

DRAFT**SILICON VALLEY CLIMATE PROSPERITY STRATEGY****A “GREEN PRINT” FOR REGIONAL ACTION****JOINT VENTURE: SILICON VALLEY NETWORK**

Prepared by Collaborative Economics and the Silicon Valley Climate Prosperity Working Group

I. THE OPPORTUNITY: Silicon Valley as a Leader in Creating a Green Economy

Silicon Valley has the opportunity to be a leader in the development and application of clean technology to create a green economy which generates savings (lower energy use), opportunity (new enterprises) and talent (jobs) while reducing carbon emissions.

In particular, our region has become a hotbed of innovation in clean energy which can create jobs in R&D, commercialization, manufacturing, and application in green buildings, green transportation, and green infrastructure. Creating a regional climate prosperity strategy can address the challenge of climate change while creating green jobs for a broad range of skill sets.

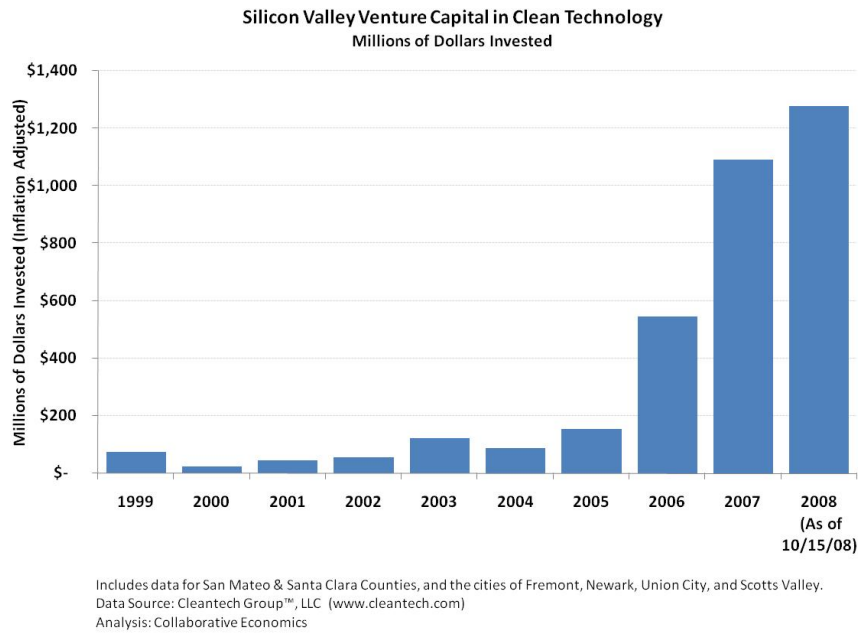
ACCELERATING A “THIRD REVOLUTION”: From IT to ET

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 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 areas such as solar, wind, batteries, and biofuels. These clean technologies are now being applied to existing industries including green buildings, transportation, 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. Valuing \$1.28 billion in 2008 (as of October 15), venture capital investment in clean technology in Silicon Valley increased 17% from 2007 and 134% from 2006. In 2008, (as of October 15) 27 clean technology companies in Silicon Valley received venture capital funding (see table below). Our region accounted for 23% of California patents in solar, wind, and battery technologies. Green jobs grew 41% from 2000 to 2006 in Silicon Valley compared to 17% for California.



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, and Tesla Motors which is developing an electric car that will be manufactured in this region. Existing firms such as Applied Materials and Cypress Semiconductor, which created a subsidiary Sun Power, and others are moving rapidly into growing global solar markets. Leading information technology firms such as Google and Cisco are exploring ways to support clean energy markets and promote energy efficiency, including assisting with the development of a smart grid. PG&E has become a leader in renewable energy and is promoting the adoption smart metering.

In addition, Silicon Valley is home to four out 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 Jose) 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.

