

Clean Technology Green Innovation for 21st Century Challenges

OVERVIEW¹

The most serious challenge that we face in the 21st Century is the dangerous rise in global warming. A parallel and related problem is the sharply increasing price of imported oil. Our over-dependence on fossil fuels lies at the root of both of these problems. Government, industry, and investors are now mobilizing an all out effort to address this problem through the development of new technologies aimed at reducing our use of carbon based fossil fuels. The Bay Area is emerging as a major national leader in this burgeoning new field of clean technology.

Benicia is ideally situated to become an important part of the solution to this challenge. The huge space available in our proposed business park, combined with our proximity to UC Berkeley and UC Davis – two of the key cleantech research centers – creates a golden opportunity for Benicia to focus the activities of its business park on the generation of clean technologies which will help reduce carbon emissions while producing new businesses and high quality “green collar” jobs.

GREEN GATEWAY Portal to Clean Technology Innovation

With cleantech as its overarching theme, Benicia's Green Gateway Business Community could become a major Bay Area focal point for developing, testing, and commercializing clean technologies. The high market demand in this sector is projected to continue to increase, even as other sectors of the economy are sagging. Venture capital investments in cleantech have doubled and tripled in just the last 2-3 years. The State of California actively promotes policies (such as AB 32) that curb greenhouse gas emissions, and offers encouragement and support, and many incentives and rewards, for green business initiatives that help to reduce our consumption of fossil fuels.

A business park with clean technology as its central concept and focus (for both its industrial and its commercial uses) would have an enormously positive economic impact on Benicia:

- Thriving and growing cleantech business activity would provide reliable revenue for the city.
- Cleantech offers a wide spectrum of high quality jobs.
- Cleantech provides good job match for Benicia employment demographics, thus improving housing/jobs balance and reducing commuters.
- Economic multiplier effect: the project and its employees would boost sales at other local businesses and keep money re-circulating in local economy.
- Cleantech businesses would not compete with downtown businesses or contribute to urban decay of our downtown business district.

GREEN INNOVATION ZONE

Green Gateway would be much more than simply a collection of industrial facilities and offices focused on cleantech activities. It would be a comprehensive “green innovation zone” with a full spectrum of mutually supportive components grouped into the following areas:

¹ Our Thanks to Doug Henton of Collaborative Economics (www.coecon.com) whose writings have inspired many of the ideas in this model relating to cleantech as the central concept and focus for the business community.

Education and Research Commons

A Conference Center and educational campus would offer space for institutions such as UC Berkeley, Lawrence Berkeley Lab, UC Davis, State colleges, and Solano Community College to create an interdisciplinary gathering place for top global talent from academic, business, technical and policy areas. The commons would be a focal point for active idea exchange, research collaborations, and a wellspring for innovations with potential commercial applications. It would offer comprehensive specialized education and training programs, from green-collar job training to post graduate research.

Green Innovation Test Bed

A combination of shared facilities, equipment, and simulation environments would help researchers and entrepreneurs develop and test their new technologies and products. The clean technology field has greater capital equipment needs than many other fields, so cost effective and accessible use of specialized facilities and equipment is particularly important to support innovation.

Green Business Launching Pad

Venture capital-backed early-stage enterprises would benefit from on-site assistance and use of support services, where they could exchange innovative ideas with other start-ups and larger firms, showcase emerging products for potential investors and other collaborators, and introduce products into the global marketplace.

Anchor Innovator Businesses

Large established businesses would act not only as generators of new technologies and products, but also as technology development partners and early customers for the products of new and smaller firms. These anchor firms would also provide a long term presence that would help accelerate development of the other components of the business park.

Green Exposition Center

An Exposition Center would offer demonstrations of new models, products and processes. There is tremendous opportunity to create a comprehensive, practical demonstration to the general public of how people can use clean technology at home, work, and for transportation. The Expo Center would welcome visitors from the region and worldwide to see and experience these existing and emerging green applications.

THE CASE FOR CLEAN TECHNOLOGY

What is Clean Technology?

Establishing a clear accounting of the growing number of businesses with primary activities in providing environmentally sustainable products and services is challenging. According to Clean Edge, a cleantech research firm, clean technology is “a diverse range of products, services, and processes that harness renewable materials and energy sources, dramatically reduce the use of natural resources, and cut or eliminate emissions and wastes.”

Cleantech businesses span a wide range of industry categories. They provide services designed to,

- Greatly reduce or eliminate negative ecological impact
- Improve the productive and responsible use of natural resources
- Provide superior performance at lower costs.

