquin River Delta	All Sectors
	San José Water Recycling	Ensuring a sustainable water supply by delivering recycled water to major businesses, city parks and landscaping, and school grounds, reducing water imported from the delta.	City of San José	San José and surrounding communities	Community-wide
BUILT ENVIRONMENT, ENERGY EFFICIENCY, RENEWABLE ENERGY, TRANSPORTATION	Cool Cities	Encouraging sustainability and actions to reduce greenhouse gas emissions.	Sierra Club, Loma Prieta Chapter	Counties of San Benito, San Mateo, and Santa Clara	Government
	Clean and Green Energy Action Plan	A regional response to global change in transportation, building codes, data centers, and energy watch.	Silicon Valley Leadership Group (SVLG)	Counties of Santa Clara, San Mateo, Alameda, and part of Santa Cruz (Scotts Valley)	Business
		Inventorying GHG emissions. Upgrading lighting systems. Upgrading HVAC systems. Purchasing hybrid vehicles. Adopting green building codes. Encouraging single stream waste recycling. Installing PV and thermal solar.	Various Cities and Counties	Cities in Alameda, San Mateo, Santa Clara, and Santa Cruz Counties	Government

INVENTORY OF CURRENT CLIMATE PROTECTION ACTIVITIES IN SILICON VALLEY *(continued)*

Activity Area	Title	Activities	Organization	Geography	Target Sectors
ENERGY EFFICIENCY	Green Business Program	Verifying that businesses meet higher standards of environmental regulations and take actions to conserve resources, prevent pollution, and minimize waste.	Association of Bay Area Governments (ABAG)	Counties of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma	Government
	Reduce CO_2 Emissions	Encouraging pledges to reduce emissions. Organizing educational programs. Conducting measurement.	Sustainable Silicon Valley (SSV)	San Mateo and Santa Clara Counties and parts of Santa Cruz and Alameda Counties	All Sectors
	Climate Protection	Developing strategies for reducing greenhouse gas emissions from city, county, and other agencies' operations.	Joint Venture: Silicon Valley Network (JVSVN)	San Mateo and Santa Clara Counties and parts of Santa Cruz and Alameda Counties	Government
	Green Vision	Setting the Green Vision Goals for sustainability throughout the city; creating Climate Compact with San Francisco and Oakland, and funding Energy Watch.	City of San José	San José	Community-wide
	Climate Savers Computing Initiative	Promoting development, deployment, and adoption of smart technologies that improve efficiency of a computer's power delivery and reduce computer's energy consumption when it is in an inactive state.	Google Intel More than 100 members and affiliates	Global	Research
	Advancing Green Technology	Investing in and encouraging the adoption of plug-in vehicles and energy-efficient computers.	Google.org	Global	Research
	Green@Home	Using volunteers to teach residents ways to save energy. Focuses on education and awareness and home energy audits.	Acterra	Redwood City, Menlo Park, Palo Alto, and Sunnyvale	Consumer
	Precourt Institute for Energy Efficiency	Promoting energy efficient technologies, systems, and practices, emphasizing economically attractive deployment.	Stanford University	Global	Research
		Reducing energy use in data centers, videoconferencing, and providing environmental information to consumers through labels and a carbon footprint calculator.	Hewlett-Packard	Global	Consumer Business
	Energy Watch Partnership	Partnerships that assist municipalities, and in some cases businesses and residences, to become more energy efficient.	City of San José, San Mateo County Energy Watch and PG&E	San Mateo and Santa Clara Counties	All Sectors
	Utilities Sustainability Task Force (USTF)	Creating an energy strategy plan for the county.	City/County Association of Governments of San Mateo (C/CAG)	San Mateo County	Government