Venture Capital Investment in Silicon Valley Clean Technology Companies, 2008*				
Company	City	Primary Industry	Detailed Industry	Deal Amount (Million Dollars)
Nanosolar, Inc.	Palo Alto	Energy Generation	Thin film solar	\$ 350
SoloPower, Inc.	Milpitas	Energy Generation	Thin film solar	\$ 200
Sapphire Energy, Inc.	Redwood City	Energy Generation	Algae Biodiesel	\$ 100
Silver Spring Networks, Inc.	Redwood City	Energy Infrastructure	Smart Grid	\$ 92
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
Tesla Motors, Inc.	San Carlos	Transportation	Electric & Hybrids	\$ 40
Trilliant Inc.	Redwood City	Energy Infrastructure	Smart Grid	\$ 40
Alien Technology Corporation	Morgan Hill	Manufacturing/ Industrial	Monitoring & Control (Systems)	\$ 38
Miasole, Inc.	Santa Clara	Energy Generation	Thin film solar	\$ 35
NanoGram Corp.	San Jose	Materials	Nano	\$ 32
BridgeLux, Inc.	Sunnyvale	Energy Efficiency	Solid State Lighting	\$ 30
Luxim Corp.	Sunnyvale	Energy Efficiency	Solid State Lighting	\$ 21
Fat Spaniel Technologies, Inc.	San Jose	Energy Infrastructure	Power Quality & Testing	\$ 18
GreenRoad Technologies	Redwood City	Transportation	Logistics (Transportation Efficiencies)	\$ 18
APX, Inc.	Santa Clara	Air & Environment	Carbon/Emissions Trading & Offsets	\$ 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
Lion Cells, Inc.	Menlo Park	Energy Storage	Advanced Batteries (Lithium-Ion)	\$ 12
Tigo Energy, Inc.	Los Gatos	Energy Generation	Solar Systems	\$ 6
Zero Motorcycles, Inc.	Scotts Valley	Transportation	Bicycles & Scooters	\$ 6
EoPlex Technologies, Inc.	Redwood City	Materials	Ceramics	\$ 4
Potter Drilling	Redwood City	Energy Generation	Geothermal (Hardware)	\$ 4
PlantSense, Inc.	San Jose	Agriculture	Precision Agriculture	\$ 4
LS9, Inc.	San Carlos	Energy Generation	Cellulosic Ethanol	\$ 3

*As of October 15, 2008.

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

A VISION OF A CLEAN, GREEN, PROSPEROUS FUTURE FOR SILICON VALLEY

There is no question that global warming requires a fundamental transformation in how the world uses energy. It is also true that the greatest environmental challenge of the 21st Century also provides perhaps the greatest economic opportunity as well. In other words, the need and market for global energy transformation are both enormous. This potential has already begun to attract Silicon Valley’s companies, entrepreneurs, and financiers. Silicon Valley has always been about the future. Once again, the Valley is reinventing itself for new times through innovation.

What will this global transformation be like? Some can see a time in the future when a smart grid will allow all residents, owners and occupants of buildings and users of transportation to utilize “clean electrons” as IT meets ET to create an energy internet. In this world, carbon emissions would be dramatically reduced and energy productivity through energy efficiency and renewable energy dramatically increased.

Thomas Friedman describes in his recent book *Hot, Flat and Crowded* (2008) what 20 years from now may be like:

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 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.¹

Eric Schmidt, Chief Executive Officer of Google, has also described a possible future of environmental and economic progress if the certain steps are taken now:

We now need to encourage investment in new high-technology industries such as clean energy and environmental technology. These are sectors where we have lacked political leadership not just recently but for decades. 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.²

Silicon Valley can help lead the way into this future, step by step over the next several years by increasing the use of renewable energy, promoting sustainable buildings, increase fuel efficiency and creating a green energy infrastructure. As a result, Silicon Valley could demonstrate how IT can support ET to create a clean, green and prosperous region – which can become a model for other places. Some activities are already underway, but Silicon Valley will need a strategy that involves the private, public and education/research communities to make this happen.

¹ Thomas Friedman. 2008. *Hot, Flat and Crowded*. Page 225.

² Eric Schmidt. 2008. “America will find opportunity in scarcity.” Comment in *Financial Times* (November 2, 2008). <http://www.ft.com/cms/s/0/8bd131d0-a8f5-11dd-a19a-000077b07658.html>

Silicon Valley Transformed: What Our Region Could Be Like in 2050

Thanks to our tradition of and commitment to innovation, Silicon Valley 2050 is an even more attractive place to live and work. Our lifestyles have been enriched—with financial savings, new jobs, a cleaner environment—rather than constrained by our decades-long transformation to a carbon-free region through energy efficiency and renewable energy alternatives. We refused to accept the status quo as inevitable—that of a carbon-based economy and society that cannot change. We also refused to accept the tradeoff of lower economic aspirations in return for saving the planet.

