Taking Action to Build a Sustainable Region and World
Solutions at the Scale of the Challenge

- Teton Mountains, Wyoming
- Himalayas
Overview

- Introduction to Sustainable Silicon Valley
- Summary of the challenges facing humanity
- Barriers to change
- Ways to intervene in a system
- SSV’s change strategies
- Regenerative Capitalism
- Cradle-to-Cradle Society
- Regional Resilience
- Invitation to engage with SSV
Overview of Sustainable Silicon Valley

- Formed in 2001, 501(c)(3) non-profit status in 2004
  - Multi-stakeholder collaboration
  - 8 founding partners (Cal EPA, SVEP, SVLG, SCVWD, and companies)

- Sustainable Silicon Valley envisions a thriving Silicon Valley with a healthy environment, a vibrant economy and a socially equitable community. We facilitate:
  - Wise use of energy, water, materials, buildings and transportation
  - Increase market readiness for sustainable solutions
  - Create regional cradle-to-cradle economies
  - Applying technology from SV innovators for global sustainability

- Over 130 partners and growing
  - Reduced CO₂ emissions by 1,000,000 tons
  - Building capacity of sustainability leaders
  - Innovation, Collaboration and Implementation: From policy to action
Partner List
Government
Partner List
Civic

Acterra
STANFORD HOSPITAL & CLINICS
SFO
Silicon Valley Leadership Group
EcologyAction
EPRI
Electric Power Research Institute
SIERRA CLUB
The Climate Registry
EDF
Finding the ways that work
North America’s Leaders Solving Climate Change Together
FOOTHILLS-DE ANZA Community College District
San José State UNIVERSITY
Green Chamber of Commerce
OUR CITY FOREST
plating our future
Santa Clara University
ROSICRUCIAN EGYPTIAN MUSEUM
SUSTAINABLE SILICON VALLEY
The Tech Museum
UN calls for sustainability to be put at heart of economics
by Tom Arup, David Wroe  Sydney Morning Herald  Jan. 31, 2012
“A UNITED NATIONS high-level panel on sustainability has urged the world to dramatically change the way it does business amid growing inequality, environmental problems and "teetering economies".

“In a report launched in Ethiopia yesterday, the group of 35 world leaders and ministers said "a new political economy" should emerge that truly recognizes the environment and social costs and brings the concept of "sustainable development" to the centre of mainstream economics”
Systems Thinking

System Elements:

- **Economy** - resources, trade, financial systems, government policies and decision-making.

- **Society** - community, religion, culture, values, attitudes and government.

- **Environment** - water, air, soil, interwoven relationships among organisms, and geological systems (ecosystem products and services).
Earth’s Ecosystem Services

- Water purification
- Air purification
- Radiation protection
- Soil formation/fertility
- Climate control
- Nutrient cycling
- Natural hazard regulation
- Food/Fiber production
- Waste decomposition
- Disease/pest control

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There is No “Away” to Throw Things
Three Stocks (Buckets)

- GHG Emissions
- Heat
- Consequences of Heat
Current Impact of Climate Change

Some of the Costs – 12 Billion+ $ Events during 2011 in US
- Deaths/Injuries
- Rescue costs
- Rebuilding
- Lost income and tax revenues
- Business interruption
- Failed crops
- Supply chain disruption

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Impact on Food and Water

Global rainfall deficiency summary June 2011

Famine and Fighting In Somalia
Traditional Capitalism: Profits at Any Cost
  “Externalize” as many costs as possible
    Labor, Natural Resources, Wastes
    Common Costs of Infrastructure, Education, Defense, Research
    Make the future pay (unfunded repairs, pollution, climate change)

Economics of More
  Take - make - waste economy
  Consumption is the engine for Growth
  Distraction to prevent organizing those exploited
  Force to quell uprisings; perpetual war
  Advertising to stoke demand for “stuff”
The concept of “externalities” makes it easy to obscure complexity but does not remove it
Eliminate the concept of “externalities”
“Unaccounted for Costs” are real nonetheless
- Very large companies & reinsurance firms know this
- Liability from carbon debt, product toxicity and conflict
Need GAAP for resource and climate risks and impacts

Vincent Laforet, Dying forest, Colorado, 2008
Traditional Capitalism: Time Frames and Communities of Interest

- Distance & Time Frames
  - Narrow focus
  - First costs vs. total costs
  - National vs. global
  - Outsourcing

- Communities of Interest
  - “No new taxes”
  - Debt burden
    - (private, public, corporate)
  - “Single Use” Allocation of resources
  - “Me 1st” vs. “7th Generation”
Why do we tolerate an economic system that is unweaving the web of life and creating deep inequality?