INVENTORY OF CURRENT CLIMATE PROTECTION ACTIVITIES IN SILICON VALLEY *(continued)*

Activity Area	Title	Activities	Organization	Geography	Target Sectors
ENERGY EFFICIENCY (WASTE REDUCTION)	Recycleworks	Waste management, recycling programs.	Public Works Department	San Mateo County	Residential Business
	Stopwaste.org	Waste management, recycling, GHG inventories for cities in Alameda County.	Alameda County Waste Management Authority and the Alameda County Source Reduction and Recycling Board	Alameda County	Residential Business
	Green Chemistry Initiative	Developing policies to reduce or eliminate the use and generation of hazardous substances.	CalEPA and Silicon Valley leadership Group (SVLG)	California	Business Government
	Integrated Energy Watch program	Providing technical assistance to member businesses for energy efficiency, demand response and solar.	Silicon Valley Leadership Froup (SVLG) partnering with PG&E	Santa Clara and San Mateo Counties	Business
ENVIRONMENTAL SUSTAINABILITY	NASA Ames Research Center	Climate change studies. Atmospheric modeling.	NASA	Global	Research Government
	Paleoclimate and Climate Change Research Group	Climate change studies, modeling.	University of California, Santa Cruz	Global	Research
	Climate Protection Program	Measuring and reporting emissions. Funding for projects that reduce emissions.	Bay Area Air Quality Management District (BAAQMD)	Counties of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara and Napa, southwestern Solano and southern Sonoma	All Sectors
	Woods Institute for the Environment	Developing solutions to environmental challenges facing the planet, with focus on energy and climate, land use and conservation, oceans and estuaries, and freshwater.	Stanford University	Global	Research
	Indicators Project	Data collection and reporting. Awards and recognition. Education and awareness.	Sustainable San Mateo County	San Mateo County	All Sectors
	Silicon Valley Clean Tech Alliance	Professionals and students informing the public to advance clean technology, renewable energy, and sustainable living.	Silicon Valley Holdings	Cities in Alameda, San Mateo, Santa Clara, and Santa Cruz Counties	Business
RENEWABLE ENERGY	Energy and Natural Resources Committee	Public policy advocacy for energy policy.	Bay Area Council	Counties of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma	Business, Government
	Green Technologies	Identifying and advocating for state and federal policies and industry initiatives that stimulate the development and adoption of new green technologies.	TechNet	Global	Government
	RE<C (Renewable Energy Cheaper Than Coal)	Developing electricity from renewable sources cheaper than electricity produced from coal.	Google.org	Global	Research

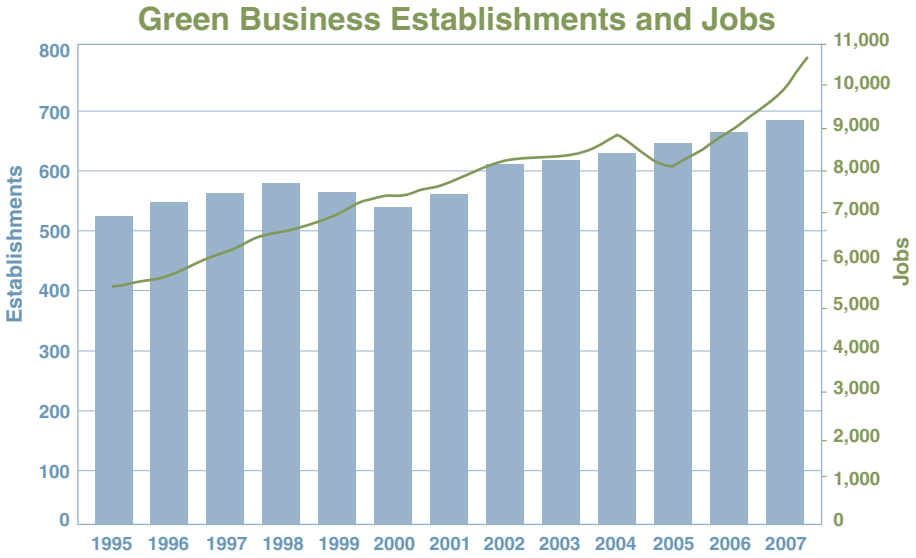
INVENTORY OF CURRENT CLIMATE PROTECTION ACTIVITIES IN SILICON VALLEY *(continued)*