Instead, Silicon Valley forged a different path—one based on innovation, of finding ways to harness our technological strengths, entrepreneurial tradition, talent and imagination to push new frontiers in the energy field—creating products and services that not only gave us an economic boost, but improved our own quality of life and made a distinctive contribution to saving the planet by 2050.

We not only came up with ideas and made things that others found important in moving to a carbon-free world; we applied those ideas and products here in Silicon Valley first, showing how homes, workplaces, commutes, jobs, economies, communities, and our children can benefit in real and measurable ways. This visible demonstration—our commitment and growing reputation for “walking the talk”—was as important to being a catalyst for energy transformation as our growing number of energy technology breakthroughs and product announcements.

By mid-century, we have made this historic transformation:

Our homes and workplaces have been adapted to maximize energy efficiency, with made-in-Silicon-Valley information technology helping us understand where savings could be achieved, and monitoring and adjusting our use of electricity. New green building materials and design features were incorporated in new construction, and in remodels and retrofits of structures. Commercial and residential energy saving products and services—as well as renewable energy alternatives—have become pervasive, competitively priced, and easy to implement. We have continuously pushed the frontier of energy efficiency, extending a tradition of energy and water conservation in California that began in the 1970s, and have enjoyed long-term savings on our energy bills.

Our vehicles and commutes have become much cleaner and more productive. Almost all of us who commute alone use zero-emission vehicles, after a transition phase in which many moved to plug-in hybrids. More of us now use other modes to get to work—such as carpools, public transportation, bicycling, and walking. These modes became more realistic for many residents as we followed through on visions to transform our urban environment, with homes closer to workplaces and a much expanded transit system. We also made telecommuting—with advances in technology and management practices—a part of most jobs, reducing congestion, and improving productivity.

Our jobs are now green jobs. Regardless of occupation, Silicon Valley workers are involved in one way or another with energy efficiency and renewable energy—from idea development to manufacturing to implementation in commercial and residential settings. Our information and biotechnology strengths have been repackaged into new products and services to capitalize on the global green revolution. Our engineers, software developers, and scientists have produced a wave of energy technology innovations. Our electricians, installers, and maintenance technicians have become the best in the world at implementing, trouble-shooting, and getting the most out of Silicon Valley innovations in our own homes,

workplaces, and vehicles. All jobs have been affected in some way, and new jobs have emerged to manage not only the local, but global transition to a carbon-free economy.

Our economy is now a full-service green economy. We have not only excelled at the top of the “value chain”—developing new technologies for commercialization—but, because of our commitment to local implementation, we have grown a supplier base to serve our leading green technology companies, a sector of professional service companies specializing in energy efficiency and renewable energy applications, and new green product distribution, installation, construction, and maintenance industries. These sectors provide an important foundation of middle-wage jobs for our region. All our industries are green in some form—whether they are directly providing a green product or service, or applying green products and practices to their design, production, and distribution functions.

Our communities have become models for how to transform energy use without sacrificing—and, in fact, improving—our quality of life. In many cases, it was local governments and educational institutions that took the lead in painting a vision of a green future, then using their procurement, land use, and other powers to create incentives and remove disincentives to energy innovation. Working in partnership with the federal and state government, Silicon Valley became one of the first regions to create a “smart grid”—the next generation of electricity transmission and distribution infrastructure that uses advanced sensor and distributed computing to improve efficiency, reliability, and safety (see box below). It also became one of the first regions with a pervasive network of alternative vehicle fueling/charging stations that made ubiquitous use of alternative energy vehicles a reality. After several decades, our new approach to energy is woven deeply into the fabric of our communities.

Our children now grow up expecting to live in a carbon-free world. For them, it is a way of life. They expect that whatever they do for a living, they will need to understand clean technology—just as earlier generations needed to understand the personal computer and internet as critical to their lives. From the time they enter school, they are taught about energy efficiency, renewable energy, and the practices that are saving our planet from global warming while stimulating a new industrial revolution that is delivering economic as well as environment benefits to us all.