Cleantech business activities can be broken down by the following broad segments:

- Energy generation
- Energy Storage
- Energy Infrastructure
- Energy Efficiency
- Transportation
- Water & Wastewater

- Air & Environment
- Materials
- Manufacturing/Industrial
- Agriculture
- Recycling & Waste

[Note: to better attract cleantech companies to our business community, cleantech and allowable cleantech uses should be added to our zoning code for Light Industrial districts (IL)]

Clean Technology Jobs

Clean technology jobs can be found in almost every industry sector and they cover a wide spectrum of jobs including skilled labor, management, office support services, engineering, scientific, and more. Two of the largest industry sectors represented by green business establishments are Professional Scientific & Technical Services (representing 36% of the business establishments and 28% of employment), and Manufacturing (representing 15% of the business establishments and 41% of the employment). Retail Trade represents an additional 9% of green business establishments and 3% of employment. ¹

The type of clean technology business park that is envisioned in this model (with its emphasis on science and engineering innovation and collaboration with Universities) would provide an excellent match for Benicia's education and employment demographics. Census 2000 showed that Benicia's population of 27,000 is above average for both income and education, relative to both the County and the State -- 37% of Benicia adults had a bachelor's degree or higher, compared to 27% in California, and 24% nationally. The Census 2000 data also showed that white-collar professions (management, office, sales, etc.) were predominant among the 14,139 employed residents. By far, the largest occupation category for Benicia residents was management/professional/related, consisting of 46% of the total. Most of these residents currently have to commute out of town for work. The 2000 Census only showed 4080 people who lived and worked in Benicia. ²

Cleantech has Strong Market Potential

The Cleantech Network, in a press release for their report called Cleantech Venture Capital: How Public Policy Has Stimulated Private Investment noted that:

Investments in the clean technology sector soared in 2006, as venture capitalists increased investments by 78 percent to \$2.9 billion. Experts say the market is hot amidst concern about global warming, higher energy prices, improved technology, and public policies enacted at the state and national levels. The report also found that cleantech is now the third largest venture investment category, ahead of telecommunications and medical devices. Venture capital investments in the cleantech sector are projected to exceed \$19 billion by 2010 and create up to 500,000 new jobs. However, further public policy initiatives, such as cap-and-trade, a national renewable energy standard, and increased public funding for research and development, are likely to accelerate cleantech investments.

Research Funding and Commercial Applications

UC Berkeley, Lawrence Berkeley Lab, and UC Davis have all been recipients of large amounts of funding, totaling hundreds of millions of dollars, for clean technology development. For example, in Jan. 2007, the Energy Biosciences Institute was established by BP, and UC Berkeley and LBL will receive \$500 million from BP to host the research center dedicated to developing biofuel technologies. Another project at LBL, the Helios Project, is focused on producing the next generation of super-efficient solar energy technology. Governor Schwarzenegger dedicated \$30 million in bonds for that project in Dec. 2006. In April 2008, the UC Davis Energy Efficiency Center received a boost of \$1.1 million in corporate funding to continue its energy efficiency research in areas related to lighting, cooling, transportation, agriculture,

¹ Clean Technology and the Green Economy, March 2008, Collaborative Economics, p.15

² Benicia Economic Development Strategy, Sept.2007. p.2

and biomass.

Much of this innovative research results in products and processes with commercial potential. The UC Davis Center for Entrepreneurship and the Innovation Access Office assists research teams develop their spinoff products into start up businesses at business incubator sites. UC Berkeley and LBL have similar programs and centers to assist in the development of commercial applications for their clean technology research.

Physical Concentration of Clean Technology Activities

Benicia's Green Gateway Research Park could be a physical focal point that provides a "magnet" for talent, companies, and investment. The Park could potentially accelerate the emergence of a cleantech Green Corridor along the East Bay and in the greater Sacramento region.

The concentration of clean technology related activities in a physical hub is important for several reasons:

Visibility. The Park could provide a tangible, visible showcase for potential innovators, investors, and companies. It would help provide a focal point for the media doing stories on clean technology innovation in the region.

Shared equipment and facilities. Clean technology tends to be capital intensive, requiring access to specialized technical equipment for development and testing. For example, the Bay Area solar industry lacks nearby and timely access to testing facilities. The closest testing facility is at Arizona State University and has a six-month waiting list. Access to shared equipment and facilities in one location could not only serve the firms that are currently in the Bay Area, but act as a magnet to draw new companies.

Unplanned innovation. A physical hub of research, development, testing and commercialization for clean technology provides an opportunity for entrepreneurs, investors, technical talent, and others to have unplanned encounters that spark new ideas, partnerships, and business models.

COMPONENTS OF THE GREEN INNOVATION ZONE

The Green Gateway Business Community would consist of five components which together would create a multi-faceted "green innovation zone" – a visible, focal point for clean technology and application in Benicia.

Education and Research Commons

The education and research commons would include a full range of institutions including UC Berkeley, LBL, UC Davis, Sacramento State University, Solano Junior College, and others, who would create an interdisciplinary gathering place for top global talent from academic, business, technical and policy areas. The commons would be a focal point for active idea exchange, research collaborations, specialized education and training of talent and a wellspring for innovations with potential commercial applications. It would offer comprehensive specialized education and training programs, from green-collar job training to post graduate research. The synergy from multiple institutions having presence there could provide an environment for cross-fertilization, a collaborative environment for generating new ideas—a free and open environment to experiment and see what sticks.

Green Innovation Test Bed

A Green Innovation test bed would be a combination of shared facilities, equipment, and simulation environments would help researchers and entrepreneurs develop and test their new technologies and products. The clean technology field has greater capital equipment needs than many other fields, so cost effective and accessible use of specialized facilities and equipment is particularly important to support innovation. No other region has yet assembled the range of equipment and facilities in one place to provide a comprehensive test bed for new clean technology innovations.