Activity Area	Title	Activities	Organization	Geography	Target Sectors
RENEWABLE ENERGY	SolarTech	Identifying and addressing barriers to the success of the solar industry in Silicon Valley.	Silicon Valley Leadership Group (SVLG)	Counties of Santa Clara, San Mateo, Alameda, and part of Santa Cruz (Scotts Valley)	Business
	Santa Clara Green Power	Providing customers with the ability to purchase power from renewable sources.	Silicon Valley Power	Santa Clara	Residential
	PaloAltoGreen	Providing customers with the ability to purchase 100% wind and solar energy.	City of Palo Alto	Palo Alto	Residential Business
TRANSPORTATION	Build Sustainable Transportation Infrastructure	Reducing the dependence on oil for transportation, and creating a sustainable mobility model of electric vehicles fueled by renewable energy.	Better Place of Palo Alto, Mayors of San Francisco, San José, and Oakland, Bay Area Council, and Silicon Valley Leadership Group (SVLG)	Counties of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma	Business Government
	Proterra All Electric School Bus	Identifying technologies for building an all-electric school bus. Setting up a prototyping facility for future all-electric vehicle projects.	Electronic Transportation Development Center, with the Environmental Business Cluster and City of San José	Global	Business Government
	Transportation Fund for Clean Air	Funding inventories of greenhouse gas emissions.	City/County Association of Governments of San Mateo (C/CAG)	San Mateo County	Government
	RechargeIT	Collecting data on plug-in performance, investing in innovative technologies, and advocating policy.	Google.org	Global	Research
	Regional Planning Program	Regional land use and transportation coordination.	ABAG-MTC Joint Policy Council	Counties of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma	Government
	Cool Commutes	A friendly competition between public and private employers to encourage the largest number of employees to commute by alternative transit rather than driving solo to work.	Silicon Valley Leadership Group (SVLG)	Cities in Alameda, San Mateo, Santa Clara, and Santa Cruz Counties	Community-wide
OUTREACH	San José Climate Clock	A competition to create a work of monumental art that uses Silicon Valley's technologies to provide feedback on climate change.	City of San José, San José State University	San José	Community-wide
	ClimateSmart™	Offers customers the ability to offset their carbon emissions. One hundred percent of contributions are used for environmental conservation, restoration and protection projects in California.	Pacific Gas & Electric Company	PG&E Service Territory	All Sectors

APPENDIX III

GREEN TECHNOLOGY BUSINESS ESTABLISHMENTS AND JOBS

Silicon Valley is a hotbed for clean technology. Businesses providing products and services that improve resource conservation and reduce environmental impacts have increased in number by 29% since 1995. These businesses include producers of state-of-the-art technology for renewable energy generation and energy management as well as lower-tech recycling services. In terms of jobs, the region has witnessed 88% growth since 1995 and 23% just since 2005. Jobs in Energy Generation account for the largest percentage of all green jobs, and these are primarily in solar system installation.[16] Job growth since 2005 has been strongest in Green Building (424%), Transportation (140%), and Advanced Materials (54%).