THE SMART GRID

The smart grid is the internet brought to electrical systems. The smart grid is an intelligent electricity transmission and distribution network or “grid” that uses robust two-way communications, advanced sensor and distributed computers to improve the efficiency, reliability and safety of power delivery and use. The development of modern microelectronics and especially the entry of the microprocessor have opened up new ways to significantly improve power grid control.

The evolving integration power distribution network includes the possibility to reduce power consumption on the client side during peak hours (demand side management), facilitate grid connection to distributed generation (with photovoltaic arrays, small wind turbines, micro hydro and even combined heat generators in buildings), grid energy storage for distributed generation for load balancing and improved reliability against many different component failure scenarios. The smart grid differs from today’s grid in a number of fundamental ways:

Characteristic	Today’s Grid	Smart Grid
Consumer involvement	Consumers are uninformed	Informed, involved, active consumers
Energy generation	Central generation	Distributed generation
Products and services	Limited opportunities	New electricity markets for consumers

A smart grid could enable a number of important energy efficiency and renewable energy applications:

- Allow seamless integration of renewable energy and make use of solar –24 hours a day
- Exploit the use of green building standards to lightened the energy load
- Make large scale energy storage a reality
- Enable us of plug in hybrid vehicles

U.S. Department of Energy, which is has overall responsibility for developing a smart grid on a national basis, points out the smart grid can be implemented in stages over the next several years.

- *First, steps are already underway to create a “smarter grid” which involved deploying existing technologies in the near future.* Some experiments with a smarter grid are already underway such as an integrated home energy management system using smart meters in Hawaii, Micro Grid in San Diego which is designed as demonstration for distributed utility services, and an integrated electrical distribution system in Fort Collins, Colorado that allows the increase use of renewable. PG&E is now introducing a smart meter program that will allow the consumer to access energy usage data and take advantage of this to better manage energy consumption and control energy bills.
- *Second, the “smart grid” represents the long term promise of a grid remarkable for its intelligence and impressive in its scope.* A DOE demonstration project on the Washington Olympic Peninsula has shown the potential for a fully developed smart grid. An intelligent system responded to instructions set in place by consumers. Meanwhile, in the background, energy was managed on the consumer’s behalf to save money and reduce the impact of the grid. Consumers saved approximately 10% on their bills. Peak load was reduced by 15%, ringing the constrained regional grid another 3-5 years of peak load growth and enabling the installation of cleaner, more efficient technologies for supply.

Source: US Department of Energy 2003 “The Smart Grid”

How Do We Get From Here to 2050?

The remainder of this report outlines a path forward. While there will be many unpredictable twists and turns along the way, one thing is certain: Silicon Valley can take charge of its energy future, and in doing so, return environmental and economic benefits to the region while developing innovations that address the biggest global challenge of our time.

The exhibit below charts a course to 2050 by the numbers—how Silicon Valley can gradually attain improvements in energy efficiency, increases in the use of renewable energy, and reductions in carbon emissions. To put our region on this path, however, we must ramp up our current efforts—and grow them rapidly in the years to come. The remainder of this report identifies these efforts, and provides a framework for developing and launching a region-wide climate prosperity strategy—one that leverages what’s working and pushes us to the next level of collaborative action.

The Long View: How the Transformation Could Take Place by 2050

Fifty years ago, Silicon Valley began the transition from a defense to information economy with the rise of the semiconductor and computer industries. While existing firms such as Varian and Hewlett-Packard were making the switch to commercial markets, new firms such as Fairchild Semiconductor were emerging. By 2050, Silicon Valley can become a carbon free, green economy as information technologies and biotechnologies combine with clean energy technologies to promote energy efficiency and renewable energy across all sectors of economy and society.

According the *California Green Innovation Index*, this future is possible. Between 1990 and 2004, as a result of innovation and policies (appliance and building standards and utility efficiency programs) carbon emissions as percent of GDP in California declined from .08 to .05. If energy policies are implemented (e.g. AB 32, Renewable Portfolio Standards, increased energy efficiency standards) and the economy continues to grow through innovation, carbon emissions as a percent of GDP will decline by 46% by 2020. On this path, our economy can be carbon free by 2050.