- Money dominates the political system
- Poor scientific education impairs people’s ability to understand or believe climate science
- Change is inconvenient
- People are working hard to survive daily life
- Reluctance to govern the commons
How Marketplace Economics Can Help

- Fundamental economic principles:
  - Transparency in the marketplace
    - Sustainability Index
    - Life cycle analysis
  - Address Resource Scarcity and Information Abundance
    - Empower customers with information
    - [http://www.planetaryskin.org/](http://www.planetaryskin.org/)
  - Engage Supply chains and tracking
    - Earthster, Hara, SAP, C3, ENXSuite
  - Tax “bad” (carbon, pollution); reduce tax on labor
  - Advertising drives consumption, could drive “Enough”

- Example: Case Study WalMart, E2 Turbo
The world has transformed from *consumptive* society to *sustainable* society, and is becoming a *regenerative* society.
Cradle To Cradle: “Be Good Not Less Bad”
Industrial Ecology: Exchange Wastes and Materials
Regenerative Capitalism

- Regenerative Capitalism
  - Replenish natural capital
  - Enhance other sources of capital
    - Education, Science, Research, Relationships, Culture
- Economics of Enough: Goal = Dynamic Equilibrium
- Cradle to Cradle Economy
  - Shift to Net Zero Carbon Buildings, Transportation and Manufacturing
  - Industrial Ecology Cycles Materials/Waste
  - Expanded Timeframes and Communities of Interest
Regenerative Capitalism and Regional Resilience

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Regenerative Cities produce surplus food, export energy, and exhale purified air and water.
Shift to Net Zero Carbon Buildings, Transportation and Manufacturing
Transition to Regenerative Economy

- Buying time by using less resources – more productively
- Dupont Corporation Goals 2015
  - Grow revenue $2 Billion from green business
  - Green House Gas emissions reduction 60%, 1990-2011
  - By 2010, 10% of energy & 25% of feed stocks from renewables
  - Raise revenues 6%/y 2000–10 with no increase in energy use
  - Since 1990 kept energy use the same and increased production 30%
  - Savings of $3 billion 2000 –2005
  - Eco-Efficiency = $2.2 Billion saved each year
  - Average Net Income (2003-2007) $2.2 Billion

Source: http://www2.dupont.com/Sustainability/en_US/Footprint/background.html#ghg
Patagonia’s Mission Statement:
“Build the best product, cause no unnecessary harm, use business to inspire and implement solutions to the environmental crisis.”
Regional Resiliency

- Local use: water, energy, and material resources
- Smart distributed infrastructure for water, energy, materials and transportation management/reuse.
- Share information and culture locally and globally
- Invest in education, training, & research
- Design land use and transportation to enhance interaction and relationships
- Regional food system augmentation
How to Intervene in a System

- Tell the truth
- Use metaphors that people understand
- Initiate new conversations
- Reinforce virtuous cycles
- Block negative cycles
- Trimtab: small changes that lead to bigger changes
- Fractal solutions that can spread and scale

Meeting our partners where they are and also pushing the envelope by *telling the truth as we see it about*:

- Climate change
- Need to transition to a regional ecosystem model of linked nodes around the globe.
- Need to correctly account for costs

**Vision of a better future and a path forward**

- Sustainability is an evolutionary process with a sustainable society being the ultimate goal
How SSV is Catalyzing Change

- Thought Leadership, Truth Telling, Stories
  - Events, conferences, publications, social media
  - Highlighting smart, distributed infrastructure
  - Giving practical examples – case studies
    “if it exists, it must be possible”

- Networking and relationship building
  - Safe space to share what is difficult and barriers as well as successes

- Coaching our partners on sustainability
- Facilitating collaborative projects
Three Goals for Sustainability

Efficiency

Cost Savings $

Reducing Waste

Managing Risk

Growing Profits $

Accounting for Unknown Risks

Business Continuity

Green Products Solutions
Evolution of Sustainability
EcoCloud™: A Place for Collaborative Innovation