The Bay Area's emerging solar technology industry already urgently needs testing and certification facilities closer to the Bay Area – and could benefit immediately from early development of such a facility. U.S. market testing is currently performed at one location, Arizona State University's Photovoltaic Testing Facility. These tests can take six months or longer. By establishing a second testing facility at Benicia's Green Gateway, it would establish Benicia as a hub of the solar industry, act as a magnet to attract innovators and their companies, as well as help firms move more quickly to market.

Green Business Launching Pad

A green business launching pad would be where venture capital-backed early-stage enterprises benefit from on-site assistance and use of support services, exchange innovative ideas with other start-ups and larger firms, showcase emerging products for potential investors and other collaborators, and introduce products into the global marketplace.

The launching pad could go beyond the traditional incubator model. It could not only provide relatively low-cost space, but on-site access to venture capitalists who have satellite offices at the Park, as well as top researchers from around the world, large company decision-makers and mentors, and business support services. They could arrange for use of expensive and specialized development and test equipment and prototype fabrication facilities—much like researchers sign up for time on the Hubble Telescope.



Anchor Innovation Businesses

In addition to new enterprises, the Zone needs larger established businesses would act not only as generators of new technologies and products, but also as technology development partners and early customers for the products of new and smaller firms. These anchor firms would also provide a long term presence that would help accelerate development of the other components of the Green Gateway Business Community.

Green Gateway Business Community could become the Bay Area's new neighborhood for established companies that are becoming new players in clean tech. Firms can establish R&D, as well as prototype fabrication facilities. Larger firms would be attracted to the prospect of access to talent, small entrepreneurial companies (who could be partners or acquisitions), and the exchange of ideas that would be created by the interplay of the components of the Green Innovation Zone.

Green Exposition Center

An Exposition Center would offer demonstrations of new models, products and processes. There is tremendous opportunity to create a comprehensive, practical demonstration to the general public of how people can use clean technology at home, work, and for transportation. For example, the Zone can demonstrate "state of the art" smart buildings and green materials, how to create affordable green housing, and welcome visitors from the region and worldwide to see and experience these existing and emerging green applications. Quite possibly, the Expo Center could even become a tourist destination.

IMPLEMENTATION STRATEGY

Achieving this bold vision would require a concerted public-private partnership with strong city and community leadership and creative thinking. Active private sector participation would be essential in each component of this vision. But first the city must set the right conditions and environment for investment, such as establishing revised zoning language that clearly includes cleantech uses, and a developing a detailed Specific Plan for the site.

All reports confirm that there is strong interest in investment in cleantech, and a growing need for a

comprehensive magnet site – a clean technology hub – (particularly in the East Bay/ Capital Corridor region) that would provide an all-in-one location for cleantech industry, commerce, R&D, and education to congregate in one place, providing mutual support and stimulation. But in order to attract that investment to Benicia and recruit businesses and educational institutions, various steps must be taken, with each step providing conditions for the next.

We recommend the following suggested steps:

Launch Green Innovation Zone Working Group.

This group would act as the catalyst to advance the concept, and would include key drivers and stakeholders from the city staff and the community, the developer, the Universities, and other early supporters. The Working Group should be assigned both dedicated staff and resources to advance the concept.

Widely communicate the concept, identifying potential champions.

The Working Group would share the concept to raise the visibility of the effort, inviting additional ideas from potential investors and participants. The Group could organize op/ed pieces and other media coverage, as well as host a signature event, showcasing the possibility of a green innovation zone. In the process, the Group would build a list of champions, aligning university, philanthropic, and corporate interests (technology companies, venture capitalists, etc.) with each of the five specific components of the green innovation zone. At the same time, the Group would broad based community support for the concept.

Build momentum with early wins.

Based on investment trends and Benicia’s unique resources, perhaps the most immediate opportunity lies in becoming an East Bay/Solano County focal point for wind and solar technology innovation. Early momentum can be built by developing “letters of intent” with established anchor companies, VCs, start-ups, R&D institutions, and others indicating their interest in being part of the green innovation zone.

Create Green Innovation Zone Leadership Group.

To achieve this vision, it is recommended that a Green Innovation Zone Leadership Group be established to help develop and implement a business plan for the Green Gateway Park. This Leadership Group would include business leaders, venture capitalists,



and government officials. Based on the initial communication and outreach activities, the Working Group would recruit public and private leaders to serve on the Green Innovation Zone Leadership Group. The Working Group should provide the support to the Leadership Group as it reviews and refines the concept and develops a business plan for development of the site.

Prepare Green Gateway for private investment.

The Leadership Group must take steps to create the conditions for and remove the obstacles to development. To build support, progress will need to be made to demonstrate that obstacles to development (e.g., financing, access, environmental, and infrastructure concerns) are manageable. At the same time, by building momentum for the concept as outlined above, there can be greater urgency to address key issues and obstacles and prepare Green Gateway for successful development.