What has to happen to realize this future? Let's look at key milestones:

- **5 years from now:** Energy efficiency as measured by total energy consumption per capita continues to improve as it has since 1970 as a result of green building standards and utility efficiency programs that reduce demand by 10%. Renewable energy increases to 30% of total energy generation. Purchase of hybrid vehicles grows faster than traditional vehicles. An initial pilot of a smart grid begins making energy efficiency and renewable energy more prevalent. As a result, carbon emissions as a percentage of GDP decline by 10% from today.
- **10 years from now:** Energy efficiency continues to reduce demand by 20% while renewable energy grows to 50% of total energy generation. Purchase of hybrids and zero emission vehicles grow to 60% of all new car sales. A smart grid is fully installed. All new commercial and residential construction is with 100% green materials and practices. Carbon emissions as percent of GDP declines by 25% from today.
- **20 years from now:** Energy efficiency reduces demand by 30%. Renewable energy increases to 75% of total energy generation. Zero emission vehicles represent over 50% of the total fleet. The smart grid is pervasive in homes and businesses. Carbon emissions as a percentage of GDP declines by 50% from today.
- **2050:** Energy efficiency has reduced demand by 50%. Renewable energy has increased to 100% of total energy generation. Zero emission vehicles represent over 75% of the total fleet. Carbon emissions as a percentage of GDP decline to near zero.

II. OUR CURRENT REGIONAL ACTIVITIES: Elements of a “Green Innovation Habitat”

Silicon Valley already possesses many critical elements for creating a clean energy future. These valuable assets include leading firms, world class university research at Stanford and University of California, NASA Ames, as well as a growing business and government support infrastructure including financial, legal, marketing, and educational and infrastructure support services. Some examples that are growing a strong “green innovation” habitat include.

- **City of San Jose’s Green Vision** which includes creating 25,000 clean technology jobs, reducing per capita energy use by 50%, receiving 100% of electrical power from clean renewable sources, building or retrofitting 50 million square feet of green buildings, and ensuring that 100% of its public fleet runs on alternative fuels in 15 years.
- **Climate Protection Task Force** organized by Joint Venture: Silicon Valley that includes all the cities of the region in promoting collaborative solutions to reduce carbon emissions through building retrofit programs, installing low energy lighting, purchasing hybrid vehicles, and installing solar energy on public buildings.
- **Sustainable Buildings Initiative** also organized by Joint Venture, involving public and private leaders in promoting green building policies including a Build It GreenPoint Rated program for residential, U.S. Green Building Council LEED rating system for commercial, and LEED silver rating for all government owned buildings and retrofits.
- **Solartech**, a consortium of solar companies, has developed a shared industry roadmap to accelerate the growth of the solar industry in our region. This industry group is working together to identify and resolve technical and adoption barriers to solar technology by addressing issues of performance, process, standards and workforce.
- **NASA Research Park** is a collaboration of UC-Santa Cruz, Carnegie Mellon, San Jose State University, and Foothill-DeAnza Community College District to create a public private partnership to develop an innovative research, development and demonstration center in the heart of Silicon Valley to deliver quality education, incubate and commercialize new clean energy technologies, and showcase innovations in sustainable development.

These assets and efforts are still in the early development phase—most did not exist just a few years ago. The opportunity now is to connect and leverage these promising efforts to accelerate Silicon Valley’s transformation—to usher in the region’s third revolution.

The table that follows provides a detailed overview of climate protection activities currently underway in Silicon Valley.