Data Source: Green Establishment Database

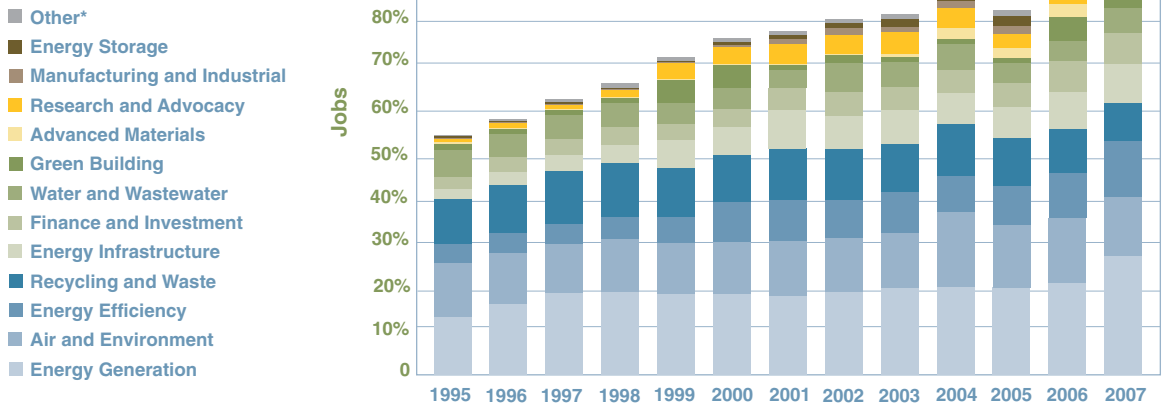
Analysis: Collaborative Establishment

Green Growth	1995–2007	2005–2007
Jobs	88%	23%
Establishments	29%	8%

[16] It is important to note that the data on green jobs refers to positions at a business establishment and is not directly comparable to employment data that counts people who are employed (e.g., Quarterly Census of Employment and Wages or Current Employment Statistics).

Green Jobs by Green Segment

Silicon Valley



*Other includes Transportation, Agriculture, and Business Services
Data Source: Green Establishment Database Analysis: Collaborative Establishment

VENTURE CAPITAL INVESTMENT IN CLEAN TECHNOLOGY

While total venture capital (VC) investment slowed in 2008, investment in clean tech in Silicon Valley increased 94% from 2007—valuing almost $1.9 billion in 2008. In 2007, Silicon Valley alone accounted for 55% of California and 31% of U.S. investment. The bulk of this investment was in energy generation, followed by energy infrastructure.

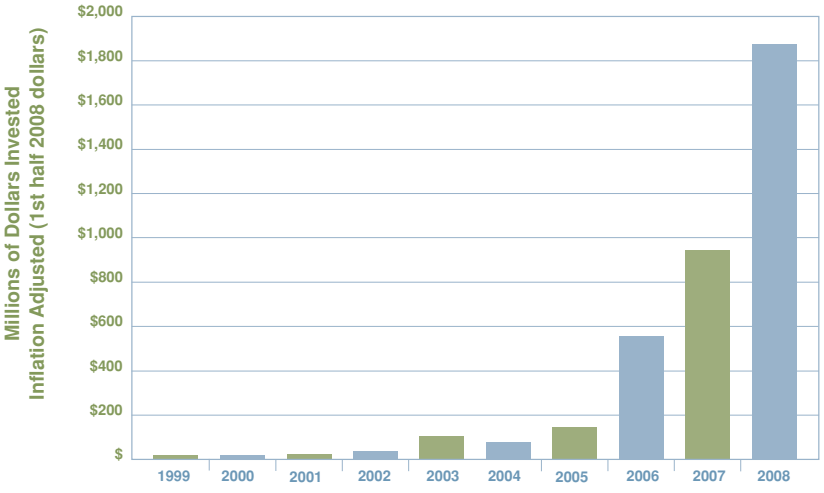
Venture Capital Investment in Clean Technology

Clean Tech Investment Growth 2007–2008:

Silicon Valley: +94%
Rest of CA +63%

Silicon Valley Clean Tech 2008:

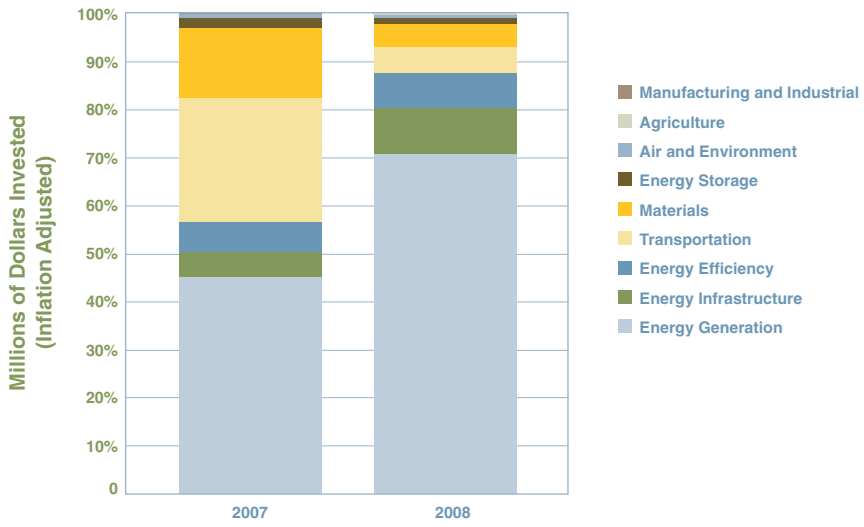
55% of CA
31% of U.S.