- Connect people, information and action
- Platform for collaboration to create robust regional industrial ecology
  - People from businesses, industry experts, academia and civic life
  - Find ways to overcome challenges
- Useful tools and maps
  - Water, Energy and Waste management
- Information on Resources
- Bridge from policy to action
  - Case studies, white papers
- Marketplace for Green Solutions
- Free to become member!
- Additional information
  - http://ecocloud-sv.com
Renewing the Urban Water Infrastructure
Centralized/Decentralized Smart Use & ReUse

Urban Water Infrastructure

Centralized purple-pipe infrastructure

Living Machine – on-site H2O treatment
Otay Border Crossing, San Diego

Spiral Separator
from PARC, Meng Lean

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2012 Events and Projects

• Partner consulting and special projects
• North Bayshore 2030 Planning, City of Mountain View
• World Water Day: Silicon Valley Water Conservation Awards
  March 22, 2012 (with 18 other agencies)

Climate Volatility, Global Trade & Regional Resilience
May 24, 2012 at Santa Clara University

www.sustainablesv.org
# Sustainable Silicon Valley Events

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<thead>
<tr>
<th>Date</th>
<th>Upcoming Sustainable Silicon Valley Events</th>
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<td>March 8</td>
<td>Communication and Employee Engagement @ eBay</td>
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<tr>
<td>March 21</td>
<td>EcoCouncil Salon for Leaders (invitation only) on water @ MS</td>
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<tr>
<td>March 22</td>
<td>Silicon Valley Water Conservation Awards (applications open!)</td>
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<tr>
<td>April 19</td>
<td>Smart Data Centers (Yahoo!, Vantage Data Centers) @ Computer History Museum</td>
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<tr>
<td>May 24</td>
<td>Annual WEST Summit – Climate Volatility, Global Trade and Regional Resiliency @ Santa Clara University</td>
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<tr>
<td>August 23</td>
<td>EcoCouncil Salon for Leaders (invitation only) @ NASA Showcase: Solutions for Planetary Sustainability</td>
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<tr>
<td>Sept 13</td>
<td>Design for Sustainability w/ Stanford Design School @ Silver Spring Networks</td>
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<tr>
<td>Nov. 8</td>
<td>EcoCouncil Salon for Leaders (invitation only) post-election role of Federal, State and International Policy</td>
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Some Resources for Regenerative Capitalism and Regional Resilience

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Thank you for being part of the dialogue

- Give us feedback and ideas
- Attend events, volunteer, become a partner
- Contribute content and guidance
- Invite your friends and colleagues to get involved

Contact Info:

- Marianna Grossman, Executive Director
  (650) 318-3638 x101 mgrossman@sustainablesv.org
  - www.sustainablesv.org
  - http://ecocloud-sv.com/
Climate Change

Atmospheric CO\textsubscript{2} concentration (ppm)

Thousands of years from now

EXTREME: 5000 G Tons CO\textsubscript{2}

MODERATE: 1000 G Tons CO\textsubscript{2}

We Are Here

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Archer, D. Fate of fossil fuel CO\textsubscript{2} in geologic time, 2005
Climate Change

Broad Thermal Peak (10-16 °F rise)

Emissions Peak

C02 Peak (2000ppm)

Sea Level (+ 230 feet)

Extreme 5000 Gigaton Scenario
(after Schmitter et al., 2008)

Year AD

2000 2200 2400 2600 2800 3000 3200 3400 3600 3800 4000

globec.org/products/osm3/presentation

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Shift to Net Zero CO$_2$ Energy by 2050
Stanford University

- Water reduction completed 50 major water efficiency retrofit projects from 2001 through 2008, pushing down average domestic use from 2.7 mgd in 2000–01 to 2.3 mgd in 2007–08, despite campus growth.
- Retrofits in student housing have cut water use by about 120 million gallons annually since 2001—a 37 percent reduction.
- Replacing once-through cooling systems in laboratories with recirculating systems that reuse the cold water has saved about 0.174 mgd.
- Installation of 58 water-saving devices on sterilizers reduced water use by about 0.084 mgd.
- At Stanford dining facilities, replacing standard dishwashers with trough conveyers that constantly recycle water cut water use by about 142 gallons per hour—a 51 percent savings.
- Challenges on reduction of energy use due to the growth of campus buildings
Santa Clara University