INVENTORY OF CURRENT CLIMATE PROTECTION ACTIVITIES IN SILICON VALLEY					
Activity Area	Title	Activities	Organization	Geography	Target Sectors
Emissions Reduction Energy Efficiency Green Building Renewable Energy	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
Emissions Reduction	Climate Protection Program	Measures and reports 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
Emissions Reduction	Cool Cities	Encourages sustainability and actions to reduce greenhouse gas emissions.	Sierra Club, Loma Prieta Chapter	Counties of San Benito, San Mateo, and Santa Clara	Government
Renewable Energy	RE<C (Renewable Energy Cheaper Than Coal)	To develop electricity from renewable sources cheaper than electricity produced from coal.	Google.org	Global	Research
Emissions Reduction	Reduce CO ₂ Emissions	Encouraging pledges to reduce emissions. Organize educational programs. Measurement.	Sustainable Silicon Valley (SSV)	San Mateo and Santa Clara Counties and parts of Santa Cruz and Alameda Counties.	All Sectors
Transportation	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
Emissions Reduction 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
Energy Efficiency Renewable Energy	Green Technologies	Identify and advocate for state and federal policies and industry initiatives that stimulates the development and adoption of new green technologies.	TechNet	Global	Government
Energy Efficiency Renewable Energy	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
Renewable Energy	SolarTech	Identify and address 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
Energy Efficiency	ABAG Energy Watch	Subsidies for energy efficiency programs.	Association of Bay Area Governments (ABAG)	Counties of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma	Government
Transportation	RechargeIT	Collects data on plug-in performance, invests in innovative technologies, and advocates policy.	Google.org	Global	Research
Energy Efficiency	Climate Savers Computing Initiative	Promotes 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.org Intel	Global	Research

INVENTORY OF CURRENT CLIMATE PROTECTION ACTIVITIES IN SILICON VALLEY (CONTINUED)					
Activity Area	Title	Activities	Organization	Geography	Target Sectors
Energy Efficiency	Advancing Green Technology	Investing and encouraging the adoption of plug-in vehicles and energy-efficient computers.	Google.org	Global	Research
Renewable Energy Transportation Green Building Energy Efficiency	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
Green Building	Green Building Collaborative	Encouraging adoption of green building codes.	Santa Clara County Cities Association	Santa Clara County	Government
Business Engagement	Green Business Program	Verifies 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
Emissions Reduction Renewable Energy Green Building Energy Efficiency	Green Vision	Sets the Green Vision Goals for sustainability throughout the City, creates Climate Compact with San Francisco, Oakland, and funds Energy Watch.	City of San José	San Jose	Community-wide
Energy Efficiency	Green@Home	Volunteers 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
Environmental Sustainability	Indicators Project	Data collection and reporting. Awards and recognition. Education and awareness.	Sustainable San Mateo County	San Mateo County	All Sectors
Climate Change	NASA Ames Research Center	Climate change studies. Atmospheric modeling.	NASA	Global	Research Government
Climate Change	Paleoclimate and Climate Change Research Group	Climate change studies, modeling.	University of California, Santa Cruz	Global	Research
Energy Efficiency	Precourt Institute for Energy Efficiency	Promote energy efficient technologies, systems, and practices, emphasizing economically attractive deployment.	Stanford University	Global	Research
Waste Reduction	Recycleworks	Waste management, recycling programs.	Public Works Department	San Mateo County	Residential Business
Transportation	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
Waste Reduction	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 Building	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
Renewable Energy Energy Efficiency	Woods Institute for the Environment	Develop 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
Various Activities by Cities and Counties		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

III. A CLIMATE PROSPERITY STRATEGY: Green Savings, Green Opportunities, Green Talent by Deploying Clean Energy Technologies

While Silicon Valley has had an impressive “start-up phase,” will the region become one of the world’s leading centers for clean energy innovation?

- How will clean technology innovations benefit the region?
- Will they spawn new industries providing products and services to local residents as well as markets worldwide?
- Will Silicon Valley succeed in harnessing its many assets and become a wellspring of clean energy innovation—while also producing tangible economic and quality of life benefits for its communities?
- In short, will Silicon Valley *deploy* its own innovations to every aspect of our region?

While many regions are looking at ways to reduce greenhouse gas emissions, Silicon Valley has always understood that innovation can solve business and societal problems while also creating economic opportunity. 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.

Energy efficiency saves money and reduces emissions. The *California Green Innovation Index* sponsored by Next 10 illustrates the key principles of climate prosperity. Since the energy crisis of the 1970s, California adopted building and appliance standards and created energy efficiency incentives through our utility policies that have saved consumers \$56 billion, eliminating the need for the construction of 24 new major power plants. Today, California uses less energy per capita than in 1975, and has the second lowest per capita carbon emissions of any state in the nation (after Rhode Island).