Includes data for San Mateo and Santa Clara Counties, and cities of Fremont, Union City, and Scotts Valley
Data Source: Cleantech Group™, LLC (www.cleantech.com)
Analysis: Collaborative Economics

Venture Capital Investment in Clean Technology

Silicon Valley



Includes data for San Mateo and Santa Clara Counties, and cities of Fremont, Union City, and Scotts Valley
Data Source: Cleantech Group™, LLC (www.cleantech.com) Analysis: Collaborative Economics

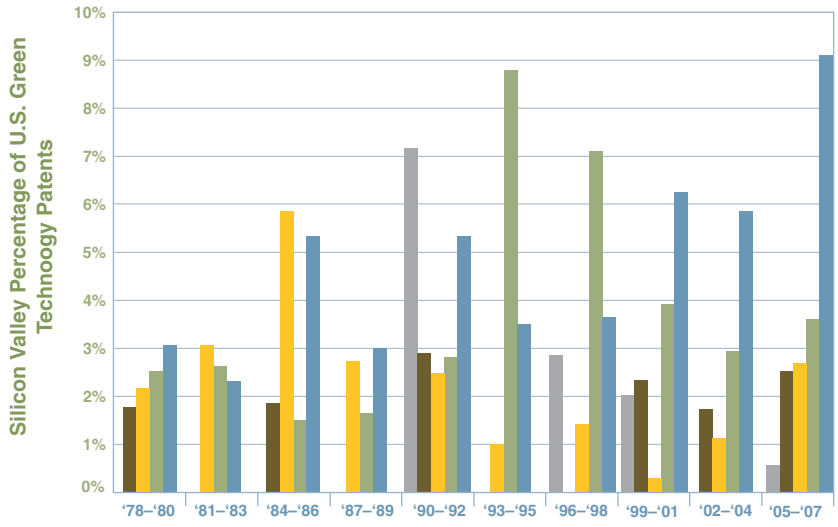
GREEN TECHNOLOGY PATENTS

Silicon Valley accounts for a growing percentage of U.S. green patent registrations. Increasing in share, 9% of all U.S. solar energy patents registered from 2005–2007 were registered in Silicon Valley. Patents registered by primary inventors located in the region are also increasing in percentage of total U.S. registrations in the areas of advanced batteries, fuel cells, and wind energy.

In 2007, Silicon Valley accounted for 20% of all green technology patents in California.

Patents Registered by Green Technology

Silicon Valley Percentage of U.S. Green Technology Patents



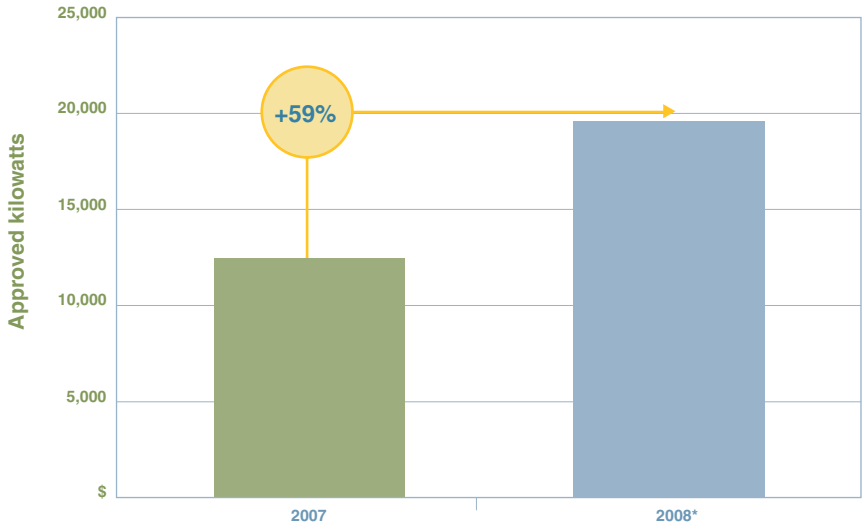
Data Source: 1790 Analytics, Patents by Technology, USPTO Patent and Trade Office
Analysis: Collaborative Economics