- Smart Microgrid to be completed in December 2011
  - Smart buildings to manage energy demand and supply dynamically
  - Can operate independently of grid for business continuity in case of disaster
- Estimated reduction in energy consumption ≈ 50%; 20% cost savings
- 60-collector solar thermal system activated, April 2011. Heating water with solar energy vs. natural gas reducing water-heating bill, offsetting 34 tons of CO₂.
- 1 megawatt solar PV array installation meets 6% of the University's electrical energy needs, 80 tons CO₂ reduction
- Purchase 30,000 MWh of renewable energy through Santa Clara Green Power, prevents > 21,545 tons of CO₂/year annually
- Recycled water for cooling and irrigation
Local Use: Smart Materials

- **Serious Materials**, Sunnyvale based company, EcoRock
  - natural curing process that eliminates energy-intensive oven drying and eliminates mercury
  - 80% recycled material, primarily from steel and cement plants
  - contains no gypsum

- Window retrofit system, iwindow used in the Empire State building
- By 2015, more than 75% of commercial retrofits will incorporate energy efficiency measures, making commercial buildings 20% more energy efficient
Energy Upgrade California

California will lead the nation in reducing the threat of the global climate crisis and create a thriving green energy economy.

- Major push for whole-building energy efficiency measures
- Renewable Portfolio Standard (RPS): 33 percent of the energy produced by all of the state's utilities to come from renewable sources by 2020
- Gov. Brown’s Goal to build 12,000 MW of distributed renewable energy resources statewide — smaller projects built close to where electricity is consumed, creating green jobs
- Reduce GHG energy demand
- Local solar on rooftops, parking lots and vacant lands — vs. massive transmission lines for example, Sunrise Powerlink and distant large-scale solar and wind farms.
Awarded 3 Platinum LEED certifications for building improvements
- From U.S. Green Building Council
- One of most environmentally sound facilities in the world

Reduced consumption of natural resources
- Domestic water by 38%, Landscaping water by 76%
- Electricity by 39%, Natural gas by 41%

Waste management
- Programs divert up to 97% of solid waste from landfills
- Similar programs deployed to over 80 facilities worldwide

Sustainable manufacturing
- Reduction of shipping materials and inventory management
- Scrap recycling
- Safe and respectful working conditions
- Freecycle@Work program enables re-use
  - Over 850 corporations signed up
  - FREE item exchange between sender and receiver
  - Post items you don’t need
  - Find items you need, and reuse
- Reduces Landfill waste
  - Diverts materials from landfills
- Demonstrates their QuickBase product
- Free online application to establish this program at your workplace
  - http://quickbase.intuit.com/freecycle
AlterLume’s Tru-Fit Electronic Bulb

THE DESIGN METHODOLOGY BEHIND AI’S INTELLECTUAL PROPERTY, ALONG WITH EXCLUSIVE TECHNOLOGY PARTNERSHIPS, ENABLES THE HIGHEST PERFORMING, ENERGY EFFICIENT, MOGUL BULB REPLACEMENT IN THE WORLD.
Green Team: Encouraging sustainable commerce
  - Over 2,500 employees and 300,000 customers are members
    - Promoting green business practices, volunteering in communities, supporting environmental legislation

Building a Greener Marketplace
  - Training customers to make greener choices
  - Worked with United Postal Service to introduce Cradle-to-Cradle certified Priority Mail packaging

Greener Campuses
  - Goal to reduce greenhouse gas emissions by 15% by ‘12 over ‘08 emissions

Largest solar system in San Jose providing 650kW power
  - Replacing 18% of utility electric energy

New San Jose headquarters building meets U.S. Green Building Council’s LEED Gold standard
SSV Partner Leadership
Life Scan a Johnson & Johnson company

- Increased use of recycled water
- First industrial facility in Milpitas to establish a recycling water system for cooling towers
- 36% reduction in facility’s potable water use
- 9,500 KWh per year energy reduction for water pump
SSV Partner Leadership
Vantage Data Centers

- Green data centers
- Featuring LEED Platinum buildings
- Advanced energy management systems
- Supports Cloud Computing Services
## Sustainability Throughout Organization

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