Climate change can create economic opportunities. Furthermore, the *California Green Innovation Index* shows that since the adoption of AB 32 (the Global Warming Solutions Act), the California Solar Initiative incentive program, the Renewal Portfolio Standard (which requires that 20% of electricity generation come from renewable sources by 2010), and rising energy prices, there has been growing private sector investment in alternative energy as witnessed by an dramatic increase in venture capital in clean technology across California, with a concentration in Silicon Valley. New green firms in solar, wind, and battery technologies have been growing across the state and especially in our region.

Climate prosperity creates new demands for talent. Finally, with the growth of new green firms and the application of clean technologies in existing industries, including buildings, transportation, logistics and manufacturing, there has been the growth of green jobs. This change has resulted in a growing need for training for these middle wage jobs, especially from community colleges and universities.

While a climate prosperity strategy has significant benefits in terms of green savings, green opportunities, and green talent, these benefits might not materialize in our region if we do not strategically connect our many assets and pursue a collaborate approach for regional success. Why? Many regions (and countries) around the world see the same opportunity and are moving aggressively in terms of private investment and public policy. Silicon Valley must act if it wants “first mover” advantage in this third revolution—and all the benefits that would accompany that leadership position.

In particular, if our region does not take aggressive steps to connect our emerging leadership in clean technology *creation* with *applications* in our existing industries—and thereby create a robust regional market (and test bed) for these innovations—we risk not capturing the full opportunity for economic and employment development for our region.

Many of our world class firms are now serving growing global markets in Europe and Asia but not selling their innovative products to our businesses or applying them in our cities, communities and educational facilities. Public policies at both the local level (permits, incentives, land use decisions) and at the state level (utility regulations, tax incentives and implementation of AB32) will shape whether we realize the savings, opportunity and talent potential from our leadership in clean technologies.

At the dawn of the Internet, Silicon Valley led the way in not only the creation of new information tools but the **deployment** of these new tools in business (e-commerce), government (electronic permitting), education (NETDay), and smart health through a regional initiative called Smart Valley. Now is the time for a “Green Smart Valley”.

STRATEGIC FRAMEWORK FOR POTENTIAL ACTIONS

The first step to achieving these climate prosperity outcomes would involve creating a **Silicon Valley Climate Prosperity Council** composed of public, private, and academic leaders to guide the development and implementation of a **Green Print** in pursuit of strategic actions. Combined with actions, a set of specific outcomes could be measured to track the region’s progress in achieving climate prosperity. Outcome measures and potential actions the Council could pursue are summarized in the table that follows.

Outcomes could be measured in four areas: reducing greenhouse gas emissions, improving energy savings, expanding opportunity, and growing green talent.

Reduce Greenhouse Gas Emissions: It is important to track total emissions and per capita emissions in the region over time. Because real reductions in GHG emissions must be achieved, total emissions must be tracked. By removing the factor of population change, examining emissions per capita provides additional information about the region’s efficiency.

Improve Energy Savings: Similar to tracking GHG emissions, it is important to measure total and per capita energy consumption. In terms of electricity production, measuring the growth in renewable energy generation reveals increasing independence from fossil fuel-based electricity.

Expand Opportunity: The new context of 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 green technology provides indication of future business opportunities.

Grow Green Talent: The growth in jobs related to green business activities is a direct indicator for the transformation of the green economy and for climate prosperity.

Strategic actions could fall into four areas: renewable energy, green building, transportation, and infrastructure.

Renewable Energy: Strategic actions would aim to support development of new technological breakthroughs and the businesses commercializing these technologies and also encourage the early adoption of new technology by consumers. Additionally, actions could help build a training system that would provide for the new skills demanded by these developments.

Green Building: Strategic actions could support the wider adoption of building standards that require higher efficiencies in energy and water and the use of environmentally sustainable building

materials. Public efforts could involve the setting of building requirements, public education campaigns to raise awareness concerning energy efficiency, and public procurement projects.

Transportation: Potential strategic actions related to transportation are wide ranging. Actions could support the development of required infrastructure for the broad adoption of fueling alternatives. Efforts could target the development of the green transportation industry in the region by supporting the location and growth of companies in the region focused on alternative fuels and vehicles and related components. Public efforts could drive the greening of public vehicle fleets. Also actions could support training in the new skills demanded by these developments.