RENEWABLE ENERGY

Silicon Valley has become a hot spot for solar in California. In 2008, Silicon Valley accounted for 13% of all new solar capacity in the state approved through the California Solar Initiative. Measured in kilowatts, solar capacity in the region increased 59% and in the state 41% over 2007. This new growth has primarily been in commercial, government, and nonprofit installations.

13% of California solar capacity added in 2008 was in Silicon Valley.

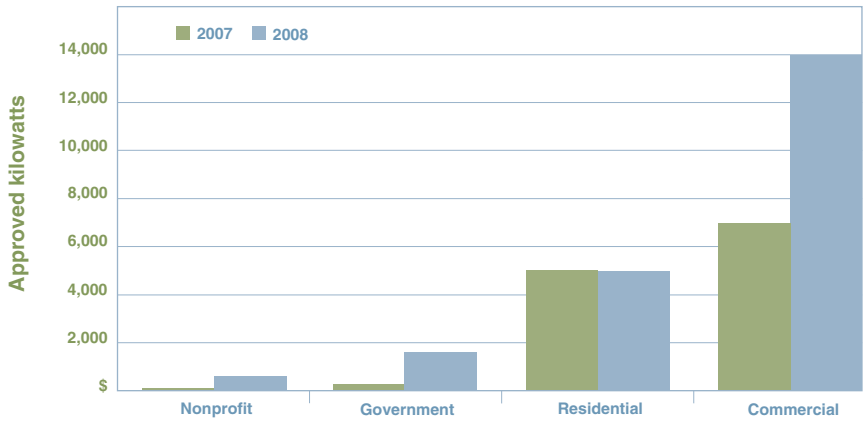
Solar Installations: Capacity (kW) Added Through the California Solar Initiative
Silicon Valley



*As of December 17, 2008
Data Source: California Public Utilities Commission, California Solar Initiative
Analysis: Collaborative Economics

Growth in Solar Capacity (kW) Added Through the California Solar Initiative	
2007-2008	
Silicon Valley	Rest of CA
+59%	+41%

Solar Installations by Sector: Capacity (kW) Added Through the California Solar Initiative
Silicon Valley

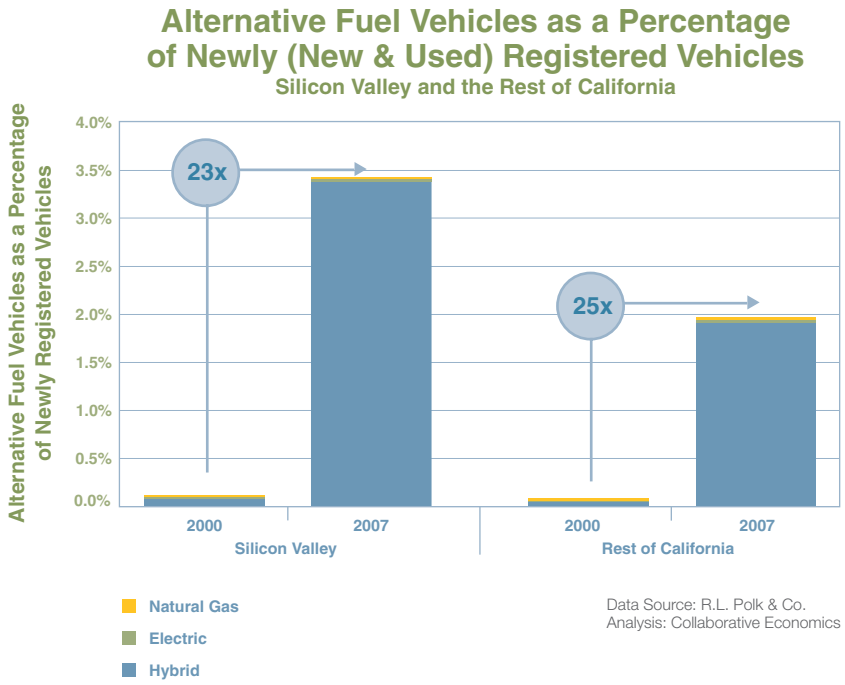


*As of December 17, 2008
Data Source: California Public Utilities Commission, California Solar Initiative
Analysis: Collaborative Economics

ALTERNATIVE FUEL VEHICLES

Silicon Valley is on the forefront of alternative fuel vehicles—particularly hybrids. The region now accounts for 15% of newly registered hybrids, 10% of electric, and 5% of natural gas vehicles in California. Alternative fuel vehicles now comprise 3.4% of all newly registered vehicles in Silicon Valley—up from very few vehicles (0.11%) in 2000.

Silicon Valley % of California Newly Registered Alternative Fuel Vehicles (New and Used)	
2007	
Hybrid	15%
Natural Gas	5%
Electric	10%



Data Source: R.L. Polk & Co.
Analysis: Collaborative Economics

SOURCES AND METHODOLOGY

Green Technology Business Establishments and Employment

The accounting of green business establishments and jobs is based on multiple data sources for the classification of green businesses (such as New Energy Finance, Cleantech Group™, LLC and others) and leveraged a sophisticated Internet search process. The National Establishments Time-Series (NETS) database based on Dun & Bradstreet establishment data was sourced to extract business information such as jobs. The operational definition of green is based primarily the definition of clean tech defined by the Cleantech Group™, LLC. This sample offers a conservative estimate of the industry in California.

Venture Capital Investment in Clean Technology and Cleantech Venture Capital Investment by Segment

Data provided by Cleantech Group™, LLC. For this analysis, venture capital is defined as disclosed clean tech investment deal totals. Data is based on Joint Venture's ZIP-code-defined region of Silicon Valley. The Cleantech Group describes clean tech as new technology and processes spanning a range of industries that enhance efficiency, reduce or eliminate negative ecological impact, and improve the productive and responsible use of natural resources. See the figure on page 39 for clean tech industry segments.

Mergers and Acquisitions in Clean Technology

Data provided by Cleantech Group™, LLC. Data is based on Joint Venture's city-defined region of Silicon Valley. The Cleantech Group describes clean tech as new technology and processes spanning ranges of industries that enhance efficiency, reduce, or eliminate negative ecological impact, and improve the productive and responsible use of natural resources. The following are the types of mergers and acquisitions included in the count: mergers, acquisitions, divestitures, and minority stake transactions.

IPO Pricings in Clean Technology

Data provided by Cleantech Group™, LLC. Data is based on Joint Venture's city-defined region of Silicon Valley. The Cleantech Group describes clean tech as new technology and processes spanning ranges of industries that enhance efficiency, reduce, or eliminate negative ecological impact, and improve the productive and responsible use of natural resources. Company location is based on corporate address provided by Cleantech. Count is based on IPO pricings each year.

Green Technology Patents

Data comes from 1790 Analytics, Patent Search by Technology (solar and wind energy generation, energy storage, fuel cells, hybrid systems) using data from the U.S. Patents and Trade Office. Data is based on Joint Venture's ZIP-code-defined region of Silicon Valley.

Renewable Energy

Data is from the California Solar Initiative, December 17, 2008, extract. Data covers approved rebates, and rebates that were cancelled or withdrawn are not included.

Alternative Fuel Vehicles Registered

Alternative fuel vehicle data is provided by R.L. Polk & Co. Data is for Santa Clara and San Mateo Counties, Scotts Valley, Fremont, Newark, and Union City. Data includes newly registered vehicles for new and used vehicles.