Infrastructure: A variety of strategic actions could combine to position Silicon Valley as the demonstration “smart grid” region. Actions could include the development of a roadmap and funding strategy for this effort as well as training opportunities related to the construction and maintenance of this new model for information and energy transmission.

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. We have become a center for energy R&D and innovation, fueled by venture capital and other investment. We are home to a new wave of pioneering companies—and the entrepreneurial and technical talent that drive them. We have educational institutions that are rapidly realigning their curriculum and programs to meet the growing demand for green jobs. We have research universities and laboratories that are national and international leaders in fields important to energy technology innovation.

At the same time, we remain a high-cost location in a high-cost State. Green technology firms have told local officials that they would ideally like to remain in Silicon Valley for manufacturing and other operations, but are concerned about the region’s cost competitiveness. In addition, assembling land for larger facilities including manufacturing is a challenge for local jurisdictions.

However, the Tesla case shows that we can successfully compete under certain conditions. The city of San Jose, working with state and federal governments, put together a package of financing along with workforce training and land assembly that was effective despite our high-cost business climate. What this example shows is that Silicon Valley’s formula may be found in the combination of value-adding and cost-reducing actions tailored to the needs of specific sectors of the green economy.

The Valley will never be a low-cost location, but can be a high-value, highly-responsive region, working strategically and collaboratively to make the expansion of the green economy as easy as possible. Both value-adding and cost-reducing elements will be required—and will need to be part of any overall climate prosperity strategy.

The table below describes the framework for Silicon Valley’s climate prosperity strategy, including examples of potential outcome measures and actions. This framework is the starting point for choosing priority outcomes and strategies between November 2008 and February 2009, at which time the Silicon Valley Climate Prosperity Strategy 1.0 will be ready for public launch at the Joint Venture: Silicon Valley annual town hall meeting.

STRATEGIC FRAMEWORK				
OUTCOME MEASURES	<p>Reduce Greenhouse Gas Emissions</p> <ul style="list-style-type: none"> • Total Greenhouse Gas Emissions • Greenhouse Gas Emissions per Capita <p>Improve Energy Savings</p> <ul style="list-style-type: none"> • Total Energy Consumption • Energy Consumption per Capita • Renewable Energy Generation <p>Expand Opportunity</p> <ul style="list-style-type: none"> • Green Business Establishments (by green industry segment) • Venture Capital Investment in Cleantech • Green Patent Registrations <p>Grow Green Talent (and Green Jobs)</p> <ul style="list-style-type: none"> • Green Jobs (by green industry segment) 			
	RENEWABLE ENERGY	GREEN BUILDINGS	TRANSPORTATION	INFRASTRUCTURE
EXAMPLES OF POTENTIAL ACTIONS	<p>Expand use of purchasing power agreements</p> <p>Expedite approval of renewable energy projects</p> <p>Encourage/broker renewable energy applications in regional user industries (e.g., Denver’s green marketplace)</p> <p>Establish regional “green team” to facilitate location/expansion of renewable energy technology companies</p> <p>Document/develop/deliver education and training for new and changing jobs</p>	<p>Encourage wider adoption of green building standards, promote wider awareness of and training in proven energy saving practices in residential and commercial buildings</p> <p>Organize and provide energy audits for building owners</p> <p>Make green procurement pervasive in public building projects</p>	<p>Develop highly visible demonstrations of green transportation alternatives</p> <p>Develop local plug-in hybrid stations</p> <p>Make green procurement pervasive in public fleets</p> <p>Document and encourage clustering of green transportation companies in the region</p> <p>Document/develop/deliver education and training for new and changing jobs</p>	<p>Develop a demonstration of the “smart grid” concept</p> <p>Create a roadmap for full implementation of a regional smart grid within a decade</p> <p>Develop a public-private funding strategy (federal, state, local, foundation, corporate) to build out smart grid</p> <p>Develop an education and training initiative to prepare talent for construction and maintenance of smart grid</p>

Following this strategic framework, the Silicon Valley Climate Prosperity Project could promote public policies, pilot projects, and private sector investment that would create a “green marketplace” that would better connect clean technology supply with green economy demand through actions that would educate, expedite, and extend the benefits to all.

The result of this Climate Prosperity Project would be the transformation of the Silicon Valley into a world leading green economy that provides real benefits for people and businesses while addressing climate change.