Private Sector
Accenture
Accretive Solutions
Adobe Systems
AeA
Akeena Solar
Applied Materials
AMD
AT&T
Bank of America
Bay Area Council Foundation
Bay Area SMACNA
Benhamou Global Ventures
Berliner Cohen, LLP
Bingham McCutchen, LLP
Cadence Design Systems
California Representative
Cisco Systems
Cogswell Polytechnical College
Colliers International
Comerica Bank
CommerceNet
Con-way
Cooley Godward, LLP
Cypress Semiconductor Corporation
Deloitte & Touche
DLA Piper, LLP
eBay Foundation
El Camino Hospital Foundation
Ernst & Young
Foothill-De Anza Community College District Foundation
Google
Grant Thornton, LLP
Greenberg Traurig, LLP
Half Moon Bay Brewing Company
Health Trust
Hewlett-Packard
Hoge Fenton, LLP
Hood & Strong, LLP
Intero Real Estate
JETRO
Johnson Controls
Juniper Networks
Kaiser Permanente
KPMG
Koret Foundation
Lucile Packard Children's Hospital at Stanford
McKinsey & Company
Menlo College
Morgan Family Foundation
Microsoft
Mitsubishi International Corporation
O'Connor Hospital
Oakland Athletics
Orrick, Herrington & Sutcliffe, LLP
Pacific Gas & Electric Company
Packard Foundation
Pipe Trades Training Center of Santa Clara County
REgrid Power
Robert Half International
SamTrans/Caltrain
San Francisco 49ers
San José Convention and Visitors Bureau
San José Sharks
San José/Silicon Valley Business Journal
San José/Silicon Valley Chamber of Commerce
San José State University Research Foundation
SanDisk
Santa Clara Building & Construction Trades Council
Santa Clara Valley Water District
Silicon Valley Bank
Silicon Valley Community Foundation
Silicon Valley Power
Skoll Foundation
Smith, Boyd & Jill
Sobrato Development Companies
Solectron
SolutionSet
Stanford University
Studley
SummerHill Homes
Sun Microsystems
SunPower Corporation
SVB Financial Group
Synopsys
TDA Group
Therma
Trident Capital
University of California, Santa Cruz
Valley Medical Center Foundation
Varian Medical Systems
VoiceObjects, Inc.
Volterra
Wells Fargo
Wilmer Hale, LLP
Wilson Sonsini Goodrich & Rosati, LLP
Zanker Road Resource Management, Ltd
Public Sector
City of Belmont
City of Campbell
City of East Palo Alto
City of Foster City
City of Fremont
City of Gilroy
City of Los Altos
City of Menlo Park
City of Milpitas
City of Monte Sereno
City of Morgan Hill
City of Mountain View
City of Newark
City of Pacifica
City of Palo Alto
City of Redwood City
City of San Carlos
City of San José
City of San Mateo
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County of Santa Clara
County of Santa Cruz
Town of Los Altos Hills
Town of Los Gatos

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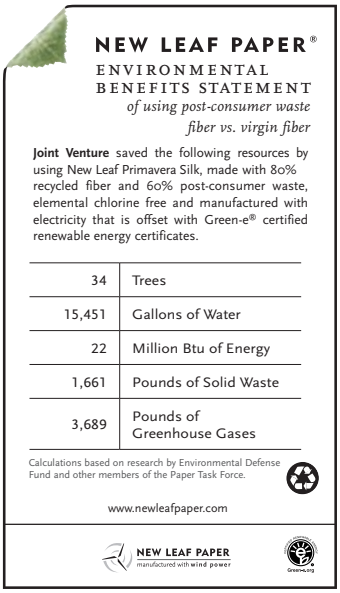

Established in 1993, Joint Venture: Silicon Valley Network provides analysis and action on issues affecting our region's economy and quality of life. The organization brings together established and emerging leaders—from business, government, academia, labor, and the broader community—to spotlight issues, launch projects, and work toward innovative solutions.

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Seth Fearey, Vice President and Chief Operating Officer, Joint Venture – Project Lead
Duffy Jennings, Vice President, Communications, Joint Venture – Editor
Kara LaPierre, Vice President, Joint Venture – Contributing Editor
Collin O'Mara, City of San José – Contributing Editor

Doug Henton – Collaborative Economics, Inc.
John Melville – Collaborative Economics, Inc.
Tracey Grose – Collaborative Economics, Inc.

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